Final

Garage Maintenance Area
(Locomotive Building Area)
Site Characterization Report

Former Plum Brook Ordnance Works
Sandusky, Ohio

Prepared for:

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Submittal of the Final Site Characterization Report for Garage Maintenance Area (Locomotive Building Area) Former Plum Brook Ordnance Works, Sandusky, Ohio Contract No. W912QR-08-D-0013: Shaw Project Number 133767

Dear Ms. McClanahan:

In accordance with the requirements of Delivery Order No. DX06 of Contract No. W912QR-08-D-0013, Shaw is pleased to submit the Final Site Characterization Report for the work that was conducted at the Garage Maintenance Area (Locomotive Building Area) at the Former Plum Brook Ordnance Works (PBOW) located in Sandusky, Ohio.

Enclosed are four copies of this final report. Copies have also been sent to those on the distribution list, as indicated, for their records. As requested, the document was sent to the Center of Expertise and the RAB in electronic format only.

Should you have any questions or require additional information regarding this submittal, please do not hesitate to contact me at (865) 694-7496.

Sincerely,

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List of Acronyms

bgs	below ground surface
BHHRA	baseline human health risk assessment
BSC	background screening concentrations
D&M	Dames and Moore, Inc.
DNT	dinitrotoluene
DOD	U.S. Department of Defense
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FD	field duplicate
FS	field split
gpm	gallons per minute
GPR	ground-penetrating radar
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radiological waste
ID	inside diameter
IDW	investigation-derived waste
ILCR	incremental lifetime cancer risk
IT	IT Corporation
LBA	Locomotive Building Area
LS	Locomotive Shop
msl	mean sea level
NASA	National Aeronautics and Space Administration
NT	nitrotoluene
NTU	nephelometric turbidity unit
OD	outside diameter
ORP	oxidation-reduction potential
PBOW	Plum Brook Ordnance Works
PBS	Plum Brook Station
PCB	polychlorinated biphenyl
PETN	pentolite
ppb	parts per billion
ppm	parts per million
PRG	preliminary remediation goal

List of Acronyms *(Continued)*

PVC	polyvinyl chloride
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RBSC	risk-based screening concentrations
RCA	Rail Car Washing Area
RI	remedial investigation
Shaw	Shaw Environmental, Inc.
SI	site investigation
SLERA	screening-level ecological risk assessment
SOW	scope of work
SVOC	semivolatile organic compound
SWSAP	sitewide sampling and analysis plan
SWSHP	sitewide safety and health plan
TAL	target analyte list
TCL	target compound list
TNT	trinitrotoluene
TNTA	TNT Area A
TNTB	TNT Area B
TNTC	TNT Area C
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound

Executive Summary

The U.S. Army Corps of Engineers (USACE) is investigating the former Plum Brook Ordnance Works (PBOW), located in Sandusky, Erie County, Ohio, under the Defense Environmental Restoration Program's Formerly Used Defense Sites authorization and funding. The PBOW site was used for the manufacture of explosives during World War II. The former PBOW site is currently operated and maintained by the National Aeronautics and Space Administration (NASA) as Plum Brook Station, an active testing and research installation associated with NASA's John Glenn Research Center of Cleveland, Ohio. USACE contracted Shaw Environmental, Inc. (Shaw) to conduct a remedial investigation (RI) of the Garage and Maintenance Area located in the central portion of the PBOW facility. The main garage and vehicle maintenance shop portion of the Garage and Maintenance Area has been and is currently in use by NASA and thus was not part of this investigation. This investigation focused on the eastern portion of the Garage and Maintenance Area known as the Locomotive Building Area (LBA) which is composed of the Locomotive Shop (LS) with its surrounding area and the Rail Car Washing Area (RCA). The LS was used for maintenance of equipment, vehicles, and railcars, and the former RCA was used for rinsing acid out of railcars. Chemical contamination that may have resulted from operations at the LS and RCA are expected to be primarily volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals.

This Site Characterization Report is Volume 1 of a three-volume RI report set for the LBA and details RI activities, including soil, groundwater, sediment, and surface water analytical results along with recommendations. Volume 2 is a Baseline Human Health Risk Assessment (BHHRA) Report and Volume 3 is a Screening-Level Ecological Risk Assessment (SLERA) Report, both to be submitted under separate cover.

In 1999, a limited site investigation (SI) was conducted of the surface and subsurface soil within the LBA. Two surface and 10 subsurface soil samples were collected from 6 borings and analyzed for SVOCs, polychlorinated biphenyls (PCB), and target analyte list (TAL) metals. Samples were not analyzed for nitroaromatics or VOCs. Laboratory results were compared to U.S. Environmental Protection Agency (EPA) preliminary remediation goals (PRGs). One of the samples came from the maintenance pit in the LS; its concentrations for antimony, arsenic, chromium, iron, lead, and PCB exceeded PRGs. This maintenance pit sample was not truly soil, but was composed of crushed limestone and associated fines that

were evidently stained with petroleum-related materials and was collected from the lining of the maintenance pit sump. For the other soil samples, no SVOCs were detected above PRGs, arsenic was detected above its PRG in all 11 samples, iron was detected above its PRG in only 6 samples and one sample (also from the LS) exhibited chromium and lead above their PRG. Analytical results from a water sample collected from the sump inside of the locomotive building also had concentrations of Aroclor 1260, antimony, arsenic, iron, and lead above the PRGs. However, a water sample from the wastewater junction box outside the LS had only lead above PRGs. A surface water sample and a sediment sample were collected from the open ditch to the east of the LS, each was analyzed for SVOCs and metals. No SVOCs were detected in either the surface water or the sediment and no metals were detected above PRGs in the water. Arsenic and iron were detected in the sediment sample above PRG levels. The SI concluded that contamination was present at the LBA. The SI recommended removal and disposal of water in the sump in the LS, removal of sludge from the maintenance pit sump, and additional evaluation of soil at the RCA.

RI activities were conducted by Shaw at the LBA in 2009. A geophysical survey was completed as a means for locating and mapping the suspected presence of an underground storage tank (UST) in the vicinity of the existing locomotive building. The geophysical survey concluded that there is/are no buried UST(s) within a perimeter of 65 feet surrounding the locomotive building.

The 2009 RI included eighteen direct-push borings: seven in the area surrounding the LS, three in the former maintenance pit (MP) within the LS, and eight at the RCA. Five of the borings at the LS (borings surrounding the LS) and four of the borings at the RCA became temporary piezometer installations. Surface water and collocated sediment samples were collected from seven locations within the unnamed drainage ditch located between the LS and the RCA, the same ditch that was sampled in the SI. Three overburden/shale groundwater monitoring wells were installed at each area in locations upgradient, downgradient, and within the source area based upon groundwater flow directions. Two bedrock groundwater monitoring wells were installed at the LS (existing well IT-MNTA-BEDGW-001 was the upgradient bedrock well at the LS) and three bedrock groundwater monitoring wells were installed at the RCA.

The analytical results for the various media were compared to risk-based screening concentrations (RBSC) derived from EPA 2009 regional screening levels for a residential land-use scenario. In addition, the analytical results for the metals in the soil samples were compared to 1998 soil background screening concentrations (BSC) and results for metals in the

groundwater samples were compared to 2005 groundwater BSCs. Background levels for the surface water and sediments have not been determined.

MAINTANENCE PIT

Maintanence Pit Fill Material. At the maintenance pit, three samples of the pit fill material were collected from three direct-push borings. Each boring was drilled to refusal at 4.9 feet below the surface level of fill material in the pit. This is consistent with the designed depth of the pit (5 feet) reported in the SI report. The refusal material could not be confirmed, but the pit is evidently lined with concrete or some other impervious material. Each pit sample was collected from approximately 3 to 4.5 feet below the surface level of fill material in the pit. VOCs were not analyzed from these samples due to the sample matrix consisting mostly of gravel; however, TCL SVOCs, nitroaromatics, PCBs, and TAL metals were analyzed.

A weathered petroleum odor was encountered in boring SB-09 which was drilled within 5-feet of the 1999 SI boring DP-01, which was collected at an interval of 6 to 7.5 feet bgs from a sump at the bottom of the maintenance pit. No organic compounds other than a low level of Aroclor 1260 (0.45 mg/kg) were detected in sample DP-01. However, this borehole was reported to have a strong petroleum odor. The sample from DP-01 exhibited strong matrix interference during analysis and had to be diluted 50-fold. The sample also had a high organic carbon content (13,000 mg/kg). Elevated petroleum contaminated material found in DP-01 was not observed in borings SB-07, SB-08, or SB-09 or reflected in the analytical results. However, a petroleum odor was noted at SB-09, which was drilled within a few feet of DP01. Therefore, the petroleum contamination encountered during the 1999 SI investigation appears to be limited to the vicinity of the maintenance pit sump and is not present throughout the pit. The maintenance pit sump drains into a sump basin that is approximately 40 feet south of the maintenance pit and just inside the Locomotive Shop.

No nitroaromatics were detected in the pit samples. SVOCs were detected with benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeding their RBSCs. No PCBs were detected in the pit samples. No metals were detected above both RBSC and BSC values. A total of five metals (aluminum, arsenic, chromium, iron, and manganese) were detected above RBSCs and a total of three (beryllium, calcium, and magnesium) were detected above BSCs. Metals detected within the maintenance pit samples above the RBSCs are only representative of the fill material and material that has accumulated within the pit.

LOCOMOTIVE SHOP

Soil. At the LS, including quality assurance/quality control samples (QA/QC), 20 soil samples were collected from five direct-push borings: seven representative of surface soil (0 to 1 foot), five from soil 3 to 5 feet below ground surface (bgs) and five from soil 8 to 10 feet bgs. Each soil sample was analyzed for target compound list (TCL) VOCs, TCL SVOCs, nitroaromatics, and TAL metals. In addition, the surface soil and 3 to 5 feet bgs samples were analyzed for PCBs and one surface soil sample was analyzed for total organic carbon (TOC).

No nitroaromatics exceed an RBSC in the surface soil. Two nitroaromatics (2,4-DNT and 2,6-DNT) were detected above the RBSCs in subsurface soil (boring LBA-SB02). VOCs were detected in the surface and subsurface soil samples at the LS; however, none of the detected compounds exceeded an RBSC. SVOCs were detected in surface soil but, only benzo[a]pyrene exceeded its RBSC and that was in only one location (LBA-SB03). SVOCs exceeding RBSCs including benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, 2,4-DNT and 2,6-DNT were detected in several subsurface samples. The PCB Aroclor 1260 exceeded the RBSC in one surface soil sample (boring LBA-SB03). No PCBs were detected in the subsurface soil samples. No metals were detected above both RBSC and BSC values. A total of six metals (aluminum, arsenic, chromium, cobalt, iron, and manganese) were detected above RBSCs and a total of five (beryllium, calcium, lead, magnesium, and mercury) were detected above BSCs. Beryllium is not a metal associated either with the TNT manufacturing process or typical maintenance activities. In addition, beryllium appears to be elevated relative to BSCs throughout this area and likely represents the upper range of its concentration in natural soil. In addition, the nutritionally essential calcium and magnesium were detected above BSC levels (as nutritionally essential elements they lack RBSC values).

Piezometer Groundwater. Seven overburden/shale groundwater samples (including QA/QC) were collected from temporary piezometers PZ-01 through PZ-05 by low-flow methods and analyzed for TCL VOCs, TCL SVOCs, nitroaromatics, TAL metals (filtered and unfiltered), TOC, total cyanide, and water quality parameters. Seven nitroaromatics were detected in the groundwater in the LBA piezometers; however, only four compounds exceed the RBSCs (2,4-DNT, 2,6-DNT, 2-NT, and 3-NT). Eight VOCs were detected in the LBA piezometers; however, only three compounds exceed the RBSCs (1,1-dichloroethane, naphthalene, and trichloroethene). Two SVOCs were detected in the piezometers and both exceeded the RBSCs (2,4-DNT and

2,6-DNT). Eighteen unfiltered metals were detected in the LS piezometers; however, only 10 exceeded the RBSCs and seven exceeded BSC values. In filtered samples, ten metals were detected, three exceeded the RBSC and one exceeded the BSC. Only arsenic exceeded both the RBSC and BSC but only in two samples.

Overburden/Shale Groundwater. Monitoring well sampling from upgradient well (LBA-MW03), source area well (LBA-MW02), and downgradient well (LBA-MW01) occurred at the LS in May (wet season) and November (dry season) of 2009. Monitoring well samples were analyzed for the same parameters as the piezometer samples: TCL VOCs, TCL SVOCs, nitroaromatics, TAL metals (filtered and unfiltered), TOC, total cyanide, and water quality parameters.

A total of nine nitroaromatics were detected in the groundwater in LBA overburden/shale monitoring wells during both sampling events; however, only six compounds exceeded RBSC values (2,4-DNT, 2,6-DNT, nitrobenzene, 2-NT, 3-NT, and 4-NT). Seven VOCs were detected and three of the compounds were above RBSC values; carbon tetrachloride, 1,1-dichloroethane, and trichloroethene. Three SVOCs were detected in the groundwater; however, only two compounds exceeded the RBSC values (2,4-DNT and 2,6-DNT). From the thirteen unfiltered metals detected, manganese was the only compound to exceed RBSCs and aluminum was the only compound to exceed the BSCs. Twelve filtered metals were detected and only manganese exceeded its RBSCs. No compounds were above their BSC values.

Bedrock Groundwater. Monitoring well sampling from existing, upgradient well (MNTA-BEDGW-001), source area well (LBA-BEDGW-002), and downgradient well (LBA-BEDGW-001) occurred at the LS in May (wet season) and November (dry season) of 2009. No nitroaromatics were detected in the groundwater from bedrock monitoring wells at the LS. Twelve VOCs were detected in the groundwater from the bedrock monitoring wells with eight exceeding RBSCs. Benzene, ethylbenzene, toluene, and total xylenes associated with natural petroleum (petroleum from the Delaware bedrock groundwater determined to be from a natural source based on a 2007 NASA fingerprint analysis) in the bedrock were detected at the highest concentrations. Chloroform, chloromethane, methylene chloride and 1,1,2,2-tetrachloroethane were also detected above RBSCs. Two SVOCs (2-methylnapthalene and naphthalene) were detected above RBSCs. With the exception of chloroform and 1,1,2,2-tetrachloroethane, the organics detected are likely attributable to natural petroleum in the bedrock. Arsenic, iron and manganese exceeded both RBSCs and BSCs in filtered and/or unfiltered samples and barium

exceeded only the RBSC in the filtered and unfiltered samples. The elevated concentration of metals is likely attributable to the strongly reducing conditions in the bedrock and are not site related.

Evaluation of analytical results from upgradient, source area and downgradient overburden/shale wells suggest that limited impact has occurred. Nitroaromatics were detected in source area soils and also in overburden/shale wells at the LS. Consistent with other PBOW sites, the nitroaromatic contamination in overburden/shale groundwater is restricted to source area wells implying limited lateral movement in groundwater. In addition, 1,1,2,2-tetrachloroethane was detected in bedrock groundwater at low concentrations suggesting some communication between the overlying overburden/shale and bedrock groundwater. The lack of nitroaromatics in bedrock groundwater suggests that these compounds are being degraded by the strongly reducing conditions.

RAIL CAR WASHING AREA

Soil. At the RCA including QA/QC, 16 soil samples were collected from 4 direct-push borings: 6 representative of surface soil (0 to 1 foot), 4 from soil 3 to 5 feet bgs and 6 from soil 8 to 10 feet bgs. Each soil sample was analyzed for TCL VOCs, TCL SVOCs, nitroaromatics, and TAL metals. In addition, the surface soil and 3 to 5 feet bgs samples were analyzed for PCBs and one surface soil sample was analyzed for TOC.

Only one nitroaromatic (2,4-DNT) exceeded an RBSC in surface soil (LBA-SB11). Four nitroaromatics (2,4-DNT, 2,6-DNT, 2-NT, and 3-NT) were detected above the RBSCs in subsurface soil (boring LBA-SB11). VOCs were detected in the surface and subsurface soil samples; however, none exceeded an RBSC. Two SVOC's were detected in the subsurface soil samples. 2,4-DNT and 2,6-DNT were both detected in SB11 above the RBSCs. The PCB Aroclor 1221 exceeded RBSC in one surface soil sample (boring SB-12) while no PCBs exceeded RBSC in the subsurface soil. No metals were detected above both RBSC and BSC values. A total of six metals (aluminum, arsenic, chromium, cobalt, iron, and manganese) were detected above RBSCs and two (beryllium and magnesium) were detected above BSCs.

Piezometer Groundwater. Four piezometers PZ-07, PZ-08, PZ-09, and PZ-10 were installed at the RCA but due to insufficient yield, no groundwater samples were collected.

Overburden/Shale Groundwater. Monitoring well sampling from upgradient well (RCA-MW01), source area well (RCA-MW02), and downgradient well (RCA-MW03) occurred at the RCA in May (wet season) and November (dry season) of 2009. The monitoring well samples were analyzed for: TCL VOCs, TCL SVOCs, nitroaromatics, TAL metals (filtered and unfiltered), TOC, total cyanide, and water quality parameters.

Analytical conclusions from the May and November 2009 overburden/shale groundwater sampling at the RCA, showed a total of three nitroaromatics (2,4-DNT, 2,6-DNT and 2-NT) were detected above RBSCs in groundwater in the RCA overburden/shale monitoring wells. The VOC dibromochlormethane was the only VOC detected above RBSCs. SVOCs were not detected in any samples. Chromium, cobalt, iron, and manganese exceeded RBSCs in the unfiltered samples and aluminum, iron, and nickel were above BSC values. Cobalt and manganese exceeded the RBSCs in the filtered samples and nickel was above the BSC in one sample. Iron was the only analyte to exceed both the RBSC and BSC and that in only one unfiltered sample during the dry sampling season.

Bedrock Groundwater. Monitoring well sampling from upgradient well (RCA-BEDGW-001), source area well (RCA-BEDGW-002), and downgradient well (RCA-BEDGW-003) was attempted at the RCA in May and November 2009. Due to insufficient yield, only one bedrock well was able to be sampled at the RCA. Nitroaromatics were not detected. Seven VOCs were detected in the groundwater from the bedrock monitoring well with four exceeding RBSCs. Benzene, ethylbenzene, toluene and xylene associated with natural petroleum in the bedrock were detected at the highest concentrations with all but toluene exceeding RBSCs. In addition, 1,1,2,2-tetrachloroethane was also detected above RBSCs. Arsenic and manganese exceeded both RBSCs and BSCs in filtered and unfiltered samples. As with the LS, the elevated concentration of benzene, ethylbenzene, toluene and xylenes are likely attributable to the natural petroleum in the bedrock as well as the strongly reducing conditions in the bedrock and are not site related.

Evaluation of analytical results from upgradient, source area and downgradient overburden/shale wells suggest that limited impact has occurred. As noted above, nitroaromatics were detected in source area soils and also in overburden/shale wells at the RCA. Consistent with other PBOW sites, the nitroaromatic contamination in overburden/shale groundwater is restricted to source area wells implying limited lateral movement in groundwater. In addition, 1,1,2,2-tetrachloroethane was detected in bedrock groundwater at low concentrations suggesting some

communication between the overlying overburden/shale and bedrock groundwater. The lack of nitroaromatics in bedrock groundwater suggests that these compounds are being degraded by the strongly reducing conditions.

Drainage Ditch Between LS and RCA

Surface Water. Nine surface water samples (includes QA/QC samples) were collected from the unnamed drainage ditch dividing the LS and RCA. Samples were analyzed for nitroaromatics, VOCs, SVOCs, TAL metals, PCBs, and water quality readings (ORP, pH, conductivity, turbidity, dissolved oxygen, and temperature). Nitroaromatics, SVOCs, PCBs and VOCs were not detected above RBSC values. Metals detected above the RBSC values include arsenic, chromium, cobalt, iron, lead, and manganese. The elevated metals are likely in part the result of degradation of culverts beneath Maintenance Road. With the exception of manganese, the maximum detected concentration of metals in surface water was detected in swales located adjacent to Maintenance Road below a culvert outfall.

Sediment. Eight sediment samples (includes QA/QC samples) were collected from collocated locations with the surface water samples from the unnamed drainage ditch. No nitroaromatics or PCBs were detected in any of the samples. Three VOCs and four SVOCs were detected; however, none of the compounds exceeded an RBSC. A total of 21 metals were detected in the sediment samples. Most of the metals were found in each of the sediment samples collected. The only metals above RBSC values were arsenic, chromium, cobalt, and manganese.

Recommendations

- To obtain further groundwater flow information and more detailed coverage, selected overburden/shale and bedrock monitoring wells at the LBA should be included in site-wide groundwater level measurement activities.

- Further evaluation of nitroaromatics in the soil at the RCA, including that to be performed in the BHHRA and SLERA, is warranted given the presence of 2,4-DNT, 2,6-DNT, 2-NT, and 3-NT in the vicinity of LBA-SB11above RBSCs. Note that while comparison of analytical results to RBSCs and BSCs values provides some context for the levels of site contamination, final recommendation for further site activities is dependent on conclusions from the BHHRA and SLERA reports, which are currently under preparation.

- Further evaluation of nitroaromatics in the overburden/shale groundwater (LS monitoring well LBA-MW02) and VOCs (LS monitoring wells LBA-MW02 and LBA-MW03), including that to be performed in the BHHRA, may be warranted given the presence of 2,4-DNT, 2,6-DNT, 2-NT, 3-NT, 1,1-dichloroethane, and trichloroethene above RBSCs in overburden/shale groundwater. Note that while comparison of analytical results to RBSCs and BSCs values provides some context for the levels of site contamination, final recommendation for further site activities is also dependent on conclusions from the BHHRA and SLERA reports, which are currently under preparation.

- Maintenance pit sample LBA-SB09 appeared to be petroleum stained and a petroleum odor was noted during sample collection. LBA-SB09 was collected near the location of SI maintenance pit sample DP01 which was actually collected in a sump within the maintenance pit. As with LBA-SB09 a heavy petroleum odor was noted during sample collection and the sample was reported to appear oil-stained. Further evaluation of the maintenance pit should be considered by the Project Delivery Team.

Planned Activities. Completion of the BHHRA and SLERA reports may address some of the items in the preceding recommendations.

1.0 Introduction

The U.S. Army is conducting a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) response action at a property previously owned by the U.S. Department of Defense, identified as the former Plum Brook Ordnance Works (PBOW) and located in Sandusky, Erie County, Ohio. The PBOW site is currently being investigated under the Defense Environmental Restoration Program for Formerly Used Defense Sites. This portion of the overall PBOW response action is currently in the remedial investigative (RI) phase for the Garage and Maintenance Area, which includes the Locomotive Building Area (LBA), and is being conducted to determine if there has been a release of hazardous substances, pollutants or contaminants that present an unacceptable risk to human health and the environment. The former 9,000-acre PBOW site was used for the manufacture of nitroaromatics during World War II. The National Aeronautics and Space Administration (NASA) operates and maintains the site as the Plum Brook Station (PBS) of the John Glenn Research Center. Figure 1-1 shows the geographical location of the former PBOW site.

The investigation is being managed and technically overseen by the Nashville, Tennessee, and Huntington, West Virginia, District Offices of the U.S. Army Corps of Engineers (USACE). Fieldwork and reporting for the LBA which is located in the eastern portion of the Garage and Maintenance Area, is performed under Delivery Order DX05 for the USACE Louisville Architecture/Engineering Environmental Services Indefinite Delivery/Indefinite Quantity, Contract Number W912DR-08-D-0013. Shaw Environmental, Inc. (Shaw) was contracted by the USACE Nashville District to conduct an RI of the soil, groundwater, surface water, and sediment at the former LBA.

This Site Characterization Report (SCR) of the LBA is Volume 1 of three planned volumes. Volume 1 consists of the text, tables, figures, and appendices presenting final evaluations, conclusions, and recommendations for the LBA RI. Background and risk-based screening criteria (Section 4.2) are used as a comparison and evaluation tool for analytical results. Volume 2 will be the baseline human health risk assessment (BHHRA) and Volume 3 will be a screening-level ecological risk assessment (SLERA). Each volume will be submitted under separate covers. The BHHRA and SLERA reports will be prepared by Shaw and will describe potential human health and ecological risks/hazards with respect to the investigation area.

Groundwater sampling at the LBA was conducted to determine the overburden/shale and bedrock groundwater chemical quality along with other objectives as listed in Section 1.1. To

determine if water quality could be affected by seasonal changes, groundwater sampling was timed to monitor potential seasonal precipitation fluxes. As concluded in the *2004 Groundwater Data Summary and Evaluation Report* (Shaw, 2005), by evaluating precipitation data specifically in the Sandusky area, two general seasons were determined to exist in reference to groundwater recharge: a wet season (January through June) and a dry season (July through December) (Shaw, 2005).

The field activities completed by Shaw for investigation of the LBA were conducted pursuant to the following documents:

General Site Activities

- *Site-Wide Accident Prevention Plan and Site-Wide Health and Safety Plan Appendix* (Shaw, 2008a)
- *Site-Wide Sampling and Analysis Plan* (Shaw, 2008b)
- *Site-Wide Quality Assurance Project Plan* (Shaw, 2008c).

Site-Specific Activities

- Work Plan, Remedial Investigation, Locomotive Building Area, Site-Specific Sampling and Analysis Plan, and Site-Specific Safety and Health Plan, (Shaw, 2008a).

1.1 Scope of Work and Project Objectives

The scope of the RI included preparation of a quality control (QC) plan and site-specific addenda to the sitewide safety and health plan (SWSHP) and sitewide sampling and analysis plan (SWSAP), soil sampling, installation of temporary piezometers and permanent monitoring wells, monitoring well development, groundwater sampling, analytical work, and investigation-derived waste (IDW) management and disposal. Figure 1-2 identifies the LBA location in relation to other areas of concern and site features. The LBA actually consists of three investigation areas; the maintenance pit within the Locomotive Shop (LS), the area surrounding the LS west of an unnamed drainage ditch, and the Rail Car Washing Area (RCA) located directly east of the LS on the eastern side of the unnamed drainage ditch.

The objectives of this investigation include the following:

- Evaluate and use existing data appropriate to the LBA.
- Define site physical features and characteristics.
- Determine nature and extent of DOD-related contamination in soil, sediment, surface water, and groundwater at the LBA.
- Determine chemical characteristics of contamination.
- Evaluate fate and transport of contamination.
- Determine if overburden groundwater underlying the LBA is in sufficient volume and quality to be defined as a potential drinking water source in the state of Ohio.
- Obtain site data of quality, quantity, and distribution appropriate for site characterization, risk assessment, and feasibility study.

1.2 Report Organization

Chapter 2.0 of this report describes PBOW and the LBA site, its physical setting, geology, and hydrogeology features. Sampling strategy and field procedures are described in Chapter 3.0. The analytical program and background comparison data are presented in Chapter 4.0. Chapter 5.0 describes specific-site information and historical and current analytical data. Chapter 6.0 presents media conclusions. Recommendations are provided in Chapter 7.0. References that were used in preparing the report are listed in Chapter 8.0.

A geophysical investigation report is included in Appendix A. Soil boring, monitoring well drill logs, well construction diagrams, sample collection logs, and rock core photographs are provided in Appendices B, C, and D, respectively. Well development water photographs and logs are included in Appendix E. Appendix F contains land survey data. Appendix G presents copies of waste manifests used for disposal of the IDW. Appendices H through K contain analytical data pertinent to the soil sampling and two groundwater (May and November 2009) sampling events. Appendix L presents the chains of custody for laboratory analysis. Appendix M provides incoming comments and responses.

1.3 Facility Location and Description

The former PBOW site is currently utilized and maintained by NASA and is operated as the PBS, a satellite office of the NASA John Glenn Research Center, located at Lewis Field in Cleveland, Ohio. Most of the aerospace testing facilities built at the site in the 1960s are on standby or inactive status. The site is located approximately 4 miles south of Sandusky, Ohio, and 59 miles west of Cleveland. Although primarily in Perkins and Oxford Townships, the eastern edge of the site extends into Huron and Milan Townships. PBOW is bounded on the north by Bogart Road, on the south by Mason Road, on the west by Patten Tract Road, and on the east by U.S Highway 250. The areas surrounding PBOW are mostly agricultural and residential. Public access is restricted at PBOW except during the annual deer hunting season.

1.4 PBOW Site History and Potential for Contamination

The PBOW site was built in early 1941 and manufactured 2,4,6- trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite (PETN). Production of explosives began in December 1941 and continued until 1945. During operation, three areas (TNT Area A [TNTA], TNT Area B [TNTB], and TNT Area C [TNTC]) manufactured TNT and DNT and one area manufactured PETN. TNTA consisted of manufacturing lines 1 through 4, TNTB consisted of lines 5 through 7, and TNTC consisted of lines 8 through 12. TNTA is located on the northeast side of PBOW, TNTB is located at the southern central part, and TNTC is located at the southwestern side of PBOW. The PETN manufacturing area is located in the north-central portion of PBOW and lies within the boundaries of Ransom Road on the west, Pentolite Road on the south, and Patrol Road on the north and east. The central portion of the former PETN manufacturing area is occupied by NASA's inactive nuclear reactor, which is in the process of being decommissioned.

It is estimated that more than one billion pounds of explosives were manufactured during the 4-year operating period. After the plant was shut down, decontamination of the processing lines began. Decontamination was considered complete during the last quarter of 1945. The property was initially transferred to the Ordnance Department after it was certified by the Army to be decontaminated in 1946. This transfer did not include the 2,800 acres comprising the Plum Brook Depot area. The War Assets Administration accepted custody of the non-depot portion of PBOW (approximately 3,230 acres) in 1946. The Department of the Army reacquired the 3,230 acres in 1954 and performed cleanup efforts during the 1950s through 1963.

Two property use agreements were entered into by the National Advisory Committee of Aeronautics, the predecessor of NASA, and the Army in 1956 and 1958. On March 15, 1963,

accountability for and custody of the entire PBOW property (6,030 acres) was transferred to NASA by the Department of the Army. NASA performed further decontamination during 1964. The NASA decontamination process was accomplished in five steps (Dames and Moore, Inc. [D&M], 1997a):

1. Inspecting and removing contaminated surface soil above the drain tiles, flumes, etc.
2. Spot checking of subsurface soil in the vicinity of drain tiles, flumes, etc., to determine where the contaminated tiles and flumes were located. Where contamination was found, the flumes, tiles, etc., were removed in sections.
3. Removal of some items previously decontaminated to Level 3X condition to a storage facility and additional decontamination of the remainder of the items to a 5X condition in order to be sold. [The number of "X"s is used in the Army's classification scheme to indicate the level of decontamination: XXX (short hand 3X)-military decontamination level established primarily for worker safety that indicates potentially contaminated material or previously contaminated material that has been decontaminated to a zero residual contamination level; XXXXX (or 5X)– level that indicates a decontaminated material with no detectable residual contamination.]
4. Destruction of all buildings by fire followed by removal of all debris and concrete foundations. All the materials, including the earth, in those areas were flashed and the area was then rough graded. Soil investigations at the TNT areas prior to this RI suggest that at least portions of the concrete building foundations remain in place.
5. Decontamination of all sump basins and removal of the concrete.

The decontamination process also included burning of nitroaromatic-filled flumes that were excavated. As shown in the records review (D&M, 1997b) this was performed on July 10, 1963, near the intersection of Fox Road and Snake Road and is suspected to have also occurred at the Additional Burning Ground area.

On April 18, 1978, NASA declared approximately 2,152 acres of land as excess. This excess acreage included former buffer areas that were not formerly used by the Army and were not subject to decontamination efforts. The Perkins Township Board of Education acquired 46 acres of the excess for use as a bus transportation center. The General Services Administration retains the remaining acreage and currently has a use agreement with the Ohio National Guard for 604 acres of the land. NASA presently uses the remainder of the former PBOW site to conduct space research as a satellite operation of the John Glenn Research Center based in Cleveland, Ohio. The details of these land transactions are listed in the site management plan (International Consultants Incorporated, 1995, and can be found at NASA PBS).

1.5 Locomotive Building Area History and Previous Investigations

The LBA is located in the central portion of the PBOW facility. The LS portion is located on the north side of Maintenance Road in the eastern part of the Garage and Maintenance Area. The RCA is located approximately 260 feet east of the LS. The location of the LS in relation to other site features is shown on Figure 1-2. Figure 1-3 presents a historical view of the LS and RCA during early PBOW operations, January 1942, and Figure 1-4 shows the area circa 1960.

1.5.1 Locomotive Shop

The LS occupies the easternmost building in the Garage and Maintenance Area. The shop was used for the maintenance of equipment, vehicles, and railcars. Within this building a work pit was built to allow maintenance personnel to work below the locomotives. The work pit is the primary area of concern within this building. The pit measures 60 feet long; 3 feet, 8 inches wide; and 5 feet deep (USACE, 2000). The pit is believed to be lined with concrete but the impervious construction material could not be confirmed. The pit is located beneath the northern set of railroad tracks that run through the building. NASA has backfilled this pit with loose stone and currently uses this building as a storage garage. The pit was used to work on the railcars and the locomotives during the operation of PBOW. When the pit was operational, the waste effluent from the pit was sent into the sewer system via a sump pump. The sump pump is still located in another pit, which measures 9 feet, 2 inches deep and 2 feet, 6 inches across in diameter. The pit is located on the south side of the building. The Locomotive Shop was Building 718 on the facility buildings list. It was located south of a track known as "Z" track. "Z" track was labeled as being the track "to (the) caustic dock."

In 1999, a limited site investigation (SI) was conducted by the USACE (USACE, 2000), a total of four soil samples were collected from the LS. Three samples were collected from soil boring SB01; one surface soil sample (0 to 0.5 foot) and two subsurface soil samples (1 to 3 feet and 3 to 5 feet). A fourth sample was collected from the lowest reach of the maintenance pit (DP01). During borehole drilling of DP01, both a petroleum staining and a petroleum hydrocarbon odor were noted. Soil samples were analyzed for SVOCs, PCBs, and TAL metals. Tables 1-1 and 1-2 present the SI soil analytical results. Figure 1-5 shows the layout and sample collection locations for the SI. A total of four surface water samples, including one field duplicate, were collected; one from the sump located within the LS, one from the sewer (wastewater junction box), and one from the drainage ditch (unnamed tributary to Plum Brook) located in the area east of Building 718 and west of the RCA. One sediment sample was also collected from the drainage ditch at the

same location as the surface water sample. Table 1-3 presents a summary of the SI surface water samples and Table 1-4 shows a summary of SI sediment samples.

In SI soil samples from the LS, no SVOCs were detected above preliminary remediation goals (PRG) derived by the U.S. Environmental Protection Agency (EPA). According to the SI report, one PCB, Aroclor 1260, was detected above the PRG at a concentration of 450 parts per million (ppm) from the maintenance pit inside of the LS. During RI preparation, it was determined that this result was 450 parts per billion (ppb) or 0.45 mg/kg. This value still exceeded the PRG screening value of 0.2 mg/kg. In addition, metals- antimony, arsenic, chromium, iron, and lead- were found to be above PRG screening limits in some of the surface and subsurface soil samples. Analytical results from a water sample collected from the sump inside of the locomotive building indicated concentrations of lead and arsenic above PRGs. Also, the field duplicate (FD) sample exhibited concentrations of antimony and iron above the PRG. PCB Aroclor 1260 was also detected in the water sample from the sump and exceeded screening levels. A surface water sample and a sediment sample were collected from the open ditch to the east of the LS, each was analyzed for SVOCs and metals. No SVOCs were detected in either the surface water or the sediment and no metals were detected above PRGs in the water. Arsenic (41.5 ppm) and iron (80,900 ppm) were detected in the sediment sample above their PRG levels of 0.38 ppm and 22,000 ppm, respectively. Water samples were collected from the sump just inside the southern wall of the LS and the sewage junction box just outside of the LS. The SI found the sump water sample to have concentrations of Aroclor 1260 (1.5 parts per billion [ppb]) and arsenic (20.6 ppb) that exceeded the PRGs.

Based on the detections of arsenic and Aroclor 1260 in the sump water the SI recommended removal and disposal of the sump water. The SI also recommended further consideration of removal of the sludge material from the maintenance pit.

1.5.2 Rail Car Washing Area

The RCA is located east of the LS and across Maintenance Road from Ash Pit #1. The location of the RCA in relation to other site features is shown on Figure 1-2. During PBOW operation, this area was used as the site of a railcar cleaning operation that involved an acid. Because of this, the RCA is also referred to as the acid area. No above ground structures were present during operations. It is located in the area surrounding the historical location of railroad tracks that exited the eastern end of the locomotive building (Figures 1-3, 1-4, and 1-5). The actual wash pit was located 261 feet from the east wall of the Locomotive Shop. From historical information recovered by the USACE during preparation of the SI report, general notes on a historical

drawing were found cautioning installation of any underground piping through the area. The statement reportedly said, "Do not run 3 inch line through acid saturated earth. Should this be necessary, paint water line with black acid resisting paint." Also during the SI, three rubble piles were observed to the east of the LS; the exact contents of these piles were unknown, but visual examination indicated the presence of masonry materials (USACE, 2000).

Currently, the area is open land with moderate vegetative cover. Limestone blocks used as railroad track supports across the drainage ditch are still present and visible on the east side of the ditch. No man-made structures other than the locomotive building are located near the RCA. During the 2009 field activities an approximate 3-inch-diameter clay pipe was discovered discharging water into the drainage ditch from the RCA.

During the SI, seven samples from three soil borings (DP001, DP002, and DP003) were collected at the RCA: one surface soil sample (0 to 2 feet) and six subsurface soil samples (three at 2 to 4 feet and three at 4 to 6 feet). Soil samples were analyzed for SVOCs, PCBs, and TAL metals. Tables 1-1 and 1-2 present SI analytical results and Figure 1-5 shows SI sample locations.

Results from the SI concluded arsenic (7.3 ppm), was above the PRG screening level of 0.38 in surface soil. No PCBs or SVOCs were detected above PRG screening levels in surface or subsurface samples. Including the FD sample, arsenic and iron were above the PRG screening levels in all subsurface soil samples except in boring DP001 (2 to 4 feet). The maximum concentration of arsenic was 17.7 ppm in DP002 (2 to 4 feet) and iron was 46,400 ppm also in the same subsurface sample.

The SI reported that 2,4-DNT and naphthalene concentrations in RCA soil exceeded PRGs. However, review of the SI data during the RI preparation indicated the concentrations were incorrectly shown in ppm, rather than ppb. Thus, instead of 4,000 ppm and 3,400 ppm for 2,4-DNT and naphthalene, the actual concentrations were 4.0 ppm and 3.4 ppm, respectively. The SI recommended additional assessment activities at the RCA in part based on the misinterpretation of the 2,4-DNT and naphthalene concentrations. However, other SI analytical results (arsenic and iron) above PRGs also support the SI recommendation for further investigation of the RCA.

2.0 Physical Setting

2.1 Geography, Topography, and Surface Drainage

PBOW is located within the Eastern Lake Region of the Central Lowland Province (Soil Conservation Service, 1971). Erie County is overlain by lacustrine sediment, glacial outwash, and glacial till. The surface is a plain with a slight slope to the north-northeast toward Lake Erie at approximately 25 feet per mile. Elevations at the PBOW range from 680 feet above mean sea level (msl) at the intersection of Taylor Road and Patrol Road on the southwestern side of the site to 625 feet above msl at the northern portion of the installation. In general, the topography of PBOW is characterized by a flat ground surface with occasional low hummocks caused primarily by glacial scouring and deposition. A low escarpment trends from the western to the northeastern portion of the site (Shaw, 2005).

PBOW lies in the eastern region of the Pickeral Creek-Pipe Creek Basin, which is part of the St. Lawrence River drainage basin (D&M, 1997a). Eleven streams exist within PBOW and flow north-northeast toward Lake Erie, which is located approximately 3.5 miles north of the site. The site is part of four drainage areas: (1) Sawmill Creek (southern PBOW), (2) Plum Brook (central PBOW), (3) Pipe Creek (western PBOW), and (4) Storrs-Hemminger Ditch (north central PBOW), all of which flow into Sandusky Bay (D&M, 1997b). The LS and RCA are divided by an unnamed, man-made drainage ditch. Surface water for the LS drains to the east and surface water for the RCA drains to the west. Both flow into the same unnamed tributary which flows to the north towards Pentolite Road and eventually drains into Plum Brook. The drainage pattern is dendritic where streams are incised into bedrock and is poorly developed where they have not yet eroded to the bedrock. Four drainage ditches at PBOW, Lindsley Ditch, Kuebler Ditch, Ransom Brook, and Plum Brook, are monitored by NASA PBS under a National Pollutant Discharge Elimination System outfall permit (OEPA, 2007). In addition to the streams, 17 isolated ponds and reservoirs and former red water ponds are located at PBOW (U.S. Geological Survey [USGS], 1992; D&M, 1997b).

2.2 Geology and Soils

2.2.1 Regional Geology

The bedrock in northern Ohio consists of Devonian and Silurian carbonates (limestone and dolomite) and clastics (shale, siltstone, and sandstone). These units unconformably overlie older sedimentary sequences of Ordovician and Cambrian Age rocks, which in turn unconformably

overlie pre-Cambrian basement rocks (D&M, 1997a). The local bedrock is situated on the eastern flank of the Findlay Arch. In the Devonian and Silurian of northern and western Erie County, weathering of the carbonates has produced cavernous porosity and karst topography.

2.2.2 Local Geology

At PBOW, three bedrock units are present: the Delaware Limestone, the Olentangy Shale, and the Ohio Shale. The Delaware Limestone is the lowermost formation screened by PBOW site wells. It is characterized as a hard, dense, finely crystalline limestone and dolomite. The unit is typically buff colored, hard, and massive, and usually is described as fossiliferous with pyrite crystals. In the vicinity of PBOW, quarries (Hanson Aggregates to the north, Hanson-Sandusky Crushed Stone to the southwest, and abandoned Castalia quarry to the west) mine limestone from the Delaware. Traces of natural petroleum-derived hydrocarbons and hydrogen sulfide (H_2S) are common in all three quarries. Overlying the Delaware Limestone is the Olentangy Shale. Two members of the Olentangy Shale have been characterized at the site, the Plum Brook Shale and the overlying Prout Limestone. The Plum Brook Shale is interpreted to consist of approximately 35 feet of bluish-gray, soft, fossiliferous shale containing thin layers of dark, hard, fossiliferous limestone. The Prout Limestone has been described as an approximate 15-to-50-foot-thick unit which occasionally outcrops in a 1,000- to 2,000-foot-wide, northeast-striking band across the middle portion of PBOW. It is described as a dark-gray to blue, very hard, siliceous, fossiliferous limestone or dolomitic mudstone. The Olentangy Shale of PBOW dips to the southeast at a slope of approximately 21 feet per mile. The uppermost formation at PBOW is the Ohio Shale. Geographic Information System data show that the Ohio Shale dips to the southeast at a slope of approximately 26 feet per mile (Shaw, 2005). Only one member of the Ohio Shale is present in the PBOW area, the Huron Shale. This unit is described as black, thinly bedded, with abundant carbonaceous matter. Some large pyrite/carbonate concretions are also present in the Huron Shale, some as large as 6 feet in diameter (D&M, 1997a).

2.2.3 Regional Hydrogeology

Regional groundwater flow is to the north-northeast towards Lake Erie, although local flow may vary due to local topography. Water in the limestone typically occurs in joints and along bedding planes or in solutionally enlarged openings. Although some limestone in the middle of the county provides well yields of up to 500 gallons per minute (gpm), the overburden and the majority of the other formations can sustain groundwater pumping of only 10 gpm or less (D&M, 1997b). A hydrogeological study conducted by USGS on the glacial deposits in

Sandusky in 1990 reported a horizontal hydraulic conductivity of 0.046 feet per day and a vertical hydraulic conductivity of 1.2 feet per day (USGS, 1992).

2.2.4 Local Hydrogeology

From domestic groundwater wells outside of PBOW boundaries, the bedrock groundwater is divided into three zones based on location and yield. Zone 1 occurs in the north and northwestern portion of PBOW. It is characterized as yielding from 100 to 500 gpm from karstic limestone approximately 100 feet below grade. Zone 2 is in the northern portion of PBOW and has yields of 15 gpm or less from limestone approximately 300 feet below grade. Zone 3 is located in the eastern and southern portion of the site in predominantly shale bedrock. In addition to being found in the shale, groundwater is located in thin sand and gravel horizons interbedded with silt and clay deposits. Most Zone 3 wells are poor yielding, many of them providing less than 3 gpm (D&M, 1997a).

Two main water-bearing zones at PBOW are present, one in the overburden/shale and one in the Delaware Limestone bedrock. Data from recent investigations (*2004 Groundwater Data Summary and Evaluation Report* [Shaw, 2005], *2002 Groundwater Data Summary and Evaluation Report* [Shaw, 2003], TNTA and TNTC RI [IT, 2000a,b] *Summary Report, Site-Wide Groundwater Monitoring* [1997-1998] [IT, 1999], and the *Site-Wide Groundwater Investigation Report* [IT, 1997a]) have found that groundwater in the overburden is in discontinuous pockets during dry time periods exemplified by monitoring wells that are typically dry or site areas in which wells could not be installed due to a lack of water in the overburden soil at the time of drilling.

2.2.5 Influence of Precipitation on Water Levels

As mentioned in the *2004 Groundwater Data Summary and Evaluation Report* (Shaw, 2005), previous investigations have indicated that there is a strong connection between precipitation and groundwater elevations, but no clear correlation exists between monthly precipitation rates and water level elevations in site wells. The lack of observed correlation is probably influenced by the amount of precipitation and the runoff rate. For example, summer thunderstorms that produce short periods of heavy precipitation may result in more surface runoff and less infiltration. Conversely, constant periods of precipitation at a lower rate over a period of days may result in more infiltration. Freezing rain or snow will also not result in an immediate recharge to groundwater. From review of local monthly precipitation data, evapotranspiration and rainfall runoff rates calculations, and a comparison table of sitewide monitoring well groundwater

elevations verses aquifer recharge rates, a seasonal correlation was determined. During the months of January through June, a greater volume of groundwater in the overburden/shale monitoring wells was present as compared to the months of July through December, when a lesser amount of water was present. Therefore, in general, the time period of January through June, when the greatest amount of water in a monitoring well is expected to be present, was given the term "wet" time period, while July through December was given the term "dry" time period.

3.0 Field Activities

3.1 Introduction

Field activities at the LBA site were performed in accordance with the updated and revised SWSAP (Shaw, 2008b) and site-specific work plan, as noted in Chapter 1.0. Activities included direct-push drilling operations with soil sampling, installation of temporary piezometers within LS and RCA sites, installation of permanent monitoring wells upgradient, within and downgradient of both sites, surface water and sediment sampling, two rounds of groundwater sampling (one conducted during the 2009 wet season and the second in the 2009 dry season), and disposal of IDW.

Prior to any intrusive work, a NASA authorized dig permit was obtained for the LBA. The dig permit process included review of utility maps for any underground utilities, including storm water, sewer, electrical, natural gas, telephone, cable, or fiber optic lines in the LBA. In addition, following Shaw's requirements, a Utility Mark-Out form was completed and any location to be bored was hand dug for the first 5 feet, verifying no utilities were present.

To comply with NASA fire regulations, a NASA authorized burn permit was also obtained each time cutting and welding of steel isolation casing was required during bedrock monitoring well installation.

3.2 Geophysical Survey

A geophysical survey was conducted as a means for investigating the potential presence of an underground storage tank (UST) in the vicinity of the locomotive building. Similar USTs have been associated with locomotive building structures at other federal facilities (e.g., West Virginia Ordnance Works), which prompted the need to establish the presence/absence of a UST at the LS. The primary survey methods recommended and used for this project were Geonics Limited EM31-MK11 ground conductivity meter (EM31).

The locomotive building is a large, brick structure oriented with its long dimension in the east-west direction. Three railroad tracks (pairs) approach the building on the western end and two of the pairs historically entered the building. The third set of tracks ran parallel to the north wall of the locomotive building. There is also a square concrete slab on the southwest corner of the building for an unknown purpose. Two utility lines (suspected water and gas lines) were marked

by NASA and exit the building near the southwest corner and traverse south towards Maintenance Road.

Field activities conducted by the Geophysics and Mapping Group of Shaw were completed on December 3 and 4, 2008. Appendix A presents a geophysical investigation report that includes methods, operations, results, and conclusions from the survey.

To confirm or deny the presence of a UST at the locomotive building, two geophysical survey instruments were used during the investigation. Instrumentation included Geonics EM31-MK11, ground conductivity meter and a GSSI SIR3000 ground penetrating radar system with a 270 MHz antenna.

The EM31 method was used to measure the in situ electrical conductivity of subsurface materials and detect any metallic material that may be present. The detection depth of the instrument extended to approximately 6 meters below ground surface (bgs). The ground-penetrating radar (GPR) system was used for detecting subsurface metal. The GPR detects materials with different electrical properties from surrounding soils or other materials (e.g. metals in soil, air in soil, soil/rock interface, etc.).

3.3 Direct-Push Soil Sampling/Piezometer Installation

Direct-push drilling was used to collect soil samples and install temporary piezometers at the LS and RCA. A total of 18 soil borings, 10 at the LS (3 in the maintenance pit) and 8 at the RCA, were drilled. Five of the borings at the LS (SB-01/PZ-05, SB-02/PZ-03, SB-03/PZ-04, PZ-01, and PZ-02) and four of the borings at the RCA (PZ-07, PZ-08, PZ-09, and PZ-10) were converted to 1-inch-diameter piezometers upon completion of soil sampling and logging activities. Although a total of 10 temporary piezometers were scheduled to be installed, based upon adequate groundwater delineation, the last piezometer was not installed (last piezometer identified as PZ-06 in predefined sample identification and caused skipping of label identification numbers). Figure 3-1 shows the locations of direct-push borings. Direct-push drilling activities were conducted by Tri-State Drilling Company, of Chattanooga, Tennessee. A track-mounted Geoprobe 6610 DT drill rig was used at all boring locations on January 18, 19, and 20, 2009. Locations of the soil boring/piezometers at the LS and RCA were selected using data and knowledge from the limited SI (USACE, 2000), topography, layout of historical disposal operations, and anticipated overburden/shale and 2004 Groundwater Data Summary and Evaluation Report bedrock groundwater flow directions.

Following PBOW closure and demolition of TNT manufacturing buildings, a fill material (sand) was graded over many PBOW areas covering remaining foundations and other former ground surface features. Direct push sampling at the LS encountered up to 2.4 feet of fill material at some locations and up to 2.8 feet of fill material at other locations at the RCA. Three soil samples were collected from each soil boring from approximate depths of 0 to 1 and 3 to 5 feet below the interpreted fill material (within the native soil) and 8- to 10-feet below the current ground surface as described above and analyzed for nitroaromatics, semivolatile organic compounds (SVOC), and metals. Also, the 0 to 1 and 3 to 5 feet soil samples were analyzed for polychlorinated biphenyls (PCB), and one surface soil sample (0 to 1 foot interval) was analyzed for total organic carbon (TOC).

Additionally, three borings (LBA-SB07, LBA-SB08, and LBA-SB09) were drilled to refusal within the maintenance pit located inside the LS. Samples were collected near the bottom of the pit and analyzed for the full suite of chemicals (TCL SVOCs, PCBs, and metals). Pit refusal was encountered at 4.9 feet in all three of the borings. A weathered petroleum odor was encountered in boring SB-09 which was drilled within 5-feet of the 1999 SI boring DP-01. Petroleum contaminated material was not observed in any of the maintenance pit borings.

Continuous lithologic logs were recorded for all borings during the RI investigation. Boreholes in which a piezometer was installed were advanced to refusal, and a 1-inch-diameter polyvinyl chloride (PVC) screen with 0.010-inch slots, typically 10 feet in length, and 1-inch-diameter PVC riser, was placed into the 3.25-inch-diameter borehole. No filter pack material or bentonite was used during piezometer construction. To prevent rainwater from entering the borehole from the surface, the piezometer was surrounded with plastic sheeting to a depth of approximately 0.5 feet bgs, cardboard with a hole in the center was placed over the piezometer covering the borehole, and bentonite was placed over the cardboard and surrounding surface to a radius of approximately 1 foot. Hazardous, toxic, and radiological waste (HTRW) drilling logs for each borehole along with the associated temporary piezometer construction diagram, if appropriate, are included in Appendix B. Table 3-1 presents a summary of direct-push soil and groundwater samples collected.

3.4 Direct-Push Groundwater Sampling

As noted in Section 3.3, nine temporary piezometers were installed, five at the LS (SB-01/PZ-05, SB-02/PZ-03, SB-03/PZ-04, PZ-01, and PZ-02) and four at the RCA (PZ-07, PZ-08, PZ-09, and

PZ-10). The purpose of the piezometers was to locate potentially contaminated groundwater, determine placement for permanent monitoring well installation, determine quantity and quality of overburden/shale groundwater, and to determine if the water is a potable supply. On January 28 through 31, 2009, using the low-flow groundwater sampling method, five groundwater samples were collected from piezometers located at the LS. Due to low recharge (less than 50 milliliters per minute) no groundwater samples could be collected from any of the temporary piezometers at the RCA. Groundwater from temporary piezometers was low-flow sampled using a peristaltic pump from wells that exhibited a recharge rate greater than 50 ml per minute. Groundwater samples were analyzed for nitroaromatics, SVOCs, metals (filtered and unfiltered), hardness, and water quality parameters including alkalinity, chloride, cyanide, hardness, nitrate, sulfate, total dissolved solids, total suspended solids, turbidity, and ferrous iron. Appendix C contains sample collections logs for the temporary piezometers.

3.5 Monitoring Well Installation

A total of eleven 2-inch monitoring wells, six overburden/shale (LBA-MW01, LBA-MW02, LBA-MW03, RCA-MW01, RCA-MW02, and RCA-MW03) and five bedrock (LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, RCA-BEDGW-002, and RCA-BEDGW-003), were installed as part of the RI activities at the LBA. Monitoring wells were installed in upgradient, downgradient, and suspected source area locations based upon analytical data from soil and groundwater samples obtained during direct-push soil sampling, temporary piezometer groundwater sampling, overburden/shale groundwater flow directions, and 2004 bedrock groundwater flow direction (Shaw, 2005). Figure 3-1 shows newly installed monitoring well locations along with soil boring and temporary piezometer locations at the LBA.

Monitoring wells were installed in accordance with guidelines specified in USACE Engineering Manual EM-1110-1-4000 (USACE, 1998) and following the procedures in the site-wide SWSAP (Shaw, 2008b). All monitoring wells were completed as described below.

Monitoring well installation was conducted March 17 through April 14, 2009 by A.E. Drilling Services of Greeneville, South Carolina. Prior to drilling, dig permits already in place with NASA for direct-push drilling were reviewed to ensure no underground utilities would be encountered during drilling at monitoring well borehole locations. In addition, the first 5 feet at each borehole location were manually dug with a 4-inch-outside diameter (OD) decontaminated, stainless-steel posthole digger to confirm no utilities were overlooked or were not identified by NASA utility location diagrams.

Following posthole digging to 5 feet, all overburden/shale boreholes were advanced by a CME-750 drill rig using 8-inch-OD (4.25-inch-inside diameter [ID]) hollow-stem augers (HSA) to the depth of auger refusal. At most boreholes, unless paired with an adjacent bedrock well in which lithologic soil sampling was conducted (LBA-MW01/LBA-BEDGW-001, LBA-MW02/LBA-BEDGW002, RCA-MW01/RCA-BEDGW-001, RCA-MW02/RCA-BEDGW-002), soil core samples were continuously collected below the 5-foot posthole boring to terminating depth using a 2-foot-long and 2-inch-OD stainless-steel split spoon. Soil core samples were visually examined by a Shaw field geologist and documented on hazardous, toxic, and radiological waste (HTRW) drilling logs. Overburden/shale monitoring well construction logs are included in Appendix B. Well completion in each borehole was accomplished using 2-inch-diameter PVC Schedule 40 riser pipe and a 10-foot Schedule 40 PVC section of 0.010-inch factory slotted screen. No soil samples were submitted to an analytical laboratory, but each sample was screened by a Sirius air quality meter to measure any organic vapors. Well construction logs of the monitoring well associated with the appropriate borehole are also included in Appendix B.

For all bedrock wells, following posthole digging to 5 feet, a pilot borehole was drilled by a CME-750 drill rig using 4.25-inch-ID by 8-inch-OD HSA to bedrock refusal. As with the overburden/shale borehole, soil core samples were continuously collected from the ground surface to terminating depth using a 2-foot-long and 2-inch-OD stainless-steel split spoon. Soil core samples were visually examined by a Shaw field geologist, screened for organic vapors, and documented on HTRW drilling logs (Appendix B).

All bedrock wells were installed as double-cased wells. Therefore, following the pilot borehole drilling, each soil borehole was overdrilled with an 8.25-inch-ID by 12-inch-OD HSA until refusal. These augers were temporarily left in place to hold back overburden materials. Following the overdrilling, an 8-inch-OD roller cone bit was used to cut through the weathered bedrock, if present, and several feet into the competent bedrock. Roller cone drilling was performed using water for the purpose of both cooling the drill bit and washing rock cuttings from the borehole. The roller cone bit was advanced until at least 3 to 5 feet of competent drilling was completed, which was measured by the competency of cutting pressure, size and color of rock fragments, and sound of drill bit cutting "chatter." Upon reaching the appropriate depth, black steel isolation casing (6-inch-ID by 6 5/8-inch-OD) was installed into the borehole and pressure grouted in place.

All pressure grouting was performed using an expendable grout shoe. The grout shoe was 6 5/8-inch PVC cap placed over the end of the isolation casing before insertion into the borehole. The center of the grout shoe consisted of a one-way valve, similar to the ball valve in a bailer. After the isolation casing and grout shoe were pushed to a depth approximately 2 to 3 inches above the drilled depth, a PVC tremie pipe was connected to the valve and grout was pumped through the shoe and into the borehole until freely flowing around the isolation casing at the surface. This method ensured a complete seal of the isolation casing.

After allowing the grout to cure for a minimum of 48 hours, bedrock was cored with water using a CME-750 drill rig. Coring was conducted through the center of the black steel isolation casing using a custom manufactured PQ bit that collects a 3-inch-OD rock core but drills a 6-inch-OD borehole. All coring was performed using a 5-foot-long core barrel. Rock cores were visually examined and a lithology description prepared (Appendix B). Photographs of the rock cores were taken and are presented in Appendix D.

It was necessary to use tap water during coring of the bedrock for the purpose of flushing bedrock chips from the borehole, cooling the drill bit, and providing some type of lubrication between the bit and bedrock. After a 5-foot run was drilled and coring equipment was out of the borehole, water was purged and any recovery rate measured. If groundwater was interpreted to have been encountered, well completion was accomplished using a 2-inch-diameter Schedule 40 PVC riser pipe and 15-foot sections of 0.010-inch continuous wrap screen. Filter packs in screened wells were constructed with sand (tremied) beginning at a depth approximately 1 foot below the screen to approximately 2 feet above the screen. Three to 6 feet of pellet bentonite were then placed above the sand. The remaining annular space between the PVC riser and borehole and PVC riser and the black steel casing was filled (tremied) with bentonite-cement grout from the top of the bentonite to approximately 2 feet bgs.

Each well was completed to minimize frost heave. Beginning at a depth of around 2 feet bgs, bentonite was added within and around the protective casing above the bentonite-cement grout to ground surface. In addition, the concrete for the concrete pad was prevented from touching the protective casing by placing an expendable plastic spacer between the concrete and the casing. This was done in case the ground surface with the pad should heave due to frost and therefore allow the concrete pad to move without breaking. Surface completion at each well consisted of a 4-inch-square, lockable, metal, above-grade protective casing. A 4-foot-square, 4-inch-thick, concrete pad with sides sloping away was constructed around each well. Four protective steel

posts were installed at each corner of the concrete pad. An identification plate with well name, total depth, depth to screen, and survey information was secured to the protective casing.

Monitoring well construction details for the new monitoring wells are summarized in Table 3-2. Drilling logs and well construction diagrams are included in Appendix B.

3.6 Monitoring Well Development

All newly constructed monitoring wells were developed no sooner than 48 hours and no later than 7 days after completion of well construction. A Waterra pump connected with 1-inch check valve and ½-inch-ID high-density polyethelyene tubing was used to perform well development. The Waterra pump is an inertial pump that requires a 6- to 8-inch surging action for water removal. During development, the check valve and associated tubing were repositioned vertically throughout the screened interval to fully develop the entire well screen. Periodically, development was further enhanced by removal of the tubing from the pump and a more aggressive manual 1- to 2-foot-length surging action was conducted. A well development log was completed for each well to document well development progress, field parameters, and other pertinent information. Water was removed from each well until turbidity measurements remained below 10 nephelometric turbidity units (NTU) or were clear to the eye and water quality parameters pH, conductivity, and dissolved oxygen stabilized or groundwater from the well was completely evacuated. Bedrock wells were more difficult to develop because the recharge rate was typically poor. Due to insufficient recharge, no final well development photographs were taken of groundwater from wells LBA-BEDG-W-002 or RCA-BEDGW-003. Photographs of development water and well development logs are included in Appendix E.

3.7 Piezometer Abandonment

On July 16 through 18, 2009, all nine of the temporary piezometers installed at the LBA for initial investigations purposes were abandoned. Prior to abandonment, the depth to groundwater was measured and recorded. Following measurement of the water level, the piezometer was completely removed from the ground and backfilled with granular bentonite consistent with Ohio regulatory requirements (www.dnr.state.oh.us/portals/7/pubs/potts/wellsealing.pdf). Approximately 1.25 pounds of bentonite were used in each borehole. Abandonment forms for each piezometer were completed and filed with the Ohio Department of Natural Resources, Division of Water (www.dnr.state.oh.us).

3.8 Groundwater Sampling

Two low-flow groundwater sampling events were completed at the LBA during the PBOW wet and dry seasons. The first sampling event was conducted following well installation during the PBOW wet season of May 2009 and the second during the dry season of November 2009. Groundwater from the monitoring wells was low-flow sampled using a bladder pump. Groundwater samples were analyzed for nitroaromatics, inorganics (TAL metals and cyanide both filtered and unfiltered), volatile organic compounds (VOC), SVOCs, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate/nitrite, sulfate, total dissolved solids, total suspended solids, turbidity, ferrous iron, and oxidation-reduction potential [ORP]).

To assess the potential air quality that may be at the well during purging activities, upon arrival at all monitoring wells and following removal of the security lock, the lid to the well was removed and vapors within the casing were immediately measured using a Sirius air quality meter that measures organic vapors, lower explosion level, carbon dioxide, oxygen, and hydrogen sulfide content. Measurement was performed as an early indication of the breathing air vapors that may be encountered when purging activities began. Once well purging activities commenced, breathing air concentrations were continuously measured and compared with the health and safety requirements (Shaw, 2008a). Hydrogen sulfide is one of the hazardous chemicals commonly encountered when purging groundwater from the bedrock wells screened within the Delaware Limestone. Hydrogen sulfide readings did not pose a problem at the LBA during either groundwater sampling event.

Three procedures were used for purging and sampling monitoring wells. Low-flow (minimal drawdown) was the preferred purging and sampling method in wells where adequate recharge was present. If a well did not recharge adequately to use the low-flow sampling method (i.e., water level dropped 6 inches or more), removal of three volumes of groundwater from above the top of screen was performed by continued pumping. If water recharge while above the screen was so minimal (less than 50 milliliters per minute) that this purging and sampling method could not be conducted in an efficient, timely manner, the water column in the well was removed entirely. Recharged groundwater was sampled the following day.

Samples collected for inorganics analysis were filtered in the field through a 0.45-micrometer high-capacity filter attached to the discharge line of the bladder pump. If the well was not sampled using the bladder pump (i.e., with a disposable Teflon® bailer), a hand-operated, disposable 0.45-micrometer filter was used.

All groundwater that was removed from the wells during purging activities was containerized and properly disposed of following the IDW management procedures as identified in the Shaw SWSAP (Shaw, 2008b) and Work Plan (Shaw 2009a). Details of disposal activities are presented in Section 3.12.

Table 3-3 shows a list of the primary groundwater samples collected. Final field measurements recorded immediately before the water quality meter flow-through cell was disconnected and prior to groundwater sample collection are shown in Table 3-4. A final water quality reading was not recorded if adequate water volume was not present or if sample water would have possibly contaminated the recording instrument beyond decontamination efforts. Monitoring well locations are shown on Figure 3-1. Appendix C contains groundwater sample collection logs.

3.9 Sediment and Surface Water Sampling

Surface water and sediment samples were collected from the unnamed tributary to Plum Brook east of the locomotive building and west of the RCA (Figure 3-1). Seven surface water samples (including one field duplicate [FD] sample) and seven sediment samples (including one FD sample) were collected in collocated locations from the unnamed drainage ditch and a tributary to the ditch. In addition, one surface water sample was collected from the drainage water flowing from a clay pipe from the possible rail car wash sump (LBA-SW07). Surface water and sediment samples were analyzed for volatiles, nitroaromatics, metals, SVOCs, and PCBs. Water quality readings (ORP, pH, conductivity, turbidity, dissolved oxygen, and temperature) were also recorded for the surface water samples and are shown in Table 3-4. In addition, one surface water sample (LBA-SW01) was analyzed for hardness and the collocated sediment sample (LBA-SD01) was analyzed for TOC. Table 3-5 presents a summary of surface water and sediment samples collected at the investigation areas. Appendix C contains surface water and sediment sample collection logs.

3.10 Decontamination Procedures

Decontamination of drill rigs, downhole tools, and sampling equipment was performed in accordance with Section 5.0 of the SWSAP (Shaw, 2008b). Specifically, drill rigs, rods, drill bits, and augers were cleaned at the decontamination pad using high-pressure hot water from a steam cleaner before entering the drilling site, between sites, and after completion of the last borehole. Other sampling equipment was decontaminated by rinsing in sequence with phosphate-free soapy water, tap water, methanol, and deionized water. Equipment was then air dried, if

possible, before use. The bladder pump used during groundwater sampling was decontaminated by disassembling the pump and decontaminating individual pieces. Disposable tubing and bailers were used in the groundwater sampling. New tubing and a new bailer (if necessary) were used for each well.

3.11 Land Survey

An Ohio-registered professional land surveyor surveyed the direct-push soil borings and piezometers, overburden/shale and bedrock monitoring wells, and surface water and sediment sampling locations during two mobilizations. During the first survey event, conducted from January 27 through 30, 2009, soil borings and piezometers were surveyed. During the second event, conducted from May 18 through 21, 2009, monitoring wells, surface water and sediment sampling locations, and a stream staff gauge were surveyed. Horizontal coordinates were surveyed to the closest 0.1 foot and referenced to the Ohio State Plane Coordinate System. Vertical coordinates (land surface and top-of-casing elevation) were surveyed to the nearest 0.01 foot and referenced to the 1929 National Geodetic Vertical Datum. Land survey data reports are included in Appendix F.

3.12 Investigation-Derived Waste Management

IDW generated during investigation activities included soil, groundwater, rock cores, decontamination water, and personal protective equipment. All IDW was managed and handled in accordance with procedures described in the SWSAP (Shaw, 2008b).

Coring fluids and decontamination, development, and purge water generated during field activities were stored in labeled 55-gallon drums. Soil generated during direct-push and monitoring well drilling was collected in 55-gallon drums and labeled with identification of contained material, content volume, date of generation, and source of origin as applicable. Personal protective equipment (Tyvek suits, latex gloves, etc.) and general refuse were double bagged and disposed in an on-site Shaw contracted industrial dumpster for disposal.

Following direct-push and monitoring well drilling, groundwater sampling, and analytical determination that the media were nonhazardous, soil and groundwater IDW was transported to a registered disposal facility. Disposed-of media include all soil and water generated during monitoring well installation activities and purge and decontamination water generated during groundwater sampling. All fluids and solids were transported by Triad Transport, Inc. to the

Environmental Quality Company in Detroit, Michigan, for disposal. All rock cores are currently being stored inside a weather protected, secure NASA bunker.

RI activities at the LBA were conducted in sequence and simultaneously with other PBOW investigations. Although identification on the storage drums included contents, date generated, volume, and location of origin, disposal of the drums was based upon weight and area stored. A record of specific drums taken by the disposal company with each trip was not kept. Therefore, drums containing LBA media (soil, purge water, isolation casing, rock core drill water, and decontamination water) may have been transported by the Environmental Quality Company on more than one date. Because the specific disposal dates of the LBA waste drums are unknown, all of the waste manifests generated during the drilling and sampling events are included in Appendix G.

4.0 Analytical Program and Data Review Methodologies

The following sections present the analytical program used in this investigation. This review includes the laboratories used for all samples, the analytical methods used, data quality evaluation, and blank analysis. In addition, a description and derivation of risk-based screening concentrations (RBSC) is presented in Section 4.2.1. The derivation and use of BSCs and the analytical results are presented in Section 4.2.2.

4.1 Analytical Program and Methodologies

4.1.1 Sample Analysis and Data Validation

Primary and FD project samples collected in January and February 2009 were analyzed by AML Scientific, LLC of Olathe, Kansas. AML Scientific ceased operations at the end of February 2009. Regular and FD project samples collected after February 2009 were analyzed by Accutest Laboratories of Orlando, Florida. Field splits (FSs) were analyzed by Test America, Inc. of Canton, Ohio. Analysis for nitroaromatic FS samples was performed by Test America of Knoxville, Tennessee, and Test America of Denver, Colorado. Shaw performed the data validation. The validation summaries are provided in Appendix H. The analytical results are summarized in Appendix I. Tables of detected hits that exclude "B" qualified (Section 4.1.3) data are included in Appendix J. A data quality evaluation is located in Appendix K.

All data analyzed were reviewed for accuracy and completeness. One hundred percent of the data analyzed were subjected to data validation following the guidelines in the U.S. Environmental Protection Agency (EPA) *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA, 2008) and EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 2004), the QAPP (Shaw, 2008c), and specific analytical method requirements. Data were evaluated against specific criteria to verify the achievement of precision, accuracy, representativeness, completeness, and comparability goals established to meet the project data quality objectives (DQO). The criteria for blank evaluation were based on those detailed in *EPA Region 3 Modifications to National Functional Guidelines for Evaluating Organic Analyses* (EPA, 1994) and *Region 3 Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (EPA, 1993).

4.1.2 Analytical Methods

Chemical analyses for the investigation were performed in accordance with guidelines detailed in EPA's *Test Methods for Evaluating Solid Waste (SW-846), Physical/Chemical Methods,* Third Edition, September 1986 (EPA, 1986) and subsequent revisions. Groundwater, surface water, soil, and sediment samples were collected at the LBA. The groundwater samples and associated quality assurance (QA)/QC samples were analyzed for VOCs, SVOCs, metals, nitroaromatics, and several water quality parameters with the exception of locations that did not yield enough water to collect the full analytical suite. In those instances, nitroaromatic samples were collected first. All surface water samples and associated QA/QC samples were analyzed for VOCs, SVOCs, metals, and nitoraromatics. All soil samples and associated QA/QC were analyzed for VOCs, SVOCs, metals, and nitroaromatics. Soil samples and associated QA/QC samples from selected depths were also analyzed for PCBs. All sediment samples and associated QA/QC were analyzed for VOCs, SVOCs, metals, nitroaromatics, and PCBs. The analytical methods used for analysis for all four media are summarized in Table 4-1.

4.1.3 Data Quality Evaluation

The reliability of the sampling and analytical procedures used during the investigation was demonstrated by implementing the project-specific QA procedures specified in the SWSAP (Shaw, 2008b) and QAPP (Shaw, 2008c) and its site-specific attachments. Successful execution of these procedures provides strong supporting evidence that the data are representative of the areas under investigation.

The DQOs for this project were to produce scientifically valid data of known accuracy and precision that were complete with respect to identified critical samples, comparable with similar data types, and representative of the media sampled so as to be useful for the cited purposes. Evaluation of the data using the DQOs and the data validation process resulted in the determination that most of the data set is valid and of sufficient quality to meet the objectives of the investigation. Some VOCs were rejected during data validation (i.e., "R" qualified) because of calibration problems. However, all of these rejected data were nondetects. Associated detections of these VOCs were qualified "J," estimated. A complete evaluation of the analytical results is given in the data quality evaluation found in Appendix K.

4.1.4 Blank Evaluation

The purpose of blank analysis is to detect contamination resulting from laboratory and field activities. Blank evaluation involves qualification of data based on the results of associated field

blanks, trip blanks, equipment rinsates, and laboratory method blanks. The criteria for blank evaluation are as follows:

- If a parameter is found in a blank but not detected in the sample, no action is taken.
- For organics, if the sample result is greater than the contract-required quantitation limit, but is less than 5 times (most analytes) or 10 times (common laboratory contaminants) that of the blank result, the sample result is qualified "B."
- For organics, if the sample result is less than the contract-required quantitation limit and less than 5 times (most analytes) or 10 times (common laboratory contaminants) the blank result, the sample result is qualified "B." The "J" qualifier is not used.
- For metals, if the sample result is greater than the instrument detection limit but less than 5 times the blank result, the sample result is qualified "B."
- If the sample result is greater than 5 times (most analytes) or 10 times (common laboratory contaminants) the blank result, the sample result is not qualified.

In instances where more than one blank is associated with a given sample, qualification is based upon a comparison with the associated blank having the highest concentration of a contaminant. Blank results are not subtracted from sample concentrations. Note that data with "B" validation qualifiers are included in the Chapter 5.0 tables, but the associated concentrations are not included in the tables' "maximum detected concentration" column because "B" qualified data are not used in PBOW risk assessments.

4.1.5 Field Duplicate Field and Split Evaluation

Field duplicates were taken at a frequency of 1 field duplicate per every 10 samples collected. All media sampled have at least one field duplicate collected. Field duplicates are defined as samples collected at a single sampling location during multiple acts of sampling, that equally represent a medium at a given time and location. The data generated from the analysis of field duplicate samples were used to evaluate the precession of the sample collection and analysis procedures. A complete evaluation of the field duplicate results is given in the data quality evaluation found in Appendix K

Field splits were collected in conjunction with field duplicate and were sent to a different laboratory than the primary contract laboratory. In this case, the field splits were submitted to Test America, North Canton. The field split samples were submitted to the split laboratory for

the same analysis as their corresponding field duplicate and original parent sample. The split samples were used to determine reproducibility of the analytical results when analyzed by different laboratories. Split sample results were also used to ensure the contract laboratory's preparation and analysis procedures were in control and met the approved method criteria. A complete evaluation of the field split results is given in the data quality evaluation found in Appendix K

4.2 Comparison to Screening Criteria

The analytical result tables presented in Chapter 5.0 include a comparison to RBSCs and BSCs as points of reference only. Concentrations of analytes that exceed the RBSCs are highlighted in the tables. RBSCs do not infer a regulatory limit or mandated cleanup level, nor is the identification of an exceedance intended to indicate an unacceptable human health risk or a need for remedial action. Formal evaluation of human health risks will be performed in the BHHRA. Concentrations in individual samples that exceed the respective BSCs are identified as bold in the Chapter 5.0 result tables.

4.2.1 Risk-Based Screening Concentrations

The RBSCs are derived from EPA (2009) regional screening levels as described in the LBA BHHRA work plan (Shaw, 2010). The groundwater RBSCs are based on a generalized residential drinking water scenario, assumed to be the most restrictive use of groundwater, and correspond to a one-in-a-million (1E-6) incremental lifetime cancer risk (ILCR) or a noncancer hazard quotient of 0.1, whichever results in a lower concentration (Shaw, 2010). The soil RBSCs are based on a long-term residential land-use scenario that assumes use by a young child for noncancer effects and use by the combined young child and adult life stages for carcinogenic effects. Together, these capture a worst plausible case for future land use. The soil RBSCs are likewise based on an ILCR of 1E-6 and a hazard quotient of 0.1. RBSCs for surface water and sediment are derived from the respective groundwater and soil RBSCs as described in the BHHRA work plan (Shaw, 2010). As stated in Section 4.2, laboratory analytical results are compared to RBSCs only as a point of reference. Further details on the RBSCs and their derivation are provided in the BHHRA work plan and will be provided in the BHHRA report.

4.2.2 Background Screening Concentrations

BSCs have been derived for inorganic analytes and benzene, toluene, ethylbenzene, and xylenes in groundwater (Shaw, 2005) and for inorganics in PBOW soils (IT, 1998). Table 4-2 presents a complete list of background screening values generated for groundwater while Table 4-3

presents a complete list for inorganics in soil. The BSCs were derived from concentrations of these analytes found in PBOW background groundwater monitoring wells and soil data sets. The background soil samples were collected from near the property boundary, away from any potential source areas, and the background groundwater wells were installed in off-site areas upgradient of PBOW sources. Each BSC is either the maximum detected concentration or the calculated 95th percent upper tolerance limit of the background data set, whichever value is lower, for each relevant analyte (IT, 1998; Shaw, 2005). The background monitoring well samples were collected using low-flow methodology and were not filtered.

5.0 Investigation Results

5.1 Local Physical Setting

5.1.1 Site-Specific Soils.

At many PBOW sites, following closure and removal of the manufacturing structures, tanks and equipment, a local fill sand was brought to the areas to cover the remaining concrete building foundations and demolition scars and to provide a natural landscape appearance. At the locomotive building, fill material is interpreted to have been encountered in 13 of the 15 piezometer, soil boring, and monitoring well boring locations. Depths of fill material outside of the locomotive building ranged from 0.9 foot (SB-04) to possibly 9.2 feet (LBA-MW02/LBA-BEDGW-002) and consisted of a dark to yellowish brown, fine-grain sand with gravel common. A gravel fill consisting of coarse limestone was encountered within the maintenance pit inside the locomotive building. Figure 5-1 includes a site map with soil boring locations and Appendix B presents HTRW soil boring drill logs.

Below the fill material, native soil consisted of a glacial till, glacial outwash, or a glacial lacustrine (lake) deposit. In general, lithology of the monitoring well borings first encountered a brown, fine-grain sand with thicknesses ranging from 0.1 foot (LBA-BEDGW-002) to 4.4 feet (LBA-BEDGW-001). Below the sand, lithology changed to a brownish colored, stiff, silty clay that continued to the top of bedrock (shale) that was encountered at approximately 26 feet bgs. The Olentangy Shale was the bedrock formation that was encountered.

At the RCA, fill material was interpreted to have been encountered in 6 of the 14 boring locations. Depths of fill ranged from 0.9 foot (SB-11) to 4 feet (RCA-MW03). At well RCA-MW03, fill material consisted of a yellowish brown, fine-grain sand overlying a black clay with silt and sand. At PZ-10 a black, loose ash was encountered to a depth of 1.0 foot and in well PZ-08, fill consisted of a mottled, yellowish brown, silt to a depth of 1.5 feet overlying a fine grain, yellowish brown sand to a depth of 2.8 feet.

Below the fill material at the RCA, native soil also consisted of a glacial till, glacial outwash, or a glacial lacustrine (lake) deposit. In general, lithology usually consisted of a black or dark brown, silt or clay with organics followed by a gray or brownish colored, stiff, silty clay or clayey silt that continued to the top of bedrock (shale) that was encountered at an average depth of 23 feet bgs. The Olentangy Shale was the bedrock formation encountered.

5.1.2 Site-Specific Geology

Bedrock units in the LBA consist of the Olentangy Shale and the underlying Delaware Limestone. Nine piezometers advanced to refusal at the LS and RCA believe to have encountered the Olentangy Shale (obtained refusal) at depths ranging from 17.9 feet (SB01/PZ05) to 22.9 feet bgs (PZ-10), while bedrock monitoring wells conclusively encountered the shale at depths ranging from 23.2 feet (RCA-BEDGW-001) to 27 feet bgs (LBA-BEDGW-002). The average elevation above msl of the shale encountered equates to 619.4 and 611.5 feet above msl for the temporary piezometers and 615.3 and 609.3 feet above msl for the monitoring wells, respectively. The depth of the Delaware Limestone encountered ranged from 35.5-feet bgs (598.8 feet above msl) in well RCA-BEDGW-003 to 41.2 feet bgs (597.3 feet above msl) in well RCA-BEDGW-001. Figure 5-2 presents a regional geological map.

The nine temporary piezometers drilled until auger refusal did not recover any refusal material (assumed to be bedrock). As determined by monitoring wells which recovered bedrock, the Olentangy Shale was found to typically be gray in color, highly weathered near the soil bedrock interface, thinly laminated, and friable. Competency of the shale increased with depth. The Delaware Limestone below the shale was typically found to be dark gray in color, hard, slightly weathered, and fossiliferous (brachiopods, corals, styolites), and exhibited massive bedding. In addition, seeping petroleum hydrocarbon was noted on the monitoring well borelog for bedrock wells LBA-BEDGW-001, RCA-BEDGW-001, RCA-BEDGW-002, and RCA-BEDGW-003. Table 5-1 lists information relative to monitoring well borings LBA-BEDGW-001, RCA-BEDGW-001, RCA-BEDGW-002, and RCA-BEDGW-003 along with other PBOW borings/monitoring wells which encountered natural petroleum hydrocarbon, rock core staining, or hydrogen sulfide vapors. (The petroleum hydrocarbon at PBOW from the Delaware bedrock is considered to be naturally occurring based upon a finger print analysis conducted by NASA in 2007 [Shaw, 2008d]).

5.1.3 Site-Specific Hydrogeology

Overburden/shale groundwater in the LBA, specifically the area east of RCA, was encountered at depths ranging from 1 foot bgs (SB01/PZ05) to 10-feet bgs (PZ01 and SB03/PZ04) in January 2009 (wet season) during soil boring drilling/piezometer installation. Groundwater was not encountered in soil boring SB05. During monitoring well installation conducted in March and April 2009 (wet season), overburden/shale groundwater was encountered at depths ranging from 6.4 feet bgs (LBA-BEDGW-001) to 9.5 feet bgs (LBA-BEDGW-002). Overburden/shale

groundwater on the other side of the drainage ditch, in the RCA, was encountered during the temporary piezometer and well installation in only 6 of the 14 borings. Overburden/shale groundwater depths ranged from 3.3 feet bgs (RCA-BEDGW-002) to 23 feet bgs (RCA-MW02 and RCA-MW03). Overburden/shale groundwater is suspected not to have been encountered in this area possibly due to the presence of an agricultural drainage line or possibly from the line that ran from the former catch sump (previously used to catch the waste acid rinse water from the former rail car washing) that is currently draining overburden/shale groundwater. The drainage line is below grade and discharges on the bank of the unnamed ditch. Groundwater is currently discharging from the drainage line. Table 5-2 shows water level elevations at piezometers and monitoring wells. As shown by the May 26, 2009 overburden/shale groundwater elevation contour map (Figure 5-3), which includes water level measurements from both the temporary piezometers and permanent monitoring wells, overburden/shale groundwater of the locomotive building flows in an east-northeast direction and groundwater from the RCA flows in a west-northwest direction toward the adjacent unnamed drainage ditch. Figure 5-4 presents an overburden/shale groundwater potentiometric map of water level measurements taken on October 27, 2009 (dry season) from the overburden/shale monitoring wells (piezometers were abandoned in July). The groundwater flow direction during October 2009 is also in an identical direction as depicted in May 2009. Overburden/shale groundwater flow from both contour maps mimics the surface topography.

In addition, one stream level staff gauge (SG05) was placed in the drainage ditch located between the LS and RCA and survey elevations recorded at the top and base of the rod. Water level measurements from the drainage ditch surface water were collected from the staff gauge. When elevations are plotted in correlation with groundwater level measurements from overburden/shale monitoring wells, the drainage ditch meets the definition of a "gaining" stream during both the wet and dry season months of May and October (Figures 5-3 and 5-4). Both figures show groundwater elevations in the LBA adjacent to the drainage ditch are greater than the water level elevation of the ditch indicating groundwater is discharging into the creek.

Two bedrock monitoring wells were installed at the LS and three were installed at the RCA during the RI. Using the 2004 bedrock groundwater elevation contour map, groundwater was believed to flow in a northwest direction (Shaw, 2005). Based on the 2004 data, existing bedrock well IT-MNTA-BEDGW-001 was used as an upgradient well, well LBA-BEDGW-002 was installed as a source well near the southeast corner of the building, and well LBA-BEDGW-001 was installed in a downgradient position, northwest of the locomotive building. Groundwater

from these bedrock wells was encountered at varying depths. Bedrock groundwater was encountered in fractures during March 2009 drilling at depths of 90.8 to 91.1 feet (LBA-BEDGW-001) and 61 feet (LBA-BEDGW-002).

Bedrock wells installed in the RCA include RCA-BEDGW-001, installed in an upgradient location southeast of the area; well RCA-BEDGW-002, installed as a source well within the RCA (western side); and well RCA-BEDGW-003, installed as the downgradient well, across the drainage ditch northwest of the RCA. Bedrock groundwater from these wells were also encountered at variable depths. The depth at which groundwater was encountered ranged from 53.8 feet bgs in well RCA-BEDGW-002 to 91.1 feet in well RCA-BEDGW-003. The screened interval of all bedrock wells are within the Delaware Limestone.

Groundwater level measurements from bedrock wells associated with Ash Pit 1 and Waste Water Treatment Plant 1 were combined with the LBA bedrock groundwater level measurements to construct groundwater contour diagrams and determine bedrock groundwater flow direction in the LBA. The diagrams indicate bedrock groundwater flows in a northwest direction at the LBA. Figures 5-5 and 5-6 show the bedrock groundwater flow on May 26 (wet season) and October 27, 2009 (dry season). Bedrock groundwater elevations from wells LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, RCA-BEDGW-003, and AP1-BEDGW-001 were not used in the contouring of the May 26, 2009 groundwater flow map and elevations from wells LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, and RCA-BEDGW-003 were not used in the October 27, 2009 bedrock groundwater flow map. The groundwater elevations were not used because the well screens are set in possibly low-producing fractures or within a different bedrock fracture network compared to the other bedrock well screens. In either case, bedrock groundwater elevations were variable with elevation changes as much as 69 feet in wells spaced only 130 feet apart (MNTA-BEDGW-001 and RCA-BEDGW-003, May 26, 2009 map). The difference in water level elevations from wells located fairly close to each other is unknown. The current data set suggests these bedrock wells may not be useful for construction of future groundwater flow maps but further evaluation should be conducted if new data becomes available. As depicted on Figures 5-5 and 5-6, groundwater elevations used in the contouring were consistent between the five month sampling period, May to October, and water level elevations show a groundwater flow direction toward the northwest, as would be expected based upon bedrock groundwater flow maps in the 2004 Groundwater Data Summary and Evaluation report (Shaw, 2005).

5.1.4 Site-Specific Hydraulic Connection Between Zones

Vertical hydraulic gradients were calculated for paired wells LBA-MW01/LBA-BEDGW-001, LBA-MW02/LBA-BEDGW-002, RCA-MW01/RCA-BEDGW-001, and RCA-MW02/RCA-BEDGW-002 (Table 5-3) at the LBA. Overburden wells LBA-MW01, LBA-MW02, RCA-MW01, and RCA-MW02 are screened within overburden material, and bedrock wells LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, and RCA-BEDGW-002 are screened within the Delaware Limestone. During bedrock groundwater flow map construction, it was determined that the water level elevations from wells LBA-BEDGW-001, LBA-BEDGW-002, and RCA-BEDGW-001 were not in static water level conditions due to unknown but possible reasons as identified in Section 5.1.3. Vertical gradient calculations from these wells may change over time when static conditions are reached; therefore the vertical hydraulic gradients from these wells should be viewed as potentially anomalous due to reasons cited above. Groundwater elevations in the overburden wells are higher than those in the bedrock wells. This difference suggests that there may be relatively limited connectivity between the overburden and bedrock water-bearing zones at the LBA. In addition, any vertical groundwater migration that occurs will be downward from the overburden into the bedrock. A comparison of wells installed at the LBA with other well pairs at PBOW reveals that the greatest difference in water levels occurs in the overburden/Delaware Limestone well pair LBA-MW01/LBA-BEDGW-001. Approximately 95.3 feet of difference exits in the water levels between the two zones (May 6, 2009) and the average vertical gradient over the three water level measurements is 1.138 feet per foot downward from the overburden to the bedrock aquifer.

5.2 Soil Analytical Results

A total of 36 soil samples, 20 from the LS, (including 3 fill material samples from the maintenance pit), and 16 from the RCA, were collected from 12 borings at the LBA as described in Section 3.3. Seven surface soil samples (including one FD and one FS sample) were collected from the LS and six surface soil samples (including one FD and one FS sample) were collected from the RCA at depths of approximately 0 to 1 foot. A total of 13 subsurface soil samples (including 3 fill material samples from the maintenance pit) were collected from the LS and a total of 10 soil samples (including one FD and one FS sample) were collected from the RCA. All subsurface soil samples were collected from depths of 3 to 5 and 8 to 10 feet except those in the maintenance pit of the LS. Table 5-4 summarizes the soil sample collection depths and analytical concentrations above RBSCs and BSCs. Figure 5-7 shows sample locations along with corresponding analytical results above RBSCs and BSCs.

5.2.1 2009 LS Surface Soil Samples

Three nitroaromatics were detected in the surface soil (0 to 1 foot) samples at the LS; however, none of the detected compounds exceeded its RBSC. Six VOC's were detected in the surface soil samples at the LS; however, none of the detected compounds exceeded its RBSC.

Thirteen SVOCs were detected in the surface soil samples at the LS; however, only three compounds exceeded their RBSCs. Benzo(a)pyrene was detected in SB03 (sample LBA0007 and LBA0008) at concentrations of 0.054 and 0.187 ppm, respectively, above the RBSC of 0.015 ppm. Benzo(a)anthracene was detected in SB03 (sample LBA0008) at a concentration of 0.236 above the RBSC of 0.15 ppm. Benzo(b)fluoranthene was detected in SB03 (sample LBA0008) at a concentration of 0.284, above the RBSC of 0.15 ppm.

One PCB, Aroclor 1260, was detected in the surface soil samples at the LS. Aroclor 1260 was detected in SB03 (sample LBA0009) at 0.24 ppm, marginally above the RBSC of 0.22 ppm. However, it's concentration in the two other samples (LBA0007 and LBA0008) collected from this same boring were less than the RBSC.

Six metals were detected above RBSC limits in surface soil samples from the LS, while two samples were above BSC values. Arsenic, chromium, cobalt, iron and manganese were detected above RBSCs in each of the soil samples. Concentrations of aluminum were detected above the RBSC of 7,700 ppm in SB02 (sample LBA0004) and SB05 (sample LBA0015) at concentrations of 7,710 and 8,260 ppm, respectively. Concentrations of arsenic were detected above the RBSC of 0.39 ppm in each sample and ranged from a low of 4.5 ppm in the sample from boring SB01 (LBA0001) to a high concentration of 11.5 ppm in the field duplicate sample from boring SB03 (sample LBA0008). Concentrations of chromium were detected above the RBSC of 0.29 ppm in each sample and ranged from a low of 10.1 ppm in boring SB03 (LBA0008) to a high of 12.4 ppm in boring SB05 (LBA0015). Cobalt concentrations were above the RBSC of 2.3 ppm and ranged from 3.52 ppm in boring SB01 (sample LBA0001) to a high of 33.2 ppm in boring SB03 (FD sample LBA0008). Iron was also detected above the RBSC value of 5,500 ppm in all of the samples. Concentrations ranged from 14,300 ppm in SB05 (sample LBA0015) to 31,400 ppm in boring SB03 (sample LBA0008). Manganese concentrations were above the RBSC of 180 ppm and ranged from 187 ppm in boring SB01 (sample LBA0001) to a high of 1,680 ppm in SB03 (sample LBA0008). Two metals (beryllium and lead) exceeded BSC values. Beryllium exceeded the BSC value of 1 ppm in all surface soil samples except for the FS sample, with concentrations ranging from 5.22 ppm in SB01 (sample LBA0001) to a maximum of 8.07 ppm in SB03 (sample

LBA0008). Lead was found above the BSC value of 48.6 ppm in only one sample (LBA0007) from boring SB03, which had a concentration of 103 ppm. TOC was 3,040 ppm in the one surface soil boring SB02 (sample LBA0004) that was analyzed for TOC.

5.2.2 2009 RCA Surface Soil Samples

Two nitroaromatics were detected in the surface soil (0 to 1 foot) samples at the RCA; however, only 2,4-DNT was detected above its RBSC in SB11 (sample LBA0031). It was found at a concentration of 1.13 ppm, above the RBSC of 0.71 ppm. Three VOC's were detected in the surface soil samples at the RCA; however, none of the detected compounds exceeded its RBSC.

Fourteen SVOCs were detected in the surface soil samples at the RCA; however, only four compounds exceeded their RBSCs. Benzo(a)pyrene was detected in SB06 (sample LBA0018) at a concentration of 0.395 ppm, above the RBSC of 0.015 ppm. Benzo(a)anthracene was detected in SB06 (sample LBA0018) at a concentration of 0.652 ppm above the RBSC of 0.15 ppm. Benzo(b)fluoranthene was detected in SB06 (sample LBA0018) at a concentration of 0.878 ppm, above the RBSC of 0.15 ppm. 2,4-Dinitrotoluene was detected in SB11 (sample LBA0031) at a concentration of 1.29 ppm, above the RBSC of 0.71 ppm.

Two PCB's were detected in the surface soil samples at the RCA; however, only one exceeded its RBSC. Aroclor 1221 was detected in SB12 (sample LBA0034) at a concentration of 0.19 ppm, above the RBSC of 0.14 ppm.

Five metals were detected above RBSC limits in surface soil samples from the RCA, while one sample was above its BSC value. Arsenic, chromium, and iron were detected above RBSCs in each of the soil samples. Concentrations of arsenic were detected above the RBSC of 0.39 ppm in each sample and ranged from a low of 5.9 ppm in the sample from boring SB10 (sample LBA0028) to a high concentration of 11.3 ppm in the sample from boring SB06 (sample LBA0018). Concentrations of chromium were detected above the RBSC of 0.29 ppm in each sample and ranged from a low of 10.8 ppm in boring SB10 (sample LBA0027) to a high of 14.7 ppm in boring SB11 (sample LBA0031). Cobalt concentrations were above the RBSC of 2.3 ppm and ranged from 4.68 ppm in boring SB11 (sample LBA0031) to a high of 21.3 ppm in boring SB12 (sample LBA0034). Iron was also detected above the RBSC value of 5,500 ppm in all of the samples. Concentrations ranged from 14,600 ppm in SB10 (sample LBA0027) to 31,400 ppm in boring SB06 (sample LBA0018). Manganese concentrations were above the RBSC of 180 ppm and ranged from 187 ppm in boring SB10 (sample LBA0027) to a high of

1,160 ppm in SB12 (sample LBA0034). One metal (beryllium) exceeded its BSC value of 1 ppm in all surface soil samples except for the FS sample, with concentrations ranging from 5.17 ppm in SB10 (sample LBA0027) to a maximum of 9.26 ppm in SB06 (sample LBA0018).

5.2.3 2009 LS Subsurface Soil Samples

No PCB's were detected in the 3 to 5 foot interval soil samples at the LS, the samples from 8-10' bgs were not analyzed for PCB's. Twelve VOCs were detected in the subsurface soil samples at the LS; however, none of these compounds exceeded their RBSC limits. Seven nitroaromatics were detected in the subsurface soil samples from the LS; however, only two exceeded their RBSCs. 2,4-DNT and 2,6-DNT were detected in SB02 (sample LBA0006) above their RBSC of 0.71 ppm at concentrations of 1.37 ppm and 0.842 ppm, respectively.

Two SVOCs were detected in the subsurface soil samples from the LS. Both were nitroaromatics and both were detected above their RBSCs. 2,4-DNT was detected in SB02 (samples LBA0005 and LBA0006) above the RBSC of 0.71 ppm at concentrations of 1.03 ppm and 9.88 ppm, respectively. 2,6-DNT was detected in SB02 (sample LBA0006) above the RBSC of 0.71 ppm at a concentration of 3.82 ppm.

Six metals were detected above RBSC limits in subsurface soil samples from the RCA, while four samples were above BSC values. Arsenic, chromium, cobalt, iron and manganese were detected above RBSCs in each of the soil samples. Concentrations of aluminum were detected above the RBSC of 7,700 ppm and ranged from 7,750 ppm in boring SB04 (sample LBA0014) to a high of 11,000 ppm in boring SB05 (sample LBA0016). Concentrations of arsenic were detected above the RBSC of 0.39 ppm in each sample and ranged from a low of 4.58 ppm in the sample from boring SB04 (LBA0013) to a high concentration of 11.6 ppm in boring SB05 (sample LBA0016). Concentrations of chromium were detected above the RBSC of 0.29 ppm in each sample and ranged from a low of 11.0 ppm in boring SB05 (sample LBA0017) to a high of 18.5 ppm in boring SB05 (sample LBA0016). Cobalt concentrations were above the RBSC of 2.3 ppm and ranged from 4.35 ppm in boring SB04 (sample LBA0013) to a high of 10.3 ppm in boring SB01 (sample LBA0003). Iron concentrations were detected above the RBSC value of 5,500 ppm and ranged from 14,200 ppm in SB04 (sample LBA0013) to a high of 31,600 ppm in boring SB05 (sample LBA0016). Manganese concentrations were above the RBSC of 180 ppm and ranged from 228 ppm in boring SB03 (sample LBA0010) to a high of 706 ppm in SB02 (sample LBA0005). Four metals (beryllium, calcium, magnesium, and mercury) exceeded BSC values; note that none of these exceeded its RBSC. Beryllium exceeded the BSC value of 1 ppm

in all subsurface soil samples with concentrations ranging from 5.15 ppm in SB01 (sample LBA0002) to a maximum of 8.55 ppm in SB05 (sample LBA0016). Calcium exceeded the BSC of 52,300 and ranged from 53,500 ppm in boring SB03 (sample LBA0011) to a high of 74,000 in boring SB01 (sample LBA0002). Magnesium was detected above the BSC of 10,400 ppm and ranged from 16,800 ppm in boring SB01 (sample LBA0002) to a high of 19,400 in boring SB03 (sample LBA0011). Mercury was detected above the BSC of 0.09 and ranged from 0.157 ppm in SB01 (sample LBA0003) to a high of 0.158 ppm in SB03 (sample LBA0011).

5.2.4 2009 Maintenance Pit Samples

Since the maintenance pit samples were primarily a crushed limestone, gravel fill they were not analyzed for VOC's. Neither nitroaromatics nor PCB's were detected in the samples submitted from the maintenance pit.

Nine SVOCs were detected in the subsurface soil samples from the maintenance pit; however, only three were detected above their RBSCs. Benzo(a)anthracene was detected above the RBSC of 0.15 ppm and ranged from 0.163 ppm in boring SB07 (sample LBA0023) to a high of 0.651 ppm in boring SB09 (sample LBA0025). Benzo(a)pyrene was detected above the RBSC of 0.015 ppm in boring SB09 (sample LBA0025) at a concentration of 0.498 ppm. Benzo(b)fluoranthene was detected above the RBSC of 0.15 ppm and ranged from 0.327 ppm in boring SB07 (sample LBA0023) to a high of 1.01 ppm in boring SB09 (sample LBA0025).

Five metals were detected above RBSC limits in subsurface soil samples from the maintenance pit, while three samples were above BSC values. Arsenic, chromium, and manganese were detected above RBSCs in each of the soil samples. Concentrations of aluminum were detected above the RBSC of 7,700 ppm and ranged from 7,740 ppm in boring SB08 (sample LBA0024) to a high of 9,160 ppm in boring SB07 (sample LBA0023). Concentrations of arsenic were detected above the RBSC of 0.39 ppm in each sample and ranged from a low of 1.38 ppm in the sample from boring SB07 (LBA0023) to a high concentration of 3.41 ppm in boring SB09 (sample LBA0025). Concentrations of chromium were detected above the RBSC of 0.29 ppm in each sample and ranged from a low of 4.63 ppm in boring SB09 (sample LBA0025) to a high of 9.62 ppm in boring SB08 (sample LBA0024). Iron was detected above the RBSC value of 5,500 ppm in SB09 (sample LBA0025) at a concentration of 6,980 ppm. Manganese concentrations were above the RBSC of 180 ppm and ranged from 369 ppm in boring SB09 (sample LBA0025) to a high of 1,050 ppm in SB07 (sample LBA0023). Three metals (beryllium, calcium, and magnesium) exceeded BSC values; note that none of these exceeded its RBSC. Beryllium

exceeded the BSC value of 1 ppm in all the maintenance pit samples with concentrations ranging from 1.14 ppm in SB09 (sample LBA0025) to a maximum of 1.2 ppm in SB07 (sample LBA0023). Calcium exceeded the BSC of 52,300 and ranged from 240,000 ppm in boring SB09 (sample LBA0025) to a high of 288,000 in borings SB07 (sample LBA0023) and SB08 (sample LBA0024). Magnesium was detected above the BSC of 10,400 ppm and ranged from 23,500 ppm in boring SB07 (sample LBA0023) to a high of 29,600 in boring SB09 (sample LBA0025).

5.2.5 2009 RCA Subsurface Soil Samples

One PCB was detected in the subsurface soil samples at the RCA; however, it did not exceed its RBSC. Five VOC's were detected in the subsurface soil samples at the RCA; however, none of these compounds exceeded their RBSC limits. Six nitroaromatics were detected in the subsurface soil samples from the RCA; however, only four exceeded their RBSCs. 2,4-DNT was detected above its RBSC of 0.71 ppm and ranged from 0.947 ppm in boring SB11 (sample LBA0032) to a high of 5.68 ppm in boring SB11 (sample LBA0033). 2,6-DNT was detected above its RBSC of 0.71 ppm in boring SB11 (sample LBA0033) at a concentration of 4.12 ppm. 2-nitrotoluene (NT) was detected above its RBSC of 2.9 ppm in boring SB11 (sample LBA0033) at a concentration of 22.7 ppm. 3-NT was detected above its RBSC of 0.61 in boring SB11 (sample LBA0033) at a concentration of 1.52 ppm.

Two SVOCs were detected in the subsurface soil samples from the RCA. Both were nitroaromatics and both exceeded their RBSC. 2,4-DNT was detected above the RBSC of 0.71 ppm and ranged from 0.866 ppm in boring SB11 (sample LBA0032) to a high of 5.82 ppm in boring SB11 (sample LBA0033). 2,6-DNT was detected above the RBSC of 0.71 at a concentration of 2.49 ppm in boring SB11 (sample LBA0033).

Six metals were detected above RBSC limits in subsurface soil samples from the RCA, while two samples were above BSC values. Arsenic, chromium, cobalt, iron and manganese were detected above RBSCs in each of the soil samples. Concentrations of aluminum were detected above the RBSC of 7,700 ppm and ranged from 7,850 ppm in boring SB06 (sample LBA0020) to a high of 12,000 ppm in boring SB10 (sample LBA0030). Concentrations of arsenic were detected above the RBSC of 0.39 ppm in each sample and ranged from a low of 5.0 ppm in the sample from boring SB06 (LBA0022) to a high concentration of 15.3 ppm in boring SB10 (sample LBA0030). Concentrations of chromium were detected above the RBSC of 0.29 ppm in each sample and ranged from a low of 11.6 ppm in boring SB069 (sample LBA0019) to a high of 19.0 ppm in boring SB10 (sample LBA0030). Cobalt concentrations were above the RBSC of

2.3 ppm and ranged from 7.78 ppm in boring SB04 (sample LBA0013) to a high of 53.8 ppm in boring SB11 (sample LBA0032). Concentrations of iron were above the RBSC value of 5,500 ppm and ranged from 18,200 ppm in SB06 (sample LBA0022) to 33,900 ppm in boring SB11 (sample LBA0032). Manganese concentrations were above the RBSC of 180 ppm and ranged from 315 ppm in boring SB06 (sample LBA0020) to a high of 3,000 ppm in SB11 (sample LBA0032). Two metals (beryllium and magnesium) exceeded BSC values; note that neither of these exceeded its RBSC. Beryllium exceeded the BSC value of 1 ppm in subsurface soil samples with concentrations ranging from 5.84 ppm in SB06 (sample LBA0020) to a maximum of 9.03 ppm in SB10 (sample LBA0030). Magnesium was detected above the BSC of 10,400 ppm and ranged from 10,900 ppm in boring SB12 (sample LBA0036) to a high of 20,500 in boring SB06 (sample LBA0020).

5.3 Surface Water Analytical Results

A total of seven surface water samples (including one QA sample) were collected from the unnamed tributary to Plum Brook between the LS and RCRA on May 20-22, 2009, and analyzed as described in Section 3.9. Sample collection began at the farthest downstream location and continued in the upstream direction. Table 3-4 presents final surface water quality field measurements. Table 5-5 presents constituents detected above RBSC values in surface water samples. Figure 5-8 presents surface water sample locations along with corresponding analytical results above RBSCs. Appendix C contains surface water sample collection logs.

Nitroaromatics, SVOCs, and PCBs were not detected in any surface water samples. Three VOCs were detected; however, none of the compounds exceeded their RBSCs. A total of 18 metals were detected in the five surface water samples, six of which exceeded its RBSC in at least one sample. Arsenic was detected in only one sample (LBA-SW06) at a concentration (8.8 ppb) above the RBSC of 0.45 ppb. Chromium was detected in seven of the nine samples and ranged from 2.6 ppb in sample LBA-SW01 to a high of 39.8 ppb in sample LBA-SW06; each detection exceeded the RBSC of 0.43 ppb. Cobalt was detected above the RBSC of 11 ppb only in the sample from LBA-SW06 at a concentration of 16.3 ppb. Iron was detected above the RBSC of 26,000 ppb only in the sample from LBA-SW06, at a concentration of 43,900. Lead was detected above the RBSC of 15 ppb only in the sample from LBA-SW06 at a concentration of 18 ppb. Manganese was detected above the RBSC of 880 ppb in six of the nine samples, with exceedances ranging from 1,050 ppb in sample LBA-SW04 to a high of 2,220 ppb in the sample from LBA-SW05. Hardness was measured in surface water sample LBA-SW01 at a concentration of 464,000 ppb.

5.4 Sediment Analytical Results

Collocated with the surface water samples, six sediment samples and associated QA/QC samples were collected from the unnamed tributary to Plum Brook located between the LS and the RCA on May 20, 21, and 22, 2009 and analyzed as described in Section 3.9.

No nitroaromatics or PCBs were detected in any of the sediment samples. Three VOCs and four SVOCs were detected; however, none of the compounds exceeded an RBSC. A total of 21 metals were detected in the sediment samples. Most of the metals were found in each of the sediment samples collected. The only metals above RBSC values were arsenic, chromium, cobalt, and manganese. Arsenic was detected in each sample collected and was above the RBSC of 3.9 ppm. Concentrations ranged from a low of 8.3 ppm in sample LBA-SD03 to a high of 17.8 ppm in sample LBA-SD04. Chromium was also found above the RBSC value of 2.9 ppm in each sample, with concentrations ranging from a low of 10.4 ppm in LBA-SD01 to 18.8 ppm in sample LBA-SD06. Cobalt was detected in three samples above the RBSC of 23 ppm, ranging from 24.6 ppm in the field split sample SD-06 to 26 ppm in sample LBA-SD04. Manganese was detected in two samples above the RBSC of 1,800 ppm. The FS sample from LBA-SD06 had a concentration of 2,280 ppm, and sample LBA-SD01 had a concentration of 5,360 ppm. TOC was measured in sediment sample LBA-SD01 at a concentration of 15,000 ppm.

5.5 Overburden/Shale Groundwater Results

From January 28 through 31, 2009, groundwater was collected from the five piezometers installed at the LS(LBA-PZ01, LBA-PZ02, LBA-PZ03, LBA-PZ04, and LBA-PZ05) using low-flow groundwater sampling methodology. Groundwater from the piezometers at the RCA (LBA-PZ07, LBA-PZ08, LBA-PZ09, and LBA-PZ10) recharged at a flow rate less than 50 milliliters per minute, so no groundwater sample was collected. A total of seven groundwater samples (including one FD and one FS sample) were collected from LBA-PZ01 through LBA-PZ05 and analyzed as described in Section 3.4. Piezometer groundwater samples should not be viewed as equivalent to monitoring well samples. The piezometers had no annular filter pack and were not developed. Analytical results from piezometer groundwater samples should be viewed as qualitative data only.

Overburden/shale groundwater was also sampled in permanently installed shallow monitoring wells at the LS [LBA-MW01 (upgradient well), LBA-MW02 (source area well), and LBA-MW03 (downgradient well)] and at the RCA [RCA-MW01 (upgradient well), RCA-MW02

(source area well), and RCA-MW03 (upgradient well)]. Groundwater was sampled near the end of May 2009 during the wet season and also sampled in November 2009 (dry season). Groundwater was collected from LBA-MW02 and LBA-MW03 during the months of May and November using a bladder pump and low-flow sampling methodology. Groundwater was collected from LBA-MW01, RCA-MW01, RCA-MW02, and RCA-MW03 during the months of May and November by purging with a bladder pump one day and sampling with a new, disposable Teflon bailer the next.

Overburden/shale piezometer and monitoring well groundwater was analyzed for nitroaromatics, metals (filtered and unfiltered), VOCs, SVOCs, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate/nitrite, sulfate, total dissolved solids, total suspended solids, turbidity, ferrous iron, and ORP). Table 3-4 provides final water quality field readings of the groundwater that were typically recorded immediately prior to sample collection. Tables 5-7 and 5-8 and Figure 5-9 show analytical results above the RBSCs and BSCs. The ORP water quality parameter measured in the groundwater for overburden/shale monitoring well LBA-MW03 (-1061.7 mV) during the May 2009 sampling event was recorded out of the normal range (ORP range -999 to 999 mV) as well as the DO measurement of groundwater in wells RCA-MW02 (17.05 ppm) and RCA-MW03 (13.89 ppm) (DO range 0 to 12 ppm). In addition, turbidity from well LBA-MW03 was recorded below the normal range of 0.0 NTU at a reading of -4.3 NTU. These water quality measurements are questionable. Although all meter calibrations were within recommended standards, out of range water quality readings are probably due to the groundwater sampling procedure for wells not able to be sampled using the low-flow sampling methodology (lag time between emptying water into the measurement cup and recording the reading, changes in temperature of ambient air versus groundwater, aeration of water while filling the measurement cup, and measurement of non-moving water). The out of range ORP and turbidity were measured from well LBA-MW03 on two different dates and sampling at both dates was performed using the low-flow methodology. The cause for the out-of-range readings by the meter is unknown. Although, the YSI water quality measurement instrument used during the groundwater sampling records and displays readings above and below normal ranges and these readings may be generally accurate, their precision is uncertain.

Groundwater collected from three of the five temporary piezometers at the LS showed elevated turbidity readings. A turbidity value of 100 NTU was selected for the PBOW temporary piezometer groundwater sampling measurement point due to the fact that piezometers were constructed with no filter pack and were not developed prior to sampling. Regardless,

groundwater analytical data from the temporary piezometers that exhibit turbidity readings greater than 100 NTU will be identified and analytical data noted as questionable or unreliable.

5.5.1 Piezometer LS Analytical Data

All LS piezometer sampling took place in January of 2009 corresponding to the wet season conditions. Seven nitroaromatics were detected above RBSCs in the groundwater in the LS piezometers, four of which exceed the RBSCs. All nitroaromatics were detected in the sample from LBA-PZ03. 2,4-DNT and 2,6-DNT were detected above their RBSCs of 0.099 ppb at concentrations of 17.2 and 15.1 ppb, respectively. 2-NT was detected above the RBSC of 0.31 ppb at a concentration of 6.89 ppb, while 3-NT was detected above the RBSC of 0.37 ppb at a concentration of 3.91 ppb. Twelve VOCs were detected in the LS piezometers; however, only three compounds exceed the RBSCs. 1,1-Dichloroethane was detected above the RBSC of 2.4 ppb in two samples: 6.66 ppb in LBA-PZ01 and 10 ppb in LBA-PZ04. Naphthalene was detected above the RBSC of 0.14 ppb in the sample LBA-PZ03 at a concentration of 4.33 ppb and trichloroethene was likewise detected above the RBSC of 2 ppb in the sample from LBA-PZ03 at a concentration of 7.03 ppb. Two SVOCs were detected in the LS piezometers and both exceeded the RBSC. 2,4-DNT and 2,6-DNT were both detected above the RBSC of 0.099 ppb in the sample from LBA-PZ03 at concentrations of 13.3 and 7.11 ppb, respectively.

Nineteen unfiltered metals were detected in the LS piezometers, 10 of which exceed the RBSCs. Aluminum exceeded the RBSC of 3,700 ppb and the BSC of 309 ppb in five samples and ranged from 3,860 ppb in the LBA-PZ05 FD sample to a high of 27,500 ppb in the LBA-PZ05 FS sample. Arsenic exceeded the RBSC of 0.045 ppb and the BSC of 7.4 ppb in five samples and ranged from 11.9 ppb in the LBA-PZ05 duplicate sample to a high of 42.7 ppb in LBA-PZ02. Beryllium exceeded the RBSC of 7.3 ppb in two samples, 12.3 ppb in LBA-PZ04 to 13.7 ppb in LBA-PZ02. Cadmium was detected above the RBSC of 1.8 ppb in five samples and ranged from 2.23 ppb in LBA-PZ05 to 4.63 ppb in LBA-PZ01. Chromium was detected above the RBSC of 0.043 ppb in four samples which ranged from 6.35 ppb in LBA-PZ05 to 39.1 ppb in LBA-PZ05 FS sample. Cobalt was detected above the RBSC of 1.1 ppb and ranged from 5.01 ppb in LBA-PZ05 FD sample to 18.6 ppb in LBA-PZ02. Cobalt also exceeded the BSC of 12.1 ppb in the samples from LBA-PZ02 and LBA-PZ4 at concentrations of 18.6 and 12.4 ppb, respectively. Copper did not exceed the RBSC but was detected above the BSC of 19.8 ppb in three samples and ranged from 53.7 ppb in LBA-PZ04 to 66 ppb in LBA-PZ02. Iron was detected above the RBSC of 2,600 ppb and the BSC of 1,550 ppb in five samples which ranged from 10,200 ppb in the LBA-PZ05 FD sample to a high of 48,900 ppb in the FS sample. Lead was detected above

the RBSC of 15 ppb in three samples which ranged from 26.6 ppb in LBA-PZ04 to 48.6 ppb in LBA-PZ02. Manganese was detected above the RBSC of 88 ppb in five samples and ranged from 286 ppb in the LBS-PZ05 FD sample to 1,450 ppb in LBA-PZ02. Manganese also exceeded the BSC of 636 ppb in three samples and ranged from 698 ppb in LBA-PZ04 to 1,450 ppb in LBA-PZ02. Nickel was detected above the BSC of 8.6 ppb in three samples that ranged from 17.6 ppb in LBA-PZ04 to 58.2 ppb in the LBA-PZ05 FS sample. Vanadium was detected above the RBSC of 18 ppb in three samples and ranged from 35.9 ppb in LBA-PZ02 to 65.9 ppb in the LBA-PZ05 FS sample.

Seventeen filtered metals were detected in the LS piezometers; however, only three of these compounds exceeded the RBSCs and only one exceeded the BSCs. Arsenic was detected above the RBSC of 0.045 ppb in three samples which ranged from 1.99 ppb in LBA-PZ05 to 28 ppb in LBA-PZ02. Arsenic also exceeded the BSC of 7.4 ppb in the samples from LBA-PZ02 and the LBA-PZ05 FD sample at concentrations of 28 and 9.75 ppb, respectively. Cadmium was detected above the RBSC of 1.8 ppb in the samples from LBA-PZ01 and LBA-PZ004 at concentrations of 4.46 and 3.29 ppb, respectively. Manganese was detected above the RBSC of 88 ppb in four samples and ranged from 104 ppb in the LBA-PZ05 FD sample to 273 ppb in LBA-PZ02.

5.5.2 Piezometer RCA Analytical Data

As mentioned in Section 5.5, four temporary piezometers (LBA-PZ07, LBA-PZ08, LBA-PZ09, and LBA-PZ10) were installed at the RCA. Due to groundwater recharge rates less than 50 milliliters per minute, no groundwater samples were collected.

5.5.3 Overburden/Shale LS Monitoring Well Analytical Data

May 2009 (Wet Season). Seven nitroaromatics were detected in the groundwater in the LS overburden/shale monitoring well LBA-MW02, five of which exceeded RBSC values. No nitroaromatics were detected in the other two overburden/shale wells LBA-MW01 and LBA-MW03. A total of three samples were collected from LBA-MW02 during the wet season which included a regular, FD, and FS sample. Nitroaromatics 2,4-DNT, 2,6-DNT, 2-NT, and 3-NT were detected above the PRG in all three samples from LBA-MW02. 2,4-DNT, 2,6-DNT, 2-NT, and 3-NT were each detected above their RBSC at maximum concentrations of 10.8 ppb, 7.8 ppb, 48.5 ppb, and 5.7 ppb, respectively, all in the FD sample. Nitroaromatic 4-NT was detected

above the RBSC in only the FD and FS samples and was found at a maximum concentration of 5.8 ppb in the FD sample.

Five VOCs were detected in the groundwater in LS overburden/shale monitoring wells, two of which exceeded RBSC values. 1,1-Dichloroethane was detected above the RBSC of 2.4 ppb only in LBA-MW03 at a concentration of 6.3 ppb. Trichloroethene was detected above the RBSC of 2 ppb in the three LBA-MW02 samples which ranged from a low of 4.8 ppb in the FS sample to 5.6 ppb in the regular sample.

Three SVOCs were reported as detected in the groundwater in LS overburden/shale monitoring wells, two of which exceeded the RBSC values. These are the two DNT isomers, which were detected only in the samples from LBA-MW02. 2,4-DNT was detected above the RBSC of 0.099 ppb in the regular LBA-MW02 sample and the LBA-MW02 FD sample at concentrations of 2.1 and 6.4 ppb, respectively. 2,6-DNT was detected above the RBSC of 0.099 ppb in the regular LBA-MW02 and the LBA-MW02 FD sample at concentrations of 2.4 and 4.3 ppb, respectively.

Twelve unfiltered metals were detected in the groundwater in LS overburden/shale monitoring wells; however, only one of these exceeded the RBSC value. Manganese was detected above the RBSC of 88 ppb in the samples from LBA-MW01 at a concentration of 436 ppb. Eleven filtered metals were detected in the groundwater in LS overburden/shale monitoring wells; however as the unfiltered samples, only manganese was above the RBSC value. Manganese was detected above the RBSC of 88 ppb in the sample from LBA-MW01 at a concentration of 457 ppb. No unfiltered or filtered metals were above BSC values.

November 2009 (Dry Season). Nine nitroaromatics were detected in the groundwater in the LS overburden/shale monitoring wells, six of which exceeded the RBSC. Like the May 2009 (wet season) sampling, all nitroaromatic RBSC exceedances were from well LBA-MW02 samples including the regular, FD, and FS samples. 2,4-DNT was detected above the RBSC of 0.099 ppb in all three of the LBA-MW02 samples at concentrations of 3.4 (regular), 17.8 ppb (FD), and 14 ppb (FS). 2,6-DNT was also detected above the RBSC of 0.099 ppb in the three samples at concentrations of 5.9 (regular), 12.4 (FS), and 11 ppb (FS). Nitrobenzene was detected above the RBSC of 0.12 ppb in only the FS sample at a concentration of 1.2 ppb. 2-NT was detected above the RBSC of 0.31 ppb in the LBA-MW02 samples at concentrations ranging from 8.1 ppb (regular) to a high of 74.7 ppb (FD). 3-NT was detected above the RBSC of 0.37 ppb in two of the LBA-MW02 samples at concentrations of 1.2 (regular) and 9.1 ppb (FD). 4-NT

was detected above the RBSC of 4.2 ppb only in the LBA-MW02 FD (8.6 ppb) and FS (5.4 ppb) samples.

Seven VOCs were detected in the groundwater in LS overburden/shale monitoring wells, three of which exceeded the RBSCs. Carbon tetrachloride was detected above the RBSC of 0.2 ppb only in the sample from LBA-MW03 at a concentration of 4 ppb. 1,1-Dichloroethane was detected above the RBSC of 2.4 ppb in four samples (all three from LBA-MW02 and one from LBA-MW03) which ranged from 3 ppb in LBA-MW02 to a high of 8.3 ppb in LBA-MW03. Trichloroethene was detected above the RBSC of 2 ppb in all three samples from well LBA-MW02 which ranged from 4.3 ppb in the regular sample to a high of 5.1 ppb in the FS. Two SVOCs were detected in the samples in LS overburden/shale monitoring well samples. Both of these, the DNT isomers, exceeded their RBSCs and both were detected only in well LBA-MW02. 2,4-DNT was detected above the RBSC of 0.099 ppb in LBA-MW02 (regular sample) and the LBA-MW02 FD samples at concentrations of 6.1 and 12.9 ppb, respectively. 2,6-DNT was detected above the RBSC of 0.099 ppb in LBA-MW02 (regular) and the LBA-MW02 FD samples at concentrations of 6.0 and 8.4 ppb.

Eleven unfiltered metals were detected in the groundwater in LS overburden/shale monitoring wells; however, only one exceeded RBSCs and only one exceeded the BSCs. Aluminum was detected above the BSC of 309 ppb in all three samples from LBA-MW02 which ranged from 313 ppb in the LBA-MW02 FD sample to a high of 1,190 ppb in the FS. Manganese was detected above the RBSC of 88 ppb in all of the LS samples. Concentrations ranged from a low of 159 ppb in LBA-MW02 FD to a high of 458 ppb in the sample from LBA-MW01. Ten filtered metals were detected in LS overburden/shale monitoring well samples; however, only one exceeded the RBSCs and none exceeded the BSCs. Manganese was detected above the RBSC of 88 ppb in two wells; 135 ppb in LBA-MW01 and 181 ppb in LBA-MW03.

5.5.4 Overburden/Shale RCA Monitoring Well Analytical Data

May 2009 (Wet Season). Four nitroaromatics were detected in the groundwater in the RCA overburden/shale monitoring well RCA-MW02, three of which exceeded RBSC values. No nitroaromatics were detected in the other two overburden/shale wells RCA-MW01 and RCA-MW03. Nitroaromatics 2,4-DNT, 2,6-DNT, and 2-NT were detected above the PRG in the sample from RCA-MW02. 2,4-DNT, 2,6-DNT, and 2-NT 3-NT were each detected above their RBSC at concentrations of 0.23 ppb, 0.29 ppb, and 2.1 ppb, respectively.

Three VOCs were detected in the groundwater in RCA overburden/shale monitoring wells; however only one exceeded its RBSC value. Dibromochloromethane was detected above the RBSC of 0.15 ppb only in the sample from RCA-MW03 at a concentration of 0.2 ppb. No SVOCs were detected in the RCA overburden/shale monitoring wells.

Fourteen unfiltered metals were detected in the groundwater in RCA overburden/shale monitoring wells; however, only two of these exceeded the RBSC values and only two exceeded the BSC values. Aluminum was detected above the BSC value of 309 ppb only in the sample from RCA-MW01 at a concentration of 386 ppb. Cobalt was detected above the RBSC of 1.1 ppb only in RCA-MW02 at a concentration of 6.1 ppb. Manganese was detected above the RBSC of 88 ppb in the sample from RCA-MW02 at concentration of 422 ppb. Nickel was detected above the BSC value of 8.6 ppb in the sample from RCA-MW02 at a concentration of 21 ppb. Thirteen filtered metals were detected in the groundwater in RCA overburden/shale monitoring wells; however, only two of these exceeded the RBSC values and only one compound exceeded the BSC value. Cobalt was detected above the RBSC of 1.1 ppb only in RCA-MW02 at a concentration of 6.1 ppb. Manganese was detected above the RBSC of 88 ppb in the sample from RCA-MW02 at a concentration 389 ppb. Nickel was detected above the BSC of 8.6 ppb only in the sample from RCA-MW02 at a concentration of 21.1 ppb.

November 2009 (Dry Season). Due to dry conditions during the month of November, well RCA-MW01 was dry and could not be sampled. Two nitroaromatics were detected in the groundwater in one of the two other RCA overburden/shale monitoring wells. Well RCA-MW02 exhibited groundwater nitroaromatic detections of 2-NT and 4-NT and only 2-NT exceeded the RBSC. 2-NT was detected at a concentration of 1.8 ppb, above the RBSC value of 0.31 ppb. No VOCs or SVOCs were detected in the groundwater during the November 2009 sampling.

Fourteen unfiltered metals were detected in the groundwater in RCA overburden/shale monitoring wells; however, only four exceeded the RBSCs and only three exceeded the BSCs. Aluminum was detected above the BSC of 309 ppb in both of the RCA samples with concentrations of 1,290 ppb in well RCA-MW02 and 1,340 ppb in well RCA-MW03. Chromium was detected above the RBSC of 0.043 ppb in the samples from RCA-MW02 and RCA-MW03 at concentrations of 2.8 and 3.3 ppb, respectively. Cobalt was detected above the RBSC of 1.1 ppb in the samples from RCA-MW02 and RCA-MW03 at concentrations of 3.7 and 2.3 ppb, respectively. Iron was detected above the RBSC of 2,600 ppb in the sample from RCA-MW02 at

a concentration of 2,830 ppb and was also detected above the BSC of 1,550 in the samples from RCA-MW02 and RCA-MW03 at concentrations of 2,830 and 2,510 ppb, respectively. Manganese was detected above the RBSC of 88 ppb in both of the samples at concentrations of 102 ppb in RCA-MW03 and 272 ppb in RCA-MW02. Nickel was detected above the BSC of 8.6 ppb in the samples from RCA-MW02 and RCA-MW03 at concentrations of 11.4 and 9.1 ppb, respectively. Only iron from well RCA-MW02 exceeded both RBSC and BSC values. Ten filtered metals were detected in the two overburden/shale monitoring well samples; however, only two exceeded the RBSCs and none exceeded the BSCs. Cobalt was detected above the RBSC of 1.1 ppb at a concentration of 1.4 ppb and manganese was detected above the RBSC of 88 ppb, both from well RCA-MW02.

5.6 Bedrock Groundwater Results

In conjunction with the groundwater sampling of the overburden/shale monitoring wells, groundwater in the permanently installed bedrock monitoring wells (LBA-BEDGW-001 [downgradient well], LBA-BEDGW-002 [source area well], IT-MNTA-BEDGW-001 [upgradient well], RCA-BEDGW-001 [upgradient well], RCA-BEDGW-002 [source area well], and RCA-BEDGW-003 [downgradient well]) were also sampled. Monitoring well screens from all of the bedrock monitoring wells are located within the Delaware Limestone bedrock unit. Like the overburden/shale wells, groundwater was sampled near the end of May 2009 during the wet season and in November 2009 during the PBOW dry season. During the months of May and November, insufficient groundwater was found in monitoring wells LBA-BEDGW-001, RCA-BEDGW-001, and RCA-BEDGW-003, so a groundwater sample could not be collected. During the month of November, insufficient groundwater was found in monitoring well LBA-BEDGW-002, so a groundwater sample could not be collected. Groundwater from the other bedrock wells (IT-MNTA-BEDGW-001 and RCA-BEDGW-002) was collected during both sampling events by purging the well dry one day using a bladder pump and returning the next day and sampling the well with a disposable bailer. Groundwater was analyzed for nitroaromatics, metals (filtered and unfiltered), VOCs, SVOCs, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate/nitrite, sulfate, total dissolved solids, total suspended solids, turbidity, ferrous iron, and ORP). Table 3-4 provides final water quality readings of the groundwater immediately prior to sample collection. Table 5-9 and Figure 5-10 show analytical results above the RBSCs and BSCs. (Note: Because monitoring wells LBA-BEDGW-001, RCA-BEDGW-001, RCA-BEDGW-003, and LBA-BEDGW-002 [November only] were not sampled during the May or November 2009 sampling events, these wells do not appear on the tables.)

May 2009 (Wet Season). No nitroaromatics were detected in the groundwater from bedrock monitoring wells during the PBOW wet season month of May. Eleven VOCs were detected in the groundwater from the bedrock monitoring wells during this event, eight of which exceeded RBSCs and four exceeded BSCs. Benzene was detected above both the RBSC of 0.41 ppb and the BSC of 2.4 ppb in wells LBA-BEDGW-002 and RCA-BEDGW-002 at concentrations of 1,680 and 31.9 ppb, respectively. Chloroform was detected above the RBSC of 0.19 ppb in the samples from IT-MNTA-BEDGW-001 and LBA-BEDGW-002 at concentrations of 66.7 and 26.8 ppb, respectively. Chloromethane was detected above the RBSC of 19 ppb in the sample from LBA-BEDGW-002 at a concentration of 35.6 ppb. Ethylbenzene was detected above the RBSC of 1.5 ppb and the BSC of 0.87 ppb in all three wells and ranged from 16.7 ppb in IT-MNTA-BEDGW-001 to a high of 169 ppb in LBA-BEDGW-002. Methylene chloride was detected above the RBSC of 4.8 ppb in the sample from IT-MNTA-BEDGW-001 at a concentration of 77.6 ppb. 1,1,2,2-Tetrachloroethane was detected above the RBSC of 0.067 ppb in RCA-BEDGW-002 at a concentration of 3.7 ppb. Toluene was detected above the RBSC of 230 ppb in LBA-BEDGW-002 above the BSC of 1.7 ppb in all three wells, with concentrations ranging from 14.2 ppb in IT-MNTA-BEDGW-001 to a high of 692 ppb in LBA-BEDGW-002. Total xylenes were detected above both the RBSC of 20 ppb and the BSC of 5.5 ppb in all three wells and ranged from 97.2 ppb in RCA-BEDGW-002 to a high of 1,130 ppb in LBA-BEDGW-002.

Eight SVOCs were detected in the groundwater from the bedrock monitoring wells; however, only two exceeded RBSCs and none exceeded BSCs. 2-Methylnaphthalene was detected above the RBSC of 15 ppb in the samples from IT-MNTA-BEDGW-001 and LAB-BEDGW-002 at concentrations of 71 and 20.9 ppb, respectively. Naphthalene was detected above the RBSC of 0.14 ppb in all three wells and ranged from 4.5 ppb in RCA-BEDGW-002 to a high of 25.6 ppb in LBA-BEDGW-002.

Sixteen unfiltered metals were detected in the groundwater from the bedrock monitoring wells; however, only four exceeded RBSCs and only five exceeded BSCs. Arsenic was detected above the RBSC of 0.045 ppb and the BSC of 7.4 ppb in wells LBA-BEDGW-002 and RCA-BEDGW-002 at concentrations of 131 and 19.9 ppb, respectively. Barium was detected above the RBSC of 730 ppb only in the sample from LBA-BEDGW-002 at a concentration of 762 ppb. Calcium was detected above the BSC of 316,000 in the samples from LBA-BEDGW-002 and RCA-BEDGW-002 at concentrations of 462,000 and 343,000 ppb, respectively. Iron was detected above the RBSC of 2,600 ppb and the BSC of 1,550 ppb only in the sample from

LBA-BEDGW-002 at a concentration of 2,940 ppb. Magnesium was detected above the BSC of 217,000 ppb in all three wells and ranged from 234,000 ppb in IT-MNTA-BEDGW-001 to a high of 352,000 ppb in LBA-BEDGW-002. Manganese was detected above the RBSC of 88 ppb in all three wells and ranged from 95.5 ppb in IT-MNTA-BEDGW-001 to a high of 1,070 ppb in LBA-BEDGW-002, which also exceeded the BSC of 636 ppb. Thirteen filtered metals were detected in the groundwater from the bedrock monitoring wells; however, only three exceeded RBSCs and only four exceeded BSCs. Arsenic was detected above the RBSC of 0.045 ppb and the BSC of 7.4 ppb in the samples from LBA-BEDGW-002 and RCA-BEDGW-002 at concentrations of 125 and 13.1 ppb, respectively. Barium was detected above the RBSC of 730 ppb only in the sample from LBA-BEDGW-002 at a concentration of 764 ppb. Calcium was detected above the BSC of 316,000 ppb in the sample from LBA-BEDGW-002 at a concentration of 471,000 ppb. Magnesium was detected above the BSC of 217,000 ppb in all three samples and ranged from 223,000 ppb in RCA-BEDGW-002 to a high of 365,000 ppb in LBA-BEDGW-002. Manganese was detected above the RBSC of 88 ppb in the samples from LBA-BEDGW-002 and RCA-BEDGW-002 at concentrations of 1,000 and 186 ppb, respectively. Manganese also exceeded the BSC of 636 ppb in the sample from LBA-BEDGW-002 at a concentration of 1,000 ppb. Cyanide was detected above the RBSC of 73 ppb only in the sample from RCA-BEDGW-002 at a concentration of 110 ppb.

November 2009 (Dry Season). Like the wet season month of May, no nitroaromatics were detected in the bedrock groundwater at the LBA. Only two wells, IT-MNTA-BEDGW-001 and RCA-BEDGW-002, could be sampled during the November sampling event. Eight VOCs were detected in the groundwater from the bedrock monitoring wells, four of which exceeded RBSCs and BSCs. Benzene was detected above the RBSC of 0.41 ppb and the BSC of 2.4 ppb in the samples from IT-MNTA-BEDGW-001 and RCA-BEDGW-002 at concentrations of 3.7 and 114 ppb, respectively. Likewise, ethylbenzene was detected above both the RBSC of 1.5 ppb and the BSC of 0.87 ppb in the samples from IT-MNTA-BEDGW-001 and RCA-BEDGW-002 at concentrations of 9.9 and 43.4 ppb, respectively. 1,1,2,2-Tetrachloroethane was detected above the RBSC of 0.067 ppb in IT-MNTA-BEDGW-001 at a concentration of 1.2 ppb. Toluene was detected above the BSC of 1.7 ppb in IT-MNTA-BEDGW-001 and RCA-BEDGW-002 at concentrations of 10 and 93.6 ppb, respectively. Total xylenes were detected above both the RBSC of 20 ppb and BSC of 5.5 ppb in the samples from IT-MNTA-BEDGW-001 and RCA-BEDGW-002 at concentrations of 136 and 234 ppb, respectively. Four SVOCs were detected in the groundwater from the bedrock monitoring wells, two of which exceeded RBSCs and none exceeded BSCs. 2-Methylnaphthalene was detected above the RBSC of 15 ppb in the

sample from IT-MNTA-BEDGW-001 at a concentration of 256 ppb. Naphthalene was detected above the RBSC of 0.14 ppb in the samples from IT-MNTA-BEDGW-001 and RCA-BEDGW-002 at concentrations of 64.9 and 7.2 ppb, respectively.

Twelve unfiltered metals were detected in the groundwater from the bedrock monitoring wells, two of which exceeded RBSCs and four exceeded BSCs. Arsenic was detected above both the RBSC of 0.045 ppb and the BSC of 7.4 ppb only in the sample from RCA-BEDGW-002 at a concentration of 28 ppb. Calcium was detected above the BSC of 316,000 ppb only in the sample from RCA-BEDGW-002 at a concentration of 360,000 ppb, and magnesium was detected above the BSC of 217,000 ppb at a concentration of 275,000 ppb only in this sample. Manganese exceeded the RBSC of 88 ppb in the sample from RCA-BEDGW-002 at a concentration of 158 ppb. Potassium exceeded the BSC of 116,000 ppb only in the sample from IT-MNTA-BEDGW-001 at a concentration of 120,000 ppb. Eleven filtered metals were detected in the groundwater from the bedrock monitoring wells; however, only two exceeded RBSCs and four exceeded BSCs. Arsenic was detected above both the RBSC of 0.045 ppb and the BSC of 7.4 ppb only in the sample from RCA-BEDGW-002 at a concentration of 42.7 ppb. Calcium was detected above the BSC of 316,000 ppb only in the sample from RCA-BEDGW-002 at a concentration of 371,000 ppb. Magnesium was detected above the BSC of 217,000 ppb only in the sample from RCA-BEDGW-002 at a concentration of 287,000 ppb. Manganese was detected above the RBSC of 88 ppb in the sample from RCA-BEDGW-002 at a concentration of 177 ppb. Potassium was detected above the BSC of 116,000 ppb only in the sample from IT-MNTA-BEDGW-001 at a concentration of 120,000 ppb.

6.0 Conclusions

This chapter presents conclusions of RI activities conducted at the LBA. Activities were conducted from January to November 2009 and included soil borehole drilling, temporary piezometer installation, soil sample collection, maintenance pit fill sample collection, overburden/shale groundwater sampling from temporary piezometers, permanent overburden/shale and Delaware Limestone bedrock monitoring well installation, two rounds of groundwater sampling from monitoring wells (one in the PBOW derived wet season and one in the dry season), surface water and sediment sampling, and IDW management and disposal. Analytical results obtained from all samples were screened against RBSC and BSC values. RBSC values do not infer a regulatory limit or mandated cleanup level, nor does an exceedance necessarily represent an unacceptable human health risk. They are used in this report only as points of reference. At the LBA, an unnamed drainage ditch, present since at least 1942, divides the LS and RCA and prohibits soil and overburden/shale groundwater communication between the two investigation areas. Therefore, although both sites are located at the LBA, the soil and overburden/shale groundwater analytical results for the LS and the RCA are presented as separate conclusions.

6.1 Surface Water Sample Summary

A total of nine surface water samples (FD and FS samples included in total) were collected from seven locations in the drainage ditch between the LS and RCA. Surface water samples were analyzed for nitroaromatics, VOCs, SVOCs, metals, PCBs, and water quality readings (ORP, pH, conductivity, turbidity, dissolved oxygen, and temperature). In addition, at sample location LBA-SW01, hardness was also analyzed. The major findings are summarized for the nine samples as follows:

- No nitroaromatics, SVOCs, or PCBs were detected
- No VOCs were detected above RBSC values.
- Metals detected above the RBSC values include the following six analytes (number of RBSC exceedance in parenthesis): arsenic (1), chromium (7), cobalt (1), iron (1), lead (1), and manganese (6). The elevated metals are likely in part the result of degradation of culverts beneath Maintenance Road. With the exception of manganese, the maximum detected concentration of metals was detected in swales located adjacent to Maintenance Road below a culvert outfall.

- Hardness was measured at a concentration of 464,000 ppb.
- Based upon minimal to no chemical detections, the surface water appears not to have been impacted by former DOD activities.

6.2 Sediment Sample Summary

A total of eight sediment samples (FD and FS samples included in total) were collocated with the surface water sample locations in the drainage ditch between the LS and RCA. Sediment samples were analyzed for nitroaromatics, VOCs, SVOCs, metals, and PCBs, and one sample, LBA-SD01, was also analyzed for TOC. Six inches (0.5 foot) of sediment were collected and placed in a new resealable bag and homogenized. The major findings are summarized as follows:

- No nitroaromatics or PCBs were detected in any of the sediment samples.
- No VOCs or SVOCs were detected above RBSC values in the sediment samples from the drainage ditch between the LS and RCA.
- Metals detected above the RBSCs include the following four analytes (number of RBSC exceedance in parenthesis): arsenic (8), chromium (8), cobalt (3) and manganese (2). These elevated concentrations of metals can be attributed to degradation of the culverts and are probably not related to former DOD activities at the site.
- TOC was found to be 15,000 ppm.
- Based upon minimal to no chemical detections, the sediment appears not to have been impacted by former DOD activities.

6.3 Soil Sample Summary

A total 33 soil samples (including QA/QC samples) were collected at the LBA from nine soil borings (17 samples from 5 borings at the LS and 16 samples from 4 borings at the RCA) .In each soil boring samples were collected at intervals of 0 to 1, 3 to 5, and 8 to 10-feet bgs. In addition to the soil samples, 3 samples were collected from the gravel fill in the maintenance pit in the LS near the base of the pit (approximately 3 to 4 feet). All the soil samples were analyzed for nitroaromatics, VOCs, SVOCs, and metals. The soil samples from 0 to 1 and 3 to 5-feet bgs were also analyzed for PCBs. The maintenance pit gravel samples were only analyzed for nitroaromatics, SVOCs, and metals. The major findings for each area are summarized as follows:

Maintenance Pit:

- A weathered petroleum odor was encountered in boring SB-09 which was drilled within 5-feet of the 1999 SI boring DP-01. Elevated petroleum contaminated material found in DP-01 was not observed in borings SB-07, SB-08, or SB-09 or reflected in the analytical results. Therefore, the heavy petroleum-related contamination encountered during the 1999 SI investigation appears to be limited to the sump and does not appear throughout the maintenance pit.

- No nitroaromatics were detected in the maintenance pit samples.

- SVOCs were detected with benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeding their RBSCs.

- No metals were detected above both RBSC and BSC values. A total of five metals (aluminum, arsenic, chromium, iron, and manganese) were detected above RBSCs and a total of three (beryllium, calcium, and magnesium) were detected above BSCs. Beryllium is not a metal associated either with the TNT manufacturing process or typical maintenance activities. In addition, beryllium appears to be elevated relative to BSCs throughout this area and likely represents the upper range of its concentration in natural soil. In addition, the nutritionally essential calcium and magnesium were detected above BSC levels (as nutritionally essential elements they lack RBSC values).

- Former DOD activities resulting with SVOCs above RBSCs, metals detected above RBSCs or BSCs, and possible petroleum contamination related to petroleum odor, may have impacted the Maintenance Pit within the LS (petroleum contamination was not able to be confirmed).

Locomotive Shop:

- No nitroaromatics exceeded an RBSC in surface soil.

- Two nitroaromatics (2,4-DNT and 2,6-DNT) were detected above the RBSCs in subsurface soil (boring LBA-SB02).

- VOCs were detected in the surface and subsurface soil samples; however, none exceeded an RBSC.

- SVOCs were detected in surface soil, but only benzo(a)pyrene exceeded its RBSC in only one location (LBA-SB03).

- SVOCs exceeding RBSCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, 2,4-DNT and 2,6-DNT were detected in several subsurface samples.

- The PCB Aroclor 1260 exceeded the RBSC in one surface soil sample (boring SB03) and PCBs were detected in subsurface soil samples.

- No metals were detected above both RBSC and BSC values. A total of six metals (aluminum, arsenic, chromium, cobalt, iron, and manganese) were detected above RBSCs and a total of five (beryllium, calcium, lead, magnesium, and mercury) were detected above BSCs. Beryllium is not a metal associated either with the TNT manufacturing process or typical maintenance activities. In addition, beryllium appears to be elevated relative to BSCs throughout this area and likely represents the upper range of its concentration in natural soil. In addition, the nutritionally essential calcium and magnesium were detected above BSC levels (as nutritionally essential elements they lack RBSC values).

- Based on the presence of nitroaromatics, SVOCs, and PCBs in surface and subsurface soil above RBSCs and metals detected above RBSCs or BSCs, former DOD operations have impacted the soil at the LS.

Rail Car Washing Area:

- Only one nitroaromatic (2,4-DNT at 0.71 ppm) exceeded an RBSC in surface soil (LBA-SB11).

- Four nitroaromatics (2,4-DNT, 2,6-DNT, 2-NT, and 3-NT) were detected above the RBSCs in subsurface soil (boring LBA-SB11).

- VOCs were detected in the surface and subsurface soil samples; however, none exceeded an RBSC.

- Two SVOC's were detected in the subsurface soil samples and 2,4-DNT and 2,6-DNT were both detected in SB11 above the RBSCs.

- The PCB Aroclor 1221 exceeded the RBSC in one surface soil sample (boring SB-12) while no PCBs exceeded an RBSC in the subsurface soil.

- No metals were detected above both RBSC and BSC values. A total of six metals (aluminum, arsenic, chromium, cobalt, iron, and manganese) were detected above RBSCs and two (beryllium and magnesium) were detected above BSCs. Beryllium is not a metal associated either with the TNT manufacturing process or typical maintenance activities. In addition, beryllium appears to be elevated relative to BSCs throughout this area and likely represents the upper range of its concentration in natural soil.

Based on the presence of nitroaromatics in surface and subsurface soil, SVOCs found in subsurface soil, and one PCB in surface soil, all above RBSCs and/or BSCs, former DOD operations have impacted the soil at the RCA.

6.4 Piezometer Overburden/Shale Groundwater Sample Summary

A total of seven groundwater samples were collected from five temporary piezometers (FD and FS samples included in total) in January and February 2009 and analyzed for nitroaromatics, VOCs, SVOCs, metals (filtered and unfiltered), hardness, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate, sulfate, total dissolved solids, total suspended solids, turbidity, ORP, and ferrous iron). All groundwater samples were collected from piezometers at the LS area. The major findings are summarized as follows:

- Nitroaromatics were detected in overburden/shale groundwater samples at the LS. 2,4-DNT, 2,6-DNT, 2-NT, and 3-NT were detected above the RBSCs in the sample from LBA-PZ03.
- VOCs were detected in piezometer overburden/shale groundwater samples. 1,1-Dichloroethane, naphthalene, and trichloroethene were detected above the RBSCs among several of the piezometers.
- SVOCs were detected in piezometer overburden/shale groundwater samples at the LBA. 2,4-DNT and 2,6-DNT were detected above the RBSCs in LBA-PZ03.
- Metals that exceeded both the RBSC and BSC included aluminum, arsenic, cobalt, iron, and manganese in the unfiltered samples.
- Only arsenic exceeded both the RBSC and BSC in filtered samples.

Based on the presence of nitroaromatics, VOCs, SVOCs, and metals above RBSCs and/or BSCs in the overburden/shale groundwater, former DOD operations have impacted the LBA groundwater.

6.5 Monitoring Well Overburden/Shale Groundwater Sample Summary

Five groundwater samples (FD and FS samples included in total) were collected during the wet season month of May 2009 and five groundwater samples were collected during the dry season month of November 2009. Groundwater was analyzed for nitroaromatics, metals (filtered and unfiltered), VOCs, SVOCs, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate/nitrite, sulfate, total dissolved solids, total suspended solids, turbidity, ORP, and ferrous

iron). The major findings related to monitoring well location (upgradient, source area, and downgradient) are summarized as follows:

Locomotive Shop:

Upgradient: Manganese was the only compound that exceeded the RBSC screening level in upgradient monitoring well LBA-MW01. It was detected in both the filtered and unfiltered groundwater samples during both the wet (May) and dry (November) season sampling events.

Source Area: Nitroaromatics were detected in the source area overburden/shale well LBA-MW02 during both the wet (May) and dry (November) season sampling events. Nitroaromatic compounds above the RBSCs included 2,4-DNT, 2,6-DNT, 2-NT, 3-NT, and 4-NT.

One VOC, trichloroethene, was detected above the RBSC during both the wet and dry sampling events.

Nitroaromatics 2,4-DNT and 2,6-DNT, detected as SVOCs, were above RBSCs during both the wet and dry season sampling events.

Only manganese was detected above the RBSC during the dry season sampling event and it was in the unfiltered groundwater sample.

Downgradient: One VOC, carbon tetrachloride, was detected above the RBSC in downgradient well LBA-MW03 during the dry season sampling and one VOC, 1,1-dichloroethane, was detected above the RBSC during both sampling events.

Only manganese was detected above the RBSC during the dry season sampling event and it was in both the unfiltered and filtered groundwater sample. Aluminum was detected above the BSC in only the dry season sampling.

- Based on the presence of nitroaromatics, VOCs, SVOCs, and metals above RBSCs and/or BSCs in the overburden/shale groundwater, former DOD operations have impacted the groundwater at the LS.

Rail Car Washing Area:

Upgradient: Aluminum was the only compound that exceeded screening levels in upgradient monitoring well RCA-MW01. It was detected above the BSC in only the unfiltered groundwater sample during the wet (May) season sampling event.

No groundwater sample was able to be collected from the upgradient well (RCA-MW01) during the dry sampling season due to insufficient groundwater.

Source Area: Nitroaromatics were detected in the source area well RCA-MW02 above the RBSC. Nitroaromatics 2,4-DNT, 2,6-DNT, and 2-NT were detected during the wet (May) season sampling event while 2-NT was the only nitroaromatic detected above the RBSC during the dry season.

Four metals above the RBSC and two above the BSC were detected in the unfiltered groundwater sample from well RCA-MW02. Cobalt and manganese were above the RBSC in the wet season and nickel was above the BSC. Chromium, cobalt, iron, and manganese were above the RBSC during the dry season and aluminum, iron, and nickel were above the BSC. Filtered metals cobalt and manganese were above the RBSC during both sampling events while only nickel was above the BSC during the wet sampling season. Iron was the only metal to exceed both the RBSC and BSC and it was from the filtered sample during the dry season.

Downgradient: One VOC, dibromochloromethane, was detected above the RBSC in downgradient well RCA-MW03 during the wet season sampling event.

Three metals above the RBSC and three above the BSC were detected in the unfiltered groundwater sample from well RCA-MW03 during the dry sampling season. Chromium, cobalt and nickel were above the RBSC while aluminum, iron, and nickel were above the BSC.

- Based on the presence of nitroaromatics, VOCs, and metals above RBSCs and/or BSCs in the overburden/shale groundwater, former DOD operations have impacted the groundwater at the RCA.

6.6 Bedrock Groundwater Sample Summary

Three groundwater samples were collected during the wet season month of May 2009 and two groundwater samples were collected during the dry season month of November 2009. Groundwater samples were collected from wells IT-MNTA-BEDGW-001 (upgradient well), LBA-BEDGW-002 (source area well), and RCA-BEDGW-002 (source area well) during the month of May and IT-MNTA-BEDGW-001 and RCA-BEDGW-002 in the month of November. No samples could be collected from bedrock well LBA-BEDGW-001, RCA-BEDGW-001, and RCA-BEDGW-003 during either sampling event due to the wells being dry. Groundwater was analyzed for nitroaromatics, metals (filtered and unfiltered), VOCs, SVOCs, and water quality

parameters (alkalinity, chloride, cyanide, hardness, nitrate/nitrite, sulfate, total dissolved solids, total suspended solids, turbidity, ferrous iron, and ORP). The major findings related to monitoring well location (upgradient, source area, and downgradient) are summarized as follows:

Locomotive Shop:

Upgradient: Six VOCs exceeded RBSCs and four exceeded BSCs during the wet and dry season sampling events from upgradient bedrock well IT-MNTA-BEDGW-001. Petroleum hydrocarbon related compounds ethylbenzene and total xylenes were above RBSCs and BSCs during both sampling events, benzene above the RBSC and BSC during the dry season sampling, and toluene was above the BSC during both sampling events. Chloroform and methylene chloride were above the RBSC during the wet season and 1,1,2,2-tetrachloroethane was above the RBSC during the dry season.

Two hydrocarbon related SVOCs were detected above RBSCs during both sampling events and included 2-methylnaphthalene and naphthalene.

Manganese was the only metal compound that exceeded RBSC screening level in upgradient monitoring well MNTA-BEDGW-001. It was detected in the unfiltered groundwater sample during the wet (May) season sampling event. Magnesium and potassium (essential human macronutrients) were detected above BSC screening levels during both sampling events.

Source Area: Six VOCs exceeded RBSCs and four exceeded BSCs during the wet season sampling event from bedrock well LBA-BEDGW-002. Petroleum hydrocarbon related compounds benzene, ethylbenzene, toluene, and total xylenes were above RBSCs and BSCs. Chloroform and chloromethane were also above the RBSC during the wet season.

Petroleum hydrocarbon related SVOCs, 2-methylnaphthalene and naphthalene, were above RBSCs during the wet season sampling event and are likely attributable to the naturally occurring hydrocarbons.

Seven metal compounds were detected above RBSCs and nine were detected above BSCs during the wet season sampling event from source area well LBA-BEDGW-001. Compounds above both the RBSC and BSC in both the unfiltered and filtered sample included arsenic and manganese. Barium was above the RBSC in both groundwater samples while only iron was above the RBSC in only the unfiltered groundwater. Essential human macronutrients calcium and magnesium exceeded BSCs in both the unfiltered and filtered groundwater samples.

No groundwater sample was able to be collected from the source area well LBA-BEDGW-001 during the dry sampling season due to insufficient groundwater.

Downgradient: No groundwater samples were able to be collected from the downgradient bedrock well LBA-BEDGW-003 during either the wet or dry season due to insufficient groundwater.

- Based on the detection of petroleum related VOCs and SVOCs above the RBSCs and/or BSCs in the Delaware Limestone groundwater, already known to contain natural petroleum hydrocarbon, and metals detected above RBSCs/BSCs, former DOD operations are interpreted not to have impacted the groundwater at the LS.

Rail Car Washing Area:

Upgradient: No groundwater samples were able to be collected from the upgradient bedrock well RCA-BEDGW-001 during either the wet or dry season due to insufficient groundwater.

Source Area: Four VOCs exceeded RBSCs and four exceeded BSCs in the source area well RCA-BEDGW-002. Petroleum hydrocarbon related compounds benzene, ethylbenzene, and total xylenes were above RBSCs and BSCs and toluene exceeded only the BSC during both the wet and dry season sampling events. VOC 1,1,2,2-tetrachloroethane was also above the RBSC during the wet season.

Petroleum hydrocarbon related SVOC naphthalene was above RBSCs during both season sampling events.

Four metal compounds were detected above RBSCs and six were detected above BSCs during the wet and dry season sampling events from source area well RCA-BEDGW-002. Arsenic was above both the RBSC and BSC in both the unfiltered and filtered samples and manganese was above only the RBSC in both samples during both sampling events. Essential human macronutrients magnesium exceeded BSCs in both the unfiltered and filtered groundwater samples during both events while calcium exceeded the BSC in the unfiltered samples and the filtered sample only during the dry season sampling. Total cyanide was also above the RBSC during the wet season (May) sampling.

Downgradient: No groundwater samples were able to be collected from the downgradient bedrock well RCA-BEDGW-003 during either the wet or dry season due to insufficient groundwater.

- Based on the detection of petroleum related VOCs and SVOCs above the RBSCs and/or BSCs in the Delaware Limestone groundwater, already known to contain natural petroleum hydrocarbon, one VOC detected above the RBSC, and metals detected above RBSCs/BSCs, former DOD operations are interpreted not to have impacted the bedrock groundwater at the RCA.

7.0 Recommendations

Based upon analytical results during this investigation, the following actions are recommended:

- To obtain further groundwater flow information and more detailed coverage, selected overburden/shale and bedrock monitoring wells at LBA should be included in sitewide groundwater level measurement activities.

- Further evaluation of nitroaromatics in soil, including that to be performed in the BHHRA and SLERA, is warranted given the presence of 2,4-DNT, 2,6-DNT, 2-NT, and 3-NT in the RCA (soil boring LBA-SB11) above RBSCs. Note that while comparison of analytical results to RBSCs and BSCs values provides some context for the levels of site contamination, final recommendation for further site activities is also dependent on conclusions from the BHHRA and SLERA reports, which are currently under preparation.

- Further evaluation of nitroaromatics in the overburden/shale groundwater and VOCs, including that to be performed in the BHHRA, may be warranted given the presence of 2,4-DNT, 2,6-DNT, 2-NT, 3-NT, 1,1-dichloroethane, and trichloroethene above RBSCs in overburden/shale groundwater. Note that while comparison of analytical results to RBSCs and BSCs values provides some context for the levels of site contamination, final recommendation for further site activities is also dependent on conclusions from the BHHRA and SLERA reports, which are currently under preparation.

- Maintenance pit sample LBA-SB09 appeared to be petroleum stained and a petroleum odor was noted during sample collection. LBA-SB09 was collected near the location of SI maintenance pit sample DP01 which was actually collected in a sump within the maintenance pit. As with LBA-SB09 a heavy petroleum odor was noted during sample collection and the sample was reported to appear oil-stained. Further evaluation of the maintenance pit should be considered by the Project Delivery Team.

Planned Activities

- Completion of the BHHRA and SLERA reports (anticipated in 2010) may address some of the items in the preceding recommendations.

8.0 References

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TABLES

Table 1-1

Limited SI (1999) - Summary of Organics in Surface and Subsurface Soil
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION	RCA								MP		LS					
		LOCATION CODE	PBOW99-DP001		PBOW99-DP002		PBOW99-DP002		PBOW99-DP003		PBOW99-LCA-DP001		PBOW99-SB001		PBOW99-SB001		PBOW99-SB001	
		SAMPLE NO	PBOW99-DP001-0004		PBOW99-DP002-0002		PBOW99-DP002-0004		PBOW99-DP003-0004		PBOW99-DP001-0008 (B718)		PBOW99-SB001-001		PBOW99-SB001-003		PBOW99-SB001-0005	
		SAMPLE DATE	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99	
		DEPTH	2 - 4 Ft		0 - 2 Ft		2 - 4 Ft		2 - 4 Ft		6 - 7.5 Ft		0 - _5 Ft		1 - 3 Ft		3 - 5 Ft	
		SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG		REG		REG	
Parameter	Units	PRG	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
PCBs																		
Aroclor 1260	mg/kg	0.2	-	-	-	-	-	-	-	-	0.45		0.19		-	-	-	-
SEMIVOLATILES																		
Dibenzofuran	mg/kg	210	-	-	1.4	J	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene	mg/kg	110	0.43		4		1.1		-	-	-	-	-	-	-	-	-	-
Methylnaphth	mg/kg	NE	-	-	5.6		-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	55	-	-	3.4		-	-	-	-	-	-	-	-	-	-	-	-
Phenanthren	mg/kg	NE	-	-	1.5		-	-	-	-	-	-	-	-	-	-	-	-

LS - Locomotive Shop.
MP - Maintenance Pit.
RCA - Rail Car Washing Area
PRG - Preliminary remediation goal. These values were included on tables in the Limited Site Inspection (LSI) Final Report of the Garage Maintenance Area (USACE, 2000). They originated from the U.S. Environmental Protection Agency (EPA) Region 9. These values were generally updated updated once annually, usually later in the year. The LSI does not indicate the year for these values, and old PRG tables are not available online or from EPA Region 9. These PRGs were based on a noncancer hazard quotient (HQ) of 1 or an incremental lifetime cancer risk (ILCR) of 1E-6, assuming residential use. For chemicals eliciting both cancer and noncancer effects, the lower of the two concentrations, based on either an HQ of 1 or an ILCR of 1E-6 was selected. These PRGs are no longer regarded as current, but are shown to present the screening process used in the LSI.

J qualifier. Analyte present. Reported value may not be accurate or precise.

Note 1: 0.45 Concentration exceeds PRG.

Source: U.S. Army Corps of Engineers (USACE), 2000, Final Report, Limited Site Investigation for the former Plum Brook Ordnance Works, Waste Water Treatment Plants 1 and 3, Garage Maintenance Building (Locomotive Building Area), July.

Table 1-2

Limited SI (1999) - Summary of Inorganics in Surface and Subsurface Soil
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION	RCA									
		LOCATION CODE	PBOW99-DP001		PBOW99-DP001		PBOW99-DP002		PBOW99-DP002		PBOW99-DP002	
		SAMPLE NO	PBOW99-DP001-0004		PBOW99-DP001-008AA		PBOW99-DP002-0002		PBOW99-DP002-0004		PBOW99-DP002-0006	
		SAMPLE DATE	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99	
		DEPTH	2 - 4 Ft		6 - 7_5 Ft		0 - 2 Ft		2 - 4 Ft		4 - 6 Ft	
		SAMPLE PURPOSE	REG		REG		REG		REG		REG	
Parameter	Units	PRG	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
METALS												
Aluminum	mg/kg	75,000	10,100		10,800		6,290		8,640		17,200	
Antimony	mg/kg	5	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	0.38	-	-	9.5		7.3		17.7		10.2	
Barium	mg/kg	1,600	112		91.2		54.7		425		138	
Beryllium	mg/kg	63	-	-	-	-	-	-	-	-	0.66	
Cadmium	mg/kg	8	-	-	0.27		-	-	-	-	-	-
Calcium	mg/kg	NE	2,850		3,310		4,180		3,420		1,930	
Chromium	mg/kg	38	16		19.1		11.7		22.5		28.6	
Cobalt	mg/kg	3,300	10.3		23.7		-	-	10.9		25.7	
Copper	mg/kg	2,800	8.8		16.6		13		14		25.2	
Iron	mg/kg	22,000	21,300		25,300		16,000		46,400		38,500	
Lead	mg/kg	130	8.6		11.9		17.2		11.5		13.8	
Magnesium	mg/kg	NE	1,520		3,230		1,110		1,460		4,310	
Manganese	mg/kg	3,100	675		1,140		205		412		891	
Nickel	mg/kg	150	32.9		50.3		12.8		27.2		45.2	
Potassium	mg/kg	NE	911		1,250		758		1,120		2,260	
Vanadium	mg/kg	520	31.2		24.5		22		49.9		33.7	
Zinc	mg/kg	12,000	82.8		98.3		38.2		99.6		97.8	
GENERAL CHEMISTRY												
pH	pH units	NE	5.7	J			7.1	J				
Total organic carbon	mg/kg	NE	8,100				17,000		7,400			

Table 1-2

Limited SI (1999) - Summary of Inorganics in Surface and Subsurface Soil
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION	RCA						MP		LS					
		LOCATION CODE	PBOW99-DP003		PBOW99-DP003		PBOW99-DP004		PBOW99-LCA-DP001-0008 (B718		PBOW99-SB001		PBOW99-SB001		PBOW99-SB001	
		SAMPLE NO	PBOW99-DP003-0004		PBOW99-DP003-0006		PBOW99-DP004-0006		PBOW99-DP001-0008		PBOW99-SB001-0005		PBOW99-SB001-001		PBOW99-SB001-003	
		SAMPLE DATE	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99		9-Jun-99		9-Jun-99		9-Jun-99	
		DEPTH	2 - 4 Ft		4 - 6 Ft		4 - 6 Ft		6 - 7.5 Ft		3 - 5 Ft		0 - _5 Ft		1 - 3 Ft	
		SAMPLE PURPOSE	REG		REG		FD		Reg		REG		REG		REG	
Parameter	Units	PRG	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
METALS																
Aluminum	mg/kg	75,000	9,500		11,200		11,900		1,460		9,590		7,180		8,020	
Antimony	mg/kg	5	-	-	-	-	-	-	10.9		-	-	-	-	1.3	
Arsenic	mg/kg	0.38	15.2		8.2		9		6.4		6.1		5.6		4.4	
Barium	mg/kg	1,600	140		167		65.8		-	-	48.8		47.1		37.9	
Beryllium	mg/kg	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	8	0.46		0.52		0.49		6.7		-	-	0.54		-	-
Calcium	mg/kg	NE	7,520		23,100		4,410		123,000		4,650		13,800		4,100	
Chromium	mg/kg	38	16.3		20.3		20.5		148		16.3		51		14.9	
Cobalt	mg/kg	3,300	22.9		15.7		15.8		-	-	-	-	-	-	-	-
Copper	mg/kg	2,800	11.7		27.7		30.8		759		10.6		16.9		7.8	
Iron	mg/kg	22,000	30,600		24,500		26,700		29,200		15,200		13,000		11,900	
Lead	mg/kg	130	11.6		14.5		14.7		1,330		13.6		222		22.5	
Magnesium	mg/kg	NE	1,900		9,050		4,380		13,300		2,540		2,870		1,770	
Manganese	mg/kg	3,100	963		1,380		688		384		224		239		146	
Nickel	mg/kg	150	34.8		52.3		47.6		17.9		16.4		14.5		10.7	
Potassium	mg/kg	NE	892		2,080		2,140		-	-	1,090		1,070		805	
Vanadium	mg/kg	520	33.4		27.4		28.9		-	-	27.6		20.3		24.3	
Zinc	mg/kg	12,000	97.7		70.5		85.6				50.7		273		45.9	
GENERAL CHEMISTRY																
pH	pH units	NE	6.2	J	7.7											
Total organic carbon	mg/kg	NE	15,000						13,000		7,400		9,600		7,500	

PRG - Preliminary remediation goal. These values were included on tables in the Limited Site Inspection (LSI) Final Report of the Garage Maintenance Area (USACE, 2000). They originated from the U.S. Environmental Protection Agency (EPA) Region 9. These values were generally updated updated once annually, usually later in the year. The LSI does not indicate the year for these values, and old PRG tables are not available online or from EPA Region 9. These PRGs were based on a noncancer hazard quotient (HQ) of 1 or an incremental lifetime cancer risk of 1E-6, assuming residential use. For chemicals eliciting both cancer and noncancer effects, the lower of the two concentrations, based on either an HQ of 1 or an ILCR of 1E-6 was selected. These PRGs are no longer regarded as current, but are shown to present the screening process used in the LSI.

Source: U.S. Army Corps of Engineers (USACE), 2000, Final Report, Limited Site Investigation for the former Plum Brook Ordnance Works, Waste Water Treatment Plants 1 and 3, Garage Maintenance Building (Locomotive Building Area), July.

Table 1-3

Limited SI (1999) - Summary of Surface Water Samples
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION CODE	PBOW99-SW001		PBOW99-SW002		PBOW99-SW003		PBOW99-SWA101	
		SAMPLE NO	PBOW99-SW001-0001		PBOW99-SW002-0001		PBOW99-SW003-0001		PBOW99SWA101	
		SAMPLE DATE	11-Jun-99		11-Jun-99		11-Jun-99		11-Jun-99	
		DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
		SAMPLE PURPOSE	REG		FD		REG		REG	
Parameter	Units	PRG	Result	VQ	Result	VQ	Result	VQ	Result	VQ
PESTICIDES/PCBs										
Aroclor 1260	µg/L	0.034	1.2		1.7		-	-		
METALS-UNFILTERED										
Aluminum	µg/L	37,000	403		954		-	-	652	
Antimony	µg/L	15	-	-	15		-	-	-	-
Arsenic	µg/L	0.045	13.2		20.6		-	-	-	-
Cadmium	µg/L	18	-	-	5		-	-	-	-
Calcium	µg/L	NE	85,600		84,200		46,600		36,100	
Chromium	µg/L	180	9.5		24.9		-	-	-	-
Copper	µg/L	1,400	-	-	46.6		-	-	-	-
Iron	µg/L	11,000	8,980		29,300		1,120		1,390	
Lead	µg/L	4	68.7		177		4.7		-	-
Magnesium	µg/L	NE	13,600		13,400		-	-	16,800	
Manganese	µg/L	1,700	69.4		163		75.5		78.8	
Potassium	µg/L	NE	7,340		6,540	J	17,400		-	-
Sodium	µg/L	NE	9,190		11,500	J	7,780		26,900	
Zinc	µg/L	11,000	96.6		391		-	-	-	-

PRG - Preliminary remediation goal.

PBOW99SWA101 was not analytzed for pesticides or polychlorinated biphenyls.
Shaded cell indicates value is greater than PRG.
µg/L - parts per billion.
Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.

PRG - Preliminary remediation goal. These values were included on tables in the Limited Site Inspection (LSI) Final Report of the Garage Maintenance Area (USACE, 2000). They originated from the U.S. Environmental Protection Agency (EPA) Region 9. These values were generally updated updated once annually, usually later in the year. The LSI does not indicate the year for these values, and old PRG tables are not available online or from EPA Region 9. These PRGs were based on a noncancer hazard quotient (HQ) of 1 or an incremental lifetime cancer risk (ILCR) of 1E-6, assuming tap water use. For chemicals eliciting both cancer and noncancer effects, the lower of the two concentrations, based on either an HQ of 1 or an ILCR of 1E-6 was selected. These PRGs are no longer regarded as current, but are shown to present the screening process used in the LSI.

Source: U.S. Army Corps of Engineers (USACE), 2000, Final Report, Limited Site Investigation for the former Plum Brook Ordnance Works, Waste Water Treatment Plants 1 and 3, Garage Maintenance Building (Locomotive Building Area), July.

Table 1-4

Limited SI (1999) - Summary of Sediment Samples
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION CODE	PBOW99-SDA101	
		SAMPLE NO	PBOW99SDA101	
		SAMPLE DATE	11-Jun-99	
		DEPTH	0 - 0 Ft	
		SAMPLE PURPOSE	REG	
Parameter	Units	PRG	Result	VQ
METALS				
Aluminum	mg/kg	75,000	11,400	
Arsenic	mg/kg	0.38	41.5	
Barium	mg/kg	5,200	135	
Beryllium	mg/kg	150	0.9	
Calcium	mg/kg	NE	5,190	J
Chromium	mg/kg	210	21.6	J
Cobalt	mg/kg	3,300	41.4	J
Copper	mg/kg	2,800	20	
Iron	mg/kg	22,000	80,900	
Lead	mg/kg	400	17.3	
Magnesium	mg/kg	NE	2,240	
Manganese	mg/kg	3,100	1,730	
Nickel	mg/kg	1,500	47	
Potassium	mg/kg	NE	1,310	
Vanadium	mg/kg	520	73.5	J
Zinc	mg/kg	22,000	145	J

PRG - Preliminary remediation goal.
NE - Not established (PRGs).
Shaded cell indicates value is greater than PRG.
mg/kg - Parts per million.
Validation Qualifiers (VQ)

J - The analyte was postively identifed; the reported value is estimated.

PRG - Preliminary remediation goal. These values were included on tables in the Limited Site Inspection (LSI) Final Report of the Garage Maintenance Area (USACE, 2000). They originated from the U.S. Environmental Protection Agency (EPA) Region 9. These values were generally updated updated once annually, usually later in the year. The LSI does not indicate the year for these values, and old PRG tables are not available online or from EPA Region 9. These PRGs were based on a noncancer hazard quotient (HQ) of 1 or an incremental lifetime cancer risk of 1E-6, assuming tap water use. For chemicals eliciting both cancer and noncancer effects, the lower of the two concentrations, based on either an HQ of 1 or an ILCR of 1E-6 was selected. These PRGs are no longer regarded as current, but are shown to present the screening process used in the LSI.

Source: U.S. Army Corps of Engineers (USACE), 2000, Final Report, Limited Site Investigation for the former Plum Brook Ordnance Works, Waste Water Treatment Plants 1 and 3, Garage Maintenance Building (Locomotive Building Area), July.

Table 3-1

Summary of Direct-Push Soil and Temporary Piezometer Groundwater Samples Collected
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	SDG Number
TEMPORARY PIEZOMETER					
GW	LBA-PZ05	LBA3006	01/28/2009	REG	0901043
GW	LBA-PZ05	LBA3001	01/28/2009	FD	0901043
GW	LBA-PZ05	LBA3002	01/28/2009	FS	A9A290152
GW	LBA-PZ02	LBA3003	01/29/2009	REG	0901043
GW	LBA-PZ03	LBA3004	01/29/2009	REG	0901046
GW	LBA-PZ04	LBA3005	01/30/2009	REG	0902003
GW	LBA-PZ01	LBA3000	01/31/2009	REG	0902003
SOIL					
SS	LBA-SB02	LBA0004	01/19/2009	REG	0901034
DS	LBA-SB02	LBA0005	01/19/2009	REG	0901034
DS	LBA-SB02	LBA0006	01/19/2009	REG	0901034
SS	LBA-SB04	LBA0012	01/19/2009	REG	0901034
DS	LBA-SB04	LBA0014	01/19/2009	REG	0901034
DS	LBA-SB04	LBA0013	01/19/2009	REG	0901034
SS	LBA-SB05	LBA0015	01/19/2009	REG	0901034
SS	LBA-SB10	LBA0026	01/19/2009	REG	0901027
SS	LBA-SB10	LBA0027	01/19/2009	FD	0901027
SS	LBA-SB10	LBA0028	01/19/2009	FS	A9A220198
DS	LBA-SB10	LBA0029	01/19/2009	REG	0901027
DS	LBA-SB10	LBA0030	01/19/2009	REG	0901027
SS	LBA-SB11	LBA0031	01/19/2009	REG	0901027
DS	LBA-SB11	LBA0032	01/19/2009	REG	0901027
DS	LBA-SB11	LBA0033	01/19/2009	REG	0901027
SS	LBA-SB12	LBA0034	01/19/2009	REG	0901027
DS	LBA-SB12	LBA0035	01/19/2009	REG	0901027
DS	LBA-SB12	LBA0036	01/19/2009	REG	0901027
SS	LBA-SB01	LBA0001	01/20/2009	REG	0901034
DS	LBA-SB01	LBA0002	01/20/2009	REG	0901034
DS	LBA-SB01	LBA0003	01/20/2009	REG	0901034
SS	LBA-SB03	LBA0007	01/20/2009	REG	0901034
SS	LBA-SB03	LBA0008	01/20/2009	FD	0901034
SS	LBA-SB03	LBA0009	01/20/2009	FS	A9A220198
DS	LBA-SB03	LBA0010	01/20/2009	REG	0901034
DS	LBA-SB03	LBA0011	01/20/2009	REG	0901034
DS	LBA-SB05	LBA0016	01/20/2009	REG	0901034
DS	LBA-SB05	LBA0017	01/20/2009	REG	0901034
SS	LBA-SB06	LBA0018	01/20/2009	REG	0901034
DS	LBA-SB06	LBA0019	01/20/2009	REG	0901034
DS	LBA-SB06	LBA0020	01/20/2009	REG	0901034
DS	LBA-SB06	LBA0021	01/20/2009	FD	0901034
DS	LBA-SB06	LBA0022	01/20/2009	FS	A9A220198
DS	LBA-SB07	LBA0023	01/20/2009	REG	0901034
DS	LBA-SB08	LBA0024	01/20/2009	REG	0901034
DS	LBA-SB09	LBA0025	01/20/2009	REG	0901034

Notes:
SDG - Sample Delivery Group.
GW - Groundwater.
SS - Surface Soil.
DS - Deep Soil (subsurface).
REG - Regular Sample.
FD - Field Duplicate.
FS - Field Split.

Table 3-2

Monitoring Well Construction Details
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well ID	Coordinates (Ohio Plane) Northings (y)	Eastings (x)	Well Depth (feet bgs)	Date Installed	Installed By	Casing Type	Casing Diameter (inches)	Borehole Diameter (inches)	Screen Interval (feet bgs)	Geologic Unit Screened	Top of Filter Pack (feet bgs)	TOC Elevation (feet msl)	Ground Elevation (feet msl)	Bedrock Elevation (feet msl)	Well Bottom Elevation (feet msl)
Monitoring Wells Screened in Overburden/Shale															
LBA-MW01	623937.120	1918462.090	16.35	3/31/2009	Shaw	PVC (40)	2	8	6.0-16.0	Overburden	5.0	639.86	637.20	NA	620.85
LBA-MW02	623827.440	1918628.330	16.35	3/31/2009	Shaw	PVC (40)	2	8	6.0-16.0	Overburden	4.5	639.25	635.90	NA	619.55
LBA-MW03	623788.630	1918684.590	16.35	3/31/2009	Shaw	PVC (40)	2	8	6.0-16.0	Overburden	5.0	638.18	635.50	NA	619.15
RCA-MW01	623724.690	1919029.450	9.35	3/26/2009	Shaw	PVC (40)	2	8	4.0-9.0	Overburden	3.5	641.01	638.40	NA	629.05
RCA-MW02	623826.400	1918834.020	28.05	3/19/2009	Shaw	PVC (40)	2	8	17.7-27.7	Overburden	14.5	638.15	635.30	609.30	607.25
RCA-MW03	623865.520	1918827.900	28.65	3/18/2009	Shaw	PVC (40)	2	8	18.3-28.3	Overburden	16.0	638.16	635.30	608.40	606.65
Monitoring Wells Screened in Delaware Limestone															
LBA-BEDGW-001	623937.80	1918452.89	100.35	3/31/2009	Shaw	Steel to 39.7', PVC (40) to 100.35'	2	12" to 24.0', 8" to 39.8', 6" to 101.0'	85.0-100.0	Delaware LM	81.0	639.74	637.30	612.30	536.95
LBA-BEDGW-002	623827.05	1918614.64	70.35	3/29/2009	Shaw	Steel to 37.0', PVC (40) to 70.35'	2	12" to 27.0', 8" to 37.1', 6" to 71.1'	55.0-70.0	Delaware LM	51.0	638.62	636.30	609.30	565.95
MNTA-BEDGW-001	623808.00	1918699.00	64.00	9/22/1997	IT	Steel to 31', PVC (40) to 64'	10" to 31', 2" to 64'	14.25" to 31', 6" to 65'	48.75-63.75	Delaware LM	44	638.40	636.05	611.25	572.05
RCA-BEDGW-001	623709.77	1919022.35	80.35	3/26/2009	Shaw	Steel to 41.6', PVC (40) to 80.35'	2	12" to 24.5', 8" to 41.5', 6" to 81.5'	65.0-80.0	Delaware LM	61.7	641.02	638.50	615.30	558.15
RCA-BEDGW-002	623832.46	1918842.57	65.35	3/27/2009	Shaw	Steel to 37.3', PVC (40) to 65.35'	2	12" to 24.5', 8" to 37.5', 6" to 66.0'	50.0-65.0	Delaware LM	48.0	638.03	635.50	609.50	570.15
RCA-BEDGW-003	623916.92	1918767.69	104.35	3/28/2009	Shaw	Steel to 35.5', PVC (40) to 104.35'	2	12" to 20', 8" to 35.6', 6" to 105.8'	89.0-104.0	Delaware LM	86.0	637.00	634.30	609.50	529.95

Coordinates scaled to the Ohio State Plane coordinate system, North Zone, NAD 1983. Vertical datum is North American Vertical Datum 1929.

Table 3-3

Summary of Monitoring Well Groundwater Samples Collected
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	SDG Number
May 2009					
GW	LBA-MW03	LB3071	05/10/2009	REG	F65207
GW	RCA-MW02	RC3075	05/11/2009	REG	F65210
GW	RCA-MW03	RC3076	05/11/2009	REG	F65210
GW	RCA-BEDGW-002	RC3078	05/11/2009	REG	F65210
GW	LBA-MW01	LB3067	05/12/2009	REG	F65220
GW	RCA-MW01	RC3074	05/12/2009	REG	F65220
GW	LBA-BEDGW-002	LB3073	05/12/2009	REG	F65220
GW	LBA-MW02	LB3068	05/19/2009	REG	F65372
GW	LBA-MW02	LB3069	05/19/2009	FD	F65372
GW	LBA-MW02	LB3070	05/19/2009	FS	A9E200268
GW	IT-MNTA-BEDGW-001	LB3074	05/19/2009	REG	F65372
November 2009					
GW	LBA-MW03	LB3080	11/03/2009	REG	F69251
GW	RCA-MW02	RC3081	11/03/2009	REG	F69251
GW	LBA-MW01	LB3075	11/04/2009	REG	F69251
GW	RCA-MW03	RC3082	11/04/2009	REG	F69251
GW	LBA-MW02	LB3076	11/05/2009	REG	F69338
GW	LBA-MW02	LB3077	11/05/2009	FD	F69338
GW	LBA-MW02	LB3079	11/05/2009	FS	A9K070415
GW	RCA-BEDGW-002	RC3084	11/05/2009	REG	F69338
GW	IT-MNTA-BEDGW-001	BEDGW-001-1109	11/06/2009	REG	F69338

Notes:
SDG - Sample Delivery Group.
GW - Groundwater.
REG - Regular Sample.
FD - Field Duplicate.
FS - Field Split.

Table 3-4

Final Field Measurements of Temporary Piezometer and Monitoring Well Groundwater and Surface Water Locomotive Building Area Site Characterization Report Former Plum Brook Ordnance Works, Sandusky, Ohio

Identification	Date	Low-Flow Sampled	Dissolved Oxygen (ppm)	Ferrous Iron (mg/L)	Oxidation Reduction Potential (mV)	pH	Electrical Conductivity (mS/cm)	Temperature (^{0}C)	Turbidity (NTU)	Amount Purged (L)
Temporary Piezometer										
LBA-PZ01	31-JAN-09	Yes	1.97	NM[a]	10.6	6.80	0.942	5.16	18.1	8.6
LBA-PZ02	29-JAN-09	Yes	2.78	NM[a]	-26.4	7.57	0.554	3.70	1210.8	5
LBA-PZ03	29-JAN-09	Yes	0.66	0.0	4.9	6.94	0.486	4.76	25.2	12
LBA-PZ04	30-JAN-09	Yes	0.51	NM[a]	17.9	6.99	0.569	5.42	1222.5	3
LBA-PZ05	28-JAN-09	Yes	5.25	1.0	-26.1	7.82	0.563	8.72	467.4	3
Overburden/Shale Monitoring Wells										
LBA-MW01	12-MAY-09	No	7.67	0.0	681.6	6.44	1.293	11.91	0.0	40.4
LBA-MW02	19-MAY-09	Yes	5.42	0.0	-503.1	6.73	0.721	12.18	0.0	5
LBA-MW03	10-MAY-09	Yes	11.88	0.0	-1061.7[b]	6.92	0.660	12.56	0.0	2.9
RCA-MW01	12-MAY-09	No	7.71	0.0	122.5	6.71	0.890	9.96	1.0	16
RCA-MW02	11-MAY-09	No	17.05[b]	0.0	-37.7	7.07	1.513	13.59	3.7	32
RCA-MW03	11-MAY-09	No	13.89[b]	0.0	86.4	7.29	0.635	11.89	1.9	33
LBA-MW01	04-NOV-09	No	6.24	0.0	-16.5	7.15	0.797	10.06	11.9	19
LBA-MW02	05-NOV-09	Yes	2.39	0.0	-2.2	6.93	0.69	10.41	0.0	3
LBA-MW03	03-NOV-09	Yes	2.52	0.0	-14.3	7.17	0.822	11.02	0.0[c]	2
RCA-MW02	02-NOV-09	No	1.50	0.0	-34.4	7.59	1.31	10.38	10.2	30
RCA-MW03	04-NOV-09	No	4.96	0.0	-49.7	7.77	0.723	8.13	76.5	30.5
Delaware Limestone Monitoring Wells										
LBA-BEDGW-002	12-MAY-09	No	8.12	0.0	-187.6	6.55	6.190	15.25	20.8	21
IT-MNTA-BEDGW-001	19-MAY-09	No	0.28	0.0	-200.8	6.44	10.53	15.17	21.5	55.4
RCA-BEDGW-002	11-MAY-09	No	4.91	0.0	-283.9	6.21	7.074	12.21	6.9	46.5
IT-MNTA-BEDGW-001	06-NOV-09	No	3.85	0.0	-19.0	6.89	9.365	9.53	13.6	8
RCA-BEDGW-002	05-NOV-09	No	10.44	0.0	2.3	6.58	8.035	9.94	2.7	34
Surface Water										
LBA-SW01	20-MAY-09	NA	9.05	NM	83.1	7.24	1.083	14.09	5.1	NA
LBA-SW02	21-MAY-09	NA	5.35	NM	156.3	6.98	1.157	12.65	3.3	NA
LBA-SW03	21-MAY-09	NA	7.49	NM	29.4	6.99	1.167	17.13	12.7	NA
LBA-SW04	21-MAY-09	NA	8.02	NM	24.1	7.06	1.120	17.59	36.0	NA
LBA-SW05	22-MAY-09	NA	5.80	NM	158.0	6.71	1.098	13.52	0.8	NA
LBA-SW06	22-MAY-09	NA	6.19	NM	103.2	6.81	0.868	14.02	294.7	NA
LBA-SW07	22-MAY-09	NA	4.16	NM	-34.2	6.79	0.949	11.52	0.0	NA

Notes:

Water quality measurements recorded by YSI water quality instrument immediately prior to the sample collection time.

Water unable to be collected from any temporary piezometers at the Rail Car Wash Area.

^{0}C - Degree Celsius.
Eh - Oxidation-reduction potential.
L - Liters.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NA - Not Applicable.

NM - Not measured.
NM[a] - Water too turbid to read ferrous iron field test.
ppm - Parts per million.
mg/L - Milligrams per liter (ppm).
NTU - Nephelometric turbidity unit.
Ferrous iron measured in field using Hach test kit.
[b]Reading suspect.
[c]Original turbidity measurement was in negative value, but due to the presence of very clear water, reading was assumed to be 0.0 NTU.

Table 3-5

Summary of Surface Water and Sediment Samples Collected
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	SDG Number
SD	LBA-SD01	LBA1000	05/20/2009	REG	F65383
SD	LBA-SD02	LBA1001	05/21/2009	REG	F65408
SD	LBA-SD03	LBA1002	05/21/2009	REG	F65408
SD	LBA-SD04	LBA1003	05/21/2009	REG	F65408
SD	LBA-SD05	LBA1004	05/22/2009	REG	F65444
SD	LBA-SD06	LBA1005	05/22/2009	REG	F65444
SD	LBA-SD06	LBA1006	05/22/2009	FD	F65444
SD	LBA-SD06	LBA1007	05/22/2009	FS	A9E280112
SW	LBA-SW01	LBA2000	05/20/2009	REG	F65383
SW	LBA-SW02	LBA2001	05/21/2009	REG	F65407
SW	LBA-SW03	LBA2002	05/21/2009	REG	F65407
SW	LBA-SW03	LBA2003	05/21/2009	FD	F65407
SW	LBA-SW03	LBA2004	05/21/2009	FS	A9E220318
SW	LBA-SW04	LBA2005	05/21/2009	REG	F65407
SW	LBA-SW05	LBA2006	05/22/2009	REG	F65442
SW	LBA-SW06	LBA2007	05/22/2009	REG	F65442
SW	LBA-SW07	LBA2008	05/22/2009	REG	F65442

Notes:
SDG - Sample Delivery Group.
SD - Sediment.
SW - Surface Water.
REG - Regular Sample.
FD - Field Duplicate.
FS - Field Split.

Table 4-1

Summary of Analytical Parameters and Methods for Soil, Groundwater, Surface Water, and Sediment Samples
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Matrix	Analytical Parameters	Analytical Method
Soil	Nitroaromatic Compounds	SW-846 3535/8330A
	TAL Metals (T)	SW-846 3050B/6010B/6020A/7471B
	PCBs	SW-846 8082
	TCL Volatile Organic Compounds	SW-846 5035/8260B
	TCL Semivolatile Organic Compounds	SW-846 3540C/8270C
	Percent Solids	EPA 160.3
	Total Organic Carbon	SW-846 9060
Groundwater	Nitroaromatic Compounds	SW-846 3535/8330A
	TAL Metals (T/D)	SW-846 3050B/6010B/6020A/7470A
	TCL Volatile Organic Compounds	SW-846 5030B/8260B
	TCL Semivolatile Organic Compounds	SW-846 3510C/8270C
	Alkalinity	EPA 310.1/SM19 2320B
	Chloride	EPA 300.0/SW9056
	Cyanide, total	SW-846 9012A/EPA 335.2/EPA 335.4
	Hardness	EPA 130.2/SM19 2340B
	Nitrate/Nitrite	EPA 353.2/SM-4500-NO3 E
	Nitrate	EPA 300.0
	Sulfate	EPA 300.0/SW-846 9056
	Total Dissolved Solids	EPA 160.1/SM19 2540C
	Total Suspended Solids	EPA 160.2/SM19 2540D
	Turbidity	EPA 180.1
Surface Water	Nitroaromatic Compounds	SW-846 3535/8330A
	TAL Metals (T/D)	SW-846 3050B/6010B/6020A/7471B
	PCBs	SW-846 8082
	TCL Volatile Organic Compounds	SW-846 5035/8260B
	TCL Semivolatile Organic Compounds	SW-846 3540C/8270C
	Hardness	SM19 2340B
Sediment	Nitroaromatic Compounds	SW-846 3535/8330A
	TAL Metals (T)	SW-846 3005A/6010B/6020A/7470A
	PCBs	SW-846 8082
	TCL Volatile Organic Compounds	SW-846 5030B/8260B
	TCL Semivolatile Organic Compounds	SW-846 3540C/8270C
	Percent Solids	EPA 160.3/SM19 2540B M
	Total Organic Carbon	Walkley-Black

PCB - Polychlorinated biphenyl.
TAL - Target analyte list.
TCL - Target compound list.
Metals (T) - Total metals.
Metals (T/D) - Total and dissolved metals reported.

Table 4-2

Background Screening Concentrations for Inorganics and BTEX Compounds in Groundwater Locomotive Building Area Site Characterization Report Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of Values, µg/L: Detected Concentrations Minimum	Detected Concentrations Maximum	Reporting Limits Minimum	Reporting Limits Maximum	Mean µg/L	Standard Deviation	UTL [a] µg/L	BSC [b] µg/L
Metals - Unfiltered										
Aluminum	11 / 13	85	3.15E+01	3.09E+02	2.00E+02	2.00E+02	1.05E+02	6.98E+01	4.17E+02	309
Arsenic	4 / 26	15	3.30E+00	7.40E+00	1.00E+01	1.00E+01	4.99E+00	6.56E-01	7.92E+00	7.4
Barium	28 / 28	100	2.58E+01	1.18E+04	2.00E+02	2.00E+03	1.73E+03	3.77E+03	1.86E+04	11800
Calcium	28 / 28	100	1.74E+04	3.16E+05	5.00E+03	5.00E+03	1.38E+05	8.31E+04	5.09E+05	316000
Cobalt	6 / 27	22	1.00E+00	1.21E+01	5.00E+01	5.00E+01	2.05E+01	8.75E+00	5.96E+01	12.1
Copper	2 / 28	7	3.30E+00	1.98E+01	2.50E+01	2.50E+01	1.24E+01	2.26E+00	2.25E+01	19.8
Iron	24 / 27	89	3.82E+01	1.55E+03	1.00E+02	1.00E+02	4.15E+02	4.87E+02	2.59E+03	1550
Magnesium	28 / 28	100	7.28E+03	2.17E+05	5.00E+03	5.00E+03	7.17E+04	5.85E+04	3.33E+05	217000
Manganese	28 / 28	100	3.60E+00	6.88E+02	1.50E+01	1.50E+01	8.12E+01	1.24E+02	6.36E+02	636
Nickel	4 / 27	15	4.80E+00	8.60E+00	4.00E+01	4.00E+01	1.81E+01	4.67E+00	3.90E+01	8.6
Potassium	28 / 28	100	2.53E+03	1.16E+05	5.00E+03	5.00E+04	2.70E+04	3.06E+04	1.64E+05	116000
Sodium	28 / 28	100	1.33E+04	1.39E+06	5.00E+03	5.00E+04	3.55E+05	4.36E+05	2.30E+06	1390000
Zinc	14 / 19	74	8.30E-01	5.07E+02	2.00E+01	2.00E+01	5.55E+01	1.23E+02	6.06E+02	507
Volatile Organic Compounds										
Benzene	9 / 28	32	1.45E-01	2.40E+00	1.00E+00	5.00E+00	6.73E-01	5.43E-01	3.10E+00	2.4
Ethylbenzene	6 / 28	21	1.30E-01	8.70E-01	1.00E+00	5.00E+00	5.82E-01	4.00E-01	2.37E+00	0.87
Toluene	8 / 28	29	1.20E-01	1.70E+00	1.00E+00	5.00E+00	4.99E-01	2.83E-01	1.76E+00	1.7
Xylenes, total	8 / 28	29	3.60E-01	5.50E+00	1.00E+00	5.00E+00	1.22E+00	1.53E+00	8.07E+00	5.5

[a] The UTL (upper tolerance limit) is calculated using the Chebychev equation (mean + 4.47 * standard deviation).

[b] The BSC (background screening criterion) is the calculated UTL or the maximum detected concentration, whichever is less.

µg/L - Micrograms per liter.

mg/L - Milligrams per liter.

BTEX - Benzene, toluene, ethylbenzene, and xylenes.

Source: Shaw Environmental, Inc., 2005, 2004 Data Summary and Evaluation Report, Final, Plum Brook Ordnance Works, Sandusky, Ohio, April.

Table 4-3

Background Concentrations of Metals in Soil[a]
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical Name (mg/kg)	Frequency of Detection	Range of Detected Concentrations	Range of Reporting Limits	Statistical Distribution	Arithmetic Mean	95% UTL [b]	Background Screening Criterion [c]
Aluminum	12 / 12	3520 - 15500	NA	L	8.43E+03	2.69E+04	1.55E+04
Antimony	9 / 25	5.9 - 9.3	5.4 - 74	NP	4.68E+00	NA	9.30E+00
Arsenic	23 / 26	2.1 - 36.5	1.2 - 3.7	L	1.08E+01	7.10E+01	3.65E+01
Barium	9 / 12	35.6 - 826	23.2 - 24.7	L	1.16E+02	1.30E+03	8.26E+02
Beryllium	6 / 25	0.57 - 1	0.57 - 1.2	L	5.65E-01	1.17E+00	1.00E+00
Cadmium	0 / 25	NA	0.57 1.2	L	4.49E-01	NA	NA
Calcium	12 / 12	735 - 52300	NA	L	1.13E+04	2.18E+05	5.23E+04
Chromium	25 / 26	4.4 - 29	12.3 - 12.3	NP	1.34E+01	NA	2.90E+01
Cobalt	9 / 12	9.6 - 116	5.8 - 6.2	L	2.26E+01	2.48E+02	1.16E+02
Copper	23 / 26	2.3 - 56.2	2.2 - 2.9	L	1.70E+01	1.47E+02	5.62E+01
Iron	12 / 12	5880 - 234000	NA	L	4.01E+04	3.58E+05	2.34E+05
Lead	26 / 26	1.9 - 48.6	NA	L	1.28E+01	5.13E+01	4.86E+01
Magnesium	12 / 12	629 - 10400	NA	L	3.26E+03	3.08E+04	1.04E+04
Manganese	26 / 26	21 - 13300	NA	L	7.29E+02	3.51E+03	3.51E+03
Mercury	2 / 26	0.085 - 0.085	0.037 - 0.3	L	9.06E-02	5.60E-01	8.50E-02
Nickel	26 / 26	5.4 - 55.1	NA	L	2.28E+01	7.79E+01	5.51E+01
Potassium	11 / 12	579 - 3390	617 - 617	L	1.24E+03	6.08E+03	3.39E+03
Selenium	5 / 25	0.61 - 2	0.57 - 4.9	NP	1.55E+00	NA	2.00E+00
Silver	2 / 26	1.1 - 11.1	1.1 - 1.3	NP	1.00E+00	NA	1.11E+01
Sodium	0 / 12	NA	566 - 663	L	3.03E+02	NA	NA
Thallium	2 / 25	1.2 - 1.3	1.1 - 6.1	NP	1.91E+00	NA	1.30E+00
Vanadium	11 / 12	9 - 40.9	61.7 - 61.7	L	2.48E+01	8.31E+01	4.09E+01
Zinc	26 / 26	6.6 - 655	NA	L	7.30E+01	3.22E+02	3.22E+02

mg/kg - Milligrams per kilogram.
NA - Not applicable; not available.
[a] Data used to determine soil background are based on sampling from IT, 1998, ***Site Investigation of Acid Areas, Plum Brook Ordnance Works, Sandusky, Ohio.***
[b] 95% UTL = 95% upper tolerance limit calculated as described in Section 2.1.4 and rounded to 3 significant figures.
[c] The maximum detected concentration is used as the background screening criterion for nonparametric data sets; for normal or lognormal data sets, the 95% UTL or the maximum detected concentration, whichever is less, is used.
Note: Detection limits from sample 6990 were deleted when calculating results for antimony, beryllium, cadmium, selenium and thallium. The detection limits were elevated by dilution factors which greatly exceed any detected concentration and would bias results unrealistically high.

Table 5-1

Observances of Hydrocarbons in Bedrock During Borehole Coring at PBOW (1941-2009)
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Borehole Identification	Date Drilled	Location	Depth to Bedrock (ft)	Depth to Bedrock (refusal - ft)	Depth to Delaware Limestone[a] (ft)	Depth Drilled (ft)	Hydrocarbon/H_2S Odor Detected[b] (ft)	Hydrocarbon Stained Core[c] (ft)	Comments
TPCB-1 (Boring)	6/9/1941	Behind Water Clarification Bldg 416	3	Unknown	85	336.8	Gas 58-60;Oil intermittently	Unknown	
BED-MW22 (Well)	8/24/01-9/10/01	Downgradient Boundary, North of Reactor Area	19.5	19.5	19.5	43	20-24.5	40-43	
BED-MW23 (Well)	8/25/01-9/6/01	South of Reactor Area and Pentolite Road	26.3	26.3	26.3	74	30-74	33-74	Hydrocarbon observed seepng from rock core.
BED-MW24 (Well)	8/26/01-9/13/01	West of West Red Water Ponds, Downgradient	17.3	17.3	17.3	41.5	26.5-40.0	31.5-41.5	Hydrocarbon observed seepng from rock core. Gas discharge (gurgling) heard during water recharge.
BED-MW27 (Well) (Abandoned)	8/23/01-9/8/01	Downgradient Boundary, East-Northeast of Reactor Area	18.8	18.8	20	105	95-105	41-105	Hydrocarbon observed seepng from rock core. Well abandoned due to excessive (nuisance) hydrogen sulfide odors.
TNTA-BEDGW-001 (Well)	9/24/01-9/13/01	TNT Area A, Near Maintenance and Short Cut Rd, At Former Bldg 146	8.5	25	51	86	None	68-85	A thickness of approx. 3.5 feet free-phase hydrocarbon was encountered prior to sampling (10/9/01).
BED-MW30 (Well)	3/15/04-3/19/04	Near Bouy Road and Patten Tract Intersection, Outside (west) PBOW Boundaries	24	24	24	58.3	31-58.3	34.5-35.7; 38.8-39.1; 39.5-49.5;	
BED-MW31 (Boring)	3/16/04-3/20/04	At former RR bed, West of Schenk Rd, Outside (downgradient) of PBOW Boundaries	13	14.5	13.8	90.2	17.5-90.2	20-30; 31.1; 40.1-21; 87.1-90.2	

Table 5-1

Observances of Hydrocarbons in Bedrock During Borehole Coring at PBOW (1941-2009)
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Borehole Identification	Date Drilled	Location	Depth to Bedrock (ft)	Depth to Bedrock (refusal - ft)	Depth to Delaware Limestone[a] (ft)	Depth Drilled (ft)	Hydrocarbon/H_2S Odor Detected[b] (ft)	Hydrocarbon Stained Core[c] (ft)	Comments
BED-MW32 (Boring)	3/29/04-4/1/04	East of Columbus Rd, Between east and west bound lanes of Route 2; Outside (downgradient) of PBOW Boundaries	17.5	17.5	17.5	90.1	17.5-55.1	29-29.5; 30-40;	
BED-MW33 (Well)	3/30/04-4/2/04	Columbus Park, Northeast of facility; Outside (downgradeint) of PBOW Boundaries	15	15	15	89.5	20-39.5	38-39.5; 85.3-89	
BED-MW34 (Boring)	3/17/04-3/22/04	NASA's Old Sewage Water Treatment Plant Area; Outside (downgradient) of main PBOW facility	19	20	35.5	90.1	20-90.1	41.5-90.1	Core section very heavily stained. Heard gas "burping" in borehole 66.1-71.1'. Free-phase hydrocarbon on water (0.3 to 0.8'), prior to abandonment.
1SLA-BEDGW-001	2/26/09 - 3/6/09	TNTA Sewer line area, north of Maintenance Rd. and Short Cut Rd.	17.9	24.2	40.2	58.2	None	52.8 - 58.2	11-9-09 - Well gauging detected 0.08' product on water.
1SLA-BEDGW-002	2/26/09 - 3/4/09	TNTA Sewer line area, north of Maintenance Rd. and Short Cut Rd.	11.2	39	43.8	75.2	50 - 65	None	After setting well, strong hydrocarbon/H2S odors detected in vicinity of well until water level becoame static.

Table 5-1

Observances of Hydrocarbons in Bedrock During Borehole Coring at PBOW (1941-2009)
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Borehole Identification	Date Drilled	Location	Depth to Bedrock (ft)	Depth to Bedrock (refusal - ft)	Depth to Delaware Limestone[a] (ft)	Depth Drilled (ft)	Hydrocarbon/H_2S Odor Detected[b] (ft)	Hydrocarbon Stained Core[c] (ft)	Comments
AP1-BEDGW-001	3/13/09 - 3/18/09	AP1 area south of Maintenance Rd., in grass north of white block building.	25.5	44.8	44.6	81.3	57.5 - 81.3	57.5 - 66.0	11-6-09 - Well gauging detected 0.9' product on water.
AP1-BEDGW-002	3/15/09 - 3/29/09	AP1 area immediately south of Maintenance Rd. in grass.	21.4	40	39.5	61.3	None	None	Well emits H2S when cap is removed.
AP2-BEDGW-002	4/2/09 - 4/17/09	AP2 west of Campbell Rd.	15.8	21.1	15.8	86.1	None	47.1 seeping from coral, 69.5 seeping from rock	
LBA-BEDGW-002	3/25/09 - 3/30/09	LBA area southeast corner of building.	27	37	37.9	71.1	None	49.6 - 56.4	11-4-09 - Well gauging indicated 0.9 feet product on water.

Table 5-1

Observances of Hydrocarbons in Bedrock During Borehole Coring at PBOW (1941-2009)
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Borehole Identification	Date Drilled	Location	Depth to Bedrock (ft)	Depth to Bedrock (refusal - ft)	Depth to Delaware Limestone[a] (ft)	Depth Drilled (ft)	Hydrocarbon/H_2S Odor Detected[b] (ft)	Hydrocarbon Stained Core[c] (ft)	Comments
RCA-BEDGW-001	3/18/09 - 3/29/09	RCA area north of Maintenance Rd. in grass.	23.2	41.6	41.2	81.5	None	53.8 - 70.2	
RCA-BEDGW-002	3/17/09 - 3/29/09	RCA area north of Maintenance Rd. in thicket.	26	37.3	37.3	66	None	57.0 - 58.2	11-3-09 - Sheen noted on water during well gauging, not detectable with interface probe.
RCA-BEDGW-003	3/19/09 - 3/29/09	RCA area north of Maintenance Rd. north of creek.	24.8	35.5	35.5	105.8	None	63.7 - 80.2	
WTP1-BEDGW-003	3/3/09 - 3/14/09	WTP1 north of the intersection of Maintenance Rd and Taylor Rd.	21.2	37.95	38.5	61.5	None	49.9 - 55.8	

Table 5-1

Observances of Hydrocarbons in Bedrock During Borehole Coring at PBOW (1941-2009)
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Borehole Identification	Date Drilled	Location	Depth to Bedrock (ft)	Depth to Bedrock (refusal - ft)	Depth to Delaware Limestone[a] (ft)	Depth Drilled (ft)	Hydrocarbon/H_2S Odor Detected[b] (ft)	Hydrocarbon Stained Core[c] (ft)	Comments
WTP3-BEDGW-001	3/27/09 - 4/1/09	WTP3 on east side of gravel drive.	24	33	30	53.1	None	40.4 - 53.1	Well emits H2S when cap is removed.
WTP3-BEDGW-002	3/28/09 - 4/14/09	WTP3 in berm north of building	25	33	30	53.4	None	43.4 - 47.8	Well emits H2S when cap is removed.
WTP3-BEDGW-003	3/29/09 - 4/14/09	WTP3 west of creek.	25.8	33.3	30	52.9	None	40.2 - 52.9	

Notes

[a] Limestone unit interpretations from Regional Geologic Map, 2004 Groundwater Data Summary and Evaluation Report (Shaw, 2005).

[b] A hydrocarbon odor was detected by the olfactory senses. PID readings in the breathing air remained below action levels.

[c] Hydrocarbon staining on the rock core is also seen in photographs (Appendix C).

A hydrocarbon thickness of 0.05 feet was measured in well BED-MW16 on 10/3/01.

A hydrocarbon thickness of 0.63 feet was measured in well AA1-BEDGW-001 on 10/4/01.

ft - Feet.

NASA - National Aeronautics and Space Administration.

PBOW - Plum Brook Ordnance Works.

TNT - Trinitrotoluene.

Identifies borehole/monitoring well of the Locomotive Building Area.

Table 5-2

Summary of Water Level Measurements
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Coordinates (Ohio Plane)[a] Northing (y)	Easting (x)	Top of Casing Elevation[a] (ft msl)	Ground Elevation[a] (ft msl)	Groundwater Elevation Measurements (feet above mean sea level [msl]) 26-May-09 DTW	26-May-09 Elevation	27-Oct-09 DTW	27-Oct-09 Elevation
Tempoary Piezometer								
PZ-01	623,907.99	1,918,641.61	637.93	636.30	6.54	631.39	[c]Abandoned	--
PZ-02	623,862.16	1,918,467.96	640.67	637.00	8.11	632.56	[c]Abandoned	--
SB02/PZ-03	623,848.15	1,918,624.77	639.46	636.10	8.00	631.46	[c]Abandoned	--
SB03/PZ-04	623,794.37	1,918,550.21	637.50	635.60	6.06	631.44	[c]Abandoned	--
SB01/PZ-05	623,880.78	1,918,509.04	640.20	637.30	7.50	632.70	[c]Abandoned	--
PZ-07/SB06	623,882.09	1,918,943.02	638.10	635.40	6.68	631.42	[c]Abandoned	--
PZ-08	623,757.23	1,918,888.90	641.18	638.10	9.14	632.04	[c]Abandoned	--
PZ-09	623,812.43	1,918,868.73	639.85	636.50	riser pulled	--	[c]Abandoned	--
PZ-10	623,890.97	1,918,863.20	636.24	634.40	6.68	629.56	[c]Abandoned	--
SG05[b]	623,781.72	1,918,728.51	630.65	626.30	2.88	627.77	2.96	627.69
Overburden/Shale Monitoring Well								
RCA-MW01	623,724.69	1,919,029.45	641.01	638.40	7.80	633.21	11.02	629.99
RCA-MW02	623,826.40	1,918,834.02	638.15	635.30	8.12	630.03	13.90	624.25
RCA-MW03	623,865.52	1,918,827.90	638.16	635.30	9.30	628.86	13.60	624.56
LBA-MW01	623,937.12	1,918,462.09	639.86	637.20	7.20	632.66	10.28	629.58
LBA-MW02	623,827.44	1,918,628.33	639.25	635.90	8.06	631.19	8.40	630.85
LBA-MW03	623,788.63	1,918,684.59	638.18	635.50	8.84	629.34	9.84	628.34
Delaware Limestone Monitoring Well								
IT-MNTA-BEDGW-001	623,808.00	1,918,699.00	638.40	636.05	38.69	599.71	39.23	599.17
LBA-BEDGW-001	623,937.80	1,918,452.89	639.74	637.30	101.59	538.15	98.18	541.56
LBA-BEDGW-002	623,827.05	1,918,614.64	638.62	636.30	71.04	567.58	64.24	574.38
RCA-BEDGW-001	623,709.77	1,919,022.35	641.02	638.50	80.24	560.78	75.82	565.20
RCA-BEDGW-002	623,832.46	1,918,842.57	638.03	635.50	38.72	599.31	40.14	597.89
RCA-BEDGW-003	623,916.92	1,918,767.69	637.00	634.30	106.36	530.64	105.60	531.40

Notes:

[a]Northings and Eastings are scaled to the Ohio State Plane Coordinate System (North Zone), NAD 1983.
Vertical datum to National Geodetic Vertical Datum 1929.
[b]Staff gauge to measure water level in unnamed drainage ditch.
[c]Piezometers were abandoned July 2009.
DTW - Depth to water.
NM - Not measured.
NA - Not applicable.
ft msl - Feet above mean sea level.

Table 5-3

Well Pair Vertical Hydraulic Gradients
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Well Name	Unit Monitored (ft bgs)	Well TD (ft bgs)	Depth of Monitored Zone (ft bgs)	Elevation of Ground Surface (ft)	Elevation of Center of Monitored Zone (ft)	Groundwater Elevation			Average Vertical Gradient (ft/ft)
							5/6/2009	5/26/2009	11/9/2009	
Pair 1	1SLA-MW02	OB/OS	28.75	13.4-28.4	630.8	609.90	620.7	625.88	629.38	
	1SLA-BEDGW-002	DL	74.6	64.2-74.2	630.9	561.70	Not measured	587.22	587.61	
	Distance between Center of Monitored Zones					48.20				
	Vertical Gradient						NA	0.802	0.867	0.834
Pair 2	AP1-MW02	OB/OLS	19.55	9.2-19.2	634.7	620.50	633.81	632.8	630.8	
	AP1-BEDGW-002	DL	59.35	44.0-59.0	634.5	583.00	599.63	594.1	596.5	
	Distance between Center of Monitored Zones					37.50				
	Vertical Gradient						0.911	1.032	0.915	0.953
Pair 3	AP2-MW02	OB	15.35	5.0-15.0	632.5	622.50	NA	628.44	621.45	
	AP2-BEDGW-002	DL	85.35	70.0-85.0	632.4	554.90	NA	612.56	607.45	
	Distance between Center of Monitored Zones					67.60				
	Vertical Gradient						NA	0.235	0.207	0.221
Pair 4	LBA-MW01	OB/OS	16.35	6.0-16.0	637.2	626.20	633.74	632.66	629.58	
	LBA-BEDGW-001	DL	100.35	85.0-100.0	637.3	544.80	538.44	538.15	541.56	
	Distance between Center of Monitored Zones					81.40				
	Vertical Gradient						1.171	1.161	1.081	1.138
Pair 5	LBA-MW-2	OB/OS	16.35	6.0-16.0	635.9	624.90	631.63	631.19	630.85	
	LBA-BEDGW-002	DL	70.35	55.0-70.0	636.30	573.80	573.03	567.58	574.38	
	Distance between Center of Monitored Zones					51.10				
	Vertical Gradient						1.147	1.245	1.105	1.166
Pair 6	RCA-MW01	OB/OS	9.35	4.0-9.0	638.4	631.90	634.1	633.21	629.99	
	RCA-BEDGW-001	DL	80.35	65.0-80.0	638.50	566.00	562.8	560.78	565.2	
	Distance between Center of Monitored Zones					65.90				
	Vertical Gradient						1.082	1.099	0.983	1.055
Pair 7	RCA-MW02	OB/OS	28.05	17.70-27.70	635.3	612.60	633.51	630.03	624.25	
	RCA-BEDGW-002	DL	65.35	50.0-65.0	635.50	578.00	583	599.31	597.89	
	Distance between Center of Monitored Zones					34.60				
	Vertical Gradient						1.460	0.888	0.762	1.037

Table 5-3

Well Pair Vertical Hydraulic Gradients
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Well Name	Unit Monitored (ft bgs)	Well TD (ft bgs)	Depth of Monitored Zone (ft bgs)	Elevation of Ground Surface (ft)	Elevation of Center of Monitored Zone (ft)	Groundwater Elevation			Average Vertical Gradient (ft/ft)
							5/6/2009	5/26/2009	11/9/2009	
Pair 8	WTP1-MW02	OB/OS	16.3	6.0-16.0	638.6	627.60	636.42	634.09	631.07	
	WTP1-BEDGW-002	DL	53.35	43.0-53.0	637.80	589.80	601.8	603.75	616.51	
	Distance between Center of Monitored Zones					37.80				
	Vertical Gradient						0.916	0.803	0.385	0.701
Pair 9	WTP1-MW03	OB/OS	16.3	6.0-16.0	637	626.00	635.63	633.52	630.7	
	WTP1-BEDGW-003	DL	55.35	45.0-55.0	637.10	587.10	600.74	599.29	600.85	
	Distance between Center of Monitored Zones					38.90				
	Vertical Gradient						0.897	0.880	0.767	0.848
Pair 10	WTP3-MW01	OB/OS	18.35	8.0-18.0	637	624.00	633.89	Not measured	626.07	
	WTP3-BEDGW-001	DL	52.35	37.0-52.0	637.10	592.60	603.05	Not measured	603.98	
	Distance between Center of Monitored Zones					31.40				
	Vertical Gradient						0.982	NA	0.704	0.843
Pair 11	WTP3-MW02	OB/OS	18.35	8.0-18.0	637.7	624.70	632.68	Not measured	628.97	
	WTP3-BEDGW-002	DL	52.35	37.0-52.0	637.60	593.10	603.64	Not measured	603.95	
	Distance between Center of Monitored Zones					31.60				
	Vertical Gradient						0.919	NA	0.792	0.855

A negative vertical gradient indicates an upward gradient.
A positive vertical gradient indicates a downward gradient.
bgs - Below ground surface.
ft - Feet.
OB - Overburden.
OS - Ohio Shale.
DL - Delaware Limestone.
OLS - Olentangy Shale.
Identifies monitoring wells of the Locomotive Building Area.

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB01						LBA-SB02					
				LOCATION	LS						LS					
				SAMPLE NO	LBA0001		LBA0002		LBA0003		LBA0004		LBA0005		LBA0006	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		0 - 1 Ft		3 - 5 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	-	-	-	-	-	-	0.324		0.53		-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	-	-	-	-	0.294		0.438		-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	-	-	-	-	0.153	J	0.321		1.37	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	-	-	-	-	-	-	0.842	J
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	-	-	-	-	-	-	2.34	
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	-	-	-	-	-	-	0.308	
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	-	-	-	-	-	-	0.707	
VOLATILES																
Acetone	mg/kg	6,100	NE	0.339	0.0367	J	-	-	0.0305	J	0.124	J	0.0297	J	0.0282	J
Benzene	mg/kg	1.1	NE	0.00381	-	-	0.00217	J	0.00121	J	-	-	0.00381	J	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	-	-	-	-	0.00573	J	0.0103	J	-	-	-	-
Carbon disulfide	mg/kg	82	NE	0.00735	-	-	-	-	0.000988	J	-	-	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	0.0254	J	-	-	-	-	0.00323	J	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.00563	-	-	0.00301	J	-	-	-	-	0.00254	J	-	-
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.00986	-	-	0.0032	J	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	0.00346	-	-	0.00346	J	-	-	-	-	0.00151	J	-	-
Toluene	mg/kg	500	NE	0.00599	-	-	0.00312	J	0.00186	J	-	-	0.00599	J	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	1.21	J	-	-	0.0156	J	1.19		0.0309	
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	0.0624	J	-	-	0.00263	J	0.0487	J	0.0122	
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.00178	-	-	-	-	0.000988	J	-	-	0.00171	J	-	-
Vinyl acetate	mg/kg	97	NE	0.00197	-	-	-	-	-	-	-	-	-	-	-	-
SEMIVOLATILES																
Acenaphthylene	mg/kg	NE	NE	0.224	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.0426	J	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.0395	J	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	7.8	NE	0.461	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	-	-	-	-	0.268	J	1.03		9.88	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	-	-	-	-	-	-	0.389	J	3.82	
Fluoranthene	mg/kg	230	NE	1.26	0.0616	J	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	0.0627	J	-	-	-	-	-	-	-	-	-	-
PCBs																
Aroclor 1221	mg/kg	0.14	NE	0.19	-	-	-	-			-	-	-	-		
Aroclor 1260	mg/kg	0.22	NE	0.24	-	-	-	-			-	-	-	-		
METALS																
Aluminum	mg/kg	7,700	15,500	12000	4,400		7,580		9,330		7,710		9,960		8,330	
Antimony	mg/kg	3.1	9.3	1.46	0.386	J	0.722		0.375	J	0.303	J	0.581		0.488	J
Arsenic	mg/kg	0.39	36.5	15.3	4.5	J	10.1	J	4.78	J	7.11	J	8.1	J	5.84	J
Barium	mg/kg	1,500	826	218	16.3		33.6		61.3		218		67.7		44.3	
Beryllium	mg/kg	16	1	9.26	**5.22**	J	**5.15**	J	**6.74**	J	**6.24**	J	**7.39**	J	**5.35**	J
Cadmium	mg/kg	7	NE	0.819	-	-	0.513	J	0.263	J	0.699		0.36	J	0.338	J
Calcium	mg/kg	NE	52,300	288000	1,180		**74,000**		49,300	J	8,530	J	3,360		43,000	J
Chromium	mg/kg	0.29	29	19	10.4		11.1		13.6		10.9		17		13.1	

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB01						LBA-SB02					
				LOCATION	LS						LS					
				SAMPLE NO	LBA0001		LBA0002		LBA0003		LBA0004		LBA0005		LBA0006	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		0 - 1 Ft		3 - 5 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cobalt	mg/kg	2.3	116	53.8	3.52		8.81		10.3	J	16.5	J	8.62		8.88	J
Copper	mg/kg	310	56.2	31.6	6.54		27		29.2	J	17.5	J	23.9		27.4	J
Iron	mg/kg	5,500	234,000	33900	15,000	J	16,600	J	21,500		17,500		22,700	J	16,300	
Lead	mg/kg	400	48.6	103	5.29		23		13		14.7		15		15.1	
Magnesium	mg/kg	NE	10,400	29600	796	J	**16,800**	J	**18,600**	J	2,100	J	3,510	J	**18,300**	J
Manganese	mg/kg	180	3,506	3000	198	J	384	J	548	J	1,560	J	706	J	240	J
Mercury	mg/kg	2.3	0.09	0.158	0.0198	J	0.0159	J	**0.157**	J	0.0317		0.0198	J	-	-
Nickel	mg/kg	150	55.1	43.5	9.01	J	22	J	27.1	J	21.9	J	31.4	J	24.9	J
Potassium	mg/kg	NE	3,390	1720	201		934		1,230		285		748		1,020	
Selenium	mg/kg	39	2	0.85	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	39	11.1	2.25	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	NE	NE	262	41.4		113		130		24		45.7		96.4	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.654		0.31	J	-	-	0.357	J	0.416	J
Vanadium	mg/kg	39	40.9	28.2	26.5		18.8		22.9		23.7		24.7		21.7	
Zinc	mg/kg	2,300	321.75	113	26		60		66.7		44.9		70.2		60.4	
GENERAL CHEMISTRY																
Total organic carbon	mg/kg	NE	NE	3040							3,040					

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB03										LBA-SB04					
				LOCATION	LS										LS					
				SAMPLE NO	LBA0007		LBA0008		LBA0009		LBA0010		LBA0011		LBA0014		LBA0012		LBA0013	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		16-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		2_5 - 3_2 Ft		8 - 10 Ft		8 - 10 Ft		_9 - 1_9 Ft		3_9 - 5_9 Ft	
				SAMPLE PURPOSE	REG		FD		FS		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																				
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.163	J
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES																				
Acetone	mg/kg	6,100	NE	0.339	0.133	J	0.08	J	0.1		-	-	-	-	-	-	0.0303	J	0.0219	J
Benzene	mg/kg	1.1	NE	0.00381	-	-	-	-	-	-	-	-	-	-	0.00225	J	-	-	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0129	J	0.0092	J	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	82	NE	0.00735	0.00254	J	0.00735	J	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	-	-	-	-	-	-	0.0158	J	0.00263	J	-	-	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.00563	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.00986	-	-	-	-	-	-	-	-	-	-	0.00986	J	-	-	-	-
Naphthalene	mg/kg	3.6	NE	0.00346	-	-	-	-			-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	500	NE	0.00599	-	-	0.00104	J	-	-	-	-	-	-	0.00338	J	-	-	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	0.00139	J	-	-	-	-	0.0928		0.115		-	-	-	-
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	-	-	-	-	-	-	-	-	0.121		-	-	-	-
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.00178	-	-	-	-			-	-	-	-	-	-	-	-	-	-
Vinyl acetate	mg/kg	97	NE	0.00197	-	-	-	-			-	-	-	-	-	-	-	-	-	-
SEMIVOLATILES																				
Acenaphthylene	mg/kg	NE	NE	0.224	-	-	0.0706	J	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	-	-	0.0811	J	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.0645	J	0.236	J	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	0.054	J	0.187	J	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	0.0996	J	0.284	J	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	0.106	J	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.0808	J	0.232	J	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	7.8	NE	0.461	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	0.059	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	0.141	J	0.455	J	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	0.13	J	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	0.072	J	0.161	J	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	0.111	J	0.337	J	-	-	-	-	-	-	-	-	-	-	-	-
PCBs																				
Aroclor 1221	mg/kg	0.14	NE	0.19	-	-	-	-	-	-	-	-					-	-	-	-
Aroclor 1260	mg/kg	0.22	NE	0.24	0.0798		0.104		0.24		-	-					-	-	-	-
METALS																				
Aluminum	mg/kg	7,700	15,500	12000	6,790		6,330		7,680		8,700		7,110		7,750		5,800		5,390	
Antimony	mg/kg	3.1	9.3	1.46	0.954		0.759		-	-	0.348	J	0.407	J	0.381	J	-	-	-	-
Arsenic	mg/kg	0.39	36.5	15.3	8.05	J	11.5	J	10.3		4.42	J	6.28	J	9.37	J	5.2	J	4.58	J
Barium	mg/kg	1,500	826	218	51.9	J	152	J	106		61.2		58.2		41.8		22.1		20.7	
Beryllium	mg/kg	16	1	9.26	**5.73**	J	**8.07**	J	-	-	**6.18**	J	**5.32**	J	**5.94**	J	**5.24**	J	**5.21**	J
Cadmium	mg/kg	7	NE	0.819	0.525		0.819		0.81		-	-	0.315	J	0.291	J	-	-	-	-
Calcium	mg/kg	NE	52,300	288000	4,600		4,500		4,840		2,970		**53,500**	J	51,800	J	1,620		2,250	
Chromium	mg/kg	0.29	29	19	10.7		10.1		10.8		13.8		11.1		11.9		11.8		12	

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB03										LBA-SB04					
				LOCATION	LS										LS					
				SAMPLE NO	LBA0007		LBA0008		LBA0009		LBA0010		LBA0011		LBA0014		LBA0012		LBA0013	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		16-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		2_5 - 3_2 Ft		8 - 10 Ft		8 - 10 Ft		_9 - 1_9 Ft		3_9 - 5_9 Ft	
				SAMPLE PURPOSE	REG		FD		FS		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cobalt	mg/kg	2.3	116	53.8	6.14	J	33.2	J	16.9		6.63		8.91	J	7.58	J	4.82		4.35	
Copper	mg/kg	310	56.2	31.6	14.2		13.8		17		11.8		27.5	J	26.1	J	8.81		8.67	
Iron	mg/kg	5,500	234,000	33900	16,300	J	29,100	J	25,100		17,300	J	16,900		18,700		14,800	J	14,200	J
Lead	mg/kg	400	48.6	103	**103**	J	39.9	J	28.6		9.31		14		15.4		6.88		7.39	
Magnesium	mg/kg	NE	10,400	29600	2,010	J	2,160	J	2,450		2,200	J	**19,400**	J	**18,900**	J	913	J	1,050	J
Manganese	mg/kg	180	3,506	3000	287	J	1,680	J	1,240	J	228	J	475	J	367	J	324	J	253	J
Mercury	mg/kg	2.3	0.09	0.158	0.042		0.0441		-	-	0.055		**0.158**	J	0.0144	J	0.0188	J	0.0118	J
Nickel	mg/kg	150	55.1	43.5	14	J	25.1	J	29.8		20.3	J	23.5	J	21.6	J	11.8	J	11.1	J
Potassium	mg/kg	NE	3,390	1720	628		624		949		342		866		983		188		205	
Selenium	mg/kg	39	2	0.85	-	-	-	-	0.85		-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	39	11.1	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	NE	NE	262	34.6		45.8		-	-	52.9		110		105		37.8		40	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.308	J	-	-	-	-	0.327	J	0.34	J	-	-	-	-
Vanadium	mg/kg	39	40.9	28.2	20.1		22		17.1		20.9		18.3		19.2		27.5		25.5	
Zinc	mg/kg	2,300	321.75	113	67.6		71.8		58		60.5		56.4		55.8		30		30	
GENERAL CHEMISTRY																				
Total organic carbon	mg/kg	NE	NE	3040																

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB05						LBA-SB07		LBA-SB08		LBA-SB09	
				LOCATION	LS						MP		MP		MP	
				SAMPLE NO	LBA0015		LBA0016		LBA0017		LBA0023		LBA0024		LBA0025	
				SAMPLE DATE	19-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		3 - 4.1 Ft		3 - 4.1 Ft		3 - 4.2 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES																
Acetone	mg/kg	6,100	NE	0.339	0.112	J	-	-	0.021	J						
Benzene	mg/kg	1.1	NE	0.00381	-	-	-	-	-	-						
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0113	J	-	-	-	-						
Carbon disulfide	mg/kg	82	NE	0.00735	-	-	-	-	0.00307	J						
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	0.00427	J	0.0345	J						
Dichloroethene, 1,1-	mg/kg	24	NE	0.00563	-	-	-	-	0.00563	J						
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.00986	-	-	-	-	-	-						
Naphthalene	mg/kg	3.6	NE	0.00346	-	-	-	-	-	-						
Toluene	mg/kg	500	NE	0.00599	-	-	-	-	-	-						
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	0.00538	J	0.0132		0.324	J						
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	-	-	-	-						
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.00178	-	-	-	-	-	-						
Vinyl acetate	mg/kg	97	NE	0.00197	-	-	-	-	-	-						
SEMIVOLATILES																
Acenaphthylene	mg/kg	NE	NE	0.224	-	-	-	-	-	-	-	-	-	-	0.195	J
Anthracene	mg/kg	1,700	NE	0.381	-	-	-	-	-	-	-	-	-	-	0.257	J
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	-	-	-	-	-	-	0.163	J	0.18	J	0.651	J
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	-	-	-	-	-	-	-	-	-	-	0.498	J
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	-	-	-	-	-	-	0.327	J	-	-	1.01	J
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	-	-	-	-	-	-	-	-	0.74	J	0.241	J
Chrysene	mg/kg	15	NE	0.784	-	-	-	-	-	-	0.251	J	0.271	J	0.719	J
Dibenzofuran	mg/kg	7.8	NE	0.461	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	-	-	-	-	-	-	0.171	J	0.23	J	1.02	J
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	-	-	-	-	-	-	-	-	-	-	0.202	J
Pyrene	mg/kg	170	NE	1.13	-	-	-	-	-	-	0.213	J	0.221	J	0.91	J
PCBs																
Aroclor 1221	mg/kg	0.14	NE	0.19	-	-	-	-								
Aroclor 1260	mg/kg	0.22	NE	0.24	-	-	-	-								
METALS																
Aluminum	mg/kg	7,700	15,500	12000	8,260		11,000		6,920		9,160		7,740		2,200	
Antimony	mg/kg	3.1	9.3	1.46	-	-	0.684		0.403	J	0.288	J	1.46	J	1.24	J
Arsenic	mg/kg	0.39	36.5	15.3	5.97	J	11.6	J	7.92	J	1.38	J	1.44	J	3.41	J
Barium	mg/kg	1,500	826	218	60.1		61.3		64.4		120		94.3		26.7	
Beryllium	mg/kg	16	1	9.26	**5.36**	J	**8.55**	J	**5.69**	J	**1.2**	J	**1.15**	J	**1.14**	J
Cadmium	mg/kg	7	NE	0.819	0.253	J	0.305	J	-	-	-	-	0.264	J	0.221	J
Calcium	mg/kg	NE	52,300	288000	5,520		3,050		51,200	J	**288,000**	J	**288,000**	J	**240,000**	J
Chromium	mg/kg	0.29	29	19	12.4		18.5		11		6.31		9.62		4.63	

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB05						LBA-SB07		LBA-SB08		LBA-SB09	
				LOCATION	LS						MP		MP		MP	
				SAMPLE NO	LBA0015		LBA0016		LBA0017		LBA0023		LBA0024		LBA0025	
				SAMPLE DATE	19-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		3 - 4.1 Ft		3 - 4.1 Ft		3 - 4.2 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cobalt	mg/kg	2.3	116	53.8	4.21		10.1		8.37	J	1.74	J	1.65	J	2.13	J
Copper	mg/kg	310	56.2	31.6	18.7		30.1		26.8	J	9.11	J	10.4	J	11.4	J
Iron	mg/kg	5,500	234,000	33900	14,300	J	31,600	J	18,100		4,920		5,390		6,980	
Lead	mg/kg	400	48.6	103	12.2		15.9		12.4		7.71		10.8		12.9	
Magnesium	mg/kg	NE	10,400	29600	1,680	J	3,940	J	**18,500**	J	**23,500**	J	**28,500**	J	**29,600**	J
Manganese	mg/kg	180	3,506	3000	201	J	539	J	514	J	1,050	J	965	J	369	J
Mercury	mg/kg	2.3	0.09	0.158	0.0353		0.0238		-	-	0.0159	J	0.00931	J	0.017	J
Nickel	mg/kg	150	55.1	43.5	14.5	J	32.3	J	22.3	J	5.06	J	5.58	J	7.33	J
Potassium	mg/kg	NE	3,390	1720	481		1,020		823		462		411		305	
Selenium	mg/kg	39	2	0.85	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	39	11.1	2.25	-	-	-	-	-	-	0.48		1.01		2.25	
Sodium	mg/kg	NE	NE	262	41.7		55.4		100		262		223		142	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.402	J	0.269	J	-	-	-	-	-	-
Vanadium	mg/kg	39	40.9	28.2	21.6		27.6		19		6.31		6.6		7.96	
Zinc	mg/kg	2,300	321.75	113	48.1		81.4		57.2		33.9		44.7		16.3	
GENERAL CHEMISTRY																
Total organic carbon	mg/kg	NE	NE	3040												

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB06										LBA-SB10									
				LOCATION	RCA										RCA									
				SAMPLE NO	LBA0018		LBA0019		LBA0020		LBA0021		LBA0022		LBA0026		LBA0027		LBA0028		LBA0029		LBA0030	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		8 - 10 Ft		8 - 10 Ft		0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		3 - 4_4 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		FD		FS		REG		FD		FS		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																								
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.378	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES																								
Acetone	mg/kg	6,100	NE	0.339	0.104	J	-	-	0.0151	J	0.0352	J	-	-	0.339	J	0.087	J	0.072		0.0524	J	0.0247	J
Benzene	mg/kg	1.1	NE	0.00381	-	-	0.00303	J	0.00254	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.00827	J	-	-	-	-	0.00555	J	-	-	0.0147	J	0.0078	J	-	-	-	-	-	-
Carbon disulfide	mg/kg	82	NE	0.00735	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.00563	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.00986	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	0.00346	-	-	-	-	-	-	-	-			-	-	-	-			-	-	-	-
Toluene	mg/kg	500	NE	0.00599	-	-	0.00576	J	0.0032	J	0.00123	J	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.00178	-	-	0.00178	J	-	-	-	-			-	-	-	-			-	-	-	-
Vinyl acetate	mg/kg	97	NE	0.00197	-	-	-	-	-	-	-	-			-	-	0.00197	UJ			-	-	-	-
SEMIVOLATILES																								
Acenaphthylene	mg/kg	NE	NE	0.224	0.224	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	0.381	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.652	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	0.395	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	0.878	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.784	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	7.8	NE	0.461	0.461	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.352	J
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0771	J
Fluoranthene	mg/kg	230	NE	1.26	1.26	J	-	-	-	-	-	-	-	-	-	-	0.0401	J	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	1.66	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	1.02	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	0.843	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	1.13	J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs																								
Aroclor 1221	mg/kg	0.14	NE	0.19	-	-	-	-							-	-	-	-	-	-	-	-		
Aroclor 1260	mg/kg	0.22	NE	0.24	-	-	-	-							-	-	-	-	-	-	-	-		
METALS																								
Aluminum	mg/kg	7,700	15,500	12000	7,020		7,410		7,850		7,930		7,660		7,210		5,830		7,240		7,180		12,000	
Antimony	mg/kg	3.1	9.3	1.46	0.377	J	0.341	J	0.445	J	0.519	J	-	-	0.573	J	0.247	J	-	-	0.317	J	0.814	
Arsenic	mg/kg	0.39	36.5	15.3	11.3	J	7.5	J	5.55	J	7.58	J	5		9.26	J	6.74	J	5.9		12.2	J	15.3	J
Barium	mg/kg	1,500	826	218	68		46.1		42	J	107	J	54.5		50.5	J	39.6	J	37.9		76.6	J	63.1	J
Beryllium	mg/kg	16	1	9.26	**9.26**	J	**6.59**	J	**5.84**	J	**7.29**	J	-	-	**6.41**	J	**5.17**	J	-	-	**7.47**	J	**9.03**	J
Cadmium	mg/kg	7	NE	0.819	0.338	J	0.254	J	0.32	J	0.408	J	-	-	0.492	J	0.261	J	-	-	0.486		0.671	
Calcium	mg/kg	NE	52,300	288000	5,080		47,700	J	47,100	J	43,900	J	50,100		4,380	J	3,220	J	3,000		3,980	J	7,120	J
Chromium	mg/kg	0.29	29	19	11.5		11.6		12.4		12.3		13.5		13.2	J	10.8	J	13.9		12.9	J	19	J

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB06										LBA-SB10									
				LOCATION	RCA										RCA									
				SAMPLE NO	LBA0018		LBA0019		LBA0020		LBA0021		LBA0022		LBA0026		LBA0027		LBA0028		LBA0029		LBA0030	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		8 - 10 Ft		8 - 10 Ft		0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		3 - 4_4 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		FD		FS		REG		FD		FS		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cobalt	mg/kg	2.3	116	53.8	9.09		9.71	J	7.78	J	14.5	J	8		7.31	J	4.75	J	-	-	14.5	J	24.4	J
Copper	mg/kg	310	56.2	31.6	16.8		26.7	J	27	J	28.1	J	21.5		13.6		10.4		10.2		13.5		31.5	
Iron	mg/kg	5,500	234,000	33900	31,400	J	21,500		18,400		23,500		18,200		18,300		14,600		17,800		23,700		28,800	
Lead	mg/kg	400	48.6	103	18.3		11.4		13.6		14.5		8.4		16	J	11.9	J	9		10.9	J	21.7	J
Magnesium	mg/kg	NE	10,400	29600	1,800	J	**16,500**	J	**20,500**	J	**17,600**	J	**14,600**		1,650	J	1,220	J	1,410		1,530	J	5,500	J
Manganese	mg/kg	180	3,506	3000	519	J	417	J	315	J	798	J	351	J	281		187		160	J	726		1,140	
Mercury	mg/kg	2.3	0.09	0.158	0.0456		0.014	J	0.0122	J	0.0148	J	-	-	0.0318		0.0266		-	-	0.0272		0.0167	J
Nickel	mg/kg	150	55.1	43.5	21.7	J	22.9	J	23	J	28.2	J	21.4		20.1	J	15.3	J	15.3		33.1	J	43.5	J
Potassium	mg/kg	NE	3,390	1720	591		822		1,010		983		1,720		374		293		-	-	320		1,030	
Selenium	mg/kg	39	2	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.61		-	-	-	-
Silver	mg/kg	39	11.1	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	NE	NE	262	50.4		93.3		106		95.4		-	-	30.8		23.5		-	-	26.7		53.4	
Thallium	mg/kg	NE	1.3	0.678	0.294	J	0.302	J	0.307	J	0.385	J	-	-	0.558		-	-	-	-	-	-	0.678	
Vanadium	mg/kg	39	40.9	28.2	24.4		20.3		21.2		22.7		17.8		25.4		20.6		26.2		27.7		27.9	
Zinc	mg/kg	2,300	321.75	113	58.4		59		56.1		63.8		48.2		60.1	J	47.5	J	45.5		102	J	96.9	J
GENERAL CHEMISTRY																								
Total organic carbon	mg/kg	NE	NE	3040																				

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB11						LBA-SB12					
				LOCATION	RCA						RCA					
				SAMPLE NO	LBA0031		LBA0032		LBA0033		LBA0034		LBA0035		LBA0036	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3_9 - 5_9 Ft		8 - 10 Ft		0 - 1 Ft		3 - 3_9 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	0.527		-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	1.13		0.947		5.68		-	-	0.393		-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	4.12		-	-	-	-	-	-
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	22.7		-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	1.52		-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	11.8		-	-	-	-	-	-
VOLATILES																
Acetone	mg/kg	6,100	NE	0.339	0.265	J	0.0388	J	0.0301	J	0.152	J	0.0464	J	0.0525	J
Benzene	mg/kg	1.1	NE	0.00381	-	-	-	-	-	-	-	-	-	-	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0136	J	-	-	-	-	0.00999	J	-	-	0.00791	J
Carbon disulfide	mg/kg	82	NE	0.00735	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.00563	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.00986	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	0.00346	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	500	NE	0.00599	-	-	-	-	0.00324	J	-	-	-	-	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	-	-	-	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.00178	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl acetate	mg/kg	97	NE	0.00197	-	-	-	-	-	-	-	-	-	-	-	-
SEMIVOLATILES																
Acenaphthylene	mg/kg	NE	NE	0.224	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	7.8	NE	0.461	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	1.29		0.866		5.82		-	-	0.23	J	-	-
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	0.204	J	0.129	J	2.49		-	-	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	-	-	-	-	-	-	0.0499	J	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	-	-	-	-	-	-	-	-	-	-	-	-
PCBs																
Aroclor 1221	mg/kg	0.14	NE	0.19	-	-	-	-			0.19		-	-		
Aroclor 1260	mg/kg	0.22	NE	0.24	0.0629	J	0.061	J			-	-	-	-		
METALS																
Aluminum	mg/kg	7,700	15,500	12000	6,690		8,940		10,400		5,950		7,140		11,800	
Antimony	mg/kg	3.1	9.3	1.46	-	-	0.27	J	0.505		0.25	J	-	-	0.306	J
Arsenic	mg/kg	0.39	36.5	15.3	8.54	J	11	J	5.19	J	8.68	J	6.83	J	6.6	J
Barium	mg/kg	1,500	826	218	55.2	J	154	J	62.4	J	93.8	J	74.4	J	58.6	J
Beryllium	mg/kg	16	1	9.26	**6.88**	J	**8.88**	J	**6.78**	J	**6.74**	J	**7.02**	J	**7.35**	J
Cadmium	mg/kg	7	NE	0.819	-	-	-	-	0.313	J	0.503		-	-	-	-
Calcium	mg/kg	NE	52,300	288000	1,970	J	1,460	J	37,600	J	3,650	J	1,320	J	32,200	J
Chromium	mg/kg	0.29	29	19	14.7	J	16.4	J	15.3	J	11.7	J	14.7	J	17.6	J

Table 5-4

Detected Constituents in Surface and Subsurface Soil Samples Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-SB11						LBA-SB12					
				LOCATION	RCA						RCA					
				SAMPLE NO	LBA0031		LBA0032		LBA0033		LBA0034		LBA0035		LBA0036	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3_9 - 5_9 Ft		8 - 10 Ft		0 - 1 Ft		3 - 3_9 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cobalt	mg/kg	2.3	116	53.8	4.68	J	53.8	J	12.7	J	21.3	J	17.2	J	8.82	J
Copper	mg/kg	310	56.2	31.6	14.2		15.3		31.6		12		12.8		28.4	
Iron	mg/kg	5,500	234,000	33900	21,600		33,900		22,000		19,800		21,800		23,800	
Lead	mg/kg	400	48.6	103	10	J	12.9	J	15.4	J	12.9	J	9.64	J	12.3	J
Magnesium	mg/kg	NE	10,400	29600	1,070	J	1,530	J	**15,600**	J	1,360	J	1,240	J	**10,900**	J
Manganese	mg/kg	180	3,506	3000	115		3,000		796		1,160		493		556	
Mercury	mg/kg	2.3	0.09	0.158	0.026		0.0299		-	-	0.0309		0.0287		0.0135	J
Nickel	mg/kg	150	55.1	43.5	14.3	J	38.2	J	33.2	J	22.6	J	23.6	J	29.1	J
Potassium	mg/kg	NE	3,390	1720	242		363		1,210		433		264		1,320	
Selenium	mg/kg	39	2	0.85	-	-	0.516	J	-	-	-	-	-	-	-	-
Silver	mg/kg	39	11.1	2.25	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	NE	NE	262	18.8		29.2		87.7		26.9		27.8		91.4	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.294	J	0.336	J	-	-	-	-	0.39	J
Vanadium	mg/kg	39	40.9	28.2	25.7		28.2		23.7		23.5		22.5		24.3	
Zinc	mg/kg	2,300	321.75	113	69.9	J	113	J	74		64.5	J	80.1	J	72.4	J
GENERAL CHEMISTRY																
Total organic carbon	mg/kg	NE	NE	3040												

LS - Locomotive Shop
MP - Maintenance Pit.
RCA - Railcar Wash Area
NE - Not established (RBSCs), not evaluated (BSCs).
Shaded cell indicates value is greater than RBSC.
Bold text indicates value is greater than the BSC.
RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1. For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.
MDC - Maximum detected concentration for the AOC ("B" qualified data not included).
BSC - Background screening concentration.
"-" - Not Detected.
mg/kg - Milligram per kilpgram.

Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.

Table 5-5

Detected Constituents in Surface Water Samples Above RBSCs
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

			LOCATION CODE	LBA-SW01		LBA-SW02		LBA-SW03						LBA-SW04		LBA-SW05		LBA-SW06		LBA-SW07	
			SAMPLE NO	LBA2000		LBA2001		LBA2002		LBA2003		LBA2004		LBA2005		LBA2006		LBA2007		LBA2008	
			SAMPLE DATE	20-May-09		21-May-09		21-May-09		21-May-09		21-May-09		21-May-09		22-May-09		22-May-09		22-May-09	
			DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
			SAMPLE PURPOSE	REG		REG		REG		FD		FS		REG		REG		REG		REG	
Parameter	Units	RBSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
VOLATILES																					
Dichloroethane, 1,1-	µg/L	24	0.45	0.25	J	0.39	J	0.26	J	0.45	J	-	-	-	-	0.39	J	-	-	-	-
Dichloroethene, cis-1,2-	µg/L	370	0.24	-	-	-	-	0.22	J	0.24	J	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	9,100	0.59	-	-	0.47	J	0.59	J	0.53	J	-	-	-	-	-	-	-	-	-	-
METALS																					
Aluminum	µg/L	37,000	23,800	1,790		1,660		1,990		1,540		1,720		2,460		2,520		23,800		11.3	B
Arsenic	µg/L	0.45	8.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.8	J	-	-
Barium	µg/L	7,300	155	49.8	J	101	J	64.5	J	58.2	J	-	-	62.6	J	62.2	J	155	J	41.6	J
Beryllium	µg/L	73	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	J	-	-
Calcium	µg/L	NE	152,000	141,000		140,000		152,000		149,000		132,000		144,000		146,000		114,000		110,000	
Chromium	µg/L	0.43	39.8	2.6	J	2.8	J	3.2	J	2.9	J	-	-	4.1	J	4.6	J	39.8		-	-
Cobalt	µg/L	11	16.3	-	-	4.2	J	2.4	J	2.3	J	-	-	2.5	J	3	J	16.3	J	-	-
Copper	µg/L	1,500	38.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.5		-	-
Iron	µg/L	26,000	43,900	2,570		4,020		4,650		3,570		2,850		4,920		5,890		43,900		1,090	
Lead	µg/L	15	18	2.6	J	3.2	J	5	J	3.9	J	-	-	4.3	J	5.5	J	18		-	-
Magnesium	µg/L	NE	29,600	27,300		27,400		29,600		29,000		26,000		27,900		28,600		28,100		17,400	
Manganese	µg/L	880	2,220	554		1,760		1,870		1,560		1,170		1,050		2,220		662		381	
Nickel	µg/L	730	71.6	4.8	J	8.9	J	7.9	J	6.4	J	-	-	8.6	J	8.7	J	71.6		-	-
Potassium	µg/L	NE	6,540	2,260	J	6,540	J	2,070	J	1,900	J	-	-	2,180	J	2,050	J	4,920	J	1,280	J
Selenium	µg/L	180	4.4	-	-	-	-	3.4	J	3.8	J	-	-	-	-	3.5	J	4.4	J	-	-
Sodium	µg/L	NE	35,000	27,600		32,400		34,700		34,300		35,000		25,200		27,000		18,200		31,700	
Vanadium	µg/L	180	46.1	5	J	4.5	J	5	J	4.3	J	-	-	5.7	J	6.9	J	46.1	J	-	-
Zinc	µg/L	11,000	177	19.7	J	32		35		30.2		21.2		31.1		33.4		177		-	-
GENERAL CHEMISTRY																					
HARDNESS (as CaCO3)	µg/L	NE	464,000	464,000																	

RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1.
For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.
MDC - Maximum detected concentration for the area of concern ("B" qualified data not included).
"-" - Not Detected.
NE - Not Established.
µg/L - Parts per billion.

Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.
B - Analyte was not detected significantly above the levels found in the associated method blank or field blanks.

Table 5-6

Detected Constituents in Sediment Samples Above RBSCs
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

			LOCATION CODE	LBA-SD01		LBA-SD02		LBA-SD03		LBA-SD04		LBA-SD05		LBA-SD06					
			SAMPLE NO	LBA1000		LBA1001		LBA1002		LBA1003		LBA1004		LBA1005		LBA1006		LBA1007	
			SAMPLE DATE	20-May-09		21-May-09		21-May-09		21-May-09		22-May-09		22-May-09		22-May-09		22-May-09	
			DEPTH	0 - _5 Ft		0 - _5 Ft		0 - _5 Ft		0 - _5 Ft		0 - _5 Ft		0 - _5 Ft		0 - _5 Ft		0 - _5 Ft	
			SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG		FD		FS	
Parameter	Units	RBSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
VOLATILES																			
Acetone	mg/kg	61,000	0.0921	-	-	0.0921	J	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	820	0.0019	-	-	-	-	-	-	-	-	-	-	0.0019	J	-	-	-	-
Methylene chloride	mg/kg	110	0.0582	0.0582		0.0195	B	-	-	-	-	-	-	-	-	-	-	-	-
SEMIVOLATILES																			
Benzo(b)fluoranthene	mg/kg	1.5	0.0481	-	-	-	-	-	-	-	-	-	-	0.0481	J	0.0458	J	-	-
Fluoranthene	mg/kg	2,300	0.0934	-	-	-	-	-	-	-	-	-	-	0.0738	J	0.0934	J	-	-
Phenanthrene	mg/kg	NE	0.0546	-	-	-	-	-	-	-	-	-	-	-	-	0.0546	J	-	-
Pyrene	mg/kg	1,700	0.0694	-	-	-	-	-	-	-	-	-	-	0.0562	J	0.0694	J	-	-
METALS																			
Aluminum	mg/kg	77,000	10900	6,300		5,710	J	7,780	J	7,760	J	8,850		10,700		9,900		10,900	
Arsenic	mg/kg	3.9	17.8	16		9.4	J	8.3	J	17.8	J	9.5		11.7		10.4		16.5	
Barium	mg/kg	15,000	156	75.7		90.3	J	58.8	J	92.1	J	63.8		70.7		81.6		156	
Beryllium	mg/kg	160	0.96	0.75		0.61		0.67	J	0.96		0.68		0.84		0.77		0.72	
Cadmium	mg/kg	70	1.9	1.9		0.46		0.46	J	0.97		0.64		0.56		0.56		-	-
Calcium	mg/kg	NE	11200	11,200	J	3,510	J	3,900	J	7,050	J	10,300		3,300		3,220		3,520	
Chromium	mg/kg	2.9	18.8	10.4		10.7	J	13.5	J	13.4	J	15.9		18.8		17.6		18.3	
Cobalt	mg/kg	23	26	24.9		17.5	J	11.8	J	26	J	10.8		11.3		11.7		24.6	
Copper	mg/kg	3,100	26.2	13.5		10.5	J	13.3	J	22.2	J	22.7		24.5		21		26.2	
Iron	mg/kg	55,000	32200	21,000		20,500	J	18,700	J	30,200	J	22,100		25,500		23,300		32,200	
Lead	mg/kg	400	17.9	10.8		9	J	9.5	J	17.9	J	11.5		10.4		10.5		17	
Magnesium	mg/kg	NE	4940	2,840		1,590	J	2,160	J	3,090	J	4,940		3,620		3,190		3,820	
Manganese	mg/kg	1,800	5360	5,360		1,510		828	J	1,610		737		779		1,170		2,280	
Mercury	mg/kg	23	0.031	0.025	J	0.023	J	-	-	0.031	J	0.022	J	0.022	J	0.023	J	-	-
Nickel	mg/kg	1,500	63.2	52.2		26.6	J	26.1	J	39.8	J	26.6		33.8		34.2		63.2	
Potassium	mg/kg	NE	1430	781	J	614	J	781	J	829	J	1,250	J	1,430		1,370		1,420	
Selenium	mg/kg	390	3	3	J	2.1	J	1.7	J	2.2	J	1.7	J	1.9	J	1.8	J	-	-
Sodium	mg/kg	NE	192	182	J	110	J	134	J	192	J	166	J	150	J	164	J	-	-
Thallium	mg/kg	NE	3.1	1.9		0.26	J	-	-	-	-	-	-	-	-	-	-	3.1	
Vanadium	mg/kg	390	27.7	22.2		19.4	J	21.9	J	26.5	J	24.5		27		25.8		27.7	
Zinc	mg/kg	23,000	80.3	80.3		52.4	J	54.1	J	73.9	J	55		63		59.1		78.3	
GENERAL CHEMISTRY																			
Total Organic Carbon	mg/kg	15,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NE - Not established (RBSCs).

Shaded cell indicates value is greater than RBSC.

RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1.

For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.

MDC - Maximum detected concentration for the area of concern ("B" qualified data not included).

"-" - Not Detected.

mg/kg - Parts per million.

Validation Qualifiers (VQ)

J - The analyte was postively identifed; the reported value is estimated.

Table 5-7

Detected Constituents in Overburden/Shale Temporary Piezometers Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-PZ01		LBA-PZ02		LBA-PZ03		LBA-PZ04		LBA-PZ05					
				LOCATION	LS		LS		LS		LS		LS		LS		LS	
				SAMPLE NO	LBA3000		LBA3003		LBA3004		LBA3005		LBA3006		LBA3001		LBA3002	
				SAMPLE DATE	31-Jan-09		29-Jan-09		29-Jan-09		30-Jan-09		28-Jan-09		28-Jan-09		28-Jan-09	
				DEPTH	7.17 - 7.28 Ft		14.14-14.14 Ft		8.42 - 8.46 Ft		6.70 - 6.71 Ft		10.07 - 10.1 Ft		10.07 - 10.1 Ft		10.07 - 10.1 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		FD		FS	
				LOW-FLOW SAMPLED	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																		
Amino-2,6-dinitrotoluene, 4-	µg/L	7.3	NE	1.7	-	-	-	-	1.71		-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	µg/L	7.3	NE	1.6	-	-	-	-	1.6		-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	17.2	-	-	-	-	17.2		-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	µg/L	0.099	NE	15.1	-	-	-	-	15.1		-	-	-	-	-	-	-	-
HMX	µg/L	180	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	µg/L	0.12	NE	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	µg/L	0.31	NE	6.9	-	-	-	-	6.89		-	-	-	-	-	-	-	-
Nitrotoluene, 3-	µg/L	0.37	NE	3.9	-	-	-	-	3.91		-	-	-	-	-	-	-	-
Nitrotoluene, 4-	µg/L	4.2	NE	1.8	-	-	-	-	1.8		-	-	-	-	-	-	-	-
VOLATILES																		
Acetone	µg/L	2,200	NE	3.5	-	-	3.46	J	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	8.5	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	100	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	0.2	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	0.15	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	2.4	NE	10.0	6.66		-	-	0.77	J	10		0.81	J	0.79	J	-	-
Dichloroethene, 1,1-	µg/L	34	NE	0.7	-	-	-	-	-	-	0.66	J	-	-	-	-	-	-
Dichloroethene, cis-1,2-	µg/L	37	NE	0.3	-	-	-	-	0.34	J	-	-	-	-	-	-	-	-
Naphthalene	µg/L	0.14	NE	4.3	-	-	-	-	4.33		-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	910	NE	58.4	58.4		0.72	J	38.5		18.1		1.06	J	0.96	J	2.2	
Trichloroethene	µg/L	2	NE	7.0	0.81	J	-	-	7.03		-	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	µg/L	1.5	NE	0.4	-	-	-	-	0.4	J	-	-	-	-	-	-	-	-
SEMIVOLATILES																		
Di-n-butyl phthalate	µg/L	370	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	13.3	-	-	-	-	13.3		-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	µg/L	0.099	NE	7.1	-	-	-	-	7.11	J	-	-	-	-	-	-	-	-
METALS-UNFILTERED																		
Aluminum	µg/L	3,700	309	27500	162		**12,800**		261		**12,600**		**4,710**		**3,860**		**27,500**	
Arsenic	µg/L	0.045	7.4	42.7	-	-	**42.7**		-	-	**13.5**		**14.4**		**11.9**		**22.4**	
Barium	µg/L	730	11,800	323	31.7		323		16		110		114		107		255	
Beryllium	µg/L	7.3	NE	13.7	-	-	13.7		-	-	12.3		4.05	J	3.2	J	-	-
Cadmium	µg/L	1.8	NE	4.6	4.63		2.43	J	2.97	J	-	-	2.23	J	2.7	J	-	-
Calcium	µg/L	NE	316,000	299000	156,000		299,000		75,300		243,000		94,000		83,500		160,000	
Chromium	µg/L	0.043	NE	39.1	-	-	20.4		-	-	20.3		6.35	J	-	-	39.1	
Cobalt	µg/L	1.1	12.1	18.6	-	-	**18.6**		-	-	**12.4**		6.12	J	5.01	J	-	-

Table 5-7

Detected Constituents in Overburden/Shale Temporary Piezometers Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-PZ01		LBA-PZ02		LBA-PZ03		LBA-PZ04		LBA-PZ05					
				LOCATION	LS		LS		LS		LS		LS		LS		LS	
				SAMPLE NO	LBA3000		LBA3003		LBA3004		LBA3005		LBA3006		LBA3001		LBA3002	
				SAMPLE DATE	31-Jan-09		29-Jan-09		29-Jan-09		30-Jan-09		28-Jan-09		28-Jan-09		28-Jan-09	
				DEPTH	7.17 - 7.28 Ft		14.14-14.14 Ft		8.42 - 8.46 Ft		6.70 - 6.71 Ft		10.07 - 10.1 Ft		10.07 - 10.1 Ft		10.07 - 10.1 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		FD		FS	
				LOW-FLOW SAMPLED	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Copper	µg/L	150	19.8	66	5.98	J	**66**		-	-	**53.7**		17.2		17.4		**54.3**	
Iron	µg/L	2,600	1,550	48900	469		**40,700**		681		**36,000**		**12,600**		**10,200**		**48,900**	
Lead	µg/L	15	NE	48.6	-	-	48.6		-	-	26.6		8.41		6.91		31.2	
Magnesium	µg/L	NE	217,000	90700	30,900		90,700		16,300		76,500		30,100		26,500		55,000	
Manganese	µg/L	88	636	1450	25.3		**1,450**		35.1		**698**		366		286		**1,240**	
Nickel	µg/L	73	8.6	58.2	-	-	**20.5**		-	-	**17.6**		7.86		4.98	J	**58.2**	
Potassium	µg/L	NE	116,000	8560	878		4,800		510	J	2,860		2,610		2,430		8,560	
Selenium	µg/L	18	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	µg/L	NE	1,390,000	20400	5,240		20,400		2,820		7,790		12,300		12,700		10,800	
Vanadium	µg/L	18	NE	65.9	-	-	35.9		-	-	37.1		11.6		9.17		65.9	
Zinc	µg/L	1,100	507	141	-	-	136		-	-	111		38	J	31.9	J	141	
METALS-FILTERED																		
Aluminum	µg/L	3,700	309	159	-	-	-	-	-	-	-	-	159		128		-	-
Arsenic	µg/L	0.045	7.4	28.0	-	-	**28**		-	-	-	-	1.99	J	**9.75**	J	-	-
Barium	µg/L	730	11,800	93.6	30.9		87.7		15.1		27.4		90.5		93.6		-	-
Cadmium	µg/L	1.8	NE	4.5	4.46		-	-	-	-	3.29	J	-	-	-	-	-	-
Calcium	µg/L	NE	316,000	154000	154,000		65,600		71,600		80,700		70,600		72,400		70,900	
Cobalt	µg/L	1.1	12.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	µg/L	2,600	1,550	446	90.9		-	-	-	-	-	-	446		382		132	
Lead	µg/L	15	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	µg/L	NE	217,000	29600	29,600		20,200		15,800		20,900		20,000		20,200		18,700	
Manganese	µg/L	88	636	273	21.4		273		29.5		24.6		110		108		104	
Mercury	µg/L	1.1	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	µg/L	73	8.6	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	µg/L	NE	116,000	2080	792		2,080		357	J	-	-	1,470		1,480		-	-
Selenium	µg/L	18	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	µg/L	NE	1,390,000	18200	5,140		18,200		3,060		7,290		11,900		12,500		11,600	
Vanadium	µg/L	18	NE	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	µg/L	1,100	507	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WATER QUALITY PARAMETERS																		
Alkalinity	µg/L	NE	NE	240000	240,000		177,000		103,000		238,000		172,000		119,000		230,000	
Chloride	µg/L	NE	NE	7960	6,140	J	7,960	J	3,610		3,240	J	6,980	J	6,550	J	6,300	J
Cyanide, total	µg/L	73	NE	0													-	-
Hardness	µg/L	NE	NE	1120000	517,000		1,120,000		255,000		921,000		359,000		317,000		680,000	
HARDNESS (as CaCO3)	µg/L	NE	NE	0														
Nitrate	µg/L	5,800	NE	0													-	-
Nitrate-Nitrite	µg/L	NE	NE	581	297	J	-	-	581		61	J	26	J	-	-		
Sulfate	µg/L	NE	NE	193000	193,000		43,800	J	30,500		28,200		53,300	J	52,800	J	56,200	
Total dissolved solids	µg/L	NE	NE	700000	584,000		172,000		239,000		295,000		331,000	J	700,000	J	310,000	
Total suspended solids	µg/L	NE	NE	3860000	-	-	3,860,000		21,000		1,770,000		641,000		676,000		1,200,000	
Turbidity	NTU	NE	NE	866	10.9	J	866	J	19.7	J	165	J	403	J	375	J	64	

Table 5-7

Detected Constituents in Overburden/Shale Temporary Piezometers Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

LS - Locomotive Shop.
NE - Not established (RBSCs), not evaluated (BSCs).
NA - Not Analyized.
Shaded cell indicates value is greater than RBSC.
Bold text indicates value is greater than the BSC.
RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1.
For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.
MDC - Maximum detected concentration for the AOC ("B" qualified data not included).
BSC - Background screening concentration.
"-" - Not Detected.
µg/L - Parts per billion.
mg/L - Parts per million.
prior to groundwater sample collection.
NM - Not measured.

Tempoary piezometers from RCA not sampled. Recharge rate in all piezometers less than 50 ml per minute.

Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.
B - The analyte was not detected significantly above the levels found in the associated method blank or field blanks.

Table 5-8

Detected Constituents in Overburden/Shale
Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-MW01				LBA-MW02											
				LOCATION	LS				LS											
				SAMPLE NO	LB3067		LB3075		LB3068		LB3069		LB3070		LB3076		LB3077		LB3079	
				SAMPLE DATE	12-May-09		4-Nov-09		19-May-09		19-May-09		19-May-09		5-Nov-09		5-Nov-09		5-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		FD		FS		REG		FD		FS	
				LOW-FLOW SAMPLED	No		No		Yes		Yes		Yes		Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																				
Amino-2,6-dinitrotoluene, 4-	µg/L	7.3	NE	0.48	-	-	-	-	0.28		-	-	0.26		0.48	J	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	µg/L	7.3	NE	0.54	-	-	-	-	0.2		0.2		-	-	0.54	J	0.29	J	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	17.8	-	-	-	-	5.4	J	10.8	J	9.9		3.4	J	17.8	J	14	
Dinitrotoluene, 2,6-	µg/L	0.099	NE	12.4	-	-	-	-	5.3	J	7.8	J	6.9		5.9	J	12.4	J	11	
HMX	µg/L	180	NE	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	µg/L	0.12	NE	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	
Nitrotoluene, 2-	µg/L	0.31	NE	74.7	-	-	-	-	25.1	J	48.5	J	39		8.1	J	74.7	J	51	
Nitrotoluene, 3-	µg/L	0.37	NE	9.1	-	-	-	-	2.9	J	5.7	J	4.5		1.2	J	9.1	J	-	-
Nitrotoluene, 4-	µg/L	4.2	NE	8.6	-	-	-	-	2.9	J	5.8	J	4.5		0.56	J	8.6	J	5.4	
VOLATILES																				
Acetone	µg/L	2,200	NE	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	8.5	NE	0.36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	100	NE	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	0.2	NE	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	0.15	NE	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/L	2.4	NE	8.3	2.2		2		1.6		1.5		1.4		3		3.7		3.6	
Dichloroethene, 1,1-	µg/L	34	NE	1.9	-	-	-	-	1.1	J	-	-	1.9		1.2		-	-	-	-
Dichloroethene, cis-1,2-	µg/L	37	NE	0.87	-	-	-	-	0.81	J	0.87	J	-	-	0.78	J	0.83	J	-	-
Trichloroethane, 1,1,1-	µg/L	910	NE	40.0	1.3		-	-	36.8		40		40		29.5		32.7		33	
Trichloroethene	µg/L	2	NE	5.6	-	-	-	-	5.6		5.2		4.8		4.3		4.8		5.1	
SEMIVOLATILES																				
Di-n-butyl phthalate	µg/L	370	NE	1.3	-	-	-	-	1.3	B	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	12.9	-	-	-	-	2.1	J	6.4	J	-	-	6.1	J	12.9	J	-	-
Dinitrotoluene, 2,6-	µg/L	0.099	NE	8.4	-	-	-	-	2.4	J	4.3	J	-	-	6	J	8.4	J	-	-
METALS-UNFILTERED																				
Aluminum	µg/L	3,700	309	1340	58.9	B	176	J	39.5	B	35.2	B	-	-	**361**		**313**		**1,190**	
Barium	µg/L	730	11,800	260	73.5	J	61.7	J	59.7	J	60.7	J	-	-	76.6	J	82.1	J	-	-
Calcium	µg/L	NE	316,000	189000	189,000		165,000	J	80,700	J	83,200	J	79,200		89,300		92,300		84,200	
Chromium	µg/L	0.043	NE	3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	1.1	12.1	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	µg/L	2,600	1,550	2830	242	J	684		-	-	-	-	-	-	200	J	207	J	1,430	
Lead	µg/L	15	NE	4.5	-	-	-	-	-	-	2.3	J	-	-	2.5	B	3.4	B	-	-
Magnesium	µg/L	NE	217,000	47900	45,000		45,700		17,300		17,800		17,100		19,400		20,600		21,100	
Manganese	µg/L	88	636	458	436		458		57.3		59.7		55.4		184		159		160	
Nickel	µg/L	73	8.6	21.0	4.3	J	2.4	J	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	µg/L	NE	116,000	19000	4,200	J	4,190	J	1,920	J	1,870	J	-	-	2,110	J	2,200	J	-	-
Selenium	µg/L	18	NE	6.7	6.3	J	4.9	J	-	-	-	-	-	-	4.5	J	-	-	-	-
Sodium	µg/L	NE	1,390,000	97100	28,300		31,200		8,500	J	5,600	J	5,680		5,380	J	6,170	J	7,420	
Vanadium	µg/L	18	NE	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-8

Detected Constituents in Overburden/Shale
Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-MW01				LBA-MW02											
				LOCATION	LS				LS											
				SAMPLE NO	LB3067		LB3075		LB3068		LB3069		LB3070		LB3076		LB3077		LB3079	
				SAMPLE DATE	12-May-09		4-Nov-09		19-May-09		19-May-09		19-May-09		5-Nov-09		5-Nov-09		5-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		FD		FS		REG		FD		FS	
				LOW-FLOW SAMPLED	No		No		Yes		Yes		Yes		Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Zinc	µg/L	1,100	507	18.3	-	-	-	-	-	-	9.2	J	-	-	-	-	-	-	-	-
METALS-FILTERED																				
Aluminum	µg/L	3,700	309	37.6	-	-	-	-	37.6	J	28.3	J	-	-	-	-	-	-	-	-
Barium	µg/L	730	11,800	190	66.9	J	56	J	51.3	J	49.2	J	-	-	28	J	33.8	J	-	-
Calcium	µg/L	NE	316,000	197000	197,000		159,000		77,300		78,400		76,100		82,600		85,700		81,500	
Cobalt	µg/L	1.1	12.1	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	µg/L	15	NE	2.7	-	-	-	-	-	-	-	-	-	-	2.1	J	2.4	J	-	-
Magnesium	µg/L	NE	217,000	47000	45,100		44,200		15,800		16,100		16,500		15,000		15,700		15,000	
Manganese	µg/L	88	636	457	457		135		47.2		46.1		57.3		30.1	J	46.3	J	47.4	
Mercury	µg/L	1.1	NE	0.16	-	-	-	-	-	-	-	-	-	-	-	-	0.16	J	-	-
Nickel	µg/L	73	8.6	21.1	5	J	2.7	J	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	µg/L	NE	116,000	19800	4,240	J	4,000	J	1,050	J	1,530	J	-	-	914	B	1,080	B	-	-
Selenium	µg/L	18	NE	5.9	5.9	J	-	-	3.6	J	-	-	-	-	-	-	-	-	-	-
Sodium	µg/L	NE	1,390,000	98100	28,700		30,100		4,210	J	4,960	J	5,660		4,120	J	4,550	J	-	-
Vanadium	µg/L	18	NE	0.92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	µg/L	1,100	507	15.5	-	-	14.5	J	-	-	9.5	J	-	-	-	-	-	-	-	-
WATER QUALITY PARAMETERS																				
Alkalinity	µg/L	NE	NE	333000	299,000		285,000		234,000		237,000		230,000		250,000		277,000		280,000	
Chloride	µg/L	NE	NE	195000	105,000		171,000		7,300		7,300		5,700		7,000		7,200		5,800	
Cyanide, total	µg/L	73	NE	16	8.5	J	-	-	7.5	J	-	-	-	-	-	-	-	-	-	-
Hardness	µg/L	NE	NE	320000									300,000						320,000	
HARDNESS (as CaCO3)	µg/L	NE	NE	657000	657,000		600,000		273,000		281,000				303,000		315,000			
Nitrate	µg/L	5,800	NE	300															300	
Nitrate-Nitrite	µg/L	NE	NE	900	-	-	110		710	J	750	J	900		440	J	450	J		
Sulfate	µg/L	NE	NE	282000	190,000		139,000		38,000		38,100		49,500		37,300	J	39,600	J	51,300	
Total dissolved solids	µg/L	NE	NE	951000	876,000		790,000		396,000	J	316,000		350,000		339,000		365,000		370,000	
Total suspended solids	µg/L	NE	NE	206000	14,000		20,000		-	-	6,000	J	-	-	-	-	7,000	J	38,000	
Turbidity	NTU	NE	NE	30.9	8.6		12.7		2.1	J	2.9	J	0.6		2	J	9.7	J	16	

Table 5-8

Detected Constituents in Overburden/Shale
Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-MW03				RCA-MW01		RCA-MW02				RCA-MW03			
				LOCATION	LS				RCA		RCA				RCA			
				SAMPLE NO	LB3071		LB3080		RC3074		RC3075		RC3081		RC3076		RC3082	
				SAMPLE DATE	10-May-09		3-Nov-09		12-May-09		11-May-09		3-Nov-09		11-May-09		4-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG		REG	
				LOW-FLOW SAMPLED	Yes		Yes		No		No		No		No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																		
Amino-2,6-dinitrotoluene, 4-	µg/L	7.3	NE	0.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	µg/L	7.3	NE	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	17.8	-	-	-	-	-	-	0.23		-	-	-	-	-	-
Dinitrotoluene, 2,6-	µg/L	0.099	NE	12.4	-	-	-	-	-	-	0.29		-	-	-	-	-	-
HMX	µg/L	180	NE	0.32	-	-	0.32		-	-	-	-	-	-	-	-	-	-
Nitrobenzene	µg/L	0.12	NE	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	µg/L	0.31	NE	74.7	-	-	-	-	-	-	2.1		1.8		-	-	-	-
Nitrotoluene, 3-	µg/L	0.37	NE	9.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	µg/L	4.2	NE	8.6	-	-	-	-	-	-	1.2		0.61		-	-	-	-
VOLATILES																		
Acetone	µg/L	2,200	NE	10	-	-	-	-	-	-	-	-	-	-	10	J	-	-
Bromoform	µg/L	8.5	NE	0.36	-	-	-	-	-	-	-	-	-	-	0.36	J	-	-
Carbon disulfide	µg/L	100	NE	0.54	-	-	0.54	J	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	0.2	NE	4	-	-	4		-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	0.15	NE	0.20	-	-	-	-	-	-	-	-	-	-	0.2	J	-	-
Dichloroethane, 1,1-	µg/L	2.4	NE	8.3	6.3		8.3		-	-	-	-	-	-	-	-	-	-
Dichloroethene, 1,1-	µg/L	34	NE	1.9	1.4		0.68	J	-	-	-	-	-	-	-	-	-	-
Dichloroethene, cis-1,2-	µg/L	37	NE	0.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/L	910	NE	40.0	35.3		22.1		-	-	-	-	-	-	-	-	-	-
Trichloroethene	µg/L	2	NE	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEMIVOLATILES																		
Di-n-butyl phthalate	µg/L	370	NE	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	µg/L	0.099	NE	12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	µg/L	0.099	NE	8.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METALS-UNFILTERED																		
Aluminum	µg/L	3,700	309	1340	-	-	20.4	J	**386**	J	77.1	J	**1,290**		52.2	J	**1,340**	
Barium	µg/L	730	11,800	260	125	J	260		188	J	77.2	J	55.8	J	114	J	102	J
Calcium	µg/L	NE	316,000	189000	90,200		78,000	J	94,300		126,000		93,200	J	25,400		34,400	J
Chromium	µg/L	0.043	NE	3.3	-	-	-	-	-	-	-	-	2.8	J	-	-	3.3	J
Cobalt	µg/L	1.1	12.1	6.1	-	-	-	-	-	-	6.1	J	3.7	J	-	-	2.3	J
Iron	µg/L	2,600	1,550	2830	-	-	-	-	348		-	-	**2,830**		-	-	**2,510**	
Lead	µg/L	15	NE	4.5	-	-	-	-	-	-	-	-	4.5	B	2.1	J	3.7	B
Magnesium	µg/L	NE	217,000	47900	26,100		28,300		23,200		47,900		37,400		15,100		15,000	
Manganese	µg/L	88	636	458	68.2		292		77.8		422		272		53		102	
Nickel	µg/L	73	8.6	21.0	3.2	J	3	J	3.6	J	**21**	J	**11.4**	J	-	-	**9.1**	J
Potassium	µg/L	NE	116,000	19000	5,570	J	5,530	J	6,570	J	18,900		19,000	J	14,900		16,300	J
Selenium	µg/L	18	NE	6.7	-	-	-	-	6.7	B	-	-	-	-	-	-	-	-
Sodium	µg/L	NE	1,390,000	97100	21,600		24,600		31,000		97,100		85,900		69,100		66,700	
Vanadium	µg/L	18	NE	3.4	-	-	-	-	1.1	J	-	-	3.4	J	-	-	3	J

Table 5-8

Detected Constituents in Overburden/Shale
Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	LBA-MW03				RCA-MW01		RCA-MW02				RCA-MW03			
				LOCATION	LS				RCA		RCA				RCA			
				SAMPLE NO	LB3071		LB3080		RC3074		RC3075		RC3081		RC3076		RC3082	
				SAMPLE DATE	10-May-09		3-Nov-09		12-May-09		11-May-09		3-Nov-09		11-May-09		4-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG		REG		REG	
				LOW-FLOW SAMPLED	Yes		Yes		No		No		No		No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Zinc	µg/L	1,100	507	18.3	11.3	J	-	-	-	-	13.1	B	17.3	J	13.4	B	18.3	J
METALS-FILTERED																		
Aluminum	µg/L	3,700	309	37.6	-	-	-	-	-	-	13.7	J	-	-	-	-	-	-
Barium	µg/L	730	11,800	190	131	J	190	J	182	J	82.7	J	46.6	J	111	J	98.1	J
Calcium	µg/L	NE	316,000	197000	86,500		81,800		99,300		122,000		79,400		23,000		23,500	
Cobalt	µg/L	1.1	12.1	6.1	-	-	-	-	-	-	6.1	J	1.4	J	-	-	-	-
Lead	µg/L	15	NE	2.7	2.7	J	-	-	-	-	2	J	-	-	-	-	2.4	J
Magnesium	µg/L	NE	217,000	47000	25,800		26,800		24,100		47,000		33,700		13,900		13,800	
Manganese	µg/L	88	636	457	71.7		181		68.2		389		157		84.7		25.6	
Mercury	µg/L	1.1	NE	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	µg/L	73	8.6	21.1	3.5	J	-	-	3.1	J	**21.1**	J	6.3	J	3.1	J	3.4	J
Potassium	µg/L	NE	116,000	19800	5,600	J	4,270	J	6,600	J	19,800		16,700		14,800		15,300	
Selenium	µg/L	18	NE	5.9	4.8	J	-	-	3.8	J	3.8	J	-	-	4	J	-	-
Sodium	µg/L	NE	1,390,000	98100	20,400		18,200		32,600		98,100	J	75,700		69,000	J	66,200	
Vanadium	µg/L	18	NE	0.92	-	-	-	-	-	-	0.92	J	-	-	-	-	-	-
Zinc	µg/L	1,100	507	15.5	11.3	J	-	-	15.5	J	9.2	J	7.4	J	-	-	7.6	J
WATER QUALITY PARAMETERS																		
Alkalinity	µg/L	NE	NE	333000	246,000		333,000		267,000		322,000		320,000		307,000		295,000	
Chloride	µg/L	NE	NE	195000	6,800		195,000	J	21,700		11,600		11,400		12,200		12,100	
Cyanide, total	µg/L	73	NE	16	13	J	-	-	16		13		-	-	-	-	-	-
Hardness	µg/L	NE	NE	320000														
HARDNESS (as CaCO3)	µg/L	NE	NE	657000	333,000		311,000		331,000		512,000		387,000		126,000		148,000	
Nitrate	µg/L	5,800	NE	300														
Nitrate-Nitrite	µg/L	NE	NE	900	-	-	110		-	-	-	-	32	J	-	-	-	-
Sulfate	µg/L	NE	NE	282000	69,800		45,400		67,100		282,000		210,000		4,300		4,400	
Total dissolved solids	µg/L	NE	NE	951000	580,000		394,000		509,000		951,000		694,000		230,000		348,000	
Total suspended solids	µg/L	NE	NE	206000	5,000	J	4,000		70,000		27,000		206,000		-	-	52,000	
Turbidity	NTU	NE	NE	30.9	-	-	1	J	21.3		3		30.9		2.1		25	

Table 5-8

Detected Constituents in Overburden/Shale
Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area SCR
Former Plum Brook Ordnance Works, Sandusky, Ohio

LS - Locomotive Shop.
RCA - Railcar Wash Area.

NE - Not established (RBSCs), not evaluated (BSCs).
NA - Not Analyized.
Shaded cell indicates value is greater than RBSC.
Bold text indicates value is greater than the BSC.
RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1.
For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.
MDC - Maximum detected concentration for the AOC ("B" qualified data not included).
BSC - Background screening concentration.
"-" - Not Detected.
µg/L - Parts per billion.
mg/L - Parts per million.
prior to groundwater sample collection.
NM - Not measured.

Tempoary piezometers from RCA not sampled. Recharge rate in all piezometers less than 50 ml per minute.

Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.
B - The analyte was not detected significantly above the levels found in the associated method blank or field blanks.

Table 5-9

Detected Constituents in Bedrock Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	IT-MNTA-BEDGW-001				LBA-BEDGW-002		RCA-BEDGW-002			
				SAMPLE NO	LB3074		BEDGW-001-1109		LB3073		RC3078		RC3084	
				SAMPLE DATE	19-May-09		6-Nov-09		12-May-09		11-May-09		5-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG	
				LOW-FLOW SAMPLED	No		No		No		No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
VOLATILES														
Acetone	ug/L	2,200	NE	345	345	J	-	-	-	-	50.7	J	-	-
Benzene	ug/L	0.41	2.4	1680	-	-	3.7		1,680	J	31.9		114	
Butanone, 2-	ug/L	710	NE	81.3	81.3	J	-	-	56.3	J	-	-	13.2	
Carbon disulfide	ug/L	100	NE	11.6	11.6	J	3.8		-	-	-	-	-	-
Chloroform	ug/L	0.19	NE	66.7	66.7		-	-	26.8		-	-	-	-
Chloromethane	ug/L	19	NE	35.6	-	-	-	-	35.6	J	12.8		-	-
Ethylbenzene	ug/L	1.5	0.87	169	**16.7**	J	**9.9**		**169**		**17**		**43.4**	
Methyl-2-pentanone, 4-	ug/L	200	NE	3.3	-	-	3.3	J	-	-	-	-	-	-
Methylene chloride	ug/L	4.8	NE	77.6	77.6	J								
Tetrachloroethane, 1,1,2,2-	ug/L	0.067	NE	3.7	-	-	1.2		-	-	3.7		-	-
Toluene	ug/L	230	1.7	692	**14.2**	J	**10**		**692**		**28.9**		**93.6**	
Xylenes, total	ug/L	20	5.5	1130	**235**		**136**		**1,130**		**97.2**		**234**	
SEMIVOLATILES														
3-Methylphenol and 4-Methylphenol	ug/L	NE	NE	5.2	-	-	-	-	5.2		-	-	-	-
Dimethylphenol, 2,4-	ug/L	73	NE	12.3	-	-	-	-	12.3		1.5	J	1.6	J
Fluorene	ug/L	150	NE	5.4	5.4	J								
Methylnaphthalene, 2-	ug/L	15	NE	256	71		256	J	20.9		6.3		8.1	
Methylphenol, 2-	ug/L	180	NE	5.6	-	-	-	-	5.6		-	-	-	-
Naphthalene	ug/L	0.14	NE	64.9	17.7	J	64.9	J	25.6		4.5	J	7.2	
Phenanthrene	ug/L	NE	NE	37.3	12.7	J	37.3	J	-	-	-	-	-	-
Phenol	ug/L	1,100	NE	8	-	-	-	-	8		-	-	-	-
METALS-UNFILTERED														
Aluminum	ug/L	3,700	309	155	90.4	B	79.6	J	73.8	B	155	J	138	J
Arsenic	ug/L	0.045	7.4	131	-	-	-	-	**131**		**19.9**		**28**	
Barium	ug/L	730	11,800	762	343		305		762		485		562	

Table 5-9

Detected Constituents in Bedrock Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	IT-MNTA-BEDGW-001				LBA-BEDGW-002		RCA-BEDGW-002			
				SAMPLE NO	LB3074		BEDGW-001-1109		LB3073		RC3078		RC3084	
				SAMPLE DATE	19-May-09		6-Nov-09		12-May-09		11-May-09		5-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG	
				LOW-FLOW SAMPLED	No		No		No		No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
Cadmium	ug/L	1.8	NE	1.4	1.4	J								
Calcium	ug/L	NE	316,000	462000	314,000	J	280,000		**462,000**		**343,000**		**360,000**	
Iron	ug/L	2,600	1,550	2940	591		180	J	**2,940**		-	-	385	
Lead	ug/L	15	NE	2.6	2.6	J	-	-	-	-	-	-	-	-
Magnesium	ug/L	NE	217,000	352000	**234,000**		212,000		**352,000**		**241,000**		**275,000**	
Manganese	ug/L	88	636	1070	95.5		85.8		**1,070**		227		158	
Nickel	ug/L	73	8.6	7.2	-	-	-	-	7.2	J	-	-	-	-
Potassium	ug/L	NE	116,000	120000	111,000		**120,000**		87,700		57,600		72,000	
Selenium	ug/L	18	NE	11.7	-	-	-	-	11.7	J	6.8	B	8.5	J
Sodium	ug/L	NE	1,390,000	1230000	1,230,000		1,130,000		1,140,000		638,000		770,000	
Thallium	ug/L	NE	NE	6.4	3.8	J	-	-	6.4	J	-	-	-	-
Vanadium	ug/L	18	NE	2.8	2.8	J	1.6	J	1.4	J	1.6	J	-	-
Zinc	ug/L	1,100	507	14.8	11.6	J	11.5	B	-	-	14.8	B	9.2	B
METALS-FILTERED														
Aluminum	ug/L	3,700	309	71.7	43.3	J	52.6	J	-	-	35.6	J	71.7	J
Arsenic	ug/L	0.045	7.4	125	-	-	-	-	**125**		13.1		42.7	
Barium	ug/L	730	11,800	764	329		304		764		494		576	
Calcium	ug/L	NE	316,000	471000	312,000		275,000		**471,000**		309,000		**371,000**	
Lead	ug/L	15	NE	3.3	2	J	2.3	J	-	-	3.3	J	-	-
Magnesium	ug/L	NE	217,000	365000	**231,000**		211,000		**365,000**		**223,000**		**287,000**	
Manganese	ug/L	88	636	1000	47		70.2		**1,000**		186		177	
Nickel	ug/L	73	8.6	5.7	-	-	-	-	5.7	J	-	-	-	-
Potassium	ug/L	NE	116,000	120000	113,000		**120,000**		90,200		57,900		75,200	
Selenium	ug/L	18	NE	9.3	-	-	4.2	J	9.3	J	7	J	7.2	J
Sodium	ug/L	NE	1,390,000	1210000	1,210,000		1,160,000		1,170,000		634,000	J	793,000	
Thallium	ug/L	NE	NE	0	-	-	-	-	-	-	-	-	-	-
Vanadium	ug/L	18	NE	2.7	2.7	J	0.93	J	1.1	J	1.9	J	1.3	J
Zinc	ug/L	1,100	507	11.2	11.2	J	-	-	-	-	-	-	-	-

Table 5-9

Detected Constituents in Bedrock Monitoring Wells Above RBSCs and/or BSCs
Locomotive Building Area Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio

				LOCATION CODE	IT-MNTA-BEDGW-001				LBA-BEDGW-002		RCA-BEDGW-002			
				SAMPLE NO	LB3074		BEDGW-001-1109		LB3073		RC3078		RC3084	
				SAMPLE DATE	19-May-09		6-Nov-09		12-May-09		11-May-09		5-Nov-09	
				DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
				SAMPLE PURPOSE	REG		REG		REG		REG		REG	
				LOW-FLOW SAMPLED	No		No		No		No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
WATER QUALITY PARAMETERS														
Alkalinity	ug/L	NE	NE	773000	773,000		718,000		369,000		753,000		770,000	
Chloride	ug/L	NE	NE	3260000	132,000		2,550,000		3,260,000		1,480,000		2,520,000	
Cyanide, total	ug/L	73	NE	110	71		-	-	14	J	110	J	-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	2600000	1,740,000		1,570,000		2,600,000		1,850,000		2,030,000	
Nitrate-Nitrite	ug/L	NE	NE	200	-	-	90	J	-	-	-	-	200	J
Sulfate	ug/L	NE	NE	218000	9,600		-	-	14,800		218,000		39,400	J
Total dissolved solids	ug/L	NE	NE	7970000	5,780,000		4,680,000		7,970,000		3,320,000		3,910,000	
Total suspended solids	ug/L	NE	NE	193000	53,000		193,000		60,000		-	-	17,000	
Turbidity	NTU	NE	NE	168	66	J	71.5		168		47.4		76.4	

NE - Not established (RBSCs), not evaluated (BSCs).
NA - Not Analyized.
Shaded cell indicates value is greater than RBSC.
Bold text indicates value is greater than the BSC.
RBSC - Values reflect an incremental lifetime cancer risk (ICLR) of 1E-6 or a noncancer hazard quotient (HQ) of 0.1.
For chemicals that exhibit both cancer and noncancer effects, whichever type of effect results in a lower concentration (using an ICLR of 1E-6 and an HQ of 0.1), that concentration is selected as the RBSC.
MDC - Maximum detected concentration for the AOC ("B" qualified data not included).
BSC - Background screening concentration.
"-" - Not Detected.
µg/L - Parts per billion.
mg/L - Parts per million.
Ferrous iron measured in field using Hach test kit.
Oxidation reduction potential - Final YSI water quality meter field measurement prior to groundwater sample collection.
NM - Not measured.

Validation Qualifiers (VQ)
J - The analyte was postively identifed; the reported value is estimated.
B - The analyte was not detected significantly above the levels found in the associated method blank or field blanks.

FIGURES

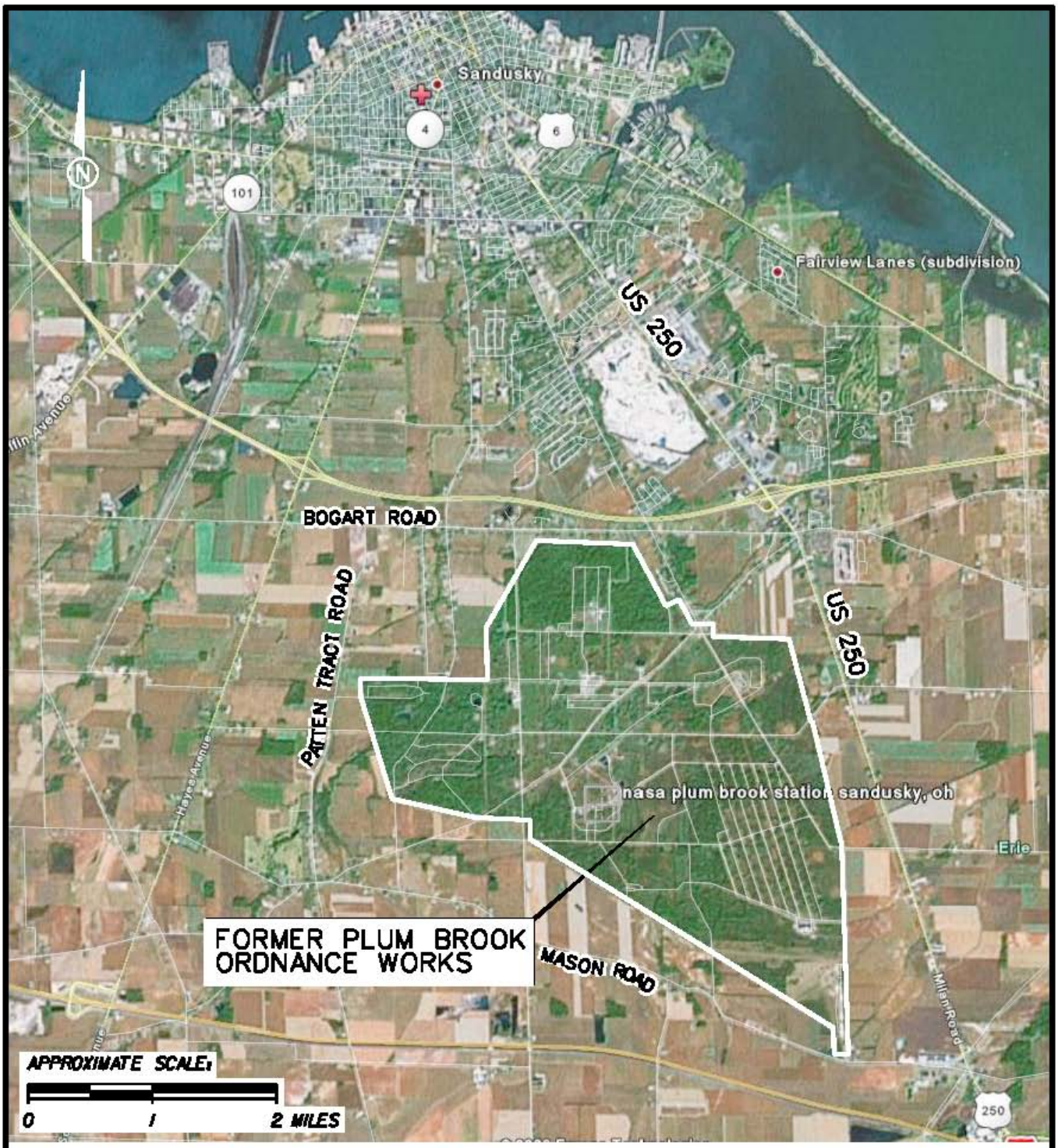

FIGURE 1-1
PBOW VICINITY MAP

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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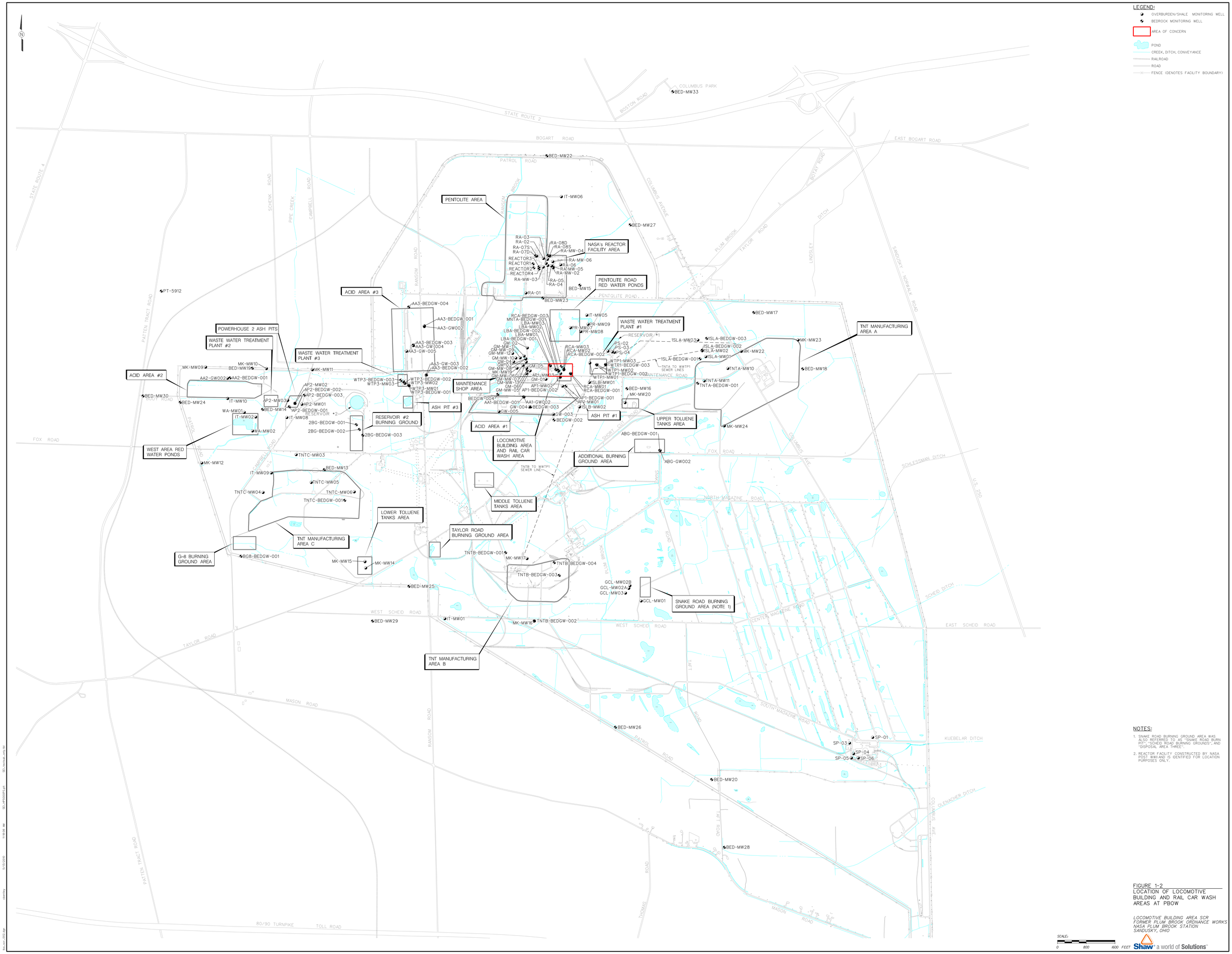


NOTES:

1. SNAKE ROAD BURNING GROUND AREA WAS ALSO REFERRED TO AS "SNAKE ROAD BURN PIT", "SCHEID ROAD BURNING GROUNDS", AND "DISPOSAL AREA THREE".
2. REACTOR FACILITY CONSTRUCTED BY NASA POST WWII AND IS IDENTIFIED FOR LOCATION PURPOSES ONLY.

FIGURE 1-2
LOCATION OF LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS AT PBOW

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

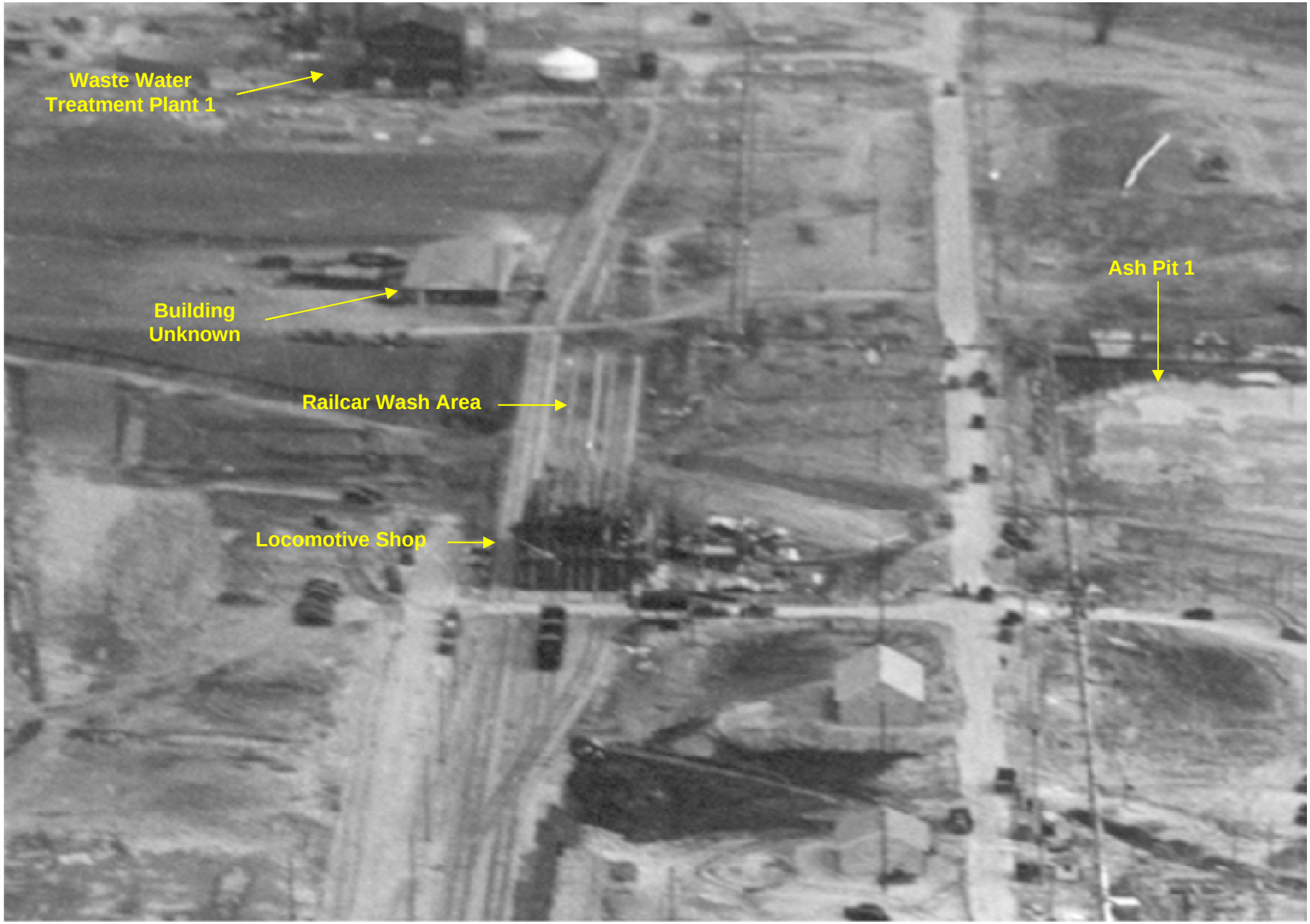


Figure 1-3

Locomotive Building Area, Looking East
19 January 1942

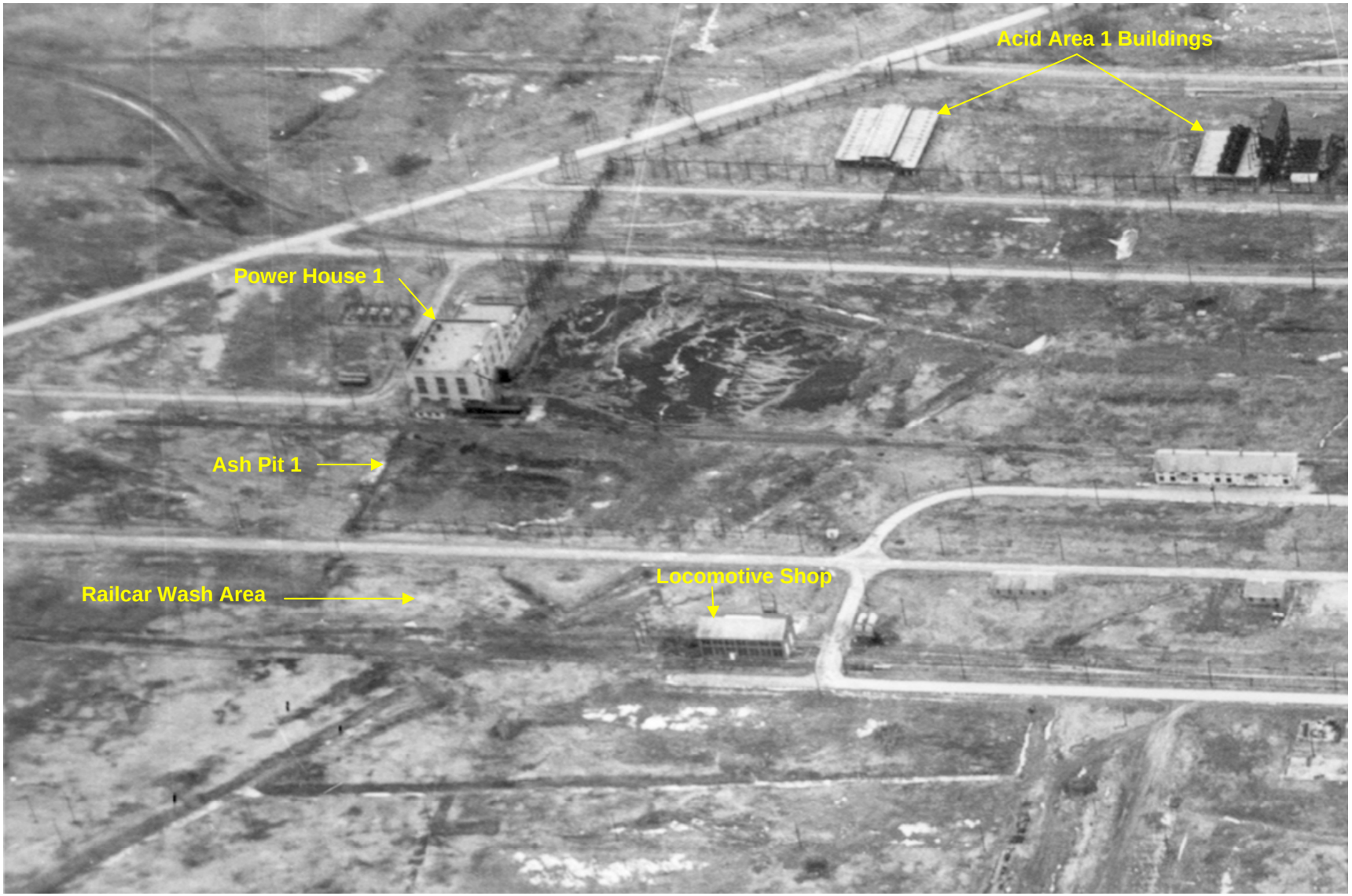
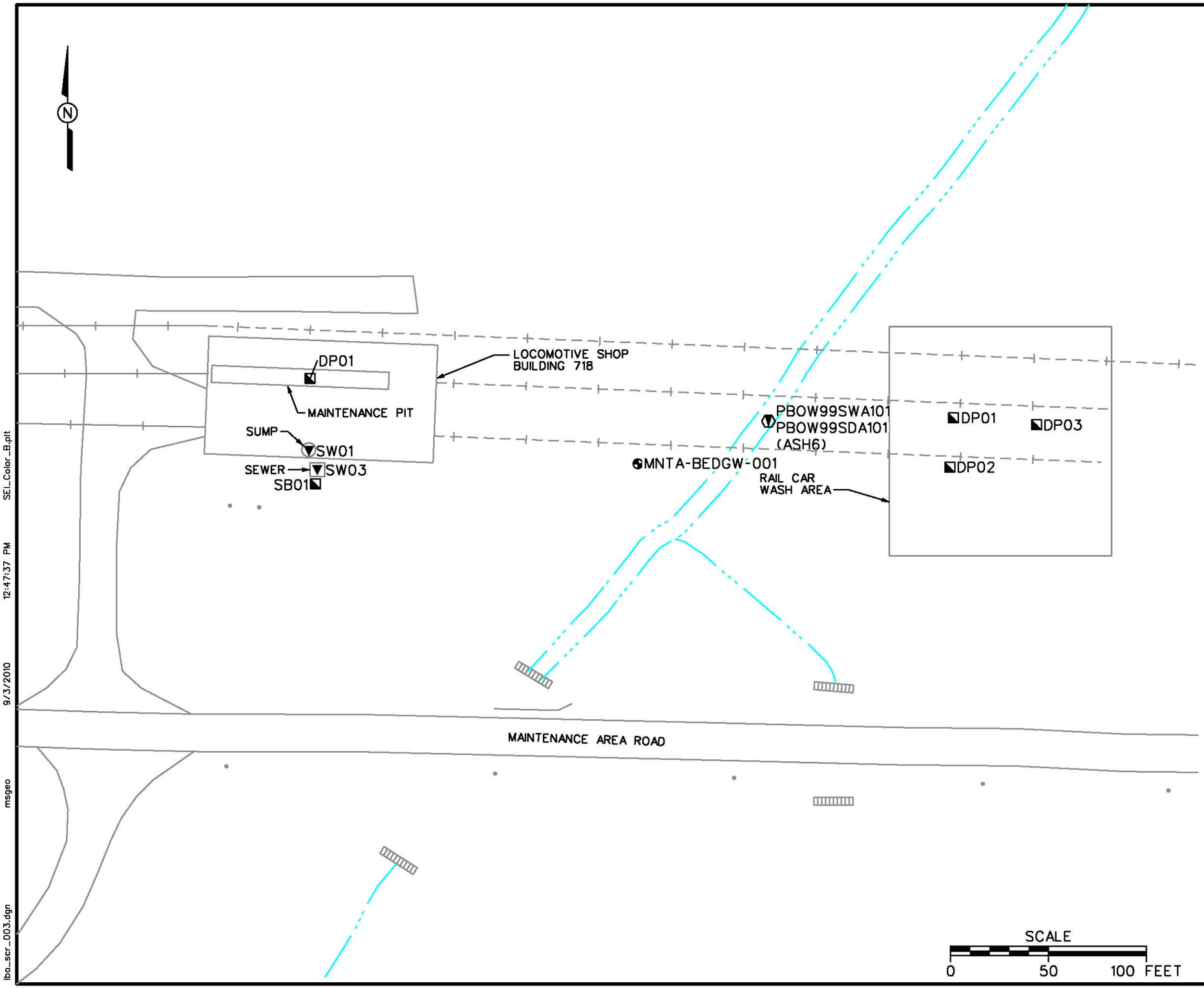


Figure 1-4

Locomotive Building Area, Looking South
circa 1960



LEGEND:

- EXISTING BEDROCK MONITORING WELL (SCREENED IN LIMESTONE)
- PREVIOUS SOIL BORING (USACE, 2000)
- PREVIOUS SURFACE WATER/SEDIMENT SAMPLE (USACE, 2000)
- PREVIOUS SURFACE WATER SAMPLE (USACE, 2000)
- UTILITY POLE
- CREEK, DITCH, CONVEYANCE
- EXISTING RAILROAD TRACK
- HISTORIC RAILROAD TRACK

LOCOMOTIVE SHOP	EASTING	NORTHING	ELEV.
DP01	1918532.01	623846.90	N/A
SW01	1918531.31	623814.93	N/A
SW03	1918535.59	623805.16	N/A

RAIL CAR WASHING AREA	EASTING	NORTHING	ELEV.
DP01	1918860.51	623831.73	636.7
DP03	1918903.13	623828.21	636.8
DP02	1918858.68	623806.58	637.5
ASH6	1918766.06	623830.01	N/A

NOTES:

1. PREVIOUS SOIL SAMPLES AND THE SURFACE WATER AND SEDIMENT SAMPLE COLLECTED IN 1999 (USACE, 2000, LIMITED SITE INVESTIGATION, FINAL REPORT, FOR THE FORMER PLUM BROOK ORDNANCE WORKS GARAGE MAINTENANCE BUILDING (LOCOMOTIVE BUILDING AREA), SANDUSKY, OHIO, JULY).
2. COORDINATES ARE OHIO STATE PLANE COORDINATE SYSTEM, NAD83.

FIGURE 1-5
HISTORIC SOIL BORING LOCATIONS LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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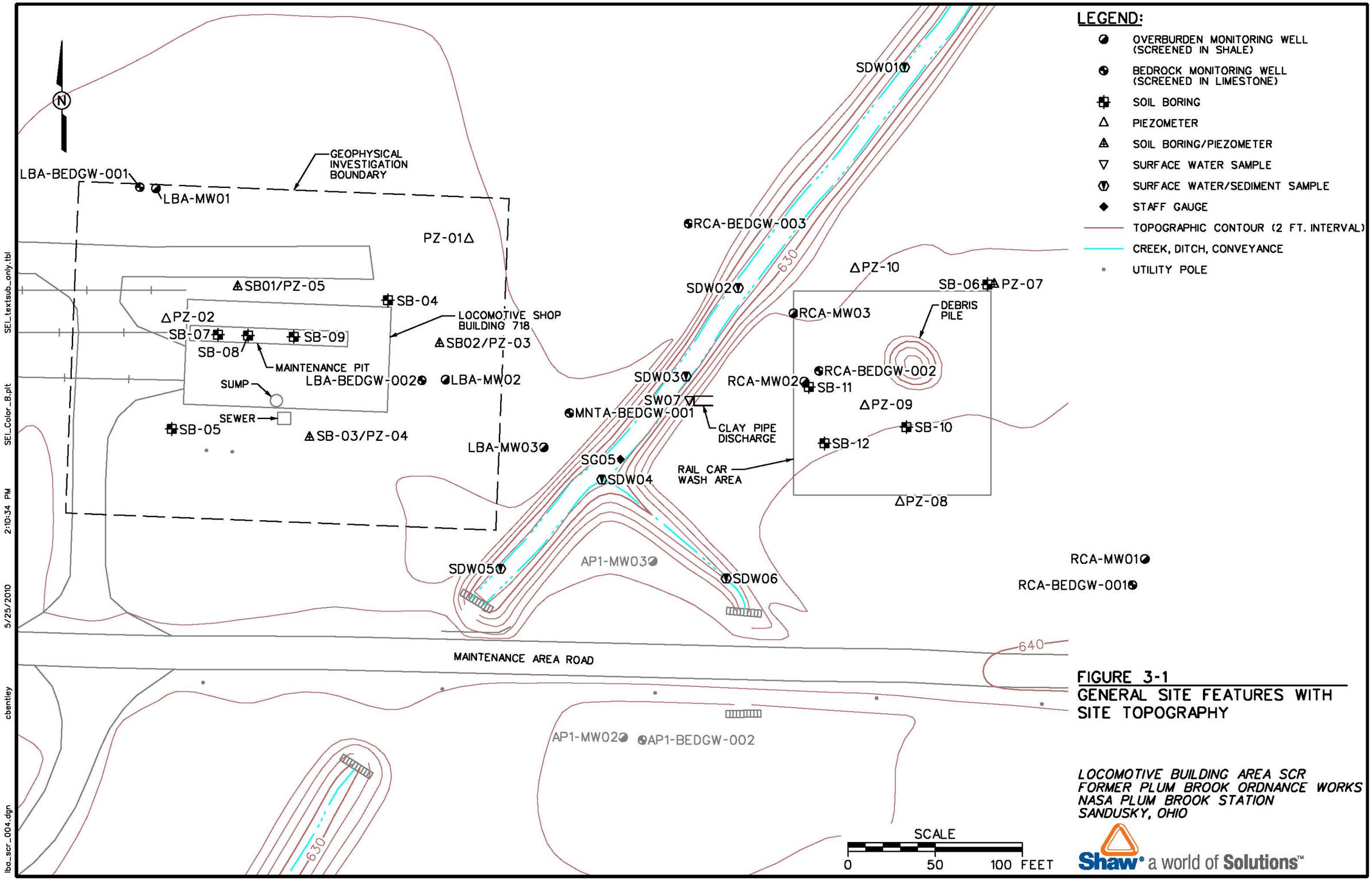


FIGURE 3-1
GENERAL SITE FEATURES WITH SITE TOPOGRAPHY

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

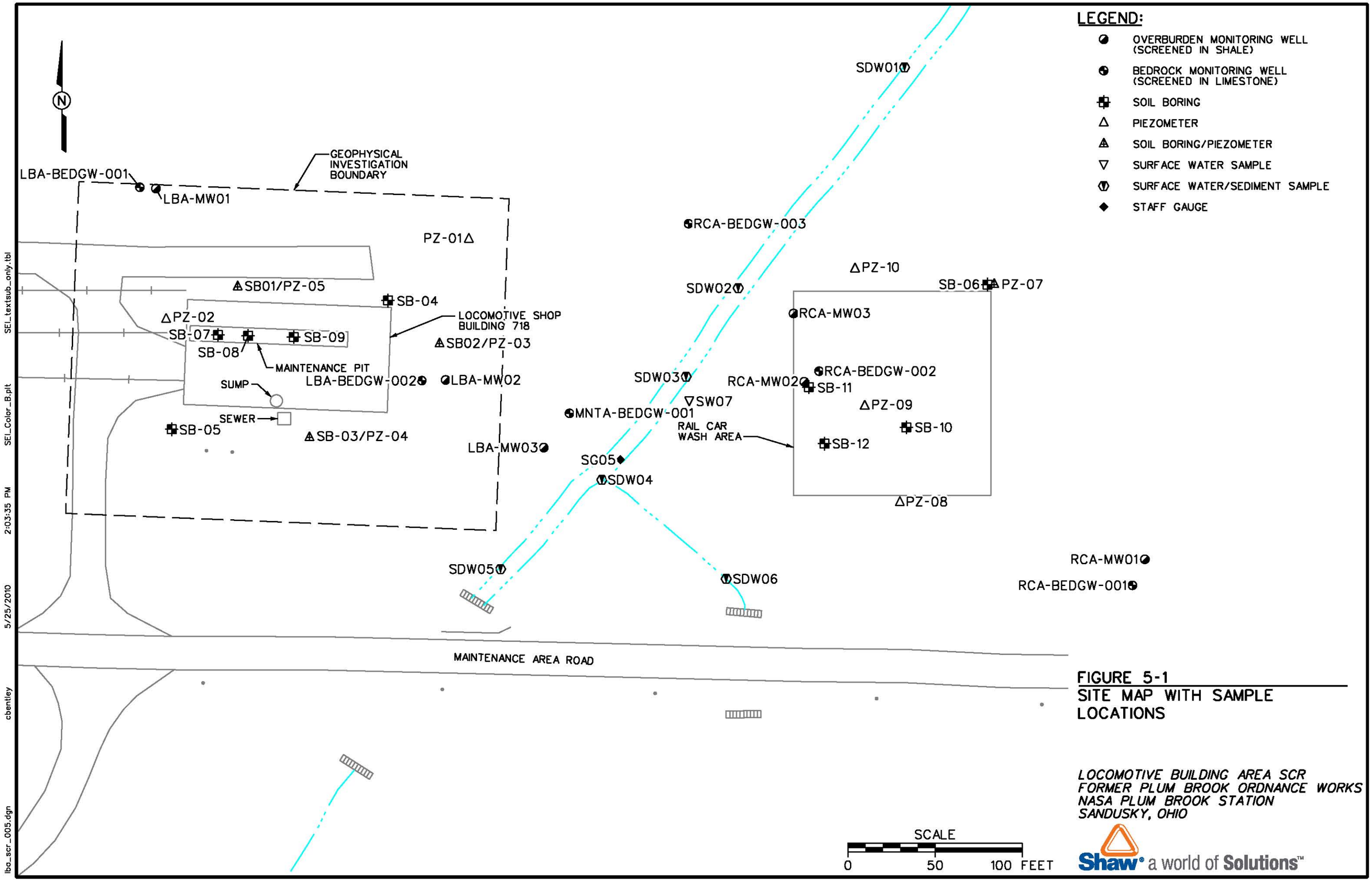
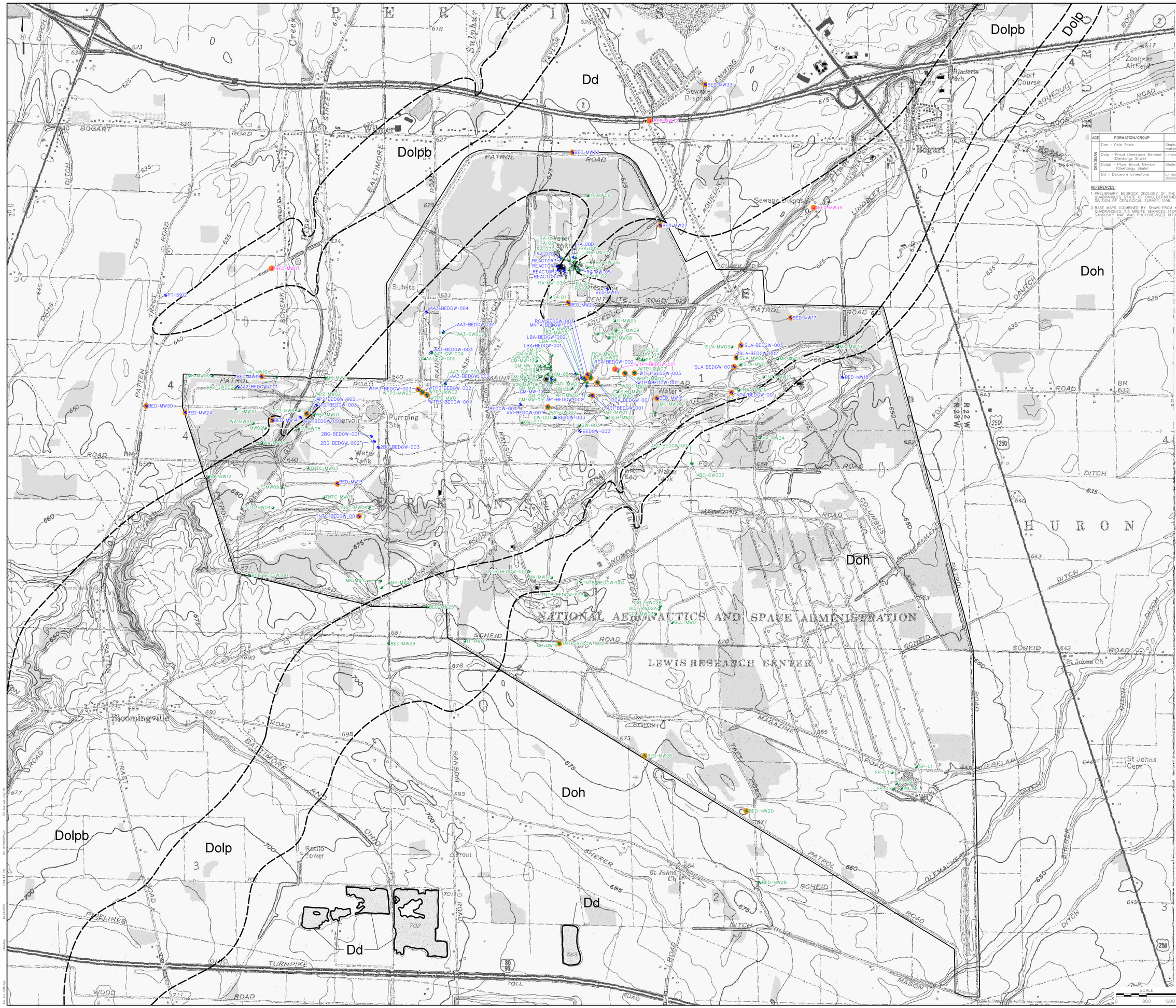


FIGURE 5-1
SITE MAP WITH SAMPLE LOCATIONS

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO



LEGEND:

- OVERBURDEN MONITORING WELL (SCREENED IN SHALE)
- BEDROCK MONITORING WELL (SCREENED IN SHALE)
- BEDROCK MONITORING WELL (SCREENED IN LIMESTONE)
- ABANDONED OVERBURDEN MONITORING WELL (SCREENED IN SHALE)
- ABANDONED BEDROCK MONITORING WELL (SCREENED IN LIMESTONE)
- ABANDONED BEDROCK WELL BORING
- H_2S AND/OR NATURAL GAS AND/OR PETROLEUM HYDROCARBON WERE NOTED DURING BEDROCK DRILLING
- GEOLOGIC CONTACT: SOLID WHERE EXPOSED, DASHED WHERE CONCEALED BY SEDIMENTS

AGE	FORMATION/GROUP	ROCK DESCRIPTION
DEVONIAN	Doh - Ohio Shale	Shale: black, thin-bedded with bituminous and carboneous material, pyrite, natural gas pockets.
	Dolp - Prout Limestone Member (Olentangy Shale)	Limestone: light gray, calcareous.
	Dolpb - Plum Brook Member (Olentangy Shale)	Shale: dark gray, thin-bedded.
	Dd - Delaware Limestone	Limestone: buff, earthy, interbedded with brown crystalline dolomite, fossiliferous, hydrogen sulfide, petroleum hydrocarbon.

REFERENCES:

1. PRELIMINARY BEDROCK GEOLOGY OF THE KIMBALL AND SANDUSKY, OHIO, QUADRANGLES, STATE OF OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SURVEY, 1995.
2. BASE MAPS (COMBINED BY SHAW) FROM KIMBALL AND SANDUSKY QUADRANGLES, 7.5 MINUTE SERVICES, (TOPOGRAPHIC), 1969. SANDUSKY MAP WAS PHOTOREVISED, 1979.

NOTES:

1. CONTACT LINES WERE ADJUSTED BASED ON 2009 MONITORING WELLS/SOIL BORING DATA.

FIGURE 5-2
REGIONAL GEOLOGIC MAP WITH WELL LOCATIONS

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

SCALE
0 800 1600 FEET

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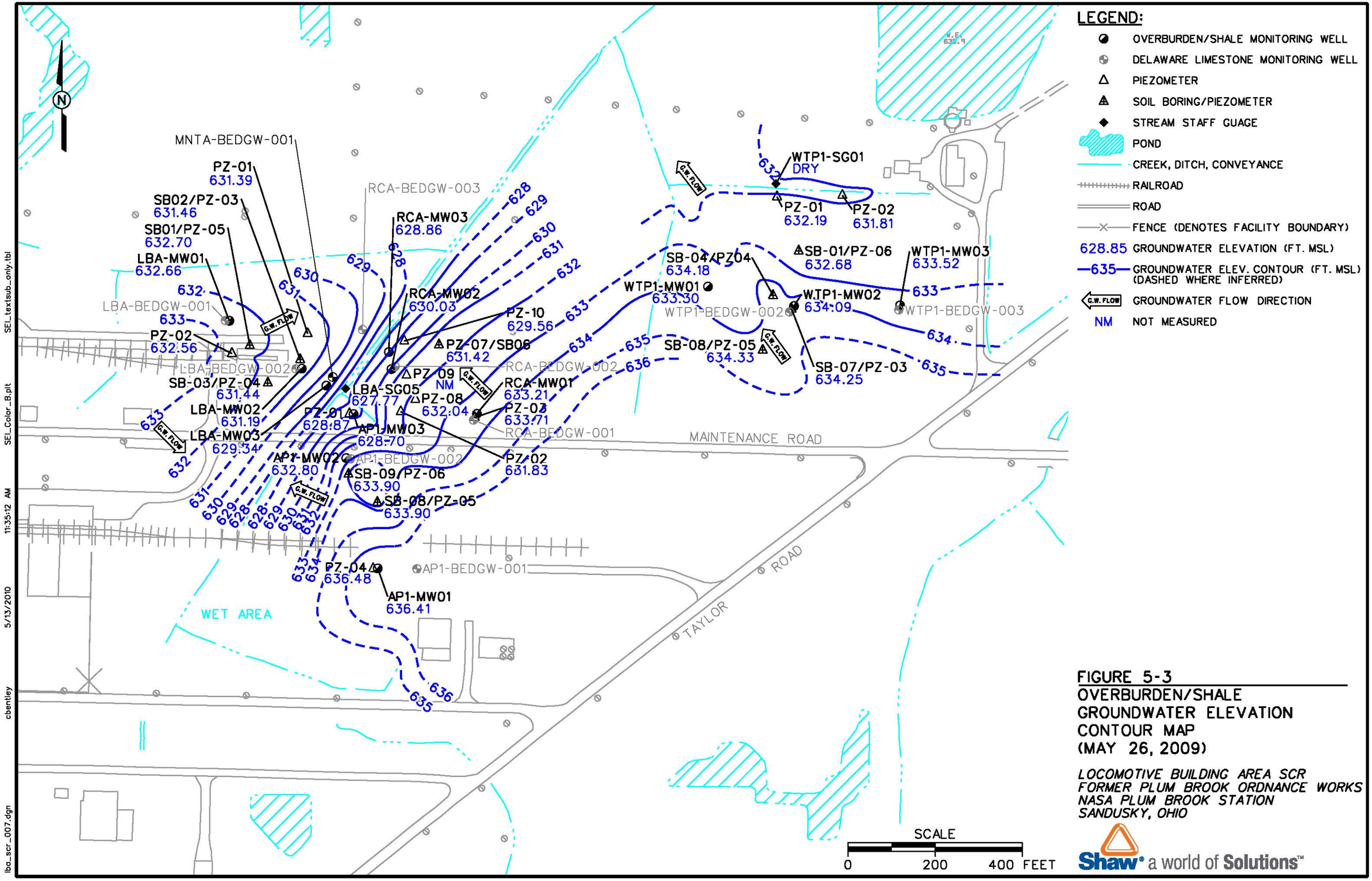

FIGURE 5-3
OVERBURDEN/SHALE GROUNDWATER ELEVATION CONTOUR MAP (MAY 26, 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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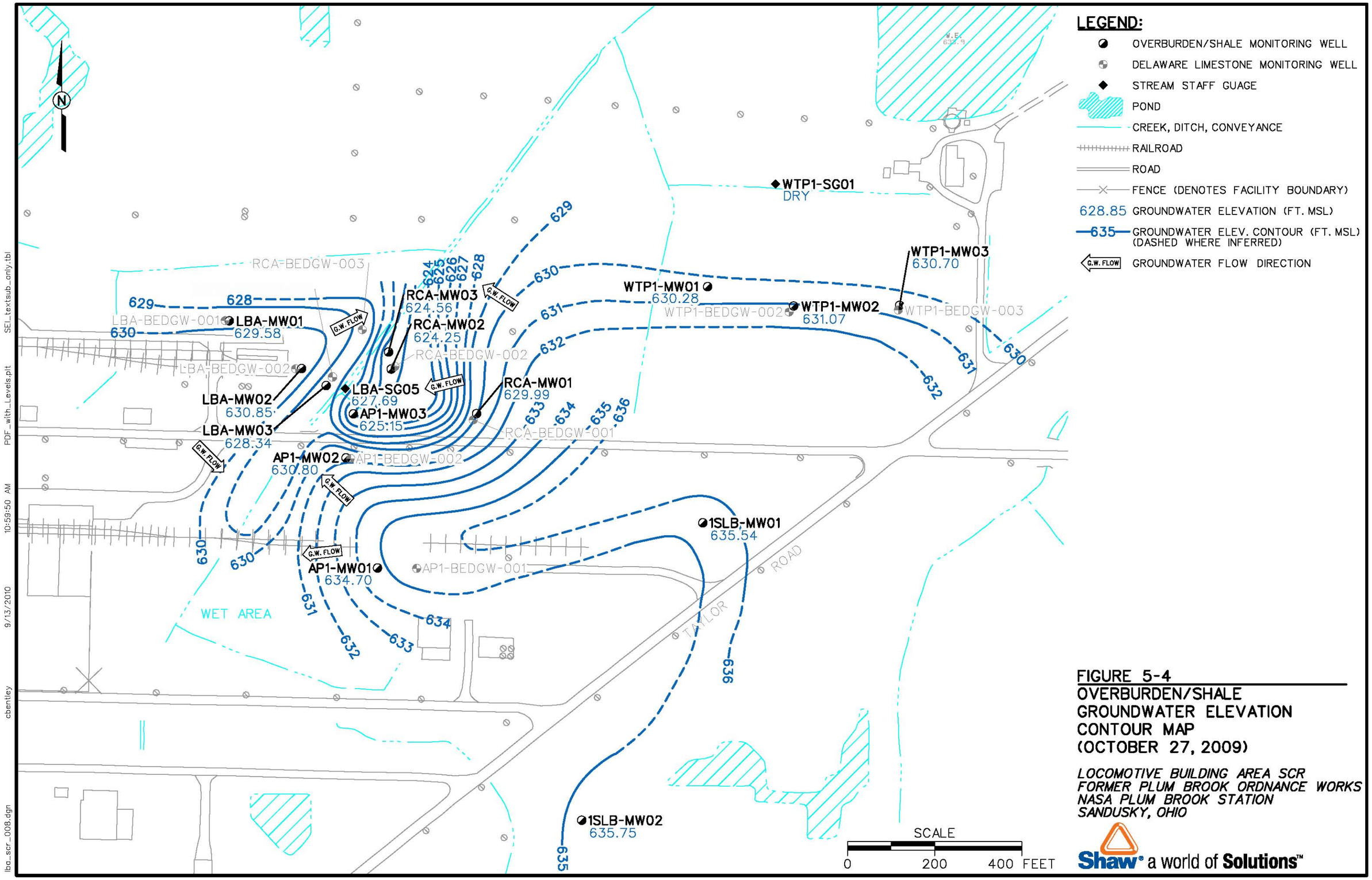

FIGURE 5-4
OVERBURDEN/SHALE
GROUNDWATER ELEVATION
CONTOUR MAP
(OCTOBER 27, 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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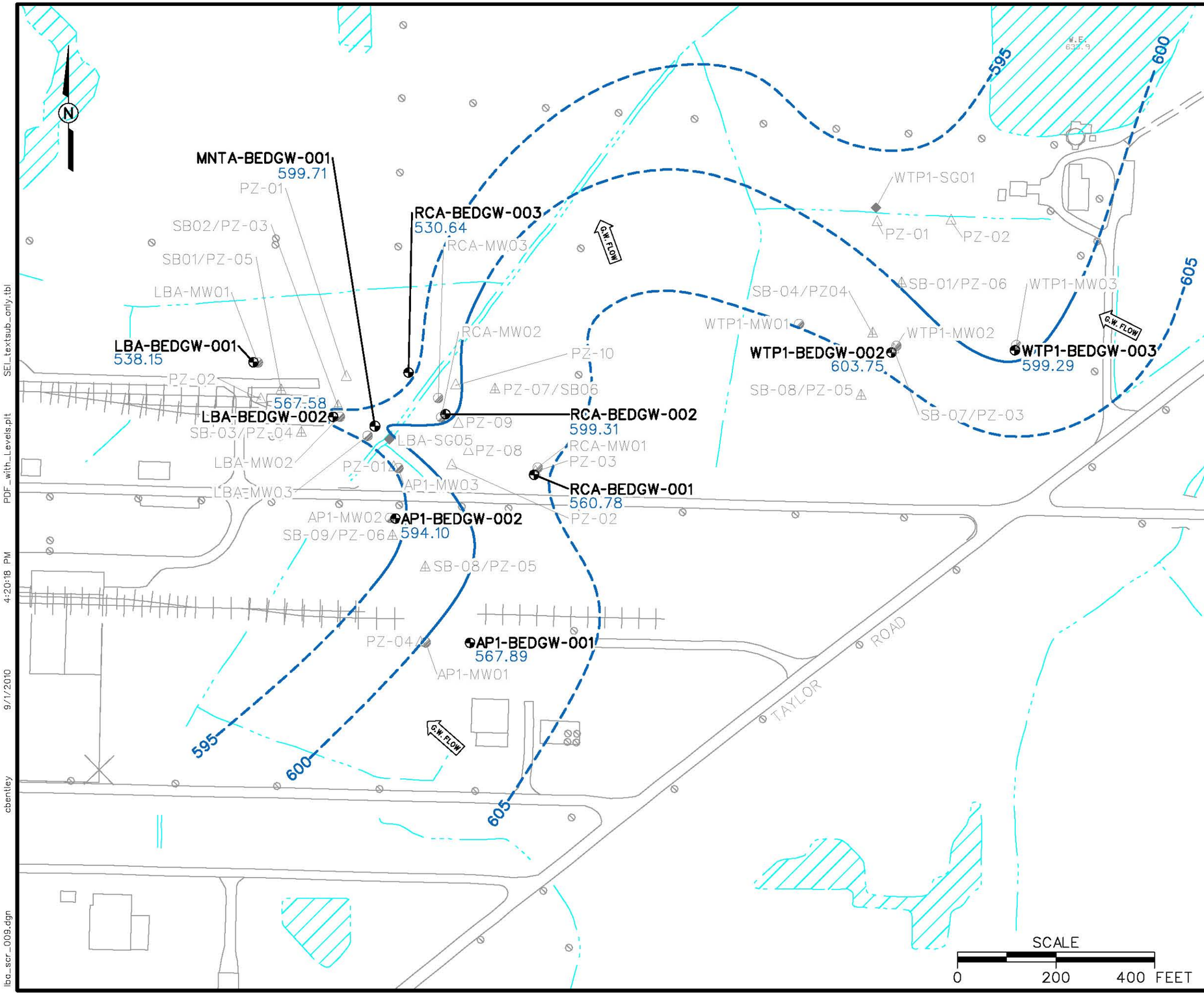

LEGEND:

- OVERBURDEN/SHALE MONITORING WELL
- DELAWARE LIMESTONE MONITORING WELL
- PIEZOMETER
- SOIL BORING/PIEZOMETER
- STREAM STAFF GUAGE
- POND
- CREEK, DITCH, CONVEYANCE
- RAILROAD
- ROAD
- FENCE (DENOTES FACILITY BOUNDARY)
- 603.75 GROUNDWATER ELEVATION (FT. MSL)
- 600 GROUNDWATER CONTOUR (FT. MSL) (DASHED WHERE INFERRED)
- G.W. FLOW GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER ELEVATIONS OF LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, AP1-BEDGW-001, AND RCA-BEDGW-003 NOT USED DUE TO POSSIBLE LOW-PRODUCING BEDROCK FRACTURE CAUSING VARIABLE GROUNDWATER ELEVATIONS, SCREENED WITHIN A DIFFERENT FRACTURE NETWORK, OR NON-STATIC WATER LEVELS CAUSED BY RECENT NEARBY CORE DRILLING ACTIVITIES.

FIGURE 5-5
DELAWARE LIMESTONE GROUNDWATER ELEVATION CONTOUR MAP
(MAY 26, 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw® a world of Solutions™

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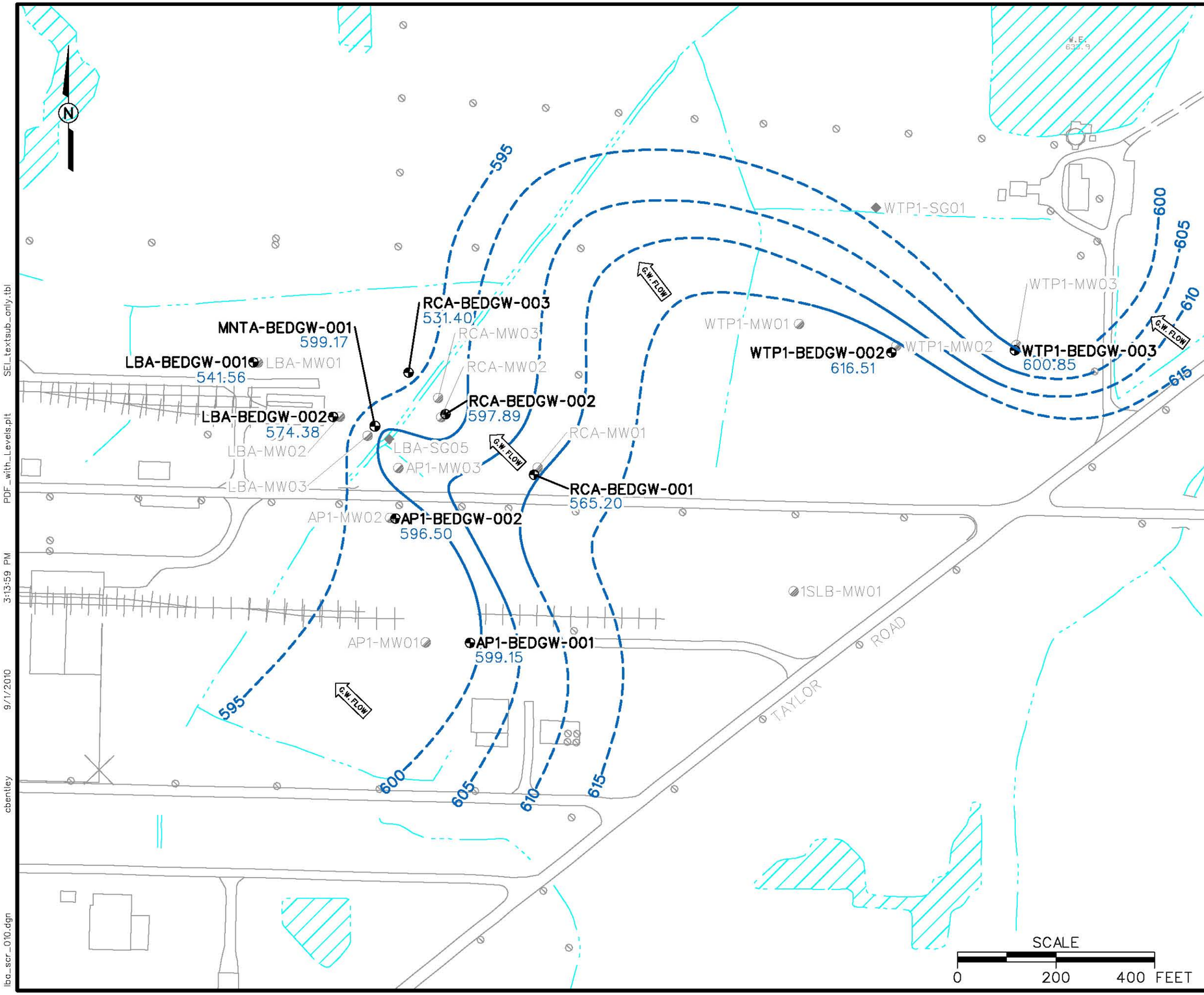

LEGEND:

- OVERBURDEN/SHALE MONITORING WELL
- DELAWARE LIMESTONE MONITORING WELL
- STREAM STAFF GUAGE
- POND
- CREEK, DITCH, CONVEYANCE
- RAILROAD
- ROAD
- FENCE (DENOTES FACILITY BOUNDARY)
- 600.85 GROUNDWATER ELEVATION (FT. MSL)
- 600 GROUNDWATER CONTOUR (FT. MSL) (DASHED WHERE INFERRED)
- G.W. FLOW GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER ELEVATIONS OF LBA-BEDGW-001, LBA-BEDGW-002, RCA-BEDGW-001, AND RCA-BEDGW-003 NOT USED DUE TO POSSIBLE LOW-PRODUCING BEDROCK FRACTURE CAUSING VARIABLE GROUNDWATER ELEVATIONS OR SCREENED WITHIN A DIFFERENT FRACTURE NETWORK.

FIGURE 5-6
DELAWARE LIMESTONE GROUNDWATER ELEVATION CONTOUR MAP (OCTOBER 27, 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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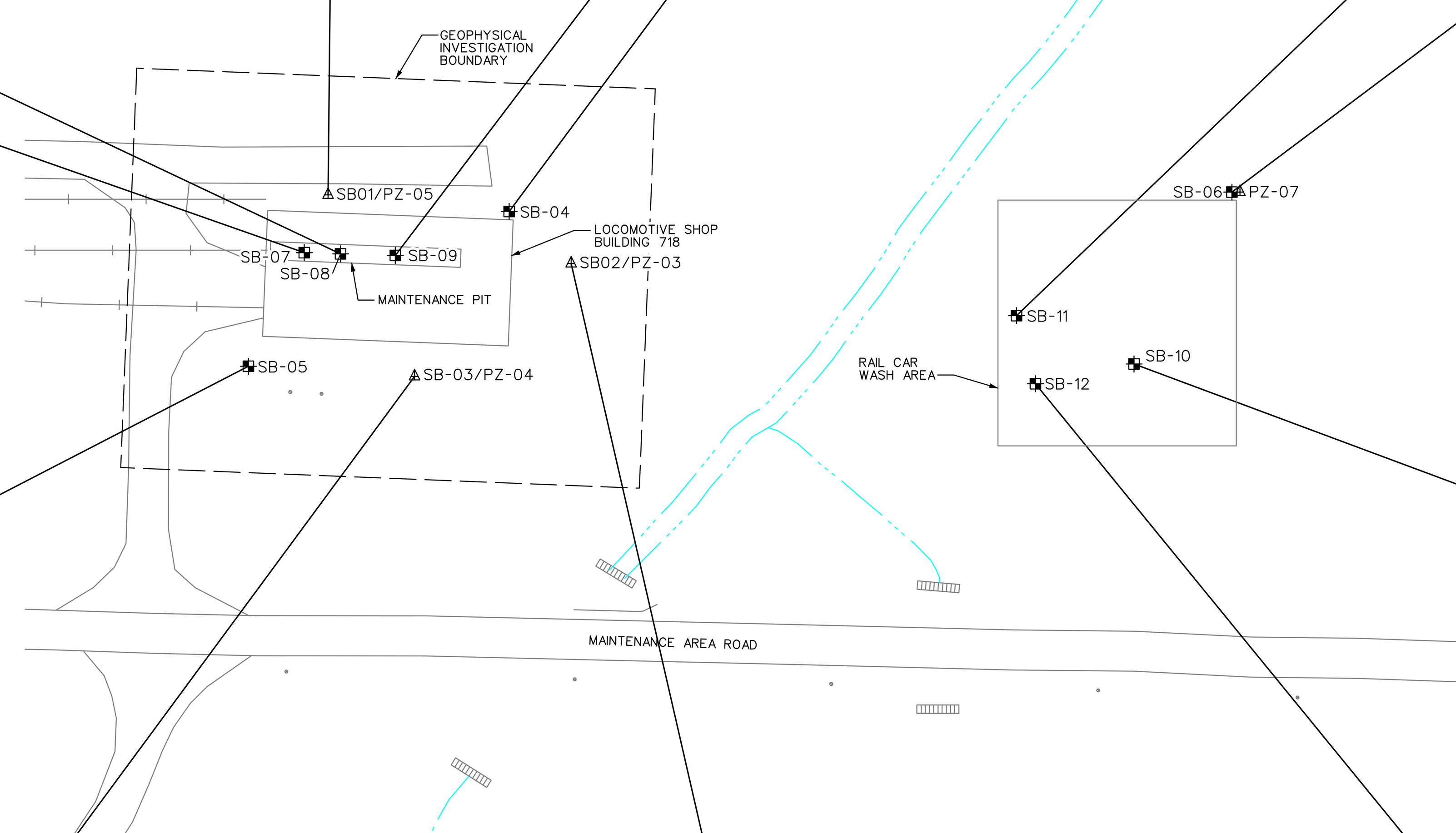

LEGEND:

- SOIL BORING
- SOIL BORING/PIEZOMETER
- mg/kg MILLIGRAM PER KILOGRAM
- NE NOT ESTABLISHED (RBSCs), NOT EVALUATED (BSCs)
- \- NOT DETECTED

NOTES:

1. SHADED CELL INDICATES VALUE IS GREATER THAN THE RISK-BASED SCREENING CONCENTRATION (RBSC).
2. BOLD TEXT INDICATES VALUE IS GREATER THAN THE BACKGROUND SCREENING CONCENTRATION (BSC).
3. RBSC VALUES REFLECT AN INCREMENTAL LIFETIME CANCER RISK (ILCR) OF 1E-6 OR A NONCANCER HAZARD QUOTIENT (HQ) OF 0.1. FOR CHEMICALS THAT EXHIBIT BOTH CANCER AND NONCANCER EFFECTS, WHICHEVER TYPE OF EFFECT RESULTS IN A LOWER CONCENTRATION (USING AN ILCR OF 1E-6 AND AN HQ OF 0.1), THAT CONCENTRATION IS SELECTED AS THE RBSC.
4. MDC IS MAXIMUM DETECTED CONCENTRATION FOR THE INVESTIGATION AREA ("B" QUALIFIED DATA NOT INCLUDED).
5. VALIDATION QUALIFIERS (VQ):
   J - THE COMPOUND/ANALYTE WAS POSITIVELY IDENTIFIED; THE REPORTED VALUE IS AN ESTIMATED CONCENTRATION.

				LOCATION CODE	LBA-SB01					
				SAMPLE NO	LBA0001		LBA0002		LBA0003	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.0367	J	-	-	0.0305	J
Benzene	mg/kg	1.1	NE	0.0038	-	-	0.00217	J	0.00121	J
Butanone, 2-	mg/kg	2,800	NE	0.0147	-	-	-	-	0.00573	J
Carbon disulfide	mg/kg	82	NE	0.0074	-	-	-	-	0.000988	J
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	0.0254	J	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.0056	-	-	0.00301	J	-	-
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.0099	-	-	0.0032	J	-	-
Naphthalene	mg/kg	3.6	NE	0.0035	-	-	0.00346	J	-	-
Toluene	mg/kg	500	NE	0.006	-	-	0.00312	J	0.00186	J
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	1.21	J	-	-
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	0.0624	J	-	-
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.0018	-	-	-	-	0.000988	J
SEMIVOLATILES										
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.0426	J	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.0395	J	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	0.0616	J	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	0.0627	J	-	-	-	-
METALS										
Aluminum	mg/kg	7,700	15,500	12000	4,400		7,580		9,330	
Antimony	mg/kg	3.1	9.3	1.46	0.386	J	0.722		0.375	J
Arsenic	mg/kg	0.39	36.5	15.3	4.5	J	10.1	J	4.78	J
Barium	mg/kg	1,500	826	218	16.3		33.6		61.3	
Beryllium	mg/kg	16	1	9.26	5.22	J	5.15	J	6.74	J
Cadmium	mg/kg	7	NE	0.819	-	-	0.513	J	0.263	J
Calcium	mg/kg	NE	52,300	288000	1,180		74,000		49,300	J
Chromium	mg/kg	0.29	29	19	10.4		11.1		13.6	
Cobalt	mg/kg	2.3	116	53.8	3.52		8.81		10.3	J
Copper	mg/kg	310	56.2	31.6	6.54		27		29.2	J
Iron	mg/kg	5,500	234,000	33900	15,000	J	16,600	J	21,500	
Lead	mg/kg	400	48.6	103	5.29		23		13	
Magnesium	mg/kg	NE	10,400	29600	796	J	16,800	J	18,600	J
Manganese	mg/kg	180	3,506	3000	198	J	384	J	548	J
Mercury	mg/kg	2.3	0.09	0.158	0.0198	J	0.0159	J	0.157	J
Nickel	mg/kg	150	55.1	43.5	9.01	J	22	J	27.1	J
Potassium	mg/kg	NE	3,390	1720	201		934		1,230	
Sodium	mg/kg	NE	NE	262	41.4		113		130	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.654		0.31	J
Vanadium	mg/kg	39	40.9	28.2	26.5		18.8		22.9	
Zinc	mg/kg	2,300	321.75	113	26		60		66.7	

				LOCATION CODE	LBA-SB09	
				SAMPLE NO	LBA0025	
				SAMPLE DATE	20-Jan-09	
				DEPTH	3 - 4.2 Ft	
				SAMPLE PURPOSE	REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ
SEMIVOLATILES						
Acenaphthylene	mg/kg	NE	NE	0.224	0.195	J
Anthracene	mg/kg	1,700	NE	0.381	0.257	J
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.651	J
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	0.498	J
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	1.01	J
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	0.241	J
Chrysene	mg/kg	15	NE	0.784	0.719	J
Fluoranthene	mg/kg	230	NE	1.26	1.02	J
Phenanthrene	mg/kg	NE	NE	0.843	0.202	J
Pyrene	mg/kg	170	NE	1.13	0.91	J
METALS						
Aluminum	mg/kg	7,700	15,500	12000	2,200	
Antimony	mg/kg	3.1	9.3	1.46	1.24	J
Arsenic	mg/kg	0.39	36.5	15.3	3.41	J
Barium	mg/kg	1,500	826	218	26.7	
Beryllium	mg/kg	16	1	9.26	1.14	J
Cadmium	mg/kg	7	NE	0.819	0.221	J
Calcium	mg/kg	NE	52,300	288000	240,000	J
Chromium	mg/kg	0.29	29	19	4.63	
Cobalt	mg/kg	2.3	116	53.8	2.13	J
Copper	mg/kg	310	56.2	31.6	11.4	J
Iron	mg/kg	5,500	234,000	33900	6,980	
Lead	mg/kg	400	48.6	103	12.9	
Magnesium	mg/kg	NE	10,400	29600	29,600	J
Manganese	mg/kg	180	3,506	3000	369	J
Mercury	mg/kg	2.3	0.09	0.158	0.017	J
Nickel	mg/kg	150	55.1	43.5	7.33	J
Potassium	mg/kg	NE	3,390	1720	305	
Silver	mg/kg	39	11.1	2.25	2.25	
Sodium	mg/kg	NE	NE	262	142	
Vanadium	mg/kg	39	40.9	28.2	7.96	
Zinc	mg/kg	2,300	321.75	113	16.3	

				LOCATION CODE	LBA-SB04					
				SAMPLE NO	LBA0012		LBA0013		LBA0014	
				SAMPLE DATE	19-Jan-09		19-Jan-09		16-Jan-09	
				DEPTH	_9 - 1_9 Ft		3_9 - 5_9 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES										
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	-	-	0.163	J	-	-
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.0303	J	0.0219	J	-	-
Benzene	mg/kg	1.1	NE	0.0038	-	-	-	-	0.00225	J
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	-	-	0.00263	J
Dichloroethene, cis-1,2-	mg/kg	78	NE	0.0099	-	-	-	-	0.00986	J
Toluene	mg/kg	500	NE	0.006	-	-	-	-	0.00338	J
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	-	-	0.115	
Trichloroethene	mg/kg	2.8	NE	0.121	-	-	-	-	0.121	
METALS										
Aluminum	mg/kg	7,700	15,500	12000	5,800		5,390		7,750	
Antimony	mg/kg	3.1	9.3	1.46	-	-	-	-	0.381	J
Arsenic	mg/kg	0.39	36.5	15.3	5.2	J	4.58	J	9.37	J
Barium	mg/kg	1,500	826	218	22.1		20.7		41.8	
Beryllium	mg/kg	16	1	9.26	5.24	J	5.21	J	5.94	J
Cadmium	mg/kg	7	NE	0.819	-	-	-	-	0.291	J
Calcium	mg/kg	NE	52,300	288000	1,620		2,250		51,800	J
Chromium	mg/kg	0.29	29	19	11.8		12		11.9	
Cobalt	mg/kg	2.3	116	53.8	4.82		4.35		7.58	J
Copper	mg/kg	310	56.2	31.6	8.81		8.67		26.1	J
Iron	mg/kg	5,500	234,000	33900	14,800	J	14,200	J	18,700	
Lead	mg/kg	400	48.6	103	6.88		7.39		15.4	
Magnesium	mg/kg	NE	10,400	29600	913	J	1,050	J	18,900	J
Manganese	mg/kg	180	3,506	3000	324	J	253	J	367	J
Mercury	mg/kg	2.3	0.09	0.158	0.0188	J	0.0118	J	0.0144	J
Nickel	mg/kg	150	55.1	43.5	11.8	J	11.1	J	21.6	J
Potassium	mg/kg	NE	3,390	1720	188		205		983	
Sodium	mg/kg	NE	NE	262	37.8		40		105	
Thallium	mg/kg	NE	1.3	0.678	-	-	-	-	0.34	J
Vanadium	mg/kg	39	40.9	28.2	27.5		25.5		19.2	
Zinc	mg/kg	2,300	321.75	113	30		30		55.8	

				LOCATION CODE	LBA-SB11					
				SAMPLE NO	LBA0031		LBA0032		LBA0033	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3_9 - 5_9 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES										
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	0.527		-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	1.13		0.947		5.68	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	4.12	
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	22.7	
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	1.52	
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	11.8	
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.265	J	0.0388	J	0.0301	J
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0136	J	-	-	-	-
Toluene	mg/kg	500	NE	0.006	-	-	-	-	0.00324	J
SEMIVOLATILES										
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	1.29		0.866		5.82	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	0.204	J	0.129	J	2.49	
PCBs										
Aroclor 1260	mg/kg	0.22	NE	0.24	0.0629	J	0.061	J		
METALS										
Aluminum	mg/kg	7,700	15,500	12000	6,690		8,940		10,400	
Antimony	mg/kg	3.1	9.3	1.46	-	-	0.27	J	0.505	
Arsenic	mg/kg	0.39	36.5	15.3	8.54	J	11	J	5.19	J
Barium	mg/kg	1,500	826	218	55.2	J	154	J	62.4	J
Beryllium	mg/kg	16	1	9.26	6.88	J	8.88	J	6.78	J
Cadmium	mg/kg	7	NE	0.819	-	-	-	-	0.313	J
Calcium	mg/kg	NE	52,300	288000	1,970	J	1,460	J	37,600	J
Chromium	mg/kg	0.29	29	19	14.7	J	16.4	J	15.3	J
Cobalt	mg/kg	2.3	116	53.8	4.68	J	53.8	J	12.7	J
Copper	mg/kg	310	56.2	31.6	14.2		15.3		31.6	
Iron	mg/kg	5,500	234,000	33900	21,600		33,900		22,000	
Lead	mg/kg	400	48.6	103	10	J	12.9	J	15.4	J
Magnesium	mg/kg	NE	10,400	29600	1,070	J	1,530	J	15,600	J
Manganese	mg/kg	180	3,506	3000	115		3,000		796	
Mercury	mg/kg	2.3	0.09	0.158	0.026		0.0299		-	-
Nickel	mg/kg	150	55.1	43.5	14.3	J	38.2	J	33.2	J
Potassium	mg/kg	NE	3,390	1720	242		363		1,210	
Selenium	mg/kg	39	2	0.85	-	-	0.516	J	-	-
Sodium	mg/kg	NE	NE	262	18.8		29.2		87.7	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.294	J	0.336	J
Vanadium	mg/kg	39	40.9	28.2	25.7		28.2		23.7	
Zinc	mg/kg	2,300	321.75	113	69.9	J	113	J	74	

				LOCATION CODE	LBA-SB08	
				SAMPLE NO	LBA0024	
				SAMPLE DATE	20-Jan-09	
				DEPTH	3 - 4.9 Ft	
				SAMPLE PURPOSE	REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ
SEMIVOLATILES						
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.18	J
Bis(2-ethylhexyl)phthalate	mg/kg	35	NE	0.74	0.74	J
Chrysene	mg/kg	15	NE	0.784	0.271	J
Fluoranthene	mg/kg	230	NE	1.26	0.23	J
Pyrene	mg/kg	170	NE	1.13	0.221	J
METALS						
Aluminum	mg/kg	7,700	15,500	12000	7,740	
Antimony	mg/kg	3.1	9.3	1.46	1.46	J
Arsenic	mg/kg	0.39	36.5	15.3	1.44	J
Barium	mg/kg	1,500	826	218	94.3	
Beryllium	mg/kg	16	1	9.26	1.15	J
Cadmium	mg/kg	7	NE	0.819	0.264	J
Calcium	mg/kg	NE	52,300	288000	288,000	J
Chromium	mg/kg	0.29	29	19	9.62	
Cobalt	mg/kg	2.3	116	53.8	1.65	J
Copper	mg/kg	310	56.2	31.6	10.4	J
Iron	mg/kg	5,500	234,000	33900	5,390	
Lead	mg/kg	400	48.6	103	10.8	
Magnesium	mg/kg	NE	10,400	29600	28,500	J
Manganese	mg/kg	180	3,506	3000	965	J
Mercury	mg/kg	2.3	0.09	0.158	0.00931	J
Nickel	mg/kg	150	55.1	43.5	5.58	J
Potassium	mg/kg	NE	3,390	1720	411	
Silver	mg/kg	39	11.1	2.25	1.01	
Sodium	mg/kg	NE	NE	262	223	
Vanadium	mg/kg	39	40.9	28.2	6.6	
Zinc	mg/kg	2,300	321.75	113	44.7	

				LOCATION CODE	LBA-SB07	
				SAMPLE NO	LBA0023	
				SAMPLE DATE	20-Jan-09	
				DEPTH	3 - 4.1 Ft	
				SAMPLE PURPOSE	REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ
SEMIVOLATILES						
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.163	J
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	0.327	J
Chrysene	mg/kg	15	NE	0.784	0.251	J
Fluoranthene	mg/kg	230	NE	1.26	0.171	J
Pyrene	mg/kg	170	NE	1.13	0.213	J
METALS						
Aluminum	mg/kg	7,700	15,500	12000	9,160	
Antimony	mg/kg	3.1	9.3	1.46	0.288	J
Arsenic	mg/kg	0.39	36.5	15.3	1.38	J
Barium	mg/kg	1,500	826	218	120	
Beryllium	mg/kg	16	1	9.26	1.2	J
Calcium	mg/kg	NE	52,300	288000	288,000	J
Chromium	mg/kg	0.29	29	19	6.31	
Cobalt	mg/kg	2.3	116	53.8	1.74	J
Copper	mg/kg	310	56.2	31.6	9.11	J
Iron	mg/kg	5,500	234,000	33900	4,920	
Lead	mg/kg	400	48.6	103	7.71	
Magnesium	mg/kg	NE	10,400	29600	23,500	J
Manganese	mg/kg	180	3,506	3000	1,050	J
Mercury	mg/kg	2.3	0.09	0.158	0.0159	J
Nickel	mg/kg	150	55.1	43.5	5.06	J
Potassium	mg/kg	NE	3,390	1720	462	
Silver	mg/kg	39	11.1	2.25	0.48	
Sodium	mg/kg	NE	NE	262	262	
Vanadium	mg/kg	39	40.9	28.2	6.31	
Zinc	mg/kg	2,300	321.75	113	33.9	

				LOCATION CODE	LBA-SB06									
				SAMPLE NO	LBA0018		LBA0019		LBA0020		LBA0021		LBA0022	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft		8 - 10 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG		FD		FS	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
VOLATILES														
Acetone	mg/kg	6,100	NE	0.339	0.104	J	-	-	0.0151	J	0.0352	J	-	-
Benzene	mg/kg	1.1	NE	0.0038	-	-	0.00303	J	0.00254	J	-	-	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.00827	J	-	-	-	-	0.00555	J	-	-
Toluene	mg/kg	500	NE	0.006	-	-	0.00576	J	0.0032	J	0.00123	J	-	-
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.0018	-	-	0.00178	J	-	-	-	-		
SEMIVOLATILES														
Acenaphthylene	mg/kg	NE	NE	0.224	0.224	J	-	-	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	0.381	J	-	-	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.652	J	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	0.395	J	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	0.878	J	-	-	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.784	J	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	7.8	NE	0.461	0.461	J	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	1.26	J	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-	mg/kg	31	NE	1.66	1.66	J	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	3.6	NE	1.02	1.02	J	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	0.843	J	-	-	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	1.13	J	-	-	-	-	-	-	-	-
METALS														
Aluminum	mg/kg	7,700	15,500	12000	7,020		7,410		7,850		7,930		7,660	
Antimony	mg/kg	3.1	9.3	1.46	0.377	J	0.341	J	0.445	J	0.519	J	-	-
Arsenic	mg/kg	0.39	36.5	15.3	11.3	J	7.5	J	5.55	J	7.58	J	5	
Barium	mg/kg	1,500	826	218	68		46.1		42	J	107	J	54.5	
Beryllium	mg/kg	16	1	9.26	9.26	J	6.59	J	5.84	J	7.29	J	-	-
Cadmium	mg/kg	7	NE	0.819	0.338	J	0.254	J	0.32	J	0.408	J	-	-
Calcium	mg/kg	NE	52,300	288000	5,080		47,700	J	47,100	J	43,900	J	50,100	
Chromium	mg/kg	0.29	29	19	11.5		11.6		12.4		12.3		13.5	
Cobalt	mg/kg	2.3	116	53.8	9.09		9.71	J	7.78	J	14.5	J	8	
Copper	mg/kg	310	56.2	31.6	16.8		26.7	J	27	J	28.1	J	21.5	
Iron	mg/kg	5,500	234,000	33900	31,400	J	21,500		18,400		23,500		18,200	
Lead	mg/kg	400	48.6	103	18.3		11.4		13.6		14.5		8.4	
Magnesium	mg/kg	NE	10,400	29600	1,800	J	16,500	J	20,500	J	17,600	J	14,600	
Manganese	mg/kg	180	3,506	3000	519	J	417	J	315	J	798	J	351	J
Mercury	mg/kg	2.3	0.09	0.158	0.0456		0.014	J	0.0122	J	0.0148	J	-	-
Nickel	mg/kg	150	55.1	43.5	21.7	J	22.9	J	23	J	28.2	J	21.4	
Potassium	mg/kg	NE	3,390	1720	591		822		1,010		983		1,720	
Sodium	mg/kg	NE	NE	262	50.4		93.3		106		95.4		-	-
Thallium	mg/kg	NE	1.3	0.678	0.294	J	0.302	J	0.307	J	0.385	J	-	-
Vanadium	mg/kg	39	40.9	28.2	24.4		20.3		21.2		22.7		17.8	
Zinc	mg/kg	2,300	321.75	113	58.4		59		56.1		63.8		48.2	

				LOCATION CODE	LBA-SB05					
				SAMPLE NO	LBA0015		LBA0016		LBA0017	
				SAMPLE DATE	19-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.112	J	-	-	0.021	J
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0113	J	-	-	-	-
Carbon disulfide	mg/kg	82	NE	0.0074	-	-	-	-	0.00307	J
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	0.00427	J	0.0345	J
Dichloroethene, 1,1-	mg/kg	24	NE	0.0056	-	-	-	-	0.00563	J
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	0.00538	J	0.0132		0.324	J
METALS										
Aluminum	mg/kg	7,700	15,500	12000	8,260		11,000		6,920	
Antimony	mg/kg	3.1	9.3	1.46	-	-	0.684		0.403	J
Arsenic	mg/kg	0.39	36.5	15.3	5.97	J	11.6	J	7.92	J
Barium	mg/kg	1,500	826	218	60.1		61.3		64.4	
Beryllium	mg/kg	16	1	9.26	5.36	J	8.55	J	5.69	J
Cadmium	mg/kg	7	NE	0.819	0.253	J	0.305	J	-	-
Calcium	mg/kg	NE	52,300	288000	5,520		3,050		51,200	J
Chromium	mg/kg	0.29	29	19	12.4		18.5		11	
Cobalt	mg/kg	2.3	116	53.8	4.21		10.1		8.37	J
Copper	mg/kg	310	56.2	31.6	18.7		30.1		26.8	J
Iron	mg/kg	5,500	234,000	33900	14,300	J	31,600	J	18,100	
Lead	mg/kg	400	48.6	103	12.2		15.9		12.4	
Magnesium	mg/kg	NE	10,400	29600	1,680	J	3,940	J	18,500	J
Manganese	mg/kg	180	3,506	3000	201	J	539	J	514	J
Mercury	mg/kg	2.3	0.09	0.158	0.0353		0.0238		-	-
Nickel	mg/kg	150	55.1	43.5	14.5	J	32.3	J	22.3	J
Potassium	mg/kg	NE	3,390	1720	481		1,020		823	
Sodium	mg/kg	NE	NE	262	41.7		55.4		100	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.402	J	0.269	J
Vanadium	mg/kg	39	40.9	28.2	21.6		27.6		19	
Zinc	mg/kg	2,300	321.75	113	48.1		81.4		57.2	

				LOCATION CODE	LBA-SB10									
				SAMPLE NO	LBA0026		LBA0027		LBA0028		LBA0029		LBA0030	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		3 - 4_4 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		FD		FS		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES														
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	-	-	-	-	-	-	0.378	
VOLATILES														
Acetone	mg/kg	6,100	NE	0.339	0.339	J	0.087	J	0.072		0.0524	J	0.0247	J
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0147	J	0.0078	J	-	-	-	-	-	-
Vinyl acetate	mg/kg	97	NE	0.002	-	-	0.00197	UJ			-	-	-	-
SEMIVOLATILES														
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	-	-	-	-	-	-	0.352	J
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	-	-	-	-	-	-	0.0771	J
Fluoranthene	mg/kg	230	NE	1.26	-	-	0.0401	J	-	-	-	-	-	-
METALS														
Aluminum	mg/kg	7,700	15,500	12000	7,210		5,830		7,240		7,180		12,000	
Antimony	mg/kg	3.1	9.3	1.46	0.573	J	0.247	J	-	-	0.317	J	0.814	
Arsenic	mg/kg	0.39	36.5	15.3	9.26	J	6.74	J	5.9		12.2	J	15.3	J
Barium	mg/kg	1,500	826	218	50.5	J	39.6	J	37.9		76.6	J	63.1	J
Beryllium	mg/kg	16	1	9.26	6.41	J	5.17	J	-	-	7.47	J	9.03	J
Cadmium	mg/kg	7	NE	0.819	0.492	J	0.261	J	-	-	0.486		0.671	
Calcium	mg/kg	NE	52,300	288000	4,380	J	3,220	J	3,000		3,980	J	7,120	J
Chromium	mg/kg	0.29	29	19	13.2	J	10.8	J	13.9		12.9	J	19	J
Cobalt	mg/kg	2.3	116	53.8	7.31	J	4.75	J	-	-	14.5	J	24.4	J
Copper	mg/kg	310	56.2	31.6	13.6		10.4		10.2		13.5		31.5	
Iron	mg/kg	5,500	234,000	33900	18,300		14,600		17,800		23,700		28,800	
Lead	mg/kg	400	48.6	103	16	J	11.9	J	9		10.9	J	21.7	J
Magnesium	mg/kg	NE	10,400	29600	1,650	J	1,220	J	1,410		1,530	J	5,500	J
Manganese	mg/kg	180	3,506	3000	281		187		160	J	726		1,140	
Mercury	mg/kg	2.3	0.09	0.158	0.0318		0.0266		-	-	0.0272		0.0167	J
Nickel	mg/kg	150	55.1	43.5	20.1	J	15.3	J	15.3		33.1	J	43.5	J
Potassium	mg/kg	NE	3,390	1720	374		293		-	-	320		1,030	
Selenium	mg/kg	39	2	0.85	-	-	-	-	0.61		-	-	-	-
Sodium	mg/kg	NE	NE	262	30.8		23.5		-	-	26.7		53.4	
Thallium	mg/kg	NE	1.3	0.678	0.558		-	-	-	-	-	-	0.678	
Vanadium	mg/kg	39	40.9	28.2	25.4		20.6		26.2		27.7		27.9	
Zinc	mg/kg	2,300	321.75	113	60.1	J	47.5	J	45.5		102	J	96.9	J

				LOCATION CODE	LBA-SB03									
				SAMPLE NO	LBA0007		LBA0008		LBA0009		LBA0010		LBA0011	
				SAMPLE DATE	20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09		20-Jan-09	
				DEPTH	0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		2_5 - 3_2 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		FD		FS		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
VOLATILES														
Acetone	mg/kg	6,100	NE	0.339	0.133	J	0.08	J	0.1		-	-	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0129	J	0.0092	J	-	-	-	-	-	-
Carbon disulfide	mg/kg	82	NE	0.0074	0.00254	J	0.00735	J	-	-	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	-		-	-	-	-	0.0158	J
Toluene	mg/kg	500	NE	0.006	-	-	0.00104	J	-	-	-	-	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	-	-	0.00139	J	-	-	-	-	0.0928	
SEMIVOLATILES														
Acenaphthylene	mg/kg	NE	NE	0.224	-	-	0.0706	J	-	-	-	-	-	-
Anthracene	mg/kg	1,700	NE	0.381	-	-	0.0811	J	-	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.15	NE	0.652	0.0645	J	0.236	J	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.015	NE	0.498	0.054	J	0.187	J	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.15	NE	1.01	0.0996	J	0.284	J	-	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	NE	NE	0.106	-	-	0.106	J	-	-	-	-	-	-
Chrysene	mg/kg	15	NE	0.784	0.0808	J	0.232	J	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	610	NE	0.059	0.059	J	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	230	NE	1.26	0.141	J	0.455	J	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.15	NE	0.13	-	-	0.13	J	-	-	-	-	-	-
Phenanthrene	mg/kg	NE	NE	0.843	0.072	J	0.161	J	-	-	-	-	-	-
Pyrene	mg/kg	170	NE	1.13	0.111	J	0.337	J	-	-	-	-	-	-
PCBs														
Aroclor 1260	mg/kg	0.22	NE	0.24	0.0798		0.104		0.24		-	-		
METALS														
Aluminum	mg/kg	7,700	15,500	12000	6,790		6,330		7,680		8,700		7,110	
Antimony	mg/kg	3.1	9.3	1.46	0.954		0.759		-	-	0.348	J	0.407	J
Arsenic	mg/kg	0.39	36.5	15.3	8.05	J	11.5	J	10.3		4.42	J	6.28	J
Barium	mg/kg	1,500	826	218	51.9	J	152	J	106		61.2		58.2	
Beryllium	mg/kg	16	1	9.26	5.73	J	8.07	J	-	-	6.18	J	5.32	J
Cadmium	mg/kg	7	NE	0.819	0.525		0.819		0.81		-	-	0.315	J
Calcium	mg/kg	NE	52,300	288000	4,600		4,500		4,840		2,970		53,500	J
Chromium	mg/kg	0.29	29	19	10.7		10.1		10.8		13.8		11.1	
Cobalt	mg/kg	2.3	116	53.8	6.14	J	33.2	J	16.9		6.63		8.91	J
Copper	mg/kg	310	56.2	31.6	14.2		13.8		17		11.8		27.5	J
Iron	mg/kg	5,500	234,000	33900	16,300	J	29,100	J	25,100		17,300	J	16,900	
Lead	mg/kg	400	48.6	103	103	J	39.9	J	28.6		9.31		14	
Magnesium	mg/kg	NE	10,400	29600	2,010	J	2,160	J	2,450		2,200	J	19,400	J
Manganese	mg/kg	180	3,506	3000	287	J	1,680	J	1,240	J	228	J	475	J
Mercury	mg/kg	2.3	0.09	0.158	0.042		0.0441		-	-	0.055		0.158	J
Nickel	mg/kg	150	55.1	43.5	14	J	25.1	J	29.8		20.3	J	23.5	J
Potassium	mg/kg	NE	3,390	1720	628		624		949		342		866	
Selenium	mg/kg	39	2	0.85	-	-	-	-	0.85		-	-	-	-
Sodium	mg/kg	NE	NE	262	34.6		45.8		-	-	52.9		110	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.308	J	-	-	-	-	0.327	J
Vanadium	mg/kg	39	40.9	28.2	20.1		22		17.1		20.9		18.3	
Zinc	mg/kg	2,300	321.75	113	67.6		71.8		58		60.5		56.4	

				LOCATION CODE	LBA-SB02					
				SAMPLE NO	LBA0004		LBA0005		LBA0006	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 5 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES										
Amino-2,6-dinitrotoluene, 4-	mg/kg	15	NE	0.53	0.324		0.53		-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	15	NE	0.438	0.294		0.438		-	-
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	0.153	J	0.321		1.37	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	4.12	-	-	-	-	0.842	J
Nitrotoluene, 2-	mg/kg	2.9	NE	22.7	-	-	-	-	2.34	
Nitrotoluene, 3-	mg/kg	0.61	NE	1.52	-	-	-	-	0.308	
Nitrotoluene, 4-	mg/kg	24	NE	11.8	-	-	-	-	0.707	
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.124	J	0.0297	J	0.0282	J
Benzene	mg/kg	1.1	NE	0.0038	-	-	0.00381	J	-	-
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.0103	J	-	-	-	-
Dichloroethane, 1,1-	mg/kg	3.3	NE	0.0345	-	-	0.00323	J	-	-
Dichloroethene, 1,1-	mg/kg	24	NE	0.0056	-	-	0.00254	J	-	-
Naphthalene	mg/kg	3.6	NE	0.0035	-	-	0.00151	J	-	-
Toluene	mg/kg	500	NE	0.006	-	-	0.00599	J	-	-
Trichloroethane, 1,1,1-	mg/kg	870	NE	1.21	0.0156	J	1.19		0.0309	
Trichloroethene	mg/kg	2.8	NE	0.121	0.00263	J	0.0487	J	0.0122	
Trimethylbenzene, 1,2,4-	mg/kg	6.2	NE	0.0018	-	-	0.00171	J	-	-
SEMIVOLATILES										
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	0.268	J	1.03		9.88	
Dinitrotoluene, 2,6-	mg/kg	0.71	NE	3.82	-	-	0.389	J	3.82	
METALS										
Aluminum	mg/kg	7,700	15,500	12000	7,710		9,960		8,330	
Antimony	mg/kg	3.1	9.3	1.46	0.303	J	0.581		0.488	J
Arsenic	mg/kg	0.39	36.5	15.3	7.11	J	8.1	J	5.84	J
Barium	mg/kg	1,500	826	218	218		67.7		44.3	
Beryllium	mg/kg	16	1	9.26	6.24	J	7.39	J	5.35	J
Cadmium	mg/kg	7	NE	0.819	0.699		0.36	J	0.338	J
Calcium	mg/kg	NE	52,300	288000	8,530	J	3,360		43,000	J
Chromium	mg/kg	0.29	29	19	10.9		17		13.1	
Cobalt	mg/kg	2.3	116	53.8	16.5	J	8.62		8.88	J
Copper	mg/kg	310	56.2	31.6	17.5	J	23.9		27.4	J
Iron	mg/kg	5,500	234,000	33900	17,500		22,700	J	16,300	
Lead	mg/kg	400	48.6	103	14.7		15		15.1	
Magnesium	mg/kg	NE	10,400	29600	2,100	J	3,510	J	18,300	J
Manganese	mg/kg	180	3,506	3000	1,560	J	706	J	240	J
Mercury	mg/kg	2.3	0.09	0.158	0.0317		0.0198	J	-	-
Nickel	mg/kg	150	55.1	43.5	21.9	J	31.4	J	24.9	J
Potassium	mg/kg	NE	3,390	1720	285		748		1,020	
Sodium	mg/kg	NE	NE	262	24		45.7		96.4	
Thallium	mg/kg	NE	1.3	0.678	-	-	0.357	J	0.416	J
Vanadium	mg/kg	39	40.9	28.2	23.7		24.7		21.7	
Zinc	mg/kg	2,300	321.75	113	44.9		70.2		60.4	
GENERAL CHEMISTRY										
Total organic carbon	mg/kg	NE	NE	3040	3,040					

				LOCATION CODE	LBA-SB12					
				SAMPLE NO	LBA0034		LBA0035		LBA0036	
				SAMPLE DATE	19-Jan-09		19-Jan-09		19-Jan-09	
				DEPTH	0 - 1 Ft		3 - 3_9 Ft		8 - 10 Ft	
				SAMPLE PURPOSE	REG		REG		REG	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES										
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	5.68	-	-	0.393		-	-
VOLATILES										
Acetone	mg/kg	6,100	NE	0.339	0.152	J	0.0464	J	0.0525	J
Butanone, 2-	mg/kg	2,800	NE	0.0147	0.00999	J	-	-	0.00791	J
SEMIVOLATILES										
Dinitrotoluene, 2,4-	mg/kg	0.71	NE	9.88	-	-	0.23	J	-	-
Fluoranthene	mg/kg	230	NE	1.26	0.0499	J	-	-	-	-
PCBs										
Aroclor 1221	mg/kg	0.14	NE	0.19	0.19		-	-		
METALS										
Aluminum	mg/kg	7,700	15,500	12000	5,950		7,140		11,800	
Antimony	mg/kg	3.1	9.3	1.46	0.25	J	-	-	0.306	J
Arsenic	mg/kg	0.39	36.5	15.3	8.68	J	6.83	J	6.6	J
Barium	mg/kg	1,500	826	218	93.8	J	74.4	J	58.6	J
Beryllium	mg/kg	16	1	9.26	6.74	J	7.02	J	7.35	J
Cadmium	mg/kg	7	NE	0.819	0.503		-	-	-	-
Calcium	mg/kg	NE	52,300	288000	3,650	J	1,320	J	32,200	J
Chromium	mg/kg	0.29	29	19	11.7	J	14.7	J	17.6	J
Cobalt	mg/kg	2.3	116	53.8	21.3	J	17.2	J	8.82	J
Copper	mg/kg	310	56.2	31.6	12		12.8		28.4	
Iron	mg/kg	5,500	234,000	33900	19,800		21,800		23,800	
Lead	mg/kg	400	48.6	103	12.9	J	9.64	J	12.3	J
Magnesium	mg/kg	NE	10,400	29600	1,360	J	1,240	J	10,900	J
Manganese	mg/kg	180	3,506	3000	1,160		493		556	
Mercury	mg/kg	2.3	0.09	0.158	0.0309		0.0287		0.0135	J
Nickel	mg/kg	150	55.1	43.5	22.6	J	23.6	J	29.1	J
Potassium	mg/kg	NE	3,390	1720	433		264		1,320	
Sodium	mg/kg	NE	NE	262	26.9		27.8		91.4	
Thallium	mg/kg	NE	1.3	0.678	-	-	-	-	0.39	J
Vanadium	mg/kg	39	40.9	28.2	23.5		22.5		24.3	
Zinc	mg/kg	2,300	321.75	113	64.5	J	80.1	J	72.4	J

FIGURE 5-7
DETECTED CONSTITUENTS AT LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS IN SURFACE AND SUBSURFACE SOIL SAMPLES ABOVE RBSCs AND/OR BSCs (JANUARY AND FEBRUARY 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw® a world of Solutions™

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LOCATION CODE				LBA-SW03					
SAMPLE NO				LBA2002		LBA2003		LBA2004	
SAMPLE DATE				21-May-09		21-May-09		21-May-09	
DEPTH				0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
SAMPLE PURPOSE				REG		FD		FS	
Parameter	Units	RBSC	MDC	Result	VQ	Result	VQ	Result	VQ
VOLATILES									
Dichloroethane, 1,1-	ug/L	24	0.45	0.26	J	0.45	J	-	-
Dichloroethene, cis-1	ug/L	370	0.24	0.22	J	0.24	J	-	-
Trichloroethane, 1,1,	ug/L	9,100	0.59	0.59	J	0.53	J	-	-
METALS									
Aluminum	ug/L	37,000	23,800	1,990		1,540		1,720	
Barium	ug/L	7,300	155	64.5	J	58.2	J	-	-
Chromium	ug/L	0.43	39.8	3.2	J	2.9	J	-	-
Cobalt	ug/L	11	16.3	2.4	J	2.3	J	-	-
Iron	ug/L	26,000	43,900	4,650		3,570		2,850	
Lead	ug/L	15	18	5	J	3.9	J	-	-
Manganese	ug/L	880	2,220	1,870		1,560		1,170	
Nickel	ug/L	730	71.6	7.9	J	6.4	J	-	-
Selenium	ug/L	180	4.4	3.4	J	3.8	J	-	-
Vanadium	ug/L	180	46.1	5	J	4.3	J	-	-
Zinc	ug/L	11,000	177	35		30.2		21.2	

LOCATION CODE				LBA-SD03	
SAMPLE NO				LBA1002	
SAMPLE DATE				21-May-09	
DEPTH				0 - _5 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	mg/kg	77,000	10900	7,780	J
Arsenic	mg/kg	3.9	17.8	8.3	J
Barium	mg/kg	15,000	156	58.8	J
Beryllium	mg/kg	160	0.96	0.67	J
Cadmium	mg/kg	70	1.9	0.46	J
Chromium	mg/kg	2.9	18.8	13.5	J
Cobalt	mg/kg	23	26	11.8	J
Copper	mg/kg	3,100	26.2	13.3	J
Iron	mg/kg	55,000	32200	18,700	J
Lead	mg/kg	400	17.9	9.5	J
Manganese	mg/kg	1,800	5360	828	J
Nickel	mg/kg	1,500	63.2	26.1	J
Selenium	mg/kg	390	3	1.7	J
Vanadium	mg/kg	390	27.7	21.9	J
Zinc	mg/kg	23,000	80.3	54.1	J

LOCATION CODE				LBA-SW01	
SAMPLE NO				LBA2000	
SAMPLE DATE				20-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
VOLATILES					
Dichloroethane, 1,1-	ug/L	24	0.45	0.25	J
METALS					
Aluminum	ug/L	37,000	23,800	1,790	
Barium	ug/L	7,300	155	49.8	J
Chromium	ug/L	0.43	39.8	2.6	J
Iron	ug/L	26,000	43,900	2,570	
Lead	ug/L	15	18	2.6	J
Manganese	ug/L	880	2,220	554	
Nickel	ug/L	730	71.6	4.8	J
Vanadium	ug/L	180	46.1	5	J
Zinc	ug/L	11,000	177	19.7	J
GENERAL CHEMISTRY					
HARDNESS (as CaC	ug/L	NE	464,000	464,000	

LOCATION CODE				LBA-SD01	
SAMPLE NO				LBA1000	
SAMPLE DATE				20-May-09	
DEPTH				0 - _5 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
VOLATILES					
Methylene chloride	mg/kg	110	0.0582	0.0582	
METALS					
Aluminum	mg/kg	77,000	10900	6,300	
Arsenic	mg/kg	3.9	17.8	16	
Barium	mg/kg	15,000	156	75.7	
Beryllium	mg/kg	160	0.96	0.75	
Cadmium	mg/kg	70	1.9	1.9	
Chromium	mg/kg	2.9	18.8	10.4	
Cobalt	mg/kg	23	26	24.9	
Copper	mg/kg	3,100	26.2	13.5	
Iron	mg/kg	55,000	32200	21,000	
Lead	mg/kg	400	17.9	10.8	
Manganese	mg/kg	1,800	5360	5,360	
Mercury	mg/kg	23	0.031	0.025	J
Nickel	mg/kg	1,500	63.2	52.2	
Selenium	mg/kg	390	3	3	J
Thallium	mg/kg	NE	3.1	1.9	
Vanadium	mg/kg	390	27.7	22.2	
Zinc	mg/kg	23,000	80.3	80.3	

LEGEND:

- ▽ SURFACE WATER SAMPLE
- SURFACE WATER/SEDIMENT SAMPLE
- mg/kg MILLIGRAM PER KILOGRAM
- NE NOT ESTABLISHED (RBSCs)
- \- NOT DETECTED

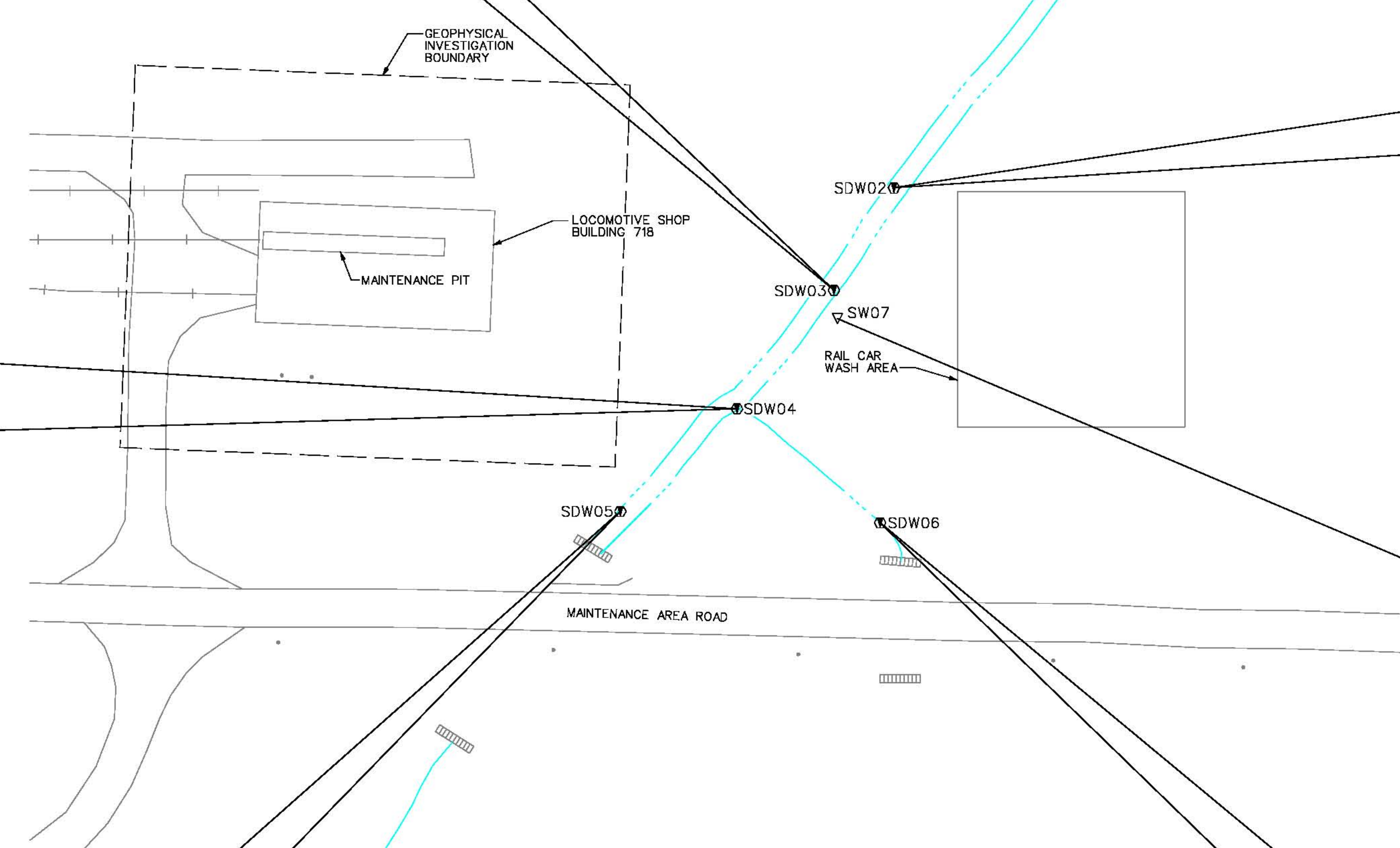
NOTES:

1. SHADED CELL INDICATES VALUE IS GREATER THAN THE RISK-BASED SCREENING CONCENTRATION (RBSC).
2. RBSC VALUES REFLECT AN INCREMENTAL LIFETIME CANCER RISK (ILCR) OF 1E-6 OR A NONCANCER HAZARD QUOTIENT (HQ) OF 0.1. FOR CHEMICALS THAT EXHIBIT BOTH CANCER AND NONCANCER EFFECTS, WHICHEVER TYPE OF EFFECT RESULTS IN A LOWER CONCENTRATION (USING AN ILCR OF 1E-6 AND AN HQ OF 0.1), THAT CONCENTRATION IS SELECTED AS THE RBSC.
3. MDC IS MAXIMUM DETECTED CONCENTRATION FOR THE INVESTIGATION AREA ("B" QUALIFIED DATA NOT INCLUDED).
4. VALIDATION QUALIFIERS (VQ):
   J- THE COMPOUND/ANALYTE WAS POSITIVELY IDENTIFIED; THE REPORTED VALUE IS AN ESTIMATED CONCENTRATION.
   B- THE ANALYTE WAS NOT DETECTED SIGNIFICANTLY ABOVE THE LEVELS FOUND IN THE ASSOCIATED METHOD BLANK OR FIELD BLANKS.

LOCATION CODE				LBA-SW02	
SAMPLE NO				LBA2001	
SAMPLE DATE				21-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
VOLATILES					
Dichloroethane, 1,1-	ug/L	24	0.45	0.39	J
Trichloroethane, 1,1,	ug/L	9,100	0.59	0.47	J
METALS					
Aluminum	ug/L	37,000	23,800	1,660	
Barium	ug/L	7,300	155	101	J
Chromium	ug/L	0.43	39.8	2.8	J
Cobalt	ug/L	11	16.3	4.2	J
Iron	ug/L	26,000	43,900	4,020	
Lead	ug/L	15	18	3.2	J
Manganese	ug/L	880	2,220	1,760	
Nickel	ug/L	730	71.6	8.9	J
Vanadium	ug/L	180	46.1	4.5	J
Zinc	ug/L	11,000	177	32	

LOCATION CODE				LBA-SW04	
SAMPLE NO				LBA2005	
SAMPLE DATE				21-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	ug/L	37,000	23,800	2,460	
Barium	ug/L	7,300	155	62.6	J
Chromium	ug/L	0.43	39.8	4.1	J
Cobalt	ug/L	11	16.3	2.5	J
Iron	ug/L	26,000	43,900	4,920	
Lead	ug/L	15	18	4.3	J
Manganese	ug/L	880	2,220	1,050	
Nickel	ug/L	730	71.6	8.6	J
Vanadium	ug/L	180	46.1	5.7	J
Zinc	ug/L	11,000	177	31.1	

LOCATION CODE				LBA-SD02	
SAMPLE NO				LBA1001	
SAMPLE DATE				21-May-09	
DEPTH				0 - _5 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
VOLATILES					
Acetone	mg/kg	61,000	0.0921	0.0921	J
Methylene chloride	mg/kg	110	0.0582	0.0195	B
METALS					
Aluminum	mg/kg	77,000	10900	5,710	J
Arsenic	mg/kg	3.9	17.8	9.4	J
Barium	mg/kg	15,000	156	90.3	J
Beryllium	mg/kg	160	0.96	0.61	
Cadmium	mg/kg	70	1.9	0.46	
Chromium	mg/kg	2.9	18.8	10.7	J
Cobalt	mg/kg	23	26	17.5	J
Copper	mg/kg	3,100	26.2	10.5	J
Iron	mg/kg	55,000	32200	20,500	J
Lead	mg/kg	400	17.9	9	J
Manganese	mg/kg	1,800	5360	1,510	
Mercury	mg/kg	23	0.031	0.023	J
Nickel	mg/kg	1,500	63.2	26.6	J
Selenium	mg/kg	390	3	2.1	J
Thallium	mg/kg	NE	3.1	0.26	J
Vanadium	mg/kg	390	27.7	19.4	J
Zinc	mg/kg	23,000	80.3	52.4	J



LOCATION CODE				LBA-SD04	
SAMPLE NO				LBA1003	
SAMPLE DATE				21-May-09	
DEPTH				0 - _5 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	mg/kg	77,000	10900	7,760	J
Arsenic	mg/kg	3.9	17.8	17.8	J
Barium	mg/kg	15,000	156	92.1	J
Beryllium	mg/kg	160	0.96	0.96	
Cadmium	mg/kg	70	1.9	0.97	
Chromium	mg/kg	2.9	18.8	13.4	J
Cobalt	mg/kg	23	26	26	J
Copper	mg/kg	3,100	26.2	22.2	J
Iron	mg/kg	55,000	32200	30,200	J
Lead	mg/kg	400	17.9	17.9	J
Manganese	mg/kg	1,800	5360	1,610	
Mercury	mg/kg	23	0.031	0.031	J
Nickel	mg/kg	1,500	63.2	39.8	J
Selenium	mg/kg	390	3	2.2	J
Vanadium	mg/kg	390	27.7	26.5	J
Zinc	mg/kg	23,000	80.3	73.9	J

LOCATION CODE				LBA-SW07	
SAMPLE NO				LBA2008	
SAMPLE DATE				22-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	ug/L	37,000	23,800	11.3	B
Barium	ug/L	7,300	155	41.6	J
Iron	ug/L	26,000	43,900	1,090	
Manganese	ug/L	880	2,220	381	

LOCATION CODE				LBA-SW05	
SAMPLE NO				LBA2006	
SAMPLE DATE				22-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
VOLATILES					
Dichloroethane, 1,1-	ug/L	24	0.45	0.39	J
METALS					
Aluminum	ug/L	37,000	23,800	2,520	
Barium	ug/L	7,300	155	62.2	J
Chromium	ug/L	0.43	39.8	4.6	J
Cobalt	ug/L	11	16.3	3	J
Iron	ug/L	26,000	43,900	5,890	
Lead	ug/L	15	18	5.5	J
Manganese	ug/L	880	2,220	2,220	
Nickel	ug/L	730	71.6	8.7	J
Selenium	ug/L	180	4.4	3.5	J
Vanadium	ug/L	180	46.1	6.9	J
Zinc	ug/L	11,000	177	33.4	

LOCATION CODE				LBA-SD05	
SAMPLE NO				LBA1004	
SAMPLE DATE				22-May-09	
DEPTH				0 - _5 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	mg/kg	77,000	10900	8,850	
Arsenic	mg/kg	3.9	17.8	9.5	
Barium	mg/kg	15,000	156	63.8	
Beryllium	mg/kg	160	0.96	0.68	
Cadmium	mg/kg	70	1.9	0.64	
Chromium	mg/kg	2.9	18.8	15.9	
Cobalt	mg/kg	23	26	10.8	
Copper	mg/kg	3,100	26.2	22.7	
Iron	mg/kg	55,000	32200	22,100	
Lead	mg/kg	400	17.9	11.5	
Manganese	mg/kg	1,800	5360	737	
Mercury	mg/kg	23	0.031	0.022	J
Nickel	mg/kg	1,500	63.2	26.6	
Selenium	mg/kg	390	3	1.7	J
Vanadium	mg/kg	390	27.7	24.5	
Zinc	mg/kg	23,000	80.3	55	

LOCATION CODE				LBA-SD06					
SAMPLE NO				LBA1005		LBA1006		LBA1007	
SAMPLE DATE				22-May-09		22-May-09		22-May-09	
DEPTH				0 - _5 Ft		0 - _5 Ft		0 - _5 Ft	
SAMPLE PURPOSE				REG		FD		FS	
Parameter	Units	RBSC	MDC	Result	VQ	Result	VQ	Result	VQ
VOLATILES									
Carbon disulfide	mg/kg	820	0.0019	0.0019	J	-	-	-	-
SEMIVOLATILES									
Benzo(b)fluoranthene	mg/kg	1.5	0.0481	0.0481	J	0.0458	J	-	-
Fluoranthene	mg/kg	2,300	0.0934	0.0738	J	0.0934	J	-	-
Phenanthrene	mg/kg	NE	0.0546	-	-	0.0546	J	-	-
Pyrene	mg/kg	1,700	0.0694	0.0562	J	0.0694	J	-	-
METALS									
Aluminum	mg/kg	77,000	10900	10,700		9,900		10,900	
Arsenic	mg/kg	3.9	17.8	11.7		10.4		16.5	
Barium	mg/kg	15,000	156	70.7		81.6		156	
Beryllium	mg/kg	160	0.96	0.84		0.77		0.72	
Cadmium	mg/kg	70	1.9	0.56		0.56		-	-
Chromium	mg/kg	2.9	18.8	18.8		17.6		18.3	
Cobalt	mg/kg	23	26	11.3		11.7		24.6	
Copper	mg/kg	3,100	26.2	24.5		21		26.2	
Iron	mg/kg	55,000	32200	25,500		23,300		32,200	
Lead	mg/kg	400	17.9	10.4		10.5		17	
Manganese	mg/kg	1,800	5360	779		1,170		2,280	
Mercury	mg/kg	23	0.031	0.022	J	0.023	J	-	-
Nickel	mg/kg	1,500	63.2	33.8		34.2		63.2	
Selenium	mg/kg	390	3	1.9	J	1.8	J	-	-
Thallium	mg/kg	NE	3.1	-	-	-	-	3.1	
Vanadium	mg/kg	390	27.7	27		25.8		27.7	
Zinc	mg/kg	23,000	80.3	63		59.1		78.3	

LOCATION CODE				LBA-SW06	
SAMPLE NO				LBA2007	
SAMPLE DATE				22-May-09	
DEPTH				0 - 0 Ft	
SAMPLE PURPOSE				REG	
Parameter	Units	RBSC	MDC	Result	VQ
METALS					
Aluminum	ug/L	37,000	23,800	23,800	
Arsenic	ug/L	0.45	8.8	8.8	J
Barium	ug/L	7,300	155	155	J
Beryllium	ug/L	73	1.1	1.1	J
Chromium	ug/L	0.43	39.8	39.8	
Cobalt	ug/L	11	16.3	16.3	J
Copper	ug/L	1,500	38.5	38.5	
Iron	ug/L	26,000	43,900	43,900	
Lead	ug/L	15	18	18	
Manganese	ug/L	880	2,220	662	
Nickel	ug/L	730	71.6	71.6	
Selenium	ug/L	180	4.4	4.4	J
Vanadium	ug/L	180	46.1	46.1	J
Zinc	ug/L	11,000	177	177	

SCALE 0 50 100 FEET

FIGURE 5-8

DETECTED CONSTITUENTS AT LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS IN SURFACE WATER AND SEDIMENT SAMPLES ABOVE RBSCs (MAY 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw a world of Solutions™

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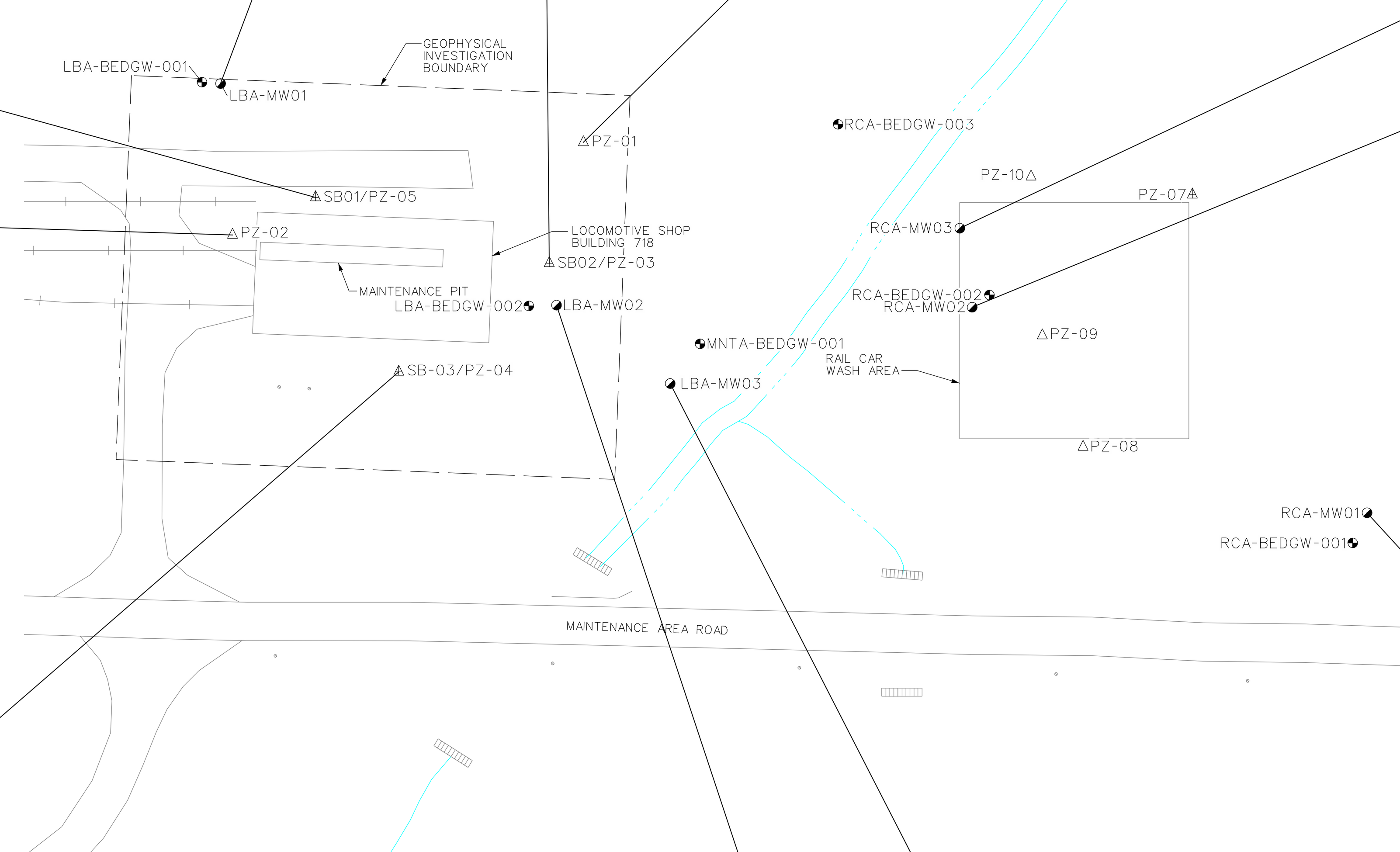
LEGEND:

- OVERBURDEN MONITORING WELL (SCREENED IN SHALE)
- BEDROCK MONITORING WELL (SCREENED IN LIMESTONE)
- △ PIEZOMETER
- SOIL BORING/PIEZOMETER
- ug/L MICROGRAM PER LITER
- NE NOT ESTABLISHED (RBSCs), NOT EVALUATED (BSCs)
- \- NOT DETECTED

NOTES:

1. SHADED CELL INDICATES VALUE IS GREATER THAN THE RISK-BASED SCREENING CONCENTRATION (RBSC).
2. BOLD TEXT INDICATES VALUE IS GREATER THAN THE BACKGROUND SCREENING CONCENTRATION (BSC).
3. RBSC VALUES REFLECT AN INCREMENTAL LIFETIME CANCER RISK (ILCR) OF 1E-6 OR A NONCANCER HAZARD QUOTIENT (HQ) OF 0.1. FOR CHEMICALS THAT EXHIBIT BOTH CANCER AND NONCANCER EFFECTS, WHICHEVER TYPE OF EFFECT RESULTS IN A LOWER CONCENTRATION (USING AN ILCR OF 1E-6 AND AN HQ OF 0.1), THAT CONCENTRATION IS SELECTED AS THE RBSC.
4. MDC IS MAXIMUM DETECTED CONCENTRATION FOR THE INVESTIGATION AREA ("B" QUALIFIED DATA NOT INCLUDED).
5. VALIDATION QUALIFIERS (VQ):
   J - THE COMPOUND/ANALYTE WAS POSITIVELY IDENTIFIED; THE REPORTED VALUE IS AN ESTIMATED CONCENTRATION.
   B- THE ANALYTE WAS NOT DETECTED SIGNIFICANTLY ABOVE THE LEVELS FOUND IN THE ASSOCIATED METHOD BLANK OR FIELD BLANKS.



					LOCATION CODE	LBA-PZ05					
					SAMPLE NO	LBA3006		LBA3001		LBA3002	
					SAMPLE DATE	28-Jan-09		28-Jan-09		28-Jan-09	
					DEPTH	10.07 - 10.1 Ft		10.07 - 10.1 Ft		10.07 - 10.1 Ft	
					SAMPLE PURPOSE	REG		FD		FS	
					LOW-FLOW SAMPLED	Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ	Result	VQ
VOLATILES											
Dichloroethane, 1,1-	ug/L	2.4	NE	10		0.81	J	0.79	J	-	-
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		1.06	J	0.96	J	2.2	
METALS-UNFILTERED											
Aluminum	ug/L	3,700	309	27500		**4,710**		**3,860**		**27,500**	
Arsenic	ug/L	0.045	7.4	42.7		**14.4**		**11.9**		**22.4**	
Barium	ug/L	730	11,800	323		114		107		255	
Beryllium	ug/L	7.3	NE	13.7		4.05	J	3.2	J	-	-
Cadmium	ug/L	1.8	NE	4.63		2.23	J	2.7	J	-	-
Chromium	ug/L	0.043	NE	39.1		6.35	J	-	-	39.1	
Cobalt	ug/L	1.1	12.1	18.6		6.12	J	5.01	J	-	-
Copper	ug/L	150	19.8	66		17.2		17.4		**54.3**	
Iron	ug/L	2,600	1,550	48900		**12,600**		**10,200**		**48,900**	
Lead	ug/L	15	NE	48.6		8.41		6.91		31.2	
Manganese	ug/L	88	636	1450		366		286		**1,240**	
Nickel	ug/L	73	8.6	58.2		7.86		4.98	J	**58.2**	
Vanadium	ug/L	18	NE	65.9		11.6		9.17		65.9	
Zinc	ug/L	1,100	507	141		38	J	31.9	J	141	
METALS-FILTERED											
Aluminum	ug/L	3,700	309	159		159		128		-	-
Arsenic	ug/L	0.045	7.4	28		1.99	J	**9.75**	J	-	-
Barium	ug/L	730	11,800	190		90.5		93.6		-	-
Iron	ug/L	2,600	1,550	446		446		382		132	
Manganese	ug/L	88	636	457		110		108		104	
WATER QUALITY PARAMETERS											
Alkalinity	ug/L	NE	NE	333000		172,000		119,000		230,000	
Chloride	ug/L	NE	NE	195000		6,980	J	6,550	J	6,300	J
Hardness	ug/L	NE	NE	1120000		359,000		317,000		680,000	
Nitrate-Nitrite	ug/L	NE	NE	900		26	J	-	-		
Sulfate	ug/L	NE	NE	282000		53,300	J	52,800	J	56,200	
Total dissolved solids	ug/L	NE	NE	951000		331,000	J	700,000	J	310,000	
Total suspended solids	ug/L	NE	NE	3860000		641,000		676,000		1,200,000	
Turbidity	NTU	NE	NE	866		403	J	375	J	64	

					LOCATION CODE	LBA-MW01			
					SAMPLE NO	LB3067		LB3075	
					SAMPLE DATE	12-May-09		4-Nov-09	
					DEPTH	0 - 0 Ft		0 - 0 Ft	
					SAMPLE PURPOSE	REG		REG	
					LOW-FLOW SAMPLED	No		No	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ
VOLATILES									
Dichloroethane, 1,1-	ug/L	2.4	NE	10		2.2		2	
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		1.3		-	-
METALS-UNFILTERED									
Aluminum	ug/L	3,700	309	27500		58.9	B	176	J
Barium	ug/L	730	11,800	323		73.5	J	61.7	J
Iron	ug/L	2,600	1,550	48900		242	J	684	
Manganese	ug/L	88	636	1450		436		458	
Nickel	ug/L	73	8.6	58.2		4.3	J	2.4	J
Selenium	ug/L	18	NE	6.3		6.3	J	4.9	J
METALS-FILTERED									
Barium	ug/L	730	11,800	190		66.9	J	56	J
Manganese	ug/L	88	636	457		457		135	
Nickel	ug/L	73	8.6	21.1		5	J	2.7	J
Selenium	ug/L	18	NE	5.9		5.9	J	-	-
Zinc	ug/L	1,100	507	15.5		-	-	14.5	J
WATER QUALITY PARAMETERS									
Alkalinity	ug/L	NE	NE	333000		299,000		285,000	
Chloride	ug/L	NE	NE	195000		105,000		171,000	
Cyanide, total	ug/L	73	NE	16		8.5	J	-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		657,000		600,000	
Nitrate-Nitrite	ug/L	NE	NE	900		-	-	110	
Sulfate	ug/L	NE	NE	282000		190,000		139,000	
Total dissolved solids	ug/L	NE	NE	951000		876,000		790,000	
Total suspended solids	ug/L	NE	NE	3860000		14,000		20,000	
Turbidity	NTU	NE	NE	866		8.6		12.7	

					LOCATION CODE	LBA-PZ03	
					SAMPLE NO	LBA3004	
					SAMPLE DATE	29-Jan-09	
					DEPTH	8.42 - 8.46 Ft	
					SAMPLE PURPOSE	REG	
					LOW-FLOW SAMPLED	Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ
EXPLOSIVES							
Amino-2,6-dinitrotoluene, 4-	ug/L	7.3	NE	1.71		1.71	
Amino-4,6-dinitrotoluene, 2-	ug/L	7.3	NE	1.6		1.6	
Dinitrotoluene, 2,4-	ug/L	0.099	NE	17.8		17.2	
Dinitrotoluene, 2,6-	ug/L	0.099	NE	15.1		15.1	
Nitrotoluene, 2-	ug/L	0.31	NE	74.7		6.89	
Nitrotoluene, 3-	ug/L	0.37	NE	9.1		3.91	
Nitrotoluene, 4-	ug/L	4.2	NE	8.6		1.8	
VOLATILES							
Dichloroethane, 1,1-	ug/L	2.4	NE	10		0.77	J
Dichloroethene, cis-1,2-	ug/L	37	NE	0.87		0.34	J
Naphthalene	ug/L	0.14	NE	4.33		4.33	
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		38.5	
Trichloroethene	ug/L	2	NE	7.03		7.03	
Trimethylbenzene, 1,2,4-	ug/L	1.5	NE	0.4		0.4	J
SEMIVOLATILES							
Dinitrotoluene, 2,4-	ug/L	0.099	NE	13.3		13.3	
Dinitrotoluene, 2,6-	ug/L	0.099	NE	8.4		7.11	J
METALS-UNFILTERED							
Aluminum	ug/L	3,700	309	27500		261	
Barium	ug/L	730	11,800	323		16	
Cadmium	ug/L	1.8	NE	4.63		2.97	J
Iron	ug/L	2,600	1,550	48900		681	
Manganese	ug/L	88	636	1450		35.1	
METALS-FILTERED							
Barium	ug/L	730	11,800	190		15.1	
Manganese	ug/L	88	636	457		29.5	
WATER QUALITY PARAMETERS							
Alkalinity	ug/L	NE	NE	333000		103,000	
Chloride	ug/L	NE	NE	195000		3,610	
Hardness	ug/L	NE	NE	1120000		255,000	
Nitrate-Nitrite	ug/L	NE	NE	900		581	
Sulfate	ug/L	NE	NE	282000		30,500	
Total dissolved solids	ug/L	NE	NE	951000		239,000	
Total suspended solids	ug/L	NE	NE	3860000		21,000	
Turbidity	NTU	NE	NE	866		19.7	J

					LOCATION CODE	LBA-PZ01	
					SAMPLE NO	LBA3000	
					SAMPLE DATE	31-Jan-09	
					DEPTH	7.17 - 7.28 Ft	
					SAMPLE PURPOSE	REG	
					LOW-FLOW SAMPLED	Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ
VOLATILES							
Dichloroethane, 1,1-	ug/L	2.4	NE	10		6.66	
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		58.4	
Trichloroethene	ug/L	2	NE	7.03		0.81	J
METALS-UNFILTERED							
Aluminum	ug/L	3,700	309	27500		162	
Barium	ug/L	730	11,800	323		31.7	
Cadmium	ug/L	1.8	NE	4.63		4.63	
Copper	ug/L	150	19.8	66		5.98	J
Iron	ug/L	2,600	1,550	48900		469	
Manganese	ug/L	88	636	1450		25.3	
METALS-FILTERED							
Barium	ug/L	730	11,800	190		30.9	
Cadmium	ug/L	1.8	NE	4.46		4.46	
Iron	ug/L	2,600	1,550	446		90.9	
Manganese	ug/L	88	636	457		21.4	
WATER QUALITY PARAMETERS							
Alkalinity	ug/L	NE	NE	333000		240,000	
Chloride	ug/L	NE	NE	195000		6,140	J
Hardness	ug/L	NE	NE	1120000		517,000	
Nitrate-Nitrite	ug/L	NE	NE	900		297	J
Sulfate	ug/L	NE	NE	282000		193,000	
Total dissolved solids	ug/L	NE	NE	951000		584,000	
Turbidity	NTU	NE	NE	866		10.9	J

					LOCATION CODE	RCA-MW03			
					SAMPLE NO	RC3076		RC3082	
					SAMPLE DATE	11-May-09		4-Nov-09	
					DEPTH	0 - 0 Ft		0 - 0 Ft	
					SAMPLE PURPOSE	REG		REG	
					LOW-FLOW SAMPLED	No		No	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ
VOLATILES									
Acetone	ug/L	2,200	NE	10		10	J	-	-
Bromoform	ug/L	8.5	NE	0.36		0.36	J	-	-
Dibromochloromethane	ug/L	0.15	NE	0.2		0.2	J	-	-
METALS-UNFILTERED									
Aluminum	ug/L	3,700	309	27500		52.2	J	**1,340**	
Barium	ug/L	730	11,800	323		114	J	102	J
Chromium	ug/L	0.043	NE	39.1		-	-	3.3	J
Cobalt	ug/L	1.1	12.1	18.6		-	-	2.3	J
Iron	ug/L	2,600	1,550	48900		-	-	**2,510**	
Lead	ug/L	15	NE	48.6		2.1	J	3.7	B
Manganese	ug/L	88	636	1450		53		102	
Nickel	ug/L	73	8.6	58.2		-	-	**9.1**	J
Vanadium	ug/L	18	NE	65.9		-	-	3	J
Zinc	ug/L	1,100	507	141		13.4	B	18.3	J
METALS-FILTERED									
Barium	ug/L	730	11,800	190		111	J	98.1	J
Lead	ug/L	15	NE	2.7		-	-	2.4	J
Manganese	ug/L	88	636	457		84.7		25.6	
Nickel	ug/L	73	8.6	21.1		3.1	J	3.4	J
Selenium	ug/L	18	NE	5.9		4	J	-	-
Zinc	ug/L	1,100	507	15.5		-	-	7.6	J
WATER QUALITY PARAMETERS									
Alkalinity	ug/L	NE	NE	333000		307,000		295,000	
Chloride	ug/L	NE	NE	195000		12,200		12,100	
Hardness	ug/L	NE	NE	1120000					
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		126,000		148,000	
Sulfate	ug/L	NE	NE	282000		4,300		4,400	
Total dissolved solids	ug/L	NE	NE	951000		230,000		348,000	
Total suspended solids	ug/L	NE	NE	3860000		-	-	52,000	
Turbidity	NTU	NE	NE	866		2.1		25	

					LOCATION CODE	LBA-PZ02	
					SAMPLE NO	LBA3003	
					SAMPLE DATE	29-Jan-09	
					DEPTH	14.14-14.14 Ft	
					SAMPLE PURPOSE	REG	
					LOW-FLOW SAMPLED	Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ
VOLATILES							
Acetone	ug/L	2,200	NE	10		3.46	J
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		0.72	J
METALS-UNFILTERED							
Aluminum	ug/L	3,700	309	27500		**12,800**	
Arsenic	ug/L	0.045	7.4	42.7		**42.7**	
Barium	ug/L	730	11,800	323		323	
Beryllium	ug/L	7.3	NE	13.7		13.7	
Cadmium	ug/L	1.8	NE	4.63		2.43	J
Chromium	ug/L	0.043	NE	39.1		20.4	
Cobalt	ug/L	1.1	12.1	18.6		**18.6**	
Copper	ug/L	150	19.8	66		**66**	
Iron	ug/L	2,600	1,550	48900		**40,700**	
Lead	ug/L	15	NE	48.6		48.6	
Manganese	ug/L	88	636	1450		**1,450**	
Nickel	ug/L	73	8.6	58.2		**20.5**	
Vanadium	ug/L	18	NE	65.9		35.9	
Zinc	ug/L	1,100	507	141		136	
METALS-FILTERED							
Arsenic	ug/L	0.045	7.4	28		**28**	
Barium	ug/L	730	11,800	190		87.7	
Manganese	ug/L	88	636	457		273	
WATER QUALITY PARAMETERS							
Alkalinity	ug/L	NE	NE	333000		177,000	
Chloride	ug/L	NE	NE	195000		7,960	J
Hardness	ug/L	NE	NE	1120000		1,120,000	
Sulfate	ug/L	NE	NE	282000		43,800	J
Total dissolved solids	ug/L	NE	NE	951000		172,000	
Total suspended solids	ug/L	NE	NE	3860000		3,860,000	
Turbidity	NTU	NE	NE	866		866	J

					LOCATION CODE	RCA-MW02			
					SAMPLE NO	RC3075		RC3081	
					SAMPLE DATE	11-May-09		3-Nov-09	
					DEPTH	0 - 0 Ft		0 - 0 Ft	
					SAMPLE PURPOSE	REG		REG	
					LOW-FLOW SAMPLED	No		No	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ
EXPLOSIVES									
Dinitrotoluene, 2,4-	ug/L	0.099	NE	17.8		0.23		-	-
Dinitrotoluene, 2,6-	ug/L	0.099	NE	15.1		0.29		-	-
Nitrotoluene, 2-	ug/L	0.31	NE	74.7		2.1		1.8	
Nitrotoluene, 4-	ug/L	4.2	NE	8.6		1.2		0.61	
METALS-UNFILTERED									
Aluminum	ug/L	3,700	309	27500		77.1	J	**1,290**	
Barium	ug/L	730	11,800	323		77.2	J	55.8	J
Chromium	ug/L	0.043	NE	39.1		-	-	2.8	J
Cobalt	ug/L	1.1	12.1	18.6		6.1	J	3.7	J
Iron	ug/L	2,600	1,550	48900		-	-	**2,830**	
Lead	ug/L	15	NE	48.6		-	-	4.5	B
Manganese	ug/L	88	636	1450		422		272	
Nickel	ug/L	73	8.6	58.2		**21**	J	**11.4**	J
Vanadium	ug/L	18	NE	65.9		-	-	3.4	J
Zinc	ug/L	1,100	507	141		13.1	B	17.3	J
METALS-FILTERED									
Aluminum	ug/L	3,700	309	159		13.7	J	-	-
Barium	ug/L	730	11,800	190		82.7	J	46.6	J
Cobalt	ug/L	1.1	12.1	6.1		6.1	J	1.4	J
Lead	ug/L	15	NE	2.7		2	J	-	-
Manganese	ug/L	88	636	457		389		157	
Nickel	ug/L	73	8.6	21.1		**21.1**	J	6.3	J
Selenium	ug/L	18	NE	5.9		3.8	J	-	-
Vanadium	ug/L	18	NE	0.92		0.92	J	-	-
Zinc	ug/L	1,100	507	15.5		9.2	J	7.4	J
WATER QUALITY PARAMETERS									
Alkalinity	ug/L	NE	NE	333000		322,000		320,000	
Chloride	ug/L	NE	NE	195000		11,600		11,400	
Cyanide, total	ug/L	73	NE	16		13		-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		512,000		387,000	
Nitrate-Nitrite	ug/L	NE	NE	900		-	-	32	J
Sulfate	ug/L	NE	NE	282000		282,000		210,000	
Total dissolved solids	ug/L	NE	NE	951000		951,000		694,000	
Total suspended solids	ug/L	NE	NE	3860000		27,000		206,000	
Turbidity	NTU	NE	NE	866		3		30.9	

					LOCATION CODE	RCA-MW01	
					SAMPLE NO	RC3074	
					SAMPLE DATE	12-May-09	
					DEPTH	0 - 0 Ft	
					SAMPLE PURPOSE	REG	
					LOW-FLOW SAMPLED	No	
Parameter	Units	RBSC	BSC	MDC		Result	VQ
METALS-UNFILTERED							
Aluminum	ug/L	3,700	309	27500		**386**	J
Barium	ug/L	730	11,800	323		188	J
Iron	ug/L	2,600	1,550	48900		348	
Manganese	ug/L	88	636	1450		77.8	
Nickel	ug/L	73	8.6	58.2		3.6	J
Selenium	ug/L	18	NE	6.3		6.7	B
Vanadium	ug/L	18	NE	65.9		1.1	J
METALS-FILTERED							
Barium	ug/L	730	11,800	190		182	J
Manganese	ug/L	88	636	457		68.2	
Nickel	ug/L	73	8.6	21.1		3.1	J
Selenium	ug/L	18	NE	5.9		3.8	J
Zinc	ug/L	1,100	507	15.5		15.5	J
WATER QUALITY PARAMETERS							
Alkalinity	ug/L	NE	NE	333000		267,000	
Chloride	ug/L	NE	NE	195000		21,700	
Cyanide, total	ug/L	73	NE	16		16	
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		331,000	
Sulfate	ug/L	NE	NE	282000		67,100	
Total dissolved solids	ug/L	NE	NE	951000		509,000	
Total suspended solids	ug/L	NE	NE	3860000		70,000	
Turbidity	NTU	NE	NE	866		21.3	

					LOCATION CODE	LBA-PZ04	
					SAMPLE NO	LBA3005	
					SAMPLE DATE	30-Jan-09	
					DEPTH	6.70 - 6.71 Ft	
					SAMPLE PURPOSE	REG	
					LOW-FLOW SAMPLED	Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ
VOLATILES							
Dichloroethane, 1,1-	ug/L	2.4	NE	10		10	
Dichloroethene, 1,1-	ug/L	34	NE	1.9		0.66	J
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		18.1	
METALS-UNFILTERED							
Aluminum	ug/L	3,700	309	27500		**12,600**	
Arsenic	ug/L	0.045	7.4	42.7		**13.5**	
Barium	ug/L	730	11,800	323		110	
Beryllium	ug/L	7.3	NE	13.7		12.3	
Chromium	ug/L	0.043	NE	39.1		20.3	
Cobalt	ug/L	1.1	12.1	18.6		**12.4**	
Copper	ug/L	150	19.8	66		**53.7**	
Iron	ug/L	2,600	1,550	48900		**36,000**	
Lead	ug/L	15	NE	48.6		26.6	
Manganese	ug/L	88	636	1450		**698**	
Nickel	ug/L	73	8.6	58.2		**17.6**	
Vanadium	ug/L	18	NE	65.9		37.1	
Zinc	ug/L	1,100	507	141		111	
METALS-FILTERED							
Barium	ug/L	730	11,800	190		27.4	
Cadmium	ug/L	1.8	NE	4.46		3.29	J
Manganese	ug/L	88	636	457		24.6	
WATER QUALITY PARAMETERS							
Alkalinity	ug/L	NE	NE	333000		238,000	
Chloride	ug/L	NE	NE	195000		3,240	J
Hardness	ug/L	NE	NE	1120000		921,000	
Nitrate-Nitrite	ug/L	NE	NE	900		61	J
Sulfate	ug/L	NE	NE	282000		28,200	
Total dissolved solids	ug/L	NE	NE	951000		295,000	
Total suspended solids	ug/L	NE	NE	3860000		1,770,000	
Turbidity	NTU	NE	NE	866		165	J

					LOCATION CODE	LBA-MW02											
					SAMPLE NO	LB3068		LB3069		LB3070		LB3076		LB3077		LB3079	
					SAMPLE DATE	19-May-09		19-May-09		19-May-09		5-Nov-09		5-Nov-09		5-Nov-09	
					DEPTH	0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft		0 - 0 Ft	
					SAMPLE PURPOSE	REG		FD		FS		REG		FD		FS	
					LOW-FLOW SAMPLED	Yes		Yes		Yes		Yes		Yes		Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ	Result	VQ
EXPLOSIVES																	
Amino-2,6-dinitrotoluene, 4-	ug/L	7.3	NE	1.71		0.28		-	-	0.26		0.48	J	-	-		
Amino-4,6-dinitrotoluene, 2-	ug/L	7.3	NE	1.6		0.2		0.2		-	-	0.54	J	0.29	J		
Dinitrotoluene, 2,4-	ug/L	0.099	NE	17.8		5.4	J	10.8	J	9.9		3.4	J	17.8	J		
Dinitrotoluene, 2,6-	ug/L	0.099	NE	15.1		5.3	J	7.8	J	6.9		5.9	J	12.4	J		
HMX	ug/L	180	NE	0.32		-	-	-	-	-	-	-	-	-	-		
Nitrobenzene	ug/L	0.12	NE	1.2		-		-		-		-		-		1.2	
Nitrotoluene, 2-	ug/L	0.31	NE	74.7		25.1	J	48.5	J	39		8.1	J	74.7	J		
Nitrotoluene, 3-	ug/L	0.37	NE	9.1		2.9	J	5.7	J	4.5		1.2	J	9.1	J		
Nitrotoluene, 4-	ug/L	4.2	NE	8.6		2.9	J	5.8	J	4.5		0.56	J	8.6	J		
VOLATILES																	
Dichloroethane, 1,1-	ug/L	2.4	NE	10		1.6		1.5		1.4		3		3.7		3.6	
Dichloroethene, 1,1-	ug/L	34	NE	1.9		1.1	J	-	-	1.9		1.2		-	-	-	-
Dichloroethene, cis-1,2-	ug/L	37	NE	0.87		0.81	J	0.87	J	-	-	0.78	J	0.83	J	-	-
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		36.8		40		40		29.5		32.7		33	
Trichloroethene	ug/L	2	NE	7.03		5.6		5.2		4.8		4.3		4.8		5.1	
SEMIVOLATILES																	
Di-n-butyl phthalate	ug/L	370	NE	1.3		1.3	B	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	0.099	NE	13.3		2.1	J	6.4	J	-	-	6.1	J	12.9	J	-	-
Dinitrotoluene, 2,6-	ug/L	0.099	NE	8.4		2.4	J	4.3	J	-	-	6	J	8.4	J	-	-
METALS-UNFILTERED																	
Aluminum	ug/L	3,700	309	27500		39.5	B	35.2	B	-	-	**361**		**313**		**1,190**	
Barium	ug/L	730	11,800	323		59.7	J	60.7	J	-	-	76.6	J	82.1	J	-	-
Iron	ug/L	2,600	1,550	48900		-	-	-	-	-	-	200	J	207	J	1,430	
Lead	ug/L	15	NE	48.6		-	-	2.3	J	-	-	2.5	B	3.4	B	-	-
Manganese	ug/L	88	636	1450		57.3		59.7		55.4		184		159		160	
Selenium	ug/L	18	NE	6.3		-	-	-	-	-	-	4.5	J	-	-	-	-
Zinc	ug/L	1,100	507	141		-	-	9.2	J	-	-	-	-	-	-	-	-
METALS-FILTERED																	
Aluminum	ug/L	3,700	309	159		37.6	J	28.3	J	-	-	-	-	-	-	-	-
Barium	ug/L	730	11,800	190		51.3	J	49.2	J	-	-	28	J	33.8	J	-	-
Lead	ug/L	15	NE	2.7		-	-	-	-	-	-	2.1	J	2.4	J	-	-
Manganese	ug/L	88	636	457		47.2		46.1		57.3		30.1	J	46.3	J	47.4	
Mercury	ug/L	1.1	NE	0.16		-	-	-	-	-	-	-	-	0.16	J	-	-
Selenium	ug/L	18	NE	5.9		3.6	J	-	-	-	-	-	-	-	-	-	-
Zinc	ug/L	1,100	507	15.5		-	-	9.5	J	-	-	-	-	-	-	-	-
WATER QUALITY PARAMETERS																	
Alkalinity	ug/L	NE	NE	333000		234,000		237,000		230,000		250,000		277,000		280,000	
Chloride	ug/L	NE	NE	195000		7,300		7,300		5,700		7,000		7,200		5,800	
Cyanide, total	ug/L	73	NE	16		7.5	J	-	-	-	-	-	-	-	-	-	-
Hardness	ug/L	NE	NE	1120000						300,000						320,000	
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		273,000		281,000				303,000		315,000			
Nitrate	ug/L	5,800	NE	300												300	
Nitrate-Nitrite	ug/L	NE	NE	900		710	J	750	J	900		440	J	450	J		
Sulfate	ug/L	NE	NE	282000		38,000		38,100		49,500		37,300	J	39,600	J	51,300	
Total dissolved solids	ug/L	NE	NE	951000		396,000	J	316,000		350,000		339,000		365,000		370,000	
Total suspended solids	ug/L	NE	NE	3860000		-	-	6,000	J	-	-	-	-	7,000	J	38,000	
Turbidity	NTU	NE	NE	866		2.1	J	2.9	J	0.6		2	J	9.7	J	16	

					LOCATION CODE	LBA-MW03			
					SAMPLE NO	LB3071		LB3080	
					SAMPLE DATE	10-May-09		3-Nov-09	
					DEPTH	0 - 0 Ft		0 - 0 Ft	
					SAMPLE PURPOSE	REG		REG	
					LOW-FLOW SAMPLED	Yes		Yes	
Parameter	Units	RBSC	BSC	MDC		Result	VQ	Result	VQ
EXPLOSIVES									
HMX	ug/L	180	NE	0.32		-	-	0.32	
VOLATILES									
Carbon disulfide	ug/L	100	NE	0.54		-	-	0.54	J
Carbon tetrachloride	ug/L	0.2	NE	4		-	-	4	
Dichloroethane, 1,1-	ug/L	2.4	NE	10		6.3		8.3	
Dichloroethene, 1,1-	ug/L	34	NE	1.9		1.4		0.68	J
Trichloroethane, 1,1,1-	ug/L	910	NE	58.4		35.3		22.1	
METALS-UNFILTERED									
Aluminum	ug/L	3,700	309	27500		-	-	20.4	J
Barium	ug/L	730	11,800	323		125	J	260	
Manganese	ug/L	88	636	1450		68.2		292	
Nickel	ug/L	73	8.6	58.2		3.2	J	3	J
Zinc	ug/L	1,100	507	141		11.3	J	-	-
METALS-FILTERED									
Barium	ug/L	730	11,800	190		131	J	190	J
Lead	ug/L	15	NE	2.7		2.7	J	-	-
Manganese	ug/L	88	636	457		71.7		181	
Nickel	ug/L	73	8.6	21.1		3.5	J	-	-
Selenium	ug/L	18	NE	5.9		4.8	J	-	-
Zinc	ug/L	1,100	507	15.5		11.3	J	-	-
WATER QUALITY PARAMETERS									
Alkalinity	ug/L	NE	NE	333000		246,000		333,000	
Chloride	ug/L	NE	NE	195000		6,800		195,000	J
Cyanide, total	ug/L	73	NE	16		13	J	-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	657000		333,000		311,000	
Nitrate-Nitrite	ug/L	NE	NE	900		-	-	110	
Sulfate	ug/L	NE	NE	282000		69,800		45,400	
Total dissolved solids	ug/L	NE	NE	951000		580,000		394,000	
Total suspended solids	ug/L	NE	NE	3860000		5,000	J	4,000	
Turbidity	NTU	NE	NE	866		-	-	1	J

SCALE

0 50 100 FEET

FIGURE 5-9

DETECTED CONSTITUENTS AT LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS IN OVERBURDEN/SHALE GROUNDWATER SAMPLES ABOVE RBSCs AND/OR BSCs (JANUARY, MAY, AND NOVEMBER 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw® a world of Solutions™

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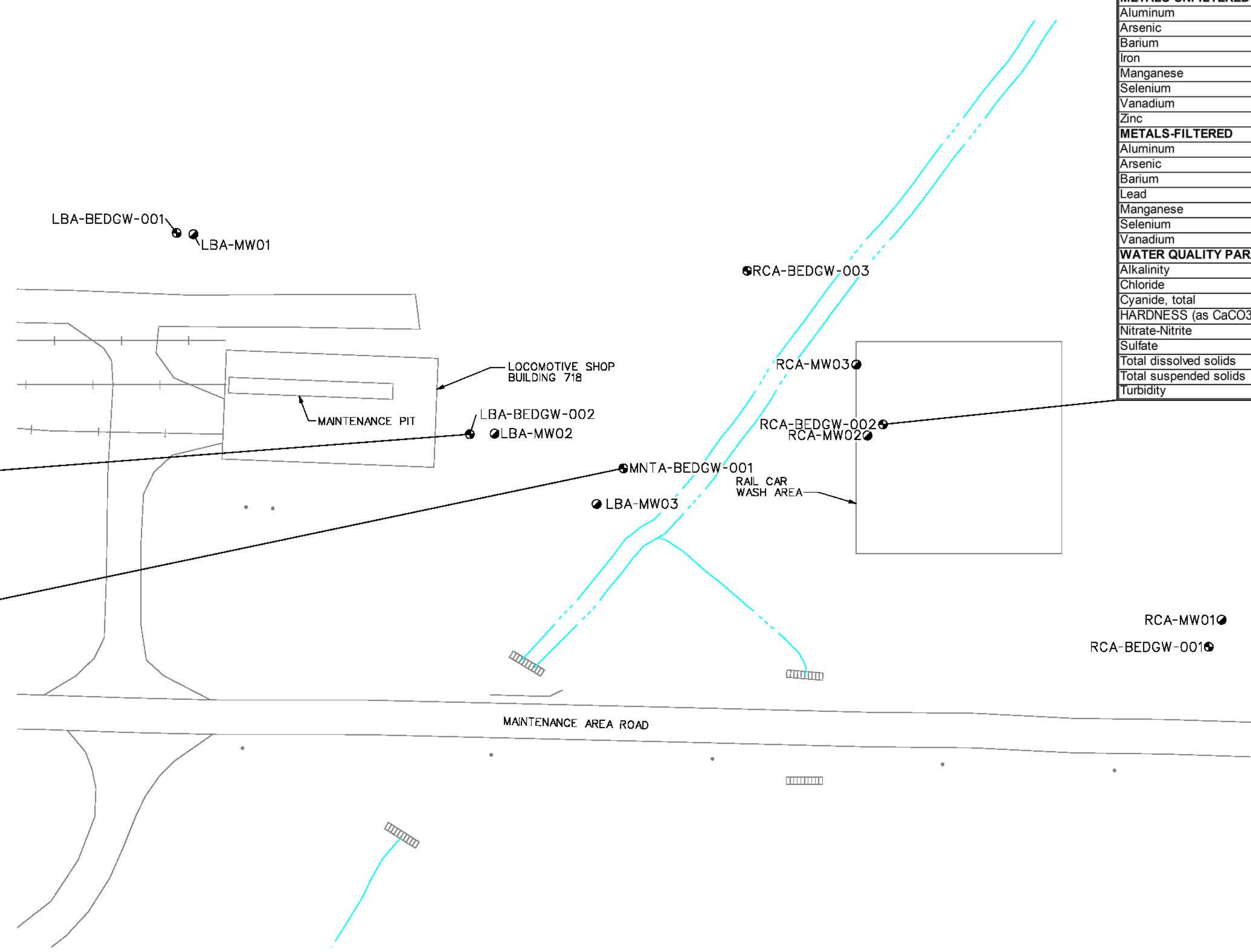
LOCATION CODE					LBA-BEDGW-002	
SAMPLE NO					LB3073	
SAMPLE DATE					12-May-09	
DEPTH					0 - 0 Ft	
SAMPLE PURPOSE					REG	
LOW-FLOW SAMPLED					No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ
VOLATILES						
Benzene	ug/L	0.41	2.4	1,680	**1,680**	J
Butanone, 2-	ug/L	710	NE	56.3	56.3	J
Chloroform	ug/L	0.19	NE	26.8	26.8	
Chloromethane	ug/L	19	NE	35.6	35.6	J
Ethylbenzene	ug/L	1.5	0.87	169	**169**	
Toluene	ug/L	230	1.7	692	**692**	
Xylenes, total	ug/L	20	5.5	1,130	**1,130**	
SEMIVOLATILES						
3-Methylphenol and 4-Methylphenol	ug/L	NE	NE	5.2	5.2	
Dimethylphenol, 2,4-	ug/L	73	NE	12.3	12.3	
Methylnaphthalene, 2-	ug/L	15	NE	256	20.9	
Methylphenol, 2-	ug/L	180	NE	5.6	5.6	
Naphthalene	ug/L	0.14	NE	64.9	25.6	
Phenol	ug/L	1,100	NE	8	8	
METALS-UNFILTERED						
Aluminum	ug/L	3,700	309	155	73.8	B
Arsenic	ug/L	0.045	7.4	131	**131**	
Barium	ug/L	730	11,800	762	762	
Cadmium	ug/L	1.8	NE	0		
Iron	ug/L	2,600	1,550	2,940	**2,940**	
Manganese	ug/L	88	636	1,070	**1,070**	
Nickel	ug/L	73	8.6	7.2	7.2	J
Selenium	ug/L	18	NE	11.7	11.7	J
Thallium	ug/L	NE	NE	6.4	6.4	J
Vanadium	ug/L	18	NE	1.6	1.4	J
METALS-FILTERED						
Arsenic	ug/L	0.045	7.4	125	**125**	
Barium	ug/L	730	11,800	764	764	
Manganese	ug/L	88	636	1,000	**1,000**	
Nickel	ug/L	73	8.6	5.7	5.7	J
Selenium	ug/L	18	NE	9.3	9.3	J
Vanadium	ug/L	18	NE	1.9	1.1	J
WATER QUALITY PARAMETERS						
Alkalinity	ug/L	NE	NE	770,000	369,000	
Chloride	ug/L	NE	NE	3,260,000	3,260,000	
Cyanide, total	ug/L	73	NE	110	14	J
HARDNESS (as CaCO3)	ug/L	NE	NE	2,600,000	2,600,000	
Sulfate	ug/L	NE	NE	218,000	14,800	
Total dissolved solids	ug/L	NE	NE	7,970,000	7,970,000	
Total suspended solids	ug/L	NE	NE	193,000	60,000	
Turbidity	NTU	NE	NE	168	168	



LOCATION CODE					RCA-BEDGW-002			
SAMPLE NO					RC3078		RC3084	
SAMPLE DATE					11-May-09		5-Nov-09	
DEPTH					0 - 0 Ft		0 - 0 Ft	
SAMPLE PURPOSE					REG		REG	
LOW-FLOW SAMPLED					No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ
VOLATILES								
Acetone	ug/L	2,200	NE	50.7	50.7	J	-	-
Benzene	ug/L	0.41	2.4	1,680	**31.9**		**114**	
Butanone, 2-	ug/L	710	NE	56.3	-	-	13.2	
Chloromethane	ug/L	19	NE	35.6	12.8		-	-
Ethylbenzene	ug/L	1.5	0.87	169	**17**		**43.4**	
Tetrachloroethane, 1,1,2,2-	ug/L	0.067	NE	3.7	3.7		-	-
Toluene	ug/L	230	1.7	692	**28.9**		**93.6**	
Xylenes, total	ug/L	20	5.5	1,130	**97.2**		**234**	
SEMIVOLATILES								
Dimethylphenol, 2,4-	ug/L	73	NE	12.3	1.5	J	1.6	J
Methylnaphthalene, 2-	ug/L	15	NE	256	6.3		8.1	
Naphthalene	ug/L	0.14	NE	64.9	4.5	J	7.2	
METALS-UNFILTERED								
Aluminum	ug/L	3,700	309	155	155	J	138	J
Arsenic	ug/L	0.045	7.4	131	**19.9**		**28**	
Barium	ug/L	730	11,800	762	485		562	
Iron	ug/L	2,600	1,550	2,940	-	-	385	
Manganese	ug/L	88	636	1,070	227		158	
Selenium	ug/L	18	NE	11.7	6.8	B	8.5	J
Vanadium	ug/L	18	NE	1.6	1.6	J	-	-
Zinc	ug/L	1,100	507	11.6	14.8	B	9.2	B
METALS-FILTERED								
Aluminum	ug/L	3,700	309	71.7	35.6	J	71.7	J
Arsenic	ug/L	0.045	7.4	125	**13.1**		**42.7**	
Barium	ug/L	730	11,800	764	494		576	
Lead	ug/L	15	NE	3.3	3.3	J	-	-
Manganese	ug/L	88	636	1,000	186		177	
Selenium	ug/L	18	NE	9.3	7	J	7.2	J
Vanadium	ug/L	18	NE	1.9	1.9	J	1.3	J
WATER QUALITY PARAMETERS								
Alkalinity	ug/L	NE	NE	770,000	753,000		770,000	
Chloride	ug/L	NE	NE	3,260,000	1,480,000		2,520,000	
Cyanide, total	ug/L	73	NE	110	110	J	-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	2,600,000	1,850,000		2,030,000	
Nitrate-Nitrite	ug/L	NE	NE	200	-	-	200	J
Sulfate	ug/L	NE	NE	218,000	218,000		39,400	J
Total dissolved solids	ug/L	NE	NE	7,970,000	3,320,000		3,910,000	
Total suspended solids	ug/L	NE	NE	193,000	-	-	17,000	
Turbidity	NTU	NE	NE	168	47.4		76.4	

LOCATION CODE					IT-MNTA-BEDGW-001			
SAMPLE NO					LB3074		BEDGW-001-1109	
SAMPLE DATE					19-May-09		6-Nov-09	
DEPTH					0 - 0 Ft		0 - 0 Ft	
SAMPLE PURPOSE					REG		REG	
LOW-FLOW SAMPLED					No		No	
Parameter	Units	RBSC	BSC	MDC	Result	VQ	Result	VQ
VOLATILES								
Acetone	ug/L	2,200	NE	50.7	345	J	-	-
Benzene	ug/L	0.41	2.4	1,680	-	-	**3.7**	
Butanone, 2-	ug/L	710	NE	56.3	81.3	J	-	-
Carbon disulfide	ug/L	100	NE	3.8	11.6	J	3.8	
Chloroform	ug/L	0.19	NE	26.8	66.7		-	-
Ethylbenzene	ug/L	1.5	0.87	169	**16.7**	J	**9.9**	
Methyl-2-pentanone, 4-	ug/L	200	NE	3.3	-	-	3.3	J
Methylene chloride	ug/L	4.8	NE	77.6	77.6	J		
Tetrachloroethane, 1,1,2,2-	ug/L	0.067	NE	3.7	-	-	1.2	
Toluene	ug/L	230	1.7	692	**14.2**	J	**10**	
Xylenes, total	ug/L	20	5.5	1,130	**235**		**136**	
SEMIVOLATILES								
Fluorene	ug/L	150	NE	5.4	5.4	J		
Methylnaphthalene, 2-	ug/L	15	NE	256	71		256	J
Naphthalene	ug/L	0.14	NE	64.9	17.7	J	64.9	J
Phenanthrene	ug/L	NE	NE	37.3	12.7	J	37.3	J
METALS-UNFILTERED								
Aluminum	ug/L	3,700	309	155	90.4	B	79.6	J
Barium	ug/L	730	11,800	762	343		305	
Cadmium	ug/L	1.8	NE	1.4	1.4	J		
Iron	ug/L	2,600	1,550	2,940	591		180	J
Lead	ug/L	15	NE	0	2.6	J	-	-
Manganese	ug/L	88	636	1,070	95.5		85.8	
Thallium	ug/L	NE	NE	6.4	3.8	J	-	-
Vanadium	ug/L	18	NE	1.6	2.8	J	1.6	J
Zinc	ug/L	1,100	507	11.6	11.6	J	11.5	B
METALS-FILTERED								
Aluminum	ug/L	3,700	309	71.7	43.3	J	52.6	J
Barium	ug/L	730	11,800	764	329		304	
Lead	ug/L	15	NE	3.3	2	J	2.3	J
Manganese	ug/L	88	636	1,000	47		70.2	
Selenium	ug/L	18	NE	9.3	-	-	4.2	J
Vanadium	ug/L	18	NE	1.9	2.7	J	0.93	J
Zinc	ug/L	1,100	507	0	11.2	J	-	-
WATER QUALITY PARAMETERS								
Alkalinity	ug/L	NE	NE	770,000	773,000		718,000	
Chloride	ug/L	NE	NE	3,260,000	132,000		2,550,000	
Cyanide, total	ug/L	73	NE	110	71		-	-
HARDNESS (as CaCO3)	ug/L	NE	NE	2,600,000	1,740,000		1,570,000	
Nitrate-Nitrite	ug/L	NE	NE	200	-	-	90	J
Sulfate	ug/L	NE	NE	218,000	9,600		-	-
Total dissolved solids	ug/L	NE	NE	7,970,000	5,780,000		4,680,000	
Total suspended solids	ug/L	NE	NE	193,000	53,000		193,000	
Turbidity	NTU	NE	NE	168	66	J	71.5	

LEGEND:

- OVERBURDEN MONITORING WELL (SCREENED IN SHALE)
- BEDROCK MONITORING WELL (SCREENED IN LIMESTONE)
- PIEZOMETER
- SOIL BORING/PIEZOMETER
- ug/L MICROGRAM PER LITER
- NE NOT ESTABLISHED (RBSCs), NOT EVALUATED (BSCs)
- \- NOT DETECTED

NOTES:

1. SHADED CELL INDICATES VALUE IS GREATER THAN THE RISK-BASED SCREENING CONCENTRATION (RBSC).
2. BOLD TEXT INDICATES VALUE IS GREATER THAN THE BACKGROUND SCREENING CONCENTRATION (BSC).
3. RBSC VALUES REFLECT AN INCREMENTAL LIFETIME CANCER RISK (ILCR) OF 1E-6 OR A NONCANCER HAZARD QUOTIENT (HQ) OF 0.1. FOR CHEMICALS THAT EXHIBIT BOTH CANCER AND NONCANCER EFFECTS, WHICHEVER TYPE OF EFFECT RESULTS IN A LOWER CONCENTRATION (USING AN ILCR OF 1E-6 AND AN HQ OF 0.1), THAT CONCENTRATION IS SELECTED AS THE RBSC.
4. MDC IS MAXIMUM DETECTED CONCENTRATION FOR THE INVESTIGATION AREA ("B" QUALIFIED DATA NOT INCLUDED).
5. LBA-BEDGW-001, RCA-BEDGW-001, AND RCA-BEDGW-003 WERE NOT SAMPLED DUE TO INSUFFICIENT RECHARGE.
6. VALIDATION QUALIFIERS (VQ):
   J - THE COMPOUND/ANALYTE WAS POSITIVELY IDENTIFIED; THE REPORTED VALUE IS AN ESTIMATED CONCENTRATION.
   B- THE ANALYTE WAS NOT DETECTED SIGNIFICANTLY ABOVE THE LEVELS FOUND IN THE ASSOCIATED METHOD BLANK OR FIELD BLANKS.

SCALE
0 50 100 FEET

FIGURE 5-10
DETECTED CONSTITUENTS AT LOCOMOTIVE BUILDING AND RAIL CAR WASH AREAS IN BEDROCK GROUNDWATER SAMPLES ABOVE RBSCs AND/OR BSCs (MAY AND NOVEMBER 2009)

LOCOMOTIVE BUILDING AREA SCR
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw a world of Solutions™

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APPENDIX A

GEOPHYSICAL INVESTIGATION REPORT

GEOPHYSICAL INVESTIGATION

Locomotive Building Area
NASA Plum Brook Facility
Sandusky, Ohio

Geophysical Search for Underground Storage Tanks

Shaw Project Number 133767

Revision 0

December 15, 2008

Submitted to:

Shaw E&I Knoxville, TN

Submitted by:

Shaw® Shaw Environmental, Inc.
Geophysics and Mapping Group
7604 Technology Way
Denver, Colorado 80237

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Acronyms and Abbreviations

bgs	below ground surface
EM	Electromagnetic
EM31-MKII	Geonics Ltd EM31-MKII ground conductivity meter
GPR	ground penetrating radar
MHz	megaHertz
nS	nanosecond
Shaw	Shaw Environmental, Inc.
FDEM	frequency-domain electromagnetics

1.0 Introduction

The Geophysics and Mapping Group of Shaw Environmental, Inc. (Shaw) is pleased to present this report on the results of our geophysical surveys conducted at the Locomotive Building Area on the NASA Plum Brook Facility, Sandusky, Ohio. Fieldwork took place over December 3-4, 2008.

This Project Report summarizes the project objectives and scope of work, geophysical methods employed including their limitations, field operations and data acquisition procedures, and presents the processed results and data interpretation information.

2.0 Project Description

Geophysical surveys were proposed as a means for locating and mapping the suspected presence of an underground storage tank (UST) in the vicinity of the existing Locomotive Building structure on Plum Brook facility in Sandusky, Ohio. Similar USTs have been associated with locomotive building structures at other federal facilities, which prompted the need to establish the presence/absence of a UST at the Plum Brook facility. The primary survey methods recommended and used for this project were ground electrical conductivity mapping (EM31) and ground penetrating radar (GPR).

The Locomotive Building is a large, brick structure oriented with its long dimension in the EW direction. Railroad tracks (three sets) enter the building on the west (2) and parallel (1) the north side of the building and just north of that wall. There is also a square concrete slab on the SW corner of the building. Two utility lines (suspected water and gas lines) were marked and exit the building near the SW corner and extend south towards Maintenance Road.

3.0 Scope of Work

The general scope of work performed by Shaw included the following tasks:

- Mobilization of personnel and instruments to the site.
- Attend a facility H&S orientation and conduct instrument setup and testing upon arrival.
- Walk survey area to identify and mark survey area boundaries, planned/staked geotechnical borehole locations, identify obstacles and/or areas that may cause data noise and interference, and identify hazards.
- Conduct initial ground tests with the instruments to assess the sensors' depths of penetration and overall data quality.

- Acquire EM31 and supporting GPR data around the perimeter of the Locomotive Building.
- Process and interpret the field data.
- Generate a report including interpreted results together with a written description of the survey procedures.

4.0 Geophysical Methods

4.1 Electromagnetics (EM31)

The EM31 method measures the *in situ* electrical conductivity of subsurface materials (terrain conductivity). Electrical conductivity of an earth material (the reciprocal of electrical resistivity) is a physical characteristic that dictates the ease with which that medium can conduct electrical currents. Among other factors, those soil characteristics that most influence the value of conductivity are: 1) soil moisture content, 2) specific conductance of contained fluids, 3) porosity, and 4) matrix material, especially clay and/or metals content. Therefore, saturated clay materials exhibit very high conductivities and dry sands exhibit very low conductivities. Saline contaminant plumes exhibit high conductivity. Metal masses exhibit wild variations (including negative values) of conductivity.

In the EM31 system, conductivity is determined by inducing (from a transmitter coil) a time-varying magnetic field and measuring (with a receiver coil) the amplitude and phase shift of an induced secondary magnetic field set up by an interaction with ground materials. These measured, secondary field values can be related to ground conductivity and metallic content.

The depth of exploration of the EM31 is approximately 6 meters. Depth of exploration using electromagnetic methods is optimal when the general subsurface conditions are higher in resistivity (i.e. dry sands) and decreases as overall conductivity increases.

There are two components of the induced magnetic field measured by the EM31 equipment. The first is the quadrature-phase (out-of-phase) component that is directly proportional to the terrain conductivity of soil and groundwater. The units of terrain conductivity measurement are milli-Siemens per meter (m-S/m). The second component is the in-phase component that is relatively more sensitive to the presence of large metallic objects such as pipes, drums, and underground storage tanks. By observing the response of both the in-phase and quadrature-phase components, it is possible to differentiate whether a change in terrain conductivity is due to the presence of buried metallic objects or due to changes in subsurface soil conditions or pore fluid conductivity.

The EM31 survey is performed along predetermined transect lines. The transect lines may be parallel or perpendicular to each other depending on the size and configuration of the target. The distance between EM-31 transect lines is dependent on the confidence level required to identify a target of a specific dimension. For example, if the target is one 55-gallon drum

(approximately 2 by 3 ft in dimension), a 10 or 20-foot transect line spacing would have a significantly higher chance of detecting the drums presence than a 30 or 50-foot spacing. Larger targets, such as changes in pore fluid conductivity or the boundaries of large landfill cells, enable the transect spacing to be greater without a significant drop in the statistical chances of detection by the instrumentation.

Areas of buried metallic debris are characterized by either a sharp gradient or bullseye-type pattern in contours for both the terrain conductivity and the in-phase response. The greater the absolute value of the in-phase response from zero, the greater the concentration of buried metallic objects or the closer proximity of the objects to the EM equipment. High metallic content can even result in negative values of terrain conductivity.

4.2 Ground Penetrating Radar

The SIR3000 is a ground penetrating radar (GPR) system designed and manufactured by Geophysical Survey Systems, Inc. In general, GPR is an imaging technique that transmits an electromagnetic pulse into the earth from an antenna coupled to the ground surface. Electromagnetic pulses are reflected and diffracted by geologic structures and man-made features present in the subsurface. GPR detects reflections from materials having different electrical properties from surrounding soils or other materials (e.g. metals in soil/concrete, air in soil, soil/rock interface, etc.). Measurements conducted along a survey line provide a high-resolution, cross-sectional profile of features present in a vertical slice of the subsurface directly beneath the survey traverse line. The penetration depth and resolution of GPR data are dependent on characteristics of the instrumentation employed as well as the nature and type of materials (soil and buried objects) in the survey area.

The SIR3000 GPR system can function in several different operating frequencies ranging from 100-1500 MHz. Both the transmitter and receiver antennae are housed in a single unit, which is pulled along the ground when collecting data. For the Plum Brook GPR survey, the SIR3000 equipped with a 270 MHz antenna was used for all GPR survey lines. The choice of antenna frequency was dictated by surface conditions and observations made during instrument testing. The 270 MHz antenna generally provided deeper penetration and was used for reconnaissance across areas where the density of subsurface materials was not expected to be high.

5.0 Field Operations and Results

5.1 Field Procedures

The area surrounding the Locomotive Building was first surveyed using the EM31 to produce maps of ground conductivity as well as In-phase response. Each side (North, West, South, and East) of the building was surveyed as a separate map. The surveyed area on each side extended from 5 ft away from the building exterior wall out to a distance of 65 ft from the building wall. Data were acquired along lines parallel to the building wall at a ten-foot spacing

(e.g. lines at 5, 15, 25, 35, 45, 55, and 65 ft from the building wall). Each line extended 65 ft feet beyond the ends of the wall for each area. Obstacles (concrete slabs, dirt piles) modified this basic layout. Survey positioning was accomplished by navigating with an onboard GPS system which recorded positional information along with the conductivity and in-phase readings from the EM31. Contoured maps of conductivity variation were generated from these basic data files using Program Surfer2

Because the EM31 is adversely affected by close proximity the perimeter of the building (5 ft line away from wall), each area was also surveyed using the GPR system near the wall to double check for potential UST indicators that may have been obscured by the building itself.

The following discussions provide an area-by-area description of the results surrounding the Locomotive Building.

5.2 Results

***East Area*.** Attached Figure 1 is the conductivity map of the area to the east of the Locomotive Building. The faint dark lines on the map are the positions of the actual track lines as recorded by the GPS unit. The map is dominated by the presence of light blue colors, which represent background conductivities in the 10-15 milliSiemens per meter (mS/m) range (equivalent to 66 – 100 ohm meter electrical resistivity) - typical for sandy soils. The only anomalous area is the red feature on the west edge of the area. This high conductivity area is caused by interference from the building and its foundation. This area along the east edge of the building was also surveyed using the GPR.

There are no conductivity (or In-phase, not shown) anomalies consistent with the presence of a metallic UST in the east survey area. Also, no GPR anomalies consistent with a buried tank were observed in this area.

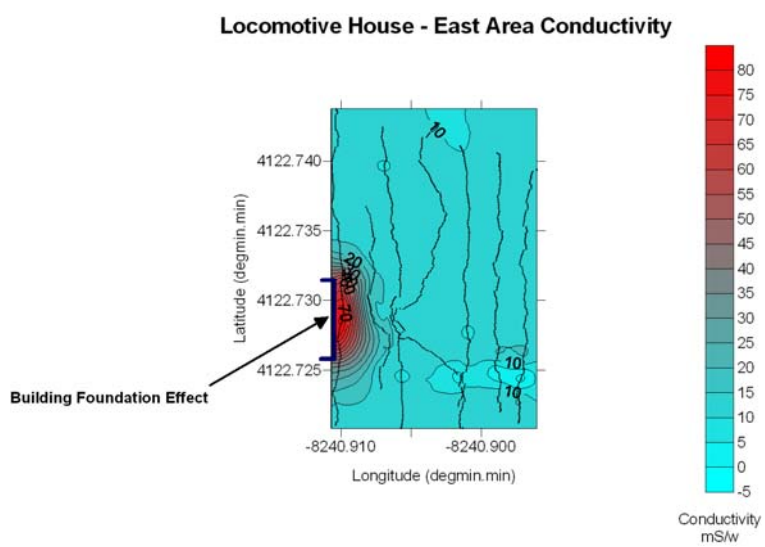


Figure 1. EM Conductivity Map of the Area East of the Locomotive Building.

***North Area*.** Figure 2 presents the corresponding conductivity map for the area north of the Locomotive Building. It, like Figure 1, shows mainly background conductivity values for the area away from the north wall of the building (i.e. no typical metal UST anomalies). The high conductivity (red) anomaly area is more complex in this area because of the presence of the railroad tracks paralleling the north wall and a small circular anomaly attributed to a backhoe bucket lying on the ground north of the wall. Follow up GPR profiles conducted parallel to and near the north wall only showed reflections from the railroad ties crossing the tracks in this area. As with the East Area, there are no EM31 or GPR anomalies consistent with a buried metal UST in the area north of the Locomotive Building.

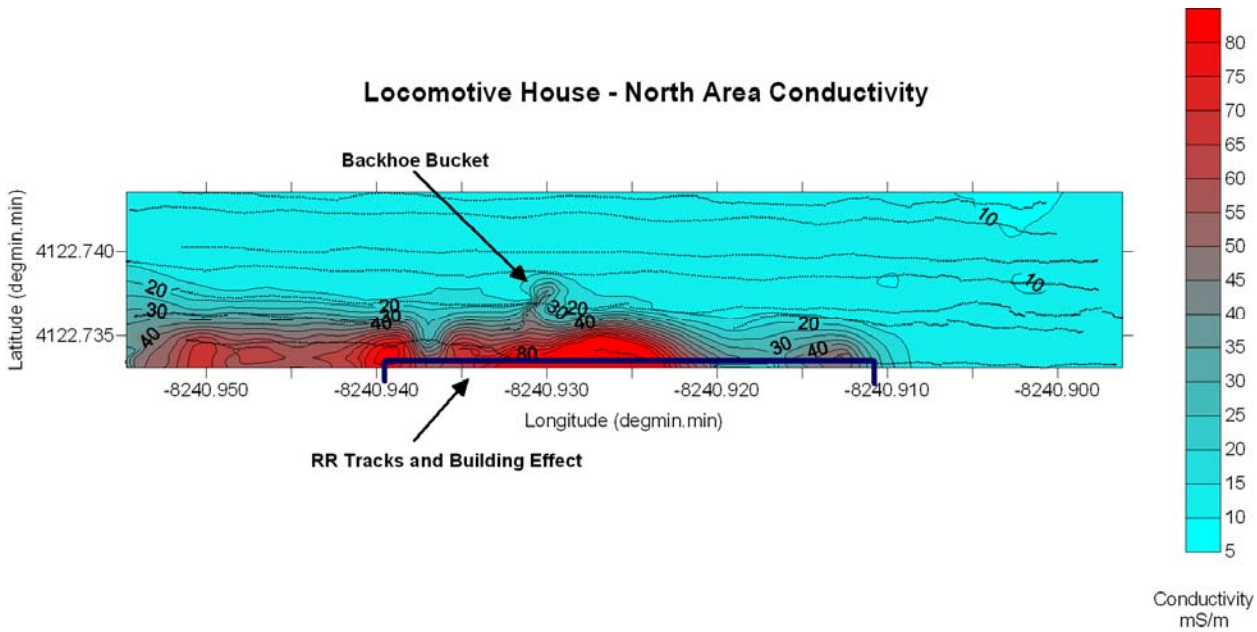


Figure 2. EM Conductivity Map of the Area North of the Locomotive Building.

West Area. Figure 3 presents the conductivity map for the area west of the Locomotive Building. This area is most complex as it contains three sets of railroad tracks as well as a pair of (marked) metal utility lines (suspected water and gas lines). Away from the complexity of the railroad tracks and marked utilities (all visible as linear anomalies on the EM31 conductivity map), the conductivity values are at the same background level typical of dry sandy soils. From a practical standpoint, it would not have been prudent to have located a UST under the tracks or beneath utilities; therefore we do not see any conductivity anomalies that are consistent with a buried UST. Follow up GPR profiles across the West Area only showed the railroad tracks and the utility pipes/conduits with no UST signatures.

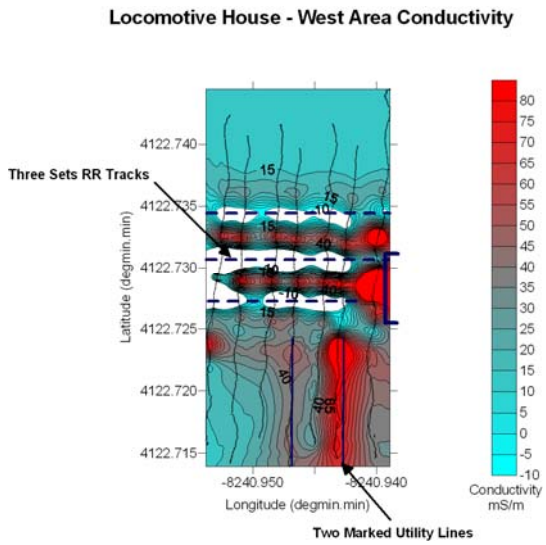


Figure 3. EM Conductivity Map of the Area West of the Locomotive Building.

South Area. Figure 4 presents the conductivity map for the area South of the Locomotive Building. This area had a small, squarish concrete pad structure off the SW corner of the building. This area, like the others, is again dominated by background conductivities with the only observed anomalies being due to the building/foundation itself and the two previously mentioned, marked metal utility lines seen trending from the SW corner area of the building toward Maintenance Road to the south. These utilities are seen as complex linear anomalies marked on the map. There are no other EM31 anomalies that are consistent with a buried metal UST. Follow up GPR profiles also show no anomalous subsurface features typical of a UST near the perimeter of the building.

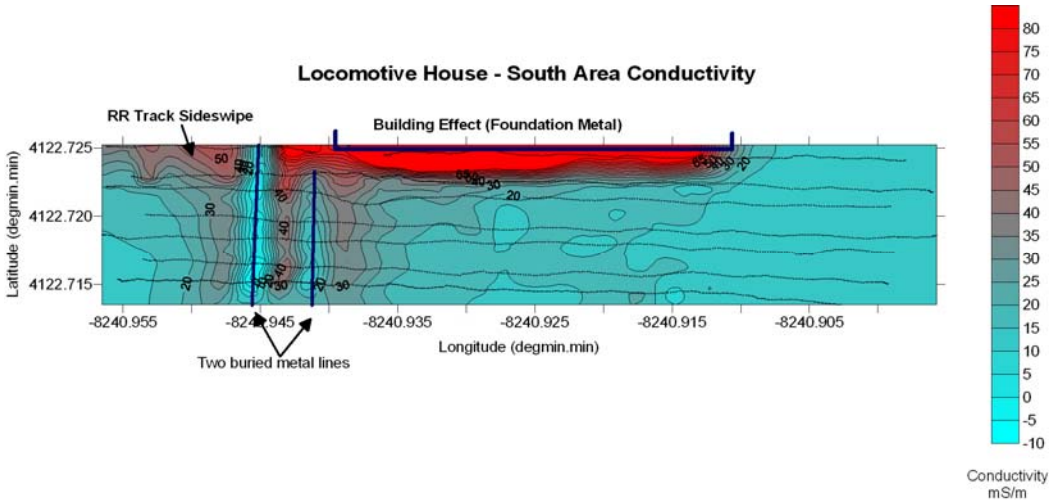


Figure 4. EM Conductivity Map of the Area South of the Locomotive Building.

6.0 Conclusions

Geophysical surveys, including EM31 Conductivity and In-phase component mapping together with multiple GPR profiles, around the near-building perimeter as well as out perpendicular to the building walls showed nothing but background soil values and no buried anomalies other than those associated with railroad tracks and with suspected and marked buried utilities. Our conclusion, then, is that there is/are no buried UST(s) within a perimeter of 65 feet surrounding the Locomotive Building. The only questionable area is the west side of the Locomotive Building where we have substantial interference from surface/near-surface features such as railroad tracks and utilities. However, it would be less likely that a UST would have been installed under such features.

APPENDIX B

DIRECT-PUSH SOIL BORING/PIEZOMETER AND MONITORING WELL HTRW DRILL LOGS AND WELL CONSTRUCTION DIAGRAMS

HTRW DRILLING LOG

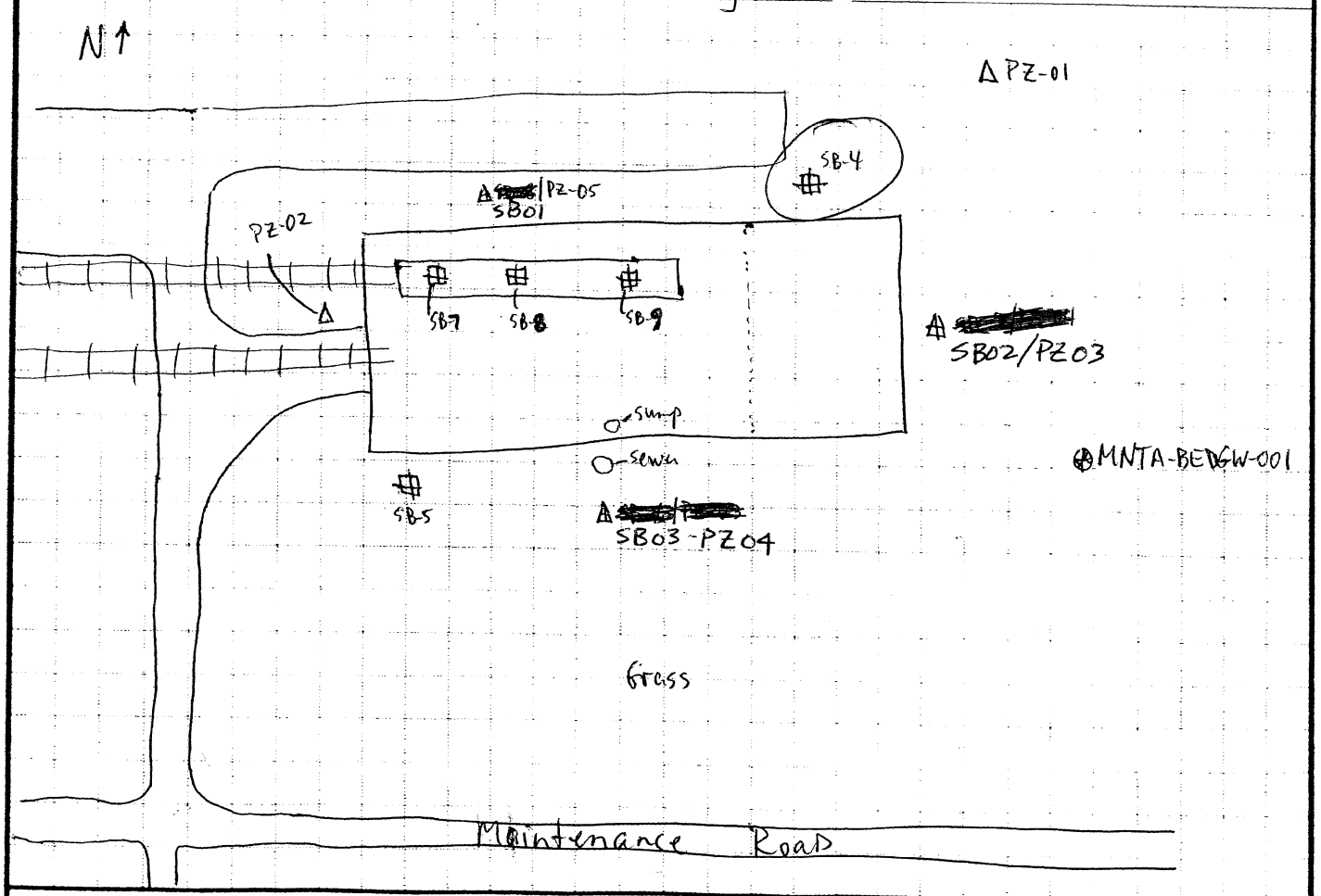
DISTRICT	Nashville, TN
HOLE NUMBER	SB04
SHEET / SHEETS	1 OF 2
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	Tri-State Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	636.69 Northing: 623872.89 Easting: 1918595.27
10 DATE STARTED	01/19/09
11 DATE COMPLETED	01/19/09
12 OVERBURDEN THICKNESS	Unknown
15 DEPTH GROUNDWATER ENCOUNTERED	2.5 ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	10'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	yes	yes	Nitros	SVOCs	PCBs	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	Eric W. Weave

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT	HOLE NO
PBOW	SB04

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB04

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (silt, sand, gravel, loose moist, noted organics (roots, wood fragments)) 0.9	GM		NA	0.9	3'/5'	Began drilling 1/19/09 S-1 (0-5') 1610
	1	Yellowish brown (10YR 5/6) very fine grain SAND with silt	SP			LBA0012 1610 1.9		
	2	▽ groundwater						
	3							Discrete sample pushed for 3.9 to 5.9'.
	4					3.9' LBA0013 1613		
	5						4.5'/5'	S-2 (5-10') 1615
	6					5.9'		
	7	7' Brown SILT (10YR 4/3) medium stiff, wet, with very fine grain sand.	ML					
	8					8' LBA0014 1615		
	9	- grading to very dark grayish brown (10YR 3/2)						
	10	10'				10'		

Project: PBOW Boring Completed

Hole Number: SB04

Total Depth 10'

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HTRW DRILLING LOG

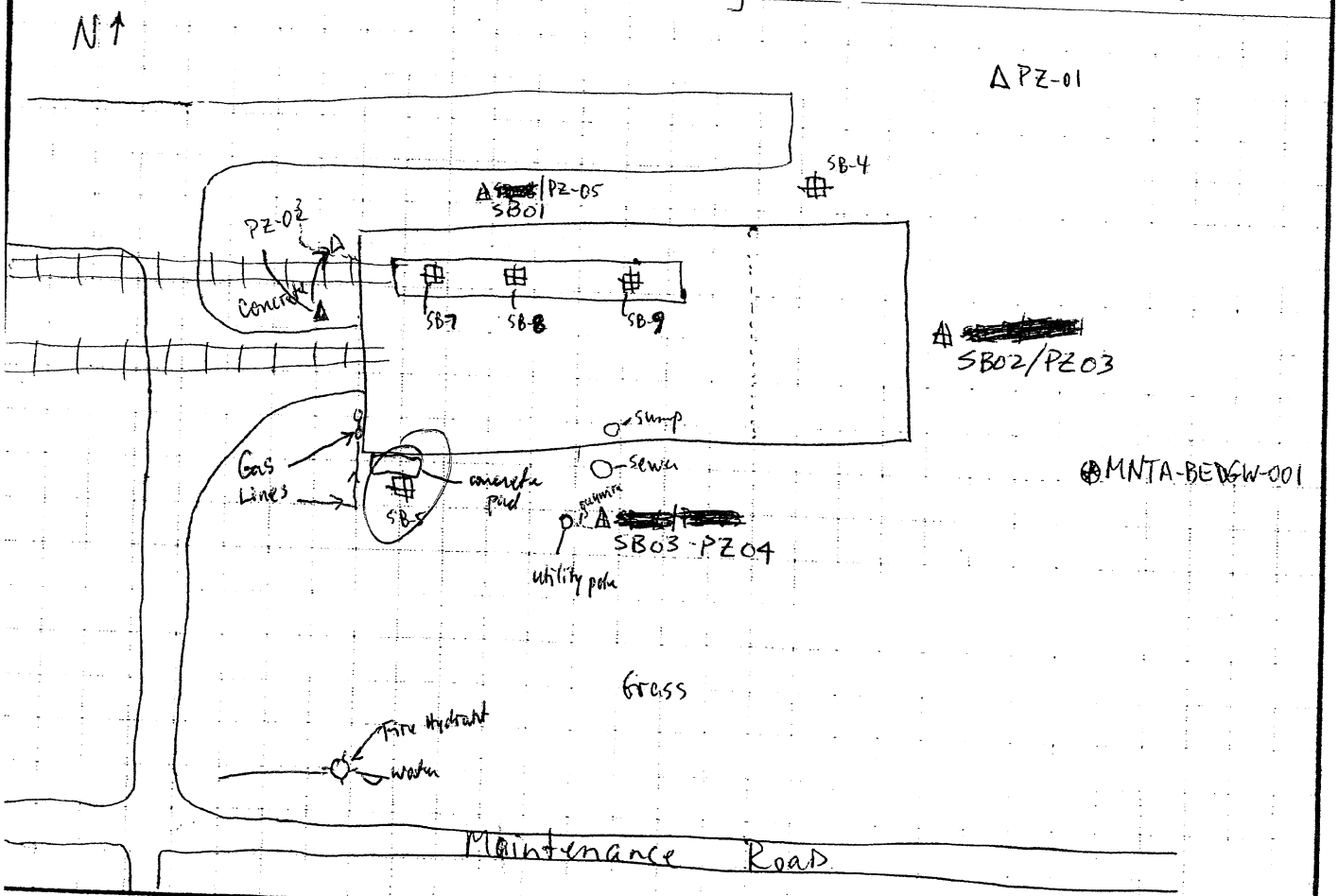
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: SB-05
3 PROJECT: PBOW	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS
5 NAME OF DRILLER: Jimmy Griffith	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drive 2-inch macrocore with 5-ft long acetate liners.	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610DT	
	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 636.35	Northing: 623799.16 Easting: 1918471.15
	10 DATE STARTED: 01/20/09	11 DATE COMPLETED: 01/20/09
12 OVERBURDEN THICKNESS: Unknown	15 DEPTH GROUNDWATER ENCOUNTERED: Not Encountered	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 10 Ft	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	yes	yes	Nitros	PCBs	SVOCs	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	M. Yantsi for E. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT	HOLE NO
PBOW	SB-05

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB-05

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		0' Very dark brown (10YR 2/2) very fine grain SAND with gravel, moist, loose, noted organics (grass roots) 1'	SP		NA		3.7'/5'	Began drilling 1/20/09 S-1 0-5' 1440
	1	Dark yellowish brown (10YR 4/4) silty CLAY, with very fine grain sand, moist, stiff, mottled (brown, gray) approximately 30%, low plasticity. 2.4'	CL			2.4' LBA0015 1440		
	3	Black (10YR 2/1) very fine grain SAND, loose, moist.	SP	0.0		3.4'		
		- grading to brown (10YR 4/3)						
	4							
	5	- grading to yellowish brown (10YR 5/4)				5.4' LBA 0016 1445	4'/5'	S-2 5'-10' 1445
	6	Yellowish brown (10YR 5/6) silty CLAY, very stiff, moist	CL	0.0				
	7	- grading to with very fine grain sand.				7.4'		
	8			0.0		8' LBA 0017 1448		
	9					9'		
	10	10'				10'		

Project: PBOW Boring Completed @ 10'

Hole Number: SB-05

Total Depth 10'

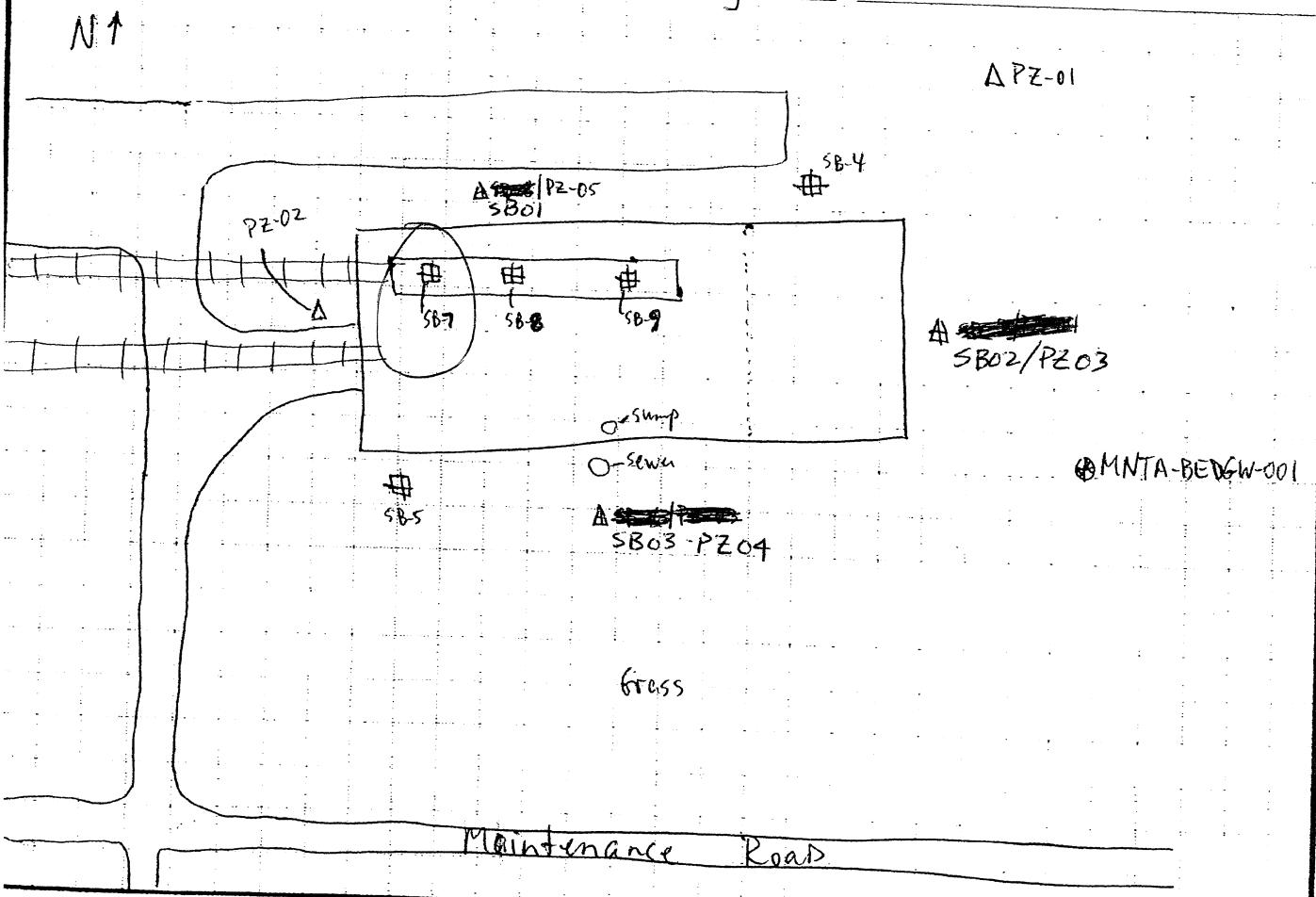
HTRW DRILLING LOG

1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	SB-07
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / SHEETS	1 OF 2
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	636.79 Northing: 623853.27 Easting: 1918497.75
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	Unknown
15 DEPTH GROUNDWATER ENCOUNTERED	4 ft (Not groundwater though)
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14 TOTAL DEPTH OF HOLE	4.9'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	Nitros	SVOCs	Metals	NA	NA %
22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR		
	yes	NA	NA	[signature]		

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT PBOW

HOLE NO SB07

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB07

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (crushed limestone, loose, dry to wet)			NA		~~1.1'~~ ~~4.9'~~ DKK	Began drilling 1/20/09
	1	very dark brown, very fine grain to pebble size, 10% very fine grain material	gm					S-1 0-5 0920
	2							Breathing space air PID - 0 O_2 - 20.9-21.1 LEL - 0% CO - 0 H_2S - 0
	3					3.0		used centerpoint and pushed to 3' to 4.9'
						LBA0023 23.	1.1	start sample collection
	4			1.2		0920 4.1	1.9	∇ water in hole ~4 ft
		4.9'						
	5	Refusal @ 4.9' Total Depth 4.9' Believe concrete						
	6							
	7							
	8							
	9							
	10							

Project: PBOW

Hole Number: SB07

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HTRW DRILLING LOG

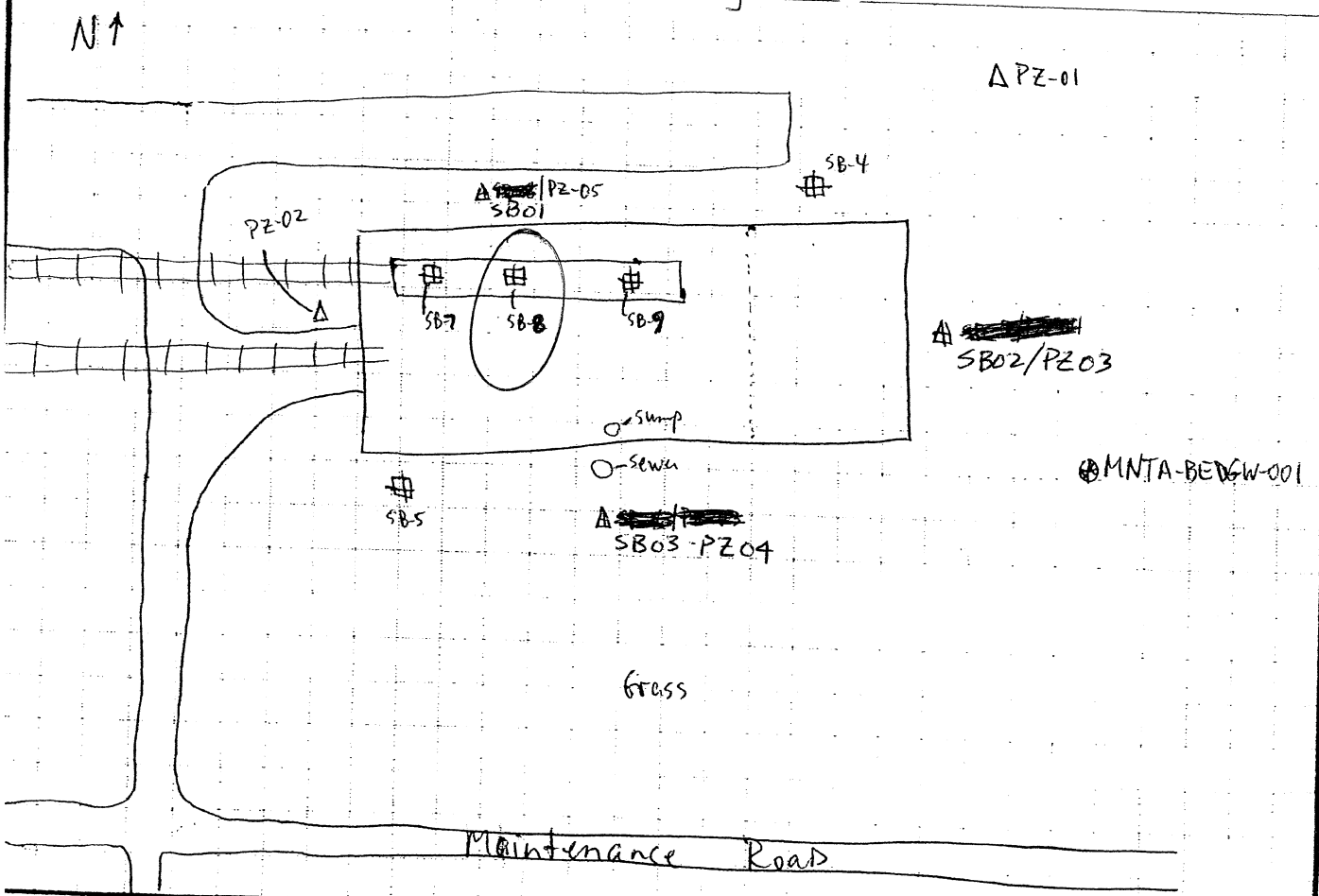
1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	SB-08
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / SHEETS	1 OF 2
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	636.82 Northing: 623852.71 Easting: 1918515.02
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	Unknown
15 DEPTH GROUNDWATER ENCOUNTERED	4 ft surface water?
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	4.9'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	Notable	yes	Nitros	SVOCs	NA	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT PBOW

HOLE NO SB-08

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB08

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (Crushed limestone, loose, dry to wet)			NA		~~4.9~~	Began drilling 1/20/09
	1	very dark brown, very fine grain to pebble size, ~~gr~~,	gm					S-1 ~~(0-5')~~ DKE 0910
	2							
							3	Used center point and pushed 3 to 4.9'. ~~sample~~ DKE
	3					LBA0024	1.1 / 1.9	
				2.2				
	4					0910		Encountered ~~gr~~ water 4'
		4.9'						
	5	Refusal @ 4.9' Total Depth 4.9' Believe concrete						
	6							
	7							
	8							
	9							
	10							

Project: PBOW

Hole Number: SB08

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HTRW DRILLING LOG

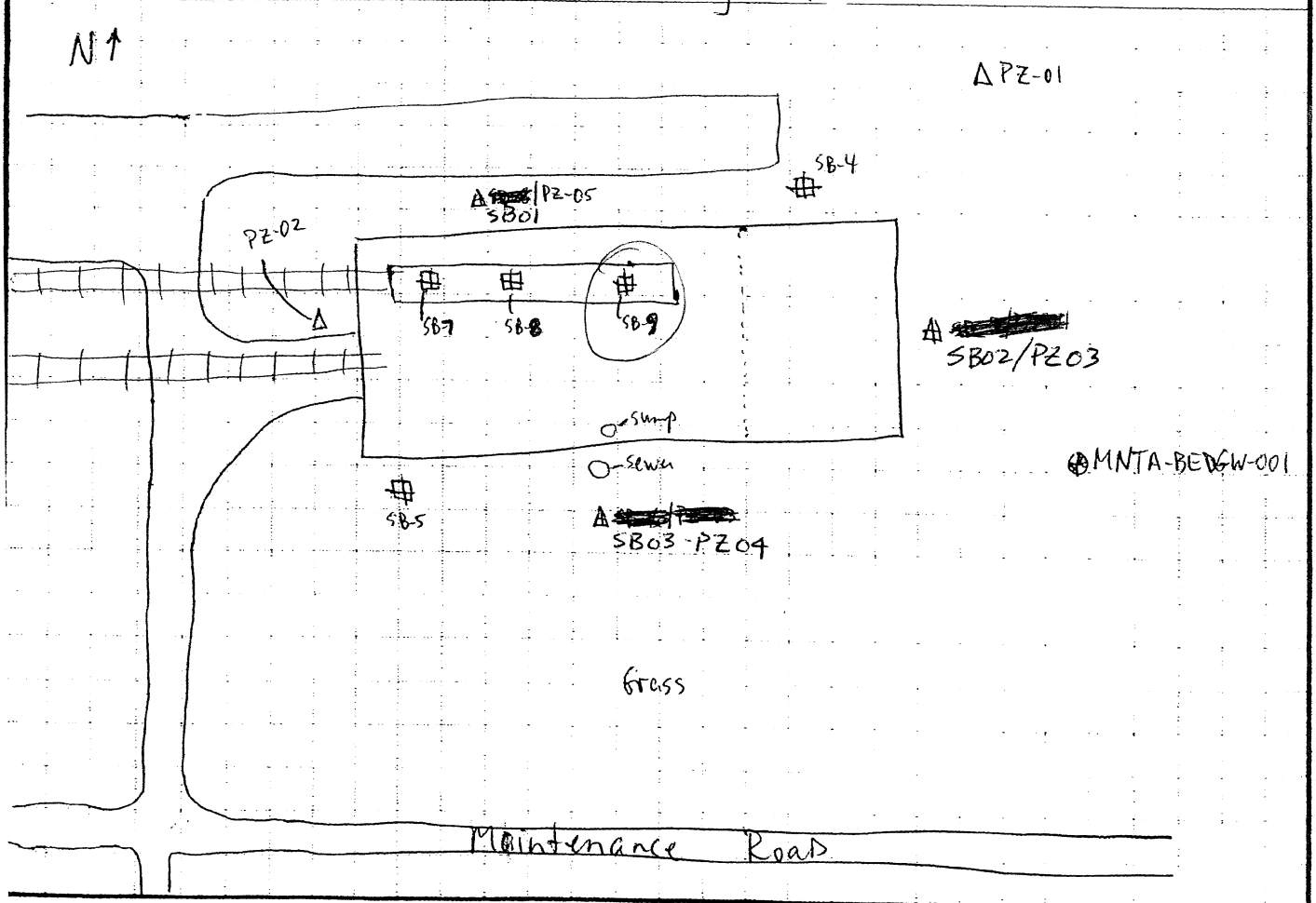
DISTRICT: Nashville, TN	HOLE NUMBER: SB09	
1 COMPANY NAME: Shaw E+I	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Jimmy Griffith	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 636.8 Northing: 623851.97 Easting: 1918541.10	
	10 DATE STARTED: 01/20/09	11 DATE COMPLETED: 01/20/09
12 OVERBURDEN THICKNESS: Unknown	15 DEPTH GROUNDWATER ENCOUNTERED: 3.9 ft (Surface water)	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14 TOTAL DEPTH OF HOLE: 4.9'	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	yes	~~Nitros~~ SVOC	Nitros		NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	E. W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT	HOLE NO
PBOW	SB09

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

E. Weaver

Hole Number: SB09

Project: PBOW

Geologist: ~~D. Kesstere~~

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (Crushed limestone, loose, dry to wet) ~~Lat 3.9 ft~~			NA		4.9	Began drilling 1/20/09 S-1 ~~0900~~ 0900
	1	very dark brown, very fine grain, to pebble size rock, wet at 3.9 ft						
	2							
	3					3 LBA0028 5		Used auger point and pushed 3-4.9 ft
	4			1.3		0900 4.2	1.2/ 1.9	Wet at 3.9 ft Distinct weathered oil odor.
		4.9'				4.9		
	5	Refusal @ 4.9' Total depth 4.9'						No VOCs collected due to mostly rock material.
	6							
	7							
	8							
	9							
	10							

Project: PBOW

Hole Number: SB09

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HTRW DRILLING LOG

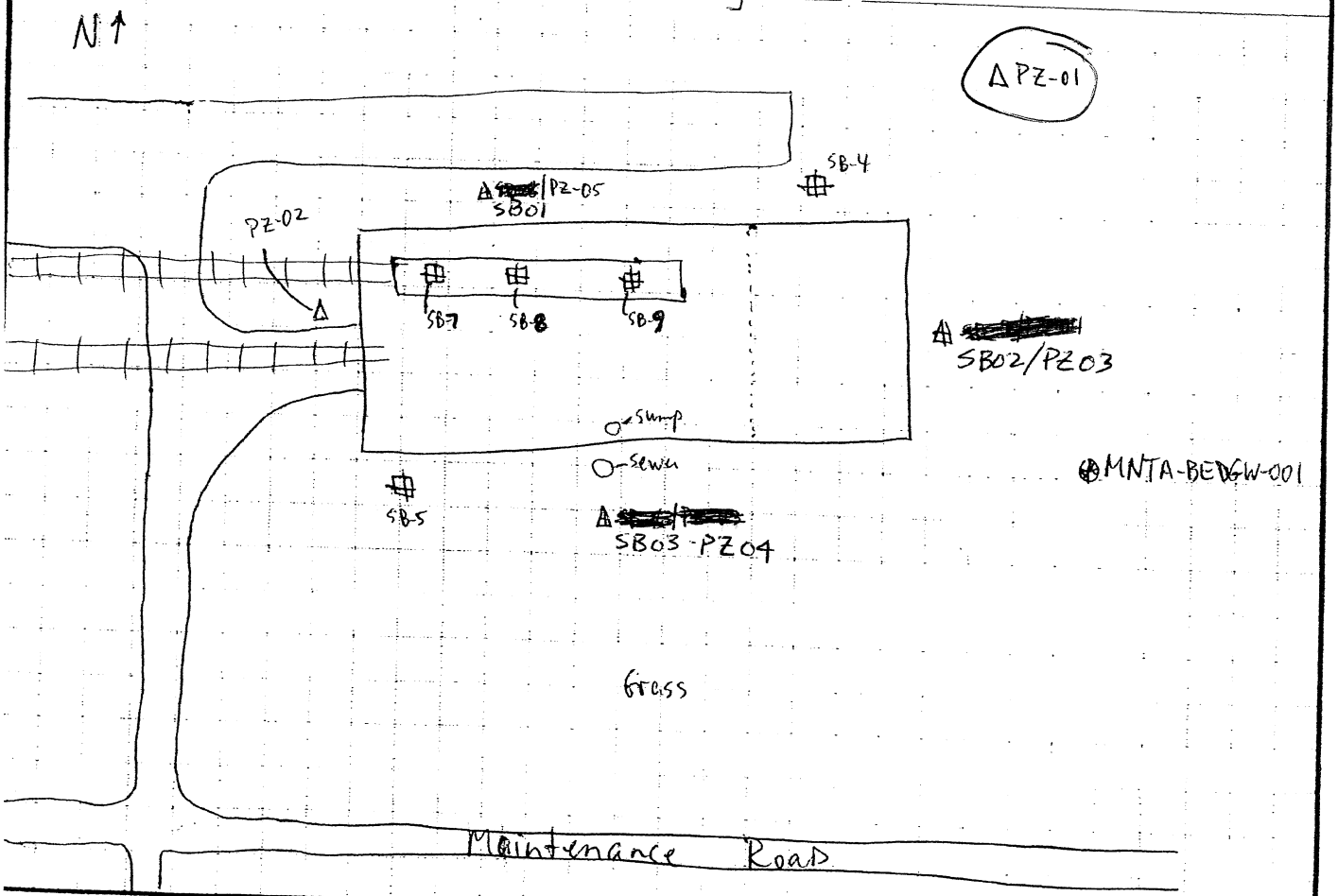
1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	PZ01
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / OF SHEETS	1 / 3
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	636.3 ft; Northing: 623907.99; Easting: 1918641.61
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	18.5'
15 DEPTH GROUNDWATER ENCOUNTERED	10 ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	~~Not encountered~~ 10 ft
14 TOTAL DEPTH OF HOLE	18.5'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	~~NA~~ NA	NA	NA	NA	NA	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	[illegible]

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT PBOW

HOLE NO PZ 01

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ 01

Project: PBOW

Geologist: ~~D. Kesslerque~~ E. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (Dark yellowish brown (10yR 4/6) very fine grain SAND with silt loose, moist, noted organics (grass, leaves) 1.7	SP	NA	NA	NA	3.2'/5'	Began drilling 1/20/09 S-1 0-5 1045
	1							
	2	Very dark brown (10yR 2/2) very fine grain SAND, ~~tace~~ few with silt, loose, moist, ~~not~~ 5.0	SP					
	3							
	4							
	5	Dark yellowish brown (10yR 4/4) silty CLAY, trace very fine + fine grain sand, mottled gray approximately 20%.	CL				5'/5'	S-2 5-10 1050
	6							
	7							
	8							
	9							
	10	▽						Encountered gw ~10 ft

Project PBOW

Hole Number: PZ 01

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ 01

Project: PBOW | Geologist: D. Kessler | Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	11	Dark yellowish brown (10YR 4/4) silty CLAY, trace very fine and fine grain sand, mottled gray approximately 20%. 11.6'	CL	NA	NA	NA	5'/5'	S-3 10'-15' 1055
	12	Dark gray (10YR 4/1) CLAY with silt, stiff to very stiff, moist, ~~moist~~ with shale fragments approximately 10%, high plasticity	CH					
	13							
	14							
	15						3.5'/3.5'	S-4 15'-18.5'
	16	- plasticity decreased with depth						
	17							
	18	18.5'						
	19	Refusal @ 18.5' Total Depth 18.5'						
	20							

Project: PBOW | Hole Number: PZ 01

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-01
Location:	Sandusky, OH	Site Location:	Locomotive Building
Client:	USACE, Nashville, TN	Installation Date	1/20/09
Subcontractor:	Tri-State Drilling	Northing:	623907.99
Driller:	Jimmy Griffith	Easting:	1918641.61
Shaw Field Representative:	David Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 637.93

Top of Casing Stickup (ft): 1.34

Land Surface Elevation (ft): 636.3

Approximate Diameter of Borehole (in): 3 1/2"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 10 Ft

Date: 1/20/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 8.66

Bottom of Screen Interval (ft): 18.66

Bottom of Piezometer (ft): 18.80

Bottom of Borehole (ft): 18.50

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: 1" PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap (Factory slot)

Sump/End Cap: 0.14 Ft ✓

Backfill Material: None

Abandonment:

Date: 6/16/09

Procedure: Natural fill Grouted (Bentonite) (Casing Removed)

Completed as Well NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).
If completed as well - see well construction diagram.

HTRW DRILLING LOG

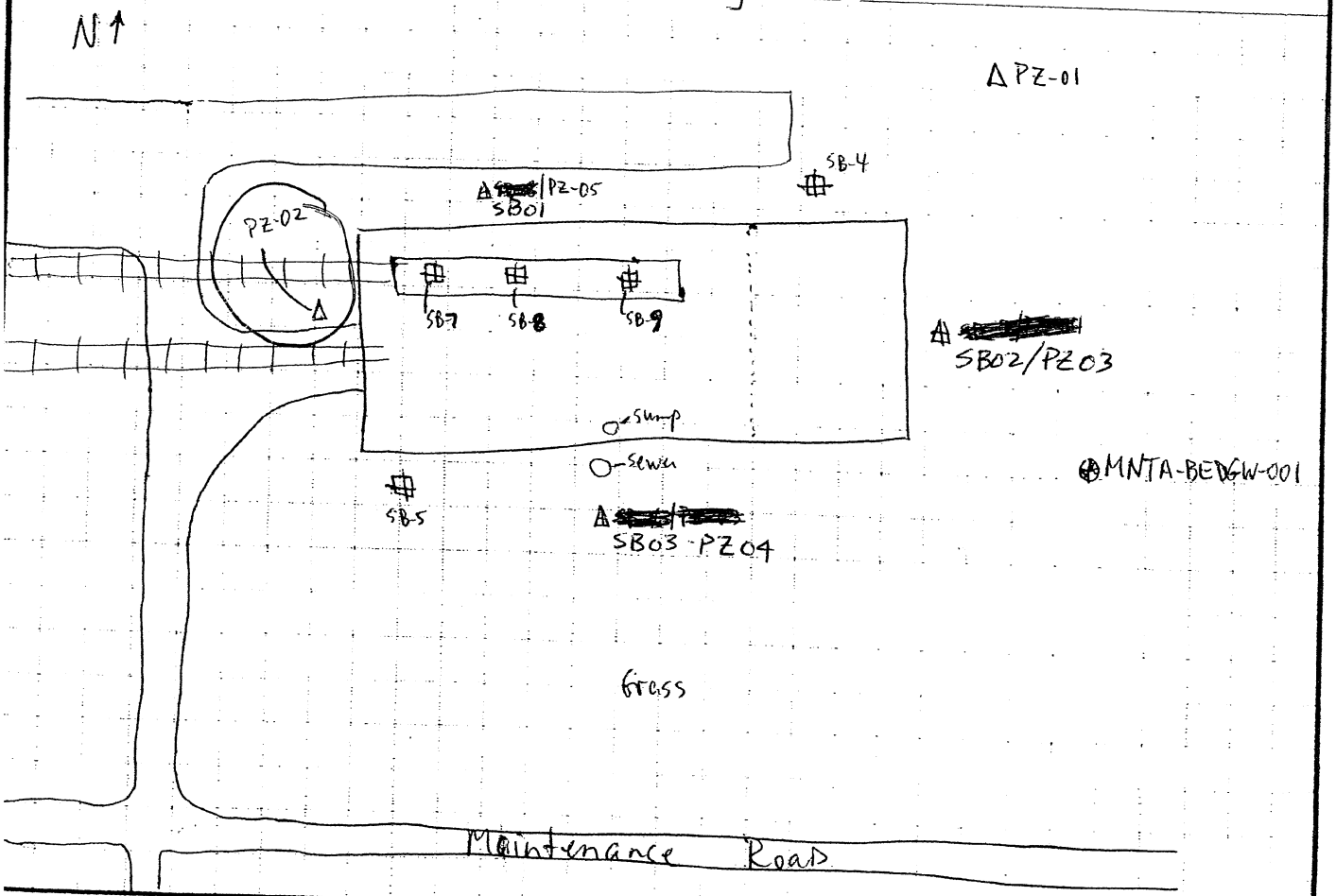
1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	PZ-02
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / OF SHEETS	1 OF 3
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	637.0 Northing: 623862.16 Easting: 1918467.96
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	19.1'
15 DEPTH GROUNDWATER ENCOUNTERED	2.8'
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14 TOTAL DEPTH OF HOLE	19.1'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NO	NO	—	—	—	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	Yes	NA	—	Eric W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT PBOW

HOLE NO PZ-02

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-02

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	0	Very dark brown (10YR 2/2) very fine grain SAND with gravel and silt, noted organics, loose medium dense. 1.3'	SP	NA	NA	NA	3.5'/5'	Began drilling 1/20/09 S-1 0-5' 1405
	1							
	2	Dark yellowish brown (10YR 3/4) very fine grain SAND, loose, moist. - grading to yellowish brown (10YR 5/6)	SP					
		▽						Encountered gw 2.8ft
	3							
	4							
	5	5.5'						
		Dark yellowish brown (10YR 4/4) SILT with very fine grain sand and clay, medium stiff, moist, low plasticity	ml				4.3'/5'	S-2 5'-10' 1410
	6							
	7							
	8	- grading to dark gray (10YR 4/1)						
	9							
	10							

Project: PBOW

Hole Number: PZ-02

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

E. Weaver

Hole Number: PZ-02

Project: PBOW

Geologist: ~~D. Kessler~~ EW

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Dark gray (10YR 4/1) SILT with very fine grain sand and clay, medium stiff, moist, low plasticity.	ML	NA	NA	NA	4.4'/5'	S-3 10'-15' 1415
	11							
	12							
	13							
	14							
	15						4.1'/4.1'	S-4 15'-19.1' 1420
	16	16'						
		Dark gray (10YR 4/1) CLAY with silt, moist, stiff, noted shale fragments approximately 50%, high plasticity	CH					
	17							
	18							
	19	19.1'						
		Refusal @ 19.1' Total Depth 19.1'						
	20							

Project: PBOW

Hole Number: PZ-02

Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-02
Location:	Sandusky, OH	Site Location:	Locomotive Building
Client:	USACE, Nashville, TN	Installation Date	1/20/09
Subcontractor:	Tri-State Drilling	Northing:	623862.16
Driller:	Jimmy Griffith	Easting:	1918467.96
Shaw Field Representative:	David Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 640.67

Top of Casing Stickup (ft): 3.4

Land Surface Elevation (ft): 637.0

Approximate Diameter of Borehole (in): 3 1/2"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 2.8

Date: 1/20/09

Post Development: NA TOC

Date: NA

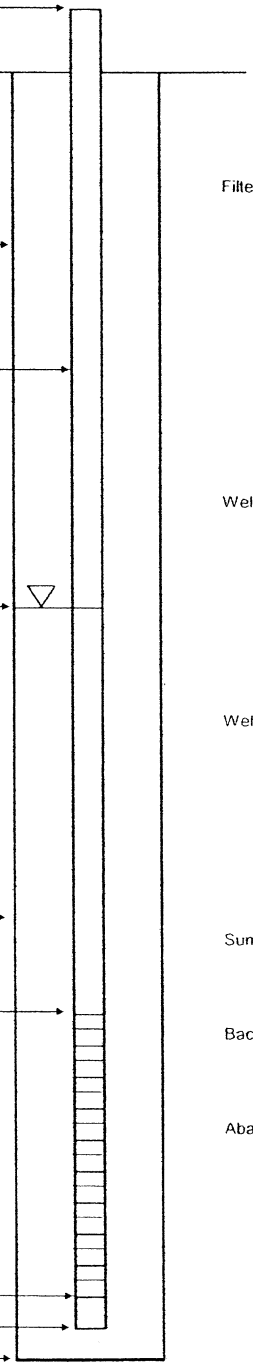
Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 9.20

Bottom of Screen Interval (ft): 19.20

Bottom of Piezometer (ft): 19.34

Bottom of Borehole (ft): 19.1



Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: 1" PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap (Factory slot)

Sump/End Cap: 0.14 ft ✓

Backfill Material: None

Abandonment:

Date: 6/15/09

Procedure: Natural fill Grouted (Bentonite) (Casing Removed)

Completed as Well NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

If completed as well - see well construction diagram.

HTRW DRILLING LOG

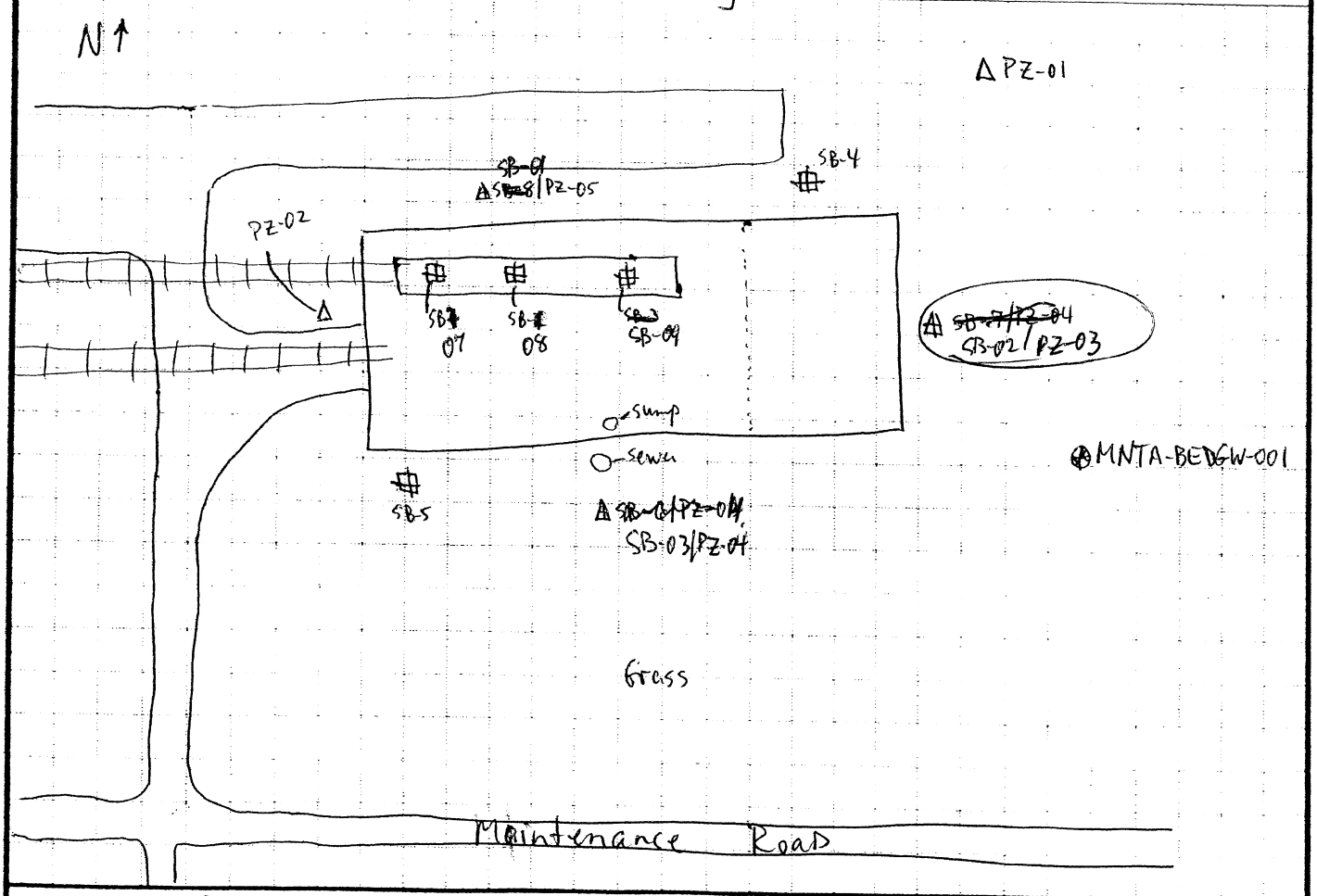
DISTRICT	Nashville, TN
HOLE NUMBER	SB02/PZ-03
SHEET / OF SHEETS	1 / 3
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	Tri-State Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610 DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	636.1 Northing: 623848.15 Easting: 1918624.77
10 DATE STARTED	01/19/09
11 DATE COMPLETED	01/19/09
12 OVERBURDEN THICKNESS	19.3'
15 DEPTH GROUNDWATER ENCOUNTERED	7.5 ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	19.3'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	yes	✓	Nitros	SVOCs	PCBs/TOC	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA	NA	1" Piezo	Eric W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT	HOLE NO.
PBOW	SB02/PZ-03

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB02/PZ-03

Project: PBOW

Geologist: ~~D. Kessler~~ B. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Fill (Dark yellowish brown (10yR 3/6) very fine grain SAND with gravel, coarse sand, silt, loose moist.) 1.5	SP		NA	1.5	3.5'/5'	Began drilling 1/19/09 S-1 (0-5) 1535
	1							
	2	Black (10yR 2/1) very fine grain SAND with silt, noted organics (roots), moist, loose. 2.5	SP			LBA0004 1535 2.5		
	3	Dark yellowish brown (10yR 4/4) silty CLAY, moist, stiff, low plasticity, trace very fine grain sand, mottled gray approximately 20%.	CL					
	4							
	5					5'		
						LBA 0005 1540 6.5'	5'/5'	S-2 (5-10') 1540
	6							
	7	- grading to dark gray (10yR 4/1)						
	8					8' LBA 0006		
	9							
	10					1543 10		

Project: PBOW

Hole Number: SB02/PZ-03

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB02/PZ-03

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	11	Dark yellowish brown (10YR 4/4) silty CLAY, moist, stiff, low plasticity, trace very fine grain sand, mottled gray approximately 20%.	CL		NA	NA	5'/5'	
	12							
	13							
	14	14.9'						
	15	Very dark gray (10YR 3/1) CLAY with silt, shale fragments (fine to coarse) approximately 50%, medium plasticity, moist, very stiff.	CH				4.3'/4.3'	
	16							
	17							
	18	- Shale fragments increase to approximately 10%, grading to low plasticity.						
	19	19.3'						
	20	Refusal @ 19.3' Total Depth 19.3'						

Project: PBOW

Hole Number: SB02/PZ-03

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-03
Location:	Sandusky, OH	Site Location:	Locomotive Building
Client:	USACE, Nashville, TN	Installation Date	1/19/09
Subcontractor:	Tri-State Drilling	Northing:	623848.15
Driller:	Jimmy Griffith	Easting:	1918624.77
Shaw Field Representative:	David Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 639.46

Top of Casing Stickup (ft): 3.36

Land Surface Elevation (ft): 636.1

Approximate Diameter of Borehole (in): 3 1/2"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 7.5 ft

Date: 1/19/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 8.86

Bottom of Screen Interval (ft): 18.86

Bottom of Piezometer (ft): 19.00

Bottom of Borehole (ft): 19.3

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: 1" PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap Factory slot

Sump/End Cap: 0.14 ft

Backfill Material: None

Abandonment:

Date: 6/16/09

Procedure: Natural fill Grouted Bentonite Casing Removed

Completed as Well NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

If completed as well - see well construction diagram.

HTRW DRILLING LOG

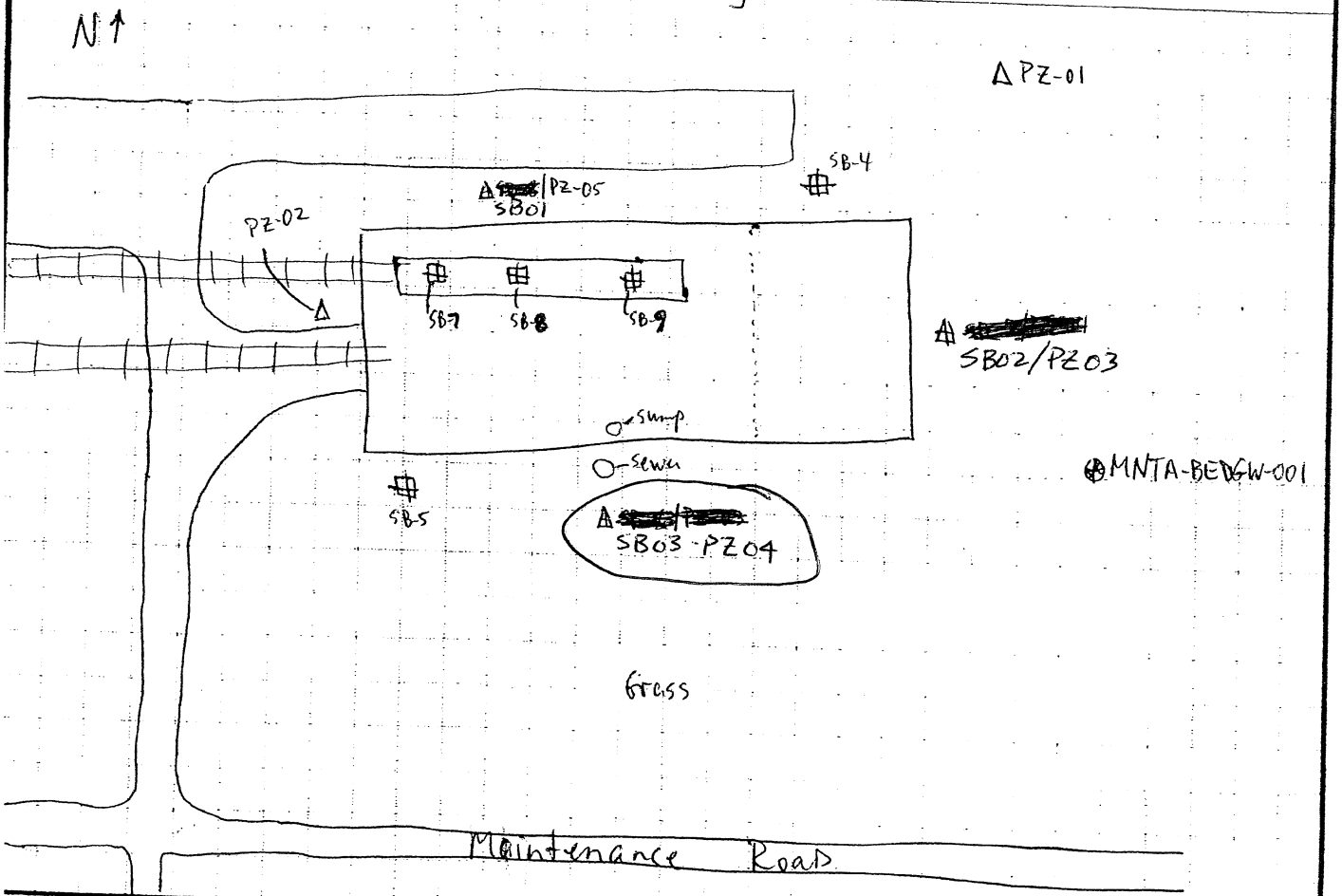
DISTRICT	Nashville, TN
HOLE NUMBER	SB03/PZ04
SHEET / SHEETS	1 OF 3
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	Tri-State Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	635.6 Northing: 623794.37 Easting: 1918550.21
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	18.1'
15 DEPTH GROUNDWATER ENCOUNTERED	ND ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	18.1'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	Yes	Yes	SVOC's	Nitro's	PCB's	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	Yes	NA	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT PBOW

HOLE NO SB03/PZ04

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB03/PZ04

Project: PBOW

Geologist: ~~D. Kessler~~ E. Newell

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	0	Very dark brown (10YR 2/2) SAND, very fine grain with silt and clay, moist - medium stiff, noted organics (grass, roots)	SP	0.0	NA	LBA0007 LBA0008 LBA0009 1505	3.2/5	Began drilling 1/20/09 S-1 0-5 1505
	1	~~grading to dark yellowish brown (10YR 4/6)~~ 2.1				1'		
	2	Yellowish brown (10YR 5/6) Silty CLAY with very fine grain sand, mottled gray approximately 10%, ~~medium~~ ~~low~~ medium plasticity,	CL	0.0		2.5' LBA0010 1508 3.2'		2.5-3.2' interval used for sample due to inadequate recovery from 3.2' to 5.0'.
	3							
	4							
	5						3.7/5	S-2 5-10 1510
	6							
	7							
	8					8' LBA0011 1510		
	9			0.0				
	10					10'		

Project: PBOW

Hole Number: SB03/PZ04

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB03/PZ-04

Project: PBOW

Geologist: ~~D. Kesster~~ E. Weaver EW

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Very dark gray (10YR 3/1) CLAY with silt, stiff, moist, medium plasticity,	CH	0.0	NA	NA	4.7'/5	S-3 10'-15' 1515
	11							
	12							
	13							
	14							
	15						3.1'/3.1'	S-4 15'-18.1' 1520
	16							
	17	- grading to with shale fragments, approximately 15%, plasticity decreasing with depth.						
	18	18.1'						
		Refusal @ 18.1' Total Depth 18.1'						
	19							
	20							

Project: PBOW

Hole Number: SB-03/PZ-04

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-04
Location:	Sandusky, OH	Site Location:	Locomotive Building
Client:	USACE, Nashville, TN	Installation Date	1/20/09
Subcontractor:	Tri-State Drilling	Northing:	623794.37
Driller:	Jimmy Griffith	Easting:	1918550.21
Shaw Field Representative:	David Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 637.50

Top of Casing Stickup (ft): 1.7

Land Surface Elevation (ft): 635.6

Approximate Diameter of Borehole (in): 3 1/2"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 10'

Date: 1/20/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 8.30

Bottom of Screen Interval (ft): 18.30

Bottom of Piezometer (ft): 18.44

Bottom of Borehole (ft): 18.1

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: Prepacked Screen Filter Sock

Well Casing:

Manufacturer: DSI

Type: PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: 1" PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap Factory slot

Sump/End Cap: 0.14 ft

Backfill Material: None

Abandonment:

Date: 6/16/09

Procedure: Natural fill Grouted Bentonite Casing Removed

Completed as Well NA

Shaw

Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88)

If completed as well - see well construction diagram.

HTRW DRILLING LOG

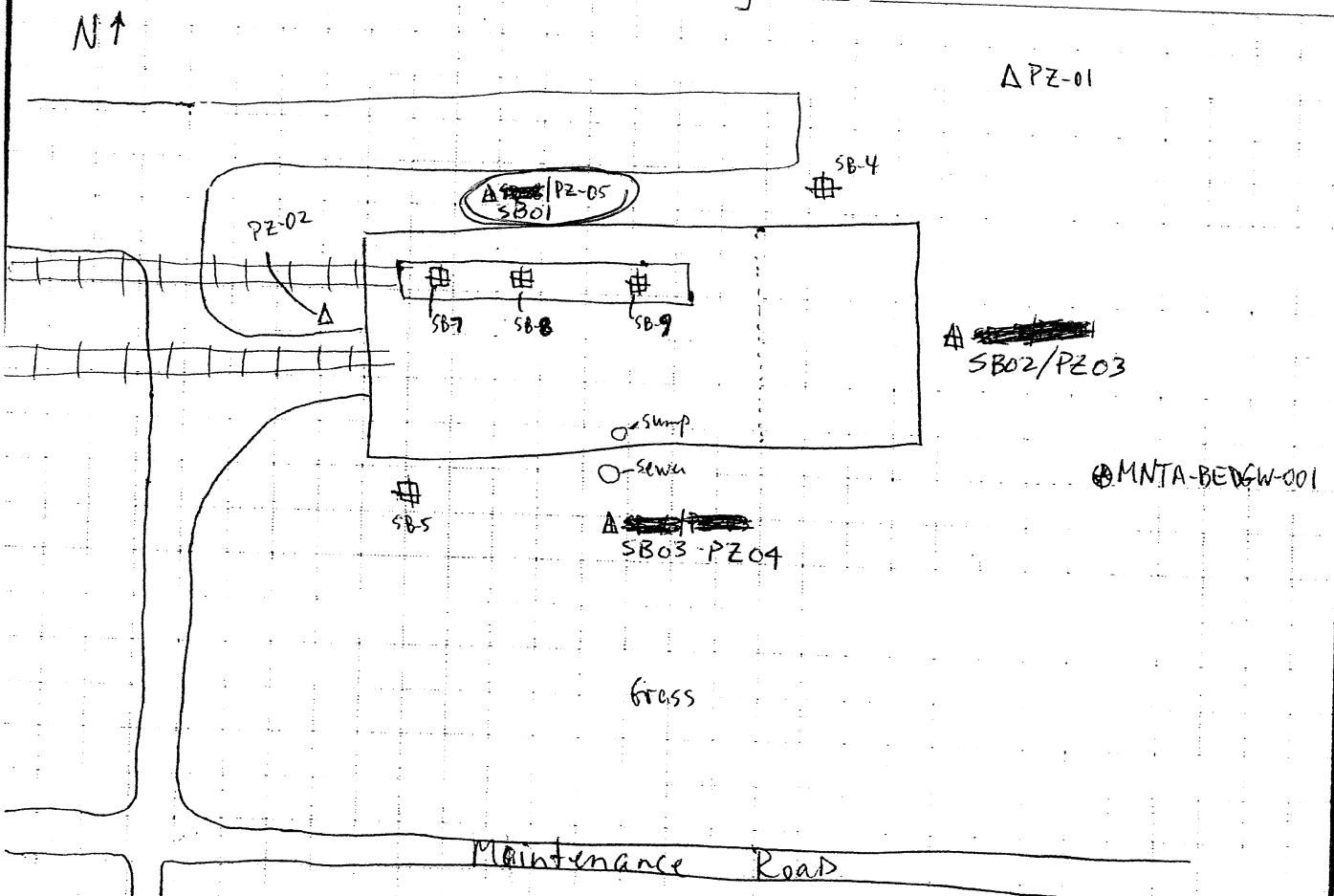
1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	SB01/PZ05
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / SHEETS	1 OF 3
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	637.3 Northing: 623880.78 Easting: 1918509.04
10 DATE STARTED	01/20/09
11 DATE COMPLETED	01/20/09
12 OVERBURDEN THICKNESS	17.9'
15 DEPTH GROUNDWATER ENCOUNTERED	1.3 Ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	17.9'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	✓	✓	Nitros	SVOCs	PCBs	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA	NA	1" Piezo	Eric W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area 7123 SCALE Not to Scale



PROJECT	HOLE NO
PBOW	SB01-PZ05

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB01/PZ05

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	1	Fill (Crushed limestone with sand + silt, loose, dry noted organics (grass, roots)) 1.3			NA	1.3'	3.5'/5'	Began drilling 1/20/09 S-1 0-5' 1130
	2	Dark yellowish brown (10YR 4/6) very fine grain SAND, wet, loose,	SP			LBA0001 LBA0001MS LBA0001MSD 1130 2.3		▽ Encountered gw 1.3 ft
	3							
	4					~~4.3~~ ~~LBA0002~~ EW		
	5	- grading to with silt. 5.7'				5' LBA0002 1135	5'/5'	S-2 5-10' 1135
	6	Brown (10YR 4/3) SILT, stiff wet, with very fine grain sand low to medium plasticity				6.3 ~~LBA0003~~ EW		
	7	- grading to very dark gray (10YR 3/1)	ml					
	8					8' LBA 0003 1138		
	9							
	10					10		

Project: PBOW

Hole Number: SB01/PZ05

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB01/PZ05

Project: PBOW

Geologist: ~~D. Kessler~~ E. Weaver

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	11	Stiff (10YR 3/1) very dark gray, low to medium plasticity, SILT, trace of sand, wet	ml		NA	NA	5'/5'	S-3 10-15 1140
	12							
	13							
	14	14.6'						
	15	very dark gray (10YR 3/1) CLAY, with silt, shale fragments approximately 15% high plasticity	ch				2.9'/2.9'	S-4 15-17.9' 1145
	16							
	17	17.9'						
	18	Refusal @ 17.9' Total Depth 17.9'						
	19							
	20							

Project: PBOW

Hole Number: SB01/PZ05

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-05
Location:	Sandusky, OH	Site Location:	Locomotive Building
Client:	USACE, Nashville, TN	Installation Date	1/20/09
Subcontractor:	Tri-State Drilling	Northing:	623880.78
Driller:	Jimmy Griffith	Easting:	1918509.04
Shaw Field Representative:	David Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 640.20

Top of Casing Stickup (ft): 3.15

Land Surface Elevation (ft): 637.3

Approximate Diameter of Borehole (in): 3 1/2"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 1.3 ft

Date: 1/20/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 6.86

Bottom of Screen Interval (ft): 16.86

Bottom of Piezometer (ft): 17.00

Bottom of Borehole (ft): 17.9

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: 1" PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap Factory slot

Sump/End Cap: 0.14 ft

Backfill Material: None

Abandonment:

Date: 6/15/09

Procedure: Natural fill Grouted Bentonite

Casing Removed

Completed as Well NA

Shaw

Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC

All elevations are referenced to MSL (NAVD 88).

If completed as well - see well construction diagram.

HTRW DRILLING LOG

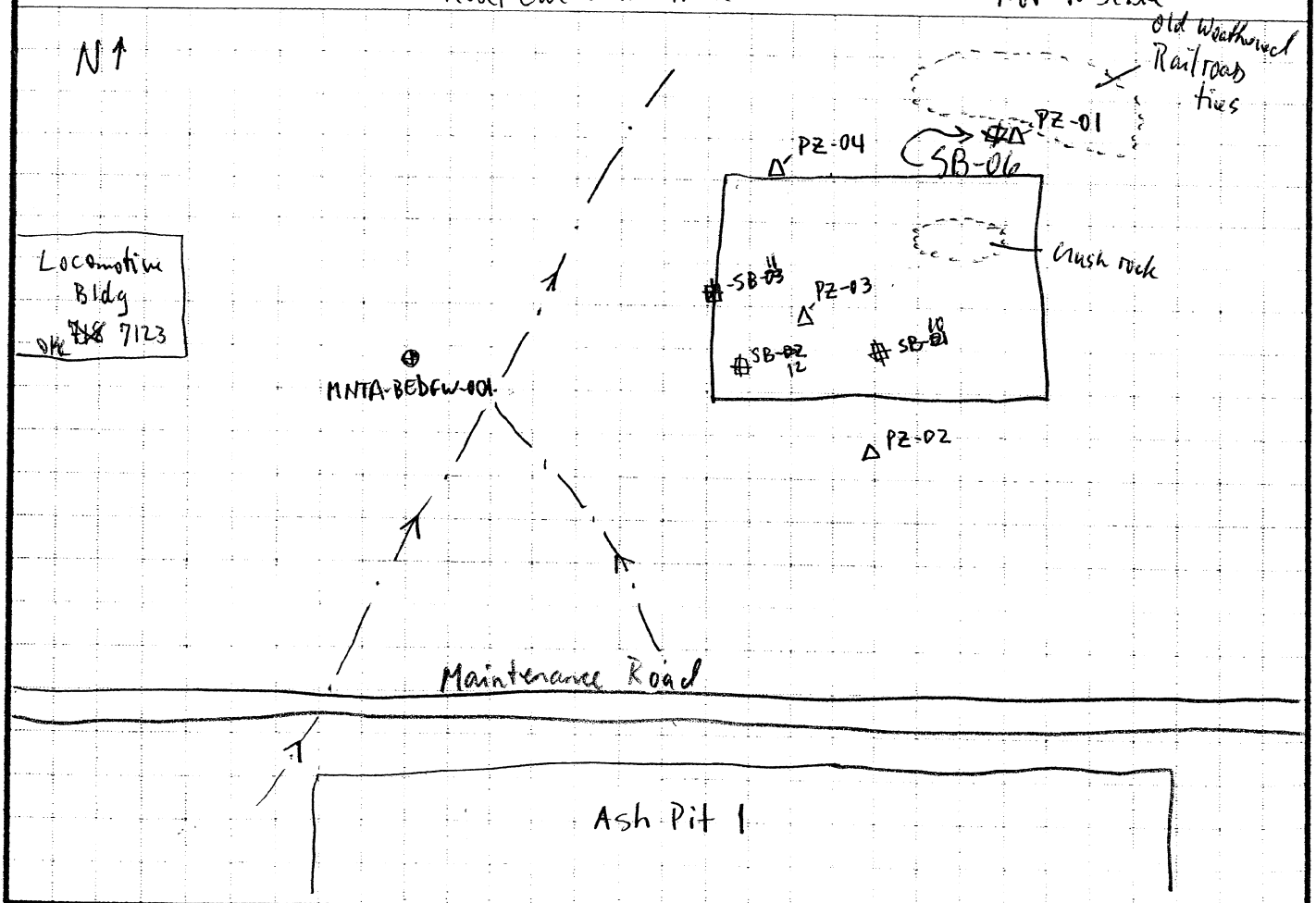
COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: SB-06
	2. DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS

3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER: Jimmy Griffith	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	8. HOLE LOCATION: See Sketch
	9. SURFACE ELEVATION: 6354 ft Northing: 623882.09 Easting: 1918943.02
	10. DATE STARTED: 1/20/09 11. DATE COMPLETED: 1/20/09
12. OVERBURDEN THICKNESS: Unknown	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered
13. DEPTH DRILLED INTO ROCK: -0-	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~11.36 ft 1/31/09 DKC~~ —
14. TOTAL DEPTH OF HOLE: 10 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	~~NA~~ yes	yes	Nitros	SVOCs	PCBs	NA %
22. DISPOSITION OF HOLE	**BACKFILLED**	**MONITORING WELL**	**OTHER (SPECIFY)**	**23. SIGNATURE OF INSPECTOR**		
	yes	NA	NA	David Kessler for E. Weaver		

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	SB-06

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB-06

Project: PBOW

Geologist: B. Weemer

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Black (10YR 2/1) very fine grain SAND with silt, loose, moist noted organics (grass, roots), noted cinders.	SP		NA	LBA 0018 1550	2.8'/5'	Began drilling 1/20/09
	1	1.2'				1'		S-1 (0-5') 1550
		Dark yellowish brown (10YR 4/6) very fine grain SAND, loose, moist.						
	2	2.3'						
		Yellowish brown (10YR 5/6) SILT trace fine grain sand, stiff, moist mottled gray approximately 30%						
	3					3'		
						LBA 0019 1553		3'-5' sample collected from a discrete push to obtain sufficient soil.
	4							
	5					5'		
							3.9'/5'	S-2 (5-10') 1555
	6							
	7	- grading to brown (10YR 4/3)				6.9' LBA 0020 LBA 0021 LBA 0022 1555		
	8	- grading to with clay						
	9					8.9'		
	10	10'				10		

Project: PBOW Boring Completed @ 10'

Total Depth 10'

Hole Number: SB-06

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HTRW DRILLING LOG

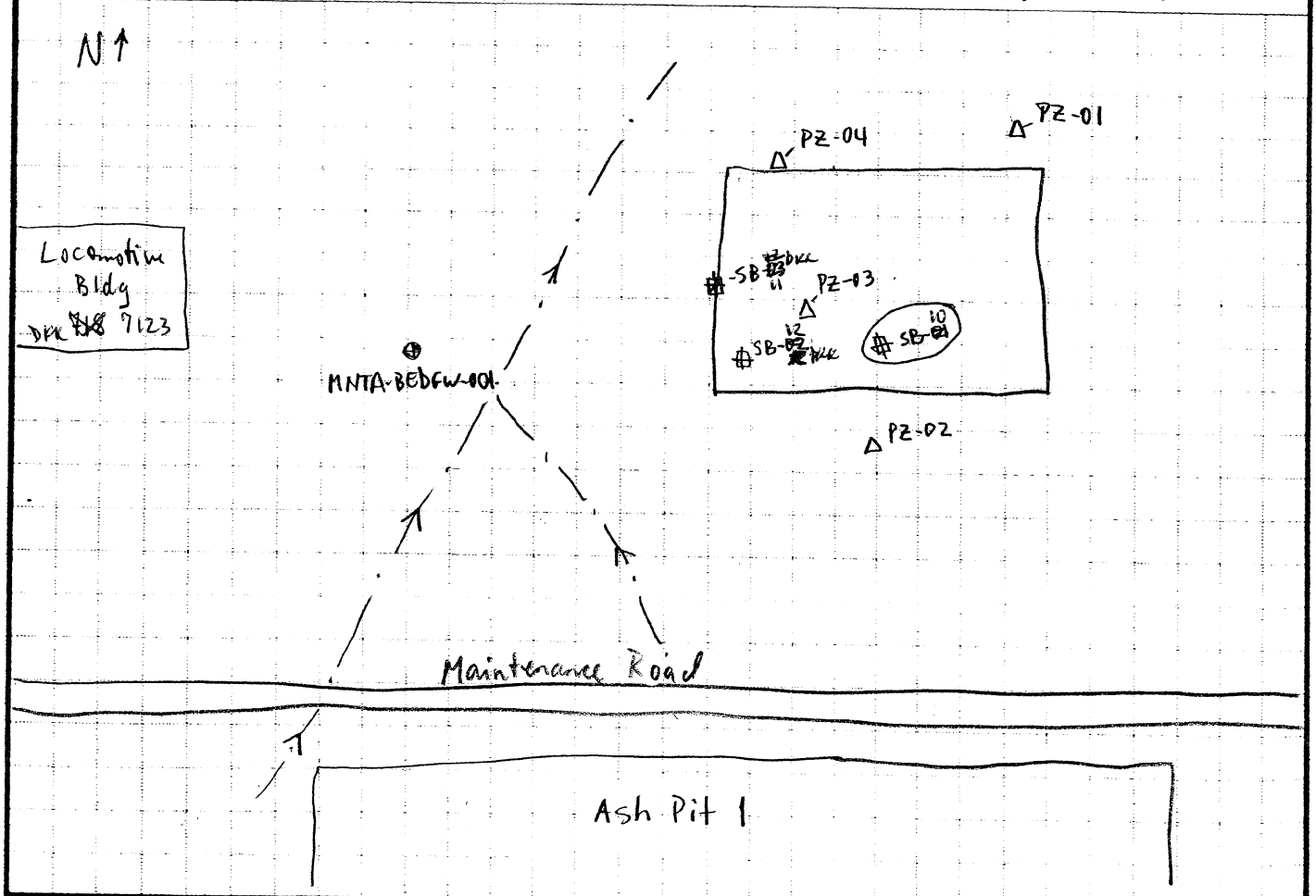
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: SD-10
	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Jimmy Griffith	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 637.58 ft; Northing: 623800.27; Easting: 1918892.60	
	10 DATE STARTED: 1/19/09	11 DATE COMPLETED: 1/19/09
12 OVERBURDEN THICKNESS: Unknown	15 DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ NE	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 10 ft	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	yes	Nitros/VOCs	SVOCs	PCBs	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	SB-10

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB-10

Project: PBOW

Geologist: E. Weaver

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	0–1	Very dark brown (10YR 2/2) very fine grain SAND with silt, rated organics, (grass, roots) moist, loose.	SP		NA	LBA0026 1010 LBA0027 LBA0028	4.4'/5'	Began drilling 1/19/09 S-1 (0-5') 1010
	1–2							
	2–3							
	3–4					3 LBA0029 1013		
	4	- grading to yellowish brown (10YR 5/6)						
	5	- grading to mottled yellowish brown with gray approximately 20%				5'		
	5–8						4.5'/5'	S-2 (5-10') 1015
	6							
	7							
	8					8' LBA0030 1015		
	9	Dark yellowish brown (10YR 4/4) silty CLAY, low plasticity, stiff, moist.	cl					
	10					10'		

Project: PBOW

Hole Number: SB-10

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HTRW DRILLING LOG

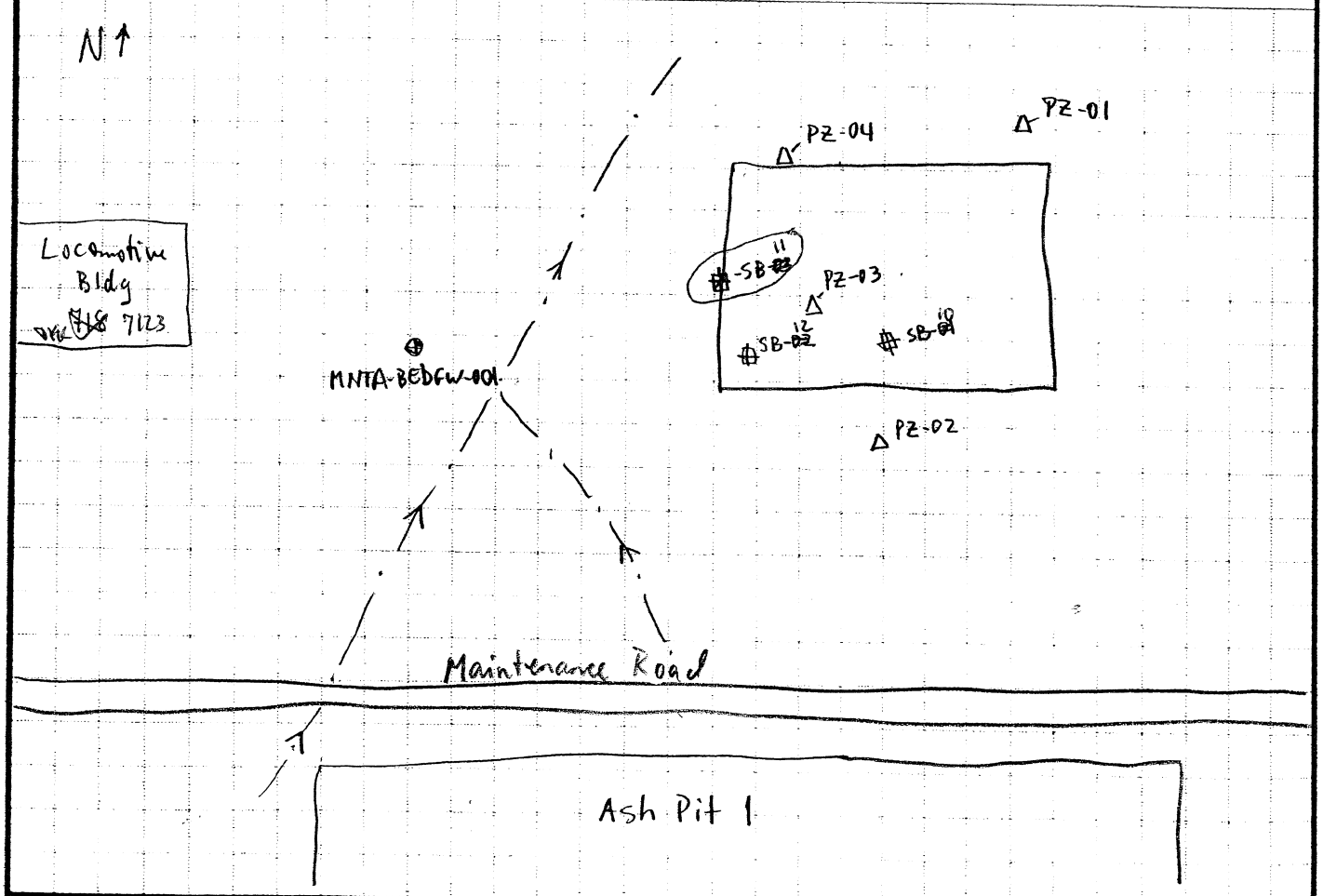
1. COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: SB-11
	2. DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS
3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH	
5. NAME OF DRILLER: Jimmy Griffith	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	8. HOLE LOCATION: See Sketch	
	9. SURFACE ELEVATION: 635.39 ft	Northing: 623823.32 Easting: 1918836.69
	10. DATE STARTED: 1/19/09	11. DATE COMPLETED: 1/19/09
12. OVERBURDEN THICKNESS: unknown	15. DEPTH GROUNDWATER ENCOUNTERED: ~~DRY~~ NE	
13. DEPTH DRILLED INTO ROCK: -0-	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10 Ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	yes	Nitros/VOCs	SVOCs	PCBs	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes	NA	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	SB-11

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB-11

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		10YR 3/3 Fill (Dark brown very fine grain sand loose, moist, noted organics (roots). 0.9			NA	0.9	3.8'/5	Began drilling 1/19/09 0-5 S-1 0955
	1	Black (10YR 2/1) very fine grain SAND with silt, loose, moist.	SP			LBA0031 0955 1.9		
	2	- grading to yellowish brown (10YR 5/6)						
	3							Pushed discrete sample from 3'-5'
	4					3.9 LBA0032 LBA0032MS LBA0032MSD		
	5	Dark yellowish brown (10YR 4/4) silty CLAY, moist, stiff, low plasticity, with very fine grain sand.	cl			0957 5.9	5'/5	S-2 S-10 1000
	6							
	7	▽						
		Dark yellowish brown (10YR 4/6) clayey SAND, wet, loose,	SP			8' LBA0033		
	8							
		Dark yellowish brown (10YR 4/4) silty CLAY, moist, stiff, low plasticity, with very fine grain sand.	cl			1000		
	9							
	10'					10'		

Project: PBOW Boring Completed @ 10' | Hole Number: SB-11

Total Depth 10'

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HTRW DRILLING LOG

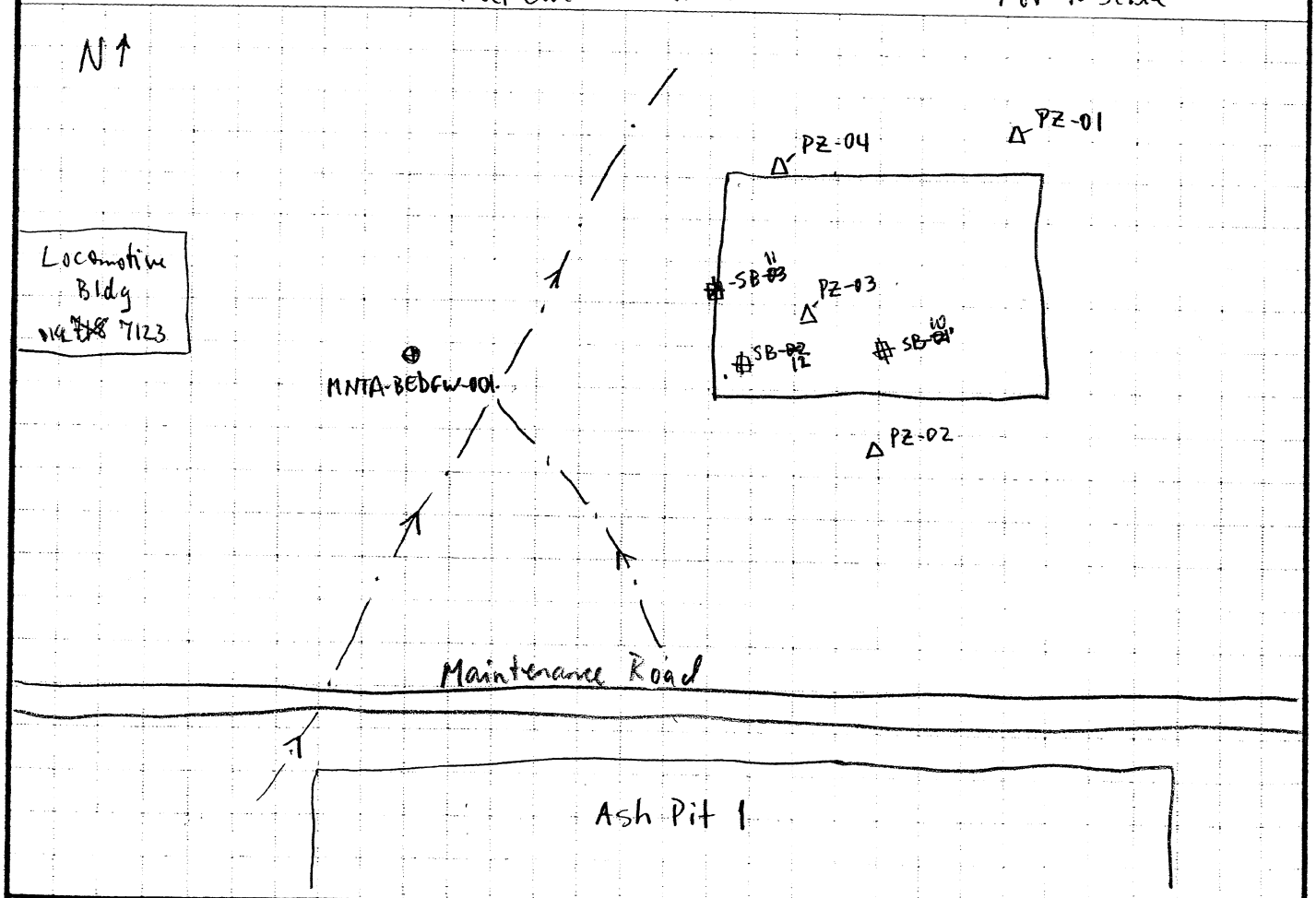
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: SB-12
3 PROJECT: PBOW	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 2 SHEETS
5 NAME OF DRILLER: Jimmy Griffith	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics, Drove 2-inch macrocore with 5-ft long acetate liners.	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 637.46 ft	Northing: 623790.87 Easting: 1918845.66
	10 DATE STARTED: 1/19/09	11 DATE COMPLETED: 1/19/09
12 OVERBURDEN THICKNESS: Unknown	15 DEPTH GROUNDWATER ENCOUNTERED: ~~DRY~~ NE	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 10'	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA					NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
		NA		E. W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT: PBOW HOLE NO. SB-12

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: SB-12

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Black (10YR 2/1) very fine grain sand ~~with silt~~ ev. noted roots, loose, moist.	SP		NA	LBA0034 0-1 935	3.9'/5'	Began drilling 1/19/09 0-5 5-1 935
	1					1'		
	2							
	3					3'		
		- grading to a dark yellowish brown (10YR 3/4)				3-3.9 LBA0035 937 3.9		
	4							
	5						5'/5'	5-2 5-10 940
	6							
	7	7'						
		Dark brown (10YR 3/3) silty CLAY, stiff, moist, trace very fine grain to fine grain sand.	CL					
	8					9'		
						9-10' 940 LBA0036		
	9							
	10	Boring Completed @ 10' 10'				10'		

Project: PBOW | Hole Number: SB-12

Total Depth 10'

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HTRW DRILLING LOG

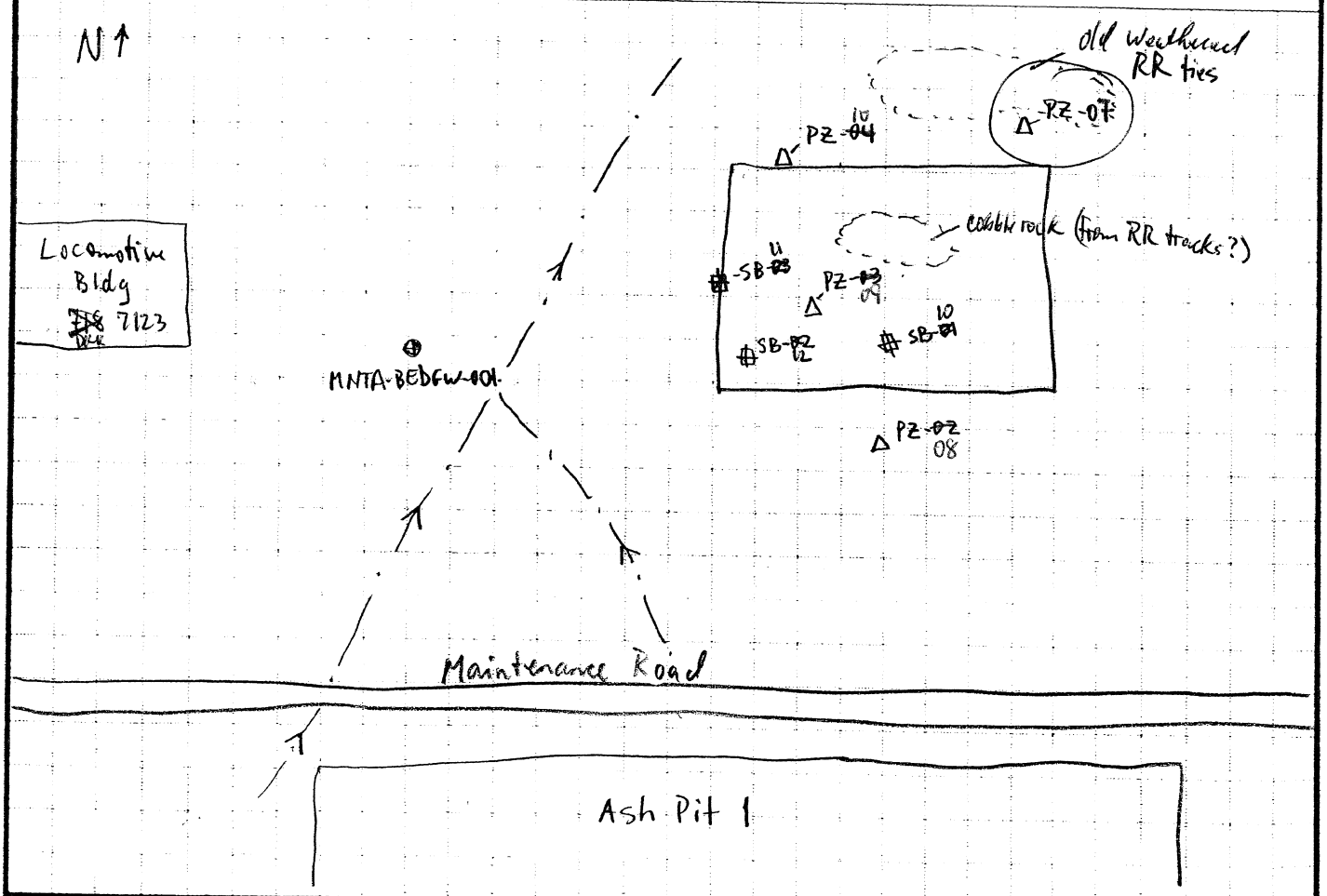
1. COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: PZ ~~01~~ 07 HRJ
	2. DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 4 SHEETS
3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH	
5. NAME OF DRILLER: Jimmy Griffith	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	8. HOLE LOCATION: See Sketch	
	9. SURFACE ELEVATION: 635.4 ft	Northing: 623882.09 Easting: 1918943.02
	10. DATE STARTED: 1/18/09	11. DATE COMPLETED: 1/18/09
12. OVERBURDEN THICKNESS: 22.5	15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered	
13. DEPTH DRILLED INTO ROCK: -0-	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 22.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA				NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	NA	1" Piezo	[signature]

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT: PBOW HOLE NO. PZ07

07

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ ~~01~~ 07

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		~~Fill~~ EW (Silt, gravel, wood fragments). Black (10YR 2/1) loose 1'		0-1' 1.1	NA		3.7'/5'	Began drilling 1/18/09 1505 S-1 Creosote odor from nearby railroad ties. (0-1'-1.1)
	1	SAND (10YR 5/6) ~~fine~~ yellowish brown, loose very fine grain - moist, 2.5'	SP	0.5				
	2							
	3	SILTY CLAY (10YR 4/2) dark grayish brown, moist ~~low plasticity~~ EW	~~CH~~ CL	1.1				
	4							
	5						4.4'/5'	S-2 1510 (~~10-15'~~) (5-10')
	6							
	7			0.0				
	8	color change to: silt absent 8.5'						
	9	CLAY (10YR 4/1) dark gray, low plasticity, moist	~~CH~~ CL					
	10							

Project: PBOW | Hole Number: PZ 07

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ ~~01~~ 07 MW

Project: PBOW | Geologist: E. Weaver | Sheet 3 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	CLAY, (10YR 4/1) dark gray, low plasticity, moist	cl		NA	NA	4.5'/5'	S-3 1515
	11			0.1				
	12							
	13							
	14							
	15						5'/5'	S-4 1520
	16			0.0				
	17	16.8'-17' Brown silty SAND lens grading to include shale fragments, coarse grain to pebble size, angular	SP / cl					
	18							
	19							
	20							

Project: PBOW | Hole Number: PZ 07

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07

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-07 MW

Project: PBOW

Geologist: E. Weaver

Sheet 4 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	20	CLAY, (10YR 4/1) dark gray, low plasticity, dry	cl	0.1	NA	NA	2.5'/2.5'	S-4 1530
	21	Shale fragments 5%						
	22							
	23	Refusal @ 22.5' Total Depth 22.5'						
	24							
	25							
	26							
	27							
	28							
	29							
	30							

Project: PBOW

Hole Number: PZ 07

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Temporary Piezometer

Project:	PDOW	Piezometer Number:	PZ-01 07
Location:	Sandusky, Ohio	Site Location:	Rail Car Wash Area
Client:	USACE, Nashville, TN	Installation Date	1/18/09
Subcontractor:	Tri-State Drilling	Northing:	623882.09
Driller:	Jimmy Griffith	Easting:	1918943.02
Shaw Field Representative:	DAVID Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 638.10

Top of Casing Stickup (ft): 2.7'

Land Surface Elevation (ft): 635.4

Approximate Diameter of Borehole (in): 3½"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: Not encountered

Date: 1/18/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 2.30

Bottom of Screen Interval (ft): 22.30

Bottom of Piezometer (ft): 22.55

Bottom of Borehole (ft): 22.5'

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing

Manufacturer: DSI

Type: 1" PVC

Diameter (in): 1"

Well Screen Casing

Manufacturer: DSI

Type: PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap (Factory slot)

Sump/End Cap: 0.25' ~~0.14'~~ DEC

Backfill Material: None

Abandonment:

Date: 6/17/09

Procedure: Natural fill Grouted (Bentonite) (Casing Removed)

Completed as Well: NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

If completed as well - see well construction diagram

RCWA 08

HTRW DRILLING LOG

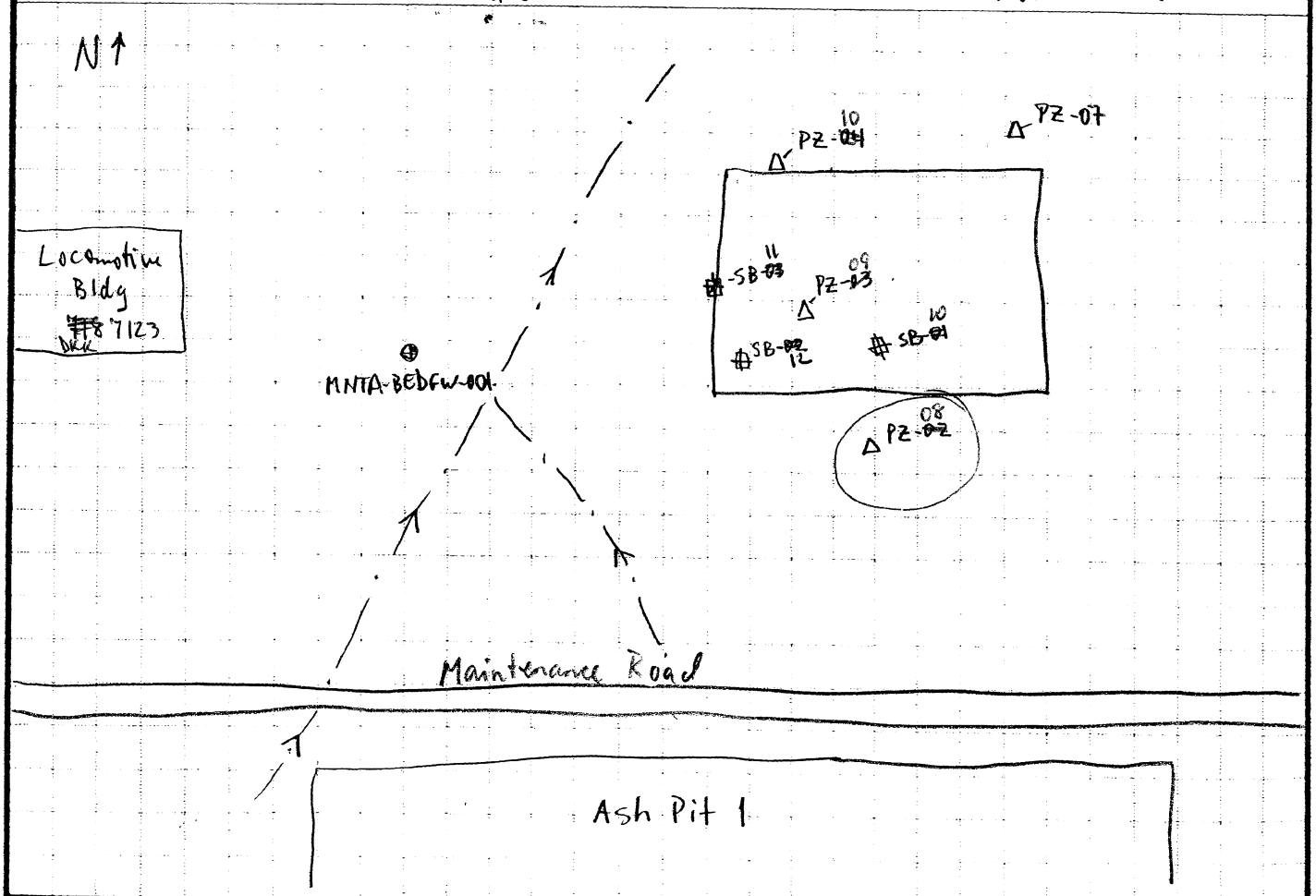
DISTRICT	Nashville, TN
HOLE NUMBER	PZ-~~02~~ 08
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	Tri-State Drilling
SHEET / SHEETS	1 OF 3
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Jimmy Griffith
6 MANUFACTURER'S DESIGNATION OF DRILL	Geoprobe 6610 DT
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	638.1 ft — Northing: 623757.23, Easting: 1918888.90
10 DATE STARTED	1/18/09
11 DATE COMPLETED	1/18/09
12 OVERBURDEN THICKNESS	~~NA~~ 19.5 ft
15 DEPTH GROUNDWATER ENCOUNTERED	≈15'
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14 TOTAL DEPTH OF HOLE	19.5 ft
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA					NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
		NA		L. W. Weaver

LOCATION SKETCH/COMMENTS Rail Car Wash Area SCALE Not to Scale



PROJECT	HOLE NO.
PBOW	PZ-~~07~~ 08

RCWA

Shaw
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HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-02 08 MS

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	1	Fill (medium stiff (10YR 5/6) yellowish brown, mottled (brown black gray) SILT, organics (roots, leaves) 1.5	ML	N/A	NA	NA	3.5'/5'	Began drilling 1/18/09 1410 S-1
	2	Fill (loose 10YR 3/4) dark yellowish brown, very fine grain Sand 2.8'	SP					
	3	Native Soil, loose (10YR 2/1) black SILT (organics, roots)	ML					
	4							
	5	5						
	6	SILT (medium stiff) 10YR 4/6 dark yellowish brown, mottled (brown gray black)					4.1'/5'	S-2 1415
		EW						
	7	_ grading to SANDY SILT						
	8							
	9							
	10							

Project: PBOW | Hole Number: PZ 02 8 DMK

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RCWA 08

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-02 ~~PZ-08~~

Project: PBOW

Geologist: E. Weaver

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10			N/A	NA	N/A	4.3'/5'	S-3 1420
	11							
	12							
	13	13 CLAY 10YR 4/1 dark gray very stiff, homogeneous Little ~5% shale fragments coarse grain pebble size high plasticity wet	CH					
	14							
	15						5'/5'	S-4 1430
	16							
	17							
	18							
	19	19.5'						
	20	Refusal @ 19.5' Total depth 19.5'						

Project: PBOW

Hole Number: PZ-08

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ 02
Location:	Sandusky, Ohio	Site Location:	Rail Car Wash Area
Client:	USACE, Nashville, TN	Installation Date	1/18/09
Subcontractor:	Tri-State Drilling	Northing:	623757.23
Driller:	Jimmy Griffith	Easting:	1918888.90
Shaw Field Representative:	DAVID Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 641.18

Top of Casing Stickup (ft): 3.1

Land Surface Elevation (ft): 638.1

Approximate Diameter of Borehole (in): 3½"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: 15'

Date: 1-18-09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft) NA

Top of Screen Interval (ft): 9.40

Bottom of Screen Interval (ft): 19.40

Bottom of Piezometer (ft): 19.65

Bottom of Borehole (ft): 19.5

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: 1" PVC

Diameter (in): 1"

Well Screen Casing

Manufacturer: DSI

Type: PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap Factory slot

Sump/End Cap: ~~0.14'~~ EW 0.25'

Backfill Material: None

Abandonment:

Date: 6/18/09

Procedure: Natural fill Grouted Bentonite

Casing Removed

Completed as Well NA

Shaw

Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

If completed as well - see well construction diagram.

HTRW DRILLING LOG

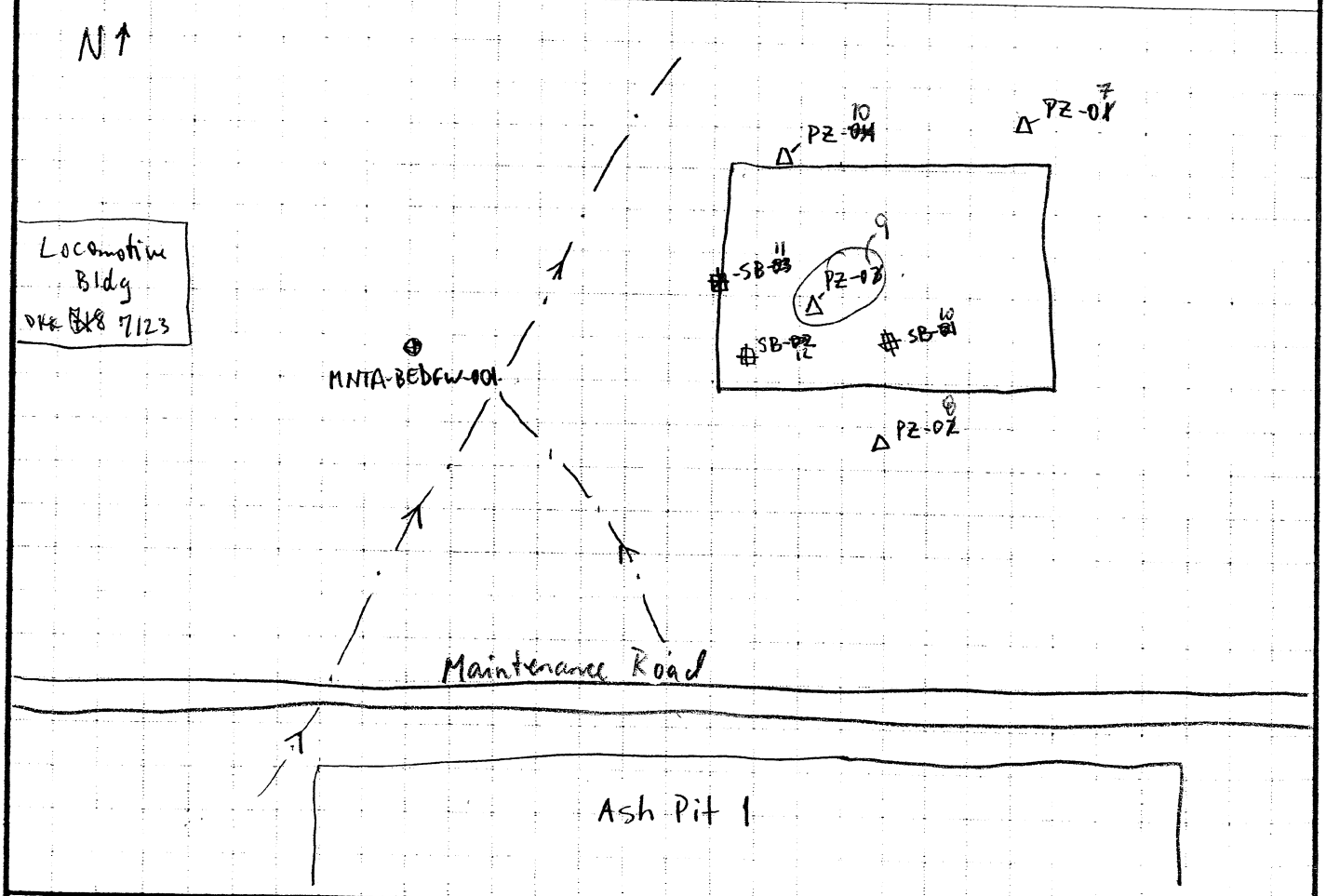
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: PZ-~~03~~ 09
3 PROJECT: PBOW	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 3 SHEETS
5 NAME OF DRILLER: Jimmy Griffith	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 636.5 ft	Northing: 623 812.43 Easting: 1918 868.73
	10 DATE STARTED: 1/19/09	11 DATE COMPLETED: 1/19/09
12 OVERBURDEN THICKNESS: 19.9	15 DEPTH GROUNDWATER ENCOUNTERED: Not encountered	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 19.9	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	NA				NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA	NA	1" Piezo	Erik W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	PZ 0~~3~~9 DKK

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-03 09

Project: PBOW

Geologist: Erik Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	1	Very dark brown (10YR 2/2), very fine grain Sand, ~~trace~~ with EW silt, loose, moist, noted organics (roots)	SP		NA	NA	3.5'/5'	Began drilling 1/8/09 0-5 S-1 840
	2	2.0' Yellowish brown (10YR 5/6) silty CLAY with ~~sand~~ EW very fine grain sand, moist, stiff, mottled (yellowish brown, gray) 15%.	CL					
	3							
	4							
	5						5'/5'	S-2 845 5-10
	6							
	7	- Sand content decreases with depth, to no sand at 8.5'						
	8							
	9							
	10							

Project: PBOW

Hole Number: PZ 0~~3~~9

SKL

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Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-03 09 MW

Project: PBOW

Geologist: E. W. Weaver

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10				NA	NA	5'/5'	S-3 10-15 850
	11	Dark gray (10YR 4/1) CLAY moist, stiff to very stiff, noted shale fragments (fine to coarse) approximately 1% low plasticity	CH					
	12							
	13							
	14	- plasticity increases with depth						
	15						2.5'/4.9'	S-4 15-19.9 900
	16	- shale content increase to approximately 10%						
	17							
	18							
	19							
	20	19.9'						

Refusal @ 19.9'

Project: PBOW

Total depth 19.9'

Hole Number: PZ 03 09

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Temporary Piezometer

Project	PBOW	Piezometer Number	PZ-03 09
Location	Sandusky, Ohio	Site Location	Rail Car Wash Area
Client	USACE, Nashville, TN	Installation Date	1/19/09
Subcontractor	Tri-State Drilling	Northing	623812.43
Driller	Jimmy Griffith	Easting	1918868.73
Shaw Field Representative	DAVID Kessler	Shaw Project Number	133767

Top of Casing Elevation (ft): 639.85

Top of Casing Stickup (ft): 3.4

Land Surface Elevation (ft): 636.5

Approximate Diameter of Borehole (in): 3½"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: Not Encountered

Date: 1/19/09

Post Development: NA TOC

Date: NA

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 9.00

Bottom of Screen Interval (ft): 19.00

Bottom of Piezometer (ft): 19.14

Bottom of Borehole (ft): 19.9

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing

Manufacturer: DSI

Type: 1" PVC

Diameter (in): 1"

Well Screen Casing

Manufacturer: DSI

Type: PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap Factory slot

Sump/End Cap: 0.14'

Backfill Material: None

Abandonment

Date: 6/18/09

Procedure: Natural fill Grouted Bentonite Casing Removed

Completed as Well: NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88)

If completed as well - see well construction diagram.

HTRW DRILLING LOG

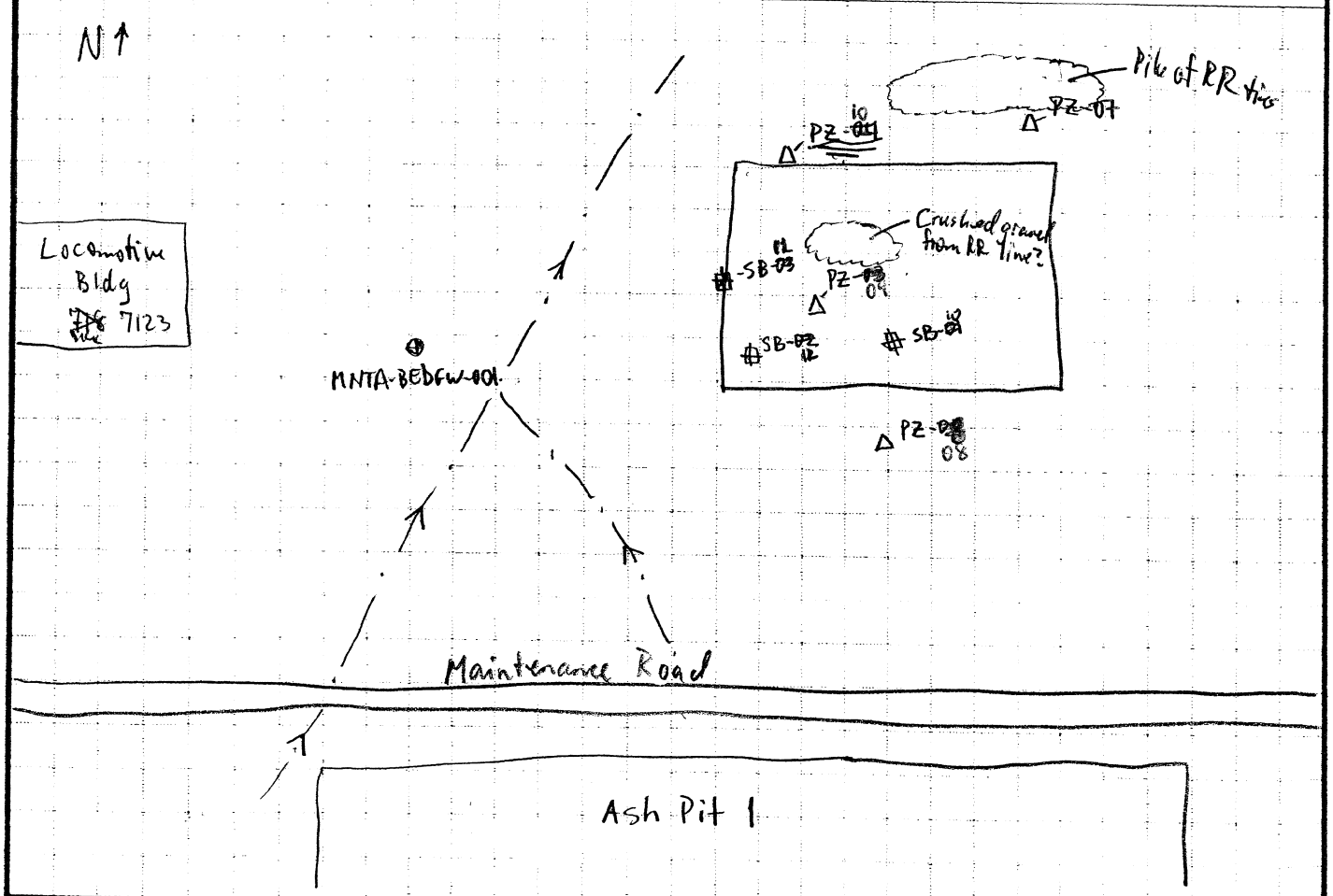
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: PZ-~~04~~ 10
3 PROJECT: PBOW	2 DRILL SUBCONTRACTOR: Tri-State Drilling	SHEET 1 OF 4 SHEETS
5 NAME OF DRILLER: Jimmy Griffith	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Surface and Subsurface initially cleared with geophysics. Drove 2-inch macrocore with 5-ft long acetate liners.	6 MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 6610 DT	
	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 634.4 ft	Northing: 623890.97 Easting: 1918863.20
	10 DATE STARTED: 1/18/09	11 DATE COMPLETED: 1/18/09
12 OVERBURDEN THICKNESS: 22.9 ft	15 DEPTH GROUNDWATER ENCOUNTERED: NA	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 22.9 ft	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA	NA	1" Piezo	Eric W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area SCALE: Not to Scale



PROJECT: PBOW HOLE NO. PZ-~~04~~ 10

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-~~04~~ 10 MW

Project: PBOW

Geologist: Emily W. Weaver

Sheet 2 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Black ASH, loose, noted organics 1.0'	X		NA	NA	4.2'/5'	Began drilling 1/18/09 1605 (0-5') S-1
	1	Brown silty CLAY (10YR 4/3) stiff, noted organics (roots), noted dark brown to black unknown material (very fine grain) from 1' to 4.2'. low plasticity	cl					
	2							
	3							
	4							
	5						5'/5'	S-2 1610 (5-10')
	6							
	7							
	8							
	9	Grading to dark gray (10YR 4/1) ~~Color~~ EW at 9.8', noted shale fragments approximately 2%.						
	10							

Project: PBOW

Hole Number: PZ-~~04~~ DEK 10

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Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-04 10

Project: PBOW

Geologist: Eric W. Weaver

Sheet 3 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	Dark gray silty CLAY (10YR 4/1) stiff, low plasticity, noted shale fragments approximately 2%.			NA	NA	4.1/5'	S-3 1615 (10-15')
	11							
	12							
	13							
	14							
	15	15.0'						
	15	Dark gray CLAY (10YR 4/1) stiff, high plasticity, noted shale fragments approximately 2%. -plasticity decreasing with depth -thin mudstone layer at 16.8'-16.9' -thin shale layer at 17.3-17.4' -shale content increasing with depth to approximately 5%	CH				3.3'/5'	S-4 1625 (15-20')
	16							
	17							
	18							
	19							
	20							

Project: PBOW

Hole Number: PZ-04 10

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Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: PZ-~~04~~ 10 MW

Project: PBOW

Geologist: Eric W. Weaver

Sheet 4 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	20	Dark gray CLAY (10YR 4/1), stiff, noted shale fragments approximately 5%.			NA	NA	2.9'/2.9'	S-4 1635 (20-22.9')
	21							
	22							
	23	22.9' Refusal @ 22.9 Ft Total Depth = 22.9 Ft						
	24							
	25							
	26							
	27							
	28							
	29							
	30							

Project: PBOW

Hole Number: PZ-~~04~~ DMW 10

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Temporary Piezometer

Project:	PBOW	Piezometer Number:	PZ-04 10 µm
Location:	Sandusky, Ohio	Site Location:	Rail Car Wash Area
Client:	USACE, Nashville, TN	Installation Date	1/18/09
Subcontractor:	Tri-State Drilling	Northing:	623890.97
Driller:	Jimmy Griffith	Easting:	1918843.20
Shaw Field Representative:	DAVID Kessler	Shaw Project Number:	133767

Top of Casing Elevation (ft): 634.24

Top of Casing Stickup (ft): 2.0

Land Surface Elevation (ft): 634.4

Approximate Diameter of Borehole (in): 3½"

Well Casing Diameter (in): 1"

Depth to Water (ft):

During Drilling: NA

Date: —

Post Development: — TOC

Date: —

Top of Filter Pack (ft): NA

Top of Screen Interval (ft): 3.0

Bottom of Screen Interval (ft): 23.0

Bottom of Piezometer (ft): 23.14

Bottom of Borehole (ft): 22.9 ft

Filter Pack Material: None

Manufacturer:

Product Name:

Size:

Installation: ~~Prepacked Screen~~ Filter Sock

Well Casing:

Manufacturer: DSI

Type: 1" PVC

Diameter (in): 1"

Well Screen Casing:

Manufacturer: DSI

Type: PVC

Slot Size (in): 0.010 %Open

Slot Type: Continuous wrap (Factory slot)

Sump/End Cap: 0.14'

Backfill Material: None

Abandonment:

Date: 6/17/09

Procedure: Natural fill Grouted (Bentonite) (Casing Removed)

Completed as Well: NA

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88)

If completed as well - see well construction diagram.

HTRW DRILLING LOG

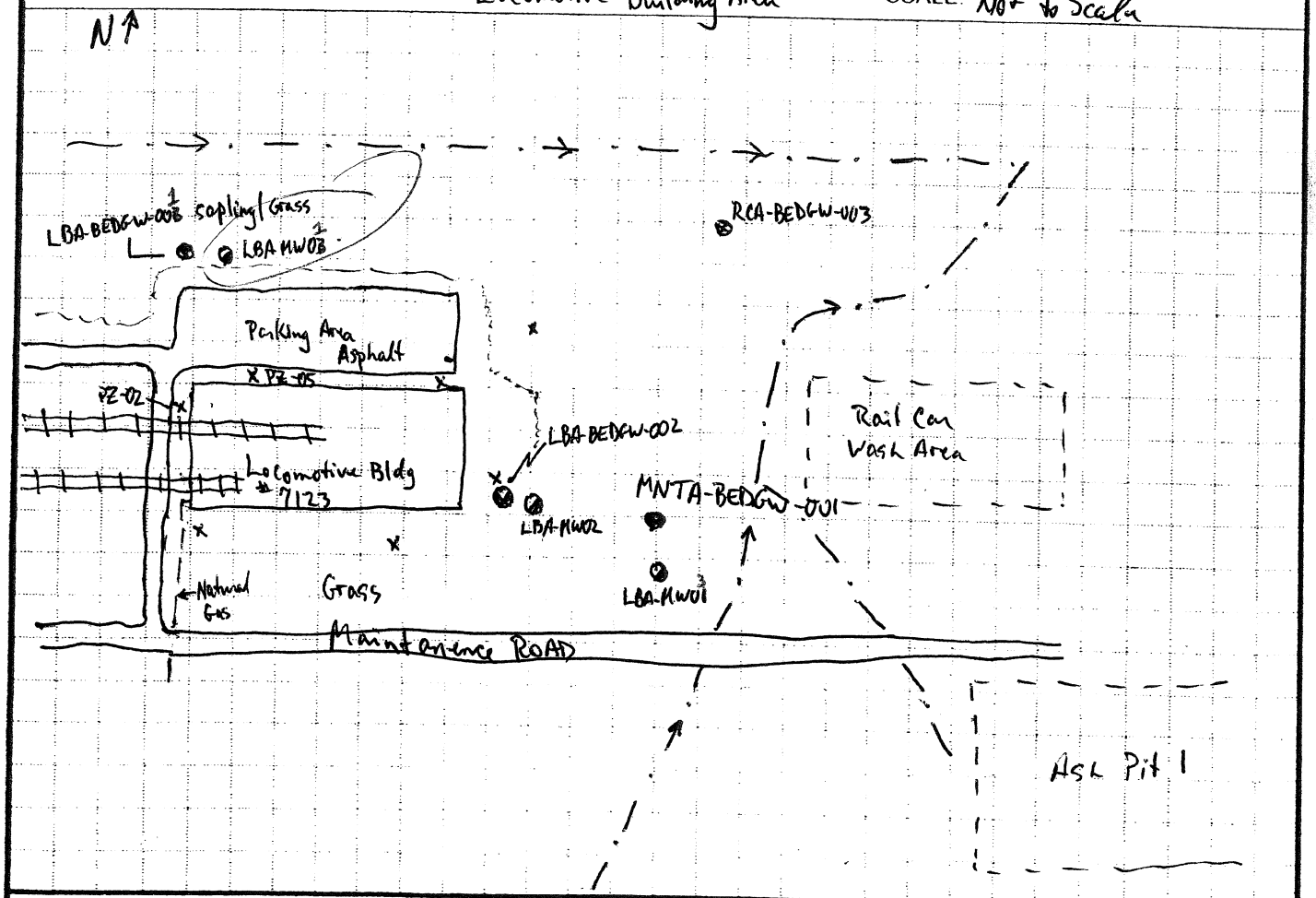
1 COMPANY NAME	Shaw E+I
DISTRICT	Nashville, TN
HOLE NUMBER	LBA-MW01
2 DRILL SUBCONTRACTOR	AE Drilling
SHEET / SHEETS	1 OF 3
3. PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Tom Burnette
6 MANUFACTURER'S DESIGNATION OF DRILL	All terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post-hole dug first 5 ft. Auger to 17' bgs with 3.25" HSA.
8 HOLE LOCATION	Locomotive Building Area
9 SURFACE ELEVATION	637.2 ft; Northing 623937.12, Easting 1918462.09
10. DATE STARTED	3-31-09
11 DATE COMPLETED	4/14/09
12. OVERBURDEN THICKNESS	Unknown
15 DEPTH GROUNDWATER ENCOUNTERED	≈8' bgs cuttings wet
13. DEPTH DRILLED INTO ROCK	0
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	5.32 ft (TOC) 4/16/09
14 TOTAL DEPTH OF HOLE	17'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	L. W. Weaver

LOCATION SKETCH/COMMENTS Locomotive Building Area SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	LBA-MW01

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-MW01

Project: PBOW

Geologist: E. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		See boring log for LBA-BEDGW-001 for soil descriptions.			NA	NA	NA	Posthole dig to 5' bgs.
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							Auger cuttings wet at 8' bgs
	9							
	10							

Project: PBOW

Hole Number: LBA-MW01

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-MW01

Project: PBOW

Geologist: E. Weaver

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
					NA	NA	NA	
	11							
	12							
	13							
	14							
	15							
	16							
	17	Boring Completed Monitor Well Installed at ~~16'~~ 17' BKK Total Depth = ~~16~~ 17 ft BKK						
	18							
	19							
	20							

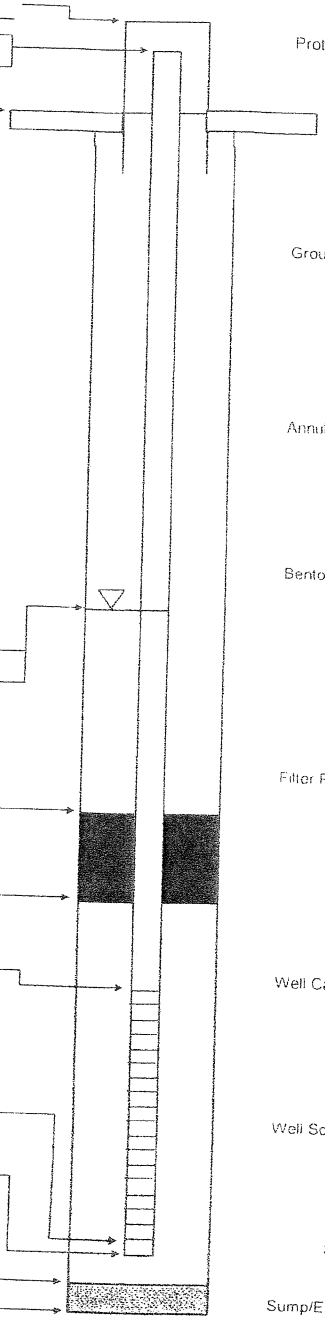
Project: PBOW

Hole Number: LBA-MW01

Monitoring Well Construction Form

Project:	PBAW	Well Number:	LBA-MW02
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Locomotive Building Area
Client:	USACE - Nashville, TN	Installation Date	3-31-09
Subcontractor:	A.E. Drilling	Northing:	623937.12
Driller:	Tom Burnett	Easting:	1918462.09
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project #- 133767



Protective Cover Elevation (ft): 640.35

Top of Casing Elv. (ft): 639.86

Top of Casing Stickup (ft): 2.42'

Land Surface Elv. (ft): 637.2

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft)
- During Drilling: ~8'
- Date: 3-31-09
- Post Development: — TOC
- Date: —

Top of Bentonite Seal (ft): 4.0'

Top of Filter Pack (ft): 5.0'

Top of Screen Interval (ft): 6.0'

Bottom of Screen Interval (ft): 16.0'

Bottom of Well (ft): 16.35'

Bottom of Filter Pack (ft): 17.0'

Bottom of Borehole (ft): 17.0'

Protective Casing
- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4- concrete filled

Ground Seal (Surface Pad)
- Dimensions: 4' x 4' x 4"
- Type: Concrete

Annular Space Seal
- Type: Bentonite-Cement Grout
- Installation: (Gravity) Tremie Pumped

Bentonite Seal
- Manufacturer: Haliburton
- Type: Pellets Slurry (chips)
- Installation: 6-in lifts (One Section) Gravity Tremie Pumped
- Hydration time (hrs): >1 hr

Filter Pack Material
- Manufacturer: Global Drilling Supplies
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3.25 ft^3 (6.5-bags)
- Installation: Gravity (Tremie)

Well Casing
- Manufacturer: Campbell/Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing
- Manufacturer: Campbell Monoflex
- Type: PVC
- Slot Size (in): .010 %Open
- Slot Type: Continuous wrap (factory slot)
- Sump/End Cap: 0.35

Backfill Material: None

Shaw
Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

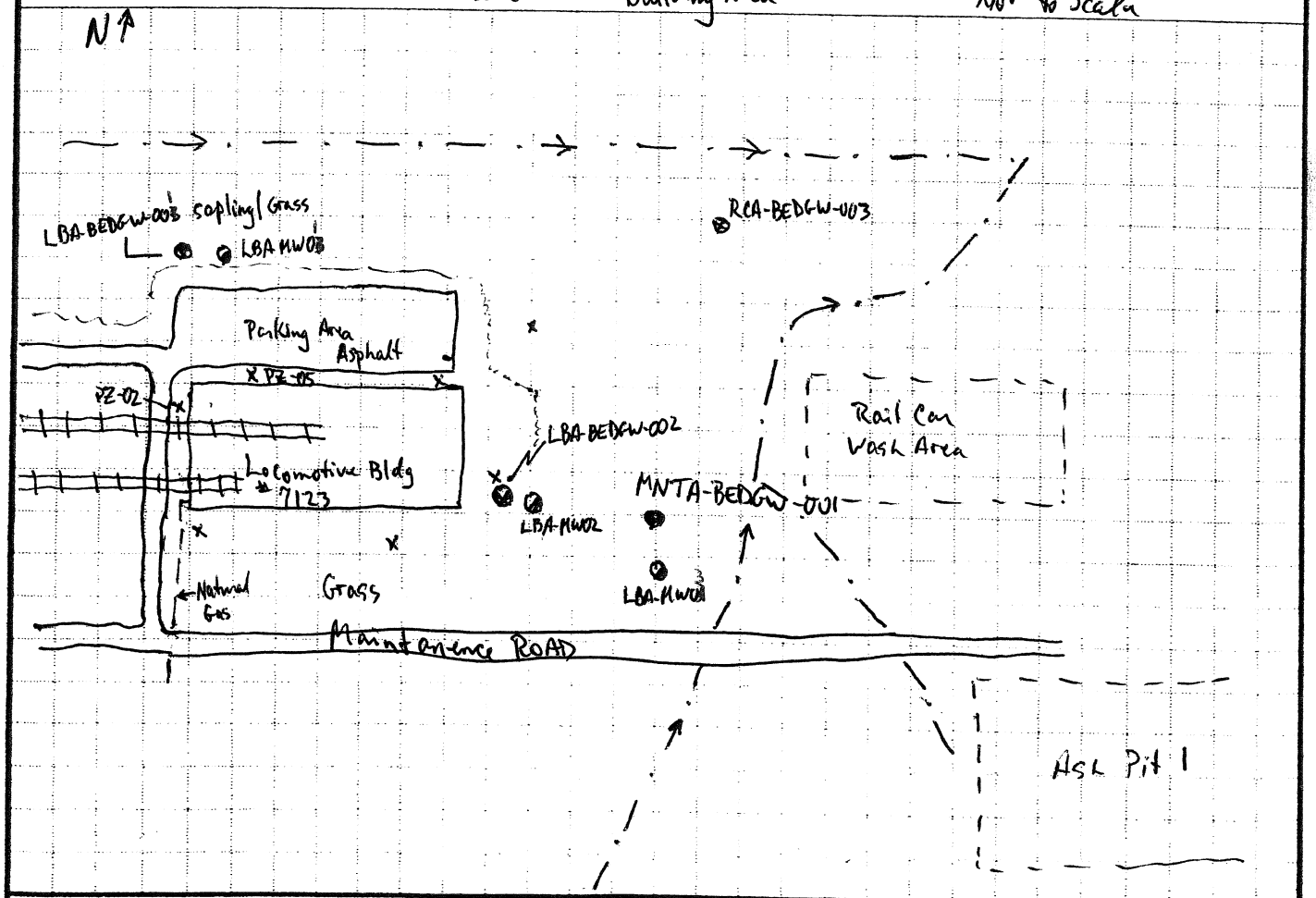
DISTRICT	Nashville, TN
HOLE NUMBER	LBA-MW02
SHEET / SHEETS	1 OF 3
1. COMPANY NAME	Shaw E+I
2. DRILL SUBCONTRACTOR	A E Drilling
3. PROJECT	PBOW
4. LOCATION	NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER	Tom Burrinette
6. MANUFACTURER'S DESIGNATION OF DRILL	All terrain CME-750
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Augered to 17' bgs with 8.25" OD HSA.
8. HOLE LOCATION	Locomotive Building Area
9. SURFACE ELEVATION	635.9 ft — Northing: 623827.48, Easting: 1918628.33
10. DATE STARTED	3-31-09
11. DATE COMPLETED	4/14/09
12. OVERBURDEN THICKNESS	unknown
13. DEPTH DRILLED INTO ROCK	0
14. TOTAL DEPTH OF HOLE	17.0'
15. DEPTH GROUNDWATER ENCOUNTERED	~6 ft overburden
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	NA	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS — Locomotive Building Area — SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	LBA-MW02

Shaw
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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-MW02

Project: PBOW

Geologist: R. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		See boring log for LBA-BEDGW-002 for description of soils.			NA	NA	NA	Post hole dug to 5' bgs
	1							
	2							
	3							
	4							
	5							
	6	- Cuttings wet at 6' bgs.						
	7							
	8							
	9							
	0							

Project: PBOW

Hole Number: LBA-MW02

Shaw
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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-MW02

Project: PBOW | Geologist: E. Weaver | Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
					NA	NA	NA	
	11							
	12							
	13							
	14							
	15							
	16							
	17	Boring Completed Monitor Well Installed @ 16' bgs. Total Borehole Depth = 17 Ft						
	18							
	19							
	20							

Project: PBOW | Hole Number: LBA-MW02

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Monitoring Well Construction Form

Project:	PBOW	Well Number:	LBA-MW02
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Locomotive Building Area
Client:	USACE - Nashville, TN	Installation Date	3-31-09
Subcontractor:	A.E. Drilling	Northing:	623827.44
Driller:	Tom Burnett	Easting:	1918628.33
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project # 133767

Protective Cover Elevation (ft): 639.71

Top of Casing Elv. (ft): 639.25

Top of Casing Stickup (ft): 3.24

Land Surface Elv. (ft): 635.9

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft)
- During Drilling: ~6-8'
- Date: 3-31-09
- Post Development: — TOC
- Date: —

Top of Bentonite Seal (ft): 3.5'

Top of Filter Pack (ft): 4.5'

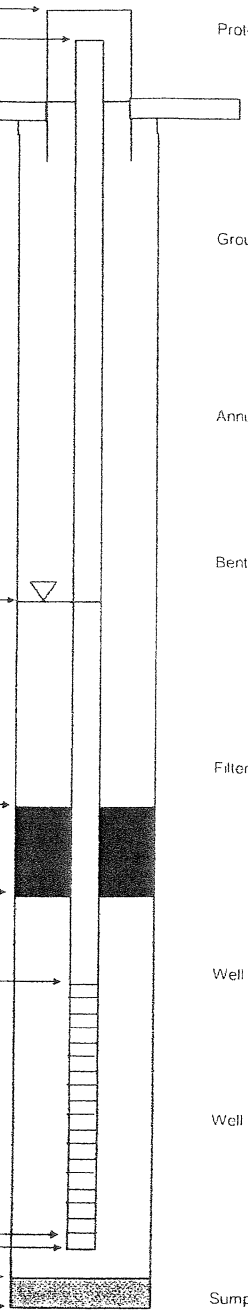
Top of Screen Interval (ft): 6.0'

Bottom of Screen Interval (ft): 16.0'

Bottom of Well (ft): 16.35'

Bottom of Filter Pack (ft): 17.0'

Bottom of Borehole (ft): 17.0'



Protective Casing
- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4- concrete filled

Ground Seal (Surface Pad)
- Dimensions: 4' x 4' x 4"
- Type: Concrete

Annular Space Seal
- Type: Bentonite-Cement Grout
- Installation: Gravity (circled) Tremie Pumped

Bentonite Seal
- Manufacturer: Haliburton
- Type: Pellets Slurry Chips (circled)
- Installation: 6-in lifts One Section (circled) Gravity Tremie Pumped
- Hydration time (hrs): >1 hr.

Filter Pack Material
- Manufacturer: Global Drilling Suppliers
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3 ft^3 (6-bags)
- Installation: Gravity Tremie (circled)

Well Casing
- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing
- Manufacturer: Campbell Monoflex
- Type: PVC
- Slot Size (in): .010 %Open
- Slot Type: Continuous wrap factory slot (circled)

Sump/End Cap: 0.35

Backfill Material: None

Shaw
Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929.

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

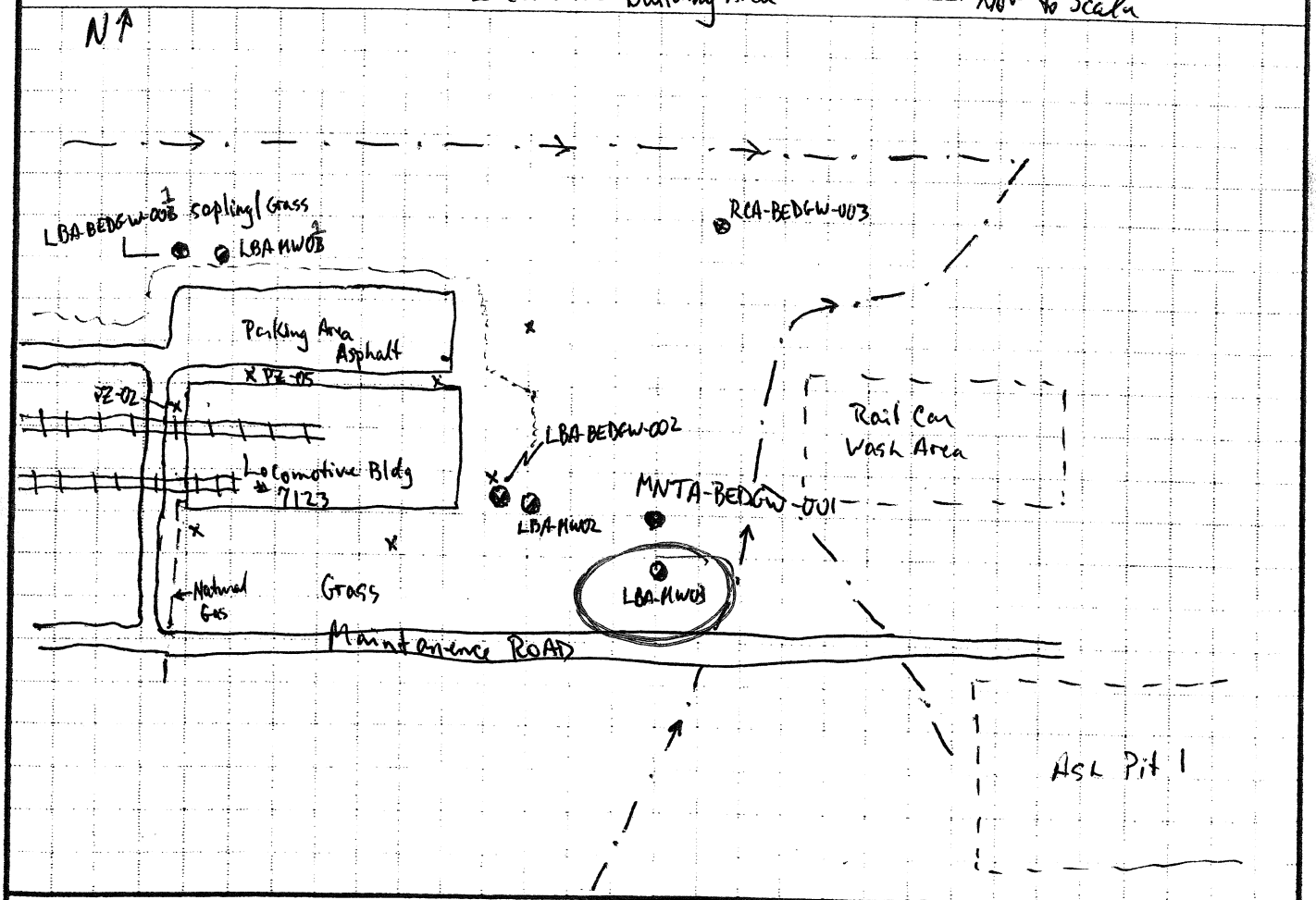
DISTRICT	Nashville, TN
HOLE NUMBER	LBA-MW03
SHEET / SHEETS	1 OF 3
1. COMPANY NAME	Shaw E+I
2. DRILL SUBCONTRACTOR	AE Drilling
3. PROJECT	PBOW
4. LOCATION	NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER	Tom Burnett
6. MANUFACTURER'S DESIGNATION OF DRILL	All terrain CME-750
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Augered to 17' bgs with 8.25" OD HSA - 2" split spoon Sampler
8. HOLE LOCATION	Locomotive Building Area
9. SURFACE ELEVATION	635.5 ft; Northing 623788.63; Easting 1918684.59
10. DATE STARTED	3-31-09
11. DATE COMPLETED	4/14/09
12. OVERBURDEN THICKNESS	unknown
13. DEPTH DRILLED INTO ROCK	0
14. TOTAL DEPTH OF HOLE	17.0'
15. DEPTH GROUNDWATER ENCOUNTERED	~ 8' bgs
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA		NA	E. W. Weaver

LOCATION SKETCH/COMMENTS — Locomotive Building Area — SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	LBA-MW03

Shaw
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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-MW03

Project: PBOW

Geologist: E. Weaver

Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical~~ Sample No.	Recovery (ft)	Remarks
		Dark yellowish brown (10YR 4/6) silty CLAY, moist, ~~stiff~~ medium stiff			NA	NA	NA	Post-hole dug to 5' bgs. Blows given by 140 lbs. mechanical hammer
	1							
	2							
	3							
	4							
	5	Dark brown (10YR 3/3) very fine grade SAND, moist, loose	SP		Blows 3/3	Time 1505	1.0/1.0	
	6	Dark yellowish brown (10YR 4/6) silty CLAY, moist, stiff.	CL		3/3			
	7				3/3	1508	0.8/2.0	
	8	- intermittent very fine grain sand + silt lenses to 10'.			2/3		2.0	Water rise and fogging of spoon on 8-10' sample.
	9				5/6	1512	/2.0	
	0							

Project: PBOW

Hole Number: LBA-MW03

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LB4-MW03

Project: PBOW

Geologist: E. Wenner

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample ~~or Core~~ Box No. Blows	Analytical Sample No. Time	Recovery (ft)	Remarks
	1	Dark yellowish brown (10YR 4/6) silty CLAY, wet, medium stiff	CL		2/3 - 5/5	1518	2.0 / 2.0	
	2	Dark gray (10YR 4/1) silty CLAY very moist, ~~wet~~, ~~soft~~ medium stiff interbedded silt layers from 12' -	CL		5/5 - 5/5	1522	2.0 / 2.0	
	3							
	4	- grading to high plasticity CLAY, silt content decreasing with depth			2/2 - 2/3	1525	2.0 / 2.0	
	5							
	6				4/6 - 6/8	1535	2.0 / 2.0	
	7	- grading to wide shale fragments 5% fine to medium grain						
	8	Total Depth = 18 ft						
	9							
	20							

Project PBOW

Hole Number: LB4-MW03

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Monitoring Well Construction Form

Project:	PBOW	Well Number:	LBA-MW03
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Locomotive Building Area
Client:	USACE - Nashville, TN	Installation Date	3-31-09
Subcontractor:	A.E. Drilling	Northing:	623788.63
Driller:	Tom Burnett	Easting:	1918084.59
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project #-133767

Protective Cover Elevation (ft): 638.70

Top of Casing Elv. (ft): 638.18

Top of Casing Stickup (ft): 2.96

Land Surface Elv. (ft): 635.5

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft)
- During Drilling: ~8'-9'
- Date: 3-31-09
- Post Development: — TOC
- Date: —

Top of Bentonite Seal (ft): 4.0'

Top of Filter Pack (ft): 5.0'

Top of Screen Interval (ft): 6.0'

Bottom of Screen Interval (ft): 16.0'

Bottom of Well (ft): 16.35'

Bottom of Filter Pack (ft): 18.0 ~~17.0~~' DKL

Bottom of Borehole (ft): 18.0 ~~17.0~~' DKL

Protective Casing
- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4- concrete filled

Ground Seal (Surface Pad)
- Dimensions: 4' x 4' x 4"
- Type: Concrete

Annular Space Seal
- Type: Bentonite-Cement Grout
- Installation: Gravity Tremie Pumped

Bentonite Seal
- Manufacturer: Haliburton
- Type: Pellets Slurry (chips)
- Installation: 6-in lifts (One Section)
- Gravity Tremie Pumped
- Hydration time (hrs): >1 hr.

Filter Pack Material
- Manufacturer: Global Drilling Supplies
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3 ft^3 (6-bags)
- Installation: Gravity Tremie

Well Casing
- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing:
- Manufacturer: Campbell Monoflex
- Type: PVC
- Slot Size (in): .010 %Open
- Slot Type: Continuous wrap (factory slot)

Sump/End Cap: 0.35

Backfill Material: None

Shaw
Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

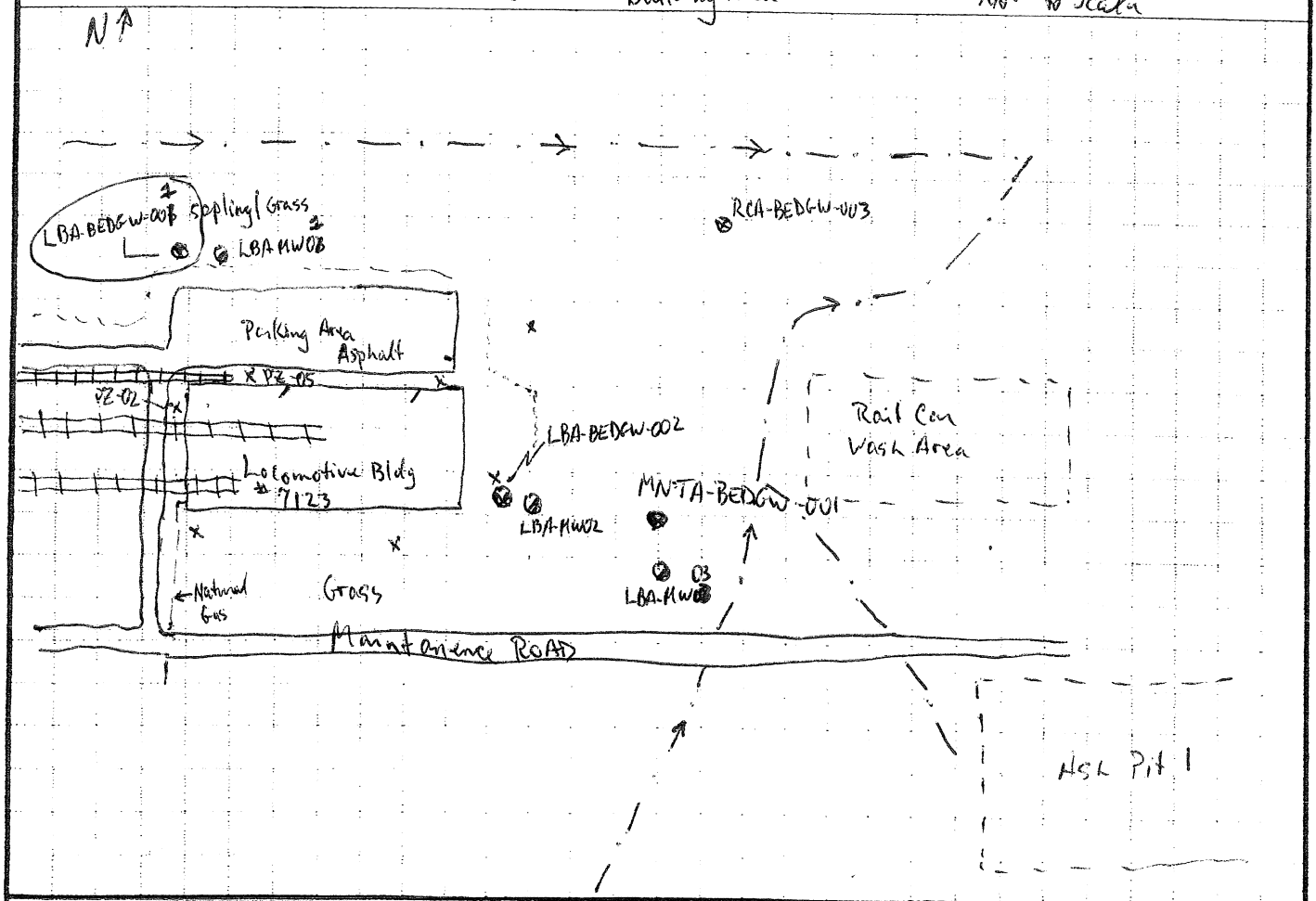
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: LBA-BEDGW-001
	2 DRILL SUBCONTRACTOR: AE Drilling	SHEET 1 OF 12 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Kevin Warren / Tom Burnett	6 MANUFACTURER'S DESIGNATION OF DRILL: All terrain CME-750	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Post-hole dug first 5 ft. Continuously sampled soil w/ 1.4" ID x 2 ft length split-spoons thru 4 1/4" ID/8" OD HSA till 25 ft. Overdrilled borehole w/ 8 1/4" ID x 12" OD HSA to 24 ft. ~~Pressured~~ Drilled bedrock w/ 8" OD tricone bit (wet) to 39.8 ft. Set black steel casing to 39.7 ft.	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 637.3 ft	Northing: 623937.80 Easting: 1918 452.89
	10 DATE STARTED: 3/26/09	11 DATE COMPLETED: 4/14/09
12 OVERBURDEN THICKNESS: 25 ft	15 DEPTH GROUNDWATER ENCOUNTERED: 90.8-91.1	
13 DEPTH DRILLED INTO ROCK: 76.0'	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14 TOTAL DEPTH OF HOLE: 101.0'	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	7

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY %
	NA	NA	NA	NA	NA	

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA		NA	David Kessler / Eric W. Weaver

LOCATION SKETCH/COMMENTS: Locomotive Building Area SCALE: Not to Scale



PROJECT	HOLE NO
PBOW	LBA-BEDGW-001

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 2 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Grass GRAVEL (Former ROAD) 0.4	gm ~~NM~~		NA	NA	NA	Post-hole dug first 5-ft.
	1	Fill (10YR 3/3) dark brown, mottled (black) SAND, trace silt, very fine grain, moist)						
	2	color changing to (10YR 5/4) yellowish brown.	SP	0.0				Breathing Air/Background VOC = 0.0 ppm LEL = 0% O_2 = 21.2% H_2S = 0 ppm CO = 0 ppm
	3	3						
	4							
	5	Medium dense ~~Stiff~~, (2.5Y 4/2) dark grayish brown, mottled (yellowish brown), very fine grain, SAND, moist	SP	0.0	5	4/6/5/6	1.5/2	Began drilling 3/26/09 S-1 0900
	6							
	7	7.4			7	0900		
	8	Stiff, (10YR 4/1) dark gray, homogeneous, high plasticity, silty CLAY, moist sand lenses (1mm) ~~laminations~~ DKK) 8.2 and 8.4'	Ch	0.0		7/4/5/5	1.7/2	S-2 perched water above clay, sand very moist to wet ~1 ft. (6.4-7.4')
	9				9	0905		
	10			NM		9/9/	0/2	S-3 No recovery push rock

Project: PBOW | Hole Number: LBA-BEDGW-001

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 3 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	10			NM		1/10/10	0/2	S-3 (cont)
	11	Medium stiff. (10YR 4/1) dark gray, high plasticity, homogeneous, silty CLAY. silt content decreasing w/ depth moist	ch	0.0	11	0910 2/3/4/4	2/2	S-4
	12							
	13			0.0	13	0915 2/3/4/4	1.8/2	S-5
	14							
	15		ch	NM	15	0920 2/3/3/3	0/2	S-6 pushed rock - no recovery
	16							
	17	Shale fragments present in shoe. well rounded (20%), moist		0.0	17	0925 2/3/4/7	0.6/2	S-7
	18							
	19			0.0	19	0930 4/5/	0.4/	S-8
	20							

Project PBOW | Hole Number: LBA-BEDGW-001

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 4 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	20				NA	15/6	0.4/2	S-8 (cont)
		Stiff. (10YR 4/1) dark gray, homogeneous. high plasticity, silty CLAY. coarse grain sand layers 22.2-22.3' and 22.8-23.0'; shale fragments 10%, variable size fragments ranging from coarse grain to pebble size. clay consistency increasing to very stiff, limestone pebble 23.5 ft		0.0		0940		
	21				21			S-9
			ch	0.0		3/5/8/8	2/2	
	22							
					23	0945		
	23							S-10
				0.0		13/15/15/16	2/2	
	24							Drilled 8¼" ID/12" OD HSA to 24 ft
	25				25	0955		
		SHALE, gray						4¼" HSA refusal @ 25 ft.
	26							Began drilling shale w/8" OD rotary bit
	27							
	28							
	29							
	30							

Project PBOW | Hole Number: LBA-BEDGW-001

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Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW

Geologist: D. Kessler/E. Weaver

Sheet 5 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample~~ No.	Recovery (ft)	Remarks
	30	SHALE, gray	NA	NA	NA	NA	NA	
	31							
	32							
	33							
	34							
	35							
	36							
	37							
	38							Rotary bit encountering lm at ~ 38.5 Ft
		38.5						
		LIMESTONE, weathered, broken						Competent limestone at 39.8 Ft (TD) & 6" steel casing set at 39.7 Ft
	39							
	40							

Project PBOW

Hole Number: LBA-BEDGW-001

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 6 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech Sample or Core~~ Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
	40							
		Start 3-30-09			39.8 ~~40.8~~			39.8 41.2
	41	LIMESTONE, dark gray, massive bedding, fossiliferous (brachs, corals) moderately fractured, hard, slightly weathered.			Box #1	41.2		C-1 (~~40.8-42.2~~) Run- Rec. 1.4' Tagged bottom at 42.2' Start 1040 End 1045 41.2 ~~42.2~~
	42					~~42.2~~ Mechanical Break		C-2 (41.2 46.2) (~~42.2~~ - ~~47.2~~) Run 5.0 Rec. 4.6 Start 1050 End 1055
	43					43.6		
	44	- Pyrite 44.1-44.3						Breathing Space Air ~~O~~ O_2 - 20.8 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	45							
		- intense fracturing from 45.7-47.6 - clay in fractures from 45.8 to 47.6'				45.7 45.8		
	46					46.1 46.2 46.4 46.5 46.6		
	47					47.1		46.2-51.2 ~~47.2~~
						47.5		C-3 (~~47.2-52.2~~) Run - 5.0 Rec - 5.1 Start - 1101 End - 1109
	48				48.2 Box #2	48.2		
	49	- grading to light gray				49.0		
	50					50.0		

Project PBOW | Hole Number: LBA-BEDGW-001

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Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW

Geologist: B. Weaver

Sheet 7 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample~~ or Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, lt, lt gray, massive bedding, fossiliferous (bracks, corals) moderately fractured, hard, slightly weathered,			Box #2 Cont.			
	51					50.9		
	52					51.9		
								51.2 56.2
								C-4 (~~52.2 57.27~~)
						52.7		Run: 5.0
	53							Rec: 5.2
								Start: 1123
								End: 1129
								Breathing Space Air
	54							O_2: 21.0
						54.4		H_2S: 0
						54.6		CO: 0
								LEL: 0
	55							VOC: 0
								Pump hole no recharge
	56					56.1		
								C-5 (56.2-61.2)
								Run: 5.0
	57				57.1 Box #3	57.1		Rec: 5.1
								Start: 1345
								End: 1357
	58					58.2		
	59	- stylolite						
						59.5		
	60							

Project: PBOW

Hole Number: LBA-BEDGW-001

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 8 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or Core~~ Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, foss. liferous (brachs corals), highly fractured, hard slightly weathered-			Box #3 Cont-			
						60.5		
						60.6		
	61							61.2
						61.2		C-5 (61.2-66.2)
						61.5		Run-5.0
	62							Rec. 4.8
								Start-1357
								End-1604
						62.6		
	63							Breathing Space Air
								O_2-21.0
								H_2S-0
	64							CO-0
								LEL-0
						64.2		VOC-0
						~~[illegible]~~		
						64.6		
						64.8		
	65	- Coral reef to 66.0'						
						65.5		
	66				66.0 Box #4	66.0		66.2
								C-7 (66.2-71.2)
								Run. 5.0
	67					66.9		Rec. 5.0
								Start-1416
								End 1421
	68							
						68.4		
	69					69.1		
						69.2		
	70					70.0		

Project: PBOW | Hole Number: LBA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 9 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech.~~ Sample ~~or~~ Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracho, corals) moderately fractured, hard, slightly weathered.			Box #4 Cont.	70.3		
	71					71.0		Pumped hole no recharge
								71.2
								C-8 (71.2-76.2) Run: 5.0 Rec: 5.2 Start: 1530 End: 1535
	72					72.0		
	73					73.2		Breathing Space Air O_2-21.2 H_2S-0 CO-0 LEL-0 VOC-0
	74							
	75					74.8		
					75.8 Box #5	75.8		
	76					76.2		76.2
								C-9 (76.2-81.2) Run: 5.0 Rec: 4.1 Start: 1541 End: 1546
	77							
								Lost 0.9' of core
	78							
	79					79.4		
	80					79.9		

Project: PBOW | Hole Number: LBA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 10 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or~~ Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light-gray, massive bedding, fossiliferous (conchs, corals) moderately fractured, hard, slightly weathered.			Box #5 Cont.	80.3		Lost 0.9' of core from 80.3 to 81.2
	81							81.2
								C-10 (81.2-86.2) Run: 5.0 Rec.: 4.9 Start: 1617 End: 1622
	82							
						82.7		Tagged bottom of hole @ 86.1'
	83							
	84					84.1		
	85							
								Purged hole no increase recharge.
	86					85.9		
					86.1 Box #6	86.1		86.2
								C-11 (86.2-91.2) Run: 5.0' Rec: 5.0 Start: 1725 End: 1731
	87					87.1		
	88							
						88.4		
	89							
						89.7		
	90							

Project: PBOW | Hole Number: LBA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 11 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech.~~ Sample ~~or~~ Core Box No.	~~Analytical Sample No.~~	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracks, corals), highly fractured, hard, slightly weathered.			Box #6 cont.			
		- suspected water bearing fracture.				90.8 90.9 91.0 91.1		91.2
	91							C-12 (91.2-96.2) Run - 5.0 Rec - 4.5 Start - 1736 End - 1742
	92					91.9 92.0 92.4		
	93					92.8		
						93.4		Tagged bottom @ 95.6
	94					94.3		
	95							
					95.6 Box #7	95.5 95.6		Pump hole - let sit overnight. Recharged to 89.95' Start 3-31-09
	96	- gradding to moderately fractured				96.1		C-13 (96.2-101.2 Run - 5.0 Rec - 5.4 Start - 0858 End - 0905
	97					97.3		
	98							
	99					99.6		
	100							

Project: PBOW | Hole Number: LBA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 12 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample~~ or Core Box No.	~~Analytical Sample No.~~	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracho, corals), moderately fractured, hard, slightly weathered.			Box #7 Cont.			Tagged bottom of hole @ 101.0'
	101	Boring Completed Monitor Well Installed Total Depth 101.0 ft				101.0 - mechanical break		101.0
	102							
	103							
	104							
	105							
	106							
	107							
	108							
	109							
	110							

Project: PBOW | Hole Number: LBA-BEDGW-001

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Monitoring Well Construction Form (Bedrock)

Project:	PBOW	Well Number:	LBA-BEDGW-001
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Locomotive Building Area
Client:	USACE - Nashville, TN	Installation Date	3-31-09
Subcontractor:	A.E. Drilling	Northing:	623937.80
Driller:	Kevin Warren / Tom Burnett	Easting:	1918452.89
Shaw Field Representative:	David Kessler / Eric Weaver	Shaw Project Number:	133767

Protective Cover Elevation (ft): 640.23

Top of Casing Elevation (ft): 639.74

Top of Casing Stickup (ft): 2.46

Land Surface Elevation (ft): 637.3

Approximate Diameter of Section 1 Borehole (in): 12" to 24' / 8" to 39.8'

Diameter of Surface Casing (in): 6 5/8" OD / 6" ID

Depth to Bedrock (ft): 25'

Bottom of Surface Casing (ft): 39.7'

Depth to Water (ft):

During Drilling: ~90.8-91.1

Date: 3-30-09

Post Development: — TOC

Date: —

Approximate Diameter of Section 2 Borehole (in): 6"

Well Casing Diameter (in): 2"

Top of Bentonite Seal (ft): 77.0'

Top of Filter Pack (ft): 81.0'

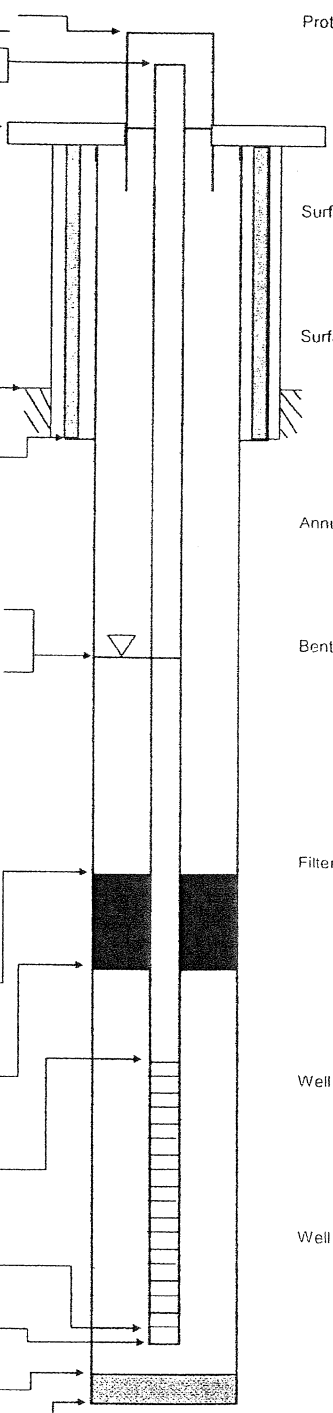
Top of Screen Interval (ft): 85.0'

Bottom of Screen Interval (ft): 100.0'

Bottom of Well (ft): 100.35'

Bottom of Filter Pack (ft): 101.0

Bottom of Borehole (ft): 101.0



Protective Casing:
- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4 - concrete filled

Surface Pad:
- Dimensions: 4' x 4' x 4"
- Type: Concrete

Surface Casing:
- Type: Black Steel
- Diameter (in): 6 5/8" OD / 6" ID
- Installation: Tremie / Haliburton / Cementing Plug / ~~Other Plug~~ Johnson Grout shoe

Annular Space Seal:
- Type: Bentonite-Cement Grout
- Installation: Gravity / (Tremie) / Pumped

Bentonite Seal:
- Manufacturer: Haliburton
- Type: (Pellets) / Slurry
- Installation: 6-in lifts / (One Section) / Gravity / (Tremie) / Pumped
- Hydration time (hrs): >1 hr

Filter Pack Material:
- Manufacturer: Global Drilling Suppliers
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3.5 ft^3 (7-bags)
- Installation: Gravity / (Tremie)

Well Casing:
- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing:
- Manufacturer: Johnson
- Type: PVC
- Slot Size (in): .010 | %Open
- Slot Type: (Continuous wrap) / Factory slot

Sump/End Cap: 0.35'

Backfill Material: None

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Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

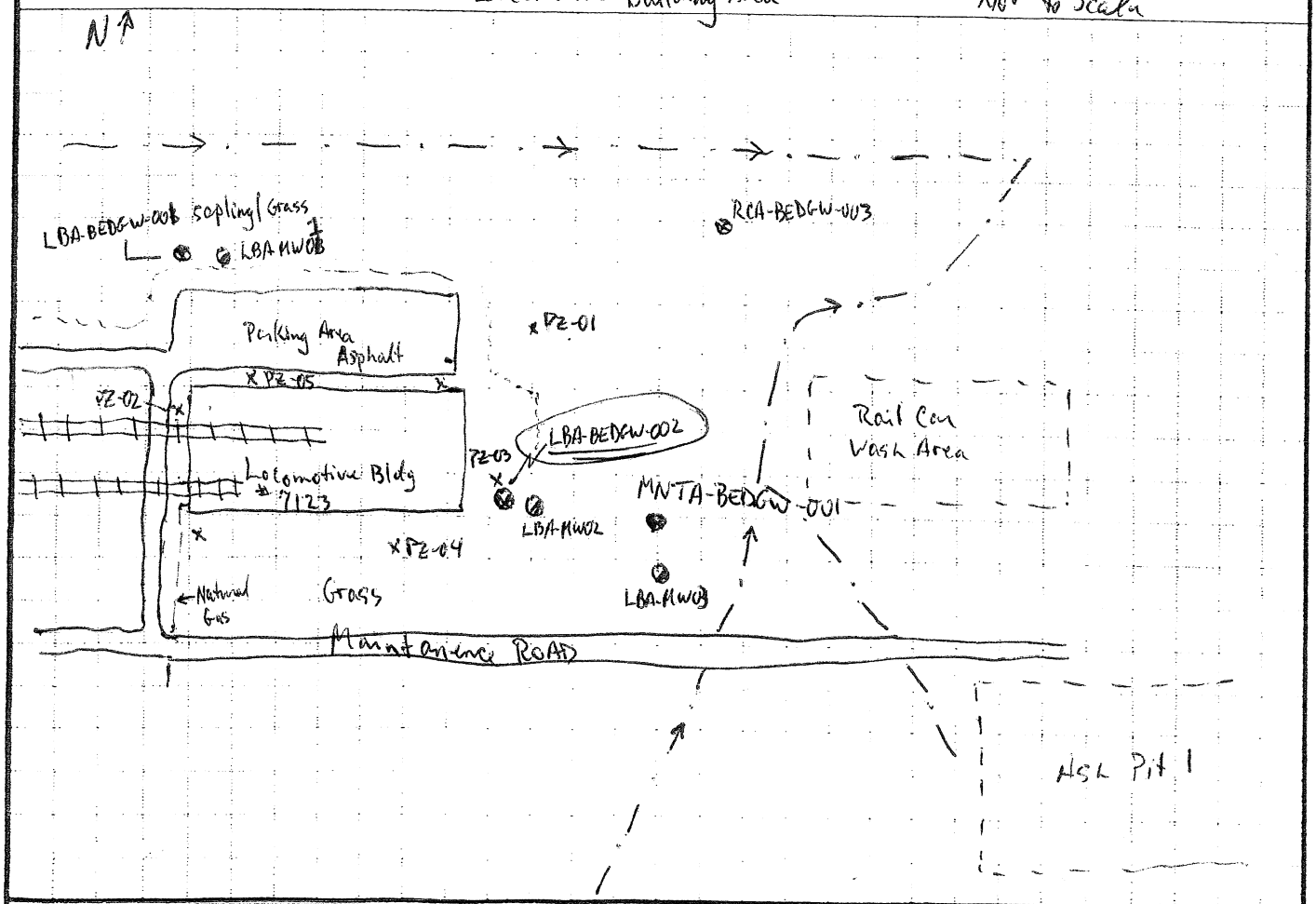
HTRW DRILLING LOG

1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: LBA-BEDGW-002
	2 DRILL SUBCONTRACTOR: A E Drilling	SHEET 1 OF 9 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Kevin Warren / Tom Burnett	6 MANUFACTURER'S DESIGNATION OF DRILL: All terrain CME-750	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Post-hole dug first 5 ft. Continuously soil sampled w/ 1.4" ID by 2 ft length SS split spoons. Drilled w/ 4¼" ID x 8" OD HSA to 27 ft. Overdrilled w/ 8¼" ID x 12" OD HSA to 27 ft. Drilled w/ 8" OD rotary bit (wet) to 37.1 ft. Installed 6 5/8" OD/6" ID black steel casing to 39 ft, Rock cored with 6" OD PQ core bit	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: 636.3 ft; Northing: 623827.05; Easting: 1918619.44	
	10 DATE STARTED: 3/25/09	11 DATE COMPLETED: 3/30/09
12 OVERBURDEN THICKNESS: 27'	15 DEPTH GROUNDWATER ENCOUNTERED: Overburden 9.5 ft / Bedrock 6.1 ft	
13 DEPTH DRILLED INTO ROCK: 44.1	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14 TOTAL DEPTH OF HOLE: 71.1	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	%
22. DISPOSITION OF HOLE	**BACKFILLED**	**MONITORING WELL**	**OTHER (SPECIFY)**	**23. SIGNATURE OF INSPECTOR**		
	NA		NA	David Kessler / Eric W. Weaver		

LOCATION SKETCH/COMMENTS: Locomotive Building Area — SCALE: Not to Scale



PROJECT	HOLE NO.
PBOW	LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW | Geologist: D. Kessler | Sheet 2 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Grass			NA	NA	NA	Post-hole dug first 5-feet 3/25/09
	1							
	2			NM				
								Breathing Air/Background: VOC = 0.0 ppm LEL = 0% O_2 = 21.2% H_2S = 0 ppm CO = 0 ppm
	3							
	4							
	5	Fill: (Medium stiff, (10 yr 5/1) gray, mottled (40% - yellowish br). high plasticity, silty CLAY. 40% silt, trace organics (wood fragments), very moist	ch	0.0	5	2/3/ 2/2	1.6/ 2	Begun drilling 3/25/09 0840 S-1
	6					0840		
	7	cinder at 7.2 ft (pebble size)				2/2/ 3/3	1.7/ 2	S-2
	8			0.0				
	9	9.2			9	0845		
		Sand lense 9.5-9.6 ft	SP	0.0		2/3/	1.8/	S-3 ▽ GW encountered 9.5 ft
	10							

Project: PBOW | Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical~~ Sample ~~No.~~ Blow	Recovery (ft)	Remarks
	10	soft, (2.5Y 4/1) dark gray, homogeneous, high plasticity, silty CLAY, wet	ch	0.0	NA	3/4	1/2	S-3 (cont)
					11	0855		
	11					1/2/ 2/3	2/2	S-4
	12			0.0				
					13	0900		
	13					1/2/ 2/3	2/2	S-5
	14			0.0				
					15	0905		
	15	shale fragments begin at 16.4 ft, coarse grain size, mottled (~~10Y~~ 2.5Y 6/4) light reddish brown. (20%)	ch	0.0		1/1/ 3/4	2/2	S-6
	16							
	17	shale fragments increase in size w/ depth			17	0910		
		consistency increases to stiff, value increases to (2.5Y 3/1) very dark gray		0.0		4/5/ 5/8	2/2	S-7
	18							
		18.6						
	19	Stiff, (2.5Y 3/1) very dark gray, homogeneous, clayey SILT, no plasticity, shale fragments	ml		19	0915		
						5/6/	2/	S-8
	20							

Project: PBOW

Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW | Geologist: D. Kessler | Sheet 4 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	20	Stiff, (2.5Y 3/1) very dark gray, homogeneous, clayey SILT, no plasticity shale fragments 20%. very coarse grain to pebble size	ml	0.0	NA	6/7	1/2	S-8 (cont)
	21				21	0920		S-9
						5/6/ 7/9	2/2	
	22			0.0				
		Sand lense 22.5-22.6', little silt 10%	SP					
	23	Sand lense 22.9-23.0', little silt 10%	SP		23	0925		S-10
		consistency increases w/ depth				8/10/ 11/11		
	24			0.0				
	25				25	0930		S-11
						4/10/ 10/12	0.6/2	rounded shale fragment in spoon prevented full recovery
	26			0.0				overdrilled borehole w/8 1/4" ID 12" OD HSA to 27 ft
	27				27	0945		
		SHALE, gray						4 1/4" ID HSA refusal @ 27 ft. Began drilling w/5" OD rotary bit (wet drilling)
	28							
	29							
	30							

Project PBOW | Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW

Geologist: D. Kessler / E. Wiewora

Sheet 5 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical~~ Sample No.	Recovery (ft)	Remarks
	30	SHALE, gray			NA	NA	NA	
	31							
	32							
	33							
	34							
	35							
	36							
	37							Drilling w/ 8" OD rotary bit to 37.1 ft. Set isolation casing to 37'
		Start 3-29-09			37.9	Fracs		C-1 (37.9-41.2)
	38	LIMESTONE, dark gray massive bedding, fossiliferous, (brachs, corals), moderately fractured, hard, slightly weathered,			Box #1	-38.1		Run - 3.3 Rec - 3.3 Start - 1280 End - 1308
	39					-38.8 -39.0		
	40							

Project: PBOW

Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW | Geologist: E. Wenner | Sheet 6 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech~~ Sample or Core Box No.	~~Analytical Sample No.~~ Trace	Recovery (ft)	Remarks
	40	LIMESTONE, dark gray, massive bedding, fossiliferous (breccia, corals), ~~moderately~~ highly fractured hard, slightly weathered.			Box #1 cont.			Tagged bottom of hole at 41.2'
	41	- intense fracturing to 41.6'				41.2 41.3 41.4 41.5 41.6		C-2 (41.2-46.2) Run-5.0 Rec-5.0 Start-1315 End-1324
	42							
	43							Breathing Space Air O_2-20.8 H_2S-0 CO-0 LEL-0 VOC-0
						43.4		
	44							
						44.8		
	45							Tagged bottom of hole @ 46.2
		- intense fracturing to 47.1				45.6 45.7 45.8		
	46	- clay in fracture			46.2	46.0 46.1 46.2		
					Box #2	46.4		C-3 (46.2-51.2) Run-5.0 Rec-4.6 Start-1330 End-1338
	47	- clay in fracture				46.9 47.1		
	48					47.9		Tagged bottom of hole @ ~~[illegible]~~ 50.8
		- grading to light gray						
	49							
		- Petroleum hydrocarbon seepage from rock down to 56.4'				49.7		
	50							

Project: PBOW | Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW

Geologist: E. Weaver

Sheet 7 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracks, corals), highly fractured, hard, slightly weathered.				50.6		
						50.8		Pumped water from hole no recharge
	51							51.2
								C-4 (51.2-56.2)
						51.6		Run - 5.0
	52							Rec - 5.2
								Start - 1455
								End - 1502
	53					53.0		Breathing Space Air
						53.5		O_2 - 20.9
								H_2S - 0
	54	- Potential water bearing fractures				54.0		CO - 0
		- Potential water bearing fracture				54.4		LEL - 0
								VOC - 0
	55							Tagged bottom of hole @ 56.0'
						55.5		
	56					56.0		
								56.2
								C-5 (56.2-61.2)
						56.8		Run - 5.0
	57							Rec. - 5.1
								Start - 1509
								End - 1514
						57.8		
	58							
	59							Tagged bottom of hole @ 61.1
						59.2		
	60							

Project: PBOW

Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW | Geologist: E. Weaver | Sheet 0 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (branchs, corals), highly fractured, hard, slightly weathered.				60.2		
	61	- Potential water bearing fractures				61.1 61.2		61.2 C-6 (61.2-66.2) Run - 5.0 Rec - 4.9 Start - 1525 End - 1530
	62					62.3		
	63							
	64					63.9 64.2		
		- Coral reef down to 66.0'				64.6		
	65	- Potential water bearing fracture - Potential water bearing fracture - Potential water bearing fracture				64.9 65.2 65.5		Pumped water from hole, recharged quickly to 66'
	66					66.0		66.2 C-7 (66.2-71.2) Run - 5.0 Rec - Start - 1650 End - 1655
		- Potential water bearing fracture				66.5		
	67							
	68					68.1		
		- Potential water bearing fracture				68.8		
	69	- Potential water bearing fracture - Potential water bearing fracture				69.2 69.6		
	70							

Project: PBOW | Hole Number: LBA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: LBA-BEDGW-002

Project: PBOW

Geologist: E. Weaver

Sheet 9 of 9 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
						-70.2 MB		
						-70.7 MB		
	71					-71.1 MB		71.2
		Boring Completed Monitor Well Installed @ 75'						
	72							
	73							
	74							
	75							
	76							
	77							
	78							
	79							
	80							

Project PBOW

Hole Number: LBA-BEDGW-002

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Monitoring Well Construction Form (Bedrock)

Project:	PBOW	Well Number:	LBA-BEDGW-002
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Locomotive Building Area
Client:	USACE - Nashville, TN	Installation Date	3-29-09
Subcontractor:	A.E. Drilling	Northing:	623827.05
Driller:	Kevin Warren / Tom Burnett	Easting:	1918614.64
Shaw Field Representative:	David Kessler / Eric Weaver	Shaw Project Number:	133767

Protective Cover Elevation (ft): 639.00

Top of Casing Elevation (ft): 638.62

Top of Casing Stickup (ft): 2.57

Land Surface Elevation (ft): 636.3

Approximate Diameter of Section 1 Borehole (in): 12" to 27'; 8" to 37.1'

Diameter of Surface Casing (in): 6 5/8" OD / 6" ID

Depth to Bedrock (ft): 27'

Bottom of Surface Casing (ft): 37'

Used 9 @ 94 lbs bags Portland Type I/II cement + bentonite mixture to seal isolation casing

Depth to Water (ft):

During Drilling: ~54-69.9'

Date: 3-29-09

Post Development: — TOC

Date: —

Approximate Diameter of Section 2 Borehole (in): 6"

Well Casing Diameter (in): 2"

Top of Bentonite Seal (ft): 48.0'

Top of Filter Pack (ft): 51.0'

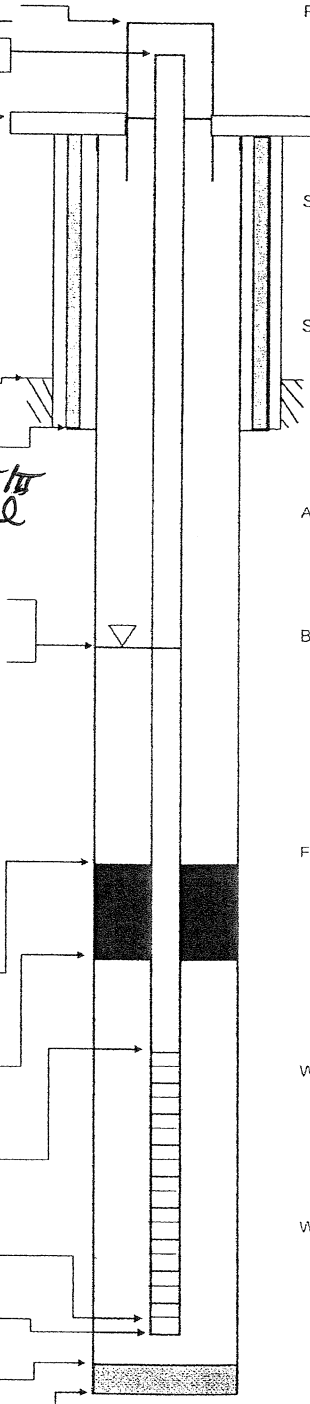
Top of Screen Interval (ft): 55.0'

Bottom of Screen Interval (ft): 70.0'

Bottom of Well (ft): 70.35'

Bottom of Filter Pack (ft): 71.1'

Bottom of Borehole (ft): 71.1'



Protective Casing:
- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4 - concrete filled

Surface Pad:
- Dimensions: 4' x 4' x 4"
- Type: Concrete

Surface Casing:
- Type: Black Steel
- Diameter (in): 6 5/8" OD / 6" ID
- Installation: Tremie / Haliburton / Cementing Plug / ~~Other Plug~~ Johnson Grout shoe

Annular Space Seal:
- Type: Bentonite-Cement Grout
- Installation: Gravity / Tremie / Pumped

Bentonite Seal:
- Manufacturer: Haliburton
- Type: Pellets / Slurry
- Installation: 6-in lifts / One Section / Gravity / Tremie / Pumped
- Hydration time (hrs): >1 hr.

Filter Pack Material:
- Manufacturer: Global Drilling Supplies
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3.54 ft^3 (7-bags)
- Installation: Gravity / Tremie

Well Casing:
- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing:
- Manufacturer: Johnson
- Type: PVC
- Slot Size (in): .010 | %Open
- Slot Type: Continuous wrap / Factory slot

Sump/End Cap: 0.35'

Backfill Material: None

Shaw
Shaw E & I, Inc.

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

HTRW DRILLING LOG

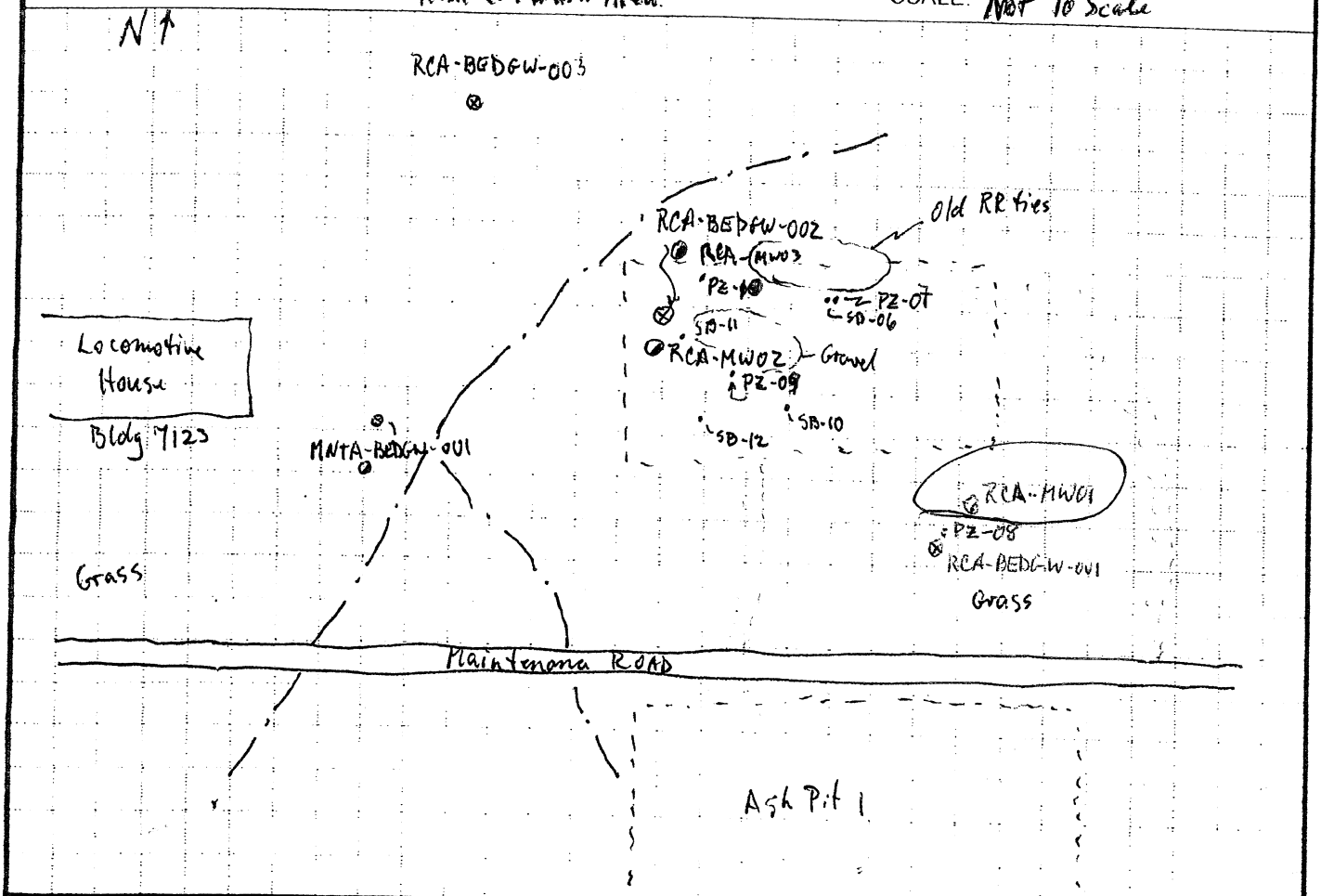
DISTRICT	Nashville, TN
HOLE NUMBER	RCA-MW01
SHEET / OF SHEETS	1 / 2
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	A.E. Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	~~Kevin Warren~~ Tom Burnett
6 MANUFACTURER'S DESIGNATION OF DRILL	All Terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Auger to 10' bgs with 4.25" ID ~~ASA~~ with a wooden plug.
8 HOLE LOCATION	Rail Car Wash Area - See Sketch
9 SURFACE ELEVATION	638.4 ft Northing: 623724.69 Easting: 1919029.45
10 DATE STARTED	3-26-09
11 DATE COMPLETED	3/30/09
12 OVERBURDEN THICKNESS	Unknown
13 DEPTH DRILLED INTO ROCK	-0-
14 TOTAL DEPTH OF HOLE	10'
15 DEPTH GROUNDWATER ENCOUNTERED	Not encountered
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	Eric W. Weaver

LOCATION SKETCH/COMMENTS Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO.
PBOW	RCA-MW01

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW01

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		See boring log for RCA-BEDGW-001 for description of soils.						Post hole dig to 5' bgs. Auger to 10' bgs with 4.25" ID HSA, with a wooden plug in bottom. Monitor Well Installed @ 9' bgs. Sand up to 3.5' bgs bentonite to 2' bgs.
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10	Boring Completed						

Project: PBOW Monitor Well Installed @ 9' bgs. | Hole Number: RCA-MW01

Total Depth of Borehole = 10.0 Ft

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Monitoring Well Construction Form

Project:	PBAW	Well Number:	RCA-MW01
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Railcar Wash Area
Client:	USACE - Nashville, TN	Installation Date	3-26-09
Subcontractor:	A.E. Drilling	Northing:	623724.69
Driller:	Tom Burnett	Easting:	1919029.45
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project #-133767

Protective Cover Elevation (ft): 641.44

Top of Casing Elv (ft): 641.01

Top of Casing Stickup (ft): 2.17

Land Surface Elv. (ft): 638.4

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft):

During Drilling: None

Date: 3-26-09

Post Development: — TOC

Date: —

Top of Bentonite Seal (ft): 2.0'

Top of Filter Pack (ft): 3.5'

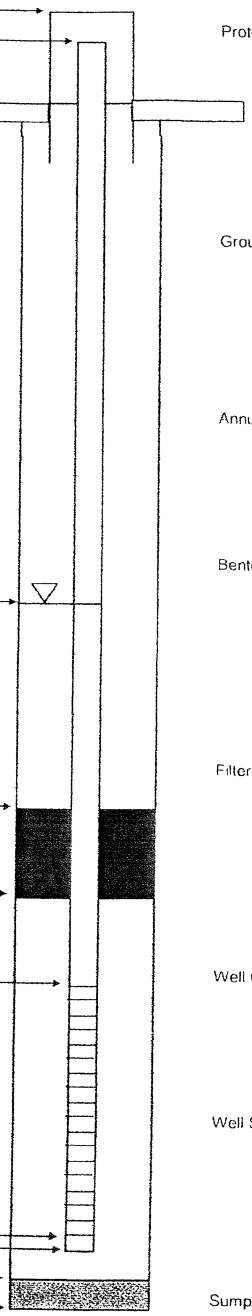
Top of Screen Interval (ft): 4.0'

Bottom of Screen Interval (ft): 9.0'

Bottom of Well (ft): 9.35'

Bottom of Filter Pack (ft): 10.0'

Bottom of Borehole (ft): 10.0'



Protective Casing:

Type: Steel

Dimensions (in): 4"x4"

Length (ft): 5'

Guard Post: 4- concrete filled

Ground Seal (Surface Pad)

Dimensions: 4'x4'x4"

Type: Concrete

Annular Space Seal:

Type: Bentonite-Cement Grout

Installation: (Gravity) Tremie Pumped

Bentonite Seal:

Manufacturer: Haliburton

Type: Pellets Slurry (chips)

Installation: 6-in lifts (One Section)

Gravity Tremie Pumped

Hydration time (hrs): >1 hr

Filter Pack Material

Manufacturer: Global Drilling Supplies

Product Name: Quartz Filter Pack Sand

Size: #7

Volume Added (ft^3): 2.5 ft^3 (5-bags)

Installation: Gravity (Tremie)

Well Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Diameter (in): 2"

Well Screen Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Slot Size (in): .010 %Open

Slot Type: Continuous wrap (factory slot)

Sump/End Cap: 0.35

Backfill Material: None

Shaw

Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

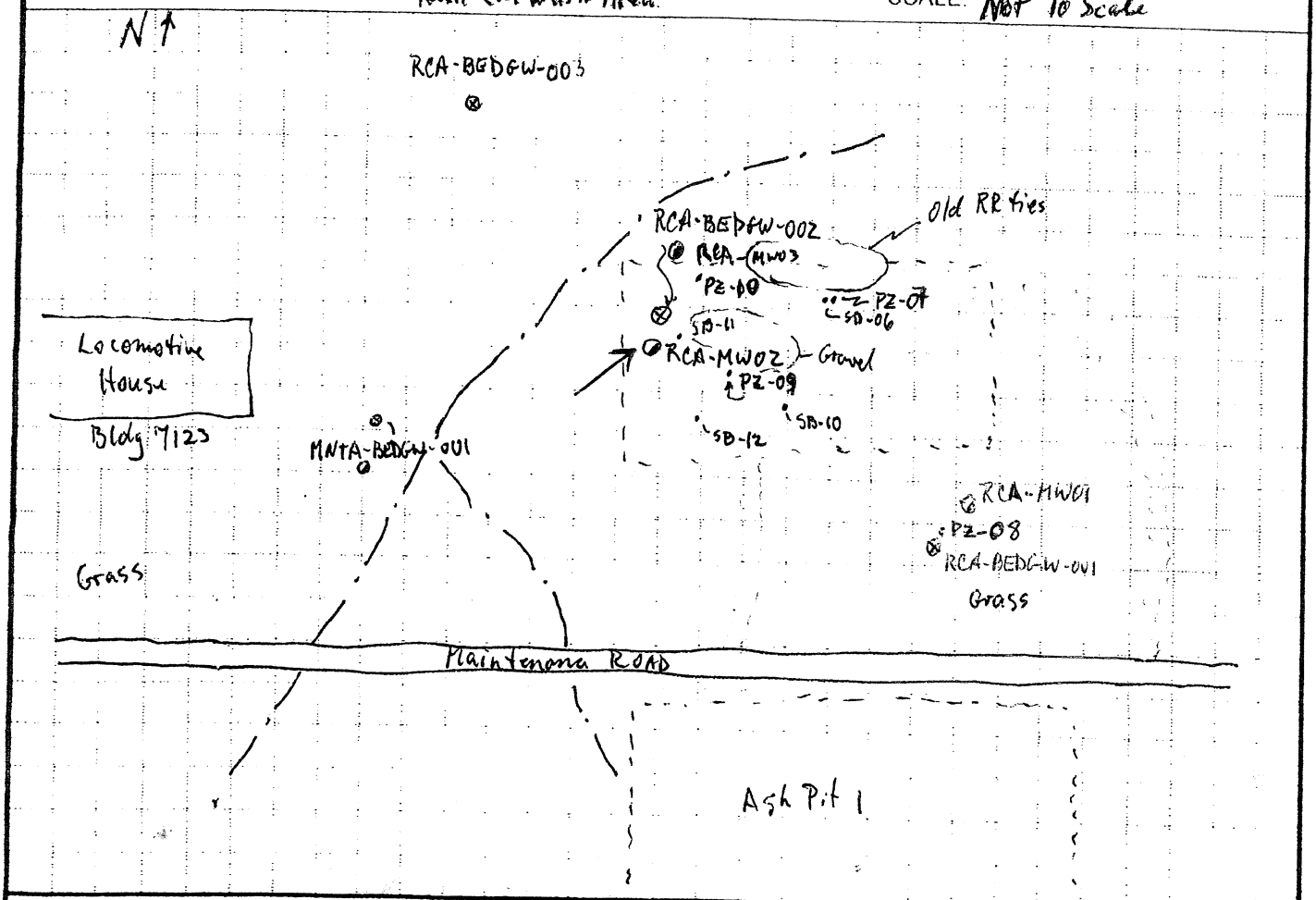
1 COMPANY NAME: Shaw E+I	DISTRICT: Nashville, TN	HOLE NUMBER: RCA-MW02
3 PROJECT: PBOW	2 DRILL SUBCONTRACTOR: A.E. Drilling	SHEET 1 OF 4 SHEETS
5 NAME OF DRILLER: ~~Kevin Warren~~ for Tom Burnett	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Post hole dug first 5 ft. Auger with 4.25" ID/8.25" OD; HSA augers to 29.0'	6 MANUFACTURER'S DESIGNATION OF DRILL: All Terrain CME-750	
	8 HOLE LOCATION: Rail Car Wash Area - See Sketch	
	9 SURFACE ELEVATION: 635.3 ft; Northing: 623826.40; Easting: 1918834.02	
	10 DATE STARTED: 3-19-09	11 DATE COMPLETED: 3-20-09
12 OVERBURDEN THICKNESS: Unknown	15 DEPTH GROUNDWATER ENCOUNTERED: ≈23' DTW @ well completion 28.43' broc	
13 DEPTH DRILLED INTO ROCK: Unknown	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	
14 TOTAL DEPTH OF HOLE: 29'	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20 SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21 TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	NA %

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	E.W. Weaver

LOCATION SKETCH/COMMENTS: Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO.
PBOW	RCA-MW02

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW02

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		FM: (Black (10YR 2/1) silty CLAY, moist, medium stiff, with fine sand)						Post hole dig to 5' bgs.
	1							See boring log for boring RCA-BEDGW-002 for complete soil descriptions.
	2	- Dark yellowish brown (10YR 4/6) mottled grey CLAY with silt and fine grain sand, medium stiff, moist.						
	3							
	4							
	5	- Begin HSA auguring.						Breathing Space AV
	6							O_2 - 21.3
								H_2S - 0
								CO - 0
								LEL - 0
	7							VOC - 0
	8							
	9							
	0							

Project: PBOW | Hole Number: RCA-MW02

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW02

Project: PBOW

Geologist: E. Weaver

Sheet 3 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
								See boring log for RCA-BEDGW-002 for complete soil descriptions.
	11							
	12							
	13							
	14							
	15							
	16							Breathing Space Air O_2 - 21.2 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	17							
	18							
	19							
	20							

Project: PBOW

Hole Number: RCA-MW02

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW07

Project: PBOW

Geologist: E Weaver

Sheet 4 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
								See boring log for RCA-BEDGW-002
	21							
	22							
	23							
	24							
	25							Breathing Space Air O_2 - 21.1 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	26							
	27							
	28							
	29	Boring Complete. Total Depth = 29.0 ft Monitor Well Installed @ 27.7'						
	30							

Project: PBOW

Hole Number: RCA-MW02

Monitoring Well Construction Form

Project:	PBOW	Well Number:	RCA-MW02
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Railcar Wash Area
Client:	USACE - Nashville, TN	Installation Date	3-19-09
Subcontractor:	A.E. Drilling	Northing:	623826.40
Driller:	Tom Burnett	Easting:	1918834.02
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project #133767

Protective Cover Elevation (ft): 638.59

Top of Casing Elv. (ft): 638.15

Top of Casing Stickup (ft): 2.8'

Land Surface Elv. (ft): 635.3

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft):

During Drilling: ~23'

Date: 3-19-09

Post Development: — TOC

Date: —

Top of Bentonite Seal (ft): 12.0'

Top of Filter Pack (ft): 14.5'

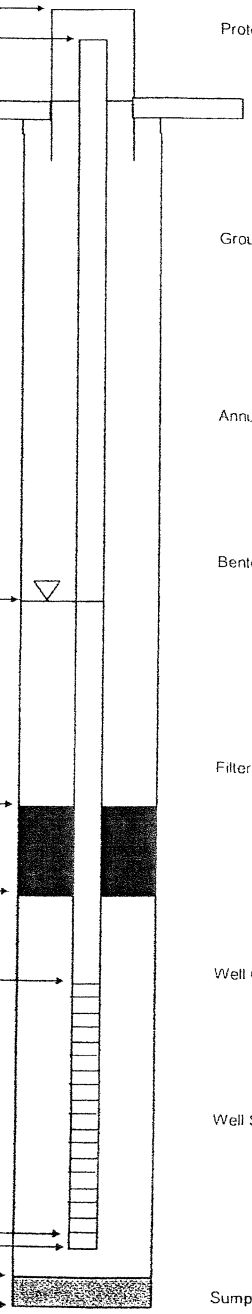
Top of Screen Interval (ft): 17.70'

Bottom of Screen Interval (ft): 27.70'

Bottom of Well (ft): 28.05

Bottom of Filter Pack (ft): 28.5'

Bottom of Borehole (ft): 29.0'



Protective Casing:

- Type: Steel
- Dimensions (in): 4" x 4"
- Length (ft): 5'
- Guard Post: 4- concrete filled

Ground Seal (Surface Pad)

- Dimensions: 4' x 4' x 4"
- Type: Concrete

Annular Space Seal

- Type: Bentonite-Cement Grout
- Installation: (Gravity) Tremie Pumped

Bentonite Seal:

- Manufacturer: Haliburton
- Type: Pellets Slurry (chips)
- Installation: 6-in lifts (One Section) Gravity Tremie Pumped
- Hydration time (hrs): >1 hr.

Filter Pack Material

- Manufacturer: Global Drilling Suppliers
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3.5 ft^3 (7-bags)
- Installation: Gravity (Tremie)

Well Casing:

- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing:

- Manufacturer: Campbell Monoflex
- Type: PVC
- Slot Size (in): .010 %Open
- Slot Type: Continuous wrap (factory slot)

Sump/End Cap: 0.35

Backfill Material: None

Shaw
Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929.

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

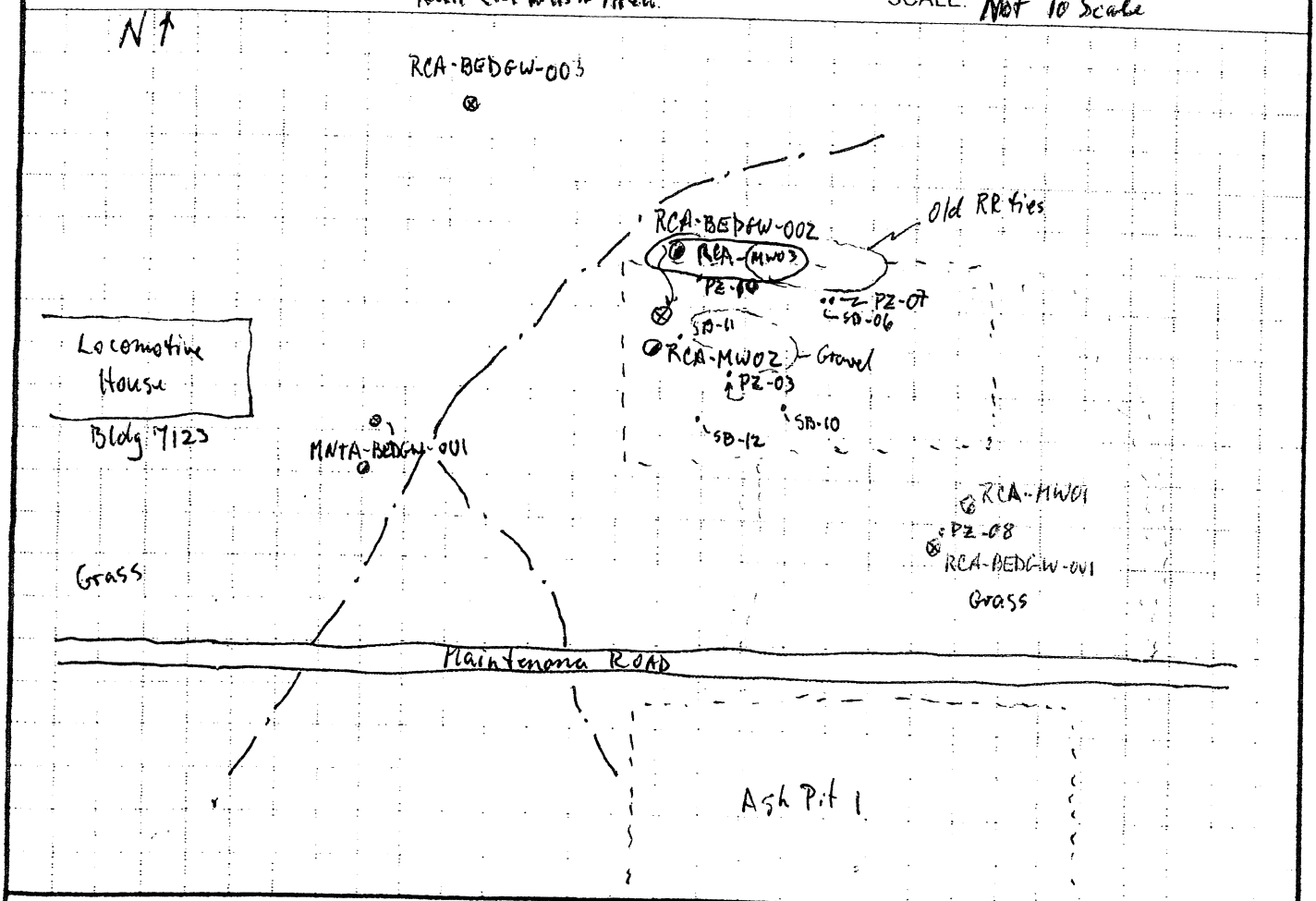
DISTRICT	Nashville, TN
HOLE NUMBER	RCA-MW03
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	A.E. Drilling
SHEET / SHEETS	1 OF 4
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Kevin Warren
6 MANUFACTURER'S DESIGNATION OF DRILL	All Terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. 2" split spoon sampler, 4.25" ID 8.25" OD HSA x 30'
8 HOLE LOCATION	Rail Car Wash Area - See Sketch
9 SURFACE ELEVATION	635.3 ft Northing: 623865.52 Easting: 1918827.90
10 DATE STARTED	3-18-09
11 DATE COMPLETED	3-20-09
12 OVERBURDEN THICKNESS	26.9
15 DEPTH GROUNDWATER ENCOUNTERED	23'
13 DEPTH DRILLED INTO ROCK	3.1'
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	30'
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	[signature]

LOCATION SKETCH/COMMENTS Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO.
PBOW	RCA-MW03

Shaw
Shaw E & I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW03

Project: PBOW | Geologist: E. Weaver | Sheet 2 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Dark yellowish brown (10YR 3/4) fine grain SAND, moist, loose (Fill)	SP					Posthole dig to 5" Start @ 1600
	1							
	2							Breathing Space Air O_2-21.1 H_2S-0 CO-0 LEL-0 VOC-0
		Black (10YR 2/1) CLAY with silt and fine grain sand, moist-med. stiff. (Fill)	CL					
	3							
	4				X			
		Dark yellowish brown (10YR 4/6) mottled gray, CLAY with silt and fine grained sand, moist-medium stiff, trace organics (roots) low plasticity						
	5				1612	4/4	1.0'	
	6					3/3	~~2/10~~	
	7				1615	4/4	1.5'	
	8	- grading to with shale fragments, 5%				2/3		
	9				1621	5/6	1.9'	
	0							

Project: PBOW | Hole Number: RCA-MW03

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Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW03

Project: PBOW | Geologist: E. Weaver | Sheet 3 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	11				1626	6/6 6/8	NR	
	12	Dark gray (10YR 4/1) SILT with shale fragments, 20% subrounded + subangular, moist - stiff low plasticity	ML		1629	7/8 9/9	2.0	
	13							
	14				1634	3/4 6/5	2.0	Breathing Space Air O_2 - 21.1 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	15							
	16	Gray (10YR 5/1) CLAY, high plasticity, moist, stiff	CL		1638	5/4 6/12	2.0	
	17	- grading to with silt, fine sand and shale fragments 10% low plasticity						
	18	- grading to very dark gray (10YR 3/1)			1641	5/7 12/12	2.0	
	19							
	20							

Project: PBOW | Hole Number: RCA-MW03

Shaw
Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-MW03

Project: PBOW

Geologist: E. Weaver

Sheet 4 of 4 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	21	Very dark gray (10YR 3/1) CLAY with silt, fine to coarse sand, and shale fragments 10%, low plasticity, moist	CL		1648	5/9 14/15	1.2	
	22							
	23				1656	20/30 30/20	1.0	
		Very dark gray (10YR 3/1) fine grain SAND, ~~wet~~ very dense	SP					
	24							
	25				1705	15/20 20/25 20/35 25/50		
		- grading to coarse grain SAND						
	26							
	27				1710	20/25 25/50 5in		Breathing Space Air O_2-21.1 H_2S-0 CO-0 LEL-0 VOC-0
		Shale, gray hard						
	28	- Augered to 30'.						
	29				No Sample collected			
	30	Boring Completed at 30'						

Project: PBOW Monitor Well installed at 28'

Hole Number: RCA-MW03

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Monitoring Well Construction Form

Project:	PBOW	Well Number:	RCA-MW03
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Railcar Wash Area
Client:	USACE - Nashville, TN	Installation Date	3-18-09
Subcontractor:	A.E. Drilling	Northing:	623865.52
Driller:	Tom Burnett	Easting:	1918827.90
Shaw Field Representative:	Eric Weaver	NAD: 83	NGVD: 1929

Shaw Project #-133767

Protective Cover Elevation (ft): 638.53

Top of Casing Elv (ft): 638.16

Top of Casing Stickup (ft): 2.2'

Land Surface Elv. (ft): 635.3

Approximate Diameter of Borehole (in): 8"

Well Casing Diameter (in): 2"

Depth to Water (ft)

During Drilling: ~23'

Date: 3-18-09

Post Development: — TOC

Date: —

Top of Bentonite Seal (ft): 13.5'

Top of Filter Pack (ft): 16.0'

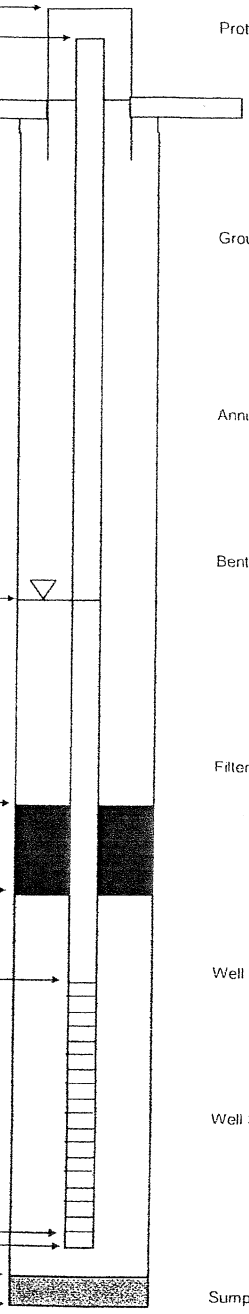
Top of Screen Interval (ft): 18.30'

Bottom of Screen Interval (ft): 28.30'

Bottom of Well (ft): 28.65'

Bottom of Filter Pack (ft): 29.0'

Bottom of Borehole (ft): 30.0'



Protective Casing:

Type: Steel

Dimensions (in): 4" x 4"

Length (ft): 5'

Guard Post: 4- concrete filled

Ground Seal (Surface Pad)

Dimensions: 4' x 4' x 4"

Type: Concrete

Annular Space Seal:

Type: Bentonite-Cement Grout

Installation: (Gravity) Tremie Pumped

Bentonite Seal:

Manufacturer: Haliburton

Type: Pellets Slurry (chips)

Installation: 6-in lifts (One Section)

Gravity Tremie Pumped

Hydration time (hrs): >1 hr

Filter Pack Material

Manufacturer: Global Drilling Suppliers

Product Name: Quartz Filter Pack Sand

Size: #7

Volume Added (ft^3): 2.5 ft^3 (5-bags)

Installation: Gravity (Tremie)

Well Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Diameter (in): 2"

Well Screen Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Slot Size (in): .010 %Open

Slot Type: Continuous wrap (factory slot)

Sump/End Cap: 0.35

Backfill Material: None

Shaw

Shaw E & I, Inc.

All elevations are referenced to the Ohio State Plane (North Zone) NAD 83 and vertical datum NGVD 1929.

Depths and heights are referenced to ground surface unless specified TOC

HTRW DRILLING LOG

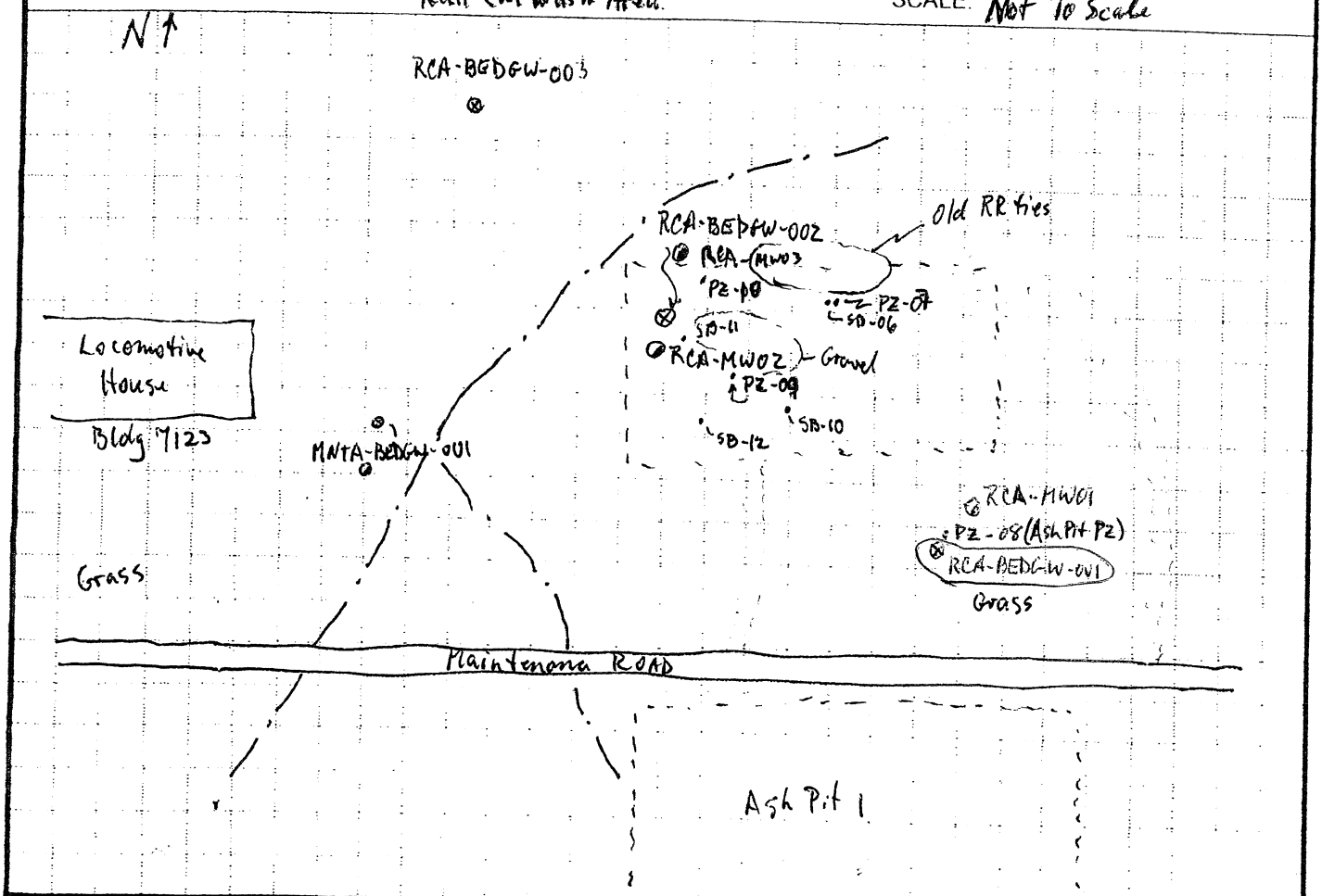
DISTRICT	Nashville, TN
HOLE NUMBER	RCA-BEDGW-001
SHEET / SHEETS	1 OF 10
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	A.E. Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Kevin Warren / Tom Burnett
6 MANUFACTURER'S DESIGNATION OF DRILL	All Terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Drilled w/ 4¼" ID / 8" OD HSA while continuously soil sampling w/ 1.4" ID x 2' length SS split-spoons. over-drilled borehole w/ 8¼" ID - 12" OD HSA to 24.5 ft. Bedrock cut w/ 8" OD rotary bit (wet) to 41.5 ft. Set 6⅝" OD / 6" ID black steel casing ~~41.6 ft~~ 41.6 ft Drilled 41.6 to 81.5 with 6" OD PQ core bit.
8 HOLE LOCATION	Rail Car Wash Area - See Sketch
9 SURFACE ELEVATION	~~638.83~~ ft 638.5 Northing: 623709.77 Easting: 1919022.35
10 DATE STARTED	3/18/09
11 DATE COMPLETED	3/29/09
12 OVERBURDEN THICKNESS	23.2 ft
13 DEPTH DRILLED INTO ROCK	58.3'
14 TOTAL DEPTH OF HOLE	81.5'
15 DEPTH GROUNDWATER ENCOUNTERED	5.5 ft overburden/shale / 65-75' Bedrock
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	5

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	David Kresh / S. W. Weaver

LOCATION SKETCH/COMMENTS Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO
PBOW	RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 2 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Grass						
	1	50ft. 2.5Y(2.5/1) black, homogeneous, low plasticity, SILT, trace of very fine grain SAND, organics, dry	ml	0.0	NA	NA	NA	Post-hole dug first 5-Feet
	2	2						
	3							Breathing Air/Background VOCs = 0.0 ppm (3.5) LEL = 0% O_2 = 20.8% H_2S = 0 ppm CO = 0 ppm H_2S odor in breathing from upwind well API-BEDGW-001
	4	Loose ~~Medium stiff~~ ~~pliff~~, (10YR 5/8) yellowish brown, mottled, brown, very fine grain, SAND wet at 5.5 ft	SP					
	5				5	3/4/3/2	1.1/2	S-1 Began drilling 3/18/09 0835 ▽ Encountered gw at 5.5' Blows/spoons driven by 140lb mechanical hammer.
	6			0.0				
	7	7.4			7	0840		S-2
	8	Medium stiff, (10YR 4/1) dark gray, homogeneous, low plasticity, ~~SILT~~ SILT, little clay (20%), wet	ml	0.0		2/3/4/6	1.5/2	
	9				9	0845		
	10					2/4/	2/	S-3

Project: PBOW | Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 3 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	10	10.5		0.0	NA	5/8	1/2	S-3 (cont)
						0850		
	11	Stiff, (10YR 4/1) dark gray, homogeneous, high plasticity, silty CLAY, dry				2/4/6/7	2/2	S-4
	12	silt content varies 30-45%, shale fragments 3%, rounded	ch	0.0				
						0855		
	13	Sandy lense @ 12.8-12.9 with shale fragments				5/5/6/9	2/2	S-5
	14	shale pebble 14.4" color (value) decreases to (10YR 3/1) very dark gray		0.0				
						0900		
	15					4/5/5/8	1.4/2	S-6
	16		ch	0.0				
						0905		
	17					3/4/6/9	2/2	S-7
	18			0.0				
						0920		
	19					3/4/	1.8/	S-8
	20			0.0				

Project: PBOW | Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 4 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blow	Recovery (ft)	Remarks
	20	Stiff, (10YR 3/1) very dark gray, high plasticity, silty CLAY, sand lenses periodic, silt content variable, dry		0.0	NA	5/12	1.2	S-8 (cont)
					21	0925		
	21		Ch			7/5/	1.7/	S-9
		Fracture in clay lined w/ dark brown (manganese) material at 20.6-20.8'		0.0		7/7	2.0	
	22	cobble in shoe at 22.7' 1m						
					23	0930		
	23	23.2				7/9/	0.6/	S-10 large pebble above shale
		SHALE, gray, highly weathered, friable, thinly laminated, dry		0.0		12/17	2	
	24							
					25	0935		
	25					15/19/	1.3/	S-11
				0.0		23/25	2	
	26							4¼" DHSA refusal @ 26'
					27	0945		
	27							
	28							
	29							
	30							

Project: PBOW | Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 5 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	30	SHALE, gray	NA		NA	NA	NA	
	31							
	32			0.0				Background/Breathing Air: VOC = 0.0 ppm (7.4) LEL = 0% O_2 = 20.8% H_2S = 0 ppm CO = 0 ppm
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							

Project PBOW | Hole Number: RCA-BEDGW-001

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56.1

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: D. Kesslee/E. Weaver | Sheet 6 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or Core~~ Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
	40	SHALE	NA					Set steel casing at 41.6 ft
								8" OD Rotary Bit cut to 41.5. (LM encountered 41.2 ft)
	41	41.2						
		LIMESTONE, dark gray, massive bedding, fossiliferous (bracks, corals), Intensely fractured, hard, slightly weathered,			Box #1	41.8		41.5-46.5
	42					42.0		C-1 (~~41.5~~-~~46.5~~)
						42.2		
						42.4		Run - ~~4.5~~ 5.0
		- grading to highly fractured				42.7		Rec - ~~4.5~~ 4.5
	43							Start - 1538
		- grading to moderately fractured				43.2		End - 1543
								5' run only recovered 4.5' tagged bottom @ 46.5' lost 0.5' (washed out)
	44							
						44.7		Breathing Space Air O_2 - 20.9
	45					45.2 - Mechanical Break		H_2S - 0
								CO - 0
								LEL - 0
								VOC - 0
	46							5 ~~46.2~~
						46.5' Mechanical Break		C-2 (46.~~7~~-51.~~2~~) 5
	47							Run - 5.0
								Rec - 4.6
								Start - 1550
								End - 1554
	48					47.8		Tagged bottom at 51.1'. 0.4' still in hole.
	49							
						49.4		
	50							

Project: PBOW | Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 7 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech, Sample or~~ Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	50	LIMESTONE dark gray, massive bedding, fossiliferous (bracks, corals) highly fractured, hard, slightly weathered.			Box #1 cont	50.1 50.4 50.5		
	51				51.1 Box #2	51.1 51.3		
	52					52.0		C-3 (51.5-56.5) Run 5.0 Rec
	53	- grading to light gray - grading to moderately fractured.				52.8 53.3		Start 1608 End - 1612 Tagged bottom @ 56.1. 0.4' fill in hole
	54	- petroleum hydrocarbon staining to 68.0'				54.6		Breathing Space Air O_2 - 20.8 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	55							
	56					56.1		Start 3-26-09
	57					57.1		C-4 (56.5-61.5) Run - 5.0 Rec - 5.3 Start - 0830 End - 0837
	58					58.3		Recovered extra 0.2' from Previous runs.
	59							
	60					59.9		

Project: PBOW | Hole Number: RCA-BEDGW-001

Shaw E&I, Inc.

HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW

Geologist: E. Weaver

Sheet 8 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No. Fracs	Recovery (ft)	Remarks
		LIMESTONE, ~~[illegible]~~ light gray, massive bedding, fossiliferous (branch, corals), highly fractured, hard, slightly weathered.			Box #2 Cont.			Breathing Space Air O_2 - 20.8 H_2S - 0 CO - 0 LEL - 0 VOC - 0
	61				61.1			
					Box #3	61.1 ~~61.3~~ ~~61.5~~ 61.5		61.5 C-5 (61.5-66.5) Run - 5.0 Rec - 5.0 Start - 0850 End - 0859 Attempted to tag bottom but Tom said there are some cuttings and could not get an accurate depth.
	62					~~62.1~~ 62.1		
	63					~~62.7~~ 62.8		
						~~63.3~~ 63.5		
	64					64.0		
						~~64.3~~ ~~64.4~~ 64.5 64.6		
	65							
						~~65.4~~ 65.5		
	66							
						66.4		66.5 C-6 (66.5-71.5) Run 5.0 Rec ~~[illegible]~~ 5.0 Start - 0914 End - 0920
	67					66.8		
						67.3		
	68					68.1 68.2		
						68.5		
	69	- Coral Reef to 70.2' Petroleum hydrocarbon seeping from coral reef.				68.9		
						69.7 69.9		
	70	~~Coral Reef~~						

Project: PBOW

Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 9 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (brachs, corals) highly fractured, hard, slightly weathered.				~~70.7~~ 70.8		water believed to come from fracs 65-75'
	71					70.9		
						71.5		71.5
								C-9 (71.5-76.5)
	72							Run - 5.0
						72.2		Rec - 5.0
						72.4		Start - 1050
								End - 1057
	73					73.0		Breathing Space AV
						73.1		O_2 - 20.8
						73.6		H_2S - 0
								CO - 0
	74					74.0		LEL - 0
								VOC - 0
						74.5		
	75							
						75.3		
						75.9		
	76							
		- grading to moderately fractured				76.5		76.5
								C-8B (76.5-81.5)
	77							Run - 5.0
								Rec - 5.0
								Start - 1104
								End - 1109
	78							
						78.8		
	79							
	80							

Project: PBOW | Hole Number: RCA-BEDGW-001

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-001

Project: PBOW | Geologist: E. Weaver | Sheet 10 of 10 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		LIMESTONE, light gray, fossiliferous (bracks, corals) massive bedding, moderately fractured, hard, slightly weathered.						
	81							81.5
		Boring Completed Monitor Well set @ 80.0'						
	82							
	83							
	84							
	85							
	86							
	87							
	88							
	89							
	90							

Project: PBOW | Hole Number: RCA-BEDGW-001

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Monitoring Well Construction Form (Bedrock)

Project:	PBGW	Well Number:	RCA-BEDGW-001
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Rocket Wash Area
Client:	USACE - Nashville, TN	Installation Date	3-26-09
Subcontractor:	A.E. Drilling	Northing:	623709.77
Driller:	Kevin Warren / Tom Burnett	Easting:	1919022.35
Shaw Field Representative:	David Kessler / Eric Weaver	Shaw Project Number:	133767

Protective Cover Elevation (ft): 641.38

Top of Casing Elevation (ft): 641.02

Top of Casing Stickup (ft): 2.67

Land Surface Elevation (ft): ~~638.83~~ HK 638.5

Approximate Diameter of Section 1 Borehole (in): 12" to 24.5' / 8" to 41.5'

Diameter of Surface Casing (in): 6 5/8" OD / 6" ID

Depth to Bedrock (ft): 23.2'

Bottom of Surface Casing (ft): 41.6'

Used 10 bags @ 94 lbs each, Portland Type I/II cement bentonite to seal isolation casing.

Depth to Water (ft):

During Drilling: ~65 to 75'

Date: 3-26-09

Post Development: — TOC

Date: —

Approximate Diameter of Section 2 Borehole (in): 6"

Well Casing Diameter (in): 2"

Top of Bentonite Seal (ft): 58.2'

Top of Filter Pack (ft): 61.7'

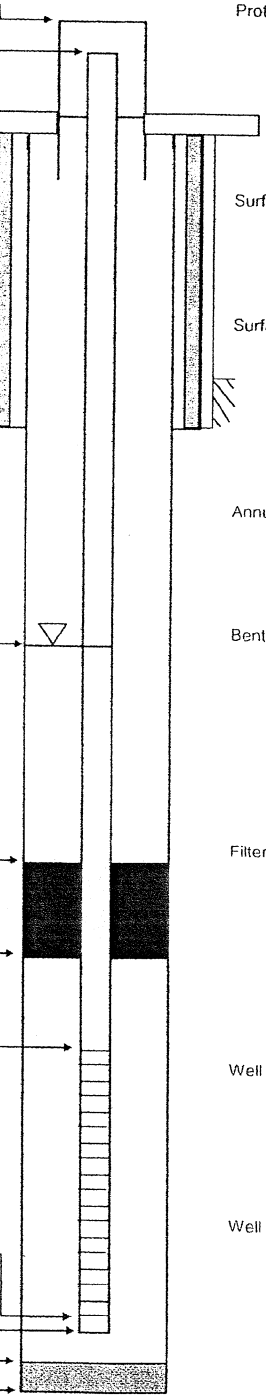
Top of Screen Interval (ft): 65.0'

Bottom of Screen Interval (ft): 80.0'

Bottom of Well (ft): 80.35'

Bottom of Filter Pack (ft): 81.5'

Bottom of Borehole (ft): 81.5'



Protective Casing:

Type: Steel

Dimensions (in): 4"x4"

Length (ft): 5'

Guard Post: 4 - concrete filled

Surface Pad:

Dimensions: 4'x4'x4"

Type: Concrete

Surface Casing:

Type: Black Steel

Diameter (in): 6 5/8" OD / 6" ID

Installation: Tremie Haliburton

Cementing Plug ~~Other Plug~~ Johnson Grout Shoe

Annular Space Seal:

Type: Bentonite-Cement Grout

Installation: Gravity (Tremie) Pumped

Bentonite Seal:

Manufacturer: Haliburton

Type: (Pellets) Slurry

Installation: 6-in lifts (One Section)

Gravity (Tremie) Pumped

Hydration time (hrs): > 1 hr

Filter Pack Material:

Manufacturer: Global Drilling Suppliers

Product Name: Quartz Filter Pack Sand

Size: #7

Volume Added (ft^3): 3.5 ft^3 (7-bags)

Installation: Gravity (Tremie)

Well Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Diameter (in): 2"

Well Screen Casing:

Manufacturer: Johnson

Type: PVC

Slot Size (in): .010 %Open

Slot Type: (Continuous wrap) Factory slot

Sump/End Cap: 0.35'

Backfill Material: None

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Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

HTRW DRILLING LOG

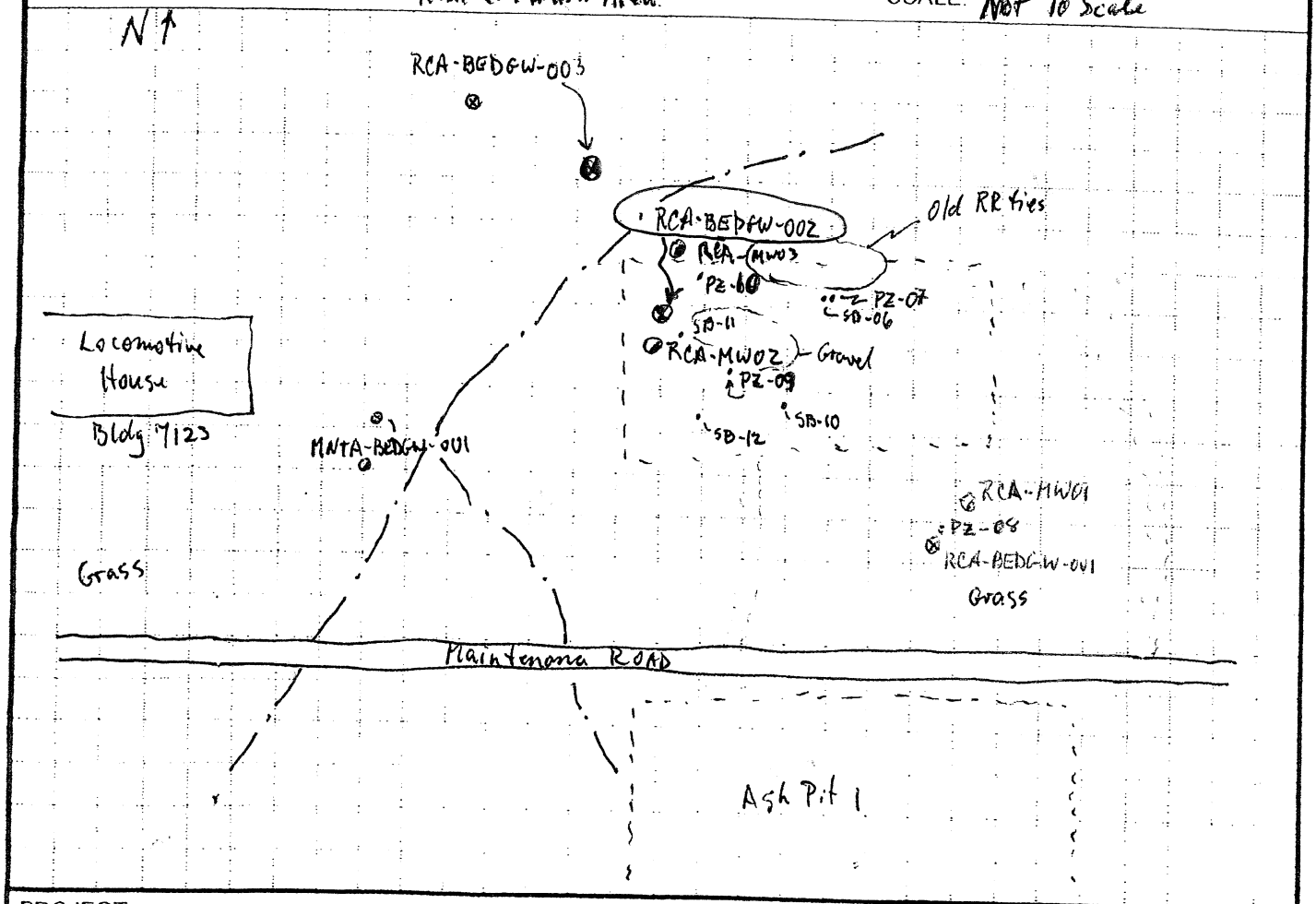
DISTRICT	Nashville, TN
HOLE NUMBER	RCA-BEDGW-002
SHEET / SHEETS	1 OF 8
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	A.E. Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Kevin Warren/Tom Burnett
6 MANUFACTURER'S DESIGNATION OF DRILL	All Terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Drilled w/ 4¼" ID/8" OD HSA to 26' Continuously sampled w/ 1.4" x 2 ft length split-spoon samplers. Overdrilled w/ 8¼" ID, 12" OD HSA to 24.5 ft. Drilled wet w/ 8" OD Rotary bit to 37.5 ft. Black Steel 6⅝" OD/6" ID isolation casing set at 37.3 ft. Drilled 37.3' to 66.0' with 6" PQ Core bit.
8 HOLE LOCATION	Rail Car Wash Area - See Sketch
9 SURFACE ELEVATION	635.5' Northing: 623,832.46 Easting: 1918842.57
10 DATE STARTED	3/17/09
11 DATE COMPLETED	3/29/09
12 OVERBURDEN THICKNESS	26 ft
13 DEPTH DRILLED INTO ROCK	40'
14 TOTAL DEPTH OF HOLE	66.0'
15 DEPTH GROUNDWATER ENCOUNTERED	Encountered surface water 3.3 ft / ~~53~~ 53.8' Bedrock
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	NA	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	David Kopsh / Eric W. Weaver

LOCATION SKETCH/COMMENTS Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO
PBOW	RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: D. Kressler | Sheet 2 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Fill: (Loose, (10YR 3/3) dark brown, homogeneous, very fine grain, SAND, little silt (15%), moist)	sm		NA	NA	NA	Began post-hole digging first 5-feet Fill: Is native soil.
	1	1						
		Loose, (10YR 5/4) yellowish brown, very fine grain, SAND, trace of silt, moist	sp	0.0				Breathing Air / Background VOCs = 0.0ppm LEL = 0% H_2S = 0ppm CO = 0ppm O_2 = 20.8%
	2							
	3							
		4						▽ Groundwater / Surface water Encountered 3.3 ft
	4							Blows driven by 140lb mechanical hammer.
	5	Medium stiff, (10YR 4/6) dark yellowish brown, mottled (gray), 40%, low plasticity, little sand (15%), very fine grain, silty CLAY, wet	cl	0.0	5	2/3/3/4 0740	1.7/2	S-1 Began drilling 3/17/09 0740
	6							
	7	Medium stiff, (10YR 5/3) brown, mottled (20%, yellowish brown), high plasticity silty CLAY, trace sand, wet	ch	0.0	7	2/2/3/4 0750	2/2	S-2 Background / Breathing Air VOC = 9.9ppm (0.0) LEL = 0% O_2 = 20.8% H_2S = 0ppm CO = 0ppm
	8							
	9			0.0	9	3/3/	2/	S-3
	10							

Project: PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: D. Kyssler | Sheet 3 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	10		ch		NA	2/3	1/2	S-3 (cont'd)
		11				0750		
	11	Medium stiff, (10YR ~~5/3~~ 4/6) dark yellowish brown, mottled (10% gray), no plasticity, SILT, little clay 20%, wet	ml	0.0	4	2/3/3/4	1.8/2	S-4
	12	12.7				0800		
	13	Medium stiff, (10YR 4/1) dark gray, homogeneous, high plasticity, silty CLAY, wet	ch	0.0	13	2/2/3/3	2/2	S-5
	14					0805		
	15	1m pebble		0.0	15	2/3/3/4	0.8/2	S-6 Angular 1m pebble prevented full recovery
	16							
	17		ch	0.0	17	0810		S-7
	18					2/3/4/3	2/2	
	19	19.1			19	0815		
	20	Stiff, (10YR 3/1) very dark gray, homogeneous, SILT,	ml			4/5/	1.8/	S-8

Project PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: D. Kessler | Sheet 4 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	20	Very stiff, (10yR 3/1) very dark gray homogeneous, no plasticity, SILT, trace sand-very fine grain, trace ~~of~~ clay, shale fragments 5% sand lenses 20.6-20.7' and 20.8-20.9', very coarse grain	ml	0.0	NA	18/5	1/2	S-8 (cont)
	21				21	0820		
	22			0.0		6/7/ 13/12	2/2	S-9
	23	sand lense 23-23.2' very coarse gr 23.3			23	0825		
	24	Dense, (10yR 3/1) very dark gray, SAND, little silt 10%, sand begins at very fine grain and increases (grades) with depth to very coarse grain, subrounded to rounded grains, wet	SP	0.0		11/12/ 18/21	2/2	S-10 gradational sand size w/depth 8 1/4" ID HSA drilled to 24.5'
	25				25	0840		
	26	26		0.0		11/12/ 50 on 5"	1.4/ 1.4	S-11
		SHALE, highly weathered, soft, gray, dry	NA		26.4	0850		4 1/4" ID HSA refusal @ 26.4'
	27					NA	NA	
	28							
	29							
	30							

Project PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: [illegible] E. Weaver | Sheet 5 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or~~ Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
	30	SHALE, gray, highly weathered	NA		NA	NA	NA	
	31			0.0				
	32							Background/Breathing VOC = 0.0 ppm (9.7) LEL = 0% O_2 = 20.8% CO = 0 ppm H_2S = 0 ppm
	33							
	34							
	35							
	36							
	37	37.3						8" OD rotary bit ~~6 3/4" ID HSA~~ cut to 37.5'
	38	LIMESTONE, dark gray, fossiliferous (brachs, corals), massive bedding, moderately fractured, hard, slightly weathered — Intense fracturing to 38.6'			Box #1	38.2 38.3 38.4 38.5 38.6		6" casing grouted at 37.3' (PVC grout shoe will be drilled out) C-L (37.3-41.0) Run 3.7 Rec 3.7 Start 1525 End 1530
	39							
	40							

Project: PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: E. Weaver | Sheet 6 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample~~ or Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
	40	LIMESTONE, dark gray, massive bedding, fossiliferous (brachs, corals), highly fractured, hard, slightly weathered.	NA		Box #1 Cont-			
	41					41.0 - Mechanical Break		41.0
								C-2 (41.0-46.0)
								Run 5.0
								Rec 5.0
	42							Start 1540
								End 1545
	43					43.1		Breathing Space Air
								O_2 - 20.8
								H_2S - 0
								CO - 0
	44					44.1		LEL - 0
								VOC - 0
		- intense fracturing to 45.1'				44.8, 44.9, 45.0, 45.1		
	45							
		- intense fracturing to 46.0'				45.5, 45.6, 45.7, 45.8		
					46.0'			
	46					46.0		46.0
					Box #2	46.2		C-3 (46.0-51.0)
								Run - 5.0
		- intense fracturing to 47.0'				46.7, 46.8, 46.9, 47.0		Rec - 5.0
	47							Start - 1553
								End - 1558
						47.6		
	48							
		- intense fracturing to 49.0'				48.6, 48.7, 48.8		
	49					49.0		
	50							

Project: PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: E. Weaver | Sheet 7 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or Core Box No.~~	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (brachs, corals), highly fractured, hard, slightly weathered.	NA		Box #2 cont.	50.4	NA	
								Start 3-27-09 51.0
	51					51.0		C-4 (51.0-56.0)
						51.4		Run 5.0
						51.6		Rec 4.4
	52							Start-0820
								End-0828
						52.6		Breathing Space Air
	53							O_2-20.8
								H_2S-0
								CO-0
		- suspected water bearing fracture				53.8		LEL-0
	54	- suspected water bearing fracture				54.1		VOC-0
								Tagged bottom @ 55.4'. 0.6' still in hole.
	55							
					55.4' Box #3	55.4		
								56.0
	56					56.1		C-5 (56.0-61.0)
						56.6		Run 5.0
								Rec 5.4
	57	I-petroleum hydrocarbon seepage						Start-0836
								End-0843
		- suspected water bearing fracture				57.5		
	58	I-petroleum hydrocarbon seepage.						Tagged bottom @ 60.8'. Recovered. 0.6 from last run. 0.2 from this run
	59					58.9		Still in hole.
						59.5		
						59.8		
	60					60.0		

Project: PBOW | Hole Number: RCA-BEDGW-002

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-002

Project: PBOW | Geologist: E. Weaver | Sheet 8 of 8 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No. Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (brachs, corals), highly fractured, hard, slightly weathered.			Box #3 Cont-			
						60.8		
						60.9		61.0
	61	possible water bearing fracture @ 60.9						C-6 (61.0-66.0)
								Run - 5.0
								Rec - 5.2
	62	- possible water bearing fracture				62.1		Start - 1045
		- possible water bearing fracture				62.3		End - 1052
						62.9		Breathing Space Air
	63							O_2 - 20.8
		- intensely fractured to 64.4' possible water bearing fracture				63.6		H_2S - 0
						63.7		CO - 0
						63.9		LEL - 0
	64					64.1		VOC - 0
					64.4	64.3		
					Box #4	64.4		
	65					65.2		
	66				66.0'			66.0
		Boring Completed Monitoring Well Installed						
	67							
	68							
	69							
	70							

Project: PBOW | Hole Number: RCA-BEDGW-002

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Monitoring Well Construction Form (Bedrock)

Project:	PBOW	Well Number:	RCA-BEDGW-002
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Near Wash Area
Client:	USACE-Nashville, TN	Installation Date	3-27-09
Subcontractor:	A.E. Drilling	Northing:	623832.46
Driller:	Kevin Warren / Tom Burnett	Easting:	1918842.57
Shaw Field Representative:	David Kessler / Eric Weaver	Shaw Project Number:	133767

Protective Cover Elevation (ft): 638.42

Top of Casing Elevation (ft): 638.03

Top of Casing Stickup (ft): 2.15

Land Surface Elevation (ft): 635.5

Approximate Diameter of Section 1 Borehole (in): 12" to 24.5' / 8" to 37.5'

Diameter of Surface Casing (in): 6 5/8" OD / 6" ID

Depth to Bedrock (ft): 26.0'

Bottom of Surface Casing (ft): 37.3'

Used 6 @ 94 lbs bags, Portland Type I/II cement with bentonite to seal isolation casing

Depth to Water (ft):

During Drilling: NS3.8'

Date: 3-27-09

Post Development: — TOC

Date: —

Approximate Diameter of Section 2 Borehole (in): 6"

Well Casing Diameter (in): 2"

Top of Bentonite Seal (ft): 45.0'

Top of Filter Pack (ft): 48.0'

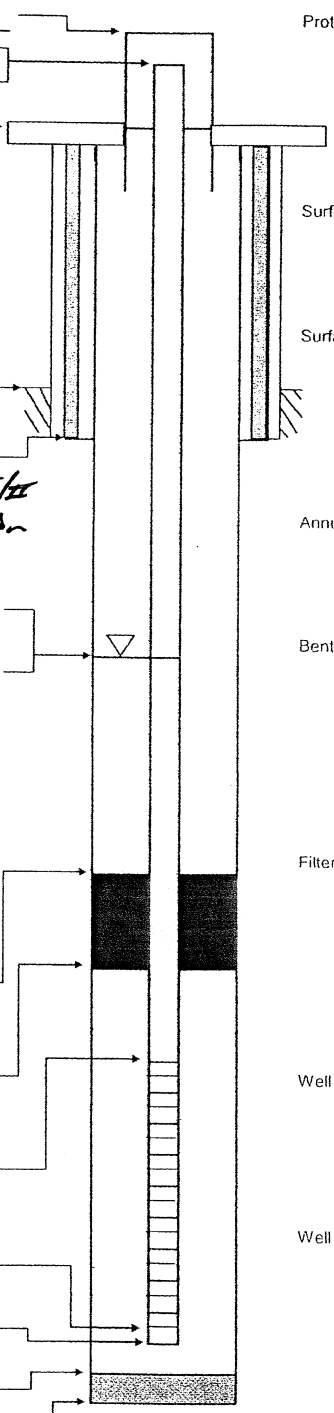
Top of Screen Interval (ft): 50.0'

Bottom of Screen Interval (ft): 65.0'

Bottom of Well (ft): 65.35'

Bottom of Filter Pack (ft): 66.0'

Bottom of Borehole (ft): 66.0'



Protective Casing:

Type: Steel

Dimensions (in): 4"x4"

Length (ft): 5'

Guard Post: 4-concrete filled

Surface Pad:

Dimensions: 4'x4'x4"

Type: Concrete

Surface Casing:

Type: Black Steel

Diameter (in): 6 5/8" OD / 6" ID

Installation: Tremie Haliburton Cementing Plug ~~Other Plug~~ Johnson Grout shoe

Annular Space Seal:

Type: Bentonite-Cement Grout

Installation: Gravity (Tremie) Pumped

Bentonite Seal:

Manufacturer: Haliburton

Type: (Pellets) Slurry

Installation: 6-in lifts (One Section)

Gravity (Tremie) Pumped

Hydration time (hrs): >1 hr.

Filter Pack Material:

Manufacturer: Global Drilling Suppliers

Product Name: Quartz Filter Pack Sand

Size: #7

Volume Added (ft^3): 3 ft^3 (6-bags)

Installation: Gravity (Tremie)

Well Casing:

Manufacturer: Campbell Monoflex

Type: PVC

Diameter (in): 2"

Well Screen Casing:

Manufacturer: Johnson

Type: PVC

Slot Size (in): .010 %Open

Slot Type: (Continuous wrap) Factory slot

Sump/End Cap: 0.35'

Backfill Material: None

Shaw

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Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

HTRW DRILLING LOG

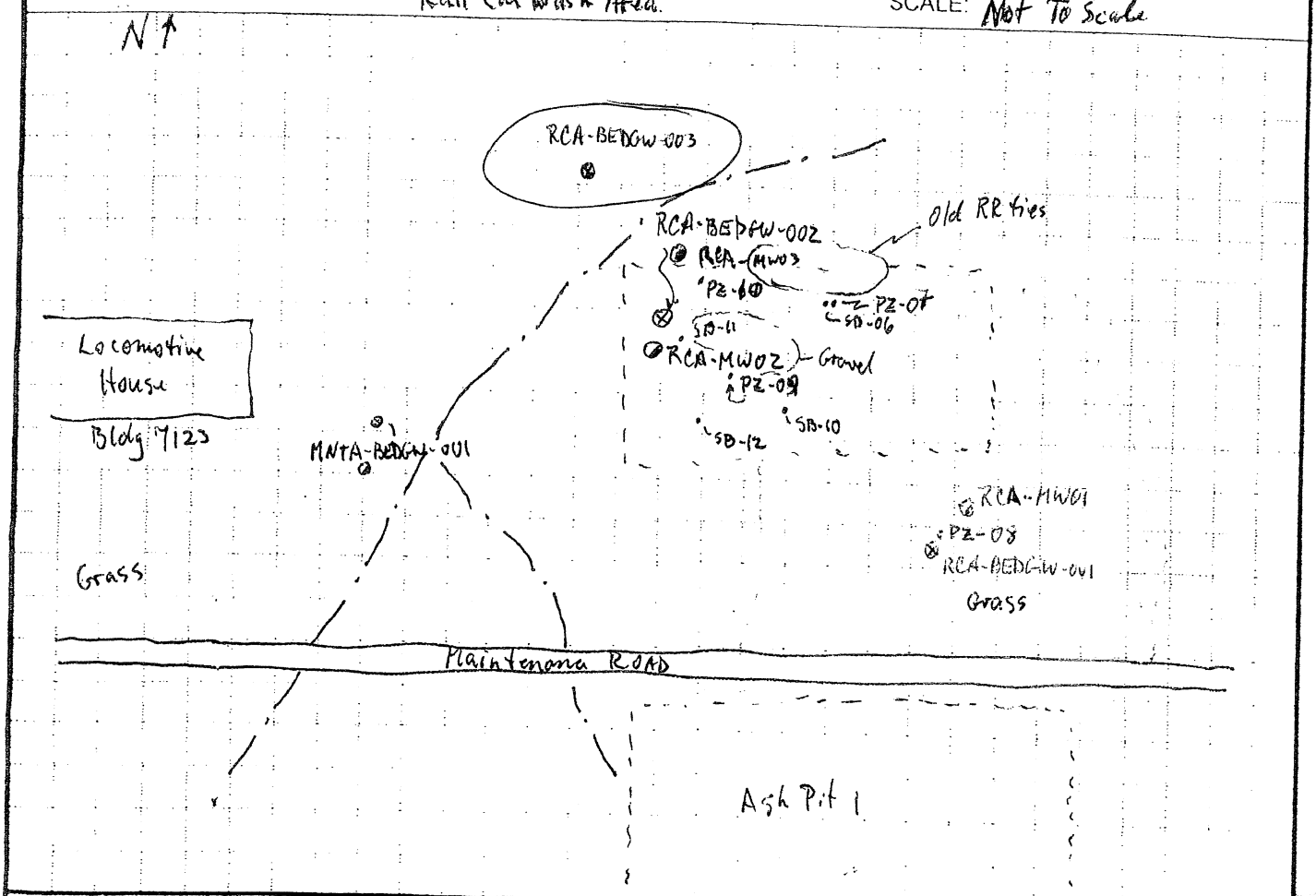
DISTRICT	Nashville, TN
HOLE NUMBER	RCA-BEDGW-003
SHEET / SHEETS	1 OF 12
1 COMPANY NAME	Shaw E+I
2 DRILL SUBCONTRACTOR	A.E. Drilling
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Kevin Warren / Tom Burnett
6 MANUFACTURER'S DESIGNATION OF DRILL	All Terrain CME-750
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	Post hole dug first 5 ft. Drilled w/ 4"9"ID + 8"OD HSA. Continuously sampling w/ 1.4"ID, 2 ft length split-spoons. Overdrilled borehole w/ 8"ID, 12"OD HSA to ~~30 ft~~ 41.5 ft, Set steel casing at 35.5 ft. Cored rock w/ 6" PQ core 6.7 to 105.8"
8 HOLE LOCATION	Rail Car Wash Area - See Sketch
9 SURFACE ELEVATION	634.3 ft — Northing: 623916.92, Easting: 1918767.69
10 DATE STARTED	3/19/09
11 DATE COMPLETED	3/29/09
12 OVERBURDEN THICKNESS	24.8 ft
15 DEPTH GROUNDWATER ENCOUNTERED	Overburden 7.4 ft / bedrock 91.1
13 DEPTH DRILLED INTO ROCK	81.0 ft
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	—
14 TOTAL DEPTH OF HOLE	105.8 ft
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	—

18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	8

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	NA	NA	NA	NA	NA	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	2" PVC	NA	David Kessler / E.W. Weaver

LOCATION SKETCH/COMMENTS Rail Car Wash Area. SCALE: Not To Scale



PROJECT	HOLE NO.
PBOW	RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: D. Kussler | Sheet 2 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
		Weeds						
	1	Soft, 2.5Y(2.5/1) black, homogeneous, low plasticity, SILT, trace of very fine grain sand, organics (roots), dry 1.5	ml		NA			Post-hole dug first 5 ft - 3/19/09
	2, 3	Medium stiff, (10YR 2/2) very dark brown, mottled (10%)(brown), low plasticity, silty CLAY, rock fragments (1cm), dry	Cl					
	4							
	5				5			NM - Not measured. Water not formation
	6	6.1		NM		3/4/ 3/3	2/2	S-1 Begin drilling 3/19/09
	7	Medium stiff, (10YR 5/2) grayish brown, mottled (30% - yellowish brown), high plasticity, Silty CLAY, dry 7.8	ch	NM	7	1225 2/3/ 3/3	1.8/2	S-2 ▽ Encountered gw 7.4 ft (very moist)
	8	Medium stiff (10YR 3/3) dark brown mottled (5% - reddish br), clayey SILT, dry	ml		9	1230		
	9			NM		4/3/	1.8	S-3
	10							

Project: PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: D. Kessler | Sheet 3 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	10	10.2			NA	1/4/4	1/2	S-3 (cont)
		Medium stiff, (10YR 4/1) dark gray, homogeneous, high plasticity, silty CLAY, moist				1235		
	11		ch	0.0	11	2/3/3/4	2/2	S-4 Background/Breathing Air VOC = 0.0ppm LEL = 0% O_2 = 20.8% H_2S = 0ppm CO = 0ppm
	12	silt content 10-30%						
		shale fragments begin at 11.5 ft coarse grain size, rounded < 1%, core dry				1240		
	13			0.0	13	3/4/4/5	1.7/2	S-5
	14							
		Shale fragments increase in number and size w/depth consistency increases w/ depth				1245		
	15			0.0	15	4/5/5/5	2/2	S-6
	16		ch					
	17					1250		
				0.0	17	4/6/9/13	2/2	S-7
	18	18.5						
	19		cl		19	1255		
				0.0		9/12/	2/	S-8
	20							

Project PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: D. Kessler | Sheet 4 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	~~Analytical Sample No.~~ Blows	Recovery (ft)	Remarks
	20	Very stiff, (10YR 4/1) dark gray, homogeneous, low plasticity, silty CLAY, trace of very fine grain sand (5%), dry shale fragments 10% silt content 40%		0.0	NA	15/19	1/2	S-8 (cont)
					21	1300		
	21		cl			7/11/13/19	2/2	S-9
	22			0.0				
	23				23	1310		S-10
	24			0.0		9/11/14/22	2/2	Drilled 8 1/4" ID HSA to 19.5 ft.
		24.8						
	25	SHALE, gray, high weathered, friable, dry	NA	NA	25	1320		
	26					26		4 1/4" ID HSA refusal at 26 ft
	27							
	28							
	29							
	30							

Project PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW

Geologist: D. Kessler / E. Weaver

Sheet 5 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech. ~~Sample or~~ Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
	30	SHALE, gray			NA			
	31							
	32							
	33							
	34							
	35	Start 3-27-09						Set 6 5/8" HD/6" ID Steel casing at 35.5 ft
	36	LIMESTONE, dark gray, massive bedding, fossiliferous (brachs, corals) highly fractured, hard, slightly weathered. (Intense fracturing 36.3-36.7 - grading to moderately fractured	NA	NA	Box #1	35.8 - Mechanical Break 36.3 36.4 36.5 36.7		Encountered limestone @ 35.4 ft. Drilled to 35.6 ft C1 (35.5-35.8) Run - 0.3 Rec - 0.3 Start - 1545 End 1551 Tassed bottom @ 35.8 C-2 (35.8-40.8) Run - 5.0 Rec - 5.0 Start - 1556 End - 1600
	37							
	38							
	39							
	40							

Project PBOW

Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: E. Weaver | Sheet 6 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or~~ Core Box No.	~~Analytical Sample No.~~	Recovery (ft)	Remarks
	40	LIMESTONE, dark gray massive bedding, fossiliferous (brachs, corals), moderately fractured, hard, slightly weathered.	NA	NA	Box #1 cont.			40.8
	41					41.3		C-3 (40.8-45.8) Run-5.0 Rec-4.9 Start-1608 End-1613
	42							Breathing Space Air O_2-21.2 H_2S-0 CO-0 LEL-0 VOC-0
	43	- intense fracturing to 44.1				42.9 43.0 43.1 43.3 43.5 43.7 43.8		
					43.0' Box #2			
	44					44.0 44.1		
		- intense fracturing to 45.0				44.7 44.8		
	45					45.0		
						45.7		
	46							C-4 (45.8-50.8) Run-5.0 Rec-5.0 Start-1620 End-1625
		- grading to light gray				46.8		
	47					47.0		
	48					48.4		
	49					49.5		
	50							

Project PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: E. Weaver | Sheet 7 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech. Sample or~~ Core Box No.	~~Analytical Sample No.~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracks, corals), highly fractured, hard, slightly weathered.	NA	NA	Box #2 cont-			Start 3-28-09 50.8
	51							C-5 (50.8-55.8)
						51.3		Run - 5.0
								Rec - 4.9
						51.8		Start - 0804
	52					52.0		End - 0809
						52.2		
								Breathing Space Air
					52.9'	52.9		O_2 - 20.8
	53				Box #3			H_2S - 0
								CO - 0
						53.4'		LEL - 0
								VOC - 0
	54							Tagged bottom of hole @ 55.7'
						54.2		
						54.6		
	55							
						55.6		55.8
	56							C-6 (55.8-60.8)
						56.3		Run - 5.0
								Rec - 5.2
								Start - 0815
	57							End - 0821
								Tagged bottom of hole @ 60.8'
		- potential water bearing fracture				57.8'		
	58					57.9		
						58.0		
	59					58.9		
						59.2		
	60							

Project: PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: B. Weaver | Sheet 8 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech Sample~~ ~~or~~ Core Box No.	~~Analytical Sample No.~~ Frags	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (bracks, corals), highly fractured, hard, slightly weathered.	NA	NA	Box #3 Cont.	60.2		
						60.8		60.8
	61					~~60.9~~		C-7 (60.8-65.8)
								Run - 5.0'
						61.6		Rec - 5.0
								Start - 0832
	62					62.1		End - 0838
		- Coral Reef down to 63.7'				62.4		
		Petroleum hydrocarbon seepage from coral reef			62.7	62.7		Tagged bottom of hole @ 65.8
	63				Box #4	62.9		
	64							
		- potential water bearing fracture	NW			64.3		
		- petroleum hydrocarbon staining to 66.7'						
	65							
		- Petroleum hydrocarbon seepage 65.5-65.8'						
								65.8'
						65.8		
	66							C-8 (65.8-70.8)
						66.4		Run 5.0
								Rec 5.2
						66.9		Start 1050
	67							End 1055
		- potential water bearing fracture	NW			67.3		Breathing Space Air
		- grading to moderately fractured w/ petroleum hydrocarbon staining to 80.2'.				67.6		O_2 - 20.8
	68							H_2S - 0
								CO - 0
								LEL - 0
								VOC - 0
	69							Attempted to tag bottom, but could not get good tag due to cuttings in hole
						69.3		
	70							

Project PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW

Geologist: E. Weaver

Sheet 9 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech.~~ Sample ~~or~~ Core Box No.	~~Analytical Sample No:~~ Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (brach, corals), moderately fractured, hard, slightly weathered	NA	NA	Box #4 Cont.			70.8
	71				71.0 Box #5	71.0		C-9 (70.8-75.8) Run - 5.0 Rec - 4.9 Start - 1100 End - 1205
	72							
	73							
	74							
	75					75.5 - Mechanical Break		75.8
	76					75.9 - Mechanical Break		C-10 (75.8-80.8) Run - 5.0 Rec - 5.1 Start - 1325 End - 1332
	77					77.1		
	78	- grading to slightly fractured.				78.0		
	79							
	80							

Project: PBOW

Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: E. Weaver | Sheet 10 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech Sample~~ or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		LIMESTONE, light gray massive bedding, fossiliferous (bracks, corals), slightly fractured, hard, slightly weathered.	NA	NA	Box #5 cont. 80.2 Box #6	80.2 - Mechanical Break		80.8
	81					81.0 - Mechanical Break		C-11 (80.8-85.8) Run - 5.0 Rec - 5.0 Start - 1340 End - 1346
	82							
	83							
	84							
						84.7		
	85							85.8
	86					86.0 - Mechanical Break		C-12 (85.8-90.8) Run - 5.0 Rec - 4.8 Start - 1410 End - 1416
	87							
	88							
						88.2		
	89							
					89.6 Box #7	89.6		
	90							

Project: PBOW | Hole Number: RCA-BEDGW-003

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: E. Weaver | Sheet 11 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No. Fracs	Recovery (ft)	Remarks
		LIMESTONE, light gray, massive bedding, fossiliferous (brachs, corals), highly fractured, hard, slightly weathered	NA	NA	Box #7 Cont.			
						90.6	Mechanical Break	90.8
						90.8		C-13 (90.8-95.8)
	91	- potential water bearing fracture. (pumped hole removed pump and piping this fracture appears to be producing water)				91.1		Run - 5.0
						91.2		Rec - 5.0
						91.3		Start - 1423
	92							End - 1429
								▽ 91.1' Fracture
						92.6		
	93							
						93.7		
						93.8		
	94							
						94.4		
						94.6		
						94.7		
	95							
						95.5		
								95.8
						95.8		C-14 (95.8-100.8)
	96							Run - 5.0
								Rec - 5.0
								Start - ~~1659~~ 1659
						96.8		End - ~~1708~~ 1708
	97							
						97.2		
	98							
						98.1		
					98.8			
					Box #8	98.8		
	99							
						99.6		
						99.9		
	100					100.0		

Project: PBOW | Hole Number: RCA-BEDGW-003

n:\shared\common\dampgroup\htrw_form\htrwlogcontin/3/4/04

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HTRW DRILLING LOG (continuation sheet)

Hole Number: RCA-BEDGW-003

Project: PBOW | Geologist: B. Weaver | Sheet 12 of 12 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS	Field Screening Results (ppm)	~~Geotech~~ Sample or Core Box No.	Analytical Sample No. Fracs	Recovery (ft)	Remarks
		LIMESTONE, wet	NA	NA	Box #8 cont.	100.3		
						100.6 bkg 100.7 100.8		
	101							C-15 (100.8-105.8) Run - 5.0 Rec - 5.0 Start - ~~[illegible]~~ 1715 End - ~~[illegible]~~ 1720
	102					102.3		
						102.5		
						102.7		
						102.8		
	103					103.1		
	104					104.1		
	105					105.3		
						105.7		
					105.8	105.8		105.8'
	106	Boring Completed @ 105.8 Ft Monitor Well Installed						
	107							
	108							
	109							
	110							

Project: PBOW | Hole Number: RCA-BEDGW-003

Monitoring Well Construction Form (Bedrock)

Project:	PDOW	Well Number:	RCA-BEDGW-003
Location:	NASA Plum Brook Station, Sandusky, Ohio	Site Location:	Rail Car Area
Client:	USACE - Nashville, TN	Installation Date	3-28-09
Subcontractor:	A.E. Drilling	Northing:	623 916.92
Driller:	Kevin Warren / Tom Burnett	Easting:	1918767.69
Shaw Field Representative:	David Kessler / Eric Weaver	Shaw Project Number:	133767

Protective Cover Elevation (ft): 637.46

Top of Casing Elevation (ft): 637.00

Top of Casing Stickup (ft): 3.05

Land Surface Elevation (ft): 634.3

Approximate Diameter of Section 1 Borehole (in): 12" to 20' / 8" to 35.6"

Diameter of Surface Casing (in): 6 5/8" OD / 6" ID

Depth to Bedrock (ft): 24.8'

Bottom of Surface Casing (ft): 35.5'

Depth to Water (ft):

During Drilling: ~91.1

Date: 3-28-09

Post Development: — TOC

Date: —

Approximate Diameter of Section 2 Borehole (in): 6"

Well Casing Diameter (in): 2"

Top of Bentonite Seal (ft): 83.0'

Top of Filter Pack (ft): 86.0'

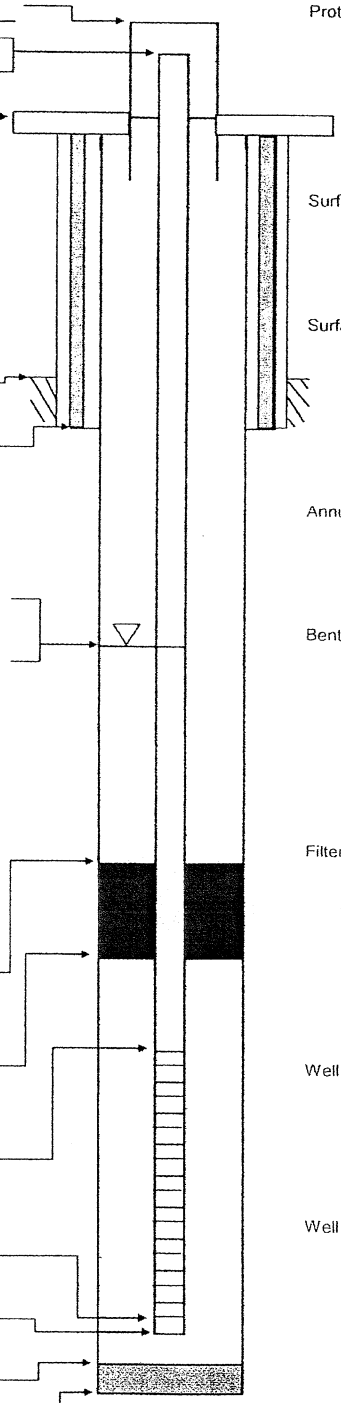
Top of Screen Interval (ft): 89.0'

Bottom of Screen Interval (ft): 104.0'

Bottom of Well (ft): 104.35

Bottom of Filter Pack (ft): 105.8'

Bottom of Borehole (ft): 105.8'



Protective Casing:
- Type: Steel
- Dimensions (in): 4"x4"
- Length (ft): 5'
- Guard Post: 4 - concrete filled

Surface Pad:
- Dimensions: 4'x4'x4"
- Type: Concrete

Surface Casing:
- Type: Black Steel
- Diameter (in): 6 5/8" OD / 6" ID
- Installation: Tremie / Haliburton / Cementing Plug / ~~Other Plug~~ Johnson Grout shoe

Annular Space Seal:
- Type: Bentonite-Cement Grout
- Installation: Gravity / (Tremie) / Pumped

Bentonite Seal:
- Manufacturer: Haliburton
- Type: (Pellets) / Slurry
- Installation: 6-in lifts / (One Section) / Gravity / (Tremie) / Pumped
- Hydration time (hrs): >1 hr.

Filter Pack Material:
- Manufacturer: Global Drilling Supplies
- Product Name: Quartz Filter Pack Sand
- Size: #7
- Volume Added (ft^3): 3.25 ft^3 (6.5-bags)
- Installation: Gravity / (Tremie)

Well Casing:
- Manufacturer: Campbell Monoflex
- Type: PVC
- Diameter (in): 2"

Well Screen Casing:
- Manufacturer: Johnson
- Type: PVC
- Slot Size (in): .010 | %Open
- Slot Type: (Continuous wrap) / Factory slot

Sump/End Cap: 0.35'

Backfill Material: None

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Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

APPENDIX C

DIRECT-PUSH SOIL BORING, DIRECT-PUSH GROUNDWATER, SURFACE WATER, SEDIMENT, AND GROUNDWATER SAMPLE COLLECTION LOGS

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB01**

Sample Number: **LBA0001**

Sample Name: **PBOW-09-SS-LBA-SB01-LBA0001-(0-1)**

Sampling Method: **DP**

Sample Type: **SS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liner, disposable ziplock baggie, terracore

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1130

Start Depth: 1.3'

End Depth: 2.3'

Sample Matrix: **SOIL**

QC Partners:

(TB) — **(ER)** — **(FB)** —

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

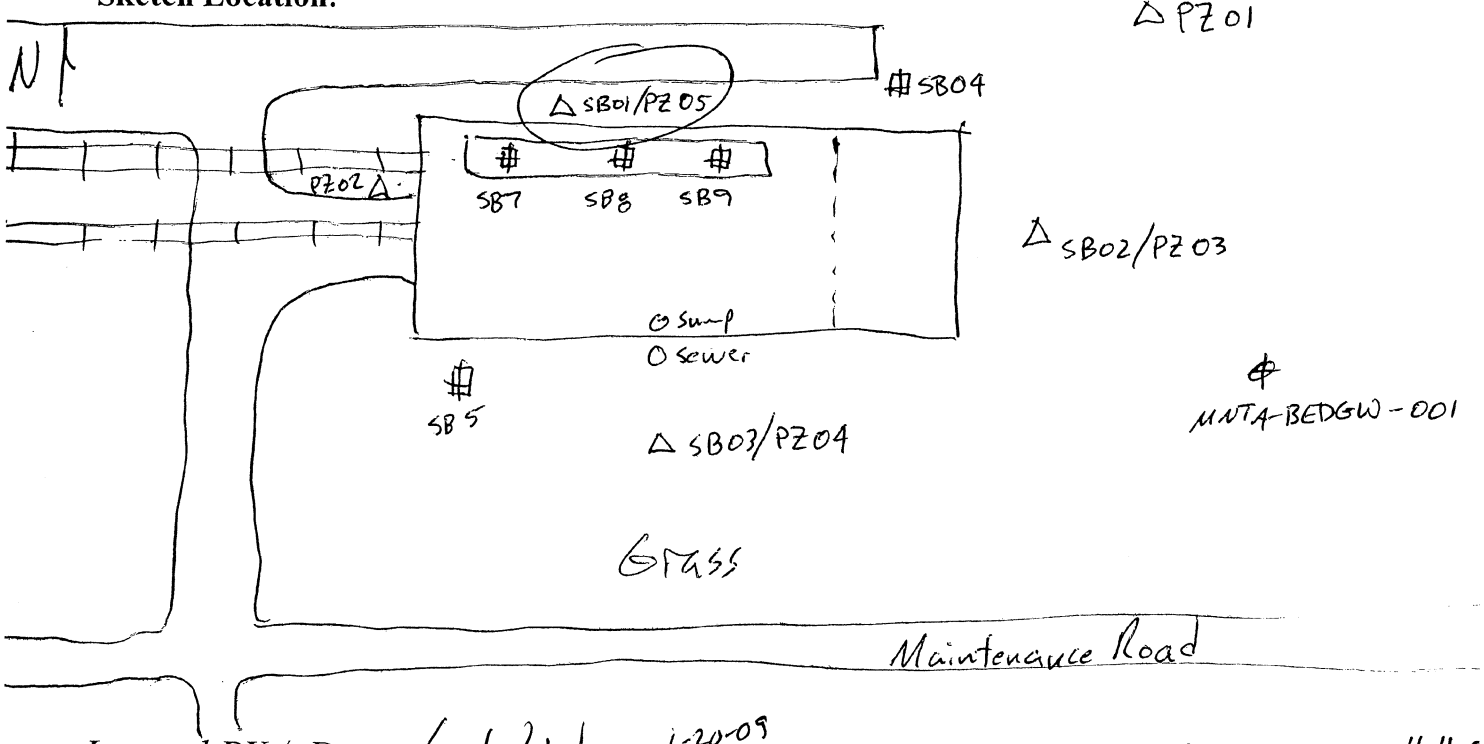
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09

Reviewed BY / Date: Edward G. Weaver 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB01**
Sample Number: **LBA0002**
Sample Name: **PBOW-09-DS-LBA-SB01-LBA0002-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable liner/plastic baggie, terra core

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1135
Start Depth: 5'
End Depth: 6.3'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

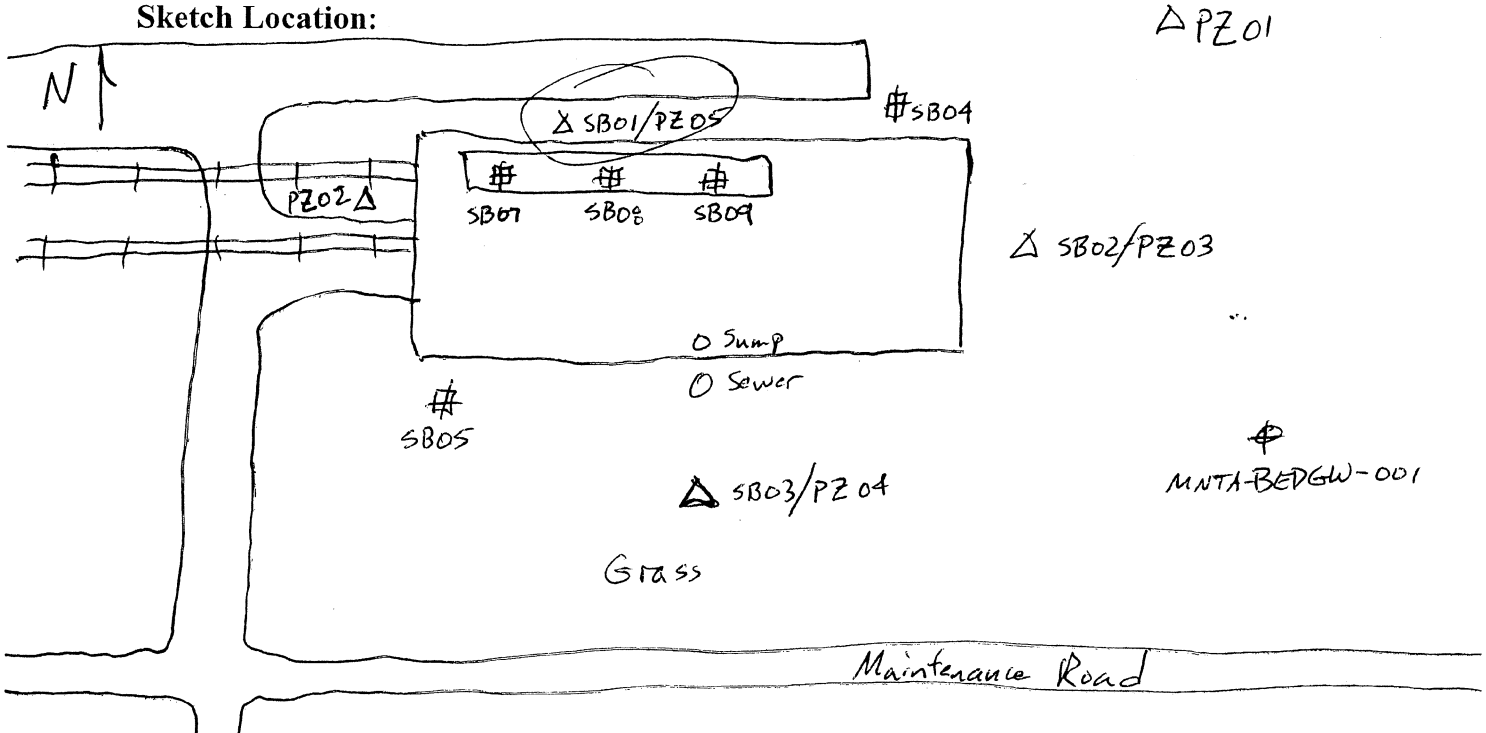
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: L. W. Weaver 1-20-09 *Reviewed BY / Date:* Edward Weaver 11-11-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: ~~PBI2109~~ PB012109AMC

Location Code: **LBA-SB01**

Sample Number: **LBA0001MS**

Sample Name: **PBOW-09-SS-LBA-SB01-LBA0001MS-(0-1)**

Sampling Method: **DP**

Sample Type: **SS** *Sample Purpose:* **MS**

Sampling Equip: Geoprobe, Acetate liner, disposable ziplock baggie, terracore

QC Partners:

(TB) — **(ER)** — **(FB)** —

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1130

Start Depth: 1.3

End Depth: 2.3

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

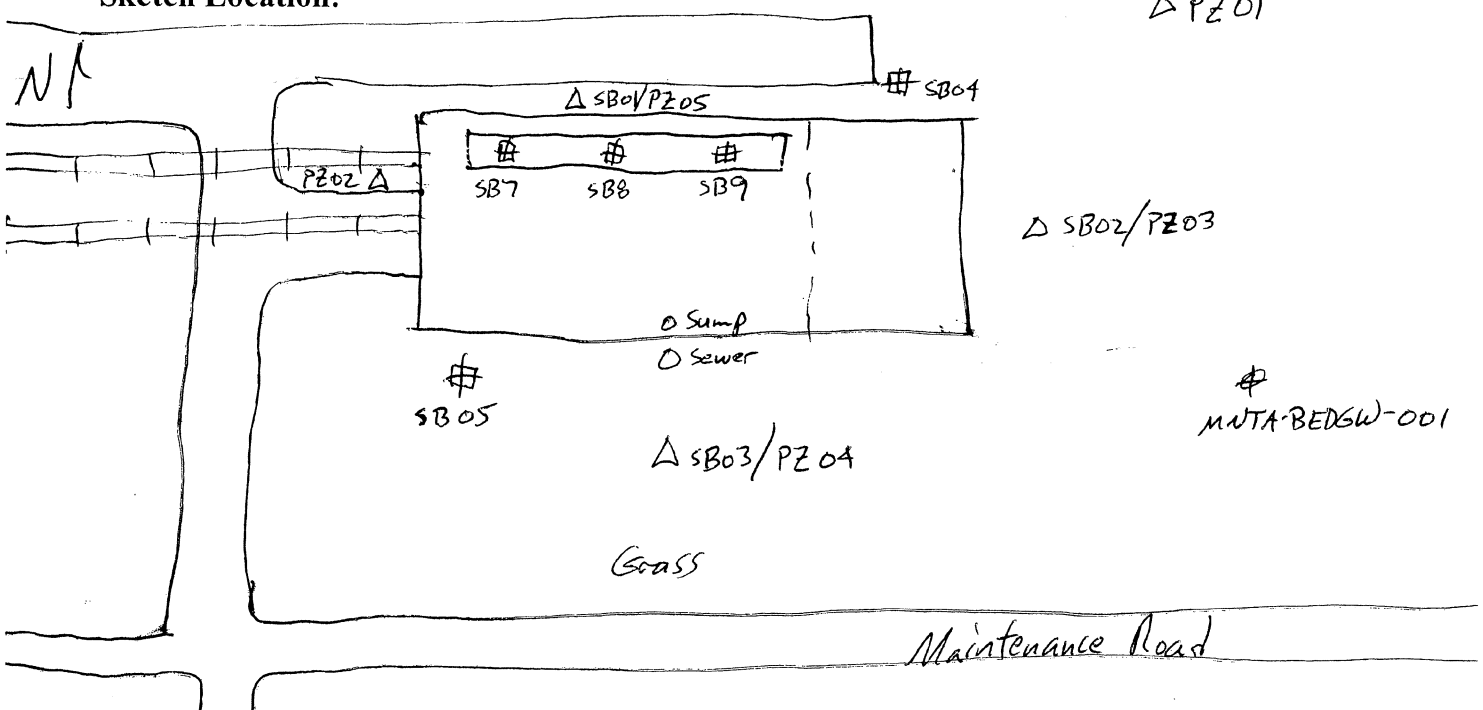
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: L.W. Weaver 1-20-09 *Reviewed BY / Date:* Edward Kessler 11-11-09

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Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB01**
Sample Number: **LBA0001MSD**
Sample Name: **PBOW-09-SS-LBA-SB01-LBA0001MSD-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **MSD**
Sampling Equip: Geoprobe, Acetate liner, disposable ziplock baggie, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1130
Start Depth: 1.3
End Depth: 2.3
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

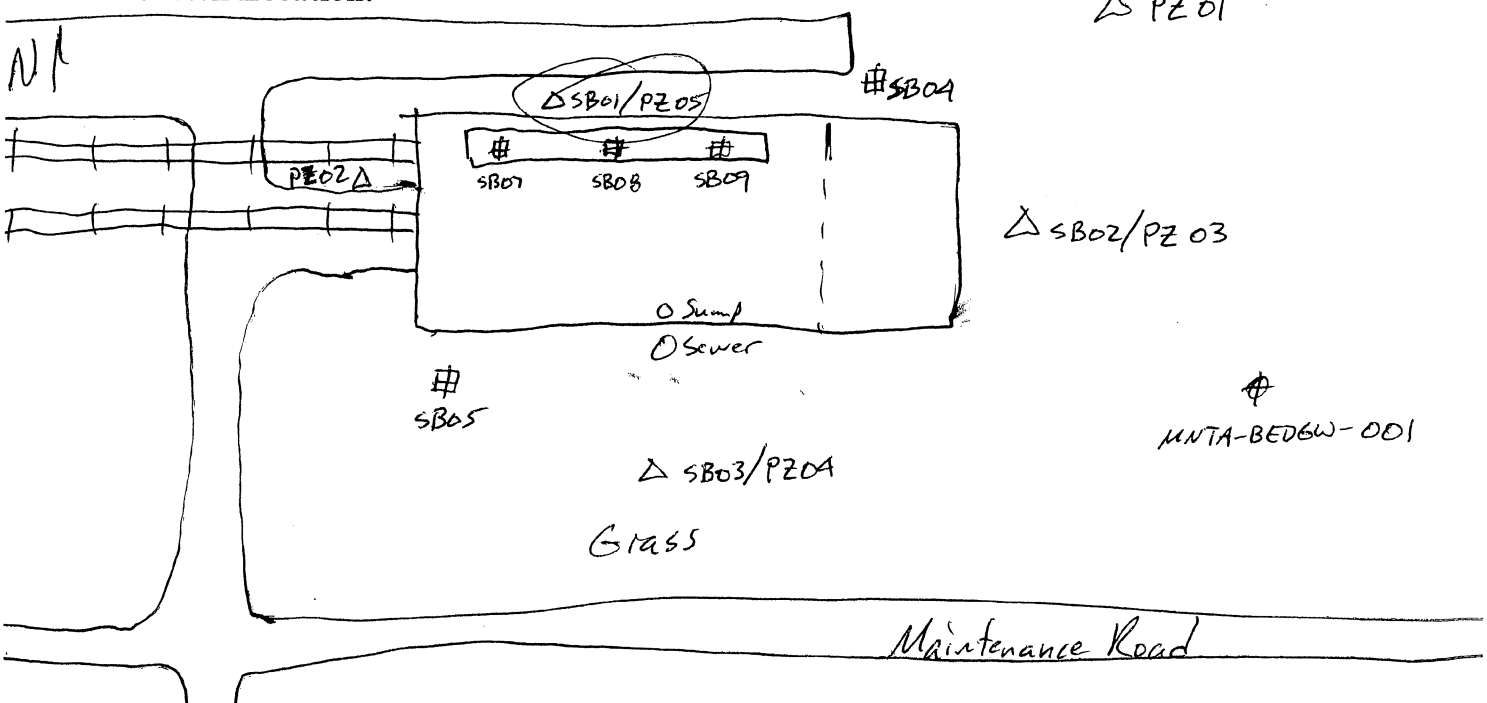
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09 Reviewed BY / Date: [illegible] 11-11-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109 AML

Location Code: **LBA-SB01**

Sample Number: **LBA0003**

Sample Name: **PBOW-09-DS-LBA-SB01-LBA0003-(8-10)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liner, disposable lexylock bags, terra core

QC Partners:

(TB) — **(ER)** — **(FB)** —

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1138

Start Depth: 8'

End Depth: 10'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

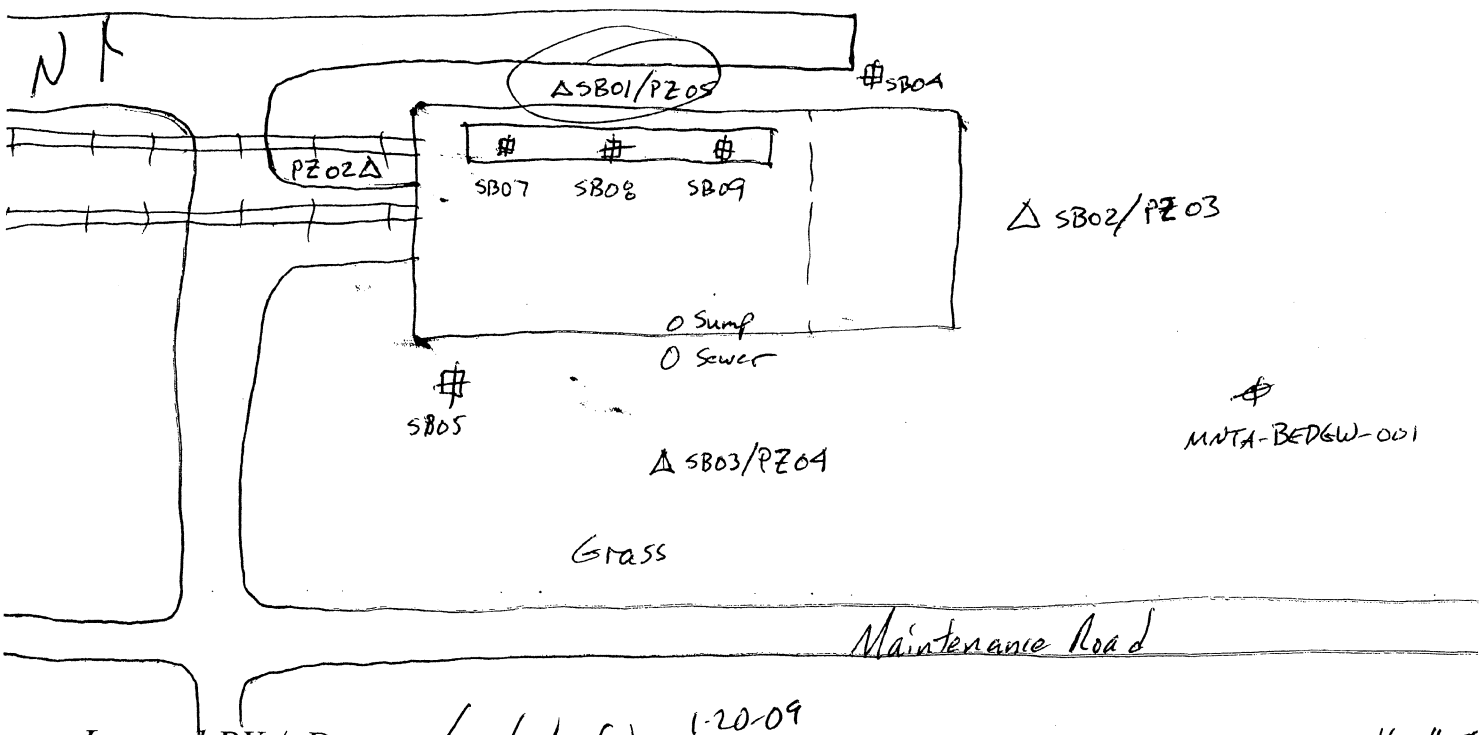
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: E.W. Weaver 1-20-09 *Reviewed BY / Date:* Edward E. Weaver 11-11-0

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109 AML

Location Code: **LBA-SB02**

Sample Number: **LBA0004**

Sample Name: **PBOW-09-SS-LBA-SB02-LBA0004-(0-1)**

Sampling Method: **DP**

Sample Type: **SS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liner, disposable baggies, 2 ziplock, terracore

Task: **LBA-SOILS**

Collection Date: 1-19-09

Collection Time: 1535

Start Depth: 1.5

End Depth: 2.5

Sample Matrix: **SOIL**

QC Partners:

(TB) — (ER) — (FB) —

Sample Team: Kessler / Weaver

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore
TOC-B	N	C	1	4	oz	CWM

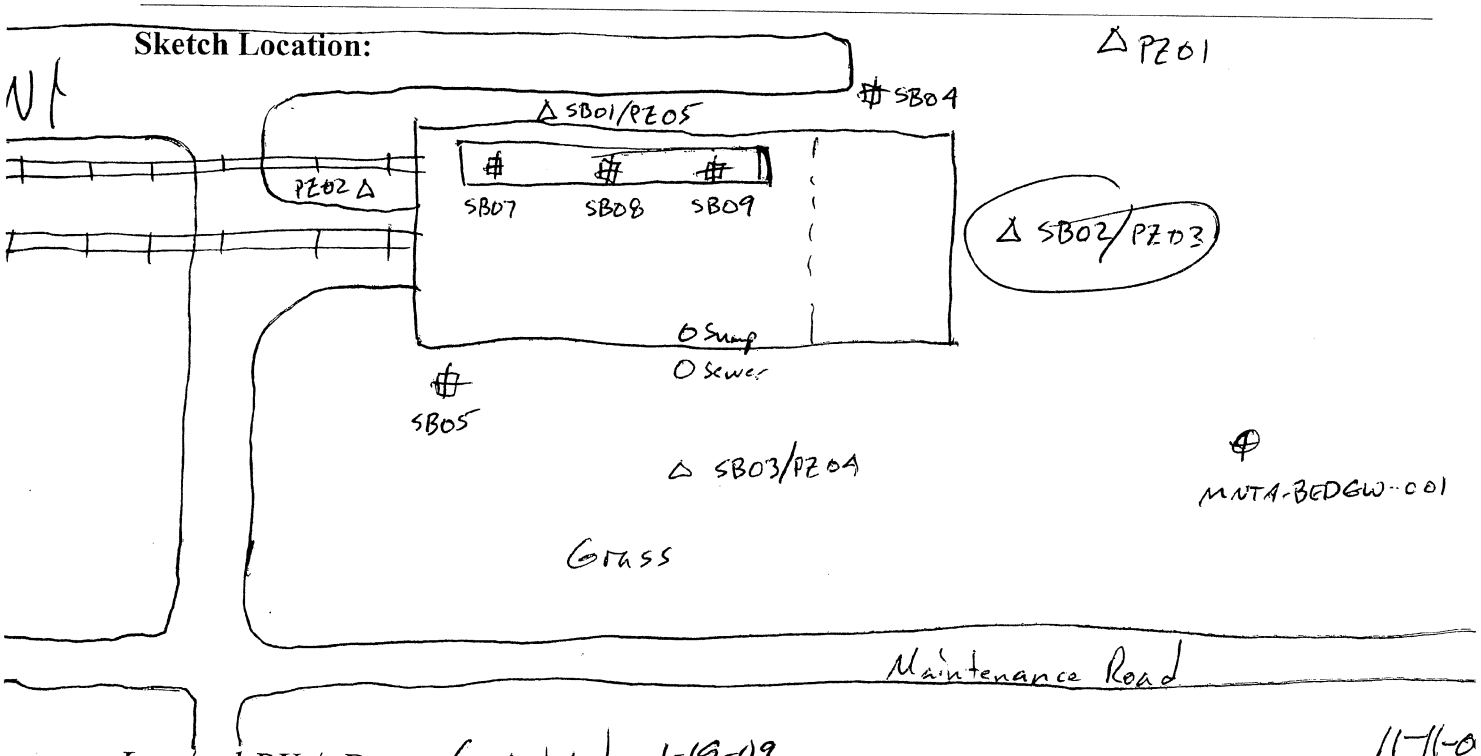
ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: C. W. Weaver 1-19-09

Reviewed BY / Date: Edward E. Weaver 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012-109AML

Location Code: **LBA-SB02**
Sample Number: **LBA0005**
Sample Name: **PBOW-09-DS-LBA-SB02-LBA0005-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable ziplock bags, ie, terracore

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1540
Start Depth: 5'
End Depth: 6.5'
Sample Matrix: **SOIL**

QC Partners:
(TB) — (ER) — (FB) —

Sample Team: Kessler/Weaver

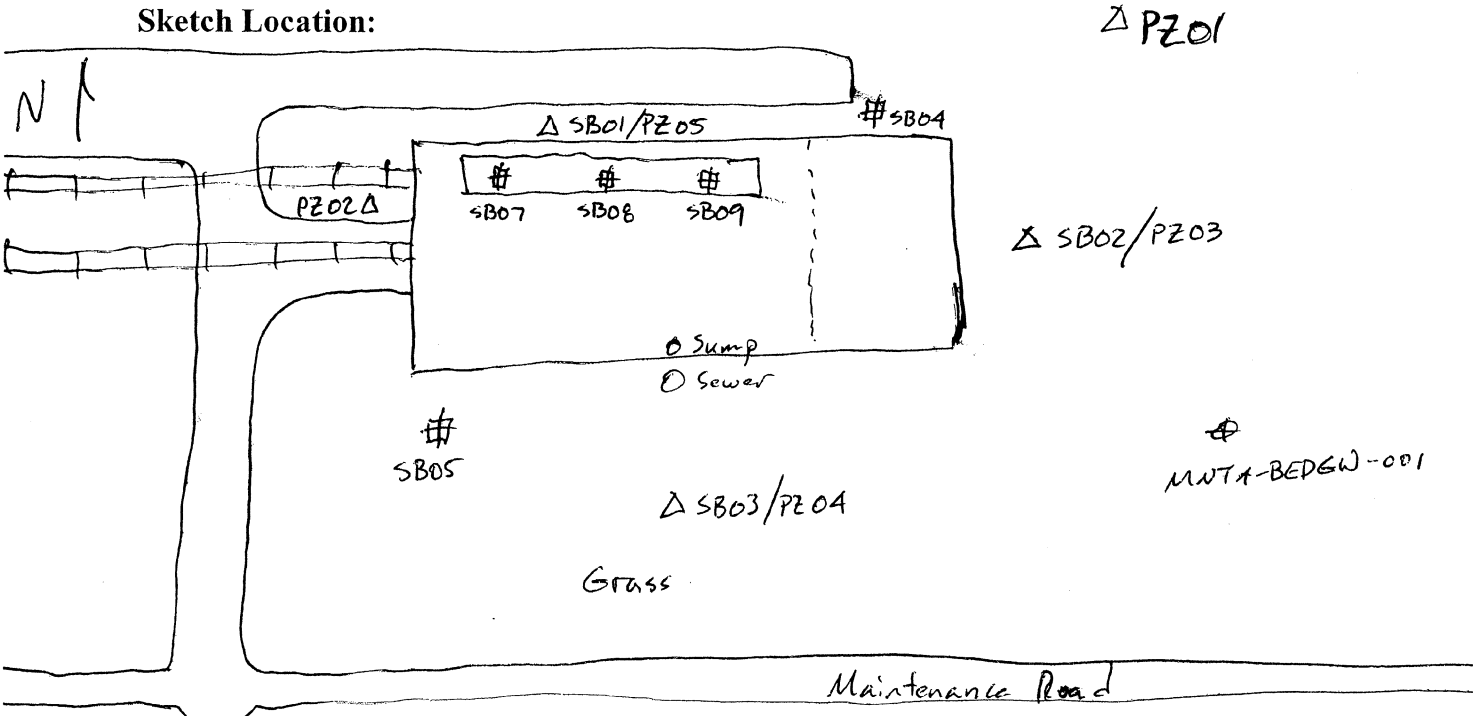
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E.W. Weaver 1-19-09 *Reviewed BY / Date:* Edward E. Weaver 1/21-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB02**

Sample Number: **LBA0006**

Sample Name: **PBOW-09-DS-LBA-SB02-LBA0006-(8-10)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liner, disposable/plastic baggie, terracore

QC Partners:

(TB) — (ER) — (FB) —

Task: **LBA-SOILS**

Collection Date: 1-19-09

Collection Time: 1543

Start Depth: 8'

End Depth: 10'

Sample Matrix: **SOIL**

Sample Team: Ressler/Weaver

ERPIMS Values:

Sacode:

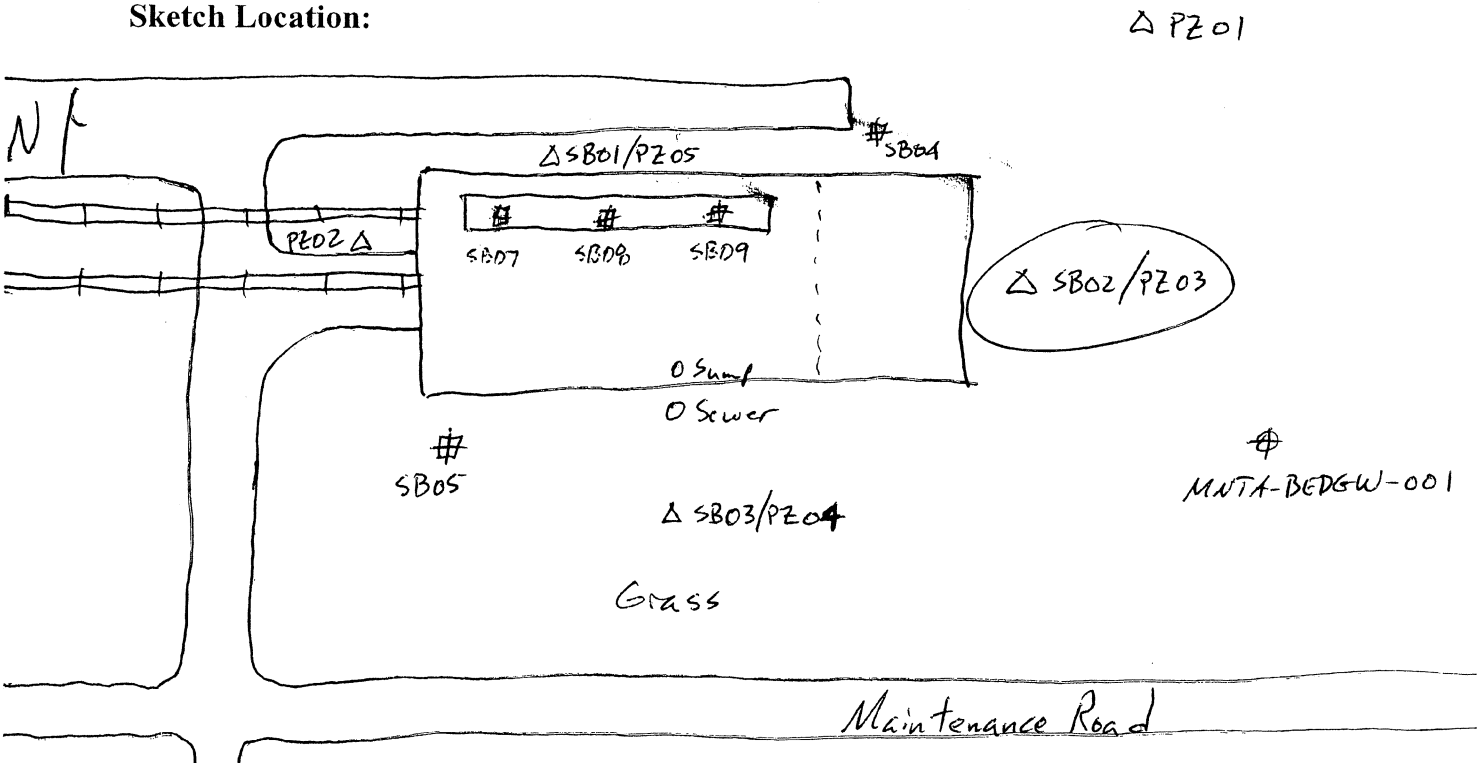
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: L. W. Weaver 1-19-09

Reviewed BY / Date: Edward R. Weaver 11-11-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB03**
Sample Number: **LBA0007**
Sample Name: **PBOW-09-SS-LBA-SB03-LBA0007-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable ziplock baggies, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1505
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

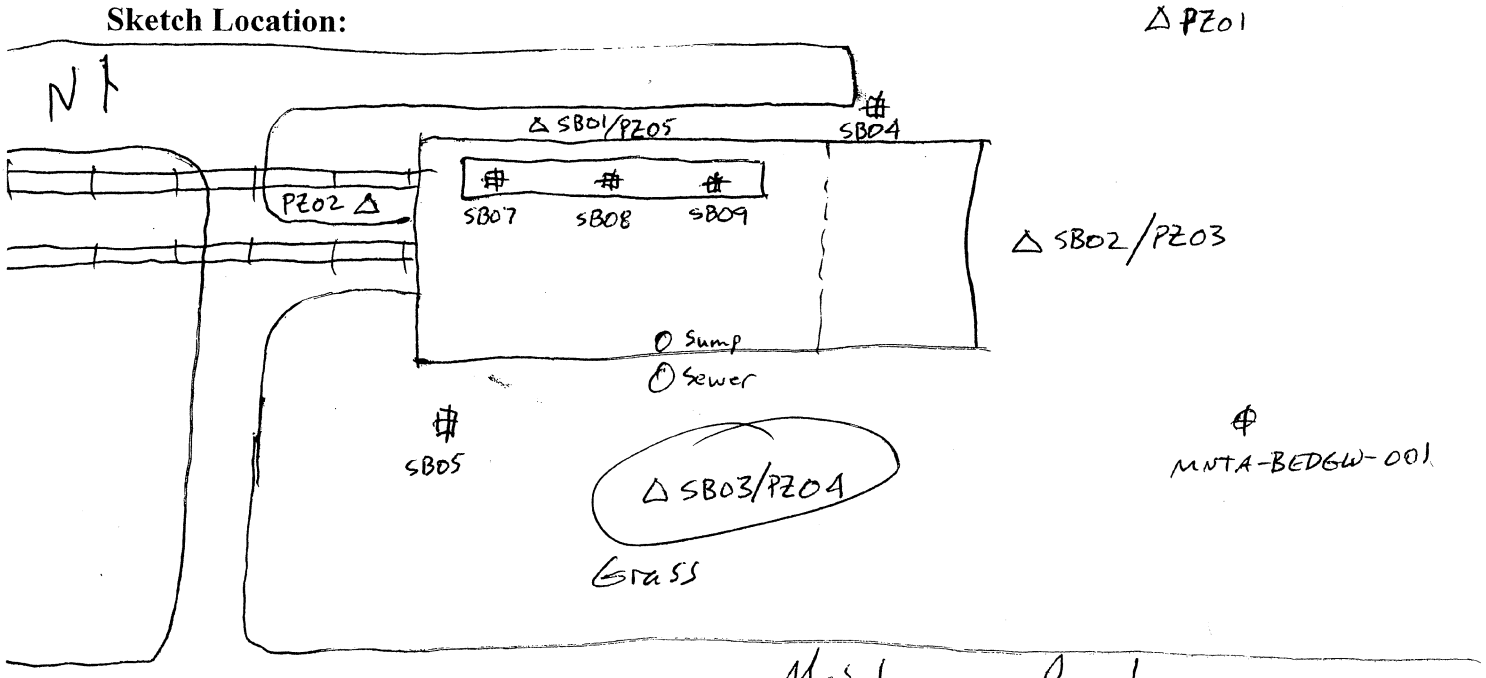
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: 1-20-09 *Reviewed BY / Date:* 1-11-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB03**

Sample Number: **LBA0008**

Sample Name: **PBOW-09-DS-LBA-SB03-LBA0008-(0-1)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **FD**

Sampling Equip: Geoprobe, Acetate liner, disposable trowel, ziplock bag, sieve, terracore

QC Partners:

(TB) — **(ER)** — **(FB)** —

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1505

Start Depth: 0

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

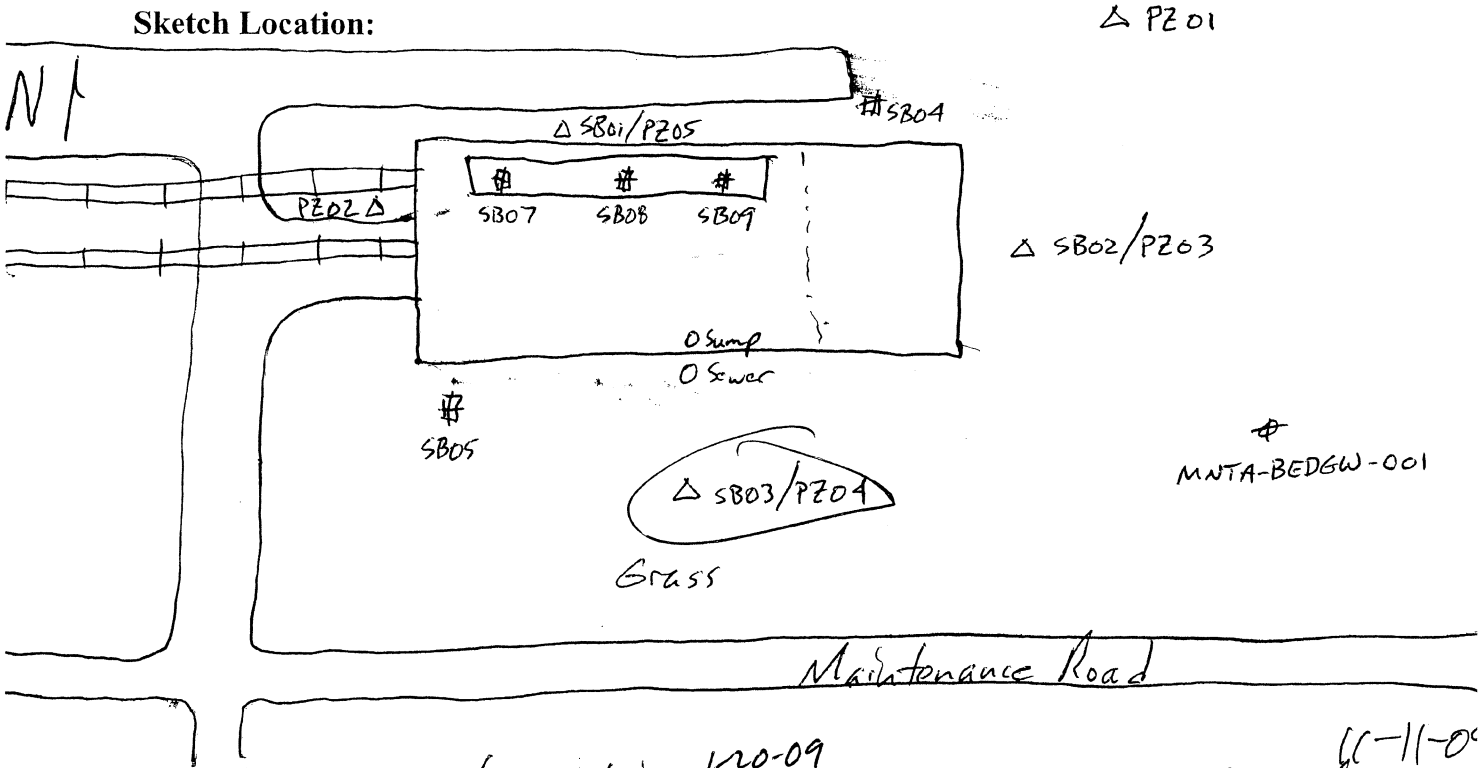
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: 1-20-09 *Reviewed BY / Date:* 1-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB03**
Sample Number: **LBA0009**
Sample Name: **PBOW-09-SS-LBA-SB03-LBA0009-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **FS**
Sampling Equip: Geoprobe, Acetate liner, disposable bailer, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1505
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

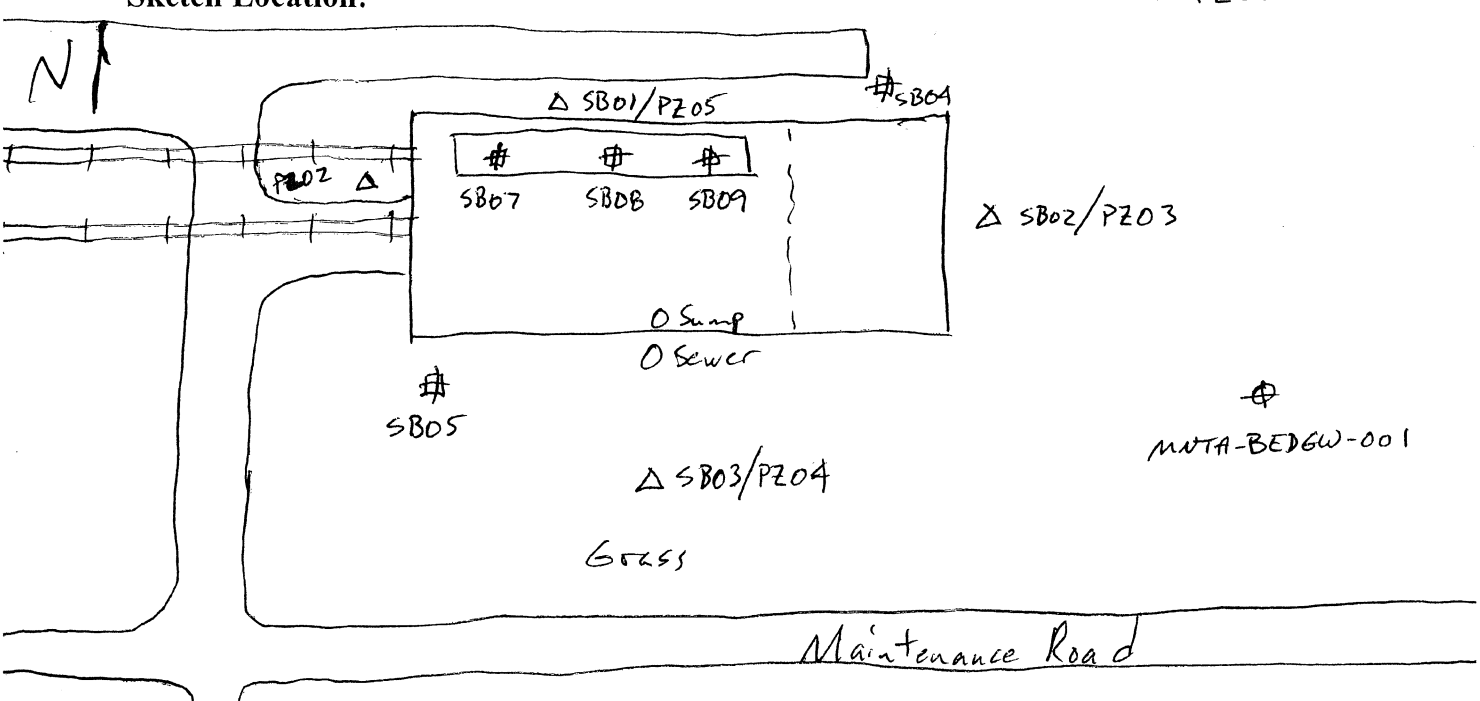
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	4	oz	CWM
METALS	N	A	2	4	oz	CWM
PCBS	N	A	2	4	oz	CWM
SEMIVOLATILES	N	A	2	4	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09 *Reviewed BY / Date:* Edward E. Weaver 1-21-09

Shaw™
Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB03**
Sample Number: **LBA0010**
Sample Name: **PBOW-09-DS-LBA-SB03-LBA0010-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe/Acetate/thin disposable/ziplock baggie, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1508
Start Depth: 2.5'
End Depth: 3.2'
Sample Matrix: **SOIL**
Sample Team: Kegler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

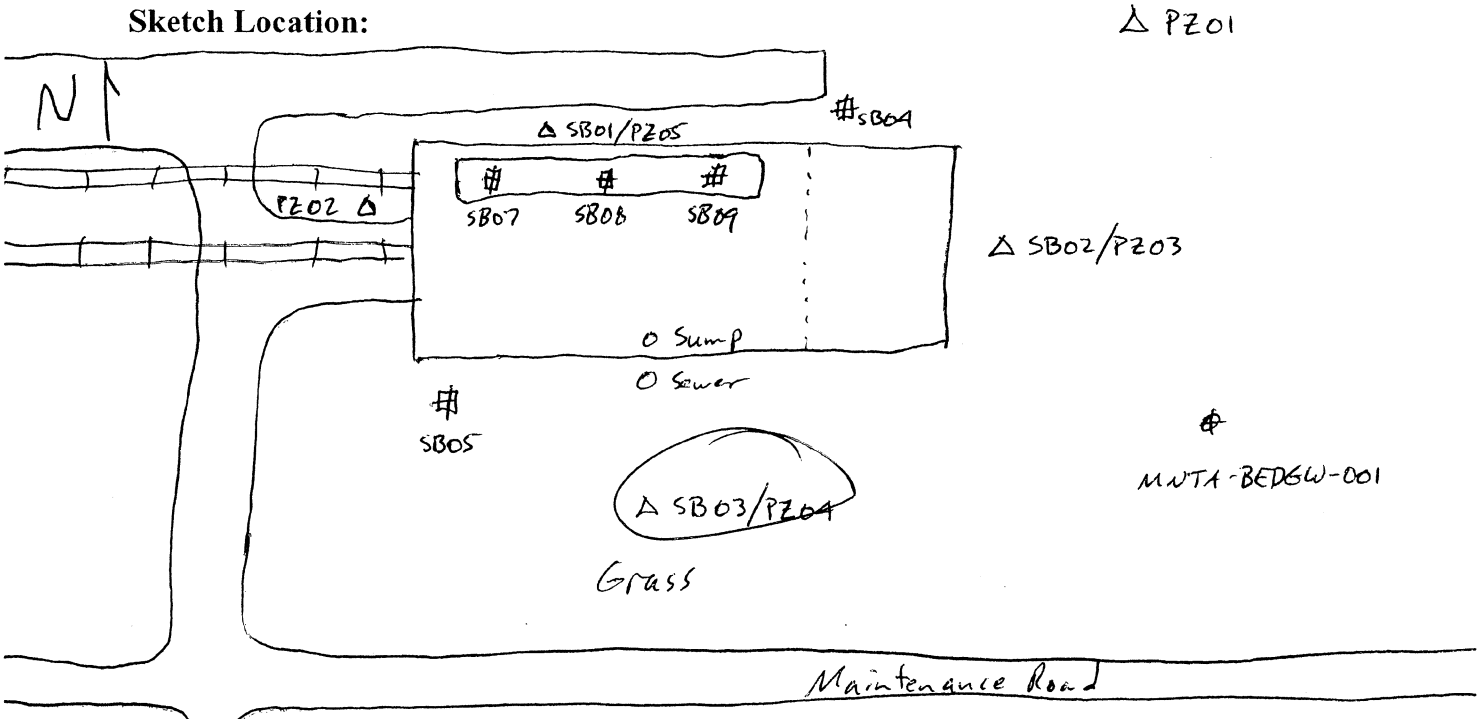
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: 1-20-09 *Reviewed BY / Date:* 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB03**
Sample Number: **LBA0011**
Sample Name: **PBOW-09-DS-LBA-SB03-LBA0011-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable/splashbuster, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1510
Start Depth: 8'
End Depth: 10'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

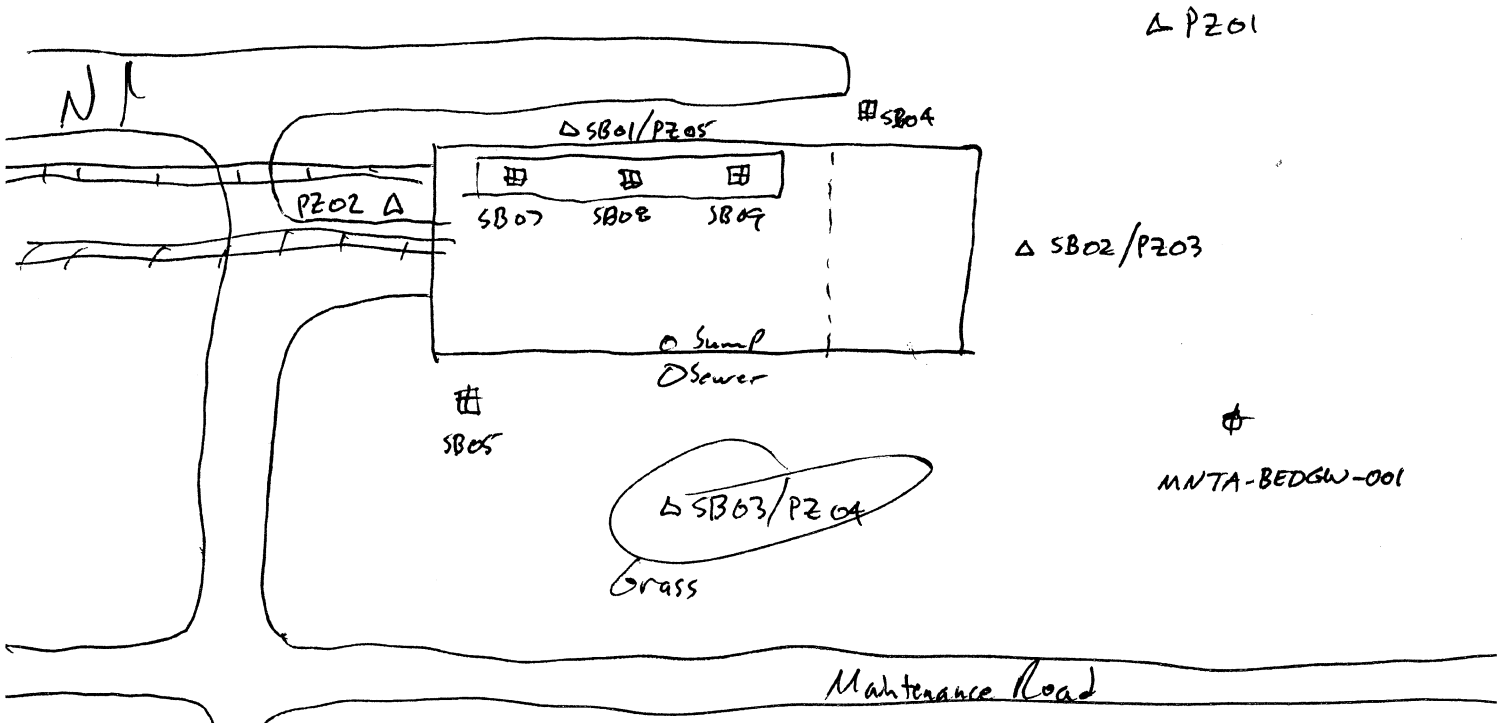
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: E.W. Weaver 1-20-09 *Reviewed BY / Date:* Edward E. Weaver 1-21-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB04**
Sample Number: **LBA0012**
Sample Name: **PBOW-09-SS-LBA-SB04-LBA0012-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable plastic baggie, TerraCore sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1610
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

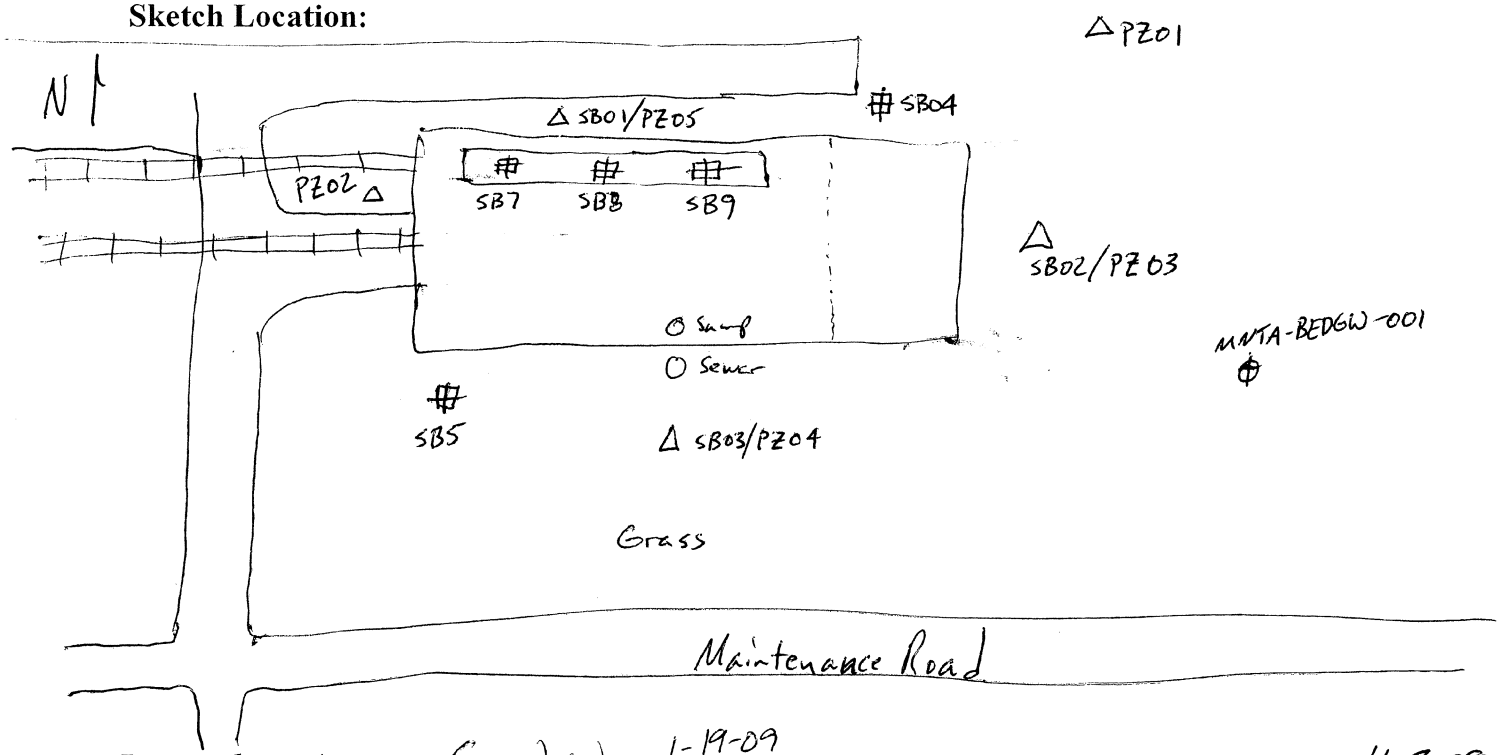
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: Collected below 0.9' of fill (actually 0.9' to 1.9' bgs)

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward Wilson 1-8-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012009 - AM2

Location Code: **LBA-SB04**

Sample Number: **LBA0013**

Sample Name: **PBOW-09-DS-LBA-SB04-LBA0013-(3-5)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra Core Sampler

Task: **LBA-SOILS**

Collection Date: 1-19-09

Collection Time: 1613

Start Depth: 3'

End Depth: 5'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

QC Partners:

(TB) —— (ER) —— (FB) ——

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

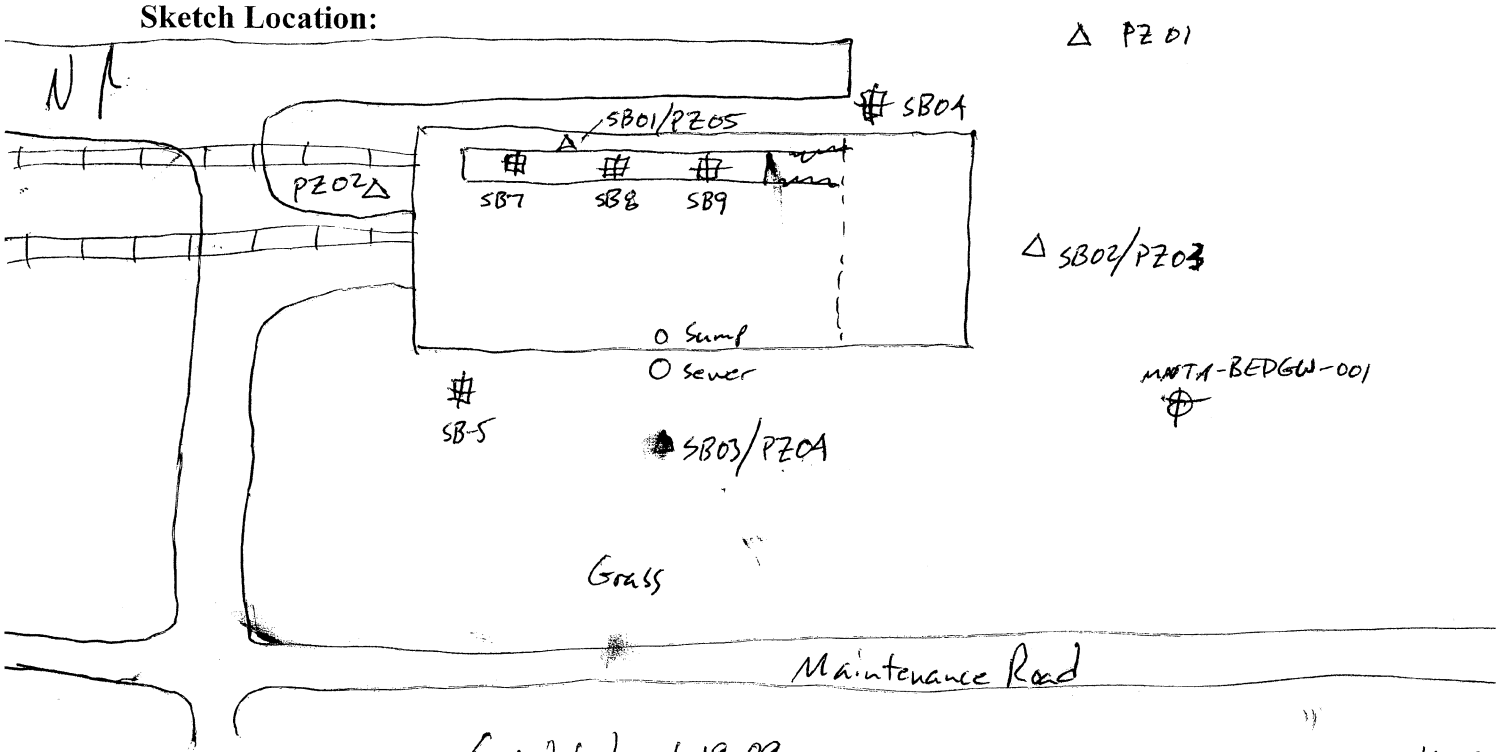
ERPIMS Values:

Sacode:

Lot Control#:

Comments: Sample collected below 0.9' of fill material (actually 3.9' to 5.9')

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09

Reviewed BY / Date: Edward K. Weaver 1-8-0

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB04**

Sample Number: **LBA0014**

Sample Name: **PBOW-09-DS-LBA-SB04-LBA0014-(8-10)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, 5' Acetate liner, disposable/plastic bag, Terra Core Sampler

Task: **LBA-SOILS**

Collection Date: 1-16-09

Collection Time: 1615

Start Depth: 8'

End Depth: 10'

Sample Matrix: **SOIL**

QC Partners:

(TB) — (ER) — (FB) —

Sample Team: Kessler/Weaver

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

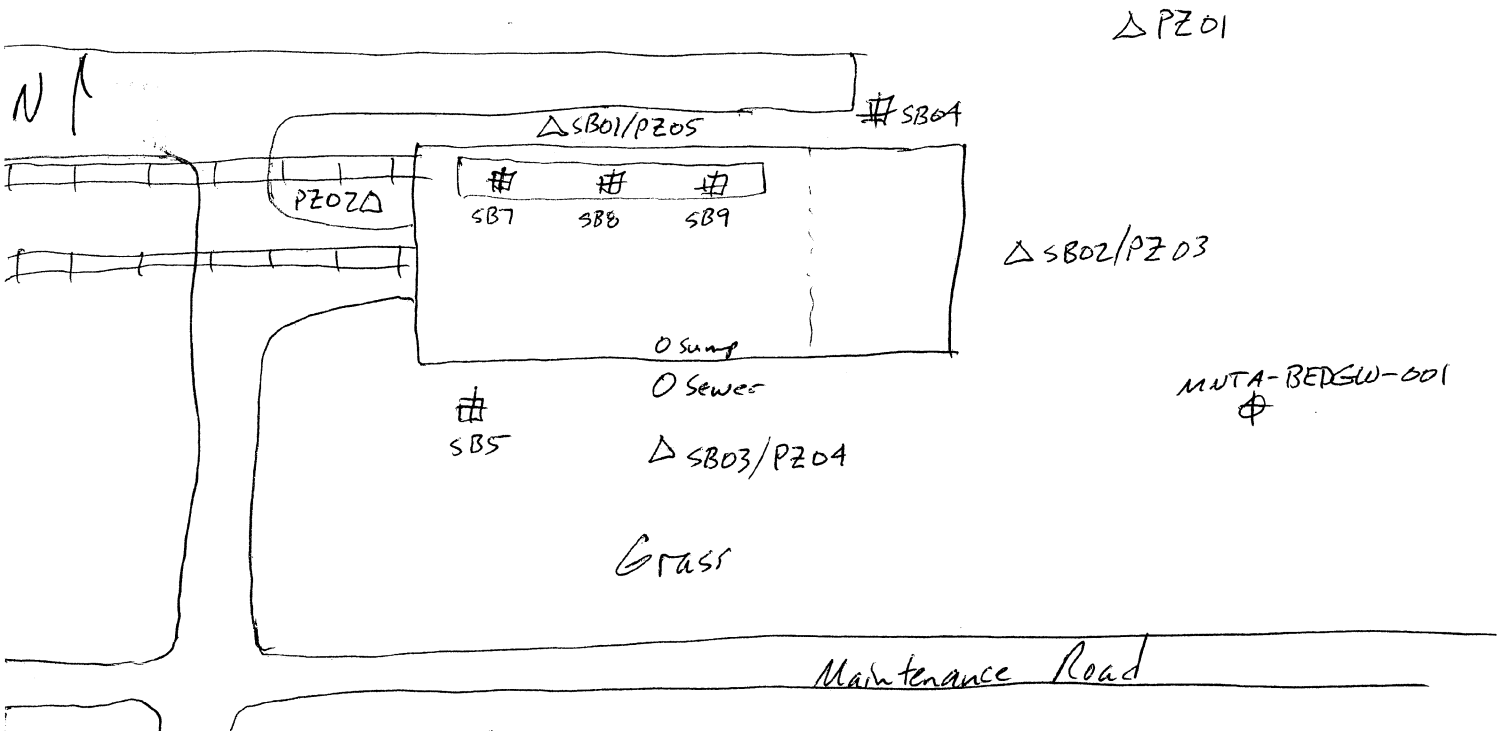
ERPIMS Values:

Sacode:

Lot Control#:

Comments: Collected 8' to 10' bgs.

Sketch Location:



Logged BY / Date: L. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward [illegible] 11-8-0[illegible]

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109 AML

Location Code: **LBA-SB05**
Sample Number: **LBA0015**
Sample Name: **PBOW-09-SS-LBA-SB05-LBA0015-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liners, disposable bailer, terra core

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1440
Start Depth: 2.4'
End Depth: 3.4'
Sample Matrix: **SOIL**
Sample Team: Keesler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

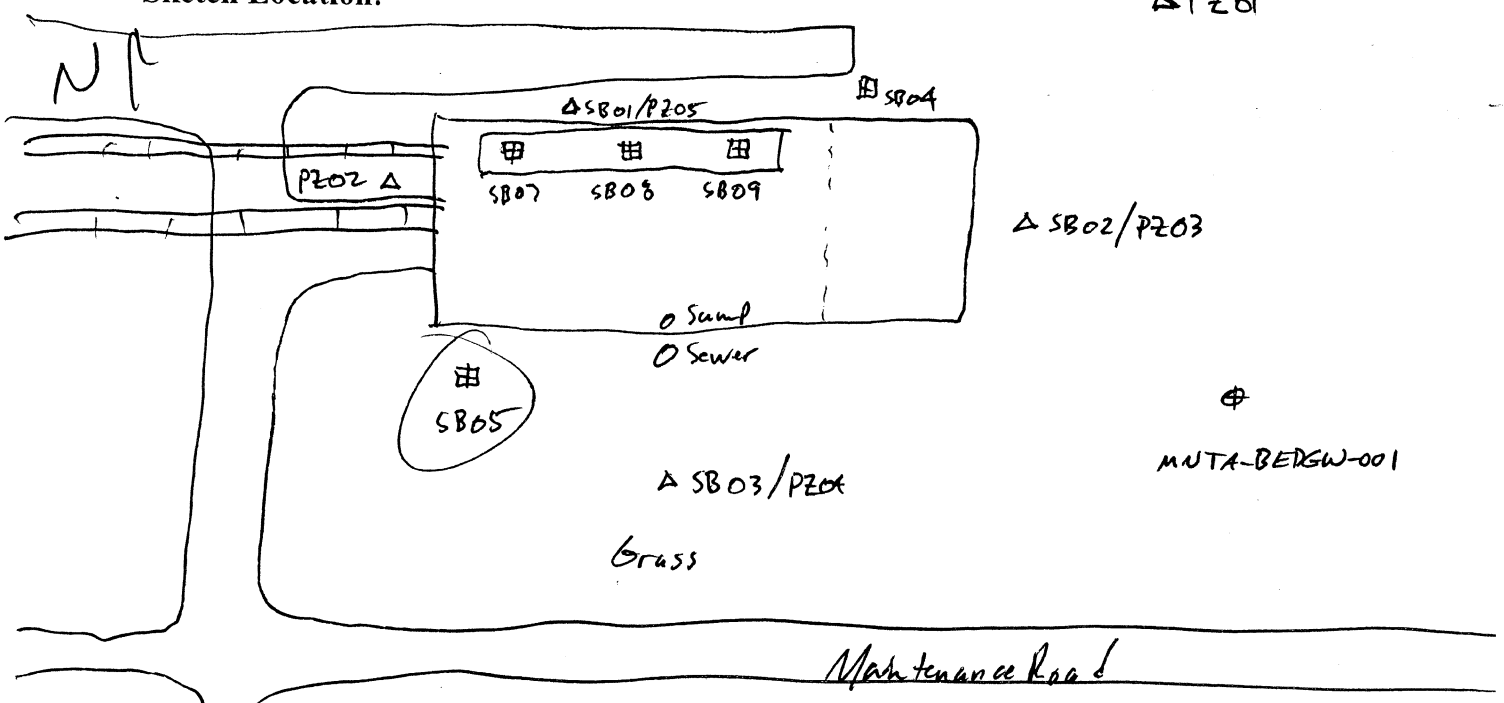
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09

Reviewed BY / Date: Edward Weaver 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109 AML

Location Code: **LBA-SB05**
Sample Number: **LBA0016**
Sample Name: **PBOW-09-DS-LBA-SB05-LBA0016-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable bailer, plastic bag, sieve, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1445
Start Depth: 5.4'
End Depth: 7.4'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) ——— (ER) ——— (FB) ———

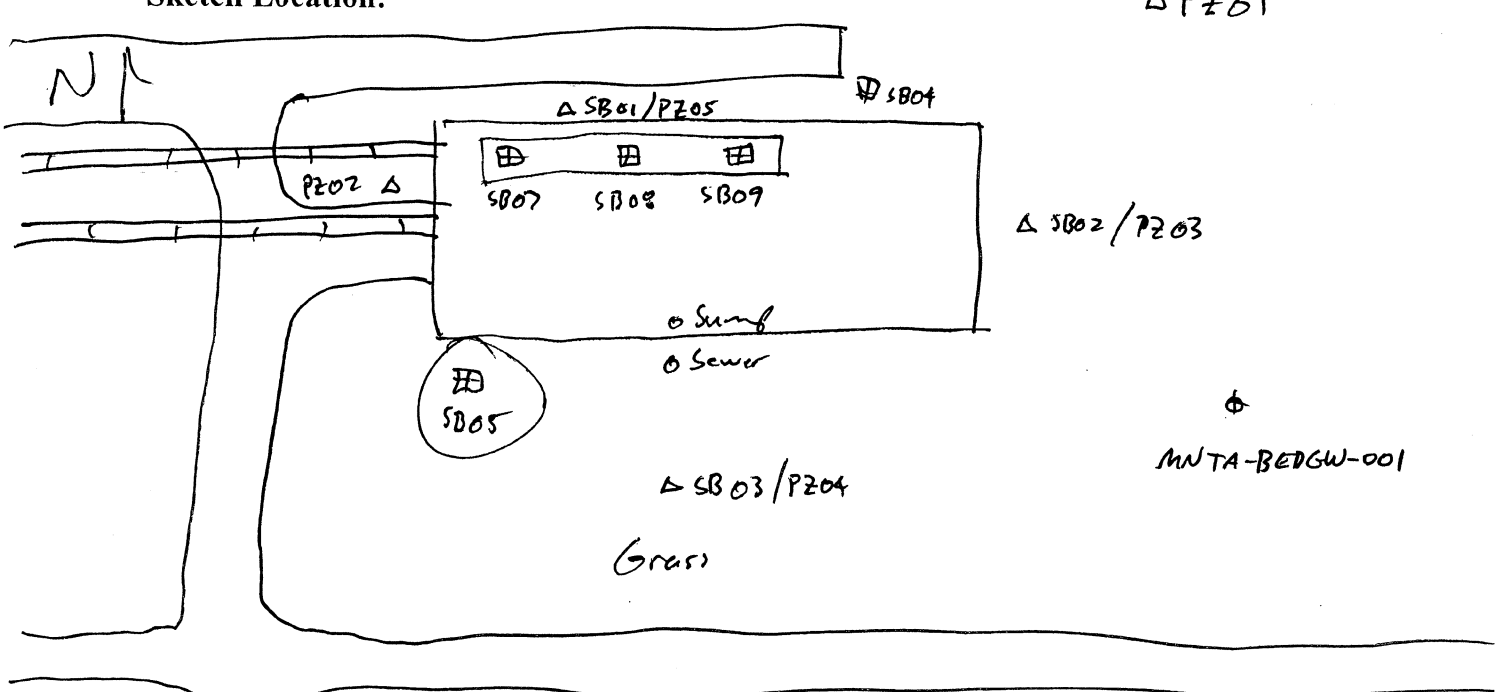
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09 *Reviewed BY / Date:* Edward E. Weaver 11-11-0

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109 AML

Location Code: **LBA-SB05**

Sample Number: **LBA0017**

Sample Name: **PBOW-09-DS-LBA-SB05-LBA0017-(8-10)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe Acetate liner, disposable cellulose block bag, terra core

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1448

Start Depth: 8'

End Depth: 9'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

QC Partners:

(TB) — (ER) — (FB) —

ERPIMS Values:

Sacode:

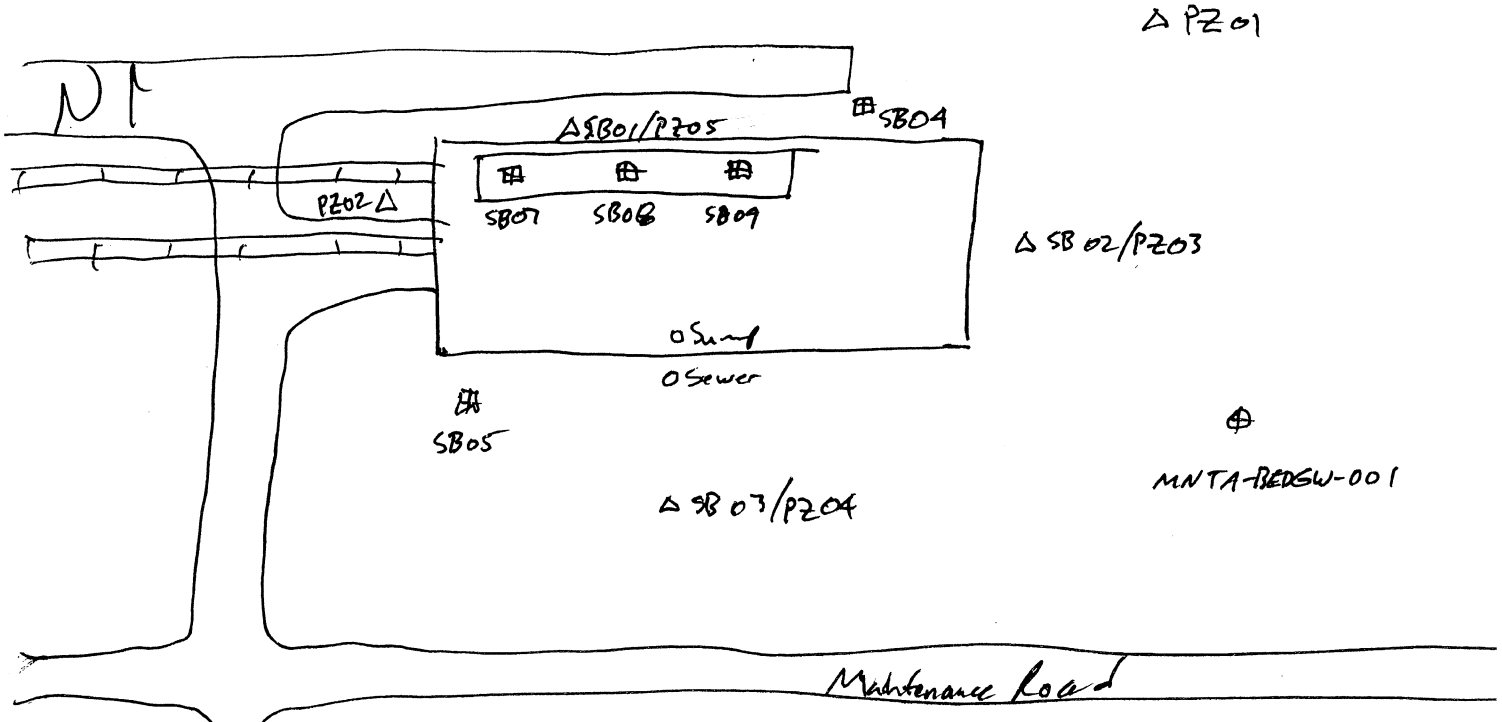
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: Eric W. Weaver

Reviewed BY / Date: Edward Lee Weaver 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB07**
Sample Number: **LBA0023**
Sample Name: **PBOW-09-DS-LBA-SB07-LB0023-(6-8)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe 5' Acetate liner, disposable ziplock bag,

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 0920
Start Depth: 3'
End Depth: 4.1'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

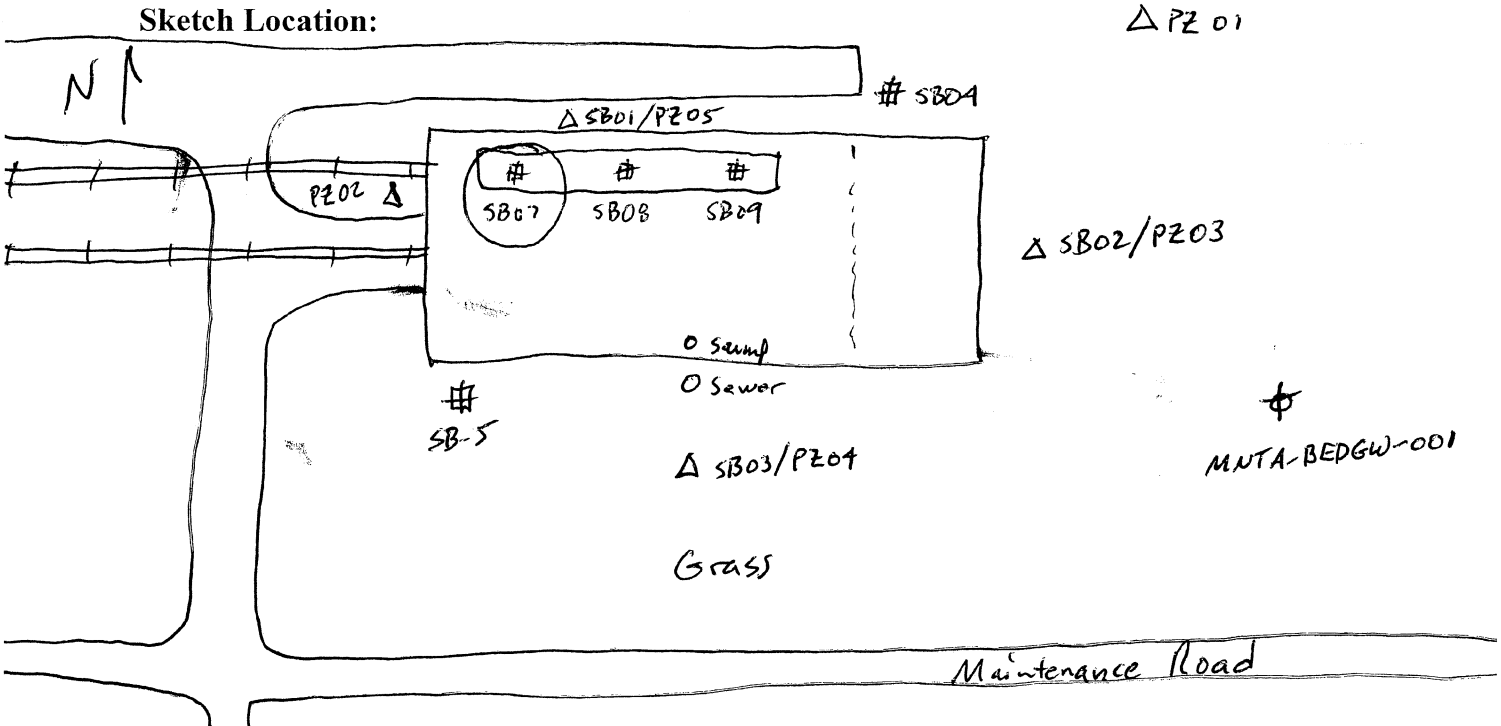
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments: NA

Sketch Location:



Logged BY / Date: L.W. Weaver 1-20-09 *Reviewed BY / Date:* Edward K. Weaver 11-8-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB08**
Sample Number: **LBA0024**
Sample Name: **PBOW-09-DS-LBA-SB08-LBA0024-(6-8)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate Liner, disposable plastic baggie Terra core

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 0910
Start Depth: 3'
End Depth: 4.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

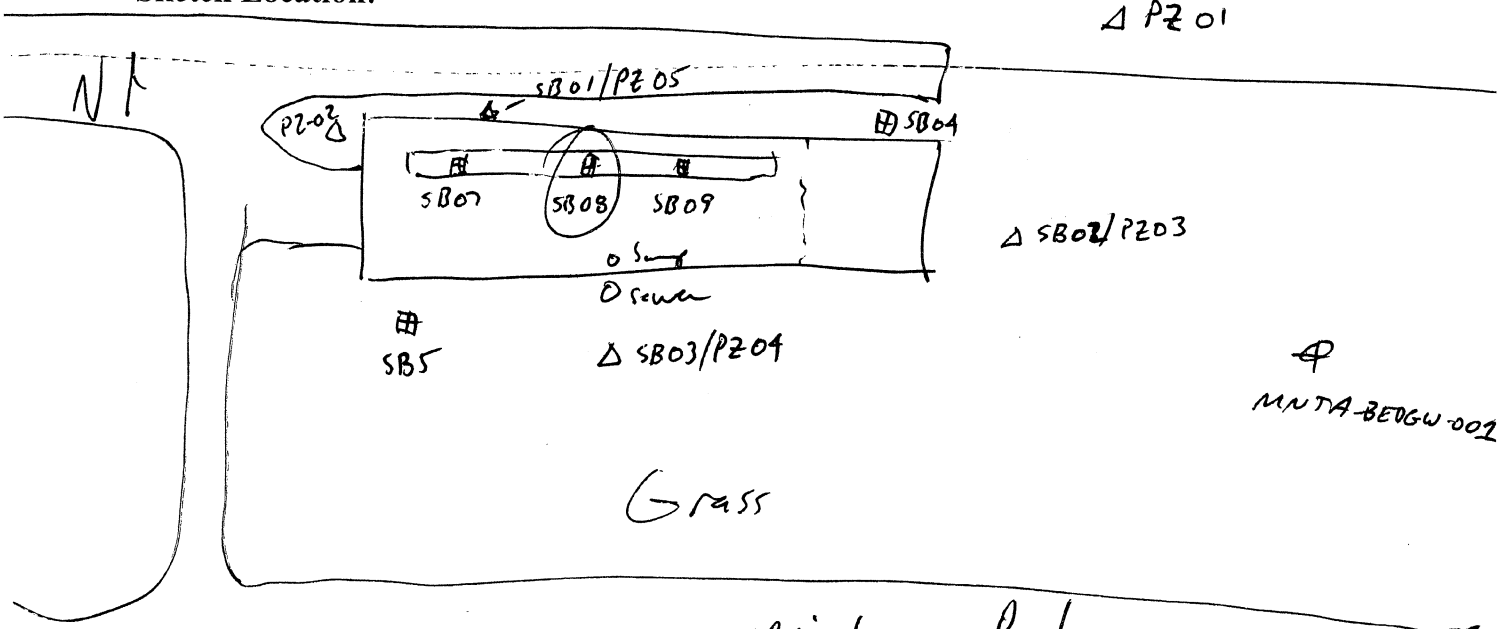
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09 *Reviewed BY / Date:* [illegible] 01-11-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB09**
Sample Number: **LBA0025**
Sample Name: **PBOW-09-DS-LBA-SB09-LBA0025-(6-8)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, Acetate liner, disposable ziplock baggie, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 0900
Start Depth: 3'
End Depth: 4.2'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

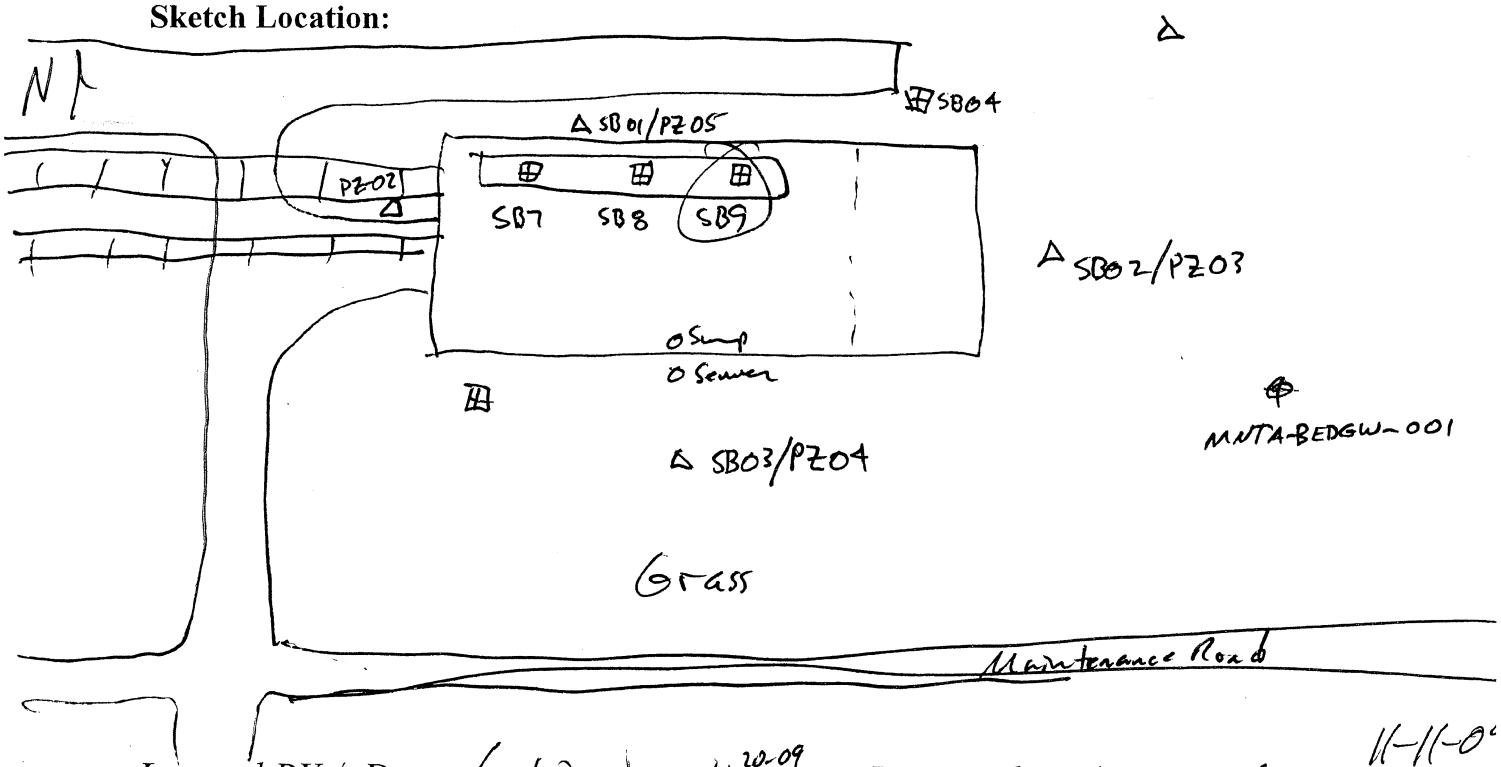
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E. W. Weaver 1-20-09

Reviewed BY / Date: Edward S. Weaver 11-11-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB06**

Sample Number: **LBA0018**

Sample Name: **PBOW-09-SS-LBA-SB06-LBA0018-(0-1)**

Sampling Method: **DP**

Sample Type: **SS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liners, disposable ziplock baggies, terra core

QC Partners:

(TB) — (ER) — (FB) —

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1550

Start Depth: 0

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

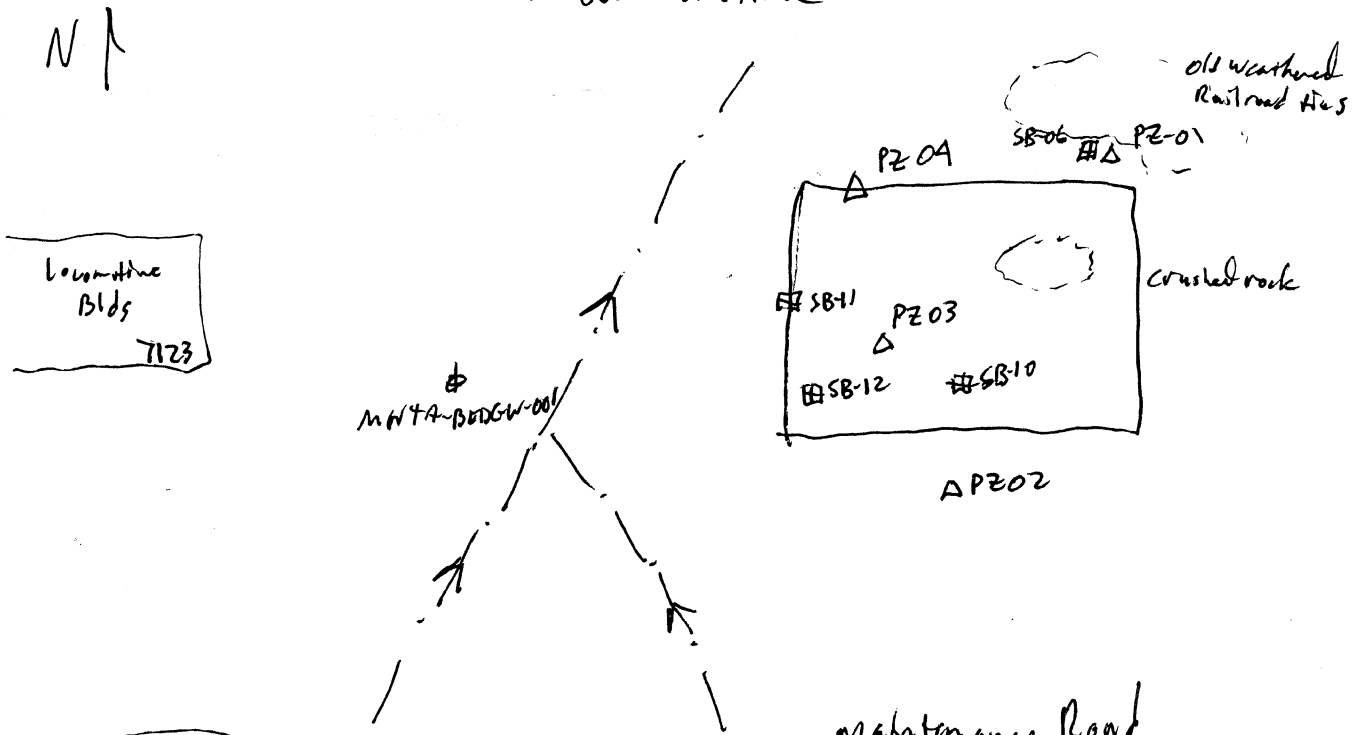
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location: Rail Car Wash Area



Logged BY / Date: E. W. Weaver 1-20-09 *Reviewed BY / Date:* Edward Kessler 1-10-

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB06**

Sample Number: **LBA0019**

Sample Name: **PBOW-09-DS-LBA-SB06-LBA0019-(3-5)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, Acetate liner, disposable bag, sta, terracore

QC Partners:

(TB) — **(ER)** — **(FB)** —

Task: **LBA-SOILS**

Collection Date: 1-20-09

Collection Time: 1553

Start Depth: 3'

End Depth: 5'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

ERPIMS Values:

Sacode:

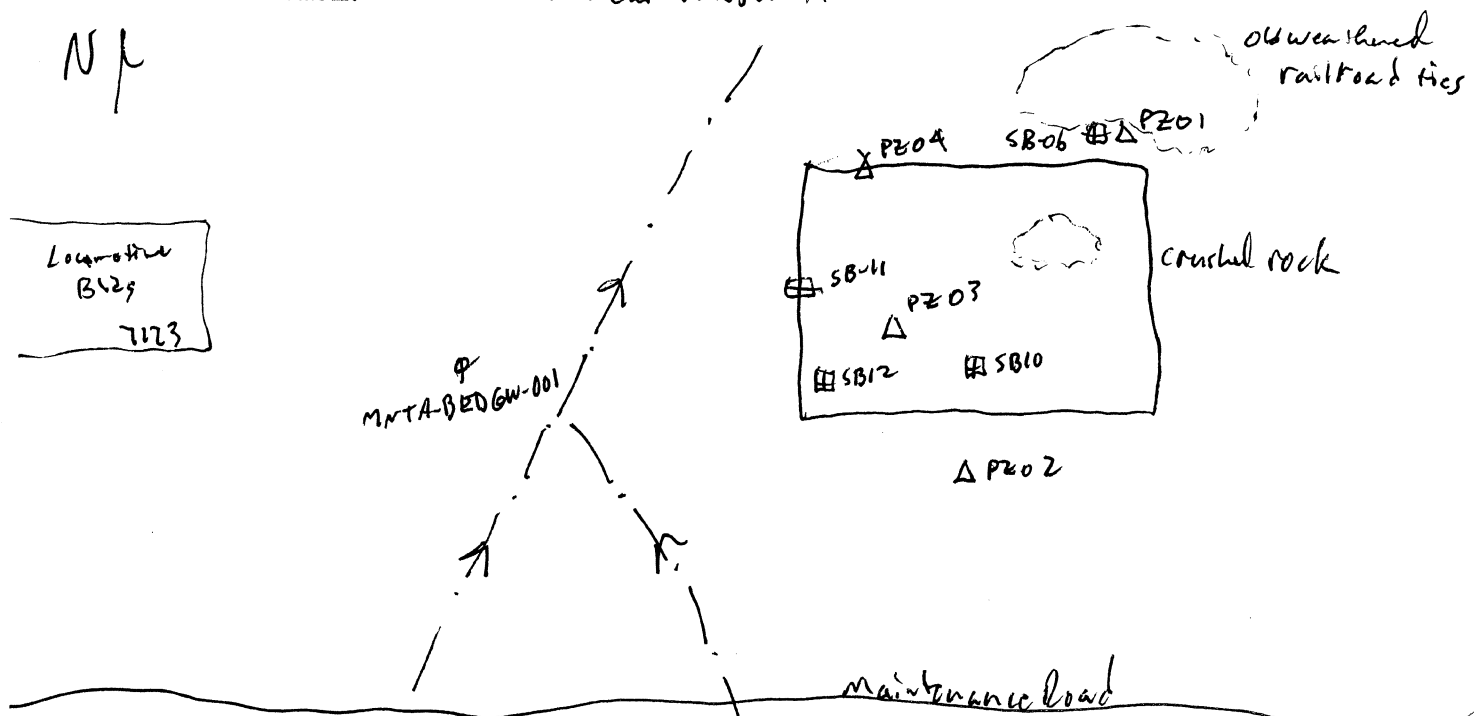
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location: Rail Car Wash Area



Logged BY / Date: E.W. Weaver 1-20-09

Reviewed BY / Date: Edward A. Weaver 1-21-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB06**
Sample Number: **LBA0020**
Sample Name: **PBOW-09-DS-LBA-SB06-LBA0020-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe/Acetate liner, disposable bowl/bolt basket, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1555
Start Depth: 6.9'
End Depth: 8.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

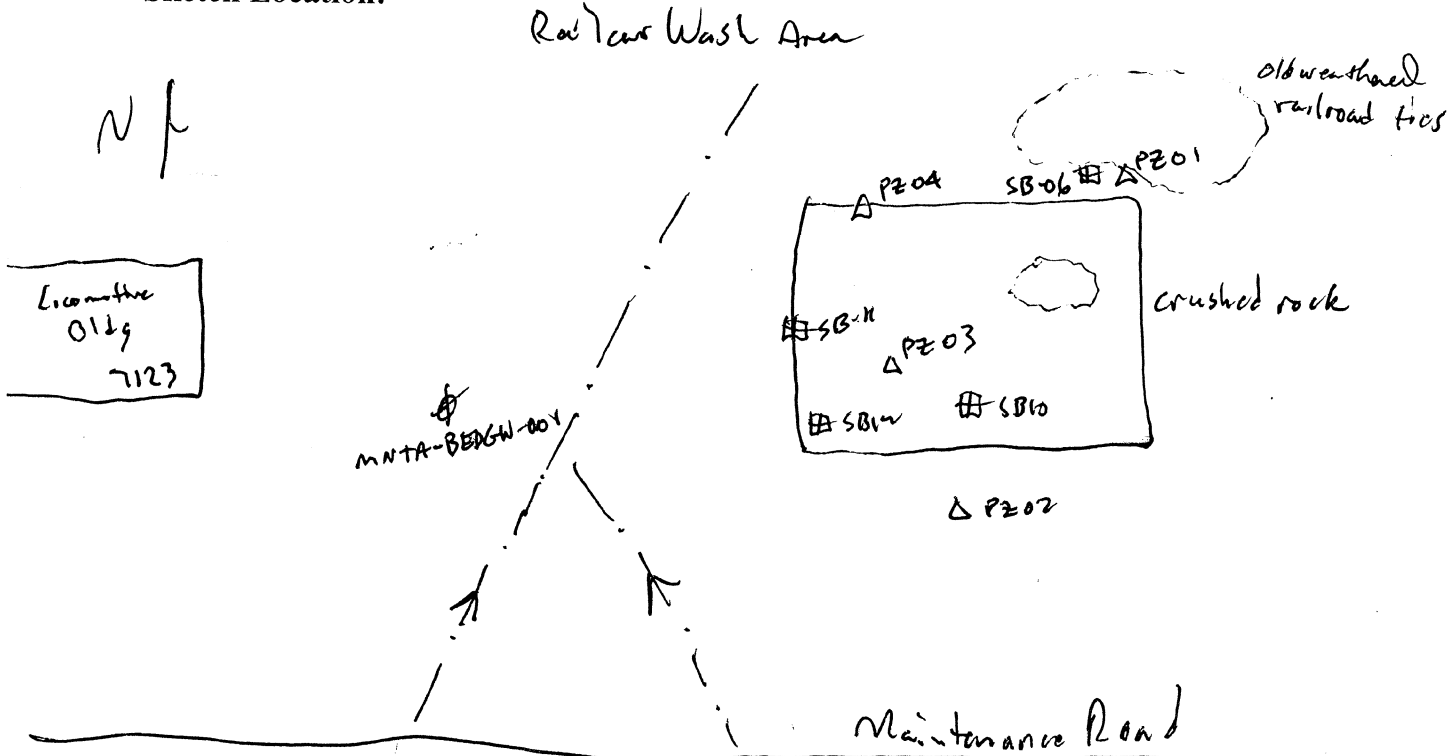
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments:

Sketch Location:



Logged BY / Date: David Kessler 1/20/09 *Reviewed BY / Date:* Edward K Weaver 1/21

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AML

Location Code: **LBA-SB06**
Sample Number: **LBA0021**
Sample Name: **PBOW-09-DS-LBA-SB06-LBA0021-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **FD**
Sampling Equip: Geoprobe, Acetate liner, disposable scoop, lab bags, Terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1555
Start Depth: 6.9'
End Depth: 8.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

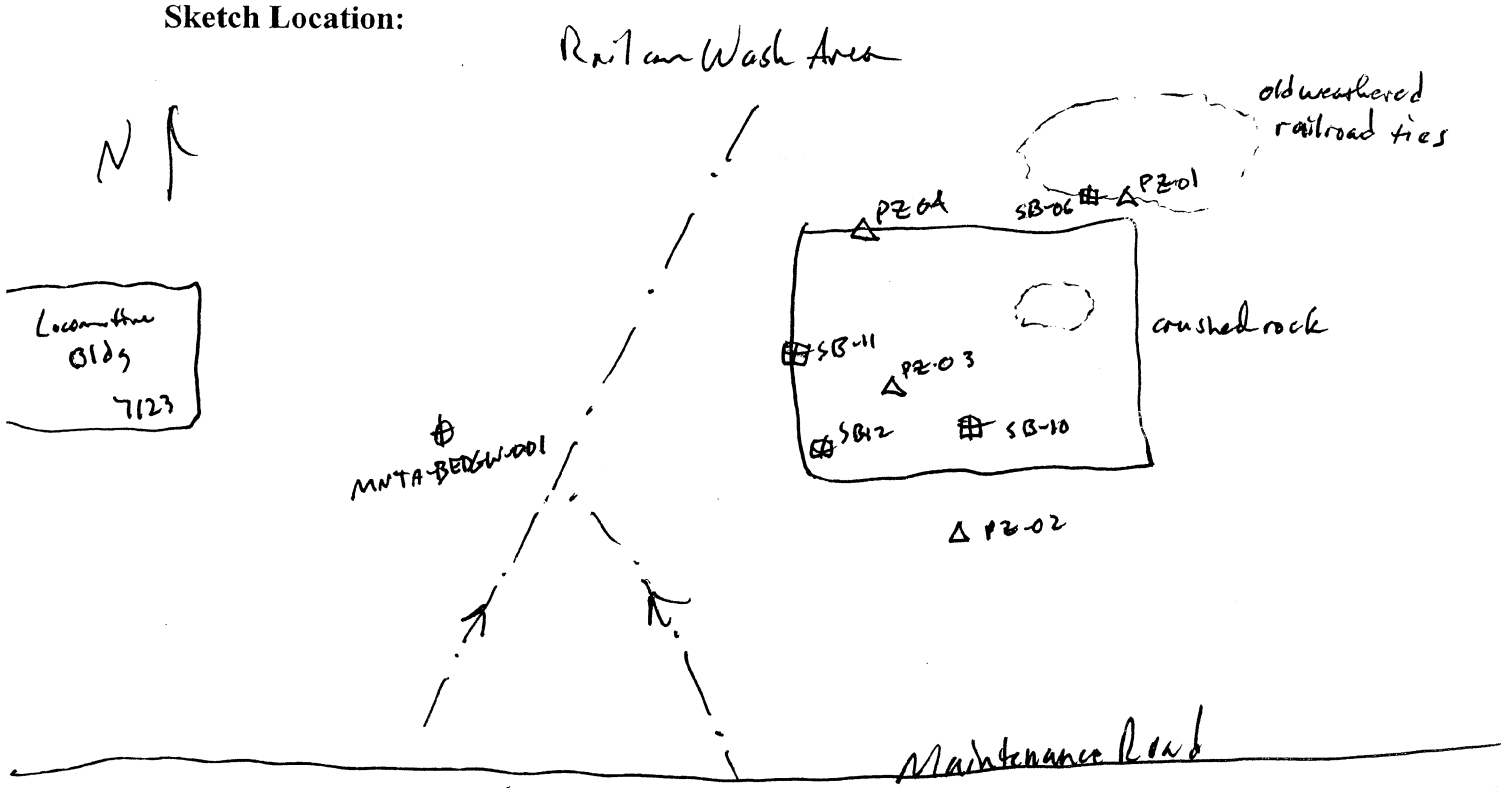
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: E. N. Weaver 1-20-09 *Reviewed BY / Date:* Edward K. Weaver

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB012109AMC

Location Code: **LBA-SB06**
Sample Number: **LBA0022**
Sample Name: **PBOW-09-DS-LBA-SB06-LBA0022-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **FS**
Sampling Equip: Geoprobe, Acetate liner, disposable bailers, terracore

Task: **LBA-SOILS**
Collection Date: 1-20-09
Collection Time: 1555
Start Depth: 6.9'
End Depth: 8.9'
Sample Matrix: **SOIL**
Sample Team: Keeler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

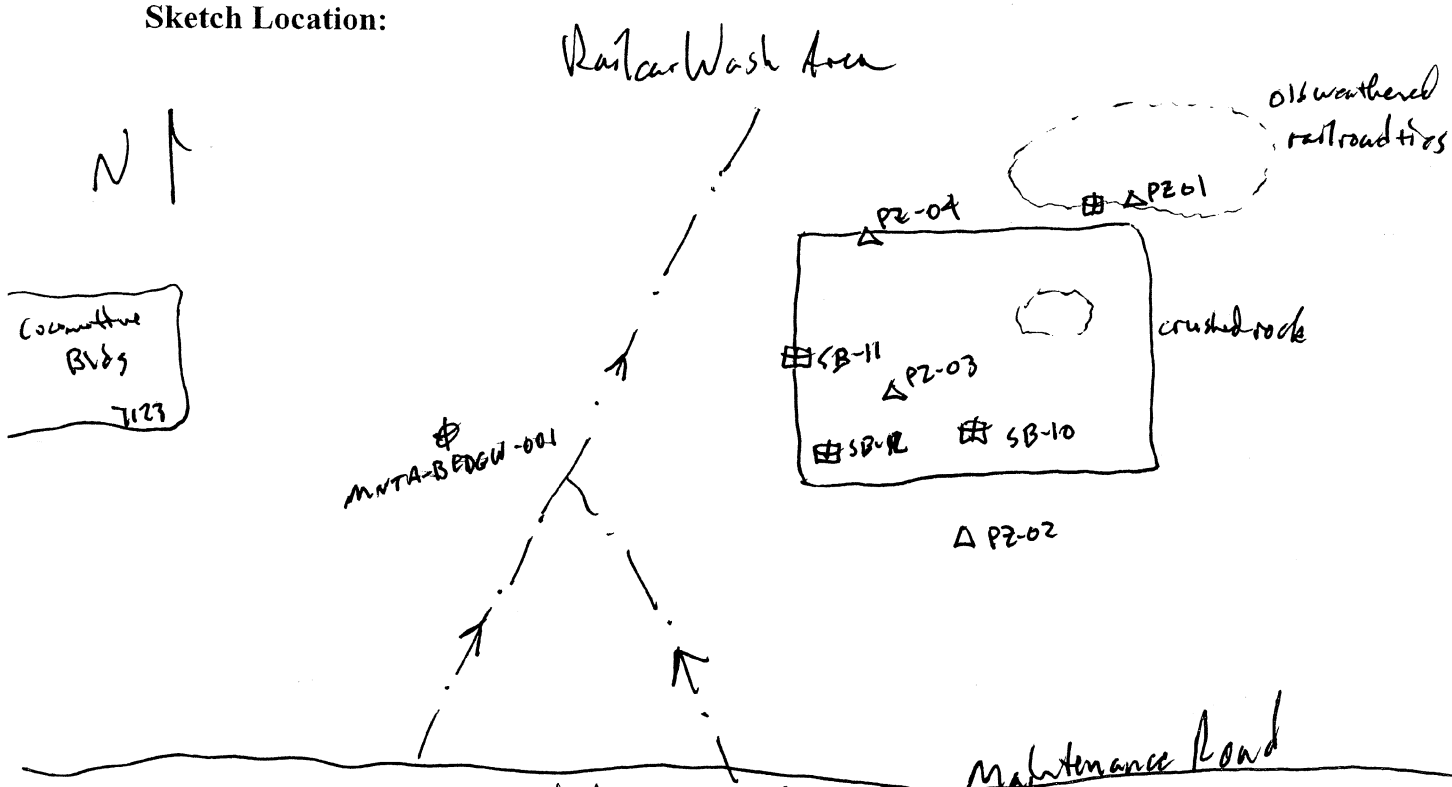
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	4	oz	CWM
METALS	N	A	2	4	oz	CWM
SEMIVOLATILES	N	A	2	4	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:



Logged BY / Date: [signature] 1-20-09

Reviewed BY / Date: [signature] 1-11-10

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB10**
Sample Number: **LBA0026**
Sample Name: **PBOW-09-SS-LBA-SB10-LBA0026-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra Core Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1010
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**

QC Partners:
(TB) — (ER) — (FB) —

Sample Team: Kessler/Weaver

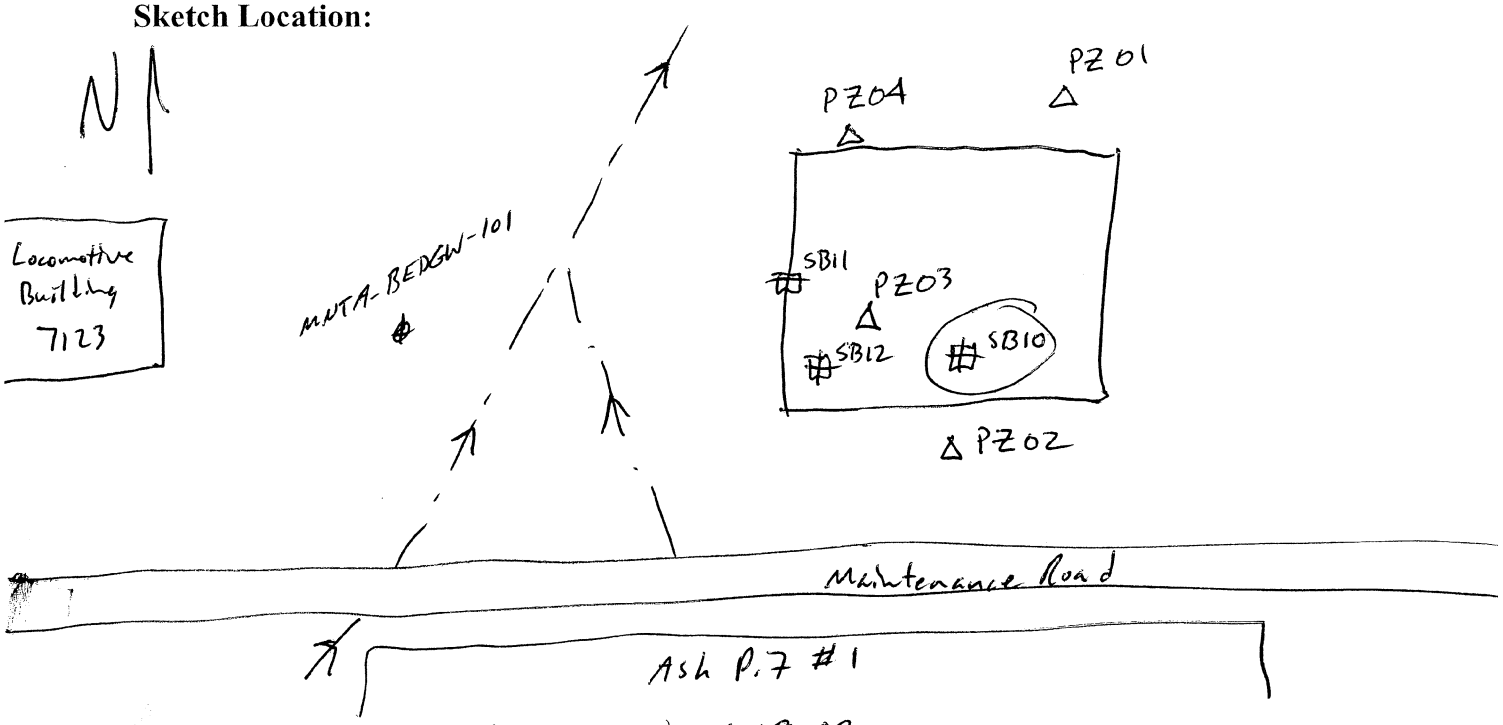
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Elizabeth Weaver 1-8-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB10**
Sample Number: **LBA0027**
Sample Name: **PBOW-09-SS-LBA-SB10-LBA0027-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **FD**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable scoop, ziplock baggie & TerraCore Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1010
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**
Sample Team: Kegler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

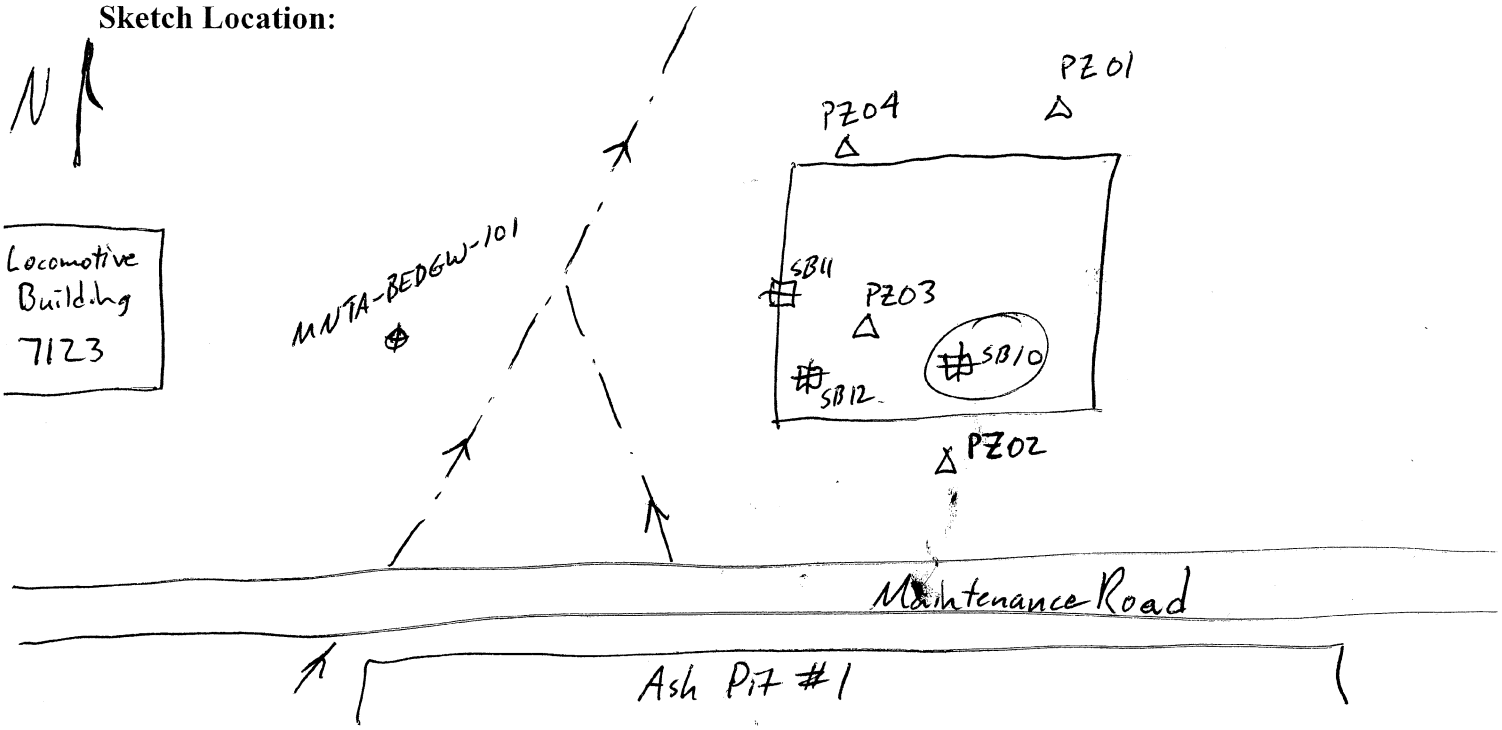
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward W. Weaver 1-8-

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909 AML

Location Code: **LBA-SB10**
Sample Number: **LBA0028**
Sample Name: **PBOW-09-SS-LBA-SB10-LBA0028-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **FS**
Sampling Equip: baggie, 5' Acetate liner, disposable ziplock baggie, Terracore sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1010
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

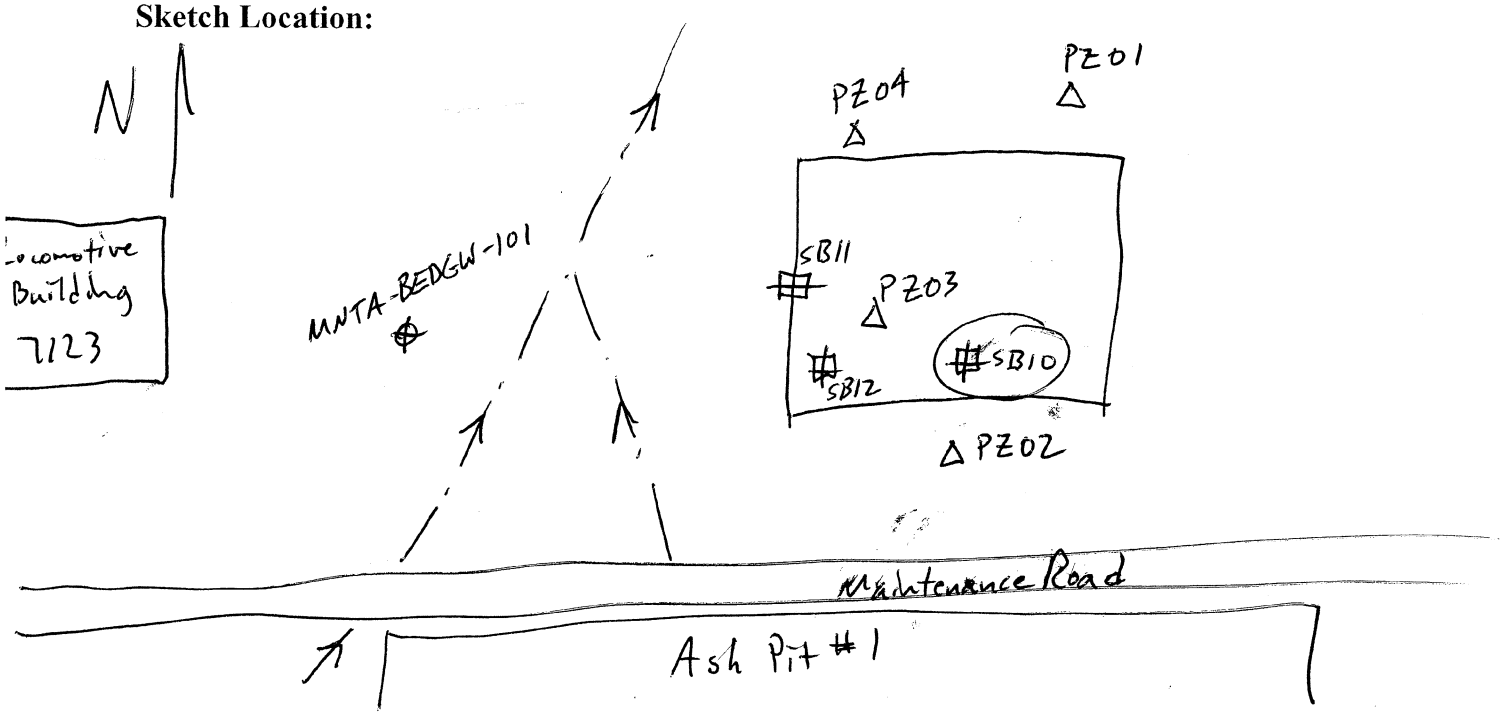
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments: NA

Sketch Location:



Logged BY / Date: E W Weaver 1-19-09 *Reviewed BY / Date:* Edward Kessler 1-8-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB10**
Sample Number: **LBA0029**
Sample Name: **PBOW-09-DS-LBA-SB10-LBA0029-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra core sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1013
Start Depth: 3'
End Depth: 4.4'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

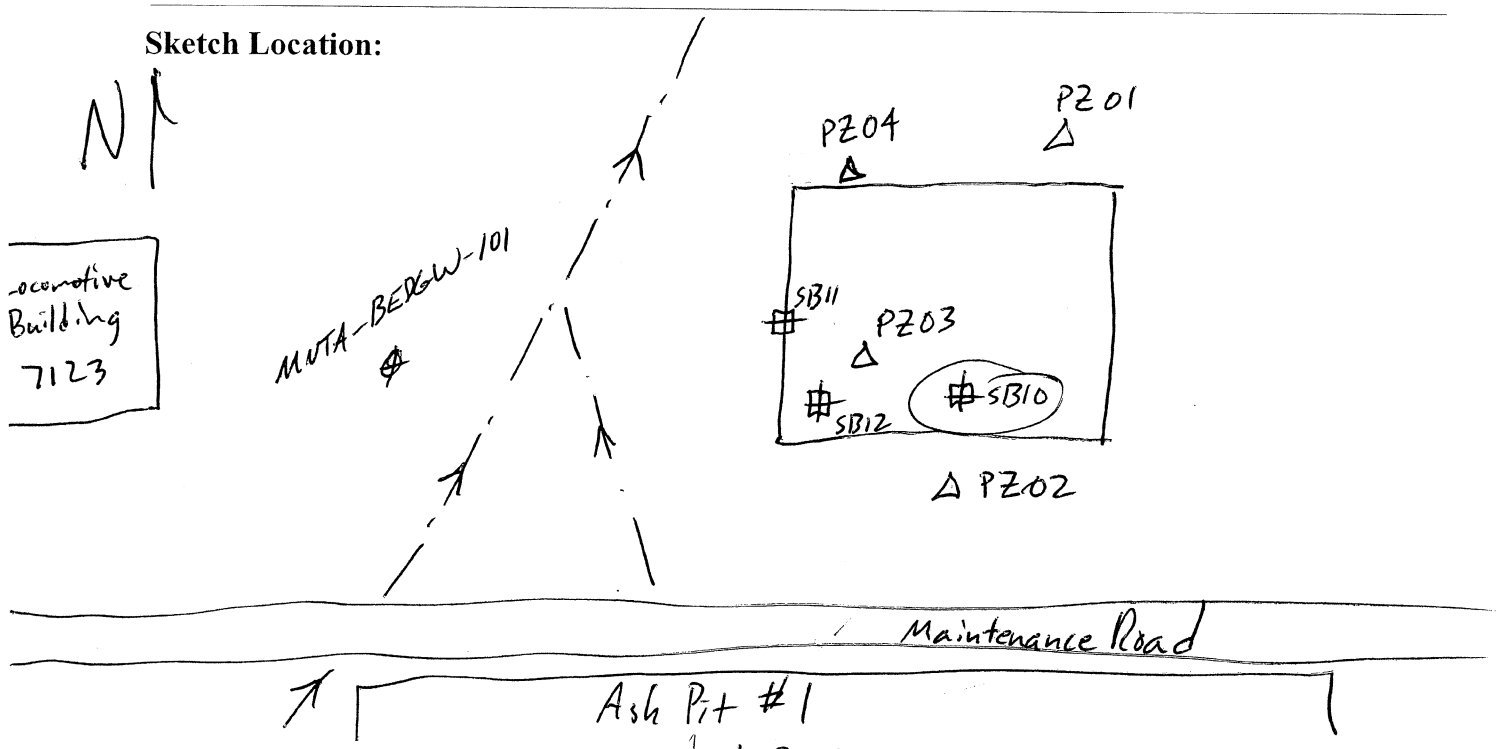
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments: NA

Sketch Location:



Logged BY / Date: Eric W. Weaver 1-19-09 *Reviewed BY / Date:* Edward M. Weaver 11-8-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909 AML

Location Code: **LBA-SB10**
Sample Number: **LBA0030**
Sample Name: **PBOW-09-DS-LBA-SB10-LBA0030-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable plastic baggie, Terra Core Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1015
Start Depth: 8'
End Depth: 10'
Sample Matrix: **SOIL**

QC Partners:
(TB) —— (ER) —— (FB) ——

Sample Team: Kessler/Weaver

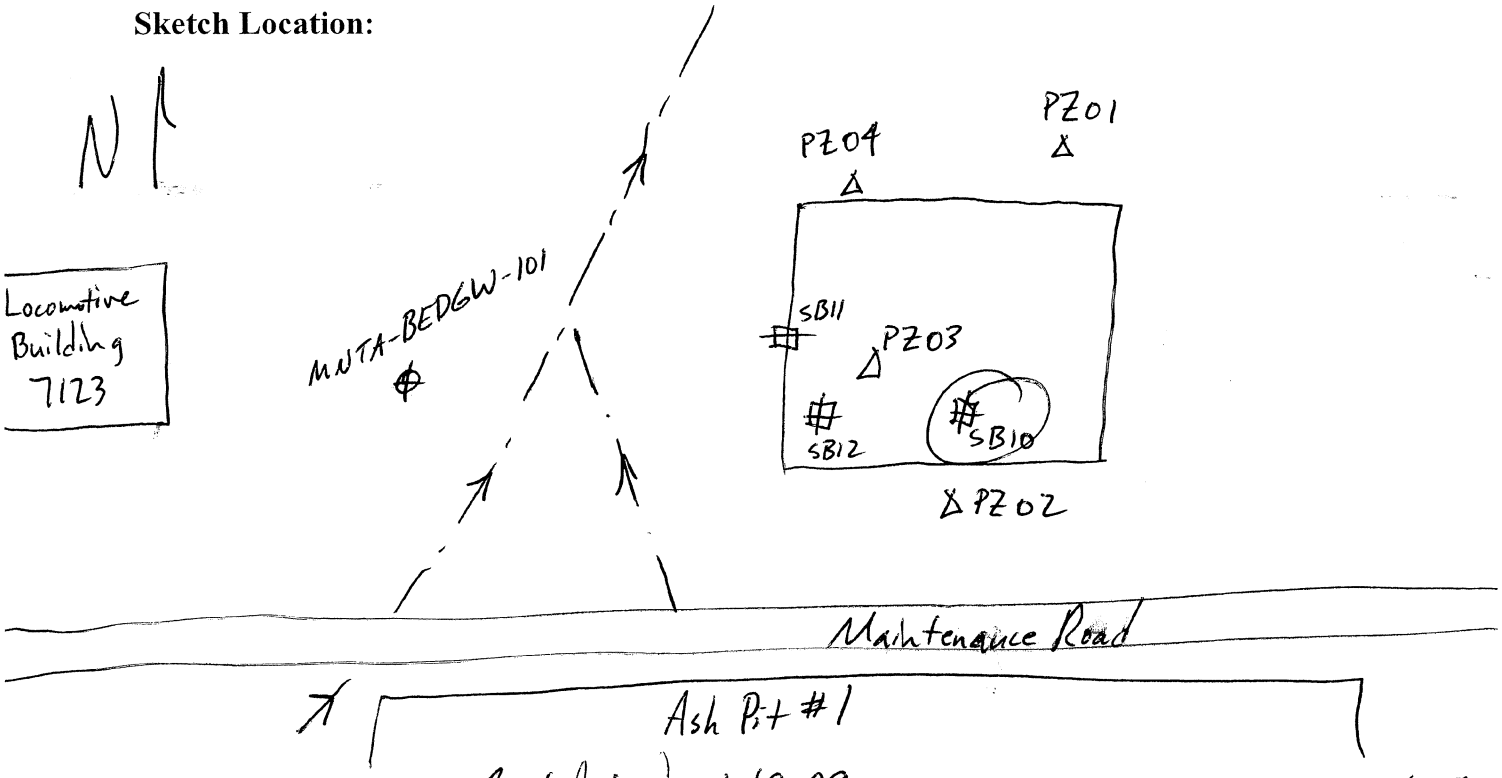
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward [illegible] 11-8-[illegible]

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB11**
Sample Number: **LBA0031**
Sample Name: **PBOW-09-SS-LBA-SB11-LBA0031-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra Core Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0955
Start Depth: 0
End Depth: 1'
Sample Matrix: **SOIL**

QC Partners:
(TB) —— (ER) —— (FB) ——

Sample Team: Kessler/Weaver

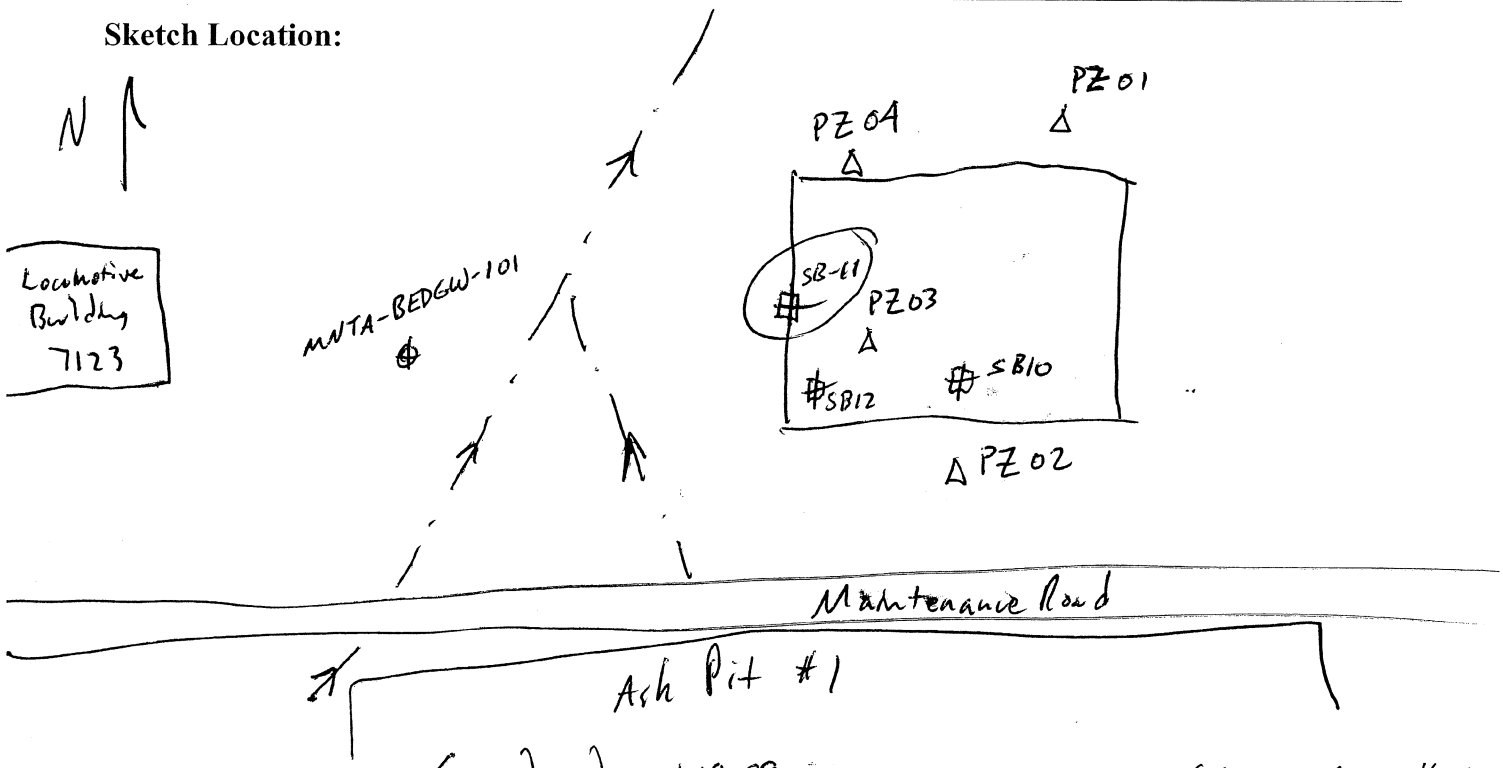
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: 0 to 1' Sample collected below 0.9 foot of fill material

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward Weaver 11-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB11**
Sample Number: **LBA0032**
Sample Name: **PBOW-09-DS-LBA-SB11-LBA0032-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, TerraCore Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0957
Start Depth: 3.9'
End Depth: 5.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

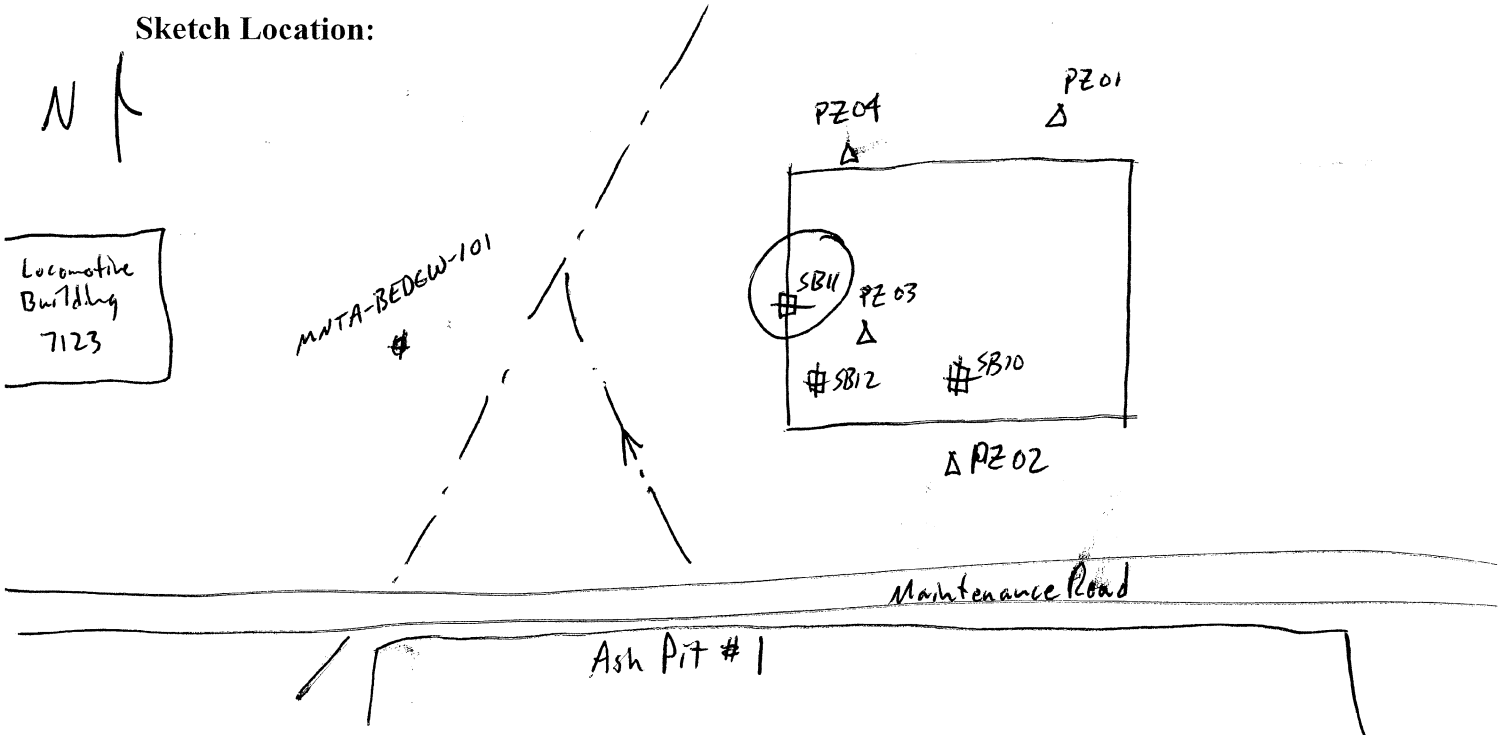
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: Erik Weaver 1-19-09 *Reviewed BY / Date:* Edward Weaver 11-8-0

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB11**
Sample Number: **LBA0032MS**
Sample Name: **PBOW-09-DS-LBA-SB11-LBA0032MS-(3-5)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **MS**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, TerraCore Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0957
Start Depth: 3.9'
End Depth: 5.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

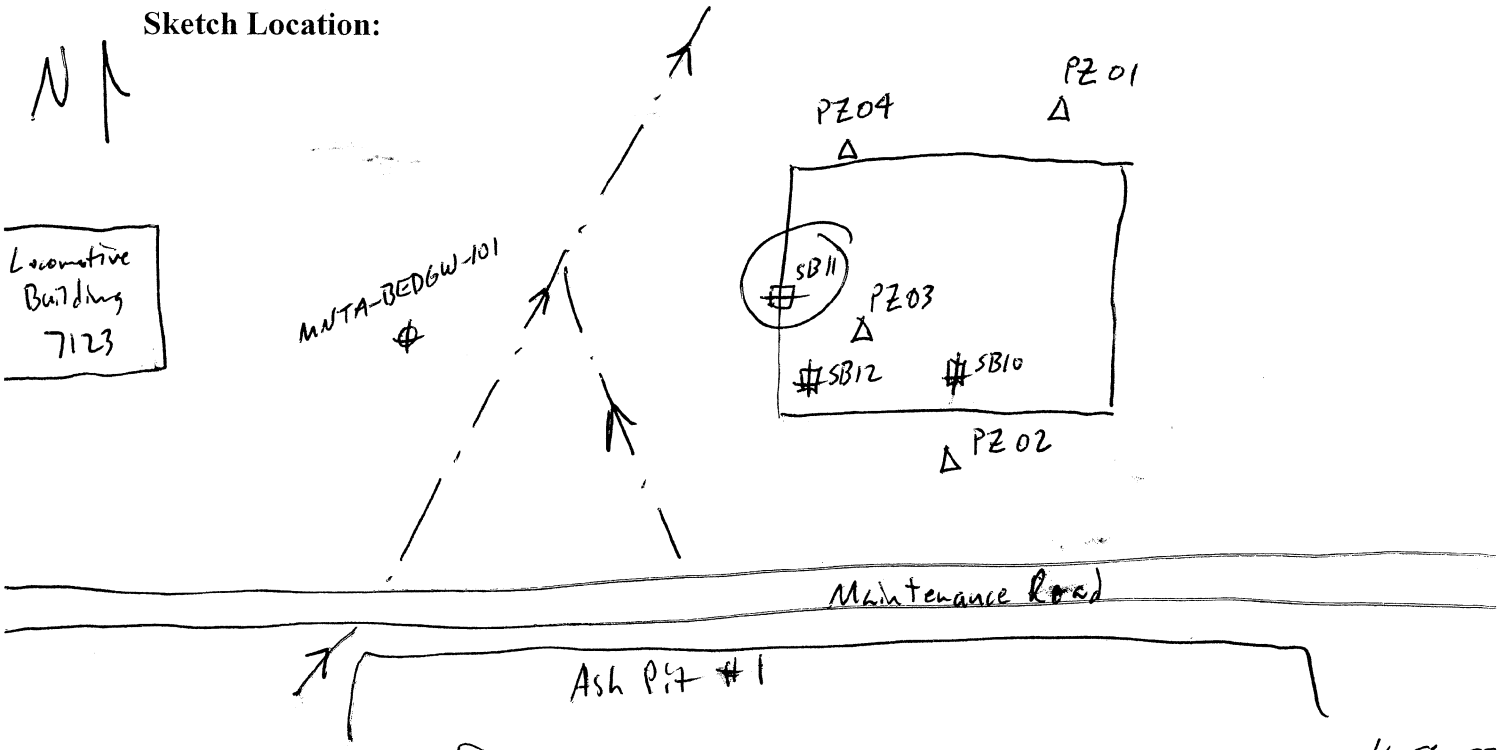
ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments: NA

Sketch Location:



Logged BY / Date: David Kessler for E. Weaver 1/19/09 *Reviewed BY / Date:* Edward Weaver 1-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909 AML

Location Code: **LBA-SB11**
Sample Number: **LBA0032MSD**
Sample Name: **PBOW-09-DS-LBA-SB11-LBA0032MSD-(3-5**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **MSD**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie TerraCore Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0957
Start Depth: 3.9'
End Depth: 5.9'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

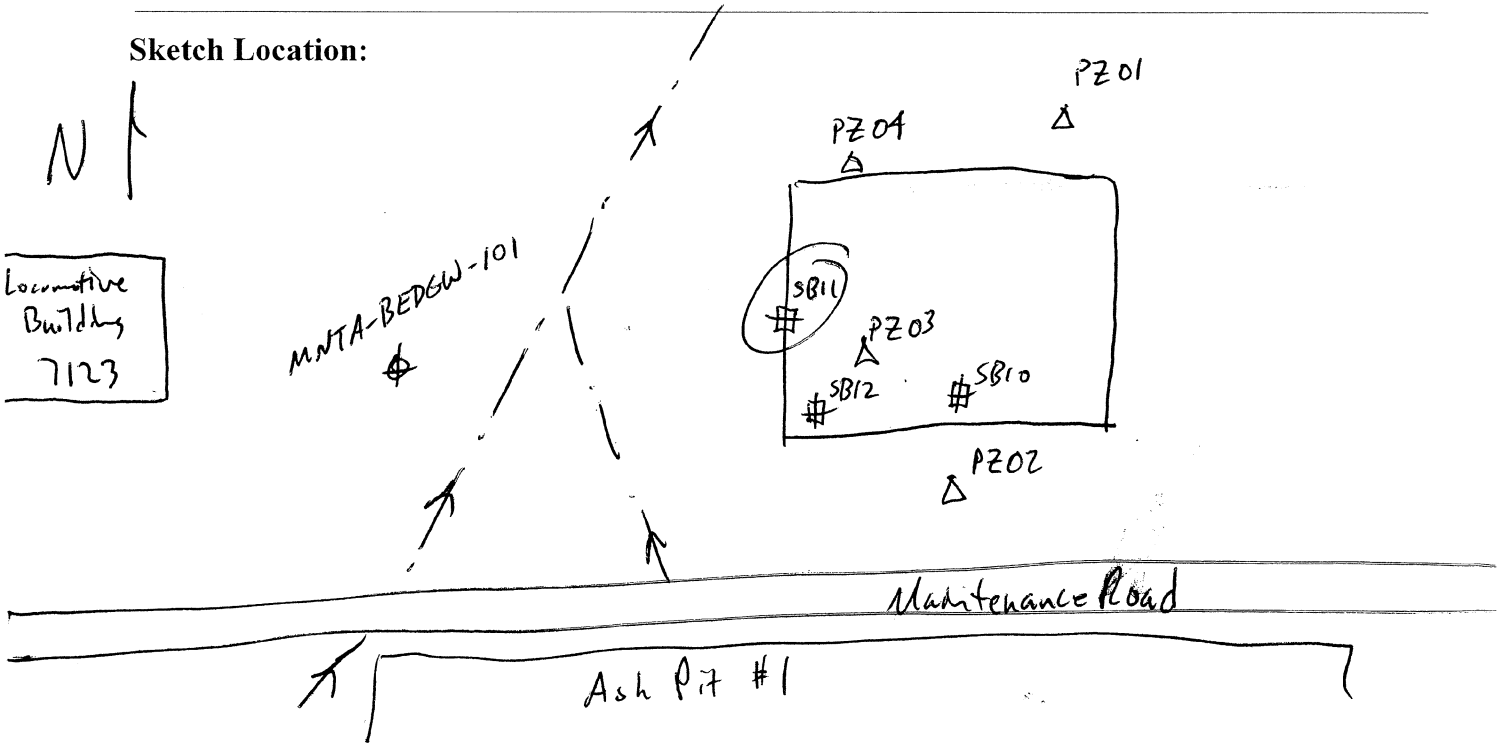
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: Eric W. Weaver 1-19-09 *Reviewed BY / Date:* Edward E. Kessler 11-8-09

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Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB11**
Sample Number: **LBA0033**
Sample Name: **PBOW-09-DS-LBA-SB11-LBA0033-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock bags & Terra Core Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 1000
Start Depth: 8'
End Depth: 10'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) —— (ER) —— (FB) ——

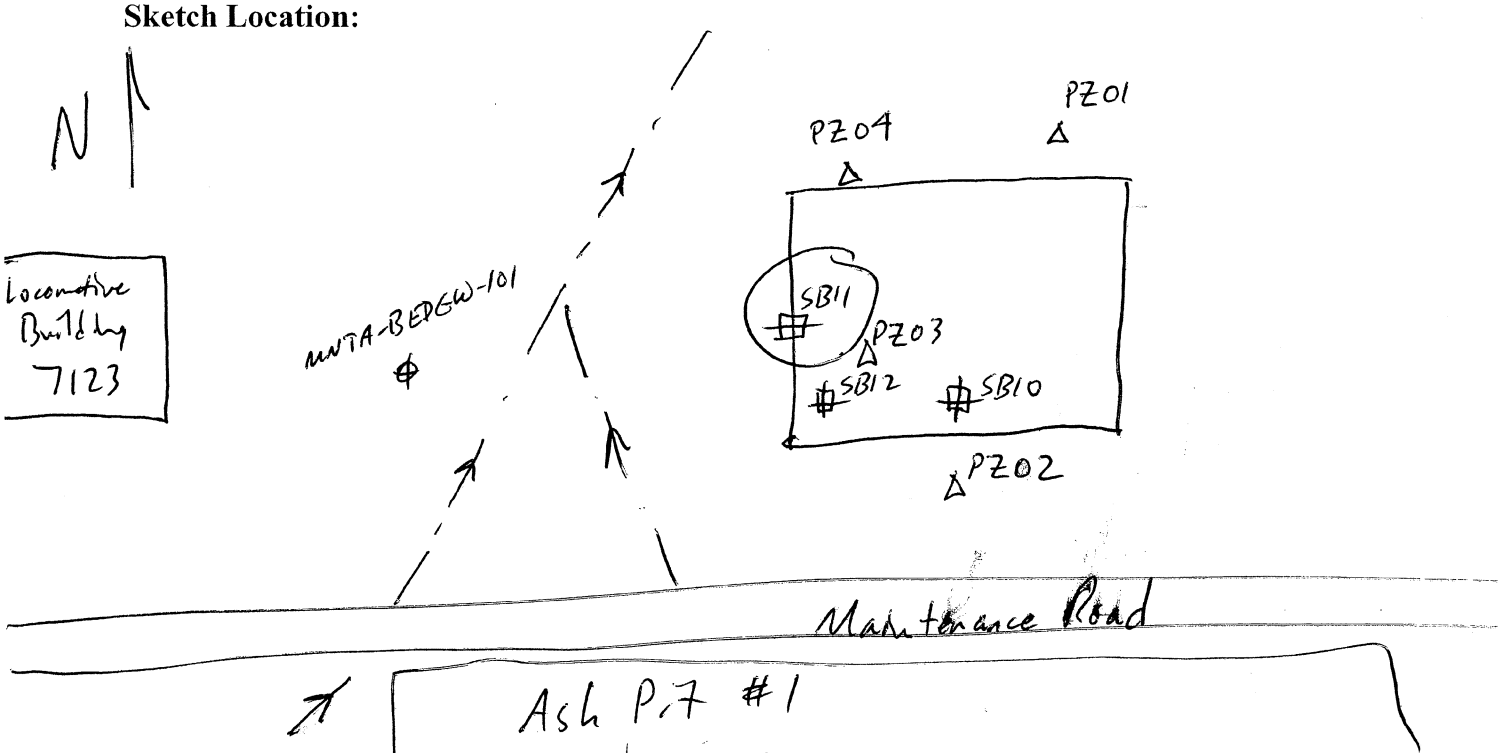
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward Kessler 1-8-09

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Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909 AML

Location Code: **LBA-SB12**
Sample Number: **LBA0034**
Sample Name: **PBOW-09-SS-LBA-SB12-LBA0034-(0-1)**
Sampling Method: **DP**
Sample Type: **SS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra core sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0935
Start Depth: 0
End Depth: 1
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

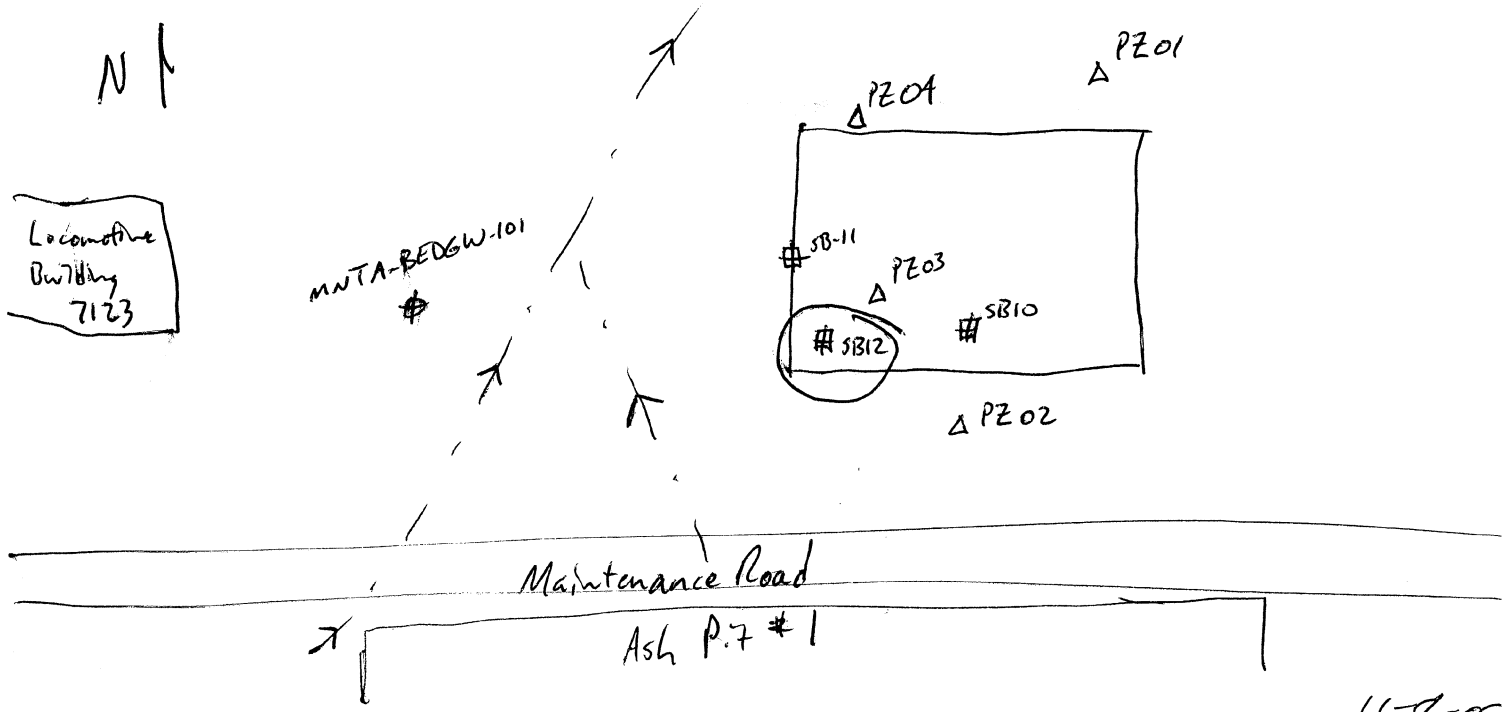
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: Eric W. Weaver 1-19-09 *Reviewed BY / Date:* Edward E. Weaver 11-8-09

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AML

Location Code: **LBA-SB12**

Sample Number: **LBA0035**

Sample Name: **PBOW-09-DS-LBA-SB12-LBA0035-(3-5)**

Sampling Method: **DP**

Sample Type: **DS** *Sample Purpose:* **REG**

Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terracore Sampler

Task: **LBA-SOILS**

Collection Date: 1-19-09

Collection Time: 0937

Start Depth: 3'

End Depth: 3.9'

Sample Matrix: **SOIL**

Sample Team: Kessler/Weaver

QC Partners:

(TB) — (ER) — (FB) —

ERPIMS Values:

Sacode:

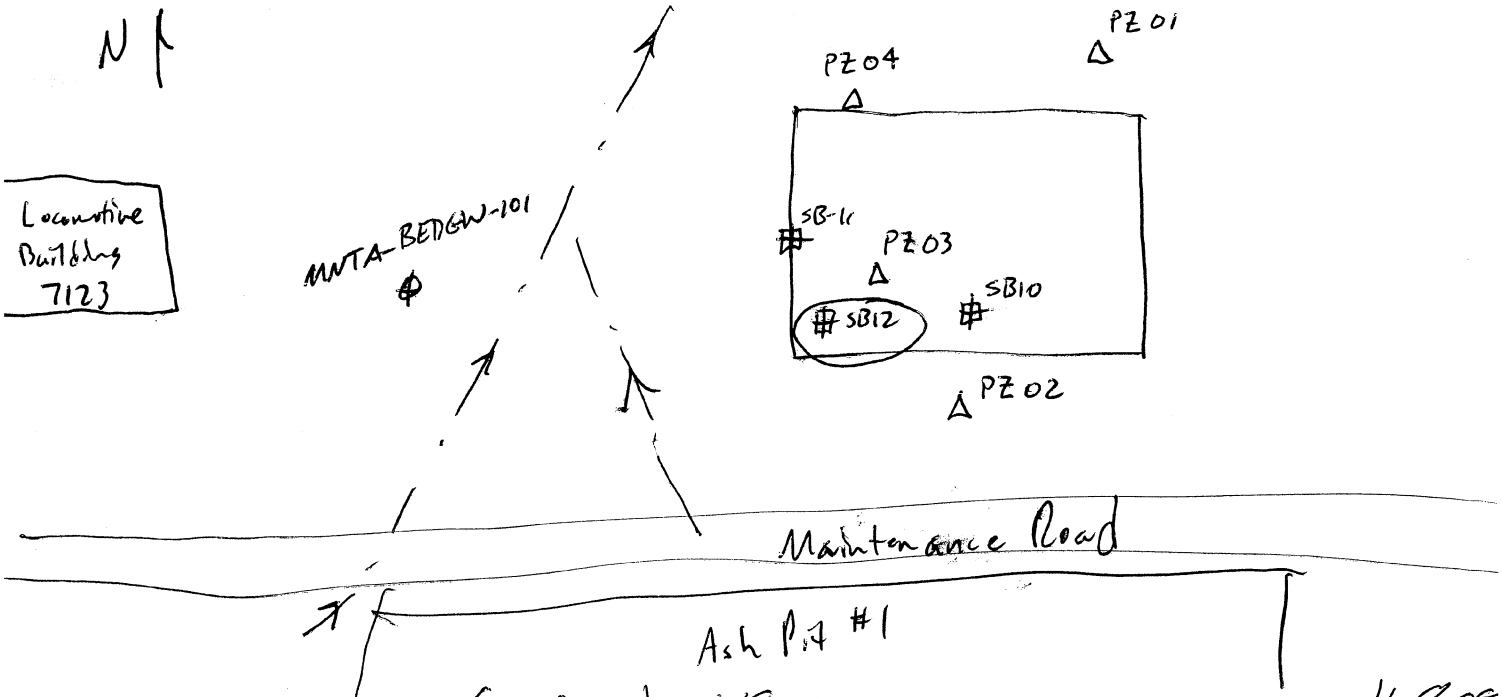
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
PCB3	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

Comments: NA

Sketch Location:



Logged BY / Date: E. W. Weaver 1-19-09 *Reviewed BY / Date:* Edward W. Weaver 11-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB011909AUL

Location Code: **LBA-SB12**
Sample Number: **LBA0036**
Sample Name: **PBOW-09-DS-LBA-SB12-LBA0036-(8-10)**
Sampling Method: **DP**
Sample Type: **DS** *Sample Purpose:* **REG**
Sampling Equip: Geoprobe, 5' Acetate liner, disposable ziplock baggie, Terra Core Sampler

Task: **LBA-SOILS**
Collection Date: 1-19-09
Collection Time: 0940
Start Depth: 8'
End Depth: 10'
Sample Matrix: **SOIL**
Sample Team: Kessler/Weaver

QC Partners:
(TB) — (ER) — (FB) —

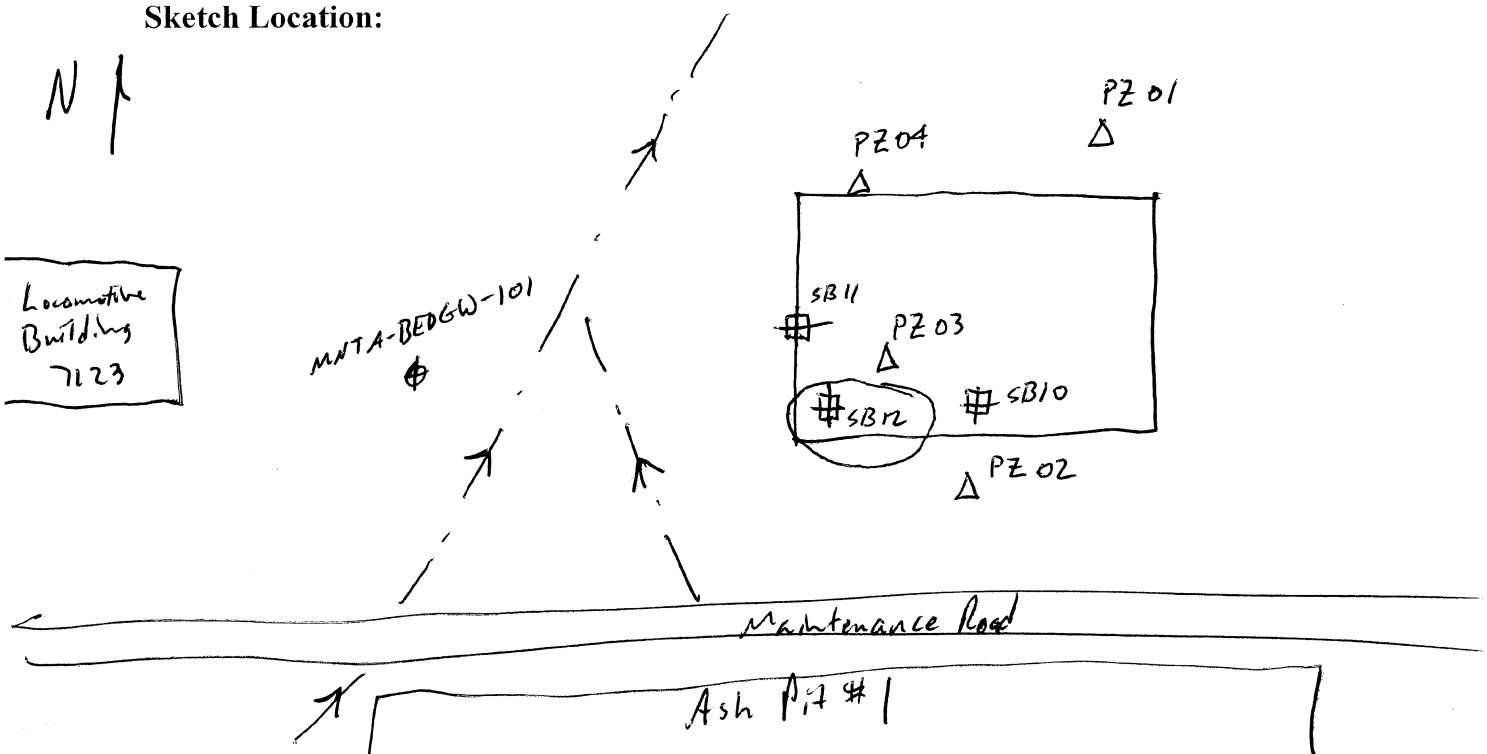
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
EXPLOSIVES	N	A	1	8	oz	CWM
METALS	N	A	1	8	oz	CWM
SEMIVOLATILES	N	A	1	8	oz	CWM
VOLATILES3	N	B	1	5	g	Terracore

ERPIMS Values:
Sacode:
Lot Control#:

Comments: NA

Sketch Location:



Logged BY / Date: Eric W. Weaver 1-19-09 *Reviewed BY / Date:* Edward J. Kessler 1-8-

Shaw E & I, Inc.

Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB02 0209 AML

Location Code: **LBA-PZ01**

Sample Number: **LBA3000**

Sample Name: **PBOW-09-GW-LBA-PZ01-LBA3000**

Sampling Method: **SP**

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: Peristaltic pump, Teflon lined tubing

QC Partners:

(TB) — (ER) — (FB) —

Task: **LBA-WATER**

Collection Date: 1-31-09

Collection Time: 0935

Start Depth: EW ~~6.48~~ 7.17' btoc

End Depth: 7.28' btoc

Sample Matrix: **WATER**

Sample Team: DK/EW/MW

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

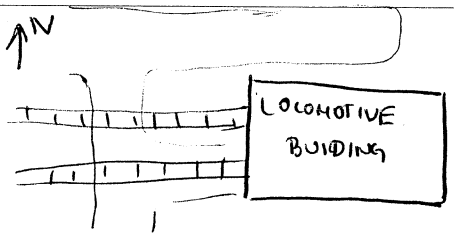
Groundwater Information:

Measured Well Depth: 20.14' btoc **Depth To Water:** 6.48' btoc

Comments: VOC's collected from peristaltic pump.

Sketch Location:

~~No sketch~~



Logged BY / Date: 1-31-09

Reviewed BY / Date: Edward Nowak 4-8-09

18.80
1.34
20.14

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Locomotive Building
Project Name/#: PBOW
Weather: Clear, Sunny, ~5°F, windy (windchill negative numbers)
Purge Equipment: Peristaltic pump, Teflon lined tubing
Sampling Equipment: same

Sampling location ID: LBA-PZ01
Sample ID: LBA3000
Collection Time/Date: 1-31-09
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0 ppm
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 20.14
Initial (pre-installation) DTW/time: 6.48 / 0839
Final (after pump priming) DTW/time: 6.45/0842
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 22'

Installation date/beginning time: 1-31-09/0840
Installation date/completion time: 1-31-09/0841
Screen Interval (ft. BTOC): 8.66 to 18.66
Sample Depth/Pump intake depth (ft BTOC): 15'
Post-installation DTW/time: 6.45/0842
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-31-09
Initial (pre-purging) DTW (ft. BTOC): 6.45
Calculated tubing + pump volume: 0.22 L
Unit casing volume: _____

PID/FID reading (well head/background): 0
Purge date/completion time: 1-31-09 / 1009
Final (post-purging) DTW (ft. BTOC): 7.28
Total volume purged: 1.5 gallons
Required purge volume: 0.66 L (3 tubing volumes)

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0852	6.48	—	—	—	—	—	—	—	—
0900	7.01	200		5.38	0.946	6.89	7.0	1.27	112.0
0905	7.02	200		4.97	0.950	6.89	7.2	0.94	175.5
0910	7.06	200		5.07	0.945	6.85	8.7	1.46	36.0
0915	7.09	205		5.04	0.944	6.83	9.2	1.67	36.2
0920	7.14	200		4.96	0.943	6.82	10.1	1.83	25.4
0925	7.16	200		5.03	0.944	6.82	10.4	1.90	23.7
0930	7.16	200		5.07	0.943	6.82	10.6	1.96	19.8

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0935	7.17	200		5.16	0.942	6.80	10.6	1.97	18.1

Sampling

Sampling beginning time: 0935 Sampling completion time: 1009

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0935	7.17	200		5.16	0.942	6.80	10.6	1.97	18.1

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units
Ferrous Iron	0.0	

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 012909 AML

Location Code: **LBA-PZ02**
Sample Number: **LBA3003**
Sample Name: **PBOW-09-GW-LBA-PZ02-LBA3003**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: **LBA-WATER**
Collection Date: 1-29-09
Collection Time: 1005
Start Depth: 14.14' btoc
End Depth: 14.14'
Sample Matrix: **WATER**
Sample Team: DRK/EWW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

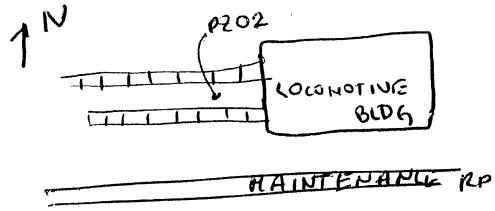
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: 22.74' btoc **Depth To Water:** 8.23' btoc

Comments: VOCs collected from peristaltic pump. ~~Attempt~~ Sample to turbid to field test for Ferrous Iron

Sketch Location:
~~No sketch~~ MR



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Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Locomotive Building
Project Name/#: PBOW
Weather: cloudy, snowing, blowing snow ~ 17°F
Purge Equipment: Peristaltic pump, Teflon lined tubing
Sampling Equipment: same

Sampling location ID: LBA-PZ02
Sample ID: LBA3003
Collection Time/Date: 1-29-09 / 1005
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 22.74
Initial (pre-installation) DTW/time: 8.23 / 835
Final (after pump priming) DTW/time: 8.15 / 840
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 27'

Installation date/beginning time: 1-29-09 / 838
Installation date/completion time: 1-29-09 / 840
Screen Interval (ft. BTOC): 9.20 to 19.20
Sample Depth/Pump intake depth (ft BTOC): 21'
Post-installation DTW/time: 8.15 / 840
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" OD
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-29-09 / 0855
Initial (pre-purging) DTW (ft. BTOC): 8.23
Calculated tubing + pump volume: —
Unit casing volume: —

PID/FID reading (well head/background): 0
Purge date/completion time: 1-29-09 / 1005
Final (post-purging) DTW (ft. BTOC): —
Total volume purged: —
Required purge volume: —

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0855	~~8.15~~	—	—	—	—	—	—	—	—
0905	12.67	70		3.68	0.518	7.49	-24.5	3.33	131.1
0910	12.44	70		3.45	0.519	7.55	-26.1	3.33	243.4
0915	12.73	70		3.43	0.518	7.59	-27.2	3.28	114.9
0920	13.50	70		3.07	0.521	7.58	-26.4	2.37	77.8
0925	13.72	60		3.40	0.528	7.60	-27.4	1.90	152.5
0930	13.68	60		3.46	0.537	7.58	-27.5	2.85	433.8
0935	13.75	60		3.50	0.540	7.57	-27.1	3.01	967.2

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 2 of 2

BBA-PZ02

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0940	13.88	60		3.57	0.545	7.56	-26.8	2.74	1210.1
0945	13.98	62		3.69	0.548	7.57	-27.0	2.70	1211.0
0950	14.06	62		3.74	0.551	7.55	-26.7	2.75	1211.1
0955	14.12	62		3.68	0.552	7.56	-27.0	2.43	1210.9
1000	14.10	62		3.73	0.553	7.56	-26.2	2.68	1211.1
1005	14.14	62		3.70	0.554	7.57	-26.4	2.78	1210.8

Sampling

Sampling beginning time: 1005 Sampling completion time: 1135

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1005	14.14	62		3.70	0.554	7.57	-26.4	2.78	1210.8

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units
Ferrous Iron	Sample too turbid to field test	

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB01 30 09 ARL

Location Code: **LBA-PZ03**
Sample Number: **LBA3004**
Sample Name: **PBOW-09-GW-LBA-PZ03-LBA3004**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: **LBA-WATER**
Collection Date: 1-29-09
Collection Time: 1700
Start Depth: 8.42' btoc
End Depth: 8.46' btoc
Sample Matrix: **WATER**
Sample Team: DK/EW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

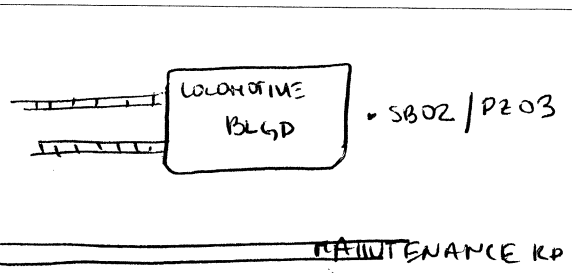
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: ~~19.34'~~ 18.84' MK btoc **Depth To Water:** 8.02' btoc

Comments: VOC's collected from peristaltic pump.
Ferrous Iron - 0.0

Sketch Location:

~~No sketch~~ MK



Logged BY / Date: [signature] 1-29-09 *Reviewed BY / Date:* [signature] 11-8-09

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of ~~4~~ 2

Operable Unit/Site ID: Locomotive Building
Project Name/#: PBOW
Weather: Cloudy, snowing, blowing snow ~17°F
Purge Equipment: Peristaltic pump, Teflon-lined tubing
Sampling Equipment: same

Sampling location ID: LBA-PZ03
Sample ID: LBA 3004
Collection Time/Date: 1-29-09 / 1700
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 19.00 plus stickup
Initial (pre-installation) DTW/time: 8.02 / 1550
Final (after pump priming) DTW/time: 8.01 1558
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 25'

Installation date/beginning time: 1-29-09 / 1545
Installation date/completion time: 1-29-09 / 1602
Screen Interval (ft. BTOC): 8.86 to 18.86
Sample Depth/Pump intake depth (ft BTOC): 19
Post-installation DTW/time: 8.01 / 1602
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-29-09 / 1605
Initial (pre-purging) DTW (ft. BTOC): 8.02
Calculated tubing + pump volume:
Unit casing volume:

PID/FID reading (well head/background): 0
Purge date/completion time: 1-29-09 / 1700
Final (post-purging) DTW (ft. BTOC): 8.46
Total volume purged:
Required purge volume:

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1605	8.01	—	—	—	—	—	—	—	—
1625	8.42	220		5.37	0.500	6.77	10.9	0.82	638.1
1630	8.42	220		5.12	0.496	6.76	11.6	0.70	384.5
1635	8.42	220		4.98	0.491	6.79	10.0	0.66	174.6
1640	8.42	220		4.82	0.489	6.87	6.2	0.65	118.5
1645	8.42	220		4.80	0.488	6.89	5.3	0.65	105.3
1650	8.42	190		4.72	0.488	6.90	5.1	0.64	74.3
1655	8.42	190		4.71	0.487	6.89	5.3	0.64	47.2

Equipment rinsed with DI water

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 2 of ~~4~~ 2

LBA-PZ03

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1700	8.42	190		4.76	0.486	6.94	4.9	0.66	25.2

1/29/09

Sampling

Sampling beginning time: 1700 Sampling completion time: 1737

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1700	8.42	190		4.76	0.486	6.94	4.9	0.66	25.2

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units
Ferrous Iron	0.0	mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB 020209 AML

Location Code: **LBA-PZ04**
Sample Number: **LBA3005**
Sample Name: **PBOW-09-GW-LBA-PZ04-LBA3005**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic Pump / 1/4" ID Teflon Lined Tubing

Task: **LBA-WATER**
Collection Date: 1/30/09
Collection Time: 1610
Start Depth: ~~6.6~~ 6.70 ft btoc
End Depth: 6.71 ft btoc
Sample Matrix: **WATER**
Sample Team: DK/EW/MW

QC Partners:
(TB) PB 020209-TB1 (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

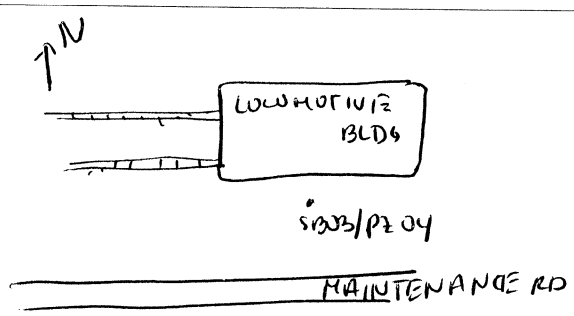
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: ~~NA~~ 18.44' btoc **Depth To Water:** 6.64 ft btoc

Comments: NA

Sketch Location:

~~No sketch~~ MR



Logged BY / Date: David Kessler 1/30/09 *Reviewed BY / Date:* Edward Wenner 11-8-09

1-800-446-7488 - Instru
Jenny - 559

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Locomotive House Area
Project Name/#: PBOW / 133767
Weather: partly sunny, cold (20°), windy, wind chill 0°
Purge Equipment: peristaltic pump / w/ Teflon-Lined 1/4" ID tubing
Sampling Equipment: "

Sampling location ID: Locomotive House - PZ-04
Sample ID: LBA-3005
Collection Time/Date: 1/30/09 1610
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: D. Kessler / M. Wesney
PID/FID reading (well head/background): 0.0 ppm / 0.0 ppm
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 20.14
Initial (pre-installation) DTW/time: 6.64 / 1450
Final (after pump priming) DTW/time: 6.63
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): NA
Discharge tube length (ft.): 22

Installation date/beginning time: 1/30/09
Installation date/completion time: 1/30/09
Screen Interval (ft. BTOC): 10.0 to 20.0
Sample Depth/Pump intake depth (ft BTOC): 17
Post-installation DTW/time: 6.63
Max. sustainable pump rate (mL/min): —
Appearance of product: very cloudy
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = 9.46 psi (Peristaltic pump)

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting			DK						
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: D. Kessler / M. Wesney
Purge date/beginning time: 1/30/09
Initial (pre-purging) DTW (ft. BTOC): 6.64 / 6:00 w/ tubing
Calculated tubing + pump volume: NA
Unit casing volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
Purge date/completion time: 1/30/09 1610
Final (post-purging) DTW (ft. BTOC): 6.70
Total volume purged: 3 gal
Required purge volume: NA

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting		DK							
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1515	6.63	310	0.34 gal	6.46	0.603	6.89	48.0	1.11	1232.9
1520	6.59	250	1 g	6.04	0.585	6.92	29.1	0.80	1227.8
1525	6.62	250	—	5.74	0.579	6.95	22.7	0.74	1226.7
1530	6.63	250	—	5.70	0.579	6.96	21.9	0.69	1226.3
1535	6.67	250	—	5.74	0.575	6.97	18.0	0.64	1225.3
1540	6.70	250	—	5.87	0.573	6.98	16.4	0.62	1226.4
1545	6.67	250	—	5.50	0.571	6.99	16.8	0.61	1223.4
1550	6.~~8~~70	230	—	5.67	0.~~8~~569	6.99	17.9	0.59	1225.7

Slow flow

LBA-PZ-04

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1555	6.75	230	—	5.49	0.571	6.99	19.0	0.55	1223.3
1600	6.77	230	—	5.44	0.570	6.98	19.0	0.53	1222.8
1605	6.67	230	—	5.70	0.569	6.98	18.5	0.52	1226.0
1610	6.70	230	3 gal	5.42	0.569	6.99	17.9	0.51	1222.5

D. Kessler 1/31/09

Sampling

Sampling beginning time: 1610 Sampling completion time: 1645

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1610	6.70	230	3	5.42	0.569	6.99	17.9	0.51	1222.5

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units
Ferrous Iron	NA-Too Cloudy	mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

* No Ferrous Iron measured, water was too cloudy

* No ~~readings~~ readings recorded during sample ~~measurement~~ collection or after collection because tubing line was removed from flow-thru cell. Readings would not be same if collected in standing water.

Ending DTW = 6.71 ft

Removed ~ 3gal purge water.

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Sample Collection Log

Page ~~3/4~~ MK ~~1 of 2~~ MK 1 of 1

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: ~~PB~~ W MK 01 2909 AML

Location Code: **LBA-PZ05**

Sample Number: **LBA3006**

Sample Name: **PBOW-09-GW-LBA-PZ05-LBA3006**

Sampling Method: **SP**

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: Peristaltic Pump, Teflon lined tubing

Task: **LBA-WATER**

Collection Date: 1-28-09

Collection Time: 1135

Start Depth: ~~1-28-09~~ EW 10.07' btoc

End Depth: 10.101 btoc

Sample Matrix: **WATER**

Sample Team: DRK/EWW/MW

QC Partners:

(TB) — (ER) — (FB) —

ERPIMS Values:

Sacode:

Lot Control#:

Containers

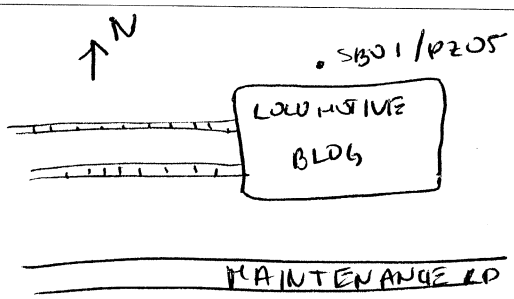
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:

Measured Well Depth: 20.15 Ft btoc **Depth To Water:** 7.81 Ft btoc

Comments: VOC's collected with peristaltic pump. Collect FD, FS, MS, and MSD at this location.

Sketch Location:



Logged BY / Date: Eric W. Wenner 1-28-09 *Reviewed BY / Date:* Edward K. Wenner 11-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 012909 AML

Location Code: **LBA-PZ0~~1~~5** EW

Sample Number: **LBA3001**

Sample Name: **PBOW-09-GW-LBA-PZ01-LBA3001**

Sampling Method: **SP**

Sample Type: **GW** *Sample Purpose:* **FD**

Sampling Equip: Peristaltic pump, Teflon lined tubing

QC Partners:

(TB) — (ER) — (FB) —

Task: **LBA-WATER**

Collection Date: 1-28-09

Collection Time: 1135

Start Depth: 10.07' btoc

End Depth: 10.101 btoc

Sample Matrix: **WATER**

Sample Team: DRK/EWW/MW

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	250	mL	HDPE
METALS3-W	N	B	1	1	L	HDPE
METALS3-W-F	Y	C	1	1	L	HDPE
CYANIDE	N	D	1	1000	mL	HDPE
NITRATE-W	N	E	1	1	L	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:

Measured Well Depth: 20.15' btoc **Depth To Water:** 7.81' btoc

Comments: VOCs collected with peristaltic pump, Collected FS, Regular sample, MS and MSD at this location

Sketch Location:

SEE LBA 3006 REG

Logged BY / Date: Eric W. Weaver 1-28-09 *Reviewed BY / Date:* Edward Kenowe 11-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 012909 TA

Location Code: **LBA-PZ01S**
Sample Number: **LBA3002**
Sample Name: **PBOW-09-GW-LBA-PZ01-LBA3002**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **FS**
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: **LBA-WATER**
Collection Date: 1-28-09
Collection Time: 1135
Start Depth: 10.07' btoc
End Depth: 10.10' btm
Sample Matrix: **WATER**
Sample Team: DRK/EWW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
NITRATE-W	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	250	mL	HDPE
METALS3-W-F	Y	C	1	1	L	HDPE
CYANIDE	N	D	1	250	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL
METALS3-W	N	I	1	1	L	HDPE

Groundwater Information:
Measured Well Depth: 20.15' btoc **Depth To Water:** 7.81' btoc

Comments: VOCs collected with peristaltic pump. Collected Regular sample, FD, MS and MSD at this location.

Sketch Location:

SEE LBA 3006 REG

Logged BY / Date: [signature] 1-28-09 *Reviewed BY / Date:* [signature] 1-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW012909 AML

Location Code: **LBA-PZ0~~6~~5** (EW)

Sample Number: **LBA3007MS**

Sample Name: **PBOW-09-GW-LBA-PZ06-LBA3007MS**

Sampling Method: **SP**

Sample Type: **GW** *Sample Purpose:* **MS**

Sampling Equip: Peristaltic pump, Teflon lined tubing

QC Partners:

(TB) — (ER) — (FB) —

Task: **LBA-WATER**

Collection Date: 1-28-09

Collection Time: 1135

Start Depth: 10.07' btoc

End Depth: 10.10' btoc

Sample Matrix: **WATER**

Sample Team: DRK/EWA/MW

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:

Measured Well Depth: 20.15' btoc **Depth To Water:** 7.81' btoc

Comments: VOCs collected with peristaltic pump. Collected Regular sample, FD, FS and MSD at this location

Sketch Location:

SEE LBA 3006 REG

Logged BY / Date: 1-28-09

Reviewed BY / Date: 11-8-09

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 012909 AML

Location Code: LBA-PZ06 GW
Sample Number: LBA3007MSD
Sample Name: PBOW-09-GW-LBA-PZ06-LBA3007MSD
Sampling Method: SP
Sample Type: GW *Sample Purpose:* MSD
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: LBA-WATER
Collection Date: 1-28-09
Collection Time: 1135
Start Depth: 10.07 ' btoc
End Depth: 10.10 ' btoc
Sample Matrix: WATER
Sample Team: DRK/EWW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: 20.15 ' btoc Depth To Water: 7.81 ' btoc

Comments: VOCs collected with peristaltic pump. Collected regular sample, FD, FS and MS at this location

Sketch Location:

SEE LBA 3006 REG

Logged BY / Date: [signature] 1-28-09 *Reviewed BY / Date:* [signature] 11-8-09

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 4

Operable Unit/Site ID: Locomotive Building
Project Name/#: PBOW
Weather: Cloudy ~28°F, heavy snow
Purge Equipment: Peristaltic/H2 Pump, Tufflow Mud Pump
Sampling Equipment: Same

Sampling location ID: LBA-PZ05
Sample ID: LBA 3006
Collection Time/Date: 1-28-09
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DRK/EWW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 20.15
Initial (pre-installation) DTW/time: 7.81
Final (after pump priming) DTW/time: 7.73
Free product (circle): ~~LNAPL / DNAPL~~
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 25'

Installation date/beginning time: 1-28-09 / 09:56
Installation date/completion time: 1-28-09 / 1005
Screen Interval (ft. BTOC): 8.30 to 18.30
Sample Depth/Pump intake depth (ft BTOC): NA
Post-installation DTW/time: 7.73
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi Used Peristaltic Pump

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

DRK

Purging

Purging/sampling crew: DRK/EWW/MW
Purge date/beginning time: 1-28-09 / 1010
Initial (pre-purging) DTW (ft. BTOC): 7.81
Calculated tubing + pump volume: _____
Unit casing volume: _____

PID/FID reading (well head/background): 0.0
Purge date/completion time: 1-28-09
Final (post-purging) DTW (ft. BTOC): 10.07 ft
Total volume purged: _____
Required purge volume: _____

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

DRK

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

1/28/09

Groundwater Purge Form

LBA-PZ05

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GROUNDWATER PURGE FORM

Sheet 2 of 4

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1010	7.81			6.58	0.538	7.34	-3.2	4.38	1197.0
1015	9.48			5.75	0.536	7.46	-9.3	3.50	1189.7
1020	9.63			4.59	0.537	7.48	-10.3	5.09	1174.9
1025	9.71			4.53	0.540	7.51	-11.6	6.91	1167.5
1030	9.71	100		4.58	0.543	7.54	-11.5	9.35	1125.0
1035	9.77	90		4.81	0.543	7.54	-13.4	8.67	1068.4
1040	9.72	90		5.14	0.543	7.58	-14.4	8.72	904.9
1045	9.75	80		5.65	0.542	7.61	-15.8	8.20	1112.0
~~1050~~	—	—	—	~~6.00~~	—	—	—	—	—
1100	9.75			7.12	0.547	7.63	-16.9	7.42	572.5
1105	9.82			7.59	0.545	7.71	-20.3	7.02	647.2
1110	9.86			7.83	0.544	7.70	-20.0	6.43	~~[illegible]~~ 609.3
1115	9.98			8.23	0.539	7.73	-21.4	6.10	518.9
1120	10.00			8.39	0.536	7.76	-22.7	5.93	487.7

Cleaned flow thru cell

Cont on page 4

Sampling

Sampling beginning time: 1135

Sampling completion time: 1725

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1135	10.07	98		8.72	0.536	7.82	-26.1	5.25	467.4

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units
Ferrous Iron	1.0 (sample cloudy)	mg/L
Ferrous Iron	0.0 (Discolored water)	mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **LBA-PZ07**
Sample Number: **LBA3008**
Sample Name: **PBOW-09-GW-LBA-PZ07-LBA3008**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: **LBA-WATER**
Collection Date: 1-31-09
Collection Time:
Start Depth:
End Depth:
Sample Matrix: **WATER**
Sample Team: DV/EW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

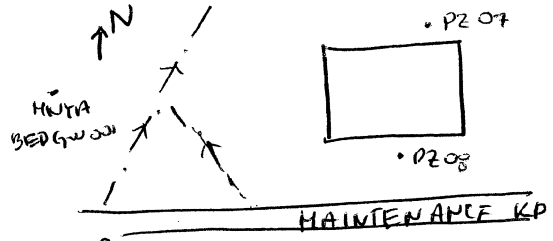
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: 25.30 ft btoc **Depth To Water:** 11.36 ft btoc

Comments: NA

Sketch Location:
~~No sketch~~ MR



Logged BY / Date: [signature] 1-31-09 *Reviewed BY / Date:* [signature] 11-8-09

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Rattlesnake Wash Area
Project Name/#: PBOW
Weather: cloudy ≈15°F
Purge Equipment: Peristaltic pump, Teflon lined tubing
Sampling Equipment: same

Sampling location ID: LBA-PZ07
Sample ID: LBA 3008
Collection Time/Date: 1-31-09
Purge Purpose (circle): **Sample** or **Redevelop**

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 25.30
Initial (pre-installation) DTW/time: 11.36 / 1422
Final (after pump priming) DTW/time: 11.13 / 1428
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.):

Installation date/beginning time: 1-31-09
Installation date/completion time: 1-31-09
Screen Interval (ft. BTOC): — to —
Sample Depth/Pump intake depth (ft BTOC): 23.3
Post-installation DTW/time: 11.13 / 1428
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-31-09
Initial (pre-purging) DTW (ft. BTOC): 11.13
Calculated tubing + pump volume: —
Unit casing volume: —

PID/FID reading (well head/background): 0
Purge date/completion time: 1-31-09
Final (post-purging) DTW (ft. BTOC): —
Total volume purged: —
Required purge volume: —

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1430	11.13								
1433	12.15	76							
1436	12.48	70							
1440	13.27	70				EW			
1445	13.69	68							
1447	14.00	66				1-31-09			
1452	14.54	66							
1455	15.04	60							

Poor Copy

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

1-31-09
EW

Sampling

Sampling completion time:

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Field Screening Parameters (ferrous iron, sulfide, etc.)

	Result	Units

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Recharge rate was 0.04' in one minute.
Purged at 60 ml/min water level continued to drop.

Piezo not sampled

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **LBA-PZ08** (Railcar Wash Area)
Sample Number: **LBA3009**
Sample Name: **PBOW-09-GW-LBA-PZ08-LBA3009**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic pump, Teflon lined tubing

Task: **LBA-WATER**
Collection Date: 1-31-09
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: DR/EW/MW

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

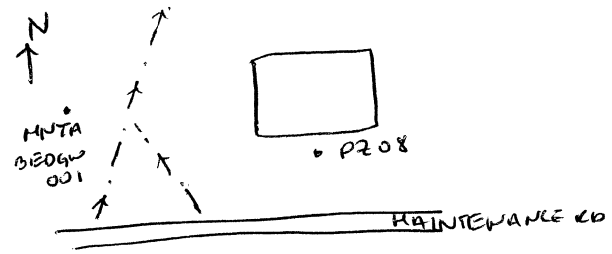
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: 22.75' btoc **Depth To Water:** 9.94' btoc

Comments: No sample collected. Initial purge rate 92 ml/min. Reduced to 28 ml/min. water level continued to drop.

Sketch Location:
~~No sketch~~ MR



Logged BY / Date: Eric W. Weaver 1-31-09 *Reviewed BY / Date:* Edward R. Weaver 1-6-09

19.65
3.10
22.75

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Railcar Wash Area
Project Name/#: PBOW
Weather: Cloudy ~10 °F windy
Purge Equipment: Peristaltic pump, Teflon lined tubing
Sampling Equipment: same

Sampling location ID: LBA-PZ08
Sample ID: LBA3009
Collection Time/Date: 1-31-09
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 22.75
Initial (pre-installation) DTW/time: 9.94 / 1100
Final (after pump priming) DTW/time: 9.64 / 1105
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 22

Installation date/beginning time: 1-31-09 /
Installation date/completion time: 1-31-09 /
Screen Interval (ft. BTOC): — to —
Sample Depth/Pump intake depth (ft BTOC): 16.2'
Post-installation DTW/time: 9.64 / 1150
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-31-09
Initial (pre-purging) DTW (ft. BTOC): 9.64
Calculated tubing + pump volume: —
Unit casing volume: —

PID/FID reading (well head/background): 0
Purge date/completion time: 1-31-09
Final (post-purging) DTW (ft. BTOC): 16.20
Total volume purged: —
Required purge volume: —

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1105	9.64	92		—	—	—	—	—	—
1115	13.68	92		4.55	0.935	6.76	13.4	3.95	19.8
1120	15.24	74		4.46	0.923	6.72	15.3	2.32	69.2
1125	16.20	28		4.34	0.934	6.71	15.0	1.53	77.9

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Sampling

Sampling beginning time: No sample collected Sampling completion time: —

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Field Screening Parameters (ferrous iron, sulfide, etc.)

Parameter	Result	Units

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Piezometer Not Sampled, Flow rate ~28 ml/min

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Sample Collection Log

HK

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **LBA-PZ09**

Sample Number: **LBA3010**

Sample Name: **PBOW-09-GW-LBA-PZ09-LBA3010**

Sampling Method: **SP**

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: Peristaltic pump, Teflon-lined tubing

QC Partners:

(TB) — **(ER)** — **(FB)** —

Task: **LBA-WATER**

Collection Date: 1-31-09

Collection Time: —

Start Depth: —

End Depth: —

Sample Matrix: **WATER**

Sample Team: DK/OW/MW

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

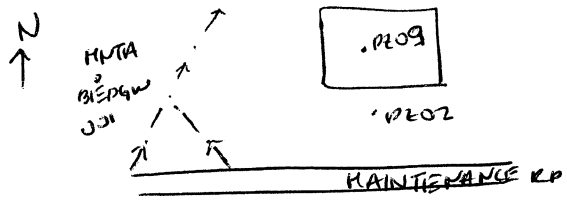
Groundwater Information:

Measured Well Depth: 22.54 ft btoc **Depth To Water:** 9.54 ft btoc

Comments: NA

Sketch Location:

~~No sketch~~ MK



Logged BY / Date: 1-31-09 *Reviewed BY / Date:* 1-8-0

19.14
3.40
22.54

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Railcar wash area
Project Name/#: PBOW
Weather: cloudy ≈ 15°F
Purge Equipment: Peristaltic pump
Sampling Equipment:

Sampling location ID: LBA-PZ03 (PZ09)
Sample ID: LBA-3010
Collection Time/Date: ~~1-31-09~~ DKK
Purge Purpose (circle): Sample or Redevelop

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total Well Depth (ft. BTOC): 22.54
Initial (pre-installation) DTW/time: 9.54 /1331
Final (after pump priming) DTW/time: 9.29/1338

Installation date/beginning time: 1-31-09
Installation date/completion time: 1-31-09
Screen Interval (ft. BTOC): — to —
Sample Depth/Pump intake depth (ft BTOC): 20.54
Post-installation DTW/time:
Max. sustainable pump rate (mL/min): —

Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length:

Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = ____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									

Purging

DK/EW/MW
1-31-09
9.54

PID/FID reading (well head/background): 0
1-31-09

Total Volume Purged:
Unit casing volume:
Required purge volume:

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = ____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1340	9.29								
1345	10.30	84							
1350	11.35	78							
1355	12.17	68							
1357	12.00	66				EW			
1400	13.43	66							
1403	14.51	64							
1405	15.22	62				1-31-09			
1410	15.90	60							

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Sampling beginning time: No Sample Collected Sampling completion time:

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Field Screening Parameters (ferrous iron, sulfide, etc.)		
	Result	Units

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Piezometer Not Sampled, Flow Rate < 50 ml/min

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Sample Collection Log

843656 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **LBA-PZ10**
Sample Number: **LBA3011**
Sample Name: **PBOW-09-GW-LBA-PZ10-LBA3011**
Sampling Method: **SP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Peristaltic pump, Teflon/Sub tubing

Task: **LBA-WATER**
Collection Date: 1-31-09
Collection Time:
Start Depth:
End Depth:
Sample Matrix: **WATER**
Sample Team: DK/EW/MW

QC Partners:
(TB) — **(ER)** — **(FB)** —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

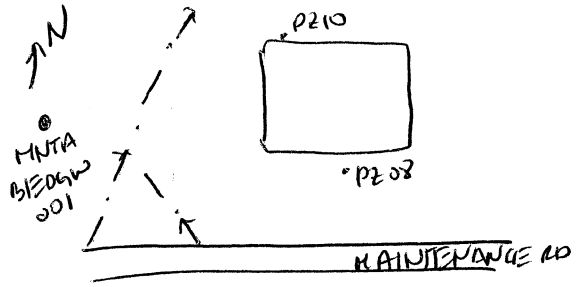
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
ALKALINITY	N	A	1	1	L	HDPE
CHLORIDE	N	A	1	1	L	HDPE
SULFATE	N	A	1	1	L	HDPE
TDS	N	A	1	1	L	HDPE
TSS	N	A	1	1	L	HDPE
TURB 180.1	N	A	1	1	L	HDPE
HARDNESS	N	B	1	500	mL	HDPE
METALS3-W	N	B	1	500	mL	HDPE
METALS3-W-F	Y	C	1	250	mL	HDPE
CYANIDE	N	D	1	500	mL	HDPE
NITRATE	N	E	1	125	mL	HDPE
EXPLOSIVES	N	F	2	1	L	Amb. Glass
SEMIVOLATILES3	N	G	2	1	L	Amb. Glass
VOLATILES3	N	H	3	40	mL	VOA VIAL

Groundwater Information:
Measured Well Depth: 25.14 'btoc **Depth To Water:** 17.04 'btoc

Comments: NA

Sketch Location:

No ~~sketch~~ NA



Logged BY / Date: E. Weaver 1/31/09 *Reviewed BY / Date:* [signature] 11-8-09

Groundwater Purge Form

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GROUNDWATER PURGE FORM

Sheet 1 of 2

Operable Unit/Site ID: Railcar Wash Area
Project Name/#: PBOW
Weather: Cloudy, ≈ 13°F,
Purge Equipment: Peristaltic pump, Teflon lined tubing
Sampling Equipment: —

Sampling location ID: LBA-PZ10
Sample ID: —
Collection Time/Date: —
Purge Purpose (circle): **Sample** or **Redevelop**

Pump Installation

Pump installation crew: DK/EW/MW
PID/FID reading (well head/background): 0
Casing diameter (inches): 1"
Total well Depth (ft. BTOC): 25.14
Initial (pre-installation) DTW/time: 17.04 / 1258
Final (after pump priming) DTW/time: 16.75 / 1302
Free product (circle): LNAPL / DNAPL
Depth to free product (ft BTOC): —
Volume of water removed during priming (mL): —
Discharge tube length (ft.): —

Installation date/beginning time: 1-31-09
Installation date/completion time: 1-31-09
Screen Interval (ft. BTOC): — to —
Sample Depth/Pump intake depth (ft BTOC): 23'
Post-installation DTW/time: 16.75
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 1/4" ID
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: DK/EW/MW
Purge date/beginning time: 1-31-09
Initial (pre-purging) DTW (ft. BTOC): —
Calculated tubing + pump volume: —
Unit casing volume: —

PID/FID reading (well head/background): 0
Purge date/completion time: 1-31-09
Final (post-purging) DTW (ft. BTOC): 18.75
Total volume purged: —
Required purge volume: —

Pneumatic Controller Tuning: Initial air pressure = H (ft.) X 0.43 = — psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1307	16.75	62							
					EW 1-31-09				

BAD Copy

Groundwater Purge Form

GROUNDWATER PURGE FORM

Sheet 2 of 2

Shaw E&I, Inc.

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mV)	DO (mg/L)	Turbidity (NTU)

Sampling

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Conductivity (mMhos/cm)	pH	Eh (mV)	DO (mg/L)	Turbidity (NTU)

EW 1-31-09

Field Screening Parameters (ferrous iron, sulfide, etc.)		
Parameter	Result	Units

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Attempting to find flow rate prior to pumping thru flow thru cell.
Recharge rate was 0.01' in ~55 seconds.

Well not sampled.
(Piezo)

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW052009-ACCT

Location Code: **LBA-SW01**
Sample Number: **LBA2000**
Sample Name: **PBOW-09-LBA-SW01-LBA2000-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Submerged sample bottles

Task: **LBA-WATER**
Collection Date: 5/20/09
Collection Time: 1125
Start Depth: 0.0 ft
End Depth: 0.3 ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052009-TB (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

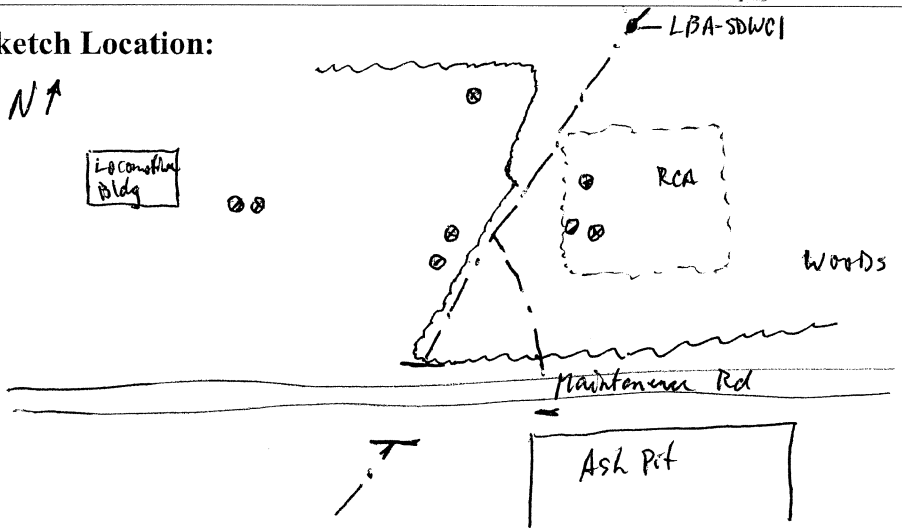
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
HARDNESS	N	C	1	500	mL	HDPE
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	83.1	7.24	1.083	5.1	9.05	14.09

Comments: NA

Sketch Location:



Logged BY / Date: David Kessler 5/20/09 *Reviewed BY / Date:* Edward Kleve 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW052109-ACCT

Location Code: **LBA-SW02**
Sample Number: **LBA2001**
Sample Name: **PBOW-09-LBA-SW02-LBA2001-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Submerged Sample Bottle

QC Partners:
(TB) 052109-TB (ER) — (FB) —

Task: **LBA-WATER**
Collection Date: 5/21/09
Collection Time: 0835
Start Depth: 0.0 ft
End Depth: 0.3 ft
Sample Matrix: **WATER**
Sample Team: DK/BT

ERPIMS Values:
Sacode:
Lot Control#:

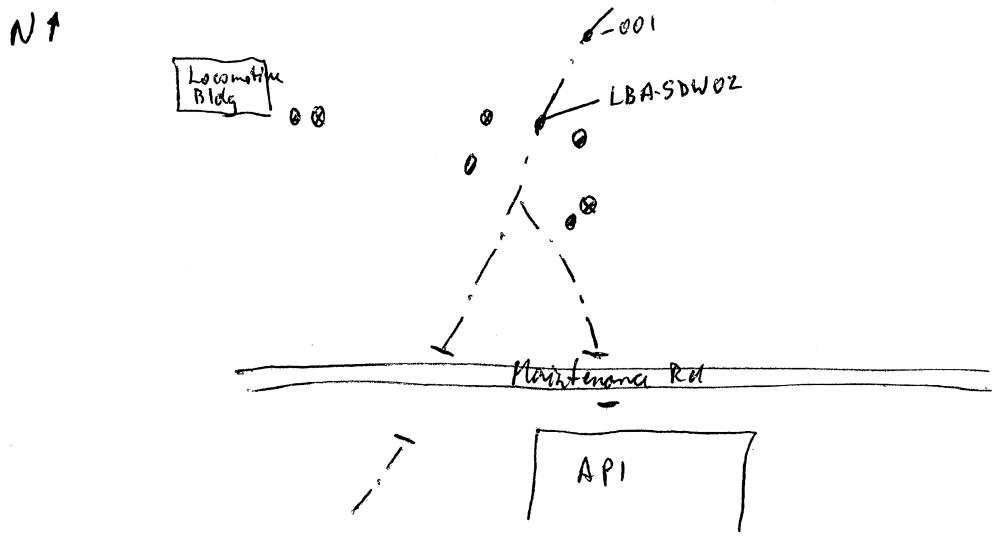
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	156.3	6.98	1.157	3.3	5.35	12.65

Comments: NA

Sketch Location:



Logged BY / Date: David Kessler 5/21/09 *Reviewed BY / Date:* Edward K. Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW052109-ACCT

Location Code: **LBA-SW03**
Sample Number: **LBA2003**
Sample Name: **PBOW-09-LBA-SW03-LBA2003-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **FD**
Sampling Equip: Submerged sample bottle

Task: **LBA-WATER**
Collection Date: 5-21-09
Collection Time: 1005
Start Depth: 0.0 Ft
End Depth: 0.3 Ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052109-TB (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	29.4	6.99	1.167	12.7	7.49	17.13

Comments: NA

Sketch Location:

See SCL LBA 2002

Logged BY / Date: David Kosch 5/21/09 *Reviewed BY / Date:* Edward [illegible] 11-11-0

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW052109-TA

Location Code: **LBA-SW03**
Sample Number: **LBA2004**
Sample Name: **PBOW-09-LBA-SW03-LBA2004-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **FS**
Sampling Equip: Submerged sample bottle

Task: **LBA-WATER**
Collection Date: 5-21-09
Collection Time: 1005
Start Depth: 0.0 Ft
End Depth: 0.3 Ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052109-TB1 (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES	N	B	2	1	L	Amb. Glass
PCB3	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	1	L	HDPE
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	29.4	6.99	1.167	12.7	7.49	17.13

Comments: NA

Sketch Location:

See sample collection log LBA-2002

Logged BY / Date: David Kozak 5/21/09 *Reviewed BY / Date:* Edward C Weaver 11-11-09

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Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: 7W052109-ACCT

Location Code: **LBA-SW03**
Sample Number: **LBA2002**
Sample Name: **PBOW-09-LBA-SW03-LBA2002-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Submerged sample bottle

Task: **LBA-WATER**
Collection Date: 5/21/09
Collection Time: 1005
Start Depth: 0.0 ft
End Depth: 0.3 ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052109-TB (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

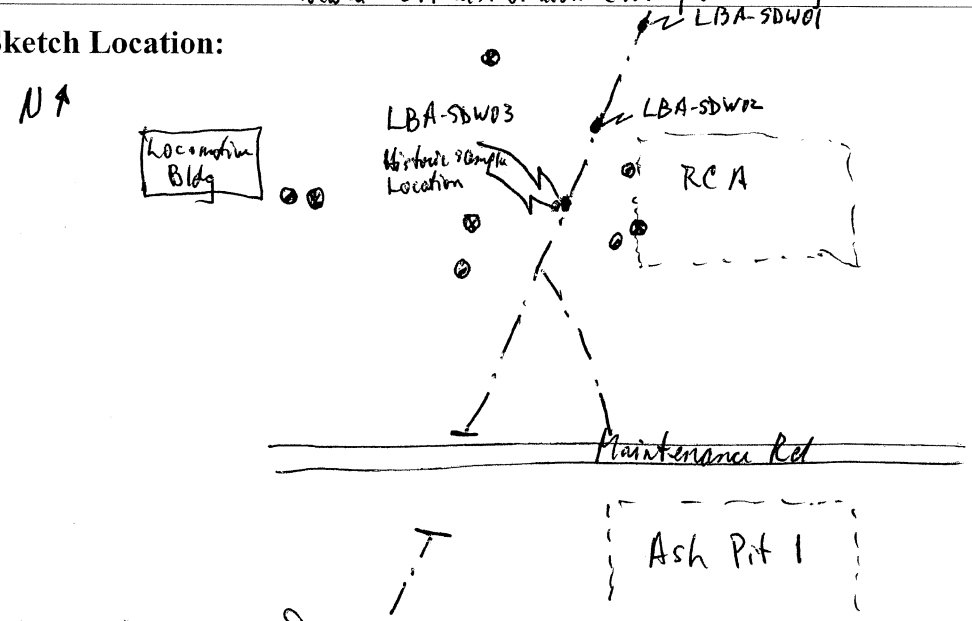
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	29.4	6.99	1.167	12.7	7.49	17.13

Comments: Submerged sample jar to fill; VOCs + metals filled from unpreserved sample bottle. Historic sample, based on survey coordinates, location of collected sample. (LBA-SDW03 stake located ~ 3 ft east of historic survey coordinates)

Sketch Location:



Logged BY / Date: David Kessler 5/21/09 Reviewed BY / Date: Edward [illegible] 7-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109-ACCT

Location Code: **LBA-SW04**
Sample Number: **LBA2005**
Sample Name: **PBOW-09-LBA-SW04-LBA2005-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Submerged sample bottle
QC Partners: 052109-TB
(TB) ~~DEC~~ **(ER)** — **(FB)** —

Task: **LBA-WATER**
Collection Date: 5/21/09
Collection Time: 1410
Start Depth: 0.0 Ft
End Depth: 0.3 Ft
Sample Matrix: **WATER**
Sample Team: D. KK/BT

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

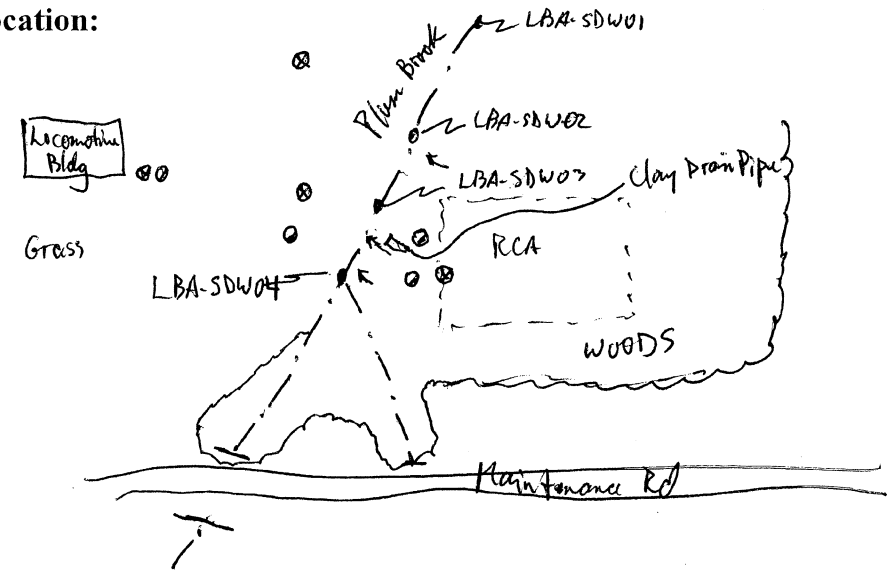
Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	24.1	7.06	1.120	36.0	8.02	17.59

Comments:

Depth to water from Stream gauge LBA-SG05 : 2.88 Ft

Sketch Location:

NA



Logged BY / Date: David Kessel 5/21/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SW05**
Sample Number: **LBA2006**
Sample Name: **PBOW-09-LBA-SW05-LBA2006-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Submerged Sample Bottle

QC Partners:
(TB) 052209-TB (ER) — (FB) —

Task: **LBA-WATER**
Collection Date: 5-22-09
Collection Time: 0850
Start Depth: 0.0 ft
End Depth: 0.3 ft
Sample Matrix: **WATER**
Sample Team: DK/BT

ERPIMS Values:
Sacode:
Lot Control#:

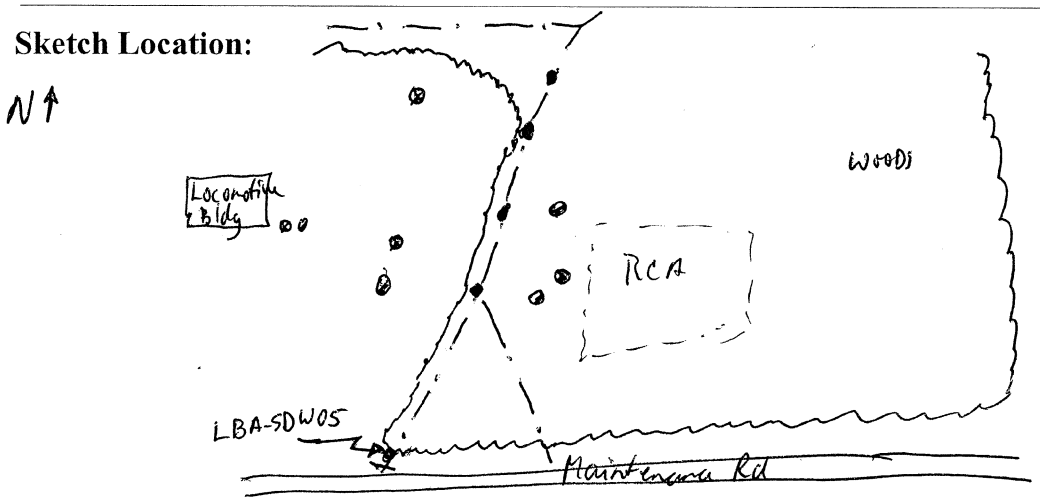
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	158.0	6.71	1.098	0.8	5.80	13.52

Comments:

Sketch Location:



Logged BY / Date: David Keosh 5/22/09 *Reviewed BY / Date:* Edward C Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: ~~5/22/09~~ JKK PB052209-ACCT

Location Code: **LBA-SW06**
Sample Number: **LBA2007**
Sample Name: **PBOW-09-LBA-SW06-LBA2007-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Sample Bottles Submerged

QC Partners:
(TB) 052209-TB (ER) — (FB) —

Task: **LBA-WATER**
Collection Date: 5/22/09
Collection Time: 1015
Start Depth: 0.0'
End Depth: 0.3'
Sample Matrix: **WATER**
Sample Team: DK/BF

ERPIMS Values:
Sacode:
Lot Control#:

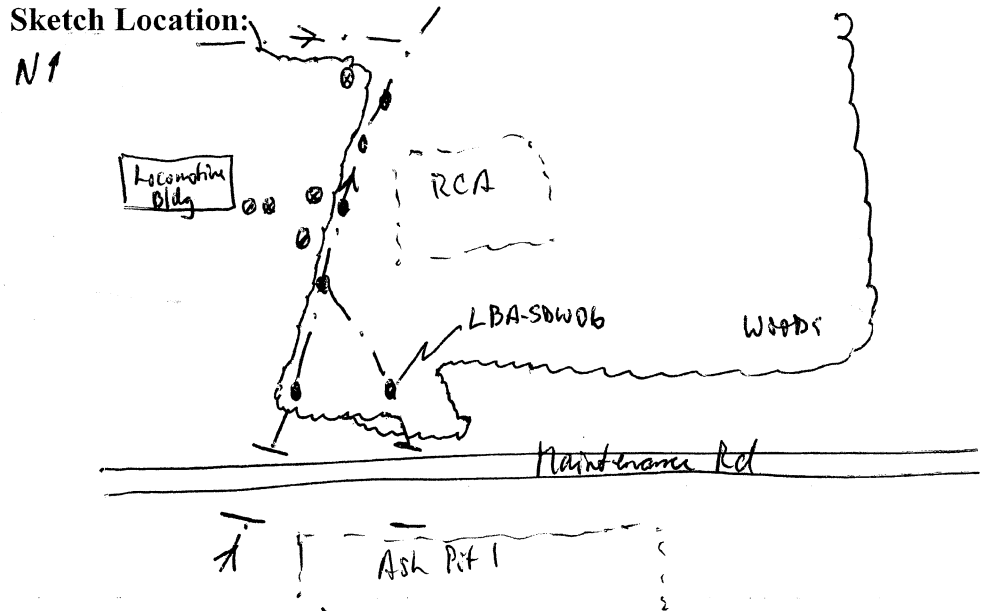
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	JKK 1	1	L	Amb. Glass
EXPLOSIVES	N	E	JKK 1	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	103.2	6.81	0.868	294.7	6.19	14.02

Comments: Only able to collect 1 @ 1l PCB, 1@1l Nitro instead of 2. All other sample bottles filled.

Sketch Location:



Logged BY / Date: David Kesh 5/22/09 *Reviewed BY / Date:* Edward L. Moore 11-11-0

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SW07**
Sample Number: **LBA2008**
Sample Name: **PBOW-09-LBA-SW07-LBA2008-REG**
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **REG**
Sampling Equip: Emptied & into sample bottle

Task: **LBA-WATER**
Collection Date: 5/22/09
Collection Time: 1415
Start Depth: 0.0 Ft
End Depth: 0.1 Ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052209-TB (ER) — (FB) —

Containers

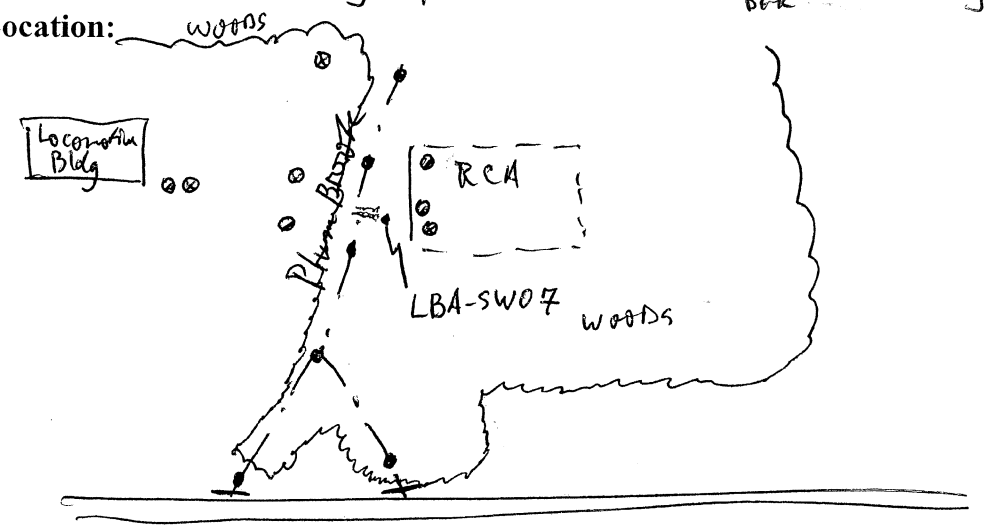
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

ERPIMS Values:
Sacode:
Lot Control#:

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	-342	6.79	0.949	0.0	4.16	11.52

Comments: Collected water from clay drainage pipe discharging water. Believed to be related to former RCA. Water entry area unknown.
- Abundant iron staining on path and in creek ~~(Plum Brook)~~ DEK drainage ditch.

Sketch Location:



Logged BY / Date: David Keesh 5/22/09 *Reviewed BY / Date:* Edward K Weaver 11/11/09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-HCCT

Location Code: LBA-SW07 DKK
Sample Number: LBA2008MS DKK
Sample Name: PBOW-09-LBA-SW07-LBA2008MS-MS DKK DKK
Sampling Method: GRAB
Sample Type: SW *Sample Purpose:* MS
Sampling Equip: Emptied into sample bottle

Task: LBA-WATER
Collection Date: 5/22/09
Collection Time: 1415
Start Depth: 0.0 ft
End Depth: 0.1 ft
Sample Matrix: WATER
Sample Team: DK/BT

QC Partners:
(TB) 052209-TB (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

ERPIMS Values:
Sacode:
Lot Control#:

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	-34.2	6.79	0.949	0.0	4.16	11.52

Comments: NA

Sketch Location:

See LBA2008 SCL for sketch

Logged BY / Date: David Kessler 5/22/09 *Reviewed BY / Date:* Edward C. Warren 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SW08** 7 DKK
Sample Number: **LBA2009MSD** 8 DKK
Sample Name: **PBOW-09-LBA-SW08-LBA2009MSD-MSD** 7 DKK 8 DKK
Sampling Method: **GRAB**
Sample Type: **SW** *Sample Purpose:* **MSD**
Sampling Equip: Emptied into sample bottle

Task: **LBA-WATER**
Collection Date: 5/22/09
Collection Time: 1415
Start Depth: 0.0 ft
End Depth: 0.1 ft
Sample Matrix: **WATER**
Sample Team: DK/BT

QC Partners:
(TB) 052209-TB (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
METALS3-W	N	C	1	500	mL	HDPE
PCB3	N	D	2	1	L	Amb. Glass
EXPLOSIVES	N	E	2	1	L	Amb. Glass

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
	-34.2	6.79	0.949	0.0	4.16	11.52

Comments: N/A

Sketch Location:

See SCL for LBA2008 for sketch.

Logged BY / Date: David Kersh 5/22/09 *Reviewed BY / Date:* Edward M Nawar 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB 052009-ACCT

Location Code: **LBA-SD01**
Sample Number: **LBA1000**
Sample Name: **PBOW-09-SD-LBA-SD01-LBA1000-(0-1)-RE**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: Grab (VOC not composited), zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5/20/09
Collection Time: ~~0~~ 1215
Start Depth: 8"
End Depth: 14"
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3 ✓	N	A	1	~~2~~ 4 DKK	oz	CWM
~~VOLATILES~~	N	B	3	5	g	~~Terracore~~ DKK
SEMIVOLATILES3 ✓	N	C	1	4	oz	CWM
METALS3 ✓	N	D	1	4	oz	CWM
PCB3 ✓	N	E	1	4	oz	CWM
EXPLOSIVES ✓	N	F	1	4	oz	CWM
TOC-B ✓	N	G	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: Collected sediment via grab. Removed ~8" decaying leaves, sticks.

Sketch Location:

See surface water SCL LBA2000

Logged BY / Date: David Keesh 5/20/09 *Reviewed BY / Date:* Edward G. Mow 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109-ACCT

Location Code: **LBA-SD02**
Sample Number: **LBA1001**
Sample Name: **PBOW-09-SD-LBA-SD02-LBA1001-(0-1)-RE**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5-21-09
Collection Time: 0905
Start Depth: 0.1 Ft
End Depth: 0.6 Ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) 052109-TB (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
~~VOLATILES~~	~~N~~	~~A~~	~~3~~	~~5~~	~~g~~	~~Terracore~~ DK
VOLATILES3	N	B	1	24	oz	CWM
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOC sample not composited. 0.0-0.1 Ft; moss, organics, roots,
0.1-0.6 Ft; Grayish brown, very soft, clayey SILT

Sketch Location:

See collocated surface water sample SCL LBA2001

Logged BY / Date: David Kessler 5/21/09 *Reviewed BY / Date:* Edward E Nave 11-11-0

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109-ACCT

Location Code: **LBA-SD03**
Sample Number: **LBA1002**
Sample Name: **PBOW-09-SD-LBA-SD03-LBA1002-(0-1)-RE(**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5/21/09
Collection Time: 1115
Start Depth: 0.2 Ft
End Depth: 0.7 Ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	~~1~~	~~4~~	~~oz~~	~~Terracore~~ CWM DKK
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~ CWM DKK
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

Comments: VOCs not composited.
0.0-0.2 Ft; moss, cattail debris, roots
0.2-0.7 Ft; very soft, light brown, clayey SILT

Sketch Location:

collocated surface water sample LBA2002 for sketch
See ~~Collect~~

Logged BY / Date: David Kersch 5/21/09 *Reviewed BY / Date:* Edward S. Warner 11-11-0

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109ACCT

Location Code: **LBA-SD03**
Sample Number: **LBA1002MS**
Sample Name: **PBOW-09-SD-LBA-SD03-LBA1002MS-(0-1)-**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **MS**
Sampling Equip: nitrile glove grab, ziplock bag composite

Task: **LBA-SOILS**
Collection Date: 5/21/09
Collection Time: 1115
Start Depth: 0.2 ft
End Depth: 0.7 ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) —
(ER) —
(FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type	
VOLATILES	N	A	~~1~~ 1	~~4~~ 8	ozs	~~Terracore~~ CWM	DKK
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~	DKK
SEMIVOLATILES3	N	C	1	4	oz	CWM	
METALS3	N	D	1	4	oz	CWM	
PCB3	N	E	1	4	oz	CWM	
EXPLOSIVES	N	F	1	4	oz	CWM	

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOCs not composited

Sketch Location:

See collocated surface water sample LBA2002

Logged BY / Date: David Kessler 5/21/09 *Reviewed BY / Date:* Edward E Weaver 11-1-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109-ACCT

Location Code: **LBA-SD03**
Sample Number: **LBA1002MSD**
Sample Name: **PBOW-09-SD-LBA-SD03-LBA1002MSD-(0-1**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **MSD**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5/21/09
Collection Time: 1115
Start Depth: 0.2 ft
End Depth: 0.7 ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	5	g	Terracore
VOLATILES3	N	B	1	2	oz	CWM
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOCs not composited

Sketch Location:

See collocated surface water sample LBA2002 for sketch

Logged BY / Date: David Kesler 5/21/09 *Reviewed BY / Date:* Edward E. Weaver 11-11-0

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052109-ACCT

Location Code: **LBA-SD04**
Sample Number: **LBA1003**
Sample Name: **PBOW-09-SD-LBA-SD04-LBA1003-(0-1)-RE(**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: nitrile glove grab/zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5-21-09
Collection Time: 1435
Start Depth: 0.3 ft
End Depth: 0.8 ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	~~2~~ 1	~~8~~ 4	~~oz~~ g	~~Terracore~~ CWM DKK
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~ DKK
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

Comments: VOCs not composited
0.0-0.3'; organics (moss, weeds, decaying leaves, sticks)
0.3-0.8'; very soft, grayish brown, clayey SILT

Sketch Location:

See collocated SW sample LBA 2005 for sketch.

Logged BY / Date: David Kesh 5/21/09 *Reviewed BY / Date:* Edward Weaver 11-11-1

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SD05**
Sample Number: **LBA1004**
Sample Name: **PBOW-09-SD-LBA-SD05-LBA1004-(0-1)-RE**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: Nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5/22/09
Collection Time: 0910
Start Depth: 0.2 ft
End Depth: 0.7 ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — **(ER)** — **(FB)** —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	~~54~~ DPK	~~OZ~~	~~Terracore~~ CWM
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~ e DKK
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOC sample not composited.
0.0-0.2 ft; black, decaying leaves, roots
0.2-0.7 ft; yellowish brown, very soft, silty CLAY

Sketch Location:

See surface water SCL for collocated sample (LBA2006)

Logged BY / Date: David Kessler 5/22/09 *Reviewed BY / Date:* Edward [illegible] 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SD06**
Sample Number: **LBA1005**
Sample Name: **PBOW-09-SD-LBA-SD06-LBA1005-(0-1)-RE**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **REG**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5-22-09
Collection Time: 1100
Start Depth: 0.1 Ft
End Depth: 0.6 Ft
Sample Matrix: **SOIL**
Sample Team: DIC/BT

QC Partners:
(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	~~1~~ 1 ea	~~4~~ 4	~~oz~~ 1 ea	~~Terracore~~ CWM
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOCs not composited
0.0-0.1 Ft; rounded pebbles, rock, organics
0.1-0.6 Ft; soft, minor black, brown, CLAY, trace silt

Sketch Location:

See SW SCL LBA2007 for sketch

Logged BY / Date: David Kesh 5-22-09 *Reviewed BY / Date:* Edward Schleuss 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-ACCT

Location Code: **LBA-SD06**
Sample Number: **LBA1006**
Sample Name: **PBOW-09-SD-LBA-SD06-LBA1006-(0-1)-RE**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **FD**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5/22/09
Collection Time: 1100
Start Depth: 0.1 Ft
End Depth: 0.6 Ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	~~1~~ DKK	~~4~~ 8	oz	~~Terracore~~ CWM
~~VOLATILES3~~	~~N~~	~~B~~	~~1~~	~~2~~	~~oz~~	~~CWM~~ DKK
SEMIVOLATILES3	N	C	1	4	oz	CWM
METALS3	N	D	1	4	oz	CWM
PCB3	N	E	1	4	oz	CWM
EXPLOSIVES	N	F	1	4	oz	CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOCs not composited

Sketch Location:

See SW SCL LBA2007 for sketch

Logged BY / Date: David Kesh 5/22/09 *Reviewed BY / Date:* Edward L. Weaver 6-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PB052209-TA

Location Code: **LBA-SD06**
Sample Number: **LBA1007**
Sample Name: **PBOW-09-SD-LBA-SD06-LBA1007-(0-1)-RE(**
Sampling Method: **DP**
Sample Type: **SD** *Sample Purpose:* **FS**
Sampling Equip: nitrile glove grab, zip-lock bag composite

Task: **LBA-SOILS**
Collection Date: 5-22-09
Collection Time: 1100
Start Depth: 0.1 ft
End Depth: 0.6 ft
Sample Matrix: **SOIL**
Sample Team: DK/BT

QC Partners:
(TB) —— (ER) —— (FB) ——

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
METALS	N	A	2	4	oz	CWM
PCBS	N	A	2	4	oz	CWM
SEMIVOLATILES	N	A	2	4	oz	CWM
EXPLOSIVES	N	B	1	4	oz	CWM
VOLATILES3	N	C	1	4 8 DKE	oz 8	~~Terracore~~ DKE CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments: VOCs not composited

Sketch Location:

See SW SCL LBA-2007 for sketch

Logged BY / Date: David Kerse 5/22/09 *Reviewed BY / Date:* Edward [illegible] 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW051209-ACCT

Location Code: **LBA-MW01**
Sample Number: **LB3067**
Sample Name: **PBOW-09-GW-LBA-MW01-LB3067-REG**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bladder pump / Bailer

Task: **TPAPLBRC**
Collection Date: 5/12/09
Collection Time: 0910
Start Depth: 6.39' btoc
End Depth: 9.39' btoc
Sample Matrix: **WATER**
Sample Team: M. Yantin / E. Weaver

QC Partners:
(TB) 051309-TB (ER) ——— (FB) ———

ERPIMS Values:
Sacode:
Lot Control#:

Containers

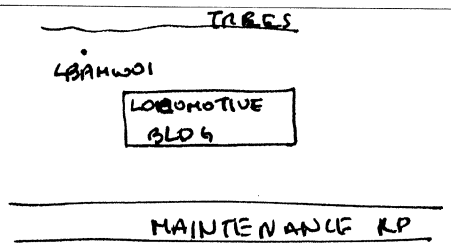
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 19.02' btoc **Depth To Water:** 6.39' btoc

Comments: Sample collected by bailer.
Iron Hach Test : 0.0 mg/L.

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LVE 002476
well wizard	LVE 002731
HP 10	LVE 002723
LEL	56928

Logged BY / Date: M. Yantin 5/12/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3067
Weather: Partly cloudy 60°

Sampling location ID: LBA-MW01
Collection Time/Date: 5/12/09 0910

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: E. Weaver / M. Martin
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.02
Bladder pump settings: CPM 2-2-1-6
Refill (seconds): 28-29-58-5
Discharge (seconds): 2-1-2.5
Throttle (psi): 20-20-20-20
Discharge tube length (ft.): 19

Screen Interval (ft. BTOC): 8.42 to 18.42
Pump intake depth (ft BTOC): 13.4
Max. sustainable pump rate (mL/min): ~~NA~~ 20
Appearance of product: clear
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0 ppm H_2S: 0.0
LEL: LEL: 0 %; Oxygen: 20.8%; Carbon: 0 ppm

Purging

Purging/sampling crew: E. Weaver / M. Martin
Purge date/beginning time: 5/11/09 0945
Initial (pre-purging) DTW (ft. BTOC): 6.12

Purge date/completion time: 5/11/09
Final (post-purging) DTW (ft. BTOC): dry

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = 19 ~~3 mL~~ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 19 ft) + 0.3 L = 0.49 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.49 L x 3 = 1.47 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = .164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 12.9 ft x .164 Gal/ft = 2.12 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + .19 ft) x 2.46 gal/ft) x 0.3 = 7.52 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 2.12 gal + 7.52 gal = 9.64 gal X 3.785 L/gal = ~~9.64~~ 36.49 L mL

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
36.49	72.97	109.46	145.95	182.43

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	0.044	.022	.026	.020	.620	—	—	—	.62

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/11/09	0955	7.05	.044	1.2	12.16	1.320	1253.8	6.45	13.54	0.0
"	1000	7.12	.044	1.88	12.28	1.322	785.8	6.46	13.44	0.0
"	1005	7.20	.044	1.44	12.83	1.323	1463.5	6.46	13.08	0.0
"	1010	7.20	.022	1.55	12.96	1.321	1468.6	6.47	13.10	0.0
"	1015	7.20	.026	1.68	13.01	1.322	1461.7	6.47	13.01	0.0
"	1020	7.23	.026	1.81	13.04	1.320	1466.2	6.47	12.99	0.0
"	1025	7.23	.020	1.91	13.06	1.320	1468.9	6.48	12.95	0.0
"	1127	DRY	.620	40.35	—	NO	READING	—	—	—
"	0910	6.39	NA	40.35	12.35	1.410	35.3	6.70	10.51	2.5

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

HRM 5/11/09

Sampling

Sampling beginning time: 0910

Sampling completion time: 0940

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/11/09	0910	6.39	NA	40.35	11.91	1.293	681.6	6.44	7.67	0.0

Sample Information

Sample ID: LB9a07

Sample collection date/time: 5/12/09

Duplicate sample collected (Y/N): N

Duplicate sample ID: NA

Split sample collected (Y/N): N

Split sample ID: NA

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

HRM 5/11/09

Comments: Low flow - not possible. Recharge rate is 20 mL/min and it is too slow. Sample collected by bailer.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051909 - ACCT

Location Code: **LBA-MW02**

Sample Number: **LB3068**

Sample Name: **PBOW-09-GW-LBA-MW02-LB3068-REG**

Sampling Method: ~~GRAB~~ LF MN

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: Bladder pump / YSI 6920

Task: **TPAPLBRC**

Collection Date: 5/19/09

Collection Time: 1033

Start Depth: 14.3' btoc

End Depth: 14.31 btoc

Sample Matrix: **WATER**

Sample Team: M. Yantin / E. Weaver

QC Partners:

(TB) 051909-TB (ER) FIELDQC-LBA (FB) —

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

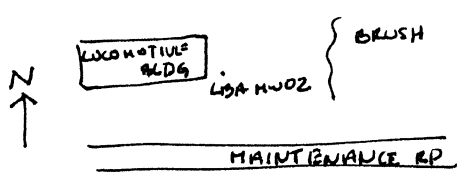
Groundwater Information:

Measured Well Depth: 19.59' btoc **Depth To Water:** 9.60' btoc

Comments:

Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6920	28821
water meter	LVE 002476
well wizard	LVE 002731
MPIO	LVE 002723
LEL	56928

Logged BY / Date: M. Yantin 5/19/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051909 - ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3068MS**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3068MS-MS**
Sampling Method: ~~GRAB~~ MW LF
Sample Type: **GW** *Sample Purpose:* **MS**
Sampling Equip: YSI 6820 / Bladder pump

Task: **TPAPLBRC**
Collection Date: 5/19/09
Collection Time: 1033
Start Depth: ~~9.60'~~ MW 14.3' btoc
End Depth: ~~9.60'~~ MW 14.3' btoc
Sample Matrix: **WATER**
Sample Team: M. Yantin / E. Weaver

QC Partners:
(TB) 051909 - TB (ER) FIELD QC - LBA (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

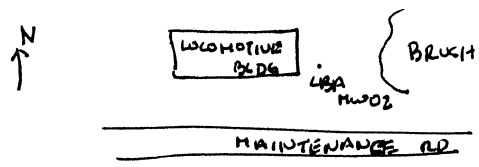
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.59' btoc **Depth To Water:** 9.60' btoc

Comments:
Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LVB 002476
well wizard	LVB 002731
MP 10	LVB 002723
LEL	56928

Logged BY / Date: M. Yantin 5/19/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW-051909-ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3068MSD**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3068MSD-MS**
Sampling Method: ~~GRAB~~ MK LF
Sample Type: **GW** *Sample Purpose:* **MSD**
Sampling Equip: YSI 6820 / Bladder pump

Task: **TPAPLBRC**
Collection Date: 5/19/09
Collection Time: 1033
Start Depth: 14.3' btoc
End Depth: 14.3' btoc
Sample Matrix: **WATER**

QC Partners:
(TB) 051909-TM (ER) FIELDQC-LBA (FB) ——

Sample Team: M. Yantin / E. Weaver

ERPIMS Values:
Sacode:
Lot Control#:

Containers

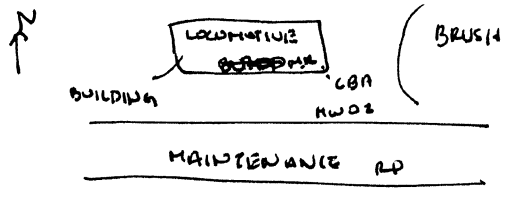
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 19.59' btoc **Depth To Water:** 9.60' btoc

Comments: Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LWE 002476
well wizard	LWE 002731
MP 10	LWE 002723
LEL	56928

Logged BY / Date: M. Yantin 5/19/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051909-ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3069**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3069-REG**
Sampling Method: ~~GRAB~~ MW LF
Sample Type: **GW** *Sample Purpose:* **FD**
Sampling Equip: YSI 6820 / Bladder pump

Task: **TPAPLBRC**
Collection Date: 5/19/09
Collection Time: 1033
Start Depth: 14.3' btoc
End Depth: 14.3' btoc
Sample Matrix: **WATER**
Sample Team: M. Yantin / E. Weaver

QC Partners:
(TB) 051909-TB (ER) FIELDQC-LBA (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

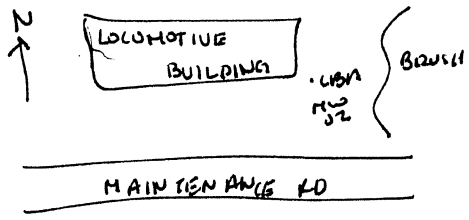
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.59' btoc **Depth To Water:** 9.60' btoc

Comments:
Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LVIB 00 2476
well wizard	LVIB 00 2731
HP 10	LVIB 00 2723
LEL	S6928

Logged BY / Date: M. Yantin 5/19/09 *Reviewed BY / Date:* Edward L. Weaver 11-11-09

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051909 - ~~ACCF~~ TA

Location Code: **LBA-MW02**

Sample Number: **LB3070**

Sample Name: **PBOW-09-GW-LBA-MW02-LB3070-REG**

Sampling Method: ~~GRAB~~ MR LF

Sample Type: **GW** *Sample Purpose:* **FS**

Sampling Equip: Bladder pump / YSI 6820

QC Partners:

(TB) 051909-TB (ER) ~~EH-MR~~ (FB) ——

Task: **TPAPLBRC**

Collection Date: 5/19/09

Collection Time: 1033

Start Depth: ~~9.60'~~ MR 14.3' btoc

End Depth: ~~9.60'~~ MR 14.3' btoc

Sample Matrix: **WATER**

Sample Team: M. Yantin / E. Weaver

ERPIMS Values:

Sacode:

Lot Control#:

Containers

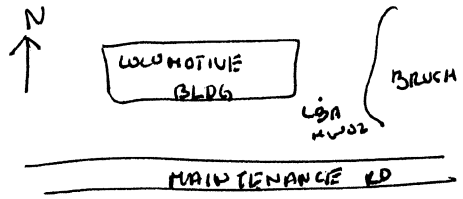
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	1	L	HDPE
METALS3-W-F	Y	E	1	1	L	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	H	1	250	mL	HDPE
CYANIDE	N	I	1	250	mL	HDPE
HARDNESS	N	J	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 19.59' btoc **Depth To Water:** 9.60' btoc

Comments: Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LUE 002476
well wizard	LUE 00 2731
MPIU	LUE 00 2723
LEL	56928

Logged BY / Date: M. Yantin 5/19/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3068/MS/MSD/LB3069/LB3070
Weather: Sunny 65°

Sampling location ID: LBA-MW02
Collection Time/Date: 5/19/09 1033

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: M. Yantin / E. Weaver
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.59
Bladder pump settings: CPM 2-2-2
Refill (seconds): 25-27-28
Discharge (seconds): 5-3-2
Throttle (psi): 20-20-20
Discharge tube length (ft.): 20

Screen Interval (ft. BTOC): 8.24 to 18.24
Pump intake depth (ft BTOC): 14.3
Max. sustainable pump rate (mL/min):
Appearance of product: clear
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: M. Yantin / E. Weaver
Purge date/beginning time: 5/19/09 0952
Initial (pre-purging) DTW (ft. BTOC): 7.76

Purge date/completion time: 5/19/09 1033
Final (post-purging) DTW (ft. BTOC): 9.60

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. — 0.02 L for a 3/8" I.D. tube
Tubing length = 20 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 20 ft) + 0.3 L = .5 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = .5 L x 3 = 1.5 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = .164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 11.83 ft x .164 Gal/ft = 1.94 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 1 ft) x 2.46 gal/ft) x 0.3 = 8.11 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 1.94 gal + 8.11 gal = 10.05 gal X 3.785 L/gal = 38.03L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
38.03	76.07	114.12	152.15	190.19

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	~~.074~~ MR .148	.170	.128	.100	.120	—			.120

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/19/09	0957	9.02	.148 ~~.074~~ MR	.79 ~~1.48~~ MR	13.24	0.967	239.8	7.45	9.20	0.6
"	1003	9.31	.170	1.59	12.28	0.810	-479.6	6.83	6.01	0.6
"	1008	9.33	.128	2.23	12.16	0.750	-500.8	6.76	5.74	0.5
"	1012	9.5	.128	2.87	12.15	0.732	-501.2	6.74	5.73	0.3
"	1018	9.62	.100	3.37	12.18	0.728	-502.8	6.73	5.82	0.5
"	1023	9.60	.100	3.87	12.18	0.719	-502.6	6.73	5.43	0.4
"	1028	9.60	.120	4.47	12.19	0.722	-501.9	6.73	5.48	0.6
"	1033	9.60	.120	5.07	12.18	0.721	-503.1	6.73	5.42	0.0
			MRA	5/19/09						

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GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

MRH 5/19/09

Sampling

Sampling beginning time: 1033

Sampling completion time: 1545

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/19/09 ~~MRH 0933~~	1033	9.60	.120	5.07	12.18	0.721	-503.1	6.73	5.42	0.0

Sample Information

Sample ID: LB 3068

Duplicate sample collected (Y/N): Y

Split sample collected (Y/N): Y

Sample collection date/time:

Duplicate sample ID: LB 3068 MS / LB3068 MSD / LB3069

Split sample ID: LB 3070

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

MRH 5/19/09

Comments:

Low-flow possible

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051009-ACCT

Location Code: **LBA-MW03**
Sample Number: **LB3071**
Sample Name: **PBOW-09-GW-LBA-MW03-LB3071-REG**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bladder pump / YSI 6820

Task: **TPAPLBRC**
Collection Date: 5/10/09
Collection Time: 1405
Start Depth: 9.85' btoc
End Depth: 9.85' btoc
Sample Matrix: **WATER**
Sample Team: E. Weaver / M. Yantin

QC Partners:
(TB) 051109-TB (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

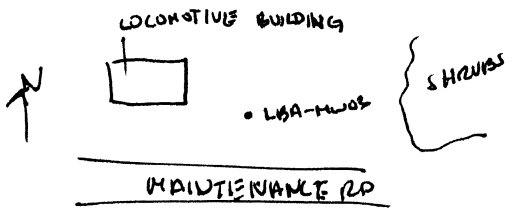
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.31' btoc **Depth To Water:** 9.85' btoc

Comments: Iron Hach Test: 0.0 mg/L
Well could be low-flowed, but at a rate of 42 mL/min.

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	29821
water meter	LVE 002474
well wizard	LVE 002431
MP10	LVE 002723
LEL	56928

Logged BY / Date: M. Yantin 5/10/09 *Reviewed BY / Date:* Edward [illegible] 1-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3071
Weather: Sunny 60°

Sampling location ID: LBA-MW03
Collection Time/Date: 5/10/09 1405

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: E. Weaver / M. Martin
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.31
Bladder pump settings: CPM 2-2-1
Refill (seconds): 25-28-58
Discharge (seconds): 5-2-2
Throttle (psi): 20-20-20
Discharge tube length (ft.): 19

Screen Interval (ft. BTOC): 8.96 to 18.96
Pump intake depth (ft BTOC): 13.9
Max. sustainable pump rate (mL/min):
Appearance of product: clear
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 3 ppm

Purging

Purging/sampling crew: E. Weaver / M. Martin
Purge date/beginning time: 5/10/09 1330
Initial (pre-purging) DTW (ft. BTOC): 8.42

Purge date/completion time: 5/10/09
Final (post-purging) DTW (ft. BTOC): 9.85' btoc

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. — 0.02 L for a 3/8" I.D. tube
Tubing length = 19 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 19 ft) + 0.3 L = .49 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = .49 L x 3 = 1.47 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (_____)^2) = _____ gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = _____ ft x _____ Gal/ft = _____ gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. in inches & d is casing dia. in inches
= 0.041 x ((_____)^2 - (_____)^2) = _____ gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height _____ ft + _____ ft) x _____ gal/ft) x 0.3 = _____ gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = _____ gal + _____ gal = _____ gal X 3.785 L/gal = _____ L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	.156	.066	.042	—					0.042

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/10/09	1340	9.81	.156	1.56	11.27	0.670	-1058.4	6.97	12.11	0.0
"	1350	9.87	.066	2.22	12.42	0.659	-1061.7	6.91	11.91	5.6
"	1355	9.85	.042	2.43	12.54	0.659	-1060.8	6.91	11.86	5.7
"	1400	"	.042	2.64	12.53	0.660	-1062.9	6.91	11.85	0.0
"	1405	"	.042	2.85	12.56	0.660	-1061.7	6.92	11.88	0.0
				MRY						
				5/10/09						

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

HRY 5/10/09

Sampling

Sampling beginning time: 1405

Sampling completion time: 1630

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/10/09	1405	9.85	.042	2.85	12.56	0.660	-1061.7	6.92	11.88	0.0

Sample Information

Sample ID: LB3071

Sample collection date/time: 5/10/09 1405

Duplicate sample collected (Y/N): N

Duplicate sample ID:

Split sample collected (Y/N): N

Split sample ID:

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

HRY 5/10/09

Comments: Low flow @ 42mL/min possible.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: NA

Location Code: **LBA-BEDGW-001**
Sample Number: **LB3072**
Sample Name: **PBOW-09-GW-LBA-BEDGW-001-LB3072-R**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: NA

Task: **TPAPLBRC**
Collection Date: 5/10/09
Collection Time: NA
Start Depth: NA
End Depth: NA
Sample Matrix: **WATER**
Sample Team: E. Weaver / M. Yantin

QC Partners:
(TB) NA (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 103.3' btoc **Depth To Water:** 101.3' btoc

Comments: Not enough water available for purging/sampling. Well not sampled.

Sketch Location:
See borelogs

EQUIPMENT USED	SN
YSI 6820	28721
water meter	LVI2002476
well wizard	LVI2002731
MP 10	LVI2002723
LEL	56928

Logged BY / Date: M. Yantin 5/10/09 *Reviewed BY / Date:* Edward S. Weaver 11-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3072
Weather: Sunny 58°

Sampling location ID: LBA-BEDGW-001
Collection Time/Date: NA

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bladder (circle or add one)

Pump installation crew: C. Weaver / M. Martin
Casing diameter (inches): 2
Total well depth (ft. BTOC): 103.3
Bladder pump settings: CPM NA
Refill (seconds): NA
Discharge (seconds): NA
Throttle (psi): NA
Discharge tube length (ft.): NA

Screen Interval (ft. BTOC): 87.46 to 102.46
Pump intake depth (ft BTOC): NA
Max. sustainable pump rate (mL/min): NA
Appearance of product: NA
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID : 90.6 ppm
LEL: LEL: 100 %; Oxygen: 19.2 %; Carbon: 0 ppm
H_2S : 0

Purging

Purging/sampling crew: M. Martin / E. Weaver
Purge date/beginning time: ~~MK 5/12/09~~ 5/11/09 0935
Initial (pre-purging) DTW (ft. BTOC): ~~103~~ MK 101.3' (5/10/09) – 102.14 (5/12/09)

Purge date/completion time: 5/11/09 0940
Final (post-purging) DTW (ft. BTOC): DRY

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft.
Tubing length = NA ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = ____ L
No. of tubing volumes purged: ____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = ____ L x ____ = ____ L

0.02 L for a 3/8" I.D. tube

MKY 5/12/09

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = .164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 1.16 ft x .164 Gal/ft = .19 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 1.16 ft + 0 ft) x 1.31 gal/ft) x 0.3 = .45 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = .19 gal + .45 gal = .64 gal X 3.785 L/gal = 2.44 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
2.44	4.88	7.32	9.76	12.2

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	NA								NA

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/11/09	0940	DRY	NA	1L						
5/12/09	0830	102.14								

DRY WELL

MKY 5/12/09

Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

HRY

Sampling

Sampling beginning time: NA

Sampling completion time: NA

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
				HRY						

Sample Information

Sample ID: LB3072

Sample collection date/time: NA

Duplicate sample collected (Y/N): N

Duplicate sample ID: NA

Split sample collected (Y/N): N

Split sample ID: NA

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

HRY 5/12/09

Comments:

DRY WELL

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051209-ACCT

Location Code: **LBA-BEDGW-002**
Sample Number: **LB3073**
Sample Name: **PBOW-09-GW-LBA-BEDGW-002-LB3073-R**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bailer

Task: **TPAPLBRC**
Collection Date: 5/12/09
Collection Time: 1030
Start Depth: 69.36' btoc
End Depth: 72.92' btoc
Sample Matrix: **WATER**
Sample Team: E Weaver / M. Yantin

QC Partners:
(TB) ——— (ER) ——— (FB) ———

ERPIMS Values:
Sacode:
Lot Control#:

Containers

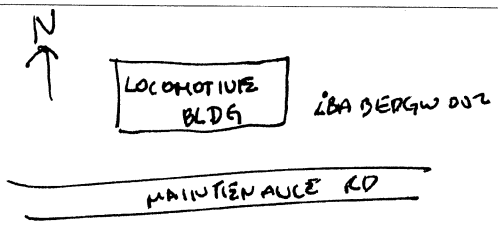
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 72.92' btoc **Depth To Water:** 69.36' btoc

Comments: ~~Samb~~ HR Sample collected by bailer.
Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6820	28821
water meter	LVIE002476
well wizard	LVIE002731
MP10	LVIE002723
LEL	56928

Logged BY / Date: M. Yantin 5/12/09 *Reviewed BY / Date:* Edward Weaver 11-11-09

Shaw Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3073
Weather: Sunny 60°

Sampling location ID: LBA-BEDGW002
Collection Time/Date: 5/12/09 1030

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: E. Weaver / M. Yantin
Casing diameter (inches): 2
Total well depth (ft. BTOC): 79.92' btoc
Bladder pump settings: CPM NA
Refill (seconds): NA
Discharge (seconds): NA
Throttle (psi): NA
Discharge tube length (ft.): NA

Screen Interval (ft. BTOC): 57.57 to 72.57
Pump intake depth (ft BTOC): NA
Max. sustainable pump rate (mL/min): NA
Appearance of product: black haze
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 18.3 ppm H2S: 200
LEL: LEL: 100%; Oxygen: 18.5 %; Carbon: 0 ppm

Purging

Purging/sampling crew: E. Weaver / M Yantin
Purge date/beginning time: 5/11/09 0915
Initial (pre-purging) DTW (ft. BTOC): 65.59

Purge date/completion time: 5/11/09 0930
Final (post-purging) DTW (ft. BTOC): dry

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft.
Tubing length = _____ ft.
Tubing volume (Liters) = (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

0.02 L for a 3/8" I.D. tube

MRY 5/11/09

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = .164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 7.33 ft x .164 Gal/ft = 1.2 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 15 ft + 0 ft) x 1.31 gal/ft) x 0.3 = 5.90 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 1.2 gal + 5.9 gal = 7.104 gal X 3.785 L/gal = 26.88 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
26.88	53.77	80.67	107.55	134.43

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	NA						MRY	5/11/09	

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/11/09	0920	65.59	NA	7	14.99	6.198	195.9	6.57	7.50	23.1
5/11/09	0925	NA	NA	14	15.09	6.197	205.9	6.59	6.14	22.7
"	0930	NA	NA	21	15.19	6.195	-209.7	6.59	6.00	22.7
5/12/09	1030	69.36	NA	21	15.25	6.190	-187.6	6.55	8.12	20.8

MRY 5/12/09

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

MBY 5/12/09

Sampling

Sampling beginning time: 5MR 1030

Sampling completion time:

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/12/09	1030	69.36	NA	21	15.25	6.190	187.6	6.55	8.12	20.8

Sample Information

Sample ID: LBA 3073

Duplicate sample collected (Y/N): N

Split sample collected (Y/N): N

Sample collection date/time: 5/12/09 1030

Duplicate sample ID: NA

Split sample ID: NA

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

MBY 5/12/09

Comments: Sample collected by bailer. Calculated well volume is more than actual well volume because water level is mid-screen.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051909-ACCT

Location Code: ~~LBA-MW01~~ MRY HNTA-BEDGW001

Sample Number: ~~LB3067~~ MRY LB3074

Sample Name: ~~PBOW-09-GW-LBA-MW01-LB3067-REG~~ MRY PBOW 09 GW HNTA BEDGW001 - LB3074 - REG

Sampling Method: GRAB

Sample Type: GW *Sample Purpose:* REG

Sampling Equip: Bladder pump / YSI 6920 / Bailer

QC Partners:

(TB) 051909 -TB (ER) — (FB) —

Task: TPAPLBRC

Collection Date: 5/19/09

Collection Time: 0920

Start Depth: 40.41' btoc

End Depth: 43.41' btoc

Sample Matrix: WATER

Sample Team: H. Yentin / E. Weaver

ERPIMS Values:

Sacode:

Lot Control#:

Containers

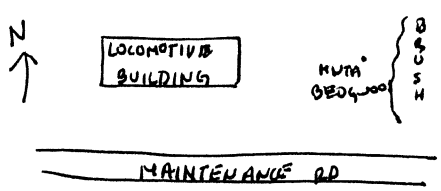
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 66.35' btoc **Depth To Water:** 40.41' btoc

Comments: Sample collected by bailer
Iron Hach Test: 0.0 mg/L

Sketch Location:



EQUIPMENT USED	SN
YSI 6920	~~LUE~~ 28821
water meter	LUE 002476
well wizard	LUE 002731
MPIO	002723
LEL	56928

Logged BY / Date: H. Yentin 5/19/09

Reviewed BY / Date: Edward Weaver 11-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: PBOW
Sample ID: LB3074
Weather: Sunny 60°

Sampling location ID: MNTA-B5DGW001
Collection Time/Date: 5/19/09 0920

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: M. Yantin / E. Weaver
Casing diameter (inches): 2
Total well depth (ft. BTOC): 64.00 bgs / 68.35' btoc
Bladder pump settings: CPM 2-2-2-6
Refill (seconds): 28-25-28-5
Discharge (seconds): 2-5-2-5
Throttle (psi): 30-40-40-50
Discharge tube length (ft.): 65

Screen Interval (ft. BTOC): 48.75 to 63.75
Pump intake depth (ft BTOC): 56.25
Max. sustainable pump rate (mL/min): NA
Appearance of product: Clear
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 65.8 ppm H_2S: 200
LEL: LEL: 33 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: M. Yantin / E. Weaver
Purge date/beginning time: 5/18/09 1400
Initial (pre-purging) DTW (ft. BTOC): 36.81

Purge date/completion time: 5/18/09 1610
Final (post-purging) DTW (ft. BTOC): DRY

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = ~~65~~ 67 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 67 ft) + 0.3 L = .97 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = .97 L x 3 = 2.91 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = .164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 29.54 ft x .164 Gal/ft = 4.84 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 15 ft + 2 ft) x 2.46 gal/ft) x 0.3 = 12.54 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 4.84 gal + 12.54 gal = 17.38 gal X 3.785 L/gal = 65.8 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
65.8	131.6	197.4	263.2	328.5

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	.032	.54	.60	—	—	DRY 5/18/09	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/18/09	1420	37.51	.032	1.6	15.53	9.201	-793.3	6.34	0.78	0.7
"	1430	37.49	.032	1.32	16.49	9.083	-781.9	6.34	0.60	0.4
"	1440	37.65	.032	1.64	16.90	9.086	-774.6	6.34	0.59	0.3
"	1445	NA	.54	4.34	12.55	9.295	-733.8	6.35	2.62	13.0
"	1450	NA	.60	7.34	12.48	9.234	-731.9	6.35	1.78	17.5
"	1455	NA	.60	10.34	12.45	9.218	-740.8	6.35	1.62	7.4
"	1500	NA	.60	13.34	12.45	9.215	-736.9	6.35	1.60	7.0
"	1610	DRY	.60	55.34	—	NO READING		—	—	—
"	0920	40.41	NA	56.34	15.17	10.53	-200.8	6.44	0.28	21.9

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

MRG 5/18/09

Sampling

Sampling beginning time: 0920 Sampling completion time: 0928

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/19/09	0920	40.41	NA	55.34	15.17	10.53	-200.8	6.44	0.28	21.5

Sample Information

Sample ID: LB 3074

Sample collection date/time: 5/ /09

Duplicate sample collected (Y/N): N

Duplicate sample ID: NA

Split sample collected (Y/N): N

Split sample ID: NA

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

MRG 5/18/09

Comments: Low flow is not possible. Lowest purge rate was 32 mL/min and water level was dropping. Well is gassing and it is difficult to determine water level.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW051309 ACCT

Location Code: **RCA-MW01**
Sample Number: **RC3074**
Sample Name: **PBOW-09-GW-RCA-MW01-RC3074-REG**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: 2" Teflon Bailer. (sampled from bottom)

QC Partners:
(TB) 051309-TB (ER) — (FB) —

Task: **TPAPLBRC**
Collection Date: 5/12/09
Collection Time: 0920
Start Depth: 7.19 Ft
End Depth: 9.96 Ft
Sample Matrix: **WATER**
Sample Team: D. Kessler / B. Tiell

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

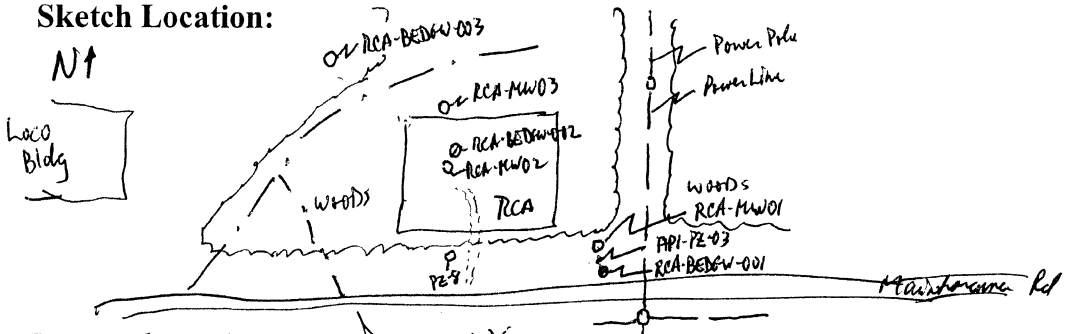
Groundwater Information:

7.19 Ft 5/12/09 0900

Measured Well Depth: ~~NA~~ 11.55 Ft **Depth To Water:** 4.44 Ft 5/11/09 1725

Comments: Ferrous Iron = 0.0 mg/L

Sketch Location:



Logged BY / Date: David Kessler

Reviewed BY / Date: Edward G. McKeon 6-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: RCA
Sample ID: RC 3074
Weather: Sunny, warm (60°), slight breeze

Sampling location ID: RCA-MW01
Collection Time/Date: 5/12/09 0920

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer (circle or add one)

Pump installation crew: D. Kesslar / B. Tiell
Casing diameter (inches): 2
Total well depth (ft. BTOC): 11.55
Bladder pump settings: CPM
Refill (seconds):
Discharge (seconds):
Throttle (psi):
Discharge tube length (ft.):

Did not attempt low-flow

Screen Interval (ft. BTOC): 6.17 to 11.17
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0.0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm, H2S: 0.0 ppm

Purging

Purging/sampling crew: D. Kessler / B. Tiell
Purge date/beginning time: 5/11/09 1725
Initial (pre-purging) DTW (ft. BTOC): 7.11

Purge date/completion time: 5-11-09 1805
Final (post-purging) DTW (ft. BTOC): 11.02

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft DKK
Tubing length = _____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

0.02 L for a 3/8" I.D. tube

Monitoring well purge volume calculations water column 4.44 ft

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 4.44 ft x 0.164 Gal/ft = 0.73 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. in inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (4)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height ____ ft + 4.44 ft) x 2.46 gal/ft) x 0.3 = 3.28 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 3.28 gal + 0.73 gal = 4.01 gal X 3.785 L/gal = 15.2 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
15.2	30.4	45.6	60.8	76.0

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—								—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5-11-09	1730	7.29	—	1	12.11	0.876	-14.3	6.74	5.53	5.1
5-11-09	1737	8.20	—	5 L	11.64	0.849	27.2	6.71	4.27	13.4
5-11-09	1750	9.59	—	10 L	10.50	0.903	30.9	6.74	5.41	45.7
5-11-09	1800	10.24	—	13 L	10.37	0.944	43.0	6.72	5.38	41.1
5-11-09	1805	11.02	—	15.5 L	well is DRY					
5-12-09	0900	7.19	—	15.5	—	—	—	—	—	—
5-12-09	0950	9.94	—	—	—	—	—	—	—	

NOTE: Initial DTW was 7.11

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sampling

Sampling beginning time: 0920

Sampling completion time: 0950

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/12/09	0920	7.19	—		9.96	0.890	122.5	6.91	7.71	1.0

Sample Information

Sample ID: RC 3074

Duplicate sample collected (Y/N): N

Split sample collected (Y/N): N

Sample collection date/time:

Duplicate sample ID: —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Nitros		2@1l amber	MK/Turbidity/Sulfate/Chloride/TDS/TSS		1@5L poly
SVOCs		2@1l amber	Nitrate/Nitrite		1@500ml poly
TAL Metal/Hardness		1@500ml poly	VOC		3@40ml VOAs
Metals Dissolved		1@500ml poly			
Cyanide		1@500ml poly			

Comments: Sample collected w/ bailer (2" Teflon). Sample filtered w/ hand pump through 0.45 micron filter.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW051109 ACCT

Location Code: **RCA-MW02**

Sample Number: **RC3075**

Sample Name: **PBOW-09-GW-RCA-MW02-RC3075-REG**

Sampling Method: **GRAB**

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: 2" Bladder pump, 1/4" ID Teflon Lined tubing

QC Partners:

(TB) 051109-TB (ER) ER4 (FB) —

Task: **TPAPLBRC**

Collection Date: 5-11-09

Collection Time: 1120

Start Depth: 20.69

End Depth: 24.61

Sample Matrix: **WATER**

Sample Team: D. Kessler/B. Thell

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

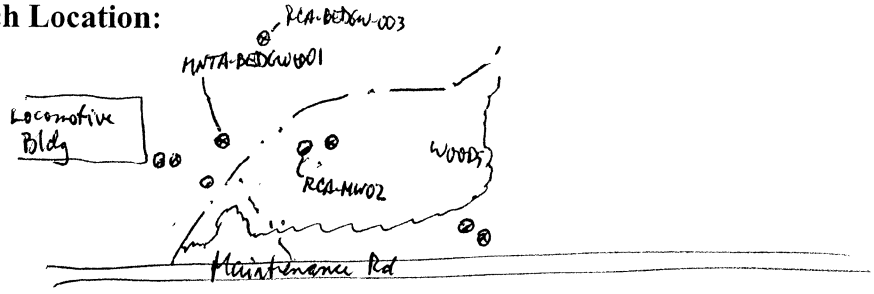
Measured Well Depth: NM

Depth To Water: 5/10/09 7.73 ft; 5/11/09 20.69 ft

Comments: Pumped well dry 5/10/09. (Could not low-flow due to slow recharge, water removed when at top of screen only 12.5 L of 51.2 L for well volume. Due to slow recharge pumped well dry. Will sample 5/11/09
Ferrous Iron = 0.0 mg/L

Sketch Location:

NA



Logged BY / Date: David Kessler

Reviewed BY / Date: Edward Gillon 11-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: RCA
Sample ID: RC 3075
Weather: sunny, warm (55°), calm

Sampling location ID: RCA-MW02
Collection Time/Date: 5/11/09 1120

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: D. Kessler/B. Tiell
Casing diameter (inches): 2
Total well depth (ft. BTOC): 30.85
Bladder pump settings: ~~CPM~~ Manual (MN)
Refill (seconds): ~~_____~~ Could not
Discharge (seconds): ~~_____~~ low-flow
Throttle (psi): ~~_____~~
Discharge tube length (ft.): 33

Screen Interval (ft. BTOC): 20.5 to 30.5
Pump intake depth (ft BTOC): 25.5
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0.0 ppm H_2S 0.0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: DKK/BT
Purge date/beginning time: 5/10/09 1015
Initial (pre-purging) DTW (ft. BTOC): 7.73 ft

Purge date/completion time: 5/10/09 1240
Final (post-purging) DTW (ft. BTOC): Dry (29.4') (Top of Pump)

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft.
Tubing length = 33 ft.
Tubing volume (Liters) = (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 33 ft) + 0.3 L = 0.63 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.63 L x 3 = 1.89 L

Could not Low-flow

0.02 L for a 3/8" I.D. tube

Monitoring well purge volume calculations water column - 23.12

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 23.12 ft x 0.164 Gal/ft = 3.79 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. in inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 3.2 ft) x 2.46 gal/ft) x 0.3 = 9.74 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 9.74 gal + 3.79 gal = 13.53 gal X 3.785 L/gal = 51.21 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
51.2	102.4	153.6	204.8	256.0

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/10/09	1015	7.73	—	—	—	—	—	—	—	—
5/10/09	1050	8.41	62 ml	—	14.07	1.782	-147.7	6.69	2.45	2.1
5/10/09	1055	8.79	37 ml	—	14.03	1.786	-141.7	6.68	2.40	2.8
5/10/09	1100	8.95	—	—	13.83	1.790	-136.8	6.67	2.38	1.9
5/10/09	1105	9.06	40 ml	1 L	13.93	1.785	-136.2	6.67	2.05	1.5
5/10/09	1110	9.37	50 ml	—	14.29	1.782	-133.0	6.67	1.32	1.0
5/10/09	1115	9.65	—	—	14.47	1.784	-133.2	6.67	2.02	1.4
5/10/09	1120	9.87	60 ml	2 L	14.48	1.787	132.5	6.67	2.01	0.8
5/10/09	1125	10.05	44 ml	—	14.49	1.794	-132.3	6.66	2.01	0.4

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GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
top attempt low flow	5/10/09	1130	—	2 L	14.76	1.796	-137.2	6.66	1.89	0.3
decrease flow	5/10/09	1136	11.60	—	3 L	12.20	1.821	-138.3	6.64	2.93	5.6
	5/10/09	1142	14.49	384 mL	6 L	10.68	1.850	-138.6	6.62	1.35	1.0
	1240	Dry		32 L							

DHK

Sampling

Sampling beginning time: 5/11/09 1120

Sampling completion time: 1200

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5-11-09	1120	20.	—	32	13.59	1.513	-37.7	7.07	17.05	3.7

Sample Information

Sample ID: RC3075

Sample collection date/time: 5-11-09 1120

Duplicate sample collected (Y/N): N

Duplicate sample ID: —

Split sample collected (Y/N): N

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Nitros		2@1l amber	Alk/Turb/Sulfate/Chloride/TSS/TDS		1@1L poly
SVOC		2@1l amber	Nitrate/Nitrite		1@500ml poly
VOC		3@40ml VOAs	Cyanide		1@500ml poly
TAL Metals/Hardness		1@500ml poly			
TAL Metals (Dissolved)		1@500ml poly			

Comments:

Ferrous Iron: 0.0mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW05 11 09 ACCT

Location Code: **RCA-MW03**
Sample Number: **RC3076**
Sample Name: **PBOW-09-GW-RCA-MW03-RC3076-REG**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: 2" Bladder pump w/ 1/4" ID Teflon Lined tubing

Task: **TPAPLBRC**
Collection Date: 5/11/09
Collection Time: 0830
Start Depth: 20.10
End Depth: 23.98
Sample Matrix: **WATER**
Sample Team: DKL/BT

QC Partners:
(TB) PW05 11 09-TB (ER) ER4 (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: NM **Depth To Water:** 8.98 ft 5/10/09
20.13 ft 5/11/09 0805

Comments: Ferrous Iron = 0.0 mg/L

Sketch Location:
N1

Logged BY / Date: David Kessler *Reviewed BY / Date:* Edward Weaver 11-11-09

Shaw Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: RCA
Sample ID: RCA-3076
Weather: partly sunny, warm(55°), slight breeze

Sampling location ID: RCA-MW03
Collection Time/Date: 5-11-09 0830

Pump Installation (Bladder)/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: DKK/BT
Casing diameter (inches): 2
Total well depth (ft. BTOC): ~~28.65~~ 29.25
Bladder pump settings: CPM___
Refill (seconds):
Discharge (seconds):
Throttle (psi):
Discharge tube length (ft.): 31

Not Able to low-flow

Screen Interval (ft. BTOC): 21.10 to 31.10
Pump intake depth (ft BTOC): 26.2
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0.0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm, H_2S = 0.0ppm

Purging

Purging/sampling crew: D.KK/BT
Purge date/beginning time: 5/10/09
Initial (pre-purging) DTW (ft. BTOC): 8.98

Purge date/completion time: 5/10/09
Final (post-purging) DTW (ft. BTOC): 28.15

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. — 0.02 L for a 3/8" I.D. tube
Tubing length = 31 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 31 ft) + 0.3 L = 0.61 L
No. of tubing volumes to purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.61 L x 3 = 1.83 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 20.27 ft x 0.164 Gal/ft = 3.32 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 2.3 ft) x 2.46 gal/ft) x 0.3 = 9.08 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 9.08 gal + 3.32 gal = 12.40 gal X 3.785 L/gal = 46.9 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
46.9	93.8	140.70	187.6	234.5

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/10/09	1410	8.98	—	—	—	—	—	—	—	—
5/10/09	1425	9.75	56 ml	—	14.72	0.705	-25.3	7.25	3.85	0.0
5/10/09	1430	9.93	—	—	14.59	0.704	7.22	-11.1	2.75	0.0
5/10/09	1435	10.20	54 ml	—	15.07	0.699	-1.9	7.22	1.30	0.0
5/10/09	1440	10.40	—	—	15.62	0.701	1.6	7.23	0.81	0.0
5/10/09	1445	10.55	22 ml	—	16.09	0.701	2.6	7.23	0.88	0.0
5/10/09	1450	10.64	—	1 L	16.37	0.701	4.1	7.23	0.91	0.0
5/10/09	1455	10.78	20 ml	—	16.86	0.700	4.5	7.23	0.95	0.0
5/10/09	1500	10.89	—	—	17.42	0.700	3.3	7.24	0.71	0.0

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GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/10/09	1505	11.13	14 ml	—	17.89	0.700	5.8	7.24	0.85	0.0
5/10/09	1510	11.29	58 ml	—	18.01	0.701	7.7	7.24	0.91	0.0
5/10/09	1515	11.44	37 ml	2 L	17.90	0.699	9.5	7.25	0.95	0.0
5/10/09	1520	11.58	—	—	17.61	0.699	10.6	7.25	1.02	0.0
5/10/09	1530	17.06	—	10 L	10.54	0.687	4.4	7.22	0.87	0.0
5/10/09	1540	22.45	—	15 L	10.29	0.703	3.6	7.16	0.69	0.0
5/10/09	1550	24.95	—	21 L	10.97	0.701	1.7	7.17	1.27	0.0
5/10/09	1600	27.65	—	28 L	11.02	0.695	-3.9	7.23	0.67	93.8
5/10/09	1610	top of pump (28.15')	—	33 L	11.35	0.699	2.7	7.31	0.93	87.9

OP ATTEMP low flow

crease flow

55 pump on ottom

DOWN DRY

Removed 33 Liters

DHK

Sampling

Sampling beginning time: 5/11/09 0830 Sampling completion time: 5/11/09 0900

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/11/09	0830	20.13	—	33	11.89	0.635	86.4	7.29	13.89	1.9

Measured in cup

Sample Information

Sample ID: RCA 3076

Duplicate sample collected (Y/N): N

Split sample collected (Y/N): N

Sample collection date/time: 5/11/09 0830

Duplicate sample ID: —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
~~2@1l~~ Nitros		2@1l amber	Alk/Turbidity/TSS/TDS/Chloride/Sulfate		1@1l poly
~~2@1l~~ SVOC		2@1l amber	VOC		3@40ml VOA
TAL Metals/Hardness	200.7	1@500ml poly	Nitrate/Nitrite		1@500ml poly
TAL Metals Dissolved		1@500ml poly			
Cyanide		1@500ml poly			

Comments: collected sample w/pump the following day after well pumped dry.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number:

Location Code: **RCA-BEDGW-001**
Sample Number: **RC3077**
Sample Name: **PBOW-09-GW-RCA-BEDGW-001-RC3077-F**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: 2" Teflon Bailer

Task: **TPAPLBRC**
Collection Date:
Collection Time:
Start Depth:
End Depth:
Sample Matrix: **WATER**
Sample Team: D. Kessler / B. Tiell

QC Partners:
(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

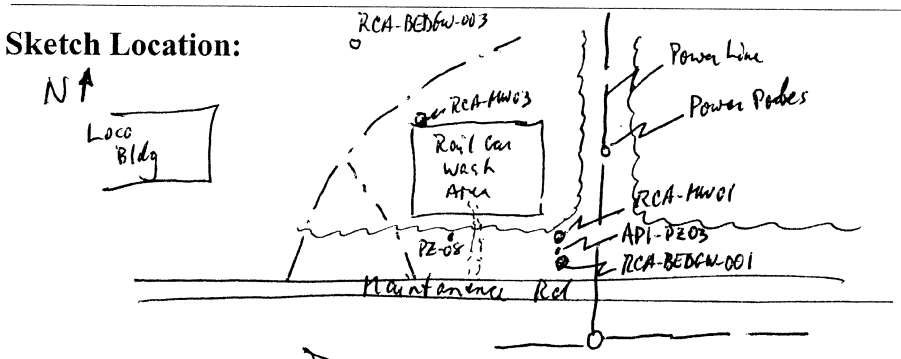
ERPIMS Values:
Sacode:
Lot Control#:

Collected no sample.
~~1.69~~ 0.60 Ft recharge in ~16.5 hrs

Groundwater Information:
Measured Well Depth: NM **Depth To Water:** 77.66 Ft 5/11/09 1615
81.33 Ft 5/12/09 0850

Comments: - Bailed/Purged water due to small water column 5.36 Ft (5/11/09)
- water column 5/12/09 1.69 Ft. (Recharge in ~16.5 hr) - Will collect no sample.
Recharged 0.6 Ft

Sketch Location:



Logged BY / Date: David Kessler

Reviewed BY / Date: Edward [illegible] 11-11-09

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: RCA
Sample ID: RC3077
Weather: partly sunny, warm (60°), slight breeze

Sampling location ID: RCA-BEDGW-001
Collection Time/Date: Not sampled

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: DKK/BT
Casing diameter (inches): 2
Total well depth (ft. BTOC): 83.02
Bladder pump settings: CPM
Refill (seconds):
Discharge (seconds):
Throttle (psi):
Discharge tube length (ft.):

Screen Interval (ft. BTOC): 67.67 to 82.67
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 4.2 ppm
LEL: LEL: 0 %; Oxygen: 20.8%; Carbon: 0 ppm, H_2S = 10.0 ppm

DKK

Purging

Purging/sampling crew: DKK/BT
Purge date/beginning time: 5-11-09 1615
Initial (pre-purging) DTW (ft. BTOC): 77.66

Purge date/completion time: 5/11/09 1640
Final (post-purging) DTW (ft. BTOC): 81.90

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = _____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

DKK

Monitoring well purge volume calculations

water column = 5.36 ft

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 5.36 ft x 0.164 Gal/ft = 0.88 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((~~Screen Height~~ water column 5.36 ft + — ft) x 1.31 gal/ft) x 0.3 = 2.11 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 2.11 gal + 0.88 gal = 2.99 gal X 3.785 L/gal = 11.32 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
11.32	22.64	33.96	45.28	56.60

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—								—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5/11/09	1610	77.66	—	0	—	—	-16.50	—	—	—
5/11/09	1615	78.21	—	1	12.80	8.862	~~-161~~	6.40	20.78	3.4
5/11/09	1623	80.49	—	3.75	13.04	9.466	-153.9	6.39	19.20	12.0
DRY 5/11/09	1642	81.90	—	7	13.38	9.711	-200.3	6.47	19.89	19.0
5/12/09	0850	81.30								

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

DWL

Sampling

Sampling beginning time: —

Sampling completion time: —

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/12/09	0850	81.73	—	7	—	—	—	—	—	—

Sample Information

Sample ID:

Sample collection date/time:

Duplicate sample collected (Y/N):

Duplicate sample ID:

Split sample collected (Y/N):

Split sample ID:

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Not Sampled

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW 051109 ACCT

Location Code: **RCA-BEDGW-002**
Sample Number: **RC3078**
Sample Name: **PBOW-09-GW-RCA-BEDGW-002-RC3078-F**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: 2" Disposable Teflon Bailer

Task: **TPAPLBRC**
Collection Date: 5/11/09
Collection Time: 1015
Start Depth: 44.03 ft
End Depth: 53.42 ft
Sample Matrix: **WATER**
Sample Team: D. Kessler / B. Tiell

QC Partners:
(TB) 051109-TB (ER) ER-4 (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

Containers

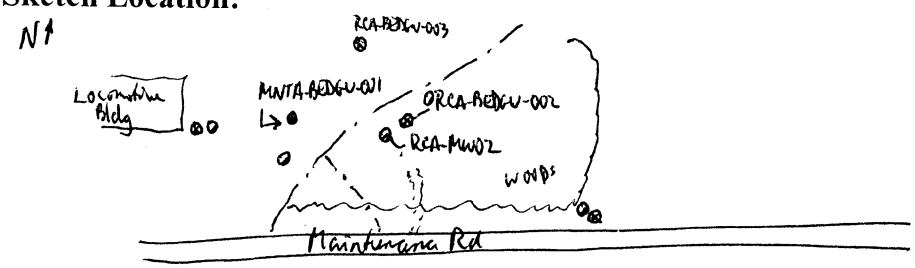
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: NM **Depth To Water:** 5/9/09 → 55.03 ft
5/10/09 → 54.82 ft
5/11/09 → 44.03 ft

Comments: Bailed well dry 5/9, 10/09.
Ferrous Iron = 0.0 mg/l

Sketch Location:



Logged BY / Date: David Kessler

Reviewed BY / Date: Edward Kassow 11-11-09

Shaw Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: Rail Car Wash Area
Sample ID: RCA3078
Weather: partly sunny, warm (50°), slight breeze

Sampling location ID: RCA-BED GW-002
Collection Time/Date: 5/11/09 1015

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other None → Bailer (circle or add one)

Pump installation crew: DKK/BT
Casing diameter (inches): 2
Total well depth (ft. BTOC): 67.40
Bladder pump settings: CPM
Refill (seconds):
Discharge (seconds):
Throttle (psi):
Discharge tube length (ft.):

Screen Interval (ft. BTOC): 52.15 to 67.15
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 14.2 ppm
LEL: LEL: 6 %; Oxygen: 20.8 %; Carbon: 0 ppm, H_2S = 8

Purging

Purging/sampling crew: DKK/BT
Purge date/beginning time: 5/9/09 1704
Initial (pre-purging) DTW (ft. BTOC): 55.03

Purge date/completion time: 5/10/09
Final (post-purging) DTW (ft. BTOC): 67.03

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft.
Tubing length = _____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

DKK

0.02 L for a 3/8" I.D. tube

Monitoring well purge volume calculations water column = 12.37 ft

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 12.37 ft x 0.164 Gal/ft = 2.03 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height — ft + 12.37 ft) x 1.31 gal/ft) x 0.3 = 4.86 gallons
water column

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 4.86 gal + 2.03 gal = 6.89 gal X 3.785 L/gal = 26.08 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
26.08	52.16	78.24	104.32	130.40

Purge Rate

Bailer	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—								—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5-9-09	1700	55.03	Bailed	0	—	—	—	—	—	—
	1704	56.09	2 bailers	~~[illegible]~~ 2	12.55	5.408	-230.9	6.41	4.51	0.0
	1714	55.95	—	2	—	—	—	—	—	—
	1727	58.07	4 Bailers	6	12.22	4.615	-248.1	6.33	1.51	1.8
	1738	60.06	10	10	11.48	4.751	-250.8	6.30	2.00	3.6
	1740	61.42	13 L	13	—	—	—	—	—	—
5-10-09	0750	54.82	—	—	—	—	—	—	—	—
	0850	57.11	—	18	11.53	7.309	-253.6	6.23	2.06	6.2
	0900	59.38	—	22	11.29	6.824	-304.4	6.18	4.38	4.2

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GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5-10-09	0910	62.22	—	22	11.22	7.078	-311.5	6.10	4.66	16.2
	0915	63.09	—	26	11.19	6.863	-309.1	6.11	6.30	7.6
	0920	64.67	—	30	11.39	7.056	-306.3	6.16	6.59	8.6
	0930	67.03	—	34	11.34	6.926	-286.1	6.27	5.82	16.1

DWK

Sampling

Sampling beginning time: 5/11/09 1015 Sampling completion time: 1045

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
5/11/09	1045	53.42	—	34	12.21	7.074	-283.9	6.21	4.91	6.9

Sample Information

Sample ID: RCA-3078 Sample collection date/time: 5/11/09 1015

Duplicate sample collected (Y/N): N Duplicate sample ID: —

Split sample collected (Y/N): N Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOAs		3 @ 40ml VOAs, HCL	Alk/Turb/Chloride/Sulfate/TDS/TSS		1 @ 1l poly cool
Nitrogen		2 @ 1l ambers	Nitrite/Nitrate		1 @ 500 ml poly H_2SO_4
SVOCs		2 @ 1l ambers	Cyanide		1 @ 500 ml poly NaOH
Metals/Hardness		1 @ 500 ml poly, HNO_3			
Metals (Dissolved)		1 @ 500 ml poly, HNO_3			

Comments: Purged well w/ Bailer 5-9, 10-09

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number:

Location Code: **RCA-BEDGW-003**
Sample Number: **RC3079**
Sample Name: **PBOW-09-GW-RCA-BEDGW-003-RC3079-F**
Sampling Method: **GRAB**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bailer

Task: **TPAPLBRC**
Collection Date:
Collection Time:
Start Depth:
End Depth:
Sample Matrix: **WATER**
Sample Team: DKK/BT

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE
HARDNESS	N	I	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: ~~108.80 ft~~ DKK ~~NA~~ 107.40
Depth To Water: 105.78 ft 5/11/09 1505
106.51 ft 5/12/09 0815

Comments:
Water column = 1.62 ft, no recharge on 5/11/09
" " = 0.89 ft " on 5/12/09
Collected No sample.

Sketch Location:
NA

Logged BY / Date: David Kessler 5-11-09 *Reviewed BY / Date:* Edward O'Neill 11-11-09

Shaw Shaw Environmental, Inc.

GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Area or Site ID: RCA
Sample ID: RC 3079
Weather: partly sunny, warm (60°), slight breeze

Sampling location ID: RCA-BEDGW-003
Collection Time/Date: Not Collected

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: DKK/BT
Casing diameter (inches): 2
Total well depth (ft. BTOC): 107.40
Bladder pump settings: CPM
Refill (seconds):
Discharge (seconds):
Throttle (psi):
Discharge tube length (ft.):

Did not low-flow on sample. only 1.62 ft water

Screen ~~Interval (ft BTOC)~~: 92.05 to 107.5
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0.0 ppm
LEL: LEL: 1 %; Oxygen: 20.8 %; Carbon: 0 ppm, H_2S 0.0 ppm

Purging

Purging/sampling crew: DKK/BT
Purge date/beginning time: 5/11/09 1505
Initial (pre-purging) DTW (ft. BTOC): 105.78

Purge date/completion time: 5/11/09 1530
Final (post-purging) DTW (ft. BTOC): 107.08

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = _____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

DKK

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 1.62 ft x 0.164 Gal/ft = 0.27 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height — ft + 1.62 ft) x 1.31 gal/ft) x 0.3 = 0.64 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 0.64 gal + 0.27 gal = 0.91 gal X 3.785 L/gal = 3.45 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
3.45	6.9	10.35	13.8	17.25

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
5-11-09	1450	105.78	—	0	—	—	—	—	—	—
	1515	106.60	—	0.5	12.48	1.050	7.1	7.18	3.64	5.7
	1530	107.08	—	0.75	—	—	—	—	—	—

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GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

No Sample collected

Sampling

Sampling beginning time:_____ Sampling completion time:_____

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sample Information

Sample ID: RC 3079

Duplicate sample collected (Y/N): N

Split sample collected (Y/N): N

Sample collection date/time:_____

Duplicate sample ID: —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Because of small water column (~~3.02~~ DKK 1.62 Ft), water purged w/ bailer. Water quality readings measured in ysi cal cup.
- No recharge measured in well. Because less than 2 ft water, Will not sample well.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW1104 09 ACCT 6.PS

Location Code: **LBA-MW01**
Sample Number: **LB3075**
Sample Name: **PBOW-09-GW-LBA-MW01-LB3075-REG**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Purge w/ bladder pump / sample w/ bailer

Task: **OCT09-GW**
Collection Date: 11/4/09
Collection Time: 0945
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: JAB CPS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.02' **Depth To Water:** 10.04'

Comments: Ferrous iron = 0 mg/L

Sketch Location:

Logged BY / Date: LSA 11/4/09 *Reviewed BY / Date:* Edward J. Mowen 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: LBA
Sample ID: LB3075
Weather: p-cloudy 44° wind from W

Sampling location ID: LBA-MW01
Collection Time/Date: 11/3/09 1220

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: JAB, CB
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.02
Bladder pump settings: CPM —
Refill (seconds): —
Discharge (seconds): —
Throttle (psi): —
Discharge tube length (ft.): 23

Screen Interval (ft. BTOC): 8.42 to 18.42
Pump intake depth (ft BTOC): 13.4
Max. sustainable pump rate (mL/min):
Appearance of product:
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: — ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB, CB
Purge date/beginning time: 11/3/09
Initial (pre-purging) DTW (ft. BTOC): 10.04

Purge date/completion time: 11-3-09/1444
Final (~~post~~-purging) DTW (ft. BTOC): Dry

Low Flow purge tubing volume calculations

not attainable

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = 23 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 23 ft) + 0.3 L = 0.53 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.53 L x ~~1.59~~ 0.53 = 1.59 L

Monitoring well purge volume calculations W.C. = 8.98

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 8.98 ft x 0.164 Gal/ft = 1.47 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 0 ft) x 2.46 gal/ft) x 0.3 = 7.38 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 7.38 gal + 1.47 gal = 8.85 gal X 3.785 L/gal = 33 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
33	66	99		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	.152	.052	.048	.050	.057	.438	.550	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/3/09	1308	10.49	152		12.39	1.46	4.3	6.81	5.05	229.5
11/3/09	1314	10.65	52	500 mL	12.21	1.47	4.6	6.80	4.65	57.1
11/3/09	1326	10.81	48		12.54	1.48	4.2	6.81	4.20	83.9
11/3/09	1339	10.98	50		11.84	1.49	3.3	6.83	3.69	30.0
11/3/09	1346	11.07	50	1 L	12.09	1.49	2.9	6.84	3.37	29.3
11/3/09	1354	11.15	54	2.2 L	11.81	1.50	3.3	6.85	3.13	2.1
	- could	not	maintain	drawdown	>	0.5'	prompt	dry		
11/3/09	1407	11.74	438		13.20	1.49	3.1	6.84	3.48	25.9
11/3/09	1424	14.31	550	11 L	14.03	1.49	-1.8	6.93	2.73	-1.4

GROUNDWATER SAMPLING FORM

LBA - MW09

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
	TOP	of	pump	18.35'						
4/3/09	1444									

Sampling

Shaw™ Shaw Environmental, Inc. 11/4/09 Sampling completion time: 0945

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/4/09	0945	10.43	—	—	10.06	0.797	-6.5	7.15	6.24	11.9

Sample Information

Sample ID: LB3075

Sample collection date/time: 11/4/09 / 0945

Duplicate sample collected (Y/N): N

Duplicate sample ID: N

Split sample collected (Y/N):

Split sample ID:

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260	3x40 ml Vials	Alk, Cl, S, TDS TSS Nitrate		1x1L HDPE
SVOC	8270	2x1L Amber	Cyanide	9010/9012	1x500 ml HDPE
Explosives	8330	2x1L Amber	Hardness	—	
Metals Filtered	6010/7470	1x500 ml HDPE	Nitrate	—	1x500 ml HDPE
Metals total	6010/7470	1x500 ml HDPE			

Comments:

Ferrous Iron - 0 mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3076**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3076-REG**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: bladder pump

Task: **OCT09-GW**
Collection Date: 11/5/09
Collection Time: 0930
Start Depth: –
End Depth: –
Sample Matrix: **WATER**
Sample Team: JAB

QC Partners:
(TB) No (ER) No (FB) ~~YES~~ No

Containers

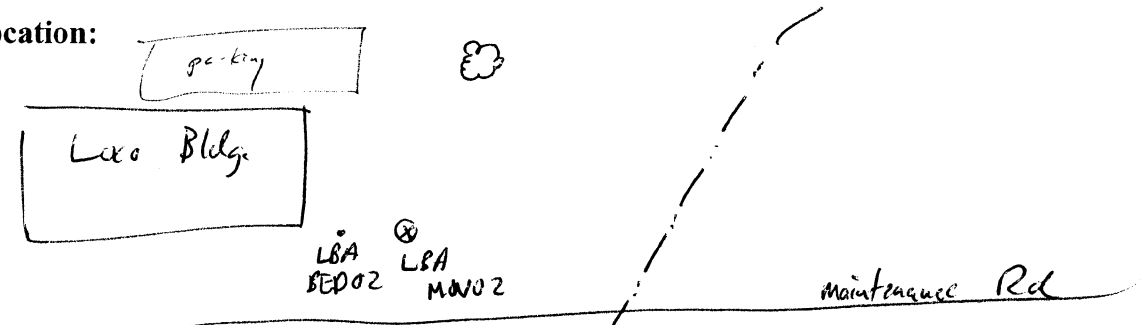
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

ERPIMS Values:
Sacode:
Lot Control#:

Groundwater Information:
Measured Well Depth: 19.4 **Depth To Water:** 8.35

Comments: 0 mg/L Ferrous Iron

Sketch Location:



Logged BY / Date: 11/5/09 *Reviewed BY / Date:* Edward E. Weaver 2-18-10

Shaw™
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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3076-MS**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3076-MS**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **MS**
Sampling Equip: bladder pump

Task: **OCT09-GW**
Collection Date: 11/5/09
Collection Time: 0930
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: JAB, CPS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.40 **Depth To Water:** 8.35

Comments: Ferrous Iron = 0 mg/L

Sketch Location:

see LB3076

Logged BY / Date: C-S 11/5/09 *Reviewed BY / Date:* Edward [illegible] 2-18-10

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3076-MSD**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3076-MSD**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **MSD**
Sampling Equip: Bladder pump

Task: **OCT09-GW**
Collection Date: 11/5/09
Collection Time: 0930
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: JAB, CAS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 14.40 **Depth To Water:** 8.35

Comments: Ferrous Iron = 0 mg/L

Sketch Location:

see LB3076

Logged BY / Date: [signature] 11/5/09 *Reviewed BY / Date:* Edward G. Weaver 2-18-10

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609ACCT

Location Code: **LBA-MW02**
Sample Number: **LB3077**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3077-FD**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **FD**
Sampling Equip: bladder pump

QC Partners:
(TB) No (ER) No (FB) No

Task: **OCT09-GW**
Collection Date: 11/5/09
Collection Time: 0930
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: JAB, CPS

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.40 **Depth To Water:** 8.35

Comments: Ferrous Iron = 0 mg/L

Sketch Location:

see LB3076

Logged BY / Date: C. S. 11/5/09 *Reviewed BY / Date:* Edward S. Weaver 2-18-10

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609TA

Location Code: **LBA-MW02**
Sample Number: **LB3079**
Sample Name: **PBOW-09-GW-LBA-MW02-LB3079**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **FS**
Sampling Equip: bladder pump

Task: **OCT09-GW**
Collection Date: 11/5/09
Collection Time: 0930
Start Depth: –
End Depth: –
Sample Matrix: **WATER**
Sample Team: JAB, CPS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	250	mL	HDPE
METALS3-W	N	D	1	1	L	HDPE
METALS3-W-F	Y	E	1	1	L	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	250	mL	HDPE
CYANIDE	N	H	1	250	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.40 **Depth To Water:** 8.35

Comments: Ferrous Iron = 0 mg/L

Sketch Location:

See LB3076

Logged BY / Date: CPS 11/5/09 *Reviewed BY / Date:* Edward L Wann 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: LBA
Sample ID: LB3076
Weather: 41° clear

Sampling location ID: LBA - MW02
Collection Time/Date: 11/5/09 0900

Pump Installation (Bladder)/Fultz/Peristaltic/Grundfos/Other _____ (circle or add one)

Pump installation crew: JAB CPS
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.4
Bladder pump settings: CPM —
Refill (seconds): 28
Discharge (seconds): 2
Throttle (psi): 10
Discharge tube length (ft.): 23

Screen Interval (ft. BTOC): 8.24 to 18.24
Pump intake depth (ft BTOC): 13.2'
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID : — ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB, CPS
Purge date/beginning time: 11/5/09 0948
Initial (pre-purging) DTW (ft. BTOC): 8.35

Purge date/completion time: 0924, 11/5/09
Final (post-purging) DTW (ft. BTOC): 9.74

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. — 0.02 L for a 3/8" I.D. tube
Tubing length = 23 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 23 ft) + 0.3 L = 0.53 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.53 L x 3 = 1.63 L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 11.05 ft x 0.164 Gal/ft = 1.81 gallons

Volume of Water in Filter Pack:

Low flow

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. in inches & d is casing dia. in inches
= 0.041 x ((9)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 0 ft) x 2.46 gal/ft) x 0.3 = 7.38 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 1.81 gal + 7.38 gal = 9.19 gal X 3.785 L/gal = 34.8 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
34.8	69.6	104.4		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	178	68	60	68	66				70
				±1	±3%	±10	± 0.1	± 10%	3<100

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/5/09	0850	9.25	—	1 L	11.24	0.747	-2.1	6.92	5.90	18.5
	0853	9.76	178	—	—	—	—	—	—	—
	0858	9.76	69	—	11.40	0.708	-1.0	6.90	4.28	9.5
	0900	9.68	60	1.4 L	10.61	0.699	-0.9	6.90	3.88	5.0
	0907	9.74	68	1.8 L	10.71	0.695	-1.9	6.92	3.40	2.0
	0916	9.74	66	2.4 L	10.04	0.694	-1.9	6.97	2.88	1.2
	0924	9.74	70	3.0 L	10.11	0.692	-2.2	6.93	2.39	0.6
			Low	Flow						

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

LBA MW02

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: 0930

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/5/09	0924	9.74	70	3.0	10.41	0.69	-2.2	6.93	2.39	0.0

Sample Information

Sample ID: LB3076

Sample collection date/time: 11/5/09, 0930

Duplicate sample collected (Y/N): Y

Duplicate sample ID: LB3077

Split sample collected (Y/N): Y

Split sample ID: LB3079

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260	3x40 ml vials	Alk, Cl, S, TDS, TSS	various	1x1L HDPE
SVOC	8270	2x1L Amber	Cyanide	9010/9012	1x500 ml HDPE
explosives	8330	2x1L Amber	Nitrate	—	1x500 ml HDPE
Metals - diss.	6010/7470	1x500 ml HDPE			
Metals - tot.	6010/7470	1x500 ml HDPE			

Comments:

Ferrous Iron = 0 mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609 ACCT

Location Code: **LBA-MW03**
Sample Number: **LB3080**
Sample Name: **PBOW-09-GW-LBA-MW03-LB3080-REG**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: purge = bladder pump sample = bladder pump

Task: **OCT09-GW**
Collection Date: 11/3/09
Collection Time: 1610
Start Depth: –
End Depth: –
Sample Matrix: **WATER**
Sample Team: JAB, CRS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

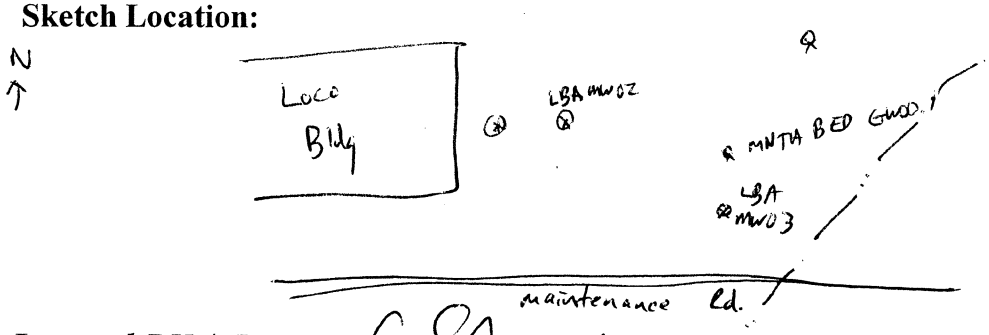
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 19.31 **Depth To Water:** 9.55

Comments: Ferrous Iron = 0 mg/L

Sketch Location:



Logged BY / Date: CRS 11/3/09 *Reviewed BY / Date:* Edward Weave 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: LBA
Sample ID: LB3080
Weather: p - cloudy, 44° wind from west

Sampling location ID: LBA-MW03
Collection Time/Date: 11/3/09 1459

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: JAB, CPS
Casing diameter (inches): 2
Total well depth (ft. BTOC): 19.31
Bladder pump settings: CPM ~~10 p~~
Refill (seconds): 28
Discharge (seconds): 2
Throttle (psi): 10 psi
Discharge tube length (ft.): 24'

Screen Interval (ft. BTOC): 8.96 to 18.96
Pump intake depth (ft BTOC): 13.9
Max. sustainable pump rate (mL/min): ≈ 58
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: — ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.9 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB, CPS
Purge date/beginning time: 11/3/09
Initial (pre-purging) DTW (ft. BTOC): ~~19.31~~ 9.55

Purge date/completion time: 11/3/09 1600
Final (post-purging) DTW (ft. BTOC):

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = 24 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 24 ft) + 0.3 L = 0.54 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.54 L x 3 = 1.62 L

Monitoring well purge volume calculations W.C. = 9.76

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 9.76 ft x 0.164 Gal/ft = 1.60 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 0 ft) x 2.46 gal/ft) x 0.3 = 7.38 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 1.60 gal + 7.38 gal = 8.98 gal X 3.785 L/gal = 34.0 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
34.0	68	102		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)									
				± 1	± 3%	± 10	± 0.1	± 10%	3 >100

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/3/09	1517	10.05	60	100 mL	12.14	0.795	-16.4	7.21	3.33	1.2
11/3/09	1533	10.11	46		11.73	0.798	-17.2	7.23	2.51	-2.9
11/3/09	1540	10.18	40		11.51	0.802	-16.8	7.22	2.26	-3.9
11/3/09	1550	10.35	60		10.95	0.916	-14.5	7.18	2.39	-4.3
11/3/09	1554	10.41	58	2.0 L	11.02	0.822	-14.3	7.17	2.52	-4.3
	1600	completed purge								

Collected Samples at 1610 11/3/09

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

LBA - MW 03

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sampling

Shaw™ Shaw Environmental, Inc.

11/3/09

Sampling completion time: 1610

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/3/09	1554	10.41	58	2.0L	11.02	0.822	-14.3	7.17	2.52	~~43~~ 0.0 DPH

Sample Information

Sample ID: LB3030

Sample collection date/time: 11/3/09, 1610

Duplicate sample collected (Y/N): N

Duplicate sample ID:

Split sample collected (Y/N):

Split sample ID: N

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260	3x40 ml vials	Alk, Cl, S, TDS, TSS		1x1L HDPE
SVOC	8270	2x1L Amber	Cyanide	9010/9012	1x500 ml HDPE
explosives	8330	2x1L Amber	Hardness	—	
Metals filtered	6010/7470	1x500 ml HDPE	Nitrate	—	1x500 ml HDPE
Metals total	6010/7470	1x500 ml HDPE			

Comments:

Ferrous Iron = 0 mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **LBA-BEDGW-001**
Sample Number: **LB3081**
Sample Name: **PBOW-09-GW-LBA-BEDGW-001-LB3081-R**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: None

QC Partners:
(TB) — (ER) — (FB) —

Task: **OCT09-GW**
Collection Date: No Sample Collected
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: EW/BT

Containers

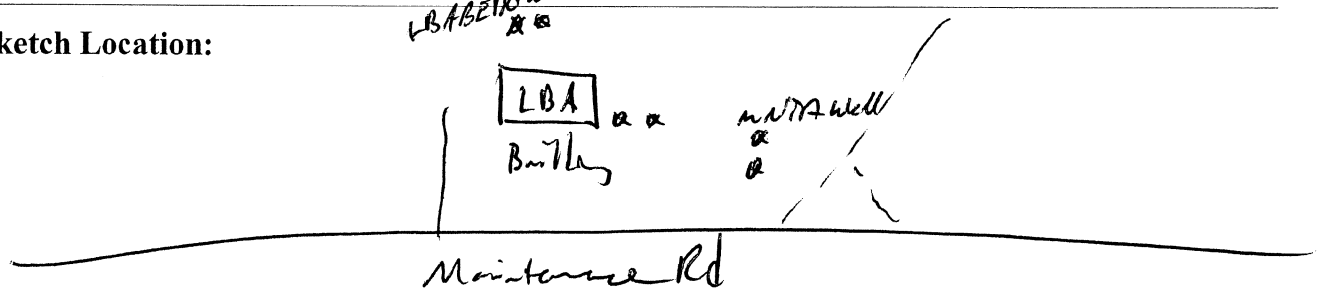
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

ERPIMS Values:
Sacode:
Lot Control#:

Groundwater Information:
Measured Well Depth: 103.3 **Depth To Water:** 100.49

Comments: Well only recharged 1.71 feet overnight. Insufficient water to collect a sample.

Sketch Location:



Logged BY / Date: E W Weaver 11-5-09 *Reviewed BY / Date:* Edward Weaver 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw Shaw Environmental, Inc.

Area or Site ID: PBOW

Sample ID: LB3061

Weather: Overcast, sprinkles, ~45°F

Sampling location ID: LBA-BEDGW-001

Collection Time/Date: No Sample Collected
Insufficient water to sample

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: —

Casing diameter (inches): 2"

Total well depth (ft. BTOC): 103.3

Bladder pump settings: CPM —

Refill (seconds): —

Discharge (seconds): —

Throttle (psi): —

Discharge tube length (ft.): —

Screen Interval (ft. BTOC): 87.46 to 102.46

Pump intake depth (ft BTOC): —

Max. sustainable pump rate (mL/min): —

Appearance of product: —

Discharge tube diameter: 1/4" ID

Inlet reducer used (Y/N): —

PID : 0 ppm H_2S: 0 ppm

LEL: LEL: 0 %; Oxygen: 20.9 %; Carbon: 0 ppm

Purging

Purging/sampling crew: EW/BT

Purge date/beginning time: 11-4-09/1150

Initial (pre-purging) DTW (ft. BTOC): 97.93

Purge date/completion time: 11-4-09/1200

Final (post-purging) DTW (ft. BTOC): 102.2

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters

Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube

Tubing length = _____ ft.

Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L

No. of tubing volumes purged: _____

Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft

Well volume (gallons) = Water Column (ft) x Gal/ft = 5.37 ft x 0.164 Gal/ft = 0.88 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches

= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft

Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)

= ((Screen Height 15 ft + 0 ft) x 1.31 gal/ft) x 0.3 = 5.90 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 5.90 gal + 0.88 gal = 6.78 gal X 3.785 L/gal = 25.66 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
25.66	51.32	76.98	102.64	128.30

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11-4-09	1150	97.93	—	5	9.83	6.84	-21.7	6.71	5.9	0.3

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

EW

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: 11-5-09 No Sample Collected Insufficient water

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11-5-09	1015	100.19	—	—	—	—	—	—	—	—

Sample Information

Sample ID: LB3081

Sample collection date/time: None Collected

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

EW

Comments: Well only recharged 1.71 feet overnight. Insufficient water to collect a sample

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: NA

Location Code: **LBA-BEDGW-002**
Sample Number: **LB3082**
Sample Name: **PBOW-09-GW-LBA-BEDGW-002-LB3082-R**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: None

QC Partners:
(TB) — **(ER)** — **(FB)** —

Task: **OCT09-GW**
Collection Date: No Sample Collected
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: EW/BT

ERPIMS Values:
Sacode:
Lot Control#:

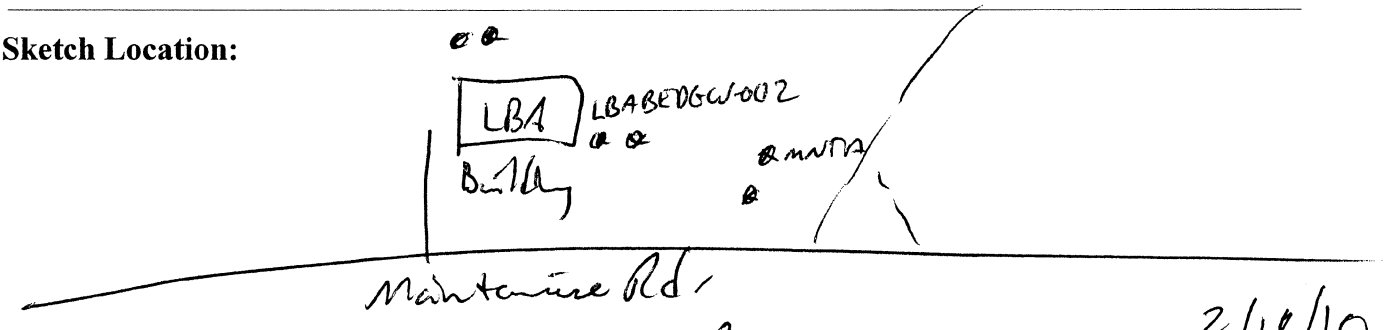
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 72.76 **Depth To Water:** 70.69

Comments: Depth to product 70.31'

Sketch Location:



Logged BY / Date: EW Wenk 11-5-09 *Reviewed BY / Date:* Edward [illegible] 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: PBOW

Sample ID: LB3082

Weather: Clear, cold ~42°F, Wind from SW

Sampling location ID: LBA-BEDGW-002

Collection Time/Date: No Sample Collected Insufficient Water

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: —

Casing diameter (inches): 2"

Total well depth (ft. BTOC): 72.76

Bladder pump settings: CPM —

Refill (seconds): —

Discharge (seconds): —

Throttle (psi): —

Discharge tube length (ft.): —

Screen Interval (ft. BTOC): 57.57 to 72.57

Pump intake depth (ft BTOC): —

Max. sustainable pump rate (mL/min): —

Appearance of product: Petroleum 63.18

Discharge tube diameter: 1/4" ID

Inlet reducer used (Y/N): —

PID : ____ ppm H_2S: ____ ppm

LEL: LEL: ____%; Oxygen: ____%; Carbon: ____ ppm

Purging

Purging/sampling crew: EW/BT

Purge date/beginning time: 11-4-09/1440

Initial (pre-purging) DTW (ft. BTOC): 64.08

Purge date/completion time: 11-4-09/1525

Final (post-purging) DTW (ft. BTOC): 72.03

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters

Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube

Tubing length = ____ ft.

Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = ____ L

No. of tubing volumes purged: ____

Total purge volume: Tubing volume (L) x No. of tubing volumes purged = ____ L x ____ = ____ L

Insufficient Water to attempt to low flow.

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft

Well volume (gallons) = Water Column (ft) x Gal/ft = 9.58 ft x 0.164 Gal/ft = 1.57 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches

= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft

Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)

= ((Screen Height 15 ft + 0 ft) x 1.31 gal/ft) x 0.3 = 5.90 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 5.90 gal + 1.57 gal = 7.47 gal X 3.785 L/gal = 28.27 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
28.27	56.54	84.81	113.08	141.35

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11-4-09	1520	70.52'	—	16	10.98	12.77	-8.1	6.62	6.04	79.1
11-5-09	1415	70.31	— Depth to product		—	—	—	—	—	—
11-5-09	1415	70.69	— Depth to water		—	—	—	—	—	—

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

EW

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: NA

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11-5-09	1415	70.69	—	—	—	—	—	—	—	—

Sample Information

Sample ID: LB3052

Sample collection date/time: No Sample Collected

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Insufficient water to collect sample

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw™
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609ACCT

Location Code: **IT-MNTA-BEDGW-001**

Sample Number: **BEDGW-001-~~ER~~1**

Sample Name: **PBOW-09-QC-MNTA-BEDGW-001-~~ER~~1109**

Sampling Method: **BP**

Sample Type: **QC** *Sample Purpose:* ~~ER~~ REG

Sampling Equip: Bailer, string

QC Partners:

(TB) — (ER) — (FB) —

Task: **OCT09-GW**

Collection Date: 11-6-09 ~~0830~~ EW

Collection Time: 0830

Start Depth: 41.75

End Depth:

Sample Matrix: **WATER**

Sample Team: EW/BT

ERPIMS Values:

Sacode:

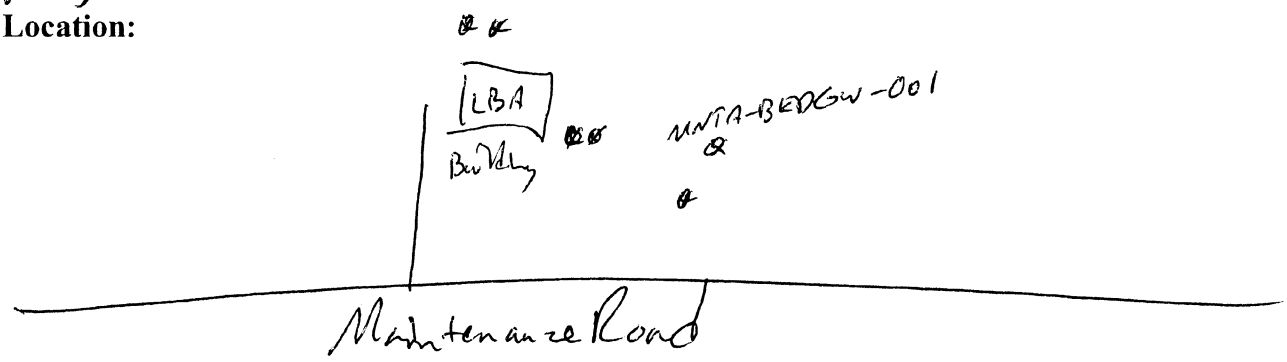
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Comments: Fe^{2+} 0.0 mg/L. Well had product in water during sampling but was not detected with interface probe prior to or at completion of sampling

Sketch Location:



Logged BY / Date: E. Whitbeck 11-6-09 *Reviewed BY / Date:* Edward E. Gibson 2/18/10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw Environmental, Inc.

Area or Site ID: PBOW

Sample ID: MNTA-002

Weather: Clear Cold ~ 42°F, slight breeze

Sampling location ID: MNTA-BEDGW-002

Collection Time/Date: 11-6-09 / 0830

Pump Installation Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: EW/BT

Casing diameter (inches): 2"

Total well depth (ft. BTOC): 66.19

Bladder pump settings: CPM 2

Refill (seconds): 27

Discharge (seconds): 3

Throttle (psi): 40

Discharge tube length (ft.): 71'

Screen Interval (ft. BTOC): 48.75' to 63.75'

Pump intake depth (ft BTOC): 56.25'

Max. sustainable pump rate (mL/min): —

Appearance of product: None

Discharge tube diameter: 1/4" ID

Inlet reducer used (Y/N): N

PID: 0.2 ppm H_2S: 10 ppm

LEL: LEL: 0 %; Oxygen 21.2 %; Carbon: 0 ppm

Purging

Purging/sampling crew: EW/BT

Purge date/beginning time: 11-5-09

Initial (pre-purging) DTW (ft. BTOC): 39.58

Purge date/completion time: 11-5-09/1610

Final (post-purging) DTW (ft. BTOC): 41.50'

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters

Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube

Tubing length = 71 ft.

Tubing volume ~~(Liters)~~ = (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 71 ft) + 0.3 L = 1.01 L

No. of tubing volumes purged: _____

Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

Could not low flow. Pumped at .40-1 per min and water level continued to drop.

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft

Well volume (gallons) = Water Column (ft) x Gal/ft = 26.61 ft x 0.164 Gal/ft = 4.36 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches

= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft

Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)

= ((Screen Height 15 ft + 2 ft) x 2.46 gal/ft) x 0.3 = 12.55 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 12.55 gal + 4.36 gal = 16.91 gal X 3.785 L/gal = 64.0 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
64.0	128.0	192.0	256.0	320.0

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	.1	.04	.310	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11-5-09	1505	39.58	.1	2.0	10.36	9.662	-10.2	6.81	1.27	10.8
11-5-09	1525	40.25	.04	2.6	—	—	—	—	—	—
11-5-09	1540	40.80	.04	3.2	10.18	9.576	-6.8	6.75	-0.24	10.8
11-5-09	1555	41.20	.310	7.85	9.50	9.456	-4.6	6.71	0.95	11.3
11-5-09	1610	41.50	.310	7.85	10.25	9.316	-0.3	6.63	2.60	25.0
11-5-09	1610	Well started gassing, stopped pumping will come back and sample tomorrow.								
11-6-09					9.53	9.365	-19.0	6.89	3.85	13.6

next purge 10 Hours

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

EW

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: 0915

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11-6-09	0830	41.75	—	—	9.53	9.365	-19.0	6.89	3.85	13.6

Sample Information

Sample ID: MNTA-001

Sample collection date/time: 11-6-09 / 0830

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
TCL VOCs	8260	3 x 40 ml vials	Alk, Turb, TDS, TSS, Sulfate, Chloride		1 x 1L HDPE
Explosives	8330	2 x 1L Amber	Cyanide	9010/9012	1 x 500 ml HDPE
TCL SVOC	8270	2 x 1L Amber	Nitrate	—	1 x 500 ml HDPE
Total TAL Metals	6010/7470	1 x 500 ml HDPE			
Total Dissolved Metals	6010/7470	1 x 500 ml HDPE			

Comments: Fe^{2+} 0.0 mg/L. Well had product in water during sampling, but was not detected with interface probe prior to or at completion of sampling.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **RCA-MW01**
Sample Number: **RC3080**
Sample Name: **PBOW-09-GW-RCA-MW01-RC3080-REG**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bailer to purge

Task: **OCT09-GW**
Collection Date: not collected
Collection Time: —
Start Depth: NA
End Depth: NA
Sample Matrix: **WATER**
Sample Team: JAB, CS

QC Partners:
(TB) No (ER) No (FB) No

ERPIMS Values:
Sacode:
Lot Control#:

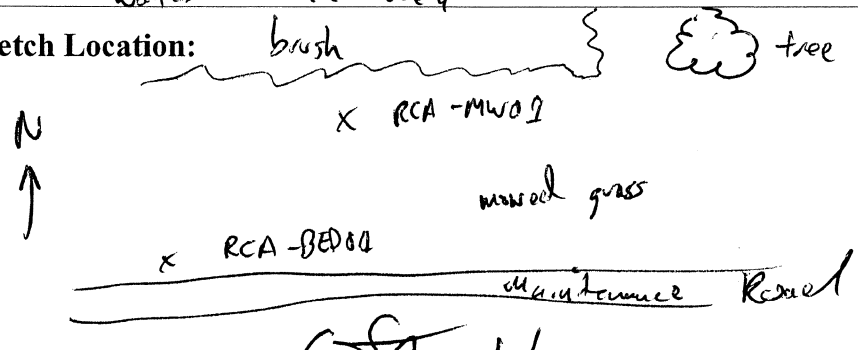
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 11.55 **Depth To Water:** 10.92

Comments: Only ≈ 0.5' of water in well. Tried to collect sample on 11/3/09 at 1200 hrs. Only 3" of water in well

Sketch Location:



Logged BY / Date: CS 11/3/09 *Reviewed BY / Date:* Edward S. Wan 2-18-11

ROUNDWATER SAMPLING FORM

Sheet 1 of 1

Shaw Environmental, Inc.

Area or Site ID: RCA
Sample ID: RC 3080 - not taken
Weather: overcast 50° wind out of North

Sampling location ID: RCA-MW01
Collection Time/Date: 11/2/09 1042

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: JAB, CPS
Casing diameter (inches): 2"
Total well depth (ft. BTOC): 11.55
Bladder pump settings: CPM —
Refill (seconds): —
Discharge (seconds): —
Throttle (psi): —
Discharge tube length (ft.): —

Screen Interval (ft. BTOC): 6.17 to 11.47
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: — ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB, CPS
Purge date/beginning time: 11/2/09 1045
Initial (pre-purging) DTW (ft. BTOC): 10.92

Purge date/completion time:
Final (post-purging) DTW (ft. BTOC):

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bailed, due to low water table

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = ____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = ____ L
No. of tubing volumes purged: ____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = ____ L x ____ = ____ L

Monitoring well purge volume calculations W.C. = 0.63

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 0.63 ft x 0.164 Gal/ft = 0.10 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height ____ ft + 0.63 ft) x 2.46 gal/ft) x 0.3 = 0.46 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 0.46 gal + 0.10 gal = 0.56 gal X 3.785 L/gal = 2.12 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
2.12	4.24	6.36		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)									

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/2/09	1045	10.92	—	0.5 L	13.09	0.670	-2.7	6.99	7.34	9.9
11/2/09	1103	11.18	—	—	—	—	—	—	—	—
	1115	11.18	—	—	—	—	—	—	—	—
	1145	11.18	—	—	—	—	—	—	—	—
—	collected		≈ 0.5 L	. went	back	on 11/3/09		1200	→	
	only	≈ 3"	of water	in	well	will	not	sample	due	
	to	low	volume.							

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sampling

Shaw Shaw Environmental, Inc.

Sampling completion time:

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sample Information

Sample ID:

Sample collection date/time:

Duplicate sample collected (Y/N):

Duplicate sample ID:

Split sample collected (Y/N):

Split sample ID:

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110409ACCT

Location Code: **RCA-MW02**

Sample Number: **RC3081**

Sample Name: **PBOW-09-GW-RCA-MW02-RC3081-REG**

Sampling Method: **BP**

Sample Type: **GW** *Sample Purpose:* **REG**

Sampling Equip: bladder pump to purge, bailer to sample

QC Partners:

(TB) N (ER) N (FB) N

Task: **OCT09-GW**

Collection Date: 11/3/09

Collection Time: 1100

Start Depth: NA

End Depth: NA

Sample Matrix: **WATER**

Sample Team: JAB, CBS

ERPIMS Values:

Sacode:

Lot Control#:

Containers

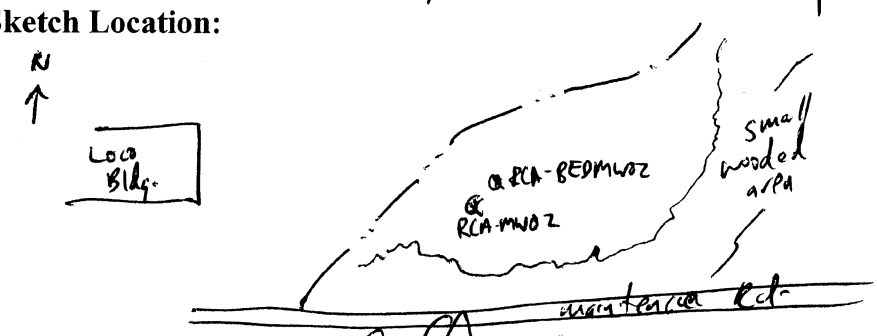
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 30.95' **Depth To Water:** 13.18'

Comments: Pump well dry. Could not Low flow sample due to slow recharge. Removed ≈ 32L of the 56.9L well & well bore volume. Will sample on the following day.

Sketch Location:



Logged BY / Date: C. [illegible] 11/3/09 *Reviewed BY / Date:* Edward [illegible] 2-18-10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: RCA
Sample ID: RC3081
Weather: overcast

Sampling location ID: RCA-MW02
Collection Time/Date: 11/2/09 1248

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: JAB CPS
Casing diameter (inches): 2
Total well depth (ft. BTOC): 30.85
Bladder pump settings: CPM MN
Refill (seconds): /
Discharge (seconds): /
Throttle (psi): /
Discharge tube length (ft.): 33

Screen Interval (ft. BTOC): 20.5 to 30.5
Pump intake depth (ft BTOC): 25.5
Max. sustainable pump rate (mL/min): —
Appearance of product: —
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: — ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 21.8 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB CPS
Purge date/beginning time: ~~1248~~ 1307 / 11/2/09
Initial (pre-purging) DTW (ft. BTOC): ~~13.85~~ 13.18

Purge date/completion time: 11/2/09
Final (post-purging) DTW (ft. BTOC): _____

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = 33 ft.
Tubing volume (Liters) = (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 33 ft) + 0.3 L = 0.63 L
No. of tubing volumes purged: 3
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.63 L x 3 = 1.89 L

not attainable

Monitoring well purge volume calculations W.C. - 16.65'

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (~~0.164~~ 2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 16.65 ft x 0.164 Gal/ft = 2.74 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 10 ft + 6.65 ft) x 2.46 gal/ft) x 0.3 = 12.3 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 2.74 gal + 12.3 gal = 15.02 gal X 3.785 L/gal = 56.9 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
56.9	113.8	170.6		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	84	70	46						

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/2/09	1318	14.72	84	300 mL	11.79	1.36	-36.3	7.61	3.53	62.4
11/2/09	1328	~~15.28~~ 15.35	70	600 mL	11.69	1.36	-30.9	7.60	3.04	46.5
11/2/09	1339	15.95	46		11.88	1.35	-35.4	7.59	2.25	41.2
11/2/09	1347	16.37	48		12.03	1.35	-33	7.59	1.87	31.0
11/2/09	1356	16.80	52	1.6 L	12.5	1.39	-35.0	7.59	1.35	22.8
11/2/09	1405	17.19	54		12.49	1.35	-34.9	7.58	1.40	19.2
Pump well dry										
11/2	1520		320 mL	32 L	10.38	1.31	-34.4	7.57	1.50	10.2
Broken down and will sample tomorrow										

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
			RCA -							
			MW02							

Sampling

Shaw™ Shaw Environmental, Inc. _____

Sampling completion time: 11/3/09 1100

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/2/09	1520	30.85	320	30 L	10.39	1.31	-34.4	7.57	1.50	10.2

Sample Information

Sample ID: RC3091

Sample collection date/time: 11/3/09 / 1100

Duplicate sample collected (Y/N): N

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: N

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260	3x 40-ml Vials	Alk, Cl, S, TDS, TSS	Various	1x1L HDPE
SVOC	8270	2x1L Amber	Cyanide	9010/9012	1x 500-ml HDPE
explosive	8330	2x1L Amber	~~Hardness~~ cl6		
Metals filtered	6010/7470	1x 500-ml HDPE	Nitrate		1x 500-ml HDPE
Metals ~~diss~~ total	6010/7470	1x 500-ml HDPE			

Comments: Ferrous Iron = 0.0 mg/L (field test)

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw™
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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110409 ACCT

Location Code: **RCA-MW03**
Sample Number: **RC3082**
Sample Name: **PBOW-09-GW-RCA-MW03-RC3082-REG**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: purge = bladder

Task: **OCT09-GW**
Collection Date: 11/4/09
Collection Time: 0850
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: JAB, CPS

QC Partners:
(TB) (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

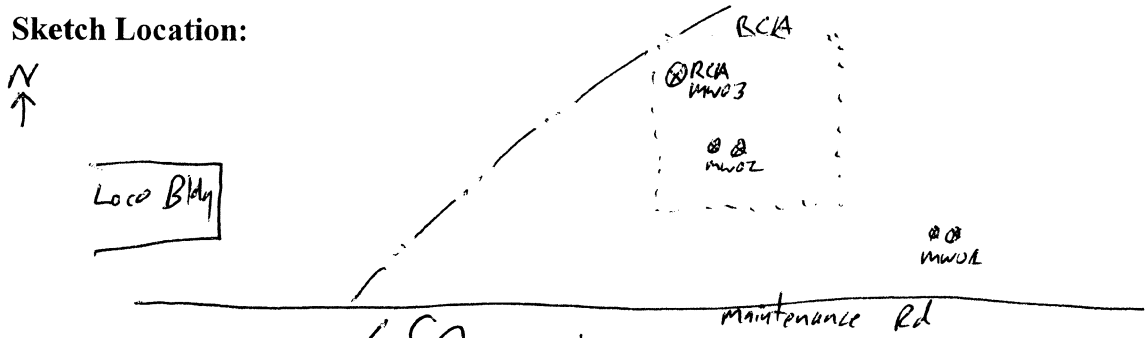
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: ~~NA~~ 29.25' CPS **Depth To Water:** 13.81

Comments: Ferrous Iron = 0 mg/L

Sketch Location:



Logged BY / Date: CPS 11/4/09 *Reviewed BY / Date:* Edward S. McKown 2-18-10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw Shaw Environmental, Inc.

Area or Site ID: RCA

Sample ID: RC 3082

Weather: 40° sun no wind

Sampling location ID: RCA-MW03

Collection Time/Date: ~~11/2/09 1552~~ CPS 11/3/09 0822

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: JAB, CPS

Casing diameter (inches): 2

Total well depth (ft. BTOC): 29.25

Bladder pump settings: CPM 2

Refill (seconds): 28

Discharge (seconds): 2

Throttle (psi): 20

Discharge tube length (ft.): 35'

Screen Interval (ft. BTOC): 21.10 to 31.10

Pump intake depth (ft BTOC): 26.2

Max. sustainable pump rate (mL/min): —

Appearance of product: none

Discharge tube diameter: 1/4" ID

Inlet reducer used (Y/N): N

PID: — ppm H_2S: 0 ppm

LEL: LEL: 0 %; Oxygen: 20.9 %; Carbon: 0 ppm

Purging

Purging/sampling crew: JAB, CPS

Purge date/beginning time: 11/3/09 0850

Initial (pre-purging) DTW (ft. BTOC): ~~13.63~~ 13.81

Purge date/completion time: 11-~~3~~09/1042

Final (post-purging) DTW (ft. BTOC): Dry

Low Flow purge tubing volume calculations

not attainable

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters

Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft.

0.02 L for a 3/8" I.D. tube

Tubing length = 35 ft.

Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 35 ft) + 0.3 L = ~~0.10~~ 0.65 L

No. of tubing volumes purged: 3

Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 0.65 L x 3 = 1.95 L

Monitoring well purge volume calculations W.C. = 17.29

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft

Well volume (gallons) = Water Column (ft) x Gal/ft = 17.29 ft x 0.164 Gal/ft = 2.84 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. in inches & d is casing dia. in inches

= 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft

Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)

= ((Screen Height 10 ft + 7.29 ft) x 2.46 gal/ft) x 0.3 = 12.8 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 2.84 gal + 12.8 gal = 15.6 gal X 3.785 L/gal = 59.0 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
59.0	118.00	179.00		

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	52	46	45						

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11/3/09	0850	14.43	—	—	—	—	—	—	—	—
11/3/09	0905	14.91	52	—	7.42	0.887	-45.8	7.80	4.29	98.0
11/3/09	0920	15.57	46	—	7.69	0.841	-45	7.79	2.55	46.0
11/3/09	0930	16.05	45	—	7.97	0.826	-44.5	7.77	1.69	21.7
11/3/09	0935	→	cannot do		low	flow	increased	flow rate	to purge	dry
11/3/09	0947	21.30	452	8L	0.48	0.808	-45.5	7.79	0.75	60.2
11/3/09	1005	24.30	430	—	10.57	0.790	-43.4	7.74	0.82	13.5
11/3/09	1013	24.00	430	22L	10.45	0.773	-46.	7.79	0.75	2.5

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

RCA - MW03

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/3/09	1034	29.41	450	30 L	10.38	0.772	-49.9	7.98	0.73	10.4
11/3/09	1042	29.80	440	30.5 L	10.51	0.774	-50.1	7.98	0.69	27.6
		Purged		dry						

Sampling

Shaw™ Shaw Environmental, Inc. 11/4/09 Sampling completion time: 0850

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11/4/09	0850	21.55	—	—	8.13	0.723	-49.7	7.77	4.96	76.5

Sample Information

Sample ID: RC3082

Sample collection date/time: 11/4/09 / 0950

Duplicate sample collected (Y/N): N

Duplicate sample ID: N

Split sample collected (Y/N): N

Split sample ID: N

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260	3 x 40 ml Vials	Alk, Cl, S, TDS, TSS	Various	1 x 1L HDPE
SVOC	8270	2 x 1L Amber	Cyanide	9010/9012	1 x 500 ml HDPE
Metals Dis	6010/7470	1 x 500 ml HDPE	Nitrate	—	1 x 500 ml HDPE
Metals Fil	6010/7470	1 x 500 ml HDPE			
explosives	8330	2 x 1L Amber			

Comments:

Ferrous Iron 0 mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **RCA-BEDGW-001**
Sample Number: **RC3083**
Sample Name: **PBOW-09-GW-RCA-BEDGW-001-RC3083-F**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: None

Task: **OCT09-GW**
Collection Date: — Not Collected
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: EW/BT

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

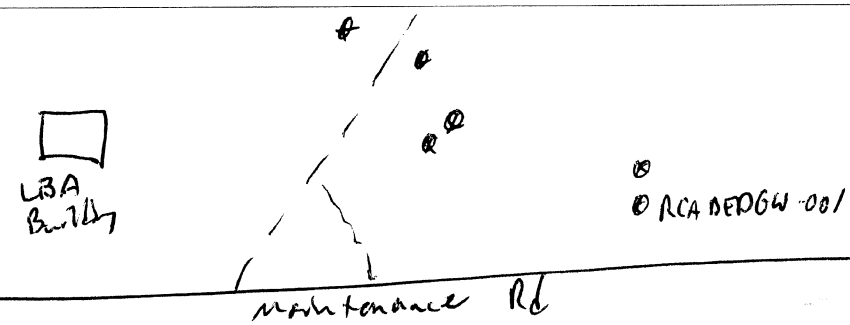
Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 83.02 **Depth To Water:** 80.17

Comments: Insufficient water to attempt to sample.

Sketch Location:



Logged BY / Date: [signature] 11-4-09 *Reviewed BY / Date:* [signature] 2-18-10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw™ Shaw Environmental, Inc.

Area or Site ID: PBOW
Sample ID: RC3083
Weather: Overcast, sprinkles, ± 55°F

Sampling location ID: RCA-BEDEW-001
Collection Time/Date: Not Collected

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer) (circle or add one)

Pump installation crew: Bailer
Casing diameter (inches): 2"
Total well depth (ft. BTOC): 83.02
Bladder pump settings: CPM —
Refill (seconds): —
Discharge (seconds): —
Throttle (psi): —
Discharge tube length (ft.): —

Screen Interval (ft. BTOC): 67.67 to 82.67
Pump intake depth (ft BTOC): —
Max. sustainable pump rate (mL/min): —
Appearance of product: None
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): N
PID: 0 ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.9%; Carbon: 0 ppm

Purging

Purging/sampling crew: EW/BT
Purge date/beginning time: 11-2-09 / 1605
Initial (pre-purging) DTW (ft. BTOC): ~~[illegible]~~ 75.62

Purge date/completion time: 11-2-09 /
Final (post-purging) DTW (ft. BTOC): 81.89

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Could not low flow — EW

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube
Tubing length = _____ ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x ____ ft) + 0.3 L = _____ L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = _____ L x _____ = _____ L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 7.4 ft x 0.164 Gal/ft = 1.21 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 7.4 ft + 0 ft) x 1.31 gal/ft) x 0.3 = 2.91 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 2.91 gal + 1.21 gal = 4.12 gal X 3.785 L/gal = 15.59 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
15.59	31.18	46.77	62.36	77.95

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min) Bailer	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11-2-09	1605	75.62	—	0	10.51	11.16	-10.3	6.87	6.30	0.9
11-2-09	1615	78.13	—	4	10.47	11.99	-7.4	6.81	3.64	13.4
11-2-09	1620	79.55	—	7	10.34	12.47	-6.6	6.79	11.05	16.9
11-2-09	1630	81.34	—	10	10.47	14.08	-8.5	6.73	7.02	10.4
Dry 11-2-09	1634	81.89	—	—	—	—	—	—	—	—
11-3-09	1114	80.17	—	—	—	—	—	—	—	—

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

EW

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: Not Collected

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
—	—	—	—	—	—	—	—	—	—	—

Sample Information

Sample ID: RC3083

Sample collection date/time: _____

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

EW

Comments: Insufficient water to attempt to sample

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

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Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: PW110609

Location Code: **RCA-BEDGW-002**
Sample Number: **RC3084**
Sample Name: **PBOW-09-GW-RCA-BEDGW-002-RC3084-F**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: Bailer, new string

QC Partners:
(TB) — (ER) LBA-ER1109 (FB) —

Task: **OCT09-GW**
Collection Date: 11-5-09
Collection Time: 0830
Start Depth: 56.97
End Depth: 61.10
Sample Matrix: **WATER**
Sample Team: EW/BT

ERPIMS Values:
Sacode:
Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:
Measured Well Depth: 67.40 **Depth To Water:** 56.97

Comments: Fe^{2+} 0.0 mg/L. Collected equipment rinsate sample from pump used at this location.

Sketch Location:

Logged BY / Date: E.W. Weaver 11-5-09 *Reviewed BY / Date:* Edward W. Weaver 2-18-10

1 ER per site

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw Shaw Environmental, Inc.

Area or Site ID: PBOW
Sample ID: RC3084
Weather: Partly cloudy, breezy, ≈ 50°F

Sampling location ID: RCA-BEDGW-002
Collection Time/Date: 0830 / 11-5-09

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other_____ (circle or add one)

Pump installation crew: EW/BT
Casing diameter (inches): 2"
Total well depth (ft. BTOC): 67.40
Bladder pump settings: CPM 2
Refill (seconds): 2%
Discharge (seconds): 2
Throttle (psi): 40
Discharge tube length (ft.): 73'

Screen Interval (ft. BTOC): 52.15 to 67.15
Pump intake depth (ft BTOC): 58.7'
Max. sustainable pump rate (mL/min):
Appearance of product: Sheen on surface Not detected sheen w/ IL interface probe.
Discharge tube diameter: 1/4" ID
Inlet reducer used (Y/N): —
PID: 0 ppm H_2S: 0 ppm
LEL: LEL: 0 %; Oxygen: 20.9 %; Carbon: 0 ppm

Purging

Purging/sampling crew: EW/BT
Purge date/beginning time: 11-3-09 / 1440
Initial (pre-purging) DTW (ft. BTOC): 41.11

Purge date/completion time: 11-3-09
Final (post-purging) DTW (ft. BTOC):
Water Column 26.29'

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters
Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. Low flow 0.02 L for a 3/8" I.D. tube
Tubing length = 73 ft.
Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x 73 ft) + 0.3 L = 1.03 L
No. of tubing volumes purged: _____
Total purge volume: Tubing volume (L) x No. of tubing volumes purged = 1.03 L x _____ = _____ L

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft
Well volume (gallons) = Water Column (ft) x Gal/ft = 26.29 ft x 0.164 Gal/ft = 4.31 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches
= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft
Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)
= ((Screen Height 15 ft + 2 ft) x 1.31 gal/ft) x 0.3 = 6.68 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 6.68 gal + 4.31 gal = 10.99 gal X 3.785 L/gal = 41.60 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
41.60	83.20	124.80	166.4	208.0

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
Start 11-3-09	1440	41.11	.03	1.02	—	—	—	—	—	—
11-3-09	1520	42.50	.09	2.55	10.23	6.173	-16.6	6.88	0.0	5.3
11-3-09	1535	43.85	.09	3.9	9.91	6.110	-12.4	6.20	0.22	0.0
11-3-09	1550	45.33	.09	5.25	9.68	6.054	8.7	6.73	2.74	1.2
11-3-09	1605	47.10	.15	7.50	9.61	5.961	-26.5	7.06	-12.28	3.7
11-3-09	1620	50.00	.15	9.0	9.36	5.981	-28.7	7.11	-1.41	5.1
11-3-09	1630	51.6	.15	10.5	—	—	—	—	—	—
~~11-4-09~~	~~0910~~	~~44.79~~	~~.3~~	—	~~9.34~~	~~7.979~~	~~-1.6~~	~~6.49~~	~~1.40~~	~~16.7~~
11-4-09	0940	48.43	.3	14.5	9.34	7.979	-1.6	6.49	1.40	16.7

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11-4-09	0955	53.42	.3	24.0	9.67	7.287	0.5	6.46	1.30	4.6
11-4-09	1010	55.18	.3	28.5	9.88	6.742	1.5	6.44	0.91	3.9
11-4-09	1025	57.50	.3	33.0	9.78	6.559	1.2	6.45	1.29	3.2
11-4-09	1040	59.72	.3	37.5	9.70	6.338	0.7	6.46	1.83	1.0
11-4-09	1055	62.02	.3	42.0	9.67	6.394	1.7	6.44	1.99	0.8
11-4-09	1110	64.44	.3	46.5	9.87	7.546	5.0	6.38	2.32	4.0
11-4-09	1125	66.30	—	~~46.5~~	9.82	7.076	1.3	6.45	2.61	0.0
11-5-09	0830	56.97	—	—	—	—	—	—	—	—

Dry

Sampling

Shaw™ Shaw Environmental, Inc.

Sampling completion time: 0940 / DTW - 61.10

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)
11-5-09	0830	56.97	—	—	9.94	8.035	2.3	6.58	10.44	2.7

Sample Information

Sample ID: RC3084

Sample collection date/time: 11-5-09/940

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
TCL VOC	8260	3x40ml Vials	Alk, Turb, TDS, TSS, Sulfate, Chloride	Various	1x1L HDPE
Explosives	8330	2x1L Amber			
TCL SVOCs	8270	2x1L Amber	Cyanide	9010/9012	1x500ml HDPE
Total TAL Metals	6010/7470	1x500ml HDPE	Nitrate	—	1x500ml HDPE
Dissolved TAL Metals	6010/7470	1x500ml HDPE			

Comments: Fe^{2+} - 0.0 mg/L

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

Shaw
Shaw E & I, Inc.

Sample Collection Log

132457 - PLUM BROOK ORDNANCE WKS

Manager: Steve Downey

RFA / COC Number: —

Location Code: **RCA-BEDGW-003**
Sample Number: **RC3085**
Sample Name: **PBOW-09-GW-RCA-BEDGW-003-RC3085-F**
Sampling Method: **BP**
Sample Type: **GW** *Sample Purpose:* **REG**
Sampling Equip: None

Task: **OCT09-GW**
Collection Date: —
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: **WATER**
Sample Team: EW/BT

QC Partners:
(TB) (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

Containers

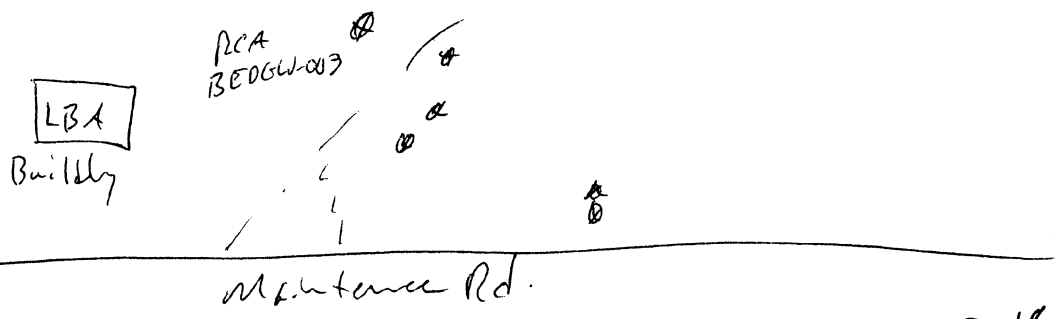
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES	N	A	3	40	mL	VOA VIAL
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	2	1	L	Amb. Glass
HARDNESS	N	D	1	500	mL	HDPE
METALS3-W	N	D	1	500	mL	HDPE
METALS3-W-F	Y	E	1	500	mL	HDPE
ALKALINITY	N	F	1	1	L	HDPE
CHLORIDE	N	F	1	1	L	HDPE
SULFATE	N	F	1	1	L	HDPE
TDS	N	F	1	1	L	HDPE
TSS	N	F	1	1	L	HDPE
TURB 180.1	N	F	1	1	L	HDPE
NO2/NO3	N	G	1	500	mL	HDPE
CYANIDE	N	H	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 107.40 **Depth To Water:** 106.26

Comments: 1.14' water column. Insufficient water to sample. No Sample Collected.

Sketch Location:



Logged BY / Date: E. Wilkerson 11-3-09 *Reviewed BY / Date:* Edward S. Maier 2-18-10

ROUNDWATER SAMPLING FORM

Sheet 1 of 2

Shaw Environmental, Inc.

Area or Site ID: PBOW

Sample ID: RC3085

Weather: Overcast, wind from west, ≈ 50°F

Sampling location ID: RCA-BED6W-003

Collection Time/Date: None

Pump Installation (Bladder/Fultz/Peristaltic/Grundfos/Other Bailer (circle or add one)

Pump installation crew: None

Casing diameter (inches): 2"

Total well depth (ft. BTOC): 107.40

Bladder pump settings: CPM —

Refill (seconds): —

Discharge (seconds): —

Throttle (psi): —

Discharge tube length (ft.): —

Screen Interval (ft. BTOC): ____ to ____

Pump intake depth (ft BTOC): —

Max. sustainable pump rate (mL/min): —

Appearance of product: None

Discharge tube diameter: 1/4" ID

Inlet reducer used (Y/N) —

PID: 0 ppm H_2S: 0 ppm

LEL: LEL: 0 %; Oxygen: 20.9 %; Carbon: 0 ppm

Purging

Purging/sampling crew: EW/BT

Purge date/beginning time: 11-2-09 / 1505

Initial (pre-purging) DTW (ft. BTOC): 105.68

Purge date/completion time: 11-2-09 / 1510

Final (post-purging) DTW (ft. BTOC): 106.35

Low Flow purge tubing volume calculations

Volume of Water in Tubing:

Bladder pump volume = 0.3 Liters

Tubing Liters/ft. (1/4" ID tubing) = 0.01 Liters/ft. 0.02 L for a 3/8" I.D. tube

Tubing length = — ft.

Tubing volume (Liters)= (Tubing Liters/ft. x Tubing length) + Pump volume = (0.01 L/ft x — ft) + 0.3 L = — L

No. of tubing volumes purged: —

Total purge volume: Tubing volume (L) x No. of tubing volumes purged = — L x — = — L

EW Not enough water to purge.

Monitoring well purge volume calculations

Volume of Water in Casing:

Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft

Well volume (gallons) = Water Column (ft) x Gal/ft = 1.72 ft x 0.164 Gal/ft = 0.282 gallons

Volume of Water in Filter Pack:

Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole dia. In inches & d is casing dia. in inches

= 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft

Filter Pack Volume (gal) = ((Screen Height + water column above screen to below bent.) x gal/ft) x porosity (0.3)

= ((Screen Height 10 ft + 0 ft) x 1.31 gal/ft) x 0.3 = 3.93 gallons

Well Purge Volume:

Well Purge Volume = Filter Pack Volume + Well Volume = 3.93 gal + 0.28 gal = 4.21 gal X 3.785 L/gal = 15.93 L

1 x Well Purge Volume	2 x Well Purge Volume	3 x Well Purge Volume	4 x Well Purge Volume	5 x Well Purge Volume
15.93	31.86	47.79	63.72	79.65

Purge Rate

	Initial	2	3	4	5	6	7	8	Final
Flow rate (L/min)	—	—	—	—	—	—	—	—	—

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidiy (NTU)
11-2-09	1505	105.68	—	1.0	10.24	1.892	-35.7	7.34	7.73	0.0
11-2-09	1510	106.35	—	—	—	—	—	—	—	—

Dry

GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sampling

Shaw™ Shaw Environmental, Inc. No Sample Collected

Sampling completion time: None

Water Quality Parameter Measurements

Date	Time	DTW (ft. BTOC)	Purge Rate (L/min)	Purge Volume (L)	Temp. (C)	Electrical Conductivity (mS/cm)	ORP (mV)	pH (std units)	DO (mg/L)	Turbidity (NTU)

Sample Information

Sample ID: RC 3085

Sample collection date/time: None

Duplicate sample collected (Y/N): —

Duplicate sample ID: —

Split sample collected (Y/N): —

Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

EW

Comments: Well did not recharge overnight. Only 1.14' water column. No Sample Collected.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter;

APPENDIX D

ROCK CORE PHOTOGRAPHS

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

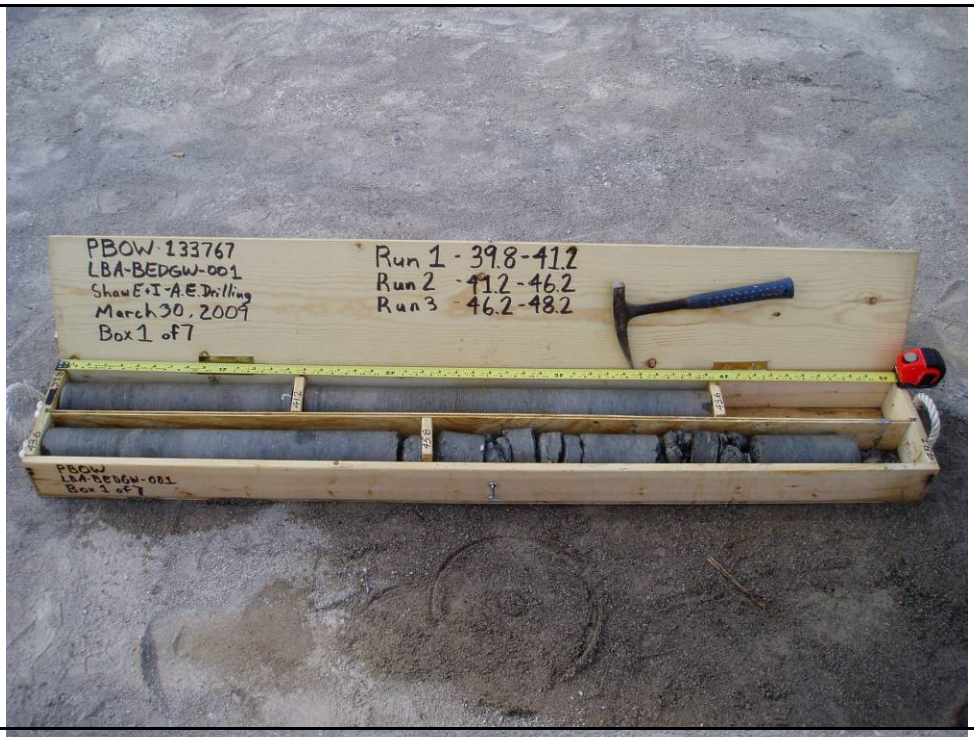
1 of 7

Depth:

39.8’ to 48.2’

Comments:

Photo 1: View of entire box.



Boring:

LBA-BEDGW-001

Box:

1 of 7

Depth:

39.8’ to 48.2’

Comments:

Photo 2: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE | **Project Number: 133767**

Site Name: Former Plum Brook Works | **Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

1 of 7

Depth:

39.8’ to 48.2

Comments:

Photo 3: Close-up view of right portion of box.

Boring:

LBA-BEDGW-001

Box:

2 of 7

Depth:

48.2’ to 57.1’

Comments:

Photo 4: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE | **Project Number: 133767**

Site Name: Former Plum Brook Works | **Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

2 of 7

Depth:

48.2' to 57.1'

Comments:

Photo 5: Close-up view of left portion of box.

Boring:

LBA-BEDGW-001

Box:

2 of 7

Depth:

48.2' to 57.1'

Comments:

Photo 6: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

3 of 7

Depth:

57.1' to 66.0'

Comments:

Photo 7: View of entire box.

Boring:

LBA-BEDGW-001

Box:

3 of 7

Depth:

57.1' to 66.0'

Comments:

Photo 8: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

3 of 7

Depth:

57.1' to 66.0'

Comments:

Photo 9: Close-up view of right portion of box.

Boring:

LBA-BEDGW-001

Box:

4 of 7

Depth:

66.0' to 75.8'

Comments:

Photo 10: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE | **Project Number: 133767**

Site Name: Former Plum Brook Works | **Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

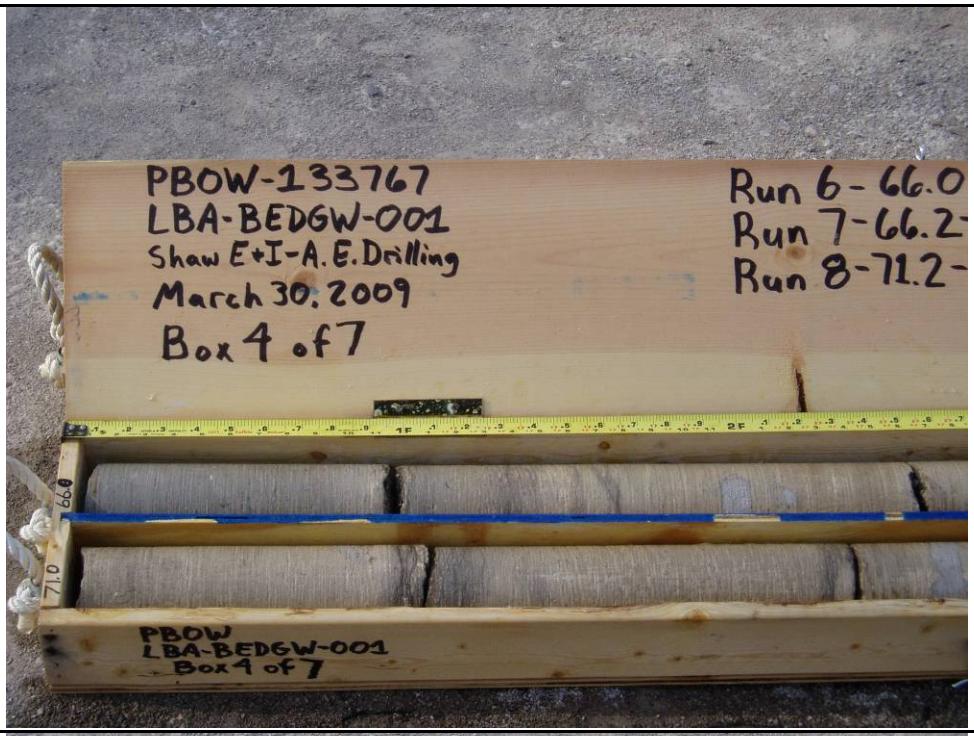
4 of 7

Depth:

66.0’ to 75.8’

Comments:

Photo 11: Close-up view of left portion of box.



Boring:

LBA-BEDGW-001

Box:

4 of 7

Depth:

66.0’ to 75.8’

Comments:

Photo 12: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

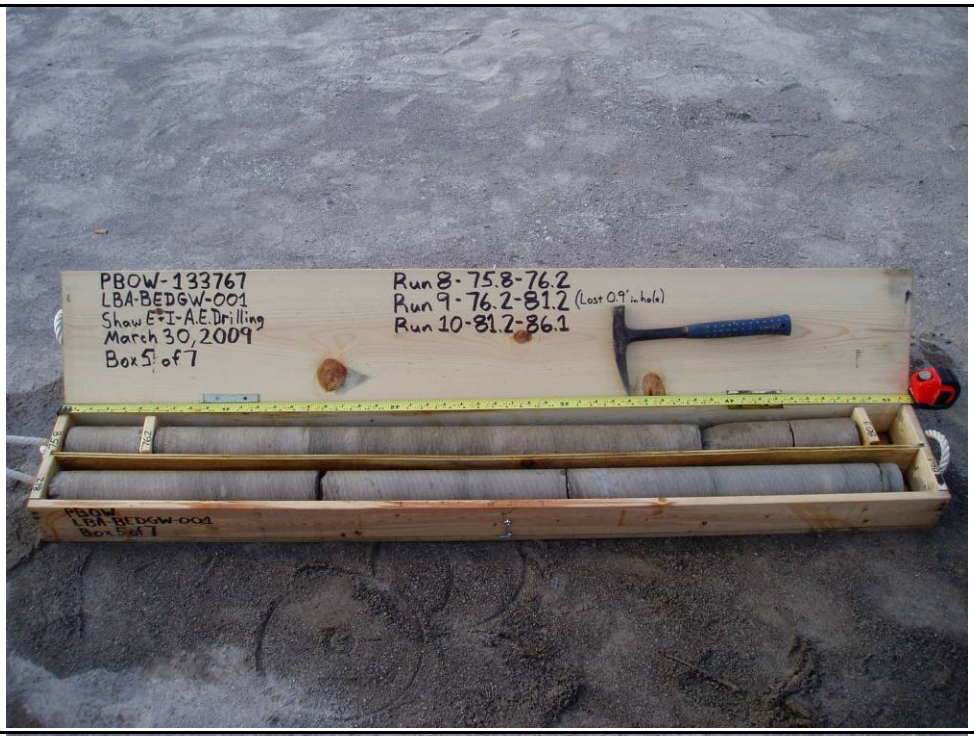
5 of 7

Depth:

75.8' to 86.1'

Comments:

Photo 13: View of entire box.



Boring:

LBA-BEDGW-001

Box:

5 of 7

Depth:

75.8' to 86.1'

Comments:

Photo 14: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

5 of 7

Depth:

75.8' to 86.1'

Comments:

Photo 15: Close-up view of right portion of box.

Boring:

LBA-BEDGW-001

Box:

6 of 7

Depth:

86.1' to 95.6'

Comments:

Photo 16: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

6 of 7

Depth:

86.1' to 95.6'

Comments:

Photo 17: Close-up view of left portion of box.

Boring:

LBA-BEDGW-001

Box:

6 of 7

Depth:

86.1' to 95.6'

Comments:

Photo 18: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

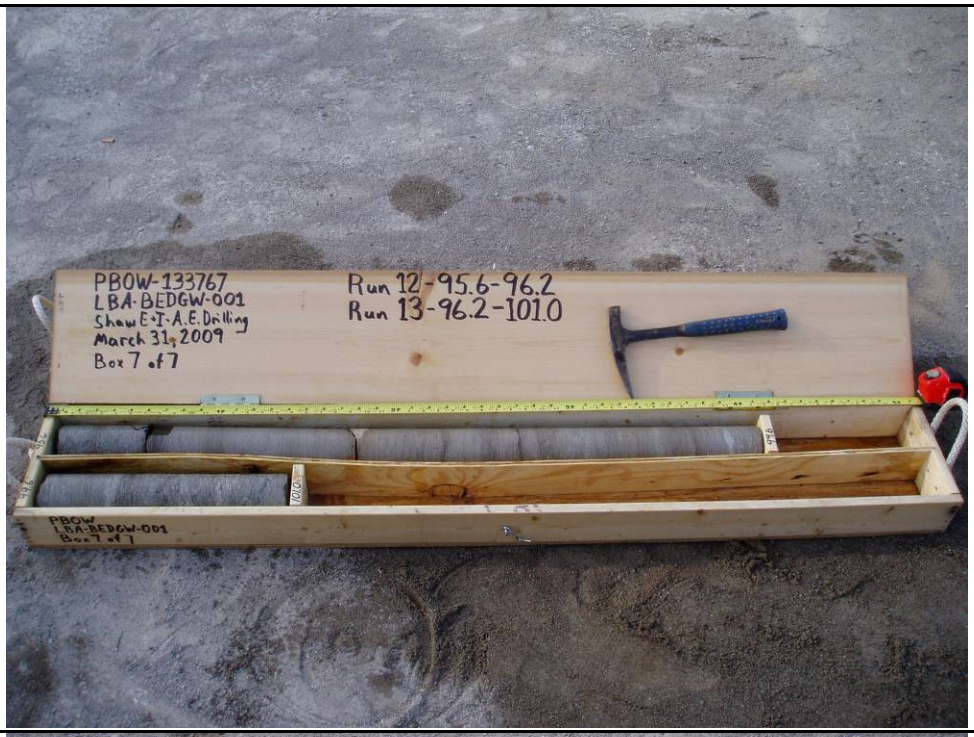
7 of 7

Depth:

95.6’ to 101.0’

Comments:

Photo 19: View of entire box.



Boring:

LBA-BEDGW-001

Box:

7 of 7

Depth:

95.6’ to 101.0’

Comments:

Photo 20: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

LBA-BEDGW-001

Box:

7 of 7

Depth:

95.6’ to 101.0’

Comments:

Photo 21: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

1 of 5

Depth:

41.5’ to 51.1’

Comments:

Photo 1: View of entire box.

Note: Box lid indicates 51.5’, should be 51.1’.

Boring:

RCA-BEDGW-001

Box:

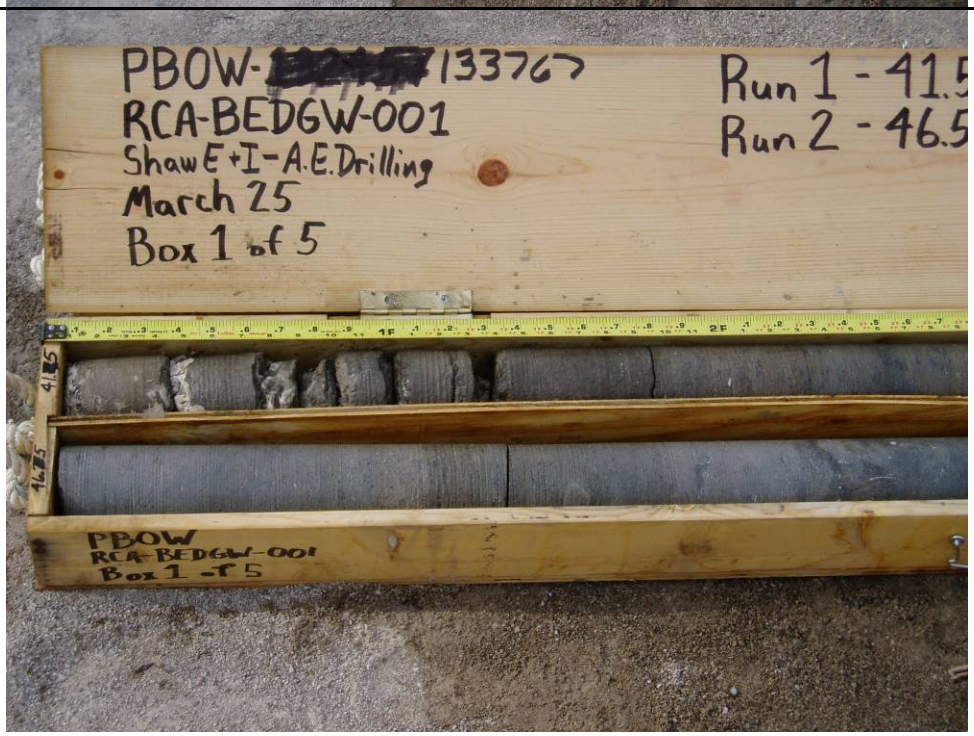
1 of 5

Depth:

41.5’ to 51.1’

Comments:

Photo 2: Close-up view of left portion of box.
Note: Box lid indicates 51.5’, should be 51.1’.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE | **Project Number: 133767**

Site Name: Former Plum Brook Works | **Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

1 of 5

Depth:

41.5’ to 51.1’

Comments:

Photo 3: Close-up view of right portion of box.
Note: Box lid indicates 51.5’, should be 51.1’.

Boring:

RCA-BEDGW-001

Box:

2 of 5

Depth:

51.1’ to 61.1’

Comments:

Photo 4: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE | **Project Number: 133767**

Site Name: Former Plum Brook Works | **Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

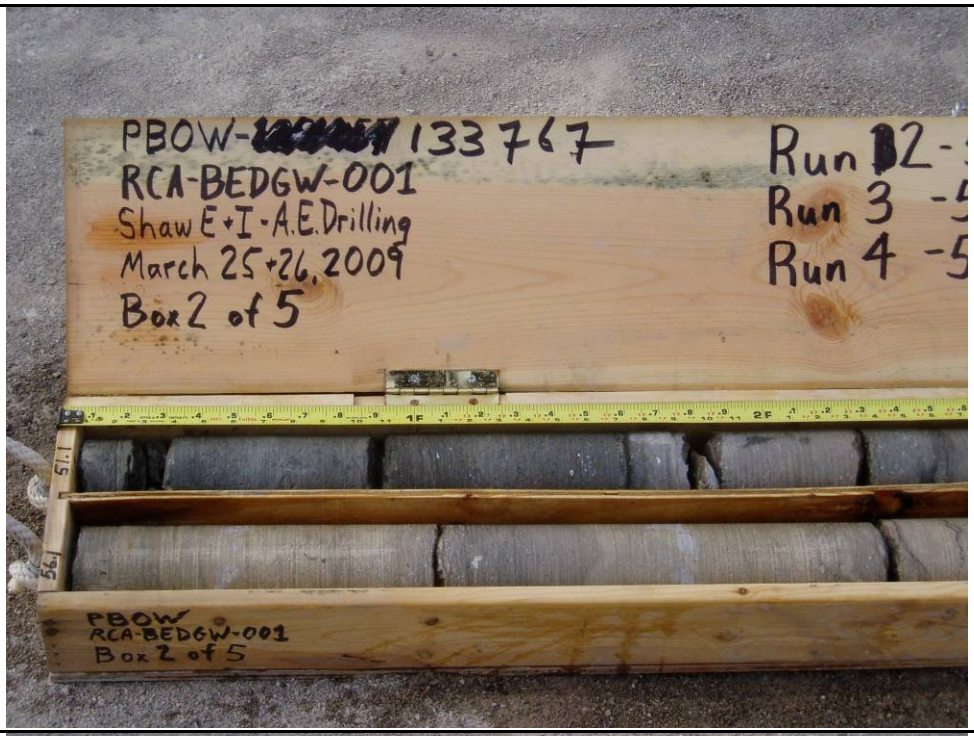
2 of 5

Depth:

51.1' to 61.1'

Comments:

Photo 5: Close-up view of left portion of box.



Boring:

RCA-BEDGW-001

Box:

2 of 5

Depth:

51.1' to 61.1'

Comments:

Photo 6: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

3 of 5

Depth:

61.1' to 69.9'

Comments:

Photo 7: View of entire box.

Boring:

RCA-BEDGW-001

Box:

3 of 5

Depth:

61.1' to 69.9'

Comments:

Photo 8: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

3 of 5

Depth:

61.1' to 69.9'

Comments:

Photo 9: Close-up view of right portion of box.

Boring:

RCA-BEDGW-001

Box:

4 of 5

Depth:

69.9' to 78.8'

Comments:

Photo 10: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

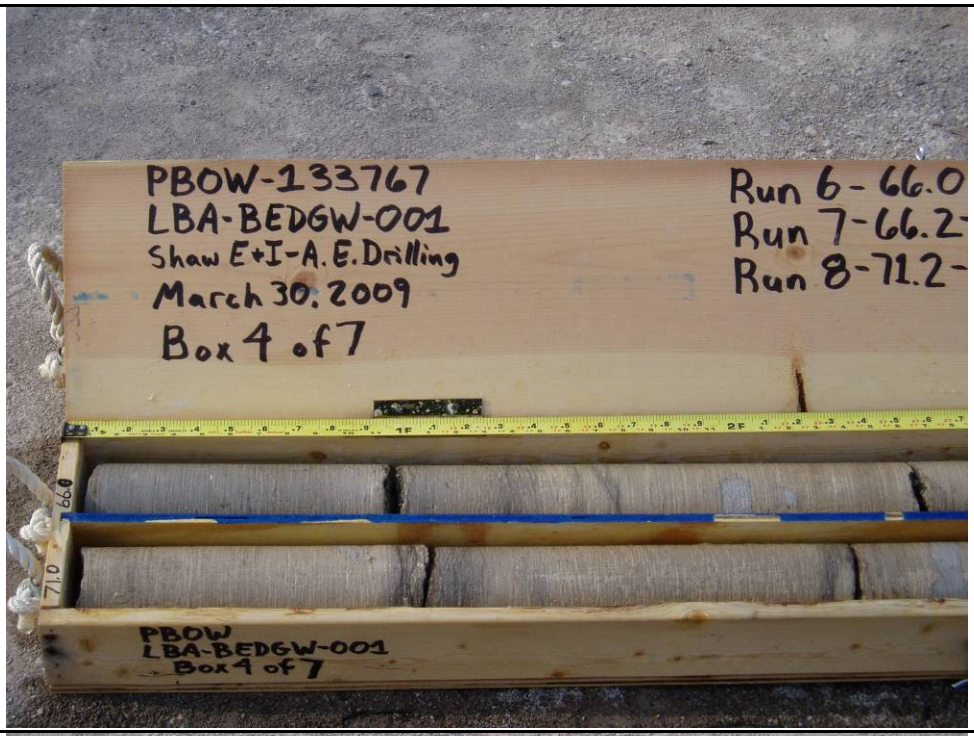
4 of 5

Depth:

69.9' to 78.8'

Comments:

Photo 11: Close-up view of left portion of box.



Boring:

RCA-BEDGW-001

Box:

4 of 5

Depth:

69.9' to 78.8'

Comments:

Photo 12: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-001

Box:

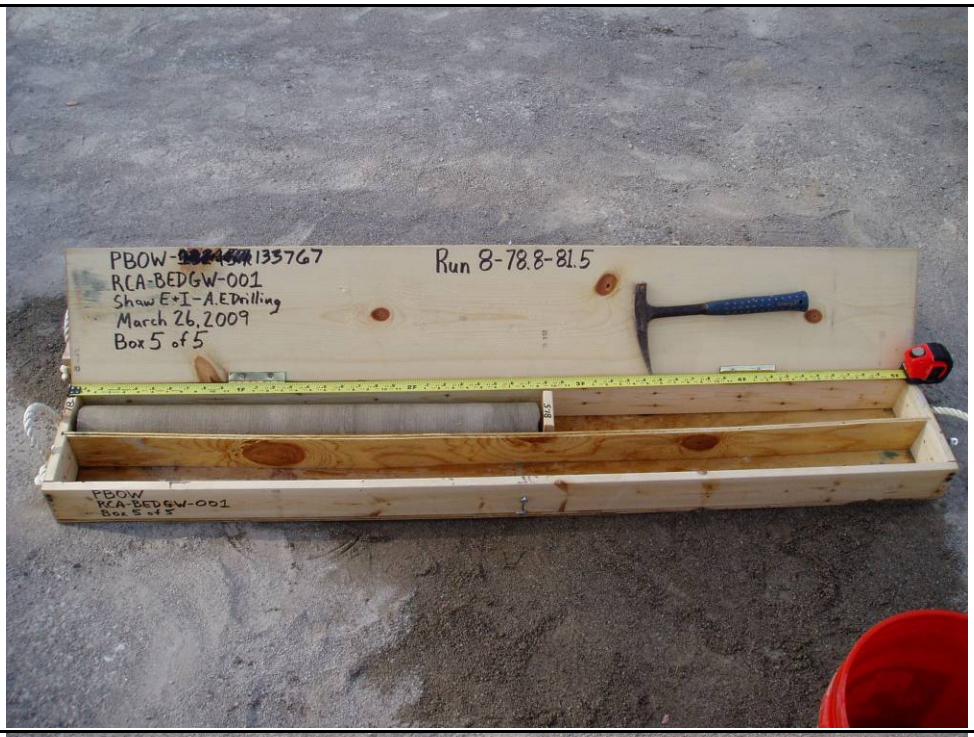
5 of 5

Depth:

78.8' to 81.5'

Comments:

Photo 13: View of entire box.



Boring:

RCA-BEDGW-001

Box:

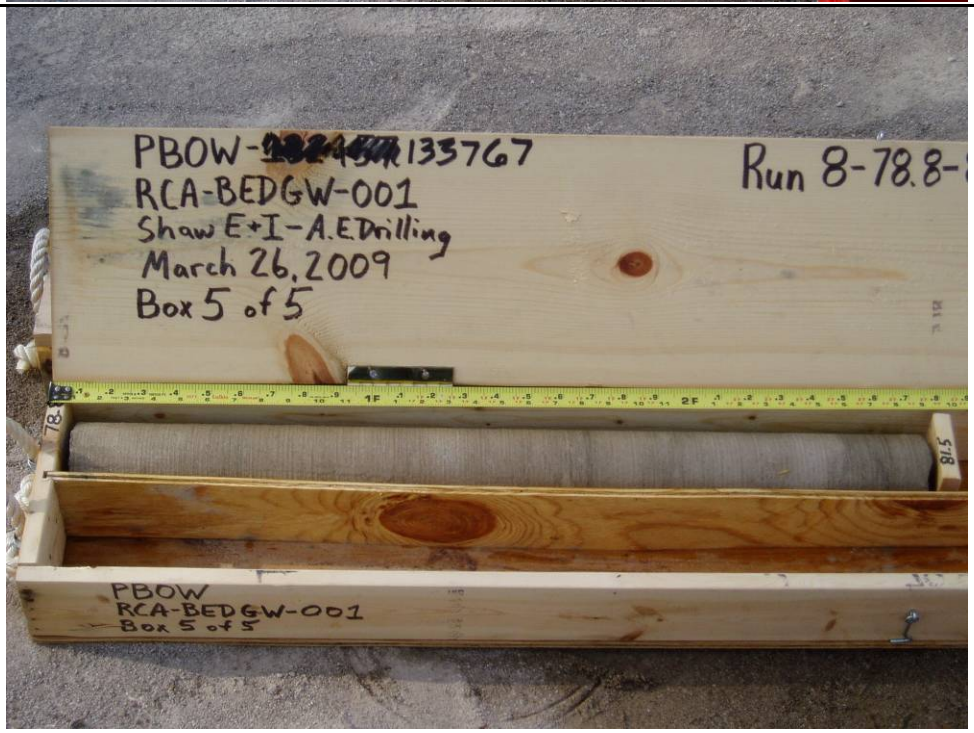
5 of 5

Depth:

78.8' to 81.5'

Comments:

Photo 14: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

1 of 4

Depth:

37.3' to 46.0'

Comments:

Photo 1: View of entire box.

Boring:

RCA-BEDGW-002

Box:

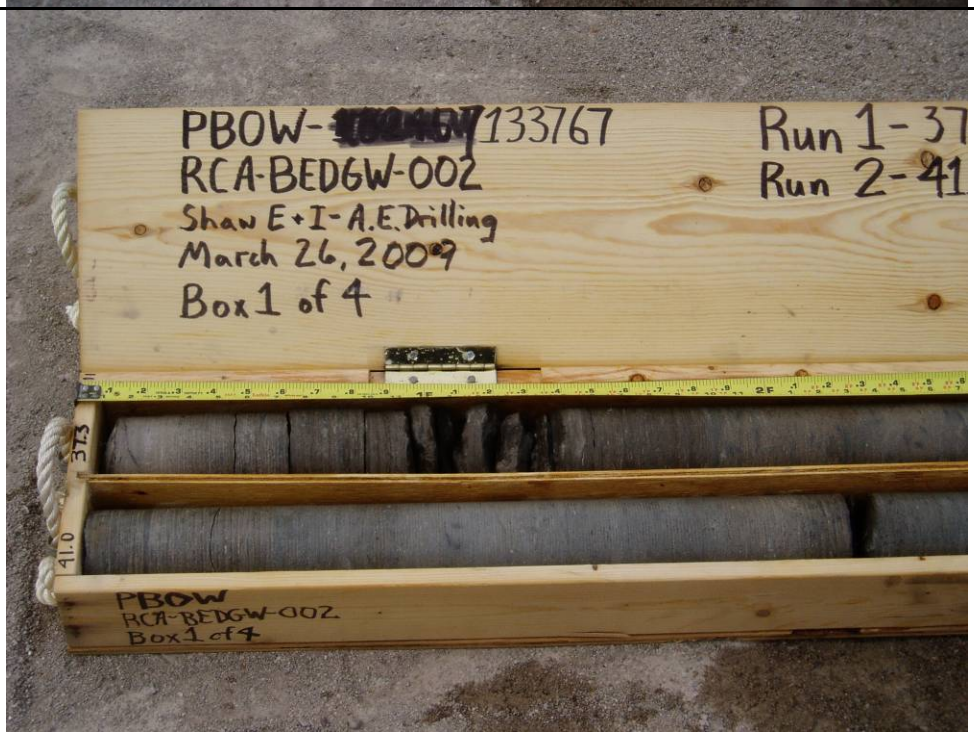
1 of 4

Depth:

37.3' to 46.0'

Comments:

Photo 2: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

1 of 4

Depth:

37.3' to 46.0'

Comments:

Photo 3: Close-up view of right portion of box.

Boring:

RCA-BEDGW-002

Box:

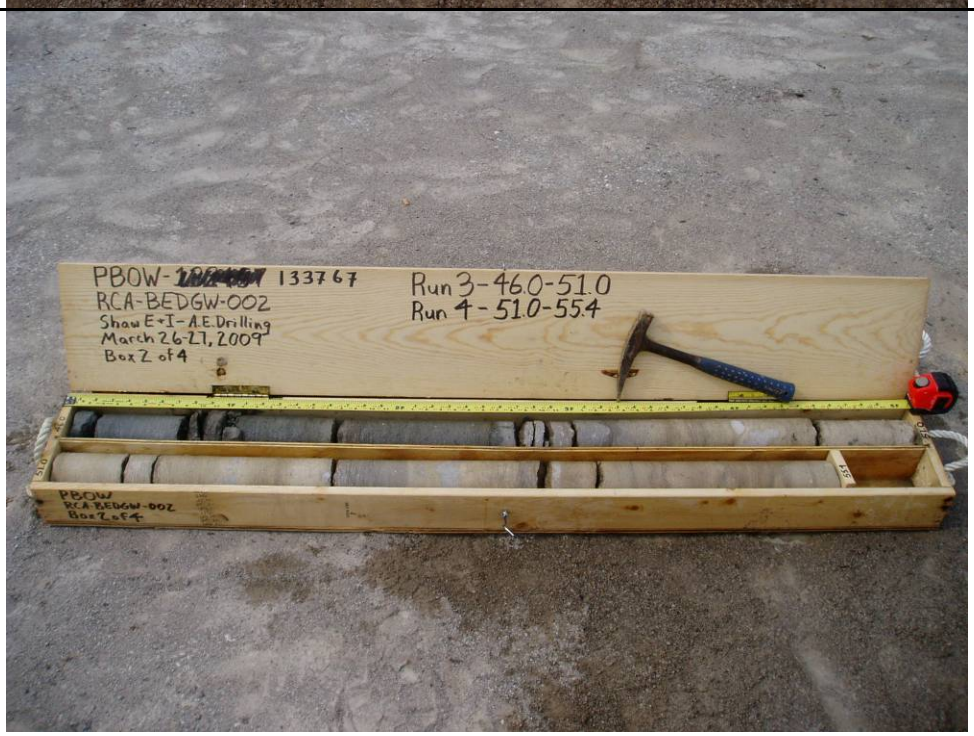
2 of 4

Depth:

46.0' to 55.4'

Comments:

Photo 4: View of entire box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

2 of 4

Depth:

46.0' to 55.4'

Comments:

Photo 5: Close-up view of left portion of box.

Boring:

RCA-BEDGW-002

Box:

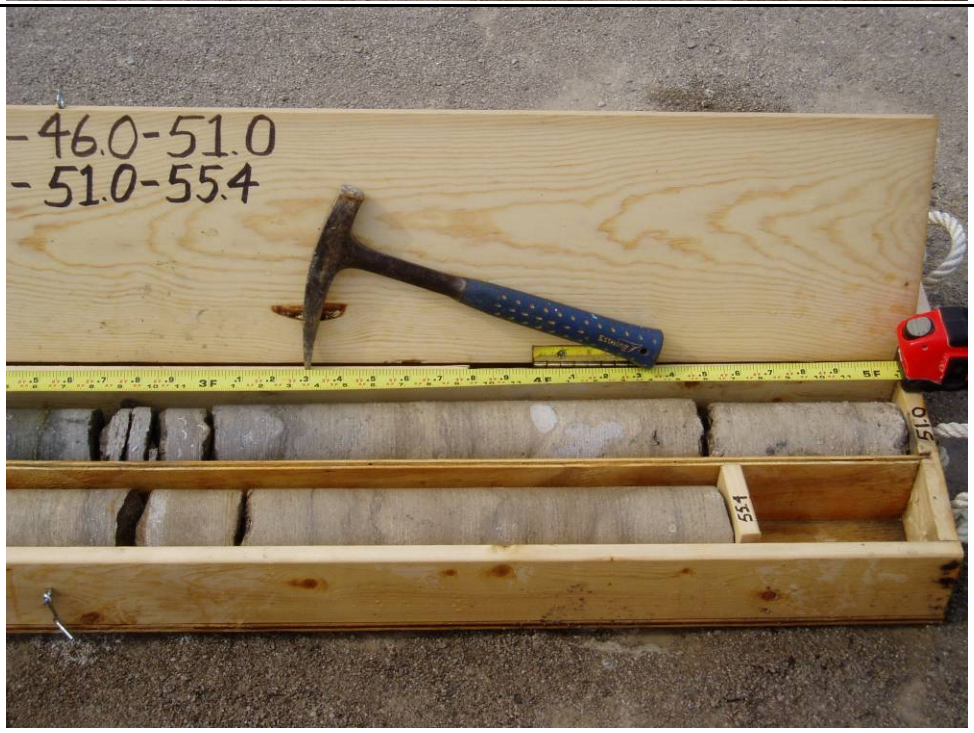
2 of 4

Depth:

46.0' to 55.4'

Comments:

Photo 6: Close-up view of right portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

3 of 4

Depth:

55.4' to 64.4'

Comments:

Photo 7: View of entire box.

Boring:

RCA-BEDGW-002

Box:

3 of 4

Depth:

55.4' to 64.4'

Comments:

Photo 8: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

3 of 4

Depth:

55.4’ to 64.4’

Comments:

Photo 9: Close-up view of right portion of box.

Boring:

RCA-BEDGW-002

Box:

4 of 4

Depth:

64.4’ to 66.0’

Comments:

Photo 10: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-002

Box:

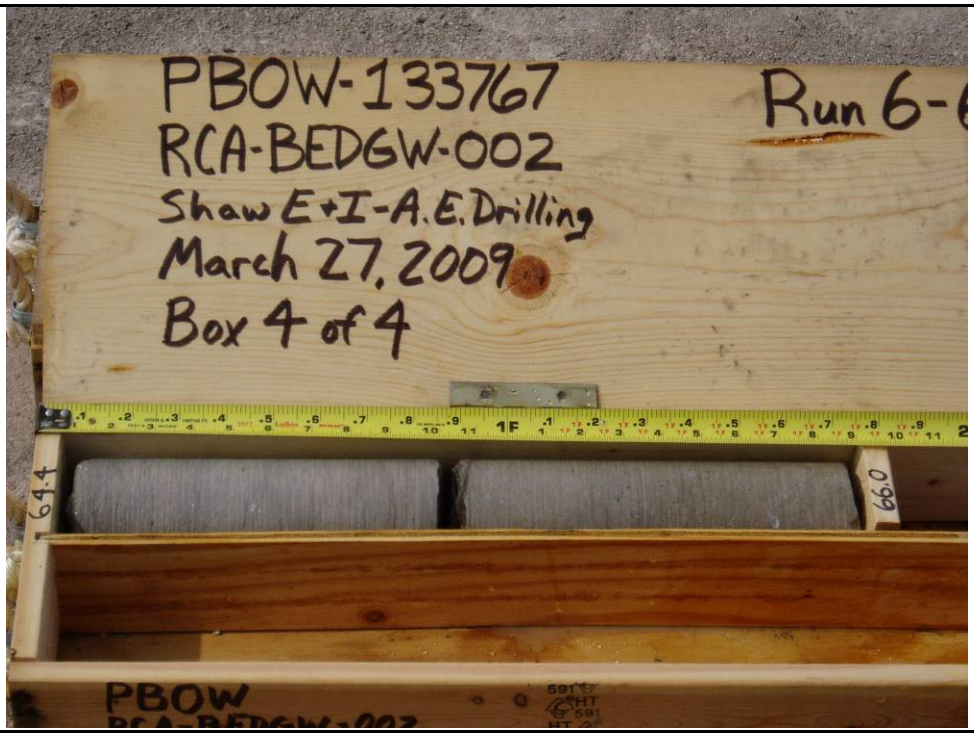
4 of 4

Depth:

64.4' to 66.0'

Comments:

Photo 11: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

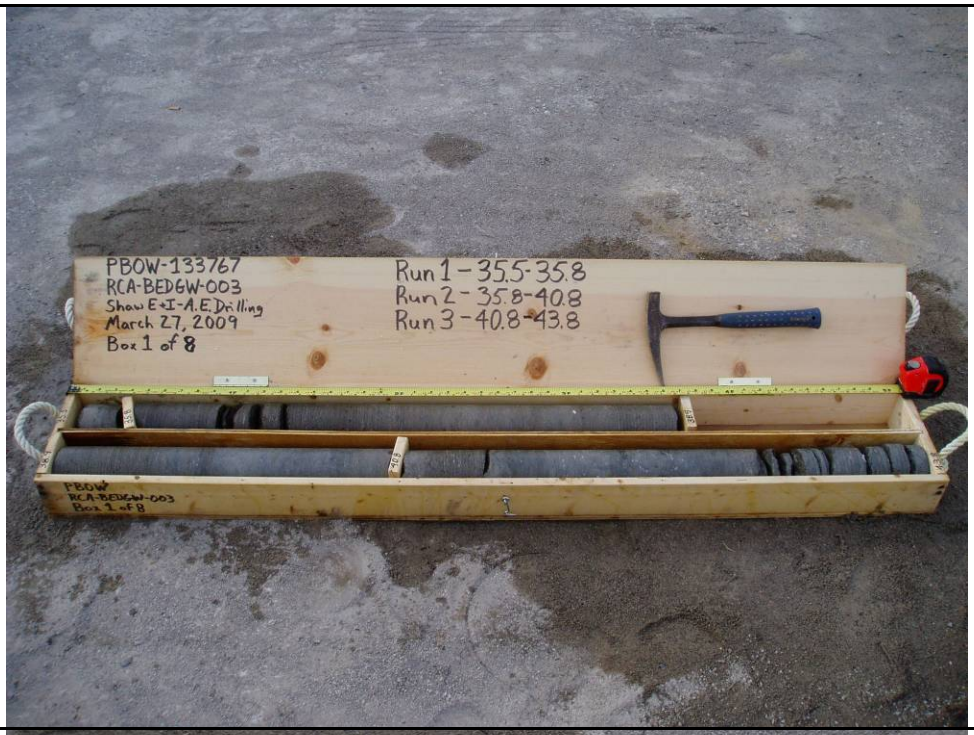
1 of 8

Depth:

35.5’ to 43.8’

Comments:

Photo 1: View of entire box.



Boring:

RCA-BEDGW-003

Box:

1 of 8

Depth:

35.5’ to 43.8’

Comments:

Photo 2: Close-up view of left portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

1 of 8

Depth:

35.5' to 43.8'

Comments:

Photo 3: Close-up view of right portion of box.

Boring:

RCA-BEDGW-003

Box:

2 of 8

Depth:

43.8' to 52.9'

Comments:

Photo 4: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

2 of 8

Depth:

43.8' to 52.9'

Comments:

Photo 5: Close-up view of left portion of box.

Boring:

RCA-BEDGW-003

Box:

2 of 8

Depth:

43.8' to 52.9'

Comments:

Photo 6: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

3 of 8

Depth:

52.9' to 62.7'

Comments:

Photo 7: View of entire box.

Boring:

RCA-BEDGW-003

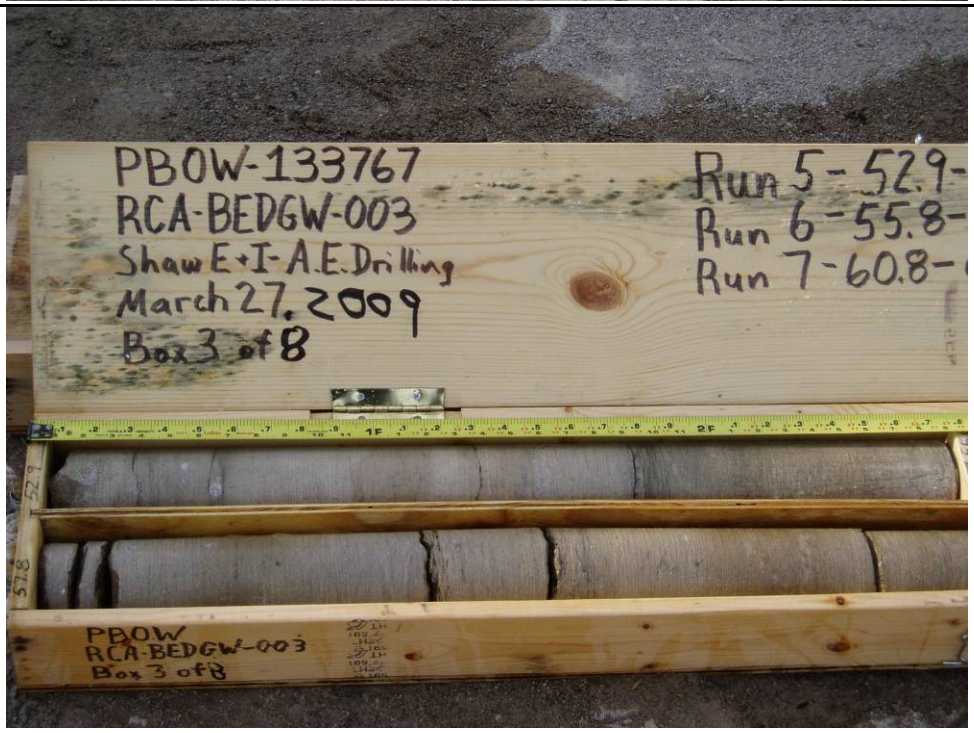
Box:

3 of 8

Depth:

52.9' to 62.7'

Comments:
Photo 8: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

3 of 8

Depth:

52.9’ to 62.7’

Comments:

Photo 9: Close-up view of right portion of box.

Boring:

RCA-BEDGW-003

Box:

4 of 8

Depth:

62.7’ to 71.0’

Comments:

Photo 10: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

4 of 8

Depth:

62.7' to 71.0'

Comments:

Photo 11: Close-up view of left portion of box.

Boring:

RCA-BEDGW-003

Box:

4 of 8

Depth:

62.7' to 71.0'

Comments:

Photo 12: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

5 of 8

Depth:

71.0' to 80.2'

Comments:

Photo 13: View of entire box.

Boring:

RCA-BEDGW-003

Box:

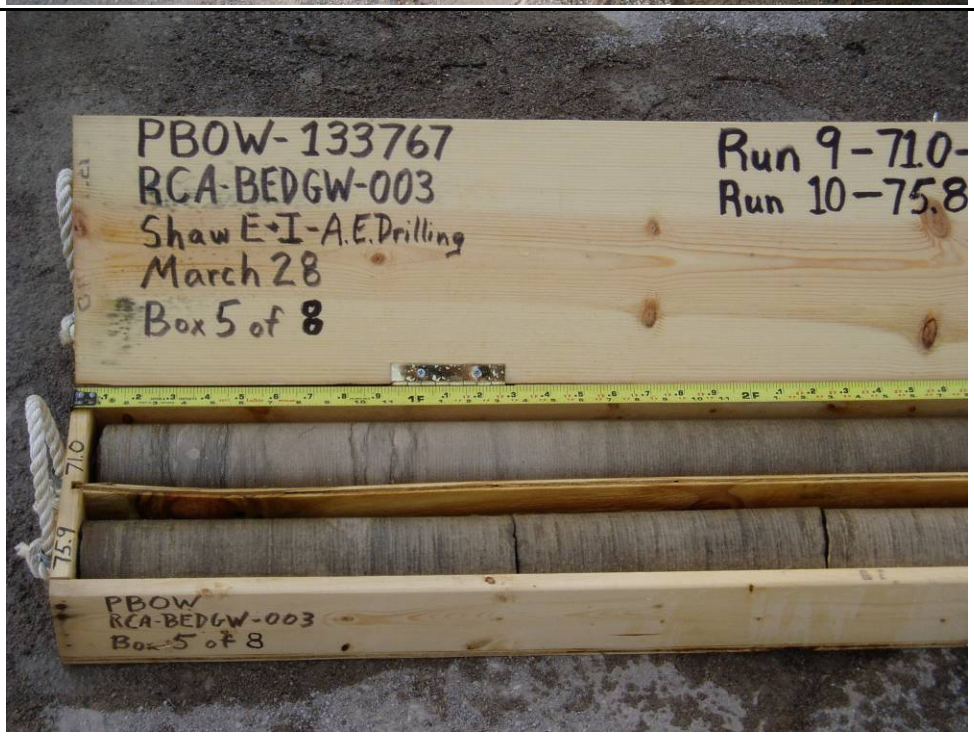
5 of 8

Depth:

71.0' to 80.2'

Comments:

Photo 14: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

5 of 8

Depth:

71.0’ to 80.2’

Comments:

Photo 15: Close-up view of right portion of box.

Boring:

RCA-BEDGW-003

Box:

6 of 8

Depth:

80.2’ to 89.6’

Comments:

Photo 16: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

6 of 8

Depth:

80.2' to 89.6'

Comments:

Photo 17: Close-up view of left portion of box.

Boring:

RCA-BEDGW-003

Box:

6 of 8

Depth:

80.2' to 89.6'

Comments:

Photo 18: Close-up view of right portion of box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

7 of 8

Depth:

89.6' to 98.8'

Comments:

Photo 19: View of entire box.

Boring:

RCA-BEDGW-003

Box:

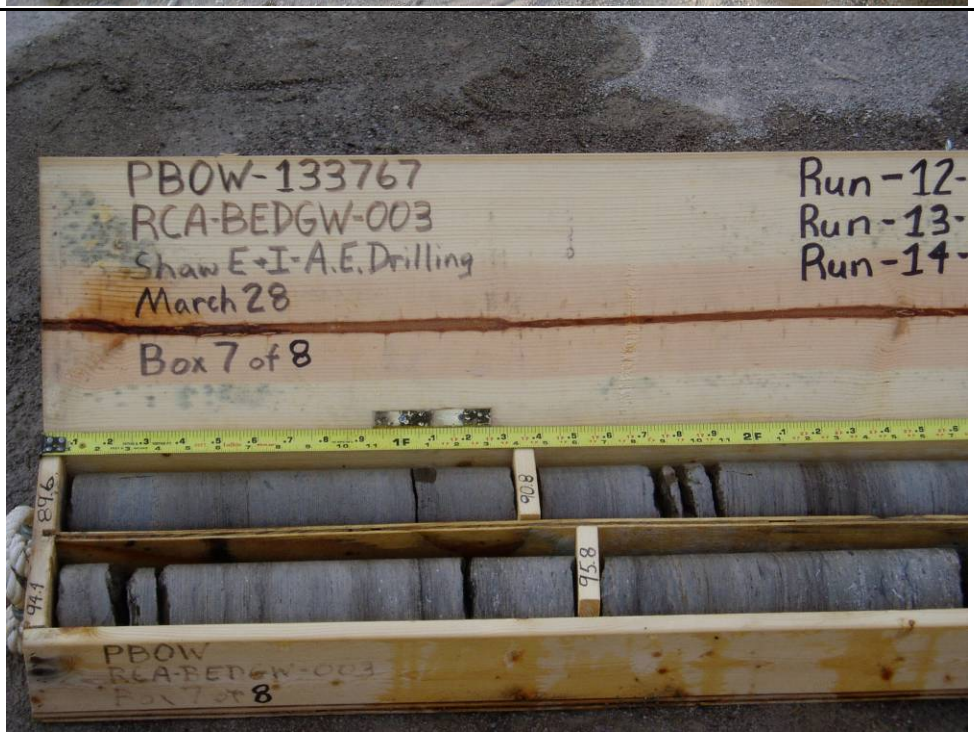
7 of 8

Depth:

89.6' to 98.8'

Comments:

Photo 20: Close-up view of left portion of box.



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

7 of 8

Depth:

89.6’ to 98.8’

Comments:

Photo 21: Close-up view of right portion of box.

Boring:

RCA-BEDGW-003

Box:

8 of 8

Depth:

98.8’ to 105.8’

Comments:

Photo 22: View of entire box.

Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Boring:

RCA-BEDGW-003

Box:

8 of 8

Depth:

98.8’ to 105.8’

Comments:

Photo 23: Close-up view of left portion of box.

Boring:

RCA-BEDGW-003

Box:

8 of 8

Depth:

98.8’ to 105.8’

Comments:

Photo 23: Close-up view of right portion of box.

Shaw E & I, Inc.

APPENDIX E

WELL DEVELOPMENT LOGS AND WELL DEVELOP WATER PHOTOGRAPHS

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBGW
Form Completed by: David Kessler
Well Developed by/firm: David Kessler / Shaw

Site ID: Locomotive House
Location ID: LBA-MW01
Date Started: 4/16/09

Monitoring Well Information

Development Method: Pump / Surge
Development Equipment: Waterra Pump with 1/2" ID x 5/8" OD HDPE tubing, YSI 6820 water quality indicator

Screen Height (ft): 10
Filter pack length (ft): 12
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 5.32
Total depth of Well (ft): 19.02
water column - 13.70 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 13.70 ft x 0.164 gal/ft = 2.25 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (12) ft x (2.46) gal/ft x 0.3 = 8.86 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 8.86 gal + 2.25 gal = 11.11 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
11.11	22.22	33.33	44.44	55.55

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
4/16/09	~~1705~~ ~~1705~~ 1705	0	5.32	—	—	—					Began, Manually surged screen interval
	1715	2.5	10.10	100.1	light br	10.89	7.29	1.240	8.77	151.1	
	1730	5	13.76	102.1	light br	10.83	7.41	1.285	9.31	194.7	
	1740	7.5	15.41	29.1	clear	9.89	7.46	1.162	8.35	162.5	
	1750	9	16.38	—	—	—	—	—	—	—	Generator out of gas.
4/17/09	1030	9	4.61	Static	—	—	—	—	—	—	
	1110	11.5	13.21 (recharging)	117.4	light br	12.54	7.30	1.384	10.35	186.0	Manual surging to obtain water — Waterra Pump Down
stopped	1120	14	16.45	189.0	light br	12.23	7.38	1.308	9.55	182.9	" " "
	1330	14	6.41	—	—	—	—	—	—	—	Waterra pump again

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: Locomotive Bldg
Location ID: LBA-MW01
Date Started: 4/16/09

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
	1340	16.5	12.38	37.8	clear	11.08	7.24	1.330	10.12	77.0	
stopped	1425	~~16~~ 19	~ 10' recharged in absence		—	—	—	—	—	—	Pumped well hard
	1430	21.5	17.35	92.0	clear	11.99	7.53	1.164	8.48	142.3	Pumped slowed, water level recharging
stopped	1445	22.5	17.10	—	—	—	—	—	—	—	Stopped to let well recharge, pump again
	1520	22.5	15.35	Began again	—	—	—	—	—	—	
stopped	1530	23.5	—	—	—	—	—	—	—	—	Left for other activities
	1800	23.5	9.25	Began	—	—	—	—	—	—	Pumped very hard to drain
	1810	27.5	>18.5'	18.2	clear	12.09	7.33	0.966	9.46	256.6	Unable to dry. Recharging well.
	1825	28	>18.5'	stopped.							
4/18/09	1520	28	9.79	—	—	—	—	—	—	—	Began pumping
	1540	29	9.75	14.5	clear	13.66	7.15	1.483	9.64	103.1	Check valve at 18.7'
	1545	30.5	12.72	2.8	clear	10.90	7.11	1.419	9.66	73.7	Increased rate
	1555	33	16.58	1.0	clear	10.71	7.30	1.395	9.97	92.6	— Stopped Development. Increased rate

Water Added: type — volume — (gal.)
Chemical Added: type — volume — (gal.)
Range and Average Discharge Rate: ~340 ml/min
Maximum Drawdown during Development: at gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments: Pumping at a steady state, w/ waterra pump, at 100ml/min 4/18/09 1530

Final Measurements (BTOC)

Total depth of Well (ft): 19.02 ft

Date Completed: 4/18/09

Hours Developed: 3 HR 10 min

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: Plum Brook Ordnance Works
Form Completed by: David Kessler
Well Developed by/firm: David Kessler / Shaw

Site ID: Locomotive Bldg
Location ID: LBA MW02
Date Started: 4/15/09

Monitoring Well Information

Development Method: Wet Pump/Surge
Development Equipment: Waterra Pump w/ 1/2" ID + 5/8" OD HDPE tubing, poly check valve

Screen Height (ft): 10
Filter pack length (ft): 12.5
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 6.05
Total depth of Well (ft): 19.58
water column = 13.53 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 13.53 ft x 0.164 gal/ft = 2.22 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8.25)^2 - (2)^2) = 2.63 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (12.5)ft x (2.63) gal/ft x 0.3 = 9.86 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 9.86 gal + 2.22 gal = 12.08 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
12.08	24.16	36.24	48.32	60.40

Development Record

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1450	0	5.80	Started Pump							
1510	1	10.32	44.9	murky	10.02	7.42	0.605	8.08	77.2	Increased rate, steady
1525	5	13.12	46.7	clearing	8.07	7.32	0.601	7.92	109.7	around 540 ml/min
1555	10	17.40	650.4	light Br	8.70	7.41	0.649	8.04	110.6	Decreased-Increased pump rates
1625	13	19.35	138.5	sl Br	9.08	7.58	0.596	10.47	119.3	Flow rate 345 ml/min
1645	15	19.35	287.0	Br	9.01	7.51	0.590	10.53	148.6	Flow rate 345 ml/min
1720	17.5	19.35	46.0	slightly cloudy	9.28	7.45	0.602	10.49	155.0	" "
1745	20	19.35	31.8	clear	9.09	7.42	0.577	10.70	163.6	Flow rate 305 ml/min
1750	Stopped-ended Development									

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: LBA-MW02
Location ID: Locomotive Bldg
Date Started: 4/15/09

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments

DCK

Water Added: type — volume — (gal.)
Chemical Added: type — volume — (gal.)
Range and Average Discharge Rate: 300 - 540 ml/min
Maximum Drawdown during Development: 19.35 at 345 gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: Drill Water Drum

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 19.59

Date Completed: 4/15/09

Hours Developed: 3 HR

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: BRIAN TILLY
Well Developed by/firm: Shaw E&I / A&E DRILLING

Site ID: LBA
Location ID: BT ~~4~~ LBA-MW03
Date Started: 04-16-2009

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: WATERRA pump, Honda 2000W Generator, YSI 6820 water quality meter 5/8 OD x 1/2 ID tubing (HDPE) Hydrolab w/ indicator

Screen Height (ft): 10'
Filter pack length (ft): 12'
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 7.32
Total depth of Well (ft): 19.31
WC = 11.99

Monitoring Well Purge Calculations

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (4)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 11.99 ft x 0.164 gal/ft = 1.96 gallons

Volume of Water in Filter Pack: 8.25 4
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x (~~64.06~~ BT 60.06)^2 - (0.041)^2) = ~~2.62~~ BT 2.46 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (11.99)ft x (~~2.62~~ BT 2.46) gal/ft x 0.3 = ~~9.42~~ BT 8.84 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ~~9.42~~ BT 8.84 gal + 1.96 gal = 10.80 gal.

SEE CORRECTION SHEET

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
~~10.80~~	BT ~~22.76~~ 21.60	BT ~~34.14~~ 32.40	BT ~~45.52~~ 43.20	BT ~~56.90~~ 54.00

Development Record

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1545		7.04								START SURGE + PURGE
1553	1.0	10.50	4.2	clear	11.26	7.43	0.631	9.07	-35.3	RUN pump @ slow RATE
1558	2.0	12.10	6.9	clear	9.95	7.56	0.614	8.65	-39.3	for 5 min creating a surge
1603	3.0	13.10	10.4	clear	10.14	7.45	0.610	8.23	-34.7	—
1612	5.5	15.10		clear		—	—	—	—	increase full speed + reduce
1615	9.0	17.80	89.1	clear	10.03	7.44	0.656	7.29	-35.8	turbidity.
1620	—	19.80	646.2	~~[illegible]~~	10.64	7.64	0.664	9.34	-44.9	shut down / day
1608	—	8.66								start purge
1613	9.5	9.94	143.2	cloudy	19.65	7.53	0.647	10.16	-43.1	purging @ slow RATE / now increa

4/16 ↓
35 min.
4/18 ↓

NOTE: @ 1616 STOP pump detach tubing from WATERRA, allowing tubing to be lowered to very bottom + purged by hand. This eliminating check value destruction and bringing heavy solids all bottom up.

Shaw
Shaw E & I, Inc.

Well Development Log

CORRECTION SHEET

Project Number: 133 767
Project Name: PBOW
Form Completed by: BRIAN TIEW
Well Developed by/firm: Shaw E&I

Site ID: LBA
Location ID: LBA - MW03
Date Started: 04-16-2009

Monitoring Well Information

Development Method:
Development Equipment:
BT 04-23-2009

Screen Height (ft): 10
Filter pack length (ft): 12
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 7.32
Total depth of Well (ft): 19.31

WC = 11.99

Monitoring Well Purge Calculations

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 11.99 ft x 0.164 gal/ft = 1.96 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8.25)^2- (2)^2) = 2.62 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (11.99)ft x (2.62) gal/ft x 0.3 = 9.42 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 9.42 gal + 1.96 gal = 11.38 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
11.38	22.76	34.14	45.52	56.90

Development Record

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments

BT 04-23-2009

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: LBA
Location ID: LBA - MW03
Date Started: 04 - 16 - 2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
cont. 4/18	1624	11.0	11.82	15.0	clear	13.38	7.45	0.626	11.49	-37.2	flow rate 480 ml/min
	1632	12.0	12.92	6.1	clear	13.06	7.44	0.600	10.62	-36.5	flow rate now 390 ml/min
1 hr. 12 min	1658	14.0	15.4	36.2	clear	15.63	7.58	0.645	11.15	-44.7	—
	1716	16.5	18.7	20.9	clear	12.30	7.58	0.672	10.56	-44.2	increase pump / full speed
	1725	17.0	18.9	—	—	—	—	—	—	—	shut down / dry
4/19	0947	—	14.18	~~67~~	—	—	—	—	—	—	start purge
	0953	18.0	15.8	67.3	semi cloudy	10.30	7.51	0.685	10.83	-38.0	flow rate 1000 ml/min
1 hr 28 min	0958	18.5	17.62	18.7	clear	9.67	7.64	0.655	10.91	-43.2	flow rate 820 ml/min
	1003	19.0	18.40	20.1	clear	9.85	7.52	0.643	10.74	-45.6	collect turbidity sample
—	1115	22.0	18.90	—	—	—	—	—	—	—	shutdown / dry

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: Dry at gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 19.31

Date Completed: 4/19/2009

Hours Developed: 3.25

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: David Kessler
Well Developed by/firm: David Kessler / Shaw

Site ID: Locomotive Bldg
Location ID: LBA-BEDGW-001
Date Started: 4/16/09

Monitoring Well Information

Development Method: Pump / Surge
Development Equipment: Waterra Pump w/ 1/2" ID x 5/8" OD HDPE tubing + poly check valve, YSI 6820.

Screen Height (ft): 15
Filter pack length (ft): 20
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 18.45
Total depth of Well (ft): 103.10
water column = 84.65 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 84.65 ft x 0.164 gal/ft = 13.88 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8)^2 - (2)^2) = 2.46 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (20)ft x (2.46) gal/ft x 0.3 = 14.76 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 14.76 gal + 13.88 gal = _____ gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
28.64	57.28	85.92	114.56	143.20

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
4/16/09	1440	0.0	18.45	—	—	—	—	—	—	—	Pumping/Surging from ~90 ft
	1455	5	49.47	6.0	clear	14.87	8.47	0.624	9.91	184.7	Surged manually 85-100 ft
	1530	10	81.24	216.4	clear	13.87	8.38	0.500	7.98	181.2	Manually surged screen interval
	1600	15	89.40	50.1	murky br	13.00	8.31	0.572	6.61	161.2	
	1630	20	98.90	28.1	clear	13.82	8.04	0.825	7.88	180.7	
	1640	23	102.20	—	—	—	—	—	—	—	Dry
4/17/09	1030	23	99.41	~~Static~~	—	—	—	—	—	—	
	1450	23	99.35	~~Static~~	—	—	—	—	—	—	
	1510	23		Unable to bring water to surface. (Removed tubing, cleaned check valve, still unable).							

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: Locomotive Bldg
Location ID: LBA-BEDGW-001
Date Started: 4/16/09

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
4/18/09										
1605	23	98.62	—	—	—	—	—	—	—	
1615	24	102.74	4.3	clear	12.91	7.78	0.891	8.54	153.0	
1618	~~Dry~~ 24.5	Dry	—	—	—	—	—	—	—	Stopped development. End

DKL 4/18/09

Water Added: type — volume — (gal.)
Chemical Added: type — volume — (gal.)
Range and Average Discharge Rate: NA
Maximum Drawdown during Development: Dry at — gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments: Due to length of recharge time, will develope no more. Obtained water sample before dry. (4.3 NTU) Consider well developed.

Final Measurements (BTOC)

Total depth of Well (ft): 103.33 ft

Date Completed: 4/18/09

Hours Developed: 2 Hr 18 min

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: Brian Tiell / David Kessler
Well Developed by/firm: Shaw E+I

Site ID: LBA - BCDGW 002
Location ID: BT LBA-BCDGW 002
Date Started: 04-02-2009

Monitoring Well Information

Development Method: Surge / Purge
Development Equipment: Waterra Pump w/ 1/2" ID / 5/8" OD HDPE tubing

Screen Height (ft): 15'
Filter pack length (ft): 19.8'
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 35.09
Total depth of Well (ft): 72.41
water column = 37.32 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.163 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 37.32 ft x 0.163 gal/ft = ~~37.16~~ 6.08 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((~~36~~ 6")^2 - (~~4~~ 2")^2) = ~~1.28~~ 1.31 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (19.8)ft x (1.31) gal/ft x 0.3 = 7.78 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 7.78 gal + 6.08 gal = 13.86 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
13.86	27.72	41.58	55.44	69.30

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
04/02	1324	0.0	33.83		clear						START surge + purge
21 min	1330	2.0	45.20	328.7	light gray	13.94	8.57	0.390	8.73	-99.8	
	1335	4.0	44.20	471.1	light gray	13.70	8.62	0.425	9.32	-101.3	flowrate 580 ml/min
	1345	10.0	68.72	Let Recharge + START AGAIN							Shut down
04/02	1420	0	61.30								RESTART
	1430	15.0	69.20	865	cloudy	13.54	7.45	1.594	5.21	-36.4	pump set low speed
20 min	1433	—	70.85	137.7	cloudy	13.18	8.11	0.608	8.72	-72.4	Black Tint SULFUR smell
	1440	16.0	72.40	water AT SHUT DOWN STILL HAD A black TINT / cloudy							SHUT DOWN / DRY
	—	—	—	—	—	—	—	—	—	—	—

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: LBA
Location ID: LBA - BedGW-002
Date Started: 04-02-2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
4/14	1125	16.0	44.15								Start purge
	11.30	20.0	60.53	20.7	clear	11.53	6.42	7.809	2.67	-7.8	strong sulfur odor
20 min.	1135	22.0	63.72	7.8	clear	11.42	7.07	5.492	1.99	-15.7	1520 ml/min
	1140	24.0	67.82	6.7	clear	11.26	7.04	6.435	2.21	-14.3	1440 ml/min
	1145	25.0	72.85	15.8	clear	11.30	7.01	8.264	2.16	-12.2	SHUT DOWN DRY
4/15/09	0935	25.0	68.25	Static							Continued - Begun 1055
	1100	25.5	70.98	66.7	clear but black	10.70	7.12	7.684	5.25	-179.8	
15 min	1115	26.0	72.1	Dry	—	—	—	—	—	—	
	1300	26.0	71.38	—	—	—	—	—	—	—	
	1305	26.5	72.15 (Dry)	—	—	—	—	—	—	—	
	1730	26.5	70.64	—	—	—	—	—	—	—	
4/16/09	0930	26.5	69.97								
	0935	26.55	72.00 (Dry)	175.9	Black	12.47	7.18	8.000	4.40	-184.9	Distinct HC odor

Complete

No photograph of water.

Water Added: type — volume — (gal.)
Chemical Added: type — volume — (gal.)
Range and Average Discharge Rate: unknown
Maximum Drawdown during Development: Dry at — gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: 1

Final Measurements (BTOC)

Total depth of Well (ft): 72.92
Date Completed: 4/16/09
Hours Developed: 1.15 HR

Comments: ON 4/14 during well purge notice a sheen on developement water.
Well recovered only 2.18 ft in 20.5 hrs. Well considered complete. No picture.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

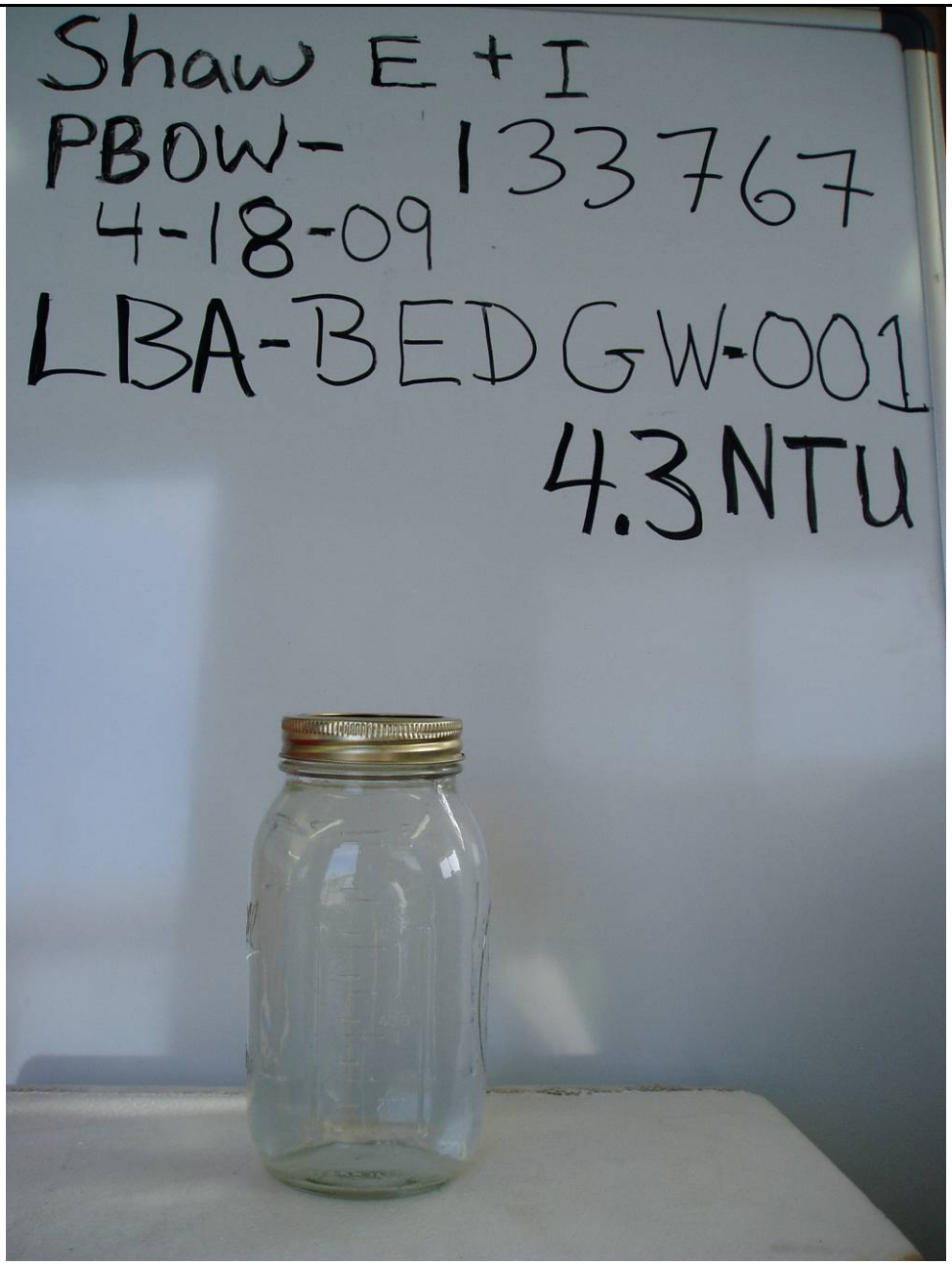
LBA-BEDGW-001

Date:

April 18, 2009

Final reading:

4.3 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

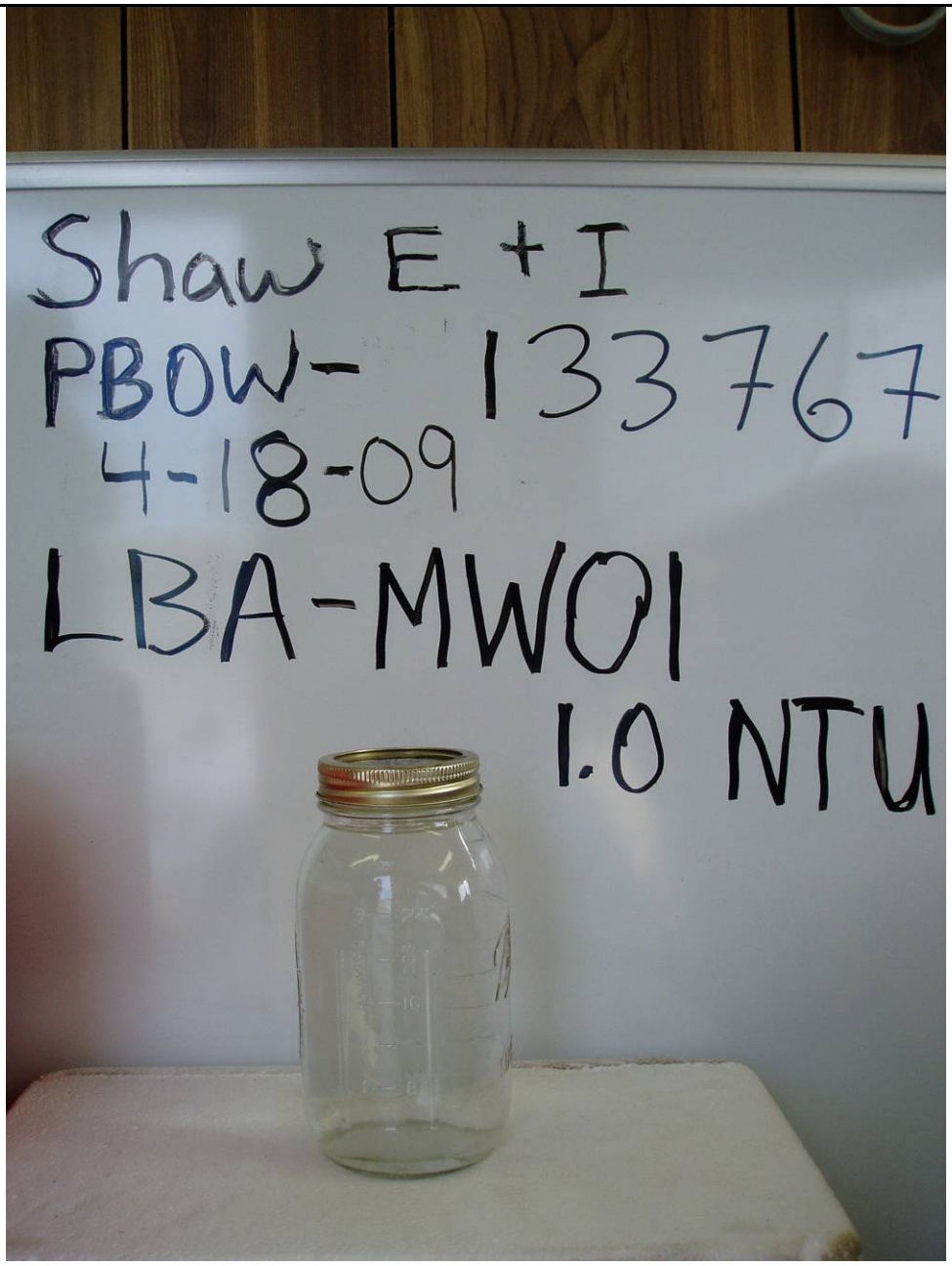
LBA-MW01

Date:

April 18, 2009

Final Reading:

1.0 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

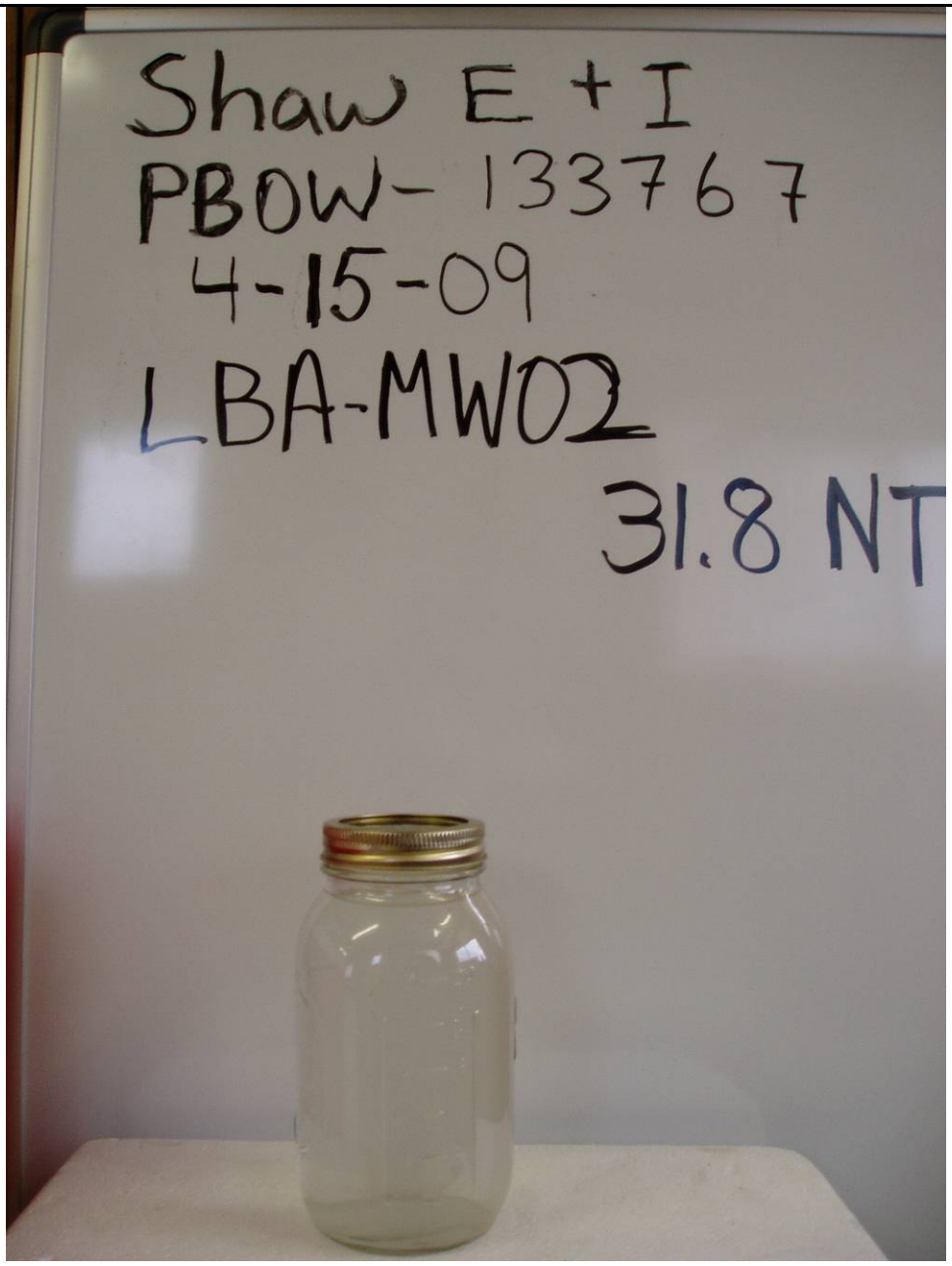
LBA-MW02

Date:

April 15, 2009

Final Reading:

31.8 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

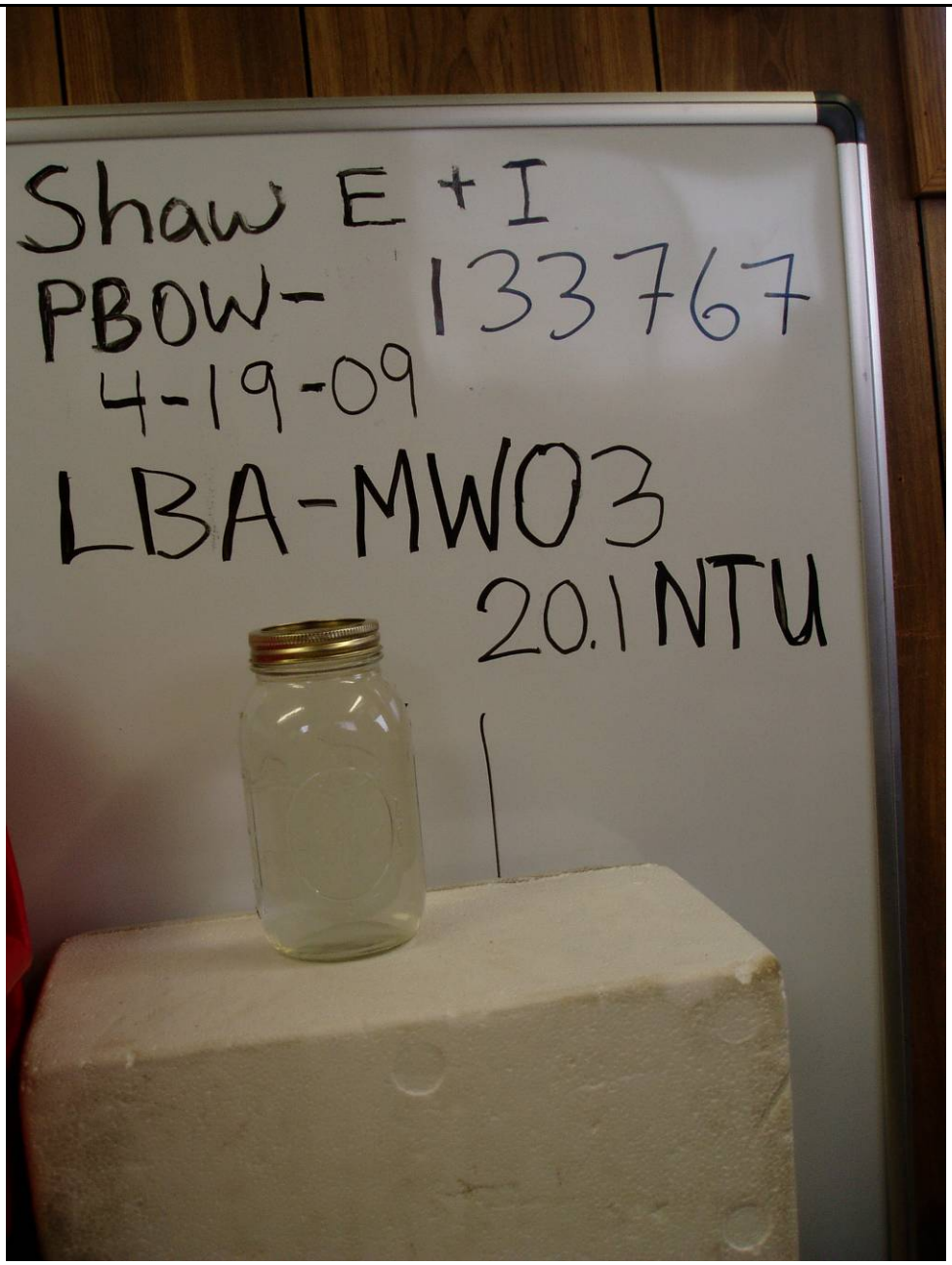
LBA-MW03

Date:

April 19, 2009

Final Reading:

20.1 NTU



Shaw E & I, Inc.

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: Brian Tiell
Well Developed by/firm: Shaw E&I

Site ID: RCA
Location ID: RCA - MW01
Date Started: 03-31-2009

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: watera pump
Hand a 2000W generator, YSI 6820 water quality meter, Hydron WL indicator, 5/8 OD 1/2 ID HDPE tubing

Screen Height (ft): 4.6
Filter pack length (ft): 6.5
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 6.80
Total depth of Well (ft): 11.52
WC = 4.72

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 4.72 ft x 0.164 gal/ft = 0.77 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8.25)^2- (2)^2) = 2.62 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (4.72)ft x (2.62) gal/ft x 0.3 = 3.70 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 3.70 gal + 0.77 gal = 4.47 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
4.47	8.94	13.41	17.88	22.35

Development Record

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1610	0.0	6.80		start	slow	+ create	surge			start surge + purge
1622	0.5	7.22	11.0	clear	8.88	7.41	0.590	11.47	-37.7	speed up pump
1626	1.0	8.30	40.1	clear	7.99	7.41	0.594	11.19	-36.3	pump full speed
1630	3.0	9.54	19.1	clear	7.85	7.30	0.686	10.89	-30.2	flow rate 620 ml/min
1638	4.0	10.95	—	clear	—	—	—	—	—	shut down / dry
1700	0.0	10.64	slow recharge			move	to next well			—
1625	0.0	7.00	—	—	—	—	—	—	—	start purge
1635	5.0	—	13.9	clear	10.75	7.54	0.588	10.35	-40.1	—
1640	5.5	10.40	14.7	clear	9.26	7.51	0.610	10.91	-31.4	—

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - MW01
Date Started: 03-31-2009

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1645	6.5	11.00	17.8	clear	9.30	7.48	0.660	10.95	-359	SHUT DOWN / DRY

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: — at — gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: 1

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 11.52

Date Completed: 04-1-2009

Hours Developed: 1 hr. 10 min.

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: Brian Tiell
Well Developed by/firm: Shaw E+I

Site ID: RCA
Location ID: RCA-MW02
Date Started: 03-27-09

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: Waterra pump, Honda 2000 W. Gen., YSI 6820, Huron Waterlevel indicator, 5/8" OD x 1/2" ID HDPE tubing

Screen Height (ft): 10'
Filter pack length (ft): 13.5
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 10.13
Total depth of Well (ft): 30.49
WC = 20.36

Monitoring Well Purge Calculations

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 20.36 ft x 0.164 gal/ft = 3.33 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((~~6~~ 8.25 / 8.06)^2 - (~~2~~ 2 / 4)^2) = 2.62 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (13.5) ft x (2.62) gal/ft x 0.3 = 10.61 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 10.61 gal + 3.33 gal = 13.94 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
13.94	27.88	41.82	55.76	69.70

Development Record

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1710	0	10.13	Initial water Quality High in silt / Dark Brown							
—	Shut down / Dry		—	—	—	—	—	—	—	—
1726	8 gal	29.80	Water Quality remains Dark Brown throughout development process							
1124	—	22.11	Pump rate slow Surging for 10 min. No water flow start Surge							
1145	—	22.01	—	—	—	—	—	—	—	Begin purge
1208	—	—	Dark Brown	Pump full speed			—	—	—	begin water flow
1215	~~13.0~~ 11.0	26.80	gray	1179.0	11.22	7.64	0.858	8.76	~~-47.3~~	—
1224	13.0	29.60	gray	water turbidity remains high				—	—	shut down / Dry

3/27 ↓
10 min.
3/27 ↑
3/28 ↓
hr.
3/28 ↑

Top of 2" casing 2.85' above ground level 03-28-09

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA-MW02
Date Started: 03-27-2009

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
3/30 1707	0.0	14.35	—	—	—	—	—	—	—	START surge+purge
8 min. 1712	16.0	23.70	467.5	Brown	11.70	7.41	1.799	7.40	-35.6	—
1718	19.0	27.75	1170.9	Brown	11.43	7.54	1.256	8.74	-42.9	Pump full speed
3/30 1725	20.0	29.90	High	Brown	—	—	—	—	—	stop purge / Dry
1/1/09 1154/1305	0.0	15.86/15.59	High	Brown	—	—	—	—	—	START PURGE
5 min 1315	22.0	21.92	270.5	light gray	12.16	7.52	1.451	8.06	-39.4	flow rate 1080 ml/min
1320	23.0	24.25	346.4	light gray	11.77	7.52	1.755	9.16	-39.0	set pump full speed to dry
1340	25.0	30.12	STILL	light gray	—	—	—	—	—	SHUT DOWN / Dry
1/2 ~~22.92~~ 1130	0.0	22.92	—	—	—	—	—	—	—	start surge + purge
1135	26.0	24.40	640.7	gray	13.86	7.68	1.266	9.48	-48.9	—
0 min. 1140	26.5	25.0	1134.7	gray	12.52	7.69	1.198	9.60	-48.9	increase pump full speed
1150	29.0	29.9	High	gray	—	—	—	—	—	SHUT DOWN / DRY
—	Turbidity still high pump down full speed to dry + let recharg.									

Water Added: type_____ volume_____ (gal.)
Chemical Added: type_____ volume_____ (gal.)
Range and Average Discharge Rate: _____
Maximum Drawdown during Development: _____ ft _____ gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: _____

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): _____

Date Completed: _____

Hours Developed: _____

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - MW02
Date Started: 03-27-2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
04/03	1008	29.0	22.62	—	—	—	—	—	—	—	START PURGE
	1020	30.0	—	476.2	milky cloudy	12.20	7.62	1.375	9.94	-44.6	INCREASE flow pumpe 50%
7 min.	1025	31.5	26.20	1302.3	GRAY	11.42	7.57	1.582	10.30	-41.9	increase flow speed
	1035	33.0	30.1	—	GRAY	—	—	—	—	—	STOP Pump Dry
4/15	0945	—	8.70	—	—	—	—	—	—	—	START purge
	0950	34.0	14.10	149.0	cloudy	10.47	7.12	1.809	6.41	-20.9	980 ml/min
0 min.	~~1000~~ 0955	35.0	17.40	176.6	light gray cloudy	9.85	7.29	1.876	6.38	-25.7	increase flow 1000 ml/min
	1000	36.0	22.4	113.2	cloudy	9.61	7.29	1.886	6.35	-26.1	920 ml/min
	1015	40.0	30.10		SHUT GRAY	DOWN	/ DRY	—	—	—	increase full speed e 100 e
4/16	1040	—	19.02	1st	1/2 gal. water	looks	clear		—	—	start purge
	1050	41.0	22.3	201.7	light GRAY	12.32	7.59	1.293	10.08	-44.0	water clouding
	1055	41.5	22.9	169.8	light GRAY	11.32	7.64	1.179	9.88	-44.6	remain cloudy
	1100	42.0	23.5	299.8	GRAY	10.96	7.57	1.212	9.94	-40.6	—

ot. P94

Water Added: type_____ volume_____ (gal.)
Chemical Added: type_____ volume_____ (gal.)
Range and Average Discharge Rate: _____
Maximum Drawdown during Development: _____ at _____ gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: _____

Comments:

Final Measurements (BTOC)

Total depth of Well (ft):

Date Completed:

Hours Developed:

Shaw
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Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - MW02
Date Started: 03-27-2009

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1110	44.0	27.1	58.6	Semi clear	11.16	7.52	1.192	7.74	-37.6	Raise tubing up 3' from bottom
1115	44.5	27.9	115.2	semi clear	11.44	7.57	1.244	10.18	-41.5	well dry @ this level
1123	—	28.1	76.7	clear	11.03	7.51	1.239	10.93	-37.2	lower tubing to bottom
1127	45.0	30.2	1005.2	gray	10.81	7.45	1.397	7.31	-34.3	shut down / dry
1045	49.0	22.50	62.2	semi clear	13.39	7.42	1.241	8.85	-34.7	collect Turbidity Sample
	Note: drain well with check valve + tubing total 4 gal on 4/17									
1050		Total Time on 4/17 = 5 min.								

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: — at — gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 30.50
Date Completed: 4-17-09
Hours Developed: 4.46

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Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: Brian Tiell
Well Developed by/firm: Shaw E+I

Site ID: RCA
Location ID: RCA-MW03
Date Started: 03-27-2009

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: Waterra pump, Honda 2000W Gen., YSI 6820, Huron-water level indicator, 5/8 OD x 1/2 ID HDPE tubing

Screen Height (ft): 10'
Filter pack length (ft): 13.0
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 16.33
Total depth of Well (ft): 30.46
WC = 14.13

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (4")^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 14.13 ft x 0.164 gal/ft = 2.31 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((68.06)^2 - (4)^2) = 2.62 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (13.0)ft x (2.62) gal/ft x 0.3 = 10.21 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 10.21 gal + 2.31 gal = 12.52 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
12.52	25.04	37.56	50.08	62.60

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
3/27 ↓	1805	—	16.33	High	—	—	—	—	—	—	START Surge & purge
10 min.	1810	5.0	29.00	920.2	gray	11.53	7.85	0.625	5.66	-59.1	
3/27 ↑	1815	7.0	28.92	High	gray cloudy	well	recoved	Approx. 1'	in 5	min.	Shut down / well Dry
3/28 ↓	0954	7.0	20.19	—	—	—	—	—	—	—	start purge
	1000	8.0	23.91	528.1	light gray	10.71	7.73	0.605	7.58	-54.1	flowrate 1400 ml/min
6 min.		—	25.50	increase	pump	rate	full	speed			1600 ml/min
	1005	11.0	28.52	579.2	gray	10.63	7.89	0.611	6.18	-61.3	—
3/28 ↑	1010	12.0	30.15	well	clearing	w/	some	silt	remaining		Shut down / Dry

Top of 2" casing 2.2' from ground level. 3/28/09

Shaw
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Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA-MW03
Date Started: 03-27-2009

3/31

2 min.

/1

.0 min.

4/2

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
0955	0.0	12.45	—	—	—	—	—	—	—	start purge
0958	15.0	20.49	367.6	cloudy	10.03	7.68	0.585	7.44	-55.3	pump full speed
1000	15.0	22.60	High	Light gray	—	—	—	—	—	pump down / generator problem
1030	—	22.10	—	—	—	—	—	—	—	Restart
1035	18.00	27.10	243.0	Light gray	10.66	7.93	0.610	8.63	-66.4	—
10.37	18.5	29.98	—	—	—	—	—	—	—	shut down
1540	0.0	16.62	—	—	—	—	—	—	—	start purge
1550	20.0	21.70	502.7	light gray	12.49	7.85	0.601	4.87	-57.4	
1552	20.5	23.80	264.2	light gray	11.55	7.89	0.597	6.56	-59.3	increase full speed
1557	22.0	28.20	147.8	cloudy	11.57	7.90	0.602	7.05	-59.9	—
1600	28.5	30.10	—	cloudy	—	—	—	—	—	Shut down/dry
1035	21.03 →		—		—	—	—	—	—	start purge
1040	30.0	23.50	559.3	light gray	12.73	7.88	0.614	8.21	-60.9	—

Water Added: type_____ volume_____ (gal.)
Chemical Added: type_____ volume_____ (gal.)
Range and Average Discharge Rate:
Maximum Drawdown during Development: ____ at ____ gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water:

Comments:

Final Measurements (BTOC)

Total depth of Well (ft):

Date Completed:

Hours Developed:

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - MW03
Date Started: 03-27-2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
15 min.	1045	31.0	24.5	762.4	gray	12.22	7.95	0.602	8.75	63.8	set pump full speed
04/02	1050	32.5	29.5	High	light gray	—	—	—	—	—	Shut down/Dry
04/03	0925	—	20.12	—	—	—	—	—	—	—	start purge
	0930	33.5	22.4	574.7	light gray	12.27	7.84	0.632	8.42	-57.4	increase flow
20 min.	0935	34.0	24.8	118.5	cloudy	11.72	7.86	0.594	8.31	-57.9	flow rate 900 ml/min.
	0940	36.0	27.20	108.5	cloudy	11.61	7.91	0.592	9.29	-60.3	increase full speed
04/03	0945	37.0	30.15	—	cloudy	water	color	milky/cloudy	—		STOP / well Dry
4/14	1545	—	6.32	—	—	—	—	—	—	—	start purge
	1550	38.0	13.1	281.0	cloudy	11.56	7.78	0.[illegible]4	4.85	-55.2	980 ml/min.
	1555	39.0	~~24.5~~ BT	24.5	clear	9.96	7.76	0.612	4.54	-54.0	—
15 min.	1600	40.0	—	35.4	clear	9.68	7.78	0.625	5.22	-54.8	—
	1604	41.0	21.7	37.2	clear	9.83	7.77	0.632	5.24	-54.2	—
	1613	42.0	23.7	30.49	clear	9.49	7.78	0.637	5.57	-54.7	collect sample 400 ml/min
—	1630	45.0	30.20	30.9	clear		Remove tubing well complete				

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: — at — gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 30.49

Date Completed: 04/14/09

Hours Developed: 2.8

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: BRIAN TIELL
Well Developed by/firm: SHAW E&I

Site ID: RCA
Location ID: RCA-BEDEW001
Date Started: 03-31-2009

Monitoring Well Information

Development Method: ~~Waterra~~ Pump/Surge
Development Equipment: Waterra Pump w/ 1/2" ID x 5/8" OD HDPE tubing, YSI 6820 water quality meter

Screen Height (ft): 15
Filter pack length (ft): 19.8
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 32.93
Total depth of Well (ft): 73.60
water column - 40.67 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 40.67 ft x 0.164 gal/ft = 6.67 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((8.25)^2- (2)^2) = 2.63 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (19.8)ft x (2.63) gal/ft x 0.3 = 15.62 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 15.62 gal + 6.67 gal = 22.29 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
22.29	44.58	66.87	89.16	111.45

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
3/31	1726	0.0	31.42								start surge + purge
	1731	4.0	57.50	299.3	light brown	11.80	8.36	0.380	8.44	-92.3	flow rate = 3720 ml/min
24 min.	1740	10.0	75.40	106.1	cloudy	11.97	8.97	0.379	7.91	-126.3	pump full speed
	1750	15.0	82.15	—	showing signs of clearing				—	—	DRY
04/02	1530	—	71.41	—	—	—	—	—	—	—	START PURGE
	1535	—	72.30	48.6	semi clear	15.20	7.89	0.651	7.60	-62.3	Light gray
20 min.	1538	16.0	72.70	239.3	cloudy	14.76	7.96	0.679	7.25	-65.0	sulfur smell
	1540	—	75.42	High	brown						Increase full speed
	1545	20.0	80.7	32.1	clear	12.60	7.51	2.178	8.30	-39.5	~~STOP pump dry~~

@ 1545 WATER went from SANDY BROWN to crystal clear

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - BedGW001
Date Started: 03-31-2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
	1550	21	82.10		clear	SHUT	DOWN	Let	Recharge		STOP / Dry
04/15	1715	—	74.93	—	—	—	—	—	—	—	start purge
	1728	22	75.40	57.8	clear	11.04	7.03	3.919	3.76	-12.8	
26 min	1735	22.5	77.92	21.3	clear	11.20	7.05	4.309	3.54	-13.2	
	1740	23.5	81.90	20.5	clear	10.69	7.10	4.811	4.74	-16.5	
	1741	24.0	82.35	—	COLLECT		SAMPLE /	TURNED	BLACK IN 10	min.	SHUT DOWN dry
4/17	1735	—	80.87	52.20	clear BLACK TINT	16.44	7.21	5.209	7.59	-21.9	START purge
5 min	1740	24.25	81.95	—	After	1 qt. 8	oz.	water	removed	/ well dry	collect turbidity sample

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: Dry at — gpm.
Disposition of Development Water: (Drums) Baker Tank Other
Number of Containers for Development Water: 1

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 83.02

Date Completed: 4/17/09

Hours Developed: 1.25

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: BRIAN TIELL
Well Developed by/firm: SHAW E&I

Site ID: RCA
Location ID: RCA - BEDGW 002
Date Started: 03-31-2009

Monitoring Well Information

Development Method: SURGE + PURGE
Development Equipment: WATERRA pump, HONDA 2000W. gen., YSI 6820, HURON - water level indicator, + 5/8 OD x 1/2 ID tubing

Screen Height (ft): 15'
Filter pack length (ft): 18'
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 19.40
Total depth of Well (ft): 67.45
WC = 48.05

Monitoring Well Purge Calculations

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.164 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 48.05 ft x 0.164 gal/ft = 7.88 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (18)ft x (1.31) gal/ft x 0.3 = 7.07 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 7.07 gal + 7.88 gal = 14.95 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
14.95	29.90	44.85	59.80	74.75

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
3/31	1345	0.0	19.40	—	—	—	—	—	—	—	START SURGE + PURGE
55 min	1402	4.0	40.98	34.3	clear	12.99	8.29	0.374	10.88	-87.5	—
	1415	5.0	39.25	79.2	clear	11.97	7.92	0.395	10.20	-65.3	set pump @ full speed
	1430	15.0	62.80	well is	GASING	/ Purging	to	Dry	well		pump full speed
3/31	1440	17.0	67.05	—	—	—	—	—	—	—	SHUT DOWN WELL/DRY
4/1	1418	0.0	61.50	—	—	—	—	—	—	—	START PURGE
27 min.	1425	18.0	66.90	11.1	clear	12.98	6.73	1.897	3.11	4.7	—
	1435	19.0	67.20	50.0	clear	12.97	7.25	1.131	4.32	-24.3	—
	1445	19.5	67.12	90.5	clear	12.95	7.32	1.198	4.03	-28.0	WELL DRY / SHUT DOWN

NOTE: STRONG sulfer smell H_2S - 102ppm LEL - 12 % VOC - 56 ppm

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA
Location ID: RCA - BCDGW002
Date Started: 03-31-2009

Development Record (continuation)

Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
1115	0.0	65.35	—	check Depth to water					—	slow Recharge

Water Added: type None volume — (gal.)
Chemical Added: type None volume — (gal.)
Range and Average Discharge Rate: —
Maximum Drawdown during Development: Dry at gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: 0

Comments:

Final Measurements (BTOC)

Total depth of Well (ft): 67.50

Date Completed: 04-01-2009

Hours Developed: 1 Hr. 22 min

Shaw
Shaw E & I, Inc.

Well Development Log

Project Number: 133767
Project Name: PBOW
Form Completed by: BRIAN TIEW / DAVID KRISTLER
Well Developed by/firm: SHAW E+I

Site ID: RCA (Locomotive Bldg)
Location ID: RCA-BEDGW003
Date Started: 4-1-2009

Monitoring Well Information

Development Method: Surge + Purge
Development Equipment: WATERRA pump, HONDA 2000W gen., YSI 6820, HUNDY water level indicator, 100 5/8" x 1/2" ID HDPE tubing

Screen Height (ft): 16 ft
Filter pack length (ft): 19.8 ft
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 12.21
Total depth of Well (ft): 107.18
Water column = 94.97 ft

Monitoring Well Purge Calculations

Volume of Water in Casing:
Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.163 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 94.97 ft x 0.163 gal/ft = 15.20 gallons

Volume of Water in Filter Pack:
Gallons/foot = 0.041 x (D^2 - d^2), where D is total borehole diameter in inches & d is casing diameter in inches = 0.041 x ((6)^2 - (2)^2) = 1.31 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (19.8)ft x (1.31) gal/ft x 0.3 = 7.80 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 7.80 gal + 15.20 gal = 23.0 gal.

1 x Purge Well Volume	2 x Purge Well Volume	3 x Purge Well Volume	4 x Purge Well Volume	5 x Purge Well Volume
23.0	46.0	69.0	92	115

Development Record

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
04/01	0935	0.0	12.21	WATER	DARK BROWN						START SURGE + PURGE
	0952	7.0	61.70	522.6	light brown	12.67	8.21	0.360	12.51	-80.2	Pump full speed
15 min.	0957	11.0	78.20	65.4	cloudy	12.01	8.47	0.350	10.72	-90.8	flowrate 2000 ml/min.
	1002		92.80	144.4	cloudy	11.94	8.45	0.350	10.93	-90.1	flowrate 1200 ml/min.
	1020	18.0	105.7		cloudy	but signs of	clearing				SHUT DOWN / DRY
04/02	1620	—	96.9								START purge
	1622	19.0	98.9	363.4	cloudy	12.58	8.18	0.401	10.60	-79.7	
9 min.	1625	20.0	103.3	122.1	cloudy	12.07	8.34	0.452	10.46	-85.7	flow rate 2120 ml/min
	1629	23.0	108.3	292.1	light gray	11.85	8.33	0.468	9.27	-87.4	SHUT DOWN DRY

Shaw
Shaw E & I, Inc.

Well Development Log (Continuation)

Site ID: RCA (Locomotive Bldg)
Location ID: RCA-BEDGW-003
Date Started: 4-1-2009

Development Record (continuation)

	Time (24 hrs)	Volume Removed (gal)	Water Level (ft) (TOC)	Turbidity (NTU)	Clarity (color)	Temp. (C)	pH (Std Units)	Conductivity (mS/cm)	D.O. (mg/L)	Redox (mV)	Comments
/3	0835	—	102.40	slow recharge run pump @ slow rate / surging							Start purge + surge
5 min.	0850	24.0	107.64	increased rate after 5 min. + pumped dry water milky							SHUT DOWN / DRY
4/14	1022	—	105.67	very slow recharge stop to purge					—	—	start purge
80 min	1043	24.5	106.23	185.4	cloudy	10.33	7.48	0.289	10.35	-44.3	
	11:00	25.0	106.82	—	—	—	—	—	—	—	shut down / Dry
/15/09	0930	25.0	106.37	Static	—	—	—	—	—	—	Continued — Too small water column recharge to pump
16/09	1115	25	104.93								Insufficient water to get to surface. Discontinue-stop

Water Added: type — volume — (gal.)
Chemical Added: type — volume — (gal.)
Range and Average Discharge Rate: unknown
Maximum Drawdown during Development: Dry at — gpm.
Disposition of Development Water: Drums Baker Tank Other
Number of Containers for Development Water: 1

Comments: Will stop development processes on well due to insufficient water.
* No photographs of final water.

Final Measurements (BTOC) (Hand bottom)

Total depth of Well (ft): 107.40 ft

Date Completed: 4/16/09

Hours Developed: 1 hr 37 min

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

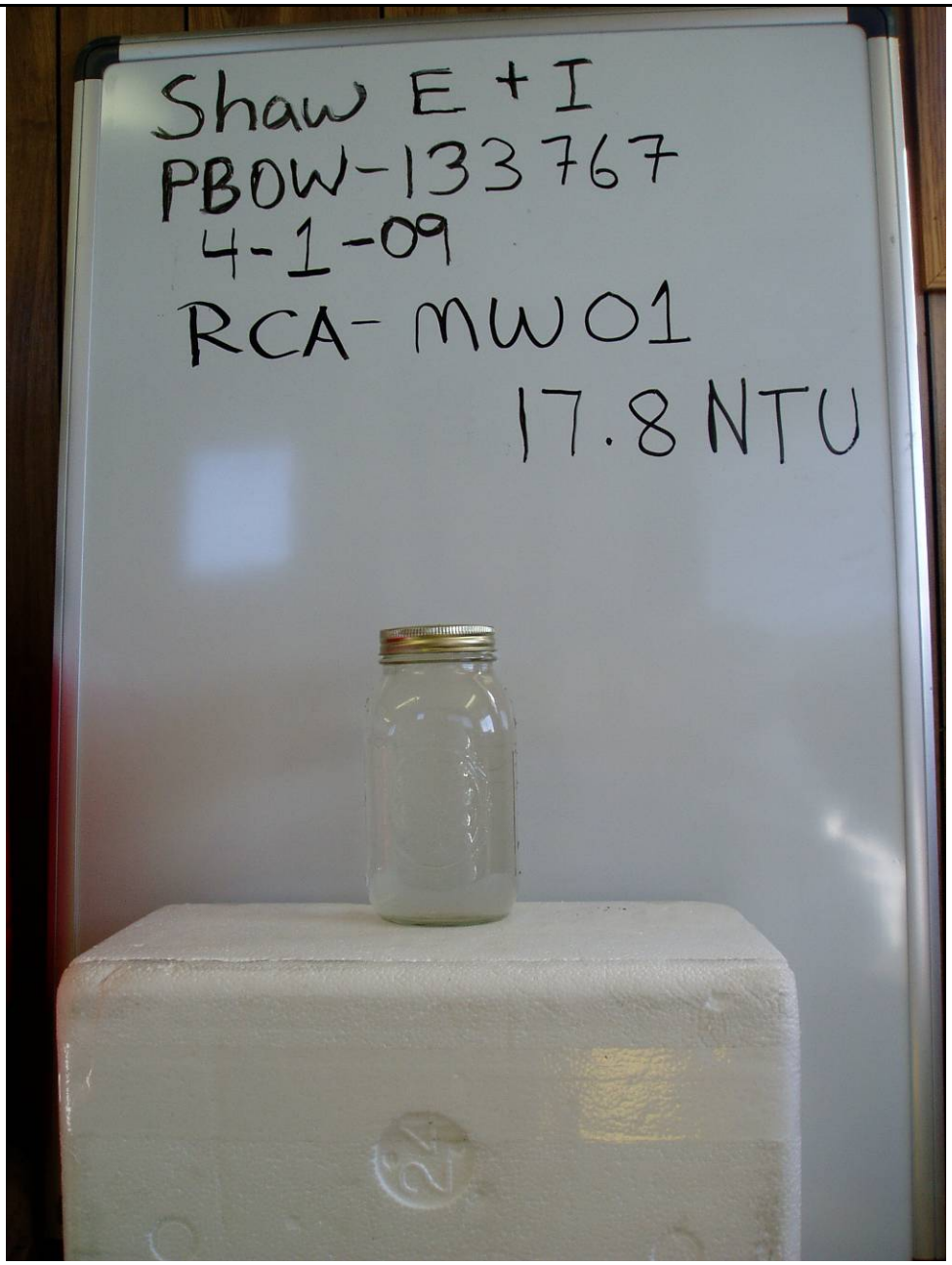
RCA-MW-01

Date:

April 1, 2009

Final Reading:

17.8 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

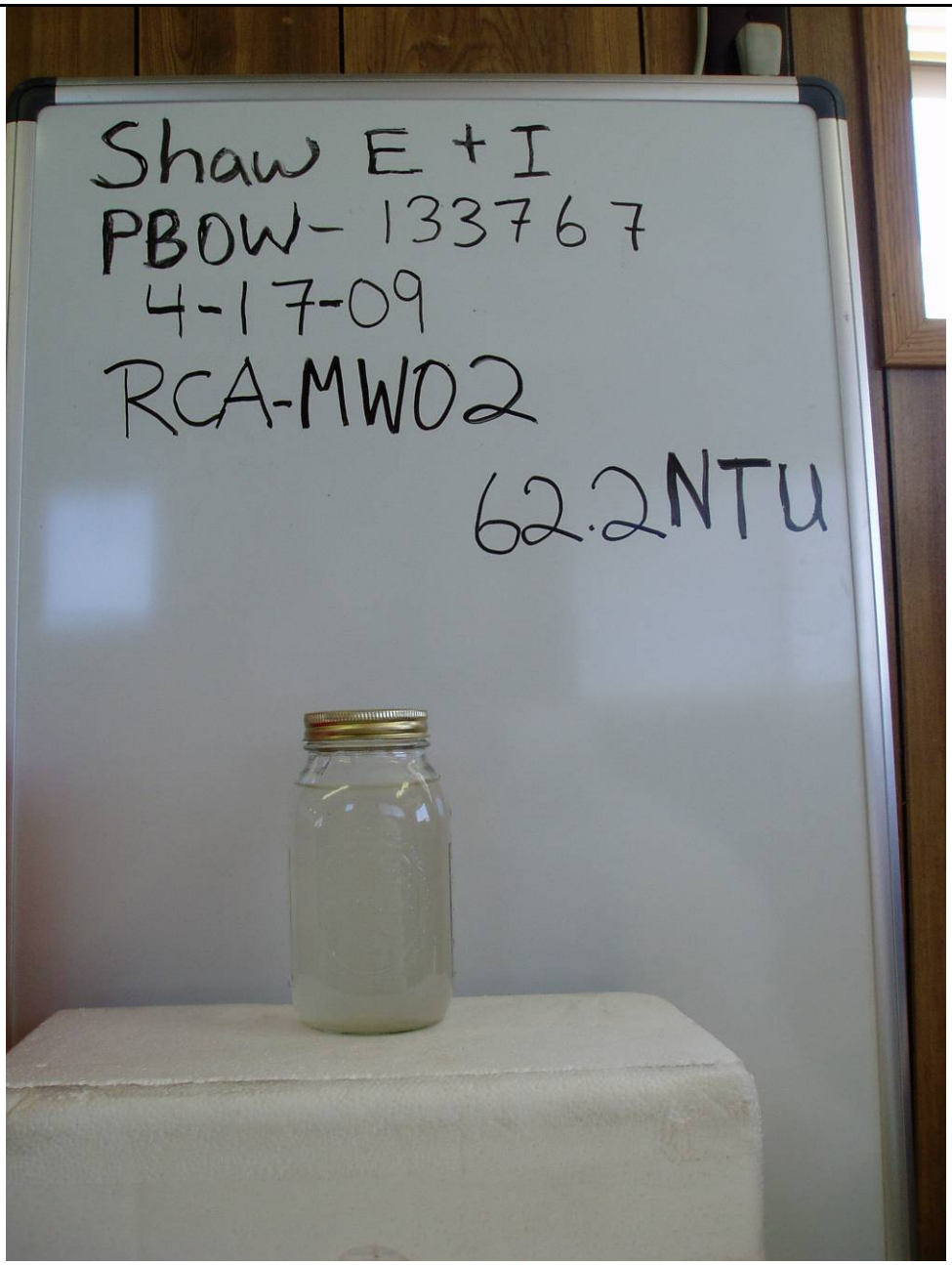
RCA-MW-02

Date:

April 17, 2009

Final Reading:

62.2 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

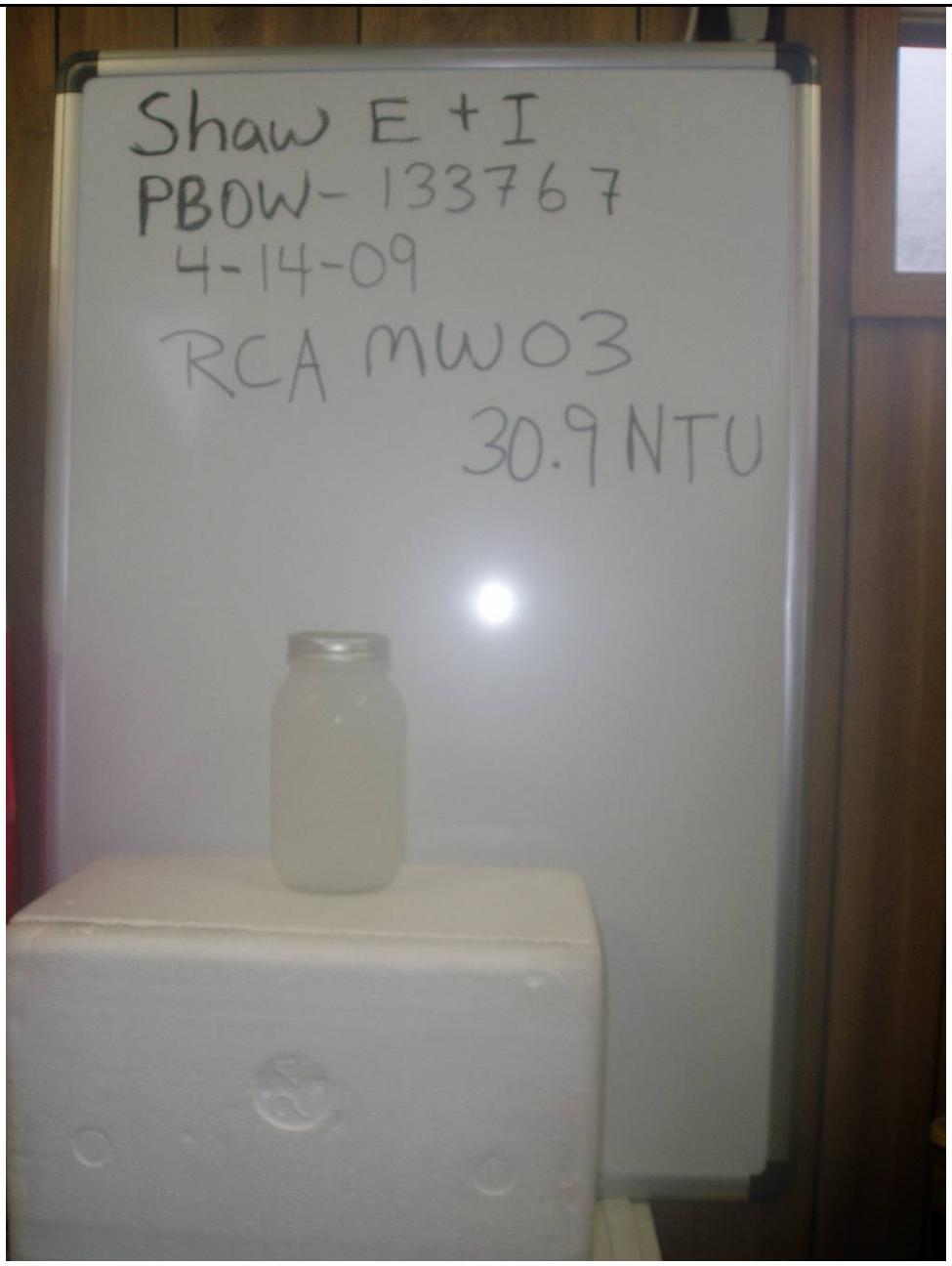
RCA-MW-03

Date:

April 14, 2009

Final Reading:

30.9 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

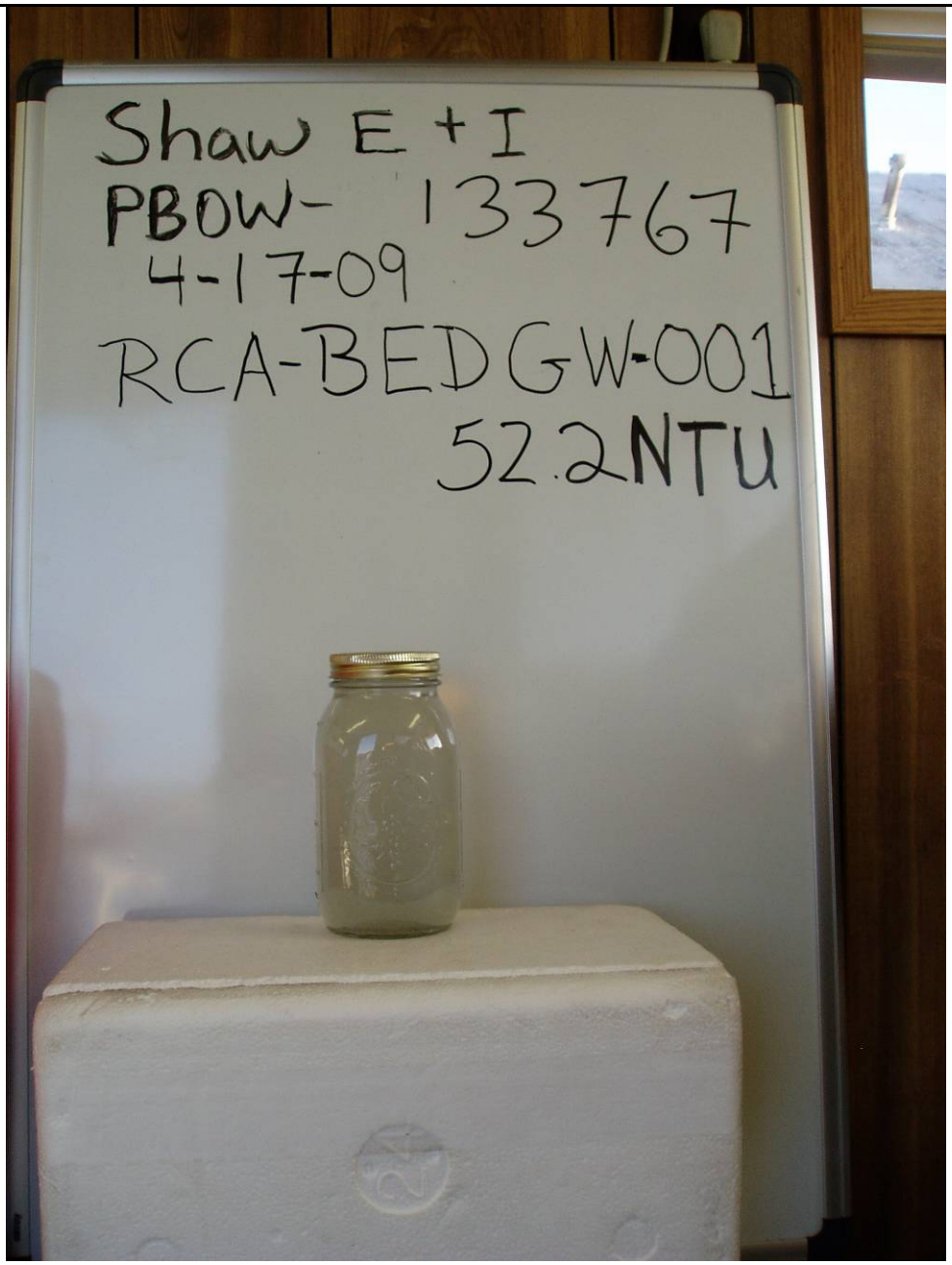
RCA-BEDGW-001

Date:

April 17, 2009

Final reading:

52.2 NTU



Shaw E & I, Inc.

Shaw Environmental, Inc.
Photographic Record

Client: USACE	**Project Number: 133767**
Site Name: Former Plum Brook Works	**Site Location: Sandusky, Erie County, Ohio**

Well:

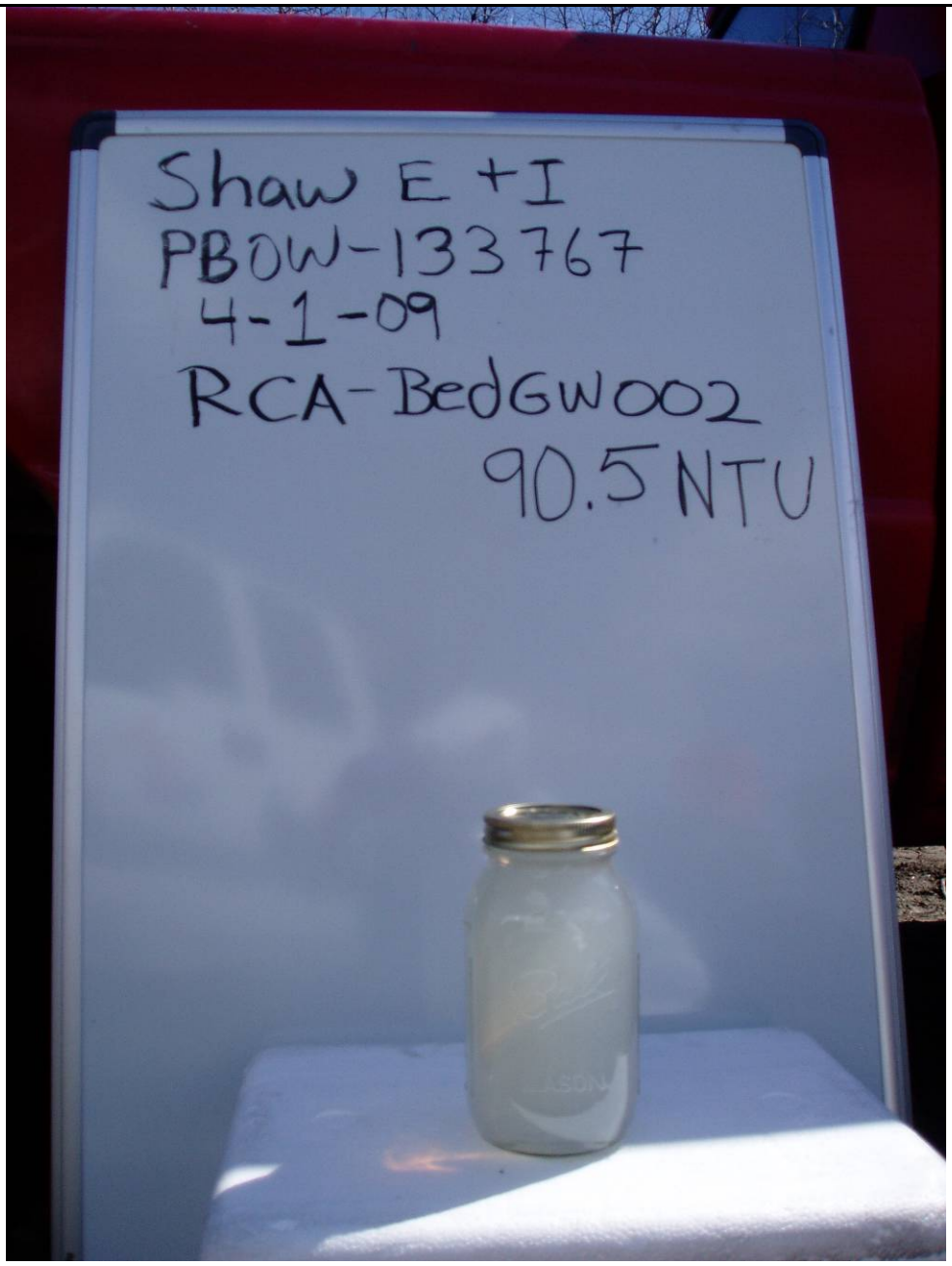
RCA-BEDGW-002

Date:

April 1, 2009

Final Reading:

90.5 NTU



Shaw E & I, Inc.

APPENDIX F

LAND SURVEY DATA

FINAL REPORT
of
SURVEYING SERVICES PERFORMED
by
SACKS SURVEYING & MAPPING, P.C. / KUSMER & ASSOCIATES J.V.
at the
PLUMBROOK ORDNANCE WORKS, SANDUSKY, OH
for
SHAW E & I (CONTRACT #W912QR-08-D-0013, D.O. DX03)
JANUARY, 2009

SUMMARY OF WORK PERFORMED

Sacks Surveying & Mapping, PC, in joint venture with Kusmer & Associates, Inc., located 42 soil sample and test pit locations and 43 piezometer locations at seven sites within the Plumbrook Ordnance Works site (Waste Water Treatment Plant #1, Ash Pit #1, Ash Pit #2, Wastewater Treatment Plant #2, Railcar Wash Area, Locomotive Area, and Waste Water Treatment Plant #1 Sewer Line). Work was performed on-site between 27 January, 2009 and 30 January, 2009 in accordance with Shaw E & I R.F.P. 2008-037 under purchase order #470434 OP in support of Shaw E & I contract W912QR-08-D-0013, D.O. DX03.

KEY PERSONNEL

W. Robert Kusmer – Ohio Land Surveyor S-6754
Stanley Robert Sacks – North Carolina Surveyor L-2913
Michael A. McKibbin – North Carolina Surveyor L-4519, Hazmat Project Manager
Jeff Bucholtz – On-site Party Chief *
Steven Chris Shelton – Survey Technician *
* all on-site personnel for this project are OSHA 29 CFR 1910.120 40-hour trained and medically monitored in accordance with Shaw E & I requirements.

FIELD PROCEDURES

All soil sample and piezometer locations reported below were surveyed with a Topcon GTS-235W Total Station using conventional angle and distance measurements to determine the horizontal and vertical position thereof. The survey control points used in this operation were established at each site by direct static differential GPS observation using three Ashtech Promark III GPS receivers. GPS vectors were adjusted holding fixed station "PB 06" using Ashtech post-processing software, producing a least squares adjustment of the WGS 84 positions. A loop using the unadjusted vectors passing the fixed and derived control positions yields a loop precision exceeding 1 part in 100,000. Horizontal and vertical values of Sacks Surveying & Mapping control station "PB 06" were derived by GPS survey in 1996 from NGS Monuments "Skyway RM 2" and "J-318" (a first order benchmark). The horizontal datum is NAD 83. The vertical datum is NGVD 29. Values were scaled to the Ohio State Plane Coordinate System (North Zone) using a combined scale and ellipsoid factor of 0.9999270034. Values for Sacks Surveying & Mapping monument "PB 06" are:

Northing (y) 189,438.4289 m
Easting (x) 585,685.6292 m
Orthometric Elevation 200.5985 m
Geoid Height -35.167 m (Geoid 99)

SAMPLE LOCATIONS

Waste Water Treatment Plant #1

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
3	623,838.916	1,920,186.361	635.762	GPS Pt 2-100
4	624,061.542	1,920,188.546	634.731	GPS Pt 2-101
206	624,221.21	1,919,718.65	639.33 Riser	PZ-01
207			638.0 Ground	
205	624,224.51	1,919,868.74	636.86 Riser	PZ-02
204			635.4 Ground	
210	624,097.22	1,919,768.37	639.67 Riser	SB-01/PZ-06
209			637.3 Ground	
208	624,087.98	1,919,683.02	637.18	SB-02
211	624,057.52	1,919,720.80	636.61	SB-03
213	623,995.17	1,919,709.85	639.26 Riser	SB-04/PZ04
212			638.1 Ground	
214	623,971.71	1,919,679.01	638.50	SB-05
218	623,987.84	1,919,772.77	637.56	SB-06
217	623,963.70	1,919,752.47	638.94 Riser	SB-07/PZ-03
216			638.0 Ground	
215	623,869.76	1,919,685.96	639.94 Riser	SB-08/PZ-05
**			638.8 Ground	

** = measure down from riser to ground supplied by Shaw E & I

Ash Pit #1

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
122	623,632.54	1,918,680.82	636.00	SB-01 *
111	623,561.23	1,918,686.10	635.92	SB-02
112	623,475.30	1,918,685.16	638.41	SB-03
113	623,463.46	1,918,828.82	638.81	SB-04
116	623,455.17	1,918,962.03	638.35	SB-05
119	623,620.51	1,918,930.44	635.23	SB-06 *

* = Stake missing; field location as directed by Shaw E & I personnel

108	623,724.22	1,918,737.52	637.65 Riser	PZ-01
109			636.8 Ground	

Ash Pit #1 <cont.>

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
107	623,728.76	1,918,855.35	639.11 Riser	PZ-02
106			637.7 Ground	
104	623,715.50	1,919,025.14	640.79 Riser	PZ-03
105			638.7 Ground	
118	623,368.95	1,918,792.10	641.23 Riser	PZ-04
117			640.9 Ground	
115	623,521.04	1,918,801.67	638.30 Riser	SB-08/PZ-05
114			637.5 Ground	
121	623,585.48	1,918,735.41	635.15 Riser	SB-09/PZ-06
120			634.5 Ground	

Ash Pit #2

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
9	622,858.595	1,911,566.119	639.400	GPS Pt 5-100
10	623,115.362	1,911,626.581	638.679	GPS Pt. 5-101
516	622,819.31	1,911,245.10	632.55	SS&M Nail 516
505	623,073.14	1,911,485.20	634.97 Riser	SB-01/PZ-01
504			631.7 Ground	
520	623,041.37	1,911,260.38	630.32 Riser	SB-02/PZ-02
521			627.5 Ground	
519	622,845.22	1,911,148.24	630.69 Riser	SB-03/PZ-03
518			627.7 Ground	
512	622,789.21	1,911,348.96	633.70 Riser	SB-04/PZ-04
511			630.0 Ground	
513	622,901.66	1,911,339.77	633.97 Riser	SB-05/PZ-05
514			631.8 Ground	
508	622,942.86	1,911,404.17	633.42 Riser	SB-06/PZ-06
507	629.7 Ground			
515	622,955.41	1,911,280.43	629.46	SB-07
509	622,840.49	1,911,425.01	632.92 Riser	SB-08/PZ-07
510			629.8 Ground	

Ash Pit #3 not sampled as of this date

Waste Water Treatment Plant #3

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
7	623,379.091	1,914,915.675	637.382	GPS Pt. 4-100
8	623,522.259	1,914,911.296	637.616	GPS Pt. 4-102
401	623,646.21	1,914,907.54		SS&M Nail 401
416	623,616.33	1,914,460.24	639.66 Riser	PZ-01
417			637.2 Ground	
415	623,575.37	1,914,357.85	638.43 Riser	PZ-02
414			636.3 Ground	
413	623,442.78	1,914,322.61	637.56	SB-01
412	623,389.04	1,914,335.44	639.36 Riser	SB-02/PZ-03
411	623,388.62	1,914,335.56	637.2 Ground	
410	623,416.20	1,914,391.06	637.63	SB-03
409	623,455.74	1,914,416.30	640.12 Riser	SB-0~~4~~/PZ-06
408			637.3 Ground	9 DKK
407	623,438.28	1,914,458.72	637.54 Riser	SB-05/PZ-05
**			636.9 Ground	
406	623,406.06	1,914,452.39	637.54	SB-06
405	623,377.78	1,914,453.57	639.72 Riser	SB-07/PZ-04
404			637.3 Ground	

** = measure up from ground to riser supplied by Shaw E & I

Railcar Wash Area (Acid Area)

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
130	623,882.09	1,918,943.02	638.10 Riser	PZ-01
131			635.4 Ground	
124	623,757.23	1,918,888.90	641.18 Riser	PZ-02
123			638.1 Ground	
127	623,812.43	1,918,868.73	639.85 Riser	PZ-03
126			636.5 Ground	
133	623,890.97	1,918,863.20	636.24 Riser	PZ-04
132			634.4 Ground	
125	623,800.27	1,918,892.60	637.58	SB-10
128	623,790.87	1,918,845.66	637.46	SB-12
129	623,823.32	1,918,836.69	635.39	SB-11

Locomotive Area

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
135	623,861.73	1,918,349.65	636.41	SS&M Nail 135
142	623,907.99	1,918,641.61	637.93 Riser	PZ-01
141			636.3 Ground	
148	623,862.16	1,918,467.96	640.67 Riser	PZ-02
147			637.0 Ground	
139	623,848.15	1,918,624.77	639.46 Riser	PZ-03
140			636.1 Ground	
138	623,794.37	1,918,550.21	637.50 Riser	SB-03/PZ-04
137			635.6 Ground	
149	623,880.78	1,918,509.04	640.20 Riser	PZ-05
150			637.3 Ground	
151	623,872.89	1,918,595.27	636.69	SB-04
136	623,799.16	1,918,471.15	636.35	SB-05
144	623,853.27	1,918,497.75	636.79	SB-07
145	623,852.71	1,918,515.02	636.82	SB-08
146	623,851.97	1,918,541.10	636.80	SB-09

Waste Water Treatment Plant #1 Sewer Line

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
5	624,284.373	1,923,674.317	635.700	GPS Pt. 3-100
6	624,608.356	1,923,501.823	631.977	GPS Pt. 3-102
301	624,567.58	1,923,502.38		SS&M Nail 301
336	624,601.08	1,921,712.32	628.78	~~SB-01~~ SB-09 DFK
337	624,623.89	1,921,715.45	628.65	~~SB-02~~ SB-10
304	624,517.72	1,923,563.59	632.31	Sth. Line, E. of road
306	624,515.71	1,923,522.82	632.20	Sth. Line, W. of road
305	624,522.75	1,923,560.31	632.08	Nth. Line, E. of road
307	624,568.23	1,923,492.44	632.09	Nth Line, W. of road
341	624,573.46	1,923,373.40	630.32	TP-03
326	624,577.93	1,923,102.28	631.96	TP-04
325	623,998.14	1,920,748.90	637.01	TP-21
324	624,049.00	1,921,018.16	635.54	TP-22
323	624,115.38	1,921,376.89	629.71	TP-23
322	624,170.76	1,921,675.58	632.49	TP-24
321	624,224.10	1,921,958.30	631.21	TP-25

Waste Water Treatment Plant #1 Sewer Line <cont.>

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
320	624,273.74	1,922,226.54	631.87	TP-26
316	624,335.37	1,922,550.74	633.80 Riser	TP-27/PZ-07
317			630.6 Ground	
313	624,383.06	1,922,811.74	630.29	TP-28
312	624,437.18	1,923,095.69	632.12	TP-29
309	624,484.42	1,923,339.45	632.11 Riser	TP-30/PZ-10
308			630.4 Ground	
340	624,616.65	1,921,456.57	628.93	TP-32
334	624,612.42	1,921,713.34	632.08 Riser	TP-33/PZ-03
335			629.0 Ground	
331	624,605.23	1,921,993.22	635.42	TP-34
330	624,595.15	1,922,271.99	636.48	TP-35
329	624,592.56	1,922,545.31	639.03 Riser	TP-36/PZ-05
328			635.7 Ground	
327	624,587.05	1,922,819.39	633.67	TP-37
PZ-01 not recovered at this date				
339	624,614.47	1,921,581.00	632.10 Riser	PZ-02
338			629.4 Ground	
333	624,609.33	1,921,832.45	631.01 Riser	PZ-04
332	624,609.09	1,921,832.50	629.8 Ground	
319	624,306.47	1,922,397.79	634.08 Riser	PZ-06
318	624,306.31	1,922,397.80	631.3 Ground	
315	624,360.52	1,922,687.65	633.93 Riser	PZ-08
314	624,360.83	1,922,687.71	630.9 Ground	
310	624,464.54	1,923,237.32	633.84 Riser	PZ-09
311	624,464.55	1,923,237.28	631.2 Ground	

CERTIFICATION

I, Warren Robert Kusmer, Ohio Professional Surveyor #S-6754, hereby certify that the information in this survey report is true to the best of my knowledge and belief.

W Robert Kusmer

Warren Robert Kusmer,
Ohio Professional Surveyor #S-6754

March 2, 2009
Date

FINAL REPORT
of
SURVEYING SERVICES PERFORMED
by
SACKS SURVEYING & MAPPING, P.C. / KUSMER & ASSOCIATES J.V.
at the
PLUMBROOK ORDNANCE WORKS, SANDUSKY, OH
for
SHAW E & I (CONTRACT #W912QR-08-D-0013, LTMP)
MAY, 2009

SUMMARY OF WORK PERFORMED

Sacks Surveying & Mapping, PC, in joint venture with Kusmer & Associates, Inc., located 39 monitoring wells, 1 bore hole, 4 staff gauges, and 24 surface water/sediment sample locations at seven sites within the Plumbrook Ordnance Works site (Waste Water Treatment Plant #1, Ash Pit #1, Ash Pit #2, Wastewater Treatment Plant #3, Railcar Wash Area, Locomotive Area, and Waste Water Treatment Plant #1 Sewer Line). Work was performed on-site between 18 May, 2009 and 21 May, 2009 in accordance with Shaw E & I R.F.P. 2008-037 under purchase order #499335 OP in support of Shaw E & I contract W912QR-08-D-0013, LTMP.

KEY PERSONNEL

W. Robert Kusmer – Ohio Land Surveyor S-6754
Stanley Robert Sacks – North Carolina Surveyor L-2913
Michael A. McKibbin – North Carolina Surveyor L-4519, Hazmat Project Manager
Jeff Bucholtz – On-site Party Chief *
Steven Chris Shelton – Survey Technician *
* all on-site personnel for this project are OSHA 29 CFR 1910.120 40-hour trained and medically monitored in accordance with Shaw E & I requirements.

FIELD PROCEDURES

All monitoring well and sampling locations reported below were surveyed with a Topcon GTS-235W Total Station using conventional angle and distance measurements to determine the horizontal and vertical position thereof. The survey control points used in this operation were previously established (January, 2009) at each site by direct static differential GPS observation using three Ashtech Promark III GPS receivers. GPS vectors were adjusted holding fixed station "PB 06" using Ashtech post-processing software, producing a least squares adjustment of the WGS 84 positions. A loop using the unadjusted vectors passing the fixed and derived control positions yields a loop precision exceeding 1 part in 100,000. Horizontal and vertical values of Sacks Surveying & Mapping control station "PB 06" were derived by GPS survey in 1996 from NGS Monuments "Sky D" and "J-318" (a first order benchmark). The horizontal datum is NAD 83. The vertical datum is NGVD 29. Values were scaled to the Ohio State Plane Coordinate System (North Zone) using a combined scale and ellipsoid factor of 0.9999270034. Values for Sacks Surveying & Mapping monument "PB 06" are:

Northing (y) 189,438.4289 m
Easting (x) 585,685.6292 m
Orthometric Elevation 200.5985 m
Geoid Height -35.167 m (Geoid 99)

SAMPLE LOCATIONS

Waste Water Treatment Plant #1

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
3	623,838.916	1,920,186.361	635.762	GPS Pt 2-100
4	624,061.542	1,920,188.546	634.731	GPS Pt 2-101
2047	624,015.57	1,919,560.22	639.40 Riser	WTP1-MW01
2048			639.90 Casing	
2046			637.16 Concrete Pad	
2045			636.6 Ground	
2037	623,971.13	1,919,757.79	640.24 Riser	WTP1-MW02
2036			640.64 Casing	
2035			638.02 Concrete Pad	
2034			638.6 Ground	
2029	623,975.45	1,919,998.27	639.68 Riser	WTP1-MW03
2028			640.19 Casing	
2027			637.46 Concrete Pad	
2026			637.0 Ground	
2053	624,011.89	1,919,564.07	636.8	Borehole at proposed WTP1-BEDGW-001
2041	623,957.54	1,919,747.58	640.35 Riser	WTP1-BEDGW-002
2040			640.72 Casing	
2039			638.18 Concrete Pad	
2038			637.8 Ground	
2033	623,962.13	1,919,998.14	639.93 Riser	WTP1-BEDGW-003
2032			640.41 Casing	
2031			637.56 Concrete Pad	
2030			637.1 Ground	
2052	624,243.79	1,919,831.93	631.8	WTP1-SDW01
2049	624,248.32	1,919,717.17	631.8	WTP1-SDW02
2056	624,006.22	1,919,446.79	633.4	WTP1-SDW03
2059	623,929.66	1,919,432.72	634.2	WTP1-SDW04
2051	624,250.91	1,919,716.51	636.11 Top/Pipe	WTP1-SG01
2050			631.7 Creek Bottom	

Ash Pit #1

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
2150	623,372.09	1,918,800.20	642.93 Riser	AP1-MW01
2149			643.42 Casing	
2148			640.69 Concrete Pad	
2147			640.3 Ground	
2081	623,622.45	1,918,730.13	638.01 Riser	AP1-MW02
2080			638.45 Casing	
2079			635.02 Concrete Pad	
2078			634.7 Ground	
2072	623,723.44	1,918,747.06	639.06 Riser	AP1-MW03
2071			639.54 Casing	
2070			636.65 Concrete Pad	
2069			636.5 Ground	
2145	623,369.01	1,918,892.38	644.28 Riser	AP1-BEDGW-001
2144			644.62 Casing	
2143			641.95 Concrete Pad	
2142			641.8 Ground	
2077	623,620.90	1,918,741.22	637.16 Riser	AP1-BEDGW-002
2076			637.52 Casing	
2075			634.63 Concrete Pad	
2074			634.5 Ground	
2088	623,399.02	1,918,443.98	627.5	AP1-SDW01
2087	623,471.38	1,918,494.34	627.8	AP1-SDW02
2084	623,612.61	1,918,583.19	627.1	AP1-SDW03
2073	623,617.03	1,918,760.43	633.6	AP1-SDW04

Ash Pit #2

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
9	622,858.595	1,911,566.119	639.400	GPS Pt 5-100
10	623,115.362	1,911,626.581	638.679	GPS Pt. 5-101
516	622,819.31	1,911,245.10	632.55	SS&M Nail 516
2159	622,866.25	1,911,550.02	640.94 Riser	AP2-MW01
2158			641.39 Casing	
2157			638.41 Concrete Pad	
2156			638.2 Ground	
2167	622,892.79	1,911,351.16	635.53 Riser	AP2-MW02
2166			635.92 Casing	
2165			632.75 Concrete Pad	
2164			632.5 Ground	
2177	622,973.78	1,911,157.35	632.16 Riser	AP2-MW03
2176			632.45 Casing	
2175			629.84 Concrete Pad	
2174			629.5 Ground	
2173	622,795.83	1,911,202.97	633.46 Riser	AP2-BEDGW-001
2172			633.88 Casing	
2171			630.50 Concrete Pad	
2170			630.4 Ground	
2163	622,887.85	1,911,361.47	635.58 Riser	AP2-BEDGW-002
2162			636.07 Casing	
2161			632.77 Concrete Pad	
2160			632.4 Ground	
2155	623,117.29	1,911,619.32	640.83 Riser	AP2-BEDGW-003
2154			641.17 Casing	
2153			638.57 Concrete Pad	
2152			638.4 Ground	
2190	623,503.16	1,911,303.54	621.2	AP2-SDW01
2187	623,268.84	1,911,230.43	621.8	AP2-SDW02
2184	623,145.14	1,911,134.90	621.8	AP2-SDW03
2193	622,772.78	1,910,936.54	623.1	AP2-SDW04
2194	622,484.96	1,910,811.50	623.0	AP2-SDW05
2189	623,270.04	1,911,226.61	625.46 Top/pipe	AP2-SG04
2188			621.1 Creek Bottom	

Ash Pit #3 not sampled as of this date

Waste Water Treatment Plant #3

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
7	623,379.091	1,914,915.675	637.382	GPS Pt. 4-100
8	623,522.259	1,914,911.296	637.616	GPS Pt. 4-102
401	623,646.21	1,914,907.54		SS&M Nail 401
2215	623,391.43	1,914,527.69	640.00 Riser	WTP3-MW01
2214			640.39 Casing	
2213			637.21 Concrete Pad	
2212			637.0 Ground	
2203	623,447.80	1,914,416.55	640.91 Riser	WTP3-MW02
2202			641.36 Casing	
2201			638.04 Concrete Pad	
2200			637.7 Ground	
2207	623,501.39	1,914,372.79	637.90 Riser	WTP3-MW03
2206			638.40 Casing	
2205			635.72 Concrete Pad	
2204			635.6 Ground	
2218	623,382.22	1,914,531.86	640.15 Riser	WTP3-BEDGW-001
2219			640.64 Casing	
2217			637.30 Concrete Pad	
2216			637.1 Ground	
2199	623,453.92	1,914,407.33	640.9 Riser	WTP3-BEDGW-002
2198			641.38 Casing	
2197			638.02 Concrete Pad	
2196			637.6 Ground	
2222	623,532.48	1,914,302.59	640.21 Riser	WTP3-BEDGW-003
2223			640.66 Casing	
2221			637.43 Concrete Pad	
2220			637.1 Ground	
2225	623,513.33	1,914,357.28	630.6	WTP3-SDW01
2224	623,415.50	1,914,298.15	632.5	WTP3-SDW02
2226	623,667.10	1,914,369.86	629.76	WTP3-SDW03
2211	623,748.43	1,914,383.75	631.00 Top/Pipe	WTP3-SG03
2210			627.3 Creek Bottom	

Railcar Wash Area (Acid Area)

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
2064	623,724.69	1,919,029.45	641.01 Riser	RCA-MW01
2063			641.44 Casing	
2062			638.63 Concrete Pad	
2061			638.4 Ground	
2124	623,826.40	1,918,834.02	638.15 Riser	RCA-MW02
2123			638.59 Casing	
2122			635.52 Concrete Pad	
2121			635.3 Ground	
2128	623,865.52	1,918,827.90	638.16 Riser	RCA-MW03
2127			638.53 Casing	
2126			635.71 Concrete Pad	
2125			635.3 Ground	
2068	623,709.77	1,919,022.35	641.02 Riser	RCA-BEDGW-001
2067			641.38 Casing	
2066			638.83 Concrete Pad	
2065		638.5 Ground		
2120	623,832.46	1,918,842.57	638.03 Riser	RCA-BEDMW-002
2119			638.42 Casing	
2118			635.71 Concrete Pad	
2117			635.5 Ground	
2108	623,916.92	1,918,767.69	637.00 Riser	RCA-BEDGW-003
2107			637.46 Casing	
2106			634.80 Concrete Pad	
2105			634.3 Ground	

Locomotive Area

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
1	623,657.242	1,919,113.236	639.873	GPS Pt. 1-100
2	623,667.454	1,918,690.125	638.297	GPS Pt. 1-101
135	623,861.73	1,918,349.65	636.41	SS&M Nail 135
2112	623,937.12	1,918,462.09	639.86 Riser	LBA-MW01
2111			640.35 Casing	
2110			637.61 Concrete Pad	
2109			637.2 Ground	
2098	623,827.44	1,918,628.33	639.25 Riser	LBA-MW02
2097			639.71 Casing	
2096			636.39 Concrete Pad	
2095			635.9 Ground	
2104	623,788.63	1,918,684.59	638.18 Riser	LBA-MW03
2103			638.70 Casing	
2102			635.71 Concrete Pad	
2101			635.5 Ground	
2116	623,937.80	1,918,452.89	639.74 Riser	LBA-BEDGW-001
2115			640.23 Casing	
2114			637.65 Concrete Pad	
2113			637.3 Ground	
2094	623,827.05	1,918,614.64	638.62 Riser	LBA-BEDGW-002
2093			639.00 Casing	
2092			636.39 Concrete Pad	
2091			636.3 Ground	
2140	624,006.50	1,918,888.18	626.4	LBA-SDW01
2136	623,880.05	1,918,796.17	627.4	LBA-SDW02
2129	623,829.34	1,918,766.27	626.9	LBA-SDW03
2133	623,782.26	1,918,733.17	627.0	LBA-SDW04
2083	623,719.16	1,918,654.72	627.8	LBA-SDW05
2082	623,716.02	1,918,803.56	630.4	LBA-SDW06
2132	623,815.14	1,918,768.04	632.1 Water level	LBA-SW07
2131			631.1 Pipe invert	
2137	623,939.77	1,918,834.41	627.7	WSD-5
2138	623,781.72	1,918,728.51	630.65 Top/Pipe	LBA-SG05
2139			626.3 Creek Bottom	

Waste Water Treatment Plant #1 Sewer Line

SS&M ID#	Northing (y)	Easting (x)	Elevation	Shaw Designation
5	624,284.373	1,923,674.317	635.700	GPS Pt. 3-100
6	624,608.356	1,923,501.823	631.977	GPS Pt. 3-102
301	624,567.58	1,923,502.38		SS&M Nail 301
2004	624,190.42	1,922,785.52	634.66 Riser	1SLA-MW01
2003			635.11 Casing	
2002			631.85 Concrete Pad	
2001			631.7 Ground	
2012	624,354.65	1,922,688.56	633.93 Riser	1SLA-MW02
2011			634.57 Casing	
2010			630.92 Concrete Pad	
2009			630.8 Ground	
2020	624,654.19	1,922,564.69	639.71 Riser	1SLA-MW03
2019			640.10 Casing	
2018			636.92 Concrete Pad	
2017			636.7 Ground	
2008	624,129.03	1,922,624.33	636.14 Riser	1SLA-BEDGW-001
2007			636.59 Casing	
2006			633.41 Concrete Pad	
2005			633.0 Ground	
2016	624,368.22	1,922,687.20	634.16 Riser	1SLA-BEDGW-002
2015			634.56 Casing	
2014			631.21 Concrete Pad	
2013			630.9 Ground	
2024	624,696.73	1,922,811.24	636.74 Riser	1SLA-BEDGW-003
2023			637.16 Casing	
2022			634.41 Concrete Pad	
2021			634.0 Ground	

CERTIFICATION

I, Warren Robert Kusmer, Ohio Professional Surveyor #S-6754, hereby certify that the information in this survey report is true to the best of my knowledge and belief.

W Robert Kusmer

Warren Robert Kusmer,
Ohio Professional Surveyor #S-6754

June 22, 2009

Date

STATE OF OHIO
W. ROBERT KUSMER
6754
REGISTERED SURVEYOR

APPENDIX G

IDW WASTE MANIFESTS
(APRIL, MAY, JUNE, SEPTEMBER, DECEMBER 2009)

**** All manifests may or may not be appropriate for disposal of wastes at Powerhouse 2 Ash Pits. Documentation of the waste generation location was not made, only the gross weight. Therefore, all manifests generated are included to document all disposal activities.**

006184141JJK

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3 800 015 379
2. Page 1 of 1
3. Emergency Response Phone: 800424-9300
4. Manifest Tracking Number: 006184141 JJK

5. Generator's Name and Mailing Address: NASA - PLUMBROOK STATION, 6100 COLUMBUS AVE, SANDUSKY OH 44870
Generator's Site Address (if different than mailing address): 6100 COLUMBUS AVE, SANDUSKY OH 44870
Generator's Phone: ~~(216) 642-0551~~ 419-621-3234

6. Transporter 1 Company Name: Triad Transport, Inc.
U.S. EPA ID Number: IOKD981588791

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ DETROIT, INC, 1923 FREDERICK, DETROIT, MI 48211
U.S. EPA ID Number: MID 980 991 557
Facility's Phone: (313) 347-1300

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN, NON DOT HAZARDOUS, NON RCRA REGULATED WATER	x 71	DM	35,500	~~500~~ P	D006
	2. UN, NON DOT HAZARDOUS, NON RCRA REGULATED SOIL	x 8	DM	4800	~~600~~ P	D006 NONE
	3.					
	4.					

14. Special Handling Instructions and Additional Information
01 D098220DET / NON HAZARDOUS IDW WATER 02 D098221DET / NON HAZARDOUS SOIL
24 HOUR EMERGENCY RESPONSE NUMBER 1-800-424-9300 PROVIDED BY SHAW E & I VIA CONTRACT WITH CHEMTREC. NASA Manifest tracking number N09031

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amy L. Bower
Signature: Amy L. Bower
Month Day Year: 04 29 09

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: DAVE GALL
Signature: Dave Gall
Month Day Year: 04 29 09
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year:

18. Discrepancy
18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tonya L. Howard
Signature:
Month Day Year: 04 29 09

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 006184141551K have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____
On behalf of EQ Detroit, Inc.

006184137JJK

Form Approved. OMB No. 2050-0039

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3 800 015 379
2. Page 1 of 1
3. Emergency Response Phone: 800 424-9300
4. Manifest Tracking Number: 006184137 JJK

GENERATOR

5. Generator's Name and Mailing Address: NASA - PLUMBROOK STATION
6100 COLUMBUS AVE
SANDUSKY OH 44870
Generator's Phone: ~~(419) 621-3234~~ 419-621-3234
Generator's Site Address (if different than mailing address): 6100 COLUMBUS AVE SANDUSKY, OH 44870

6. Transporter 1 Company Name: Triad Transport Inc.
U.S. EPA ID Number: OKD 981588791

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ DETROIT, INC
1923 FREDERICK
DETROIT, MI 48211
Facility's Phone: (313) 347-1300
U.S. EPA ID Number: MID 980 991 556

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN, NON DOT HAZARDOUS, NON RCRA REGULATED Water	63	DM	32,720	P	029L D.G.
	2. UN NON DOT HAZARDOUS NON RCRA REGULATED Soil	17	DM	10,200	P	NONE D.G.
	3.					
	4.					

14. Special Handling Instructions and Additional Information
01. D098220DET / NON HAZARDOUS IDW WATER 02. D098221DET / NON HAZARDOUS SOIL
24 HOUR EMERGENCY RESPONSE NUMBER 1-800-424-9300 PROVIDED BY SHAW E & I VIA CONTRACT WITH CHEMTREC. NASA Tracking number N09032

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amy L. Bower
Signature: Amy L. Bower
Month 04 Day 30 Year 09

INTL

16. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Date leaving U.S.:
Transporter signature (for exports only):

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Dave Gall
Signature: Dave Gall
Month 4 Day 30 Year 09
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
U.S. EPA ID Number

18b. Alternate Facility (or Generator)
Facility's Phone:
Month Day Year

18c. Signature of Alternate Facility (or Generator)

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tonya Stewart
Signature:
Month 04 Day 30 Year 09

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 006184137 have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: Mark Hudson

On behalf of EQ Detroit, Inc.

006184138JJK

Please print or type. (Form designed for use on elite (12-pitch) typewriter)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3 800 015 379
2. Page 1 of 1
3. Emergency Response Phone: 8004249300
4. Manifest Tracking Number: 006184138 JJK

5. Generator's Name and Mailing Address: NASA - PLUMBROOK STATION
6100 COLUMBUS AVE
SANDUSKY, OH 44870
Generator's Phone: ~~(216) 842-0331~~ 419-621-3234

Generator's Site Address (if different than mailing address):
6100 COLUMBUS AVE
SANDUSKY, OH 44870

6. Transporter 1 Company Name: Triad Transport, Inc.
U.S. EPA ID Number: OKD981588791

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ DETROIT, INC
1923 FREDERICK
DETROIT, MI 48211
Facility's Phone: (313) 347-1300
U.S. EPA ID Number: MID 980 991 566

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1 UN, NON DOT HAZARDOUS, NON RCRA REGULATED Water	60	DM	23,500	P	D29L		
	2 UN, NON DOT HAZARDOUS, NON RCRA REGULATED Soil	20	DM	18,000	P	NONE		
	3							
	4							

14. Special Handling Instructions and Additional Information
01 D098220DET / NON HAZARDOUS IDW WATER 02. D098221DET / NON HAZARDOUS SOIL
24 HOUR EMERGENCY RESPONSE NUMBER: 1-800-424-9300 PROVIDED BY SHAW,E & I VIA CONTRACT WITH CHEMTREC. NASA tracking number N09033

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Amy L. Bower
Signature: Amy L. Bower
Month 05 Day 01 Year 09

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Dave Gall
Signature: Dave Gall
Month 05 Day 01 Year 09
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tony Stewart
Signature:
Month 05 Day 01 Year 09

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 006184138 have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____
On behalf of EQ Detroit, Inc.

006184139JJK

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OHS 800 015 379
2. Page 1 of: 1
3. Emergency Response Phone: 800-424-9300
4. Manifest Tracking Number: 006184139 JJK

5. Generator's Name and Mailing Address: NASA - PLUMBROOK STATION, 6100 COLUMBUS AVE, SANDUSKY, OH 44870

Generator's Site Address (if different than mailing address): 6100 COLUMBUS AVE, SANDUSKY, OH 44870

Generator's Phone: ~~(216) 848-9991~~ 419-621-3234

6. Transporter 1 Company Name: Triad Trucking Company — U.S. EPA ID Number:

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ DETROIT, INC., 1923 FREDERICK, DETROIT, MI 48211 — U.S. EPA ID Number: MID 980 991 586

Facility's Phone: (313) 347-1300

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
	1. UN, NON DOT HAZARDOUS, NON RCRA REGULATED Water	56	DM	28,000 Gal	lbs	D29L		
	2. UN, NON DOT HAZARDOUS, NON RCRA REGULATED Soil	29	DM	14,500 Gal	lbs	NONE		
	3.							
	4.							

14. Special Handling Instructions and Additional Information

01. D098220DET / NON HAZARDOUS IDW WATER 02. D098221DET / NON HAZARDOUS SOIL
24 HOUR EMERGENCY RESPONSE NUMBER: 1-800-424-9300 PROVIDED BY SHAW E & I VIA CONTRACT WITH CHEMTREC. NASA - N09034

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr. — Signature: Robert F. Lallier on behalf of Director, GRL — Month 5 Day 5 Year 09

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. — Port of entry/exit: — Date leaving U.S.:
Transporter signature (for exports only):

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: DAVE BALL — Signature: Dave Ball — Month 05 Day 05 Year 09

Transporter 2 Printed/Typed Name: — Signature: — Month Day Year

18. Discrepancy

18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H111	H111		

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Danielle Edwards — Signature: Danielle Edwards — Month 05 Day 05 Year 09

GENERATOR — INTL — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 006184139 have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____
On behalf of EQ Detroit, Inc.

000310559FLE

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH380001537 9
2. Page 1 of: 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310559 FLE

5. Generator's Name and Mailing Address
NASA-Plumbrook Station
6100 Columbus Ave.
Sandusky, OH 44870
Generator's Phone: 216-642-0891

Generator's Site Address (if different than mailing address)
6100 Columbus Ave.
Sandusky, OH 44870

6. Transporter 1 Company Name: Triad Transport, Inc.
U.S. EPA ID Number: OKD981588791

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EQ Detroit, Inc.
1923 Frederick
Detroit, MI 48211
Facility's Phone: 313-347-1300
U.S. EPA ID Number: MID980991566

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN, Non Dot Hazardous, Non RCRA Regulated	19	DM	15,200	lbs	None
	2. UN, Non Dot Hazardous, Non RCRA Regulated	59	DM	23,600	lbs	0291
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1. D098221DET/ Non Hazardous Soil 2. D098220DET/ Non Hazardous IDW Water
24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr.
Signature: Robert F. Lallier on behalf of Director, GRC
Month Day Year: 06 16 09

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Benjamin D. Rhoads Sr.
Signature: Benjamin D. Rhoads Sr.
Month Day Year: 06 16 09
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year:

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
OK to change see 12 line 1 & 2 per Beth Crawford 6/16/09
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tonya C. Stewart
Signature:
Month Day Year: 06 16 09

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 000310559FLE have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____

On behalf of EQ Detroit, Inc.

000310584FLE

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3800015379
2. Page 1 of 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310584 FLE

5. Generator's Name and Mailing Address
NASA-Plumbrook Station
6100 Columbus Ave.
Sandusky, OH 44870
Generator's Phone: 216-642-0891

Generator's Site Address (if different than mailing address)
6100 Columbus Ave.
Sandusky, OH 44870

6. Transporter 1 Company Name: Triad Transport, Inc.
U.S. EPA ID Number: OKD981588791

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EQ Detroit, Inc.
1923 Frederick
Detroit, MI 48211
Facility's Phone: 313-347-1300
U.S. EPA ID Number: MID980991566

9a HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol.	13. Waste Codes
	1. UN, Non Dot Hazardous, Non RCRA Regulated		DM			
	2. UN, Non Dot Hazardous, Non RCRA Regulated	56	DM	22,400	lbs P	D029L
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1. D098221DET/Non Hazardous Soil 2. D098220DET/ Non Hazardous IDW Water
24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr.
Signature: Robert F. Lallier on behalf of Director, GRC
Month Day Year: Oct 17 09

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Benjamin D. Rhoads Sr.
Signature: Benjamin D. Rhoads Sr.
Month Day Year: 10 17 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18b
Printed/Typed Name: Tonya Stewart
Signature
Month Day Year: 10 17 09

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

000310583FLE

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3800015379
2. Page 1 of 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310583 FLE

5. Generator's Name and Mailing Address
NASA-Plumbrook Station
6100 Columbus Ave.
Sandusky, OH 44870
Generator's Phone: 216-642-0891

Generator's Site Address (if different than mailing address)
6100 Columbus Ave.
Sandusky, OH 44870

6. Transporter 1 Company Name: Triad Transport, Inc.
U.S. EPA ID Number: OKD981588791

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
EQ, Detroit, Inc.
1923 Frederick
Detroit, MI 48211
Facility's Phone: 313-347-1300
U.S. EPA ID Number: MID980991566

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol	13. Waste Codes
	1. UN, Non Dot Hazardous, Non RCRA Regulated	22	DM	17,600	P	
	2. UN, Non Dot Hazardous, Non RCRA Regulated	20	DM	8,000	P	0291
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1. D098221DET/ Non-Hazardous Soil 2. D098220DET/ Non Hazardous IDW Water
XX 24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr.
Signature: Robert F. Lallier Jr. on behalf of Director, GRC
Month 6 Day 18 Year 09

16. International Shipments ☐ Import to U.S ☐ Export from U.S Port of entry/exit:
Transporter signature (for exports only) Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Benjamin D. Rhoads Sr.
Signature: Benjamin D. Rhoads Sr.
Month 06 Day 18 Year 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3 4

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Tonya L Howard
Signature
Month 10 Day 18 Year 09

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 000310583FLE have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____

On behalf of EQ Detroit, Inc.

000310538FLE

Form Approved. OMB No 2050-0039

Please print or type (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3800015379
2. Page 1 of 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310538 FLE

5. Generator's Name and Mailing Address: Nasa-Plumbrook Station, 6100 Columbus Ave., Sandusky, OH 44870

Generator's Site Address (if different than mailing address): 6100 Columbus Ave., Sandusky, OH 44870

Generator's Phone: ~~216-642-0891~~ 419.621-3234

6. Transporter 1 Company Name: EQ Industrial Services — U.S. EPA ID Number: MID 000 263 871

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ, Detroit, Inc., 1923 Frederick, Detroit, MI 48211 — U.S. EPA ID Number: MID980991566

Facility's Phone: 313-347-1300

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN, Non DOT Hazardous, Non-RCRA Regulated	~~X~~ 3 CYS	D M	1,000 ~~150~~ est.	P	None
	2. UN, Non Dot Hazardous, Non-RCRA Regulated	~~X~~ 4	D M	210 est.	G	D029L
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9a1) D098221DET/ Non-Hazardous Soil 9a2) D098220DET/ Non-Hazardous IDW Water
24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr. — Signature: Robert F. Lallier — Month 9 Day 10 Year 09

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: Date leaving U.S.
Transporter signature (for exports only):

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Raymond Root — Signature: Raymond Root — Month 09 Day 10 Year 09
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H111 2. H111 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: David Patton — Signature — Month 09 Day 10 Year 09

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

EQ Detroit, Inc.

1923 FREDERICK STREET • DETROIT, MICHIGAN 48211 • tel 313-923-0080 • fax 313-923-3375 • www.eqonline.com

CERTIFICATE OF RECEIPT

This certificate is to verify that the wastes specified on manifest # 000310538FLE have been properly received at EQ Detroit and will be properly managed to meet all applicable local, state and federal standards.

FACILITY NAME:	EQ Detroit, Inc. EPA ID # MID 980991566
ADDRESS:	1923 Frederick Street Detroit, MI 48211
PHONE NUMBER:	313-923-0080 800-495-6059
FAX NUMBER:	313-923-3375

Authorized Signature: _____
On behalf of EQ Detroit, Inc.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH380001537 9
2. Page 1 of: 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310647 FLE

GENERATOR

Generator's Name and Mailing Address: Isa-Plumbrook Station
6100 Columbus Ave.
Sandusky, OH 44870
Generator's Phone: 216-642-0891

Generator's Site Address (if different than mailing address): 6100 Columbus Ave.
Sandusky, OH 44870

6. Transporter 1 Company Name: EQ Industrial Services
U.S. EPA ID Number: MI0000263871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Wayne Disposal, Inc.
49350 North I-94 Service Drive.
Belleville, MI 48111
Facility's Phone: 1-800-592-5489
U.S. EPA ID Number: MID048090633

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3077, Hazardous Waste Solid, n.o.s. (2,4-Dinitrotoluene) 9, PG III	4	DM	2400	P	D030		
	2.							
	3.							
	4.							

Special Handling Instructions and Additional Information

9a1) Approval #: L098097WDI-OTS ERG #: 171
24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec
NASA# 09012

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr.
Signature: Robert F. Lallier on behalf of Director, GRC
Month 12 Day 17 Year 09

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: DAYLE BLAIR
Signature: Dayle Blair
Month 12 Day 17 Year 09
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Land Disposal Restriction & Certification Form

Please check the appropriate facility:

☐ **Michigan Disposal Waste Treatment Plant**	49350 N. I-94 Service Drive, Belleville, MI 48111	EPA ID # MID 000 724 831
☒ **Wayne Disposal, Inc. Site #2 Landfill**	49350 N. I-94 Service Drive, Belleville, MI 48111	EPA ID # MID 048 090 633
☐ **EQ Detroit, Inc.**	1923 Frederick Street, Detroit, MI 48211	EPA ID # MID 980 991 566
☐ **EQ Resource Recovery, Inc.**	36345 Van Born Road, Romulus, MI 48174	EPA ID # MID 060 975 844
☐ **EQ North Carolina**	1005 Investment Blvd, Apex, NC 27502	EPA ID # NCD 982 170 292
☐ **EQ Florida, Inc.**	7202 East 8th Ave, Tampa, FL 33619	EPA ID # FLD 981 932 494

Generator Name: Nasa - Plumbrook **U.S. EPA ID No.:** OH3800015379

Generator Address: 6100 Columbus Ave Sandusky, OH 44870

State Manifest No.: _____ **Manifest Doc. No.:** C003101047 FLE

Instructions

Column 1: Identify all U.S. EPA hazardous waste codes that apply to this waste shipment.
Column 2: Choose the appropriate treatability group: Non-Wastewater (NWW) or Wastewater (WW).
Column 3: Enter the appropriate Subcategory, if applicable. Also enter "Contaminated Soil" or "Debris" if the waste will be treated using one of the alternative treatment technologies provided by 40 CFR 268.49 (c) – soil, or 40 CFR 268.45 – debris.
Column 4: Enter the letter of the appropriate paragraph from pages 1-2 of this form.
Column 5: For F001 – F005, F039, D001 – D043, Debris and Contaminated Soil: please enter the Reference Number(s) for any constituents in your waste stream subject to treatment. The Reference Number(s) can be found in the EQ Resource Guide, LDR/UHC Constituent Table.

Manifest Line Item	U.S. EPA Hazardous Waste Code (s)	NWW or WW	Subcategory	How Must the Waste be Managed?	Reference Number(s) of Hazardous Constituents contained in the waste. Complete for F001-F005, F039, D001-D043, Soil and Debris wastes.
9a ~~11A~~	D030	NWW	—	D	D030
11B					
11C					
11D					

I hereby certify that all information submitted on this and all associated documents is complete and accurate to the best of my knowledge and information.

Generator Signature: Robert F. Lallier **Title:** Env Manager

Printed Name: Robert F. Lallier Jr. **Date:** 12/17/09

How Must the Waste Be Managed?

S. THIS CONTAMINATED SOIL *DOES* / *DOES NOT* (CIRCLE ONE) CONTAIN LISTED HAZARDOUS WASTE AND *DOES* / *DOES NOT* (CIRCLE ONE) EXHIBIT A CHARACTERISTIC OF HAZARDOUS WASTE AND *IS SUBJECT TO* / *COMPLIES WITH* (CIRCLE ONE) THE SOIL TREATMENT STANDARDS AS PROVIDED BY 268.49(c) OR THE UNIVERSAL TREATMENT STANDARDS. I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

000310647 FLE

Land Disposal Restriction & Certification Form

A. THIS RESTRICTED WASTE REQUIRES TREATMENT TO THE APPLICABLE STANDARD. This waste must be treated to the applicable performance based treatment standard set forth in 40CFR Part 268 Subpart C and Subpart D, 268.40 or RCRA Section 3004(d) prior to land disposal.

B. THIS HAZARDOUS DEBRIS IS SUBJECT TO THE ALTERNATIVE TREATMENT STANDARDS OF 40 CFR 268.45.

C. THIS RESTRICTED WASTE HAS BEEN TREATED TO THE PERFORMANCE STANDARDS. I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40 without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

D. THIS RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT TREATMENT. I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR part 268 subpart D. I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

E. THIS LAB PACK DOES NOT CONTAIN ANY WASTES IDENTIFIED AT APPENDIX IV TO PART 268. I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only wastes that have not been excluded under appendix IV to 40 CFR part 268 and that this lab pack will be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.42(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.

F. THIS RESTRICTED WASTE HAS BEEN TREATED TO REMOVE THE HAZARDOUS CHARACTERISTIC AND CONTAINS UNDERLYING HAZARDOUS CONSTITUENTS THAT REQUIRE FURTHER TREATMENT TO MEET THE UNIVERSAL TREATMENT STANDARDS. I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

G. THIS RESTRICTED WASTE HAS BEEN TREATED TO REMOVE THE HAZARDOUS CHARACTERISTIC AND BEEN TREATED FOR UNDERLYING HAZARDOUS CONSTITUENTS. I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in §268.2(i) have been treated on-site to meet the §268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment..

H. THIS RESTRICTED WASTE IS SUBJECT TO AN EXEMPTION FROM LAND DISPOSAL. *(Please include the date the waste is subject to the prohibitions in Column 5)* This waste is subject to an exemption from a prohibition on the type of land disposal method utilized for the waste (such as, but not limited to, a case-by-case extension under 40 CFR Part 268.5, an exemption under 40 CFR 268.6, or a nationwide capacity variance under 40 CFR 269 Subpart C)

I. THIS RESTRICTED WASTE WITH TREATMENT STANDARDS EXPRESSED AS CONCENTRATIONS IN THE WASTE PURSUANT TO 268.43, IF COMPLIANCE WITH THE TREATMENT STANDARDS IN SUBPART D OF THIS PART IS BASED IN PART OR IN WHOLE ON THE ANALYTICAL DETECTION LIMIT ALTERNATIVE IN 268.439(c). I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by combustion units as specified in 268.42, Table 1. I have been unable to detect the nonwastewater organic constituents, despite having used best good-faith efforts to analyze for such constituents. I am aware there are significant penalties for submitting a false certifications, including the possibility of fine and imprisonment.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH3800015379
2. Page 1 of 1
3. Emergency Response Phone: 1-800-424-9300
4. Manifest Tracking Number: 000310535 FLE

GENERATOR

5. Generator's Name and Mailing Address
Nasa-Plumbrook Station
6100 Columbus Ave.
Sandusky, OH 44870
Generator's Phone: 216-642-0891

Generator's Site Address (if different than mailing address)
6100 Columbus Ave.
Sandusky, OH 44870

6. Transporter 1 Company Name: EQ Industrial Services
U.S. EPA ID Number: MI0000263871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
EQ Detroit Inc.
1923 Frederick
Detroit, MI 48211
Facility's Phone: 313-347-1300
U.S. EPA ID Number: MID980991566

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. UN, Non-DOT Hazardous, Non-RCRA Regulated Liquids	7	DM	300	G	029L
	2. UN, Non-DOT Hazardous, Non-RCRA Regulated Solids	1	DM	200	P	
	3.					
	4.					

14. Special Handling Instructions and Additional Information
NASA # N09103
9a1) D098220DET/Non-Hazardous IDW Water 9a2) D098221DET/Non-Hazardous Soil
24hr Emergency Response: 1-800-424-9300 provided by Shaw E&I via contract with Chemtrec

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Robert F. Lallier Jr. Signature: Robert F. Lallier on behalf of Director GRC Month 12 Day 17 Year 09

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: DAVE BLAIR Signature: Dave Blair Month 12 Day 17 Year 09
Transporter 2 Printed/Typed Name: Signature: Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name Signature Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

APPENDIX H

DATA VALIDATION SUMMARIES

Data Validation Summary Report
Locomotive and Railcar Sampling January – November 2009
Former Plum Brook Ordnance Works
Sandusky, Ohio

1.0 Introduction

Level IV data validation was performed on 100 percent of the environmental samples collected for the January 2009 through November 2009 sampling events. The analytical data consisted of sixteen sample delivery groups (0901027, 0901034, 0901043, 0901046, 0902003, F65207, F65210, F65220, F65372, F65383, F65407, F65408, F65442, F65444, F69251 and F69338), which were analyzed by AML Scientific of Olathe, Kansas and Accutest of Orlando, Florida. In addition, validation of the field-split data, six SDGs (A9A220198, A9A290152, A9E200268, A9E220318, A9E280112 and A9K070415), which were analyzed by Test America, was performed and findings are discussed in section 5.0 of this report. Water and soil matrices were validated.

The following samples were validated for this investigation:

SDG Number	Sample Number
0901027	LBA0026, LBA0027, LBA0029, LBA0030, LBA0031, LBA0032, LBA0033, LBA0034, LBA0035, LBA0036
0901034	LBA0001, LBA0002, LBA0003, LBA0004, LBA0005, LBA0006, LBA0007, LBA0008, LBA0010, LBA0011, LBA0012, LBA0013, LBA0014, LBA0015, LBA0016, LBA0017, LBA0018, LBA0019, LBA0020, LBA0021, LBA0023, LBA0024, LBA0025
0901043	LBA3001, LBA3003, LBA3006
0901046	LBA3004
0902003	LBA3000, LBA3005
F65207	LB3071
F65210	RC3078, RC3075, RC3076
F65220	LB3073, LB3067, RC3074
F65372	LB3068, LB3069, LB3074
F65383	LBA1000, LBS2000
F65407	LBA2001, LBA2002, LBA2003, LBA2005
F65408	LBA1001, LBA1002, LBA1003
F65442	LBA2006, LBA2007, LBA2008
F65444	LBA1004, LBA1005, LBA1006
F69251	LB3075, LB3080, RC3081, RC3082
F69338	LB3076, LB3077, RC3084, BEDGW-001-1109

The chemical parameters, for which the samples were analyzed, are identified below:

Parameter (Prep/Analytical Method)
Volatile Organics by GC/MS SW846 5030/8260B
Semivolatile Organics by GC/MS SW846 3510C/8270C
Total and Dissolved Metals by SW846 3005A/6010B and 7470A/7471
Nitroaromatic and Nitramine Explosives by SW846 8330M
PCBs by SW846 8082
Wet Chemistry (TOC, Sulfate, Nitrate, Chloride, Alkalinity, Turbidity, TDS, TSS, Hardness, Cyanide)

GC/MS – Gas chromatography/mass spectrometry. TOC - Total organic carbon.
TDS - Total dissolved solids. TSS – Total suspended solids.

2.0 Procedures

The sample data were validated following the logic identified in the EPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review (October 2004) and the EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Review (June 2008) for all areas except blanks. EPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (April 1993) and Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration (September 1994) were applied to the areas associated with blank contamination. Specific quality control (QC) criteria as identified in the quality assurance plan (QAP), analytical methods, and laboratory standard operating procedures (SOP) were applied to all sample results. As a result of the use of Update III SW846 test methods for the analytical data and the application of the Contract Laboratory Program (CLP) guidelines during the validation process, there were instances where the specific QC requirements for all target compounds were not defined. This primarily occurred in the organic, GC/MS calibration areas and is due to the fact that the analytical methods are performance-based and allow the use of average calibration responses in lieu of individual responses, which are defined by CLP protocol. In light of applying CLP guidelines to SW846 methods and evaluating the usability of the data during the validation process, specific QC criteria were determined to address all target compounds and are identified in this report for each parameter, as well as in the validation checklists, which function as worksheets. For those analytical methods not addressed by the CLP and Region III guidelines, the validation was based on the method requirements (i.e., SW846, Code of Federal Regulations, SOPs) and technical judgment, following the logic of the CLP validation guidelines. Lab-specific criteria may be found in Attachment A.

3.0 Summary of Data Validation Findings

The overall quality of the data was determined to be acceptable with minimal qualifications. The only rejected data ("R" qualified) was due to "poor performing" volatile compounds (ketones, some halogenated hydrocarbons, etc.), which experienced poor calibration responses in the associated calibration data and samples that were reanalyzed and have more than one set of results reported. The "R" qualifier was assigned to the samples with more than one set of results to indicate that a given result should not be used to characterize a particular constituent or an analysis for a given sample. For the Explosive analysis, surrogate recovery for sample RC3084 resulted in those data being rejected.

Individual validation reports have been prepared for each parameter, and the overall results of the validation findings are summarized in this report. A listing of the validation qualifiers and the reason codes, along with their definitions, is found in Attachment A. The following section highlights the key findings of the data validation for each analysis.

3.1 Missing Data

There were no form 1s submitted from the lab for the volatile analysis for samples LBA0032 and LBA0033 (from SDG 0901027) that were analyzed on 1/28/09; data for the analysis date of 01/30/09 for both samples were included in the data package.

Samples LB3007 and LB3008 were planned but never collected in the field.

4.0 Analysis-Specific Data Validation Summaries

4.1 Volatile Organics by GC/MS SW846 8260B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Sample Preservation

Sample preservation criteria were met for all samples, with the following exception(s):

SDG Number	Samples Affected	Analysis	Validation Qualifier
F65408	LBA1001, LBA1002, LBA1003	Volatiles	J/UJ/B

The laboratory noted in the case narrative samples LBA1001, LBA1002, and LBA1003 were received in a bulk container and were not preserved within 48 hours. However, samples were analyzed within recommended hold time. VOC results for LBA1001, LBA1002, and LBA1003 were qualified as estimated based on the data validators professional judgment.

Initial and Continuing Calibration

The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria with the following exception(s):

The following exhibited individual ICAL/CCAL relative response factor (RRF) <0.1:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0026, LBA0027, LBA0029, LBA0030, LBA0031, LBA0032, LBA0033, LBA0034, LBA0035, LBA0036	Acetone, Acrolein, 2-Butanone	J/R
0901034	LBA0001, LBA0002, LBA0003, LBA0004, LBA0005, LBA0006, LBA0007, LBA0008, LBA0010, LBA0011, LBA0012, LBA0013, LBA0014, LBA0015, LBA0016, LBA0017, LBA0018, LBA0019, LBA0020, LBA0021	Acetone, Acrolein, 2-Butanone	J/R
0901043	LBA3001, LBA3003, LBA3006	Acetone, Acrolein	J/R
0901046	LBA3004	Acetone, Acrolein	R
0902003	LBA3000, LBA3005	Acetone, Acrolein	R
F65210	RC3075, RC3076, RC3078	Acetone	J/R
F65220	LB3067, LB3073, RC3074	Acetone	R
F65372	LB3068, LB3069, LB3074	Acetone	J/R
F65383	LBA2000	Acetone	R
F65407	LBA2001, LBA2002, LBA2003, LBA2005	Acetone	R
F69338	LB3077, RC3084	Acetone	R

The following exhibited individual ICAL percent relative standard deviation > 30% and/or CCAL percent difference > 20%:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0026, LBA0027, LBA0029, LBA0031, LBA0035	Vinyl acetate	UJ
0901043	LBA3001, LBA3003, LBA3006	Trichlorofluoromethane	UJ
0902003	LBA3005	Acetone, Acrolein, Bromoform, Hexachlorobutadiene	UJ/R
F65372	LB3068, LB3074	Chloroethane	UJ
F65383	LBA2000	Chloroethane	UJ
F65408	LBA1001, LBA1002, LBA1003	Methylene Chloride, 2-Hexanone	B/UJ
F65442	LBA2006, LBA2007, LBA2008	Acetone	UJ
F65444	LBA1004, LBA1005, LBA1006	Acetone, Chloromethane	UJ

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable with the following exception(s):

SDG Number	Samples Affected	Compounds	Blank Contaminant	Validation Qualifier
F65408	LBA1001	Methylene Chloride	Equipment	B

Surrogate Recoveries

All surrogate recoveries were within QC limits, with the following exception(s):

SDG Number	Samples Affected	Analyte(s) Qualified	Validation Qualifier
0901027	LBA0026, LBA0027, LBA0031, LBA0034	Acetone, 2-Butanone	J
0901027	LBA0029, LBA0030, LBA0032, LBA0035,	Acetone	J
0901027	LBA0036	All analytes in sample	J/UJ/R
0901034	LBA0002, LBA0003, LBA0004, LBA0005, LBA0007, LBA0008, LBA0015, LBA0017, LBA0019, LBA0020, LBA0021,	All analytes in sample	J/UJ/R

Matrix Spike/Matrix Spike Duplicate

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0032	All analytes in sample	J/UJ/R
0901034	LBA0001	All analytes in sample	J/UJ
F65220	LB3073	Benzene	J
F65372	LB3068	1,1-Dichloroethylene*	J
F65408	LBA1002	Methylene Chloride, 2-Hexanone, Bromoform, 2-Butanone, Dibromochloromethane, tran-1,3-Dichloropropene, 4-Methyl-2-pentanone, 1,1,2-	B/UJ

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
F65442	LBA2008	Bromoform, Dibromochloromethane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Styrene	UJ

*Analyte qualified for %RPD outside QC limits for the MS/MSD analysis.

Laboratory Control Sample

Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met, with the following exception(s):

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
F65408	LBA1001	1,1,2,2-Tetrachloroethane	UJ

Field Duplicates

Original and field duplicate results were evaluated and no problems were identified with the following exception(s):

SDG	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0026(original), LBA0027(FD)	Acetone, 2-Butanone	J
0901034	LBA0007(original), LBA0008(FD)	Carbon disulfide	J
0901034	LBA0020(original), LBA0021(FD)	Acetone, Toluene	J
F65407	LBA2002(original), LBA2003(FD)	1,1-Dichloroethane	J

Internal Standards

All internal standards met QC criteria, with the following exception(s):

SDG Number	Samples Affected	Internal Standard	Affected Analyte(s)	Validation Qualifier
0901027	LBA0036	1,4-DCB-d4*	1,2,3-Trichloropropane, 1,1,2,2-Tetrachloroethane, Bromobenzene, n-Propylbenzene, 2-Chlorotoluene, 4-Chlorotoluene, 1,3,5-Trimethylbenzene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, sec-Butylbenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, 4-Isopropyltoluene, n-Butylbenzene, 1,2-Dibromo-3-chloropropane, 1,2,4-Trichlorobenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, Naphthalene	UJ
0901034	LBA0002, LBA0003, LBA0004, LBA0005, LBA0006, LBA0007, LBA0008, LBA0015, LBA0017, LBA0019, LBA0020, LBA0021,	1,4-DCB-d4*	1,2,3-Trichloropropane, 1,1,2,2-Tetrachloroethane, Bromobenzene, n-Propylbenzene, 2-Chlorotoluene, 4-Chlorotoluene, 1,3,5-Trimethylbenzene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, sec-Butylbenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, 4-Isopropyltoluene, n-Butylbenzene, 1,2-Dibromo-3-chloropropane,	UJ

SDG Number	Samples Affected	Internal Standard	Affected Analyte(s)	Validation Qualifier
			1,2,4-Trichlorobenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, Naphthalene	

*1,4-DCB-d4 is internal standard 1,4-Dichlorobenzene-d4.

Quantitation

Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

4.2 Semivolatile Organics by GC/MS SW846 8270C

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples, with the following exception(s):

SDG Number	Samples Affected	Analysis	Validation Qualifier
F65444	LBA1004	Semivolatiles	UJ

Sample Preservation

Sample preservation criteria were met for all samples.

Initial and Continuing Calibration

The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria with the following exception(s):

The following exhibited individual ICAL percent relative standard deviation > 30% and/or CCAL percent difference > 20%:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0030, LBA0033, LBA0034, LBA0035, LBA0036	2,4-Dinitrophenol	UJ
0901034	LBA0001, LBA0002, LBA0003, LBA0005, LBA0006, LBA0007, LBA0008, LBA0010, LBA0012, LBA0013, LBA0015, LBA0016, LBA0018, LBA0019	Hexachlorocyclopentadiene	UJ
0902003	LBA3000, LBA3005	Hexachlorocyclopentadiene	UJ

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable with the following exception(s):

SDG Number	Samples Affected	Compounds	Blank Contaminant	Validation Qualifier
F65372	LB3068	Di-n-butyl phthalate	Equipment	B

Surrogate Recoveries

All surrogate recoveries were within QC limits, with the following exception(s):

SDG Number	Samples Affected	Analyte(s) Qualified	Validation Qualifier
F69338	BEDGW-001-1109	All	J/R

Matrix Spike/Matrix Spike Duplicate

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901027	LBA0032	3,3'-Dichlorobenzidine	UJ
0901034	LBA0001	4-Chloroaniline*, 3,3'-Dichlorobenzidine*,	UJ
0901034	LBA0024	Bis(2-ethylhexyl)phthalate, Butyl benzyl phthalate*	J/UJ
0901043	LBA3006	2-Chloronaphthalene, 2-Chlorophenol, 2,4-Dichlorophenol, 4,6-Dinitro-2-methylphenol, 2,4-Dinitrophenol, 4-Methylphenol, 2-Nitrophenol, 4-Nitrophenol, Pentachlorophenol, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol	UJ
F65220	RC3074	4-Nitrophenol	UJ

*Analyte was qualified for %RPD outside QC limits for the MS/MSD analysis.

Laboratory Control Sample

Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Field Duplicates

Original and field duplicate results were evaluated and no problems were identified with the following exception(s):

SDG	Samples Affected	Compound(s)	Validation Qualifier
0901034	LBA0007(original), LBA0008(FD)	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)Fluoranthene, Chrysene, Fluoranthene, Phenanthrene, Pyrene	J
F65372	LB3068(original), LB3069(FD)	2,4-Dinitroluene, 2,6-Dinitrotoluene	J
F69338	LB3076(original), LB3077(FD)	2,4-Dinitroluene, 2,6-Dinitrotoluene	J

Internal Standards

All internal standards met QC criteria.

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

4.3 Total and Dissolved Metals by SW846 6010B/7470A/7471

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable, with the following exception(s):

SDG Number	Samples Affected	Analytes	Blank Contaminant	Validation Qualifier
F65210	RC3075, RC3076, RC3078	(Total) Zinc	Equipment	B
	RC3078	(Total) Selenium	Equipment	B
F65220	LB3067, LB3073	(Total) Aluminum	Equipment	B
	RC3074	(Total) Selenium	Equipment	B
F65372	LB3068, LB3069, LB3074	(Total) Aluminum	Equipment	B
F65442	LBA2008	(Total) Aluminum	Equipment	B
F69251	RC3081, RC3082	(Total) Lead	Prep	B
F69338	LB3076, LB3077	(Total) Lead	Prep	B
F69338	RC3084, BEDGW-001-1109	(Total) Zinc	Prep	B
F69338	LB3076, LB3077	(Filtered) Potassium	Prep	B

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
0901027	LBA0026, LBA0027, LBA0029, LBA0030, LBA0031, LBA0032, LBA0033, LBA0034, LBA0035, LBA0036	(Total) As, Ba*, Co*, Mg, Ni, Se, Ag*	J/UJ
0901034	LBA0001, LBA0002, LBA0003, LBA0004, LBA0005, LBA0006, LBA0007, LBA0008,	(Total) As, Be, Fe, Ni, Se	J/UJ

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
	LBA0010, LBA0011, LBA0012, LBA0013, LBA0014, LBA0015, LBA0016, LBA0017, LBA0018, LBA0019, LBA0020, LBA0021, LBA0023, LBA0024, LBA0025		
0901034	LBA0003, LBA0004, LBA0006, LBA0011, LBA0014, LBA0017, LBA0019, LBA0020, LBA0021, LBA0023, LBA0024, LBA0025	(Total) Sb	J/UJ
F65210	RC3075, RC3076, RC3078	(Filtered) Na	J
F65372	LB3068, LB3069, LB3074	(Total) Ca	J
F65408	LBA1001, LBA1002, LBA1003	(Total) Sb, As, Ca, Cr, Pb, Mg, Ni, K, Ag, Na, Tl, V, Zn	J/UJ
F69251	LB3075, LB3080, RC3081, RC3082	(Total) K, Se	J/UJ

*Analytes were qualified for %RPD outside QC limits for the MS/MSD analysis.

Laboratory Duplicate Sample Analysis

A Laboratory Duplicate Sample analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
F65220	LB3067, LB3073, RC3074	(Total) Al, Se	B/J
F65408	LBA1002	(Total) As, Ni, Zn	J
F69338	LB3076, LB3077	(Total) Pb	B
F69338	LB3076, RC3084	(Total) Se	J

Laboratory Control Sample

Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Interference Check Sample

All Interference Check Sample (ICS) percent recoveries were met the following exception(s):

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
F65383	LBA1000	(Total) Calcium	J

Inductively Coupled Plasma Serial Dilutions

All QC criteria were met for the serial dilutions associated with the project samples with the following exception(s):

SDG	Samples Affected	Analyte(s)	Validation Qualifier
0901027	LBA0026, LBA0027, LBA0029, LBA0030, LBA0031, LBA0032, LBA0033, LBA0034, LBA0035, LBA0036	(Total) Ba, Co, Mg, Ni, Be, Ca, Cr, Pb, Zn,	J

SDG	Samples Affected	Analyte(s)	Validation Qualifier
0901034	LBA0001, LBA0002, LBA0005, LBA0007, LBA0008, LBA0010, LBA0012, LBA0013, LBA0015, LBA0016, LBA0018	(Total) Be, Fe, Ni, Mg, Mn	J
0901034	LBA0003, LBA0004, LBA0006, LBA0011, LBA0014, LBA0017, LBA0019, LBA0020, LBA0021, LBA0023, LBA0024, LBA0025	(Total) Be, Ca, Co, Ni	J
F65408	LBA1001, LBA1002, LBA1003	(Total) Ca, Cr, Pb, Mg, Ni, V, Zn	J
F69251	LB3075, LB3080, RC3081, RC3082	(Total) K, Ca	J

Field Duplicates

Original and field duplicate results were evaluated and no problems were identified with the following exception(s):

SDG	Samples Affected	Analyte(s)	Validation Qualifier
0901027	LBA0026(original), LBA0027(FD)	(Total) Cadmium, Antimony	J
0901034	LBA0007(original), LBA0008(FD)	(Total) Iron, Nickel, Manganese, Barium, Cobalt, Lead	J
0901034	LBA0020(original), LBA0021(FD)	(Total) Manganese, Cobalt, Barium	J
0901043	LBA3006(original), LBA3001(FD)	(Filtered) Arsenic	J
F65372	LB3068(original), LB3069(FD)	(Total) Sodium (Filtered) Potassium	J
F69338	LB3076(original), LB3077(FD)	(Total) Lead (Filtered) Manganese	B/J

Quantitation

Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "B", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

4.4 Nitroaromatic and Nitroamine Explosives by SW846 8330

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Sample Preservation

Sample preservation criteria were met for all samples.

Initial and Continuing Calibration

The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits, with the following exceptions:

SDG Number	Samples Affected	Surrogate	Validation Qualifier
F65210	RC3078	All analytes in sample	UJ
F65372	LB3074	All analytes in sample	UJ
F69338	RC3084, BEDGW-001-1109	All analytes in sample	R

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
0901034	LBA0019	2,4-Dinitrotoluene	UJ
F65372	LB3068	2,4-Dinitrotoluene, 2-Nitrotoluene	J
F65408	LBA1002	4-Amino-2,6-dinitrotoluene, 2-Amino-4,6-dinitrotoluene	UJ
F69338	LB3076	2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene	J

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met, with the following exception(s):

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
0901034	LBA0006	2,6-Dinitrotoluene	J

Field Duplicates
Original and field duplicate results were evaluated and no problems were identified with the following exception(s):

SDG	Samples Affected	Compound(s)	Validation Qualifier
F65372	LB3068(original), LB3069(FD)	2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene	J
F69338	LB3076(original), LB3077(FD)	2,6-Dinitrotoluene, 2,4-Dinitrotoluene, 2-amino-4,6-Dinitrotoluene, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene	J

Second Column Confirmation
Samples having analytes with positive detects were verified on a second confirmation column; QC criteria (40% RPD) were met with the following exception(s):

SDG Number	Samples Affected	Analyte	Validation Qualifier
F69338	LB3076	4-amino-2,6-Dinitrotoluene, 2-amino-4,6-Dinitrotoluene	J

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

4.5 Polychlorinated Biphenyls (PCBs) by SW846 8082

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Field Duplicates
Original and field duplicate results were evaluated and no problems were identified.

Second Column Confirmation
Samples having analytes with positive detects were verified on a second confirmation column; QC criteria (40% RPD) were met with the following exception(s):

SDG Number	Samples Affected	Analyte	Validation Qualifier
0901027	LBA0031, LBA0032	Aroclor 1260	J

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

4.6 Wet Chemistry (TOC, Sulfate, Nitrate, Chloride, Alkalinity, Turbidity, TDS, TSS, Hardness, Cyanide

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples with the following exception(s):

SDG Number	Samples Affected	Analysis	Validation Qualifier
0901043	LBA3001, LBA3003, LBA3006	Turbidity	J
0901046	LBA3004	Turbidity	J
0902003	LBA3000, LBA3005	Turbidity	J
F65207	LB3071	Cyanide, Total	J
F65210	RC3078	Cyanide, Total	J
F65220	LB3073	Cyanide, Total	J
F65372	LB3068, LB3069, LB3074	Turbidity	J

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found acceptable.

Matrix Spike/Matrix Spike Duplicate
MS/MSD analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Analytes(s)	Validation Qualifier
0901043	LBA3001, LBA3003, LBA3006	Chloride, Sulfate	J
0902003	LBA3000, LBA3005	Chloride, Nitrate-Nitrite	J

SDG Number	Samples Affected	Analytes(s)	Validation Qualifier
F65207	LB3071	Cyanide, Total	J
F65372	LB3068, LB3069	Nitrate-Nitrite	J/UJ
F69338	LB3076, LB3077, RC3084, BEDGW-001-1109	Nitrate-Nitrite, Sulfate	J/UJ

Laboratory Duplicate Sample Analysis

A Laboratory Duplicate Sample analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Analytes(s)	Validation Qualifier
F65207	LB3071	Cyanide	J
F65372	LB3068	TDS	J

Laboratory Control Sample

LCS analysis was performed for the project samples, and all QC criteria were met.

Field Duplicates

Original and field duplicate results were evaluated and no problems were identified with the following exception(s):

SDG	Samples Affected	Compound(s)	Validation Qualifier
0901043	LBA3006(original), LBA3001(FD)	Total Dissolved Solids	J
F65372	LB3068(original), LB3069(FD)	Turbidity	J
F69338	LB3076(original), LB3077(FD)	Turbidity	J

Quantitation

Results quantified between the MDL and RL which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.0 Quality Assurance Field Split Sample Data Evaluation

Data from the quality assurance split samples, (SDGs: A9A220198, A9A290152, A9E200268, A9E220318, A9E280112 and A9K070415), were validated. The field split (FS) samples were analyzed for Volatiles by SW846 8260B, Semivolatiles by SW846 8270C, Explosives by SW846 8330, Polychlorinated Biphenyls (PCBs) by SW846 8280, Total and Dissolved Metals by SW 846 6010B and 7471A, and Wet Chemistry Analyses (TOC, Sulfate, Nitrate, Chloride, Alkalinity, Turbidity, TDS, TSS, Hardness, Cyanide). The following section highlights the key findings of the data validation for each analysis.

The following samples were validated for this site investigation:

SDG Number	Sample Number
A9A220198	LBA0009, LBA0022, LBA0028
A9A290152	LBA3002
A9E200268	LB3070
A9E220318	LBA2004

SDG Number	Sample Number
A9E280112	LBA1007
A9K070415	LB3079

5.1 Volatile Organics by GC/MS SW846 8260B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Sample Preservation

Sample preservation criteria were met for all samples.

Initial and Continuing Calibration

The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria with the following exception(s):

- The following exhibited individual ICAL/CCAL relative response factor (RRF) <0.1:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
A9E200268	LB3070	Bromomethane	R
A9E220318	LBA2004	Bromomethane, 1,2-Dibromo-3-chloropropane	R
A9E280112	LBA1007	1,2-Dibromo-3-chloropropane	R
A9K070145	LB3079	Chloroethane, 1,2-Dibromo-3-chloropropane	R

The following exhibited individual ICAL percent relative standard deviation > 30% and/or CCAL percent difference > 20%:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
A9A220198	LBA0009, LBA0022, LBA0028	Dichlorodifluoromethane, Trichlorofluoromethane	UJ
A9A290152	LBA3002	Bromoform, 1,2-Dibromo-3-chloropropane, Dibromochloromethane, Dichlorodifluoromethane, cis-1,3-Dichloropropene, 1,2,4-Trichlorobenzene	UJ
A9E200268	LB3070	Bromomethane, Chloroethane, 1,2-Dibromo-3-chloropropane, 1,3-Dichlorobenzene, Dichlorodifluoromethane, Methylcyclohexane, 1,2,4-Trichlorobenzene, Trichlorofluoromethane	R/UJ
A9E220318	LBA2004	Chloroethane	UJ
A9E280112	LBA1007	1,2-Dibromo-3-chloropropane	R
A9K070145	LB3079	Chloroethane, Carbon tetrachloride, Chloromethane, trans-1,3-Dichloropropene, 2-Hexanone	R/UJ

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Internal Standards
All internal standards met QC criteria, with the following exception(s):

SDG Number	Samples Affected	Internal Standard	Affected Analyte(s)	Validation Qualifier
A9A220198	LBA0009, LBA0022, LBA0028	1,4-DCB-d4*	Benzene, Bromodichloromethane, Bromoform, Carbon Tetrachloride, Dibromochloromethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, tran-1,3-Dichloropropene	UJ

*1,4-DCB-d4 is internal standard 1,4-Dichlorobenzene-d4.

Field Split/Original Sample Comparison
Table 2 shows the Regular/Field Duplicate/Field Split comparison of the data. A Relative Percent Difference is calculated for the analytes that were positive detects. Original, field duplicate and field split samples that had a volatile analysis performed are listed in the table below.

Sample/FD/FS
LBA0026 (Original) / LBA0027 (FD) / LBA0028(FS)
LBA0007 (Original) / LBA0008 (FD) / LBA0009 (FS)
LBA0020 (Original) / LBA0021 (FD) / LBA0022(FS)
LBA1005 (Original) / LBA1006 (FD) / LBA1007 (FS)
LBA3006 (Original) / LBA3001 (FD) / LBA3002 (FS)
LB3068 (Original) / LB3069 (FD) / LB3070 (FS)
LBA2002 (Original) / LBA2003 (FD) / LBA2004 (FS)
LB3076 (Original) / LB3077(FD) / LB3079 (FS)

Quantitation
Results quantitated between the MDL and the RL, which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.2 Semivolatile Organics by GC/MS SW846 8270C

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria with the following exception(s):

The following exhibited individual ICAL percent relative standard deviation > 30% and/or CCAL percent difference > 20%:

SDG Number	Samples Affected	Compound(s)	Validation Qualifier
A9A290152	LBA3002	Di-n-butyl phthalate, Pyrene	UJ

Blanks
The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Internal Standards
All internal standards met QC criteria.

Field Splits
The following table lists the Original/Field Duplicate/Field Split samples that were analyzed for semivolatiles.

Sample/FD/FS
LBA0026 (Original) / LBA0027 (FD) / LBA0028(FS)
LBA0007 (Original) / LBA0008 (FD) / LBA0009 (FS)
LBA0020 (Original) / LBA0021 (FD) / LBA0022(FS)

Sample/FD/FS
LBA1005 (Original) / LBA1006 (FD) / LBA1007 (FS)
LBA3006 (Original) / LBA3001 (FD) / LBA3002 (FS)
LB3068 (Original) / LB3069 (FD) / LB3070 (FS)
LBA2002 (Original) / LBA2003 (FD) / LBA2004 (FS)
LB3076 (Original) / LB3077(FD) / LB3079 (FS)

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.3 Total and Dissolved Metals by SW846 6010B/7470A/7471

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met with the following exception(s):

SDG Number	Samples Affected	Analyte(s)	Validation Qualifier
A9A220198	LBA0009, LBA0022, LBA0028	(Total) Sb, Mn, Ag*	J/UJ

*Analyte was qualified for %RPD outside QC limits for the MS/MSD analysis.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Interference Check Sample
All Interference Check Sample (ICS) percent recoveries were acceptable. All QC criteria were met.

Inductively Coupled Plasma Serial Dilutions
All QC criteria were met for the serial dilutions associated with the project samples.

Field Splits
Table 2 shows the Regular/Field Duplicate/Field Split comparison of the data. A Relative Percent Difference is calculated for the analytes that were positive detects. The samples (Original/FD/FS) that had a metal analysis performed are listed below:

Sample/FD/FS
LBA0026 (Original) / LBA0027 (FD) / LBA0028(FS)
LBA0007 (Original) / LBA0008 (FD) / LBA0009 (FS)
LBA0020 (Original) / LBA0021 (FD) / LBA0022(FS)
LBA1005 (Original) / LBA1006 (FD) / LBA1007 (FS)
LBA3006 (Original) / LBA3001 (FD) / LBA3002 (FS)
LB3068 (Original) / LB3069 (FD) / LB3070 (FS)
LBA2002 (Original) / LBA2003 (FD) / LBA2004 (FS)
LB3076 (Original) / LB3077(FD) / LB3079 (FS)

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "B", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.4 Nitroaromatic and Nitroamine Explosives by SW846 8330

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Field Splits
Original and field split results were evaluated and no problems were identified. All analytes were non-detect in the original and field split samples. Explosives by SW846 8330 analysis was performed on the original and field split samples listed below.

Sample/FD/FS
LBA0026 (Original) / LBA0027 (FD) / LBA0028(FS)
LBA0007 (Original) / LBA0008 (FD) / LBA0009 (FS)
LBA0020 (Original) / LBA0021 (FD) / LBA0022(FS)
LBA1005 (Original) / LBA1006 (FD) / LBA1007 (FS)
LBA3006 (Original) / LBA3001 (FD) / LBA3002 (FS)
LB3068 (Original) / LB3069 (FD) / LB3070 (FS)
LBA2002 (Original) / LBA2003 (FD) / LBA2004 (FS)
LB3076 (Original) / LB3077(FD) / LB3079 (FS)

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.5 Polychlorinated Biphenyls (PCBs) by SW846 8082

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
The initial calibration (ICAL) and continuing calibrations (CCAL) associated with the project samples met QC criteria.

Blanks
The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries
All surrogate recoveries were within QC limits.

Matrix Spike/Matrix Spike Duplicate
Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
Laboratory Control Sample (LCS) analysis was performed for the project samples and all QC criteria were met.

Second Column Confirmation
Samples having analytes with positive detects were verified on a second confirmation column; QC criteria (40% RPD) were met.

Field Splits
Original and field split results were evaluated and no problems were identified. All analytes were non-detect in the original and field split samples. A PCB analysis was performed on the original and field split samples listed below.

Sample/FD/FS
LBA0026 (Original) / LBA0027 (FD) / LBA0028(FS)
LBA0007 (Original) / LBA0008 (FD) / LBA0009 (FS)
LBA0020 (Original) / LBA0021 (FD) / LBA0022(FS)
LBA1005 (Original) / LBA1006 (FD) / LBA1007 (FS)
LBA2002 (Original) / LBA2003 (FD) / LBA2004 (FS)

Quantitation
Results quantitated between the method detection limit (MDL) and the reporting limit (RL), which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

5.6 Wet Chemistry (TOC, Sulfate, Nitrate, Chloride, Alkalinity, Turbidity, TDS, TSS, Hardness, Cyanide

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times
Technical holding time criteria were met for all samples.

Sample Preservation
Sample preservation criteria were met for all samples.

Initial and Continuing Calibration
All initial and continuing calibrations associated with the project samples met QC criteria, with the following exception(s):

SDG Number	Samples Affected	Analyte	Validation Qualifier
A9A290152	LBA3002	Chloride	J

Blanks
The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found acceptable.

Matrix Spike/Matrix Spike Duplicate
MS/MSD analysis was performed for the project samples, and all QC criteria were met.

Laboratory Control Sample
LCS analysis was performed for the project samples, and all QC criteria were met.

Field Splits
The original, field duplicate and field splits are listed in the below. Table 2 shows the comparison for original, field duplicate and field split samples that has positive detects.

Sample/FD/FS
LBA3006 (Original) / LBA3001 (FD) / LBA3002 (FS)
LB3068 (Original) / LB3069 (FD) / LB3070 (FS)
LB3076 (Original) / LB3077(FD) / LB3079 (FS)

Quantitation
Results quantified between the MDL and RL which the lab qualified as "J", were qualified as estimated "J" unless blank contamination was present or the results were rejected.

Appendix H

Laboratory and Validation Qualifier Definitions
Former Plum Brook Ordnance Works
Sandusky, Ohio

Qualifier	Definition
Laboratory	
B (metals)	The analyte was detected; the concentration is below the reporting limit.
B (organics)	Indicates analyte is found in associated method blank.
J (metals)	The compound was detected in the blank.
J (organics)	The compound was positively identified; the reported value is below the reporting limit.
U	Not detected. The compound was analyzed for, but not detected above the associated reporting limit.
E	Indicates that the result is above the maximum calibration range.
N	Indicates presumptive evidence of a compound.
P	RPD > 40% between the primary and confirmation column results for dual column chromatographic method (e.g. GC and HPLC methods).
*	Exceeds QC limit.
Q1	The %D or %Drift for the associated CCV is outside the method QC limit.
ME	Marginal Exceedence of the 3-sigma QC limits.
ME*	Exceedence of the 4-sigma QC limits.
Validation	
B	The compound/analyte was detected in a lab or field blank.
J	The compound/analyte was positively identified; the reported value is an estimated concentration.
U	Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
UJ	The analyte is not detected; the result is an estimated value.
R	Analyte is rejected.

Appendix H

Summary of Data Validation Reason Codes
Former Plum Brook Ordnance Works
Sandusky, Ohio

Reason Code	Description
01	Sample received outside of 4+/-2 degrees Celsius
01A	Improper sample preservation
02	Holding Time Exceeded
02A	Extraction
02B	Analysis
03	Instrument Performance - Outside Criteria
03A	BFB
03B	DFTPP
03C	DDT and/or Endrin % breakdown exceeds criteria
03D	retention time windows
03E	Resolution
04	Initial Calibration results outside specified criteria
04A	Compound mean RRF<0.05
04B	Compound %RSD>30
04C	Correlation Coefficient<0.995
05	Continuing Calibration results outside specified criteria
05A	Compound mean RRF<0.05
05B	Compound %D>25
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or Preparation Blank
06B	ICB or CCB
06C	ER
06D	TB
06E	FB
07	Surrogate Recoveries outside control limits
07A	Sample
07B	Associated method blank or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	%RPD outside acceptance criteria (precision)
09	Post Digestion Spike outside criteria (GFAA)
10	Internal Standards outside specified control limits
10A	Recovery
10B	Retention Time
11	Laboratory Control Sample recoveries outside specified control limits
11A	Recovery
11B	%RPD (if run in duplicate)
12	Interference Check Standard
13	Serial Dilution
14	Tentatively Identified Compounds
15	Quantitation
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria exceeded
18	Percent difference between original and second column > 25%
19	Professional judgement was used to qualify the data
20	Pesticide clean-up checks
21	Target compound identification
22	Radiological calibration
23	Radiological quantitation
24	Reported result and/or lab qualifier revised to reflect validation findings
999	See hard copy for details.

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML Scientific, LLC			Test America		
	Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Volatile Organic Compounds, SW846 8260B									
Acetone	61 - 144	61 - 144	29	20 - 160	20 - 160	30	N/A	N/A	N/A
Acrolein	N/A	N/A	N/A	64 - 130	64 - 130	30	N/A	N/A	N/A
Acrylonitrile	N/A	N/A	N/A	72 - 129	72 - 129	30	N/A	N/A	N/A
Benzene	78 - 130	78 - 130	25	75 - 125	75 - 125	30	75 - 129	75 - 129	N/A
Bromobenzene	N/A	N/A	N/A	65 - 120	65 - 120	30	N/A	N/A	N/A
Bromochloromethane	N/A	N/A	N/A	70 - 125	70 - 125	30	N/A	N/A	N/A
Bromodichloromethane	73 - 122	73 - 122	25	70 - 130	70 - 130	30	N/A	N/A	N/A
Bromoform	70 - 139	70 - 139	26	55 - 135	55 - 135	30	N/A	N/A	N/A
Bromomethane	N/A	N/A	N/A	30 - 160	30 - 160	30	N/A	N/A	N/A
2-Butanone	N/A	N/A	N/A	30 - 160	30 - 160	30	N/A	N/A	N/A
Chlorobenzene	83 - 122	83 - 122	23	75 - 125	75 - 125	30	75 - 127	75 - 127	N/A
Chloroethane	61 - 153	61 - 153	31	40 - 155	40 - 155	30	N/A	N/A	N/A
Chloromethane	N/A	N/A	N/A	50 - 130	50 - 130	30	N/A	N/A	N/A
Chloroform	79 - 129	79 - 129	27	70 - 125	70 - 125	30	N/A	N/A	N/A
2-Chlorotoluene	N/A	N/A	N/A	70 - 130	70 - 130	30	N/A	N/A	N/A
4-Chlorotoluene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
Carbon disulfide	61 - 142	61 - 142	27	45 - 160	45 - 160	30	N/A	N/A	N/A
Carbon tetrachloride	79 - 135	79 - 135	29	65 - 135	65 - 135	30	N/A	N/A	N/A
1,2-Dibromoethane	N/A	N/A	N/A	70 - 125	70 - 125	30	N/A	N/A	N/A
1,2-Dibromo-3-chloropropane	N/A	N/A	N/A	40 - 135	40 - 135	30	N/A	N/A	N/A
1,1-Dichloroethane	77 - 132	77 - 132	26	75 - 125	75 - 125	30	N/A	N/A	N/A
1,1-Dichloroethylene	66 - 132	66 - 132	27	65 - 135	65 - 135	30	55 - 142	55 - 142	N/A
1,2-Dichloroethane	78 - 129	78 - 129	24	70 - 135	70 - 135	30	N/A	N/A	N/A
1,2-Dichloropropane	74 - 127	74 - 127	27	70 - 120	70 - 120	30	N/A	N/A	N/A
1,3-Dichloropropane	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
2,2-Dichloropropane	N/A	N/A	N/A	65 - 135	65 - 135	30	N/A	N/A	N/A
1,1-Dichloropropene	N/A	N/A	N/A	70 - 135	70 - 135	30	N/A	N/A	N/A
1,2-Dichlorobenzene	N/A	N/A	N/A	75 - 120	75 - 120	30	N/A	N/A	N/A
1,3-Dichlorobenzene	N/A	N/A	N/A	70 - 125	70 - 125	30	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	70 - 125	70 - 125	30	N/A	N/A	N/A
Dibromochloromethane	78 - 117	78 - 117	27	65 - 130	65 - 130	30	N/A	N/A	N/A
Dibromomethane	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
Dichlorodifluoromethane	N/A	N/A	N/A	35 - 135	35 - 135	30	N/A	N/A	N/A
cis-1,2-Dichloroethylene	74 - 123	74 - 123	26	65 - 125	65 - 125	30	N/A	N/A	N/A
cis-1,3-Dichloropropene	79 - 130	79 - 130	23	70 - 125	70 - 125	30	N/A	N/A	N/A
trans-1,2-Dichloroethylene	77 - 129	77 - 129	27	65 - 135	65 - 135	30	N/A	N/A	N/A
trans-1,3-Dichloropropene	87 - 131	87 - 131	27	65 - 125	65 - 125	30	N/A	N/A	N/A
Ethylbenzene	82 - 124	82 - 124	25	75 - 125	75 - 125	30	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML Scientific, LLC			Test America		
	Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
2-Hexanone	67 - 130	67 - 130	29	45 - 145	45 - 145	30	N/A	N/A	N/A
Hexachlorobutadiene	N/A	N/A	N/A	55 - 140	55 - 140	30	N/A	N/A	N/A
Isopropylbenzene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
4-Isopropyltoluene	N/A	N/A	N/A	75 - 135	75 - 135	30	N/A	N/A	N/A
4-Methyl-2-pentanone	69 - 125	69 - 125	24	45 - 145	45 - 145	30	N/A	N/A	N/A
Methyl bromide	60 - 146	60 - 146	31	N/A	N/A	N/A	N/A	N/A	N/A
Methyl chloride	58 - 163	58 - 163	26	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	62 - 140	62 - 140	25	55 - 140	55 - 140	30	N/A	N/A	N/A
Methyl ethyl ketone	66 - 134	66 - 134	23	N/A	N/A	N/A	N/A	N/A	N/A
Methyl tert-Butyl ether	N/A	N/A	N/A	81 - 126	81 - 126	30	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	40 - 125	40 - 125	30	N/A	N/A	N/A
n-Butylbenzene	N/A	N/A	N/A	65 - 140	65 - 140	30	N/A	N/A	N/A
n-Propylbenzene	N/A	N/A	N/A	65 - 135	65 - 135	30	N/A	N/A	N/A
Styrene	79 - 123	79 - 123	28	75 - 125	75 - 125	30	N/A	N/A	N/A
sec-Butylbenzene	N/A	N/A	N/A	65 - 130	65 - 130	30	N/A	N/A	N/A
1,1,1-Trichloroethane	80 - 133	80 - 133	27	70 - 135	70 - 135	30	N/A	N/A	N/A
1,2,3-Trichloropropane	N/A	N/A	N/A	65 - 130	65 - 130	30	N/A	N/A	N/A
1,1,1,2-Tetrachloroethane	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	70 - 128	70 - 128	30	55 - 130	55 - 130	30	N/A	N/A	N/A
1,1,2-Trichloroethane	76 - 118	76 - 118	28	60 - 125	60 - 125	30	N/A	N/A	N/A
1,3,5-Trimethylbenzene	N/A	N/A	N/A	65 - 135	65 - 135	30	N/A	N/A	N/A
1,2,3-Trichlorobenzene	N/A	N/A	N/A	60 - 135	60 - 135	30	N/A	N/A	N/A
1,2,4-Trichlorobenzene	N/A	N/A	N/A	65 - 130	65 - 130	30	N/A	N/A	N/A
1,2,4-Trimethylbenzene	N/A	N/A	N/A	65 - 135	65 - 135	30	N/A	N/A	N/A
tert-Butylbenzene	N/A	N/A	N/A	65 - 130	65 - 130	30	N/A	N/A	N/A
Tetrachloroethylene	79 - 132	79 - 132	27	65 - 140	65 - 140	30	N/A	N/A	N/A
Toluene	80 - 123	80 - 123	26	70 - 125	70 - 125	30	71 - 130	71 - 130	N/A
Trichloroethylene	78 - 132	78 - 132	28	75 - 125	75 - 125	30	70 - 131	70 - 131	N/A
Trichlorofluoromethane	N/A	N/A	N/A	25 - 185	25 - 185	30	N/A	N/A	N/A
Vinyl acetate	N/A	N/A	N/A	71 - 126	71 - 126	30	N/A	N/A	N/A
Vinyl chloride	60 - 145	60 - 145	29	60 - 125	60 - 125	30	N/A	N/A	N/A
m-Xylene/p-Xylene	N/A	N/A	N/A	80 - 125	80 - 125	30	N/A	N/A	N/A
o-Xylene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
Xylene (total)	83 - 127	83 - 127	24	N/A	N/A	N/A	N/A	N/A	N/A
Semivolatile Organic Compounds, SW-846 8270C									
Benzoic Acid	44 - 116	44 - 116	36	0 - 110	0 - 110	25	N/A	N/A	N/A
2-Chlorophenol	54 - 97	54 - 97	31	45 - 105	45 - 105	25	32 - 110	32 - 110	30
4-Chloro-3-methyl phenol	59 - 102	59 - 102	27	45 - 115	45 - 115	25	32 - 117	32 - 117	30
2,4-Dichlorophenol	60 - 101	60 - 101	30	45 - 110	45 - 110	25	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML Scientific, LLC			Test America		
	Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
2,4-Dimethylphenol	49 - 89	49 - 89	31	30 - 105	30 - 105	25	N/A	N/A	N/A
2,4-Dinitrophenol	39 - 107	39 - 107	40	15 - 130	15 - 130	25	N/A	N/A	N/A
4,6-Dinitro-o-cresol	58 - 109	58 - 109	37	30 - 135	30 - 135	25	N/A	N/A	N/A
2-Methylphenol	53 - 94	53 - 94	29	40 - 105	40 - 105	25	N/A	N/A	N/A
3&4-Methylphenol	54 - 95	54 - 95	31	N/A	N/A	25	N/A	N/A	N/A
4-Methylphenol	N/A	N/A	N/A	40 - 105	40 - 105	25	N/A	N/A	N/A
2-Nitrophenol	55 - 96	55 - 96	30	40 - 110	40 - 110	25	N/A	N/A	N/A
4-Nitrophenol	56 - 106	56 - 106	29	15 - 140	15 - 140	25	10 - 125	10 - 125	30
Pentachlorophenol	50 - 115	50 - 115	33	25 - 120	25 - 120	25	10 - 182	10 - 182	30
Phenol	55 - 99	55 - 99	28	40 - 100	40 - 100	25	10 - 144	10 - 144	30
2,4,5-Trichlorophenol	60 - 101	60 - 101	28	50 - 110	50 - 110	25	N/A	N/A	N/A
2,4,6-Trichlorophenol	60 - 100	60 - 100	27	45 - 110	45 - 110	25	N/A	N/A	N/A
Acenaphthene	59 - 97	59 - 97	29	45 - 110	45 - 110	25	10 - 200	10 - 200	30
Acenaphthylene	58 - 98	58 - 98	30	45 - 105	45 - 105	25	N/A	N/A	N/A
Anthracene	61 - 104	61 - 104	29	55 - 105	55 - 105	25	N/A	N/A	N/A
Benzo(a)anthracene	60 - 106	60 - 106	31	50 - 110	50 - 110	25	N/A	N/A	N/A
Benzo(a)pyrene	59 - 102	59 - 102	32	50 - 110	50 - 110	25	N/A	N/A	N/A
Benzo(b)fluoranthene	60 - 107	60 - 107	31	45 - 115	45 - 115	25	N/A	N/A	N/A
Benzo(g,h,i)perylene	56 - 103	56 - 103	32	40 - 125	40 - 125	25	N/A	N/A	N/A
Benzo(k)fluoranthene	61 - 107	61 - 107	30	45 - 125	45 - 125	25	N/A	N/A	N/A
4-Bromophenol phenyl ether	60 - 104	60 - 104	26	45 - 115	45 - 115	25	N/A	N/A	N/A
Butyl benzyl phthalate	57 - 110	57 - 110	28	50 - 125	50 - 125	25	N/A	N/A	N/A
Benzyl Alcohol	N/A	N/A	N/A	20 - 125	20 - 125	25	N/A	N/A	N/A
Butyl Alcohol	51 - 102	51 - 102	34	N/A	N/A	N/A	N/A	N/A	N/A
2-Chloronaphthalene	57 - 95	57 - 95	28	45 - 105	45 - 105	25	N/A	N/A	N/A
4-Chloroaniline	19 - 85	19 - 85	34	10 - 95	10 - 95	25	N/A	N/A	N/A
Carbazole	60 - 106	60 - 106	30	45 - 115	45 - 115	25	N/A	N/A	N/A
Chrysene	60 - 107	60 - 107	31	55 - 110	55 - 110	25	N/A	N/A	N/A
bis(2-Chloroethyoxy)methane	51 - 89	51 - 89	30	45 - 110	45 - 110	25	N/A	N/A	N/A
bis(2-Chloroethyl)ether	50 - 96	50 - 96	33	40 - 105	40 - 105	25	N/A	N/A	N/A
bis(2-Chloroisopropyl)ether	44 - 94	44 - 94	32	20 - 115	20 - 115	25	N/A	N/A	N/A
4-Chlorophenyl phenyl ether	60 - 101	60 - 101	26	45 - 110	45 - 110	25	N/A	N/A	N/A
1,2-Dichlorobenzene	47 - 91	47 - 91	35	45 - 95	45 - 95	25	N/A	N/A	N/A
1,3-Dichlorobenzene	45 - 86	45 - 86	36	40 - 100	40 - 100	25	N/A	N/A	N/A
1,4-Dichlorobenzene	45 - 88	45 - 88	36	35 - 105	35 - 105	25	26 - 110	26 - 110	30
2,4-Dinitrotoluene	59 - 103	59 - 103	30	50 - 115	50 - 115	25	42 - 118	42 - 118	30
2,6-Dinitrotoluene	57 - 99	57 - 99	30	50 - 110	50 - 110	25	N/A	N/A	N/A
3,3'-Dichlorobenzidine	34 - 88	34 - 88	31	10 - 130	10 - 130	25	N/A	N/A	N/A
Dibenzo(a,h)antracene	57 - 105	57 - 105	29	40 - 125	40 - 125	25	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML Scientific, LLC			Test America		
	Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Dibenzofuran	58 - 103	58 - 103	27	50 - 105	50 - 105	25	N/A	N/A	N/A
Di-n-butyl phthalate	59 - 105	59 - 105	27	55 - 110	55 - 110	25	N/A	N/A	N/A
Di-n-octyl phthalate	59 - 117	59 - 117	28	40 - 130	40 - 130	25	N/A	N/A	N/A
Diethyl phthalate	59 - 106	59 - 106	27	50 - 115	50 - 115	25	N/A	N/A	N/A
Dimethyl phthalate	60 - 100	60 - 100	26	50 - 110	50 - 110	25	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	57 - 111	57 - 111	29	45 - 125	45 - 125	25	N/A	N/A	N/A
Fluoranthene	60 - 110	60 - 110	32	55 - 115	55 - 115	25	N/A	N/A	N/A
Fluorene	60 - 99	60 - 99	30	50 - 110	50 - 110	25	N/A	N/A	N/A
Hexachlorobenzene	58 - 103	58 - 103	27	45 - 120	45 - 120	25	N/A	N/A	N/A
Hexachlorobutadiene	49 - 95	49 - 95	33	40 - 115	40 - 115	25	N/A	N/A	N/A
Hexachlorocyclopentadiene	36 - 94	36 - 94	41	45 - 135	45 - 135	25	N/A	N/A	N/A
Hexachloroethane	44 - 89	44 - 89	38	35 - 110	35 - 110	25	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	57 - 104	57 - 104	33	40 - 120	40 - 120	25	N/A	N/A	N/A
Isophorone	58 - 97	58 - 97	30	45 - 110	45 - 110	25	N/A	N/A	N/A
2-Methylnaphthalene	57 - 103	57 - 103	32	45 - 105	45 - 105	25	N/A	N/A	N/A
2-Nitroaniline	53 - 106	53 - 106	29	45 - 120	45 - 120	25	N/A	N/A	N/A
3-Nitroaniline	29 - 85	29 - 85	31	25 - 110	25 - 110	25	N/A	N/A	N/A
4-Nitroaniline	49 - 104	49 - 104	31	35 - 115	35 - 115	25	N/A	N/A	N/A
Naphthalene	54 - 93	54 - 93	32	40 - 105	40 - 105	25	N/A	N/A	N/A
Nitrobenzene	53 - 92	53 - 92	32	40 - 115	40 - 115	25	N/A	N/A	N/A
N-Nitroso-di-n-propylamine	49 - 94	49 - 94	28	40 - 115	40 - 115	25	30 - 121	30 - 121	30
N-Nitrosodimethylamine	N/A	N/A	N/A	20 - 115	20 - 115	25	N/A	N/A	N/A
N-Nitrosodiphenylamine	53 - 107	53 - 107	28	50 - 115	50 - 115	25	N/A	N/A	N/A
Phenanthrene	61 - 103	61 - 103	32	50 - 110	50 - 110	25	N/A	N/A	N/A
Pyrene	58 - 109	58 - 109	33	45 - 125	45 - 125	25	10 - 200	10 - 200	30
Diphenylamine	N/A	N/A	N/A	45 - 135	45 - 135	25	N/A	N/A	N/A
1,2,4-Trichlorobenzene	52 - 93	52 - 93	32	45 - 110	45 - 110	25	33 - 110	33 - 110	30
Nitroaromatics and Nitroamines, SW-846 8330									
HMX	75 - 156	75 - 156	27	75 - 125	75 - 125	50	75 - 125	75 - 125	N/A
RDX	77 - 131	77 - 131	28	70 - 135	70 - 135	50	70 - 135	70 - 135	N/A
1,3-Dinitrobenzene	82 - 134	82 - 134	20	80 - 125	80 - 125	50	80 - 125	80 - 125	N/A
2,6-Dinitrotoluene	86 - 142	86 - 142	17	80 - 120	80 - 120	50	80 - 120	80 - 120	N/A
2,4-Dinitrotoluene	74 - 129	74 - 129	18	80 - 125	80 - 125	50	80 - 125	80 - 125	N/A
2-amino-4,6-Dinitrotoluene	83 - 123	83 - 123	22	80 - 125	80 - 125	50	80 - 125	80 - 125	N/A
4-amino-2,6-Dinitrotoluene	85 - 137	85 - 137	18	80 - 125	80 - 125	50	80 - 125	80 - 125	N/A
Nitrobenzene	82 - 138	82 - 138	19	75 - 125	75 - 125	50	75 - 125	75 - 125	N/A
o-Nitrotoluene	85 - 129	85 - 129	21	75 - 120	75 - 120	50	75 - 120	75 - 120	N/A
m-Nitrotoluene	85 - 136	85 - 136	22	80 - 125	80 - 125	50	80 - 125	80 - 125	N/A
p-Nitrotoluene	86 - 133	86 - 133	19	75 - 125	75 - 125	50	75 - 125	75 - 125	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML Scientific, LLC			Test America		
	Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD		Soil - LCS	Soil - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Tetryl	53 - 124	53 - 124	22	10 - 150	10 - 150	50	10 - 150	10 - 150	N/A
1,3,5-Trinitrobenzene	81 - 138	81 - 138	24	75 - 125	75 - 125	50	75 - 125	75 - 125	N/A
2,4,6-Trinitrotoluene	70 - 137	70 - 137	29	55 - 140	55 - 140	50	55 - 140	55 - 140	N/A
PCBs, SW-846 8082									
Aroclor-1016	69 - 117	69 - 117	26	40 - 140	40 - 140	20	10 - 199	10 - 199	30
Aroclor-1260	71 - 121	71 - 121	30	60 - 130	60 - 130	20	10 - 199	10 - 199	30
Metals, SW-846 6010B/7470A									
Aluminum	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Antimony	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Arsenic	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Barium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Beryllium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Cadmium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Calcium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Chromium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Cobalt	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Copper	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Iron	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Lead	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Magnesium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Manganese	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Nickel	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Potassium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Selenium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Silver	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Sodium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Thallium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Vanadium	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Zinc	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Mercury	80 - 120	80 - 120	20	75 - 125	75 - 125	35	80 - 120	75 - 125	20
Total Organic Carbon (TOC) SW-846 9060									
TOC			25	70 - 130					

LCS - Laboratory Control Sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate
RPD - Relative Percent Difference
N/A - Not Applicable

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Volatile Organic Compounds, SW846 8260B									
Acetone	59 - 134	59 - 134	14	40 - 140	40 - 140	30	N/A	N/A	N/A
Acrolein	N/A	N/A	N/A	54 - 142	54 - 142	30	N/A	N/A	N/A
Acrylonitrile	N/A	N/A	N/A	40 - 140	40 - 140	30	N/A	N/A	N/A
Benzene	83 - 124	83 - 124	11	80 - 120	80 - 120	30	78 - 118	78 - 118	N/A
Bromobenzene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
Bromochloromethane	N/A	N/A	N/A	65 - 130	65 - 130	30	N/A	N/A	N/A
Bromodichloromethane	76 - 116	76 - 116	10	75 - 120	75 - 120	30	N/A	N/A	N/A
Bromomethane	N/A	N/A	N/A	30 - 145	30 - 145	30	N/A	N/A	N/A
Bromoform	68 - 128	68 - 128	11	70 - 130	70 - 130	30	N/A	N/A	N/A
2-Butanone	N/A	N/A	N/A	30 - 150	30 - 150	30	N/A	N/A	N/A
Chlorobenzene	87 - 115	87 - 115	9	80 - 120	80 - 120	30	76 - 117	76 - 117	N/A
Chloroethane	54 - 166	54 - 166	20	60 - 135	60 - 135	30	N/A	N/A	N/A
Chloromethane	N/A	N/A	N/A	40 - 125	40 - 125	30	N/A	N/A	N/A
Chloroform	85 - 123	85 - 123	10	65 - 135	65 - 135	30	N/A	N/A	N/A
2-Chlorotoluene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
4-Chlorotoluene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
Carbon disulfide	67 - 147	67 - 147	12	35 - 160	35 - 160	30	N/A	N/A	N/A
Carbon tetrachloride	74 - 139	74 - 139	13	65 - 140	65 - 140	30	N/A	N/A	N/A
1,2-Dibromoethane	N/A	N/A	N/A	80 - 120	80 - 120	30	N/A	N/A	N/A
1,1-Dichloroethane	82 - 127	82 - 127	10	70 - 135	70 - 135	30	N/A	N/A	N/A
1,1-Dichloroethylene	75 - 133	75 - 133	13	70 - 130	70 - 130	30	62 - 130	62 - 130	N/A
1,1-Dichloropropene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
1,2-Dichloroethane	76 - 122	76 - 122	11	70 - 130	70 - 130	30	N/A	N/A	N/A
1,2-Dichloropropane	81 - 120	81 - 120	11	75 - 125	75 - 125	30	N/A	N/A	N/A
1,2-Dichlorobenzene	N/A	N/A	N/A	70 - 120	70 - 120	30	N/A	N/A	N/A
1,3-Dichlorobenzene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
1,3-Dichloropropane	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
2,2-Dichloropropane	N/A	N/A	N/A	70 - 135	70 - 135	30	N/A	N/A	N/A
Dibromochloromethane	74 - 116	74 - 116	11	60 - 135	60 - 135	30	N/A	N/A	N/A
Dibromomethane	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
Dichlorodifluoromethane	N/A	N/A	N/A	30 - 155	30 - 155	30	N/A	N/A	N/A
1,2-Dibromo-3-chloropropane	N/A	N/A	N/A	50 - 130	50 - 130	30	N/A	N/A	N/A
cis-1,2-Dichloroethylene	81 - 114	81 - 114	10	70 - 125	70 - 125	30	N/A	N/A	N/A
cis-1,3-Dichloropropene	83 - 119	83 - 119	10	70 - 130	70 - 130	30	N/A	N/A	N/A
trans-1,2-Dichloroethylene	82 - 126	82 - 126	10	60 - 140	60 - 140	30	N/A	N/A	N/A
trans-1,3-Dichloropropene	87 - 123	87 - 123	10	55 - 140	55 - 140	30	N/A	N/A	N/A
Ethylbenzene	87 - 118	87 - 118	10	75 - 125	75 - 125	30	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Hexachlorobutadiene	N/A	N/A	N/A	50 - 140	50 - 140	30	N/A	N/A	N/A
2-Hexanone	58 - 125	58 - 125	14	55 - 130	55 - 130	30	N/A	N/A	N/A
Isopropylbenzene	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
4-Isopropyltoluene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
4-Methyl-2-pentanone	62 - 125	62 - 125	13	60 - 135	60 - 135	30	N/A	N/A	N/A
Methyl bromide	55 - 151	55 - 151	21	N/A	N/A	N/A	N/A	N/A	N/A
Methyl chloride	55 - 173	55 - 173	22	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	69 - 125	69 - 125	11	55 - 140	55 - 140	30	N/A	N/A	N/A
Methyl ethyl ketone	61 - 127	61 - 127	13	N/A	N/A	N/A	N/A	N/A	N/A
Methyl tert-Butyl Ether	N/A	N/A	N/A	65 - 125	65 - 125	30	N/A	N/A	N/A
n-Butylbenzene	N/A	N/A	N/A	70 - 135	70 - 135	30	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	55 - 140	55 - 140	30	N/A	N/A	N/A
n- Propylbenzene	N/A	N/A	N/A	70 - 130	70 - 130	30	N/A	N/A	N/A
sec-Butylbenzene	N/A	N/A	N/A	70 - 125	70 - 125	30	N/A	N/A	N/A
Styrene	78 - 118	78 - 118	11	65 - 135	65 - 135	30	N/A	N/A	N/A
1,1,1-Trichloroethane	79 - 133	79 - 133	11	65 - 130	65 - 130	30	N/A	N/A	N/A
1,1.1,2-Tetrachloroethane	N/A	N/A	N/A	80 - 130	80 - 130	30	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	71 - 120	71 - 120	11	65 - 130	65 - 130	30	N/A	N/A	N/A
1,1,2-Trichloroethane	80 - 114	80 - 114	11	75 - 125	75 - 125	30	N/A	N/A	N/A
1,2,3-Trichlorobenzene	N/A	N/A	N/A	55 - 140	55 - 140	30	N/A	N/A	N/A
1,2,3-Trichloropropane	N/A	N/A	N/A	75 - 125	75 - 125	30	N/A	N/A	N/A
1,3,5-Trimethylbenzene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
1,2,4-Trichlorobenzene	N/A	N/A	N/A	65 - 135	65 - 135	30	N/A	N/A	N/A
1,2,4-Trimethylbenzene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
Tetrachloroethylene	80 - 131	80 - 131	12	45 - 150	45 - 150	30	N/A	N/A	N/A
tert-Butylbenzene	N/A	N/A	N/A	70 - 130	70 - 130	30	N/A	N/A	N/A
Toluene	86 - 116	86 - 116	10	75 - 120	75 - 120	30	70 - 119	70 - 119	N/A
Trichloroethylene	85 - 124	85 - 124	10	70 - 125	70 - 125	30	62 - 130	62 - 130	N/A
Trichlorofluoromethane	N/A	N/A	N/A	60 - 145	60 - 145	30	N/A	N/A	N/A
Vinyl chloride	57 - 153	57 - 153	22	50 - 145	50 - 145	30	N/A	N/A	N/A
Vinyl acetate	N/A	N/A	N/A	72 - 121	72 - 121	30	N/A	N/A	N/A
m-Xylene/p-Xylene	N/A	N/A	N/A	75 - 130	75 - 130	30	N/A	N/A	N/A
o-Xylene	N/A	N/A	N/A	80 - 120	80 - 120	30	N/A	N/A	N/A
Xylene (total)	86 - 120	86 - 120	10	N/A	N/A	N/A	N/A	N/A	N/A
Semivolatile Organic Compounds, SW-846 8270C									
Benzoic Acid	10 - 50	10 - 50	40	20 - 145	20 - 145	50	N/A	N/A	N/A
2-Chlorophenol	44 - 103	44 - 103	29	35 - 105	35 - 105	50	27 - 110	27 - 110	30
4-Chloro-3-methyl phenol	53 - 105	53 - 105	24	45 - 110	45 - 110	50	39 - 110	39 - 110	30
2,4-Dichlorophenol	53 - 108	53 - 108	26	50 - 105	50 - 105	50	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
2,4-Dimethylphenol	37 - 91	37 - 91	28	30 - 110	30 - 110	50	N/A	N/A	N/A
2,4-Dinitrophenol	37 - 111	37 - 111	30	15 - 140	15 - 140	50	N/A	N/A	N/A
4,6-Dinitro-o-cresol	62 - 115	62 - 115	26	N/A	N/A	N/A	N/A	N/A	N/A
2-Methylphenol	35 - 91	35 - 91	30	40 - 110	40 - 110	50	N/A	N/A	N/A
4-Methylphenol	N/A	N/A	N/A	45 - 135	45 - 135	50	N/A	N/A	N/A
3&4-Methylphenol	32 - 85	32 - 85	29	N/A	N/A	N/A	N/A	N/A	N/A
2-Nitrophenol	49 - 111	49 - 111	30	40 - 115	40 - 115	50	N/A	N/A	N/A
4-Nitrophenol	13 - 55	13 - 55	31	10 - 85	10 - 85	50	12 - 130	12 - 130	30
Pentachlorophenol	57 118	57 118	26	40 - 115	40 - 115	50	26 - 110	26 - 110	30
Phenol	13 - 54	13 - 54	34	21 - 50	21 - 50	50	14 - 112	14 - 112	30
2,4,5-Trichlorophenol	59 - 106	59 - 106	23	50 - 110	50 - 110	50	N/A	N/A	N/A
2,4,6-Trichlorophenol	58 - 107	58 - 107	24	50 - 115	50 - 115	50	N/A	N/A	N/A
Acenaphthene	58 - 106	58 - 106	21	45 - 110	45 - 110	50	40 - 110	40 - 110	30
Acenaphthylene	58 - 105	58 - 105	21	50 - 105	50 - 105	50	N/A	N/A	N/A
Anthracene	65 - 108	65 - 108	19	55 - 110	55 - 110	50	N/A	N/A	N/A
Benzo(a)anthracene	63 - 111	63 - 111	19	55 - 110	55 - 110	50	N/A	N/A	N/A
Benzo(a)pyrene	62 - 106	62 - 106	20	55 - 110	55 - 110	50	N/A	N/A	N/A
Benzo(b)fluoranthene	63 - 109	63 - 109	20	45 - 120	45 - 120	50	N/A	N/A	N/A
Benzo(g,h,i)perylene	61 - 111	61 - 111	21	40 - 125	40 - 125	50	N/A	N/A	N/A
Benzo(k)fluoranthene	64 - 111	64 - 111	20	45 - 125	45 - 125	50	N/A	N/A	N/A
4-Bromophenol phenyl ether	64 - 107	64 - 107	20	50 - 115	50 - 115	50	N/A	N/A	N/A
Butyl benzyl phthalate	59 - 114	59 - 114	20	45 - 115	45 - 115	50	N/A	N/A	N/A
Benzyl Alcohol	34 - 98	34 - 98	27	45 - 135	45 - 135	50	N/A	N/A	N/A
2-Chloronaphthalene	54 - 105	54 - 105	24	50 - 105	50 - 105	50	N/A	N/A	N/A
4-Chloroaniline	53 - 103	53 - 103	22	15 - 110	15 - 110	50	N/A	N/A	N/A
Carbazole	66 - 109	66 - 109	20	50 - 115	50 - 115	50	N/A	N/A	N/A
Chrysene	64 - 111	64 - 111	19	55 - 110	55 - 110	50	N/A	N/A	N/A
bis(2-Chloroethyoxy)methane	48 - 101	48 - 101	28	45 - 105	45 - 105	50	N/A	N/A	N/A
bis(2-Chloroethyl)ether	51 - 108	51 - 108	27	35 - 110	35 - 110	50	N/A	N/A	N/A
bis(2-Chloroisopropyl)ether	43 - 106	43 - 106	27	25 - 130	25 - 130	50	N/A	N/A	N/A
4-Chlorophenyl pheny ether	61 - 107	61 - 107	20	50 - 110	50 - 110	50	N/A	N/A	N/A
1,2-Dichlorobenzene	41 - 102	41 - 102	28	35 - 100	35 - 100	50	N/A	N/A	N/A
1,3-Dichlorobenzene	38 - 100	38 - 100	28	30 - 100	30 - 100	50	N/A	N/A	N/A
1,4-Dichlorobenzene	40 - 100	40 - 100	28	30 - 100	30 - 100	50	19 - 110	19 - 110	30
2,4-Dinitrotoluene	60 - 109	60 - 109	20	50 - 120	50 - 120	50	52 - 123	52 - 123	30
2,6-Dinitrotoluene	58 - 104	58 - 104	21	50 - 115	50 - 115	50	N/A	N/A	N/A
3,3'-Dichlorobenzidine	57 - 105	57 - 105	25	20 - 110	20 - 110	50	N/A	N/A	N/A
Dibenzo(a,h)antracene	62 - 112	62 - 112	20	40 - 125	40 - 125	50	N/A	N/A	N/A
Dibenzofuran	61 - 108	61 - 108	20	55 - 105	55 - 105	50	N/A	N/A	N/A

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Di-n-butyl phthalate	62 - 109	62 - 109	20	55 - 115	55 - 115	50	N/A	N/A	N/A
Di-n-octyl phthalate	60 - 120	60 - 120	24	35 - 135	35 - 135	50	N/A	N/A	N/A
Diethyl phthalate	62 - 109	62 - 109	19	40 - 120	40 - 120	50	N/A	N/A	N/A
Dimethyl phthalate	63 - 106	63 - 106	19	25 - 125	25 - 125	50	N/A	N/A	N/A
Diphenylamine	N/A	N/A	N/A	45 - 135	45 - 135	50	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	59 - 116	59 - 116	21	40 - 125	40 - 125	50	N/A	N/A	N/A
Fluoranthene	65 - 114	65 - 114	21	55 - 115	55 - 115	50	N/A	N/A	N/A
Fluorene	61 - 106	61 - 106	19	50 - 110	50 - 110	50	N/A	N/A	N/A
Hexachlorobenzene	62 - 107	62 - 107	20	50 - 110	50 - 110	50	N/A	N/A	N/A
Hexachlorobutadiene	38 - 107	38 - 107	30	25 - 105	25 - 105	50	N/A	N/A	N/A
Hexachlorocyclopentadiene	19 - 84	19 - 84	35	30 - 145	30 - 145	50	N/A	N/A	N/A
Hexachloroethane	35 - 101	30 - 101	29	30 - 95	30 - 95	50	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	61 - 113	61 - 113	20	45 - 125	45 - 125	50	N/A	N/A	N/A
Isophorone	56 - 111	56 - 111	26	50 - 110	50 - 110	50	N/A	N/A	N/A
2-Metlhyl-4,6-dinitrophenol	N/A	N/A	N/A	45 - 135	45 - 135	50	N/A	N/A	N/A
2-Methylnaphthalene	56 - 112	56 - 112	26	45 - 105	45 - 105	50	N/A	N/A	N/A
2-Nitroaniline	60 - 109	60 - 109	20	50 - 115	50 - 115	50	N/A	N/A	N/A
3-Nitroaniline	52 - 107	52 - 107	21	20 - 125	20 - 125	50	N/A	N/A	N/A
4-Nitroaniline	59 - 111	59 - 111	21	35 - 120	35 - 120	50	N/A	N/A	N/A
Naphthalene	50 - 104	50 - 104	28	40 - 100	40 - 100	50	N/A	N/A	N/A
Nitrobenzene	52 - 105	52 - 105	28	45 - 110	45 - 110	50	N/A	N/A	N/A
N-Nitroso-di-n-propylamine	51 - 104	51 - 104	28	35 - 130	35 - 130	50	37 - 121	37 - 121	30
N-Nitrosodimethylamine	N/A	N/A	N/A	20 - 115	20 - 115	50	N/A	N/A	N/A
N-Nitrosodiphenylamine	57 - 110	57 - 110	19	50 - 110	50 - 110	50	N/A	N/A	N/A
Phenanthrene	65 - 108	65 - 108	20	50 - 115	50 - 115	50	N/A	N/A	N/A
Pyrene	60 - 113	60 - 113	20	50 - 130	50 - 130	50	55 - 120	55 - 120	30
1,2,4-Trichlorobenzene	45 - 104	45 - 104	28	35 - 105	35 - 105	50	25 - 110	25 - 110	30
Nitroaromatics and Nitroamines, SW-846 8330									
HMX	74 - 152	74 - 152	21	80 - 115	80 - 115	30	80 - 115	80 - 115	30
RDX	80 - 124	80 - 124	20	50 - 160	50 - 160	30	50 - 160	50 - 160	30
1,3-Dinitrobenzene	84 - 123	84 - 123	23	45 - 160	45 - 160	30	45 - 160	45 - 160	30
2,6-Dinitrotoluene	84 - 133	84 - 133	23	60 - 135	60 - 135	30	60 - 135	60 - 135	30
2,4-Dinitrotoluene	77 - 116	77 - 116	26	60 - 135	60 - 135	30	60 - 135	60 - 135	30
2-amino-4,6-Dinitrotoluene	78 - 117	78 - 117	28	55 - 155	55 - 155	30	55 - 155	55 - 155	30
4-amino-2,6-Dinitrotoluene	84 - 123	84 - 123	27	55 - 155	55 - 155	30	55 - 155	55 - 155	30
Nitrobenzene	76 - 128	76 - 128	28	50 - 140	50 - 140	30	50 - 140	50 - 140	30
o-Nitrotoluene	76 - 120	76 - 120	30	50 - 130	50 - 130	30	50 - 130	50 - 130	30
m-Nitrotoluene	74 - 124	74 - 124	32	45 - 135	45 - 135	30	45 - 135	45 - 135	30
p-Nitrotoluene	81 - 125	81 - 125	34	50 - 130	50 - 130	30	50 - 130	50 - 130	30

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Tetryl	62 - 117	62 - 117	28	20 - 175	20 - 175	30	20 - 175	20 - 175	30
1,3,5-Trinitrobenzene	85 - 127	85 - 127	21	65 - 140	65 - 140	30	65 - 140	65 - 140	30
2,4,6-Trinitrotoluene	71 - 128	71 - 128	21	50 - 145	50 - 145	30	50 - 145	50 - 145	30
Nitroglycerin	N/A	N/A	N/A	N/A	N/A	N/A	76 - 116	76 - 116	30
PETN	N/A	N/A	N/A	N/A	N/A	N/A	69 - 117	69 - 117	30
PCBs, SW-846 8082									
Aroclor-1016	76 - 117	76 - 117	16	N/A	N/A	N/A	44 - 119	10 - 199	30
Aroclor-1260	65 - 117	65 - 117	23	N/A	N/A	N/A	41 - 118	10 - 199	30
Metals, SW-846 6010B/6020A/7470A									
Aluminum	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Antimony	80 - 120	80 - 120	20	80 - 120	75 - 125	20	80 - 120	75 - 125	20
Arsenic	80 - 120	80 - 120	20	80 - 120	75 - 125	20	80 - 120	75 - 125	20
Barium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Beryllium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Cadmium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Calcium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Chromium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Cobalt	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Copper	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Iron	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Lead	80 - 120	80 - 120	20	80 - 120	75 - 125	20	80 - 120	75 - 125	20
Magnesium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Manganese	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Nickel	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Potassium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Selenium	80 - 120	80 - 120	20	80 - 120	75 - 125	20	80 - 120	75 - 125	20
Silver	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Sodium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Thallium	80 - 120	80 - 120	20	80 - 120	75 - 125	20	80 - 120	75 - 125	20
Vanadium	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Zinc	80 - 120	80 - 120	20	80 - 120	80 - 120	25	80 - 120	75 - 125	20
Mercury	80 - 120	80 - 120	20	80 - 120	80 - 120	20	80 - 120	75 - 125	20
Water Quality									
Chloride	90 - 110	90 - 110	20	90 - 110	90 - 110	20	90 - 110	80 - 120	20
Hardness as CaCO3	N/A	N/A	N/A	N/A	N/A	N/A	88 - 110	87 - 114	20
Nitrate	90 - 110	90 - 110	20	80 - 120	80 - 120	20	90 - 110	34 - 125	20
Sulfate	90 - 110	90 - 110	20	90 - 110	90 - 110	20	90 - 110	80 - 120	20
Total Alkalinity	90 - 113	90 - 113	20	70 - 130	N/A	N/A	90 - 127	10 - 160	24
Total Cyanide	90 - 110	90 - 110	20	75 - 125	75 - 125	25	69 - 118	42 - 140	20

Appendix H

Laboratory Control Limits for QC Samples
Plum Brook Ordnance Works

Spiked Compound	Accutest			AML			Test America Laboratories, Inc.		
	Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD		Water - LCS	Water - MS/MSD	
	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)	% Recovery Range	% Recovery Range	Precision RPD (%)
Total Dissolved Solids	N/A	N/A	5	75 - 125	N/A	N/A	88 - 110	N/A	20
Total Suspended Solids	N/A	N/A	5	75 - 125	N/A	N/A	73 - 113	N/A	20
Turbidity	N/A	N/A	8	N/A	N/A	N/A	75 - 125	N/A	20

LCS - Laboratory Control Sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate
RPD - Relative Percent Difference
N/A - Not Applicable

APPENDIX I

CHEMICAL ANALYTICAL DATA SUMMARY

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001		
SAMPLE_NO				BEDGW-001-1109		
SAMPLE_DATE				6-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	3.85		
Field Tests	FERROUS IRON	N	mg/L	0		
Field Tests	Oxidation Reduction Potential	N	mV	-19		
Field Tests	pH	N	pH_units	6.89		
Field Tests	Specific Conductivity	N	mS/cm	9.365		
Field Tests	Temperature	N	C	9.53		
Field Tests	Turbidity	N	NTU	13.6		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.23	U	UJ
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.23	U	UJ
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.23	U	UJ
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.23	U	UJ
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.23	U	UJ
Explosives	HMX	N	ug/L	0.23	U	UJ
Explosives	Nitrobenzene	N	ug/L	0.23	U	UJ
Explosives	Nitrotoluene, 2-	N	ug/L	0.23	U	UJ
Explosives	Nitrotoluene, 3-	N	ug/L	0.23	U	UJ
Explosives	Nitrotoluene, 4-	N	ug/L	0.23	U	UJ
Explosives	RDX	N	ug/L	0.23	U	UJ
Explosives	Tetryl	N	ug/L	0.23	U	UJ
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.23	U	UJ
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.23	U	UJ
Volatiles	Acetone	N	ug/L	25	U	U
Volatiles	Benzene	N	ug/L	3.7		
Volatiles	Bromodichloromethane	N	ug/L	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U
Volatiles	Carbon disulfide	N	ug/L	3.8		
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U
Volatiles	Dibromochloromethane	N	ug/L	1	U	U
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U
Volatiles	Ethylbenzene	N	ug/L	9.9		
Volatiles	Hexanone, 2-	N	ug/L	10	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	3.3	J	J
Volatiles	Methylene chloride	N	ug/L	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1.2		
Volatiles	Tetrachloroethene	N	ug/L	1	U	U
Volatiles	Toluene	N	ug/L	10		
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U
Volatiles	Vinyl chloride	N	ug/L	1	U	U
Volatiles	Xylenes, total	N	ug/L	136		

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001		
SAMPLE_NO				BEDGW-001-1109		
SAMPLE_DATE				6-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	100	U	UJ
Semivolatiles	Acenaphthene	N	ug/L	100	U	UJ
Semivolatiles	Acenaphthylene	N	ug/L	100	U	UJ
Semivolatiles	Anthracene	N	ug/L	100	U	UJ
Semivolatiles	Benzo(a)anthracene	N	ug/L	100	U	UJ
Semivolatiles	Benzo(a)pyrene	N	ug/L	100	U	UJ
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	100	U	UJ
Semivolatiles	Benzo(ghi)perylene	N	ug/L	100	U	UJ
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	100	U	UJ
Semivolatiles	Benzoic acid	N	ug/L	500	U	UJ
Semivolatiles	Benzyl alcohol	N	ug/L	100	U	UJ
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	100	U	UJ
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	100	U	UJ
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	100	U	UJ
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	100	U	UJ
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	100	U	UJ
Semivolatiles	Butyl benzyl phthalate	N	ug/L	100	U	UJ
Semivolatiles	Carbazole	N	ug/L	100	U	UJ
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	100	U	UJ
Semivolatiles	Chloroaniline, 4-	N	ug/L	100	U	UJ
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	100	U	UJ
Semivolatiles	Chlorophenol, 2-	N	ug/L	100	U	UJ
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	100	U	UJ
Semivolatiles	Chrysene	N	ug/L	100	U	UJ
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	100	U	UJ
Semivolatiles	Dibenzofuran	N	ug/L	100	U	UJ
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	100	U	UJ
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	100	U	UJ
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	100	U	UJ
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	200	U	UJ
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	100	U	UJ
Semivolatiles	Diethyl phthalate	N	ug/L	100	U	UJ
Semivolatiles	Dimethyl phthalate	N	ug/L	100	U	UJ
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	100	U	UJ
Semivolatiles	Di-n-butyl phthalate	N	ug/L	100	U	UJ
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	200	U	UJ
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	500	U	UJ
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	100	U	UJ
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	100	U	UJ
Semivolatiles	Di-n-octyl phthalate	N	ug/L	100	U	UJ
Semivolatiles	Fluoranthene	N	ug/L	100	U	UJ
Semivolatiles	Fluorene	N	ug/L	100	U	UJ
Semivolatiles	Hexachlorobenzene	N	ug/L	100	U	UJ
Semivolatiles	Hexachlorobutadiene	N	ug/L	100	U	UJ
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	100	U	UJ
Semivolatiles	Hexachloroethane	N	ug/L	100	U	UJ
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	100	U	UJ
Semivolatiles	Isophorone	N	ug/L	100	U	UJ
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	256		J
Semivolatiles	Methylphenol, 2-	N	ug/L	100	U	UJ
Semivolatiles	Naphthalene	N	ug/L	64.9	J	J
Semivolatiles	Nitroaniline, 2-	N	ug/L	200	U	UJ
Semivolatiles	Nitroaniline, 3-	N	ug/L	200	U	UJ
Semivolatiles	Nitroaniline, 4-	N	ug/L	200	U	UJ
Semivolatiles	Nitrobenzene	N	ug/L	100	U	UJ
Semivolatiles	Nitrophenol, 2-	N	ug/L	100	U	UJ
Semivolatiles	Nitrophenol, 4-	N	ug/L	500	U	UJ
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	100	U	UJ

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001		
SAMPLE_NO				BEDGW-001-1109		
SAMPLE_DATE				6-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	100	U	UJ
Semivolatiles	Pentachlorophenol	N	ug/L	500	U	UJ
Semivolatiles	Phenanthrene	N	ug/L	37.3	J	J
Semivolatiles	Phenol	N	ug/L	100	U	UJ
Semivolatiles	Pyrene	N	ug/L	100	U	UJ
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	100	U	UJ
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	100	U	UJ
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	100	U	UJ
Metals - Unfiltered	Aluminum	N	ug/L	79.6	B	J
Metals - Unfiltered	Antimony	N	ug/L	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U
Metals - Unfiltered	Barium	N	ug/L	305		
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	280000		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U
Metals - Unfiltered	Iron	N	ug/L	180	B	J
Metals - Unfiltered	Lead	N	ug/L	5	U	U
Metals - Unfiltered	Magnesium	N	ug/L	212000		
Metals - Unfiltered	Manganese	N	ug/L	85.8		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	120000		
Metals - Unfiltered	Selenium	N	ug/L	20	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	1130000		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	1.6	B	J
Metals - Unfiltered	Zinc	N	ug/L	11.5	B	B
Metals - Filtered	Aluminum	Y	ug/L	52.6	B	J
Metals - Filtered	Antimony	Y	ug/L	6	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U	U
Metals - Filtered	Barium	Y	ug/L	304		
Metals - Filtered	Beryllium	Y	ug/L	4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U	U
Metals - Filtered	Calcium	Y	ug/L	275000		
Metals - Filtered	Chromium	Y	ug/L	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U	U
Metals - Filtered	Lead	Y	ug/L	2.3	B	J
Metals - Filtered	Magnesium	Y	ug/L	211000		
Metals - Filtered	Manganese	Y	ug/L	70.2		
Metals - Filtered	Mercury	Y	ug/L	1	U	U
Metals - Filtered	Nickel	Y	ug/L	40	U	U
Metals - Filtered	Potassium	Y	ug/L	120000		
Metals - Filtered	Selenium	Y	ug/L	4.2	B	J
Metals - Filtered	Silver	Y	ug/L	10	U	U
Metals - Filtered	Sodium	Y	ug/L	1160000		
Metals - Filtered	Thallium	Y	ug/L	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	0.93	B	J
Metals - Filtered	Zinc	Y	ug/L	20	U	U

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001		
SAMPLE_NO				BEDGW-001-1109		
SAMPLE_DATE				6-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Water Quality Parameters	Alkalinity	N	ppm	718		
Water Quality Parameters	Chloride	N	ppm	2550		
Water Quality Parameters	Cyanide, total	N	ppm	0.01	U	U
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	1570		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.09	B	J
Water Quality Parameters	Sulfate	N	ppm	50	U	UJ
Water Quality Parameters	Total dissolved solids	N	ppm	4680		
Water Quality Parameters	Total suspended solids	N	ppm	193		
Water Quality Parameters	Turbidity	N	NTU	71.5		

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				LBA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				LB3073			RC3078		
SAMPLE_DATE				12-May-09			11-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	8.12			4.91		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-187.6			-283.9		
Field Tests	pH	N	pH_units	6.55			6.21		
Field Tests	Specific Conductivity	N	mS/cm	6.19			7.074		
Field Tests	Temperature	N	C	15.25			12.21		
Field Tests	Turbidity	N	NTU	20.8			6.9		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.38	U		0.19	U	UJ
Explosives	HMX	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Nitrobenzene	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	RDX	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Tetryl	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U		0.19	U	UJ
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U		0.19	U	UJ
Volatiles	Acetone	N	ug/L	500	U	R	50.7		J
Volatiles	Benzene	N	ug/L	1680		J	31.9		
Volatiles	Bromodichloromethane	N	ug/L	20	U		1	U	
Volatiles	Bromoform	N	ug/L	20	U		1	U	
Volatiles	Bromomethane	N	ug/L	40	U		2	U	
Volatiles	Butanone, 2-	N	ug/L	56.3	J	J	5	U	
Volatiles	Carbon disulfide	N	ug/L	40	U		2	U	
Volatiles	Carbon tetrachloride	N	ug/L	20	U		1	U	
Volatiles	Chlorobenzene	N	ug/L	20	U		1	U	
Volatiles	Chloroethane	N	ug/L	40	U		2	U	
Volatiles	Chloroform	N	ug/L	26.8			1	U	
Volatiles	Chloromethane	N	ug/L	35.6	J	J	12.8		
Volatiles	Dibromochloromethane	N	ug/L	20	U		1	U	
Volatiles	Dichloroethane, 1,1-	N	ug/L	20	U		1	U	
Volatiles	Dichloroethane, 1,2-	N	ug/L	20	U		1	U	
Volatiles	Dichloroethene, 1,1-	N	ug/L	20	U		1	U	
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	20	U		1	U	
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	20	U		1	U	
Volatiles	Dichloropropane, 1,2-	N	ug/L	20	U		1	U	
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	20	U		1	U	
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	20	U		1	U	
Volatiles	Ethylbenzene	N	ug/L	169			17		
Volatiles	Hexanone, 2-	N	ug/L	200	U		10	U	
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	100	U		5	U	
Volatiles	Methylene chloride	N	ug/L	100	U		5	U	
Volatiles	Styrene	N	ug/L	20	U		1	U	
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	20	U		3.7		
Volatiles	Tetrachloroethene	N	ug/L	20	U		1	U	
Volatiles	Toluene	N	ug/L	692			28.9		
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	20	U		1	U	
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	20	U		1	U	
Volatiles	Trichloroethene	N	ug/L	20	U		1	U	
Volatiles	Vinyl chloride	N	ug/L	20	U		1	U	
Volatiles	Xylenes, total	N	ug/L	1130			97.2		

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				LBA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				LB3073			RC3078		
SAMPLE_DATE				12-May-09			11-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	5.2			4.8	U	
Semivolatiles	Acenaphthene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Acenaphthylene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Anthracene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzo(a)anthracene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzo(a)pyrene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzo(ghi)perylene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Benzoic acid	N	ug/L	26	U		24	U	
Semivolatiles	Benzyl alcohol	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Butyl benzyl phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Carbazole	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chloroaniline, 4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chlorophenol, 2-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Chrysene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dibenzofuran	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10	U		9.6	U	
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Diethyl phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dimethyl phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	12.3			1.5	J	J
Semivolatiles	Di-n-butyl phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10	U		9.6	U	
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	26	U		24	U	
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Di-n-octyl phthalate	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Fluoranthene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Fluorene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Hexachlorobenzene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Hexachlorobutadiene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Hexachloroethane	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Isophorone	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	20.9			6.3		
Semivolatiles	Methylphenol, 2-	N	ug/L	5.6			4.8	U	
Semivolatiles	Naphthalene	N	ug/L	25.6			4.5	J	J
Semivolatiles	Nitroaniline, 2-	N	ug/L	10	U		9.6	U	
Semivolatiles	Nitroaniline, 3-	N	ug/L	10	U		9.6	U	
Semivolatiles	Nitroaniline, 4-	N	ug/L	10	U		9.6	U	
Semivolatiles	Nitrobenzene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Nitrophenol, 2-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Nitrophenol, 4-	N	ug/L	26	U		24	U	
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	5.1	U		4.8	U	

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				LBA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				LB3073			RC3078		
SAMPLE_DATE				12-May-09			11-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Pentachlorophenol	N	ug/L	26	U		24	U	
Semivolatiles	Phenanthrene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Phenol	N	ug/L	8			4.8	U	
Semivolatiles	Pyrene	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	5.1	U		4.8	U	
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	5.1	U		4.8	U	
Metals - Unfiltered	Aluminum	N	ug/L	73.8	B	B	155	B	J
Metals - Unfiltered	Antimony	N	ug/L	6	U		6	U	
Metals - Unfiltered	Arsenic	N	ug/L	131			19.9		
Metals - Unfiltered	Barium	N	ug/L	762			485		
Metals - Unfiltered	Beryllium	N	ug/L	4	U		4	U	
Metals - Unfiltered	Cadmium	N	ug/L	5	U		5	U	
Metals - Unfiltered	Calcium	N	ug/L	462000			343000		
Metals - Unfiltered	Chromium	N	ug/L	10	U		10	U	
Metals - Unfiltered	Cobalt	N	ug/L	50	U		50	U	
Metals - Unfiltered	Copper	N	ug/L	25	U		25	U	
Metals - Unfiltered	Iron	N	ug/L	2940			300	U	
Metals - Unfiltered	Lead	N	ug/L	5	U		10	U	
Metals - Unfiltered	Magnesium	N	ug/L	352000			241000		
Metals - Unfiltered	Manganese	N	ug/L	1070			227		
Metals - Unfiltered	Mercury	N	ug/L	1	U		1	U	
Metals - Unfiltered	Nickel	N	ug/L	7.2	B	J	40	U	
Metals - Unfiltered	Potassium	N	ug/L	87700			57600		
Metals - Unfiltered	Selenium	N	ug/L	11.7		J	6.8	B	B
Metals - Unfiltered	Silver	N	ug/L	10	U		10	U	
Metals - Unfiltered	Sodium	N	ug/L	1140000			638000		
Metals - Unfiltered	Thallium	N	ug/L	6.4	B	J	10	U	
Metals - Unfiltered	Vanadium	N	ug/L	1.4	B	J	1.6	B	J
Metals - Unfiltered	Zinc	N	ug/L	40	U		14.8	B	B
Metals - Filtered	Aluminum	Y	ug/L	200	U		35.6	B	J
Metals - Filtered	Antimony	Y	ug/L	6	U		6	U	
Metals - Filtered	Arsenic	Y	ug/L	125			13.1		
Metals - Filtered	Barium	Y	ug/L	764			494		
Metals - Filtered	Beryllium	Y	ug/L	4	U		4	U	
Metals - Filtered	Cadmium	Y	ug/L	5	U		5	U	
Metals - Filtered	Calcium	Y	ug/L	471000			309000		
Metals - Filtered	Chromium	Y	ug/L	10	U		10	U	
Metals - Filtered	Cobalt	Y	ug/L	50	U		50	U	
Metals - Filtered	Copper	Y	ug/L	25	U		25	U	
Metals - Filtered	Iron	Y	ug/L	300	U		600	U	
Metals - Filtered	Lead	Y	ug/L	5	U		3.3	B	J
Metals - Filtered	Magnesium	Y	ug/L	365000			223000		
Metals - Filtered	Manganese	Y	ug/L	1000			186		
Metals - Filtered	Mercury	Y	ug/L	1	U		1	U	
Metals - Filtered	Nickel	Y	ug/L	5.7	B	J	40	U	
Metals - Filtered	Potassium	Y	ug/L	90200			57900		
Metals - Filtered	Selenium	Y	ug/L	9.3	B	J	7	B	J
Metals - Filtered	Silver	Y	ug/L	10	U		10	U	
Metals - Filtered	Sodium	Y	ug/L	1170000			634000		J
Metals - Filtered	Thallium	Y	ug/L	10	U		10	U	
Metals - Filtered	Vanadium	Y	ug/L	1.1	B	J	1.9	B	J
Metals - Filtered	Zinc	Y	ug/L	40	U		20	U	

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Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				LBA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				LB3073			RC3078		
SAMPLE_DATE				12-May-09			11-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Water Quality Parameters	Alkalinity	N	ppm	369			753		
Water Quality Parameters	Chloride	N	ppm	3260			1480		
Water Quality Parameters	Cyanide, total	N	ppm	0.014		J	0.11		J
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	2600			1850		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	2	U		2	U	
Water Quality Parameters	Sulfate	N	ppm	14.8			218		
Water Quality Parameters	Total dissolved solids	N	ppm	7970			3320		
Water Quality Parameters	Total suspended solids	N	ppm	60			10	U	
Water Quality Parameters	Turbidity	N	NTU	168			47.4		

Appendix I

Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002		
SAMPLE_NO				RC3084		
SAMPLE_DATE				5-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	10.44		
Field Tests	FERROUS IRON	N	mg/L	0		
Field Tests	Oxidation Reduction Potential	N	mV	2.3		
Field Tests	pH	N	pH_units	6.58		
Field Tests	Specific Conductivity	N	mS/cm	8.035		
Field Tests	Temperature	N	C	9.94		
Field Tests	Turbidity	N	NTU	2.7		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	R
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U	R
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	R
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U	R
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U	R
Explosives	HMX	N	ug/L	0.19	U	R
Explosives	Nitrobenzene	N	ug/L	0.19	U	R
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U	R
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U	R
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U	R
Explosives	RDX	N	ug/L	0.19	U	R
Explosives	Tetryl	N	ug/L	0.19	U	R
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	R
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	R
Volatiles	Acetone	N	ug/L	25	U	R
Volatiles	Benzene	N	ug/L	114		
Volatiles	Bromodichloromethane	N	ug/L	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U
Volatiles	Butanone, 2-	N	ug/L	13.2		
Volatiles	Carbon disulfide	N	ug/L	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U
Volatiles	Dibromochloromethane	N	ug/L	1	U	U
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U
Volatiles	Ethylbenzene	N	ug/L	43.4		
Volatiles	Hexanone, 2-	N	ug/L	10	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U
Volatiles	Methylene chloride	N	ug/L	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U
Volatiles	Toluene	N	ug/L	93.6		
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U
Volatiles	Vinyl chloride	N	ug/L	1	U	U
Volatiles	Xylenes, total	N	ug/L	234		

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Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002		
SAMPLE_NO				RC3084		
SAMPLE_DATE				5-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.9	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.9	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.9	U	U
Semivolatiles	Anthracene	N	ug/L	4.9	U	U
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.9	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.9	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.9	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.9	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.9	U	U
Semivolatiles	Benzoic acid	N	ug/L	25	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.9	U	U
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.9	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.9	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.9	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.9	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.9	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.9	U	U
Semivolatiles	Carbazole	N	ug/L	4.9	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.9	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.9	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.9	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.9	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.9	U	U
Semivolatiles	Chrysene	N	ug/L	4.9	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.9	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.9	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.9	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.9	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.9	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.8	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.9	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.9	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.9	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	1.6	J	J
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.9	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.8	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	25	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.9	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.9	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.9	U	U
Semivolatiles	Fluoranthene	N	ug/L	4.9	U	U
Semivolatiles	Fluorene	N	ug/L	4.9	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.9	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.9	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.9	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.9	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.9	U	U
Semivolatiles	Isophorone	N	ug/L	4.9	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	8.1		
Semivolatiles	Methylphenol, 2-	N	ug/L	4.9	U	U
Semivolatiles	Naphthalene	N	ug/L	7.2		
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.8	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.8	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.8	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.9	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.9	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	25	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.9	U	U

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Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002		
SAMPLE_NO				RC3084		
SAMPLE_DATE				5-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.9	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	25	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.9	U	U
Semivolatiles	Phenol	N	ug/L	4.9	U	U
Semivolatiles	Pyrene	N	ug/L	4.9	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.9	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.9	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.9	U	U
Metals - Unfiltered	Aluminum	N	ug/L	138	B	J
Metals - Unfiltered	Antimony	N	ug/L	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	28		
Metals - Unfiltered	Barium	N	ug/L	562		
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	360000		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U
Metals - Unfiltered	Iron	N	ug/L	385		
Metals - Unfiltered	Lead	N	ug/L	5	U	U
Metals - Unfiltered	Magnesium	N	ug/L	275000		
Metals - Unfiltered	Manganese	N	ug/L	158		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	72000		
Metals - Unfiltered	Selenium	N	ug/L	8.5	B	J
Metals - Unfiltered	Silver	N	ug/L	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	770000		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U
Metals - Unfiltered	Zinc	N	ug/L	9.2	B	B
Metals - Filtered	Aluminum	Y	ug/L	71.7	B	J
Metals - Filtered	Antimony	Y	ug/L	6	U	U
Metals - Filtered	Arsenic	Y	ug/L	42.7		
Metals - Filtered	Barium	Y	ug/L	576		
Metals - Filtered	Beryllium	Y	ug/L	4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U	U
Metals - Filtered	Calcium	Y	ug/L	371000		
Metals - Filtered	Chromium	Y	ug/L	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U	U
Metals - Filtered	Lead	Y	ug/L	5	U	U
Metals - Filtered	Magnesium	Y	ug/L	287000		
Metals - Filtered	Manganese	Y	ug/L	177		
Metals - Filtered	Mercury	Y	ug/L	1	U	U
Metals - Filtered	Nickel	Y	ug/L	40	U	U
Metals - Filtered	Potassium	Y	ug/L	75200		
Metals - Filtered	Selenium	Y	ug/L	7.2	B	J
Metals - Filtered	Silver	Y	ug/L	10	U	U
Metals - Filtered	Sodium	Y	ug/L	793000		
Metals - Filtered	Thallium	Y	ug/L	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	1.3	B	J
Metals - Filtered	Zinc	Y	ug/L	20	U	U

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Chemical Analytical Data Summary
Bedrock Groundwater
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002		
SAMPLE_NO				RC3084		
SAMPLE_DATE				5-Nov-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Water Quality Parameters	Alkalinity	N	ppm	770		
Water Quality Parameters	Chloride	N	ppm	2520		
Water Quality Parameters	Cyanide, total	N	ppm	0.01	U	U
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	2030		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.2		J
Water Quality Parameters	Sulfate	N	ppm	39.4	B	J
Water Quality Parameters	Total dissolved solids	N	ppm	3910		
Water Quality Parameters	Total suspended solids	N	ppm	17		
Water Quality Parameters	Turbidity	N	NTU	76.4		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	7.67			6.24		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	681.6			-16.5		
Field Tests	pH	N	pH_units	6.44			7.15		
Field Tests	Specific Conductivity	N	mS/cm	1.293			0.797		
Field Tests	Temperature	N	C	11.91			10.06		
Field Tests	Turbidity	N	NTU	0			11.9		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U		0.2	U	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U		0.2	U	
Explosives	HMX	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrobenzene	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U		0.2	U	
Explosives	RDX	N	ug/L	0.19	U		0.2	U	
Explosives	Tetryl	N	ug/L	0.19	U		0.2	U	
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U		0.2	U	
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U		0.2	U	
Volatiles	Acetone	N	ug/L	25	U	R	25	U	
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U		1	U	
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U		1	U	
Volatiles	Bromoform	N	ug/L	1	U		1	U	
Volatiles	Bromomethane	N	ug/L	2	U		2	U	
Volatiles	Butanone, 2-	N	ug/L	5	U		5	U	
Volatiles	Carbon disulfide	N	ug/L	2	U		2	U	
Volatiles	Carbon tetrachloride	N	ug/L	1	U		1	U	
Volatiles	Chlorobenzene	N	ug/L	1	U		1	U	
Volatiles	Chloroethane	N	ug/L	2	U		2	U	
Volatiles	Chloroform	N	ug/L	1	U		1	U	
Volatiles	Chloromethane	N	ug/L	2	U		2	U	
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U		1	U	
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	2.2			2		
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U		1	U	

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U		1	U	
Volatiles	Ethylbenzene	N	ug/L	1	U		1	U	
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U		10	U	
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U		5	U	
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U		5	U	
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U		1	U	
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U		1	U	
Volatiles	Tetrachloroethene	N	ug/L	1	U		1	U	
Volatiles	Toluene	N	ug/L	1	U		1	U	
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1.3			1	U	
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U		1	U	
Volatiles	Trichloroethene	N	ug/L	1	U		1	U	
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U		1	U	
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U		3	U	
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Acenaphthene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Acenaphthylene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Benzoic acid	N	ug/L	25	U		27	U	
Semivolatiles	Benzyl alcohol	N	ug/L	4.9	U		5.3	U	
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Chrysene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dibenzofuran	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.8	U		11	U	
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Diethyl phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dimethyl phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.8	U		11	U	
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	25	U		27	U	
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.9	U		5.3	U	
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Fluorene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Hexachlorobenzene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Hexachloroethane	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Isophorone	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Methylphenol, 2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.8	U		11	U	
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.8	U		11	U	
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.8	U		11	U	
Semivolatiles	Nitrobenzene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Nitrophenol, 4-	N	ug/L	25	U		27	U	
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.9	U		5.3	U	
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Pentachlorophenol	N	ug/L	25	U		27	U	
Semivolatiles	Phenanthrene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Phenol	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Pyrene	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.9	U		5.3	U	
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.9	U		5.3	U	
Metals - Unfiltered	Aluminum	N	ug/L	58.9	B	B	176	B	J
Metals - Unfiltered	Antimony	N	ug/L	6	U		12	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Barium	N	ug/L	73.5	B	J	61.7	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U		4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U		5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	189000			165000		J
Metals - Unfiltered	Chromium	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U		50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U		25	U	U
Metals - Unfiltered	Iron	N	ug/L	242	B	J	684		
Metals - Unfiltered	Lead	N	ug/L	5	U		10	U	U
Metals - Unfiltered	Magnesium	N	ug/L	45000			45700		
Metals - Unfiltered	Manganese	N	ug/L	436			458		
Metals - Unfiltered	Mercury	N	ug/L	1	U		1	U	
Metals - Unfiltered	Nickel	N	ug/L	4.3	B	J	2.4	B	J
Metals - Unfiltered	Potassium	N	ug/L	4200	B	J	4190	B	J
Metals - Unfiltered	Selenium	N	ug/L	6.3	B	J	4.9	B	J
Metals - Unfiltered	Silver	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Sodium	N	ug/L	28300			31200		
Metals - Unfiltered	Thallium	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U		50	U	U
Metals - Unfiltered	Zinc	N	ug/L	40	U		20	U	U
Metals - Filtered	Aluminum	Y	ug/L	200	U		200	U	U
Metals - Filtered	Antimony	Y	ug/L	6	U		12	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U		10	U	U
Metals - Filtered	Barium	Y	ug/L	66.9	B	J	56	B	J
Metals - Filtered	Beryllium	Y	ug/L	4	U		4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U		5	U	U
Metals - Filtered	Calcium	Y	ug/L	197000			159000		
Metals - Filtered	Chromium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U		50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U		25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U		300	U	U
Metals - Filtered	Lead	Y	ug/L	5	U		10	U	U
Metals - Filtered	Magnesium	Y	ug/L	45100			44200		
Metals - Filtered	Manganese	Y	ug/L	457			135		
Metals - Filtered	Mercury	Y	ug/L	1	U		1	U	
Metals - Filtered	Nickel	Y	ug/L	5	B	J	2.7	B	J
Metals - Filtered	Potassium	Y	ug/L	4240	B	J	4000	B	J
Metals - Filtered	Selenium	Y	ug/L	5.9	B	J	10	U	U
Metals - Filtered	Silver	Y	ug/L	10	U		10	U	U
Metals - Filtered	Sodium	Y	ug/L	28700			30100		
Metals - Filtered	Thallium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U		50	U	U
Metals - Filtered	Zinc	Y	ug/L	40	U		14.5	B	J
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	299			285		
Water Quality Parameters	Chloride	N	ppm	105			171		
Water Quality Parameters	Cyanide, total	N	ppm	0.0085	B	J	0.01	U	
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	657			600		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	2	U		0.11		
Water Quality Parameters	Sulfate	N	ppm	190			139		
Water Quality Parameters	Total dissolved solids	N	ppm	876			790		
Water Quality Parameters	Total suspended solids	N	ppm	14			20		
Water Quality Parameters	Turbidity	N	NTU	8.6			12.7		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.42					
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	-503.1					
Field Tests	pH	N	pH_units	6.73					
Field Tests	Specific Conductivity	N	mS/cm	0.721					
Field Tests	Temperature	N	C	12.18					
Field Tests	Turbidity	N	NTU	0					
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.28			0.38	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.2			0.2		
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	5.4		J	10.8		J
Explosives	Dinitrotoluene, 2,6-	N	ug/L	5.3		J	7.8		J
Explosives	HMX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	25.1		J	48.5		J
Explosives	Nitrotoluene, 3-	N	ug/L	2.9		J	5.7		J
Explosives	Nitrotoluene, 4-	N	ug/L	2.9		J	5.8		J
Explosives	RDX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	25	U	R	25	U	R
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	UJ	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	1.6			1.5		
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.1		J	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.81	J	J	0.87	J	J
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U	U	5	U	U
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	36.8			40		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	5.6			5.2		
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	5	U	U	5	U	U
Semivolatiles	Acenaphthene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Acenaphthylene	N	ug/L	5	U	U	5	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Benzoic acid	N	ug/L	25	U	U	25	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	5	U	U	5	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	5	U	U	5	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	5	U	U	5	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	5	U	U	5	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	5	U	U	5	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	5	U	U	5	U	U
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Chrysene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dibenzofuran	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	5	U	U	5	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	1.3	J	B	5	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	25	U	U	25	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	2.1	J	J	6.4		J
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	2.4	J	J	4.3	J	J
Semivolatiles	Di-n-octyl phthalate	N	ug/L	5	U	U	5	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Fluorene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Hexachloroethane	N	ug/L	5	U	U	5	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Isophorone	N	ug/L	5	U	U	5	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitrobenzene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	25	U	U	25	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	5	U	U	5	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	5	U	U	5	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	25	U	U	25	U	U
Semivolatiles	Phenanthrene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Phenol	N	ug/L	5	U	U	5	U	U
Semivolatiles	Pyrene	N	ug/L	5	U	U	5	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	5	U	U	5	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	5	U	U	5	U	U
Metals - Unfiltered	Aluminum	N	ug/L	39.5	B	B	35.2	B	B
Metals - Unfiltered	Antimony	N	ug/L	6	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	59.7	B	J	60.7	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	80700		J	83200		J
Metals - Unfiltered	Chromium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	300	U	U	300	U	U
Metals - Unfiltered	Lead	N	ug/L	10	U	U	2.3	B	J
Metals - Unfiltered	Magnesium	N	ug/L	17300			17800		
Metals - Unfiltered	Manganese	N	ug/L	57.3			59.7		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	1920	B	J	1870	B	J
Metals - Unfiltered	Selenium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	8500	B	J	5600	B	J
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Zinc	N	ug/L	20	U	U	9.2	B	J
Metals - Filtered	Aluminum	Y	ug/L	37.6	B	J	28.3	B	J
Metals - Filtered	Antimony	Y	ug/L	6	U	U	6	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Barium	Y	ug/L	51.3	B	J	49.2	B	J
Metals - Filtered	Beryllium	Y	ug/L	4	U	U	4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U	U	5	U	U
Metals - Filtered	Calcium	Y	ug/L	77300			78400		
Metals - Filtered	Chromium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U	U	25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U	U	300	U	U
Metals - Filtered	Lead	Y	ug/L	5	U	U	10	U	U
Metals - Filtered	Magnesium	Y	ug/L	15800			16100		
Metals - Filtered	Manganese	Y	ug/L	47.2			46.1		
Metals - Filtered	Mercury	Y	ug/L	1	U	U	1	U	U
Metals - Filtered	Nickel	Y	ug/L	40	U	U	40	U	U
Metals - Filtered	Potassium	Y	ug/L	1050	B	J	1530	B	J
Metals - Filtered	Selenium	Y	ug/L	3.6	B	J	10	U	U
Metals - Filtered	Silver	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Sodium	Y	ug/L	4210	B	J	4960	B	J
Metals - Filtered	Thallium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Zinc	Y	ug/L	20	U	U	9.5	B	J
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	234			237		
Water Quality Parameters	Chloride	N	ppm	7.3			7.3		
Water Quality Parameters	Cyanide, total	N	ppm	0.0075	B	J	0.01	U	U
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	273			281		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.71		J	0.75		J
Water Quality Parameters	Sulfate	N	ppm	38			38.1		
Water Quality Parameters	Total dissolved solids	N	ppm	396		J	316		
Water Quality Parameters	Total suspended solids	N	ppm	10	U	U	6	B	J
Water Quality Parameters	Turbidity	N	NTU	2.1		J	2.9		J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm				2.39		
Field Tests	FERROUS IRON	N	mg/L				0		
Field Tests	Oxidation Reduction Potential	N	mV				-2.2		
Field Tests	pH	N	pH_units				6.93		
Field Tests	Specific Conductivity	N	mS/cm				0.69		
Field Tests	Temperature	N	C				10.41		
Field Tests	Turbidity	N	NTU				0		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.26			0.48		J
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.2	U	U	0.54		J
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	9.9	D		3.4		J
Explosives	Dinitrotoluene, 2,6-	N	ug/L	6.9			5.9		J
Explosives	HMX	N	ug/L	0.5	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	39	D		8.1		J
Explosives	Nitrotoluene, 3-	N	ug/L	4.5			1.2		J
Explosives	Nitrotoluene, 4-	N	ug/L	4.5			0.56		J
Explosives	RDX	N	ug/L	0.5	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.2	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	10	U	U	25	U	U
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	1	U	R	2	U	U
Volatiles	Butanone, 2-	N	ug/L	10	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	1	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	1	U	UJ	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	1	U	U	2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L	1	U	U			
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	UJ			
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L	1	U	U			
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	1	U	U			
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	1	U	UJ			
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	1	U	U			
Volatiles	Dichlorodifluoromethane	N	ug/L	1	U	UJ			
Volatiles	Dichloroethane, 1,1-	N	ug/L	1.4			3		
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.9			1.2		
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U	0.78	J	J
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L	1	U	U			
Volatiles	METHYL ACETATE	N	ug/L	10	U	U			
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	5	U	U			
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L	1	U	UJ			
Volatiles	Methylene chloride	N	ug/L	1	U	U	5	U	U
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	1	U	UJ			
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	40			29.5		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	4.8			4.3		
Volatiles	Trichlorofluoromethane	N	ug/L	1	U	UJ			
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L	1	U	U			
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	2	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L				4.9	U	U
Semivolatiles	Acenaphthene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Acenaphthylene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	ACETOPHENONE	N	ug/L	10	U	U			
Semivolatiles	Anthracene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Atrazine	N	ug/L	10	U	U			
Semivolatiles	Benzaldehyde	N	ug/L	10	U	U			
Semivolatiles	Benzo(a)anthracene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Benzoic acid	N	ug/L				25	U	U
Semivolatiles	Benzyl alcohol	N	ug/L				4.9	U	U
Semivolatiles	BIBENZENE	N	ug/L	10	U	U			
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Caprolactam	N	ug/L	10	U	U			

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Chrysene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dibenzofuran	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L				4.9	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L				4.9	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L				4.9	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	50	U	U	9.8	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	50	U	U	9.8	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	50	U	U	25	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	10	U	U	6.1		J
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	10	U	U	6		J
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Fluorene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Hexachloroethane	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Isophorone	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L	10	U	U			
Semivolatiles	Naphthalene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	50	U	U	9.8	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	50	U	U	9.8	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	50	U	U	9.8	U	U
Semivolatiles	Nitrobenzene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	50	U	U	25	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	10	U	U	25	U	U
Semivolatiles	Phenanthrene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Phenol	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Pyrene	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L				4.9	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10	U	U	4.9	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10	U	U	4.9	U	U
Metals - Unfiltered	Aluminum	N	ug/L	200	U	U	361		
Metals - Unfiltered	Antimony	N	ug/L	60	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	200	U	U	76.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	5	U	U	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	79200			89300		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	100	U	U	200	B	J
Metals - Unfiltered	Lead	N	ug/L	3	U	U	2.5	B	B
Metals - Unfiltered	Magnesium	N	ug/L	17100			19400		
Metals - Unfiltered	Manganese	N	ug/L	55.4			184		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	5000	U	U	2110	B	J
Metals - Unfiltered	Selenium	N	ug/L	5	U	U	4.5	B	J
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	5680			5380	B	J
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Zinc	N	ug/L	20	U	U	20	U	U
Metals - Filtered	Aluminum	Y	ug/L	200	U	U	200	U	U
Metals - Filtered	Antimony	Y	ug/L	60	U	U	6	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Barium	Y	ug/L	200	U	U	28	B	J
Metals - Filtered	Beryllium	Y	ug/L	5	U	U	4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U	U	5	U	U
Metals - Filtered	Calcium	Y	ug/L	76100			82600		
Metals - Filtered	Chromium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U	U	25	U	U
Metals - Filtered	Iron	Y	ug/L	100	U	U	300	U	U
Metals - Filtered	Lead	Y	ug/L	3	U	U	2.1	B	J
Metals - Filtered	Magnesium	Y	ug/L	16500			15000		
Metals - Filtered	Manganese	Y	ug/L	57.3			30.1		J
Metals - Filtered	Mercury	Y	ug/L	0.2	U	U	1	U	U
Metals - Filtered	Nickel	Y	ug/L	40	U	U	40	U	U
Metals - Filtered	Potassium	Y	ug/L	5000	U	U	914	B	B
Metals - Filtered	Selenium	Y	ug/L	5	U	U	20	U	U
Metals - Filtered	Silver	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Sodium	Y	ug/L	5660			4120	B	J
Metals - Filtered	Thallium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Zinc	Y	ug/L	20	U	U	20	U	U
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	230			250		
Water Quality Parameters	Chloride	N	ppm	5.7			7		
Water Quality Parameters	Cyanide, total	N	ppm	0.01	U	U	0.01	U	U
Water Quality Parameters	Hardness	N	ppm	300					
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm				303		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.9			0.44		J
Water Quality Parameters	Sulfate	N	ppm	49.5			37.3		J
Water Quality Parameters	Total dissolved solids	N	ppm	350			339		
Water Quality Parameters	Total suspended solids	N	ppm	4	U	U	10	U	U
Water Quality Parameters	Turbidity	N	NTU	0.6			2		J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3077			LB3079		
SAMPLE_DATE				5-Nov-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm						
Field Tests	FERROUS IRON	N	mg/L						
Field Tests	Oxidation Reduction Potential	N	mV						
Field Tests	pH	N	pH_units						
Field Tests	Specific Conductivity	N	mS/cm						
Field Tests	Temperature	N	C						
Field Tests	Turbidity	N	NTU						
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	U			
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.29		J			
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U			
Explosives	Dinitrotoluene, 2,4-	N	ug/L	17.8		J			
Explosives	Dinitrotoluene, 2,6-	N	ug/L	12.4		J			
Explosives	HMX	N	ug/L	0.19	U	U			
Explosives	Nitrobenzene	N	ug/L	0.19	U	U			
Explosives	Nitrotoluene, 2-	N	ug/L	74.7		J			
Explosives	Nitrotoluene, 3-	N	ug/L	9.1		J			
Explosives	Nitrotoluene, 4-	N	ug/L	8.6		J			
Explosives	RDX	N	ug/L	0.19	U	U			
Explosives	Tetryl	N	ug/L	0.19	U	U			
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U			
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U			
Volatiles	Acetone	N	ug/L	25	U	R	10	U	U
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	1	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U	10	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	1	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	UJ
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	1	U	R
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	1	U	UJ
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L				1	U	U
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L				2	U	R
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L				1	U	U
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L				1	U	U
Volatiles	Dichlorobenzene, 1,3-	N	ug/L				1	U	U
Volatiles	Dichlorobenzene, 1,4-	N	ug/L				1	U	U
Volatiles	Dichlorodifluoromethane	N	ug/L				1	U	U
Volatiles	Dichloroethane, 1,1-	N	ug/L	3.7			3.6		
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.83	J	J	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3077			LB3079		
SAMPLE_DATE				5-Nov-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	UJ
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	UJ
Volatiles	Isopropylbenzene	N	ug/L				1	U	U
Volatiles	METHYL ACETATE	N	ug/L				10	U	U
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L				5	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U	10	U	U
Volatiles	Methylcyclohexane	N	ug/L				1	U	U
Volatiles	Methylene chloride	N	ug/L	5	U	U	1	U	U
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L				1	U	U
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	32.7			33		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	4.8			5.1		
Volatiles	Trichlorofluoromethane	N	ug/L				1	U	U
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L				1	U	U
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U	U	2	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	5	U	U			
Semivolatiles	Acenaphthene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Acenaphthylene	N	ug/L	5	U	U	10	U	U
Semivolatiles	ACETOPHENONE	N	ug/L				10	U	U
Semivolatiles	Anthracene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Atrazine	N	ug/L				10	U	U
Semivolatiles	Benzaldehyde	N	ug/L				10	U	U
Semivolatiles	Benzo(a)anthracene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Benzoic acid	N	ug/L	25	U	U			
Semivolatiles	Benzyl alcohol	N	ug/L	5	U	U			
Semivolatiles	BIBENZENE	N	ug/L				10	U	U
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	5	U	U	10	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	5	U	U	10	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	5	U	U	10	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	Caprolactam	N	ug/L				10	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3077			LB3079		
SAMPLE_DATE				5-Nov-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Chrysene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dibenzofuran	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	5	U	U			
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	5	U	U			
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	5	U	U			
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.9	U	U	50	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.9	U	U	50	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	25	U	U	50	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	12.9		J	10	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	8.4		J	10	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	5	U	U	10	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Fluorene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Hexachloroethane	N	ug/L	5	U	U	10	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Isophorone	N	ug/L	5	U	U	10	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L				10	U	U
Semivolatiles	Naphthalene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.9	U	U	50	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.9	U	U	50	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.9	U	U	50	U	U
Semivolatiles	Nitrobenzene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	25	U	U	50	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	5	U	U	10	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	5	U	U	10	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	25	U	U	10	U	U
Semivolatiles	Phenanthrene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Phenol	N	ug/L	5	U	U	10	U	U
Semivolatiles	Pyrene	N	ug/L	5	U	U	10	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	5	U	U			
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	5	U	U	10	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	5	U	U	10	U	U
Metals - Unfiltered	Aluminum	N	ug/L	313			1190		
Metals - Unfiltered	Antimony	N	ug/L	6	U	U	60	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	82.1	B	J	200	U	U
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U	5	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3077			LB3079		
SAMPLE_DATE				5-Nov-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	92300			84200		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	207	B	J	1430		
Metals - Unfiltered	Lead	N	ug/L	3.4	B	B	3	U	U
Metals - Unfiltered	Magnesium	N	ug/L	20600			21100		
Metals - Unfiltered	Manganese	N	ug/L	159			160		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U	0.2	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	2200	B	J	5000	U	U
Metals - Unfiltered	Selenium	N	ug/L	20	U	U	5	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	6170	B	J	7420		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U	50	U	U
Metals - Unfiltered	Zinc	N	ug/L	20	U	U	20	U	U
Metals - Filtered	Aluminum	Y	ug/L	200	U	U	200	U	U
Metals - Filtered	Antimony	Y	ug/L	6	U	U	60	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Barium	Y	ug/L	33.8	B	J	200	U	U
Metals - Filtered	Beryllium	Y	ug/L	4	U	U	5	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U	U	5	U	U
Metals - Filtered	Calcium	Y	ug/L	85700			81500		
Metals - Filtered	Chromium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U	U	25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U	U	100	U	U
Metals - Filtered	Lead	Y	ug/L	2.4	B	J	3	U	U
Metals - Filtered	Magnesium	Y	ug/L	15700			15000		
Metals - Filtered	Manganese	Y	ug/L	46.3		J	47.4		
Metals - Filtered	Mercury	Y	ug/L	0.16	B	J	0.2	U	U
Metals - Filtered	Nickel	Y	ug/L	40	U	U	40	U	U
Metals - Filtered	Potassium	Y	ug/L	1080	B	B	5000	U	U
Metals - Filtered	Selenium	Y	ug/L	20	U	U	5	U	U
Metals - Filtered	Silver	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Sodium	Y	ug/L	4550	B	J	5000	U	U
Metals - Filtered	Thallium	Y	ug/L	10	U	U	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U	U	50	U	U
Metals - Filtered	Zinc	Y	ug/L	20	U	U	20	U	U
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	277			280		
Water Quality Parameters	Chloride	N	ppm	7.2			5.8		
Water Quality Parameters	Cyanide, total	N	ppm	0.01	U	U	0.01	U	U
Water Quality Parameters	Hardness	N	ppm				320		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	315					
Water Quality Parameters	Nitrate	N	ppm				0.3		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.45		J			
Water Quality Parameters	Sulfate	N	ppm	39.6		J	51.3		
Water Quality Parameters	Total dissolved solids	N	ppm	365			370		
Water Quality Parameters	Total suspended solids	N	ppm	7	B	J	38		
Water Quality Parameters	Turbidity	N	NTU	9.7		J	16		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW03			LBA-MW03		
SAMPLE_NO				LB3071			LB3080		
SAMPLE_DATE				10-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	11.88			2.52		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-1061.7			-14.3		
Field Tests	pH	N	pH_units	6.92			7.17		
Field Tests	Specific Conductivity	N	mS/cm	0.66			0.822		
Field Tests	Temperature	N	C	12.56			11.02		
Field Tests	Turbidity	N	NTU	0			-4.3		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U		0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U		0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U		0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U		0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U		0.19	U	U
Explosives	HMX	N	ug/L	0.19	U		0.32		
Explosives	Nitrobenzene	N	ug/L	0.19	U		0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U		0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U		0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U		0.19	U	U
Explosives	RDX	N	ug/L	0.19	U		0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U		0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U		0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U		0.19	U	U
Volatiles	Acetone	N	ug/L	25	U		25	U	U
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U		1	U	U
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U		1	U	U
Volatiles	Bromoform	N	ug/L	1	U		1	U	U
Volatiles	Bromomethane	N	ug/L	2	U		2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U		5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U		0.54	J	J
Volatiles	Carbon tetrachloride	N	ug/L	1	U		4		
Volatiles	Chlorobenzene	N	ug/L	1	U		1	U	U
Volatiles	Chloroethane	N	ug/L	2	U		2	U	U
Volatiles	Chloroform	N	ug/L	1	U		1	U	U
Volatiles	Chloromethane	N	ug/L	2	U		2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U		1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	6.3			8.3		
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.4			0.68	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U		1	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW03			LBA-MW03		
SAMPLE_NO				LB3071			LB3080		
SAMPLE_DATE				10-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U		1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U		1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U		10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U		5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U		5	U	U
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U		1	U	U
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U		1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U		1	U	U
Volatiles	Toluene	N	ug/L	1	U		1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	35.3			22.1		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U		1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U		1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U		1	U	U
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U		3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Benzoic acid	N	ug/L	24	U		27	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW03			LBA-MW03		
SAMPLE_NO				LB3071			LB3080		
SAMPLE_DATE				10-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Chrysene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U		11	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U		11	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U		27	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Fluorene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Isophorone	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U		11	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U		11	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U		11	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U		27	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	24	U		27	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Phenol	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Pyrene	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U		5.3	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U		5.3	U	U
Metals - Unfiltered	Aluminum	N	ug/L	200	U		20.4	B	J
Metals - Unfiltered	Antimony	N	ug/L	6	U		12	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Barium	N	ug/L	125	B	J	260		
Metals - Unfiltered	Beryllium	N	ug/L	4	U		4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U		5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW03			LBA-MW03		
SAMPLE_NO				LB3071			LB3080		
SAMPLE_DATE				10-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	90200			78000		J
Metals - Unfiltered	Chromium	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U		50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U		25	U	U
Metals - Unfiltered	Iron	N	ug/L	300	U		300	U	U
Metals - Unfiltered	Lead	N	ug/L	5	U		10	U	U
Metals - Unfiltered	Magnesium	N	ug/L	26100			28300		
Metals - Unfiltered	Manganese	N	ug/L	68.2			292		
Metals - Unfiltered	Mercury	N	ug/L	1	U		1	U	U
Metals - Unfiltered	Nickel	N	ug/L	3.2	B	J	3	B	J
Metals - Unfiltered	Potassium	N	ug/L	5570	B	J	5530	B	J
Metals - Unfiltered	Selenium	N	ug/L	10	U		10	U	UJ
Metals - Unfiltered	Silver	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Sodium	N	ug/L	21600			24600		
Metals - Unfiltered	Thallium	N	ug/L	20	U		10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U		50	U	U
Metals - Unfiltered	Zinc	N	ug/L	11.3	B	J	20	U	U
Metals - Filtered	Aluminum	Y	ug/L	200	U		200	U	U
Metals - Filtered	Antimony	Y	ug/L	6	U		12	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U		10	U	U
Metals - Filtered	Barium	Y	ug/L	131	B	J	190	B	J
Metals - Filtered	Beryllium	Y	ug/L	4	U		4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U		5	U	U
Metals - Filtered	Calcium	Y	ug/L	86500			81800		
Metals - Filtered	Chromium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U		50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U		25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U		300	U	U
Metals - Filtered	Lead	Y	ug/L	2.7	B	J	10	U	U
Metals - Filtered	Magnesium	Y	ug/L	25800			26800		
Metals - Filtered	Manganese	Y	ug/L	71.7			181		
Metals - Filtered	Mercury	Y	ug/L	1	U		1	U	U
Metals - Filtered	Nickel	Y	ug/L	3.5	B	J	40	U	U
Metals - Filtered	Potassium	Y	ug/L	5600	B	J	4270	B	J
Metals - Filtered	Selenium	Y	ug/L	4.8	B	J	10	U	U
Metals - Filtered	Silver	Y	ug/L	10	U		10	U	U
Metals - Filtered	Sodium	Y	ug/L	20400			18200		
Metals - Filtered	Thallium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U		50	U	U
Metals - Filtered	Zinc	Y	ug/L	11.3	B	J	20	U	U
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	246			333		
Water Quality Parameters	Chloride	N	ppm	6.8			195	B	J
Water Quality Parameters	Cyanide, total	N	ppm	0.013		J	0.01	U	U
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	333			311		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	2	U		0.11		
Water Quality Parameters	Sulfate	N	ppm	69.8			45.4		
Water Quality Parameters	Total dissolved solids	N	ppm	580			394		
Water Quality Parameters	Total suspended solids	N	ppm	5	B	J	4		
Water Quality Parameters	Turbidity	N	NTU	1	U		1	B	J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	1.97			2.78		
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	10.6			-26.4		
Field Tests	pH	N	pH_units	6.8			7.57		
Field Tests	Specific Conductivity	N	mS/cm	0.000942			0.000554		
Field Tests	Temperature	N	C	5.16			3.7		
Field Tests	Turbidity	N	NTU	18.1			1210.8		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	HMX	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Nitrobenzene	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	RDX	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Tetryl	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.324	U	U	0.316	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.324	U	U	0.316	U	U
Volatiles	Acetone	N	ug/L	10	U	R	3.46	J	J
Volatiles	Acrolein	N	ug/L	10	U	R	10	U	R
Volatiles	Acrylonitrile	N	ug/L	10	U	U	10	U	U
Volatiles	Benzene	N	ug/L	2	U	U	2	U	U
Volatiles	Bromobenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Bromochloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Bromodichloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Bromoform	N	ug/L	2	U	U	2	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorobenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroform	N	ug/L	2	U	U	2	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorotoluene, 4-	N	ug/L	2	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromochloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorodifluoromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethane, 1,1-	N	ug/L	6.66			2	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 2,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropene, 1,1-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	2	U	U	2	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Ethylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Hexachlorobutadiene	N	ug/L	2	U	U	2	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	2	U	U	2	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	10	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	2	U	U	2	U	U
Volatiles	Naphthalene	N	ug/L	2	U	U	2	U	U
Volatiles	n-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	n-Propylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	p-Isopropyltoluene	N	ug/L	2	U	U	2	U	U
Volatiles	sec-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Styrene	N	ug/L	2	U	U	2	U	U
Volatiles	tert-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethene	N	ug/L	2	U	U	2	U	U
Volatiles	Toluene	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	58.4			0.72	J	J
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichloroethene	N	ug/L	0.81	J	J	2	U	U
Volatiles	Trichlorofluoromethane	N	ug/L	2	U	U	2	U	UJ
Volatiles	Trichloropropane, 1,2,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	2	U	U	2	U	U
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L	2	U	U	2	U	U
Volatiles	Vinyl acetate	N	ug/L	2	U	U	2	U	U
Volatiles	Vinyl chloride	N	ug/L	2	U	U	2	U	U
Volatiles	Xylene, o-	N	ug/L	2	U	U	2	U	U
Volatiles	Xylenes, m,p-	N	ug/L	4	U	U	4	U	U
Volatiles	Xylenes, total	N	ug/L						
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Acenaphthene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Acenaphthylene	N	ug/L	10	U	U	10	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzoic acid	N	ug/L	10	U	U	10	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	10	U	U	10	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10	U	U	10	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10	U	U	10	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10	U	U	10	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Chrysene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dibenzofuran	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	20	U	U	20	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10	U	U	10	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L	10	U	U	10	U	U
Semivolatiles	Fluoranthene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Fluorene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10	U	UJ	10	U	U
Semivolatiles	Hexachloroethane	N	ug/L	10	U	U	10	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Isophorone	N	ug/L	10	U	U	10	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Naphthalene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitrobenzene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L	10	U	U	10	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10	U	U	10	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10	U	U	10	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	20	U	U	20	U	U
Semivolatiles	Phenanthrene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Phenol	N	ug/L	10	U	U	10	U	U
Semivolatiles	Pyrene	N	ug/L	10	U	U	10	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10	U	U	10	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Aluminum	N	ug/L	162			12800		
Metals - Unfiltered	Antimony	N	ug/L	5.56	U	U	5.56	U	U
Metals - Unfiltered	Arsenic	N	ug/L	11.1	U	U	42.7		
Metals - Unfiltered	Barium	N	ug/L	31.7			323		
Metals - Unfiltered	Beryllium	N	ug/L	4.44	U	U	13.7		
Metals - Unfiltered	Cadmium	N	ug/L	4.63			2.43	J	J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	156000			299000		
Metals - Unfiltered	Chromium	N	ug/L	11.1	U	U	20.4		
Metals - Unfiltered	Cobalt	N	ug/L	8.89	U	U	18.6		
Metals - Unfiltered	Copper	N	ug/L	5.98	J	J	66		
Metals - Unfiltered	Iron	N	ug/L	469			40700		
Metals - Unfiltered	Lead	N	ug/L	5.56	U	U	48.6		
Metals - Unfiltered	Magnesium	N	ug/L	30900			90700		
Metals - Unfiltered	Manganese	N	ug/L	25.3			1450		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U	U	0.2	U	U
Metals - Unfiltered	Nickel	N	ug/L	6.67	U	U	20.5		
Metals - Unfiltered	Potassium	N	ug/L	878			4800		
Metals - Unfiltered	Selenium	N	ug/L	11.1	U	U	11.1	U	U
Metals - Unfiltered	Silver	N	ug/L	11.1	U	U	11.1	U	U
Metals - Unfiltered	Sodium	N	ug/L	5240			20400		
Metals - Unfiltered	Thallium	N	ug/L	5.56	U	U	5.56	U	U
Metals - Unfiltered	Vanadium	N	ug/L	4.44	U	U	35.9		
Metals - Unfiltered	Zinc	N	ug/L	55.6	U	U	136		
Metals - Filtered	Aluminum	Y	ug/L	88.9	U	U	88.9	U	U
Metals - Filtered	Antimony	Y	ug/L	5.56	U	U	5.56	U	U
Metals - Filtered	Arsenic	Y	ug/L	11.1	U	U	28		
Metals - Filtered	Barium	Y	ug/L	30.9			87.7		
Metals - Filtered	Beryllium	Y	ug/L	4.44	U	U	4.44	U	U
Metals - Filtered	Cadmium	Y	ug/L	4.46			4.44	U	U
Metals - Filtered	Calcium	Y	ug/L	154000			65600		
Metals - Filtered	Chromium	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Cobalt	Y	ug/L	8.89	U	U	8.89	U	U
Metals - Filtered	Copper	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Iron	Y	ug/L	90.9			88.9	U	U
Metals - Filtered	Lead	Y	ug/L	5.56	U	U	5.56	U	U
Metals - Filtered	Magnesium	Y	ug/L	29600			20200		
Metals - Filtered	Manganese	Y	ug/L	21.4			273		
Metals - Filtered	Mercury	Y	ug/L	0.2	U	U	0.2	U	U
Metals - Filtered	Nickel	Y	ug/L	6.67	U	U	6.67	U	U
Metals - Filtered	Potassium	Y	ug/L	792			2080		
Metals - Filtered	Selenium	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Silver	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Sodium	Y	ug/L	5140			18200		
Metals - Filtered	Thallium	Y	ug/L	5.56	U	U	5.56	U	U
Metals - Filtered	Vanadium	Y	ug/L	4.44	U	U	4.44	U	U
Metals - Filtered	Zinc	Y	ug/L	55.6	U	U	55.6	U	U
Cyanide	Cyanide, total	N	ppm	0.025	U	U	0.025	U	U
Water Quality Parameters	Alkalinity	N	ppm	240			177		
Water Quality Parameters	Chloride	N	ppm	6.14		J	7.96		J
Water Quality Parameters	Cyanide, total	N	ppm						
Water Quality Parameters	Hardness	N	ppm	517			1120		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.297		J	0.04	U	U
Water Quality Parameters	Sulfate	N	ppm	193			43.8		J
Water Quality Parameters	Total dissolved solids	N	ppm	584			172		
Water Quality Parameters	Total suspended solids	N	ppm	4	U	U	3860		
Water Quality Parameters	Turbidity	N	NTU	10.9		J	866		J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	0.66			0.51		
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	4.9			17.9		
Field Tests	pH	N	pH_units	6.94			6.99		
Field Tests	Specific Conductivity	N	mS/cm	0.000486			0.000569		
Field Tests	Temperature	N	C	4.76			5.42		
Field Tests	Turbidity	N	NTU	25.2			1222.5		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	1.71			0.333	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	1.6			0.333	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	17.2			0.333	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	15.1			0.333	U	U
Explosives	HMX	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Nitrobenzene	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	6.89			0.333	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	3.91			0.333	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	1.8			0.333	U	U
Explosives	RDX	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Tetryl	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.343	U	U	0.333	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.343	U	U	0.333	U	U
Volatiles	Acetone	N	ug/L	10	U	R	10	U	R
Volatiles	Acrolein	N	ug/L	10	U	R	10	U	R
Volatiles	Acrylonitrile	N	ug/L	10	U	U	10	U	U
Volatiles	Benzene	N	ug/L	2	U	U	2	U	U
Volatiles	Bromobenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Bromochloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Bromodichloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Bromoform	N	ug/L	2	U	U	2	U	UJ
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorobenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroform	N	ug/L	2	U	U	2	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L	2	U	U	2	U	U
Volatiles	Chlorotoluene, 4-	N	ug/L	2	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromochloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dibromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichlorodifluoromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.77	J	J	10		
Volatiles	Dichloroethane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	2	U	U	0.66	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.34	J	J	2	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropane, 2,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropene, 1,1-	N	ug/L	2	U	U	2	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	2	U	U	2	U	U

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Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Ethylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Hexachlorobutadiene	N	ug/L	2	U	U	2	U	UJ
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	2	U	U	2	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	10	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	2	U	U	2	U	U
Volatiles	Naphthalene	N	ug/L	4.33			2	U	U
Volatiles	n-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	n-Propylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	p-Isopropyltoluene	N	ug/L	2	U	U	2	U	U
Volatiles	sec-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Styrene	N	ug/L	2	U	U	2	U	U
Volatiles	tert-Butylbenzene	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Tetrachloroethene	N	ug/L	2	U	U	2	U	U
Volatiles	Toluene	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	38.5			18.1		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichloroethene	N	ug/L	7.03			2	U	U
Volatiles	Trichlorofluoromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Trichloropropane, 1,2,3-	N	ug/L	2	U	U	2	U	U
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	0.4	J	J	2	U	U
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L	2	U	U	2	U	U
Volatiles	Vinyl acetate	N	ug/L	2	U	U	2	U	U
Volatiles	Vinyl chloride	N	ug/L	2	U	U	2	U	U
Volatiles	Xylene, o-	N	ug/L	2	U	U	2	U	U
Volatiles	Xylenes, m,p-	N	ug/L	4	U	U	4	U	U
Volatiles	Xylenes, total	N	ug/L						
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Acenaphthene	N	ug/L	10	U		10	U	U
Semivolatiles	Acenaphthylene	N	ug/L	10	U		10	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	10	U		10	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	10	U		10	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	10	U		10	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10	U		10	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10	U		10	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10	U		10	U	U
Semivolatiles	Benzoic acid	N	ug/L	10	U		10	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	10	U		10	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10	U		10	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10	U		10	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10	U		10	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	10	U		10	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Chrysene	N	ug/L	10	U		10	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10	U		10	U	U
Semivolatiles	Dibenzofuran	N	ug/L	10	U		10	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	10	U		10	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	10	U		10	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	10	U		10	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10	U		10	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10	U		10	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10	U		10	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10	U		10	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	20	U		20	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	13.3			10	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	7.11	J	J	10	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10	U		10	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L	10	U		10	U	U
Semivolatiles	Fluoranthene	N	ug/L	10	U		10	U	U
Semivolatiles	Fluorene	N	ug/L	10	U		10	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	10	U		10	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	10	U		10	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10	U		10	U	UJ
Semivolatiles	Hexachloroethane	N	ug/L	10	U		10	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10	U		10	U	U
Semivolatiles	Isophorone	N	ug/L	10	U		10	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Naphthalene	N	ug/L	10	U		10	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	10	U		10	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	Nitrobenzene	N	ug/L	10	U		10	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	10	U		10	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	10	U		10	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L	10	U		10	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10	U		10	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10	U		10	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	20	U		20	U	U
Semivolatiles	Phenanthrene	N	ug/L	10	U		10	U	U
Semivolatiles	Phenol	N	ug/L	10	U		10	U	U
Semivolatiles	Pyrene	N	ug/L	10	U		10	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	10	U		10	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10	U		10	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Aluminum	N	ug/L	261			12600		
Metals - Unfiltered	Antimony	N	ug/L	5.56	U		5.56	U	U
Metals - Unfiltered	Arsenic	N	ug/L	11.1	U		13.5		
Metals - Unfiltered	Barium	N	ug/L	16			110		
Metals - Unfiltered	Beryllium	N	ug/L	4.44	U	U	12.3		
Metals - Unfiltered	Cadmium	N	ug/L	2.97	J	J	4.44	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	75300			243000		
Metals - Unfiltered	Chromium	N	ug/L	11.1	U	U	20.3		
Metals - Unfiltered	Cobalt	N	ug/L	8.89	U	U	12.4		
Metals - Unfiltered	Copper	N	ug/L	11.1	U	U	53.7		
Metals - Unfiltered	Iron	N	ug/L	681			36000		
Metals - Unfiltered	Lead	N	ug/L	5.56	U		26.6		
Metals - Unfiltered	Magnesium	N	ug/L	16300			76500		
Metals - Unfiltered	Manganese	N	ug/L	35.1			698		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U		0.2	U	U
Metals - Unfiltered	Nickel	N	ug/L	6.67	U	U	17.6		
Metals - Unfiltered	Potassium	N	ug/L	510	J	J	2860		
Metals - Unfiltered	Selenium	N	ug/L	11.1	U		11.1	U	U
Metals - Unfiltered	Silver	N	ug/L	11.1	U	U	11.1	U	U
Metals - Unfiltered	Sodium	N	ug/L	2820			7790		
Metals - Unfiltered	Thallium	N	ug/L	5.56	U		5.56	U	U
Metals - Unfiltered	Vanadium	N	ug/L	4.44	U	U	37.1		
Metals - Unfiltered	Zinc	N	ug/L	55.6	U	U	111		
Metals - Filtered	Aluminum	Y	ug/L	88.9	U	U	88.9	U	U
Metals - Filtered	Antimony	Y	ug/L	5.56	U		5.56	U	U
Metals - Filtered	Arsenic	Y	ug/L	11.1	U		11.1	U	U
Metals - Filtered	Barium	Y	ug/L	15.1			27.4		
Metals - Filtered	Beryllium	Y	ug/L	4.44	U	U	4.44	U	U
Metals - Filtered	Cadmium	Y	ug/L	4.44	U	U	3.29	J	J
Metals - Filtered	Calcium	Y	ug/L	71600			80700		
Metals - Filtered	Chromium	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Cobalt	Y	ug/L	8.89	U	U	8.89	U	U
Metals - Filtered	Copper	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Iron	Y	ug/L	88.9	U	U	88.9	U	U
Metals - Filtered	Lead	Y	ug/L	5.56	U		5.56	U	U
Metals - Filtered	Magnesium	Y	ug/L	15800			20900		
Metals - Filtered	Manganese	Y	ug/L	29.5			24.6		
Metals - Filtered	Mercury	Y	ug/L	0.2	U		0.2	U	U
Metals - Filtered	Nickel	Y	ug/L	6.67	U	U	6.67	U	U
Metals - Filtered	Potassium	Y	ug/L	357	J	J	556	U	U
Metals - Filtered	Selenium	Y	ug/L	11.1	U		11.1	U	U
Metals - Filtered	Silver	Y	ug/L	11.1	U	U	11.1	U	U
Metals - Filtered	Sodium	Y	ug/L	3060			7290		
Metals - Filtered	Thallium	Y	ug/L	5.56	U		5.56	U	U
Metals - Filtered	Vanadium	Y	ug/L	4.44	U	U	4.44	U	U
Metals - Filtered	Zinc	Y	ug/L	55.6	U	U	55.6	U	U
Cyanide	Cyanide, total	N	ppm	0.025	U		0.025	U	U
Water Quality Parameters	Alkalinity	N	ppm	103			238		
Water Quality Parameters	Chloride	N	ppm	3.61			3.24		J
Water Quality Parameters	Cyanide, total	N	ppm						
Water Quality Parameters	Hardness	N	ppm	255			921		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.581			0.061		J
Water Quality Parameters	Sulfate	N	ppm	30.5			28.2		
Water Quality Parameters	Total dissolved solids	N	ppm	239			295		
Water Quality Parameters	Total suspended solids	N	ppm	21			1770		
Water Quality Parameters	Turbidity	N	NTU	19.7		J	165		J

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm						
Field Tests	FERROUS IRON	N	mg/L						
Field Tests	Oxidation Reduction Potential	N	mV						
Field Tests	pH	N	pH_units						
Field Tests	Specific Conductivity	N	mS/cm						
Field Tests	Temperature	N	C						
Field Tests	Turbidity	N	NTU						
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	HMX	N	ug/L	0.308	U	U	0.5	U	U
Explosives	Nitrobenzene	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	RDX	N	ug/L	0.308	U	U	0.5	U	U
Explosives	Tetryl	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.308	U	U	0.2	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.308	U	U	0.2	U	U
Volatiles	Acetone	N	ug/L	10	U	R	10	U	U
Volatiles	Acrolein	N	ug/L	10	U	R			
Volatiles	Acrylonitrile	N	ug/L	10	U	U			
Volatiles	Benzene	N	ug/L	2	U	U	1	U	U
Volatiles	Bromobenzene	N	ug/L	2	U	U			
Volatiles	Bromochloromethane	N	ug/L	2	U	U			
Volatiles	Bromodichloromethane	N	ug/L	2	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	2	U	U	1	U	UJ
Volatiles	Bromomethane	N	ug/L	2	U	U	1	U	U
Volatiles	Butanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	1	U	U
Volatiles	Carbon tetrachloride	N	ug/L	2	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	2	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	1	U	U
Volatiles	Chloroform	N	ug/L	2	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	1	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L	2	U	U			
Volatiles	Chlorotoluene, 4-	N	ug/L	2	U	U			
Volatiles	Cyclohexane	N	ug/L				1	U	U
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	U	2	U	UJ
Volatiles	Dibromochloromethane	N	ug/L	2	U	U	1	U	UJ
Volatiles	Dibromoethane, 1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dibromomethane	N	ug/L	2	U	U			
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichlorodifluoromethane	N	ug/L	2	U	U	1	U	UJ
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.79	J	J	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L	2	U	U			
Volatiles	Dichloropropane, 2,2-	N	ug/L	2	U	U			
Volatiles	Dichloropropene, 1,1-	N	ug/L	2	U	U			
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	2	U	U	1	U	UJ

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	2	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	2	U	U	1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L	2	U	U			
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L	2	U	U	1	U	U
Volatiles	METHYL ACETATE	N	ug/L				10	U	U
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	2	U	U	5	U	U
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	10	U	U
Volatiles	Methylcyclohexane	N	ug/L				1	U	U
Volatiles	Methylene chloride	N	ug/L	2	U	U	1	U	U
Volatiles	Naphthalene	N	ug/L	2	U	U			
Volatiles	n-Butylbenzene	N	ug/L	2	U	U			
Volatiles	n-Propylbenzene	N	ug/L	2	U	U			
Volatiles	p-Isopropyltoluene	N	ug/L	2	U	U			
Volatiles	sec-Butylbenzene	N	ug/L	2	U	U			
Volatiles	Styrene	N	ug/L	2	U	U	1	U	U
Volatiles	tert-Butylbenzene	N	ug/L	2	U	U			
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L	2	U	U			
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	2	U	U	1	U	U
Volatiles	Toluene	N	ug/L	2	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L	2	U	U			
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	2	U	U	1	U	UJ
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	0.96	J	J	2.2		
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	2	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	2	U	U	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L	2	U	UJ	1	U	U
Volatiles	Trichloropropane, 1,2,3-	N	ug/L	2	U	U			
Volatiles	Trichlorotrifluoroethane	N	ug/L				1	U	U
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	2	U	U			
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L	2	U	U			
Volatiles	Vinyl acetate	N	ug/L	2	U	U			
Volatiles	Vinyl chloride	N	ug/L	2	U	U	1	U	U
Volatiles	Xylene, o-	N	ug/L	2	U	U			
Volatiles	Xylenes, m,p-	N	ug/L	4	U	U			
Volatiles	Xylenes, total	N	ug/L				2	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Acenaphthene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Acenaphthylene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	ACETOPHENONE	N	ug/L				10	U	U
Semivolatiles	Anthracene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Atrazine	N	ug/L				10	U	U
Semivolatiles	Benzaldehyde	N	ug/L				10	U	U
Semivolatiles	Benzo(a)anthracene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Benzoic acid	N	ug/L	10.8	U	U			
Semivolatiles	Benzyl alcohol	N	ug/L	10.8	U	U			
Semivolatiles	BIBENZENE	N	ug/L				10	U	U
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Caprolactam	N	ug/L				10	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Chrysene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dibenzofuran	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	10.8	U	U			
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	10.8	U	U			
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	10.8	U	U			
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10.8	U	U	10	U	UJ
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	21.5	U	U	50	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L	10.8	U	U			
Semivolatiles	Fluoranthene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Fluorene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Hexachloroethane	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Isophorone	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Naphthalene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	Nitrobenzene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	10.8	U	U	50	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L	10.8	U	U			
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	21.5	U	U	10	U	U
Semivolatiles	Phenanthrene	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Phenol	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Pyrene	N	ug/L	10.8	U	U	10	U	UJ
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	10.8	U	U			
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10.8	U	U	10	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10.8	U	U	10	U	U
Metals - Unfiltered	Aluminum	N	ug/L	3860			27500		
Metals - Unfiltered	Antimony	N	ug/L	5.56	U	U	60	U	U
Metals - Unfiltered	Arsenic	N	ug/L	11.9			22.4		
Metals - Unfiltered	Barium	N	ug/L	107			255		
Metals - Unfiltered	Beryllium	N	ug/L	3.2	J	J	5	U	U
Metals - Unfiltered	Cadmium	N	ug/L	2.7	J	J	5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	83500			160000		
Metals - Unfiltered	Chromium	N	ug/L	11.1	U	U	39.1		
Metals - Unfiltered	Cobalt	N	ug/L	5.01	J	J	50	U	U
Metals - Unfiltered	Copper	N	ug/L	17.4			54.3		
Metals - Unfiltered	Iron	N	ug/L	10200			48900		
Metals - Unfiltered	Lead	N	ug/L	6.91			31.2		
Metals - Unfiltered	Magnesium	N	ug/L	26500			55000		
Metals - Unfiltered	Manganese	N	ug/L	286			1240		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U	U	0.2	U	U
Metals - Unfiltered	Nickel	N	ug/L	4.98	J	J	58.2		
Metals - Unfiltered	Potassium	N	ug/L	2430			8560		
Metals - Unfiltered	Selenium	N	ug/L	11.1	U	U	5	U	U
Metals - Unfiltered	Silver	N	ug/L	11.1	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	12700			10800		
Metals - Unfiltered	Thallium	N	ug/L	5.56	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	9.17			65.9		
Metals - Unfiltered	Zinc	N	ug/L	31.9	J	J	141		
Metals - Filtered	Aluminum	Y	ug/L	128			200	U	U
Metals - Filtered	Antimony	Y	ug/L	5.56	U	U	60	U	U
Metals - Filtered	Arsenic	Y	ug/L	9.75	J	J	10	U	U
Metals - Filtered	Barium	Y	ug/L	93.6			200	U	U
Metals - Filtered	Beryllium	Y	ug/L	4.44	U	U	5	U	U
Metals - Filtered	Cadmium	Y	ug/L	4.44	U	U	5	U	U
Metals - Filtered	Calcium	Y	ug/L	72400			70900		
Metals - Filtered	Chromium	Y	ug/L	11.1	U	U	10	U	U
Metals - Filtered	Cobalt	Y	ug/L	8.89	U	U	50	U	U
Metals - Filtered	Copper	Y	ug/L	11.1	U	U	25	U	U
Metals - Filtered	Iron	Y	ug/L	382			132		
Metals - Filtered	Lead	Y	ug/L	5.56	U	U	3	U	U
Metals - Filtered	Magnesium	Y	ug/L	20200			18700		
Metals - Filtered	Manganese	Y	ug/L	108			104		
Metals - Filtered	Mercury	Y	ug/L	0.2	U	U	0.2	U	U
Metals - Filtered	Nickel	Y	ug/L	6.67	U	U	40	U	U
Metals - Filtered	Potassium	Y	ug/L	1480			5000	U	U
Metals - Filtered	Selenium	Y	ug/L	11.1	U	U	5	U	U
Metals - Filtered	Silver	Y	ug/L	11.1	U	U	10	U	U
Metals - Filtered	Sodium	Y	ug/L	12500			11600		
Metals - Filtered	Thallium	Y	ug/L	5.56	U	U	10	U	U
Metals - Filtered	Vanadium	Y	ug/L	4.44	U	U	50	U	U
Metals - Filtered	Zinc	Y	ug/L	55.6	U	U	20	U	U
Cyanide	Cyanide, total	N	ppm	0.025	U	U			
Water Quality Parameters	Alkalinity	N	ppm	119			230		
Water Quality Parameters	Chloride	N	ppm	6.55		J	6.3		J
Water Quality Parameters	Cyanide, total	N	ppm				0.01	U	U
Water Quality Parameters	Hardness	N	ppm	317			680		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm				0.1	U	U
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.04	U	U			
Water Quality Parameters	Sulfate	N	ppm	52.8		J	56.2		
Water Quality Parameters	Total dissolved solids	N	ppm	700		J	310		
Water Quality Parameters	Total suspended solids	N	ppm	676			1200		
Water Quality Parameters	Turbidity	N	NTU	375		J	64		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			RCA-MW01		
SAMPLE_NO				LBA3006			RC3074		
SAMPLE_DATE				28-Jan-09			12-May-09		
FK_DEPTH				10_07 - 10_1 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.25			7.71		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-26.1			122.5		
Field Tests	pH	N	pH_units	7.82			6.71		
Field Tests	Specific Conductivity	N	mS/cm	0.000536			0.88		
Field Tests	Temperature	N	C	8.72			9.96		
Field Tests	Turbidity	N	NTU	467.4			1		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.308	U	U	0.19	U	
Explosives	HMX	N	ug/L	0.308	U	U	0.19	U	
Explosives	Nitrobenzene	N	ug/L	0.308	U	U	0.19	U	
Explosives	Nitrotoluene, 2-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Nitrotoluene, 3-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Nitrotoluene, 4-	N	ug/L	0.308	U	U	0.19	U	
Explosives	RDX	N	ug/L	0.308	U	U	0.19	U	
Explosives	Tetryl	N	ug/L	0.308	U	U	0.19	U	
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.308	U	U	0.19	U	
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.308	U	U	0.19	U	
Volatiles	Acetone	N	ug/L	10	U	R	25	U	R
Volatiles	Acrolein	N	ug/L	10	U	R			
Volatiles	Acrylonitrile	N	ug/L	10	U	U			
Volatiles	Benzene	N	ug/L	2	U	U	1	U	
Volatiles	Bromobenzene	N	ug/L	2	U	U			
Volatiles	Bromochloromethane	N	ug/L	2	U	U			
Volatiles	Bromodichloromethane	N	ug/L	2	U	U	1	U	
Volatiles	Bromoform	N	ug/L	2	U	U	1	U	
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	
Volatiles	Butanone, 2-	N	ug/L	10	U	U	5	U	
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	
Volatiles	Carbon tetrachloride	N	ug/L	2	U	U	1	U	
Volatiles	Chlorobenzene	N	ug/L	2	U	U	1	U	
Volatiles	Chloroethane	N	ug/L	2	U	U	2	U	
Volatiles	Chloroform	N	ug/L	2	U	U	1	U	
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	
Volatiles	Chlorotoluene, 2-	N	ug/L	2	U	U			
Volatiles	Chlorotoluene, 4-	N	ug/L	2	U	U			
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	U			
Volatiles	Dibromochloromethane	N	ug/L	2	U	U	1	U	
Volatiles	Dibromoethane, 1,2-	N	ug/L	2	U	U			
Volatiles	Dibromomethane	N	ug/L	2	U	U			
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	2	U	U			
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	2	U	U			
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	2	U	U			
Volatiles	Dichlorodifluoromethane	N	ug/L	2	U	U			
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.81	J	J	1	U	
Volatiles	Dichloroethane, 1,2-	N	ug/L	2	U	U	1	U	
Volatiles	Dichloroethene, 1,1-	N	ug/L	2	U	U	1	U	
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	2	U	U	1	U	
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	2	U	U	1	U	
Volatiles	Dichloropropane, 1,2-	N	ug/L	2	U	U	1	U	
Volatiles	Dichloropropane, 1,3-	N	ug/L	2	U	U			
Volatiles	Dichloropropane, 2,2-	N	ug/L	2	U	U			
Volatiles	Dichloropropene, 1,1-	N	ug/L	2	U	U			
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	2	U	U	1	U	

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Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			RCA-MW01		
SAMPLE_NO				LBA3006			RC3074		
SAMPLE_DATE				28-Jan-09			12-May-09		
FK_DEPTH				10_07 - 10_1 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	2	U	U	1	U	
Volatiles	Ethylbenzene	N	ug/L	2	U	U	1	U	
Volatiles	Hexachlorobutadiene	N	ug/L	2	U	U			
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	
Volatiles	Isopropylbenzene	N	ug/L	2	U	U			
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	2	U	U			
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	5	U	
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	2	U	U	5	U	
Volatiles	Naphthalene	N	ug/L	2	U	U			
Volatiles	n-Butylbenzene	N	ug/L	2	U	U			
Volatiles	n-Propylbenzene	N	ug/L	2	U	U			
Volatiles	p-Isopropyltoluene	N	ug/L	2	U	U			
Volatiles	sec-Butylbenzene	N	ug/L	2	U	U			
Volatiles	Styrene	N	ug/L	2	U	U	1	U	
Volatiles	tert-Butylbenzene	N	ug/L	2	U	U			
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L	2	U	U			
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	2	U	U	1	U	
Volatiles	Tetrachloroethene	N	ug/L	2	U	U	1	U	
Volatiles	Toluene	N	ug/L	2	U	U	1	U	
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L	2	U	U			
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	2	U	U			
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1.06	J	J	1	U	
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	2	U	U	1	U	
Volatiles	Trichloroethene	N	ug/L	2	U	U	1	U	
Volatiles	Trichlorofluoromethane	N	ug/L	2	U	UJ			
Volatiles	Trichloropropane, 1,2,3-	N	ug/L	2	U	U			
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	2	U	U			
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L	2	U	U			
Volatiles	Vinyl acetate	N	ug/L	2	U	U			
Volatiles	Vinyl chloride	N	ug/L	2	U	U	1	U	
Volatiles	Xylene, o-	N	ug/L	2	U	U			
Volatiles	Xylenes, m,p-	N	ug/L	4	U	U			
Volatiles	Xylenes, total	N	ug/L				3	U	
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L				4.8	U	
Semivolatiles	Acenaphthene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Acenaphthylene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Benzo(a)pyrene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Benzoic acid	N	ug/L	10.2	U	U	24	U	
Semivolatiles	Benzyl alcohol	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Caprolactam	N	ug/L						

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Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			RCA-MW01		
SAMPLE_NO				LBA3006			RC3074		
SAMPLE_DATE				28-Jan-09			12-May-09		
FK_DEPTH				10_07 - 10_1 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Chloroaniline, 4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10.2	U	UJ	4.8	U	
Semivolatiles	Chlorophenol, 2-	N	ug/L	10.2	U	UJ	4.8	U	
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Chrysene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dibenzofuran	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10.2	U	U	9.6	U	
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10.2	U	UJ	4.8	U	
Semivolatiles	Diethyl phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dimethyl phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10.2	U	UJ	9.6	U	
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	20.4	U	UJ	24	U	
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	DIPHENYLAMINE	N	ug/L	10.2	U	U			
Semivolatiles	Fluoranthene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Fluorene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Hexachlorobenzene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Hexachlorobutadiene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Hexachloroethane	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Isophorone	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Methylphenol, 2-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Methylphenol, 4-	N	ug/L	10.2	U	UJ			
Semivolatiles	Naphthalene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Nitroaniline, 2-	N	ug/L	10.2	U	U	9.6	U	
Semivolatiles	Nitroaniline, 3-	N	ug/L	10.2	U	U	9.6	U	
Semivolatiles	Nitroaniline, 4-	N	ug/L	10.2	U	U	9.6	U	
Semivolatiles	Nitrobenzene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Nitrophenol, 2-	N	ug/L	10.2	U	UJ	4.8	U	
Semivolatiles	Nitrophenol, 4-	N	ug/L	10.2	U	UJ	24	U	UJ
Semivolatiles	n-Nitrosodimethylamine	N	ug/L	10.2	U	U			
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Pentachlorophenol	N	ug/L	20.4	U	UJ	24	U	
Semivolatiles	Phenanthrene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Phenol	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Pyrene	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	10.2	U	U	4.8	U	
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10.2	U	UJ	4.8	U	
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10.2	U	UJ	4.8	U	
Metals - Unfiltered	Aluminum	N	ug/L	4710			386		J
Metals - Unfiltered	Antimony	N	ug/L	5.56	U	U	6	U	
Metals - Unfiltered	Arsenic	N	ug/L	14.4			10	U	
Metals - Unfiltered	Barium	N	ug/L	114			188	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4.05	J	J	4	U	
Metals - Unfiltered	Cadmium	N	ug/L	2.23	J	J	5	U	

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			RCA-MW01		
SAMPLE_NO				LBA3006			RC3074		
SAMPLE_DATE				28-Jan-09			12-May-09		
FK_DEPTH				10_07 - 10_1 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	94000			94300		
Metals - Unfiltered	Chromium	N	ug/L	6.35	J	J	10	U	
Metals - Unfiltered	Cobalt	N	ug/L	6.12	J	J	50	U	
Metals - Unfiltered	Copper	N	ug/L	17.2			25	U	
Metals - Unfiltered	Iron	N	ug/L	12600			348		
Metals - Unfiltered	Lead	N	ug/L	8.41			5	U	
Metals - Unfiltered	Magnesium	N	ug/L	30100			23200		
Metals - Unfiltered	Manganese	N	ug/L	366			77.8		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U	U	1	U	
Metals - Unfiltered	Nickel	N	ug/L	7.86			3.6	B	J
Metals - Unfiltered	Potassium	N	ug/L	2610			6570	B	J
Metals - Unfiltered	Selenium	N	ug/L	11.1	U	U	6.7	B	B
Metals - Unfiltered	Silver	N	ug/L	11.1	U	U	10	U	
Metals - Unfiltered	Sodium	N	ug/L	12300			31000		
Metals - Unfiltered	Thallium	N	ug/L	5.56	U	U	10	U	
Metals - Unfiltered	Vanadium	N	ug/L	11.6			1.1	B	J
Metals - Unfiltered	Zinc	N	ug/L	38	J	J	40	U	
Metals - Filtered	Aluminum	Y	ug/L	159			200	U	
Metals - Filtered	Antimony	Y	ug/L	1.11	U	U	6	U	
Metals - Filtered	Arsenic	Y	ug/L	1.99	J	J	10	U	
Metals - Filtered	Barium	Y	ug/L	90.5			182	B	J
Metals - Filtered	Beryllium	Y	ug/L	4.44	U	U	4	U	
Metals - Filtered	Cadmium	Y	ug/L	4.44	U	U	5	U	
Metals - Filtered	Calcium	Y	ug/L	70600			99300		
Metals - Filtered	Chromium	Y	ug/L	11.1	U	U	10	U	
Metals - Filtered	Cobalt	Y	ug/L	8.89	U	U	50	U	
Metals - Filtered	Copper	Y	ug/L	11.1	U	U	25	U	
Metals - Filtered	Iron	Y	ug/L	446			300	U	
Metals - Filtered	Lead	Y	ug/L	1.11	U	U	5	U	
Metals - Filtered	Magnesium	Y	ug/L	20000			24100		
Metals - Filtered	Manganese	Y	ug/L	110			68.2		
Metals - Filtered	Mercury	Y	ug/L	0.2	U	U	1	U	
Metals - Filtered	Nickel	Y	ug/L	6.67	U	U	3.1	B	J
Metals - Filtered	Potassium	Y	ug/L	1470			6600	B	J
Metals - Filtered	Selenium	Y	ug/L	2.22	U	U	3.8	B	J
Metals - Filtered	Silver	Y	ug/L	11.1	U	U	10	U	
Metals - Filtered	Sodium	Y	ug/L	11900			32600		
Metals - Filtered	Thallium	Y	ug/L	1.11	U	U	10	U	
Metals - Filtered	Vanadium	Y	ug/L	4.44	U	U	50	U	
Metals - Filtered	Zinc	Y	ug/L	55.6	U	U	15.5	B	J
Cyanide	Cyanide, total	N	ppm	0.025	U	U			
Water Quality Parameters	Alkalinity	N	ppm	172			267		
Water Quality Parameters	Chloride	N	ppm	6.98		J	21.7		
Water Quality Parameters	Cyanide, total	N	ppm				0.016		
Water Quality Parameters	Hardness	N	ppm	359					
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm				331		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.026	J	J	2	U	
Water Quality Parameters	Sulfate	N	ppm	53.3		J	67.1		
Water Quality Parameters	Total dissolved solids	N	ppm	331		J	509		
Water Quality Parameters	Total suspended solids	N	ppm	641			70		
Water Quality Parameters	Turbidity	N	NTU	403		J	21.3		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	17.05			1.5		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-37.7			-34.4		
Field Tests	pH	N	pH_units	7.07			7.59		
Field Tests	Specific Conductivity	N	mS/cm	1.513			1.31		
Field Tests	Temperature	N	C	13.59			10.38		
Field Tests	Turbidity	N	NTU	3.4			10.2		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U		0.2	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U		0.2	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U		0.2	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.23			0.2	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.29			0.2	U	U
Explosives	HMX	N	ug/L	0.19	U		0.2	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U		0.2	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	2.1			1.8		
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U		0.2	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	1.2			0.61		
Explosives	RDX	N	ug/L	0.19	U		0.2	U	U
Explosives	Tetryl	N	ug/L	0.19	U		0.2	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U		0.2	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U		0.2	U	U
Volatiles	Acetone	N	ug/L	25	U	R	25	U	U
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U		1	U	U
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U		1	U	U
Volatiles	Bromoform	N	ug/L	1	U		1	U	U
Volatiles	Bromomethane	N	ug/L	2	U		2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U		5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U		2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U		1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U		1	U	U
Volatiles	Chloroethane	N	ug/L	2	U		2	U	U
Volatiles	Chloroform	N	ug/L	1	U		1	U	U
Volatiles	Chloromethane	N	ug/L	2	U		2	U	U
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U		1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U		1	U	U
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U		1	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U		1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U		1	U	U
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U		10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U		5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U		5	U	U
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U		1	U	U
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U		1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U		1	U	U
Volatiles	Toluene	N	ug/L	1	U		1	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U		1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U		1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U		1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U		1	U	U
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U		3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U		5	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U		5	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Benzoic acid	N	ug/L	24	U		25	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U		5	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U		5	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U		5	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U		5	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Chrysene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U		10	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U		10	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U		25	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U		5	U	U
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Fluorene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U		5	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Isophorone	N	ug/L	4.8	U		5	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U		10	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U		10	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U		10	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U		25	U	U
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U		5	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U		5	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	24	U		25	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Phenol	N	ug/L	4.8	U		5	U	U
Semivolatiles	Pyrene	N	ug/L	4.8	U		5	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U		5	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U		5	U	U
Metals - Unfiltered	Aluminum	N	ug/L	77.1	B	J	1290		
Metals - Unfiltered	Antimony	N	ug/L	6	U		12	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Barium	N	ug/L	77.2	B	J	55.8	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U		4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U		5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	126000			93200		J
Metals - Unfiltered	Chromium	N	ug/L	10	U		2.8	B	J
Metals - Unfiltered	Cobalt	N	ug/L	6.1	B	J	3.7	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U		25	U	U
Metals - Unfiltered	Iron	N	ug/L	300	U		2830		
Metals - Unfiltered	Lead	N	ug/L	10	U		4.5	B	B
Metals - Unfiltered	Magnesium	N	ug/L	47900			37400		
Metals - Unfiltered	Manganese	N	ug/L	422			272		
Metals - Unfiltered	Mercury	N	ug/L	1	U		1	U	U
Metals - Unfiltered	Nickel	N	ug/L	21	B	J	11.4	B	J
Metals - Unfiltered	Potassium	N	ug/L	18900			19000		J
Metals - Unfiltered	Selenium	N	ug/L	20	U		10	U	UJ
Metals - Unfiltered	Silver	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Sodium	N	ug/L	97100			85900		
Metals - Unfiltered	Thallium	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U		3.4	B	J
Metals - Unfiltered	Zinc	N	ug/L	13.1	B	B	17.3	B	J
Metals - Filtered	Aluminum	Y	ug/L	13.7	B	J	200	U	U
Metals - Filtered	Antimony	Y	ug/L	6	U		12	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U		10	U	U
Metals - Filtered	Barium	Y	ug/L	82.7	B	J	46.6	B	J
Metals - Filtered	Beryllium	Y	ug/L	4	U		4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U		5	U	U
Metals - Filtered	Calcium	Y	ug/L	122000			79400		
Metals - Filtered	Chromium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Cobalt	Y	ug/L	6.1	B	J	1.4	B	J
Metals - Filtered	Copper	Y	ug/L	25	U		25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U		300	U	U
Metals - Filtered	Lead	Y	ug/L	2	B	J	10	U	U
Metals - Filtered	Magnesium	Y	ug/L	47000			33700		
Metals - Filtered	Manganese	Y	ug/L	389			157		
Metals - Filtered	Mercury	Y	ug/L	1	U		1	U	U
Metals - Filtered	Nickel	Y	ug/L	21.1	B	J	6.3	B	J
Metals - Filtered	Potassium	Y	ug/L	19800			16700		
Metals - Filtered	Selenium	Y	ug/L	3.8	B	J	10	U	U
Metals - Filtered	Silver	Y	ug/L	10	U		10	U	U
Metals - Filtered	Sodium	Y	ug/L	98100		J	75700		
Metals - Filtered	Thallium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Vanadium	Y	ug/L	0.92	B	J	50	U	U
Metals - Filtered	Zinc	Y	ug/L	9.2	B	J	7.4	B	J
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	322			320		
Water Quality Parameters	Chloride	N	ppm	11.6			11.4		
Water Quality Parameters	Cyanide, total	N	ppm	0.013			0.01	U	U
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	512			387		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	2	U		0.032	B	J
Water Quality Parameters	Sulfate	N	ppm	282			210		
Water Quality Parameters	Total dissolved solids	N	ppm	951			694		
Water Quality Parameters	Total suspended solids	N	ppm	27			206		
Water Quality Parameters	Turbidity	N	NTU	3			30.9		

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW03			RCA-MW03		
SAMPLE_NO				RC3076			RC3082		
SAMPLE_DATE				11-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	13.89			4.96		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	86.4			-49.7		
Field Tests	pH	N	pH_units	7.29			7.77		
Field Tests	Specific Conductivity	N	mS/cm	0.635			0.723		
Field Tests	Temperature	N	C	11.89			8.13		
Field Tests	Turbidity	N	NTU	1.9			76.5		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U		0.2	U	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U		0.2	U	
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U		0.2	U	
Explosives	HMX	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrobenzene	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U		0.2	U	
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U		0.2	U	
Explosives	RDX	N	ug/L	0.19	U		0.2	U	
Explosives	Tetryl	N	ug/L	0.19	U		0.2	U	
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U		0.2	U	
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U		0.2	U	
Volatiles	Acetone	N	ug/L	10	J	J	25	U	
Volatiles	Acrolein	N	ug/L						
Volatiles	Acrylonitrile	N	ug/L						
Volatiles	Benzene	N	ug/L	1	U		1	U	
Volatiles	Bromobenzene	N	ug/L						
Volatiles	Bromochloromethane	N	ug/L						
Volatiles	Bromodichloromethane	N	ug/L	1	U		1	U	
Volatiles	Bromoform	N	ug/L	0.36	J	J	1	U	
Volatiles	Bromomethane	N	ug/L	2	U		2	U	
Volatiles	Butanone, 2-	N	ug/L	5	U		5	U	
Volatiles	Carbon disulfide	N	ug/L	2	U		2	U	
Volatiles	Carbon tetrachloride	N	ug/L	1	U		1	U	
Volatiles	Chlorobenzene	N	ug/L	1	U		1	U	
Volatiles	Chloroethane	N	ug/L	2	U		2	U	
Volatiles	Chloroform	N	ug/L	1	U		1	U	
Volatiles	Chloromethane	N	ug/L	2	U		2	U	
Volatiles	Chlorotoluene, 2-	N	ug/L						
Volatiles	Chlorotoluene, 4-	N	ug/L						
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	0.2	J	J	1	U	
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dibromomethane	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U		1	U	
Volatiles	Dichloropropane, 1,3-	N	ug/L						
Volatiles	Dichloropropane, 2,2-	N	ug/L						
Volatiles	Dichloropropene, 1,1-	N	ug/L						
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U		1	U	

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW03			RCA-MW03		
SAMPLE_NO				RC3076			RC3082		
SAMPLE_DATE				11-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U		1	U	
Volatiles	Ethylbenzene	N	ug/L	1	U		1	U	
Volatiles	Hexachlorobutadiene	N	ug/L						
Volatiles	Hexanone, 2-	N	ug/L	10	U		10	U	
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U		5	U	
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U		5	U	
Volatiles	Naphthalene	N	ug/L						
Volatiles	n-Butylbenzene	N	ug/L						
Volatiles	n-Propylbenzene	N	ug/L						
Volatiles	p-Isopropyltoluene	N	ug/L						
Volatiles	sec-Butylbenzene	N	ug/L						
Volatiles	Styrene	N	ug/L	1	U		1	U	
Volatiles	tert-Butylbenzene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,1,2-	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U		1	U	
Volatiles	Tetrachloroethene	N	ug/L	1	U		1	U	
Volatiles	Toluene	N	ug/L	1	U		1	U	
Volatiles	Trichlorobenzene, 1,2,3-	N	ug/L						
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U		1	U	
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U		1	U	
Volatiles	Trichloroethene	N	ug/L	1	U		1	U	
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichloropropane, 1,2,3-	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Trimethylbenzene, 1,3,5-	N	ug/L						
Volatiles	Vinyl acetate	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U		1	U	
Volatiles	Xylene, o-	N	ug/L						
Volatiles	Xylenes, m,p-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	3	U		3	U	
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Acenaphthene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Benzoic acid	N	ug/L	24	U		26	U	
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U		5.2	U	
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Caprolactam	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW03			RCA-MW03		
SAMPLE_NO				RC3076			RC3082		
SAMPLE_DATE				11-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Carbazole	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Chrysene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U		10	U	
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U		10	U	
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U		26	U	
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U		5.2	U	
Semivolatiles	DIPHENYLAMINE	N	ug/L						
Semivolatiles	Fluoranthene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Fluorene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Isophorone	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U		10	U	
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U		10	U	
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U		10	U	
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U		26	U	
Semivolatiles	n-Nitrosodimethylamine	N	ug/L						
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U		5.2	U	
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Pentachlorophenol	N	ug/L	24	U		26	U	
Semivolatiles	Phenanthrene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Phenol	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Pyrene	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U		5.2	U	
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U		5.2	U	
Metals - Unfiltered	Aluminum	N	ug/L	52.2	B	J	1340		
Metals - Unfiltered	Antimony	N	ug/L	6	U		12	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Barium	N	ug/L	114	B	J	102	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U		4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U		5	U	U

Appendix I

Chemical Analytical Data Summary
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW03			RCA-MW03		
SAMPLE_NO				RC3076			RC3082		
SAMPLE_DATE				11-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Calcium	N	ug/L	25400			34400		J
Metals - Unfiltered	Chromium	N	ug/L	10	U		3.3	B	J
Metals - Unfiltered	Cobalt	N	ug/L	50	U		2.3	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U		25	U	U
Metals - Unfiltered	Iron	N	ug/L	300	U		2510		
Metals - Unfiltered	Lead	N	ug/L	2.1	B	J	3.7	B	B
Metals - Unfiltered	Magnesium	N	ug/L	15100			15000		
Metals - Unfiltered	Manganese	N	ug/L	53			102		
Metals - Unfiltered	Mercury	N	ug/L	1	U		1	U	
Metals - Unfiltered	Nickel	N	ug/L	40	U		9.1	B	J
Metals - Unfiltered	Potassium	N	ug/L	14900			16300		J
Metals - Unfiltered	Selenium	N	ug/L	20	U		10	U	UJ
Metals - Unfiltered	Silver	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Sodium	N	ug/L	69100			66700		
Metals - Unfiltered	Thallium	N	ug/L	10	U		10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U		3	B	J
Metals - Unfiltered	Zinc	N	ug/L	13.4	B	B	18.3	B	J
Metals - Filtered	Aluminum	Y	ug/L	200	U		200	U	U
Metals - Filtered	Antimony	Y	ug/L	6	U		12	U	U
Metals - Filtered	Arsenic	Y	ug/L	10	U		10	U	U
Metals - Filtered	Barium	Y	ug/L	111	B	J	98.1	B	J
Metals - Filtered	Beryllium	Y	ug/L	4	U		4	U	U
Metals - Filtered	Cadmium	Y	ug/L	5	U		5	U	U
Metals - Filtered	Calcium	Y	ug/L	23000			23500		
Metals - Filtered	Chromium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Cobalt	Y	ug/L	50	U		50	U	U
Metals - Filtered	Copper	Y	ug/L	25	U		25	U	U
Metals - Filtered	Iron	Y	ug/L	300	U		300	U	U
Metals - Filtered	Lead	Y	ug/L	10	U		2.4	B	J
Metals - Filtered	Magnesium	Y	ug/L	13900			13800		
Metals - Filtered	Manganese	Y	ug/L	84.7			25.6		
Metals - Filtered	Mercury	Y	ug/L	1	U		1	U	
Metals - Filtered	Nickel	Y	ug/L	3.1	B	J	3.4	B	J
Metals - Filtered	Potassium	Y	ug/L	14800			15300		
Metals - Filtered	Selenium	Y	ug/L	4	B	J	10	U	U
Metals - Filtered	Silver	Y	ug/L	10	U		10	U	U
Metals - Filtered	Sodium	Y	ug/L	69000		J	66200		
Metals - Filtered	Thallium	Y	ug/L	10	U		10	U	U
Metals - Filtered	Vanadium	Y	ug/L	50	U		50	U	U
Metals - Filtered	Zinc	Y	ug/L	20	U		7.6	B	J
Cyanide	Cyanide, total	N	ppm						
Water Quality Parameters	Alkalinity	N	ppm	307			295		
Water Quality Parameters	Chloride	N	ppm	12.2			12.1		
Water Quality Parameters	Cyanide, total	N	ppm	0.01	U		0.01	U	
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	126			148		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	2	U		0.1	U	
Water Quality Parameters	Sulfate	N	ppm	4.3			4.4		
Water Quality Parameters	Total dissolved solids	N	ppm	230			348		
Water Quality Parameters	Total suspended solids	N	ppm	10	U		52		
Water Quality Parameters	Turbidity	N	NTU	2.1			25		

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD01			LBA-SD02		
SAMPLE_NO				LBA1000			LBA1001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	HMX	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Nitrobenzene	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	RDX	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Tetryl	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.16	U	U	0.16	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.16	U	U	0.16	U	U
Volatiles	Acetone	N	mg/kg	0.071	U	U	0.0921		J
Volatiles	Benzene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Bromodichloromethane	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Bromoform	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Bromomethane	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Butanone, 2-	N	mg/kg	0.036	U	U	0.035	U	UJ
Volatiles	Carbon disulfide	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Carbon tetrachloride	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Chlorobenzene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Chloroethane	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Chloroform	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Chloromethane	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Cyclohexane	N	mg/kg						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg						
Volatiles	Dibromochloromethane	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dibromoethane, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg						
Volatiles	Dichlorodifluoromethane	N	mg/kg						
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Ethylbenzene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Hexanone, 2-	N	mg/kg	0.036	U	U	0.035	U	UJ
Volatiles	Isopropylbenzene	N	mg/kg						
Volatiles	METHYL ACETATE	N	mg/kg						
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg						
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.036	U	U	0.035	U	UJ
Volatiles	Methylcyclohexane	N	mg/kg						
Volatiles	Methylene chloride	N	mg/kg	0.0582			0.0195		B
Volatiles	Styrene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Tetrachloroethene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Toluene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg						
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Trichloroethene	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Trichlorofluoromethane	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD01			LBA-SD02		
SAMPLE_NO				LBA1000			LBA1001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichlorotrifluoroethane	N	mg/kg						
Volatiles	Vinyl chloride	N	mg/kg	0.0071	U	U	0.0071	U	UJ
Volatiles	Xylenes, total	N	mg/kg	0.021	U	U	0.021	U	UJ
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Acenaphthene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg						
Semivolatiles	Anthracene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Atrazine	N	mg/kg						
Semivolatiles	Benzaldehyde	N	mg/kg						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Benzoic acid	N	mg/kg	1.2	U	U	1.1	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	BIBENZENE	N	mg/kg						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Caprolactam	N	mg/kg						
Semivolatiles	Carbazole	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Chrysene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	1.2	U	U	1.1	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Fluoranthene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Fluorene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Isophorone	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Methylphenol, 4-	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD01			LBA-SD02		
SAMPLE_NO				LBA1000			LBA1001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Naphthalene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.49	U	U	0.42	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	1.2	U	U	1.1	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	1.2	U	U	1.1	U	U
Semivolatiles	Phenanthrene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Phenol	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Pyrene	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.24	U	U	0.21	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.24	U	U	0.21	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.024	U	U	0.021	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.024	U	U	0.021	U	U
Metals - Unfiltered	Aluminum	N	mg/kg	6300			5710		J
Metals - Unfiltered	Antimony	N	mg/kg	4.2	U	U	3.8	U	UJ
Metals - Unfiltered	Arsenic	N	mg/kg	16			9.4		J
Metals - Unfiltered	Barium	N	mg/kg	75.7			90.3		J
Metals - Unfiltered	Beryllium	N	mg/kg	0.75			0.61		
Metals - Unfiltered	Cadmium	N	mg/kg	1.9			0.46		
Metals - Unfiltered	Calcium	N	mg/kg	11200		J	3510		J
Metals - Unfiltered	Chromium	N	mg/kg	10.4			10.7		J
Metals - Unfiltered	Cobalt	N	mg/kg	24.9			17.5		J
Metals - Unfiltered	Copper	N	mg/kg	13.5			10.5		J
Metals - Unfiltered	Iron	N	mg/kg	21000			20500		J
Metals - Unfiltered	Lead	N	mg/kg	10.8			9		J
Metals - Unfiltered	Magnesium	N	mg/kg	2840			1590		J
Metals - Unfiltered	Manganese	N	mg/kg	5360			1510		
Metals - Unfiltered	Mercury	N	mg/kg	0.025	B	J	0.023	B	J
Metals - Unfiltered	Nickel	N	mg/kg	52.2			26.6		J
Metals - Unfiltered	Potassium	N	mg/kg	781	B	J	614	B	J
Metals - Unfiltered	Selenium	N	mg/kg	3	B	J	2.1	B	J
Metals - Unfiltered	Silver	N	mg/kg	2.8	U	U	0.64	U	UJ
Metals - Unfiltered	Sodium	N	mg/kg	182	B	J	110	B	J
Metals - Unfiltered	Thallium	N	mg/kg	1.9			0.26	B	J
Metals - Unfiltered	Vanadium	N	mg/kg	22.2			19.4		J
Metals - Unfiltered	Zinc	N	mg/kg	80.3			52.4		J
Water Quality Parameters	% Solids	N	Percent	69.3			78.7		

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD03			LBA-SD04		
SAMPLE_NO				LBA1002			LBA1003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.18	U	UJ	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.18	U	UJ	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	HMX	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Nitrobenzene	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	RDX	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Tetryl	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.18	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.18	U	U	0.19	U	U
Volatiles	Acetone	N	mg/kg	0.058	U	UJ	0.064	U	UJ
Volatiles	Benzene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Bromodichloromethane	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Bromoform	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Bromomethane	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Butanone, 2-	N	mg/kg	0.029	U	UJ	0.032	U	UJ
Volatiles	Carbon disulfide	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Carbon tetrachloride	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Chlorobenzene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Chloroethane	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Chloroform	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Chloromethane	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Cyclohexane	N	mg/kg						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg						
Volatiles	Dibromochloromethane	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dibromoethane, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg						
Volatiles	Dichlorodifluoromethane	N	mg/kg						
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Ethylbenzene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Hexanone, 2-	N	mg/kg	0.029	U	UJ	0.032	U	UJ
Volatiles	Isopropylbenzene	N	mg/kg						
Volatiles	METHYL ACETATE	N	mg/kg						
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg						
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.029	U	UJ	0.032	U	UJ
Volatiles	Methylcyclohexane	N	mg/kg						
Volatiles	Methylene chloride	N	mg/kg	0.012	U	UJ	0.013	U	UJ
Volatiles	Styrene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Tetrachloroethene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Toluene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg						
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Trichloroethene	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Trichlorofluoromethane	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD03			LBA-SD04		
SAMPLE_NO				LBA1002			LBA1003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichlorotrifluoroethane	N	mg/kg						
Volatiles	Vinyl chloride	N	mg/kg	0.0058	U	UJ	0.0064	U	UJ
Volatiles	Xylenes, total	N	mg/kg	0.017	U	UJ	0.019	U	UJ
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Acenaphthene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg						
Semivolatiles	Anthracene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Atrazine	N	mg/kg						
Semivolatiles	Benzaldehyde	N	mg/kg						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Benzoic acid	N	mg/kg	1.1	U	U	1.2	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	BIBENZENE	N	mg/kg						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Caprolactam	N	mg/kg						
Semivolatiles	Carbazole	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Chrysene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	1.1	U	U	1.2	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Fluoranthene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Fluorene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Isophorone	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Methylphenol, 4-	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD03			LBA-SD04		
SAMPLE_NO				LBA1002			LBA1003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Naphthalene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.43	U	U	0.47	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	1.1	U	U	1.2	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	1.1	U	U	1.2	U	U
Semivolatiles	Phenanthrene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Phenol	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Pyrene	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.22	U	U	0.24	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.22	U	U	0.24	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.022	U	U	0.024	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.022	U	U	0.024	U	U
Metals - Unfiltered	Aluminum	N	mg/kg	7780		J	7760		J
Metals - Unfiltered	Antimony	N	mg/kg	3.8	U	UJ	4	U	UJ
Metals - Unfiltered	Arsenic	N	mg/kg	8.3		J	17.8		J
Metals - Unfiltered	Barium	N	mg/kg	58.8		J	92.1		J
Metals - Unfiltered	Beryllium	N	mg/kg	0.67		J	0.96		
Metals - Unfiltered	Cadmium	N	mg/kg	0.46		J	0.97		
Metals - Unfiltered	Calcium	N	mg/kg	3900		J	7050		J
Metals - Unfiltered	Chromium	N	mg/kg	13.5		J	13.4		J
Metals - Unfiltered	Cobalt	N	mg/kg	11.8		J	26		J
Metals - Unfiltered	Copper	N	mg/kg	13.3		J	22.2		J
Metals - Unfiltered	Iron	N	mg/kg	18700		J	30200		J
Metals - Unfiltered	Lead	N	mg/kg	9.5		J	17.9		J
Metals - Unfiltered	Magnesium	N	mg/kg	2160		J	3090		J
Metals - Unfiltered	Manganese	N	mg/kg	828		J	1610		
Metals - Unfiltered	Mercury	N	mg/kg	0.099	U	U	0.031	B	J
Metals - Unfiltered	Nickel	N	mg/kg	26.1		J	39.8		J
Metals - Unfiltered	Potassium	N	mg/kg	781	B	J	829	B	J
Metals - Unfiltered	Selenium	N	mg/kg	1.7	B	J	2.2	B	J
Metals - Unfiltered	Silver	N	mg/kg	0.63	U	UJ	0.67	U	UJ
Metals - Unfiltered	Sodium	N	mg/kg	134	B	J	192	B	J
Metals - Unfiltered	Thallium	N	mg/kg	0.63	U	UJ	0.67	U	UJ
Metals - Unfiltered	Vanadium	N	mg/kg	21.9		J	26.5		J
Metals - Unfiltered	Zinc	N	mg/kg	54.1		J	73.9		J
Water Quality Parameters	% Solids	N	Percent	76.9			70.9		

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD05			LBA-SD06		
SAMPLE_NO				LBA1004			LBA1005		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	HMX	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Nitrobenzene	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	RDX	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Tetryl	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.18	U	U	0.16	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.18	U	U	0.16	U	U
Volatiles	Acetone	N	mg/kg	0.071	U	UJ	0.07	U	UJ
Volatiles	Benzene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Bromodichloromethane	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Bromoform	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Bromomethane	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Butanone, 2-	N	mg/kg	0.036	U	U	0.035	U	U
Volatiles	Carbon disulfide	N	mg/kg	0.0071	U	U	0.0019	J	J
Volatiles	Carbon tetrachloride	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Chlorobenzene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Chloroethane	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Chloroform	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Chloromethane	N	mg/kg	0.0071	U	UJ	0.007	U	UJ
Volatiles	Cyclohexane	N	mg/kg						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg						
Volatiles	Dibromochloromethane	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg						
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg						
Volatiles	Dichlorodifluoromethane	N	mg/kg						
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Ethylbenzene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Hexanone, 2-	N	mg/kg	0.036	U	U	0.035	U	U
Volatiles	Isopropylbenzene	N	mg/kg						
Volatiles	METHYL ACETATE	N	mg/kg						
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg						
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.036	U	U	0.035	U	U
Volatiles	Methylcyclohexane	N	mg/kg						
Volatiles	Methylene chloride	N	mg/kg	0.014	U	U	0.014	U	U
Volatiles	Styrene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Tetrachloroethene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Toluene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg						
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Trichloroethene	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Trichlorofluoromethane	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD05			LBA-SD06		
SAMPLE_NO				LBA1004			LBA1005		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichlorotrifluoroethane	N	mg/kg						
Volatiles	Vinyl chloride	N	mg/kg	0.0071	U	U	0.007	U	U
Volatiles	Xylenes, total	N	mg/kg	0.021	U	U	0.021	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Acenaphthene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg						
Semivolatiles	Anthracene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Atrazine	N	mg/kg						
Semivolatiles	Benzaldehyde	N	mg/kg						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.23	U	UJ	0.0481	J	J
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Benzoic acid	N	mg/kg	1.2	U	UJ	1.1	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	BIBENZENE	N	mg/kg						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Caprolactam	N	mg/kg						
Semivolatiles	Carbazole	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Chrysene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	1.2	U	UJ	1.1	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Fluoranthene	N	mg/kg	0.23	U	UJ	0.0738	J	J
Semivolatiles	Fluorene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Isophorone	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Methylphenol, 4-	N	mg/kg						

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD05			LBA-SD06		
SAMPLE_NO				LBA1004			LBA1005		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Naphthalene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.47	U	UJ	0.45	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	1.2	U	UJ	1.1	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	1.2	U	UJ	1.1	U	U
Semivolatiles	Phenanthrene	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Phenol	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Pyrene	N	mg/kg	0.23	U	UJ	0.0562	J	J
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.23	U	UJ	0.22	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.23	U	UJ	0.22	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.023	U	U	0.022	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.023	U	U	0.022	U	U
Metals - Unfiltered	Aluminum	N	mg/kg	8850			10700		
Metals - Unfiltered	Antimony	N	mg/kg	4	U	U	4	U	U
Metals - Unfiltered	Arsenic	N	mg/kg	9.5			11.7		
Metals - Unfiltered	Barium	N	mg/kg	63.8			70.7		
Metals - Unfiltered	Beryllium	N	mg/kg	0.68			0.84		
Metals - Unfiltered	Cadmium	N	mg/kg	0.64			0.56		
Metals - Unfiltered	Calcium	N	mg/kg	10300			3300		
Metals - Unfiltered	Chromium	N	mg/kg	15.9			18.8		
Metals - Unfiltered	Cobalt	N	mg/kg	10.8			11.3		
Metals - Unfiltered	Copper	N	mg/kg	22.7			24.5		
Metals - Unfiltered	Iron	N	mg/kg	22100			25500		
Metals - Unfiltered	Lead	N	mg/kg	11.5			10.4		
Metals - Unfiltered	Magnesium	N	mg/kg	4940			3620		
Metals - Unfiltered	Manganese	N	mg/kg	737			779		
Metals - Unfiltered	Mercury	N	mg/kg	0.022	B	J	0.022	B	J
Metals - Unfiltered	Nickel	N	mg/kg	26.6			33.8		
Metals - Unfiltered	Potassium	N	mg/kg	1250	B	J	1430		
Metals - Unfiltered	Selenium	N	mg/kg	1.7	B	J	1.9	B	J
Metals - Unfiltered	Silver	N	mg/kg	0.66	U	U	0.67	U	U
Metals - Unfiltered	Sodium	N	mg/kg	166	B	J	150	B	J
Metals - Unfiltered	Thallium	N	mg/kg	0.66	U	U	0.67	U	U
Metals - Unfiltered	Vanadium	N	mg/kg	24.5			27		
Metals - Unfiltered	Zinc	N	mg/kg	55			63		
Water Quality Parameters	% Solids	N	Percent	71.8			74.7		

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD06			LBA-SD06		
SAMPLE_NO				LBA1006			LBA1007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	HMX	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Nitrobenzene	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	RDX	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Tetryl	N	mg/kg	0.18	U	U	0.3	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.18	U	U	0.2	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.18	U	U	0.2	U	U
Volatiles	Acetone	N	mg/kg	0.068	U	UJ	0.027	U	U
Volatiles	Benzene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Bromodichloromethane	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Bromoform	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Bromomethane	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Butanone, 2-	N	mg/kg	0.034	U	U	0.027	U	U
Volatiles	Carbon disulfide	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Carbon tetrachloride	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Chlorobenzene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Chloroethane	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Chloroform	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Chloromethane	N	mg/kg	0.0068	U	UJ	0.0067	U	U
Volatiles	Cyclohexane	N	mg/kg				0.013	U	U
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg				0.013	U	R
Volatiles	Dibromochloromethane	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg				0.0067	U	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg				0.0067	U	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg				0.0067	U	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg				0.0067	U	U
Volatiles	Dichlorodifluoromethane	N	mg/kg				0.0067	U	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Ethylbenzene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Hexanone, 2-	N	mg/kg	0.034	U	U	0.027	U	U
Volatiles	Isopropylbenzene	N	mg/kg				0.0067	U	U
Volatiles	METHYL ACETATE	N	mg/kg				0.013	U	U
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg				0.027	U	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.034	U	U	0.027	U	U
Volatiles	Methylcyclohexane	N	mg/kg				0.013	U	U
Volatiles	Methylene chloride	N	mg/kg	0.014	U	U	0.0067	U	U
Volatiles	Styrene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Tetrachloroethene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Toluene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg				0.0067	U	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Trichloroethene	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Trichlorofluoromethane	N	mg/kg				0.0067	U	U

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD06			LBA-SD06		
SAMPLE_NO				LBA1006			LBA1007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichlorotrifluoroethane	N	mg/kg				0.0067	U	U
Volatiles	Vinyl chloride	N	mg/kg	0.0068	U	U	0.0067	U	U
Volatiles	Xylenes, total	N	mg/kg	0.021	U	U	0.013	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	mg/kg	0.22	U	U			
Semivolatiles	Acenaphthene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg				0.089	U	U
Semivolatiles	Anthracene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Atrazine	N	mg/kg				0.44	U	U
Semivolatiles	Benzaldehyde	N	mg/kg				0.44	U	U
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.0458	J	J	0.44	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Benzoic acid	N	mg/kg	1.1	U	U			
Semivolatiles	Benzyl alcohol	N	mg/kg	0.22	U	U			
Semivolatiles	BIBENZENE	N	mg/kg				0.44	U	U
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Caprolactam	N	mg/kg				0.44	U	U
Semivolatiles	Carbazole	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Chrysene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.22	U	U			
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.22	U	U			
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.22	U	U			
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.45	U	U	2.1	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.45	U	U	2.1	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	1.1	U	U	2.1	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.45	U	U	0.44	U	U
Semivolatiles	Fluoranthene	N	mg/kg	0.0934	J	J	0.44	U	U
Semivolatiles	Fluorene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.22	U	U	2.1	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Isophorone	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Methylphenol, 4-	N	mg/kg				0.44	U	U

Appendix I

Chemical Analytical Data Summary
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD06			LBA-SD06		
SAMPLE_NO				LBA1006			LBA1007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - _5 Ft			0 - _5 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Naphthalene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.45	U	U	2.1	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.45	U	U	2.1	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.45	U	U	2.1	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	1.1	U	U	2.1	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	1.1	U	U	0.44	U	U
Semivolatiles	Phenanthrene	N	mg/kg	0.0546	J	J	0.44	U	U
Semivolatiles	Phenol	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Pyrene	N	mg/kg	0.0694	J	J	0.44	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.22	U	U			
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.22	U	U	0.44	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.22	U	U	0.44	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.022	U	U	0.044	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.022	U	U	0.044	U	U
Metals - Unfiltered	Aluminum	N	mg/kg	9900			10900		
Metals - Unfiltered	Antimony	N	mg/kg	3.9	U	U	8.1	U	U
Metals - Unfiltered	Arsenic	N	mg/kg	10.4			16.5		
Metals - Unfiltered	Barium	N	mg/kg	81.6			156		
Metals - Unfiltered	Beryllium	N	mg/kg	0.77			0.72		
Metals - Unfiltered	Cadmium	N	mg/kg	0.56			0.67	U	U
Metals - Unfiltered	Calcium	N	mg/kg	3220			3520		
Metals - Unfiltered	Chromium	N	mg/kg	17.6			18.3		
Metals - Unfiltered	Cobalt	N	mg/kg	11.7			24.6		
Metals - Unfiltered	Copper	N	mg/kg	21			26.2		
Metals - Unfiltered	Iron	N	mg/kg	23300			32200		
Metals - Unfiltered	Lead	N	mg/kg	10.5			17		
Metals - Unfiltered	Magnesium	N	mg/kg	3190			3820		
Metals - Unfiltered	Manganese	N	mg/kg	1170			2280		
Metals - Unfiltered	Mercury	N	mg/kg	0.023	B	J	0.13	U	U
Metals - Unfiltered	Nickel	N	mg/kg	34.2			63.2		
Metals - Unfiltered	Potassium	N	mg/kg	1370			1420		
Metals - Unfiltered	Selenium	N	mg/kg	1.8	B	J	0.67	U	U
Metals - Unfiltered	Silver	N	mg/kg	0.65	U	U	1.3	U	U
Metals - Unfiltered	Sodium	N	mg/kg	164	B	J	671	U	U
Metals - Unfiltered	Thallium	N	mg/kg	0.65	U	U	3.1		
Metals - Unfiltered	Vanadium	N	mg/kg	25.8			27.7		
Metals - Unfiltered	Zinc	N	mg/kg	59.1			78.3		
Water Quality Parameters	% Solids	N	Percent	73.4			74.5		

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB01			LBA-SB01			LBA-SB01	
			Sample Number:	LBA0001			LBA0002			LBA0003	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			3 - 5 Ft			8 - 10 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	HMX	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Nitrobenzene	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	RDX	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Tetryl	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.15	U	U	0.15	U	U	0.146	U
Volatiles	Acetone	N	mg/kg	0.0367	J	J	0.0215	U	R	0.0305	J
Volatiles	Acrolein	N	mg/kg	0.00473	U	R	0.0107	U	R	0.00462	U
Volatiles	Acrylonitrile	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Benzene	N	mg/kg	0.000945	U	UJ	0.00217	J	J	0.00121	J
Volatiles	Bromobenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Bromochloromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Bromodichloromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Bromoform	N	mg/kg	0.00107	U	UJ	0.00243	U	UJ	0.00104	U
Volatiles	Bromomethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Butanone, 2-	N	mg/kg	0.00473	U	R	0.0107	U	R	0.00573	J
Volatiles	Carbon disulfide	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000988	J
Volatiles	Carbon tetrachloride	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Chlorobenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Chloroethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Chloroform	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Chloromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Chlorotoluene, 2-	N	mg/kg	0.00107	U	UJ	0.00243	U	UJ	0.00104	U
Volatiles	Chlorotoluene, 4-	N	mg/kg	0.00106	U	UJ	0.00241	U	UJ	0.00103	U
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	0.000993	U	UJ	0.00226	U	UJ	0.000969	U
Volatiles	Dibromochloromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dibromomethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.00101	U	UJ	0.0023	U	UJ	0.000988	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.000983	U	UJ	0.00223	U	UJ	0.00096	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.000983	U	UJ	0.00223	U	UJ	0.00096	U
Volatiles	Dichlorodifluoromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.000945	U	UJ	0.0254		J	0.000923	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.000945	U	UJ	0.00301	J	J	0.000923	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.000945	U	UJ	0.0032	J	J	0.000923	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Ethylbenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Hexachlorobutadiene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Hexanone, 2-	N	mg/kg	0.00473	U	UJ	0.0107	U	UJ	0.00462	U
Volatiles	Isopropylbenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.00473	U	UJ	0.0107	U	UJ	0.00462	U
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	0.00105	U	UJ	0.00239	U	UJ	0.00102	U
Volatiles	Naphthalene	N	mg/kg	0.000945	U	UJ	0.00346	J	J	0.000923	U
Volatiles	n-Butylbenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	n-Propylbenzene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	p-Isopropyltoluene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	sec-Butylbenzene	N	mg/kg	0.00101	U	UJ	0.0023	U	UJ	0.00098	U
Volatiles	Styrene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	tert-Butylbenzene	N	mg/kg	0.000945	U	UJ	0.00219	U	UJ	0.000941	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Tetrachloroethene	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB01			LBA-SB01			LBA-SB01	
			Sample Number:	LBA0001			LBA0002			LBA0003	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			3 - 5 Ft			8 - 10 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Volatiles	Toluene	N	mg/kg	0.000945	U	UJ	0.00312	J	J	0.00186	J
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.000945	U	UJ	1.21		J	0.000923	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Trichloroethene	N	mg/kg	0.000945	U	UJ	0.0624		J	0.000923	U
Volatiles	Trichlorofluoromethane	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	0.00101	U	UJ	0.0023	U	UJ	0.000988	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000988	J
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	0.000964	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Vinyl acetate	N	mg/kg	0.00166	U	UJ	0.00378	U	UJ	0.00162	U
Volatiles	Vinyl chloride	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Xylene, o-	N	mg/kg	0.000945	U	UJ	0.00215	U	UJ	0.000923	U
Volatiles	Xylenes, m,p-	N	mg/kg	0.00189	U	UJ	0.0043	U	UJ	0.00185	U
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	0.00684	U	U	0.00746	U	U	0.00726	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.00456	U	U	0.00497	U	U	0.00484	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	0.00821	U	U	0.00895	U	U	0.00871	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.0426	J	J	0.0272	U	U	0.0265	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.025	U	U	0.0272	U	U	0.0265	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.0633	U	U	0.069	U	U	0.0671	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.0926	U	U	0.101	U	U	0.0982	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.115	U	U	0.126	U	U	0.122	U
Semivolatiles	Benzoic acid	N	mg/kg	0.0926	U	U	0.101	U	U	0.0982	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.0926	U	U	0.101	U	U	0.0982	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.00798	U	U	0.0087	U	U	0.00847	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.00969	U	U	0.0106	U	U	0.0103	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.0165	U	U	0.018	U	U	0.0175	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.0351	U	U	0.0383	U	U	0.0373	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.0136	U	U	0.0148	U	U	0.0144	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.0154	U	U	0.0268	U	U	0.0163	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	0.038	U	U	0.0414	U	U	0.0403	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.00935	U	U	0.0102	U	U	0.00992	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.0329	U	UJ	0.0359	U	U	0.035	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.00604	U	U	0.00659	U	U	0.00641	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.00467	U	U	0.0051	U	U	0.00496	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.0291	U	U	0.0317	U	U	0.0308	U
Semivolatiles	Chrysene	N	mg/kg	0.0395	J	J	0.0164	U	U	0.016	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.0858	U	U	0.0936	U	U	0.0911	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.00638	U	U	0.00696	U	U	0.00677	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.00878	U	U	0.00957	U	U	0.00931	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.0138	U	U	0.015	U	U	0.0146	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.00741	U	U	0.00808	U	U	0.00786	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.0376	U	UJ	0.041	U	U	0.0399	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.0136	U	U	0.0148	U	U	0.0144	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.0154	U	U	0.0168	U	U	0.0163	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.0116	U	U	0.0127	U	U	0.0123	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.01	U	U	0.0109	U	U	0.0106	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.00821	U	U	0.00895	U	U	0.00871	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.0382	U	U	0.0416	U	U	0.0405	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	0.0605	U	U	0.066	U	U	0.0642	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.0133	U	U	0.0145	U	U	0.0142	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.00912	U	U	0.00994	U	U	0.00968	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.0715	U	U	0.0779	U	U	0.0758	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	0.0376	U	U	0.041	U	U	0.0399	U
Semivolatiles	Fluoranthene	N	mg/kg	0.0616	J	J	0.00895	U	U	0.00871	U
Semivolatiles	Fluorene	N	mg/kg	0.0161	U	U	0.0175	U	U	0.0171	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.0236	U	U	0.0257	U	U	0.025	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.036	U	U	0.0393	U	U	0.0382	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.0121	Q2,U	UJ	0.0132	Q2,U	UJ	0.0128	Q2,U
Semivolatiles	Hexachloroethane	N	mg/kg	0.0116	U	U	0.0127	U	U	0.0123	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.123	U	U	0.134	U	U	0.131	U
Semivolatiles	Isophorone	N	mg/kg	0.00456	U	U	0.00497	U	U	0.00484	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.0996	U	U	0.109	U	U	0.106	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.0057	U	U	0.00621	U	U	0.00605	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB01			LBA-SB01			LBA-SB01	
			Sample Number:	LBA0001			LBA0002			LBA0003	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			3 - 5 Ft			8 - 10 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Semivolatiles	Methylphenol, 4-	N	mg/kg	0.0119	U	U	0.0129	U	U	0.0126	U
Semivolatiles	Naphthalene	N	mg/kg	0.009	U	U	0.00982	U	U	0.00956	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.0164	U	U	0.0179	U	U	0.0174	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.0129	U	U	0.014	U	U	0.0137	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.135	U	U	0.147	U	U	0.143	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.0124	U	U	0.0135	U	U	0.0132	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.0135	U	U	0.0147	U	U	0.0143	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	0.0308	U	U	0.0336	U	U	0.0327	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	0.0114	U	U	0.0124	U	U	0.0121	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.0136	U	U	0.0148	U	U	0.0144	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.00536	U	U	0.00584	U	U	0.00569	U
Semivolatiles	Pentachlorophenol	N	mg/kg	0.0341	U	U	0.0372	U	U	0.0362	U
Semivolatiles	Phenanthrene	N	mg/kg	0.00923	U	U	0.0101	U	U	0.0098	U
Semivolatiles	Phenol	N	mg/kg	0.00456	U	U	0.00497	U	U	0.00484	U
Semivolatiles	Pyrene	N	mg/kg	0.0627	J	J	0.0165	U	U	0.0161	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.00935	U	U	0.0102	U	U	0.00992	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.0326	U	U	0.0355	U	U	0.0346	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.0256	U	U	0.028	U	U	0.0272	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.00763	U	U	0.00824	U	U		
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.00763	U	U	0.00824	U	U		
Metals - Unfiltered	Aluminum	N	mg/kg	4400			7580			9330	
Metals - Unfiltered	Antimony	N	mg/kg	0.386	J	J	0.722			0.375	J
Metals - Unfiltered	Arsenic	N	mg/kg	4.5		J	10.1		J	4.78	
Metals - Unfiltered	Barium	N	mg/kg	16.3			33.6			61.3	
Metals - Unfiltered	Beryllium	N	mg/kg	5.22		J	5.15		J	6.74	
Metals - Unfiltered	Cadmium	N	mg/kg	0.234	U	U	0.513	J	J	0.263	J
Metals - Unfiltered	Calcium	N	mg/kg	1180			74000			49300	
Metals - Unfiltered	Chromium	N	mg/kg	10.4			11.1			13.6	
Metals - Unfiltered	Cobalt	N	mg/kg	3.52			8.81			10.3	
Metals - Unfiltered	Copper	N	mg/kg	6.54			27			29.2	
Metals - Unfiltered	Iron	N	mg/kg	15000		J	16600		J	21500	
Metals - Unfiltered	Lead	N	mg/kg	5.29			23			13	
Metals - Unfiltered	Magnesium	N	mg/kg	796		J	16800		J	18600	
Metals - Unfiltered	Manganese	N	mg/kg	198		J	384		J	548	
Metals - Unfiltered	Mercury	N	mg/kg	0.0198	J	J	0.0159	J	J	0.157	J
Metals - Unfiltered	Nickel	N	mg/kg	9.01		J	22		J	27.1	
Metals - Unfiltered	Potassium	N	mg/kg	201			934			1230	
Metals - Unfiltered	Selenium	N	mg/kg	0.469	U	UJ	0.526	U	UJ	0.494	U
Metals - Unfiltered	Silver	N	mg/kg	0.231	U	U	0.263	U	U	0.243	U
Metals - Unfiltered	Sodium	N	mg/kg	41.4			113			130	
Metals - Unfiltered	Thallium	N	mg/kg	0.234	U	U	0.654			0.31	J
Metals - Unfiltered	Vanadium	N	mg/kg	26.5			18.8			22.9	
Metals - Unfiltered	Zinc	N	mg/kg	26			60			66.7	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:		LBA-SB02			LBA-SB02			
			Sample Number:		LBA0004			LBA0005			
			Sample Date:		19-Jan-09			19-Jan-09			
			Sample Depth:		0 - 1 Ft			3 - 5 Ft			
			Sample Purpose:		REG			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	0.324			0.53			0.149
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	0.294			0.438			0.149
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	U	0.153	J	J	0.321			1.37
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.842
Explosives	HMX	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Nitrobenzene	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Nitrotoluene, 2-	N	mg/kg	U	0.146	U	U	0.15	U	U	2.34
Explosives	Nitrotoluene, 3-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.308
Explosives	Nitrotoluene, 4-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.707
Explosives	RDX	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Tetryl	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	0.146	U	U	0.15	U	U	0.149
Volatiles	Acetone	N	mg/kg	J	0.124		J	0.0297	J	J	0.0282
Volatiles	Acrolein	N	mg/kg	R	0.00558	U	R	0.00731	U	R	0.00444
Volatiles	Acrylonitrile	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Benzene	N	mg/kg	J	0.00112	U	UJ	0.00381	J	J	0.000889
Volatiles	Bromobenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Bromochloromethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Bromodichloromethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Bromoform	N	mg/kg	UJ	0.00126	U	UJ	0.00165	U	UJ	0.001
Volatiles	Bromomethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Butanone, 2-	N	mg/kg	J	0.0103	J	J	0.00731	U	R	0.00444
Volatiles	Carbon disulfide	N	mg/kg	J	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Carbon tetrachloride	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Chlorobenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Chloroethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Chloroform	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Chloromethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Chlorotoluene, 2-	N	mg/kg	UJ	0.00126	U	UJ	0.00165	U	UJ	0.001
Volatiles	Chlorotoluene, 4-	N	mg/kg	UJ	0.00125	U	UJ	0.00164	U	UJ	0.000996
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	UJ	0.00117	U	UJ	0.00153	U	UJ	0.000933
Volatiles	Dibromochloromethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dibromoethane, 1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dibromomethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	UJ	0.00119	U	UJ	0.00156	U	UJ	0.000951
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	UJ	0.00116	U	UJ	0.00152	U	UJ	0.000925
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	UJ	0.00116	U	UJ	0.00152	U	UJ	0.000925
Volatiles	Dichlorodifluoromethane	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloroethane, 1,1-	N	mg/kg	UJ	0.00112	U	UJ	0.00323	J	J	0.000889
Volatiles	Dichloroethane, 1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloroethene, 1,1-	N	mg/kg	UJ	0.00112	U	UJ	0.00254	J	J	0.000889
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropane, 1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropane, 1,3-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropane, 2,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropene, 1,1-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Ethylbenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Hexachlorobutadiene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Hexanone, 2-	N	mg/kg	UJ	0.00558	U	UJ	0.00731	U	UJ	0.00444
Volatiles	Isopropylbenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	UJ	0.00558	U	UJ	0.00731	U	UJ	0.00444
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	UJ	0.00124	U	UJ	0.00162	U	UJ	0.000987
Volatiles	Naphthalene	N	mg/kg	UJ	0.00112	U	UJ	0.00151	J	J	0.000889
Volatiles	n-Butylbenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	n-Propylbenzene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	p-Isopropyltoluene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	sec-Butylbenzene	N	mg/kg	UJ	0.00119	U	UJ	0.00156	U	UJ	0.000951
Volatiles	Styrene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	tert-Butylbenzene	N	mg/kg	UJ	0.00114	U	UJ	0.00149	U	UJ	0.000907
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889
Volatiles	Tetrachloroethene	N	mg/kg	UJ	0.00112	U	UJ	0.00146	U	UJ	0.000889

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB02		LBA-SB02			
				Sample Number:	LBA0004		LBA0005			
				Sample Date:	19-Jan-09		19-Jan-09			
				Sample Depth:	0 - 1 Ft		3 - 5 Ft			
				Sample Purpose:	REG		REG			
Test Group	Parameter	Filtered	Units	ValQual	Result Qual	ValQual	Result Qual	ValQual	Result
Volatiles	Toluene	N	mg/kg	J	0.00112 U	UJ	0.00599 J	J	0.000889
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	UJ	0.0156	J	1.19		0.0309
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Trichloroethene	N	mg/kg	UJ	0.00263 J	J	0.0487	J	0.0122
Volatiles	Trichlorofluoromethane	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	UJ	0.00119 U	UJ	0.00156 U	UJ	0.000951
Volatiles	Trichlorotrifluoroethane	N	mg/kg						
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	J	0.00112 U	UJ	0.00171 J	J	0.000889
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Vinyl acetate	N	mg/kg	UJ	0.00196 U	UJ	0.00257 U	UJ	0.00156
Volatiles	Vinyl chloride	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Xylene, o-	N	mg/kg	UJ	0.00112 U	UJ	0.00146 U	UJ	0.000889
Volatiles	Xylenes, m,p-	N	mg/kg	UJ	0.00223 U	UJ	0.00292 U	UJ	0.00178
Volatiles	Xylenes, total	N	mg/kg						
Semivolatiles	Acenaphthene	N	mg/kg	U	0.0371 U	U	0.00737 U	U	0.00751
Semivolatiles	Acenaphthylene	N	mg/kg	U	0.0247 U	U	0.00491 U	U	0.00501
Semivolatiles	ACETOPHENONE	N	mg/kg						
Semivolatiles	Anthracene	N	mg/kg	U	0.0445 U	U	0.00884 U	U	0.00902
Semivolatiles	Atrazine	N	mg/kg						
Semivolatiles	Benzaldehyde	N	mg/kg						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	0.135 U	U	0.0269 U	U	0.0274
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	0.135 U	U	0.0269 U	U	0.0274
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	0.343 U	U	0.0681 U	U	0.0695
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	0.502 U	U	0.0997 U	U	0.102
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	0.624 U	U	0.124 U	U	0.126
Semivolatiles	Benzoic acid	N	mg/kg	U	0.502 U	U	0.0997 U	U	0.102
Semivolatiles	Benzyl alcohol	N	mg/kg	U	0.502 U	U	0.0997 U	U	0.102
Semivolatiles	BIBENZENE	N	mg/kg						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	0.0433 U	U	0.00859 U	U	0.00877
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	0.0525 U	U	0.0104 U	U	0.0106
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	0.0896 U	U	0.0178 U	U	0.0182
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	0.19 U	U	0.0378 U	U	0.0386
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	0.0735 U	U	0.0146 U	U	0.0149
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	0.0834 U	U	0.0166 U	U	0.0169
Semivolatiles	Caprolactam	N	mg/kg						
Semivolatiles	Carbazole	N	mg/kg	U	0.206 U	U	0.0409 U	U	0.0417
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	0.0507 U	U	0.0101 U	U	0.0103
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	0.179 U	U	0.0355 U	U	0.0362
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	0.0327 U	U	0.00651 U	U	0.00664
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	0.0253 U	U	0.00503 U	U	0.00513
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	0.158 U	U	0.0313 U	U	0.0319
Semivolatiles	Chrysene	N	mg/kg	U	0.0816 U	U	0.0162 U	U	0.0165
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	0.465 U	U	0.0924 U	U	0.0943
Semivolatiles	Dibenzofuran	N	mg/kg	U	0.0346 U	U	0.00687 U	U	0.00701
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.0476 U	U	0.00945 U	U	0.00964
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.0748 U	U	0.0149 U	U	0.0152
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.0402 U	U	0.00798 U	U	0.00814
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	0.204 U	U	0.0405 U	U	0.0413
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	0.0735 U	U	0.0146 U	U	0.0149
Semivolatiles	Diethyl phthalate	N	mg/kg	U	0.0834 U	U	0.0166 U	U	0.0169
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	0.063 U	U	0.0125 U	U	0.0128
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	0.0544 U	U	0.0108 U	U	0.011
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	0.0445 U	U	0.00884 U	U	0.00902
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	0.207 U	U	0.0411 U	U	0.0419
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	0.328 U	U	0.0652 U	U	0.0665
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	0.268 J	J	1.03		9.88
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	0.0494 U	U	0.389 J	J	3.82
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	0.387 U	U	0.077 U	U	0.0785
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	0.204 U	U	0.0405 U	U	0.0413
Semivolatiles	Fluoranthene	N	mg/kg	U	0.0445 U	U	0.00884 U	U	0.00902
Semivolatiles	Fluorene	N	mg/kg	U	0.0871 U	U	0.0173 U	U	0.0177
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	0.128 U	U	0.0254 U	U	0.0259
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	0.195 U	U	0.0388 U	U	0.0396
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	UJ	0.0655 U	U	0.013 Q2,U	UJ	0.0133
Semivolatiles	Hexachloroethane	N	mg/kg	U	0.063 U	U	0.0125 U	U	0.0128
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	0.667 U	U	0.133 U	U	0.135
Semivolatiles	Isophorone	N	mg/kg	U	0.0247 U	U	0.00491 U	U	0.00501
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	0.54 U	U	0.107 U	U	0.109
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	0.0309 U	U	0.00614 U	U	0.00626

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Location Code:			LBA-SB02			LBA-SB02			
		Sample Number:			LBA0004			LBA0005			
		Sample Date:			19-Jan-09			19-Jan-09			
		Sample Depth:			0 - 1 Ft			3 - 5 Ft			
		Sample Purpose:			REG			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	0.0643	U	U	0.0128	U	U	0.013
Semivolatiles	Naphthalene	N	mg/kg	U	0.0488	U	U	0.0097	U	U	0.00989
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	0.089	U	U	0.0177	U	U	0.018
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	0.0698	U	U	0.0139	U	U	0.0141
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	0.729	U	U	0.145	U	U	0.148
Semivolatiles	Nitrobenzene	N	mg/kg	U	0.0673	U	U	0.0134	U	U	0.0136
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	0.0729	U	U	0.0145	U	U	0.0148
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	0.167	U	U	0.0331	U	U	0.0338
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	0.0618	U	U	0.0123	U	U	0.0125
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	0.0735	U	U	0.0146	U	U	0.0149
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	0.029	U	U	0.00577	U	U	0.00589
Semivolatiles	Pentachlorophenol	N	mg/kg	U	0.185	U	U	0.0367	U	U	0.0374
Semivolatiles	Phenanthrene	N	mg/kg	U	0.05	U	U	0.00994	U	U	0.0101
Semivolatiles	Phenol	N	mg/kg	U	0.0247	U	U	0.00491	U	U	0.00501
Semivolatiles	Pyrene	N	mg/kg	U	0.0822	U	U	0.0163	U	U	0.0167
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.0507	U	U	0.0101	U	U	0.0103
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	0.177	U	U	0.0351	U	U	0.0358
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	0.139	U	U	0.0276	U	U	0.0282
Pesticides/PCBs	Aroclor 1016	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1221	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1232	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1242	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1248	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1254	N	mg/kg		0.00811	U	U	0.00811	U	U	
Pesticides/PCBs	Aroclor 1260	N	mg/kg		0.00811	U	U	0.00811	U	U	
Metals - Unfiltered	Aluminum	N	mg/kg		7710			9960			8330
Metals - Unfiltered	Antimony	N	mg/kg	J	0.303	J	J	0.581			0.488
Metals - Unfiltered	Arsenic	N	mg/kg	J	7.11		J	8.1		J	5.84
Metals - Unfiltered	Barium	N	mg/kg		218			67.7			44.3
Metals - Unfiltered	Beryllium	N	mg/kg	J	6.24		J	7.39		J	5.35
Metals - Unfiltered	Cadmium	N	mg/kg	J	0.699			0.36	J	J	0.338
Metals - Unfiltered	Calcium	N	mg/kg	J	8530		J	3360			43000
Metals - Unfiltered	Chromium	N	mg/kg		10.9			17			13.1
Metals - Unfiltered	Cobalt	N	mg/kg	J	16.5		J	8.62			8.88
Metals - Unfiltered	Copper	N	mg/kg	J	17.5		J	23.9			27.4
Metals - Unfiltered	Iron	N	mg/kg		17500			22700		J	16300
Metals - Unfiltered	Lead	N	mg/kg		14.7			15			15.1
Metals - Unfiltered	Magnesium	N	mg/kg	J	2100		J	3510		J	18300
Metals - Unfiltered	Manganese	N	mg/kg	J	1560		J	706		J	240
Metals - Unfiltered	Mercury	N	mg/kg	J	0.0317			0.0198	J	J	0.0115
Metals - Unfiltered	Nickel	N	mg/kg	J	21.9		J	31.4		J	24.9
Metals - Unfiltered	Potassium	N	mg/kg		285			748			1020
Metals - Unfiltered	Selenium	N	mg/kg	UJ	0.499	U	UJ	0.495	U	UJ	0.508
Metals - Unfiltered	Silver	N	mg/kg	U	0.25	U	U	0.248	U	U	0.254
Metals - Unfiltered	Sodium	N	mg/kg		24			45.7			96.4
Metals - Unfiltered	Thallium	N	mg/kg	J	0.25	U	U	0.357	J	J	0.416
Metals - Unfiltered	Vanadium	N	mg/kg		23.7			24.7			21.7
Metals - Unfiltered	Zinc	N	mg/kg		44.9			70.2			60.4
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg		3040	B					

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB02			LBA-SB03			LBA-SB03	
				Sample Number:		LBA0006			LBA0007			LBA0008	
				Sample Date:		19-Jan-09			20-Jan-09			20-Jan-09	
				Sample Depth:		8 - 10 Ft			0 - 1 Ft			0 - 1 Ft	
				Sample Purpose:		REG			REG			FD	
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg			0.147	U	U	0.148	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg		J	0.147	U	U	0.148	U	U
Explosives	HMX	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Nitrobenzene	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg			0.147	U	U	0.148	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg			0.147	U	U	0.148	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg			0.147	U	U	0.148	U	U
Explosives	RDX	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Tetryl	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	U	0.147	U	U	0.148	U	U
Volatiles	Acetone	N	mg/kg	J	J	0.133		J	0.08		J
Volatiles	Acrolein	N	mg/kg	U	R	0.0056	U	R	0.00496	U	R
Volatiles	Acrylonitrile	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Benzene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Bromobenzene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Bromochloromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Bromodichloromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Bromoform	N	mg/kg	U	U	0.00127	U	UJ	0.00112	U	UJ
Volatiles	Bromomethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Butanone, 2-	N	mg/kg	U	R	0.0129	J	J	0.0092	J	J
Volatiles	Carbon disulfide	N	mg/kg	U	U	0.00254	J	J	0.00735	J	J
Volatiles	Carbon tetrachloride	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Chlorobenzene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Chloroethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Chloroform	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Chloromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Chlorotoluene, 2-	N	mg/kg	U	UJ	0.00127	U	UJ	0.00112	U	UJ
Volatiles	Chlorotoluene, 4-	N	mg/kg	U	UJ	0.00126	U	UJ	0.00111	U	UJ
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	UJ	0.00118	U	UJ	0.00104	U	UJ
Volatiles	Dibromochloromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dibromomethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	UJ	0.0012	U	UJ	0.00106	U	UJ
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	UJ	0.00117	U	UJ	0.00103	U	UJ
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	UJ	0.00117	U	UJ	0.00103	U	UJ
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Ethylbenzene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Hexachlorobutadiene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Hexanone, 2-	N	mg/kg	U	U	0.0056	U	UJ	0.00496	U	UJ
Volatiles	Isopropylbenzene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	U	0.0056	U	UJ	0.00496	U	UJ
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	U	U	0.00124	U	UJ	0.0011	U	UJ
Volatiles	Naphthalene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	n-Butylbenzene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	n-Propylbenzene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	p-Isopropyltoluene	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	sec-Butylbenzene	N	mg/kg	U	UJ	0.0012	U	UJ	0.00106	U	UJ
Volatiles	Styrene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	tert-Butylbenzene	N	mg/kg	U	UJ	0.00114	U	UJ	0.00101	U	UJ
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Tetrachloroethene	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB02		LBA-SB03			LBA-SB03		
			Sample Number:	LBA0006		LBA0007			LBA0008		
			Sample Date:	19-Jan-09		20-Jan-09			20-Jan-09		
			Sample Depth:	8 - 10 Ft		0 - 1 Ft			0 - 1 Ft		
			Sample Purpose:	REG		REG			FD		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Toluene	N	mg/kg	U	U	0.00112	U	UJ	0.00104	J	J
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg			0.00112	U	UJ	0.00139	J	J
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trichloroethene	N	mg/kg			0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trichlorofluoromethane	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U	UJ	0.0012	U	UJ	0.00106	U	UJ
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U	UJ	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Vinyl acetate	N	mg/kg	U	U	0.00197	U	UJ	0.00175	U	UJ
Volatiles	Vinyl chloride	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Xylene, o-	N	mg/kg	U	U	0.00112	U	UJ	0.000992	U	UJ
Volatiles	Xylenes, m,p-	N	mg/kg	U	U	0.00224	U	UJ	0.00198	U	UJ
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	U	U	0.00753	U	U	0.00722	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	U	U	0.00502	U	U	0.0706	J	J
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	U	U	0.00904	U	U	0.0811	J	J
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	U	0.0645	J	J	0.236	J	J
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	U	0.054	J	J	0.187	J	J
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	U	0.0996	J	J	0.284	J	J
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	U	0.102	U	U	0.106	J	J
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	U	0.127	U	U	0.122	U	U
Semivolatiles	Benzoic acid	N	mg/kg	U	U	0.102	U	U	0.0978	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	U	U	0.102	U	U	0.0978	U	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	U	0.00879	U	U	0.00843	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	U	0.0107	U	U	0.0102	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	U	0.0182	U	U	0.0175	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	U	0.0387	U	U	0.0371	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	U	0.0149	U	U	0.0143	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	U	0.017	U	U	0.0163	U	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	U	U	0.0418	U	U	0.0401	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	U	0.0103	U	U	0.00987	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	U	0.0363	U	U	0.0348	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	U	0.00665	U	U	0.00638	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	U	0.00515	U	U	0.00494	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	U	0.032	U	U	0.0307	U	U
Semivolatiles	Chrysene	N	mg/kg	U	U	0.0808	J	J	0.232	J	J
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	U	0.0945	U	U	0.0907	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	U	U	0.00703	U	U	0.00674	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U	0.00967	U	U	0.00927	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U	0.0152	U	U	0.0146	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U	0.00816	U	U	0.00783	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	U	0.0414	U	U	0.0397	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	U	0.0149	U	U	0.0143	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	U	U	0.017	U	U	0.0163	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	U	0.0128	U	U	0.0123	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	U	0.011	U	U	0.0106	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	U	0.059	J	J	0.00867	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	U	0.0421	U	U	0.0403	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	U	0.0667	U	U	0.0639	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg			0.0147	U	U	0.0141	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg			0.01	U	U	0.00963	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	U	0.0787	U	U	0.0755	U	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	U	0.0414	U	U	0.0397	U	U
Semivolatiles	Fluoranthene	N	mg/kg	U	U	0.141	J	J	0.455		J
Semivolatiles	Fluorene	N	mg/kg	U	U	0.0177	U	U	0.017	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	U	0.026	U	U	0.0249	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.0397	U	U	0.038	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	Q2,U	UJ	0.0133	Q2,U	UJ	0.0128	Q2,U	UJ
Semivolatiles	Hexachloroethane	N	mg/kg	U	U	0.0128	U	U	0.0123	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	U	0.136	U	U	0.13	J	J
Semivolatiles	Isophorone	N	mg/kg	U	U	0.00502	U	U	0.00482	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	U	0.11	U	U	0.105	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	U	0.00628	U	U	0.00602	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB02		LBA-SB03		LBA-SB03		
				Sample Number:		LBA0006		LBA0007		LBA0008		
				Sample Date:		19-Jan-09		20-Jan-09		20-Jan-09		
				Sample Depth:		8 - 10 Ft		0 - 1 Ft		0 - 1 Ft		
				Sample Purpose:		REG		REG		FD		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	U	0.0131	U	U	0.0125	U	U
Semivolatiles	Naphthalene	N	mg/kg	U	U	0.00992	U	U	0.00951	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	U	0.0181	U	U	0.0173	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	U	0.0142	U	U	0.0136	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	U	0.148	U	U	0.142	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	U	U	0.0137	U	U	0.0131	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	U	0.0148	U	U	0.0142	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	U	0.0339	U	U	0.0325	U	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	U	0.0126	U	U	0.012	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	U	0.0149	U	U	0.0143	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	U	0.0059	U	U	0.00566	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	U	U	0.0375	U	U	0.036	U	U
Semivolatiles	Phenanthrene	N	mg/kg	U	U	0.072	J	J	0.161	J	J
Semivolatiles	Phenol	N	mg/kg	U	U	0.00502	U	U	0.00482	U	U
Semivolatiles	Pyrene	N	mg/kg	U	U	0.111	J	J	0.337	J	J
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U	0.0103	U	U	0.00987	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	U	0.0359	U	U	0.0344	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	U	0.0283	U	U	0.0271	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg			0.00826	U	U	0.00798	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg			0.0798			0.104		
Metals - Unfiltered	Aluminum	N	mg/kg			6790			6330		
Metals - Unfiltered	Antimony	N	mg/kg	J	J	0.954			0.759		
Metals - Unfiltered	Arsenic	N	mg/kg		J	8.05		J	11.5		J
Metals - Unfiltered	Barium	N	mg/kg			51.9		J	152		J
Metals - Unfiltered	Beryllium	N	mg/kg		J	5.73		J	8.07		J
Metals - Unfiltered	Cadmium	N	mg/kg	J	J	0.525			0.819		
Metals - Unfiltered	Calcium	N	mg/kg		J	4600			4500		
Metals - Unfiltered	Chromium	N	mg/kg			10.7			10.1		
Metals - Unfiltered	Cobalt	N	mg/kg		J	6.14		J	33.2		J
Metals - Unfiltered	Copper	N	mg/kg		J	14.2			13.8		
Metals - Unfiltered	Iron	N	mg/kg			16300		J	29100		J
Metals - Unfiltered	Lead	N	mg/kg			103		J	39.9		J
Metals - Unfiltered	Magnesium	N	mg/kg		J	2010		J	2160		J
Metals - Unfiltered	Manganese	N	mg/kg		J	287		J	1680		J
Metals - Unfiltered	Mercury	N	mg/kg	U	U	0.042			0.0441		
Metals - Unfiltered	Nickel	N	mg/kg		J	14		J	25.1		J
Metals - Unfiltered	Potassium	N	mg/kg			628			624		
Metals - Unfiltered	Selenium	N	mg/kg	U	UJ	0.456	U	UJ	0.445	U	UJ
Metals - Unfiltered	Silver	N	mg/kg	U	U	0.228	U	U	0.223	U	U
Metals - Unfiltered	Sodium	N	mg/kg			34.6			45.8		
Metals - Unfiltered	Thallium	N	mg/kg	J	J	0.228	U	U	0.308	J	J
Metals - Unfiltered	Vanadium	N	mg/kg			20.1			22		
Metals - Unfiltered	Zinc	N	mg/kg			67.6			71.8		
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB03			LBA-SB03			LBA-SB03	
			Sample Number:	LBA0009			LBA0010			LBA0011	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			2.5 - 3.2 Ft			8 - 10 Ft	
			Sample Purpose:	FS			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	HMX	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Nitrobenzene	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	RDX	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Tetryl	N	mg/kg	0.3	U	U	0.148	U	U	0.149	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.2	U	U	0.148	U	U	0.149	U
Volatiles	Acetone	N	mg/kg	0.1			0.00904	U	R	0.0163	U
Volatiles	Acrolein	N	mg/kg				0.00452	U	R	0.00813	U
Volatiles	Acrylonitrile	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Benzene	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Bromobenzene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Bromochloromethane	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Bromodichloromethane	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Bromoform	N	mg/kg	0.0048	U	UJ	0.00102	U	U	0.00184	U
Volatiles	Bromomethane	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Butanone, 2-	N	mg/kg	0.019	U	U	0.00452	U	R	0.00813	U
Volatiles	Carbon disulfide	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Carbon tetrachloride	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Chlorobenzene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Chloroethane	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Chloroform	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Chloromethane	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Chlorotoluene, 2-	N	mg/kg				0.00102	U	U	0.00184	U
Volatiles	Chlorotoluene, 4-	N	mg/kg				0.00101	U	U	0.00182	U
Volatiles	Cyclohexane	N	mg/kg	0.0097	U	U					
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	0.0097	U	U	0.000949	U	U	0.00171	U
Volatiles	Dibromochloromethane	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Dibromomethane	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.0048	U	U	0.000967	U	U	0.00174	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.0048	U	U	0.00094	U	U	0.00169	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.0048	U	U	0.00094	U	U	0.00169	U
Volatiles	Dichlorodifluoromethane	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.0158	J
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Ethylbenzene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Hexachlorobutadiene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Hexanone, 2-	N	mg/kg	0.019	U	U	0.00452	U	U	0.00813	U
Volatiles	Isopropylbenzene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	METHYL ACETATE	N	mg/kg	0.0097	U	U					
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	0.019	U	U	0.000904	U	U	0.00163	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.019	U	U	0.00452	U	U	0.00813	U
Volatiles	Methylcyclohexane	N	mg/kg	0.0097	U	U					
Volatiles	Methylene chloride	N	mg/kg	0.0048	U	U	0.001	U	U	0.0018	U
Volatiles	Naphthalene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	n-Butylbenzene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	n-Propylbenzene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	p-Isopropyltoluene	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	sec-Butylbenzene	N	mg/kg				0.000967	U	U	0.00174	U
Volatiles	Styrene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	tert-Butylbenzene	N	mg/kg				0.000922	U	U	0.00166	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Tetrachloroethene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB03			LBA-SB03			LBA-SB03	
			Sample Number:	LBA0009			LBA0010			LBA0011	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			2.5 - 3.2 Ft			8 - 10 Ft	
			Sample Purpose:	FS			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Volatiles	Toluene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.0928	
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Trichloroethene	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Trichlorofluoromethane	N	mg/kg	0.0048	U	UJ	0.000904	U	U	0.00163	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg				0.000967	U	U	0.00174	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg	0.0048	U	U					
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Vinyl acetate	N	mg/kg				0.00159	U	U	0.00286	U
Volatiles	Vinyl chloride	N	mg/kg	0.0048	U	U	0.000904	U	U	0.00163	U
Volatiles	Xylene, o-	N	mg/kg				0.000904	U	U	0.00163	U
Volatiles	Xylenes, m,p-	N	mg/kg				0.00181	U	U	0.00325	U
Volatiles	Xylenes, total	N	mg/kg	0.0097	U	U					
Semivolatiles	Acenaphthene	N	mg/kg	0.41	U	U	0.0071	U	U	0.00753	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.41	U	U	0.00474	U	U	0.00502	U
Semivolatiles	ACETOPHENONE	N	mg/kg	0.083	U	U					
Semivolatiles	Anthracene	N	mg/kg	0.41	U	U	0.00852	U	U	0.00903	U
Semivolatiles	Atrazine	N	mg/kg	0.41	U	U					
Semivolatiles	Benzaldehyde	N	mg/kg	0.41	U	U					
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.41	U	U	0.0259	U	U	0.0275	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.41	U	U	0.0259	U	U	0.0275	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.41	U	U	0.0657	U	U	0.0696	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.41	U	U	0.0961	U	U	0.102	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.41	U	U	0.12	U	U	0.127	U
Semivolatiles	Benzoic acid	N	mg/kg				0.0961	U	U	0.102	U
Semivolatiles	Benzyl alcohol	N	mg/kg				0.0961	U	U	0.102	U
Semivolatiles	BIBENZENE	N	mg/kg	0.41	U	U					
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.41	U	U	0.00829	U	U	0.00878	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.41	U	U	0.0101	U	U	0.0107	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.41	U	U	0.0172	U	U	0.0182	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.41	U	U	0.0365	U	U	0.0386	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.41	U	U	0.0141	U	U	0.0149	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.41	U	U	0.016	U	U	0.0169	U
Semivolatiles	Caprolactam	N	mg/kg	0.41	U	U					
Semivolatiles	Carbazole	N	mg/kg	0.41	U	U	0.0394	U	U	0.0418	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.41	U	U	0.00971	U	U	0.0103	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.41	U	U	0.0342	U	U	0.0363	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.41	U	U	0.00627	U	U	0.00665	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.41	U	U	0.00485	U	U	0.00514	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.41	U	U	0.0302	U	U	0.032	U
Semivolatiles	Chrysene	N	mg/kg	0.41	U	U	0.0156	U	U	0.0166	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.41	U	U	0.0891	U	U	0.0945	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.41	U	U	0.00663	U	U	0.00703	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg				0.00912	U	U	0.00966	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg				0.0143	U	U	0.0152	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg				0.0077	U	U	0.00815	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	2	U	U	0.0391	U	U	0.0414	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.41	U	U	0.0141	U	U	0.0149	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.41	U	U	0.016	U	U	0.0169	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.41	U	U	0.0121	U	U	0.0128	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.41	U	U	0.0104	U	U	0.011	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.41	U	U	0.00852	U	U	0.00903	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	2	U	U	0.0397	U	U	0.042	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	2	U	U	0.0629	U	U	0.0666	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.41	U	U	0.0139	U	U	0.0147	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.41	U	U	0.00947	U	U	0.01	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.41	U	U	0.0742	U	U	0.0787	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg				0.0391	U	U	0.0414	U
Semivolatiles	Fluoranthene	N	mg/kg	0.41	U	U	0.00852	U	U	0.00903	U
Semivolatiles	Fluorene	N	mg/kg	0.41	U	U	0.0167	U	U	0.0177	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.41	U	U	0.0245	U	U	0.026	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.41	U	U	0.0374	U	U	0.0396	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	2	U	U	0.0125	Q2,U	UJ	0.0133	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.41	U	U	0.0121	U	U	0.0128	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.41	U	U	0.128	U	U	0.135	U
Semivolatiles	Isophorone	N	mg/kg	0.41	U	U	0.00474	U	U	0.00502	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.41	U	U	0.103	U	U	0.11	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.41	U	U	0.00592	U	U	0.00627	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB03			LBA-SB03			LBA-SB03	
			Sample Number:	LBA0009			LBA0010			LBA0011	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	0 - 1 Ft			2.5 - 3.2 Ft			8 - 10 Ft	
			Sample Purpose:	FS			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Semivolatiles	Methylphenol, 4-	N	mg/kg	0.41	U	U	0.0123	U	U	0.013	U
Semivolatiles	Naphthalene	N	mg/kg	0.41	U	U	0.00935	U	U	0.00991	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	2	U	U	0.017	U	U	0.0181	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	2	U	U	0.0134	U	U	0.0142	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	2	U	U	0.14	U	U	0.148	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.41	U	U	0.0129	U	U	0.0137	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.41	U	U	0.014	U	U	0.0148	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	2	U	U	0.032	U	U	0.0339	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg				0.0118	U	U	0.0125	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.41	U	U	0.0141	U	U	0.0149	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.41	U	U	0.00556	U	U	0.0059	U
Semivolatiles	Pentachlorophenol	N	mg/kg	0.41	U	U	0.0354	U	U	0.0375	U
Semivolatiles	Phenanthrene	N	mg/kg	0.41	U	U	0.00959	U	U	0.0102	U
Semivolatiles	Phenol	N	mg/kg	0.41	U	U	0.00474	U	U	0.00502	U
Semivolatiles	Pyrene	N	mg/kg	0.41	U	U	0.0157	U	U	0.0167	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg				0.00971	U	U	0.0103	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.41	U	U	0.0339	U	U	0.0359	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.41	U	U	0.0266	U	U	0.0282	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1221	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1232	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1242	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1248	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1254	N	mg/kg	0.041	U	U	0.0079	U	U		
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.24			0.0079	U	U		
Metals - Unfiltered	Aluminum	N	mg/kg	7680			8700			7110	
Metals - Unfiltered	Antimony	N	mg/kg	7.4	U	UJ	0.348	J	J	0.407	J
Metals - Unfiltered	Arsenic	N	mg/kg	10.3			4.42		J	6.28	
Metals - Unfiltered	Barium	N	mg/kg	106			61.2			58.2	
Metals - Unfiltered	Beryllium	N	mg/kg	0.62	U	U	6.18		J	5.32	
Metals - Unfiltered	Cadmium	N	mg/kg	0.81			0.237	U	U	0.315	J
Metals - Unfiltered	Calcium	N	mg/kg	4840			2970			53500	
Metals - Unfiltered	Chromium	N	mg/kg	10.8			13.8			11.1	
Metals - Unfiltered	Cobalt	N	mg/kg	16.9			6.63			8.91	
Metals - Unfiltered	Copper	N	mg/kg	17			11.8			27.5	
Metals - Unfiltered	Iron	N	mg/kg	25100			17300		J	16900	
Metals - Unfiltered	Lead	N	mg/kg	28.6			9.31			14	
Metals - Unfiltered	Magnesium	N	mg/kg	2450			2200		J	19400	
Metals - Unfiltered	Manganese	N	mg/kg	1240		J	228		J	475	
Metals - Unfiltered	Mercury	N	mg/kg	0.12	U	U	0.055			0.158	J
Metals - Unfiltered	Nickel	N	mg/kg	29.8			20.3		J	23.5	
Metals - Unfiltered	Potassium	N	mg/kg	949			342			866	
Metals - Unfiltered	Selenium	N	mg/kg	0.85			0.473	U	UJ	0.504	U
Metals - Unfiltered	Silver	N	mg/kg	1.2	U	UJ	0.237	U	U	0.252	U
Metals - Unfiltered	Sodium	N	mg/kg	621	U	U	52.9			110	
Metals - Unfiltered	Thallium	N	mg/kg	1.2	U	U	0.237	U	U	0.327	J
Metals - Unfiltered	Vanadium	N	mg/kg	17.1			20.9			18.3	
Metals - Unfiltered	Zinc	N	mg/kg	58			60.5			56.4	
Water Quality Parameters	% Solids	N	Percent	80.6							
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:		LBA-SB04			LBA-SB04			
			Sample Number:		LBA0014			LBA0012			
			Sample Date:		16-Jan-09			19-Jan-09			
			Sample Depth:		8 - 10 Ft			.9 - 1.9 Ft			
			Sample Purpose:		REG			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.163
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	HMX	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Nitrobenzene	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Nitrotoluene, 2-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Nitrotoluene, 3-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Nitrotoluene, 4-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	RDX	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Tetryl	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	0.147	U	U	0.147	U	U	0.149
Volatiles	Acetone	N	mg/kg	R	0.0107	U	R	0.0303	J	J	0.0219
Volatiles	Acrolein	N	mg/kg	R	0.00534	U	R	0.00462	U	R	0.00512
Volatiles	Acrylonitrile	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Benzene	N	mg/kg	U	0.00225	J	J	0.000923	U	U	0.00102
Volatiles	Bromobenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Bromochloromethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Bromodichloromethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Bromoform	N	mg/kg	U	0.00121	U	U	0.00104	U	U	0.00116
Volatiles	Bromomethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Butanone, 2-	N	mg/kg	R	0.00534	U	R	0.00462	U	R	0.00512
Volatiles	Carbon disulfide	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Carbon tetrachloride	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Chlorobenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Chloroethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Chloroform	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Chloromethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Chlorotoluene, 2-	N	mg/kg	U	0.00121	U	U	0.00104	U	U	0.00116
Volatiles	Chlorotoluene, 4-	N	mg/kg	U	0.0012	U	U	0.00103	U	U	0.00115
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	0.00112	U	U	0.000969	U	U	0.00108
Volatiles	Dibromochloromethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dibromomethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.00114	U	U	0.000988	U	U	0.0011
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.00111	U	U	0.00096	U	U	0.00107
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.00111	U	U	0.00096	U	U	0.00107
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloroethane, 1,1-	N	mg/kg	J	0.00263	J	J	0.000923	U	U	0.00102
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	0.00986	J	J	0.000923	U	U	0.00102
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Ethylbenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Hexachlorobutadiene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Hexanone, 2-	N	mg/kg	U	0.00534	U	U	0.00462	U	U	0.00512
Volatiles	Isopropylbenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	0.00534	U	U	0.00462	U	U	0.00512
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	U	0.00119	U	U	0.00102	U	U	0.00114
Volatiles	Naphthalene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	n-Butylbenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	n-Propylbenzene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	p-Isopropyltoluene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	sec-Butylbenzene	N	mg/kg	U	0.00114	U	U	0.000988	U	U	0.0011
Volatiles	Styrene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	tert-Butylbenzene	N	mg/kg	U	0.00109	U	U	0.000942	U	U	0.00104
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102
Volatiles	Tetrachloroethene	N	mg/kg	U	0.00107	U	U	0.000923	U	U	0.00102

Appendix I

Chemical Analytical Data Summary
Soil
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				Location Code:	LBA-SB04		LBA-SB04			
				Sample Number:	LBA0014		LBA0012			
				Sample Date:	16-Jan-09		19-Jan-09			
				Sample Depth:	8 - 10 Ft		.9 - 1.9 Ft			
				Sample Purpose:	REG		REG			
Test Group	Parameter	Filtered	Units	ValQual	Result Qual	ValQual	Result Qual	ValQual	Result
Volatiles	Toluene	N	mg/kg	U	0.00338 J	J	0.000923 U	U	0.00102
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg		0.115		0.000923 U	U	0.00102
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Trichloroethene	N	mg/kg	U	0.121		0.000923 U	U	0.00102
Volatiles	Trichlorofluoromethane	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U	0.00114 U	U	0.000988 U	U	0.0011
Volatiles	Trichlorotrifluoroethane	N	mg/kg						
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Vinyl acetate	N	mg/kg	U	0.00188 U	U	0.00162 U	U	0.0018
Volatiles	Vinyl chloride	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Xylene, o-	N	mg/kg	U	0.00107 U	U	0.000923 U	U	0.00102
Volatiles	Xylenes, m,p-	N	mg/kg	U	0.00214 U	U	0.00185 U	U	0.00205
Volatiles	Xylenes, total	N	mg/kg						
Semivolatiles	Acenaphthene	N	mg/kg	U	0.00734 U	U	0.00716 U	U	0.00719
Semivolatiles	Acenaphthylene	N	mg/kg	U	0.00489 U	U	0.00477 U	U	0.0048
Semivolatiles	ACETOPHENONE	N	mg/kg						
Semivolatiles	Anthracene	N	mg/kg	U	0.00881 U	U	0.00859 U	U	0.00863
Semivolatiles	Atrazine	N	mg/kg						
Semivolatiles	Benzaldehyde	N	mg/kg						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	0.0268 U	U	0.0261 U	U	0.0263
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	0.0268 U	U	0.0261 U	U	0.0263
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	0.0679 U	U	0.0662 U	U	0.0665
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	0.0993 U	U	0.0969 U	U	0.0974
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	0.124 U	U	0.121 U	U	0.121
Semivolatiles	Benzoic acid	N	mg/kg	U	0.0993 U	U	0.0969 U	U	0.0974
Semivolatiles	Benzyl alcohol	N	mg/kg	U	0.0993 U	U	0.0969 U	U	0.0974
Semivolatiles	BIBENZENE	N	mg/kg						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	0.00856 U	U	0.00835 U	U	0.00839
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	0.0104 U	U	0.0101 U	U	0.0102
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	0.0177 U	U	0.0173 U	U	0.0174
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	0.0377 U	U	0.0368 U	U	0.0369
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	0.0146 U	U	0.0142 U	U	0.0143
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	0.0165 U	U	0.0161 U	U	0.0162
Semivolatiles	Caprolactam	N	mg/kg						
Semivolatiles	Carbazole	N	mg/kg	U	0.0407 U	U	0.0397 U	U	0.0399
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	0.01 U	U	0.00979 U	U	0.00983
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	0.0353 U	U	0.0345 U	U	0.0347
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	0.00648 U	U	0.00633 U	U	0.00636
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	0.00501 U	U	0.00489 U	U	0.00492
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	0.0312 U	U	0.0304 U	U	0.0306
Semivolatiles	Chrysene	N	mg/kg	U	0.0161 U	U	0.0158 U	U	0.0158
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	0.0921 U	U	0.0899 U	U	0.0903
Semivolatiles	Dibenzofuran	N	mg/kg	U	0.00685 U	U	0.00668 U	U	0.00671
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.00942 U	U	0.00919 U	U	0.00923
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.0148 U	U	0.0144 U	U	0.0145
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.00795 U	U	0.00776 U	U	0.00779
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	0.0404 U	U	0.0394 U	U	0.0396
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	0.0146 U	U	0.0142 U	U	0.0143
Semivolatiles	Diethyl phthalate	N	mg/kg	U	0.0165 U	U	0.0161 U	U	0.0162
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	0.0125 U	U	0.0122 U	U	0.0122
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	0.0108 U	U	0.0105 U	U	0.0106
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	0.00881 U	U	0.00859 U	U	0.00863
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	0.041 U	U	0.04 U	U	0.0402
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	0.0649 U	U	0.0634 U	U	0.0637
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	0.0143 U	U	0.014 U	U	0.014
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	0.00979 U	U	0.00955 U	U	0.00959
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	0.0767 U	U	0.0748 U	U	0.0752
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	0.0404 U	U	0.0394 U	U	0.0396
Semivolatiles	Fluoranthene	N	mg/kg	U	0.00881 U	U	0.00859 U	U	0.00863
Semivolatiles	Fluorene	N	mg/kg	U	0.0172 U	U	0.0168 U	U	0.0169
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	0.0253 U	U	0.0247 U	U	0.0248
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	0.0387 U	U	0.0377 U	U	0.0379
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	U	0.013 U	U	0.0127 Q2,U	UJ	0.0127
Semivolatiles	Hexachloroethane	N	mg/kg	U	0.0125 U	U	0.0122 U	U	0.0122
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	0.132 U	U	0.129 U	U	0.13
Semivolatiles	Isophorone	N	mg/kg	U	0.00489 U	U	0.00477 U	U	0.0048
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	0.107 U	U	0.104 U	U	0.105
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	0.00612 U	U	0.00597 U	U	0.006

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				Sample Date:	16-Jan-09			19-Jan-09			
				Sample Depth:	8 - 10 Ft			.9 - 1.9 Ft			
				Sample Purpose:	REG			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	0.0127	U	U	0.0124	U	U	0.0125
Semivolatiles	Naphthalene	N	mg/kg	U	0.00966	U	U	0.00943	U	U	0.00947
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	0.0176	U	U	0.0172	U	U	0.0173
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	0.0138	U	U	0.0135	U	U	0.0135
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	0.144	U	U	0.141	U	U	0.141
Semivolatiles	Nitrobenzene	N	mg/kg	U	0.0133	U	U	0.013	U	U	0.0131
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	0.0144	U	U	0.0141	U	U	0.0141
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	0.033	U	U	0.0322	U	U	0.0324
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	0.0122	U	U	0.0119	U	U	0.012
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	0.0146	U	U	0.0142	U	U	0.0143
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	0.00575	U	U	0.00561	U	U	0.00564
Semivolatiles	Pentachlorophenol	N	mg/kg	U	0.0366	U	U	0.0357	U	U	0.0359
Semivolatiles	Phenanthrene	N	mg/kg	U	0.00991	U	U	0.00967	U	U	0.00971
Semivolatiles	Phenol	N	mg/kg	U	0.00489	U	U	0.00477	U	U	0.0048
Semivolatiles	Pyrene	N	mg/kg	U	0.0163	U	U	0.0159	U	U	0.0159
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.01	U	U	0.00979	U	U	0.00983
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	0.035	U	U	0.0341	U	U	0.0343
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	0.0275	U	U	0.0269	U	U	0.027
Pesticides/PCBs	Aroclor 1016	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1221	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1232	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1242	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1248	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1254	N	mg/kg					0.00796	U	U	0.00797
Pesticides/PCBs	Aroclor 1260	N	mg/kg					0.00796	U	U	0.00797
Metals - Unfiltered	Aluminum	N	mg/kg		7750			5800			5390
Metals - Unfiltered	Antimony	N	mg/kg	J	0.381	J	J	0.227	U	U	0.253
Metals - Unfiltered	Arsenic	N	mg/kg	J	9.37		J	5.2		J	4.58
Metals - Unfiltered	Barium	N	mg/kg		41.8			22.1			20.7
Metals - Unfiltered	Beryllium	N	mg/kg	J	5.94		J	5.24		J	5.21
Metals - Unfiltered	Cadmium	N	mg/kg	J	0.291	J	J	0.227	U	U	0.253
Metals - Unfiltered	Calcium	N	mg/kg	J	51800		J	1620			2250
Metals - Unfiltered	Chromium	N	mg/kg		11.9			11.8			12
Metals - Unfiltered	Cobalt	N	mg/kg	J	7.58		J	4.82			4.35
Metals - Unfiltered	Copper	N	mg/kg	J	26.1		J	8.81			8.67
Metals - Unfiltered	Iron	N	mg/kg		18700			14800		J	14200
Metals - Unfiltered	Lead	N	mg/kg		15.4			6.88			7.39
Metals - Unfiltered	Magnesium	N	mg/kg	J	18900		J	913		J	1050
Metals - Unfiltered	Manganese	N	mg/kg	J	367		J	324		J	253
Metals - Unfiltered	Mercury	N	mg/kg	J	0.0144	J	J	0.0188	J	J	0.0118
Metals - Unfiltered	Nickel	N	mg/kg	J	21.6		J	11.8		J	11.1
Metals - Unfiltered	Potassium	N	mg/kg		983			188			205
Metals - Unfiltered	Selenium	N	mg/kg	UJ	0.496	U	UJ	0.455	U	UJ	0.506
Metals - Unfiltered	Silver	N	mg/kg	U	0.248	U	U	0.227	U	U	0.253
Metals - Unfiltered	Sodium	N	mg/kg		105			37.8			40
Metals - Unfiltered	Thallium	N	mg/kg	J	0.34	J	J	0.227	U	U	0.253
Metals - Unfiltered	Vanadium	N	mg/kg		19.2			27.5			25.5
Metals - Unfiltered	Zinc	N	mg/kg		55.8			30			30
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB04			LBA-SB05			LBA-SB05	
				Sample Number:		LBA0013			LBA0015			LBA0016	
				Sample Date:		19-Jan-09			19-Jan-09			20-Jan-09	
				Sample Depth:		3.9 - 5.9 Ft			0 - 1 Ft			3 - 5 Ft	
				Sample Purpose:		REG			REG			REG	
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	J	J	0.149	U	U	0.149	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	HMX	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Nitrobenzene	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	RDX	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Tetryl	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	U	0.149	U	U	0.149	U	U
Volatiles	Acetone	N	mg/kg	J	J	0.112		J	0.00971	U	R
Volatiles	Acrolein	N	mg/kg	U	R	0.00532	U	R	0.00486	U	R
Volatiles	Acrylonitrile	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Benzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Bromobenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Bromochloromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Bromodichloromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Bromoform	N	mg/kg	U	U	0.0012	U	UJ	0.0011	U	U
Volatiles	Bromomethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Butanone, 2-	N	mg/kg	U	R	0.0113	J	J	0.00486	U	R
Volatiles	Carbon disulfide	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Carbon tetrachloride	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Chlorobenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Chloroethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Chloroform	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Chloromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Chlorotoluene, 2-	N	mg/kg	U	U	0.0012	U	UJ	0.0011	U	U
Volatiles	Chlorotoluene, 4-	N	mg/kg	U	U	0.00119	U	UJ	0.00109	U	U
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	U	0.00112	U	UJ	0.00102	U	U
Volatiles	Dibromochloromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dibromomethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U	0.00114	U	UJ	0.00104	U	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U	0.00111	U	UJ	0.00101	U	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U	0.00111	U	UJ	0.00101	U	U
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	U	0.00106	U	UJ	0.00427	J	J
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Ethylbenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Hexanone, 2-	N	mg/kg	U	U	0.00532	U	UJ	0.00486	U	U
Volatiles	Isopropylbenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	U	0.00532	U	UJ	0.00486	U	U
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	U	U	0.00118	U	UJ	0.00108	U	U
Volatiles	Naphthalene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	n-Butylbenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	n-Propylbenzene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	p-Isopropyltoluene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	sec-Butylbenzene	N	mg/kg	U	U	0.00114	U	UJ	0.00104	U	U
Volatiles	Styrene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	tert-Butylbenzene	N	mg/kg	U	U	0.00109	U	UJ	0.000991	U	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Tetrachloroethene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB04			LBA-SB05			LBA-SB05	
			Sample Number:	LBA0013			LBA0015			LBA0016	
			Sample Date:	19-Jan-09			19-Jan-09			20-Jan-09	
			Sample Depth:	3.9 - 5.9 Ft			0 - 1 Ft			3 - 5 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Toluene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	U	U	0.00538	J	J	0.0132		
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichloroethene	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichlorofluoromethane	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U	U	0.00114	U	UJ	0.00104	U	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Vinyl acetate	N	mg/kg	U	U	0.00187	U	UJ	0.00171	U	U
Volatiles	Vinyl chloride	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Xylene, o-	N	mg/kg	U	U	0.00106	U	UJ	0.000971	U	U
Volatiles	Xylenes, m,p-	N	mg/kg	U	U	0.00213	U	UJ	0.00194	U	U
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	U	U	0.0075	U	U	0.00755	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	U	U	0.005	U	U	0.00503	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	U	U	0.009	U	U	0.00906	U	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	U	0.0274	U	U	0.0275	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	U	0.0274	U	U	0.0275	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	U	0.0694	U	U	0.0698	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	U	0.102	U	U	0.102	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	U	0.126	U	U	0.127	U	U
Semivolatiles	Benzoic acid	N	mg/kg	U	U	0.102	U	U	0.102	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	U	U	0.102	U	U	0.102	U	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	U	0.00875	U	U	0.00881	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	U	0.0106	U	U	0.0107	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	U	0.0181	U	U	0.0182	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	U	0.0385	U	U	0.0387	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	U	0.0149	U	U	0.015	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	U	0.0169	U	U	0.017	U	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	U	U	0.0416	U	U	0.0419	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	U	0.0103	U	U	0.0103	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	U	0.0361	U	U	0.0364	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	U	0.00663	U	U	0.00667	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	U	0.00513	U	U	0.00516	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	U	0.0319	U	U	0.0321	U	U
Semivolatiles	Chrysene	N	mg/kg	U	U	0.0165	U	U	0.0166	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	U	0.0941	U	U	0.0947	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	U	U	0.007	U	U	0.00704	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U	0.00963	U	U	0.00969	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U	0.0151	U	U	0.0152	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U	0.00813	U	U	0.00818	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	U	0.0413	U	U	0.0415	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	U	0.0149	U	U	0.015	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	U	U	0.0169	U	U	0.017	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	U	0.0128	U	U	0.0128	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	U	0.011	U	U	0.0111	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	U	0.009	U	U	0.00906	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	U	0.0419	U	U	0.0421	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	U	0.0664	U	U	0.0668	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	U	0.0146	U	U	0.0147	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	U	0.01	U	U	0.0101	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	U	0.0784	U	U	0.0789	U	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	U	0.0413	U	U	0.0415	U	U
Semivolatiles	Fluoranthene	N	mg/kg	U	U	0.009	U	U	0.00906	U	U
Semivolatiles	Fluorene	N	mg/kg	U	U	0.0176	U	U	0.0177	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	U	0.0259	U	U	0.026	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.0395	U	U	0.0398	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	Q2,U	UJ	0.0133	Q2,U	UJ	0.0133	Q2,U	UJ
Semivolatiles	Hexachloroethane	N	mg/kg	U	U	0.0128	U	U	0.0128	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	U	0.135	U	U	0.136	U	U
Semivolatiles	Isophorone	N	mg/kg	U	U	0.005	U	U	0.00503	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	U	0.109	U	U	0.11	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	U	0.00625	U	U	0.00629	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB04			LBA-SB05			LBA-SB05		
				Sample Number:		LBA0013			LBA0015			LBA0016		
				Sample Date:		19-Jan-09			19-Jan-09			20-Jan-09		
				Sample Depth:		3.9 - 5.9 Ft			0 - 1 Ft			3 - 5 Ft		
				Sample Purpose:		REG			REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	U		0.013	U	U	0.0131	U	U
Semivolatiles	Naphthalene	N	mg/kg	U	U		0.00988	U	U	0.00994	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	U		0.018	U	U	0.0181	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	U		0.0141	U	U	0.0142	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	U		0.148	U	U	0.148	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	U	U		0.0136	U	U	0.0137	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	U		0.0148	U	U	0.0148	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	U		0.0338	U	U	0.034	U	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	U		0.0125	U	U	0.0126	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	U		0.0149	U	U	0.015	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	U		0.00588	U	U	0.00591	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	U	U		0.0374	U	U	0.0376	U	U
Semivolatiles	Phenanthrene	N	mg/kg	U	U		0.0101	U	U	0.0102	U	U
Semivolatiles	Phenol	N	mg/kg	U	U		0.005	U	U	0.00503	U	U
Semivolatiles	Pyrene	N	mg/kg	U	U		0.0166	U	U	0.0167	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U		0.0103	U	U	0.0103	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	U		0.0358	U	U	0.036	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	U		0.0281	U	U	0.0283	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg	U	U		0.00837	U	U	0.00832	U	U
Metals - Unfiltered	Aluminum	N	mg/kg				8260			11000		
Metals - Unfiltered	Antimony	N	mg/kg	U	U		0.244	U	U	0.684		
Metals - Unfiltered	Arsenic	N	mg/kg		J		5.97		J	11.6		J
Metals - Unfiltered	Barium	N	mg/kg				60.1			61.3		
Metals - Unfiltered	Beryllium	N	mg/kg		J		5.36		J	8.55		J
Metals - Unfiltered	Cadmium	N	mg/kg	U	U		0.253	J	J	0.305	J	J
Metals - Unfiltered	Calcium	N	mg/kg				5520			3050		
Metals - Unfiltered	Chromium	N	mg/kg				12.4			18.5		
Metals - Unfiltered	Cobalt	N	mg/kg				4.21			10.1		
Metals - Unfiltered	Copper	N	mg/kg				18.7			30.1		
Metals - Unfiltered	Iron	N	mg/kg		J		14300		J	31600		J
Metals - Unfiltered	Lead	N	mg/kg				12.2			15.9		
Metals - Unfiltered	Magnesium	N	mg/kg		J		1680		J	3940		J
Metals - Unfiltered	Manganese	N	mg/kg		J		201		J	539		J
Metals - Unfiltered	Mercury	N	mg/kg	J	J		0.0353			0.0238		
Metals - Unfiltered	Nickel	N	mg/kg		J		14.5		J	32.3		J
Metals - Unfiltered	Potassium	N	mg/kg				481			1020		
Metals - Unfiltered	Selenium	N	mg/kg	U	UJ		0.487	U	UJ	0.466	U	UJ
Metals - Unfiltered	Silver	N	mg/kg	U	U		0.244	U	U	0.233	U	U
Metals - Unfiltered	Sodium	N	mg/kg				41.7			55.4		
Metals - Unfiltered	Thallium	N	mg/kg	U	U		0.244	U	U	0.402	J	J
Metals - Unfiltered	Vanadium	N	mg/kg				21.6			27.6		
Metals - Unfiltered	Zinc	N	mg/kg				48.1			81.4		
Water Quality Parameters	% Solids	N	Percent									
Water Quality Parameters	Total organic carbon	N	mg/kg									

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB05			LBA-SB06			LBA-SB06	
			Sample Number:	LBA0017			LBA0018			LBA0019	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 5 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	HMX	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Nitrobenzene	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	RDX	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Tetryl	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.148	U	U	0.148	U	U	0.148	U
Volatiles	Acetone	N	mg/kg	0.021	J	J	0.104		J	0.0149	U
Volatiles	Acrolein	N	mg/kg	0.00539	U	R	0.00592	U	R	0.00746	U
Volatiles	Acrylonitrile	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Benzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00303	J
Volatiles	Bromobenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Bromochloromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Bromodichloromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Bromoform	N	mg/kg	0.00122	U	UJ	0.00134	U	U	0.00169	U
Volatiles	Bromomethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Butanone, 2-	N	mg/kg	0.00539	U	R	0.00827	J	J	0.00746	U
Volatiles	Carbon disulfide	N	mg/kg	0.00307	J	J	0.00118	U	U	0.00149	U
Volatiles	Carbon tetrachloride	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Chlorobenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Chloroethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Chloroform	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Chloromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Chlorotoluene, 2-	N	mg/kg	0.00122	U	UJ	0.00134	U	U	0.00169	U
Volatiles	Chlorotoluene, 4-	N	mg/kg	0.00121	U	UJ	0.00133	U	U	0.00167	U
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	0.00113	U	UJ	0.00124	U	U	0.00157	U
Volatiles	Dibromochloromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dibromomethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.00115	U	UJ	0.00127	U	U	0.0016	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.00112	U	UJ	0.00123	U	U	0.00155	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.00112	U	UJ	0.00123	U	U	0.00155	U
Volatiles	Dichlorodifluoromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0345		J	0.00118	U	U	0.00149	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.00563	J	J	0.00118	U	U	0.00149	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Ethylbenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Hexachlorobutadiene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Hexanone, 2-	N	mg/kg	0.00539	U	UJ	0.00592	U	U	0.00746	U
Volatiles	Isopropylbenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.00539	U	UJ	0.00592	U	U	0.00746	U
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	0.0012	U	UJ	0.00131	U	U	0.00166	U
Volatiles	Naphthalene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	n-Butylbenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	n-Propylbenzene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	p-Isopropyltoluene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	sec-Butylbenzene	N	mg/kg	0.00115	U	UJ	0.00127	U	U	0.0016	U
Volatiles	Styrene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	tert-Butylbenzene	N	mg/kg	0.0011	U	UJ	0.00121	U	U	0.00152	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Tetrachloroethene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB05			LBA-SB06			LBA-SB06	
			Sample Number:	LBA0017			LBA0018			LBA0019	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 5 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Volatiles	Toluene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00576	J
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.324	J	J	0.00118	U	U	0.00149	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Trichloroethene	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Trichlorofluoromethane	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	0.00115	U	UJ	0.00127	U	U	0.0016	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00178	J
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Vinyl acetate	N	mg/kg	0.0019	U	UJ	0.00208	U	U	0.00263	U
Volatiles	Vinyl chloride	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Xylene, o-	N	mg/kg	0.00108	U	UJ	0.00118	U	U	0.00149	U
Volatiles	Xylenes, m,p-	N	mg/kg	0.00216	U	UJ	0.00237	U	U	0.00299	U
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	0.00752	U	U	0.037	U	U	0.00742	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.00502	U	U	0.224	J	J	0.00494	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	0.00903	U	U	0.381	J	J	0.0089	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.0275	U	U	0.652	J	J	0.0271	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.0275	U	U	0.395	J	J	0.0271	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.0696	U	U	0.878	J	J	0.0686	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.102	U	U	0.501	U	U	0.1	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.127	U	U	0.623	U	U	0.125	U
Semivolatiles	Benzoic acid	N	mg/kg	0.102	U	U	0.501	U	U	0.1	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.102	U	U	0.501	U	U	0.1	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.00878	U	U	0.0432	U	U	0.00865	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.0107	U	U	0.0525	U	U	0.0105	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.0182	U	U	0.0895	U	U	0.0179	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.0386	U	U	0.19	U	U	0.0381	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.0149	U	U	0.0734	U	U	0.0147	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.0169	U	U	0.0833	U	U	0.0167	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	0.0418	U	U	0.206	U	U	0.0412	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.0103	U	U	0.0506	U	U	0.0101	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.0362	U	U	0.178	U	U	0.0357	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.00665	U	U	0.0327	U	U	0.00655	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.00514	U	U	0.0253	U	U	0.00507	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.032	U	U	0.157	U	U	0.0315	U
Semivolatiles	Chrysene	N	mg/kg	0.0166	U	U	0.784	J	J	0.0163	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.0944	U	U	0.465	U	U	0.0931	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.00702	U	U	0.461	J	J	0.00692	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.00966	U	U	0.0475	U	U	0.00952	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.0152	U	U	0.0747	U	U	0.015	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.00815	U	U	0.0401	U	U	0.00803	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.0414	U	U	0.204	U	U	0.0408	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.0149	U	U	0.0734	U	U	0.0147	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.0169	U	U	0.0833	U	U	0.0167	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.0128	U	U	0.063	U	U	0.0126	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.011	U	U	0.0543	U	U	0.0109	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.00903	U	U	0.0444	U	U	0.0089	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.042	U	U	0.207	U	U	0.0414	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	0.0666	U	U	0.328	U	U	0.0656	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.0147	U	U	0.0722	U	U	0.0145	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.01	U	U	0.0494	U	U	0.00989	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.0786	U	U	0.387	U	U	0.0775	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	0.0414	U	U	0.204	U	U	0.0408	U
Semivolatiles	Fluoranthene	N	mg/kg	0.00903	U	U	1.26	J	J	0.0089	U
Semivolatiles	Fluorene	N	mg/kg	0.0177	U	U	0.087	U	U	0.0174	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.026	U	U	0.128	U	U	0.0256	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.0396	U	U	0.195	U	U	0.0391	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.0133	U	U	0.0654	Q2,U	UJ	0.0131	Q2,U
Semivolatiles	Hexachloroethane	N	mg/kg	0.0128	U	U	0.063	U	U	0.0126	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.135	U	U	0.667	U	U	0.134	U
Semivolatiles	Isophorone	N	mg/kg	0.00502	U	U	0.0247	U	U	0.00494	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.11	U	U	1.66	J	J	0.108	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.00627	U	U	0.0309	U	U	0.00618	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB05			LBA-SB06			LBA-SB06	
			Sample Number:	LBA0017			LBA0018			LBA0019	
			Sample Date:	20-Jan-09			20-Jan-09			20-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 5 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Semivolatiles	Methylphenol, 4-	N	mg/kg	0.013	U	U	0.0642	U	U	0.0129	U
Semivolatiles	Naphthalene	N	mg/kg	0.00991	U	U	1.02	J	J	0.00977	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.0181	U	U	0.0889	U	U	0.0178	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.0142	U	U	0.0697	U	U	0.014	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.148	U	U	0.728	U	U	0.146	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.0137	U	U	0.0673	U	U	0.0135	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.0148	U	U	0.0728	U	U	0.0146	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	0.0339	U	U	0.167	U	U	0.0334	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	0.0125	U	U	0.0617	U	U	0.0124	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.0149	U	U	0.0734	U	U	0.0147	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.00589	U	U	0.029	U	U	0.00581	U
Semivolatiles	Pentachlorophenol	N	mg/kg	0.0375	U	U	0.185	U	U	0.037	U
Semivolatiles	Phenanthrene	N	mg/kg	0.0102	U	U	0.843	J	J	0.01	U
Semivolatiles	Phenol	N	mg/kg	0.00502	U	U	0.0247	U	U	0.00494	U
Semivolatiles	Pyrene	N	mg/kg	0.0167	U	U	1.13	J	J	0.0164	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.0103	U	U	0.0506	U	U	0.0101	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.0359	U	U	0.177	U	U	0.0354	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.0282	U	U	0.139	U	U	0.0278	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg				0.0081	U	U	0.00835	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg				0.0081	U	U	0.00835	U
Metals - Unfiltered	Aluminum	N	mg/kg	6920			7020			7410	
Metals - Unfiltered	Antimony	N	mg/kg	0.403	J	J	0.377	J	J	0.341	J
Metals - Unfiltered	Arsenic	N	mg/kg	7.92		J	11.3		J	7.5	
Metals - Unfiltered	Barium	N	mg/kg	64.4			68			46.1	
Metals - Unfiltered	Beryllium	N	mg/kg	5.69		J	9.26		J	6.59	
Metals - Unfiltered	Cadmium	N	mg/kg	0.254	U	U	0.338	J	J	0.254	J
Metals - Unfiltered	Calcium	N	mg/kg	51200		J	5080			47700	
Metals - Unfiltered	Chromium	N	mg/kg	11			11.5			11.6	
Metals - Unfiltered	Cobalt	N	mg/kg	8.37		J	9.09			9.71	
Metals - Unfiltered	Copper	N	mg/kg	26.8		J	16.8			26.7	
Metals - Unfiltered	Iron	N	mg/kg	18100			31400		J	21500	
Metals - Unfiltered	Lead	N	mg/kg	12.4			18.3			11.4	
Metals - Unfiltered	Magnesium	N	mg/kg	18500		J	1800		J	16500	
Metals - Unfiltered	Manganese	N	mg/kg	514		J	519		J	417	
Metals - Unfiltered	Mercury	N	mg/kg	0.0115	U	U	0.0456			0.014	J
Metals - Unfiltered	Nickel	N	mg/kg	22.3		J	21.7		J	22.9	
Metals - Unfiltered	Potassium	N	mg/kg	823			591			822	
Metals - Unfiltered	Selenium	N	mg/kg	0.509	U	UJ	0.493	U	UJ	0.462	U
Metals - Unfiltered	Silver	N	mg/kg	0.254	U	U	0.247	U	U	0.231	U
Metals - Unfiltered	Sodium	N	mg/kg	100			50.4			93.3	
Metals - Unfiltered	Thallium	N	mg/kg	0.269	J	J	0.294	J	J	0.302	J
Metals - Unfiltered	Vanadium	N	mg/kg	19			24.4			20.3	
Metals - Unfiltered	Zinc	N	mg/kg	57.2			58.4			59	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB06		LBA-SB06			
				Sample Number:	LBA0020		LBA0021			
				Sample Date:	20-Jan-09		20-Jan-09			
				Sample Depth:	8 - 10 Ft		8 - 10 Ft			
				Sample Purpose:	REG		FD			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	UJ	0.148	U	U	0.149	U	U	0.2
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	HMX	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Nitrobenzene	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Nitrotoluene, 2-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Nitrotoluene, 3-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Nitrotoluene, 4-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	RDX	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Tetryl	N	mg/kg	U	0.148	U	U	0.149	U	U	0.3
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	0.148	U	U	0.149	U	U	0.2
Volatiles	Acetone	N	mg/kg	R	0.0151	J	J	0.0352	J	J	0.018
Volatiles	Acrolein	N	mg/kg	R	0.00636	U	R	0.00471	U	R	
Volatiles	Acrylonitrile	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Benzene	N	mg/kg	J	0.00254	J	J	0.000942	U	UJ	0.0045
Volatiles	Bromobenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Bromochloromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Bromodichloromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Bromoform	N	mg/kg	UJ	0.00144	U	UJ	0.00106	U	UJ	0.0045
Volatiles	Bromomethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Butanone, 2-	N	mg/kg	R	0.00636	U	R	0.00555	J	J	0.018
Volatiles	Carbon disulfide	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Carbon tetrachloride	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Chlorobenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Chloroethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Chloroform	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Chloromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Chlorotoluene, 2-	N	mg/kg	UJ	0.00144	U	UJ	0.00106	U	UJ	
Volatiles	Chlorotoluene, 4-	N	mg/kg	UJ	0.00142	U	UJ	0.00106	U	UJ	
Volatiles	Cyclohexane	N	mg/kg								0.009
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	UJ	0.00133	U	UJ	0.000989	U	UJ	0.009
Volatiles	Dibromochloromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dibromoethane, 1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dibromomethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	UJ	0.00136	U	UJ	0.00101	U	UJ	0.0045
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	UJ	0.00132	U	UJ	0.00098	U	UJ	0.0045
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	UJ	0.00132	U	UJ	0.00098	U	UJ	0.0045
Volatiles	Dichlorodifluoromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloroethane, 1,1-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloroethane, 1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloroethene, 1,1-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloropropane, 1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloropropane, 1,3-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Dichloropropane, 2,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Dichloropropene, 1,1-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Ethylbenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Hexachlorobutadiene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Hexanone, 2-	N	mg/kg	UJ	0.00636	U	UJ	0.00471	U	UJ	0.018
Volatiles	Isopropylbenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	METHYL ACETATE	N	mg/kg								0.009
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.018
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	UJ	0.00636	U	UJ	0.00471	U	UJ	0.018
Volatiles	Methylcyclohexane	N	mg/kg								0.009
Volatiles	Methylene chloride	N	mg/kg	UJ	0.00141	U	UJ	0.00105	U	UJ	0.0045
Volatiles	Naphthalene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	n-Butylbenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	n-Propylbenzene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	p-Isopropyltoluene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	sec-Butylbenzene	N	mg/kg	UJ	0.00136	U	UJ	0.00101	U	UJ	
Volatiles	Styrene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	tert-Butylbenzene	N	mg/kg	UJ	0.0013	U	UJ	0.000961	U	UJ	
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Tetrachloroethene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB06			LBA-SB06			
				Sample Number:	LBA0020			LBA0021			
				Sample Date:	20-Jan-09			20-Jan-09			
				Sample Depth:	8 - 10 Ft			8 - 10 Ft			
				Sample Purpose:	REG			FD			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Volatiles	Toluene	N	mg/kg	J	0.0032	J	J	0.00123	J	J	0.0045
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Trichloroethene	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Trichlorofluoromethane	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	UJ	0.00136	U	UJ	0.00101	U	UJ	
Volatiles	Trichlorotrifluoroethane	N	mg/kg								0.0045
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	J	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Vinyl acetate	N	mg/kg	UJ	0.00224	U	UJ	0.00166	U	UJ	
Volatiles	Vinyl chloride	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	0.0045
Volatiles	Xylene, o-	N	mg/kg	UJ	0.00127	U	UJ	0.000942	U	UJ	
Volatiles	Xylenes, m,p-	N	mg/kg	UJ	0.00254	U	UJ	0.00188	U	UJ	
Volatiles	Xylenes, total	N	mg/kg								0.009
Semivolatiles	Acenaphthene	N	mg/kg	U	0.00741	U	U	0.00742	U	U	0.41
Semivolatiles	Acenaphthylene	N	mg/kg	U	0.00494	U	U	0.00495	U	U	0.41
Semivolatiles	ACETOPHENONE	N	mg/kg								0.082
Semivolatiles	Anthracene	N	mg/kg	U	0.00889	U	U	0.00891	U	U	0.41
Semivolatiles	Atrazine	N	mg/kg								0.41
Semivolatiles	Benzaldehyde	N	mg/kg								0.41
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	0.027	U	U	0.0271	U	U	0.41
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	0.027	U	U	0.0271	U	U	0.41
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	0.0685	U	U	0.0687	U	U	0.41
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	0.1	U	U	0.1	U	U	0.41
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	0.125	U	U	0.125	U	U	0.41
Semivolatiles	Benzoic acid	N	mg/kg	U	0.1	U	U	0.1	U	U	
Semivolatiles	Benzyl alcohol	N	mg/kg	U	0.1	U	U	0.1	U	U	
Semivolatiles	BIBENZENE	N	mg/kg								0.41
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	0.00865	U	U	0.00866	U	U	0.41
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	0.0105	U	U	0.0105	U	U	0.41
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	0.0179	U	U	0.0179	U	U	0.41
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	0.038	U	U	0.0381	U	U	0.41
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	0.0147	U	U	0.0147	U	U	0.41
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	0.0167	U	U	0.0167	U	U	0.41
Semivolatiles	Caprolactam	N	mg/kg								0.41
Semivolatiles	Carbazole	N	mg/kg	U	0.0411	U	U	0.0412	U	U	0.41
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	0.0101	U	U	0.0101	U	U	0.41
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	0.0357	U	U	0.0358	U	U	0.41
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	0.00655	U	U	0.00656	U	U	0.41
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	0.00506	U	U	0.00507	U	U	0.41
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	0.0315	U	U	0.0315	U	U	0.41
Semivolatiles	Chrysene	N	mg/kg	U	0.0163	U	U	0.0163	U	U	0.41
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	0.093	U	U	0.0932	U	U	0.41
Semivolatiles	Dibenzofuran	N	mg/kg	U	0.00692	U	U	0.00693	U	U	0.41
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.00951	U	U	0.00953	U	U	
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.0149	U	U	0.015	U	U	
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.00803	U	U	0.00804	U	U	
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	0.0408	U	U	0.0408	U	U	2
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	0.0147	U	U	0.0147	U	U	0.41
Semivolatiles	Diethyl phthalate	N	mg/kg	U	0.0167	U	U	0.0167	U	U	0.41
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	0.0126	U	U	0.0126	U	U	0.41
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	0.0109	U	U	0.0109	U	U	0.41
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	0.00889	U	U	0.00891	U	U	0.41
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	0.0414	U	U	0.0414	U	U	2
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	0.0656	U	U	0.0657	U	U	2
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	0.0145	U	U	0.0145	U	U	0.41
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	0.00988	U	U	0.0099	U	U	0.41
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	0.0774	U	U	0.0776	U	U	0.41
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	0.0408	U	U	0.0408	U	U	
Semivolatiles	Fluoranthene	N	mg/kg	U	0.00889	U	U	0.00891	U	U	0.41
Semivolatiles	Fluorene	N	mg/kg	U	0.0174	U	U	0.0174	U	U	0.41
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	0.0256	U	U	0.0256	U	U	0.41
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	0.039	U	U	0.0391	U	U	0.41
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	UJ	0.0131	U	U	0.0131	U	U	2
Semivolatiles	Hexachloroethane	N	mg/kg	U	0.0126	U	U	0.0126	U	U	0.41
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	0.133	U	U	0.134	U	U	0.41
Semivolatiles	Isophorone	N	mg/kg	U	0.00494	U	U	0.00495	U	U	0.41
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	0.108	U	U	0.108	U	U	0.41
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	0.00618	U	U	0.00619	U	U	0.41

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB06			LBA-SB06			
				Sample Number:	LBA0020			LBA0021			
				Sample Date:	20-Jan-09			20-Jan-09			
				Sample Depth:	8 - 10 Ft			8 - 10 Ft			
				Sample Purpose:	REG			FD			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	0.0128	U	U	0.0129	U	U	0.41
Semivolatiles	Naphthalene	N	mg/kg	U	0.00976	U	U	0.00977	U	U	0.41
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	0.0178	U	U	0.0178	U	U	2
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	0.014	U	U	0.014	U	U	2
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	0.146	U	U	0.146	U	U	2
Semivolatiles	Nitrobenzene	N	mg/kg	U	0.0135	U	U	0.0135	U	U	0.41
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	0.0146	U	U	0.0146	U	U	0.41
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	0.0333	U	U	0.0334	U	U	2
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	0.0124	U	U	0.0124	U	U	
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	0.0147	U	U	0.0147	U	U	0.41
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	0.0058	U	U	0.00581	U	U	0.41
Semivolatiles	Pentachlorophenol	N	mg/kg	U	0.0369	U	U	0.037	U	U	0.41
Semivolatiles	Phenanthrene	N	mg/kg	U	0.01	U	U	0.01	U	U	0.41
Semivolatiles	Phenol	N	mg/kg	U	0.00494	U	U	0.00495	U	U	0.41
Semivolatiles	Pyrene	N	mg/kg	U	0.0164	U	U	0.0165	U	U	0.41
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.0101	U	U	0.0101	U	U	
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	0.0353	U	U	0.0354	U	U	0.41
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	0.0278	U	U	0.0278	U	U	0.41
Pesticides/PCBs	Aroclor 1016	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1221	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1232	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1242	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1248	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1254	N	mg/kg	U							
Pesticides/PCBs	Aroclor 1260	N	mg/kg	U							
Metals - Unfiltered	Aluminum	N	mg/kg		7850			7930			7660
Metals - Unfiltered	Antimony	N	mg/kg	J	0.445	J	J	0.519		J	7.4
Metals - Unfiltered	Arsenic	N	mg/kg	J	5.55		J	7.58		J	5
Metals - Unfiltered	Barium	N	mg/kg		42		J	107		J	54.5
Metals - Unfiltered	Beryllium	N	mg/kg	J	5.84		J	7.29		J	0.61
Metals - Unfiltered	Cadmium	N	mg/kg	J	0.32	J	J	0.408	J	J	0.61
Metals - Unfiltered	Calcium	N	mg/kg	J	47100		J	43900		J	50100
Metals - Unfiltered	Chromium	N	mg/kg		12.4			12.3			13.5
Metals - Unfiltered	Cobalt	N	mg/kg	J	7.78		J	14.5		J	8
Metals - Unfiltered	Copper	N	mg/kg	J	27		J	28.1		J	21.5
Metals - Unfiltered	Iron	N	mg/kg		18400			23500			18200
Metals - Unfiltered	Lead	N	mg/kg		13.6			14.5			8.4
Metals - Unfiltered	Magnesium	N	mg/kg	J	20500		J	17600		J	14600
Metals - Unfiltered	Manganese	N	mg/kg	J	315		J	798		J	351
Metals - Unfiltered	Mercury	N	mg/kg	J	0.0122	J	J	0.0148	J	J	0.12
Metals - Unfiltered	Nickel	N	mg/kg	J	23		J	28.2		J	21.4
Metals - Unfiltered	Potassium	N	mg/kg		1010			983			1720
Metals - Unfiltered	Selenium	N	mg/kg	UJ	0.478	U	UJ	0.512	U	UJ	0.61
Metals - Unfiltered	Silver	N	mg/kg	U	0.239	U	U	0.256	U	U	1.2
Metals - Unfiltered	Sodium	N	mg/kg		106			95.4			614
Metals - Unfiltered	Thallium	N	mg/kg	J	0.307	J	J	0.385	J	J	1.2
Metals - Unfiltered	Vanadium	N	mg/kg		21.2			22.7			17.8
Metals - Unfiltered	Zinc	N	mg/kg		56.1			63.8			48.2
Water Quality Parameters	% Solids	N	Percent								81.4
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB06		LBA-SB07			LBA-SB08		
				Sample Number:	LBA0022		LBA0023			LBA0024		
				Sample Date:	20-Jan-09		20-Jan-09			20-Jan-09		
				Sample Depth:	8 - 10 Ft		3 - 4.1 Ft			6 - 8 Ft		
				Sample Purpose:	FS		REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	HMX	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Nitrobenzene	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	RDX	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Tetryl	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	U	0.148	U	U	0.146	U	U
Volatiles	Acetone	N	mg/kg	U	U						
Volatiles	Acrolein	N	mg/kg								
Volatiles	Acrylonitrile	N	mg/kg								
Volatiles	Benzene	N	mg/kg	U	UJ						
Volatiles	Bromobenzene	N	mg/kg								
Volatiles	Bromochloromethane	N	mg/kg								
Volatiles	Bromodichloromethane	N	mg/kg	U	UJ						
Volatiles	Bromoform	N	mg/kg	U	UJ						
Volatiles	Bromomethane	N	mg/kg	U	U						
Volatiles	Butanone, 2-	N	mg/kg	U	U						
Volatiles	Carbon disulfide	N	mg/kg	U	U						
Volatiles	Carbon tetrachloride	N	mg/kg	U	UJ						
Volatiles	Chlorobenzene	N	mg/kg	U	U						
Volatiles	Chloroethane	N	mg/kg	U	U						
Volatiles	Chloroform	N	mg/kg	U	U						
Volatiles	Chloromethane	N	mg/kg	U	U						
Volatiles	Chlorotoluene, 2-	N	mg/kg								
Volatiles	Chlorotoluene, 4-	N	mg/kg								
Volatiles	Cyclohexane	N	mg/kg	U	U						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	U						
Volatiles	Dibromochloromethane	N	mg/kg	U	UJ						
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	U						
Volatiles	Dibromomethane	N	mg/kg								
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U						
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U						
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U						
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	UJ						
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	U						
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	U						
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	U						
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	U						
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	U						
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	UJ						
Volatiles	Dichloropropane, 1,3-	N	mg/kg								
Volatiles	Dichloropropane, 2,2-	N	mg/kg								
Volatiles	Dichloropropene, 1,1-	N	mg/kg								
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	UJ						
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	UJ						
Volatiles	Ethylbenzene	N	mg/kg	U	U						
Volatiles	Hexachlorobutadiene	N	mg/kg								
Volatiles	Hexanone, 2-	N	mg/kg	U	U						
Volatiles	Isopropylbenzene	N	mg/kg	U	U						
Volatiles	METHYL ACETATE	N	mg/kg	U	U						
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	U						
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	U						
Volatiles	Methylcyclohexane	N	mg/kg	U	U						
Volatiles	Methylene chloride	N	mg/kg	U	U						
Volatiles	Naphthalene	N	mg/kg								
Volatiles	n-Butylbenzene	N	mg/kg								
Volatiles	n-Propylbenzene	N	mg/kg								
Volatiles	p-Isopropyltoluene	N	mg/kg								
Volatiles	sec-Butylbenzene	N	mg/kg								
Volatiles	Styrene	N	mg/kg	U	U						
Volatiles	tert-Butylbenzene	N	mg/kg								
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg								
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	U						
Volatiles	Tetrachloroethene	N	mg/kg	U	U						

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB06		LBA-SB07		LBA-SB08		
				Sample Number:		LBA0022		LBA0023		LBA0024		
				Sample Date:		20-Jan-09		20-Jan-09		20-Jan-09		
				Sample Depth:		8 - 10 Ft		3 - 4.1 Ft		6 - 8 Ft		
				Sample Purpose:		FS		REG		REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Toluene	N	mg/kg	U	U						
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg								
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U						
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	U	UJ						
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	UJ						
Volatiles	Trichloroethene	N	mg/kg	U	U						
Volatiles	Trichlorofluoromethane	N	mg/kg	U	UJ						
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg								
Volatiles	Trichlorotrifluoroethane	N	mg/kg	U	U						
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg								
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg								
Volatiles	Vinyl acetate	N	mg/kg								
Volatiles	Vinyl chloride	N	mg/kg	U	U						
Volatiles	Xylene, o-	N	mg/kg								
Volatiles	Xylenes, m,p-	N	mg/kg								
Volatiles	Xylenes, total	N	mg/kg	U	U						
Semivolatiles	Acenaphthene	N	mg/kg	U	U	0.0327	U	U	0.0321	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	U	U	0.0218	U	U	0.0214	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg	U	U						
Semivolatiles	Anthracene	N	mg/kg	U	U	0.0392	U	U	0.0385	U	U
Semivolatiles	Atrazine	N	mg/kg	U	U						
Semivolatiles	Benzaldehyde	N	mg/kg	U	U						
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	U	0.163	J	J	0.18	J	J
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	U	0.119	U	U	0.117	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	U	0.327	J	J	0.297	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	U	0.443	U	U	0.434	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	U	0.55	U	U	0.54	U	U
Semivolatiles	Benzoic acid	N	mg/kg			0.443	U	U	0.434	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg			0.443	U	U	0.434	U	U
Semivolatiles	BIBENZENE	N	mg/kg	U	U						
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	U	0.0381	U	U	0.0374	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	U	0.0463	U	U	0.0455	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	U	0.079	U	U	0.0776	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	U	0.168	U	U	0.74	J	J
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	U	0.0649	U	U	0.0636	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	U	0.0736	U	U	0.0722	U	UJ
Semivolatiles	Caprolactam	N	mg/kg	U	U						
Semivolatiles	Carbazole	N	mg/kg	U	U	0.181	U	U	0.178	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	U	0.0447	U	U	0.0439	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	U	0.157	U	U	0.155	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	U	0.0289	U	U	0.0283	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	U	0.0223	U	U	0.0219	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	U	0.139	U	U	0.136	U	U
Semivolatiles	Chrysene	N	mg/kg	U	U	0.251	J	J	0.271	J	J
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	U	0.41	U	U	0.403	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	U	U	0.0035	U	U	0.03	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg			0.042	U	U	0.0412	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg			0.0659	U	U	0.0647	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg			0.0354	U	U	0.0348	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	U	0.18	U	U	0.177	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	U	0.0649	U	U	0.0636	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	U	U	0.0736	U	U	0.0722	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	U	0.0556	U	U	0.0546	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	U	0.048	U	U	0.0471	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	U	0.0392	U	U	0.0385	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	U	0.183	U	U	0.179	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	U	0.289	U	U	0.284	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	U	0.0638	U	U	0.0626	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	U	0.0436	U	U	0.0428	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	U	0.342	U	U	0.335	U	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg			0.18	U	U	0.177	U	U
Semivolatiles	Fluoranthene	N	mg/kg	U	U	0.171	J	J	0.23	J	J
Semivolatiles	Fluorene	N	mg/kg	U	U	0.0768	U	U	0.0754	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	U	0.113	U	U	0.111	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.172	U	U	0.169	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	U	U	0.0578	U	U	0.0567	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	U	U	0.0556	U	U	0.0546	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	U	0.589	U	U	0.578	U	U
Semivolatiles	Isophorone	N	mg/kg	U	U	0.0218	U	U	0.0214	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	U	0.476	U	U	0.467	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	U	0.0272	U	U	0.0267	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Location Code:		LBA-SB06			LBA-SB07			LBA-SB08	
		Sample Number:		LBA0022			LBA0023			LBA0024	
		Sample Date:		20-Jan-09			20-Jan-09			20-Jan-09	
		Sample Depth:		8 - 10 Ft			3 - 4.1 Ft			6 - 8 Ft	
		Sample Purpose:		FS			REG			REG	
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	U	0.0567	U	U	0.0556	U	U
Semivolatiles	Naphthalene	N	mg/kg	U	U	0.0431	U	U	0.0423	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	U	0.0785	U	U	0.077	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	U	0.0616	U	U	0.0604	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	U	0.643	U	U	0.631	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	U	U	0.0594	U	U	0.0583	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	U	0.0643	U	U	0.0631	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	U	0.147	U	U	0.144	U	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg			0.0545	U	U	0.0535	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	U	0.0649	U	U	0.0636	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	U	0.0256	U	U	0.0251	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	U	U	0.163	U	U	0.16	U	U
Semivolatiles	Phenanthrene	N	mg/kg	U	U	0.0441	U	U	0.0433	U	U
Semivolatiles	Phenol	N	mg/kg	U	U	0.0218	U	U	0.0214	U	U
Semivolatiles	Pyrene	N	mg/kg	U	U	0.213	J	J	0.221	J	J
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg			0.0447	U	U	0.0439	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	U	0.156	U	U	0.153	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	U	0.123	U	U	0.12	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg								
Pesticides/PCBs	Aroclor 1221	N	mg/kg								
Pesticides/PCBs	Aroclor 1232	N	mg/kg								
Pesticides/PCBs	Aroclor 1242	N	mg/kg								
Pesticides/PCBs	Aroclor 1248	N	mg/kg								
Pesticides/PCBs	Aroclor 1254	N	mg/kg								
Pesticides/PCBs	Aroclor 1260	N	mg/kg								
Metals - Unfiltered	Aluminum	N	mg/kg			9160			7740		
Metals - Unfiltered	Antimony	N	mg/kg	U	UJ	0.288	J	J	1.46		J
Metals - Unfiltered	Arsenic	N	mg/kg			1.38		J	1.44		J
Metals - Unfiltered	Barium	N	mg/kg			120			94.3		
Metals - Unfiltered	Beryllium	N	mg/kg	U	U	1.2		J	1.15		J
Metals - Unfiltered	Cadmium	N	mg/kg	U	U	0.219	U	U	0.264	J	J
Metals - Unfiltered	Calcium	N	mg/kg			288000		J	288000		J
Metals - Unfiltered	Chromium	N	mg/kg			6.31			9.62		
Metals - Unfiltered	Cobalt	N	mg/kg			1.74		J	1.65		J
Metals - Unfiltered	Copper	N	mg/kg			9.11		J	10.4		J
Metals - Unfiltered	Iron	N	mg/kg			4920			5390		
Metals - Unfiltered	Lead	N	mg/kg			7.71			10.8		
Metals - Unfiltered	Magnesium	N	mg/kg			23500		J	28500		J
Metals - Unfiltered	Manganese	N	mg/kg		J	1050		J	965		J
Metals - Unfiltered	Mercury	N	mg/kg	U	U	0.0159	J	J	0.00931	J	J
Metals - Unfiltered	Nickel	N	mg/kg			5.06		J	5.58		J
Metals - Unfiltered	Potassium	N	mg/kg			462			411		
Metals - Unfiltered	Selenium	N	mg/kg	U	U	0.439	U	UJ	0.43	U	UJ
Metals - Unfiltered	Silver	N	mg/kg	U	UJ	0.48			1.01		
Metals - Unfiltered	Sodium	N	mg/kg	U	U	262			223		
Metals - Unfiltered	Thallium	N	mg/kg	U	U	0.219	U	U	0.215	U	U
Metals - Unfiltered	Vanadium	N	mg/kg			6.31			6.6		
Metals - Unfiltered	Zinc	N	mg/kg			33.9			44.7		
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB09			LBA-SB10			LBA-SB10	
			Sample Number:	LBA0025			LBA0026			LBA0027	
			Sample Date:	20-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	6 - 8 Ft			0 - 1 Ft			0 - 1 Ft	
			Sample Purpose:	REG			REG			FD	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	0.146	U	U	0.288	Q1,U	U	0.288	Q1,U
Explosives	HMX	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Nitrobenzene	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Nitrotoluene, 2-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Nitrotoluene, 3-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Nitrotoluene, 4-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	RDX	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Tetryl	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.146	U	U	0.288	U	U	0.288	U
Volatiles	Acetone	N	mg/kg				0.339	J	J	0.087	
Volatiles	Acrolein	N	mg/kg				0.0554	U	R	0.056	U
Volatiles	Acrylonitrile	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Benzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Bromobenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Bromochloromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Bromodichloromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Bromoform	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Bromomethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Butanone, 2-	N	mg/kg				0.0147	J	J	0.0078	J
Volatiles	Carbon disulfide	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Carbon tetrachloride	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chlorobenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chloroethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chloroform	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chloromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chlorotoluene, 2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Chlorotoluene, 4-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dibromochloromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dibromomethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichlorodifluoromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Ethylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Hexachlorobutadiene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Hexanone, 2-	N	mg/kg				0.0554	U	U	0.056	U
Volatiles	Isopropylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg				0.0554	U	U	0.056	U
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Naphthalene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	n-Butylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	n-Propylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	p-Isopropyltoluene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	sec-Butylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Styrene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	tert-Butylbenzene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Tetrachloroethene	N	mg/kg				0.0111	U	U	0.0112	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB09			LBA-SB10			LBA-SB10	
			Sample Number:	LBA0025			LBA0026			LBA0027	
			Sample Date:	20-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	6 - 8 Ft			0 - 1 Ft			0 - 1 Ft	
			Sample Purpose:	REG			REG			FD	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Volatiles	Toluene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichloroethene	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichlorofluoromethane	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Vinyl acetate	N	mg/kg				0.0111	Q1,U	UJ	0.00197	Q1,
Volatiles	Vinyl chloride	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Xylene, o-	N	mg/kg				0.0111	U	U	0.0112	U
Volatiles	Xylenes, m,p-	N	mg/kg				0.0222	U	U	0.0224	U
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	0.0328	U	U	0.457	U	U	0.4	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.195	J	J	0.457	U	U	0.4	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	0.257	J	J	0.457	U	U	0.4	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.651	J	J	0.457	U	U	0.4	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.498	J	J	0.457	U	U	0.4	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	1.01	J	J	0.457	U	U	0.4	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.444	U	U	0.457	U	U	0.4	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.553	U	U	0.457	U	U	0.4	U
Semivolatiles	Benzoic acid	N	mg/kg	0.444	U	U	0.457	U	U	0.4	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.444	U	U	0.457	U	U	0.4	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.0383	U	U	0.457	U	U	0.4	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.0465	U	U	0.457	U	U	0.4	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.0794	U	U	0.457	U	U	0.4	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.241	J	J	0.457	U	U	0.4	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.0651	U	U	0.457	U	U	0.4	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.0739	U	U	0.457	U	U	0.4	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	0.182	U	U	0.457	U	U	0.4	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.0449	U	U	0.457	U	U	0.4	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.158	U	U	0.457	U	U	0.4	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.029	U	U	0.457	U	U	0.4	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.0224	U	U	0.457	U	U	0.4	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.14	U	U	0.457	U	U	0.4	U
Semivolatiles	Chrysene	N	mg/kg	0.719	J	J	0.457	U	U	0.4	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.412	U	U	0.457	U	U	0.4	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.0306	U	U	0.457	U	U	0.4	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.0421	U	U	0.457	U	U	0.4	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.0662	U	U	0.457	U	U	0.4	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.0356	U	U	0.457	U	U	0.4	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.181	U	U	0.457	U	U	0.4	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.0651	U	U	0.457	U	U	0.4	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.0739	U	U	0.457	U	U	0.4	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.0558	U	U	0.457	U	U	0.4	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.0482	U	U	0.457	U	U	0.4	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.0394	U	U	0.457	U	U	0.4	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.183	U	U	0.457	U	U	0.4	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	0.291	U	U	0.914	U	U	0.801	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	0.064	U	U	0.457	U	U	0.4	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	0.0438	U	U	0.457	U	U	0.4	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.343	U	U	0.457	U	U	0.4	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	0.181	U	U	0.457	U	U	0.4	U
Semivolatiles	Fluoranthene	N	mg/kg	1.02	J	J	0.457	U	U	0.0401	J
Semivolatiles	Fluorene	N	mg/kg	0.0772	U	U	0.457	U	U	0.4	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.113	U	U	0.457	U	U	0.4	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.173	U	U	0.457	U	U	0.4	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.058	U	U	0.457	U	U	0.4	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.0558	U	U	0.457	U	U	0.4	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.591	U	U	0.457	U	U	0.4	U
Semivolatiles	Isophorone	N	mg/kg	0.0219	U	U	0.457	U	U	0.4	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.478	U	U	0.457	U	U	0.4	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.0274	U	U	0.457	U	U	0.4	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB09			LBA-SB10			LBA-SB10	
			Sample Number:	LBA0025			LBA0026			LBA0027	
			Sample Date:	20-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	6 - 8 Ft			0 - 1 Ft			0 - 1 Ft	
			Sample Purpose:	REG			REG			FD	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Semivolatiles	Methylphenol, 4-	N	mg/kg	0.0569	U	U	0.457	U	U	0.4	U
Semivolatiles	Naphthalene	N	mg/kg	0.0432	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.0788	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.0618	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.646	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.0597	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.0646	U	U	0.457	U	U	0.4	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	0.148	U	U	0.457	U	U	0.4	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	0.0547	U	U	0.457	U	U	0.4	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.0651	U	U	0.457	U	U	0.4	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.0257	U	U	0.457	U	U	0.4	U
Semivolatiles	Pentachlorophenol	N	mg/kg	0.164	U	U	0.914	U	U	0.801	U
Semivolatiles	Phenanthrene	N	mg/kg	0.202	J	J	0.457	U	U	0.4	U
Semivolatiles	Phenol	N	mg/kg	0.0219	U	U	0.457	U	U	0.4	U
Semivolatiles	Pyrene	N	mg/kg	0.91	J	J	0.457	U	U	0.4	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.0449	U	U	0.457	U	U	0.4	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.157	U	U	0.457	U	U	0.4	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.123	U	U	0.457	U	U	0.4	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg				0.0457	U	U	0.04	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg				0.0457	U	U	0.04	U
Metals - Unfiltered	Aluminum	N	mg/kg	2200			7210			5830	
Metals - Unfiltered	Antimony	N	mg/kg	1.24		J	0.573		J	0.247	J
Metals - Unfiltered	Arsenic	N	mg/kg	3.41		J	9.26		J	6.74	
Metals - Unfiltered	Barium	N	mg/kg	26.7			50.5		J	39.6	
Metals - Unfiltered	Beryllium	N	mg/kg	1.14		J	6.41		J	5.17	
Metals - Unfiltered	Cadmium	N	mg/kg	0.221	J	J	0.492	J	J	0.261	J
Metals - Unfiltered	Calcium	N	mg/kg	240000		J	4380		J	3220	
Metals - Unfiltered	Chromium	N	mg/kg	4.63			13.2		J	10.8	
Metals - Unfiltered	Cobalt	N	mg/kg	2.13		J	7.31		J	4.75	
Metals - Unfiltered	Copper	N	mg/kg	11.4		J	13.6			10.4	
Metals - Unfiltered	Iron	N	mg/kg	6980			18300			14600	
Metals - Unfiltered	Lead	N	mg/kg	12.9			16		J	11.9	
Metals - Unfiltered	Magnesium	N	mg/kg	29600		J	1650		J	1220	
Metals - Unfiltered	Manganese	N	mg/kg	369		J	281			187	
Metals - Unfiltered	Mercury	N	mg/kg	0.017	J	J	0.0318			0.0266	
Metals - Unfiltered	Nickel	N	mg/kg	7.33		J	20.1		J	15.3	
Metals - Unfiltered	Potassium	N	mg/kg	305			374			293	
Metals - Unfiltered	Selenium	N	mg/kg	0.434	U	UJ	1.1	U	UJ	0.911	U
Metals - Unfiltered	Silver	N	mg/kg	2.25			0.549	U	UJ	0.455	U
Metals - Unfiltered	Sodium	N	mg/kg	142			30.8			23.5	
Metals - Unfiltered	Thallium	N	mg/kg	0.217	U	U	0.558			0.455	U
Metals - Unfiltered	Vanadium	N	mg/kg	7.96			25.4			20.6	
Metals - Unfiltered	Zinc	N	mg/kg	16.3			60.1		J	47.5	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB10		LBA-SB10			
				Sample Number:	LBA0028		LBA0029			
				Sample Date:	19-Jan-09		19-Jan-09			
				Sample Depth:	0 - 1 Ft		3 - 4.4 Ft			
				Sample Purpose:	FS		REG			
Test Group	Parameter	Filtered	Units	ValQual	Result Qual	ValQual	Result Qual	ValQual	Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.378
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	HMX	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Nitrobenzene	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Nitrotoluene, 2-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Nitrotoluene, 3-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Nitrotoluene, 4-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	RDX	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Tetryl	N	mg/kg	U	0.3 U	U	0.297 U	U	0.294
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	0.2 U	U	0.297 U	U	0.294
Volatiles	Acetone	N	mg/kg	J	0.072		0.0524	J	0.0247
Volatiles	Acrolein	N	mg/kg	R			0.0514 U	R	0.0479
Volatiles	Acrylonitrile	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Benzene	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Bromobenzene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Bromochloromethane	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Bromodichloromethane	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Bromoform	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Bromomethane	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Butanone, 2-	N	mg/kg	J	0.021 U	U	0.0514 U	R	0.0479
Volatiles	Carbon disulfide	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Carbon tetrachloride	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Chlorobenzene	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Chloroethane	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Chloroform	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Chloromethane	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Chlorotoluene, 2-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Chlorotoluene, 4-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Cyclohexane	N	mg/kg		0.01 U	U			
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	0.01 U	U	0.0103 U	U	0.00958
Volatiles	Dibromochloromethane	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dibromomethane	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	0.0052 U	UJ	0.0103 U	U	0.00958
Volatiles	Ethylbenzene	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Hexachlorobutadiene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Hexanone, 2-	N	mg/kg	U	0.021 U	U	0.0514 U	U	0.0479
Volatiles	Isopropylbenzene	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	METHYL ACETATE	N	mg/kg		0.01 U	U			
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	0.021 U	U	0.0103 U	U	0.00958
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	0.021 U	U	0.0514 U	U	0.0479
Volatiles	Methylcyclohexane	N	mg/kg		0.01 U	U			
Volatiles	Methylene chloride	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Naphthalene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	n-Butylbenzene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	n-Propylbenzene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	p-Isopropyltoluene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	sec-Butylbenzene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Styrene	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	tert-Butylbenzene	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U			0.0103 U	U	0.00958
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958
Volatiles	Tetrachloroethene	N	mg/kg	U	0.0052 U	U	0.0103 U	U	0.00958

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB10			LBA-SB10			
				Sample Number:	LBA0028			LBA0029			
				Sample Date:	19-Jan-09			19-Jan-09			
				Sample Depth:	0 - 1 Ft			3 - 4.4 Ft			
				Sample Purpose:	FS			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Volatiles	Toluene	N	mg/kg	U	0.0052	U	U	0.0103	U	U	0.00958
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U				0.0103	U	U	0.00958
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.0052	U	U	0.0103	U	U	0.00958
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	U	0.0052	U	UJ	0.0103	U	U	0.00958
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	0.0052	U	UJ	0.0103	U	U	0.00958
Volatiles	Trichloroethene	N	mg/kg	U	0.0052	U	U	0.0103	U	U	0.00958
Volatiles	Trichlorofluoromethane	N	mg/kg	U	0.0052	U	UJ	0.0103	U	U	0.00958
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U				0.0103	U	U	0.00958
Volatiles	Trichlorotrifluoroethane	N	mg/kg		0.0052	U	U				
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U				0.0103	U	U	0.00958
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U				0.0103	U	U	0.00958
Volatiles	Vinyl acetate	N	mg/kg	UJ				0.0103	Q1,U	UJ	0.00958
Volatiles	Vinyl chloride	N	mg/kg	U	0.0052	U	U	0.0103	U	U	0.00958
Volatiles	Xylene, o-	N	mg/kg	U				0.0103	U	U	0.00958
Volatiles	Xylenes, m,p-	N	mg/kg	U				0.0206	U	U	0.0192
Volatiles	Xylenes, total	N	mg/kg		0.01	U	U				
Semivolatiles	Acenaphthene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Acenaphthylene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	ACETOPHENONE	N	mg/kg		0.081	U	U				
Semivolatiles	Anthracene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Atrazine	N	mg/kg		0.4	U	U				
Semivolatiles	Benzaldehyde	N	mg/kg		0.4	U	U				
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Benzoic acid	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Benzyl alcohol	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	BIBENZENE	N	mg/kg		0.4	U	U				
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Caprolactam	N	mg/kg		0.4	U	U				
Semivolatiles	Carbazole	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Chrysene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dibenzofuran	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Diethyl phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	U	1.9	U	U	0.766	U	U	0.842
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.352
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.0771
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Fluoranthene	N	mg/kg	J	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Fluorene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Hexachloroethane	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Isophorone	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB10			LBA-SB10			
				Sample Number:	LBA0028			LBA0029			
				Sample Date:	19-Jan-09			19-Jan-09			
				Sample Depth:	0 - 1 Ft			3 - 4.4 Ft			
				Sample Purpose:	FS			REG			
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual	Result	Qual	ValQual	Result
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Naphthalene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	Nitrobenzene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	1.9	U	U	0.383	U	U	0.421
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Pentachlorophenol	N	mg/kg	U	0.4	U	U	0.766	U	U	0.842
Semivolatiles	Phenanthrene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Phenol	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Pyrene	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U				0.383	U	U	0.421
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	0.4	U	U	0.383	U	U	0.421
Pesticides/PCBs	Aroclor 1016	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1221	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1232	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1242	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1248	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1254	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Pesticides/PCBs	Aroclor 1260	N	mg/kg	U	0.04	U	U	0.0387	U	U	
Metals - Unfiltered	Aluminum	N	mg/kg		7240			7180			12000
Metals - Unfiltered	Antimony	N	mg/kg	J	7.3	U	UJ	0.317	J	J	0.814
Metals - Unfiltered	Arsenic	N	mg/kg	J	5.9			12.2		J	15.3
Metals - Unfiltered	Barium	N	mg/kg	J	37.9			76.6		J	63.1
Metals - Unfiltered	Beryllium	N	mg/kg	J	0.61	U	U	7.47		J	9.03
Metals - Unfiltered	Cadmium	N	mg/kg	J	0.61	U	U	0.486			0.671
Metals - Unfiltered	Calcium	N	mg/kg	J	3000			3980		J	7120
Metals - Unfiltered	Chromium	N	mg/kg	J	13.9			12.9		J	19
Metals - Unfiltered	Cobalt	N	mg/kg	J	6.1	U	U	14.5		J	24.4
Metals - Unfiltered	Copper	N	mg/kg		10.2			13.5			31.5
Metals - Unfiltered	Iron	N	mg/kg		17800			23700			28800
Metals - Unfiltered	Lead	N	mg/kg	J	9			10.9		J	21.7
Metals - Unfiltered	Magnesium	N	mg/kg	J	1410			1530		J	5500
Metals - Unfiltered	Manganese	N	mg/kg		160		J	726			1140
Metals - Unfiltered	Mercury	N	mg/kg		0.12	U	U	0.0272			0.0167
Metals - Unfiltered	Nickel	N	mg/kg	J	15.3			33.1		J	43.5
Metals - Unfiltered	Potassium	N	mg/kg		606	U	U	320			1030
Metals - Unfiltered	Selenium	N	mg/kg	UJ	0.61			0.907	U	UJ	1.02
Metals - Unfiltered	Silver	N	mg/kg	UJ	1.2	U	UJ	0.454	U	UJ	0.51
Metals - Unfiltered	Sodium	N	mg/kg		606	U	U	26.7			53.4
Metals - Unfiltered	Thallium	N	mg/kg	U	1.2	U	U	0.454	U	U	0.678
Metals - Unfiltered	Vanadium	N	mg/kg		26.2			27.7			27.9
Metals - Unfiltered	Zinc	N	mg/kg	J	45.5			102		J	96.9
Water Quality Parameters	% Solids	N	Percent		82.5						
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB10			LBA-SB11			LBA-SB11		
				Sample Number:		LBA0030			LBA0031			LBA0032		
				Sample Date:		19-Jan-09			19-Jan-09			19-Jan-09		
				Sample Depth:		8 - 10 Ft			0 - 1 Ft			3.9 - 5.9 Ft		
				Sample Purpose:		REG			REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	U	0.527			0.291	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg			1.13			0.947		
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	HMX	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Nitrobenzene	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	RDX	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Tetryl	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	U	0.293	U	U	0.291	U	U
Volatiles	Acetone	N	mg/kg	J	J	0.265		J	0.0388	J	J
Volatiles	Acrolein	N	mg/kg	U	R	0.0576	U	R	0.0486	U	R
Volatiles	Acrylonitrile	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Benzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Bromobenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Bromochloromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Bromodichloromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Bromoform	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Bromomethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Butanone, 2-	N	mg/kg	U	R	0.0136	J	J	0.0486	U	R
Volatiles	Carbon disulfide	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Carbon tetrachloride	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chlorobenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chloroethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chloroform	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chloromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chlorotoluene, 2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Chlorotoluene, 4-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dibromochloromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dibromomethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Ethylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Hexanone, 2-	N	mg/kg	U	U	0.0576	U	U	0.0486	U	UJ
Volatiles	Isopropylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	U	0.0576	U	U	0.0486	U	UJ
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Naphthalene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	n-Butylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	n-Propylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	p-Isopropyltoluene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	sec-Butylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Styrene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	tert-Butylbenzene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Tetrachloroethene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:		LBA-SB10		LBA-SB11		LBA-SB11		
				Sample Number:		LBA0030		LBA0031		LBA0032		
				Sample Date:		19-Jan-09		19-Jan-09		19-Jan-09		
				Sample Depth:		8 - 10 Ft		0 - 1 Ft		3.9 - 5.9 Ft		
				Sample Purpose:		REG		REG		REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Toluene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichloroethene	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichlorofluoromethane	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Vinyl acetate	N	mg/kg	U	U	0.0115	Q1,U	UJ	0.00971	U	UJ
Volatiles	Vinyl chloride	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Xylene, o-	N	mg/kg	U	U	0.0115	U	U	0.00971	U	UJ
Volatiles	Xylenes, m,p-	N	mg/kg	U	U	0.023	U	U	0.0194	U	UJ
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzoic acid	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Chrysene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	U	0.407	U	U	0.395	U	UJ
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	Q2,U	UJ	0.815	U	U	0.789	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	J	J	1.29			0.866		
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	J	J	0.204	J	J	0.129	J	J
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Fluoranthene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Fluorene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Isophorone	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

				Location Code:	LBA-SB10		LBA-SB11		LBA-SB11		
				Sample Number:	LBA0030		LBA0031		LBA0032		
				Sample Date:	19-Jan-09		19-Jan-09		19-Jan-09		
				Sample Depth:	8 - 10 Ft		0 - 1 Ft		3.9 - 5.9 Ft		
				Sample Purpose:	REG		REG		REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Naphthalene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	U	U	0.815	U	U	0.789	U	U
Semivolatiles	Phenanthrene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Phenol	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Pyrene	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	U	0.407	U	U	0.395	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg			0.0407	U	U	0.0388	U	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg			0.0629	P	J	0.061	P	J
Metals - Unfiltered	Aluminum	N	mg/kg			6690			8940		
Metals - Unfiltered	Antimony	N	mg/kg			0.467	U	U	0.27	J	J
Metals - Unfiltered	Arsenic	N	mg/kg		J	8.54		J	11		J
Metals - Unfiltered	Barium	N	mg/kg		J	55.2		J	154		J
Metals - Unfiltered	Beryllium	N	mg/kg		J	6.88		J	8.88		J
Metals - Unfiltered	Cadmium	N	mg/kg			0.467	U	U	0.474	U	U
Metals - Unfiltered	Calcium	N	mg/kg		J	1970		J	1460		J
Metals - Unfiltered	Chromium	N	mg/kg		J	14.7		J	16.4		J
Metals - Unfiltered	Cobalt	N	mg/kg		J	4.68		J	53.8		J
Metals - Unfiltered	Copper	N	mg/kg			14.2			15.3		
Metals - Unfiltered	Iron	N	mg/kg			21600			33900		
Metals - Unfiltered	Lead	N	mg/kg		J	10		J	12.9		J
Metals - Unfiltered	Magnesium	N	mg/kg		J	1070		J	1530		J
Metals - Unfiltered	Manganese	N	mg/kg			115			3000		
Metals - Unfiltered	Mercury	N	mg/kg	J	J	0.026			0.0299		
Metals - Unfiltered	Nickel	N	mg/kg		J	14.3		J	38.2		J
Metals - Unfiltered	Potassium	N	mg/kg			242			363		
Metals - Unfiltered	Selenium	N	mg/kg	U	UJ	0.934	U	UJ	0.516	J	J
Metals - Unfiltered	Silver	N	mg/kg	U	UJ	0.467	U	UJ	0.474	U	UJ
Metals - Unfiltered	Sodium	N	mg/kg			18.8			29.2		
Metals - Unfiltered	Thallium	N	mg/kg			0.467	U	U	0.294	J	J
Metals - Unfiltered	Vanadium	N	mg/kg			25.7			28.2		
Metals - Unfiltered	Zinc	N	mg/kg		J	69.9		J	113		J
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB11			LBA-SB12			LBA-SB12	
			Sample Number:	LBA0033			LBA0034			LBA0035	
			Sample Date:	19-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 3.9 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	5.68			0.297	U	U	0.393	
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	4.12			0.297	U	U	0.291	U
Explosives	HMX	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Nitrobenzene	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Nitrotoluene, 2-	N	mg/kg	22.7			0.297	U	U	0.291	U
Explosives	Nitrotoluene, 3-	N	mg/kg	1.52			0.297	U	U	0.291	U
Explosives	Nitrotoluene, 4-	N	mg/kg	11.8			0.297	U	U	0.291	U
Explosives	RDX	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Tetryl	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	0.291	U	U	0.297	U	U	0.291	U
Volatiles	Acetone	N	mg/kg	0.0301	J	J	0.152		J	0.0464	J
Volatiles	Acrolein	N	mg/kg	0.0509	U	R	0.0575	U	R	0.0477	U
Volatiles	Acrylonitrile	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Benzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Bromobenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Bromochloromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Bromodichloromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Bromoform	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Bromomethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Butanone, 2-	N	mg/kg	0.0509	U	R	0.00999	J	J	0.0477	U
Volatiles	Carbon disulfide	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Carbon tetrachloride	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chlorobenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chloroethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chloroform	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chloromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chlorotoluene, 2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Chlorotoluene, 4-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Cyclohexane	N	mg/kg								
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dibromochloromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dibromoethane, 1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dibromomethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichlorodifluoromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloroethane, 1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropane, 1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropane, 1,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropane, 2,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropene, 1,1-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Ethylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Hexachlorobutadiene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Hexanone, 2-	N	mg/kg	0.0509	U	U	0.0575	U	U	0.0477	U
Volatiles	Isopropylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	METHYL ACETATE	N	mg/kg								
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	0.0509	U	U	0.0575	U	U	0.0477	U
Volatiles	Methylcyclohexane	N	mg/kg								
Volatiles	Methylene chloride	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Naphthalene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	n-Butylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	n-Propylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	p-Isopropyltoluene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	sec-Butylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Styrene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	tert-Butylbenzene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Tetrachloroethene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB11			LBA-SB12			LBA-SB12	
			Sample Number:	LBA0033			LBA0034			LBA0035	
			Sample Date:	19-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 3.9 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Volatiles	Toluene	N	mg/kg	0.00324	J	J	0.0115	U	U	0.00953	U
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichloroethene	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichlorofluoromethane	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trichlorotrifluoroethane	N	mg/kg								
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Vinyl acetate	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	Q1,U
Volatiles	Vinyl chloride	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Xylene, o-	N	mg/kg	0.0102	U	U	0.0115	U	U	0.00953	U
Volatiles	Xylenes, m,p-	N	mg/kg	0.0204	U	U	0.023	U	U	0.0191	U
Volatiles	Xylenes, total	N	mg/kg								
Semivolatiles	Acenaphthene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Acenaphthylene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	ACETOPHENONE	N	mg/kg								
Semivolatiles	Anthracene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Atrazine	N	mg/kg								
Semivolatiles	Benzaldehyde	N	mg/kg								
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzoic acid	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Benzyl alcohol	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	BIBENZENE	N	mg/kg								
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Caprolactam	N	mg/kg								
Semivolatiles	Carbazole	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Chrysene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dibenzofuran	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Diethyl phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	0.868	Q2,U	UJ	0.845	Q2,U	UJ	0.768	Q2,U
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	5.82			0.423	U	U	0.23	J
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	2.49			0.423	U	U	0.384	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Fluoranthene	N	mg/kg	0.434	U	U	0.0499	J	J	0.384	U
Semivolatiles	Fluorene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Hexachloroethane	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Isophorone	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

			Location Code:	LBA-SB11			LBA-SB12			LBA-SB12	
			Sample Number:	LBA0033			LBA0034			LBA0035	
			Sample Date:	19-Jan-09			19-Jan-09			19-Jan-09	
			Sample Depth:	8 - 10 Ft			0 - 1 Ft			3 - 3.9 Ft	
			Sample Purpose:	REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Semivolatiles	Methylphenol, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Naphthalene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitrobenzene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Pentachlorophenol	N	mg/kg	0.868	U	U	0.845	U	U	0.768	U
Semivolatiles	Phenanthrene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Phenol	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Pyrene	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	0.434	U	U	0.423	U	U	0.384	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg				0.0423	U	U	0.0384	U
Pesticides/PCBs	Aroclor 1221	N	mg/kg				0.19			0.0384	U
Pesticides/PCBs	Aroclor 1232	N	mg/kg				0.0423	U	U	0.0384	U
Pesticides/PCBs	Aroclor 1242	N	mg/kg				0.0423	U	U	0.0384	U
Pesticides/PCBs	Aroclor 1248	N	mg/kg				0.0423	U	U	0.0384	U
Pesticides/PCBs	Aroclor 1254	N	mg/kg				0.0423	U	U	0.0384	U
Pesticides/PCBs	Aroclor 1260	N	mg/kg				0.0423	U	U	0.0384	U
Metals - Unfiltered	Aluminum	N	mg/kg	10400			5950			7140	
Metals - Unfiltered	Antimony	N	mg/kg	0.505			0.25	J	J	0.454	U
Metals - Unfiltered	Arsenic	N	mg/kg	5.19		J	8.68		J	6.83	
Metals - Unfiltered	Barium	N	mg/kg	62.4		J	93.8		J	74.4	
Metals - Unfiltered	Beryllium	N	mg/kg	6.78		J	6.74		J	7.02	
Metals - Unfiltered	Cadmium	N	mg/kg	0.313	J	J	0.503			0.454	U
Metals - Unfiltered	Calcium	N	mg/kg	37600		J	3650		J	1320	
Metals - Unfiltered	Chromium	N	mg/kg	15.3		J	11.7		J	14.7	
Metals - Unfiltered	Cobalt	N	mg/kg	12.7		J	21.3		J	17.2	
Metals - Unfiltered	Copper	N	mg/kg	31.6			12			12.8	
Metals - Unfiltered	Iron	N	mg/kg	22000			19800			21800	
Metals - Unfiltered	Lead	N	mg/kg	15.4		J	12.9		J	9.64	
Metals - Unfiltered	Magnesium	N	mg/kg	15600		J	1360		J	1240	
Metals - Unfiltered	Manganese	N	mg/kg	796			1160			493	
Metals - Unfiltered	Mercury	N	mg/kg	0.0264	U	U	0.0309			0.0287	
Metals - Unfiltered	Nickel	N	mg/kg	33.2		J	22.6		J	23.6	
Metals - Unfiltered	Potassium	N	mg/kg	1210			433			264	
Metals - Unfiltered	Selenium	N	mg/kg	0.999	U	UJ	0.984	U	UJ	0.908	U
Metals - Unfiltered	Silver	N	mg/kg	0.499	U	UJ	0.492	U	UJ	0.454	U
Metals - Unfiltered	Sodium	N	mg/kg	87.7			26.9			27.8	
Metals - Unfiltered	Thallium	N	mg/kg	0.336	J	J	0.492	U	U	0.454	U
Metals - Unfiltered	Vanadium	N	mg/kg	23.7			23.5			22.5	
Metals - Unfiltered	Zinc	N	mg/kg	74			64.5		J	80.1	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Location Code:			LBA-SB12		
		Sample Number:			LBA0036		
		Sample Date:			19-Jan-09		
		Sample Depth:			8 - 10 Ft		
		Sample Purpose:			REG		
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	U	0.294	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	U	0.294	U	U
Explosives	Dinitrobenzene, 1,3-	N	mg/kg	U	0.294	U	U
Explosives	Dinitrotoluene, 2,4-	N	mg/kg		0.294	U	U
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	U	0.294	U	U
Explosives	HMX	N	mg/kg	U	0.294	U	U
Explosives	Nitrobenzene	N	mg/kg	U	0.294	U	U
Explosives	Nitrotoluene, 2-	N	mg/kg	U	0.294	U	U
Explosives	Nitrotoluene, 3-	N	mg/kg	U	0.294	U	U
Explosives	Nitrotoluene, 4-	N	mg/kg	U	0.294	U	U
Explosives	RDX	N	mg/kg	U	0.294	U	U
Explosives	Tetryl	N	mg/kg	U	0.294	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	mg/kg	U	0.294	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	mg/kg	U	0.294	U	U
Volatiles	Acetone	N	mg/kg	J	0.0525	J	J
Volatiles	Acrolein	N	mg/kg	R	0.0474	U	R
Volatiles	Acrylonitrile	N	mg/kg	U	0.00947	U	UJ
Volatiles	Benzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Bromobenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Bromochloromethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Bromodichloromethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Bromoform	N	mg/kg	U	0.00947	U	UJ
Volatiles	Bromomethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Butanone, 2-	N	mg/kg	R	0.00791	J	J
Volatiles	Carbon disulfide	N	mg/kg	U	0.00947	U	UJ
Volatiles	Carbon tetrachloride	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chlorobenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chloroethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chloroform	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chloromethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chlorotoluene, 2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Chlorotoluene, 4-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Cyclohexane	N	mg/kg				
Volatiles	Dibromo-3-chloropropane, 1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dibromochloromethane	N	mg/kg	U	0.000947	U	UJ
Volatiles	Dibromoethane, 1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dibromomethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichlorodifluoromethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloroethane, 1,1-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloroethane, 1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloroethene, 1,1-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloroethene, trans-1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropane, 1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropane, 1,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropane, 2,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropene, 1,1-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropene, cis-1,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Ethylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Hexachlorobutadiene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Hexanone, 2-	N	mg/kg	U	0.00474	U	UJ
Volatiles	Isopropylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	METHYL ACETATE	N	mg/kg				
Volatiles	Methyl Tertiary Butyl Ether	N	mg/kg	U	0.00947	U	UJ
Volatiles	Methyl-2-pentanone, 4-	N	mg/kg	U	0.0474	U	UJ
Volatiles	Methylcyclohexane	N	mg/kg				
Volatiles	Methylene chloride	N	mg/kg	U	0.00947	U	UJ
Volatiles	Naphthalene	N	mg/kg	U	0.00947	U	UJ
Volatiles	n-Butylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	n-Propylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	p-Isopropyltoluene	N	mg/kg	U	0.00947	U	UJ
Volatiles	sec-Butylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Styrene	N	mg/kg	U	0.00947	U	UJ
Volatiles	tert-Butylbenzene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Tetrachloroethane, 1,1,1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Tetrachloroethene	N	mg/kg	U	0.00947	U	UJ

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Location Code:			LBA-SB12		
		Sample Number:			LBA0036		
		Sample Date:			19-Jan-09		
		Sample Depth:			8 - 10 Ft		
		Sample Purpose:			REG		
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual
Volatiles	Toluene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichlorobenzene, 1,2,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichloroethane, 1,1,2-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichloroethene	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichlorofluoromethane	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichloropropane, 1,2,3-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trichlorotrifluoroethane	N	mg/kg				
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Trimethylbenzene, 1,3,5-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Vinyl acetate	N	mg/kg	UJ	0.00947	U	UJ
Volatiles	Vinyl chloride	N	mg/kg	U	0.00947	U	UJ
Volatiles	Xylene, o-	N	mg/kg	U	0.00947	U	UJ
Volatiles	Xylenes, m,p-	N	mg/kg	U	0.0189	U	UJ
Volatiles	Xylenes, total	N	mg/kg				
Semivolatiles	Acenaphthene	N	mg/kg	U	0.399	U	U
Semivolatiles	Acenaphthylene	N	mg/kg	U	0.399	U	U
Semivolatiles	ACETOPHENONE	N	mg/kg				
Semivolatiles	Anthracene	N	mg/kg	U	0.399	U	U
Semivolatiles	Atrazine	N	mg/kg				
Semivolatiles	Benzaldehyde	N	mg/kg				
Semivolatiles	Benzo(a)anthracene	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzo(a)pyrene	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzo(k)fluoranthene	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzoic acid	N	mg/kg	U	0.399	U	U
Semivolatiles	Benzyl alcohol	N	mg/kg	U	0.399	U	U
Semivolatiles	BIBENZENE	N	mg/kg				
Semivolatiles	Bis(2-chloroethoxy)methane	N	mg/kg	U	0.399	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	mg/kg	U	0.399	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	mg/kg	U	0.399	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Butyl benzyl phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	Caprolactam	N	mg/kg				
Semivolatiles	Carbazole	N	mg/kg	U	0.399	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Chloroaniline, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Chloronaphthalene, 2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Chlorophenol, 2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Chrysene	N	mg/kg	U	0.399	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	mg/kg	U	0.399	U	U
Semivolatiles	Dibenzofuran	N	mg/kg	U	0.399	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	mg/kg	U	0.399	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	mg/kg	U	0.399	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Diethyl phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	Dimethyl phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	mg/kg	U	0.399	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	mg/kg	UJ	0.797	Q2,U	UJ
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	J	0.399	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	U	0.399	U	U
Semivolatiles	Di-n-octyl phthalate	N	mg/kg	U	0.399	U	U
Semivolatiles	DIPHENYLAMINE	N	mg/kg	U	0.399	U	U
Semivolatiles	Fluoranthene	N	mg/kg	U	0.399	U	U
Semivolatiles	Fluorene	N	mg/kg	U	0.399	U	U
Semivolatiles	Hexachlorobenzene	N	mg/kg	U	0.399	U	U
Semivolatiles	Hexachlorobutadiene	N	mg/kg	U	0.399	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	mg/kg	U	0.399	U	U
Semivolatiles	Hexachloroethane	N	mg/kg	U	0.399	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	U	0.399	U	U
Semivolatiles	Isophorone	N	mg/kg	U	0.399	U	U
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Methylphenol, 2-	N	mg/kg	U	0.399	U	U

Appendix I

Chemical Analytical Data Summary
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Location Code:			LBA-SB12		
		Sample Number:			LBA0036		
		Sample Date:			19-Jan-09		
		Sample Depth:			8 - 10 Ft		
		Sample Purpose:			REG		
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Naphthalene	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitroaniline, 2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitroaniline, 3-	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitroaniline, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitrobenzene	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitrophenol, 2-	N	mg/kg	U	0.399	U	U
Semivolatiles	Nitrophenol, 4-	N	mg/kg	U	0.399	U	U
Semivolatiles	n-Nitrosodimethylamine	N	mg/kg	U	0.399	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	mg/kg	U	0.399	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	mg/kg	U	0.399	U	U
Semivolatiles	Pentachlorophenol	N	mg/kg	U	0.797	U	U
Semivolatiles	Phenanthrene	N	mg/kg	U	0.399	U	U
Semivolatiles	Phenol	N	mg/kg	U	0.399	U	U
Semivolatiles	Pyrene	N	mg/kg	U	0.399	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	mg/kg	U	0.399	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	mg/kg	U	0.399	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	mg/kg	U	0.399	U	U
Pesticides/PCBs	Aroclor 1016	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1221	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1232	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1242	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1248	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1254	N	mg/kg	U			
Pesticides/PCBs	Aroclor 1260	N	mg/kg	U			
Metals - Unfiltered	Aluminum	N	mg/kg		11800		
Metals - Unfiltered	Antimony	N	mg/kg	U	0.306	J	J
Metals - Unfiltered	Arsenic	N	mg/kg	J	6.6		J
Metals - Unfiltered	Barium	N	mg/kg	J	58.6		J
Metals - Unfiltered	Beryllium	N	mg/kg	J	7.35		J
Metals - Unfiltered	Cadmium	N	mg/kg	U	0.479	U	U
Metals - Unfiltered	Calcium	N	mg/kg	J	32200		J
Metals - Unfiltered	Chromium	N	mg/kg	J	17.6		J
Metals - Unfiltered	Cobalt	N	mg/kg	J	8.82		J
Metals - Unfiltered	Copper	N	mg/kg		28.4		
Metals - Unfiltered	Iron	N	mg/kg		23800		
Metals - Unfiltered	Lead	N	mg/kg	J	12.3		J
Metals - Unfiltered	Magnesium	N	mg/kg	J	10900		J
Metals - Unfiltered	Manganese	N	mg/kg		556		
Metals - Unfiltered	Mercury	N	mg/kg		0.0135	J	J
Metals - Unfiltered	Nickel	N	mg/kg	J	29.1		J
Metals - Unfiltered	Potassium	N	mg/kg		1320		
Metals - Unfiltered	Selenium	N	mg/kg	UJ	0.958	U	UJ
Metals - Unfiltered	Silver	N	mg/kg	UJ	0.479	U	UJ
Metals - Unfiltered	Sodium	N	mg/kg		91.4		
Metals - Unfiltered	Thallium	N	mg/kg	U	0.39	J	J
Metals - Unfiltered	Vanadium	N	mg/kg		24.3		
Metals - Unfiltered	Zinc	N	mg/kg	J	72.4		J
Water Quality Parameters	% Solids	N	Percent				
Water Quality Parameters	Total organic carbon	N	mg/kg				

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW01			LBA-SW02		
SAMPLE_NO				LBA2000			LBA2001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	9.05			5.35		
Field Tests	Oxidation Reduction Potential	N	mV	83.1			156.3		
Field Tests	pH	N	pH_units	7.24			6.98		
Field Tests	Specific Conductivity	N	mS/cm	1.083			1.157		
Field Tests	Temperature	N	C	14.09			12.65		
Field Tests	Turbidity	N	NTU	5.1			3.3		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	HMX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	RDX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	25	U	R	25	U	R
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	UJ	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.25	J	J	0.39	J	J
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U	U	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW01			LBA-SW02		
SAMPLE_NO				LBA2000			LBA2001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U	0.47	J	J
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylenes, total	N	ug/L	3	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Acenaphthene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Acenaphthylene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Benzoic acid	N	ug/L	25	U	U	24	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Caprolactam	N	ug/L						
Semivolatiles	Carbazole	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Chrysene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dibenzofuran	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	10	U	U	9.6	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	10	U	U	9.6	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	25	U	U	24	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Fluoranthene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Fluorene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Hexachloroethane	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Isophorone	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	5	U	U	4.8	U	U

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW01			LBA-SW02		
SAMPLE_NO				LBA2000			LBA2001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 2-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	10	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	10	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	10	U	U	9.6	U	U
Semivolatiles	Nitrobenzene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	25	U	U	24	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	25	U	U	24	U	U
Semivolatiles	Phenanthrene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Phenol	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Pyrene	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	5	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	5	U	U	4.8	U	U
Pesticides/PCBs	Aroclor 1016	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1221	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1232	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1242	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1248	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1254	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1260	N	ug/L	0.48	U	U	0.48	U	U
Metals - Unfiltered	Aluminum	N	ug/L	1790			1660		
Metals - Unfiltered	Antimony	N	ug/L	6	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	49.8	B	J	101	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	141000			140000		
Metals - Unfiltered	Chromium	N	ug/L	2.6	B	J	2.8	B	J
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U	4.2	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	2570			4020		
Metals - Unfiltered	Lead	N	ug/L	2.6	B	J	3.2	B	J
Metals - Unfiltered	Magnesium	N	ug/L	27300			27400		
Metals - Unfiltered	Manganese	N	ug/L	554			1760		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	4.8	B	J	8.9	B	J
Metals - Unfiltered	Potassium	N	ug/L	2260	B	J	6540	B	J
Metals - Unfiltered	Selenium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	27600			32400		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	5	B	J	4.5	B	J
Metals - Unfiltered	Zinc	N	ug/L	19.7	B	J	32		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	464					

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW03		
SAMPLE_NO				LBA2002			LBA2003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	7.49					
Field Tests	Oxidation Reduction Potential	N	mV	29.4					
Field Tests	pH	N	pH_units	6.99					
Field Tests	Specific Conductivity	N	mS/cm	1.167					
Field Tests	Temperature	N	C	17.13					
Field Tests	Turbidity	N	NTU	12.7					
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	HMX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	RDX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	25	U	R	25	U	R
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.26	J	J	0.45	J	J
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.22	J	J	0.24	J	J
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U	U	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW03		
SAMPLE_NO				LBA2002			LBA2003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	0.59	J	J	0.53	J	J
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylenes, total	N	ug/L	3	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzoic acid	N	ug/L	24	U	U	24	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Caprolactam	N	ug/L						
Semivolatiles	Carbazole	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chrysene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U	U	24	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Fluorene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Isophorone	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U	U	4.8	U	U

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW03		
SAMPLE_NO				LBA2002			LBA2003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U	U	24	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	24	U	U	24	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Phenol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U	U	4.8	U	U
Pesticides/PCBs	Aroclor 1016	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1221	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1232	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1242	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1248	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1254	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1260	N	ug/L	0.48	U	U	0.48	U	U
Metals - Unfiltered	Aluminum	N	ug/L	1990			1540		
Metals - Unfiltered	Antimony	N	ug/L	6	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	64.5	B	J	58.2	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	152000			149000		
Metals - Unfiltered	Chromium	N	ug/L	3.2	B	J	2.9	B	J
Metals - Unfiltered	Cobalt	N	ug/L	2.4	B	J	2.3	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	4650			3570		
Metals - Unfiltered	Lead	N	ug/L	5	B	J	3.9	B	J
Metals - Unfiltered	Magnesium	N	ug/L	29600			29000		
Metals - Unfiltered	Manganese	N	ug/L	1870			1560		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	7.9	B	J	6.4	B	J
Metals - Unfiltered	Potassium	N	ug/L	2070	B	J	1900	B	J
Metals - Unfiltered	Selenium	N	ug/L	3.4	B	J	3.8	B	J
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	34700			34300		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	5	B	J	4.3	B	J
Metals - Unfiltered	Zinc	N	ug/L	35			30.2		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW04		
SAMPLE_NO				LBA2004			LBA2005		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm				8.02		
Field Tests	Oxidation Reduction Potential	N	mV				24.1		
Field Tests	pH	N	pH_units				7.06		
Field Tests	Specific Conductivity	N	mS/cm				1.12		
Field Tests	Temperature	N	C				17.59		
Field Tests	Turbidity	N	NTU				36		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	HMX	N	ug/L	0.5	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	RDX	N	ug/L	0.5	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.2	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.2	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	10	U	U	25	U	R
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	1	U	R	2	U	U
Volatiles	Butanone, 2-	N	ug/L	10	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	1	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	1	U	UJ	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	1	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L	1	U	U			
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L	2	U	R			
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L	1	U	U			
Volatiles	Dichlorobenzene, 1,2-	N	ug/L	1	U	U			
Volatiles	Dichlorobenzene, 1,3-	N	ug/L	1	U	U			
Volatiles	Dichlorobenzene, 1,4-	N	ug/L	1	U	U			
Volatiles	Dichlorodifluoromethane	N	ug/L	1	U	U			
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L	1	U	U			
Volatiles	METHYL ACETATE	N	ug/L	10	U	U			
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L	5	U	U			
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	10	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L	1	U	U			
Volatiles	Methylene chloride	N	ug/L	1	U	U	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L	1	U	U			

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW04		
SAMPLE_NO				LBA2004			LBA2005		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L	1	U	U			
Volatiles	Trichlorotrifluoroethane	N	ug/L	1	U	U			
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylenes, total	N	ug/L	2	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L				4.8	U	U
Semivolatiles	Acenaphthene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Acenaphthylene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	ACETOPHENONE	N	ug/L	10	U	U			
Semivolatiles	Anthracene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Atrazine	N	ug/L	10	U	U			
Semivolatiles	Benzaldehyde	N	ug/L	10	U	U			
Semivolatiles	Benzo(a)anthracene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Benzoic acid	N	ug/L				24	U	U
Semivolatiles	Benzyl alcohol	N	ug/L				4.8	U	U
Semivolatiles	BIBENZENE	N	ug/L	10	U	U			
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Caprolactam	N	ug/L	10	U	U			
Semivolatiles	Carbazole	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Chrysene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dibenzofuran	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L				4.8	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L				4.8	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L				4.8	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	50	U	U	9.6	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	50	U	U	9.6	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	50	U	U	24	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Fluoranthene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Fluorene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Hexachloroethane	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Isophorone	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	10	U	U	4.8	U	U

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW04		
SAMPLE_NO				LBA2004			LBA2005		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 2-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L	10	U	U			
Semivolatiles	Naphthalene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	50	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	50	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	50	U	U	9.6	U	U
Semivolatiles	Nitrobenzene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	50	U	U	24	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	10	U	U	24	U	U
Semivolatiles	Phenanthrene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Phenol	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Pyrene	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L				4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	10	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	10	U	U	4.8	U	U
Pesticides/PCBs	Aroclor 1016	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1221	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1232	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1242	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1248	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1254	N	ug/L	1	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1260	N	ug/L	1	U	U	0.48	U	U
Metals - Unfiltered	Aluminum	N	ug/L	1720			2460		
Metals - Unfiltered	Antimony	N	ug/L	60	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Barium	N	ug/L	200	U	U	62.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	5	U	U	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	132000			144000		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U	4.1	B	J
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U	2.5	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U	U	25	U	U
Metals - Unfiltered	Iron	N	ug/L	2850			4920		
Metals - Unfiltered	Lead	N	ug/L	3	U	U	4.3	B	J
Metals - Unfiltered	Magnesium	N	ug/L	26000			27900		
Metals - Unfiltered	Manganese	N	ug/L	1170			1050		
Metals - Unfiltered	Mercury	N	ug/L	0.2	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U	8.6	B	J
Metals - Unfiltered	Potassium	N	ug/L	5000	U	U	2180	B	J
Metals - Unfiltered	Selenium	N	ug/L	5	U	U	10	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	35000			25200		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U	5.7	B	J
Metals - Unfiltered	Zinc	N	ug/L	21.2			31.1		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW05			LBA-SW06		
SAMPLE_NO				LBA2006			LBA2007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.8			6.19		
Field Tests	Oxidation Reduction Potential	N	mV	158			103.2		
Field Tests	pH	N	pH_units	6.71			6.81		
Field Tests	Specific Conductivity	N	mS/cm	1.098			0.868		
Field Tests	Temperature	N	C	13.52			14.02		
Field Tests	Turbidity	N	NTU	0.8			294.7		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	HMX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	RDX	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U	0.19	U	U
Volatiles	Acetone	N	ug/L	25	U	UJ	25	U	UJ
Volatiles	Benzene	N	ug/L	1	U	U	1	U	U
Volatiles	Bromodichloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	U	1	U	U
Volatiles	Bromomethane	N	ug/L	2	U	U	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U	5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U	2	U	U
Volatiles	Cyclohexane	N	ug/L						
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L						
Volatiles	Dibromochloromethane	N	ug/L	1	U	U	1	U	U
Volatiles	Dibromoethane, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,2-	N	ug/L						
Volatiles	Dichlorobenzene, 1,3-	N	ug/L						
Volatiles	Dichlorobenzene, 1,4-	N	ug/L						
Volatiles	Dichlorodifluoromethane	N	ug/L						
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.39	J	J	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	U	1	U	U
Volatiles	Ethylbenzene	N	ug/L	1	U	U	1	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U	10	U	U
Volatiles	Isopropylbenzene	N	ug/L						
Volatiles	METHYL ACETATE	N	ug/L						
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L						
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U	5	U	U
Volatiles	Methylcyclohexane	N	ug/L						
Volatiles	Methylene chloride	N	ug/L	5	U	U	5	U	U
Volatiles	Styrene	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW05			LBA-SW06		
SAMPLE_NO				LBA2006			LBA2007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L						
Volatiles	Trichlorotrifluoroethane	N	ug/L						
Volatiles	Vinyl chloride	N	ug/L	1	U	U	1	U	U
Volatiles	Xylenes, total	N	ug/L	3	U	U	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	ACETOPHENONE	N	ug/L						
Semivolatiles	Anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Atrazine	N	ug/L						
Semivolatiles	Benzaldehyde	N	ug/L						
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Benzoic acid	N	ug/L	24	U	U	24	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	BIBENZENE	N	ug/L						
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Caprolactam	N	ug/L						
Semivolatiles	Carbazole	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Chrysene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U	U	24	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Fluoranthene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Fluorene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Isophorone	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U	U	4.8	U	U

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW05			LBA-SW06		
SAMPLE_NO				LBA2006			LBA2007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L						
Semivolatiles	Naphthalene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U	U	9.6	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U	U	24	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	24	U	U	24	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Phenol	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Pyrene	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U	U	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U	U	4.8	U	U
Pesticides/PCBs	Aroclor 1016	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1221	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1232	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1242	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1248	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1254	N	ug/L	0.48	U	U	0.48	U	U
Pesticides/PCBs	Aroclor 1260	N	ug/L	0.48	U	U	0.48	U	U
Metals - Unfiltered	Aluminum	N	ug/L	2520			23800		
Metals - Unfiltered	Antimony	N	ug/L	6	U	U	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U	8.8	B	J
Metals - Unfiltered	Barium	N	ug/L	62.2	B	J	155	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U	1.1	B	J
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	146000			114000		
Metals - Unfiltered	Chromium	N	ug/L	4.6	B	J	39.8		
Metals - Unfiltered	Cobalt	N	ug/L	3	B	J	16.3	B	J
Metals - Unfiltered	Copper	N	ug/L	25	U	U	38.5		
Metals - Unfiltered	Iron	N	ug/L	5890			43900		
Metals - Unfiltered	Lead	N	ug/L	5.5	B	J	18		
Metals - Unfiltered	Magnesium	N	ug/L	28600			28100		
Metals - Unfiltered	Manganese	N	ug/L	2220			662		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	8.7	B	J	71.6		
Metals - Unfiltered	Potassium	N	ug/L	2050	B	J	4920	B	J
Metals - Unfiltered	Selenium	N	ug/L	3.5	B	J	4.4	B	J
Metals - Unfiltered	Silver	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	27000			18200		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	6.9	B	J	46.1	B	J
Metals - Unfiltered	Zinc	N	ug/L	33.4			177		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW07		
SAMPLE_NO				LBA2008		
SAMPLE_DATE				22-May-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	4.16		
Field Tests	Oxidation Reduction Potential	N	mV	-34.2		
Field Tests	pH	N	pH_units	6.79		
Field Tests	Specific Conductivity	N	mS/cm	0.949		
Field Tests	Temperature	N	C	11.52		
Field Tests	Turbidity	N	NTU	0		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.19	U	U
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.19	U	U
Explosives	Dinitrobenzene, 1,3-	N	ug/L	0.19	U	U
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.19	U	U
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.19	U	U
Explosives	HMX	N	ug/L	0.19	U	U
Explosives	Nitrobenzene	N	ug/L	0.19	U	U
Explosives	Nitrotoluene, 2-	N	ug/L	0.19	U	U
Explosives	Nitrotoluene, 3-	N	ug/L	0.19	U	U
Explosives	Nitrotoluene, 4-	N	ug/L	0.19	U	U
Explosives	RDX	N	ug/L	0.19	U	U
Explosives	Tetryl	N	ug/L	0.19	U	U
Explosives	Trinitrobenzene, 1,3,5-	N	ug/L	0.19	U	U
Explosives	Trinitrotoluene, 2,4,6-	N	ug/L	0.19	U	U
Volatiles	Acetone	N	ug/L	25	U	UJ
Volatiles	Benzene	N	ug/L	1	U	U
Volatiles	Bromodichloromethane	N	ug/L	1	U	U
Volatiles	Bromoform	N	ug/L	1	U	UJ
Volatiles	Bromomethane	N	ug/L	2	U	U
Volatiles	Butanone, 2-	N	ug/L	5	U	U
Volatiles	Carbon disulfide	N	ug/L	2	U	U
Volatiles	Carbon tetrachloride	N	ug/L	1	U	U
Volatiles	Chlorobenzene	N	ug/L	1	U	U
Volatiles	Chloroethane	N	ug/L	2	U	U
Volatiles	Chloroform	N	ug/L	1	U	U
Volatiles	Chloromethane	N	ug/L	2	U	U
Volatiles	Cyclohexane	N	ug/L			
Volatiles	Dibromo-3-chloropropane, 1,2-	N	ug/L			
Volatiles	Dibromochloromethane	N	ug/L	1	U	UJ
Volatiles	Dibromoethane, 1,2-	N	ug/L			
Volatiles	Dichlorobenzene, 1,2-	N	ug/L			
Volatiles	Dichlorobenzene, 1,3-	N	ug/L			
Volatiles	Dichlorobenzene, 1,4-	N	ug/L			
Volatiles	Dichlorodifluoromethane	N	ug/L			
Volatiles	Dichloroethane, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, 1,1-	N	ug/L	1	U	U
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	1	U	U
Volatiles	Dichloroethene, trans-1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropane, 1,2-	N	ug/L	1	U	U
Volatiles	Dichloropropene, cis-1,3-	N	ug/L	1	U	UJ
Volatiles	Dichloropropene, trans-1,3-	N	ug/L	1	U	UJ
Volatiles	Ethylbenzene	N	ug/L	1	U	U
Volatiles	Hexanone, 2-	N	ug/L	10	U	U
Volatiles	Isopropylbenzene	N	ug/L			
Volatiles	METHYL ACETATE	N	ug/L			
Volatiles	Methyl Tertiary Butyl Ether	N	ug/L			
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	5	U	U
Volatiles	Methylcyclohexane	N	ug/L			
Volatiles	Methylene chloride	N	ug/L	5	U	U
Volatiles	Styrene	N	ug/L	1	U	UJ
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1	U	U
Volatiles	Tetrachloroethene	N	ug/L	1	U	U
Volatiles	Toluene	N	ug/L	1	U	U
Volatiles	Trichlorobenzene, 1,2,4-	N	ug/L			

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW07		
SAMPLE_NO				LBA2008		
SAMPLE_DATE				22-May-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1	U	U
Volatiles	Trichloroethane, 1,1,2-	N	ug/L	1	U	U
Volatiles	Trichloroethene	N	ug/L	1	U	U
Volatiles	Trichlorofluoromethane	N	ug/L			
Volatiles	Trichlorotrifluoroethane	N	ug/L			
Volatiles	Vinyl chloride	N	ug/L	1	U	U
Volatiles	Xylenes, total	N	ug/L	3	U	U
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	4.8	U	U
Semivolatiles	Acenaphthene	N	ug/L	4.8	U	U
Semivolatiles	Acenaphthylene	N	ug/L	4.8	U	U
Semivolatiles	ACETOPHENONE	N	ug/L			
Semivolatiles	Anthracene	N	ug/L	4.8	U	U
Semivolatiles	Atrazine	N	ug/L			
Semivolatiles	Benzaldehyde	N	ug/L			
Semivolatiles	Benzo(a)anthracene	N	ug/L	4.8	U	U
Semivolatiles	Benzo(a)pyrene	N	ug/L	4.8	U	U
Semivolatiles	Benzo(b)fluoranthene	N	ug/L	4.8	U	U
Semivolatiles	Benzo(ghi)perylene	N	ug/L	4.8	U	U
Semivolatiles	Benzo(k)fluoranthene	N	ug/L	4.8	U	U
Semivolatiles	Benzoic acid	N	ug/L	24	U	U
Semivolatiles	Benzyl alcohol	N	ug/L	4.8	U	U
Semivolatiles	BIBENZENE	N	ug/L			
Semivolatiles	Bis(2-chloroethoxy)methane	N	ug/L	4.8	U	U
Semivolatiles	Bis(2-chloroethyl)ether	N	ug/L	4.8	U	U
Semivolatiles	Bis(2-chloroisopropyl)ether	N	ug/L	4.8	U	U
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	ug/L	4.8	U	U
Semivolatiles	Bromophenyl phenyl ether, 4-	N	ug/L	4.8	U	U
Semivolatiles	Butyl benzyl phthalate	N	ug/L	4.8	U	U
Semivolatiles	Caprolactam	N	ug/L			
Semivolatiles	Carbazole	N	ug/L	4.8	U	U
Semivolatiles	Chloro-3-methylphenol, 4-	N	ug/L	4.8	U	U
Semivolatiles	Chloroaniline, 4-	N	ug/L	4.8	U	U
Semivolatiles	Chloronaphthalene, 2-	N	ug/L	4.8	U	U
Semivolatiles	Chlorophenol, 2-	N	ug/L	4.8	U	U
Semivolatiles	Chlorophenyl phenyl ether, 4-	N	ug/L	4.8	U	U
Semivolatiles	Chrysene	N	ug/L	4.8	U	U
Semivolatiles	Dibenz(a,h)anthracene	N	ug/L	4.8	U	U
Semivolatiles	Dibenzofuran	N	ug/L	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,2-	N	ug/L	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,3-	N	ug/L	4.8	U	U
Semivolatiles	Dichlorobenzene, 1,4-	N	ug/L	4.8	U	U
Semivolatiles	Dichlorobenzidine, 3,3'-	N	ug/L	9.6	U	U
Semivolatiles	Dichlorophenol, 2,4-	N	ug/L	4.8	U	U
Semivolatiles	Diethyl phthalate	N	ug/L	4.8	U	U
Semivolatiles	Dimethyl phthalate	N	ug/L	4.8	U	U
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	4.8	U	U
Semivolatiles	Di-n-butyl phthalate	N	ug/L	4.8	U	U
Semivolatiles	Dinitro-2-methylphenol, 4,6-	N	ug/L	9.6	U	U
Semivolatiles	Dinitrophenol, 2,4-	N	ug/L	24	U	U
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	4.8	U	U
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	4.8	U	U
Semivolatiles	Di-n-octyl phthalate	N	ug/L	4.8	U	U
Semivolatiles	Fluoranthene	N	ug/L	4.8	U	U
Semivolatiles	Fluorene	N	ug/L	4.8	U	U
Semivolatiles	Hexachlorobenzene	N	ug/L	4.8	U	U
Semivolatiles	Hexachlorobutadiene	N	ug/L	4.8	U	U
Semivolatiles	Hexachlorocyclopentadiene	N	ug/L	4.8	U	U
Semivolatiles	Hexachloroethane	N	ug/L	4.8	U	U
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	ug/L	4.8	U	U
Semivolatiles	Isophorone	N	ug/L	4.8	U	U
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	4.8	U	U

Appendix I

Chemical Analytical Data Summary
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW07		
SAMPLE_NO				LBA2008		
SAMPLE_DATE				22-May-09		
FK_DEPTH				0 - 0 Ft		
SAMPLE_PURPOSE				REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Semivolatiles	Methylphenol, 2-	N	ug/L	4.8	U	U
Semivolatiles	Methylphenol, 4-	N	ug/L			
Semivolatiles	Naphthalene	N	ug/L	4.8	U	U
Semivolatiles	Nitroaniline, 2-	N	ug/L	9.6	U	U
Semivolatiles	Nitroaniline, 3-	N	ug/L	9.6	U	U
Semivolatiles	Nitroaniline, 4-	N	ug/L	9.6	U	U
Semivolatiles	Nitrobenzene	N	ug/L	4.8	U	U
Semivolatiles	Nitrophenol, 2-	N	ug/L	4.8	U	U
Semivolatiles	Nitrophenol, 4-	N	ug/L	24	U	U
Semivolatiles	n-Nitroso-di-n-propylamine	N	ug/L	4.8	U	U
Semivolatiles	n-Nitrosodiphenylamine	N	ug/L	4.8	U	U
Semivolatiles	Pentachlorophenol	N	ug/L	24	U	U
Semivolatiles	Phenanthrene	N	ug/L	4.8	U	U
Semivolatiles	Phenol	N	ug/L	4.8	U	U
Semivolatiles	Pyrene	N	ug/L	4.8	U	U
Semivolatiles	Trichlorobenzene, 1,2,4-	N	ug/L	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,5-	N	ug/L	4.8	U	U
Semivolatiles	Trichlorophenol, 2,4,6-	N	ug/L	4.8	U	U
Pesticides/PCBs	Aroclor 1016	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1221	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1232	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1242	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1248	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1254	N	ug/L	0.48	U	U
Pesticides/PCBs	Aroclor 1260	N	ug/L	0.48	U	U
Metals - Unfiltered	Aluminum	N	ug/L	11.3	B	B
Metals - Unfiltered	Antimony	N	ug/L	6	U	U
Metals - Unfiltered	Arsenic	N	ug/L	10	U	U
Metals - Unfiltered	Barium	N	ug/L	41.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4	U	U
Metals - Unfiltered	Cadmium	N	ug/L	5	U	U
Metals - Unfiltered	Calcium	N	ug/L	110000		
Metals - Unfiltered	Chromium	N	ug/L	10	U	U
Metals - Unfiltered	Cobalt	N	ug/L	50	U	U
Metals - Unfiltered	Copper	N	ug/L	25	U	U
Metals - Unfiltered	Iron	N	ug/L	1090		
Metals - Unfiltered	Lead	N	ug/L	10	U	U
Metals - Unfiltered	Magnesium	N	ug/L	17400		
Metals - Unfiltered	Manganese	N	ug/L	381		
Metals - Unfiltered	Mercury	N	ug/L	1	U	U
Metals - Unfiltered	Nickel	N	ug/L	40	U	U
Metals - Unfiltered	Potassium	N	ug/L	1280	B	J
Metals - Unfiltered	Selenium	N	ug/L	10	U	U
Metals - Unfiltered	Silver	N	ug/L	10	U	U
Metals - Unfiltered	Sodium	N	ug/L	31700		
Metals - Unfiltered	Thallium	N	ug/L	10	U	U
Metals - Unfiltered	Vanadium	N	ug/L	50	U	U
Metals - Unfiltered	Zinc	N	ug/L	20	U	U
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm			

Notes:
(1) Nondetects reported in Appendix I (laboratory 'u' qualified data) are reported to the laboratory reporting limit.
(2) Estimated values below the laboratory reporting limit but above the MDL are shown as laboratory 'J' qualified detects.

APPENDIX J

DETECTED HITS SUMMARY EXCLUDING "B" QUALIFIERS

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Bedrock Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001			LBA-BEDGW-002		
SAMPLE_NO				BEDGW-001-1109			LB3073		
SAMPLE_DATE				6-Nov-09			12-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	3.85			8.12		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-19			-187.6		
Field Tests	pH	N	pH_units	6.89			6.55		
Field Tests	Specific Conductivity	N	mS/cm	9.365			6.19		
Field Tests	Temperature	N	C	9.53			15.25		
Field Tests	Turbidity	N	NTU	13.6			20.8		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	3.7			1680		J
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	56.3	J	J
Volatiles	Carbon disulfide	N	ug/L	3.8		-	-		-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	26.8		
Volatiles	Chloromethane	N	ug/L	-	-	-	35.6	J	J
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	9.9			169		
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	3.3	J	J -	-		-
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	1.2		-	-		-
Volatiles	Toluene	N	ug/L	10			692		
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Xylenes, total	N	ug/L	136			1130		
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-	5.2		
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	12.3		
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	256		J	20.9		
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	5.6		
Semivolatiles	Naphthalene	N	ug/L	64.9	J	J	25.6		
Semivolatiles	Phenanthrene	N	ug/L	37.3	J	J -	-		-
Semivolatiles	Phenol	N	ug/L	-	-	-	8		
Metals - Unfiltered	Aluminum	N	ug/L	79.6	B	J	73.8	B	B
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	131		
Metals - Unfiltered	Barium	N	ug/L	305			762		
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	280000			462000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	180	B	J	2940		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	212000			352000		
Metals - Unfiltered	Manganese	N	ug/L	85.8			1070		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	7.2	B	J
Metals - Unfiltered	Potassium	N	ug/L	120000			87700		
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	11.7		J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Bedrock Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				IT-MNTA-BEDGW-001			LBA-BEDGW-002		
SAMPLE_NO				BEDGW-001-1109			LB3073		
SAMPLE_DATE				6-Nov-09			12-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Sodium	N	ug/L	1130000			1140000		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	6.4	B	J
Metals - Unfiltered	Vanadium	N	ug/L	1.6	B	J	1.4	B	J
Metals - Unfiltered	Zinc	N	ug/L	11.5	B	B	-	-	-
Metals - Filtered	Aluminum	Y	ug/L	52.6	B	J	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	125		
Metals - Filtered	Barium	Y	ug/L	304			764		
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	275000			471000		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	2.3	B	J	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	211000			365000		
Metals - Filtered	Manganese	Y	ug/L	70.2			1000		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	5.7	B	J
Metals - Filtered	Potassium	Y	ug/L	120000			90200		
Metals - Filtered	Selenium	Y	ug/L	4.2	B	J	9.3	B	J
Metals - Filtered	Sodium	Y	ug/L	1160000			1170000		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	0.93	B	J	1.1	B	J
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-	-	-
Water Quality Parameters	Alkalinity	N	ppm	718			369		
Water Quality Parameters	Chloride	N	ppm	2550			3260		
Water Quality Parameters	Cyanide, total	N	ppm	-	-	-	0.014		J
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	1570			2600		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.09	B	J	-	-	-
Water Quality Parameters	Sulfate	N	ppm	-	-	-	14.8		
Water Quality Parameters	Total dissolved solids	N	ppm	4680			7970		
Water Quality Parameters	Total suspended solids	N	ppm	193			60		
Water Quality Parameters	Turbidity	N	NTU	71.5			168		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Bedrock Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				RC3078			RC3084		
SAMPLE_DATE				11-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	4.91			10.44		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-283.9			2.3		
Field Tests	pH	N	pH_units	6.21			6.58		
Field Tests	Specific Conductivity	N	mS/cm	7.074			8.035		
Field Tests	Temperature	N	C	12.21			9.94		
Field Tests	Turbidity	N	NTU	6.9			2.7		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	50.7		J	-	-	-
Volatiles	Benzene	N	ug/L	31.9			114		
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	13.2		
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	12.8		-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	17			43.4		
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	3.7		-	-	-	-
Volatiles	Toluene	N	ug/L	28.9			93.6		
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Xylenes, total	N	ug/L	97.2			234		
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	1.5	J	J	1.6	J	J
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	6.3			8.1		
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	4.5	J	J	7.2		
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	155	B	J	138	B	J
Metals - Unfiltered	Arsenic	N	ug/L	19.9			28		
Metals - Unfiltered	Barium	N	ug/L	485			562		
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	343000			360000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	-	-	-	385		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	241000			275000		
Metals - Unfiltered	Manganese	N	ug/L	227			158		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Potassium	N	ug/L	57600			72000		
Metals - Unfiltered	Selenium	N	ug/L	6.8	B	B	8.5	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Bedrock Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-BEDGW-002			RCA-BEDGW-002		
SAMPLE_NO				RC3078			RC3084		
SAMPLE_DATE				11-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Sodium	N	ug/L	638000			770000		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	1.6	B	J	-	-	-
Metals - Unfiltered	Zinc	N	ug/L	14.8	B	B	9.2	B	B
Metals - Filtered	Aluminum	Y	ug/L	35.6	B	J	71.7	B	J
Metals - Filtered	Arsenic	Y	ug/L	13.1			42.7		
Metals - Filtered	Barium	Y	ug/L	494			576		
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	309000			371000		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	3.3	B	J	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	223000			287000		
Metals - Filtered	Manganese	Y	ug/L	186			177		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Potassium	Y	ug/L	57900			75200		
Metals - Filtered	Selenium	Y	ug/L	7	B	J	7.2	B	J
Metals - Filtered	Sodium	Y	ug/L	634000		J	793000		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	1.9	B	J	1.3	B	J
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-	-	-
Water Quality Parameters	Alkalinity	N	ppm	753			770		
Water Quality Parameters	Chloride	N	ppm	1480			2520		
Water Quality Parameters	Cyanide, total	N	ppm	0.11		J	-	-	-
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	1850			2030		
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-	-	0.2		J
Water Quality Parameters	Sulfate	N	ppm	218			39.4	B	J
Water Quality Parameters	Total dissolved solids	N	ppm	3320			3910		
Water Quality Parameters	Total suspended solids	N	ppm	-	-	-	17		
Water Quality Parameters	Turbidity	N	NTU	47.4			76.4		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	7.67			6.24		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	681.6			-16.5		
Field Tests	pH	N	pH_units	6.44			7.15		
Field Tests	Specific Conductivity	N	mS/cm	1.293			0.797		
Field Tests	Temperature	N	C	11.91			10.06		
Field Tests	Turbidity	N	NTU	0			11.9		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-		-	-		-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-		-	-		-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-		-	-		-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-		-	-		-
Explosives	HMX	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 2-	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 3-	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 4-	N	ug/L	-		-	-		-
Volatiles	Acetone	N	ug/L	-		-	-		-
Volatiles	Benzene	N	ug/L	-		-	-		-
Volatiles	Bromoform	N	ug/L	-		-	-		-
Volatiles	Butanone, 2-	N	ug/L	-		-	-		-
Volatiles	Carbon disulfide	N	ug/L	-		-	-		-
Volatiles	Carbon tetrachloride	N	ug/L	-		-	-		-
Volatiles	Chloroform	N	ug/L	-		-	-		-
Volatiles	Chloromethane	N	ug/L	-		-	-		-
Volatiles	Dibromochloromethane	N	ug/L	-		-	-		-
Volatiles	Dichloroethane, 1,1-	N	ug/L	2.2			2		
Volatiles	Dichloroethene, 1,1-	N	ug/L	-		-	-		-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-		-	-		-
Volatiles	Ethylbenzene	N	ug/L	-		-	-		-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-		-	-		-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-		-	-		-
Volatiles	Toluene	N	ug/L	-		-	-		-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1.3			-		-
Volatiles	Trichloroethene	N	ug/L	-		-	-		-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-		-	-		-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-		-	-		-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-		-	-		-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-		-	-		-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-		-	-		-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-		-	-		-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-		-	-		-
Semivolatiles	Methylphenol, 2-	N	ug/L	-		-	-		-
Semivolatiles	Naphthalene	N	ug/L	-		-	-		-
Semivolatiles	Phenanthrene	N	ug/L	-		-	-		-
Semivolatiles	Phenol	N	ug/L	-		-	-		-
Metals - Unfiltered	Aluminum	N	ug/L	58.9	B	B	176	B	J
Metals - Unfiltered	Arsenic	N	ug/L	-		-	-		-
Metals - Unfiltered	Barium	N	ug/L	73.5	B	J	61.7	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-		-	-		-
Metals - Unfiltered	Cadmium	N	ug/L	-		-	-		-
Metals - Unfiltered	Calcium	N	ug/L	189000			165000		J
Metals - Unfiltered	Chromium	N	ug/L	-		-	-		-
Metals - Unfiltered	Cobalt	N	ug/L	-		-	-		-
Metals - Unfiltered	Copper	N	ug/L	-		-	-		-
Metals - Unfiltered	Iron	N	ug/L	242	B	J	684		
Metals - Unfiltered	Lead	N	ug/L	-		-	-		-
Metals - Unfiltered	Magnesium	N	ug/L	45000			45700		
Metals - Unfiltered	Manganese	N	ug/L	436			458		
Metals - Unfiltered	Mercury	N	ug/L	-		-	-		-
Metals - Unfiltered	Nickel	N	ug/L	4.3	B	J	2.4	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW01			LBA-MW01		
SAMPLE_NO				LB3067			LB3075		
SAMPLE_DATE				12-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	4200	B	J	4190	B	J
Metals - Unfiltered	Selenium	N	ug/L	6.3	B	J	4.9	B	J
Metals - Unfiltered	Sodium	N	ug/L	28300			31200		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Zinc	N	ug/L	-	-	-	-	-	-
Metals - Filtered	Aluminum	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Barium	Y	ug/L	66.9	B	J	56	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	197000			159000		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	45100			44200		
Metals - Filtered	Manganese	Y	ug/L	457			135		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	5	B	J	2.7	B	J
Metals - Filtered	Potassium	Y	ug/L	4240	B	J	4000	B	J
Metals - Filtered	Selenium	Y	ug/L	5.9	B	J	-	-	-
Metals - Filtered	Sodium	Y	ug/L	28700			30100		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	14.5	B	J
Water Quality Parameters	Alkalinity	N	ppm	299			285		
Water Quality Parameters	Chloride	N	ppm	105			171		
Water Quality Parameters	Cyanide, total	N	ppm	0.0085	B	J	-	-	-
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	657			600		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-	-	0.11		
Water Quality Parameters	Sulfate	N	ppm	190			139		
Water Quality Parameters	Total dissolved solids	N	ppm	876			790		
Water Quality Parameters	Total suspended solids	N	ppm	14			20		
Water Quality Parameters	Turbidity	N	NTU	8.6			12.7		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.42					
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	-503.1					
Field Tests	pH	N	pH_units	6.73					
Field Tests	Specific Conductivity	N	mS/cm	0.721					
Field Tests	Temperature	N	C	12.18					
Field Tests	Turbidity	N	NTU	0					
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.28		-	-		-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.2			0.2		
Explosives	Dinitrotoluene, 2,4-	N	ug/L	5.4		J	10.8		J
Explosives	Dinitrotoluene, 2,6-	N	ug/L	5.3		J	7.8		J
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	25.1		J	48.5		J
Explosives	Nitrotoluene, 3-	N	ug/L	2.9		J	5.7		J
Explosives	Nitrotoluene, 4-	N	ug/L	2.9		J	5.8		J
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	1.6			1.5		
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.1		J	-		-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.81	J	J	0.87	J	J
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	36.8			40		
Volatiles	Trichloroethene	N	ug/L	5.6			5.2		
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-	-	-	-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	1.3	J	B	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	2.1	J	J	6.4		J
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	2.4	J	J	4.3	J	J
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	39.5	B	B	35.2	B	B
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	59.7	B	J	60.7	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	80700		J	83200		J
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Lead	N	ug/L	-	-	-	2.3	B	J
Metals - Unfiltered	Magnesium	N	ug/L	17300			17800		
Metals - Unfiltered	Manganese	N	ug/L	57.3			59.7		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	-	-	-

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3068			LB3069		
SAMPLE_DATE				19-May-09			19-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	1920	B	J	1870	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	8500	B	J	5600	B	J
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Zinc	N	ug/L	-	-	-	9.2	B	J
Metals - Filtered	Aluminum	Y	ug/L	37.6	B	J	28.3	B	J
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Barium	Y	ug/L	51.3	B	J	49.2	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	77300			78400		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	15800			16100		
Metals - Filtered	Manganese	Y	ug/L	47.2			46.1		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Potassium	Y	ug/L	1050	B	J	1530	B	J
Metals - Filtered	Selenium	Y	ug/L	3.6	B	J	-	-	-
Metals - Filtered	Sodium	Y	ug/L	4210	B	J	4960	B	J
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	9.5	B	J
Water Quality Parameters	Alkalinity	N	ppm	234			237		
Water Quality Parameters	Chloride	N	ppm	7.3			7.3		
Water Quality Parameters	Cyanide, total	N	ppm	0.0075	B	J	-	-	-
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	273			281		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.71		J	0.75		J
Water Quality Parameters	Sulfate	N	ppm	38			38.1		
Water Quality Parameters	Total dissolved solids	N	ppm	396		J	316		
Water Quality Parameters	Total suspended solids	N	ppm	-	-	-	6	B	J
Water Quality Parameters	Turbidity	N	NTU	2.1		J	2.9		J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm				2.39		
Field Tests	FERROUS IRON	N	mg/L				0		
Field Tests	Oxidation Reduction Potential	N	mV				-2.2		
Field Tests	pH	N	pH_units				6.93		
Field Tests	Specific Conductivity	N	mS/cm				0.69		
Field Tests	Temperature	N	C				10.41		
Field Tests	Turbidity	N	NTU				0		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.26			0.48		J
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	0.54		J
Explosives	Dinitrotoluene, 2,4-	N	ug/L	9.9	D		3.4		J
Explosives	Dinitrotoluene, 2,6-	N	ug/L	6.9			5.9		J
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	39	D		8.1		J
Explosives	Nitrotoluene, 3-	N	ug/L	4.5			1.2		J
Explosives	Nitrotoluene, 4-	N	ug/L	4.5			0.56		J
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	1.4			3		
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.9			1.2		
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	0.78	J	J
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	40			29.5		
Volatiles	Trichloroethene	N	ug/L	4.8			4.3		
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-	-	-	-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L			-	-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	6.1		J
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	6		J
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	-	-	-	361		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	-	-	-	76.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	79200			89300		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	-	-	-	200	B	J
Metals - Unfiltered	Lead	N	ug/L	-	-	-	2.5	B	B
Metals - Unfiltered	Magnesium	N	ug/L	17100			19400		
Metals - Unfiltered	Manganese	N	ug/L	55.4			184		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	-	-	-

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3070			LB3076		
SAMPLE_DATE				19-May-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	-	-	-	2110	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	4.5	B	J
Metals - Unfiltered	Sodium	N	ug/L	5680			5380	B	J
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Zinc	N	ug/L	-	-	-	-	-	-
Metals - Filtered	Aluminum	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Barium	Y	ug/L	-	-	-	28	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	76100			82600		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	-	-	-	2.1	B	J
Metals - Filtered	Magnesium	Y	ug/L	16500			15000		
Metals - Filtered	Manganese	Y	ug/L	57.3			30.1		J
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Potassium	Y	ug/L	-	-	-	914	B	B
Metals - Filtered	Selenium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Sodium	Y	ug/L	5660			4120	B	J
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-	-	-
Water Quality Parameters	Alkalinity	N	ppm	230			250		
Water Quality Parameters	Chloride	N	ppm	5.7			7		
Water Quality Parameters	Cyanide, total	N	ppm	-	-	-	-	-	-
Water Quality Parameters	Hardness	N	ppm	300					
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm				303		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.9			0.44		J
Water Quality Parameters	Sulfate	N	ppm	49.5			37.3		J
Water Quality Parameters	Total dissolved solids	N	ppm	350			339		
Water Quality Parameters	Total suspended solids	N	ppm	-	-	-	-	-	-
Water Quality Parameters	Turbidity	N	NTU	0.6			2		J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW02			LBA-MW02		
SAMPLE_NO				LB3077			LB3079		
SAMPLE_DATE				5-Nov-09			5-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm						
Field Tests	FERROUS IRON	N	mg/L						
Field Tests	Oxidation Reduction Potential	N	mV						
Field Tests	pH	N	pH_units						
Field Tests	Specific Conductivity	N	mS/cm						
Field Tests	Temperature	N	C						
Field Tests	Turbidity	N	NTU						
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-			
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.29		J			
Explosives	Dinitrotoluene, 2,4-	N	ug/L	17.8		J			
Explosives	Dinitrotoluene, 2,6-	N	ug/L	12.4		J			
Explosives	HMX	N	ug/L	-	-	-			
Explosives	Nitrotoluene, 2-	N	ug/L	74.7		J			
Explosives	Nitrotoluene, 3-	N	ug/L	9.1		J			
Explosives	Nitrotoluene, 4-	N	ug/L	8.6		J			
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	3.7			3.6		
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.83	J	J	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	32.7			33		
Volatiles	Trichloroethene	N	ug/L	4.8			5.1		
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-	-	-	-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-			
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	12.9		J	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	8.4		J	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	313			1190		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	82.1	B	J	-	-	-
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	92300			84200		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	207	B	J	1430		
Metals - Unfiltered	Lead	N	ug/L	3.4	B	B	-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	20600			21100		
Metals - Unfiltered	Manganese	N	ug/L	159			160		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	-	-	-

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-MW02				LBA-MW02		
SAMPLE_NO					LB3077				LB3079		
SAMPLE_DATE					5-Nov-09				5-Nov-09		
FK_DEPTH					0 - 0 Ft				0 - 0 Ft		
SAMPLE_PURPOSE					FD				FS		
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual		Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L		2200	B	J	-	-		-
Metals - Unfiltered	Selenium	N	ug/L	-	-		-	-	-		-
Metals - Unfiltered	Sodium	N	ug/L		6170	B	J		7420		
Metals - Unfiltered	Thallium	N	ug/L	-	-		-	-	-		-
Metals - Unfiltered	Vanadium	N	ug/L	-	-		-	-	-		-
Metals - Unfiltered	Zinc	N	ug/L	-	-		-	-	-		-
Metals - Filtered	Aluminum	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Arsenic	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Barium	Y	ug/L		33.8	B	J	-	-		-
Metals - Filtered	Beryllium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Cadmium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Calcium	Y	ug/L		85700				81500		
Metals - Filtered	Chromium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Cobalt	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Copper	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Iron	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Lead	Y	ug/L		2.4	B	J	-	-		-
Metals - Filtered	Magnesium	Y	ug/L		15700				15000		
Metals - Filtered	Manganese	Y	ug/L		46.3		J		47.4		
Metals - Filtered	Mercury	Y	ug/L		0.16	B	J	-	-		-
Metals - Filtered	Nickel	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Potassium	Y	ug/L		1080	B	B	-	-		-
Metals - Filtered	Selenium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Sodium	Y	ug/L		4550	B	J	-	-		-
Metals - Filtered	Thallium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Vanadium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Zinc	Y	ug/L	-	-		-	-	-		-
Water Quality Parameters	Alkalinity	N	ppm		277				280		
Water Quality Parameters	Chloride	N	ppm		7.2				5.8		
Water Quality Parameters	Cyanide, total	N	ppm	-	-		-	-	-		-
Water Quality Parameters	Hardness	N	ppm						320		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm		315						
Water Quality Parameters	Nitrate	N	ppm						0.3		
Water Quality Parameters	Nitrate-Nitrite	N	ppm		0.45		J				
Water Quality Parameters	Sulfate	N	ppm		39.6		J		51.3		
Water Quality Parameters	Total dissolved solids	N	ppm		365				370		
Water Quality Parameters	Total suspended solids	N	ppm		7	B	J		38		
Water Quality Parameters	Turbidity	N	NTU		9.7		J		16		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-MW03			LBA-MW03		
SAMPLE_NO				LB3071			LB3080		
SAMPLE_DATE				10-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	11.88			2.52		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-1061.7			-14.3		
Field Tests	pH	N	pH_units	6.92			7.17		
Field Tests	Specific Conductivity	N	mS/cm	0.66			0.822		
Field Tests	Temperature	N	C	12.56			11.02		
Field Tests	Turbidity	N	NTU	0			-4.3		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	0.32		
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	0.54	J	J
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	4		
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	6.3			8.3		
Volatiles	Dichloroethene, 1,1-	N	ug/L	1.4			0.68	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	35.3			22.1		
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-	-	-	-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	-	-	-	20.4	B	J
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	125	B	J	260		
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	90200			78000		J
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Lead	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	26100			28300		
Metals - Unfiltered	Manganese	N	ug/L	68.2			292		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	3.2	B	J	3	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-MW03			LBA-MW03		
SAMPLE_NO					LB3071			LB3080		
SAMPLE_DATE					10-May-09			3-Nov-09		
FK_DEPTH					0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE					REG			REG		
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L		5570	B	J	5530	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-		-	-		-
Metals - Unfiltered	Sodium	N	ug/L		21600			24600		
Metals - Unfiltered	Thallium	N	ug/L	-	-		-	-		-
Metals - Unfiltered	Vanadium	N	ug/L	-	-		-	-		-
Metals - Unfiltered	Zinc	N	ug/L		11.3	B	J	-		-
Metals - Filtered	Aluminum	Y	ug/L	-	-		-	-		-
Metals - Filtered	Arsenic	Y	ug/L	-	-		-	-		-
Metals - Filtered	Barium	Y	ug/L		131	B	J	190	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Cadmium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Calcium	Y	ug/L		86500			81800		
Metals - Filtered	Chromium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Cobalt	Y	ug/L	-	-		-	-		-
Metals - Filtered	Copper	Y	ug/L	-	-		-	-		-
Metals - Filtered	Iron	Y	ug/L	-	-		-	-		-
Metals - Filtered	Lead	Y	ug/L		2.7	B	J	-		-
Metals - Filtered	Magnesium	Y	ug/L		25800			26800		
Metals - Filtered	Manganese	Y	ug/L		71.7			181		
Metals - Filtered	Mercury	Y	ug/L	-	-		-	-		-
Metals - Filtered	Nickel	Y	ug/L		3.5	B	J	-		-
Metals - Filtered	Potassium	Y	ug/L		5600	B	J	4270	B	J
Metals - Filtered	Selenium	Y	ug/L		4.8	B	J	-		-
Metals - Filtered	Sodium	Y	ug/L		20400			18200		
Metals - Filtered	Thallium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Vanadium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Zinc	Y	ug/L		11.3	B	J	-		-
Water Quality Parameters	Alkalinity	N	ppm		246			333		
Water Quality Parameters	Chloride	N	ppm		6.8			195	B	J
Water Quality Parameters	Cyanide, total	N	ppm		0.013		J	-		-
Water Quality Parameters	Hardness	N	ppm							
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm		333			311		
Water Quality Parameters	Nitrate	N	ppm							
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-		-	0.11		
Water Quality Parameters	Sulfate	N	ppm		69.8			45.4		
Water Quality Parameters	Total dissolved solids	N	ppm		580			394		
Water Quality Parameters	Total suspended solids	N	ppm		5	B	J	4		
Water Quality Parameters	Turbidity	N	NTU	-	-		-	1	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	1.97			2.78		
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	10.6			-26.4		
Field Tests	pH	N	pH_units	6.8			7.57		
Field Tests	Specific Conductivity	N	mS/cm	0.000942			0.000554		
Field Tests	Temperature	N	C	5.16			3.7		
Field Tests	Turbidity	N	NTU	18.1			1210.8		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	3.46	J	J
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	6.66			-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	58.4			0.72	J	J
Volatiles	Trichloroethene	N	ug/L	0.81	J	J	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	-	-	-	-	-	-
Volatiles	Xylenes, total	N	ug/L						
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	162			12800		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	42.7		
Metals - Unfiltered	Barium	N	ug/L	31.7			323		
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	13.7		
Metals - Unfiltered	Cadmium	N	ug/L	4.63			2.43	J	J
Metals - Unfiltered	Calcium	N	ug/L	156000			299000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	20.4		
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	18.6		
Metals - Unfiltered	Copper	N	ug/L	5.98	J	J	66		
Metals - Unfiltered	Iron	N	ug/L	469			40700		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	48.6		
Metals - Unfiltered	Magnesium	N	ug/L	30900			90700		
Metals - Unfiltered	Manganese	N	ug/L	25.3			1450		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	20.5		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ01			LBA-PZ02		
SAMPLE_NO				LBA3000			LBA3003		
SAMPLE_DATE				31-Jan-09			29-Jan-09		
FK_DEPTH				7_17 - 7_28 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	878			4800		
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	5240			20400		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	35.9		
Metals - Unfiltered	Zinc	N	ug/L	-	-	-	136		
Metals - Filtered	Aluminum	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	28		
Metals - Filtered	Barium	Y	ug/L	30.9			87.7		
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	4.46		-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	154000			65600		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	90.9		-	-	-	-
Metals - Filtered	Lead	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	29600			20200		
Metals - Filtered	Manganese	Y	ug/L	21.4			273		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Potassium	Y	ug/L	792			2080		
Metals - Filtered	Selenium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Sodium	Y	ug/L	5140			18200		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-	-	-
Water Quality Parameters	Alkalinity	N	ppm	240			177		
Water Quality Parameters	Chloride	N	ppm	6.14		J	7.96		J
Water Quality Parameters	Cyanide, total	N	ppm						
Water Quality Parameters	Hardness	N	ppm	517			1120		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.297		J	-	-	-
Water Quality Parameters	Sulfate	N	ppm	193			43.8		J
Water Quality Parameters	Total dissolved solids	N	ppm	584			172		
Water Quality Parameters	Total suspended solids	N	ppm	-	-	-	3860		
Water Quality Parameters	Turbidity	N	NTU	10.9		J	866		J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	0.66			0.51		
Field Tests	FERROUS IRON	N	mg/L	0					
Field Tests	Oxidation Reduction Potential	N	mV	4.9			17.9		
Field Tests	pH	N	pH_units	6.94			6.99		
Field Tests	Specific Conductivity	N	mS/cm	0.000486			0.000569		
Field Tests	Temperature	N	C	4.76			5.42		
Field Tests	Turbidity	N	NTU	25.2			1222.5		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	1.71			-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	1.6			-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	17.2			-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	15.1			-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	6.89			-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	3.91			-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	1.8			-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.77	J	J	10		
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	0.66	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.34	J	J	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L	4.33			-	-	-
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	38.5			18.1		
Volatiles	Trichloroethene	N	ug/L	7.03			-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	0.4	J	J	-	-	-
Volatiles	Xylenes, total	N	ug/L						
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	13.3			-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	7.11	J	J	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	261			12600		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	13.5		
Metals - Unfiltered	Barium	N	ug/L	16			110		
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	12.3		
Metals - Unfiltered	Cadmium	N	ug/L	2.97	J	J	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	75300			243000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	20.3		
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	12.4		
Metals - Unfiltered	Copper	N	ug/L	-	-	-	53.7		
Metals - Unfiltered	Iron	N	ug/L	681			36000		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	26.6		
Metals - Unfiltered	Magnesium	N	ug/L	16300			76500		
Metals - Unfiltered	Manganese	N	ug/L	35.1			698		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	17.6		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ03			LBA-PZ04		
SAMPLE_NO				LBA3004			LBA3005		
SAMPLE_DATE				29-Jan-09			30-Jan-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	510	J	J	2860		
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	2820			7790		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	37.1		
Metals - Unfiltered	Zinc	N	ug/L	-	-	-	111		
Metals - Filtered	Aluminum	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Barium	Y	ug/L	15.1			27.4		
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	3.29	J	J
Metals - Filtered	Calcium	Y	ug/L	71600			80700		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	15800			20900		
Metals - Filtered	Manganese	Y	ug/L	29.5			24.6		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Potassium	Y	ug/L	357	J	J	-	-	-
Metals - Filtered	Selenium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Sodium	Y	ug/L	3060			7290		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-	-	-
Water Quality Parameters	Alkalinity	N	ppm	103			238		
Water Quality Parameters	Chloride	N	ppm	3.61			3.24		J
Water Quality Parameters	Cyanide, total	N	ppm						
Water Quality Parameters	Hardness	N	ppm	255			921		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	0.581			0.061		J
Water Quality Parameters	Sulfate	N	ppm	30.5			28.2		
Water Quality Parameters	Total dissolved solids	N	ppm	239			295		
Water Quality Parameters	Total suspended solids	N	ppm	21			1770		
Water Quality Parameters	Turbidity	N	NTU	19.7		J	165		J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm						
Field Tests	FERROUS IRON	N	mg/L						
Field Tests	Oxidation Reduction Potential	N	mV						
Field Tests	pH	N	pH_units						
Field Tests	Specific Conductivity	N	mS/cm						
Field Tests	Temperature	N	C						
Field Tests	Turbidity	N	NTU						
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L		0.79	J	J	-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L	-	-	-			
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L		0.96	J	J	2.2		
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	-	-	-			
Volatiles	Xylenes, total	N	ug/L				-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L						
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L		3860			27500	
Metals - Unfiltered	Arsenic	N	ug/L		11.9			22.4	
Metals - Unfiltered	Barium	N	ug/L		107			255	
Metals - Unfiltered	Beryllium	N	ug/L		3.2	J	J	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L		2.7	J	J	-	-	-
Metals - Unfiltered	Calcium	N	ug/L		83500			160000	
Metals - Unfiltered	Chromium	N	ug/L	-	-	-		39.1	
Metals - Unfiltered	Cobalt	N	ug/L		5.01	J	J	-	-	-
Metals - Unfiltered	Copper	N	ug/L		17.4			54.3	
Metals - Unfiltered	Iron	N	ug/L		10200			48900	
Metals - Unfiltered	Lead	N	ug/L		6.91			31.2	
Metals - Unfiltered	Magnesium	N	ug/L		26500			55000	
Metals - Unfiltered	Manganese	N	ug/L		286			1240	
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L		4.98	J	J	58.2	

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			LBA-PZ05		
SAMPLE_NO				LBA3001			LBA3002		
SAMPLE_DATE				28-Jan-09			28-Jan-09		
FK_DEPTH				10_07 - 10_1 Ft			10_07 - 10_1 Ft		
SAMPLE_PURPOSE				FD			FS		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	2430			8560		
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	12700			10800		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	9.17			65.9		
Metals - Unfiltered	Zinc	N	ug/L	31.9	J	J	141		
Metals - Filtered	Aluminum	Y	ug/L	128		-	-		-
Metals - Filtered	Arsenic	Y	ug/L	9.75	J	J	-		-
Metals - Filtered	Barium	Y	ug/L	93.6		-	-		-
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Calcium	Y	ug/L	72400			70900		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Cobalt	Y	ug/L	-	-	-	-		-
Metals - Filtered	Copper	Y	ug/L	-	-	-	-		-
Metals - Filtered	Iron	Y	ug/L	382			132		
Metals - Filtered	Lead	Y	ug/L	-	-	-	-		-
Metals - Filtered	Magnesium	Y	ug/L	20200			18700		
Metals - Filtered	Manganese	Y	ug/L	108			104		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-		-
Metals - Filtered	Nickel	Y	ug/L	-	-	-	-		-
Metals - Filtered	Potassium	Y	ug/L	1480		-	-		-
Metals - Filtered	Selenium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Sodium	Y	ug/L	12500			11600		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Vanadium	Y	ug/L	-	-	-	-		-
Metals - Filtered	Zinc	Y	ug/L	-	-	-	-		-
Water Quality Parameters	Alkalinity	N	ppm	119			230		
Water Quality Parameters	Chloride	N	ppm	6.55		J	6.3		J
Water Quality Parameters	Cyanide, total	N	ppm			-	-		-
Water Quality Parameters	Hardness	N	ppm	317			680		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						
Water Quality Parameters	Nitrate	N	ppm			-	-		-
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-	-			
Water Quality Parameters	Sulfate	N	ppm	52.8		J	56.2		
Water Quality Parameters	Total dissolved solids	N	ppm	700		J	310		
Water Quality Parameters	Total suspended solids	N	ppm	676			1200		
Water Quality Parameters	Turbidity	N	NTU	375		J	64		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-PZ05			RCA-MW01		
SAMPLE_NO				LBA3006			RC3074		
SAMPLE_DATE				28-Jan-09			12-May-09		
FK_DEPTH				10_07 - 10_1 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.25			7.71		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-26.1			122.5		
Field Tests	pH	N	pH_units	7.82			6.71		
Field Tests	Specific Conductivity	N	mS/cm	0.000536			0.88		
Field Tests	Temperature	N	C	8.72			9.96		
Field Tests	Turbidity	N	NTU	467.4			1		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.81	J	J	-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L	-	-	-			
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	1.06	J	J	-	-	-
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L	-	-	-			
Volatiles	Xylenes, total	N	ug/L				-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L				-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	4710			386		J
Metals - Unfiltered	Arsenic	N	ug/L	14.4			-	-	-
Metals - Unfiltered	Barium	N	ug/L	114			188	B	J
Metals - Unfiltered	Beryllium	N	ug/L	4.05	J	J	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	2.23	J	J	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	94000			94300		
Metals - Unfiltered	Chromium	N	ug/L	6.35	J	J	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	6.12	J	J	-	-	-
Metals - Unfiltered	Copper	N	ug/L	17.2			-	-	-
Metals - Unfiltered	Iron	N	ug/L	12600			348		
Metals - Unfiltered	Lead	N	ug/L	8.41			-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	30100			23200		
Metals - Unfiltered	Manganese	N	ug/L	366			77.8		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	7.86			3.6	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-PZ05				RCA-MW01		
SAMPLE_NO					LBA3006				RC3074		
SAMPLE_DATE					28-Jan-09				12-May-09		
FK_DEPTH					10_07 - 10_1 Ft				0 - 0 Ft		
SAMPLE_PURPOSE					REG				REG		
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual		Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L		2610				6570	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-		-		6.7	B	B
Metals - Unfiltered	Sodium	N	ug/L		12300				31000		
Metals - Unfiltered	Thallium	N	ug/L	-	-		-	-	-		-
Metals - Unfiltered	Vanadium	N	ug/L		11.6				1.1	B	J
Metals - Unfiltered	Zinc	N	ug/L		38	J	J	-	-		-
Metals - Filtered	Aluminum	Y	ug/L		159			-	-		-
Metals - Filtered	Arsenic	Y	ug/L		1.99	J	J	-	-		-
Metals - Filtered	Barium	Y	ug/L		90.5				182	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Cadmium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Calcium	Y	ug/L		70600				99300		
Metals - Filtered	Chromium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Cobalt	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Copper	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Iron	Y	ug/L		446			-	-		-
Metals - Filtered	Lead	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Magnesium	Y	ug/L		20000				24100		
Metals - Filtered	Manganese	Y	ug/L		110				68.2		
Metals - Filtered	Mercury	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Nickel	Y	ug/L	-	-		-		3.1	B	J
Metals - Filtered	Potassium	Y	ug/L		1470				6600	B	J
Metals - Filtered	Selenium	Y	ug/L	-	-		-		3.8	B	J
Metals - Filtered	Sodium	Y	ug/L		11900				32600		
Metals - Filtered	Thallium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Vanadium	Y	ug/L	-	-		-	-	-		-
Metals - Filtered	Zinc	Y	ug/L	-	-		-		15.5	B	J
Water Quality Parameters	Alkalinity	N	ppm		172				267		
Water Quality Parameters	Chloride	N	ppm		6.98		J		21.7		
Water Quality Parameters	Cyanide, total	N	ppm						0.016		
Water Quality Parameters	Hardness	N	ppm		359						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						331		
Water Quality Parameters	Nitrate	N	ppm								
Water Quality Parameters	Nitrate-Nitrite	N	ppm		0.026	J	J	-	-		-
Water Quality Parameters	Sulfate	N	ppm		53.3		J		67.1		
Water Quality Parameters	Total dissolved solids	N	ppm		331		J		509		
Water Quality Parameters	Total suspended solids	N	ppm		641				70		
Water Quality Parameters	Turbidity	N	NTU		403		J		21.3		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	17.05			1.5		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	-37.7			-34.4		
Field Tests	pH	N	pH_units	7.07			7.59		
Field Tests	Specific Conductivity	N	mS/cm	1.513			1.31		
Field Tests	Temperature	N	C	13.59			10.38		
Field Tests	Turbidity	N	NTU	3.4			10.2		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	0.23		-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	0.29		-	-	-	-
Explosives	HMX	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	ug/L	2.1			1.8		
Explosives	Nitrotoluene, 3-	N	ug/L	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	ug/L	1.2			0.61		
Volatiles	Acetone	N	ug/L	-	-	-	-	-	-
Volatiles	Benzene	N	ug/L	-	-	-	-	-	-
Volatiles	Bromoform	N	ug/L	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	ug/L	-	-	-	-	-	-
Volatiles	Carbon tetrachloride	N	ug/L	-	-	-	-	-	-
Volatiles	Chloroform	N	ug/L	-	-	-	-	-	-
Volatiles	Chloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dibromochloromethane	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Ethylbenzene	N	ug/L	-	-	-	-	-	-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-	-	-	-	-	-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Toluene	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethene	N	ug/L	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-	-	-	-	-	-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Methylphenol, 2-	N	ug/L	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	ug/L	-	-	-	-	-	-
Semivolatiles	Phenol	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	77.1	B	J	1290		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	77.2	B	J	55.8	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Cadmium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	126000			93200		J
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	2.8	B	J
Metals - Unfiltered	Cobalt	N	ug/L	6.1	B	J	3.7	B	J
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	-	-	-	2830		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	4.5	B	B
Metals - Unfiltered	Magnesium	N	ug/L	47900			37400		
Metals - Unfiltered	Manganese	N	ug/L	422			272		
Metals - Unfiltered	Mercury	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Nickel	N	ug/L	21	B	J	11.4	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW02			RCA-MW02		
SAMPLE_NO				RC3075			RC3081		
SAMPLE_DATE				11-May-09			3-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L	18900			19000		J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	97100			85900		
Metals - Unfiltered	Thallium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	3.4	B	J
Metals - Unfiltered	Zinc	N	ug/L	13.1	B	B	17.3	B	J
Metals - Filtered	Aluminum	Y	ug/L	13.7	B	J	-	-	-
Metals - Filtered	Arsenic	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Barium	Y	ug/L	82.7	B	J	46.6	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cadmium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Calcium	Y	ug/L	122000			79400		
Metals - Filtered	Chromium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Cobalt	Y	ug/L	6.1	B	J	1.4	B	J
Metals - Filtered	Copper	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Iron	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Lead	Y	ug/L	2	B	J	-	-	-
Metals - Filtered	Magnesium	Y	ug/L	47000			33700		
Metals - Filtered	Manganese	Y	ug/L	389			157		
Metals - Filtered	Mercury	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Nickel	Y	ug/L	21.1	B	J	6.3	B	J
Metals - Filtered	Potassium	Y	ug/L	19800			16700		
Metals - Filtered	Selenium	Y	ug/L	3.8	B	J	-	-	-
Metals - Filtered	Sodium	Y	ug/L	98100		J	75700		
Metals - Filtered	Thallium	Y	ug/L	-	-	-	-	-	-
Metals - Filtered	Vanadium	Y	ug/L	0.92	B	J	-	-	-
Metals - Filtered	Zinc	Y	ug/L	9.2	B	J	7.4	B	J
Water Quality Parameters	Alkalinity	N	ppm	322			320		
Water Quality Parameters	Chloride	N	ppm	11.6			11.4		
Water Quality Parameters	Cyanide, total	N	ppm	0.013		-	-		-
Water Quality Parameters	Hardness	N	ppm						
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	512			387		
Water Quality Parameters	Nitrate	N	ppm						
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-	-	0.032	B	J
Water Quality Parameters	Sulfate	N	ppm	282			210		
Water Quality Parameters	Total dissolved solids	N	ppm	951			694		
Water Quality Parameters	Total suspended solids	N	ppm	27			206		
Water Quality Parameters	Turbidity	N	NTU	3			30.9		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				RCA-MW03			RCA-MW03		
SAMPLE_NO				RC3076			RC3082		
SAMPLE_DATE				11-May-09			4-Nov-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	13.89			4.96		
Field Tests	FERROUS IRON	N	mg/L	0			0		
Field Tests	Oxidation Reduction Potential	N	mV	86.4			-49.7		
Field Tests	pH	N	pH_units	7.29			7.77		
Field Tests	Specific Conductivity	N	mS/cm	0.635			0.723		
Field Tests	Temperature	N	C	11.89			8.13		
Field Tests	Turbidity	N	NTU	1.9			76.5		
Explosives	Amino-2,6-dinitrotoluene, 4-	N	ug/L	-		-	-		-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	ug/L	-		-	-		-
Explosives	Dinitrotoluene, 2,4-	N	ug/L	-		-	-		-
Explosives	Dinitrotoluene, 2,6-	N	ug/L	-		-	-		-
Explosives	HMX	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 2-	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 3-	N	ug/L	-		-	-		-
Explosives	Nitrotoluene, 4-	N	ug/L	-		-	-		-
Volatiles	Acetone	N	ug/L	10	J	J	-		-
Volatiles	Benzene	N	ug/L	-		-	-		-
Volatiles	Bromoform	N	ug/L	0.36	J	J	-		-
Volatiles	Butanone, 2-	N	ug/L	-		-	-		-
Volatiles	Carbon disulfide	N	ug/L	-		-	-		-
Volatiles	Carbon tetrachloride	N	ug/L	-		-	-		-
Volatiles	Chloroform	N	ug/L	-		-	-		-
Volatiles	Chloromethane	N	ug/L	-		-	-		-
Volatiles	Dibromochloromethane	N	ug/L	0.2	J	J	-		-
Volatiles	Dichloroethane, 1,1-	N	ug/L	-		-	-		-
Volatiles	Dichloroethene, 1,1-	N	ug/L	-		-	-		-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-		-	-		-
Volatiles	Ethylbenzene	N	ug/L	-		-	-		-
Volatiles	Methyl-2-pentanone, 4-	N	ug/L	-		-	-		-
Volatiles	Naphthalene	N	ug/L						
Volatiles	Tetrachloroethane, 1,1,2,2-	N	ug/L	-		-	-		-
Volatiles	Toluene	N	ug/L	-		-	-		-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-		-	-		-
Volatiles	Trichloroethene	N	ug/L	-		-	-		-
Volatiles	Trimethylbenzene, 1,2,4-	N	ug/L						
Volatiles	Xylenes, total	N	ug/L	-		-	-		-
Semivolatiles	3-Methylphenol and 4-Methylphenol	N	ug/L	-		-	-		-
Semivolatiles	Dimethylphenol, 2,4-	N	ug/L	-		-	-		-
Semivolatiles	Di-n-butyl phthalate	N	ug/L	-		-	-		-
Semivolatiles	Dinitrotoluene, 2,4-	N	ug/L	-		-	-		-
Semivolatiles	Dinitrotoluene, 2,6-	N	ug/L	-		-	-		-
Semivolatiles	Methylnaphthalene, 2-	N	ug/L	-		-	-		-
Semivolatiles	Methylphenol, 2-	N	ug/L	-		-	-		-
Semivolatiles	Naphthalene	N	ug/L	-		-	-		-
Semivolatiles	Phenanthrene	N	ug/L	-		-	-		-
Semivolatiles	Phenol	N	ug/L	-		-	-		-
Metals - Unfiltered	Aluminum	N	ug/L	52.2	B	J	1340		
Metals - Unfiltered	Arsenic	N	ug/L	-		-	-		-
Metals - Unfiltered	Barium	N	ug/L	114	B	J	102	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-		-	-		-
Metals - Unfiltered	Cadmium	N	ug/L	-		-	-		-
Metals - Unfiltered	Calcium	N	ug/L	25400			34400		J
Metals - Unfiltered	Chromium	N	ug/L	-		-	3.3	B	J
Metals - Unfiltered	Cobalt	N	ug/L	-		-	2.3	B	J
Metals - Unfiltered	Copper	N	ug/L	-		-	-		-
Metals - Unfiltered	Iron	N	ug/L	-		-	2510		
Metals - Unfiltered	Lead	N	ug/L	2.1	B	J	3.7	B	B
Metals - Unfiltered	Magnesium	N	ug/L	15100			15000		
Metals - Unfiltered	Manganese	N	ug/L	53			102		
Metals - Unfiltered	Mercury	N	ug/L	-		-	-		-
Metals - Unfiltered	Nickel	N	ug/L	-		-	9.1	B	J

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Groundwater
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					RCA-MW03			RCA-MW03		
SAMPLE_NO					RC3076			RC3082		
SAMPLE_DATE					11-May-09			4-Nov-09		
FK_DEPTH					0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE					REG			REG		
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual	Result	Qual	ValQual
Metals - Unfiltered	Potassium	N	ug/L		14900			16300		J
Metals - Unfiltered	Selenium	N	ug/L	-	-		-	-		-
Metals - Unfiltered	Sodium	N	ug/L		69100			66700		
Metals - Unfiltered	Thallium	N	ug/L	-	-		-	-		-
Metals - Unfiltered	Vanadium	N	ug/L	-	-		-	3	B	J
Metals - Unfiltered	Zinc	N	ug/L		13.4	B	B	18.3	B	J
Metals - Filtered	Aluminum	Y	ug/L	-	-		-	-		-
Metals - Filtered	Arsenic	Y	ug/L	-	-		-	-		-
Metals - Filtered	Barium	Y	ug/L		111	B	J	98.1	B	J
Metals - Filtered	Beryllium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Cadmium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Calcium	Y	ug/L		23000			23500		
Metals - Filtered	Chromium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Cobalt	Y	ug/L	-	-		-	-		-
Metals - Filtered	Copper	Y	ug/L	-	-		-	-		-
Metals - Filtered	Iron	Y	ug/L	-	-		-	-		-
Metals - Filtered	Lead	Y	ug/L	-	-		-	2.4	B	J
Metals - Filtered	Magnesium	Y	ug/L		13900			13800		
Metals - Filtered	Manganese	Y	ug/L		84.7			25.6		
Metals - Filtered	Mercury	Y	ug/L	-	-		-	-		-
Metals - Filtered	Nickel	Y	ug/L		3.1	B	J	3.4	B	J
Metals - Filtered	Potassium	Y	ug/L		14800			15300		
Metals - Filtered	Selenium	Y	ug/L		4	B	J	-		-
Metals - Filtered	Sodium	Y	ug/L		69000		J	66200		
Metals - Filtered	Thallium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Vanadium	Y	ug/L	-	-		-	-		-
Metals - Filtered	Zinc	Y	ug/L	-	-		-	7.6	B	J
Water Quality Parameters	Alkalinity	N	ppm		307			295		
Water Quality Parameters	Chloride	N	ppm		12.2			12.1		
Water Quality Parameters	Cyanide, total	N	ppm	-	-		-	-		-
Water Quality Parameters	Hardness	N	ppm							
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm		126			148		
Water Quality Parameters	Nitrate	N	ppm							
Water Quality Parameters	Nitrate-Nitrite	N	ppm	-	-		-	-		-
Water Quality Parameters	Sulfate	N	ppm		4.3			4.4		
Water Quality Parameters	Total dissolved solids	N	ppm		230			348		
Water Quality Parameters	Total suspended solids	N	ppm	-	-		-	52		
Water Quality Parameters	Turbidity	N	NTU		2.1			25		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-SD01				LBA-SD02			
SAMPLE_NO					LBA1000				LBA1001			
SAMPLE_DATE					20-May-09				21-May-09			
FK_DEPTH					0 - _5 Ft				0 - _5 Ft			
SAMPLE_PURPOSE					REG				REG			
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual		Result	Qual	ValQual		Result
Volatiles	Acetone	N	mg/kg	-	-		-		0.0921		J	-	
Volatiles	Carbon disulfide	N	mg/kg	-	-		-	-	-		-	-	
Volatiles	Methylene chloride	N	mg/kg		0.0582				0.0195		B	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-		-	-	-		-	-	
Semivolatiles	Fluoranthene	N	mg/kg	-	-		-	-	-		-	-	
Semivolatiles	Phenanthrene	N	mg/kg	-	-		-	-	-		-	-	
Semivolatiles	Pyrene	N	mg/kg	-	-		-	-	-		-	-	
Metals - Unfiltered	Aluminum	N	mg/kg		6300				5710		J		7780
Metals - Unfiltered	Arsenic	N	mg/kg		16				9.4		J		8.3
Metals - Unfiltered	Barium	N	mg/kg		75.7				90.3		J		58.8
Metals - Unfiltered	Beryllium	N	mg/kg		0.75				0.61				0.67
Metals - Unfiltered	Cadmium	N	mg/kg		1.9				0.46				0.46
Metals - Unfiltered	Calcium	N	mg/kg		11200		J		3510		J		3900
Metals - Unfiltered	Chromium	N	mg/kg		10.4				10.7		J		13.5
Metals - Unfiltered	Cobalt	N	mg/kg		24.9				17.5		J		11.8
Metals - Unfiltered	Copper	N	mg/kg		13.5				10.5		J		13.3
Metals - Unfiltered	Iron	N	mg/kg		21000				20500		J		18700
Metals - Unfiltered	Lead	N	mg/kg		10.8				9		J		9.5
Metals - Unfiltered	Magnesium	N	mg/kg		2840				1590		J		2160
Metals - Unfiltered	Manganese	N	mg/kg		5360				1510				828
Metals - Unfiltered	Mercury	N	mg/kg		0.025	B	J		0.023	B	J	-	
Metals - Unfiltered	Nickel	N	mg/kg		52.2				26.6		J		26.1
Metals - Unfiltered	Potassium	N	mg/kg		781	B	J		614	B	J		781
Metals - Unfiltered	Selenium	N	mg/kg		3	B	J		2.1	B	J		1.7
Metals - Unfiltered	Sodium	N	mg/kg		182	B	J		110	B	J		134
Metals - Unfiltered	Thallium	N	mg/kg		1.9				0.26	B	J	-	
Metals - Unfiltered	Vanadium	N	mg/kg		22.2				19.4		J		21.9
Metals - Unfiltered	Zinc	N	mg/kg		80.3				52.4		J		54.1
Water Quality Parameters	% Solids	N	Percent		69.3				78.7				76.9

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SD03			LBA-SD04			LBA-SD05	
SAMPLE_NO				LBA1002			LBA1003			LBA1004	
SAMPLE_DATE				21-May-09			21-May-09			22-May-09	
FK_DEPTH				0 - _5 Ft			0 - _5 Ft			0 - _5 Ft	
SAMPLE_PURPOSE				REG			REG			REG	
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual
Volatiles	Acetone	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Methylene chloride	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	mg/kg		J		7760		J	8850	
Metals - Unfiltered	Arsenic	N	mg/kg		J		17.8		J	9.5	
Metals - Unfiltered	Barium	N	mg/kg		J		92.1		J	63.8	
Metals - Unfiltered	Beryllium	N	mg/kg		J		0.96			0.68	
Metals - Unfiltered	Cadmium	N	mg/kg		J		0.97			0.64	
Metals - Unfiltered	Calcium	N	mg/kg		J		7050		J	10300	
Metals - Unfiltered	Chromium	N	mg/kg		J		13.4		J	15.9	
Metals - Unfiltered	Cobalt	N	mg/kg		J		26		J	10.8	
Metals - Unfiltered	Copper	N	mg/kg		J		22.2		J	22.7	
Metals - Unfiltered	Iron	N	mg/kg		J		30200		J	22100	
Metals - Unfiltered	Lead	N	mg/kg		J		17.9		J	11.5	
Metals - Unfiltered	Magnesium	N	mg/kg		J		3090		J	4940	
Metals - Unfiltered	Manganese	N	mg/kg		J		1610			737	
Metals - Unfiltered	Mercury	N	mg/kg	-	-		0.031	B	J	0.022	B
Metals - Unfiltered	Nickel	N	mg/kg		J		39.8		J	26.6	
Metals - Unfiltered	Potassium	N	mg/kg	B	J		829	B	J	1250	B
Metals - Unfiltered	Selenium	N	mg/kg	B	J		2.2	B	J	1.7	B
Metals - Unfiltered	Sodium	N	mg/kg	B	J		192	B	J	166	B
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	-		-	-	
Metals - Unfiltered	Vanadium	N	mg/kg		J		26.5		J	24.5	
Metals - Unfiltered	Zinc	N	mg/kg		J		73.9		J	55	
Water Quality Parameters	% Solids	N	Percent				70.9			71.8	

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE						LBA-SD06				LBA-SD06		
SAMPLE_NO						LBA1005				LBA1006		
SAMPLE_DATE						22-May-09				22-May-09		
FK_DEPTH						0 - _5 Ft				0 - _5 Ft		
SAMPLE_PURPOSE						REG				FD		
Test Group	Parameter	Filtered	Units	ValQual		Result	Qual	ValQual		Result	Qual	ValQual
Volatiles	Acetone	N	mg/kg	-	-	-		-	-	-		-
Volatiles	Carbon disulfide	N	mg/kg	-		0.0019	J	J	-	-		-
Volatiles	Methylene chloride	N	mg/kg	-	-	-		-	-	-		-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-		0.0481	J	J		0.0458	J	J
Semivolatiles	Fluoranthene	N	mg/kg	-		0.0738	J	J		0.0934	J	J
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-		-		0.0546	J	J
Semivolatiles	Pyrene	N	mg/kg	-		0.0562	J	J		0.0694	J	J
Metals - Unfiltered	Aluminum	N	mg/kg			10700				9900		
Metals - Unfiltered	Arsenic	N	mg/kg			11.7				10.4		
Metals - Unfiltered	Barium	N	mg/kg			70.7				81.6		
Metals - Unfiltered	Beryllium	N	mg/kg			0.84				0.77		
Metals - Unfiltered	Cadmium	N	mg/kg			0.56				0.56		
Metals - Unfiltered	Calcium	N	mg/kg			3300				3220		
Metals - Unfiltered	Chromium	N	mg/kg			18.8				17.6		
Metals - Unfiltered	Cobalt	N	mg/kg			11.3				11.7		
Metals - Unfiltered	Copper	N	mg/kg			24.5				21		
Metals - Unfiltered	Iron	N	mg/kg			25500				23300		
Metals - Unfiltered	Lead	N	mg/kg			10.4				10.5		
Metals - Unfiltered	Magnesium	N	mg/kg			3620				3190		
Metals - Unfiltered	Manganese	N	mg/kg			779				1170		
Metals - Unfiltered	Mercury	N	mg/kg	J		0.022	B	J		0.023	B	J
Metals - Unfiltered	Nickel	N	mg/kg			33.8				34.2		
Metals - Unfiltered	Potassium	N	mg/kg	J		1430				1370		
Metals - Unfiltered	Selenium	N	mg/kg	J		1.9	B	J		1.8	B	J
Metals - Unfiltered	Sodium	N	mg/kg	J		150	B	J		164	B	J
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-		-	-	-		-
Metals - Unfiltered	Vanadium	N	mg/kg			27				25.8		
Metals - Unfiltered	Zinc	N	mg/kg			63				59.1		
Water Quality Parameters	% Solids	N	Percent			74.7				73.4		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-SD06		
SAMPLE_NO					LBA1007		
SAMPLE_DATE					22-May-09		
FK_DEPTH					0 - _5 Ft		
SAMPLE_PURPOSE					FS		
Test Group	Parameter	Filtered	Units		Result	Qual	ValQual
Volatiles	Acetone	N	mg/kg	-		-	-
Volatiles	Carbon disulfide	N	mg/kg	-		-	-
Volatiles	Methylene chloride	N	mg/kg	-		-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-		-	-
Semivolatiles	Fluoranthene	N	mg/kg	-		-	-
Semivolatiles	Phenanthrene	N	mg/kg	-		-	-
Semivolatiles	Pyrene	N	mg/kg	-		-	-
Metals - Unfiltered	Aluminum	N	mg/kg		10900		
Metals - Unfiltered	Arsenic	N	mg/kg		16.5		
Metals - Unfiltered	Barium	N	mg/kg		156		
Metals - Unfiltered	Beryllium	N	mg/kg		0.72		
Metals - Unfiltered	Cadmium	N	mg/kg	-		-	-
Metals - Unfiltered	Calcium	N	mg/kg		3520		
Metals - Unfiltered	Chromium	N	mg/kg		18.3		
Metals - Unfiltered	Cobalt	N	mg/kg		24.6		
Metals - Unfiltered	Copper	N	mg/kg		26.2		
Metals - Unfiltered	Iron	N	mg/kg		32200		
Metals - Unfiltered	Lead	N	mg/kg		17		
Metals - Unfiltered	Magnesium	N	mg/kg		3820		
Metals - Unfiltered	Manganese	N	mg/kg		2280		
Metals - Unfiltered	Mercury	N	mg/kg	-		-	-
Metals - Unfiltered	Nickel	N	mg/kg		63.2		
Metals - Unfiltered	Potassium	N	mg/kg		1420		
Metals - Unfiltered	Selenium	N	mg/kg	-		-	-
Metals - Unfiltered	Sodium	N	mg/kg	-		-	-
Metals - Unfiltered	Thallium	N	mg/kg		3.1		
Metals - Unfiltered	Vanadium	N	mg/kg		27.7		
Metals - Unfiltered	Zinc	N	mg/kg		78.3		
Water Quality Parameters	% Solids	N	Percent		74.5		

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB01			LBA-SB01			LBA-SB01	
SAMPLE_NO				LBA0001			LBA0002			LBA0003	
SAMPLE_DATE				20-Jan-09			20-Jan-09			20-Jan-09	
FK_DEPTH				0 - 1 Ft			3 - 5 Ft			8 - 10 Ft	
SAMPLE_PURPOSE				REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Acetone	N	mg/kg	0.0367	J	J	-	-	-	0.0305	J
Volatiles	Benzene	N	mg/kg	-	-	-	0.00217	J	J	0.00121	J
Volatiles	Butanone, 2-	N	mg/kg	-	-	-	-	-	-	0.00573	J
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	0.000988	J
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	0.0254		J	-	-
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	0.00301	J	J	-	-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	0.0032	J	J	-	-
Volatiles	Naphthalene	N	mg/kg	-	-	-	0.00346	J	J	-	-
Volatiles	Toluene	N	mg/kg	-	-	-	0.00312	J	J	0.00186	J
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	1.21		J	-	-
Volatiles	Trichloroethene	N	mg/kg	-	-	-	0.0624		J	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-	-	-	0.000988	J
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.0426	J	J	-	-	-	-	-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Chrysene	N	mg/kg	0.0395	J	J	-	-	-	-	-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	0.0616	J	J	-	-	-	-	-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	0.0627	J	J	-	-	-	-	-
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-	-	-	-	-			
Pesticides/PCBs	Aroclor 1260	N	mg/kg	-	-	-	-	-			
Metals - Unfiltered	Aluminum	N	mg/kg	4400			7580			9330	
Metals - Unfiltered	Antimony	N	mg/kg	0.386	J	J	0.722			0.375	J
Metals - Unfiltered	Arsenic	N	mg/kg	4.5		J	10.1		J	4.78	
Metals - Unfiltered	Barium	N	mg/kg	16.3			33.6			61.3	
Metals - Unfiltered	Beryllium	N	mg/kg	5.22		J	5.15		J	6.74	
Metals - Unfiltered	Cadmium	N	mg/kg	-	-	-	0.513	J	J	0.263	J
Metals - Unfiltered	Calcium	N	mg/kg	1180			74000			49300	
Metals - Unfiltered	Chromium	N	mg/kg	10.4			11.1			13.6	
Metals - Unfiltered	Cobalt	N	mg/kg	3.52			8.81			10.3	
Metals - Unfiltered	Copper	N	mg/kg	6.54			27			29.2	
Metals - Unfiltered	Iron	N	mg/kg	15000		J	16600		J	21500	
Metals - Unfiltered	Lead	N	mg/kg	5.29			23			13	
Metals - Unfiltered	Magnesium	N	mg/kg	796		J	16800		J	18600	
Metals - Unfiltered	Manganese	N	mg/kg	198		J	384		J	548	
Metals - Unfiltered	Mercury	N	mg/kg	0.0198	J	J	0.0159	J	J	0.157	J
Metals - Unfiltered	Nickel	N	mg/kg	9.01		J	22		J	27.1	
Metals - Unfiltered	Potassium	N	mg/kg	201			934			1230	
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-	-	-	-	-
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	mg/kg	41.4			113			130	
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	0.654			0.31	J
Metals - Unfiltered	Vanadium	N	mg/kg	26.5			18.8			22.9	
Metals - Unfiltered	Zinc	N	mg/kg	26			60			66.7	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE						LBA-SB02				LBA-SB02			
SAMPLE_NO						LBA0004				LBA0005			
SAMPLE_DATE						19-Jan-09				19-Jan-09			
FK_DEPTH						0 - 1 Ft				3 - 5 Ft			
SAMPLE_PURPOSE						REG				REG			
Test Group	Parameter	Filtered	Units	ValQual		Result	Qual	ValQual		Result	Qual	ValQual		Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-		0.324				0.53			-	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-		0.294				0.438			-	
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-		0.153	J	J		0.321				1.37
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-	-	-		-		0.842
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-		-	-	-		-		2.34
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-		-	-	-		-		0.308
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-		-	-	-		-		0.707
Volatiles	Acetone	N	mg/kg	J		0.124		J		0.0297	J	J		0.0282
Volatiles	Benzene	N	mg/kg	J	-	-		-		0.00381	J	J	-	
Volatiles	Butanone, 2-	N	mg/kg	J		0.0103	J	J	-	-		-	-	
Volatiles	Carbon disulfide	N	mg/kg	J	-	-		-	-	-		-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-		-		0.00323	J	J	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-		-		0.00254	J	J	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Naphthalene	N	mg/kg	-	-	-		-		0.00151	J	J	-	
Volatiles	Toluene	N	mg/kg	J	-	-		-		0.00599	J	J	-	
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-		0.0156		J		1.19				0.0309
Volatiles	Trichloroethene	N	mg/kg	-		0.00263	J	J		0.0487		J		0.0122
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	J	-	-		-		0.00171	J	J	-	
Volatiles	Vinyl acetate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Chrysene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-		0.268	J	J		1.03				9.88
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-		0.389	J	J		3.82
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Naphthalene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg		-	-		-	-	-		-		
Pesticides/PCBs	Aroclor 1260	N	mg/kg		-	-		-	-	-		-		
Metals - Unfiltered	Aluminum	N	mg/kg			7710				9960				8330
Metals - Unfiltered	Antimony	N	mg/kg	J		0.303	J	J		0.581				0.488
Metals - Unfiltered	Arsenic	N	mg/kg	J		7.11		J		8.1		J		5.84
Metals - Unfiltered	Barium	N	mg/kg			218				67.7				44.3
Metals - Unfiltered	Beryllium	N	mg/kg	J		6.24		J		7.39		J		5.35
Metals - Unfiltered	Cadmium	N	mg/kg	J		0.699				0.36	J	J		0.338
Metals - Unfiltered	Calcium	N	mg/kg	J		8530		J		3360				43000
Metals - Unfiltered	Chromium	N	mg/kg			10.9				17				13.1
Metals - Unfiltered	Cobalt	N	mg/kg	J		16.5		J		8.62				8.88
Metals - Unfiltered	Copper	N	mg/kg	J		17.5		J		23.9				27.4
Metals - Unfiltered	Iron	N	mg/kg			17500				22700		J		16300
Metals - Unfiltered	Lead	N	mg/kg			14.7				15				15.1
Metals - Unfiltered	Magnesium	N	mg/kg	J		2100		J		3510		J		18300
Metals - Unfiltered	Manganese	N	mg/kg	J		1560		J		706		J		240
Metals - Unfiltered	Mercury	N	mg/kg	J		0.0317				0.0198	J	J	-	
Metals - Unfiltered	Nickel	N	mg/kg	J		21.9		J		31.4		J		24.9
Metals - Unfiltered	Potassium	N	mg/kg			285				748				1020
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg			24				45.7				96.4
Metals - Unfiltered	Thallium	N	mg/kg	J	-	-		-		0.357	J	J		0.416
Metals - Unfiltered	Vanadium	N	mg/kg			23.7				24.7				21.7
Metals - Unfiltered	Zinc	N	mg/kg			44.9				70.2				60.4
Water Quality Parameters	% Solids	N	Percent											
Water Quality Parameters	Total organic carbon	N	mg/kg			3040	B							

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB02			LBA-SB03			LBA-SB03		
SAMPLE_NO				LBA0006			LBA0007			LBA0008		
SAMPLE_DATE				19-Jan-09			20-Jan-09			20-Jan-09		
FK_DEPTH				8 - 10 Ft			0 - 1 Ft			0 - 1 Ft		
SAMPLE_PURPOSE				REG			REG			FD		
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg			-	-	-	-	-		-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg		J	-	-	-	-	-		-
Explosives	Nitrotoluene, 2-	N	mg/kg			-	-	-	-	-		-
Explosives	Nitrotoluene, 3-	N	mg/kg			-	-	-	-	-		-
Explosives	Nitrotoluene, 4-	N	mg/kg			-	-	-	-	-		-
Volatiles	Acetone	N	mg/kg	J	J		0.133		J	0.08		J
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Butanone, 2-	N	mg/kg	-	-		0.0129	J	J	0.0092	J	J
Volatiles	Carbon disulfide	N	mg/kg	-	-		0.00254	J	J	0.00735	J	J
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Toluene	N	mg/kg	-	-	-	-	-		0.00104	J	J
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg			-	-	-		0.00139	J	J
Volatiles	Trichloroethene	N	mg/kg			-	-	-	-	-		-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-		0.0706	J	J
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-		0.0811	J	J
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-		0.0645	J	J	0.236	J	J
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-		0.054	J	J	0.187	J	J
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-		0.0996	J	J	0.284	J	J
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-		0.106	J	J
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Chrysene	N	mg/kg	-	-		0.0808	J	J	0.232	J	J
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-		0.059	J	J	-		-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg			-	-	-	-	-		-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg			-	-	-	-	-		-
Semivolatiles	Fluoranthene	N	mg/kg	-	-		0.141	J	J	0.455		J
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-		0.13	J	J
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Phenanthrene	N	mg/kg	-	-		0.072	J	J	0.161	J	J
Semivolatiles	Pyrene	N	mg/kg	-	-		0.111	J	J	0.337	J	J
Pesticides/PCBs	Aroclor 1221	N	mg/kg			-	-	-	-	-		-
Pesticides/PCBs	Aroclor 1260	N	mg/kg				0.0798			0.104		
Metals - Unfiltered	Aluminum	N	mg/kg				6790			6330		
Metals - Unfiltered	Antimony	N	mg/kg	J	J		0.954			0.759		
Metals - Unfiltered	Arsenic	N	mg/kg		J		8.05		J	11.5		J
Metals - Unfiltered	Barium	N	mg/kg				51.9		J	152		J
Metals - Unfiltered	Beryllium	N	mg/kg		J		5.73		J	8.07		J
Metals - Unfiltered	Cadmium	N	mg/kg	J	J		0.525			0.819		
Metals - Unfiltered	Calcium	N	mg/kg		J		4600			4500		
Metals - Unfiltered	Chromium	N	mg/kg				10.7			10.1		
Metals - Unfiltered	Cobalt	N	mg/kg		J		6.14		J	33.2		J
Metals - Unfiltered	Copper	N	mg/kg		J		14.2			13.8		
Metals - Unfiltered	Iron	N	mg/kg				16300		J	29100		J
Metals - Unfiltered	Lead	N	mg/kg				103		J	39.9		J
Metals - Unfiltered	Magnesium	N	mg/kg		J		2010		J	2160		J
Metals - Unfiltered	Manganese	N	mg/kg		J		287		J	1680		J
Metals - Unfiltered	Mercury	N	mg/kg	-	-		0.042			0.0441		
Metals - Unfiltered	Nickel	N	mg/kg		J		14		J	25.1		J
Metals - Unfiltered	Potassium	N	mg/kg				628			624		
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-	-	-	-		-
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-	-	-	-		-
Metals - Unfiltered	Sodium	N	mg/kg				34.6			45.8		
Metals - Unfiltered	Thallium	N	mg/kg	J	J	-	-	-		0.308	J	J
Metals - Unfiltered	Vanadium	N	mg/kg				20.1			22		
Metals - Unfiltered	Zinc	N	mg/kg				67.6			71.8		
Water Quality Parameters	% Solids	N	Percent									
Water Quality Parameters	Total organic carbon	N	mg/kg									

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB03			LBA-SB03			LBA-SB03	
SAMPLE_NO				LBA0009			LBA0010			LBA0011	
SAMPLE_DATE				20-Jan-09			20-Jan-09			20-Jan-09	
FK_DEPTH				0 - 1 Ft			2_5 - 3_2 Ft			8 - 10 Ft	
SAMPLE_PURPOSE				FS			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Acetone	N	mg/kg	0.1		-	-	-	-	-	-
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-		0.0158	J
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Naphthalene	N	mg/kg			-	-	-	-	-	-
Volatiles	Toluene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	-	-		0.0928	
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg			-	-	-	-	-	-
Volatiles	Vinyl acetate	N	mg/kg			-	-	-	-	-	-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-	-	-	-	-			
Pesticides/PCBs	Aroclor 1260	N	mg/kg	0.24		-	-	-			
Metals - Unfiltered	Aluminum	N	mg/kg	7680			8700			7110	
Metals - Unfiltered	Antimony	N	mg/kg	-	-	-	0.348	J	J	0.407	J
Metals - Unfiltered	Arsenic	N	mg/kg	10.3			4.42		J	6.28	
Metals - Unfiltered	Barium	N	mg/kg	106			61.2			58.2	
Metals - Unfiltered	Beryllium	N	mg/kg	-	-	-	6.18		J	5.32	
Metals - Unfiltered	Cadmium	N	mg/kg	0.81		-	-		-	0.315	J
Metals - Unfiltered	Calcium	N	mg/kg	4840			2970			53500	
Metals - Unfiltered	Chromium	N	mg/kg	10.8			13.8			11.1	
Metals - Unfiltered	Cobalt	N	mg/kg	16.9			6.63			8.91	
Metals - Unfiltered	Copper	N	mg/kg	17			11.8			27.5	
Metals - Unfiltered	Iron	N	mg/kg	25100			17300		J	16900	
Metals - Unfiltered	Lead	N	mg/kg	28.6			9.31			14	
Metals - Unfiltered	Magnesium	N	mg/kg	2450			2200		J	19400	
Metals - Unfiltered	Manganese	N	mg/kg	1240		J	228		J	475	
Metals - Unfiltered	Mercury	N	mg/kg	-	-	-	0.055			0.158	J
Metals - Unfiltered	Nickel	N	mg/kg	29.8			20.3		J	23.5	
Metals - Unfiltered	Potassium	N	mg/kg	949			342			866	
Metals - Unfiltered	Selenium	N	mg/kg	0.85		-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg	-	-	-	52.9			110	
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	-		-	0.327	J
Metals - Unfiltered	Vanadium	N	mg/kg	17.1			20.9			18.3	
Metals - Unfiltered	Zinc	N	mg/kg	58			60.5			56.4	
Water Quality Parameters	% Solids	N	Percent	80.6							
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE						LBA-SB04				LBA-SB04			
SAMPLE_NO						LBA0014				LBA0012			
SAMPLE_DATE						16-Jan-09				19-Jan-09			
FK_DEPTH						8 - 10 Ft				_9 - 1_9 Ft			
SAMPLE_PURPOSE						REG				REG			
Test Group	Parameter	Filtered	Units	ValQual		Result	Qual	ValQual		Result	Qual	ValQual		Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-		-	-	-		-		0.163
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Acetone	N	mg/kg	-	-	-		-		0.0303	J	J		0.0219
Volatiles	Benzene	N	mg/kg	-		0.00225	J	J	-	-		-	-	
Volatiles	Butanone, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Carbon disulfide	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg	J		0.00263	J	J	-	-		-	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-		0.00986	J	J	-	-		-	-	
Volatiles	Naphthalene	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Toluene	N	mg/kg	-		0.00338	J	J	-	-		-	-	
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg			0.115			-	-		-	-	
Volatiles	Trichloroethene	N	mg/kg	-		0.121			-	-		-	-	
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Vinyl acetate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Chrysene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Naphthalene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg						-	-		-	-	
Pesticides/PCBs	Aroclor 1260	N	mg/kg						-	-		-	-	
Metals - Unfiltered	Aluminum	N	mg/kg			7750				5800				5390
Metals - Unfiltered	Antimony	N	mg/kg	J		0.381	J	J	-	-		-	-	
Metals - Unfiltered	Arsenic	N	mg/kg	J		9.37		J		5.2		J		4.58
Metals - Unfiltered	Barium	N	mg/kg			41.8				22.1				20.7
Metals - Unfiltered	Beryllium	N	mg/kg	J		5.94		J		5.24		J		5.21
Metals - Unfiltered	Cadmium	N	mg/kg	J		0.291	J	J	-	-		-	-	
Metals - Unfiltered	Calcium	N	mg/kg	J		51800		J		1620				2250
Metals - Unfiltered	Chromium	N	mg/kg			11.9				11.8				12
Metals - Unfiltered	Cobalt	N	mg/kg	J		7.58		J		4.82				4.35
Metals - Unfiltered	Copper	N	mg/kg	J		26.1		J		8.81				8.67
Metals - Unfiltered	Iron	N	mg/kg			18700				14800		J		14200
Metals - Unfiltered	Lead	N	mg/kg			15.4				6.88				7.39
Metals - Unfiltered	Magnesium	N	mg/kg	J		18900		J		913		J		1050
Metals - Unfiltered	Manganese	N	mg/kg	J		367		J		324		J		253
Metals - Unfiltered	Mercury	N	mg/kg	J		0.0144	J	J		0.0188	J	J		0.0118
Metals - Unfiltered	Nickel	N	mg/kg	J		21.6		J		11.8		J		11.1
Metals - Unfiltered	Potassium	N	mg/kg			983				188				205
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg			105				37.8				40
Metals - Unfiltered	Thallium	N	mg/kg	J		0.34	J	J	-	-		-	-	
Metals - Unfiltered	Vanadium	N	mg/kg			19.2				27.5				25.5
Metals - Unfiltered	Zinc	N	mg/kg			55.8				30				30
Water Quality Parameters	% Solids	N	Percent											
Water Quality Parameters	Total organic carbon	N	mg/kg											

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB04			LBA-SB05			LBA-SB05		
SAMPLE_NO				LBA0013			LBA0015			LBA0016		
SAMPLE_DATE				19-Jan-09			19-Jan-09			20-Jan-09		
FK_DEPTH				3_9 - 5_9 Ft			0 - 1 Ft			3 - 5 Ft		
SAMPLE_PURPOSE				REG			REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	J	J	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Acetone	N	mg/kg	J	J		0.112	J	-	-	-	-
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	mg/kg	-	-		0.0113	J	J	-	-	-
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-		0.00427	J	J
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Toluene	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-		0.00538	J	J	0.0132		
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-	-	-	-	-	-	-	-	-
Pesticides/PCBs	Aroclor 1260	N	mg/kg	-	-	-	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	mg/kg				8260			11000		
Metals - Unfiltered	Antimony	N	mg/kg	-	-	-	-	-		0.684		
Metals - Unfiltered	Arsenic	N	mg/kg		J		5.97		J	11.6		J
Metals - Unfiltered	Barium	N	mg/kg				60.1			61.3		
Metals - Unfiltered	Beryllium	N	mg/kg		J		5.36		J	8.55		J
Metals - Unfiltered	Cadmium	N	mg/kg	-	-		0.253	J	J	0.305	J	J
Metals - Unfiltered	Calcium	N	mg/kg				5520			3050		
Metals - Unfiltered	Chromium	N	mg/kg				12.4			18.5		
Metals - Unfiltered	Cobalt	N	mg/kg				4.21			10.1		
Metals - Unfiltered	Copper	N	mg/kg				18.7			30.1		
Metals - Unfiltered	Iron	N	mg/kg		J		14300		J	31600		J
Metals - Unfiltered	Lead	N	mg/kg				12.2			15.9		
Metals - Unfiltered	Magnesium	N	mg/kg		J		1680		J	3940		J
Metals - Unfiltered	Manganese	N	mg/kg		J		201		J	539		J
Metals - Unfiltered	Mercury	N	mg/kg	J	J		0.0353			0.0238		
Metals - Unfiltered	Nickel	N	mg/kg		J		14.5		J	32.3		J
Metals - Unfiltered	Potassium	N	mg/kg				481			1020		
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-	-	-	-	-	-
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	mg/kg				41.7			55.4		
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	-	-		0.402	J	J
Metals - Unfiltered	Vanadium	N	mg/kg				21.6			27.6		
Metals - Unfiltered	Zinc	N	mg/kg				48.1			81.4		
Water Quality Parameters	% Solids	N	Percent									
Water Quality Parameters	Total organic carbon	N	mg/kg									

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB05			LBA-SB06			LBA-SB06	
SAMPLE_NO				LBA0017			LBA0018			LBA0019	
SAMPLE_DATE				20-Jan-09			20-Jan-09			20-Jan-09	
FK_DEPTH				8 - 10 Ft			0 - 1 Ft			3 - 5 Ft	
SAMPLE_PURPOSE				REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-		-	-		-	-	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-		-	-		-	-	
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-		-	-		-	-	
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-		-	-		-	-	
Explosives	Nitrotoluene, 2-	N	mg/kg	-		-	-		-	-	
Explosives	Nitrotoluene, 3-	N	mg/kg	-		-	-		-	-	
Explosives	Nitrotoluene, 4-	N	mg/kg	-		-	-		-	-	
Volatiles	Acetone	N	mg/kg	0.021	J	J	0.104		J	-	
Volatiles	Benzene	N	mg/kg	-		-	-		-	0.00303	J
Volatiles	Butanone, 2-	N	mg/kg	-		-	0.00827	J	J	-	
Volatiles	Carbon disulfide	N	mg/kg	0.00307	J	J	-		-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg	0.0345		J	-		-	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg	0.00563	J	J	-		-	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-		-	-		-	-	
Volatiles	Naphthalene	N	mg/kg	-		-	-		-	-	
Volatiles	Toluene	N	mg/kg	-		-	-		-	0.00576	J
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	0.324	J	J	-		-	-	
Volatiles	Trichloroethene	N	mg/kg	-		-	-		-	-	
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-		-	-		-	0.00178	J
Volatiles	Vinyl acetate	N	mg/kg	-		-	-		-	-	
Semivolatiles	Acenaphthylene	N	mg/kg	-		-	0.224	J	J	-	
Semivolatiles	Anthracene	N	mg/kg	-		-	0.381	J	J	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-		-	0.652	J	J	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-		-	0.395	J	J	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-		-	0.878	J	J	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-		-	-		-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-		-	-		-	-	
Semivolatiles	Chrysene	N	mg/kg	-		-	0.784	J	J	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-		-	0.461	J	J	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-		-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-		-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-		-	-		-	-	
Semivolatiles	Fluoranthene	N	mg/kg	-		-	1.26	J	J	-	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-		-	-		-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-		-	1.66	J	J	-	
Semivolatiles	Naphthalene	N	mg/kg	-		-	1.02	J	J	-	
Semivolatiles	Phenanthrene	N	mg/kg	-		-	0.843	J	J	-	
Semivolatiles	Pyrene	N	mg/kg	-		-	1.13	J	J	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg				-		-	-	
Pesticides/PCBs	Aroclor 1260	N	mg/kg				-		-	-	
Metals - Unfiltered	Aluminum	N	mg/kg	6920			7020			7410	
Metals - Unfiltered	Antimony	N	mg/kg	0.403	J	J	0.377	J	J	0.341	J
Metals - Unfiltered	Arsenic	N	mg/kg	7.92		J	11.3		J	7.5	
Metals - Unfiltered	Barium	N	mg/kg	64.4			68			46.1	
Metals - Unfiltered	Beryllium	N	mg/kg	5.69		J	9.26		J	6.59	
Metals - Unfiltered	Cadmium	N	mg/kg	-		-	0.338	J	J	0.254	J
Metals - Unfiltered	Calcium	N	mg/kg	51200		J	5080			47700	
Metals - Unfiltered	Chromium	N	mg/kg	11			11.5			11.6	
Metals - Unfiltered	Cobalt	N	mg/kg	8.37		J	9.09			9.71	
Metals - Unfiltered	Copper	N	mg/kg	26.8		J	16.8			26.7	
Metals - Unfiltered	Iron	N	mg/kg	18100			31400		J	21500	
Metals - Unfiltered	Lead	N	mg/kg	12.4			18.3			11.4	
Metals - Unfiltered	Magnesium	N	mg/kg	18500		J	1800		J	16500	
Metals - Unfiltered	Manganese	N	mg/kg	514		J	519		J	417	
Metals - Unfiltered	Mercury	N	mg/kg	-		-	0.0456			0.014	J
Metals - Unfiltered	Nickel	N	mg/kg	22.3		J	21.7		J	22.9	
Metals - Unfiltered	Potassium	N	mg/kg	823			591			822	
Metals - Unfiltered	Selenium	N	mg/kg	-		-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	-		-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg	100			50.4			93.3	
Metals - Unfiltered	Thallium	N	mg/kg	0.269	J	J	0.294	J	J	0.302	J
Metals - Unfiltered	Vanadium	N	mg/kg	19			24.4			20.3	
Metals - Unfiltered	Zinc	N	mg/kg	57.2			58.4			59	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE						LBA-SB06				LBA-SB06			
SAMPLE_NO						LBA0020				LBA0021			
SAMPLE_DATE						20-Jan-09				20-Jan-09			
FK_DEPTH						8 - 10 Ft				8 - 10 Ft			
SAMPLE_PURPOSE						REG				FD			
Test Group	Parameter	Filtered	Units	ValQual		Result	Qual	ValQual		Result	Qual	ValQual		Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-		-	-	-		-	-	
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Acetone	N	mg/kg	-		0.0151	J	J		0.0352	J	J	-	
Volatiles	Benzene	N	mg/kg	J		0.00254	J	J	-	-		-	-	
Volatiles	Butanone, 2-	N	mg/kg	-	-	-		-		0.00555	J	J	-	
Volatiles	Carbon disulfide	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Naphthalene	N	mg/kg	-	-	-		-	-	-		-		
Volatiles	Toluene	N	mg/kg	J		0.0032	J	J		0.00123	J	J	-	
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Trichloroethene	N	mg/kg	-	-	-		-	-	-		-	-	
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	J	-	-		-	-	-		-		
Volatiles	Vinyl acetate	N	mg/kg	-	-	-		-	-	-		-		
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Chrysene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Naphthalene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-		-	-	-		-	-	
Semivolatiles	Pyrene	N	mg/kg	-	-	-		-	-	-		-	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-										
Pesticides/PCBs	Aroclor 1260	N	mg/kg	-										
Metals - Unfiltered	Aluminum	N	mg/kg			7850				7930				7660
Metals - Unfiltered	Antimony	N	mg/kg	J		0.445	J	J		0.519		J	-	
Metals - Unfiltered	Arsenic	N	mg/kg	J		5.55		J		7.58		J		5
Metals - Unfiltered	Barium	N	mg/kg			42		J		107		J		54.5
Metals - Unfiltered	Beryllium	N	mg/kg	J		5.84		J		7.29		J	-	
Metals - Unfiltered	Cadmium	N	mg/kg	J		0.32	J	J		0.408	J	J	-	
Metals - Unfiltered	Calcium	N	mg/kg	J		47100		J		43900		J		50100
Metals - Unfiltered	Chromium	N	mg/kg			12.4				12.3				13.5
Metals - Unfiltered	Cobalt	N	mg/kg	J		7.78		J		14.5		J		8
Metals - Unfiltered	Copper	N	mg/kg	J		27		J		28.1		J		21.5
Metals - Unfiltered	Iron	N	mg/kg			18400				23500				18200
Metals - Unfiltered	Lead	N	mg/kg			13.6				14.5				8.4
Metals - Unfiltered	Magnesium	N	mg/kg	J		20500		J		17600		J		14600
Metals - Unfiltered	Manganese	N	mg/kg	J		315		J		798		J		351
Metals - Unfiltered	Mercury	N	mg/kg	J		0.0122	J	J		0.0148	J	J	-	
Metals - Unfiltered	Nickel	N	mg/kg	J		23		J		28.2		J		21.4
Metals - Unfiltered	Potassium	N	mg/kg			1010				983				1720
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	-	-	-		-	-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg			106				95.4			-	
Metals - Unfiltered	Thallium	N	mg/kg	J		0.307	J	J		0.385	J	J	-	
Metals - Unfiltered	Vanadium	N	mg/kg			21.2				22.7				17.8
Metals - Unfiltered	Zinc	N	mg/kg			56.1				63.8				48.2
Water Quality Parameters	% Solids	N	Percent											81.4
Water Quality Parameters	Total organic carbon	N	mg/kg											

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB06			LBA-SB07			LBA-SB08		
SAMPLE_NO				LBA0022			LBA0023			LBA0024		
SAMPLE_DATE				20-Jan-09			20-Jan-09			20-Jan-09		
FK_DEPTH				8 - 10 Ft			3 - 4_1 Ft			6 - 8 Ft		
SAMPLE_PURPOSE				FS			REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Volatiles	Acetone	N	mg/kg	-	-							
Volatiles	Benzene	N	mg/kg	-	-							
Volatiles	Butanone, 2-	N	mg/kg	-	-							
Volatiles	Carbon disulfide	N	mg/kg	-	-							
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-							
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-							
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-							
Volatiles	Naphthalene	N	mg/kg									
Volatiles	Toluene	N	mg/kg	-	-							
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-							
Volatiles	Trichloroethene	N	mg/kg	-	-							
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg									
Volatiles	Vinyl acetate	N	mg/kg									
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-		0.163	J	J	0.18	J	J
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-		0.327	J	J	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	0.74	J	J
Semivolatiles	Chrysene	N	mg/kg	-	-		0.251	J	J	0.271	J	J
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-		0.171	J	J	0.23	J	J
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-		0.213	J	J	0.221	J	J
Pesticides/PCBs	Aroclor 1221	N	mg/kg									
Pesticides/PCBs	Aroclor 1260	N	mg/kg									
Metals - Unfiltered	Aluminum	N	mg/kg				9160			7740		
Metals - Unfiltered	Antimony	N	mg/kg	-	-		0.288	J	J	1.46		J
Metals - Unfiltered	Arsenic	N	mg/kg				1.38		J	1.44		J
Metals - Unfiltered	Barium	N	mg/kg				120			94.3		
Metals - Unfiltered	Beryllium	N	mg/kg	-	-		1.2		J	1.15		J
Metals - Unfiltered	Cadmium	N	mg/kg	-	-	-	-		-	0.264	J	J
Metals - Unfiltered	Calcium	N	mg/kg				288000		J	288000		J
Metals - Unfiltered	Chromium	N	mg/kg				6.31			9.62		
Metals - Unfiltered	Cobalt	N	mg/kg				1.74		J	1.65		J
Metals - Unfiltered	Copper	N	mg/kg				9.11		J	10.4		J
Metals - Unfiltered	Iron	N	mg/kg				4920			5390		
Metals - Unfiltered	Lead	N	mg/kg				7.71			10.8		
Metals - Unfiltered	Magnesium	N	mg/kg				23500		J	28500		J
Metals - Unfiltered	Manganese	N	mg/kg		J		1050		J	965		J
Metals - Unfiltered	Mercury	N	mg/kg	-	-		0.0159	J	J	0.00931	J	J
Metals - Unfiltered	Nickel	N	mg/kg				5.06		J	5.58		J
Metals - Unfiltered	Potassium	N	mg/kg				462			411		
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-		-	-		-
Metals - Unfiltered	Silver	N	mg/kg	-	-		0.48			1.01		
Metals - Unfiltered	Sodium	N	mg/kg	-	-		262			223		
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	-		-	-		-
Metals - Unfiltered	Vanadium	N	mg/kg				6.31			6.6		
Metals - Unfiltered	Zinc	N	mg/kg				33.9			44.7		
Water Quality Parameters	% Solids	N	Percent									
Water Quality Parameters	Total organic carbon	N	mg/kg									

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB09			LBA-SB10			LBA-SB10	
SAMPLE_NO				LBA0025			LBA0026			LBA0027	
SAMPLE_DATE				20-Jan-09			19-Jan-09			19-Jan-09	
FK_DEPTH				6 - 8 Ft			0 - 1 Ft			0 - 1 Ft	
SAMPLE_PURPOSE				REG			REG			FD	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Acetone	N	mg/kg				0.339	J	J	0.087	
Volatiles	Benzene	N	mg/kg			-	-		-	-	
Volatiles	Butanone, 2-	N	mg/kg				0.0147	J	J	0.0078	J
Volatiles	Carbon disulfide	N	mg/kg			-	-		-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg			-	-		-	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg			-	-		-	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg			-	-		-	-	
Volatiles	Naphthalene	N	mg/kg			-	-		-	-	
Volatiles	Toluene	N	mg/kg			-	-		-	-	
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg			-	-		-	-	
Volatiles	Trichloroethene	N	mg/kg			-	-		-	-	
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg			-	-		-	-	
Volatiles	Vinyl acetate	N	mg/kg			-	-		-	0.00197	Q1,
Semivolatiles	Acenaphthylene	N	mg/kg	0.195	J	J	-		-	-	
Semivolatiles	Anthracene	N	mg/kg	0.257	J	J	-		-	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	0.651	J	J	-		-	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	0.498	J	J	-		-	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	1.01	J	J	-		-	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	0.241	J	J	-		-	-	
Semivolatiles	Chrysene	N	mg/kg	0.719	J	J	-		-	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Fluoranthene	N	mg/kg	1.02	J	J	-		-	0.0401	J
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-		-	-	
Semivolatiles	Phenanthrene	N	mg/kg	0.202	J	J	-		-	-	
Semivolatiles	Pyrene	N	mg/kg	0.91	J	J	-		-	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg			-	-		-	-	
Pesticides/PCBs	Aroclor 1260	N	mg/kg			-	-		-	-	
Metals - Unfiltered	Aluminum	N	mg/kg	2200			7210			5830	
Metals - Unfiltered	Antimony	N	mg/kg	1.24		J	0.573		J	0.247	J
Metals - Unfiltered	Arsenic	N	mg/kg	3.41		J	9.26		J	6.74	
Metals - Unfiltered	Barium	N	mg/kg	26.7			50.5		J	39.6	
Metals - Unfiltered	Beryllium	N	mg/kg	1.14		J	6.41		J	5.17	
Metals - Unfiltered	Cadmium	N	mg/kg	0.221	J	J	0.492	J	J	0.261	J
Metals - Unfiltered	Calcium	N	mg/kg	240000		J	4380		J	3220	
Metals - Unfiltered	Chromium	N	mg/kg	4.63			13.2		J	10.8	
Metals - Unfiltered	Cobalt	N	mg/kg	2.13		J	7.31		J	4.75	
Metals - Unfiltered	Copper	N	mg/kg	11.4		J	13.6			10.4	
Metals - Unfiltered	Iron	N	mg/kg	6980			18300			14600	
Metals - Unfiltered	Lead	N	mg/kg	12.9			16		J	11.9	
Metals - Unfiltered	Magnesium	N	mg/kg	29600		J	1650		J	1220	
Metals - Unfiltered	Manganese	N	mg/kg	369		J	281			187	
Metals - Unfiltered	Mercury	N	mg/kg	0.017	J	J	0.0318			0.0266	
Metals - Unfiltered	Nickel	N	mg/kg	7.33		J	20.1		J	15.3	
Metals - Unfiltered	Potassium	N	mg/kg	305			374			293	
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-		-	-	
Metals - Unfiltered	Silver	N	mg/kg	2.25		-	-		-	-	
Metals - Unfiltered	Sodium	N	mg/kg	142			30.8			23.5	
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-	0.558		-	-	
Metals - Unfiltered	Vanadium	N	mg/kg	7.96			25.4			20.6	
Metals - Unfiltered	Zinc	N	mg/kg	16.3			60.1		J	47.5	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE						LBA-SB10				LBA-SB10			
SAMPLE_NO						LBA0028				LBA0029			
SAMPLE_DATE						19-Jan-09				19-Jan-09			
FK_DEPTH						0 - 1 Ft				3 - 4_4 Ft			
SAMPLE_PURPOSE						FS				REG			
Test Group	Parameter	Filtered	Units	ValQual		Result	Qual	ValQual		Result	Qual	ValQual	Result
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-		0.378
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Acetone	N	mg/kg	J		0.072				0.0524		J	0.0247
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Butanone, 2-	N	mg/kg	J	-	-	-	-	-	-	-	-	
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Naphthalene	N	mg/kg	-					-	-	-	-	
Volatiles	Toluene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-					-	-	-	-	
Volatiles	Vinyl acetate	N	mg/kg	UJ					-	-	-	-	
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	-	-	-	-	-	-	-	-		0.352
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-	-		0.0771
Semivolatiles	Fluoranthene	N	mg/kg	J	-	-	-	-	-	-	-	-	
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-	-	-	
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-	-	-	-	-	-	-	-		
Pesticides/PCBs	Aroclor 1260	N	mg/kg	-	-	-	-	-	-	-	-		
Metals - Unfiltered	Aluminum	N	mg/kg			7240				7180			12000
Metals - Unfiltered	Antimony	N	mg/kg	J	-	-		-		0.317	J	J	0.814
Metals - Unfiltered	Arsenic	N	mg/kg	J		5.9				12.2		J	15.3
Metals - Unfiltered	Barium	N	mg/kg	J		37.9				76.6		J	63.1
Metals - Unfiltered	Beryllium	N	mg/kg	J	-	-		-		7.47		J	9.03
Metals - Unfiltered	Cadmium	N	mg/kg	J	-	-		-		0.486			0.671
Metals - Unfiltered	Calcium	N	mg/kg	J		3000				3980		J	7120
Metals - Unfiltered	Chromium	N	mg/kg	J		13.9				12.9		J	19
Metals - Unfiltered	Cobalt	N	mg/kg	J	-	-		-		14.5		J	24.4
Metals - Unfiltered	Copper	N	mg/kg			10.2				13.5			31.5
Metals - Unfiltered	Iron	N	mg/kg			17800				23700			28800
Metals - Unfiltered	Lead	N	mg/kg	J		9				10.9		J	21.7
Metals - Unfiltered	Magnesium	N	mg/kg	J		1410				1530		J	5500
Metals - Unfiltered	Manganese	N	mg/kg			160		J		726			1140
Metals - Unfiltered	Mercury	N	mg/kg		-	-		-		0.0272			0.0167
Metals - Unfiltered	Nickel	N	mg/kg	J		15.3				33.1		J	43.5
Metals - Unfiltered	Potassium	N	mg/kg		-	-		-		320			1030
Metals - Unfiltered	Selenium	N	mg/kg	-		0.61			-	-		-	
Metals - Unfiltered	Silver	N	mg/kg	-	-	-		-	-	-		-	
Metals - Unfiltered	Sodium	N	mg/kg		-	-		-		26.7			53.4
Metals - Unfiltered	Thallium	N	mg/kg	-	-	-		-	-	-		-	0.678
Metals - Unfiltered	Vanadium	N	mg/kg			26.2				27.7			27.9
Metals - Unfiltered	Zinc	N	mg/kg	J		45.5				102		J	96.9
Water Quality Parameters	% Solids	N	Percent			82.5							
Water Quality Parameters	Total organic carbon	N	mg/kg										

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB10			LBA-SB11			LBA-SB11		
SAMPLE_NO				LBA0030			LBA0031			LBA0032		
SAMPLE_DATE				19-Jan-09			19-Jan-09			19-Jan-09		
FK_DEPTH				8 - 10 Ft			0 - 1 Ft			3_9 - 5_9 Ft		
SAMPLE_PURPOSE				REG			REG			REG		
Test Group	Parameter	Filtered	Units	Qual	ValQual		Result	Qual	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-		0.527		-	-		-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg				1.13			0.947		
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-	-	-	-		-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Acetone	N	mg/kg	J	J		0.265	J		0.0388	J	J
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Butanone, 2-	N	mg/kg	-	-		0.0136	J	J	-		-
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Toluene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-	-	-	-		-
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	J	J		1.29			0.866		
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	J	J		0.204	J	J	0.129	J	J
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-		-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-		-
Pesticides/PCBs	Aroclor 1221	N	mg/kg			-	-	-	-	-		-
Pesticides/PCBs	Aroclor 1260	N	mg/kg				0.0629	P	J	0.061	P	J
Metals - Unfiltered	Aluminum	N	mg/kg				6690			8940		
Metals - Unfiltered	Antimony	N	mg/kg			-	-		-	0.27	J	J
Metals - Unfiltered	Arsenic	N	mg/kg		J		8.54		J	11		J
Metals - Unfiltered	Barium	N	mg/kg		J		55.2		J	154		J
Metals - Unfiltered	Beryllium	N	mg/kg		J		6.88		J	8.88		J
Metals - Unfiltered	Cadmium	N	mg/kg			-	-		-	-		-
Metals - Unfiltered	Calcium	N	mg/kg		J		1970		J	1460		J
Metals - Unfiltered	Chromium	N	mg/kg		J		14.7		J	16.4		J
Metals - Unfiltered	Cobalt	N	mg/kg		J		4.68		J	53.8		J
Metals - Unfiltered	Copper	N	mg/kg				14.2			15.3		
Metals - Unfiltered	Iron	N	mg/kg				21600			33900		
Metals - Unfiltered	Lead	N	mg/kg		J		10		J	12.9		J
Metals - Unfiltered	Magnesium	N	mg/kg		J		1070		J	1530		J
Metals - Unfiltered	Manganese	N	mg/kg				115			3000		
Metals - Unfiltered	Mercury	N	mg/kg	J	J		0.026			0.0299		
Metals - Unfiltered	Nickel	N	mg/kg		J		14.3		J	38.2		J
Metals - Unfiltered	Potassium	N	mg/kg				242			363		
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-		-	0.516	J	J
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-		-	-		-
Metals - Unfiltered	Sodium	N	mg/kg				18.8			29.2		
Metals - Unfiltered	Thallium	N	mg/kg			-	-		-	0.294	J	J
Metals - Unfiltered	Vanadium	N	mg/kg				25.7			28.2		
Metals - Unfiltered	Zinc	N	mg/kg		J		69.9		J	113		J
Water Quality Parameters	% Solids	N	Percent									
Water Quality Parameters	Total organic carbon	N	mg/kg									

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SB11			LBA-SB12			LBA-SB12	
SAMPLE_NO				LBA0033			LBA0034			LBA0035	
SAMPLE_DATE				19-Jan-09			19-Jan-09			19-Jan-09	
FK_DEPTH				8 - 10 Ft			0 - 1 Ft			3 - 3_9 Ft	
SAMPLE_PURPOSE				REG			REG			REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg	5.68			-	-		0.393	
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	4.12			-	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	22.7			-	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	1.52			-	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	11.8			-	-	-	-	-
Volatiles	Acetone	N	mg/kg	0.0301	J	J	0.152		J	0.0464	J
Volatiles	Benzene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Butanone, 2-	N	mg/kg	-	-	-	0.00999	J	J	-	-
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Toluene	N	mg/kg	0.00324	J	J	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-	-	-	-	-
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	5.82			-	-		0.23	J
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	2.49			-	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	0.0499	J	J	-	-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-	-	-	-	-
Pesticides/PCBs	Aroclor 1221	N	mg/kg				0.19		-	-	
Pesticides/PCBs	Aroclor 1260	N	mg/kg				-	-	-	-	
Metals - Unfiltered	Aluminum	N	mg/kg	10400			5950			7140	
Metals - Unfiltered	Antimony	N	mg/kg	0.505			0.25	J	J	-	-
Metals - Unfiltered	Arsenic	N	mg/kg	5.19		J	8.68		J	6.83	
Metals - Unfiltered	Barium	N	mg/kg	62.4		J	93.8		J	74.4	
Metals - Unfiltered	Beryllium	N	mg/kg	6.78		J	6.74		J	7.02	
Metals - Unfiltered	Cadmium	N	mg/kg	0.313	J	J	0.503		-	-	
Metals - Unfiltered	Calcium	N	mg/kg	37600		J	3650		J	1320	
Metals - Unfiltered	Chromium	N	mg/kg	15.3		J	11.7		J	14.7	
Metals - Unfiltered	Cobalt	N	mg/kg	12.7		J	21.3		J	17.2	
Metals - Unfiltered	Copper	N	mg/kg	31.6			12			12.8	
Metals - Unfiltered	Iron	N	mg/kg	22000			19800			21800	
Metals - Unfiltered	Lead	N	mg/kg	15.4		J	12.9		J	9.64	
Metals - Unfiltered	Magnesium	N	mg/kg	15600		J	1360		J	1240	
Metals - Unfiltered	Manganese	N	mg/kg	796			1160			493	
Metals - Unfiltered	Mercury	N	mg/kg	-	-	-	0.0309			0.0287	
Metals - Unfiltered	Nickel	N	mg/kg	33.2		J	22.6		J	23.6	
Metals - Unfiltered	Potassium	N	mg/kg	1210			433			264	
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-	-	-	-	-
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	mg/kg	87.7			26.9			27.8	
Metals - Unfiltered	Thallium	N	mg/kg	0.336	J	J	-	-	-	-	
Metals - Unfiltered	Vanadium	N	mg/kg	23.7			23.5			22.5	
Metals - Unfiltered	Zinc	N	mg/kg	74			64.5		J	80.1	
Water Quality Parameters	% Solids	N	Percent								
Water Quality Parameters	Total organic carbon	N	mg/kg								

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-SB12		
SAMPLE_NO					LBA0036		
SAMPLE_DATE					19-Jan-09		
FK_DEPTH					8 - 10 Ft		
SAMPLE_PURPOSE					REG		
Test Group	Parameter	Filtered	Units	ValQual	Result	Qual	ValQual
Explosives	Amino-2,6-dinitrotoluene, 4-	N	mg/kg	-	-	-	-
Explosives	Amino-4,6-dinitrotoluene, 2-	N	mg/kg	-	-	-	-
Explosives	Dinitrotoluene, 2,4-	N	mg/kg		-	-	-
Explosives	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-
Explosives	Nitrotoluene, 2-	N	mg/kg	-	-	-	-
Explosives	Nitrotoluene, 3-	N	mg/kg	-	-	-	-
Explosives	Nitrotoluene, 4-	N	mg/kg	-	-	-	-
Volatiles	Acetone	N	mg/kg	J	0.0525	J	J
Volatiles	Benzene	N	mg/kg	-	-	-	-
Volatiles	Butanone, 2-	N	mg/kg	-	0.00791	J	J
Volatiles	Carbon disulfide	N	mg/kg	-	-	-	-
Volatiles	Dichloroethane, 1,1-	N	mg/kg	-	-	-	-
Volatiles	Dichloroethene, 1,1-	N	mg/kg	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	mg/kg	-	-	-	-
Volatiles	Naphthalene	N	mg/kg	-	-	-	-
Volatiles	Toluene	N	mg/kg	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	mg/kg	-	-	-	-
Volatiles	Trichloroethene	N	mg/kg	-	-	-	-
Volatiles	Trimethylbenzene, 1,2,4-	N	mg/kg	-	-	-	-
Volatiles	Vinyl acetate	N	mg/kg	-	-	-	-
Semivolatiles	Acenaphthylene	N	mg/kg	-	-	-	-
Semivolatiles	Anthracene	N	mg/kg	-	-	-	-
Semivolatiles	Benzo(a)anthracene	N	mg/kg	-	-	-	-
Semivolatiles	Benzo(a)pyrene	N	mg/kg	-	-	-	-
Semivolatiles	Benzo(b)fluoranthene	N	mg/kg	-	-	-	-
Semivolatiles	Benzo(ghi)perylene	N	mg/kg	-	-	-	-
Semivolatiles	Bis(2-ethylhexyl)phthalate	N	mg/kg	-	-	-	-
Semivolatiles	Chrysene	N	mg/kg	-	-	-	-
Semivolatiles	Dibenzofuran	N	mg/kg	-	-	-	-
Semivolatiles	Di-n-butyl phthalate	N	mg/kg	-	-	-	-
Semivolatiles	Dinitrotoluene, 2,4-	N	mg/kg	J	-	-	-
Semivolatiles	Dinitrotoluene, 2,6-	N	mg/kg	-	-	-	-
Semivolatiles	Fluoranthene	N	mg/kg	-	-	-	-
Semivolatiles	Indeno(1,2,3-cd)pyrene	N	mg/kg	-	-	-	-
Semivolatiles	Methylnaphthalene, 2-	N	mg/kg	-	-	-	-
Semivolatiles	Naphthalene	N	mg/kg	-	-	-	-
Semivolatiles	Phenanthrene	N	mg/kg	-	-	-	-
Semivolatiles	Pyrene	N	mg/kg	-	-	-	-
Pesticides/PCBs	Aroclor 1221	N	mg/kg	-			
Pesticides/PCBs	Aroclor 1260	N	mg/kg	-			
Metals - Unfiltered	Aluminum	N	mg/kg		11800		
Metals - Unfiltered	Antimony	N	mg/kg	-	0.306	J	J
Metals - Unfiltered	Arsenic	N	mg/kg	J	6.6		J
Metals - Unfiltered	Barium	N	mg/kg	J	58.6		J
Metals - Unfiltered	Beryllium	N	mg/kg	J	7.35		J
Metals - Unfiltered	Cadmium	N	mg/kg	-	-	-	-
Metals - Unfiltered	Calcium	N	mg/kg	J	32200		J
Metals - Unfiltered	Chromium	N	mg/kg	J	17.6		J
Metals - Unfiltered	Cobalt	N	mg/kg	J	8.82		J
Metals - Unfiltered	Copper	N	mg/kg		28.4		
Metals - Unfiltered	Iron	N	mg/kg		23800		
Metals - Unfiltered	Lead	N	mg/kg	J	12.3		J
Metals - Unfiltered	Magnesium	N	mg/kg	J	10900		J
Metals - Unfiltered	Manganese	N	mg/kg		556		
Metals - Unfiltered	Mercury	N	mg/kg		0.0135	J	J
Metals - Unfiltered	Nickel	N	mg/kg	J	29.1		J
Metals - Unfiltered	Potassium	N	mg/kg		1320		
Metals - Unfiltered	Selenium	N	mg/kg	-	-	-	-
Metals - Unfiltered	Silver	N	mg/kg	-	-	-	-
Metals - Unfiltered	Sodium	N	mg/kg		91.4		
Metals - Unfiltered	Thallium	N	mg/kg	-	0.39	J	J
Metals - Unfiltered	Vanadium	N	mg/kg		24.3		
Metals - Unfiltered	Zinc	N	mg/kg	J	72.4		J
Water Quality Parameters	% Solids	N	Percent				
Water Quality Parameters	Total organic carbon	N	mg/kg				

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW01			LBA-SW02		
SAMPLE_NO				LBA2000			LBA2001		
SAMPLE_DATE				20-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	9.05			5.35		
Field Tests	Oxidation Reduction Potential	N	mV	83.1			156.3		
Field Tests	pH	N	pH_units	7.24			6.98		
Field Tests	Specific Conductivity	N	mS/cm	1.083			1.157		
Field Tests	Temperature	N	C	14.09			12.65		
Field Tests	Turbidity	N	NTU	5.1			3.3		
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.25	J	J	0.39	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	0.47	J	J
Metals - Unfiltered	Aluminum	N	ug/L	1790			1660		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	49.8	B	J	101	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	141000			140000		
Metals - Unfiltered	Chromium	N	ug/L	2.6	B	J	2.8	B	J
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	4.2	B	J
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	2570			4020		
Metals - Unfiltered	Lead	N	ug/L	2.6	B	J	3.2	B	J
Metals - Unfiltered	Magnesium	N	ug/L	27300			27400		
Metals - Unfiltered	Manganese	N	ug/L	554			1760		
Metals - Unfiltered	Nickel	N	ug/L	4.8	B	J	8.9	B	J
Metals - Unfiltered	Potassium	N	ug/L	2260	B	J	6540	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	27600			32400		
Metals - Unfiltered	Vanadium	N	ug/L	5	B	J	4.5	B	J
Metals - Unfiltered	Zinc	N	ug/L	19.7	B	J	32		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm	464					

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW03		
SAMPLE_NO				LBA2002			LBA2003		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			FD		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	7.49					
Field Tests	Oxidation Reduction Potential	N	mV	29.4					
Field Tests	pH	N	pH_units	6.99					
Field Tests	Specific Conductivity	N	mS/cm	1.167					
Field Tests	Temperature	N	C	17.13					
Field Tests	Turbidity	N	NTU	12.7					
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.26	J	J	0.45	J	J
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	0.22	J	J	0.24	J	J
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	0.59	J	J	0.53	J	J
Metals - Unfiltered	Aluminum	N	ug/L	1990			1540		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	64.5	B	J	58.2	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	152000			149000		
Metals - Unfiltered	Chromium	N	ug/L	3.2	B	J	2.9	B	J
Metals - Unfiltered	Cobalt	N	ug/L	2.4	B	J	2.3	B	J
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	4650			3570		
Metals - Unfiltered	Lead	N	ug/L	5	B	J	3.9	B	J
Metals - Unfiltered	Magnesium	N	ug/L	29600			29000		
Metals - Unfiltered	Manganese	N	ug/L	1870			1560		
Metals - Unfiltered	Nickel	N	ug/L	7.9	B	J	6.4	B	J
Metals - Unfiltered	Potassium	N	ug/L	2070	B	J	1900	B	J
Metals - Unfiltered	Selenium	N	ug/L	3.4	B	J	3.8	B	J
Metals - Unfiltered	Sodium	N	ug/L	34700			34300		
Metals - Unfiltered	Vanadium	N	ug/L	5	B	J	4.3	B	J
Metals - Unfiltered	Zinc	N	ug/L	35			30.2		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW03			LBA-SW04		
SAMPLE_NO				LBA2004			LBA2005		
SAMPLE_DATE				21-May-09			21-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				FS			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm				8.02		
Field Tests	Oxidation Reduction Potential	N	mV				24.1		
Field Tests	pH	N	pH_units				7.06		
Field Tests	Specific Conductivity	N	mS/cm				1.12		
Field Tests	Temperature	N	C				17.59		
Field Tests	Turbidity	N	NTU				36		
Volatiles	Dichloroethane, 1,1-	N	ug/L	-	-	-	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	1720			2460		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Barium	N	ug/L	-	-	-	62.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	132000			144000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-	4.1	B	J
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-	2.5	B	J
Metals - Unfiltered	Copper	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Iron	N	ug/L	2850			4920		
Metals - Unfiltered	Lead	N	ug/L	-	-	-	4.3	B	J
Metals - Unfiltered	Magnesium	N	ug/L	26000			27900		
Metals - Unfiltered	Manganese	N	ug/L	1170			1050		
Metals - Unfiltered	Nickel	N	ug/L	-	-	-	8.6	B	J
Metals - Unfiltered	Potassium	N	ug/L	-	-	-	2180	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	35000			25200		
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-	5.7	B	J
Metals - Unfiltered	Zinc	N	ug/L	21.2			31.1		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE				LBA-SW05			LBA-SW06		
SAMPLE_NO				LBA2006			LBA2007		
SAMPLE_DATE				22-May-09			22-May-09		
FK_DEPTH				0 - 0 Ft			0 - 0 Ft		
SAMPLE_PURPOSE				REG			REG		
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	5.8			6.19		
Field Tests	Oxidation Reduction Potential	N	mV	158			103.2		
Field Tests	pH	N	pH_units	6.71			6.81		
Field Tests	Specific Conductivity	N	mS/cm	1.098			0.868		
Field Tests	Temperature	N	C	13.52			14.02		
Field Tests	Turbidity	N	NTU	0.8			294.7		
Volatiles	Dichloroethane, 1,1-	N	ug/L	0.39	J	J	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	2520			23800		
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-	8.8	B	J
Metals - Unfiltered	Barium	N	ug/L	62.2	B	J	155	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-	1.1	B	J
Metals - Unfiltered	Calcium	N	ug/L	146000			114000		
Metals - Unfiltered	Chromium	N	ug/L	4.6	B	J	39.8		
Metals - Unfiltered	Cobalt	N	ug/L	3	B	J	16.3	B	J
Metals - Unfiltered	Copper	N	ug/L	-	-	-	38.5		
Metals - Unfiltered	Iron	N	ug/L	5890			43900		
Metals - Unfiltered	Lead	N	ug/L	5.5	B	J	18		
Metals - Unfiltered	Magnesium	N	ug/L	28600			28100		
Metals - Unfiltered	Manganese	N	ug/L	2220			662		
Metals - Unfiltered	Nickel	N	ug/L	8.7	B	J	71.6		
Metals - Unfiltered	Potassium	N	ug/L	2050	B	J	4920	B	J
Metals - Unfiltered	Selenium	N	ug/L	3.5	B	J	4.4	B	J
Metals - Unfiltered	Sodium	N	ug/L	27000			18200		
Metals - Unfiltered	Vanadium	N	ug/L	6.9	B	J	46.1	B	J
Metals - Unfiltered	Zinc	N	ug/L	33.4			177		
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm						

Appendix J

Detected Hits Summary Excluding "B" Qualifiers
Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION_CODE					LBA-SW07	
SAMPLE_NO					LBA2008	
SAMPLE_DATE					22-May-09	
FK_DEPTH					0 - 0 Ft	
SAMPLE_PURPOSE					REG	
Test Group	Parameter	Filtered	Units	Result	Qual	ValQual
Field Tests	Dissolved Oxygen	N	ppm	4.16		
Field Tests	Oxidation Reduction Potential	N	mV	-34.2		
Field Tests	pH	N	pH_units	6.79		
Field Tests	Specific Conductivity	N	mS/cm	0.949		
Field Tests	Temperature	N	C	11.52		
Field Tests	Turbidity	N	NTU	0		
Volatiles	Dichloroethane, 1,1-	N	ug/L	-	-	-
Volatiles	Dichloroethene, cis-1,2-	N	ug/L	-	-	-
Volatiles	Trichloroethane, 1,1,1-	N	ug/L	-	-	-
Metals - Unfiltered	Aluminum	N	ug/L	11.3	B	B
Metals - Unfiltered	Arsenic	N	ug/L	-	-	-
Metals - Unfiltered	Barium	N	ug/L	41.6	B	J
Metals - Unfiltered	Beryllium	N	ug/L	-	-	-
Metals - Unfiltered	Calcium	N	ug/L	110000		
Metals - Unfiltered	Chromium	N	ug/L	-	-	-
Metals - Unfiltered	Cobalt	N	ug/L	-	-	-
Metals - Unfiltered	Copper	N	ug/L	-	-	-
Metals - Unfiltered	Iron	N	ug/L	1090		
Metals - Unfiltered	Lead	N	ug/L	-	-	-
Metals - Unfiltered	Magnesium	N	ug/L	17400		
Metals - Unfiltered	Manganese	N	ug/L	381		
Metals - Unfiltered	Nickel	N	ug/L	-	-	-
Metals - Unfiltered	Potassium	N	ug/L	1280	B	J
Metals - Unfiltered	Selenium	N	ug/L	-	-	-
Metals - Unfiltered	Sodium	N	ug/L	31700		
Metals - Unfiltered	Vanadium	N	ug/L	-	-	-
Metals - Unfiltered	Zinc	N	ug/L	-	-	-
Water Quality Parameters	HARDNESS (as CaCO3)	N	ppm			

APPENDIX K

DATA QUALITY EVALUATIONS

Table 1

Sample Cross Reference
Former Plum Brook Ordnance Works
Sandusky, Ohio

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	Sample Delivery Group
SS	LBA-SB10	LBA0026	01/19/2009	REG	0901027
SS	LBA-SB10	LBA0027	01/19/2009	FD	0901027
SS	LBA-SB10	LBA0028	01/19/2009	FS/MS/MSD	A9A220198
DS	LBA-SB10	LBA0029	01/19/2009	REG	0901027
DS	LBA-SB10	LBA0030	01/19/2009	REG	0901027
SS	LBA-SB11	LBA0031	01/19/2009	REG	0901027
DS	LBA-SB11	LBA0032	01/19/2009	REG/MS/MSD	0901027
DS	LBA-SB11	LBA0033	01/19/2009	REG	0901027
SS	LBA-SB12	LBA0034	01/19/2009	REG	0901027
DS	LBA-SB12	LBA0035	01/19/2009	REG	0901027
DS	LBA-SB12	LBA0036	01/19/2009	REG	0901027
SS	LBA-SB01	LBA0001	01/20/2009	REG/MS/MSD	0901034
DS	LBA-SB01	LBA0002	01/20/2009	REG	0901034
DS	LBA-SB01	LBA0003	01/20/2009	REG/MS/MSD	0901034
SS	LBA-SB02	LBA0004	01/19/2009	REG	0901034
DS	LBA-SB02	LBA0005	01/19/2009	REG	0901034
DS	LBA-SB02	LBA0006	01/19/2009	REG	0901034
SS	LBA-SB03	LBA0007	01/20/2009	REG	0901034
DS	LBA-SB03	LBA0008	01/20/2009	FD	0901034
SS	LBA-SB03	LBA0009	01/20/2009	FS	A9A220198
DS	LBA-SB03	LBA0010	01/20/2009	REG	0901034
DS	LBA-SB03	LBA0011	01/20/2009	REG	0901034
SS	LBA-SB04	LBA0012	01/19/2009	REG	0901034
DS	LBA-SB04	LBA0013	01/19/2009	REG	0901034
DS	LBA-SB04	LBA0014	01/16/2009	REG	0901034
SS	LBA-SB05	LBA0015	01/19/2009	REG	0901034
DS	LBA-SB05	LBA0016	01/20/2009	REG	0901034
DS	LBA-SB05	LBA0017	01/20/2009	REG	0901034
SS	LBA-SB06	LBA0018	01/20/2009	REG/MS/MSD	0901034
DS	LBA-SB06	LBA0019	01/20/2009	REG/MS/MSD	0901034
DS	LBA-SB06	LBA0020	01/20/2009	REG	0901034
DS	LBA-SB06	LBA0021	01/20/2009	FD	0901034
DS	LBA-SB06	LBA0022	01/20/2009	FS	A9A220198
DS	LBA-SB07	LBA0023	01/20/2009	REG	0901034
DS	LBA-SB08	LBA0024	01/20/2009	REG/MS/MSD	0901034
DS	LBA-SB09	LBA0025	01/20/2009	REG	0901034
GW	LBA-PZ05	LBA3001	01/28/2009	FD	0901043
GW	LBA-PZ05	LBA3002	01/28/2009	FS/MS/MSD	A9A290152
GW	LBA-PZ02	LBA3003	01/29/2009	REG	0901043
GW	LBA-PZ05	LBA3006	01/28/2009	REG/MS/MSD	0901043
GW	LBA-PZ03	LBA3004	01/29/2009	REG	0901046
GW	LBA-PZ01	LBA3000	01/31/2009	REG	0902003
GW	LBA-PZ04	LBA3005	01/30/2009	REG	0902003
GW	LBA-MW03	LB3071	05/10/2009	REG/MS/MSD	F65207
GW	RCA-BEDGW-002	RC3078	05/11/2009	REG	F65210
GW	RCA-MW02	RC3075	05/11/2009	REG	F65210
GW	RCA-MW03	RC3076	05/11/2009	REG/MS/MSD	F65210
GW	LBA-BEDGW-002	LB3073	05/12/2009	REG/MS/MSD	F65220
GW	LBA-MW01	LB3067	05/12/2009	REG	F65220

Table 1

Sample Cross Reference
Former Plum Brook Ordnance Works
Sandusky, Ohio

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	Sample Delivery Group
GW	RCA-MW01	RC3074	05/12/2009	REG/MS/MSD	F65220
GW	LBA-MW02	LB3068	05/19/2009	REG/MS/MSD	F65372
GW	LBA-MW02	LB3069	05/19/2009	FD	F65372
GW	LBA-MW02	LB3070	05/19/2009	FS/MS/MSD	A9E200268
GW	LBA-MW02	LB3074	05/19/2009	REG	F65372
SD	LBA-SD01	LBA1000	05/20/2009	REG	F65383
SW	LBA-SW01	LBA2000	05/20/2009	REG	F65383
SW	LBA-SW02	LBA2001	05/21/2009	REG	F65407
SW	LBA-SW03	LBA2002	05/21/2009	REG	F65407
SW	LBA-SW03	LBA2003	05/21/2009	FD	F65407
SW	LBA-SW03	LBA2004	05/21/2009	FS	A9E220318
SW	LBA-SW04	LBA2005	05/21/2009	REG	F65407
SD	LBA-SD02	LBA1001	05/21/2009	REG	F65408
SD	LBA-SD03	LBA1002	05/21/2009	REG/MS/MSD	F65408
SD	LBA-SD04	LBA1003	05/21/2009	REG	F65408
SW	LBA-SW05	LBA2006	05/22/2009	REG	F65442
SW	LBA-SW06	LBA2007	05/22/2009	REG	F65442
SW	LBA-SW07	LBA2008	05/22/2009	REG/MS/MSD	F65442
SD	LBA-SD05	LBA1004	05/22/2009	REG	F65444
SD	LBA-SD06	LBA1005	05/22/2009	REG	F65444
SD	LBA-SD06	LBA1006	05/22/2009	FD	F65444
SD	LBA-SD06	LBA1007	05/22/2009	FS/MS/MSD	A9E280112
GW	LBA-MW01	LB3075	11/04/2009	REG/MS/MSD	F69251
GW	LBA-MW03	LB3080	11/03/2009	REG	F69251
GW	RCA-MW02	RC3081	11/03/2009	REG	F69251
GW	RCA-MW03	RC3082	11/04/2009	REG	F69251
GW	LBA-MW02	LB3076	11/05/2009	REG/MS/MSD	F69338
GW	LBA-MW02	LB3077	11/05/2009	FD/MS/MSD	F69338
GW	LBA-MW02	LB3079	11/05/2009	FS/MS/MSD	A9K070415
GW	RCA-BEDGW-002	RC3084	11/05/2009	REG	F69338

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03			
SAMPLE_NO			LBA0007		LBA0008		LBA0009			
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09		Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		Percent	Percent
SAMPLE_TYPE			SS		SS		SS		Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS		REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual		
Aluminum	N	mg/kg	6790		6330		7680		7.01	12.30
Antimony	N	mg/kg	0.954		0.759		ND	UJ	22.77	-
Arsenic	N	mg/kg	8.05	J	11.5	J	10.3		35.29	24.52
Barium	N	mg/kg	51.9	J	152	J	106		98.19	68.52
Beryllium	N	mg/kg	5.73	J	8.07	J	ND	U	33.91	-
Cadmium	N	mg/kg	0.525		0.819		0.81		43.75	42.70
Calcium	N	mg/kg	4600		4500		4840		2.20	5.08
Chromium	N	mg/kg	10.7		10.1		10.8		5.77	0.93
Cobalt	N	mg/kg	6.14	J	33.2	J	16.9		137.57	93.40
Copper	N	mg/kg	14.2		13.8		17		2.86	17.95
Iron	N	mg/kg	16300	J	29100	J	25100		56.39	42.51
Lead	N	mg/kg	103	J	39.9	J	28.6		88.31	113.07
Magnesium	N	mg/kg	2010	J	2160	J	2450		7.19	19.73
Manganese	N	mg/kg	287	J	1680	J	1240	J	141.64	124.82
Mercury	N	mg/kg	0.042		0.0441		ND	U	4.88	-
Nickel	N	mg/kg	14	J	25.1	J	29.8		56.78	72.15
Potassium	N	mg/kg	628		624		949		0.64	40.71
Selenium	N	mg/kg	ND	UJ	ND	UJ	0.85		-	-
Sodium	N	mg/kg	34.6		45.8		ND	U	27.86	-
Thallium	N	mg/kg	ND	U	0.308	J	ND	U	-	-
Vanadium	N	mg/kg	20.1		22		17.1		9.03	16.13
Zinc	N	mg/kg	67.6		71.8		58		6.03	15.29
Aroclor 1260	N	mg/kg	0.0798		0.104		0.24		26.33	100.19
Acenaphthylene	N	mg/kg	ND	U	0.0706	J	ND	U	-	-
Anthracene	N	mg/kg	ND	U	0.0811	J	ND	U	-	-
Benzo(a)anthracene	N	mg/kg	0.0645	J	0.236	J	ND	U	114.14	-
Benzo(a)pyrene	N	mg/kg	0.054	J	0.187	J	ND	U	110.37	-
Benzo(b)fluoranthene	N	mg/kg	0.0996	J	0.284	J	ND	U	96.14	-
Benzo(ghi)perylene	N	mg/kg	ND	U	0.106	J	ND	U	-	-
Chrysene	N	mg/kg	0.0808	J	0.232	J	ND	U	96.68	-
Di-n-butyl phthalate	N	mg/kg	0.059	J	ND	U	ND	U	-	-
Fluoranthene	N	mg/kg	0.141	J	0.455	J	ND	U	105.37	-
Indeno(1,2,3-cd)pyrene	N	mg/kg	ND	U	0.13	J	ND	U	-	-
Phenanthrene	N	mg/kg	0.072	J	0.161	J	ND	U	76.39	-
Pyrene	N	mg/kg	0.111	J	0.337	J	ND	U	100.89	-
Acetone	N	mg/kg	0.133	J	0.08	J	0.1		49.77	28.33
Acrolein	N	mg/kg	0.0056	R	0.00496	R			12.12	200.00
Butanone, 2-	N	mg/kg	0.0129	J	0.0092	J	ND	U	33.48	-
Carbon disulfide	N	mg/kg	0.00254	J	0.00735	J	ND	U	97.27	-
Toluene	N	mg/kg	ND	UJ	0.00104	J	ND	U	-	-
Trichloroethane, 1,1,1-	N	mg/kg	ND	UJ	0.00139	J	ND	UJ	-	-

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03		
SAMPLE_NO			LBA0007		LBA0008		LBA0009		
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09	Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft	Percent	Percent
SAMPLE_TYPE			SS		SS		SS	Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS	REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
LOCATION_CODE			**LBA-SB06**		**LBA-SB06**		**LBA-SB06**		
SAMPLE_NO			**LBA0020**		**LBA0021**		**LBA0022**		
SAMPLE_DATE			**20-Jan-09**		**20-Jan-09**		**20-Jan-09**	**Relative**	**Relative**
FK_DEPTH			**8 - 10 Ft**		**8 - 10 Ft**		**8 - 10 Ft**	**Percent**	**Percent**
SAMPLE_TYPE			**DS**		**DS**		**DS**	**Difference**	**Difference**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**	**REG and FD**	**REG and FS**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
Aluminum	N	mg/kg	7850		7930		7660		1.01	2.45
Antimony	N	mg/kg	0.445	J	0.519	J	ND	UJ	15.35	-
Arsenic	N	mg/kg	5.55	J	7.58	J	5		30.92	10.43
Barium	N	mg/kg	42	J	107	J	54.5		87.25	25.91
Beryllium	N	mg/kg	5.84	J	7.29	J	ND	U	22.09	-
Cadmium	N	mg/kg	0.32	J	0.408	J	ND	U	24.18	-
Calcium	N	mg/kg	47100	J	43900	J	50100		7.03	6.17
Chromium	N	mg/kg	12.4		12.3		13.5		0.81	8.49
Cobalt	N	mg/kg	7.78	J	14.5	J	8		60.32	2.79
Copper	N	mg/kg	27	J	28.1	J	21.5		3.99	22.68
Iron	N	mg/kg	18400		23500		18200		24.34	1.09
Lead	N	mg/kg	13.6		14.5		8.4		6.41	47.27
Magnesium	N	mg/kg	20500	J	17600	J	14600		15.22	33.62
Manganese	N	mg/kg	315	J	798	J	351	J	86.79	10.81
Mercury	N	mg/kg	0.0122	J	0.0148	J	ND	U	19.26	-
Nickel	N	mg/kg	23	J	28.2	J	21.4		20.31	7.21
Potassium	N	mg/kg	1010		983		1720		2.71	52.01
Sodium	N	mg/kg	106		95.4		ND	U	10.53	-
Thallium	N	mg/kg	0.307	J	0.385	J	ND	U	22.54	-
Vanadium	N	mg/kg	21.2		22.7		17.8		6.83	17.44
Zinc	N	mg/kg	56.1		63.8		48.2		12.84	15.15
Acetone	N	mg/kg	0.0151	J	0.0352	J	ND	U	79.92	-
Acrolein	N	mg/kg	0.00636	R	0.00471	R			29.81	200.00
Benzene	N	mg/kg	0.00254	J	ND	UJ	ND	UJ	-	-
Butanone, 2-	N	mg/kg	0.00636	R	0.00555	J	ND	U	13.60	-
Toluene	N	mg/kg	0.0032	J	0.00123	J	ND	U	88.94	-
LOCATION_CODE			**LBA-SB10**		**LBA-SB10**		**LBA-SB10**		
SAMPLE_NO			**LBA0026**		**LBA0027**		**LBA0028**		
SAMPLE_DATE			**19-Jan-09**		**19-Jan-09**		**19-Jan-09**	**Relative**	**Relative**
FK_DEPTH			**0 - 1 Ft**		**0 - 1 Ft**		**0 - 1 Ft**	**Percent**	**Percent**
SAMPLE_TYPE			**SS**		**SS**		**SS**	**Difference**	**Difference**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**	**REG and FD**	**REG and FS**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
Aluminum	N	mg/kg	7210		5830		7240		21.17	0.42
Antimony	N	mg/kg	0.573	J	0.247	J	ND	UJ	79.51	-
Arsenic	N	mg/kg	9.26	J	6.74	J	5.9		31.50	44.33
Barium	N	mg/kg	50.5	J	39.6	J	37.9		24.20	28.51
Beryllium	N	mg/kg	6.41	J	5.17	J	ND	U	21.42	-
Cadmium	N	mg/kg	0.492	J	0.261	J	ND	U	61.35	-

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03			
SAMPLE_NO			LBA0007		LBA0008		LBA0009			
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09		Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		Percent	Percent
SAMPLE_TYPE			SS		SS		SS		Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS		REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual		
Calcium	N	mg/kg	4380	J	3220	J	3000		30.53	37.40
Chromium	N	mg/kg	13.2	J	10.8	J	13.9		20.00	5.17
Cobalt	N	mg/kg	7.31	J	4.75	J	ND	U	42.45	-
Copper	N	mg/kg	13.6		10.4		10.2		26.67	28.57
Iron	N	mg/kg	18300		14600		17800		22.49	2.77
Lead	N	mg/kg	16	J	11.9	J	9		29.39	56.00
Magnesium	N	mg/kg	1650	J	1220	J	1410		29.97	15.69
Manganese	N	mg/kg	281		187		160	J	40.17	54.88
Mercury	N	mg/kg	0.0318		0.0266		ND	U	17.81	-
Nickel	N	mg/kg	20.1	J	15.3	J	15.3		27.12	27.12
Potassium	N	mg/kg	374		293		ND	U	24.29	-
Selenium	N	mg/kg	ND	UJ	ND	UJ	0.61		-	-
Sodium	N	mg/kg	30.8		23.5		ND	U	26.89	-
Thallium	N	mg/kg	0.558		ND	U	ND	U	-	-
Vanadium	N	mg/kg	25.4		20.6		26.2		20.87	3.10
Zinc	N	mg/kg	60.1	J	47.5	J	45.5		23.42	27.65
Fluoranthene	N	mg/kg	ND	U	0.0401	J	ND	U	-	-
Acetone	N	mg/kg	0.339	J	0.087	J	0.072		118.31	129.93
Butanone, 2-	N	mg/kg	0.0147	J	0.0078	J	ND	U	61.33	-

LOCATION_CODE			**LBA-SD06**		**LBA-SD06**		**LBA-SD06**			
SAMPLE_NO			**LBA1005**		**LBA1006**		**LBA1007**			
SAMPLE_DATE			**22-May-09**		**22-May-09**		**22-May-09**		**Relative**	**Relative**
FK_DEPTH			**0 - 0.5 Ft**		**0 - 0.5 Ft**		**0 - 0.5 Ft**		**Percent**	**Percent**
SAMPLE_TYPE			**SD**		**SD**		**SD**		**Difference**	**Difference**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**		**REG and FD**	**REG and FS**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual		
% Solids	N	Percent	74.7		73.4		74.5		1.76	0.27
Aluminum	N	mg/kg	10700		9900		10900		7.77	1.85
Arsenic	N	mg/kg	11.7		10.4		16.5		11.76	34.04
Barium	N	mg/kg	70.7		81.6		156		14.31	75.25
Beryllium	N	mg/kg	0.84		0.77		0.72		8.70	15.38
Cadmium	N	mg/kg	0.56		0.56		ND	U	0.00	-
Calcium	N	mg/kg	3300		3220		3520		2.45	6.45
Chromium	N	mg/kg	18.8		17.6		18.3		6.59	2.70
Cobalt	N	mg/kg	11.3		11.7		24.6		3.48	74.09
Copper	N	mg/kg	24.5		21		26.2		15.38	6.71
Iron	N	mg/kg	25500		23300		32200		9.02	23.22
Lead	N	mg/kg	10.4		10.5		17		0.96	48.18
Magnesium	N	mg/kg	3620		3190		3820		12.63	5.38
Manganese	N	mg/kg	779		1170		2280		40.12	98.14
Mercury	N	mg/kg	0.022	J	0.023	J	ND	U	4.44	-
Nickel	N	mg/kg	33.8		34.2		63.2		1.18	60.62
Potassium	N	mg/kg	1430		1370		1420		4.29	0.70
Selenium	N	mg/kg	1.9	J	1.8	J	ND	U	5.41	-
Sodium	N	mg/kg	150	J	164	J	ND	U	8.92	-
Thallium	N	mg/kg	ND	U	ND	U	3.1		-	-
Vanadium	N	mg/kg	27		25.8		27.7		4.55	2.56

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03		
SAMPLE_NO			LBA0007		LBA0008		LBA0009		
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09	Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft	Percent	Percent
SAMPLE_TYPE			SS		SS		SS	Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS	REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
Zinc	N	mg/kg	63		59.1		78.3	6.39	21.66
Benzo(b)fluoranthene	N	mg/kg	0.0481	J	0.0458	J	ND	U	4.90	-
Fluoranthene	N	mg/kg	0.0738	J	0.0934	J	ND	U	23.44	-
Phenanthrene	N	mg/kg	ND	U	0.0546	J	ND	U	-	-
Pyrene	N	mg/kg	0.0562	J	0.0694	J	ND	U	21.02	-
Carbon disulfide	N	mg/kg	0.0019	J	ND	U	ND	U	-	-

LOCATION_CODE			**LBA-MW02**		**LBA-MW02**		**LBA-MW02**		
SAMPLE_NO			**LB3068**		**LB3069**		**LB3070**		
SAMPLE_DATE			**19-May-09**		**19-May-09**		**19-May-09**	**Relative**	**Relative**
FK_DEPTH			**0 - 0 Ft**		**0 - 0 Ft**		**0 - 0 Ft**	**Percent**	**Percent**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**	**Difference**	**Difference**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	**REG and FD**	**REG and FS**
Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.28		ND	U	0.26		-	7.41
Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.2		0.2		ND	U	0.00	-
Dinitrotoluene, 2,4-	N	ug/L	5.4	J	10.8	J	9.9		66.67	58.82
Dinitrotoluene, 2,6-	N	ug/L	5.3	J	7.8	J	6.9		38.17	26.23
Nitrotoluene, 2-	N	ug/L	25.1	J	48.5	J	39		63.59	43.37
Nitrotoluene, 3-	N	ug/L	2.9	J	5.7	J	4.5		65.12	43.24
Nitrotoluene, 4-	N	ug/L	2.9	J	5.8	J	4.5		66.67	43.24
Aluminum	N	ug/L	39.5	B	35.2	B	ND	U	11.51	-
Barium	N	ug/L	59.7	J	60.7	J	ND	U	1.66	-
Calcium	N	ug/L	80700	J	83200	J	79200		3.05	1.88
Lead	N	ug/L	ND	U	2.3	J	ND	U	-	-
Magnesium	N	ug/L	17300		17800		17100		2.85	1.16
Manganese	N	ug/L	57.3		59.7		55.4		4.10	3.37
Potassium	N	ug/L	1920	J	1870	J	ND	U	2.64	-
Sodium	N	ug/L	8500	J	5600	J	5680		41.13	39.77
Zinc	N	ug/L	ND	U	9.2	J	ND	U	-	-
Aluminum	Y	ug/L	37.6	J	28.3	J	ND	U	28.22	-
Barium	Y	ug/L	51.3	J	49.2	J	ND	U	4.18	-
Calcium	Y	ug/L	77300		78400		76100		1.41	1.56
Magnesium	Y	ug/L	15800		16100		16500		1.88	4.33
Manganese	Y	ug/L	47.2		46.1		57.3		2.36	19.33
Potassium	Y	ug/L	1050	J	1530	J	ND	U	37.21	-
Selenium	Y	ug/L	3.6	J	ND	U	ND	U	-	-
Sodium	Y	ug/L	4210	J	4960	J	5660		16.36	29.38
Zinc	Y	ug/L	ND	U	9.5	J	ND	U	-	-
Di-n-butyl phthalate	N	ug/L	1.3	B	ND	U	ND	U	-	-
Dinitrotoluene, 2,4-	N	ug/L	2.1	J	6.4	J	ND	U	101.18	-
Dinitrotoluene, 2,6-	N	ug/L	2.4	J	4.3	J	ND	U	56.72	-
Dichloroethane, 1,1-	N	ug/L	1.6		1.5		1.4		6.45	13.33
Dichloroethene, 1,1-	N	ug/L	1.1	J	ND	U	1.9		-	53.33
Dichloroethene, cis-1,2-	N	ug/L	0.81	J	0.87	J	ND	U	7.14	-
Trichloroethane, 1,1,1-	N	ug/L	36.8		40		40		8.33	8.33
Trichloroethene	N	ug/L	5.6		5.2		4.8		7.41	15.38
Alkalinity	N	ppm	234		237		230		1.27	1.72
Chloride	N	ppm	7.3		7.3		5.7		0.00	24.62

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03		
SAMPLE_NO			LBA0007		LBA0008		LBA0009		
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09	Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft	Percent	Percent
SAMPLE_TYPE			SS		SS		SS	Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS	REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
Cyanide, total	N	ppm	0.0075	J	ND	U	ND	U	-	-
HARDNESS (as CaCO3)	N	ppm	273		281				2.89	200.00
Nitrate-Nitrite	N	ppm	0.71	J	0.75	J	0.9		5.48	23.60
Sulfate	N	ppm	38		38.1		49.5		0.26	26.29
Total dissolved solids	N	ppm	396	J	316		350		22.47	12.33
Total suspended solids	N	ppm	ND	U	6	J	ND	U	-	-
Turbidity	N	NTU	2.1	J	2.9	J	0.6		32.00	111.11

LOCATION_CODE			**LBA-MW02**		**LBA-MW02**		**LBA-MW02**			
SAMPLE_NO			**LB3076**		**LB3077**		**LB3079**			
SAMPLE_DATE			**5-Nov-09**		**5-Nov-09**		**5-Nov-09**		**Relative**	**Relative**
FK_DEPTH			**0 - 0 Ft**		**0 - 0 Ft**		**0 - 0 Ft**		**Percent**	**Percent**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**		**Difference**	**Difference**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	**REG and FD**	**REG and FS**
Amino-2,6-dinitrotoluene, 4-	N	ug/L	0.48	J	ND	U			-	-
Amino-4,6-dinitrotoluene, 2-	N	ug/L	0.54	J	0.29	J			60.24	-
Dinitrotoluene, 2,4-	N	ug/L	3.4	J	17.8	J			135.85	-
Dinitrotoluene, 2,6-	N	ug/L	5.9	J	12.4	J			71.04	-
Nitrotoluene, 2-	N	ug/L	8.1	J	74.7	J			160.87	-
Nitrotoluene, 3-	N	ug/L	1.2	J	9.1	J			153.40	-
Nitrotoluene, 4-	N	ug/L	0.56	J	8.6	J			175.55	-
Aluminum	N	ug/L	361		313		1190		14.24	106.90
Barium	N	ug/L	76.6	J	82.1	J	ND	U	6.93	-
Calcium	N	ug/L	89300		92300		84200		3.30	5.88
Iron	N	ug/L	200	J	207	J	1430		3.44	150.92
Lead	N	ug/L	2.5	B	3.4	B	ND	U	30.51	-
Magnesium	N	ug/L	19400		20600		21100		6.00	8.40
Manganese	N	ug/L	184		159		160		14.58	13.95
Potassium	N	ug/L	2110	J	2200	J	ND	U	4.18	-
Selenium	N	ug/L	4.5	J	ND	U	ND	U	-	-
Sodium	N	ug/L	5380	J	6170	J	7420		13.68	31.88
Barium	Y	ug/L	28	J	33.8	J	ND	U	18.77	-
Calcium	Y	ug/L	82600		85700		81500		3.68	1.34
Lead	Y	ug/L	2.1	J	2.4	J	ND	U	13.33	-
Magnesium	Y	ug/L	15000		15700		15000		4.56	0.00
Manganese	Y	ug/L	30.1	J	46.3	J	47.4		42.41	44.65
Mercury	Y	ug/L	ND	U	0.16	J	ND	U	-	-
Potassium	Y	ug/L	914	B	1080	B	ND	U	16.65	-
Sodium	Y	ug/L	4120	J	4550	J	ND	U	9.92	-
Dinitrotoluene, 2,4-	N	ug/L	6.1	J	12.9	J	ND	U	71.58	-
Dinitrotoluene, 2,6-	N	ug/L	6	J	8.4	J	ND	U	33.33	-
Dichloroethane, 1,1-	N	ug/L	3		3.7		3.6		20.90	18.18
Dichloroethene, 1,1-	N	ug/L	1.2		ND	U	ND	U	-	-
Dichloroethene, cis-1,2-	N	ug/L	0.78	J	0.83	J	ND	U	6.21	-
Trichloroethane, 1,1,1-	N	ug/L	29.5		32.7		33		10.29	11.20
Trichloroethene	N	ug/L	4.3		4.8		5.1		10.99	17.02
Alkalinity	N	ppm	250		277		280		10.25	11.32

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03		
SAMPLE_NO			LBA0007		LBA0008		LBA0009		
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09	Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft	Percent	Percent
SAMPLE_TYPE			SS		SS		SS	Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS	REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	
Chloride	N	ppm	7		7.2		5.8	2.82	18.75
HARDNESS (as CaCO3)	N	ppm	303		315		320	3.88	5.46
Nitrate-Nitrite	N	ppm	0.44	J	0.45	J	0.3	2.25	37.84
Sulfate	N	ppm	37.3	J	39.6	J	51.3	5.98	31.60
Total dissolved solids	N	ppm	339		365		370	7.39	8.74
Total suspended solids	N	ppm	ND	U	7	J	38	-	-
Turbidity	N	NTU	2	J	9.7	J	16	131.62	155.56

LOCATION_CODE			**LBA-PZ05**		**LBA-PZ05**		**LBA-PZ05**		
SAMPLE_NO			**LBA3006**		**LBA3001**		**LBA3002**		
SAMPLE_DATE			**28-Jan-09**		**28-Jan-09**		**28-Jan-09**	**Relative**	**Relative**
FK_DEPTH			**10.07 - 10.1 Ft**		**10.07 - 10.1 Ft**		**10.07 - 10.1 Ft**	**Percent**	**Percent**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**	**Difference**	**Difference**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	**REG and FD**	**REG and FS**
Aluminum	N	ug/L	4710		3860		27500		19.84	141.51
Arsenic	N	ug/L	14.4		11.9		22.4		19.01	43.48
Barium	N	ug/L	114		107		255		6.33	76.42
Beryllium	N	ug/L	4.05	J	3.2	J	ND	U	23.45	-
Cadmium	N	ug/L	2.23	J	2.7	J	ND	U	19.07	-
Calcium	N	ug/L	94000		83500		160000		11.83	51.97
Chromium	N	ug/L	6.35	J	ND	U	39.1		-	144.11
Cobalt	N	ug/L	6.12	J	5.01	J	ND	U	19.95	-
Copper	N	ug/L	17.2		17.4		54.3		1.16	103.78
Iron	N	ug/L	12600		10200		48900		21.05	118.05
Lead	N	ug/L	8.41		6.91		31.2		19.58	115.07
Magnesium	N	ug/L	30100		26500		55000		12.72	58.52
Manganese	N	ug/L	366		286		1240		24.54	108.84
Nickel	N	ug/L	7.86		4.98	J	58.2		44.86	152.41
Potassium	N	ug/L	2610		2430		8560		7.14	106.54
Sodium	N	ug/L	12300		12700		10800		3.20	12.99
Vanadium	N	ug/L	11.6		9.17		65.9		23.40	140.13
Zinc	N	ug/L	38	J	31.9	J	141		17.45	115.08
Aluminum	Y	ug/L	159		128		ND	U	21.60	-
Arsenic	Y	ug/L	1.99	J	9.75	J	ND	U	132.20	-
Barium	Y	ug/L	90.5		93.6		ND	U	3.37	-
Calcium	Y	ug/L	70600		72400		70900		2.52	0.42
Iron	Y	ug/L	446		382		132		15.46	108.65
Magnesium	Y	ug/L	20000		20200		18700		1.00	6.72
Manganese	Y	ug/L	110		108		104		1.83	5.61
Potassium	Y	ug/L	1470		1480		ND	U	0.68	-
Sodium	Y	ug/L	11900		12500		11600		4.92	2.55
Dichloroethane, 1,1-	N	ug/L	0.81	J	0.79	J	ND	U	2.50	-
Trichloroethane, 1,1,1-	N	ug/L	1.06	J	0.96	J	2.2		9.90	69.94
Alkalinity	N	ppm	172		119		230		36.43	28.86
Chloride	N	ppm	6.98	J	6.55	J	6.3	J	6.36	10.24
Hardness	N	ppm	359		317		680		12.43	61.79
Nitrate-Nitrite	N	ppm	0.026	J	ND	U	0.1		-	117.46

Table 2

Summary of Original, Field Duplicate, and Field Split Hits with Relative Percent Difference Calculations
Former Plum Brook Ordnance Works
Sandusky, Ohio

LOCATION_CODE			LBA-SB03		LBA-SB03		LBA-SB03			
SAMPLE_NO			LBA0007		LBA0008		LBA0009			
SAMPLE_DATE			20-Jan-09		20-Jan-09		20-Jan-09		Relative	Relative
FK_DEPTH			0 - 1 Ft		0 - 1 Ft		0 - 1 Ft		Percent	Percent
SAMPLE_TYPE			SS		SS		SS		Difference	Difference
SAMPLE_PURPOSE			REG		FD		FS		REG and FD	REG and FS
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual		
Sulfate	N	ppm	53.3	J	52.8	J	56.2		0.94	5.30
Total dissolved solids	N	ppm	331	J	700	J	310		71.58	6.55
Total suspended solids	N	ppm	641		676		1200		5.32	60.73
Turbidity	N	NTU	403	J	375	J	64		7.20	145.18

LOCATION_CODE			**LBA-SW03**		**LBA-SW03**		**LBA-SW03**			
SAMPLE_NO			**LBA2002**		**LBA2003**		**LBA2004**			
SAMPLE_DATE			**21-May-09**		**21-May-09**		**21-May-09**		**Relative**	**Relative**
FK_DEPTH			**0 - 0 Ft**		**0 - 0 Ft**		**0 - 0 Ft**		**Percent**	**Percent**
SAMPLE_PURPOSE			**REG**		**FD**		**FS**		**Difference**	**Difference**
Parameter	Filtered	Units	Result	ValQual	Result	ValQual	Result	ValQual	**REG and FD**	**REG and FS**
Aluminum	N	ug/L	1990		1540		1720		25.50	14.56
Barium	N	ug/L	64.5	J	58.2	J	ND	U	10.27	-
Calcium	N	ug/L	152000		149000		132000		1.99	14.08
Chromium	N	ug/L	3.2	J	2.9	J	ND	U	9.84	-
Cobalt	N	ug/L	2.4	J	2.3	J	ND	U	4.26	-
Iron	N	ug/L	4650		3570		2850		26.28	48.00
Lead	N	ug/L	5	J	3.9	J	ND	U	24.72	-
Magnesium	N	ug/L	29600		29000		26000		2.05	12.95
Manganese	N	ug/L	1870		1560		1170		18.08	46.05
Nickel	N	ug/L	7.9	J	6.4	J	ND	U	20.98	-
Potassium	N	ug/L	2070	J	1900	J	ND	U	8.56	-
Selenium	N	ug/L	3.4	J	3.8	J	ND	U	11.11	-
Sodium	N	ug/L	34700		34300		35000		1.16	0.86
Vanadium	N	ug/L	5	J	4.3	J	ND	U	15.05	-
Zinc	N	ug/L	35		30.2		21.2		14.72	49.11
Dichloroethane, 1,1-	N	ug/L	0.26	J	0.45	J	ND	U	53.52	-
Dichloroethene, cis-1,2-	N	ug/L	0.22	J	0.24	J	ND	U	8.70	-
Trichloroethane, 1,1,1-	N	ug/L	0.59	J	0.53	J	ND	U	10.71	-

Notes:
(1) Any detected concentration of a constituent above the laboratory's MDL is as shown in this table as a detect.

Table 3

Summary of Data Validation Reason Codes
Former Plum Brook Ordnance Works
Sandusky, Ohio

Reason Code	Description
01	Sample received outside of 4+/-2 degrees Celsius
01A	Improper sample preservation
02	Holding Time Exceeded
02A	Extraction
02B	Analysis
03	Instrument Performance - Outside Criteria
03A	BFB
03B	DFTPP
03C	DDT and/or Endrin % breakdown exceeds criteria
03D	retention time windows
03E	Resolution
04	Initial Calibration results outside specified criteria
04A	Compound mean RRF<0.05
04B	Compound %RSD>30
04C	Correlation Coefficient<0.995
05	Continuing Calibration results outside specified criteria
05A	Compound mean RRF<0.05
05B	Compound %D>25
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or Preparation Blank
06B	ICB or CCB
06C	ER
06D	TB
06E	FB
07	Surrogate Recoveries outside control limits
07A	Sample
07B	Associated method blank or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	%RPD outside acceptance criteria (precision)
09	Post Digestion Spike outside criteria (GFAA)
10	Internal Standards outside specified control limits
10A	Recovery
10B	Retention Time
11	Laboratory Control Sample recoveries outside specified control limits
11A	Recovery
11B	%RPD (if run in duplicate)
12	Interference Check Standard
13	Serial Dilution
14	Tentatively Identified Compounds
15	Quantitation
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria exceeded
18	Percent difference between original and second column > 25%
19	Professional judgement was used to qualify the data
20	Pesticide clean-up checks
21	Target compound identification
22	Radiological calibration
23	Radiological quantitation
24	Reported result and/or lab qualifier revised to reflect validation findings
999	See hard copy for details.

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F69338	BEDGW-001-1109	EXPLOSIVES	1,3,5-Trinitrobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	1,3-Dinitrobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	2,4,6-Trinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	2,4-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	2,6-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	HMX	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	Nitrobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	RDX	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	Tetryl	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	m-Nitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	o-Nitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	EXPLOSIVES	p-Nitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A	15		
F69338	BEDGW-001-1109	GEN CHEMISTRY	Sulfate	UJ	08A			
F69338	BEDGW-001-1109	METALS	Aluminum	J	15			
F69338	BEDGW-001-1109	METALS	Iron	J	15			
F69338	BEDGW-001-1109	METALS	Lead	J	15			
F69338	BEDGW-001-1109	METALS	Selenium	J	15			
F69338	BEDGW-001-1109	METALS	Vanadium	J	15			
F69338	BEDGW-001-1109	METALS	Zinc	B	06A	15		
F69338	BEDGW-001-1109	SEMIVOLATILES	1,2,4-Trichlorobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	1,2-Dichlorobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	1,3-Dichlorobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	1,4-Dichlorobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4,5-Trichlorophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4,6-Tribromophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4,6-Trichlorophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4-Dichlorophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4-Dimethylphenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4-Dinitrophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,4-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2,6-Dinitrotoluene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Chloronaphthalene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Chlorophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Methylnaphthalene	J	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Methylphenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Nitroaniline	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	2-Nitrophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	3 and 4-Methylphenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	3,3'-Dichlorobenzidine	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	3-Nitroaniline	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4,6-Dinitro-o-cresol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Bromophenyl phenyl ether	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Chloro-3-methyl phenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Chloroaniline	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Chlorophenyl phenyl ether	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Nitroaniline	UJ	07A	19		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F69338	BEDGW-001-1109	SEMIVOLATILES	4-Nitrophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Acenaphthene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Acenaphthylene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Anthracene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzo(a)anthracene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzo(a)pyrene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzo(b)fluoranthene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzo(g,h,i)perylene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzo(k)fluoranthene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzoic Acid	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Benzyl Alcohol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Butyl benzyl phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Carbazole	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Chrysene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Di-n-butyl phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Di-n-octyl phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Dibenzo(a,h)anthracene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Dibenzofuran	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Diethyl phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Dimethyl phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Fluoranthene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Fluorene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Hexachlorobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Hexachlorobutadiene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Hexachlorocyclopentadiene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Hexachloroethane	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Isophorone	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	N-Nitroso-di-n-propylamine	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	N-Nitrosodiphenylamine	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Naphthalene	J	07A	15	19	
F69338	BEDGW-001-1109	SEMIVOLATILES	Nitrobenzene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Nitrobenzene-d5	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Pentachlorophenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Phenanthrene	J	07A	15	19	
F69338	BEDGW-001-1109	SEMIVOLATILES	Phenol	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Phenol-d5	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Pyrene	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	Terphenyl-d14	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	bis(2-Chloroethoxy)methane	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	bis(2-Chloroethyl)ether	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	bis(2-Chloroisopropyl)ether	UJ	07A	19		
F69338	BEDGW-001-1109	SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	UJ	07A	19		
F69338	BEDGW-001-1109	VOLATILES	4-Methyl-2-pentanone	J	15			
F65220	LB3067	GEN CHEMISTRY	Cyanide, Total	J	15			
F65220	LB3067	METALS	Aluminum	B	06C	08B	15	
F65220	LB3067	METALS	Barium	J	15			
F65220	LB3067	METALS	Iron	J	15			
F65220	LB3067	METALS	Nickel	J	15			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65220	LB3067	METALS	Potassium	J	15			
F65220	LB3067	METALS	Selenium	J	08B	15		
F65220	LB3067	METALS	Selenium	J	15			
F65220	LB3067	VOLATILES	Acetone	R	04A	05A		
F65372	LB3068	EXPLOSIVES	2,4-Dinitrotoluene	J	08A	17		
F65372	LB3068	EXPLOSIVES	2,6-Dinitrotoluene	J	17			
F65372	LB3068	EXPLOSIVES	m-Nitrotoluene	J	17			
F65372	LB3068	EXPLOSIVES	o-Nitrotoluene	J	08A	17		
F65372	LB3068	EXPLOSIVES	p-Nitrotoluene	J	17			
F65372	LB3068	GEN CHEMISTRY	Cyanide, Total	J	15			
F65372	LB3068	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A			
F65372	LB3068	GEN CHEMISTRY	Solids, Total Dissolved	J	08B			
F65372	LB3068	GEN CHEMISTRY	Turbidity	J	02B	17		
F65372	LB3068	METALS	Aluminum	B	06C	15		
F65372	LB3068	METALS	Aluminum	J	15			
F65372	LB3068	METALS	Barium	J	15			
F65372	LB3068	METALS	Calcium	J	08A			
F65372	LB3068	METALS	Potassium	J	15			
F65372	LB3068	METALS	Potassium	J	17	15		
F65372	LB3068	METALS	Selenium	J	15			
F65372	LB3068	METALS	Sodium	J	15			
F65372	LB3068	METALS	Sodium	J	17	15		
F65372	LB3068	SEMIVOLATILES	2,4-Dinitrotoluene	J	17	15		
F65372	LB3068	SEMIVOLATILES	2,6-Dinitrotoluene	J	17	15		
F65372	LB3068	SEMIVOLATILES	Di-n-butyl phthalate	B	06C	15		
F65372	LB3068	VOLATILES	1,1-Dichloroethylene	J	08A	08B		
F65372	LB3068	VOLATILES	Acetone	R	04A	05A		
F65372	LB3068	VOLATILES	Chloroethane	UJ	05B			
F65372	LB3068	VOLATILES	cis-1,2-Dichloroethylene	J	15			
F65372	LB3069	EXPLOSIVES	2,4-Dinitrotoluene	J	17			
F65372	LB3069	EXPLOSIVES	2,6-Dinitrotoluene	J	17			
F65372	LB3069	EXPLOSIVES	m-Nitrotoluene	J	17			
F65372	LB3069	EXPLOSIVES	o-Nitrotoluene	J	17			
F65372	LB3069	EXPLOSIVES	p-Nitrotoluene	J	17			
F65372	LB3069	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A			
F65372	LB3069	GEN CHEMISTRY	Solids, Total Suspended	J	15			
F65372	LB3069	GEN CHEMISTRY	Turbidity	J	02B	17		
F65372	LB3069	METALS	Aluminum	B	06C	15		
F65372	LB3069	METALS	Aluminum	J	15			
F65372	LB3069	METALS	Barium	J	15			
F65372	LB3069	METALS	Calcium	J	08A			
F65372	LB3069	METALS	Lead	J	15			
F65372	LB3069	METALS	Potassium	J	15			
F65372	LB3069	METALS	Potassium	J	17	15		
F65372	LB3069	METALS	Sodium	J	15			
F65372	LB3069	METALS	Sodium	J	17	15		
F65372	LB3069	METALS	Zinc	J	15			
F65372	LB3069	SEMIVOLATILES	2,4-Dinitrotoluene	J	17			
F65372	LB3069	SEMIVOLATILES	2,6-Dinitrotoluene	J	17	15		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65372	LB3069	VOLATILES	Acetone	R	04A	05A		
F65372	LB3069	VOLATILES	cis-1,2-Dichloroethylene	J	15			
A9E200268	LB3070	EXPLOSIVES	2,4-DINITROTOLUENE	R	16			
A9E200268	LB3070	EXPLOSIVES	2-NITROTOLUENE	R	16			
A9E200268	LB3070	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	05B			
A9E200268	LB3070	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	05B			
A9E200268	LB3070	VOLATILES	1,3-DICHLOROBENZENE	UJ	05B			
A9E200268	LB3070	VOLATILES	BROMOMETHANE	R	05A	05B		
A9E200268	LB3070	VOLATILES	CHLOROETHANE	UJ	05B			
A9E200268	LB3070	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	05B			
A9E200268	LB3070	VOLATILES	METHYLCYCLOHEXANE	UJ	05B			
A9E200268	LB3070	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	05B			
F65207	LB3071	GEN CHEMISTRY	Cyanide, Total	J	02A	08A	08B	
F65207	LB3071	GEN CHEMISTRY	Solids, Total Suspended	J	15			
F65207	LB3071	METALS	Barium	J	15			
F65207	LB3071	METALS	Lead	J	15			
F65207	LB3071	METALS	Nickel	J	15			
F65207	LB3071	METALS	Potassium	J	15			
F65207	LB3071	METALS	Selenium	J	15			
F65207	LB3071	METALS	Zinc	J	15			
F65220	LB3073	GEN CHEMISTRY	Cyanide, Total	J	02A			
F65220	LB3073	METALS	Aluminum	B	06C	08B	15	
F65220	LB3073	METALS	Nickel	J	15			
F65220	LB3073	METALS	Selenium	J	08B			
F65220	LB3073	METALS	Selenium	J	15			
F65220	LB3073	METALS	Thallium	J	15			
F65220	LB3073	METALS	Vanadium	J	15			
F65220	LB3073	VOLATILES	Acetone	R	04A	05A		
F65220	LB3073	VOLATILES	Benzene	J	08A			
F65220	LB3073	VOLATILES	Methyl chloride	J	15			
F65220	LB3073	VOLATILES	Methyl ethyl ketone	J	15			
F65372	LB3074	EXPLOSIVES	1,3,5-Trinitrobenzene	UJ	07A			
F65372	LB3074	EXPLOSIVES	1,3-Dinitrobenzene	UJ	07A			
F65372	LB3074	EXPLOSIVES	2,4,6-Trinitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	2,4-Dinitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	2,6-Dinitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	HMX	UJ	07A			
F65372	LB3074	EXPLOSIVES	Nitrobenzene	UJ	07A			
F65372	LB3074	EXPLOSIVES	RDX	UJ	07A			
F65372	LB3074	EXPLOSIVES	Tetryl	UJ	07A			
F65372	LB3074	EXPLOSIVES	m-Nitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	o-Nitrotoluene	UJ	07A			
F65372	LB3074	EXPLOSIVES	p-Nitrotoluene	UJ	07A			
F65372	LB3074	GEN CHEMISTRY	Turbidity	J	02B			
F65372	LB3074	METALS	Aluminum	B	06C	15		
F65372	LB3074	METALS	Aluminum	J	15			
F65372	LB3074	METALS	Cadmium	J	15			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65372	LB3074	METALS	Calcium	J	08A			
F65372	LB3074	METALS	Lead	J	15			
F65372	LB3074	METALS	Thallium	J	15			
F65372	LB3074	METALS	Vanadium	J	15			
F65372	LB3074	METALS	Zinc	J	15			
F65372	LB3074	SEMIVOLATILES	Fluorene	J	15			
F65372	LB3074	SEMIVOLATILES	Naphthalene	J	15			
F65372	LB3074	SEMIVOLATILES	Phenanthrene	J	15			
F65372	LB3074	VOLATILES	Acetone	J	04A	05A	15	
F65372	LB3074	VOLATILES	Carbon disulfide	J	15			
F65372	LB3074	VOLATILES	Chloroethane	UJ	05B			
F65372	LB3074	VOLATILES	Ethylbenzene	J	15			
F65372	LB3074	VOLATILES	Methyl ethyl ketone	J	15			
F65372	LB3074	VOLATILES	Methylene chloride	J	15			
F65372	LB3074	VOLATILES	Toluene	J	15			
F69251	LB3075	METALS	Aluminum	J	15			
F69251	LB3075	METALS	Barium	J	15			
F69251	LB3075	METALS	Calcium	J	13			
F69251	LB3075	METALS	Nickel	J	15			
F69251	LB3075	METALS	Potassium	J	08A	13	15	
F69251	LB3075	METALS	Potassium	J	15			
F69251	LB3075	METALS	Selenium	J	08A	15		
F69251	LB3075	METALS	Zinc	J	15			
F69338	LB3076	EXPLOSIVES	2,4-Dinitrotoluene	J	08A	17		
F69338	LB3076	EXPLOSIVES	2,6-Dinitrotoluene	J	08A	17		
F69338	LB3076	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	J	17	18		
F69338	LB3076	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	J	18			
F69338	LB3076	EXPLOSIVES	m-Nitrotoluene	J	08A	17		
F69338	LB3076	EXPLOSIVES	o-Nitrotoluene	J	08A	17		
F69338	LB3076	EXPLOSIVES	p-Nitrotoluene	J	08A	17		
F69338	LB3076	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A			
F69338	LB3076	GEN CHEMISTRY	Sulfate	J	08A			
F69338	LB3076	GEN CHEMISTRY	Turbidity	J	17			
F69338	LB3076	METALS	Barium	J	15			
F69338	LB3076	METALS	Iron	J	15			
F69338	LB3076	METALS	Lead	B	06A	08B	15	17
F69338	LB3076	METALS	Lead	J	15			
F69338	LB3076	METALS	Manganese	J	17			
F69338	LB3076	METALS	Potassium	B	06A	15		
F69338	LB3076	METALS	Potassium	J	15			
F69338	LB3076	METALS	Selenium	J	08B	15		
F69338	LB3076	METALS	Sodium	J	15			
F69338	LB3076	SEMIVOLATILES	2,4-Dinitrotoluene	J	17			
F69338	LB3076	SEMIVOLATILES	2,6-Dinitrotoluene	J	17			
F69338	LB3076	VOLATILES	cis-1,2-Dichloroethylene	J	15			
F69338	LB3077	EXPLOSIVES	2,4-Dinitrotoluene	J	17			
F69338	LB3077	EXPLOSIVES	2,6-Dinitrotoluene	J	17			
F69338	LB3077	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	J	17			
F69338	LB3077	EXPLOSIVES	m-Nitrotoluene	J	17			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F69338	LB3077	EXPLOSIVES	o-Nitrotoluene	J	17			
F69338	LB3077	EXPLOSIVES	p-Nitrotoluene	J	17			
F69338	LB3077	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A			
F69338	LB3077	GEN CHEMISTRY	Solids, Total Suspended	J	15			
F69338	LB3077	GEN CHEMISTRY	Sulfate	J	08A			
F69338	LB3077	GEN CHEMISTRY	Turbidity	J	17			
F69338	LB3077	METALS	Barium	J	15			
F69338	LB3077	METALS	Iron	J	15			
F69338	LB3077	METALS	Lead	B	06A	08B	15	17
F69338	LB3077	METALS	Lead	J	15			
F69338	LB3077	METALS	Manganese	J	17			
F69338	LB3077	METALS	Mercury	J	15			
F69338	LB3077	METALS	Potassium	B	06A	15		
F69338	LB3077	METALS	Potassium	J	15			
F69338	LB3077	METALS	Sodium	J	15			
F69338	LB3077	SEMIVOLATILES	2,4-Dinitrotoluene	J	17			
F69338	LB3077	SEMIVOLATILES	2,6-Dinitrotoluene	J	17			
F69338	LB3077	VOLATILES	Acetone	R	04A			
F69338	LB3077	VOLATILES	cis-1,2-Dichloroethylene	J	15			
A9K070415	LB3079	GEN CHEMISTRY	NITRATE AS N	R	16			
A9K070415	LB3079	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	04A	05A		
A9K070415	LB3079	VOLATILES	2-HEXANONE	UJ	05B			
A9K070415	LB3079	VOLATILES	CARBON TETRACHLORIDE	UJ	05B			
A9K070415	LB3079	VOLATILES	CHLOROETHANE	R	04A	05B		
A9K070415	LB3079	VOLATILES	CHLOROMETHANE	UJ	05B			
A9K070415	LB3079	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	05B			
F69251	LB3080	GEN CHEMISTRY	Chloride	J	15			
F69251	LB3080	GEN CHEMISTRY	Turbidity	J	15			
F69251	LB3080	METALS	Aluminum	J	15			
F69251	LB3080	METALS	Barium	J	15			
F69251	LB3080	METALS	Calcium	J	13			
F69251	LB3080	METALS	Nickel	J	15			
F69251	LB3080	METALS	Potassium	J	08A	13	15	
F69251	LB3080	METALS	Potassium	J	15			
F69251	LB3080	METALS	Selenium	UJ	08A			
F69251	LB3080	VOLATILES	1,1-Dichloroethylene	J	15			
F69251	LB3080	VOLATILES	Carbon disulfide	J	15			
0901034	LBA0001	METALS	ANTIMONY	J	15			
0901034	LBA0001	METALS	ARSENIC	J	08A			
0901034	LBA0001	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0001	METALS	CADMIUM	R	16			
0901034	LBA0001	METALS	IRON	J	08A	13		
0901034	LBA0001	METALS	LEAD	R	16			
0901034	LBA0001	METALS	MAGNESIUM	J	13			
0901034	LBA0001	METALS	MANGANESE	J	13			
0901034	LBA0001	METALS	MERCURY	J	15			
0901034	LBA0001	METALS	NICKEL	J	08A	13		
0901034	LBA0001	METALS	SELENIUM	UJ	08A			
0901034	LBA0001	SEMIVOLATILES	3,3'-DICHLOROBENZIDINE	UJ	08B			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0001	SEMIVOLATILES	4-CHLOROANILINE	UJ	08B			
0901034	LBA0001	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15			
0901034	LBA0001	SEMIVOLATILES	CHRYSENE	J	15			
0901034	LBA0001	SEMIVOLATILES	FLUORANTHENE	J	15			
0901034	LBA0001	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0001	SEMIVOLATILES	PYRENE	J	15			
0901034	LBA0001	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1-DICHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1-DICHLOROETHENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,1-DICHLOROPROPENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2-DIBROMOETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2-DICHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2-DICHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,2-DICHLOROPROPANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,3-DICHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	1,3-DICHLOROPROPANE	UJ	08A			
0901034	LBA0001	VOLATILES	1,4-DICHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	2,2-DICHLOROPROPANE	UJ	08A			
0901034	LBA0001	VOLATILES	2-BUTANONE	R	04A	05A	08A	
0901034	LBA0001	VOLATILES	2-CHLOROTOLUENE	UJ	08A			
0901034	LBA0001	VOLATILES	2-HEXANONE	UJ	08A			
0901034	LBA0001	VOLATILES	4-CHLOROTOLUENE	UJ	08A			
0901034	LBA0001	VOLATILES	4-METHYL-2-PENTANONE	UJ	08A			
0901034	LBA0001	VOLATILES	ACETONE	J	04A	05A	15	08A
0901034	LBA0001	VOLATILES	ACROLEIN	R	04A	05A	08A	
0901034	LBA0001	VOLATILES	ACRYLONITRILE	UJ	08A			
0901034	LBA0001	VOLATILES	BENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	BROMOBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	BROMOCHLOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	BROMODICHLOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	BROMOFORM	UJ	08A			
0901034	LBA0001	VOLATILES	BROMOMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	CARBON DISULFIDE	UJ	08A			
0901034	LBA0001	VOLATILES	CARBON TETRACHLORIDE	UJ	08A			
0901034	LBA0001	VOLATILES	CHLOROBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	CHLOROETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	CHLOROFORM	UJ	08A			
0901034	LBA0001	VOLATILES	CHLOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	08A			
0901034	LBA0001	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0001	VOLATILES	DIBROMOCHLOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	DIBROMOMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	ETHYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	HEXACHLOROBUTADIENE	UJ	08A			
0901034	LBA0001	VOLATILES	ISOPROPYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	08A			
0901034	LBA0001	VOLATILES	METHYLENE CHLORIDE	UJ	08A			
0901034	LBA0001	VOLATILES	N-BUTYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	N-PROPYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	NAPHTHALENE	UJ	08A			
0901034	LBA0001	VOLATILES	P-ISOPROPYLTOLUENE	UJ	08A			
0901034	LBA0001	VOLATILES	SEC-BUTYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	STYRENE	UJ	08A			
0901034	LBA0001	VOLATILES	TERT-BUTYLBENZENE	UJ	08A			
0901034	LBA0001	VOLATILES	TETRACHLOROETHENE	UJ	08A			
0901034	LBA0001	VOLATILES	TOLUENE	UJ	08A			
0901034	LBA0001	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	08A			
0901034	LBA0001	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	08A			
0901034	LBA0001	VOLATILES	TRICHLOROETHENE	UJ	08A			
0901034	LBA0001	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	08A			
0901034	LBA0001	VOLATILES	VINYL ACETATE	UJ	08A			
0901034	LBA0001	VOLATILES	VINYL CHLORIDE	UJ	08A			
0901034	LBA0001	VOLATILES	XYLENE, O-	UJ	08A			
0901034	LBA0001	VOLATILES	XYLENES, M,P-	UJ	08A			
0901034	LBA0002	METALS	ARSENIC	J	08A			
0901034	LBA0002	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0002	METALS	CADMIUM	J	15			
0901034	LBA0002	METALS	CADMIUM	R	16			
0901034	LBA0002	METALS	IRON	J	08A	13		
0901034	LBA0002	METALS	LEAD	R	16			
0901034	LBA0002	METALS	MAGNESIUM	J	13			
0901034	LBA0002	METALS	MANGANESE	J	13			
0901034	LBA0002	METALS	MERCURY	J	15			
0901034	LBA0002	METALS	NICKEL	J	08A	13		
0901034	LBA0002	METALS	SELENIUM	UJ	08A			
0901034	LBA0002	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0002	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,1,1-TRICHLOROETHANE	J	07A			
0901034	LBA0002	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0002	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,1-DICHLOROETHANE	J	07A			
0901034	LBA0002	VOLATILES	1,1-DICHLOROETHENE	J	15	07A		
0901034	LBA0002	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0002	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	07A	10A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0002	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0002	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0002	VOLATILES	2-BUTANONE	R	04A	05A	07A	
0901034	LBA0002	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0002	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0002	VOLATILES	ACETONE	R	04A	05A	07A	
0901034	LBA0002	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0002	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0002	VOLATILES	BENZENE	J	15	07A		
0901034	LBA0002	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0002	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0002	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0002	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0002	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0002	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	CIS-1,2-DICHLOROETHENE	J	15	07A		
0901034	LBA0002	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0002	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0002	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0002	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0002	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0002	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	NAPHTHALENE	J	15	10A	07A	
0901034	LBA0002	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0002	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0002	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0002	VOLATILES	TOLUENE	J	07A	15		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0002	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0002	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0002	VOLATILES	TRICHLOROETHENE	J	07A			
0901034	LBA0002	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0002	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0002	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0002	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0002	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0003	METALS	ANTIMONY	J	08A	15		
0901034	LBA0003	METALS	ARSENIC	J	08A			
0901034	LBA0003	METALS	BERYLLIUM	J	13			
0901034	LBA0003	METALS	CADMIUM	J	15			
0901034	LBA0003	METALS	CADMIUM	R	16			
0901034	LBA0003	METALS	CALCIUM	J	13			
0901034	LBA0003	METALS	COBALT	J	13			
0901034	LBA0003	METALS	COPPER	J	08A			
0901034	LBA0003	METALS	LEAD	R	16			
0901034	LBA0003	METALS	MAGNESIUM	J	08A			
0901034	LBA0003	METALS	MANGANESE	J	08A			
0901034	LBA0003	METALS	MERCURY	J	15			
0901034	LBA0003	METALS	NICKEL	J	13			
0901034	LBA0003	METALS	SELENIUM	UJ	08A			
0901034	LBA0003	METALS	THALLIUM	J	15			
0901034	LBA0003	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0003	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0003	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0003	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0003	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0003	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0003	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,2,4-TRIMETHYLBENZENE	J	07A	10A	15	
0901034	LBA0003	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0003	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,2-DIBROMOETHANE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0003	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0003	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0003	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0003	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0003	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0003	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0003	VOLATILES	2-BUTANONE	J	07A	04A	05A	15
0901034	LBA0003	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0003	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0003	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0003	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0003	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0003	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0003	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0003	VOLATILES	ACETONE	J	07A	04A	05A	15
0901034	LBA0003	VOLATILES	ACETONE	R	16			
0901034	LBA0003	VOLATILES	ACROLEIN	R	07A	04A	05A	
0901034	LBA0003	VOLATILES	ACROLEIN	R	16			
0901034	LBA0003	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0003	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0003	VOLATILES	BENZENE	J	07A	15		
0901034	LBA0003	VOLATILES	BENZENE	R	16			
0901034	LBA0003	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0003	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	BROMOFORM	R	16			
0901034	LBA0003	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0003	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0003	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	CARBON DISULFIDE	J	07A	15		
0901034	LBA0003	VOLATILES	CARBON DISULFIDE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0003	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0003	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0003	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0003	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0003	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0003	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0003	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0003	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0003	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0003	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0003	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0003	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0003	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0003	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0003	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0003	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0003	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0003	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0003	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0003	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0003	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0003	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	STYRENE	R	16			
0901034	LBA0003	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0003	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0003	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0003	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0003	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0003	VOLATILES	TOLUENE	J	07A	15		
0901034	LBA0003	VOLATILES	TOLUENE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0003	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0003	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0003	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0003	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0003	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0003	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0003	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0003	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0003	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0003	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0003	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0003	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0003	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0003	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0003	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0003	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0003	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0004	EXPLOSIVES	2,4-DINITROTOLUENE	J	15			
0901034	LBA0004	METALS	ANTIMONY	J	08A	15		
0901034	LBA0004	METALS	ARSENIC	J	08A			
0901034	LBA0004	METALS	BERYLLIUM	J	13			
0901034	LBA0004	METALS	CADMIUM	R	16			
0901034	LBA0004	METALS	CALCIUM	J	13			
0901034	LBA0004	METALS	COBALT	J	13			
0901034	LBA0004	METALS	COPPER	J	08A			
0901034	LBA0004	METALS	LEAD	R	16			
0901034	LBA0004	METALS	MAGNESIUM	J	08A			
0901034	LBA0004	METALS	MANGANESE	J	08A			
0901034	LBA0004	METALS	NICKEL	J	13			
0901034	LBA0004	METALS	SELENIUM	UJ	08A			
0901034	LBA0004	SEMIVOLATILES	2,4-DINITROTOLUENE	J	15			
0901034	LBA0004	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,1,1-TRICHLOROETHANE	J	07A			
0901034	LBA0004	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0004	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0004	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0004	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0004	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0004	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	10A	07A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0004	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0004	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0004	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,2-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0004	VOLATILES	1,2-DICHLOROETHANE-D4		07A			
0901034	LBA0004	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0004	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,3-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0004	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0004	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	1,4-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0004	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0004	VOLATILES	2-BUTANONE	J	04A	05A	15	07A
0901034	LBA0004	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0004	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0004	VOLATILES	2-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0004	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0004	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	4-BROMOFLUOROBENZENE		07A			
0901034	LBA0004	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0004	VOLATILES	4-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0004	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0004	VOLATILES	ACETONE	J	04A	05A	07A	
0901034	LBA0004	VOLATILES	ACETONE	R	16			
0901034	LBA0004	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0004	VOLATILES	ACROLEIN	R	16			
0901034	LBA0004	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0004	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0004	VOLATILES	BENZENE	R	16			
0901034	LBA0004	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0004	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0004	VOLATILES	BROMOBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	BROMOCHLOROMETHANE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0004	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	BROMOFORM	R	16			
0901034	LBA0004	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0004	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0004	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0004	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0004	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0004	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0004	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0004	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0004	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0004	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0004	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0004	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0004	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0004	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0004	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0004	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0004	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0004	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0004	VOLATILES	HEXACHLOROBUTADIENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0004	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0004	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0004	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0004	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0004	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	N-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	N-PROPYLBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0004	VOLATILES	NAPHTHALENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0004	VOLATILES	P-ISOPROPYLTOLUENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	SEC-BUTYLBENZENE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0004	VOLATILES	SEC-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0004	VOLATILES	STYRENE	R	16			
0901034	LBA0004	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0004	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0004	VOLATILES	TERT-BUTYLBENZENE	UJ	07A			
0901034	LBA0004	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0004	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0004	VOLATILES	TOLUENE	R	16			
0901034	LBA0004	VOLATILES	TOLUENE	UJ	07A			
0901034	LBA0004	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0004	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0004	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0004	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0004	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0004	VOLATILES	TRICHLOROETHENE	J	07A	15		
0901034	LBA0004	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0004	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0004	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0004	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0004	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0004	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0004	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0004	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0004	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0004	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0004	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0005	METALS	ARSENIC	J	08A			
0901034	LBA0005	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0005	METALS	CADMIUM	J	15			
0901034	LBA0005	METALS	CADMIUM	R	16			
0901034	LBA0005	METALS	IRON	J	08A	13		
0901034	LBA0005	METALS	LEAD	R	16			
0901034	LBA0005	METALS	MAGNESIUM	J	13			
0901034	LBA0005	METALS	MANGANESE	J	13			
0901034	LBA0005	METALS	MERCURY	J	15			
0901034	LBA0005	METALS	NICKEL	J	08A	13		
0901034	LBA0005	METALS	SELENIUM	UJ	08A			
0901034	LBA0005	METALS	THALLIUM	J	15			
0901034	LBA0005	SEMIVOLATILES	2,6-DINITROTOLUENE	J	15			
0901034	LBA0005	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0005	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0005	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,1-DICHLOROETHANE	J	15	07A		
0901034	LBA0005	VOLATILES	1,1-DICHLOROETHENE	J	07A	15		
0901034	LBA0005	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0005	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0005	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,2,4-TRIMETHYLBENZENE	J	07A	15		
0901034	LBA0005	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,2-DICHLOROETHANE-D4		07A			
0901034	LBA0005	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0005	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0005	VOLATILES	2-BUTANONE	R	04A	05A	07A	
0901034	LBA0005	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0005	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0005	VOLATILES	ACETONE	J	04A	05A	07A	
0901034	LBA0005	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0005	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0005	VOLATILES	BENZENE	J	07A	15		
0901034	LBA0005	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0005	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0005	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0005	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0005	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0005	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0005	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0005	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0005	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0005	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0005	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0005	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	NAPHTHALENE	J	07A	10A	15	
0901034	LBA0005	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	STYRENE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0005	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0005	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0005	VOLATILES	TOLUENE	J	07A	15		
0901034	LBA0005	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0005	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0005	VOLATILES	TRICHLOROETHENE	J	07A			
0901034	LBA0005	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0005	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0005	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0005	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0005	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0006	EXPLOSIVES	2,6-DINITROTOLUENE	J	11A			
0901034	LBA0006	METALS	ANTIMONY	J	08A	15		
0901034	LBA0006	METALS	ARSENIC	J	08A			
0901034	LBA0006	METALS	BERYLLIUM	J	13			
0901034	LBA0006	METALS	CADMIUM	J	15			
0901034	LBA0006	METALS	CADMIUM	R	16			
0901034	LBA0006	METALS	CALCIUM	J	13			
0901034	LBA0006	METALS	COBALT	J	13			
0901034	LBA0006	METALS	COPPER	J	08A			
0901034	LBA0006	METALS	LEAD	R	16			
0901034	LBA0006	METALS	MAGNESIUM	J	08A			
0901034	LBA0006	METALS	MANGANESE	J	08A			
0901034	LBA0006	METALS	NICKEL	J	13			
0901034	LBA0006	METALS	SELENIUM	UJ	08A			
0901034	LBA0006	METALS	THALLIUM	J	15			
0901034	LBA0006	SEMIVOLATILES	2,4-DINITROTOLUENE	R	16			
0901034	LBA0006	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0006	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	10A			
0901034	LBA0006	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0006	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0006	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0006	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	10A			
0901034	LBA0006	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0006	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	10A			
0901034	LBA0006	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0006	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,2-DICHLOROBENZENE	UJ	10A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0006	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0006	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0006	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,3-DICHLOROBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0006	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	1,4-DICHLOROBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0006	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0006	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0006	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0006	VOLATILES	2-CHLOROTOLUENE	UJ	10A			
0901034	LBA0006	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0006	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0006	VOLATILES	4-CHLOROTOLUENE	UJ	10A			
0901034	LBA0006	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0006	VOLATILES	ACETONE	J	04A	05A	15	
0901034	LBA0006	VOLATILES	ACETONE	R	16			
0901034	LBA0006	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0006	VOLATILES	ACROLEIN	R	16			
0901034	LBA0006	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0006	VOLATILES	BENZENE	R	16			
0901034	LBA0006	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0006	VOLATILES	BROMOBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	BROMOFORM	R	16			
0901034	LBA0006	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0006	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0006	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0006	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0006	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0006	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0006	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0006	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0006	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0006	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0006	VOLATILES	HEXACHLOROBUTADIENE	UJ	10A			
0901034	LBA0006	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0006	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0006	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	N-BUTYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	N-PROPYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0006	VOLATILES	NAPHTHALENE	UJ	10A			
0901034	LBA0006	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0006	VOLATILES	P-ISOPROPYLTOLUENE	UJ	10A			
0901034	LBA0006	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	SEC-BUTYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	STYRENE	R	16			
0901034	LBA0006	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0006	VOLATILES	TERT-BUTYLBENZENE	UJ	10A			
0901034	LBA0006	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0006	VOLATILES	TOLUENE	R	16			
0901034	LBA0006	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0006	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0006	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0006	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0006	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0006	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0006	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0006	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0006	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0007	METALS	ARSENIC	J	08A			
0901034	LBA0007	METALS	BARIUM	J	17			
0901034	LBA0007	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0007	METALS	CADMIUM	R	16			
0901034	LBA0007	METALS	COBALT	J	17			
0901034	LBA0007	METALS	IRON	J	08A	17	13	
0901034	LBA0007	METALS	LEAD	J	17			
0901034	LBA0007	METALS	LEAD	R	16			
0901034	LBA0007	METALS	MAGNESIUM	J	13			
0901034	LBA0007	METALS	MANGANESE	J	13	17		
0901034	LBA0007	METALS	NICKEL	J	08A	13	17	
0901034	LBA0007	METALS	SELENIUM	UJ	08A			
0901034	LBA0007	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	BENZO(A)PYRENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	BENZO(B)FLUORANTHENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	CHRYSENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	DI-N-BUTYL PHTHALATE	J	15			
0901034	LBA0007	SEMIVOLATILES	FLUORANTHENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0007	SEMIVOLATILES	PHENANTHRENE	J	15	17		
0901034	LBA0007	SEMIVOLATILES	PYRENE	J	15	17		
0901034	LBA0007	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0007	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0007	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0007	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0007	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0007	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0007	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0007	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0007	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0007	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0007	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0007	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0007	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0007	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0007	VOLATILES	2-BUTANONE	J	07A	15	04A	05A
0901034	LBA0007	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0007	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0007	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0007	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0007	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0007	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0007	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0007	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0007	VOLATILES	ACETONE	J	04A	05A	07A	
0901034	LBA0007	VOLATILES	ACETONE	R	16			
0901034	LBA0007	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0007	VOLATILES	ACROLEIN	R	16			
0901034	LBA0007	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0007	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0007	VOLATILES	BENZENE	R	16			
0901034	LBA0007	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0007	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0007	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	BROMOFORM	R	16			
0901034	LBA0007	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0007	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0007	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	CARBON DISULFIDE	J	07A	15	17	
0901034	LBA0007	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0007	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0007	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0007	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0007	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0007	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0007	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0007	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0007	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0007	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0007	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0007	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0007	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0007	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0007	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0007	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	ISOPROPYLBENZENE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0007	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0007	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0007	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0007	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0007	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0007	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0007	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	STYRENE	R	16			
0901034	LBA0007	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0007	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0007	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0007	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0007	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0007	VOLATILES	TOLUENE	R	16			
0901034	LBA0007	VOLATILES	TOLUENE	UJ	07A			
0901034	LBA0007	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0007	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0007	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0007	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0007	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0007	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0007	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0007	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0007	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0007	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0007	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0007	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0007	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0007	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0007	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0007	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0007	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0008	METALS	ARSENIC	J	08A			
0901034	LBA0008	METALS	BARIUM	J	17			
0901034	LBA0008	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0008	METALS	CADMIUM	R	16			
0901034	LBA0008	METALS	COBALT	J	17			
0901034	LBA0008	METALS	IRON	J	08A	13	17	
0901034	LBA0008	METALS	LEAD	J	17			
0901034	LBA0008	METALS	LEAD	R	16			
0901034	LBA0008	METALS	MAGNESIUM	J	13			
0901034	LBA0008	METALS	MANGANESE	J	13	17		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0008	METALS	NICKEL	J	08A	13	17	
0901034	LBA0008	METALS	SELENIUM	UJ	08A			
0901034	LBA0008	METALS	THALLIUM	J	15			
0901034	LBA0008	SEMIVOLATILES	ACENAPHTHYLENE	J	15			
0901034	LBA0008	SEMIVOLATILES	ANTHRACENE	J	15			
0901034	LBA0008	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15	17		
0901034	LBA0008	SEMIVOLATILES	BENZO(A)PYRENE	J	15	17		
0901034	LBA0008	SEMIVOLATILES	BENZO(B)FLUORANTHENE	J	15	17		
0901034	LBA0008	SEMIVOLATILES	BENZO(G,H,I)PERYLENE	J	15			
0901034	LBA0008	SEMIVOLATILES	CHRYSENE	J	15	17		
0901034	LBA0008	SEMIVOLATILES	FLUORANTHENE	J	17			
0901034	LBA0008	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0008	SEMIVOLATILES	INDENO(1,2,3-CD)PYRENE	J	15			
0901034	LBA0008	SEMIVOLATILES	PHENANTHRENE	J	15	17		
0901034	LBA0008	SEMIVOLATILES	PYRENE	J	15	17		
0901034	LBA0008	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,1,1-TRICHLOROETHANE	J	07A	15		
0901034	LBA0008	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0008	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0008	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0008	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0008	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0008	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0008	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0008	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0008	VOLATILES	1,2-DICHLOROETHANE-D4		07A			
0901034	LBA0008	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0008	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			

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Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0008	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0008	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0008	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0008	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0008	VOLATILES	2-BUTANONE	J	04A	05A	07A	15
0901034	LBA0008	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0008	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0008	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0008	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0008	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	4-BROMOFLUOROBENZENE		07A			
0901034	LBA0008	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0008	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0008	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0008	VOLATILES	ACETONE	J	04A	05A	07A	
0901034	LBA0008	VOLATILES	ACETONE	R	16			
0901034	LBA0008	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0008	VOLATILES	ACROLEIN	R	16			
0901034	LBA0008	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0008	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0008	VOLATILES	BENZENE	R	16			
0901034	LBA0008	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0008	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0008	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	BROMOFORM	R	16			
0901034	LBA0008	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0008	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0008	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	CARBON DISULFIDE	J	07A	15	17	
0901034	LBA0008	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0008	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0008	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0008	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0008	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0008	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0008	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	CHLOROFORM	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0008	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0008	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0008	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0008	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0008	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0008	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	DIBROMOFLUOROMETHANE		07A			
0901034	LBA0008	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0008	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0008	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0008	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0008	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0008	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0008	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0008	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0008	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0008	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0008	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	STYRENE	R	16			
0901034	LBA0008	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0008	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0008	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0008	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0008	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0008	VOLATILES	TOLUENE	J	07A	15		
0901034	LBA0008	VOLATILES	TOLUENE	R	16			
0901034	LBA0008	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0008	VOLATILES	TOLUENE-D8		07A			
0901034	LBA0008	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0008	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0008	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0008	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0008	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0008	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0008	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0008	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0008	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0008	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0008	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0008	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0008	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0008	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0008	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0008	VOLATILES	XYLENES, M,P-	UJ	07A			
A9A220198	LBA0009	METALS	ANTIMONY	UJ	08A			
A9A220198	LBA0009	METALS	MANGANESE	J	08A			
A9A220198	LBA0009	METALS	SILVER	UJ	08B			
A9A220198	LBA0009	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0009	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0009	VOLATILES	1,2-DICHLOROPROPANE	UJ	10A			
A9A220198	LBA0009	VOLATILES	BENZENE	UJ	10A			
A9A220198	LBA0009	VOLATILES	BROMODICHLOROMETHANE	UJ	10A			
A9A220198	LBA0009	VOLATILES	BROMOFORM	UJ	10A			
A9A220198	LBA0009	VOLATILES	CARBON TETRACHLORIDE	UJ	10A			
A9A220198	LBA0009	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0009	VOLATILES	DIBROMOCHLOROMETHANE	UJ	10A			
A9A220198	LBA0009	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	05B			
A9A220198	LBA0009	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0009	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	05B			
0901034	LBA0010	METALS	ANTIMONY	J	15			
0901034	LBA0010	METALS	ARSENIC	J	08A			
0901034	LBA0010	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0010	METALS	CADMIUM	R	16			
0901034	LBA0010	METALS	IRON	J	08A	13		
0901034	LBA0010	METALS	LEAD	R	16			
0901034	LBA0010	METALS	MAGNESIUM	J	13			
0901034	LBA0010	METALS	MANGANESE	J	13			
0901034	LBA0010	METALS	NICKEL	J	08A	13		
0901034	LBA0010	METALS	SELENIUM	UJ	08A			
0901034	LBA0010	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0010	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0010	VOLATILES	ACETONE	R	04A	05A		
0901034	LBA0010	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0011	METALS	ANTIMONY	J	08A	15		
0901034	LBA0011	METALS	ARSENIC	J	08A			
0901034	LBA0011	METALS	BERYLLIUM	J	13			
0901034	LBA0011	METALS	CADMIUM	J	15			
0901034	LBA0011	METALS	CADMIUM	R	16			
0901034	LBA0011	METALS	CALCIUM	J	13			
0901034	LBA0011	METALS	COBALT	J	13			
0901034	LBA0011	METALS	COPPER	J	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0011	METALS	LEAD	R	16			
0901034	LBA0011	METALS	MAGNESIUM	J	08A			
0901034	LBA0011	METALS	MANGANESE	J	08A			
0901034	LBA0011	METALS	MERCURY	J	15			
0901034	LBA0011	METALS	NICKEL	J	13			
0901034	LBA0011	METALS	SELENIUM	UJ	08A			
0901034	LBA0011	METALS	THALLIUM	J	15			
0901034	LBA0011	VOLATILES	1,1-DICHLOROETHANE	J	15			
0901034	LBA0011	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0011	VOLATILES	ACETONE	R	04A	05A		
0901034	LBA0011	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0012	METALS	ARSENIC	J	08A			
0901034	LBA0012	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0012	METALS	CADMIUM	R	16			
0901034	LBA0012	METALS	IRON	J	08A	13		
0901034	LBA0012	METALS	LEAD	R	16			
0901034	LBA0012	METALS	MAGNESIUM	J	13			
0901034	LBA0012	METALS	MANGANESE	J	13			
0901034	LBA0012	METALS	MERCURY	J	15			
0901034	LBA0012	METALS	NICKEL	J	08A	13		
0901034	LBA0012	METALS	SELENIUM	UJ	08A			
0901034	LBA0012	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0012	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0012	VOLATILES	ACETONE	J	04A	05A	15	
0901034	LBA0012	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0013	EXPLOSIVES	2-AMINO-4,6-DINITROTOLUENE	J	15			
0901034	LBA0013	METALS	ARSENIC	J	08A			
0901034	LBA0013	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0013	METALS	CADMIUM	R	16			
0901034	LBA0013	METALS	IRON	J	08A	13		
0901034	LBA0013	METALS	LEAD	R	16			
0901034	LBA0013	METALS	MAGNESIUM	J	13			
0901034	LBA0013	METALS	MANGANESE	J	13			
0901034	LBA0013	METALS	MERCURY	J	15			
0901034	LBA0013	METALS	NICKEL	J	08A	13		
0901034	LBA0013	METALS	SELENIUM	UJ	08A			
0901034	LBA0013	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0013	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0013	VOLATILES	ACETONE	J	04A	05A	15	
0901034	LBA0013	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0014	METALS	ANTIMONY	J	08A	15		
0901034	LBA0014	METALS	ARSENIC	J	08A			
0901034	LBA0014	METALS	BERYLLIUM	J	13			
0901034	LBA0014	METALS	CADMIUM	J	15			
0901034	LBA0014	METALS	CADMIUM	R	16			
0901034	LBA0014	METALS	CALCIUM	J	13			
0901034	LBA0014	METALS	COBALT	J	13			
0901034	LBA0014	METALS	COPPER	J	08A			
0901034	LBA0014	METALS	LEAD	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0014	METALS	MAGNESIUM	J	08A			
0901034	LBA0014	METALS	MANGANESE	J	08A			
0901034	LBA0014	METALS	MERCURY	J	15			
0901034	LBA0014	METALS	NICKEL	J	13			
0901034	LBA0014	METALS	SELENIUM	UJ	08A			
0901034	LBA0014	METALS	THALLIUM	J	15			
0901034	LBA0014	VOLATILES	1,1-DICHLOROETHANE	J	15			
0901034	LBA0014	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0014	VOLATILES	ACETONE	R	04A	05A		
0901034	LBA0014	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0014	VOLATILES	BENZENE	J	15			
0901034	LBA0014	VOLATILES	CIS-1,2-DICHLOROETHENE	J	15			
0901034	LBA0015	METALS	ARSENIC	J	08A			
0901034	LBA0015	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0015	METALS	CADMIUM	J	15			
0901034	LBA0015	METALS	CADMIUM	R	16			
0901034	LBA0015	METALS	IRON	J	08A	13		
0901034	LBA0015	METALS	LEAD	R	16			
0901034	LBA0015	METALS	MAGNESIUM	J	13			
0901034	LBA0015	METALS	MANGANESE	J	13			
0901034	LBA0015	METALS	NICKEL	J	08A	13		
0901034	LBA0015	METALS	SELENIUM	UJ	08A			
0901034	LBA0015	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0015	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,1,1-TRICHLOROETHANE	J	15	07A		
0901034	LBA0015	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0015	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0015	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0015	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0015	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0015	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0015	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0015	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0015	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0015	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0015	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0015	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0015	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0015	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0015	VOLATILES	2-BUTANONE	J	07A	04A	05A	15
0901034	LBA0015	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0015	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0015	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0015	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0015	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0015	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0015	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0015	VOLATILES	ACETONE	J	04A	05A	07A	
0901034	LBA0015	VOLATILES	ACETONE	R	16			
0901034	LBA0015	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0015	VOLATILES	ACROLEIN	R	16			
0901034	LBA0015	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0015	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0015	VOLATILES	BENZENE	R	16			
0901034	LBA0015	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0015	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0015	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	BROMOFORM	R	16			
0901034	LBA0015	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0015	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0015	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0015	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0015	VOLATILES	CARBON TETRACHLORIDE	R	16			

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Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0015	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0015	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0015	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0015	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0015	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0015	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0015	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0015	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0015	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0015	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0015	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0015	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0015	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0015	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0015	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0015	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0015	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0015	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0015	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	N-PROPYLBENZENE	UJ	07A			
0901034	LBA0015	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0015	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0015	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	STYRENE	R	16			
0901034	LBA0015	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0015	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0015	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0015	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0015	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0015	VOLATILES	TOLUENE	R	16			
0901034	LBA0015	VOLATILES	TOLUENE	UJ	07A			
0901034	LBA0015	VOLATILES	TOLUENE-D8	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0015	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0015	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0015	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0015	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0015	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0015	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0015	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0015	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0015	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0015	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0015	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0015	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0015	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0015	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0015	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0015	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0016	METALS	ARSENIC	J	08A			
0901034	LBA0016	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0016	METALS	CADMIUM	J	15			
0901034	LBA0016	METALS	CADMIUM	R	16			
0901034	LBA0016	METALS	IRON	J	08A	13		
0901034	LBA0016	METALS	LEAD	R	16			
0901034	LBA0016	METALS	MAGNESIUM	J	13			
0901034	LBA0016	METALS	MANGANESE	J	13			
0901034	LBA0016	METALS	NICKEL	J	08A	13		
0901034	LBA0016	METALS	SELENIUM	UJ	08A			
0901034	LBA0016	METALS	THALLIUM	J	15			
0901034	LBA0016	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0016	VOLATILES	1,1-DICHLOROETHANE	J	15			
0901034	LBA0016	VOLATILES	2-BUTANONE	R	04A	05A		
0901034	LBA0016	VOLATILES	ACETONE	R	04A	05A		
0901034	LBA0016	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0017	METALS	ANTIMONY	J	08A	15		
0901034	LBA0017	METALS	ARSENIC	J	08A			
0901034	LBA0017	METALS	BERYLLIUM	J	13			
0901034	LBA0017	METALS	CADMIUM	R	16			
0901034	LBA0017	METALS	CALCIUM	J	13			
0901034	LBA0017	METALS	COBALT	J	13			
0901034	LBA0017	METALS	COPPER	J	08A			
0901034	LBA0017	METALS	LEAD	R	16			
0901034	LBA0017	METALS	MAGNESIUM	J	08A			
0901034	LBA0017	METALS	MANGANESE	J	08A			
0901034	LBA0017	METALS	NICKEL	J	13			
0901034	LBA0017	METALS	SELENIUM	UJ	08A			
0901034	LBA0017	METALS	THALLIUM	J	15			
0901034	LBA0017	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,1,1-TRICHLOROETHANE	J	15	07A		
0901034	LBA0017	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0017	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	10A	07A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0017	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,1-DICHLOROETHANE	J	07A			
0901034	LBA0017	VOLATILES	1,1-DICHLOROETHENE	J	15	07A		
0901034	LBA0017	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0017	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,2-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,3-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0017	VOLATILES	1,4-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0017	VOLATILES	2-BUTANONE	R	04A	05A	07A	
0901034	LBA0017	VOLATILES	2-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0017	VOLATILES	4-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0017	VOLATILES	ACETONE	J	04A	05A	15	07A
0901034	LBA0017	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0017	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0017	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0017	VOLATILES	BROMOBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0017	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	CARBON DISULFIDE	J	15	07A		
0901034	LBA0017	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0017	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0017	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0017	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0017	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0017	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0017	VOLATILES	HEXACHLOROBUTADIENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0017	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0017	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0017	VOLATILES	N-BUTYLBENZENE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0017	VOLATILES	N-PROPYLBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	NAPHTHALENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	P-ISOPROPYLTOLUENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	SEC-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0017	VOLATILES	TERT-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0017	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0017	VOLATILES	TOLUENE	UJ	07A			
0901034	LBA0017	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0017	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0017	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0017	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0017	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0017	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0017	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0017	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0018	METALS	ANTIMONY	J	15			
0901034	LBA0018	METALS	ARSENIC	J	08A			
0901034	LBA0018	METALS	BERYLLIUM	J	08A	13		
0901034	LBA0018	METALS	CADMIUM	J	15			
0901034	LBA0018	METALS	CADMIUM	R	16			
0901034	LBA0018	METALS	IRON	J	08A	13		
0901034	LBA0018	METALS	LEAD	R	16			
0901034	LBA0018	METALS	MAGNESIUM	J	13			
0901034	LBA0018	METALS	MANGANESE	J	13			
0901034	LBA0018	METALS	NICKEL	J	08A	13		
0901034	LBA0018	METALS	SELENIUM	UJ	08A			
0901034	LBA0018	METALS	THALLIUM	J	15			
0901034	LBA0018	SEMIVOLATILES	2-METHYLNAPHTHALENE	J	15			
0901034	LBA0018	SEMIVOLATILES	ACENAPHTHYLENE	J	15			
0901034	LBA0018	SEMIVOLATILES	ANTHRACENE	J	15			
0901034	LBA0018	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15			
0901034	LBA0018	SEMIVOLATILES	BENZO(A)PYRENE	J	15			
0901034	LBA0018	SEMIVOLATILES	BENZO(B)FLUORANTHENE	J	15			
0901034	LBA0018	SEMIVOLATILES	CHRYSENE	J	15			
0901034	LBA0018	SEMIVOLATILES	DIBENZOFURAN	J	15			
0901034	LBA0018	SEMIVOLATILES	FLUORANTHENE	J	15			
0901034	LBA0018	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0018	SEMIVOLATILES	NAPHTHALENE	J	15			
0901034	LBA0018	SEMIVOLATILES	PHENANTHRENE	J	15			
0901034	LBA0018	SEMIVOLATILES	PYRENE	J	15			
0901034	LBA0018	VOLATILES	2-BUTANONE	J	04A	05A	15	
0901034	LBA0018	VOLATILES	ACETONE	J	04A	05A		
0901034	LBA0018	VOLATILES	ACROLEIN	R	04A	05A		
0901034	LBA0019	EXPLOSIVES	2,4-DINITROTOLUENE	UJ	08A			
0901034	LBA0019	METALS	ANTIMONY	J	08A	15		
0901034	LBA0019	METALS	ARSENIC	J	08A			
0901034	LBA0019	METALS	BERYLLIUM	J	13			
0901034	LBA0019	METALS	CADMIUM	J	15			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0019	METALS	CADMIUM	R	16			
0901034	LBA0019	METALS	CALCIUM	J	13			
0901034	LBA0019	METALS	COBALT	J	13			
0901034	LBA0019	METALS	COPPER	J	08A			
0901034	LBA0019	METALS	LEAD	R	16			
0901034	LBA0019	METALS	MAGNESIUM	J	08A			
0901034	LBA0019	METALS	MANGANESE	J	08A			
0901034	LBA0019	METALS	MERCURY	J	15			
0901034	LBA0019	METALS	NICKEL	J	13			
0901034	LBA0019	METALS	SELENIUM	UJ	08A			
0901034	LBA0019	METALS	THALLIUM	J	15			
0901034	LBA0019	SEMIVOLATILES	HEXACHLOROCYCLOPENTADIENE	UJ	05B			
0901034	LBA0019	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0019	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0019	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0019	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0019	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0019	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,2,4-TRIMETHYLBENZENE	J	07A	10A	15	
0901034	LBA0019	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0019	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0019	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0019	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0019	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0019	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0019	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0019	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0019	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0019	VOLATILES	2-BUTANONE	R	07A	04A	05A	
0901034	LBA0019	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0019	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0019	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0019	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0019	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0019	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0019	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0019	VOLATILES	ACETONE	R	07A	04A	05A	
0901034	LBA0019	VOLATILES	ACETONE	R	16			
0901034	LBA0019	VOLATILES	ACROLEIN	R	07A	04A	05A	
0901034	LBA0019	VOLATILES	ACROLEIN	R	16			
0901034	LBA0019	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0019	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0019	VOLATILES	BENZENE	J	07A	15		
0901034	LBA0019	VOLATILES	BENZENE	R	16			
0901034	LBA0019	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0019	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	BROMOFORM	R	16			
0901034	LBA0019	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0019	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0019	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0019	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0019	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0019	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0019	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0019	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0019	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0019	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0019	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0019	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0019	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0019	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0019	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0019	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0019	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0019	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0019	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0019	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0019	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0019	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0019	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0019	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0019	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0019	VOLATILES	P-ISOPROPYLTOLUENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	STYRENE	R	16			
0901034	LBA0019	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0019	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0019	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901034	LBA0019	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0019	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0019	VOLATILES	TOLUENE	J	07A	15		
0901034	LBA0019	VOLATILES	TOLUENE	R	16			
0901034	LBA0019	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0019	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0019	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0019	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0019	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0019	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0019	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0019	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0019	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0019	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0019	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0019	VOLATILES	VINYL CHLORIDE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0019	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0019	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0019	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0019	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0019	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0020	METALS	ANTIMONY	J	08A	15		
0901034	LBA0020	METALS	ARSENIC	J	08A			
0901034	LBA0020	METALS	BARIUM	J	17			
0901034	LBA0020	METALS	BERYLLIUM	J	13			
0901034	LBA0020	METALS	CADMIUM	J	15			
0901034	LBA0020	METALS	CADMIUM	R	16			
0901034	LBA0020	METALS	CALCIUM	J	13			
0901034	LBA0020	METALS	COBALT	J	13	17		
0901034	LBA0020	METALS	COPPER	J	08A			
0901034	LBA0020	METALS	LEAD	R	16			
0901034	LBA0020	METALS	MAGNESIUM	J	08A			
0901034	LBA0020	METALS	MANGANESE	J	08A	17		
0901034	LBA0020	METALS	MERCURY	J	15			
0901034	LBA0020	METALS	NICKEL	J	13			
0901034	LBA0020	METALS	SELENIUM	UJ	08A			
0901034	LBA0020	METALS	THALLIUM	J	15			
0901034	LBA0020	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0020	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0020	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0020	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0020	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0020	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0020	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0020	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,2-DICHLOROBENZENE	UJ	10A	07A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0020	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0020	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0020	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,3-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0020	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0020	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	1,4-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0020	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0020	VOLATILES	2-BUTANONE	R	04A	05A	07A	
0901034	LBA0020	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0020	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0020	VOLATILES	2-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0020	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0020	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	4-BROMOFLUOROBENZENE		07A			
0901034	LBA0020	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0020	VOLATILES	4-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0020	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0020	VOLATILES	ACETONE	J	04A	05A	07A	17
0901034	LBA0020	VOLATILES	ACETONE	R	16			
0901034	LBA0020	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0020	VOLATILES	ACROLEIN	R	16			
0901034	LBA0020	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0020	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0020	VOLATILES	BENZENE	J	15	07A		
0901034	LBA0020	VOLATILES	BENZENE	R	16			
0901034	LBA0020	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0020	VOLATILES	BROMOBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	BROMOFORM	R	16			
0901034	LBA0020	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0020	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0020	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0020	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0020	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0020	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0020	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0020	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0020	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0020	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0020	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0020	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0020	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0020	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0020	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0020	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0020	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0020	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0020	VOLATILES	HEXACHLOROBUTADIENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0020	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0020	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0020	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0020	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0020	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	N-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	N-PROPYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0020	VOLATILES	NAPHTHALENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0020	VOLATILES	P-ISOPROPYLTOLUENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	SEC-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	STYRENE	R	16			
0901034	LBA0020	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0020	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0020	VOLATILES	TERT-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0020	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0020	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0020	VOLATILES	TOLUENE	J	07A	17	15	
0901034	LBA0020	VOLATILES	TOLUENE	R	16			
0901034	LBA0020	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0020	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0020	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0020	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0020	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0020	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0020	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0020	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0020	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0020	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0020	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0020	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0020	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0020	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0020	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0020	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0020	VOLATILES	XYLENES, M,P-	UJ	07A			
0901034	LBA0021	METALS	ANTIMONY	J	08A			
0901034	LBA0021	METALS	ARSENIC	J	08A			
0901034	LBA0021	METALS	BARIUM	J	17			
0901034	LBA0021	METALS	BERYLLIUM	J	13			
0901034	LBA0021	METALS	CADMIUM	J	15			
0901034	LBA0021	METALS	CADMIUM	R	16			
0901034	LBA0021	METALS	CALCIUM	J	13			
0901034	LBA0021	METALS	COBALT	J	13	17		
0901034	LBA0021	METALS	COPPER	J	08A			
0901034	LBA0021	METALS	LEAD	R	16			
0901034	LBA0021	METALS	MAGNESIUM	J	08A			
0901034	LBA0021	METALS	MANGANESE	J	08A	17		
0901034	LBA0021	METALS	MERCURY	J	15			
0901034	LBA0021	METALS	NICKEL	J	13			
0901034	LBA0021	METALS	SELENIUM	UJ	08A			
0901034	LBA0021	METALS	THALLIUM	J	15			
0901034	LBA0021	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901034	LBA0021	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901034	LBA0021	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901034	LBA0021	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901034	LBA0021	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901034	LBA0021	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	10A	07A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0021	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901034	LBA0021	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901034	LBA0021	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,2-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901034	LBA0021	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901034	LBA0021	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,3-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901034	LBA0021	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901034	LBA0021	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	1,4-DICHLOROBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901034	LBA0021	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901034	LBA0021	VOLATILES	2-BUTANONE	J	04A	05A	15	07A
0901034	LBA0021	VOLATILES	2-BUTANONE	R	16			
0901034	LBA0021	VOLATILES	2-CHLOROTOLUENE	R	16			
0901034	LBA0021	VOLATILES	2-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	2-HEXANONE	R	16			
0901034	LBA0021	VOLATILES	2-HEXANONE	UJ	07A			
0901034	LBA0021	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	4-BROMOFLUOROBENZENE		07A			
0901034	LBA0021	VOLATILES	4-CHLOROTOLUENE	R	16			
0901034	LBA0021	VOLATILES	4-CHLOROTOLUENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901034	LBA0021	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901034	LBA0021	VOLATILES	ACETONE	J	04A	05A	15	17
0901034	LBA0021	VOLATILES	ACETONE	R	16			
0901034	LBA0021	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901034	LBA0021	VOLATILES	ACROLEIN	R	16			
0901034	LBA0021	VOLATILES	ACRYLONITRILE	R	16			
0901034	LBA0021	VOLATILES	ACRYLONITRILE	UJ	07A			
0901034	LBA0021	VOLATILES	BENZENE	R	16			
0901034	LBA0021	VOLATILES	BENZENE	UJ	07A			
0901034	LBA0021	VOLATILES	BROMOBENZENE	R	16			
0901034	LBA0021	VOLATILES	BROMOBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0021	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	BROMOFORM	R	16			
0901034	LBA0021	VOLATILES	BROMOFORM	UJ	07A			
0901034	LBA0021	VOLATILES	BROMOMETHANE	R	16			
0901034	LBA0021	VOLATILES	BROMOMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	CARBON DISULFIDE	R	16			
0901034	LBA0021	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901034	LBA0021	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901034	LBA0021	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901034	LBA0021	VOLATILES	CHLOROBENZENE	R	16			
0901034	LBA0021	VOLATILES	CHLOROBENZENE	UJ	07A			
0901034	LBA0021	VOLATILES	CHLOROETHANE	R	16			
0901034	LBA0021	VOLATILES	CHLOROETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	CHLOROFORM	R	16			
0901034	LBA0021	VOLATILES	CHLOROFORM	UJ	07A			
0901034	LBA0021	VOLATILES	CHLOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	CHLOROMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0021	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0021	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0021	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0021	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	DIBROMOMETHANE	R	16			
0901034	LBA0021	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	ETHYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	ETHYLBENZENE	UJ	07A			
0901034	LBA0021	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901034	LBA0021	VOLATILES	HEXACHLOROBUTADIENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	ISOPROPYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901034	LBA0021	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901034	LBA0021	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901034	LBA0021	VOLATILES	METHYLENE CHLORIDE	R	16			
0901034	LBA0021	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901034	LBA0021	VOLATILES	N-BUTYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	N-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	N-PROPYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	N-PROPYLBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	NAPHTHALENE	R	16			
0901034	LBA0021	VOLATILES	NAPHTHALENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	P-ISOPROPYLTOLUENE	R	16			
0901034	LBA0021	VOLATILES	P-ISOPROPYLTOLUENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	SEC-BUTYLBENZENE	UJ	10A	07A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0021	VOLATILES	STYRENE	R	16			
0901034	LBA0021	VOLATILES	STYRENE	UJ	07A			
0901034	LBA0021	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901034	LBA0021	VOLATILES	TERT-BUTYLBENZENE	UJ	10A	07A		
0901034	LBA0021	VOLATILES	TETRACHLOROETHENE	R	16			
0901034	LBA0021	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901034	LBA0021	VOLATILES	TOLUENE	J	07A	15	17	
0901034	LBA0021	VOLATILES	TOLUENE	R	16			
0901034	LBA0021	VOLATILES	TOLUENE-D8	R	16			
0901034	LBA0021	VOLATILES	TOLUENE-D8		07A			
0901034	LBA0021	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901034	LBA0021	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901034	LBA0021	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901034	LBA0021	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901034	LBA0021	VOLATILES	TRICHLOROETHENE	R	16			
0901034	LBA0021	VOLATILES	TRICHLOROETHENE	UJ	07A			
0901034	LBA0021	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901034	LBA0021	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901034	LBA0021	VOLATILES	VINYL ACETATE	R	16			
0901034	LBA0021	VOLATILES	VINYL ACETATE	UJ	07A			
0901034	LBA0021	VOLATILES	VINYL CHLORIDE	R	16			
0901034	LBA0021	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901034	LBA0021	VOLATILES	XYLENE, O-	R	16			
0901034	LBA0021	VOLATILES	XYLENE, O-	UJ	07A			
0901034	LBA0021	VOLATILES	XYLENES, M,P-	R	16			
0901034	LBA0021	VOLATILES	XYLENES, M,P-	UJ	07A			
A9A220198	LBA0022	METALS	ANTIMONY	UJ	08A			
A9A220198	LBA0022	METALS	MANGANESE	J	08A			
A9A220198	LBA0022	METALS	SILVER	UJ	08B			
A9A220198	LBA0022	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0022	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0022	VOLATILES	1,2-DICHLOROPROPANE	UJ	10A			
A9A220198	LBA0022	VOLATILES	BENZENE	UJ	10A			
A9A220198	LBA0022	VOLATILES	BROMODICHLOROMETHANE	UJ	10A			
A9A220198	LBA0022	VOLATILES	BROMOFORM	UJ	10A			
A9A220198	LBA0022	VOLATILES	CARBON TETRACHLORIDE	UJ	10A			
A9A220198	LBA0022	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0022	VOLATILES	DIBROMOCHLOROMETHANE	UJ	10A			
A9A220198	LBA0022	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	05B			
A9A220198	LBA0022	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0022	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	05B			
0901034	LBA0023	METALS	ANTIMONY	J	08A	15		
0901034	LBA0023	METALS	ARSENIC	J	08A			
0901034	LBA0023	METALS	BERYLLIUM	J	13			
0901034	LBA0023	METALS	CADMIUM	R	16			
0901034	LBA0023	METALS	CALCIUM	J	13			
0901034	LBA0023	METALS	COBALT	J	13			
0901034	LBA0023	METALS	COPPER	J	08A			
0901034	LBA0023	METALS	LEAD	R	16			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0023	METALS	MAGNESIUM	J	08A			
0901034	LBA0023	METALS	MANGANESE	J	08A			
0901034	LBA0023	METALS	MERCURY	J	15			
0901034	LBA0023	METALS	NICKEL	J	13			
0901034	LBA0023	METALS	SELENIUM	UJ	08A			
0901034	LBA0023	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15			
0901034	LBA0023	SEMIVOLATILES	BENZO(B)FLUORANTHENE	J	15			
0901034	LBA0023	SEMIVOLATILES	CHRYSENE	J	15			
0901034	LBA0023	SEMIVOLATILES	FLUORANTHENE	J	15			
0901034	LBA0023	SEMIVOLATILES	PYRENE	J	15			
0901034	LBA0024	METALS	ANTIMONY	J	08A			
0901034	LBA0024	METALS	ARSENIC	J	08A			
0901034	LBA0024	METALS	BERYLLIUM	J	13			
0901034	LBA0024	METALS	CADMIUM	J	15			
0901034	LBA0024	METALS	CADMIUM	R	16			
0901034	LBA0024	METALS	CALCIUM	J	13			
0901034	LBA0024	METALS	COBALT	J	13			
0901034	LBA0024	METALS	COPPER	J	08A			
0901034	LBA0024	METALS	LEAD	R	16			
0901034	LBA0024	METALS	MAGNESIUM	J	08A			
0901034	LBA0024	METALS	MANGANESE	J	08A			
0901034	LBA0024	METALS	MERCURY	J	15			
0901034	LBA0024	METALS	NICKEL	J	13			
0901034	LBA0024	METALS	SELENIUM	UJ	08A			
0901034	LBA0024	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15			
0901034	LBA0024	SEMIVOLATILES	BIS(2-ETHYLHEXYL)PHTHALATE	J	08A	15		
0901034	LBA0024	SEMIVOLATILES	BUTYL BENZLY PHTHALATE	UJ	08B			
0901034	LBA0024	SEMIVOLATILES	CHRYSENE	J	15			
0901034	LBA0024	SEMIVOLATILES	FLUORANTHENE	J	15			
0901034	LBA0024	SEMIVOLATILES	PYRENE	J	15			
0901034	LBA0025	METALS	ANTIMONY	J	08A			
0901034	LBA0025	METALS	ARSENIC	J	08A			
0901034	LBA0025	METALS	BERYLLIUM	J	13			
0901034	LBA0025	METALS	CADMIUM	J	15			
0901034	LBA0025	METALS	CADMIUM	R	16			
0901034	LBA0025	METALS	CALCIUM	J	13			
0901034	LBA0025	METALS	COBALT	J	13			
0901034	LBA0025	METALS	COPPER	J	08A			
0901034	LBA0025	METALS	LEAD	R	16			
0901034	LBA0025	METALS	MAGNESIUM	J	08A			
0901034	LBA0025	METALS	MANGANESE	J	08A			
0901034	LBA0025	METALS	MERCURY	J	15			
0901034	LBA0025	METALS	NICKEL	J	13			
0901034	LBA0025	METALS	SELENIUM	UJ	08A			
0901034	LBA0025	SEMIVOLATILES	ACENAPHTHYLENE	J	15			
0901034	LBA0025	SEMIVOLATILES	ANTHRACENE	J	15			
0901034	LBA0025	SEMIVOLATILES	BENZO(A)ANTHRACENE	J	15			
0901034	LBA0025	SEMIVOLATILES	BENZO(A)PYRENE	J	15			
0901034	LBA0025	SEMIVOLATILES	BENZO(B)FLUORANTHENE	J	15			

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Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901034	LBA0025	SEMIVOLATILES	BIS(2-ETHYLHEXYL)PHTHALATE	J	15			
0901034	LBA0025	SEMIVOLATILES	CHRYSENE	J	15			
0901034	LBA0025	SEMIVOLATILES	FLUORANTHENE	J	15			
0901034	LBA0025	SEMIVOLATILES	PHENANTHRENE	J	15			
0901034	LBA0025	SEMIVOLATILES	PYRENE	J	15			
0901027	LBA0026	METALS	ANTIMONY	J	17			
0901027	LBA0026	METALS	ARSENIC	J	08A			
0901027	LBA0026	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0026	METALS	BERYLLIUM	J	13			
0901027	LBA0026	METALS	CADMIUM	J	15	17		
0901027	LBA0026	METALS	CADMIUM	R	16			
0901027	LBA0026	METALS	CALCIUM	J	13			
0901027	LBA0026	METALS	CHROMIUM	J	13			
0901027	LBA0026	METALS	COBALT	J	08A	08B	13	
0901027	LBA0026	METALS	LEAD	J	13			
0901027	LBA0026	METALS	LEAD	R	16			
0901027	LBA0026	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0026	METALS	NICKEL	J	08A	13		
0901027	LBA0026	METALS	SELENIUM	UJ	08A			
0901027	LBA0026	METALS	SILVER	UJ	08A	08B		
0901027	LBA0026	METALS	ZINC	J	13			
0901027	LBA0026	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0026	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0026	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0026	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0026	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0026	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0026	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0026	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0026	VOLATILES	2-BUTANONE	J	04A	05A	07A	17
0901027	LBA0026	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0026	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0026	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0026	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0026	VOLATILES	4-ISOPROPYLTOLUENE	R	16			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0026	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0026	VOLATILES	ACETONE	J	04A	05A	07A	17
0901027	LBA0026	VOLATILES	ACETONE	R	16			
0901027	LBA0026	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0026	VOLATILES	ACROLEIN	R	16			
0901027	LBA0026	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0026	VOLATILES	BENZENE	R	16			
0901027	LBA0026	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0026	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	BROMOFORM	R	16			
0901027	LBA0026	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0026	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0026	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0026	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0026	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0026	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0026	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0026	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0026	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0026	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0026	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0026	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0026	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0026	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	STYRENE	R	16			
0901027	LBA0026	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0026	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0026	VOLATILES	TOLUENE	R	16			
0901027	LBA0026	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0026	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0026	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0026	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0026	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0026	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0026	VOLATILES	VINYL ACETATE	UJ	05B			
0901027	LBA0026	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0026	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0026	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0027	METALS	ANTIMONY	J	15	17		
0901027	LBA0027	METALS	ARSENIC	J	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0027	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0027	METALS	BERYLLIUM	J	13			
0901027	LBA0027	METALS	CADMIUM	J	15	17		
0901027	LBA0027	METALS	CADMIUM	R	16			
0901027	LBA0027	METALS	CALCIUM	J	13			
0901027	LBA0027	METALS	CHROMIUM	J	13			
0901027	LBA0027	METALS	COBALT	J	08A	08B	13	
0901027	LBA0027	METALS	LEAD	J	13			
0901027	LBA0027	METALS	LEAD	R	16			
0901027	LBA0027	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0027	METALS	NICKEL	J	08A	13		
0901027	LBA0027	METALS	SELENIUM	UJ	08A			
0901027	LBA0027	METALS	SILVER	UJ	08A	08B		
0901027	LBA0027	METALS	ZINC	J	13			
0901027	LBA0027	SEMIVOLATILES	FLUORANTHENE	J	15			
0901027	LBA0027	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0027	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0027	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0027	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0027	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0027	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0027	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0027	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0027	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0027	VOLATILES	2-BUTANONE	J	04A	05A	07A	17
0901027	LBA0027	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0027	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0027	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0027	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0027	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0027	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0027	VOLATILES	ACETONE	J	04A	05A	07A	17
0901027	LBA0027	VOLATILES	ACETONE	R	16			
0901027	LBA0027	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0027	VOLATILES	ACROLEIN	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0027	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0027	VOLATILES	BENZENE	R	16			
0901027	LBA0027	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0027	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	BROMOFORM	R	16			
0901027	LBA0027	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0027	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0027	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0027	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0027	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0027	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0027	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0027	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0027	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0027	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0027	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0027	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0027	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0027	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	STYRENE	R	16			
0901027	LBA0027	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0027	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0027	VOLATILES	TOLUENE	R	16			
0901027	LBA0027	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0027	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0027	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0027	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0027	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0027	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0027	VOLATILES	VINYL ACETATE	UJ	05B			
0901027	LBA0027	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0027	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0027	VOLATILES	XYLENES, M,P-	R	16			
A9A220198	LBA0028	METALS	ANTIMONY	UJ	08A			
A9A220198	LBA0028	METALS	MANGANESE	J	08A			
A9A220198	LBA0028	METALS	SILVER	UJ	08B			
A9A220198	LBA0028	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0028	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	10A			
A9A220198	LBA0028	VOLATILES	1,2-DICHLOROPROPANE	UJ	10A			
A9A220198	LBA0028	VOLATILES	BENZENE	UJ	10A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
A9A220198	LBA0028	VOLATILES	BROMODICHLOROMETHANE	UJ	10A			
A9A220198	LBA0028	VOLATILES	BROMOFORM	UJ	10A			
A9A220198	LBA0028	VOLATILES	CARBON TETRACHLORIDE	UJ	10A			
A9A220198	LBA0028	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0028	VOLATILES	DIBROMOCHLOROMETHANE	UJ	10A			
A9A220198	LBA0028	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	05B			
A9A220198	LBA0028	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	10A			
A9A220198	LBA0028	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	05B			
0901027	LBA0029	METALS	ANTIMONY	J	15			
0901027	LBA0029	METALS	ARSENIC	J	08A			
0901027	LBA0029	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0029	METALS	BERYLLIUM	J	13			
0901027	LBA0029	METALS	CADMIUM	R	16			
0901027	LBA0029	METALS	CALCIUM	J	13			
0901027	LBA0029	METALS	CHROMIUM	J	13			
0901027	LBA0029	METALS	COBALT	J	08A	08B	13	
0901027	LBA0029	METALS	LEAD	J	13			
0901027	LBA0029	METALS	LEAD	R	16			
0901027	LBA0029	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0029	METALS	NICKEL	J	08A	13		
0901027	LBA0029	METALS	SELENIUM	UJ	08A			
0901027	LBA0029	METALS	SILVER	UJ	08A	08B		
0901027	LBA0029	METALS	ZINC	J	13			
0901027	LBA0029	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0029	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0029	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0029	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0029	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0029	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0029	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0029	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0029	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0029	VOLATILES	2-BUTANONE	R	04A	05A		
0901027	LBA0029	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0029	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0029	VOLATILES	2-HEXANONE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0029	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0029	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0029	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0029	VOLATILES	ACETONE	J	04A	05A	07A	
0901027	LBA0029	VOLATILES	ACETONE	R	16			
0901027	LBA0029	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0029	VOLATILES	ACROLEIN	R	16			
0901027	LBA0029	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0029	VOLATILES	BENZENE	R	16			
0901027	LBA0029	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0029	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	BROMOFORM	R	16			
0901027	LBA0029	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0029	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0029	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0029	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0029	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0029	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0029	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0029	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0029	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0029	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0029	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0029	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0029	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0029	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	STYRENE	R	16			
0901027	LBA0029	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0029	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0029	VOLATILES	TOLUENE	R	16			
0901027	LBA0029	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0029	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0029	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0029	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0029	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0029	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0029	VOLATILES	VINYL ACETATE	UJ	05B			
0901027	LBA0029	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0029	VOLATILES	XYLENE, O-	R	16			

Table 4

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0029	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0030	METALS	ARSENIC	J	08A			
0901027	LBA0030	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0030	METALS	BERYLLIUM	J	13			
0901027	LBA0030	METALS	CADMIUM	R	16			
0901027	LBA0030	METALS	CALCIUM	J	13			
0901027	LBA0030	METALS	CHROMIUM	J	13			
0901027	LBA0030	METALS	COBALT	J	08A	08B	13	
0901027	LBA0030	METALS	LEAD	J	13			
0901027	LBA0030	METALS	LEAD	R	16			
0901027	LBA0030	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0030	METALS	MERCURY	J	15			
0901027	LBA0030	METALS	NICKEL	J	08A	13		
0901027	LBA0030	METALS	SELENIUM	UJ	08A			
0901027	LBA0030	METALS	SILVER	UJ	08A	08B		
0901027	LBA0030	METALS	ZINC	J	13			
0901027	LBA0030	SEMIVOLATILES	2,4-DINITROPHENOL	UJ	05B			
0901027	LBA0030	SEMIVOLATILES	2,4-DINITROTOLUENE	J	15			
0901027	LBA0030	SEMIVOLATILES	2,6-DINITROTOLUENE	J	15			
0901027	LBA0030	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0030	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0030	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0030	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0030	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0030	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0030	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0030	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0030	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0030	VOLATILES	2-BUTANONE	R	04A	05A		
0901027	LBA0030	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0030	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0030	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0030	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0030	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0030	VOLATILES	4-METHYL-2-PENTANONE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0030	VOLATILES	ACETONE	J	04A	05A	07A	15
0901027	LBA0030	VOLATILES	ACETONE	R	16			
0901027	LBA0030	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0030	VOLATILES	ACROLEIN	R	16			
0901027	LBA0030	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0030	VOLATILES	BENZENE	R	16			
0901027	LBA0030	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0030	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	BROMOFORM	R	16			
0901027	LBA0030	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0030	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0030	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0030	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0030	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0030	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0030	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0030	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0030	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0030	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0030	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0030	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0030	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0030	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	STYRENE	R	16			
0901027	LBA0030	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0030	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0030	VOLATILES	TOLUENE	R	16			
0901027	LBA0030	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0030	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0030	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0030	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0030	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0030	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0030	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0030	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0030	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0031	METALS	ARSENIC	J	08A			
0901027	LBA0031	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0031	METALS	BERYLLIUM	J	13			
0901027	LBA0031	METALS	CADMIUM	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0031	METALS	CALCIUM	J	13			
0901027	LBA0031	METALS	CHROMIUM	J	13			
0901027	LBA0031	METALS	COBALT	J	08A	08B	13	
0901027	LBA0031	METALS	LEAD	J	13			
0901027	LBA0031	METALS	LEAD	R	16			
0901027	LBA0031	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0031	METALS	NICKEL	J	08A	13		
0901027	LBA0031	METALS	SELENIUM	UJ	08A			
0901027	LBA0031	METALS	SILVER	UJ	08A	08B		
0901027	LBA0031	METALS	ZINC	J	13			
0901027	LBA0031	PEST/PCB	AROCLOR 1260	J	18			
0901027	LBA0031	SEMIVOLATILES	2,6-DINITROTOLUENE	J	15			
0901027	LBA0031	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0031	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0031	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0031	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0031	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0031	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0031	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0031	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0031	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0031	VOLATILES	2-BUTANONE	J	04A	05A	07A	15
0901027	LBA0031	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0031	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0031	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0031	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0031	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0031	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0031	VOLATILES	ACETONE	J	04A	05A	07A	
0901027	LBA0031	VOLATILES	ACETONE	R	16			
0901027	LBA0031	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0031	VOLATILES	ACROLEIN	R	16			
0901027	LBA0031	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0031	VOLATILES	BENZENE	R	16			
0901027	LBA0031	VOLATILES	BROMOBENZENE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0031	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	BROMOFORM	R	16			
0901027	LBA0031	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0031	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0031	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0031	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0031	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0031	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0031	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0031	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0031	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0031	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0031	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0031	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0031	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0031	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	STYRENE	R	16			
0901027	LBA0031	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0031	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0031	VOLATILES	TOLUENE	R	16			
0901027	LBA0031	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0031	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0031	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0031	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0031	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0031	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0031	VOLATILES	VINYL ACETATE	UJ	05B			
0901027	LBA0031	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0031	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0031	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0032	METALS	ANTIMONY	J	15			
0901027	LBA0032	METALS	ARSENIC	J	08A			
0901027	LBA0032	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0032	METALS	BERYLLIUM	J	13			
0901027	LBA0032	METALS	CADMIUM	R	16			
0901027	LBA0032	METALS	CALCIUM	J	13			
0901027	LBA0032	METALS	CHROMIUM	J	13			
0901027	LBA0032	METALS	COBALT	J	08A	08B	13	
0901027	LBA0032	METALS	LEAD	J	13			
0901027	LBA0032	METALS	LEAD	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0032	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0032	METALS	NICKEL	J	08A	13		
0901027	LBA0032	METALS	SELENIUM	J	08A	15		
0901027	LBA0032	METALS	SILVER	UJ	08A	08B		
0901027	LBA0032	METALS	THALLIUM	J	15			
0901027	LBA0032	METALS	ZINC	J	13			
0901027	LBA0032	PEST/PCB	AROCLOR 1260	J	18			
0901027	LBA0032	SEMIVOLATILES	2,6-DINITROTOLUENE	J	15			
0901027	LBA0032	SEMIVOLATILES	3,3'-DICHLOROBENZIDINE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1-DICHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1-DICHLOROETHENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,1-DICHLOROPROPENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DIBROMOETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DICHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DICHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DICHLOROETHANE-D4	UJ	08A			
0901027	LBA0032	VOLATILES	1,2-DICHLOROPROPANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,3-DICHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	1,3-DICHLOROPROPANE	UJ	08A			
0901027	LBA0032	VOLATILES	1,4-DICHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	2,2-DICHLOROPROPANE	UJ	08A			
0901027	LBA0032	VOLATILES	2-BUTANONE	R	04A	05A	08A	
0901027	LBA0032	VOLATILES	2-CHLOROTOLUENE	UJ	08A			
0901027	LBA0032	VOLATILES	2-HEXANONE	UJ	08A			
0901027	LBA0032	VOLATILES	4-BROMOFLUOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	4-CHLOROTOLUENE	UJ	08A			
0901027	LBA0032	VOLATILES	4-ISOPROPYLTOLUENE	UJ	08A			
0901027	LBA0032	VOLATILES	4-METHYL-2-PENTANONE	UJ	08A			
0901027	LBA0032	VOLATILES	ACETONE	J	04A	05A	07A	08A
0901027	LBA0032	VOLATILES	ACROLEIN	R	04A	05A	08A	
0901027	LBA0032	VOLATILES	ACRYLONITRILE	UJ	08A			
0901027	LBA0032	VOLATILES	BENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	BROMOBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	BROMOCHLOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	BROMODICHLOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	BROMOFORM	UJ	08A			
0901027	LBA0032	VOLATILES	BROMOMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	CARBON DISULFIDE	UJ	08A			
0901027	LBA0032	VOLATILES	CARBON TETRACHLORIDE	UJ	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0032	VOLATILES	CHLOROBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	CHLOROETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	CHLOROFORM	UJ	08A			
0901027	LBA0032	VOLATILES	CHLOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	08A			
0901027	LBA0032	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	08A			
0901027	LBA0032	VOLATILES	DIBROMOCHLOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	DIBROMOFLUOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	DIBROMOMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	ETHYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	HEXACHLOROBUTADIENE	UJ	08A			
0901027	LBA0032	VOLATILES	ISOPROPYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	08A			
0901027	LBA0032	VOLATILES	METHYLENE CHLORIDE	UJ	08A			
0901027	LBA0032	VOLATILES	N-BUTYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	N-PROPYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	NAPHTHALENE	UJ	08A			
0901027	LBA0032	VOLATILES	SEC-BUTYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	STYRENE	UJ	08A			
0901027	LBA0032	VOLATILES	TERT-BUTYLBENZENE	UJ	08A			
0901027	LBA0032	VOLATILES	TETRACHLOROETHENE	UJ	08A			
0901027	LBA0032	VOLATILES	TOLUENE	UJ	08A			
0901027	LBA0032	VOLATILES	TOLUENE-D8	UJ	08A			
0901027	LBA0032	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	08A			
0901027	LBA0032	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	08A			
0901027	LBA0032	VOLATILES	TRICHLOROETHENE	UJ	08A			
0901027	LBA0032	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	08A			
0901027	LBA0032	VOLATILES	VINYL ACETATE	UJ	08A			
0901027	LBA0032	VOLATILES	VINYL CHLORIDE	UJ	08A			
0901027	LBA0032	VOLATILES	XYLENE, O-	UJ	08A			
0901027	LBA0032	VOLATILES	XYLENES, M,P-	UJ	08A			
0901027	LBA0033	EXPLOSIVES	2,4-DINITROTOLUENE	R	16			
0901027	LBA0033	EXPLOSIVES	2,6-DINITROTOLUENE	R	16			
0901027	LBA0033	EXPLOSIVES	2-NITROTOLUENE	R	16			
0901027	LBA0033	EXPLOSIVES	4-NITROTOLUENE	R	16			
0901027	LBA0033	METALS	ARSENIC	J	08A			
0901027	LBA0033	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0033	METALS	BERYLLIUM	J	13			
0901027	LBA0033	METALS	CADMIUM	J	15			
0901027	LBA0033	METALS	CADMIUM	R	16			
0901027	LBA0033	METALS	CALCIUM	J	13			
0901027	LBA0033	METALS	CHROMIUM	J	13			
0901027	LBA0033	METALS	COBALT	J	08A	08B	13	
0901027	LBA0033	METALS	LEAD	J	13			
0901027	LBA0033	METALS	LEAD	R	16			
0901027	LBA0033	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0033	METALS	NICKEL	J	08A	13		
0901027	LBA0033	METALS	SELENIUM	UJ	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0033	METALS	SILVER	UJ	08A	08B		
0901027	LBA0033	METALS	THALLIUM	J	15			
0901027	LBA0033	SEMIVOLATILES	2,4-DINITROPHENOL	UJ	05B			
0901027	LBA0033	VOLATILES	2-BUTANONE	R	04A	05A		
0901027	LBA0033	VOLATILES	ACETONE	J	04A	05A	15	
0901027	LBA0033	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0033	VOLATILES	TOLUENE	J	15			
0901027	LBA0034	METALS	ANTIMONY	J	15			
0901027	LBA0034	METALS	ARSENIC	J	08A			
0901027	LBA0034	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0034	METALS	BERYLLIUM	J	13			
0901027	LBA0034	METALS	CADMIUM	R	16			
0901027	LBA0034	METALS	CALCIUM	J	13			
0901027	LBA0034	METALS	CHROMIUM	J	13			
0901027	LBA0034	METALS	COBALT	J	08A	08B	13	
0901027	LBA0034	METALS	LEAD	J	13			
0901027	LBA0034	METALS	LEAD	R	16			
0901027	LBA0034	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0034	METALS	NICKEL	J	08A	13		
0901027	LBA0034	METALS	SELENIUM	UJ	08A			
0901027	LBA0034	METALS	SILVER	UJ	08A	08B		
0901027	LBA0034	METALS	ZINC	J	13			
0901027	LBA0034	SEMIVOLATILES	2,4-DINITROPHENOL	UJ	05B			
0901027	LBA0034	SEMIVOLATILES	FLUORANTHENE	J	15			
0901027	LBA0034	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0034	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0034	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0034	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0034	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0034	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0034	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0034	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0034	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0034	VOLATILES	2-BUTANONE	J	04A	05A	07A	15
0901027	LBA0034	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0034	VOLATILES	2-CHLOROTOLUENE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0034	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0034	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0034	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0034	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0034	VOLATILES	ACETONE	J	04A	05A	07A	
0901027	LBA0034	VOLATILES	ACETONE	R	16			
0901027	LBA0034	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0034	VOLATILES	ACROLEIN	R	16			
0901027	LBA0034	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0034	VOLATILES	BENZENE	R	16			
0901027	LBA0034	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0034	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	BROMOFORM	R	16			
0901027	LBA0034	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0034	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0034	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0034	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0034	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0034	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0034	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0034	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0034	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0034	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0034	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0034	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0034	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0034	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	STYRENE	R	16			
0901027	LBA0034	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0034	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0034	VOLATILES	TOLUENE	R	16			
0901027	LBA0034	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0034	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0034	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0034	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0034	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0034	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0034	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0034	VOLATILES	XYLENE, O-	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0034	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0035	METALS	ARSENIC	J	08A			
0901027	LBA0035	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0035	METALS	BERYLLIUM	J	13			
0901027	LBA0035	METALS	CADMIUM	R	16			
0901027	LBA0035	METALS	CALCIUM	J	13			
0901027	LBA0035	METALS	CHROMIUM	J	13			
0901027	LBA0035	METALS	COBALT	J	08A	08B	13	
0901027	LBA0035	METALS	LEAD	J	13			
0901027	LBA0035	METALS	LEAD	R	16			
0901027	LBA0035	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0035	METALS	NICKEL	J	08A	13		
0901027	LBA0035	METALS	SELENIUM	UJ	08A			
0901027	LBA0035	METALS	SILVER	UJ	08A	08B		
0901027	LBA0035	METALS	ZINC	J	13			
0901027	LBA0035	SEMIVOLATILES	2,4-DINITROPHENOL	UJ	05B			
0901027	LBA0035	SEMIVOLATILES	2,4-DINITROTOLUENE	J	15			
0901027	LBA0035	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0035	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0035	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0035	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0035	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0035	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0035	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0035	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0035	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0035	VOLATILES	2-BUTANONE	R	04A	05A		
0901027	LBA0035	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0035	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0035	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0035	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0035	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0035	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0035	VOLATILES	ACETONE	J	04A	05A	07A	15
0901027	LBA0035	VOLATILES	ACETONE	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0035	VOLATILES	ACROLEIN	R	04A	05A		
0901027	LBA0035	VOLATILES	ACROLEIN	R	16			
0901027	LBA0035	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0035	VOLATILES	BENZENE	R	16			
0901027	LBA0035	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0035	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	BROMOFORM	R	16			
0901027	LBA0035	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0035	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0035	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0035	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0035	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0035	VOLATILES	CHLOROFORM	R	16			
0901027	LBA0035	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0035	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0035	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0035	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0035	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0035	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0035	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0035	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	STYRENE	R	16			
0901027	LBA0035	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0035	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0035	VOLATILES	TOLUENE	R	16			
0901027	LBA0035	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0035	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0035	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0035	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0035	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0035	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0035	VOLATILES	VINYL ACETATE	UJ	05B			
0901027	LBA0035	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0035	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0035	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0036	METALS	ANTIMONY	J	15			
0901027	LBA0036	METALS	ARSENIC	J	08A			
0901027	LBA0036	METALS	BARIUM	J	08A	08B	13	
0901027	LBA0036	METALS	BERYLLIUM	J	13			
0901027	LBA0036	METALS	CADMIUM	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0036	METALS	CALCIUM	J	13			
0901027	LBA0036	METALS	CHROMIUM	J	13			
0901027	LBA0036	METALS	COBALT	J	08A	08B	13	
0901027	LBA0036	METALS	LEAD	J	13			
0901027	LBA0036	METALS	LEAD	R	16			
0901027	LBA0036	METALS	MAGNESIUM	J	08A	13		
0901027	LBA0036	METALS	MERCURY	J	15			
0901027	LBA0036	METALS	NICKEL	J	08A	13		
0901027	LBA0036	METALS	SELENIUM	UJ	08A			
0901027	LBA0036	METALS	SILVER	UJ	08A	08B		
0901027	LBA0036	METALS	THALLIUM	J	15			
0901027	LBA0036	METALS	ZINC	J	13			
0901027	LBA0036	SEMIVOLATILES	2,4-DINITROPHENOL	UJ	05B			
0901027	LBA0036	VOLATILES	1,1,1,2-TETRACHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,1,1,2-TETRACHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,1,1-TRICHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,1,1-TRICHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,1,2,2-TETRACHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,1,2,2-TETRACHLOROETHANE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,1,2-TRICHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,1,2-TRICHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,1-DICHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,1-DICHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,1-DICHLOROETHENE	R	16			
0901027	LBA0036	VOLATILES	1,1-DICHLOROETHENE	UJ	07A			
0901027	LBA0036	VOLATILES	1,1-DICHLOROPROPENE	R	16			
0901027	LBA0036	VOLATILES	1,1-DICHLOROPROPENE	UJ	07A			
0901027	LBA0036	VOLATILES	1,2,3-TRICHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,2,3-TRICHLOROBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2,3-TRICHLOROPROPANE	R	16			
0901027	LBA0036	VOLATILES	1,2,3-TRICHLOROPROPANE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2,4-TRICHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2,4-TRIMETHYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,2,4-TRIMETHYLBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	16			
0901027	LBA0036	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2-DIBROMOETHANE	R	16			
0901027	LBA0036	VOLATILES	1,2-DIBROMOETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,2-DICHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,2-DICHLOROBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,2-DICHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	1,2-DICHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,2-DICHLOROETHANE-D4	R	16			
0901027	LBA0036	VOLATILES	1,2-DICHLOROETHANE-D4	UJ	07A			
0901027	LBA0036	VOLATILES	1,2-DICHLOROPROPANE	R	16			
0901027	LBA0036	VOLATILES	1,2-DICHLOROPROPANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,3,5-TRIMETHYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,3,5-TRIMETHYLBENZENE	UJ	07A	10A		

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0036	VOLATILES	1,3-DICHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,3-DICHLOROBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	1,3-DICHLOROPROPANE	R	16			
0901027	LBA0036	VOLATILES	1,3-DICHLOROPROPANE	UJ	07A			
0901027	LBA0036	VOLATILES	1,4-DICHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	1,4-DICHLOROBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	2,2-DICHLOROPROPANE	R	16			
0901027	LBA0036	VOLATILES	2,2-DICHLOROPROPANE	UJ	07A			
0901027	LBA0036	VOLATILES	2-BUTANONE	J	04A	05A	07A	15
0901027	LBA0036	VOLATILES	2-BUTANONE	R	16			
0901027	LBA0036	VOLATILES	2-CHLOROTOLUENE	R	16			
0901027	LBA0036	VOLATILES	2-CHLOROTOLUENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	2-HEXANONE	R	16			
0901027	LBA0036	VOLATILES	2-HEXANONE	UJ	07A			
0901027	LBA0036	VOLATILES	4-BROMOFLUOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	4-BROMOFLUOROBENZENE	UJ	07A			
0901027	LBA0036	VOLATILES	4-CHLOROTOLUENE	R	16			
0901027	LBA0036	VOLATILES	4-CHLOROTOLUENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	4-ISOPROPYLTOLUENE	R	16			
0901027	LBA0036	VOLATILES	4-ISOPROPYLTOLUENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	4-METHYL-2-PENTANONE	R	16			
0901027	LBA0036	VOLATILES	4-METHYL-2-PENTANONE	UJ	07A			
0901027	LBA0036	VOLATILES	ACETONE	J	04A	05A	07A	
0901027	LBA0036	VOLATILES	ACETONE	R	16			
0901027	LBA0036	VOLATILES	ACROLEIN	R	04A	05A	07A	
0901027	LBA0036	VOLATILES	ACROLEIN	R	16			
0901027	LBA0036	VOLATILES	ACRYLONITRILE	R	16			
0901027	LBA0036	VOLATILES	ACRYLONITRILE	UJ	07A			
0901027	LBA0036	VOLATILES	BENZENE	R	16			
0901027	LBA0036	VOLATILES	BENZENE	UJ	07A			
0901027	LBA0036	VOLATILES	BROMOBENZENE	R	16			
0901027	LBA0036	VOLATILES	BROMOBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	BROMOCHLOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	BROMOCHLOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	BROMODICHLOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	BROMODICHLOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	BROMOFORM	R	16			
0901027	LBA0036	VOLATILES	BROMOFORM	UJ	07A			
0901027	LBA0036	VOLATILES	BROMOMETHANE	R	16			
0901027	LBA0036	VOLATILES	BROMOMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	CARBON DISULFIDE	R	16			
0901027	LBA0036	VOLATILES	CARBON DISULFIDE	UJ	07A			
0901027	LBA0036	VOLATILES	CARBON TETRACHLORIDE	R	16			
0901027	LBA0036	VOLATILES	CARBON TETRACHLORIDE	UJ	07A			
0901027	LBA0036	VOLATILES	CHLOROBENZENE	R	16			
0901027	LBA0036	VOLATILES	CHLOROBENZENE	UJ	07A			
0901027	LBA0036	VOLATILES	CHLOROETHANE	R	16			
0901027	LBA0036	VOLATILES	CHLOROETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	CHLOROFORM	R	16			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0036	VOLATILES	CHLOROFORM	UJ	07A			
0901027	LBA0036	VOLATILES	CHLOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	CHLOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	CIS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0036	VOLATILES	CIS-1,2-DICHLOROETHENE	UJ	07A			
0901027	LBA0036	VOLATILES	CIS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0036	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	07A			
0901027	LBA0036	VOLATILES	DIBROMOCHLOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	DIBROMOCHLOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	DIBROMOFLUOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	DIBROMOFLUOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	DIBROMOMETHANE	R	16			
0901027	LBA0036	VOLATILES	DIBROMOMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	DICHLORODIFLUOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	ETHYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	ETHYLBENZENE	UJ	07A			
0901027	LBA0036	VOLATILES	HEXACHLOROBUTADIENE	R	16			
0901027	LBA0036	VOLATILES	HEXACHLOROBUTADIENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	ISOPROPYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	ISOPROPYLBENZENE	UJ	07A			
0901027	LBA0036	VOLATILES	METHYL TERTIARY BUTYL ETHER	R	16			
0901027	LBA0036	VOLATILES	METHYL TERTIARY BUTYL ETHER	UJ	07A			
0901027	LBA0036	VOLATILES	METHYLENE CHLORIDE	R	16			
0901027	LBA0036	VOLATILES	METHYLENE CHLORIDE	UJ	07A			
0901027	LBA0036	VOLATILES	N-BUTYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	N-BUTYLBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	N-PROPYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	N-PROPYLBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	NAPHTHALENE	R	16			
0901027	LBA0036	VOLATILES	NAPHTHALENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	SEC-BUTYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	SEC-BUTYLBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	STYRENE	R	16			
0901027	LBA0036	VOLATILES	STYRENE	UJ	07A			
0901027	LBA0036	VOLATILES	TERT-BUTYLBENZENE	R	16			
0901027	LBA0036	VOLATILES	TERT-BUTYLBENZENE	UJ	07A	10A		
0901027	LBA0036	VOLATILES	TETRACHLOROETHENE	R	16			
0901027	LBA0036	VOLATILES	TETRACHLOROETHENE	UJ	07A			
0901027	LBA0036	VOLATILES	TOLUENE	R	16			
0901027	LBA0036	VOLATILES	TOLUENE	UJ	07A			
0901027	LBA0036	VOLATILES	TOLUENE-D8	R	16			
0901027	LBA0036	VOLATILES	TOLUENE-D8	UJ	07A			
0901027	LBA0036	VOLATILES	TRANS-1,2-DICHLOROETHENE	R	16			
0901027	LBA0036	VOLATILES	TRANS-1,2-DICHLOROETHENE	UJ	07A			
0901027	LBA0036	VOLATILES	TRANS-1,3-DICHLOROPROPENE	R	16			
0901027	LBA0036	VOLATILES	TRANS-1,3-DICHLOROPROPENE	UJ	07A			
0901027	LBA0036	VOLATILES	TRICHLOROETHENE	R	16			
0901027	LBA0036	VOLATILES	TRICHLOROETHENE	UJ	07A			

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Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0901027	LBA0036	VOLATILES	TRICHLOROFLUOROMETHANE	R	16			
0901027	LBA0036	VOLATILES	TRICHLOROFLUOROMETHANE	UJ	07A			
0901027	LBA0036	VOLATILES	VINYL ACETATE	R	16			
0901027	LBA0036	VOLATILES	VINYL ACETATE	UJ	07A			
0901027	LBA0036	VOLATILES	VINYL CHLORIDE	R	16			
0901027	LBA0036	VOLATILES	VINYL CHLORIDE	UJ	07A			
0901027	LBA0036	VOLATILES	XYLENE, O-	R	16			
0901027	LBA0036	VOLATILES	XYLENE, O-	UJ	07A			
0901027	LBA0036	VOLATILES	XYLENES, M,P-	R	16			
0901027	LBA0036	VOLATILES	XYLENES, M,P-	UJ	07A			
F65383	LBA1000	METALS	Calcium	J	12			
F65383	LBA1000	METALS	Mercury	J	15			
F65383	LBA1000	METALS	Potassium	J	15			
F65383	LBA1000	METALS	Selenium	J	15			
F65383	LBA1000	METALS	Sodium	J	15			
F65408	LBA1001	METALS	Antimony	UJ	08A			
F65408	LBA1001	METALS	Arsenic	J	08A			
F65408	LBA1001	METALS	Calcium	J	08A	13		
F65408	LBA1001	METALS	Chromium	J	08A	13		
F65408	LBA1001	METALS	Lead	J	08A	13		
F65408	LBA1001	METALS	Magnesium	J	08A	13		
F65408	LBA1001	METALS	Nickel	J	08A	13		
F65408	LBA1001	METALS	Potassium	J	08A			15
F65408	LBA1001	METALS	Silver	UJ	08A			
F65408	LBA1001	METALS	Sodium	J	08A			15
F65408	LBA1001	METALS	Thallium	J	08A			15
F65408	LBA1001	METALS	Vanadium	J	08A	13		
F65408	LBA1001	METALS	Zinc	J	08A	13		
F65408	LBA1001	VOLATILES	1,1,2,2-Tetrachloroethane	UJ	10A			01A
F65408	LBA1001	VOLATILES	2-Hexanone	UJ	05B			01A
F65408	LBA1001	VOLATILES	Methylene chloride	B	04B	05B	06C	01A
F65408	LBA1002	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	UJ	08A			
F65408	LBA1002	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	UJ	08A			
F65408	LBA1002	METALS	Antimony	UJ	08A			
F65408	LBA1002	METALS	Arsenic	J	08A		08B	
F65408	LBA1002	METALS	Calcium	J	08A	13		
F65408	LBA1002	METALS	Chromium	J	08A	13		
F65408	LBA1002	METALS	Lead	J	08A	13		
F65408	LBA1002	METALS	Magnesium	J	08A	13		
F65408	LBA1002	METALS	Nickel	J	08A	13	08B	
F65408	LBA1002	METALS	Potassium	J	08A			15
F65408	LBA1002	METALS	Silver	UJ	08A			
F65408	LBA1002	METALS	Sodium	J	08A			15
F65408	LBA1002	METALS	Thallium	UJ	08A			
F65408	LBA1002	METALS	Vanadium	J	08A	13		
F65408	LBA1002	METALS	Zinc	J	08A	13	08B	
F65408	LBA1002	VOLATILES	1,1,2-Trichloroethane	UJ	08A			01A
F65408	LBA1002	VOLATILES	2-Hexanone	UJ	05B	08A		01A
F65408	LBA1002	VOLATILES	4-Methyl-2-pentanone	UJ	08A			01A

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65408	LBA1002	VOLATILES	Bromoform	UJ	08A			01A
F65408	LBA1002	VOLATILES	Dibromochloromethane	UJ	08A			01A
F65408	LBA1002	VOLATILES	Methyl ethyl ketone	UJ	08A			01A
F65408	LBA1002	VOLATILES	Methylene chloride	UJ	04B	05B	08A	01A
F65408	LBA1002	VOLATILES	trans-1,3-Dichloropropene	UJ	08A			01A
F65408	LBA1003	METALS	Antimony	UJ	08A			
F65408	LBA1003	METALS	Arsenic	J	08A			
F65408	LBA1003	METALS	Calcium	J	08A	13		
F65408	LBA1003	METALS	Chromium	J	08A	13		
F65408	LBA1003	METALS	Lead	J	08A	13		
F65408	LBA1003	METALS	Magnesium	J	08A	13		
F65408	LBA1003	METALS	Nickel	J	08A	13		
F65408	LBA1003	METALS	Potassium	J	08A			15
F65408	LBA1003	METALS	Silver	UJ	08A			
F65408	LBA1003	METALS	Sodium	J	08A			15
F65408	LBA1003	METALS	Thallium	UJ	08A			
F65408	LBA1003	METALS	Vanadium	J	08A	13		
F65408	LBA1003	METALS	Zinc	J	08A	13		
F65408	LBA1003	VOLATILES	2-Hexanone	UJ	05B			01A
F65408	LBA1003	VOLATILES	Methylene chloride	UJ	04B	05B		01A
F65444	LBA1004	METALS	Mercury	J	15			
F65444	LBA1004	METALS	Potassium	J	15			
F65444	LBA1004	METALS	Selenium	J	15			
F65444	LBA1004	METALS	Sodium	J	15			
F65444	LBA1004	SEMIVOLATILES	1,2,4-Trichlorobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	1,2-Dichlorobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	1,3-Dichlorobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	1,4-Dichlorobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4,5-Trichlorophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4,6-Trichlorophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4-Dichlorophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4-Dimethylphenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4-Dinitrophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,4-Dinitrotoluene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2,6-Dinitrotoluene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Chloronaphthalene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Chlorophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Methylnaphthalene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Methylphenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Nitroaniline	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	2-Nitrophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	3 and 4-Methylphenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	3,3'-Dichlorobenzidine	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	3-Nitroaniline	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4,6-Dinitro-o-cresol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4-Bromophenyl phenyl ether	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4-Chloro-3-methyl phenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4-Chloroaniline	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4-Chlorophenyl phenyl ether	UJ	02A			

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F65444	LBA1004	SEMIVOLATILES	4-Nitroaniline	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	4-Nitrophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Acenaphthene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Acenaphthylene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Anthracene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzo(a)anthracene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzo(a)pyrene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzo(b)fluoranthene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzo(g,h,i)perylene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzo(k)fluoranthene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzoic acid	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Benzyl Alcohol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Butyl benzyl phthalate	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Carbazole	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Chrysene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Di-n-butyl phthalate	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Di-n-octyl phthalate	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Dibenzo(a,h)anthracene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Dibenzofuran	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Diethyl phthalate	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Dimethyl phthalate	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Fluoranthene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Fluorene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Hexachlorobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Hexachlorobutadiene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Hexachlorocyclopentadiene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Hexachloroethane	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Isophorone	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	N-Nitroso-di-n-propylamine	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	N-Nitrosodiphenylamine	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Naphthalene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Nitrobenzene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Pentachlorophenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Phenanthrene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Phenol	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	Pyrene	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	bis(2-Chloroethoxy)methane	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	bis(2-Chloroethyl)ether	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	bis(2-Chloroisopropyl)ether	UJ	02A			
F65444	LBA1004	SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	UJ	02A			
F65444	LBA1004	VOLATILES	Acetone	UJ	05B			
F65444	LBA1004	VOLATILES	Methyl chloride	UJ	05B			
F65444	LBA1005	METALS	Mercury	J	15			
F65444	LBA1005	METALS	Selenium	J	15			
F65444	LBA1005	METALS	Sodium	J	15			
F65444	LBA1005	SEMIVOLATILES	Benzo(b)fluoranthene	J	15			
F65444	LBA1005	SEMIVOLATILES	Fluoranthene	J	15			
F65444	LBA1005	SEMIVOLATILES	Pyrene	J	15			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65444	LBA1005	VOLATILES	Acetone	UJ	05B			
F65444	LBA1005	VOLATILES	Carbon disulfide	J	15			
F65444	LBA1005	VOLATILES	Methyl chloride	UJ	05B			
F65444	LBA1006	METALS	Mercury	J	15			
F65444	LBA1006	METALS	Selenium	J	15			
F65444	LBA1006	METALS	Sodium	J	15			
F65444	LBA1006	SEMIVOLATILES	Benzo(b)fluoranthene	J	15			
F65444	LBA1006	SEMIVOLATILES	Fluoranthene	J	15			
F65444	LBA1006	SEMIVOLATILES	Pyrene	J	15			
F65444	LBA1006	VOLATILES	Acetone	UJ	05B			
F65444	LBA1006	VOLATILES	Methyl chloride	UJ	05B			
A9E280112	LBA1007	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	05A	05B		
F65383	LBA2000	METALS	Barium	J	15			
F65383	LBA2000	METALS	Chromium	J	15			
F65383	LBA2000	METALS	Lead	J	15			
F65383	LBA2000	METALS	Nickel	J	15			
F65383	LBA2000	METALS	Potassium	J	15			
F65383	LBA2000	METALS	Vanadium	J	15			
F65383	LBA2000	METALS	Zinc	J	15			
F65383	LBA2000	VOLATILES	1,1-Dichloroethane	J	15			
F65383	LBA2000	VOLATILES	Acetone	R	04A	05A		
F65383	LBA2000	VOLATILES	Chloroethane	UJ	05B			
F65407	LBA2001	METALS	Barium	J	15			
F65407	LBA2001	METALS	Chromium	J	15			
F65407	LBA2001	METALS	Cobalt	J	15			
F65407	LBA2001	METALS	Lead	J	15			
F65407	LBA2001	METALS	Nickel	J	15			
F65407	LBA2001	METALS	Potassium	J	15			
F65407	LBA2001	METALS	Vanadium	J	15			
F65407	LBA2001	VOLATILES	1,1,1-Trichloroethane	J	15			
F65407	LBA2001	VOLATILES	1,1-Dichloroethane	J	15			
F65407	LBA2001	VOLATILES	Acetone	R	04A	05A		
F65407	LBA2002	METALS	Barium	J	15			
F65407	LBA2002	METALS	Chromium	J	15			
F65407	LBA2002	METALS	Cobalt	J	15			
F65407	LBA2002	METALS	Lead	J	15			
F65407	LBA2002	METALS	Nickel	J	15			
F65407	LBA2002	METALS	Potassium	J	15			
F65407	LBA2002	METALS	Selenium	J	15			
F65407	LBA2002	METALS	Vanadium	J	15			
F65407	LBA2002	VOLATILES	1,1,1-Trichloroethane	J	15			
F65407	LBA2002	VOLATILES	1,1-Dichloroethane	J	15	17		
F65407	LBA2002	VOLATILES	Acetone	R	04A	05A		
F65407	LBA2002	VOLATILES	cis-1,2-Dichloroethylene	J	15			
F65407	LBA2003	METALS	Barium	J	15			
F65407	LBA2003	METALS	Chromium	J	15			
F65407	LBA2003	METALS	Cobalt	J	15			
F65407	LBA2003	METALS	Lead	J	15			
F65407	LBA2003	METALS	Nickel	J	15			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65407	LBA2003	METALS	Potassium	J	15			
F65407	LBA2003	METALS	Selenium	J	15			
F65407	LBA2003	METALS	Vanadium	J	15			
F65407	LBA2003	VOLATILES	1,1,1-Trichloroethane	J	15			
F65407	LBA2003	VOLATILES	1,1-Dichloroethane	J	15	17		
F65407	LBA2003	VOLATILES	Acetone	R	04A	05A		
F65407	LBA2003	VOLATILES	cis-1,2-Dichloroethylene	J	15			
A9E220318	LBA2004	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	R	04A	05A		
A9E220318	LBA2004	VOLATILES	BROMOMETHANE	R	04A	05A		
A9E220318	LBA2004	VOLATILES	CHLOROETHANE	UJ	05B			
F65407	LBA2005	METALS	Barium	J	15			
F65407	LBA2005	METALS	Chromium	J	15			
F65407	LBA2005	METALS	Cobalt	J	15			
F65407	LBA2005	METALS	Lead	J	15			
F65407	LBA2005	METALS	Nickel	J	15			
F65407	LBA2005	METALS	Potassium	J	15			
F65407	LBA2005	METALS	Vanadium	J	15			
F65407	LBA2005	VOLATILES	Acetone	R	04A	05A		
F65442	LBA2006	METALS	Barium	J	15			
F65442	LBA2006	METALS	Chromium	J	15			
F65442	LBA2006	METALS	Cobalt	J	15			
F65442	LBA2006	METALS	Lead	J	15			
F65442	LBA2006	METALS	Nickel	J	15			
F65442	LBA2006	METALS	Potassium	J	15			
F65442	LBA2006	METALS	Selenium	J	15			
F65442	LBA2006	METALS	Vanadium	J	15			
F65442	LBA2006	VOLATILES	1,1-Dichloroethane	J	15			
F65442	LBA2006	VOLATILES	Acetone	UJ	05B			
F65442	LBA2007	METALS	Arsenic	J	15			
F65442	LBA2007	METALS	Barium	J	15			
F65442	LBA2007	METALS	Beryllium	J	15			
F65442	LBA2007	METALS	Cobalt	J	15			
F65442	LBA2007	METALS	Potassium	J	15			
F65442	LBA2007	METALS	Selenium	J	15			
F65442	LBA2007	METALS	Vanadium	J	15			
F65442	LBA2007	VOLATILES	Acetone	UJ	05B			
F65442	LBA2008	METALS	Aluminum	B	06C	15		
F65442	LBA2008	METALS	Barium	J	15			
F65442	LBA2008	METALS	Potassium	J	15			
F65442	LBA2008	VOLATILES	Acetone	UJ	05B			
F65442	LBA2008	VOLATILES	Bromoform	UJ	08A			
F65442	LBA2008	VOLATILES	Dibromochloromethane	UJ	08A			
F65442	LBA2008	VOLATILES	Styrene	UJ	08A			
F65442	LBA2008	VOLATILES	cis-1,3-Dichloropropene	UJ	08A			
F65442	LBA2008	VOLATILES	trans-1,3-Dichloropropene	UJ	08A			
0902003	LBA3000	GEN CHEMISTRY	Chloride	J	08A			
0902003	LBA3000	GEN CHEMISTRY	Nitrate/Nitrite as N	J	08A			
0902003	LBA3000	GEN CHEMISTRY	Sulfate	R	16			
0902003	LBA3000	GEN CHEMISTRY	Turbidity	J	02B			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0902003	LBA3000	METALS	Copper	J	15			
0902003	LBA3000	SEMIVOLATILES	Hexachlorocyclopentadiene	UJ	05B			
0902003	LBA3000	VOLATILES	Acetone	R	04A	05A		
0902003	LBA3000	VOLATILES	Acrolein	R	04A	05A		
0902003	LBA3000	VOLATILES	Trichloroethene	J	15			
0901043	LBA3001	GEN CHEMISTRY	Chloride	J	08A			
0901043	LBA3001	GEN CHEMISTRY	Sulfate	J	08A			
0901043	LBA3001	GEN CHEMISTRY	Total Dissolved Solids	J	17			
0901043	LBA3001	GEN CHEMISTRY	Turbidity	J	02B			
0901043	LBA3001	METALS	Arsenic	J	15	17		
0901043	LBA3001	METALS	Beryllium	J	15			
0901043	LBA3001	METALS	Cadmium	J	15			
0901043	LBA3001	METALS	Cobalt	J	15			
0901043	LBA3001	METALS	Nickel	J	15			
0901043	LBA3001	VOLATILES	1,1,1-Trichloroethane	J	15			
0901043	LBA3001	VOLATILES	1,1-Dichloroethane	J	15			
0901043	LBA3001	VOLATILES	Acetone	R	04A	05A		
0901043	LBA3001	VOLATILES	Acrolein	R	04A	05A		
0901043	LBA3001	VOLATILES	Trichlorofluoromethane	UJ	05B			
A9A290152	LBA3002	GEN CHEMISTRY	CHLORIDE	J	05B			
A9A290152	LBA3002	SEMIVOLATILES	DI-N-BUTYL PHTHALATE	UJ	05B			
A9A290152	LBA3002	SEMIVOLATILES	PYRENE	UJ	05B			
A9A290152	LBA3002	VOLATILES	1,2,4-TRICHLOROBENZENE	UJ	05B			
A9A290152	LBA3002	VOLATILES	1,2-DIBROMO-3-CHLOROPROPANE	UJ	05B			
A9A290152	LBA3002	VOLATILES	BROMOFORM	UJ	05B			
A9A290152	LBA3002	VOLATILES	CIS-1,3-DICHLOROPROPENE	UJ	05B			
A9A290152	LBA3002	VOLATILES	DIBROMOCHLOROMETHANE	UJ	05B			
A9A290152	LBA3002	VOLATILES	DICHLORODIFLUOROMETHANE	UJ	05B			
0901043	LBA3003	GEN CHEMISTRY	Chloride	J	08A			
0901043	LBA3003	GEN CHEMISTRY	Sulfate	J	08A			
0901043	LBA3003	GEN CHEMISTRY	Turbidity	J	02B			
0901043	LBA3003	METALS	Cadmium	J	15			
0901043	LBA3003	VOLATILES	1,1,1-Trichloroethane	J	15			
0901043	LBA3003	VOLATILES	Acetone	J	04A	05A	15	
0901043	LBA3003	VOLATILES	Acetone	R	16			
0901043	LBA3003	VOLATILES	Acrolein	R	04A	05A		
0901043	LBA3003	VOLATILES	Trichlorofluoromethane	UJ	05B			
0901046	LBA3004	EXPLOSIVES	2,4-Dinitrotoluene	R	16			
0901046	LBA3004	EXPLOSIVES	2,6-Dinitrotoluene	R	16			
0901046	LBA3004	EXPLOSIVES	2-Nitrotoluene	R	16			
0901046	LBA3004	GEN CHEMISTRY	Turbidity	J	02B			
0901046	LBA3004	METALS	Cadmium	J	15			
0901046	LBA3004	SEMIVOLATILES	2,6-Dinitrotoluene	J	15			
0901046	LBA3004	VOLATILES	1,1-Dichloroethane	J	15			
0901046	LBA3004	VOLATILES	1,2,4-Trimethylbenzene	J	15			
0901046	LBA3004	VOLATILES	Acetone	R	04A	05A		
0901046	LBA3004	VOLATILES	Acrolein	R	04A	05A		
0901046	LBA3004	VOLATILES	cis-1,2-Dichloroethene	J	15			
0902003	LBA3005	GEN CHEMISTRY	Chloride	J	08A			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
0902003	LBA3005	GEN CHEMISTRY	Nitrate/Nitrite as N	J	08A			
0902003	LBA3005	GEN CHEMISTRY	Turbidity	J	02B			
0902003	LBA3005	METALS	Cadmium	J	15			
0902003	LBA3005	SEMIVOLATILES	Hexachlorocyclopentadiene	UJ	05B			
0902003	LBA3005	VOLATILES	1,1-Dichloroethene	J	15			
0902003	LBA3005	VOLATILES	Acetone	R	04A	05A	05B	
0902003	LBA3005	VOLATILES	Acrolein	R	04A	05A	05B	
0902003	LBA3005	VOLATILES	Bromoform	UJ	05B			
0902003	LBA3005	VOLATILES	Hexachlorobutadiene	UJ	05B			
0901043	LBA3006	GEN CHEMISTRY	Chloride	J	08A			
0901043	LBA3006	GEN CHEMISTRY	Nitrate/Nitrite as N	J	15			
0901043	LBA3006	GEN CHEMISTRY	Sulfate	J	08A			
0901043	LBA3006	GEN CHEMISTRY	Total Dissolved Solids	J	17			
0901043	LBA3006	GEN CHEMISTRY	Turbidity	J	02B			
0901043	LBA3006	METALS	Arsenic	J	15	17		
0901043	LBA3006	METALS	Beryllium	J	15			
0901043	LBA3006	METALS	Cadmium	J	15			
0901043	LBA3006	METALS	Chromium	J	15			
0901043	LBA3006	METALS	Cobalt	J	15			
0901043	LBA3006	SEMIVOLATILES	2,4,5-Trichlorophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2,4,6-Trichlorophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2,4-Dichlorophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2,4-Dinitrophenol	UJ	08A	19		
0901043	LBA3006	SEMIVOLATILES	2-Chloronaphthalene	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2-Chlorophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2-Methyl-4,6-dinitrophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	2-Nitrophenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	4-Methylphenol	UJ	08A			
0901043	LBA3006	SEMIVOLATILES	4-Nitrophenol	UJ	08A	19		
0901043	LBA3006	SEMIVOLATILES	Pentachlorophenol	UJ	08A	19		
0901043	LBA3006	VOLATILES	1,1,1-Trichloroethane	J	15			
0901043	LBA3006	VOLATILES	1,1-Dichloroethane	J	15			
0901043	LBA3006	VOLATILES	Acetone	R	04A	05A		
0901043	LBA3006	VOLATILES	Acrolein	R	04A	05A		
0901043	LBA3006	VOLATILES	Trichlorofluoromethane	UJ	05B			
F65220	RC3074	METALS	Aluminum	J	08B			
F65220	RC3074	METALS	Barium	J	15			
F65220	RC3074	METALS	Nickel	J	15			
F65220	RC3074	METALS	Potassium	J	15			
F65220	RC3074	METALS	Selenium	B	06C	08B	15	
F65220	RC3074	METALS	Selenium	J	15			
F65220	RC3074	METALS	Vanadium	J	15			
F65220	RC3074	METALS	Zinc	J	15			
F65220	RC3074	SEMIVOLATILES	4-Nitrophenol	UJ	08A			
F65220	RC3074	VOLATILES	Acetone	R	04A	05A		
F65210	RC3075	METALS	Aluminum	J	15			
F65210	RC3075	METALS	Barium	J	15			
F65210	RC3075	METALS	Cobalt	J	15			
F65210	RC3075	METALS	Lead	J	15			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes R1	R2	R3	R4
F65210	RC3075	METALS	Nickel	J	15			
F65210	RC3075	METALS	Selenium	J	15			
F65210	RC3075	METALS	Sodium	J	08A			
F65210	RC3075	METALS	Vanadium	J	15			
F65210	RC3075	METALS	Zinc	B	06C	15		
F65210	RC3075	METALS	Zinc	J	15			
F65210	RC3075	VOLATILES	Acetone	R	04A	05A		
F65210	RC3076	METALS	Aluminum	J	15			
F65210	RC3076	METALS	Barium	J	15			
F65210	RC3076	METALS	Lead	J	15			
F65210	RC3076	METALS	Nickel	J	15			
F65210	RC3076	METALS	Selenium	J	15			
F65210	RC3076	METALS	Sodium	J	08A			
F65210	RC3076	METALS	Zinc	B	06C	15		
F65210	RC3076	VOLATILES	Acetone	J	04A	15		
F65210	RC3076	VOLATILES	Bromoform	J	15			
F65210	RC3076	VOLATILES	Dibromochloromethane	J	15			
F65210	RC3078	EXPLOSIVES	1,3,5-Trinitrobenzene	UJ	07A			
F65210	RC3078	EXPLOSIVES	1,3-Dinitrobenzene	UJ	07A			
F65210	RC3078	EXPLOSIVES	2,4,6-Trinitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	2,4-Dinitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	2,6-Dinitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	HMX	UJ	07A			
F65210	RC3078	EXPLOSIVES	Nitrobenzene	UJ	07A			
F65210	RC3078	EXPLOSIVES	RDX	UJ	07A			
F65210	RC3078	EXPLOSIVES	Tetryl	UJ	07A			
F65210	RC3078	EXPLOSIVES	m-Nitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	o-Nitrotoluene	UJ	07A			
F65210	RC3078	EXPLOSIVES	p-Nitrotoluene	UJ	07A			
F65210	RC3078	GEN CHEMISTRY	Cyanide, Total	J	02A			
F65210	RC3078	METALS	Aluminum	J	15			
F65210	RC3078	METALS	Lead	J	15			
F65210	RC3078	METALS	Selenium	B	06C	15		
F65210	RC3078	METALS	Selenium	J	15			
F65210	RC3078	METALS	Sodium	J	08A			
F65210	RC3078	METALS	Vanadium	J	15			
F65210	RC3078	METALS	Zinc	B	06C	15		
F65210	RC3078	SEMIVOLATILES	2,4-Dimethylphenol	J	15			
F65210	RC3078	SEMIVOLATILES	Naphthalene	J	15			
F65210	RC3078	VOLATILES	Acetone	J	04A	05A		
F69251	RC3081	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	15			
F69251	RC3081	METALS	Barium	J	15			
F69251	RC3081	METALS	Calcium	J	13			
F69251	RC3081	METALS	Chromium	J	15			
F69251	RC3081	METALS	Cobalt	J	15			
F69251	RC3081	METALS	Lead	B	06A	15		
F69251	RC3081	METALS	Nickel	J	15			

Table 4

Summary of Data Validation Qualifiers Assigned and Reason Codes for Qualification
Former Plum Brook Ordnance Works
Sandusky, Ohio

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes			
					R1	R2	R3	R4
F69251	RC3081	METALS	Potassium	J	08A	13		
F69251	RC3081	METALS	Selenium	UJ	08A			
F69251	RC3081	METALS	Vanadium	J	15			
F69251	RC3081	METALS	Zinc	J	15			
F69251	RC3082	METALS	Barium	J	15			
F69251	RC3082	METALS	Calcium	J	13			
F69251	RC3082	METALS	Chromium	J	15			
F69251	RC3082	METALS	Cobalt	J	15			
F69251	RC3082	METALS	Lead	B	06A	15		
F69251	RC3082	METALS	Lead	J	15			
F69251	RC3082	METALS	Nickel	J	15			
F69251	RC3082	METALS	Potassium	J	08A	13		
F69251	RC3082	METALS	Selenium	UJ	08A			
F69251	RC3082	METALS	Vanadium	J	15			
F69251	RC3082	METALS	Zinc	J	15			
F69338	RC3084	EXPLOSIVES	1,3,5-Trinitrobenzene	R	07A			
F69338	RC3084	EXPLOSIVES	1,3-Dinitrobenzene	R	07A			
F69338	RC3084	EXPLOSIVES	2,4,6-Trinitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	2,4-Dinitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	2,6-Dinitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	2-amino-4,6-Dinitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	4-amino-2,6-Dinitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	HMX	R	07A			
F69338	RC3084	EXPLOSIVES	Nitrobenzene	R	07A			
F69338	RC3084	EXPLOSIVES	RDX	R	07A			
F69338	RC3084	EXPLOSIVES	Tetryl	R	07A			
F69338	RC3084	EXPLOSIVES	m-Nitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	o-Nitrotoluene	R	07A			
F69338	RC3084	EXPLOSIVES	p-Nitrotoluene	R	07A			
F69338	RC3084	GEN CHEMISTRY	Nitrogen, Nitrate + Nitrite	J	08A			
F69338	RC3084	GEN CHEMISTRY	Sulfate	J	08A	15		
F69338	RC3084	METALS	Aluminum	J	15			
F69338	RC3084	METALS	Selenium	J	08B	15		
F69338	RC3084	METALS	Selenium	J	15			
F69338	RC3084	METALS	Vanadium	J	15			
F69338	RC3084	METALS	Zinc	B	06A	15		
F69338	RC3084	SEMIVOLATILES	2,4-Dimethylphenol	J	15			
F69338	RC3084	VOLATILES	Acetone	R	04A			

Footnotes:
(1) Table 3 defines all reason codes.
(2) Reason codes are assigned in order of their importance to the validation qualifiers applied. R1 is the most important

Definitions:
VQ = validation qualifier

Table 5

Laboratory and Validation Qualifier Definitions
Former Plum Brook Ordnance Works
Sandusky, Ohio

Qualifier	Definition
Laboratory	
B (metals)	The analyte was detected; the concentration is below the reporting limit.
B (organics)	Indicates analyte is found in associated method blank.
J (metals)	The compound was detected in the blank.
J (organics)	The compound was positively identified; the reported value is below the reporting limit.
U	Not detected. The compound was analyzed for, but not detected above the associated reporting limit.
E	Indicates that the result is above the maximum calibration range.
N	Indicates presumptive evidence of a compound.
P	RPD > 40% between the primary and confirmation column results for dual column chromatographic method (e.g. GC and HPLC methods).
*	Exceeds QC limit.
Q1	The %D or %Drift for the associated CCV is outside the method QC limit.
ME	Marginal Exceedence of the 3-sigma QC limits.
ME*	Exceedence of the 4-sigma QC limits.
Validation	
B	The compound/analyte was detected in a lab or field blank.
J	The compound/analyte was positively identified; the reported value is an estimated concentration.
U	Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
UJ	The analyte is not detected; the result is an estimated value.
R	Analyte is rejected.

APPENDIX L

CHAINS OF CUSTODY

0901027

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 19 09AML

PAGE 1 OF 5

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133422
Required Report Date: 21 DAYS

Sample Shipment Date: 1-19-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8531 9327 9450

Bill To: Accounting, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923
Report To: Eddie Weaver, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901027-01	AP0108	SOIL	1-18-09/925	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
0901027-02	AP0109	SOIL	1-18-09/928	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
0901027-03	AP0111	SOIL	1-18-09/845	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
0901027-04	AP0112	SOIL	1-18-09/848	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&I	Date: 1-19-09 Time: 1700	1. Received by:	Date: 1/20/09 Time: 0930am
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901027

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 19 09AML

PAGE 2 OF 5

Project Name No.: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133422
Required Report Date: 21 DAYS

Sample Shipment Date: 1-19-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8531 9327 9450

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901027-05	AP0110	SOIL	1-18-09/930	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
0901027-06	AP0113	SOIL	1-18-09/850	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E&I	Date: 1-19-09 Time: 1700	1. Received by: [signature]	Date: 1/20/09 Time: 0930am
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901027

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 19 09AML

PAGE 3 OF 5

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-19-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8531 9327 9450

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type Description	Date Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901027-07	LBA0026	SOIL	1-19-09/1010	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-08	LBA0027	SOIL	1-19-09/1010	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-09	LBA0029	SOIL	1-19-09/1013	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-10	LBA0031	SOIL	1-19-09/0955	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-11	LBA0032	SOIL	1-19-09/0957	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-11	LBA0032MS	SOIL	1-19-09/0957	Wide Mouth Glass Jar	9 ~~8~~ oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: K

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: E W Weaver Shaw E&I — Date: 1-19-09 Time: 1700
1. Received by: [signature] — Date: 1/20/09 Time: 0930AM
2. Relinquished by: ____ Date: ____ Time: ____
2. Received by: ____ Date: ____ Time: ____
3. Relinquished by: ____ Date: ____ Time: ____
2. Received by: ____ Date: ____ Time: ____

Comments:

0901027

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 19 09AML

PAGE 4 OF 5

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-19-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8531 9327 9450

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901027-12	LBA 0030	SOIL	1-19-09 / 1015	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-13	LBA0033	SOIL	1-19-09 / 1000	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901027-14	LBA0036	SOIL	1-19-09 / 0940	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOC's by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie Weaver Shaw E&I	Date: 1-19-09 Time: 1700	1. Received by:	Date: 1/20/09 Time: 0930am
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901027

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 19 09AML

PAGE 5 OF 5

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-19-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No. 6531 9327 9450

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901027-11	LBA0032MSD	SOIL	1-19-09 / 0957	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901027-15	LBA0034	SOIL	1-19-09 / 0935	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901027-16	LBA0035	SOIL	1-19-09 / 0937	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: E. W. Weaver Shaw E&I — Date: 1-19-09 Time: 1700
1. Received by: Date: ____ Time: ____
2. Relinquished by: Date: ____ Time: ____
2. Received by: Date: ____ Time: ____
3. Relinquished by: Date: ____ Time: ____
2. Received by: Date: ____ Time: ____

Comments:

T901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

PAGE 1 OF 6

Project Name No: PBOA
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melanta Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1775

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901034-01 LBA 0001	SOIL	~~1-20-09~~ EW 1-20-09 1130	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-01 LBA 0001MS	SOIL	1-20-09 1130	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-01 LBA 0001MSD	SOIL	1-20-09 1130	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-02 LBA 0002	SOIL	1-20-09 1135	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-03 LBA 0005	SOIL	1-19-09 1543	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-04 LBA 0007	SOIL	1-20-09 1505	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
			Terra Core	5 Grams	Cool	VOC's by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eric W. Weaver Shaw E&I — Date: 1-21-09 Time: 1700
2. Relinquished by: — Date: Time:
3. Relinquished by: — Date: Time:

1. Received by: [signature] — Date: 1/22/09 Time: 1030
2. Received by: — Date: Time:
2. Received by: — Date: Time:

Comments:

0901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

Project Name No.: PROW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AXL Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1775

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901034-05	LBA 0008	SOIL	1-20-09 1505	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-06	LBA0010	SOIL	1-20-09 1508	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-07	LBA0012	SOIL	1-19-09 1610	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-08	LBA 0013	SOIL	1-19-09 1613	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-09	LBA0015	SOIL	1-20-09 1440	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-10	LBA0016	SOIL	1-20-09 1445	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&I	Date: 1-21-09 Time: 1700	1. Received by:	Date: 1/22/09 Time: 1030
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

PAGE 3 OF 6

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3657 1775

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901034-11	LBA0018	SOIL	1-20-09 1550	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
0901034-12	LBA0019	SOIL	1-20-09 1553	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
	~~LBA EW~~	SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL	EW	Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				Terra Core	5 Grams	Cool	VOC's by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E&I	Date: 1-21-09 Time: 1700	1. Received by:	Date: 1/22/09 Time: 1030
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1775

Bill To: Accounting, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923
Report To: Eddie Weaver, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901034-13	LBA 0003	SOIL	1-20-09 1138	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-14	LBA 0006	SOIL	1-19-09 1540	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-15	LBA0011	SOIL	1-20-09 1510	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-16	LBA 0014	SOIL	1-19-09 1615	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-17	LBA 0017	SOIL	1-20-09 1440	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-18	LBA 0020	SOIL	1-20-09 1555	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eric W. Weaver Shaw E&I	Date: 1-21-09 Time: 1700	1. Received by:	Date: 1/22/09 Time: 1030
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

0901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

PAGE 5 OF 6

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1775

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
0901034-19	LBA0021	SOIL	1-20-09 1555	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		
0901034-20	LBA0023	SOIL	1-20-09 0920	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				~~Terra Core~~	~~5 Grams~~	~~Cool~~	~~VOCs by 8260~~ EW		
0901034-21	LBA0024	SOIL	1-20-09 0910	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				~~Terra Core~~	~~5 Grams~~	Cool	~~VOCs by 8260~~ EW		
0901034-22	LBA0025	SOIL	1-20-09 0900	Wide Mouth Glass Jar	9 oz EW	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				~~Terra Core~~	~~5 Grams~~	~~Cool~~	~~VOCs by 8260~~ EW		
		SOIL		Wide Mouth Glass Jar	8 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	~~VOCs by 8260~~		
		SOIL		~~Wide Mouth~~ Glass Jar	8 oz	~~Cool~~	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471		
				Terra Core	5 Grams	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E & I — Date: 1-21-09 Time: 1700
2. Relinquished by: — Date: Time:
3. Relinquished by: — Date: Time:

1. Received by: [signature] — Date: 1/22/09 Time: 1030
2. Received by: — Date: Time:
2. Received by: — Date: Time:

Comments:

0901034

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09AML

PAGE 6 OF 6

Project Name No: PHOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1775

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA 0004	SOIL	1-19-09 / 1535	Wide Mouth Glass Jar	9 oz	Cool	Explosives by 8330, SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				4 oz	Cool	TOC by Walkley-Black		
0901034-23			Terra Core	5grams	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E&I	Date: 1-21-09 Time: 1700	1. Received by:	Date: 1/22/09 Time: 1030
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

Shaw
Shaw E & I, Inc.

0901043

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW01 29 09AML

PAGE 1 OF 3

Project Name No: ~~AOW~~ PB ew
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-29-09
Laboratory Destination: AML
Laboratory Contact: Melanie Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1834

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA3001	WATER	1-28-09 1135	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 ml	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 ml	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 ml	H2SO4	Nitrate		
			1 - HDPE	500 ml	NaOH	Cyanide by 9010 9012		
0901043-01			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
LBA3006	WATER	1-28-09 1135	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 ml	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 ml	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 ml	H2SO4	Nitrate		
			1 - HDPE	500 ml	NaOH	Cyanide by 9010 9012		
0901043-02			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: Flammable: Poison B: Unknown: X

Sample Disposal:
Return to Client: Disposal by Lab: X Archive:

Turnaround Time:
Normal: X Rush:

Level of QC Required:
Definitive: X Project Specific:

1. Relinquished by: [signature] Date: 1-29-09 Time: 1700
2. Relinquished by: Date: Time:
3. Relinquished by: Date: Time:

1. Received by: [signature] Date: 1/30/09 Time: 1100am
2. Received by: Date: Time:
2. Received by: Date: Time:

Comments:

Shaw
Shaw E & I, Inc.

0901043

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW01 29 09AML

PAGE 1 OF 3

Project Name No: PB EW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-29-09
Laboratory Destination: AML
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver:865-690-3211
Carrier Waybill No.: 8672 3651 1834

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA3006MS 0901043-02	WATER	1-28-09 1135	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 ml	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 ml	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010 9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
LBA3006MSD 0901043-03	WATER	1-28-09 1135	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010 9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
PB012909TB-1 0901043-04	Water	1-29-09	3 VoA vial	40 ml	HCL	TCL Volatiles		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X *Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: Eddie Weaver Shaw E&I — Date: 1-29-09 Time: 1700
1. Received by: [signature] — Date: 1/30/09 Time: 1100 am
2. Relinquished by: ___ Date: ___ Time: ___
2. Received by: ___ Date: ___ Time: ___
3. Relinquished by: ___ Date: ___ Time: ___
3. Received by: ___ Date: ___ Time: ___

Comments:

Shaw
Shaw E & I, Inc.

0901043

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW01 29 09AML

PAGE 3 OF 3

Project Name No: ~~WFOW~~ PB
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-29-09
Laboratory Destination: AML
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1834

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA3003	WATER	1-29-09	3 VOA Vial	40ml	HCL	VOC's by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 ml	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 ml.	HNO3	Dissolved TAL Metals by 6010B 7470A		
		1005	2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
			1 - HDPE	125 ml	H2SO4	Nitrate		
			1 - HDPE	500 ml.	NaOH	Cyanide by 9010 9012		
0901043-03			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOC's by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 ml.	HNO3	Total TAL Metals by 6010B 7470A / Hardness		
			1 - HDPE	500 ml.	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
			1 - HDPE	125 ml.	H2SO4	Nitrate		
			1 - HDPE	500 ml.	NaOH	Cyanide by 9010 9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&I — Date: 1-29-09 Time: 1700
1. Received by: [signature] — Date: 1/30/09 Time: 1100am
2. Relinquished by: — Date: ___ Time: ___
2. Received by: — Date: ___ Time: ___
3. Relinquished by: — Date: ___ Time: ___
2. Received by: — Date: ___ Time: ___

Comments:

Originals

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB0 02 09AML

PAGE 1 OF 4

0902003

Project Name No: PB OW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133422
Required Report Date: 21 DAYS

Sample Shipment Date: 2-2-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1867

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
AP3022	WATER	2-2-09	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 ml	HNO3	Dissolved TAL Metals by 6010B/7470A		
		1030	2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 ml	NaOH	Cyanide by 9010/9012		
0902003-01			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
AP3015	WATER	2-2-09	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
		1030	2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
0902003-02			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E&I — Date: 2-2-09 Time: 1700
1. Received by: [signature] — Date: 2/3/09 Time: 994 Sam
2. Relinquished by: — Date: Time:
2. Received by: — Date: Time:
3. Relinquished by: — Date: Time:
2. Received by: — Date: Time:

Comments:

9
1369

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB02 02 09AML

0902003

Project Name No.: ~~WWW~~ PB
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133422
Required Report Date: 21 DAYS

Sample Shipment Date: 2-2-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melavia Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1867

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
AP3019	WATER	2-1-09 1110	2 - Amber	1 L.	Cool	Explosives by 8330		
			1 - HDPE	500 mL.	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL.	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL.	NaOH	Cyanide by 9010/9012		
0902003-03			1 - HDPE	1 L.	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
AP3019MS	WATER	2-1-09 1110	2 - Amber	1 L.	Cool	Explosives by 8330		
			1 - HDPE	500 mL.	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL.	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L.	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL.	H2SO4	Nitrate		
			1 - HDPE	500 mL.	NaOH	Cyanide by 9010/9012		
0902003-03			1 - HDPE	1 L.	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&E Date: 2-2-09 Time: 1700
2. Relinquished by: Date: Time:
3. Relinquished by: Date: Time:

1. Received by: Date: 2/3/09 Time: 0945am
2. Received by: Date: Time:
2. Received by: Date: Time:

Comments:

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB09 2 02 09AML

PAGE 3 OF 4

0902003

Project Name No: ~~WKOW~~ PB
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133422
Required Report Date: 21 DAYS

Sample Shipment Date: 2-2-09
Laboratory Destination: AML Scientific, LLC
Laboratory Contact: Melania Harris
Project Contact Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1867

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
AP3019MSD 0902003-03	WATER	2-1-09 1110	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
AP3018 0202003-04	WATER	1-31-09 1730	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Erin W. Weaver Shaw E&I — Date: 2-2-09 Time: 1700
1. Received by: [signature] — Date: 2/3/09 Time: 0945am
2. Relinquished by: — Date: Time:
2. Received by: — Date: Time:
3. Relinquished by: — Date: Time:
3. Received by: — Date: Time:

Comments:

11 of 1369

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: ~~PAOW~~ PB 02 09AML

PAGE 4 OF 4

0902003

Project Name No.: ~~WAOW~~ PB
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 2-2-09
Laboratory Destination: AML
Laboratory Contact: Melania Harris
Project Contact Name: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3657 1867

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA3000	WATER	1-31-09	3 VOA Vial	40ml	HCL	VOC's by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B 7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B 7470A		
		0935	2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010 9012		
0902003-05			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
LBA3005	WATER	1-30-09	3 VOA Vial	40ml	HCL	VOC's by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B 7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B 7470A		
		1610	2 - Amber	1 L	Cool	TCL SVOC's by 8270C		
0902003-06			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010 9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
Trip Blank	Water	2-2-09	3 VOA vial	40 ml	HCL	VOC by 8260		

Special Instructions: 0902003-07

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&I	Date: 2-2-09 Time: 1700	1. Received by:	Date: 2/3/09 Time: 0945am
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

312 01369

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

P65207

REFERENCE COC NO.: PW05 10 09ACCT

PAGE 1 OF 1

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/11/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 86072 3651-1948

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 LB 3071	WATER	5/10/09 1405	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Yantin - Shaw	Date: 5/11/09 Time: 1700	1. Received by: fR	Date: Time:
2. Relinquished by: fR	Date: Time:	2. Received by: [signature] / Accutest	Date: 5-12-09 Time: 09:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

2.4 2.6 2.4 2.8 3.4 2.6
2.0 2.6 2.2

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

F65210

REFERENCE COC NO.: PV05 11 09ACCT

PAGE 1 OF 1

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: ~~132467 WWTP&3/APR-7~~ 133767 Rail Car Wash
Required Report Date: 21 DAYS

Sample Shipment Date: 5/11/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1948

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 RC3076	WATER	5/11/09 0830	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
2 RC3078	WATER	5/11/09 1015	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions: RC3078 - High hydrogensulfide odor.

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler - Shaw	Date: 5/11/09 Time: 1800	1. Received by:	Date: Time:
2. Relinquished by:	Date: 5/12/09 Time: 9:00	2. Received by: Accutest	Date: 5/12/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:
2.4 2.6 2.4 2.8 3.4 2.6 2.0
2.6 2.2

F65210

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05 11 09ACCT

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Rail Car Washing Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5-11-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 ~~320-NE~~ 36511948

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 / RC3075	WATER	5/11/09 1120	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
4 ER4	WATER	5/11/09 1345	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler - Shaw	Date: 5/11/09 Time: 1800	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 5/12/09 Time: 9:30	2. Received by: Accutest	Date: Time: 5/12/09 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:
2.4 2.6 2.4 2.8 3.4 2.6 2.0
2.6 2.2

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

A6S220 12 HK

REFERENCE CONTROL WO# 09ACCT

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Rail Car Washing Area
Required Report Date: 21 DAYS

Sample Shipment Date: ~~5/13/09~~ HK 5/12/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1959

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
RCA-3074	WATER	5/12/09 0920	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: David Kessler-Shaw	Date: 5/13/09 Time: 1800	1. Received by: fx	Date: Time:
2. Relinquished by: fx	Date: 5/13/09 Time: 9:20	2. Received by: Accutest	Date: 5/13/09 Time: 9:20
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

3.0 3.2

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

F65220

REFERENCE COC NO: [illegible] 09ACCT

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/12/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 867236451 1959

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 LB 3067	WATER	5/12/09 0910	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
3 LB 3073	WATER	5/12/09 1030	3 VOA Vial	40ml	HCL	VOCs by 8260		
			1 ~~2~~ - Amber MK	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			1 ~~2~~ - Amber MK	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Martin	Date: 5/12/09 Time: 1900	1. Received by:	Date: Time:
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: Only 1 L Amber was collected for SVOCs and Nitroaromatics on LB 3073

Shaw
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ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

A65220

REFERENCE COC NO.: PW05 12 09ACCT

PAGE 1 OF 1

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/12/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1959

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
051209-TB	WATER	5/12/09 1800	2 ~~3~~ VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: M. Jantin - Shaw	Date: 05/12/09 Time: 1800	1. Received by:	Date: Time:
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

F65372

REFERENCE COC NO.: PW05 19 09ACCT

PAGE 1 OF 3

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/19/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 867723651 1937

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LB 3068	WATER	5/19/09 1033	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
LB 3068 MS	WATER	5/19/09 1033	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: H. Yantin - Shaw	Date: 5/19/09 Time: 1800	1. Received by:	Date: Time:
2. Relinquished by:	Date: Time:	2. Received by: / Accutest	Date: 5-21-09 Time: 09:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

38 44 2.8 4.8 5.6

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

P65372

REFERENCE COC NO.: PW05 19 09ACCT

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/19/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1937

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LB 3068 MSD	WATER	5/19/09 1033	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
				1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				1 - HDPE	500 mL	H2SO4	Nitrate		
				1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
				1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
2	LB 3069	WATER	5/19/09 1033	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
				1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				1 - HDPE	500 mL	H2SO4	Nitrate		
				1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
				1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Yentin -Shaw	Date: 5/19/09 Time: 1800	1. Received by: fx	Date: Time:
2. Relinquished by: fx	Date: Time:	2. Received by: /Accutest	Date: 5-21-09 Time: 09:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:
3.8 4.8 2.8 4.4 5.6

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ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

P65372

REFERENCE COC NO.: PW05 19 09ACCT

PAGE 3 OF 3

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/19/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1937

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 MR LB LB 3074	WATER	5/19/09 1033	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Yantin - Shaw	Date: 5/19/09 Time: 1800	1. Received by: fx	Date: Time:
2. Relinquished by: fx	Date: Time:	2. Received by: [signature] / Accutest	Date: 5-21-09 Time: 09:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 3.8 4.4 2.8 4.8 5-6

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE CO[illegible]O.[illegible]V05, [illegible]09ACCT F65383

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: ~~133457 WWTP1&3/AP1&3~~ 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 5/20/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1970

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 FB3 ~~ER9~~ DKL	WATER	5/19/09 1720	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
2 ER3	WATER	5/19/09 1740	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Yanton-Shaw	Date: 5/20/09 Time: 1900	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 5/21/09 Time: 9:30	2. Received by: CL/Accutest	Date: 5/21/09 Time: 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.4 3.8

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: F65383 09ACCT

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: ~~132457 WWTP1&3/AP1&3~~ Locomotive 133747
Required Report Date: 21 DAYS

Sample Shipment Date: 5/20/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1970

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 052009-TB	WATER	5/20/09 1800	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			1 - HDPE	500 mL	HNO3	~~Dissolved TAL Metals by 6010B/7470A~~		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: M. Yantin-Shaw	Date: 5/20/09 Time: 1800	1. Received by:	Date: Time:
2. Relinquished by:	Date: 5/21/09 Time: 9:00	2. Received by: /Accutest	Date: 5/21/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.4 3.8

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05-Z-C-00-CCT F65383
PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/20/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1970 - FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA2000	WATER	5/20/09 1125	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		

DKK

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5/20/09 Time: 1800	1. Received by: X	Date: Time:
2. Relinquished by: X	Date: 5/21/09 Time: 9:00	2. Received by: Chl Accutest	Date: Time: 5/21/09
3. Relinquished by:	Date: Time:	2. Received by:	Date: 9:00 Time:

Comments:

4.4 3.8

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

FL5383

REFERENCE COC NO.: PB05 20 09ACCT

PAGE 1 OF

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/20/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1970 - FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
5 LBA1000	Sediment	5/20/09 1215	CWM	4 oz	Cool	PCBs by 8082 ✓		
			CWM	4 oz	Cool	SVOCs by 8270C ✓		
			CWM	4 oz	Cool	Explosives by 8330A ✓		
			CWM	4 oz	Cool	~~% Moisture VOCs~~ TOC ✓		
			~~Tera Core~~	~~5 grams~~	~~Cool~~	~~VOCs by 8260~~ VOCs by 8260 ✓		
			CWM	4 oz	Cool	TAL Metals 6010/7471 ✓		
	Sediment		CWM	4 oz	Cool	PCBs by 8082		
			CWM	4 oz	Cool	SVOCs by 8270C		
			CWM	4 oz	Cool	Explosives by 8330A		
			~~CWM~~	~~4 oz~~	~~Cool~~	~~% Moisture VOCs~~ DKK		
			~~Tera Core~~	~~5 grams~~ 4oz	Cool	VOCs by 8260		
			CWM	4 oz	Cool	TAL Metals 6010/7471		
DKK	Sediment		CWM	4 oz	Cool	PCBs by 8082		
			CWM	4 oz	Cool	SVOCs by 8270C		
			CWM	4 oz	Cool	Explosives by 8330A		
			~~CWM~~	~~2 oz~~	~~Cool~~	~~% Moisture VOCs~~ DKK		
			Tera Core	5 grams	Cool	VOCs by 8260		
			CWM	4 oz	Cool	TAL Metals 6010/7471		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5/20/09 Time: 1800	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 5/21/09 Time: 9:00	2. Received by: Accutest	Date: 5/21/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

4.4 3.8

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

F65407

REFERENCE COC NO.: PW05 2 09ACCT

PAGE 1 OF 1

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/21/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672-3151-1981

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LBA2001	WATER	5/21/09 0835	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
2	LBA2002	WATER	5/21/09 1005	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
3	LBA2003	WATER	5/21/09 1005	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
4	LBA2005	WATER	5/21/09 1410	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
Special Instructions:	~~LBA~~ 052109-TB -TRIP			2@40-WA	40ml	HCL	VOCs -TRIP		

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5-21-09 Time: 1800	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 5/22/09 Time: 9:00	2. Received by: Accutest	Date: 5/22/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 3.4 4.0

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

F65407

REFERENCE CODE NO.: PBV05 2 09ACCT

PAGE 1 OF 1

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/21/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672-3651-1981

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LBA2001	WATER	5/21/09 0835	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
2	LBA2002	WATER	5/21/09 1005	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
3	LBA2003	WATER	5/21/09 1005	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
4	LBA2005	WATER	5/21/09 1410	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
Special Instructions:	~~LBA~~ 052109-TB -TRIP			2@40mL	40ml	HCL	VOCs -TRIP		

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: David Kessler-Shaw	Date: 5-21-09 Time: 1800	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 5/22/09 Time: 9:00	2. Received by: Accutest	Date: 5/22/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 3.4 4.0

PL05 408

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB05 21 09ACCT

PAGE 1 OF 2

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/21/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1981 FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LBA1001	Sediment	5/21/09 0905	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4 oz	Cool	~~% Moisture - VOCs~~ CDKK		
				~~Tera Core~~ DKL	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		
2	LBA1002	Sediment	5/21/09 1115	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4 oz	Cool	~~% Moisture - VOCs~~ CDKK		
				~~Tera Core~~ CWM	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		
2	LBA1002 MS	Sediment	5/21/09 1115	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4 oz	Cool	~~% Moisture - VOCs~~ CDKK		
				~~Tera Core~~ CWM	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler - Shaw	Date: 5-21-09 Time: 1800	1. Received by: fx	Date: Time:
2. Relinquished by: fx	Date: Time:	2. Received by: Cat / Accutest	Date: 5-22-09 Time: 09:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

2-8

F65408

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFFRENCE COC NO.: PB05 21 09ACCT

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/21/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1981 -FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 LBA1002MSD	Sediment	5/21/09 1115	CWM	4 oz	Cool	PCBs by 8082		
			CWM	4 oz	Cool	SVOCs by 8270C		
			CWM	4 oz	Cool	Explosives by 8330A		
			~~CWM~~	~~2 oz~~	~~Cool~~	~~% Moisture -VOCs~~ DKK		
			~~Tera Core~~	~~5 grams~~	Cool	VOCs by 8260		
			CWM	4 oz	Cool	TAL Metals 6010/7471		
3 LBA 1003	Sediment	5/21/09 1435	CWM	4 oz	Cool	PCBs by 8082		
			CWM	4 oz	Cool	SVOCs by 8270C		
			CWM	4 oz	Cool	Explosives by 8330A		
			~~CWM~~	~~2 oz~~	~~Cool~~	~~% Moisture -VOCs~~ DKK		
			~~Tera Core~~	~~5 grams~~	Cool	VOCs by 8260		
			CWM	4 oz	Cool	TAL Metals 6010/7471		
	Sediment		CWM	4 oz	Cool	PCBs by 8082		
			CWM	4 oz	Cool	SVOCs by 8270C		
			CWM	4 oz	Cool	Explosives by 8330A		
			CWM	2 oz	Cool	% Moisture -VOCs		
			Tera Core	5 grams	Cool	VOCs by 8260 DKK		
			CWM	4 oz	Cool	TAL Metals 6010/7471		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5-21-09 Time: 1800	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: Time:	2. Received by: [illegible] /Accutest	Date: 5-22-09 Time: 09:40
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

2-8

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05 22 09ACCT

PAGE 1 OF 2

P6542

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/22/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8684-4331-1269 FedEx

Report To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884
Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LBA2006	WATER	5/22/09 0850	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
2	LBA2007	WATER	5/22/09 1015	3 VOA Vial	40ml	HCL	VOCs by 8260		
				1 2 - Amber	1 L	Cool	Explosives by 8330		
				** 1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				** 1 2 - Amber	1 L	Cool	PCBs by 8082		
3	LBA2008	WATER	5/22/09 1415	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		
3	LBA2008MS	WATER	5/22/09 1415	3 VOA Vial	40ml	HCL	VOCs by 8260		
				2 - Amber	1 L	Cool	Explosives by 8330		
				1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
				2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
				2 - Amber	1 L	Cool	PCBs by 8082		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5-22-09 Time: 1630	1. Received by:	Date: 5/23/09 Time: 9:00
2. Relinquished by:	Date: 5/23/09 Time: 9:00	2. Received by: Accutest	Date: 5/23/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 3.2

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

FC8442

REFERENCE COC NO.: PW05 22 09ACCT

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/22/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8684-4331-1269-Fedex

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 LBA2008MSD	WATER	5/22/09 1415	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			2 - Amber	1 L	Cool	PCBs by 8082		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler - Shaw	Date: 5-22-09 Time: 1630	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 5/23/09 Time: 9:00	2. Received by: Clark/Accutest	Date: 5/23/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

4.0 3.2

F6544

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB05 2-2 09ACCT

PAGE 1 OF

Project Name/No.: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5-22-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8684-4331-1269 FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LBA1004	Sediment	5/22/09 0910	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4oz	~~Cool~~	~~% Moisture-VOCs~~ DKK		
				~~Tera Core~~ DKK	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		
2	LBA1005	Sediment	5/22/09 1100	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4oz	~~Cool~~	~~% Moisture-VOCs~~ DKK		
				~~Tera Core~~ DKK	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		
3	LBA1006	Sediment	5/22/09 1100	CWM	4 oz	Cool	PCBs by 8082		
				CWM	4 oz	Cool	SVOCs by 8270C		
				CWM	4 oz	Cool	Explosives by 8330A		
				~~CWM~~ CWM	~~2 oz~~ 4oz	~~Cool~~	~~% Moisture-VOCs~~ DKK		
				~~Tera Core~~ DKK	~~5 grams~~	Cool	VOCs by 8260		
				CWM	4 oz	Cool	TAL Metals 6010/7471		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: David Kessler-Shaw	Date: 5-22-09 Time: 1630	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 5/23/09 Time: 9:30	2. Received by: [signature]/Accutest	Date: 5/23/09 Time: 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

4.2

F69251

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW1 04 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-4-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 WW3031	WATER	11-3-09 0830	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~ EW		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: [signature]	Date: 11-4-09 Time: 1300	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 11/5/09 Time: 9:00	2. Received by: [signature] / Accutest	Date: 11/5/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

4.0 3.0 B.23.8 5.0

LBA MW03

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW18 1104 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 LB3080	WATER	11/3/09 1610	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions: 1 cooler

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: [signature] Date: 11/4/09 Time: 1430
2. Relinquished by: [signature] Date: 11/5/09 Time: 9:00
3. Relinquished by: Date: Time:

1. Received by: [signature] Date: Time:
2. Received by: [signature] Accutest Date: 11/5/09 Time: 9:00
2. Received by: Date: Time:

Comments:

4.0 3.0 3.23.85.0

RCAmw03

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: ~~PW10~~ 11/4/09 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 RC3082	WATER	11/4/09 0850	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260B~~ 6PC		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/4/09 Time: 1430	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 11/5/09 Time: 9:00	2. Received by: [signature] Accutest	Date: 11/5/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

4.03.03.27.85.0

LBAMW01

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW18 ~~SGL~~ 1104 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
4 LB3075	WATER	11/4/09 0945	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions: 1 cooler

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/4/09 Time: 1430	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 11/5/09 Time: 9:20	2. Received by: [signature]	Date: 11/5/09 Time: 9:20
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 8.0 3.0 3.2 3.8 5.0

MW02 F69251
1104

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW10 09ACCT

PAGE 1 OF 3

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
5 RC3081	WATER	11/3/09 1100	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
6 trip blank	WATER	11/4/09 1100	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/4/09 Time: 1430	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 11/5/09 Time: 9:00	2. Received by: [signature] Accutest	Date: 11/5/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

4.0 3.0 3.23 - 85.0

FL69251

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Shaw™
Shaw E & I, Inc.

REFERENCE COC NO.: PW18/104 09ACCT

PAGE 2 OF 3

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 LB3080	WATER	11/3/09 1610	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
4 LB3075	WATER	11/4/09 0945	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature] Date: 11/4/09 Time: 1430
2. Relinquished by: [signature] Date: 11/5/09 Time: 9:00
3. Relinquished by: Date: Time:

1. Received by: [signature] Date: Time:
2. Received by: [signature] / Accutest Date: 11/5/09 Time: 9:00
2. Received by: Date: Time:

Comments: 1 cooler

4.0 3.0 3.2 3.8 5.0

F69251

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW10 1104 09ACCT

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/4/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 RC3082	WATER	11/4/09 0850	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
1 WW3031	WATER	11/3/09 0830	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/4/09 Time:	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/5/09 Time: 9:00	2. Received by: Accutest	Date: 11/5/09 Time: 9:00
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

4.0 3.0 3.2 3.8
5.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PWW 1106 09ACCT

PAGE 1 OF 1

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 LB3076	WATER	11/5/09 0930	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
~~WATER~~			~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 1430	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

P69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW~~10~~ 1106 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 LB3076-MSD	WATER	11/5/09 0930	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/06/09 Time: 1430	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/7/09 Time: 930	2. Received by: CWR / Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0
4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW10 1106 09ACCT

PAGE 1 OF 1

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132957
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1 LB3076-MS	WATER	11/5/09 0930	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 14:30	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW18 1106 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 RC3084	WATER	11-5-09 0830	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: [signature]	Date: 11-6-09 Time: 1200	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: [signature] / Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

A69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW1~~0~~6 09ACCT

PAGE ____ OF ____

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
3 AP3073	WATER	11-6-09 0945	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
4 Trip Blank (prepared by lab)	WATER	11-6-09 1130	3 VOA Vial	40ml	HCL	VOCs by 8260		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: E. W. Weaver	Date: 11-6-09 Time: 1200	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: Cl Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:
4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW10 1106 09ACCT

PAGE 1 OF 1

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
5 AP3070	WATER	11/4/09 1700	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
~~WATER~~			~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: C.S.	Date: 11/6/09 Time: 1430	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 9:30	2. Received by: Accutest	Date: 11/7/09 Time: 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PWM11 06 09ACCT

PAGE 1 OF 2

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
6 LB3077	WATER	11/5/09 0930	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
LB3080	WATER	11/3/09 1610	3 VOA Vial	40ml	HCL	VOCs by 8260		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		
1 LB3076-MSD		11/5/09 0930	3 VOA Vial	40 ml	HCL	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 1430	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PWI 06 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
7 LBA-ER-1109	WATER	11-4-09 1645	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/6/09 Time: 1450	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: [signature] / Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW1 06 09ACCT

PAGE ___ OF ___

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
11 LBA-ER 1109	WATER	11-4-09 1700	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
7 WWTP1-ER 1109	WATER	11-4-09 1645	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: C. S.	Date: 11/6/09 Time: 1430	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: Clark Accutest	Date: 11/7/09 Time: 9:30
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 3.0

P69338

REFERENCE COC NO.: PW11 09ACCT

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Sample Team Member:
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date:
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
8 DI-Water-BLK1	WATER	11-4-09 1630	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	125 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:

Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:

Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:

Normal: X Rush:

Level of QC Required:

Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 1430	1. Received by:	Date: Time:
2. Relinquished by:	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

FL69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW~~10~~ 1106 09ACCT

PAGE ___ OF ___

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
8 DI-Water-BLK1	WATER	11-4-09 1630	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~ EWL		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 1436	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 9:30	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

FL69338

REFERENCE COC NO.: PW10 06 09ACCT

PAGE ___ OF ___

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Shaw™
Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
2 RC3084	WATER	11-5-09 0830	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
9 BEDGW-001-ER1	WATER	11-6-09 0830	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: K

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eric W. Weaver	Date: 11-6-09 Time: 1200	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW10 06 09ACCT

PAGE ___ OF ___

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
9 BEDGW-002-ER1	WATER	11-6-09 0830	3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: C. W. Weaver	Date: 11-6-09 Time: 1200	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 9:30	2. Received by: Carl (Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

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PW1106

REFERENCE COC NO.: ~~PRTU~~ 09ACCT

PAGE 2 OF 2

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

	Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
1	LB3076 - MS	water	11/5/09 0930	3 VOA vial	40 ml	HCL	VOCs by 8260		
1	LB3076		11/5/09 0930						
	LB3075		11/4/09 0945						
10	AP3071		11/6/09 0920						
5	AP3070		11/4/09 1700						
12	AP3072		11/6/09 0930						
13	trip blank	water	11/3/09 1200	3 VOA vial	40 ml	HCL	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/6/09 Time: 1430	1. Received by: [signature]	Date: Time:
2. Relinquished by: [signature]	Date: 11/7/09 Time: 930	2. Received by: [signature] Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW1011 06 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
10 AP3071	WATER	11/6/09 0920	~~3 VOA Vial~~	~~40ml~~	~~HCL~~ CPS	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
~~CPS~~	~~WATER~~		~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		
			~~CPS~~					

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: ____

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
Definitive: X Project Specific: ____

1. Relinquished by: CPS	Date: 11/6/09 Time: 1430	1. Received by: AX	Date: Time:
2. Relinquished by: AX	Date: 11/7/09 Time: 930	2. Received by: CN/Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:
1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: EW PW1 06 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11-6-09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
11 LBA-ER-1109	WATER	11-4-09 1700	~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~ EW		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
	WATER		3 VOA Vial	40ml	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			1 - HDPE	500 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: [signature]	Date: 11/6/09 Time: 1430	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: [signature] Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

F69338

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PWB 1106 09ACCT

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 132457
Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09
Laboratory Destination: Accutest
Laboratory Contact: Sue Bell
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
12 AP3072	WATER	11/6/09 0830	~~3 VOA Vial~~	~~40ml~~	~~HCL~~ CB	~~VOCs by 8260~~		
			2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	500 mL	HNO3	Total TAL Metals/Hardness by 6010B/7470A		
			1 - HDPE	500 mL	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			1 - HDPE	500 mL	H2SO4	Nitrate		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~ CB		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride		
~~WATER~~ CB			~~3 VOA Vial~~	~~40ml~~	~~HCL~~	~~VOCs by 8260~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~Explosives by 8330~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Total TAL Metals/Hardness by 6010B/7470A~~		
			~~1 - HDPE~~	~~500 mL~~	~~HNO3~~	~~Dissolved TAL Metals by 6010B/7470A~~		
			~~2 - Amber~~	~~1 L~~	~~Cool~~	~~TCL SVOCs by 8270C~~		
			~~1 - HDPE~~	~~500 mL~~	~~H2SO4~~	~~Nitrate~~		
			~~1 - HDPE~~	~~500 mL~~	~~NaOH~~	~~Cyanide by 9010/9012~~		
			~~1 - HDPE~~	~~1 L~~	~~Cool~~	~~Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride~~		
		CB						

Special Instructions:

Possible Hazard Identification:

Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:

Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:

Normal: X Rush: ___

Level of QC Required:

Definitive: X Project Specific: ___

1. Relinquished by: CB	Date: ~~CB~~ 11/6/09 Time: 1430	1. Received by: FX	Date: Time:
2. Relinquished by: FX	Date: 11/7/09 Time: 930	2. Received by: Accutest	Date: 11/7/09 Time: 930
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler 4.0 4.2 5.0 4.6 3.2 3.4 3.6 5.0 4.8 4.2 3.0 2.0

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB01 21 09TA

PAGE 2 OF 2

Bill To: Accounting
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-21-09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1764

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA0022	SOIL	1-20-09 / 1555	2-Wide Mouth Jars	~~4~~ oz	Cool	SVOC by 8270, TAL Metals by 6010/7471		
			Wide Mouth Glass Jar	9 EW ~~4~~ oz	Cool	Explosives by 8330		
			Terra Core	5 grams	Cool	VOCs by 8260		
	SOIL		2-Wide Mouth Jars	4 oz	Cool	SVOC by 8270, TAL Metals by 6010/7471		
			Wide Mouth Glass Jar	4 oz	Cool	Explosives by 8330		
			Terra Core	5 grams	Cool	VOCs by 8260		

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: E. W. Weaver Shaw E&I — Date: 1-21-09 Time: 1700
2. Relinquished by: — Date: ___ Time: ___
3. Relinquished by: — Date: ___ Time: ___

1. Received by: — Date: 1-22-09 Time: 920
2. Received by: — Date: ___ Time: ___
2. Received by: — Date: ___ Time: ___

Comments:

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW01 28 09 ~~AMIL~~ TA

PAGE 1 OF 1

Project Name No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767
Required Report Date: 21 DAYS

Sample Shipment Date: 1-28-09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1801

Bill To: Accounting, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923
Report To: Eddie Weaver, Shaw E & I, 312 Directors Drive, Knoxville, TN 37923

Sample Number	Sample Type Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA3002	WATER	1-28-09 1135	2 - Amber	1 L.	Cool	Explosives by 8330		
			1 - HDPE	1 L.	HNO3	Total TAL Metals by 6010B 7470A		
			1 - HDPE	1 L.	HNO3	Dissolved TAL Metals by 6010B 7470A		
			2 - Amber	1 L.	Cool	TCL SVOC's by 8270C		
			3 - VOA Vial	40 mL.	HCL	VOC's by 8260		
			1 - HDPE	250 mL.	NaOH	Cyanide by 9010 9012		
			1 - HDPE	1 L.	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride, Nitrate		
			1 - HDPE	250 mL.	HNO3	Hardness		
PB012809TB-1	Water	1-28-09	2-VOA vial	40 ml	HCL	VOCs 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: Eddie W. Weaver Shaw E&I Date: 1-28-09 Time: 1700
2. Relinquished by: Date: Time:
3. Relinquished by: Date: Time:

1. Received by: Chris Lizzi Date: 1-29-09 Time: 9:55
2. Received by: Date: Time:
2. Received by: Date: Time:

Comments:

North Canton

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Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05 19 09TA

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/19/09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1960

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LB 3070	WATER	5/19/09 1033	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	1 L	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	1 L	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - VOA Vial	40 mL	HCL	VOCs by 8260		
			1 - HDPE	250 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride, Nitrate		
			1 - HDPE	250 mL	HNO3	Hardness		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: M. Mantini - Shaw	Date: 5/19/09 Time: 1800	1. Received by: TESTAMERICA	Date: 20 MAY 2009 Time: 0930
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

North Canton

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Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05 19 09TA

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/19/09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672 3651 1960

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
051909-TB	WATER	5/19/09 1800	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	1 L	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	1 L	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - VOA Vial	40 mL	HCL	VOCs by 8260		
			1 - HDPE	250 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride, Nitrate		
			1 - HDPE	250 mL	HNO3	Hardness		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: M. Yantin - Shaw	Date: 5/19/09 Time: 1800	1. Received by: TEST AMERICA	Date: 20 May 2009 Time: 0930
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

North Canton

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TA

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Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PW05 21 09TA

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/21/09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8672-3651-1992 FEDX

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA2004	WATER	5/21/09 1005	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	1 L	HNO3	Total TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - VOA Vial	40 mL	HCL	VOCs by 8260		
			2 - Amber	1 L	Cool	PCBs by 8082		
052109-TB1	Water	5/21/09	2-VOA vial	40 ml	HCL	VOC - TRIP		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X
Project Specific: ___

1. Relinquished by: David Kessler - Shaw	Date: 5-21-09 Time: 1800	1. Received by:	Date: 5/22/09 Time: 915
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

North Canton

Shaw
Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PB05 22 09TA

PAGE 1 OF 1

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 133767 Locomotive Building Area
Required Report Date: 21 DAYS

Sample Shipment Date: 5/22/09
Laboratory Destination: Test America
Laboratory Contact: Lois Ezzo
Project Contact/Phone: Eddie Weaver/865-690-3211
Carrier Waybill No.: 8639-8124-1180 FedEx

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LBA1007	Sediment	5/22/09 1100	Wide Mouth Glass Jar	2 X 4 oz	Cool	SVOC by 8270, TAL Metals by 6010/7471, PCBs by 8082		
				4 oz	Cool	Explosives by 8330A		
			~~CWM~~ CWA	~~2 oz~~	~~Cool~~	~~% Moisture-VOCs~~		
			~~Tera Core~~	~~5 grams~~ 4 oz	Cool	VOCs by 8260		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
Definitive: X Project Specific: ___

1. Relinquished by: David Kessler-Shaw	Date: 5-22-09 Time: 1630	1. Received by: Denny Burma	Date: 5/23/09 Time: 930
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments:

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: PWM 1106 09TA

PAGE 1 OF 1

Shaw™

Shaw E & I, Inc.

Sample Team Member: ~~David Kessler~~ Chris Strzepka

Profit Center: Knoxville

Project Manager: Steve Downey

Project No.: 132457 ~~Ash Pit~~ LBA

Required Report Date: 21 DAYS

Sample Shipment Date: 11/6/09

Laboratory Destination: Test America

Laboratory Contact: Lois Ezzo

Project Contact/Phone: Eddie Weaver/865-690-3211

Carrier Waybill No.:

Bill To: Attn: Accounts Payable Dept.
Shaw Environmental
P.O. Box 98519
Baton Rouge, LA 70884

Report To: Eddie Weaver
Shaw E & I
312 Directors Drive
Knoxville, TN 37923

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Condition on Receipt	Disposal Record
LB3079	WATER	11/5/09 0930	2 - Amber	1 L	Cool	Explosives by 8330		
			1 - HDPE	1 L	HNO3	Total TAL Metals by 6010B/7470A		
			1 - HDPE	1 L	HNO3	Dissolved TAL Metals by 6010B/7470A		
			2 - Amber	1 L	Cool	TCL SVOCs by 8270C		
			3 - VOA Vial	40 mL	HCL	VOCs by 8260		
			1 - HDPE	250 mL	NaOH	Cyanide by 9010/9012		
			1 - HDPE	1 L	Cool	Turbidity, Alkalinity, TDS, TSS, Sulfate, Chloride, Nitrate		
			1 - HDPE	250 mL	HNO3	Hardness		

Special Instructions:

Possible Hazard Identification:

Non-haz: ___ Flammable: ___ Poison B: ___ Unknown: ___

Sample Disposal:

Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:

Normal: X Rush: ___

Level of QC Required:

Definitive: X Project Specific: ___

1. Relinquished by:	Date: 11/6/09 Time: 1430	1. Received by:	Date: 11/7/09 Time: 930
2. Relinquished by:	Date: Time:	2. Received by:	Date: Time:
3. Relinquished by:	Date: Time:	2. Received by:	Date: Time:

Comments: 1 cooler

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North Canton

APPENDIX M

COMMENTS AND RESPONSES

Response to Comments
Ohio Environmental Protection Agency
Garage Maintenance Area (Locomotive Building Area)
Site Characterization Report
Former Plum Brook Ordnance Works, Sandusky, Ohio
(Report Dated May 2010)

Reference: Comments from Janusz Byczkowski, DERR, CO, dated 11 June 2010.

Comment 1: **The regional screening levels (RSL) are no longer provided by ORNL. The RSLs are provided at the U.S. EPA's "Regional Screening Levels for Chemical Contaminants at Superfund Sites" screening level/preliminary remediation goal website. This website was developed with DOE's ORNL under an Interagency Agreement as an update of the EPA Region 3 RBC Table, Region 6 HHMSSL Table and the Region 9 PRG Table.**

The URL link quoted above, does not work as written in the References Section.

Response 1: A formatting error occurred in the reference section. An underscore should appear between "concentration" and "table". The URL Link as shown as follows: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm is current as of August 17, 2010. This formatting error will be corrected.

The references will be revised to "EPA" instead of "ORNL-EPA," although the Oak Ridge National Laboratory (ORNL) is still integrally involved in the revision of RSL values. As the reviewer states, the RSL website was developed as an update of various Region 3, Region 6 and Region 9 values. The RSLs are a regionally lead effort, which receives only guidance from Superfund/Headquarters. The website itself is no longer hosted by ORNL, but is now hosted by EPA Region 3. However, updated RSLs are still calculated by ORNL, under the direction of the EPA Regions. ORNL still also provides assistance such as how the interpretation of new guidance may affect the RSLs. Note that the calculator link (http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search) on the RSL website hosted by Region 3 links back to ORNL.

Comment 2: **The use of "MDC" or the "95 percent" UTL as BSCs, is currently not recommended by OEPA-DERR for background screening.**

If background levels (BSCs) cannot be recalculated from the original data in accordance with OEPA-DERR (2009) guidance, then either, no chemicals detected in this Area should be screened based on background

level, or a thorough explanation should be provided as to why the guidance was not used.

Reference: **OEPA-DERR (2009) Use of Background for Remedial Response Sites. 21 August 2009. On line:** http://www.epa.ohio.gov/portals/30/rules/bground%20guidance.pdf

Response 2: Much discussion and coordination between OEPA and USACE have gone into the selection of background locations and the methodology for the derivation of background screening values. The background approach was agreed upon by the PBOW Project Team prior to release of the referenced OEPA document. There was never any discussion about not using the soil background data set and evaluation approach for all PBOW sites as described in the TNT Areas A and C BHHRA work plan and report (IT, 2001a,b). This approach was developed as a PBOW Team effort, with input from USACE and OEPA risk assessors Laurie Moore and Bonnie Buthker. After evaluating numerous background statistics for soil (e.g., mean, median, UCLs and UTLs), the OEPA risk assessors and the rest of the PBOW Team deemed the 95 percent UTL or maximum detected concentration, whichever is less, to be the appropriate background statistic to use during background screening of metals at PBOW areas of concern. The consensus to use this approach for soil is documented in the May 2000 PBOW Team Meeting minutes.

The development of the background evaluation approach for groundwater was likewise a team effort developed by the USACE and OEPA, including the risk assessors. It was agreed the same basic approach would be used for groundwater background and was agreed upon for soil background. This approach and the background groundwater data set are described in Appendix M of the Final 2004 Groundwater Data Summary and Evaluation Report (Shaw, 2005).

In summary, the approach provided in the report follows the protocol of a much-discussed, documented PBOW Team agreement. Even though this PBOW Team decision pre-dated the guidance by several years, the statistical methods described in the guidance existed at the time of the PBOW Team decision and were certainly available for consideration, as were other methods. The PBOW Team decided upon the methods used and referenced in the report. Numerous PBOW site reports and decisions have been based on this approach.

Comment 3: **From the data in Table 4-2, it seems that minimum reporting limits (RL) for Arsenic and Cobalt in groundwater samples exceed both background and risk-based screening levels (SL).**

In such a case, either the samples should be re-analyzed using more sensitive methodology or the detected chemicals should be listed as

chemicals of concern (COPC), assuming their concentrations in the medium = ½ RL.

Response 3: Section 4.2.2 presents and describes the BSCs. Please note that the first sentence of Section 4.2 states, "The analytical result tables in Chapter 5.0 include a comparison to RBSCs and RBSCs as points of reference only." This section also states that formal evaluation of human health risks will be performed in the baseline human health risk assessment (BHHRA). The BHHRA identifies COPCs; the Site Characterization Report intentionally makes no mention of COPCs and infers no evaluation of risks.

The samples collected for background screening were analyzed using current SW-846 methods as described in the 2004 Data Summary and Evaluation Report (Shaw, 2005). These methods and the resulting reporting limits represent state of the practice. Please note that for the analytes mentioned, arsenic and cobalt, all (J-qualified) detections were less than the reporting limits. In each case, the maximum detected concentration (MDC) was used as the BSC. For cobalt, the MDC of 12.1 µg/L is less than ½ the RL of 50 µg/L, and cobalt was detected at a concentration as low as 1.0 µg/L.

Although the RLs are presented in Table 4-2, results for these data were reported as estimated concentrations to the method detection limit (MDL) which in some instances was as low as 1.0 µg/L. The MDL is defined as the minimum concentration of a constituent that can be measured and reported with a 99 percent confidence. The MDLs for both arsenic and cobalt are below the BSCs, and the MDL for cobalt is less than the RBSC. While there is some uncertainty in this region of quantitation, the analytical methods are state of the practice and sufficiently robust to meet the project DQOs.

It is also noted the RSLs, on which the RBSCs are based, are derived strictly using risk assessment methodology, without any consideration as to whether analytical methods can attain the RBSC levels. Although it is appropriate that RBSCs be strictly risk-based, analytical limitations must be acknowledged. For example, there is no current SW-846 Method that can attain the RBSC of 0.045 µg/L as an RL or even as an MDL.