APPENDIX A

SECTION 14

2002 Report: 2001 Groundwater Remedial Investigation

(IT, March 2002)

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the IT group

March 15, 2002

U.S. Army of Engineer District, Nashville
ATTN: CELRN-EC-R-M (Mrs. Linda Ingram)
110 Ninth Avenue South, Room 682
U.S. Court House Annex
Nashville, Tennessee 37203

Submittal of the 2001 Groundwater Remedial Investigation, Former Plum Brook Ordnance Works, Sandusky, Ohio: Contract No. DACA62-00-D-0002; Delivery Order 0010; IT/PN 825635

Dear Ingram:

In accordance with the requirements of Delivery Order Number 0010 of Contract Number DACA62-00-D-0002, IT Corporation is pleased to submit the 2001 Groundwater Remedial Investigation Report of the TNT and Red Water Ponds Areas at the former Plum Brook Ordnance Works in Sandusky, Ohio. A presentation will be made at the RAB meeting on 27 March 2002.

Enclosed are six (6) copies of the 2001 Groundwater Remedial Investigation; note that responses to internal IT review comments on the report are included in the document. As requested, copies of the report have also been forwarded to the recipients shown on the distribution list, quantities as indicated. Should you have any questions or require additional information regarding this submittal, please do not hesitate to call the undersigned at (865) 690-3211.

Request that you review the document and provide either comments or a response with no comments by 22 April 2001. This document will not be revised but all comments will be addressed in the Annual Report. Please send your response to Ms. Linda Ingram, Technical Coordinator, Nashville District Corps of Engineers, ATTN: CELRN-EL-R-M, P.O. Box 1070, Nashville, Tennessee 37203-1070.

Sincerely,

Steve Downey
Project Manager

Enclosure

Distribution List for 2001 Groundwater Remedial Investigation Report

U.S. Army of Engineer District, Nashville — 6 copies
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ATTN: CELRH-ED-AE (Mr. Rick Meadows)
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Mr. Ron Nabors — 2 copies
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Bowling Green, Ohio 43402-0466

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Mr. Robert Lallier — 2 copies
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Mr. Mark Bohne 1 copy
PBOW RAB Co-chairman
311 East Mason Road
Milan, Ohio 44846

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DISCIPLINE SIGN-OFF REVIEW

Client Name: U.S. Army Engineer District, Nashville; CELRN-EC-R-M

Project Description: Groundwater RI, TNT and RWP Areas, Former Plum Brook Ordnance Works, Sandusky, OH

Contract Number: D A C A 6 2 - 0 0 - D - 0 0 0 2 Delivery Order Number: 0 0 1 0

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☐ SHP or SSHP	
☒ GW RI Report	Volumes I and II, Groundwater Investigation, Rev. 0, March 2002
☐ Risk Assessment / Evaluation	
☐ Specifications & Plans	
☐ Design Calculations	
☐ Tables	
☐ Drawings / Figures	
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- ☐ Preliminary
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- ☐ Draft
- ☐ Draft Final
- ☐ Final
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	Name, Grade	Discipline	Signature	Date
Originator	David Kessler	Geologist	David Kessler	3/14/02
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Project Review	Steve Downey	Civil Engineer	Steve T Downey	3/14/02
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Project Manager	Steve Downey	Civil Engineer	Steve T Downey	3/14/02

NOTICE: By signature above, parties certify that the subject document has been prepared by and/or reviewed by them (as appropriate), that all review comments have been resolved, and that the document is ready for submittal.

2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works
Sandusky, Ohio
Response to Internal IT Review Comments
(Report dated March 2002)

General Comment from all reviewers:
Each technical reviewer provided comments that suggested grammatical changes and word revisions. Simple grammatical changes and rewording of sentences will not be presented but will be incorporated into the document as appropriate.

Comments Received from Steve Downey:

Comment 1. Volume 1, Section 2.3, page 2-4: Morrison Knudsen Group (MK) should be identified as Morrison Knudsen Corporation.

Response: The text will be changed from Morrison Knudsen Group to Morrison Knudsen Corporation.

Comment 2. Volume 1, Section 3.1.2.1 (page 3-10) and Section 3.1.2.2 (page 3-11): Include maximum nitroaromatic concentrations of both soil and groundwater samples that were detected at the West and Pentolite Road Red Water Pond areas by IT Corporation during the 1998 direct-push investigation.

Response: Agreed. Soil and groundwater maximum nitroaromatic concentrations detected above PRG limits during the direct-push investigation will be included in the appropriate sections.

Comments Received from Catherine Williams:

Comment 1. Tables 6-5 through 6-17 titled "Blank Corrected Constituents in ..." present analytical results that are not truly blank corrected. Tables should be renamed to properly present the analytical results.

Response: Agreed. The tables will be renamed "Detected Constituents in ..." and the data in the Appendices will be reviewed.

Comment 2. Several acronyms in the text are not identified in the list of acronyms (ppb, QA/QC, GSA, LERC...).

Response: Agreed. Editing will recheck the text and additions will be made to the list of acronyms.

Comment 3. General Comment: Consistency should be kept throughout the document with reference to inorganics or metals, nitroaromatics or explosives, and TNT Manufacturing Areas A, B, and C or TNTA, B, and C.

Response: Agreed. The document will be globally checked and consist use of the terms will be made. The terms *inorganics, nitroaromatics, TNTA, TNTB, and TNTC* will be used consistently throughout the text.

Comment 4. General Comment: Always spell out "Building," don't abbreviate "Bldg."

Response: Agreed.

Comment 5. Volume 1, Section 4.10: Mention the contractor's name who removed the IDW and the landfill where the IDW was taken for disposal.

Response: Agreed. The subcontractor (US Liquids of Detroit, Inc.) and the associated disposal facility for both soil and groundwater will be mentioned in the text.

Comment 6. Volume 1, Section 6.0: When discussing analytical results, clarify that constituents were "detected" in the sample rather than a constituent being observed or found in a certain well.

Response: Agreed.

Comments Received from Bill Hedberg:

Comment 1. Figure 2-9, Overburden Thickness Contour Map: The legend states that when the greater than symbol (>) is given, the overburden is at a depth greater than the indicated number. The greater than symbol is not indicating depth but implies an overburden thickness.

Response: Agreed. The legend will be changed to denote that the greater than symbol indicates an overburden thickness greater than the indicated number.

Comment 2. Volume 1, Executive Summary: One petroleum aromatic hydrocarbon is mentioned to have been detected in the overburden groundwater at TNTB, monitoring well MK-MW17. This was not a petroleum aromatic hydrocarbon but a polynuclear (polycyclic) aromatic hydrocarbon.

Response: Agreed. The text containing petroleum aromatic hydrocarbon will be changed to polynuclear aromatic hydrocarbon.

Comment 3. Volume 1, Section 3.1.1.2, page 3-6: Monitoring well MK-MW16 is noted as being a downgradient well. From review of the figures, MK-MW16 is shown as an upgradient well.

Response: Agreed. The text will be changed to note that monitoring well MK-MW16 is an upgradient well.

Comment 4. Volume 1, Section 4.6, page 4-6 and Table 4-2: As a note; most of the final field measurements of bedrock monitoring well groundwater samples were

recorded with very high pH values. The high recording of pH is usually indicative of grout contamination.

Response: True, high pH measurements were recorded. Readings greater than 9.0 were found in the groundwater in a total of 16 bedrock wells but in only 4 of the newly installed wells. The reason for the high pH readings in only the bedrock wells have not been determined.

Comment 5. Volume 1, Section 6.0: This section needs to be carefully reviewed to ensure that the figure call-outs are consistent with the appropriate figure.

Response: Agreed. The figure call-outs in the text will be reviewed and adjusted to match the appropriate figures.

2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works
Sandusky, Ohio

Prepared for:

U.S. Army Corps of Engineers, Nashville District
P. O. Box 1070
Nashville, Tennessee 37202-1070

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

IT Project No. 825635

Revision 0

March 2002

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List of Appendices (Volume II)

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List of Acronyms

AA1	Acid Area 1
AA2	Acid Area 2
AA3	Acid Area 3
ABG	Additional Burning Ground
bgs	below ground surface
BTEX	benzene, toluene, ethyl benzene, and xylene
CELRN	U.S. Army Corps of Engineers, Nashville District
D&M	Dames and Moore, Inc.
DCE	dichloroethene
DNB	dinitrobenzene
DNT	dinitrotoluene
DO	dissolved oxygen
DOD	U.S. Department of Defense
DQO	data quality objective
DRO	diesel range organics
Eh	oxidation-reduction potential
EPA	U.S. Environmental Protection Agency
ft/day	feet per day
ft/ft	foot per foot
gpm	gallons per minute
GRO	gasoline range organics
H_2S	hydrogen sulfide
HTRW	hazardous, toxic, and radiological waste
ICI	International Consultants, Inc.
ID	inside diameter
IDW	investigation-derived waste
IT	IT Corporation
LERC	Laboratory Emergency Response Center
μg/L	micrograms per liter
MCL	maximum contaminant level
MK	Morrison Knudsen Corporation
MNTA	Maintenance Shop Area
msl	mean sea level
mg/kg	micrograms per kilogram

List of Acronyms (Continued)

NASA	National Aeronautics and Space Administration
OD	outer diameter
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
PBOW	Plum Brook Ordnance Works
PBS	Plum Brook Station
PCB	polychlorinated biphenyl
pH	hydrogen ion concentration
ppb	parts per billion
ppm	parts per million
PRG	preliminary remediation goal
PRRWP	Pentolite Road Red Water Ponds
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RA	risk assessment
RI	remedial investigation
SAIC	Science Applications International Corporation
SAP	sampling and analysis plan
SCEM	site conceptual exposure model
SCS	Soil Conservation Service
SPLP	synthetic precipitation leaching procedure
SSAP	site-specific sampling and analysis plan
SVOC	semivolatile organic compound
TCA	trichloroethane
TNT	trinitrotoluene
TNTA	TNT Area A
TNTB	TNT Area B
TNTC	TNT Area C
VOC	volatile organic compound
USACE	U.S. Army Corps of Engineers
WARWP	West Area Red Water Ponds

Executive Summary

Site Description. The former Plum Brook Ordnance Works (PBOW) was built in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Production of explosives began in December 1941 and continued until 1945. It is estimated that more than one billion pounds of explosives were manufactured during the 4-year operation period.

After the plant was shut down, decontamination of TNT, acid, pentolite, and DNT processing lines began and were completed during the last quarter of 1945. The property was initially transferred to the Ordnance Department, then to the War Assets Administration after it was certified by the U.S. Army to be decontaminated. In 1949, PBOW was transferred to the General Services Administration.

The National Aeronautics and Space Administration (NASA) acquired the PBOW on March 15, 1963 and is presently utilizing the site. On April 18, 1978, NASA declared approximately 2,152 acres of land as excess. The Perkins Township Board of Education acquired 46 acres of the excess and uses this area as a bus transportation center. GSA retains the remaining acreage and currently has a use agreement with the Ohio National Guard for 604 acres of the land. NASA presently controls about 6,400 acres and is using the site to conduct space research as a satellite operation of NASA's Laboratory Emergency Response Center in Cleveland Ohio. The details of these land transactions are listed in the site management plan and can be found at the NASA Plum Brook Station (PBS).

Historical Activities. Previous investigations of site hydrogeology and groundwater contamination were documented in the Contamination Evaluation Report (IT Corporation [IT], 1991), the Site Inspection Report (MK, 1994), the Site Management Plan (ICI, 1995), the Site-Wide Groundwater Investigation Draft Report (Dames & Moore [D&M], 1996) and the Site-Wide Groundwater Investigation Report (IT, 1996).

In 1989, IT conducted the contamination evaluation focusing on areas associated with past Department of Defense operations at PBOW. As part of the investigation, four groundwater monitoring wells were installed in the overburden water-bearing zone.

A site inspection was conducted at PBOW by MK from June through July 1993. The purpose of the site inspection was to collect information concerning conditions to assess the threat posed to human health and the environment and to determine the need for any additional investigations. A total of 13 monitoring wells were installed in the overburden water-bearing zone in multiple areas.

From May to June of 1994, D&M conducted a groundwater investigation of the overburden and bedrock water-bearing zones. The objectives of the D&M investigation were as follows:

- Evaluate groundwater occurrence and flow conditions in the overburden and bedrock water-bearing zones;
- Assess the groundwater quality in the overburden water-bearing zone and at the Red Water Ponds and TNT Manufacturing Areas;
- Investigate on a sitewide basis the baseline groundwater quality of the bedrock water-bearing zone;
- Evaluate the necessity of additional work at PBOW.

A total of 11 monitoring wells were installed in the overburden water-bearing zone and 8 wells were placed in the bedrock water-bearing zone. Groundwater samples were also collected from 25 wells.

In September 1995, ICI issued a site management plan for PBOW. The objectives were to describe the regulatory framework, site setting, site investigations and results, and management objectives for the PBOW.

IT conducted a site-wide groundwater investigation at the former PBOW from September through October 1996. This work included installation of overburden monitoring wells, redevelopment of the existing monitoring wells, and collection and analysis of groundwater samples to acquire supplementary data of site-wide groundwater levels and contaminants to add to an existing database, and to fill in existing data gaps in groundwater levels and contamination in the western portion of PBOW.

In May 1998, IT repeated a site-wide groundwater investigation, sampling the same monitoring wells as sampled during 1996. Groundwater sampling results indicated the continued presence of elevated nitroaromatics at the West and Pentolite Road Red Water Ponds (PRRWP). For further assessment at the Red Water Pond areas, IT conducted a soil and groundwater direct-push investigation. Elevated nitroaromatics were detected in several direct-push soil and groundwater samples.

In October and November 1998, IT conducted a remedial investigation of TNT Manufacturing Area B (TNTB) to determine the nature and extent of soil, surface water, and sediment contamination. Elevated levels of nitroaromatics were found within 1 to 5 feet of many of the former building foundations. Surface water and sediments were not impacted by former TNTB activities. In August 2000, final results were submitted.

During June through October 2000, IT conducted a remedial investigation of TNT Manufacturing Areas A and C (TNTA and TNTC, respectively) to determine the nature and extent of soil, surface water, and sediment contamination. Similar to TNTB, elevated levels of nitroaromatic contamination were found within 3 to 5 feet of the former building foundation. Nitroaromatics were also found in the surface water and sediments of TNTA while only select organics and metals were detected above regulatory limits.

Current Status of Overburden Water-Bearing Zone in TNTA, TNTB, and TNTC. Groundwater samples were collected from four monitoring wells at the TNT Manufacturing areas in 2001 but data from 1997 and 1998 can be used as a comparison tool to assess quality conditions. The overburden water-bearing zone has been impacted by organic and/or explosive contaminants to different extents by past site activities. Nitroaromatic compounds have not significantly impacted the groundwater at TNT Manufacturing Areas A and C but metals, filtered and unfiltered, are present above preliminary remediation goal limits. Four nitroaromatics, one polynuclear aromatic hydrocarbon, one nitroaromatic recorded as a semivolatile organic compound, and three metals are evident in the overburden groundwater at TNTB, in the downgradient monitoring well MK-MW17.

Overburden Geologic and Hydrogeological Conclusions. Groundwater flow in the overburden is predominantly to the north-northeast. The general flow direction in the overburden aquifer largely mirrors the surface topography and is strongly correspondent to the topography of the top of the bedrock; thus, groundwater on the western side of the site flows toward a groundwater low. Groundwater elevation fluctuations are very similar among overburden wells which may imply a high degree of connectivity between the site wells. Another possibility is that the overburden water-bearing zone has a higher vertical hydraulic conductivity than assumed and the water levels in the overburden are directly influenced by changes in the bedrock water-bearing zone water levels. Slug test results reveal significant variability in the overburden water-bearing zone hydraulic conductivities across the site, possibly implying the water-bearing zone is not a single hydrogeologic unit.

Current Status of Bedrock Water-Bearing Zone. The bedrock water-bearing zone at PBOW has been impacted by organic and/or explosive contaminants to different extents by past site activities, although to a lesser degree than the overburden. Nitroaromatic compounds are found only in the groundwater at the TNTA and downgradient monitoring wells during the October 2001 sampling event. Significant VOC compound concentrations (most commonly benzene, toluene, ethylbenzene, and xylenes) are also found at PRRWP, TNTA, TNTB, TNTC, Acid Area 2, Acid Area 3, Maintenance, Upper Toluene Tanks, and downgradient well areas. SVOCs also exhibit impacts on water quality at the PRRWP, TNTA, TNTC, AA1, AA2, Maintenance, Additional Burning Grounds, Upper Toluene Tanks Area, and downgradient area well.

Dissolved concentrations of arsenic, manganese, and thallium were commonly detected at concentrations exceeding PRGs in many areas of PBOW. Other less frequently detected metals exceeding PRGs in the bedrock water bearing zone include iron and barium. All areas detected at least one dissolved inorganic compound at concentrations exceeding PRGs.

Bedrock Geologic and Hydrogelogical Conclusions. Groundwater flow in the bedrock is predominantly to the north-northeast. Little groundwater elevation fluctuation occurred over time in the wells monitoring the Ohio Shale and the Olentangy Shale. However, wells monitoring the Delaware Limestone showed significant variability. Although groundwater was not measured in 2001, there is a similar groundwater elevation fluctuation between wells REACTOR 1, 2, 3, and PB-BED-MW13 located on the west side of PBOW along a bedrock low coming from the Reactor Building Area.

Slug tests revealed that the Ohio Shale had the highest hydraulic conductivity of the three bedrock units tested at approximately 20 ft/day. The Delaware Limestone and Olentangy Shale had hydraulic conductivities of three orders of magnitude lower.

Quarries mining the Delaware Limestone in the vicinity of PBOW have natural hydrocarbon. This is evident in PBOW wells monitoring the bedrock based on drilling notes, photographs, H_2S readings, free-phase hydrocarbon encountered, and BTEX compounds detected in the groundwater.

In general, there is a downward vertical gradient from the overburden to the bedrock in the western and northern portions of the site. The greatest groundwater elevation difference was 25 feet in overburden/Delaware Limestone pair IT-AA1-GW002/IT-AA1-BED-GW001 located in the north central portion of the site. In contrast, the central and southern portions of the site showed very similar groundwater elevations in overburden/Ohio Shale pairs. This may indicate a high degree of connectivity between groundwater in the overburden and Ohio Shale.

Peaks in calculated recharge rates appear to correlate with groundwater highs taking into account a lag time. Similarly, lows in recharge rates roughly correspond with lows in the groundwater when taking into account the lag time.

1.0 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected hazardous waste sites at properties previously owned by the U.S. Department of Defense (DOD). The former Plum Brook Ordnance Works (PBOW), located in Sandusky, Erie County, Ohio, is currently being investigated under the Defense Environmental Restoration Program for Formerly Used Defense Sites. Figure 1-1 shows the geographical location of the former PBOW site. This 9,000-acre facility was used for the manufacture of explosives during World War II. The site is currently owned by the National Aeronautics and Space Administration (NASA) and is operated as the Plum Brook Station (PBS) of the John Glenn Research Center.

The investigation is being managed and technically overseen by the Nashville District Office of the U.S. Army Corps of Engineers (USACE). IT Corporation (IT) was contracted by the USACE, Nashville District to conduct a groundwater remedial investigation (RI) at two red water pond areas and three former trinitrotoluene (TNT) manufacturing areas. The two red water pond areas are the West Area Red Water Ponds (WARWP) and the Pentolite Road Red Water Ponds (PRRWP). The three former TNT manufacturing areas are TNT Area A (TNTA), TNT Area B (TNTB), and TNT Area C (TNTC). This work was performed under Delivery Order 0010 of Contract Number DACA62-00-D-0002.

This RI report assimilates data generated during three field investigations:

- Direct-push screening investigation conducted from July 24 through August 7, 2001
- Bedrock monitoring well installation, confirmation soil sampling, well development, and groundwater sampling conducted from August 23 through October 10, 2001
- Hydraulic conductivity testing field investigation conducted from November 13 to 15, 2001.

The field activities were conducted pursuant to the following documents: final site-specific sampling and analysis plan (SSAP) and final site-specific safety and health plan, (IT, 2001), the site-wide sampling and analysis plan (SAP) (IT, 1996a), quality assurance project plan (QAPP) (IT, 1996b), and the site-wide safety and health plan (IT, 1996c).

1.1 Objectives and Scope of Work

The objectives of this investigation included the following:

- Determine if hazardous substances are present at the site at concentrations that may constitute unacceptable risk to human health or the environment.
- Define site physical features and characteristics (aquifer background conditions).
- Evaluate fate and transport pathways (groundwater modeling).
- Determine the nature and extent of source areas.
- Define current and future routes of exposure.
- Determine whether contaminant distribution is consistent with DOD activities.

The scope of the groundwater RI included the preparation of a quality control plan and site-specific addenda to the site-wide SAP and safety and health plan, monitoring well installation, monitoring well development, in situ permeability determination, groundwater sampling, soil sampling, analytical work, investigation-derived waste (IDW) management and disposal, and preparation and submittal of a report of findings. Based on the findings of previous investigations, this report presents both supplemental soil data and new groundwater data obtained as part of the groundwater RI. Figure 1-2 identifies the areas investigated in relation to other site features. Sufficient groundwater information was collected from the new monitoring wells installed across the base so that a scope of work for groundwater modeling can be completed.

1.2 Facility Location and Description

The former PBOW site is currently owned by NASA and is operated as the Plum Brook Station (PBS) of the NASA John Glenn Research Center, which is located at Lewis Field based in Cleveland, Ohio. Most of the aerospace testing facilities built at the site in the 1960s are in 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 County Road 43, 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.

1.3 Site History and Potential for Contamination

The PBOW site was built in early 1941 as a manufacturing plant for 2,4,6-TNT, dinitrotoluene (DNT), and pentolite. Production of explosives began on December 16, 1941 and continued until 1945. 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 TNT, acid, pentolite, and DNT processing lines began. Decontamination was completed during the last quarter of 1945. The property was initially transferred to the Ordnance Department and then to the War Assets Administration after it was certified by the U.S. Army to be decontaminated. In 1949, PBOW was transferred to the General Services Administration.

NASA acquired PBOW on March 15, 1963, and is presently utilizing the site. On April 18, 1978, NASA declared approximately 2,152 acres of land as excess. 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 controls about 6,400 acres and is using the site to conduct space research as a satellite operation of its John Glenn Research Center. The details of these land transactions are listed in the site management plan and can be found at the NASA PBS.

Based on review of historical use of the site and findings of previous investigations, potential contaminants in the groundwater at PBOW may include nitroaromatic compounds, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), cyanide, and inorganics.

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 [SCS], 1971). Erie County is overlain by lake, glacial outwash, and glacial till sediment. 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 site range from 680 feet above mean sea level (msl) at the intersection of Taylor Road and Patrol Road on the western 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 influenced primarily by glacial scouring and deposition. A low escarpment trends from the western to the northeastern portion of the site.

PBOW lies in the eastern region of the Pickeral Creek-Pipe Creek Basin, which is part of the St. Lawrence River drainage basin (Dames and Moore, Inc. [D&M], 1997). Eleven streams exist within the site and flow north-northeast toward Lake Erie, which is located approximately 3.5 miles north of the site. The three main streams at the site, Plum Brook, Ransom Brook, and Pipe Creek, are being monitored by NASA PBS. 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, all of which flow into Sandusky Bay (D&M, 1997). The drainage pattern is dendritic where streams are incised into bedrock and is poorly developed where they have not yet downcut to the bedrock. In addition to the streams, 17 isolated ponds and reservoirs and former red water ponds are located at PBOW (IT, 1996a; D&M, 1997).

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, 1997). The local bedrock is situated on the eastern flank of the Findlay Arch. Beds in the vicinity of PBOW dip to the southeast at an angle of approximately 10 to 30 feet per mile. In the Devonian and Silurian carbonate of northern and western Erie County, weathering of the carbonates has produced cavernous porosity and karst topography.

2.2.2 *Local Geology*

Three formations, all of Devonian Age, are shown on a revised regional geologic map (Figure 2-1). Each of the units discussed below was encountered in the upper 100 feet of bedrock at PBOW along the lines of section presented in Figure 2-2 and on cross-sections shown on Figures 2-3 through 2-7. A top-of-bedrock elevation contour map is presented on Figure 2-8, and an updated overburden thickness contour map is presented in Figure 2-9. These figures were previously presented in the June 1999 site-wide groundwater monitoring report (IT, 1999), but have been updated according to lithologic descriptions obtained from the installation of 10 bedrock monitoring wells.

The Delaware Limestone is the lowermost formation screened by site wells. It is characterized as a hard, dense, finely crystalline limestone and dolomite. Dissolution of this unit produced solution channels along bedding planes and joints and has produced caverns in some areas. The unit is typically buff colored and usually is described as fossiliferous. In the vicinity of PBOW, quarries mine limestone from the Delaware. Traces of natural petroleum-derived benzene, toluene, ethyl benzene, and xylene (BTEX) and hydrogen sulfide (H_2S) are common in area 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 a 15 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 uppermost formation at the site is the Ohio Shale. Only one member of the Ohio Shale is present in the PBOW area, the Huron Shale. This unit has been 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, 1997).

2.2.3 *Local Soils*

The bedrock overburden in Erie County is predominantly glacial till, glacial outwash, or glacial lacustrine (lake) deposits. In the vicinity of PBOW, the soil has been interpreted to be lacustrine. In many areas, the overburden also consists of highly weathered bedrock. The thickness of the overburden ranges from 1 foot to greater than 25 feet. As shown on the updated Figure 2-9, overburden is thickest on the northern portion of the site in the vicinity of the Reactor Building Area, where it has filled in a bedrock low.

The 1971 *SCS Soil Survey for Erie County* mapped four soil associations on PBOW (in order of areal percentage) as the Prout, Arkport-Galen, Del Rey-Lenawee, and Lewisburg (SCS, 1971). More recently, the Ohio Department of Natural Resources (ODNR) revised the soil associations in the county, which also changed the soil associations at PBOW. As shown in the 1994 report (ODNR, 1994), the soil in the northwest portion of the PBOW site is now placed within the Kibbie-Elnora-Tuscola-Colwood Association that is described as nearly level to gently sloping. The drainage ability of the soil is presented as somewhat poorly drained, moderately well drained, and very poorly drained soils formed in outwash, lacustrine, and deltaic sediments. Along a strip from west to northeast across the site is the Castalia-Millsdale-Milton-Ritchey Association. This association is described as shallow to moderately deep, nearly level to moderately steep, well drained and very poorly drained soils formed in glacial till, lacustrine sediments, and limestone residuum. Across much of the central portion of the site is the Hornell-Fries-Colwood Association, described as moderately deep to deep, nearly level to gently sloping, somewhat poorly drained to very poorly drained soils formed in glacial till and lacustrine sediments over shale bedrock. At the extreme southeast portion of PBOW is the Pewamo-Bennington Association, described as nearly level to gently sloping, very poorly drained and somewhat poorly drained soils formed from glacial till and lacustrine sediments.

2.2.4 Hydrogeology

2.2.4.1 Current Groundwater Usage

The majority of residents in Erie County receive water from public utilities that receive most of their water from surface water sources. Residences to the north and east of PBOW are connected to city, county, or rural services. Five percent of the county residents obtain groundwater from private wells. Erie County's primary groundwater source is the limestone and dolomite found in the western end of the county. Groundwater wells in the central and eastern portions of the county tap lower-yielding shale and sandy zones in the overburden (D&M, 1997). Some wells surrounding PBOW are used for agricultural purposes, including irrigation, which could have an effect on drawdown near the site (International Consultants, Inc. [ICI], 1995). A few wells in the vicinity of PBOW were determined to be used for private and public consumption (Science Applications International Corporation [SAIC], 1991); however, none within the facility boundary are used.

2.2.4.2 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 limestones in the middle of the county provide 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, 1997). A hydrogeological study by the U.S. Geological Survey conducted on the glacial deposits in Sandusky in 1990 reported a horizontal hydraulic conductivity of 0.046 feet per day (ft/day) and a vertical hydraulic conductivity of 1.2 ft/day (IT, 1996a).

2.2.4.3 General Site Hydrogeology

At PBOW, the groundwater has been divided into three zones based on location and yield. Zone one occurs in the north and northwestern portion of PBOW. It has been characterized as yielding from 100 to 500 gpm from karst limestone approximately 100 feet below grade. Zone two is in the northern portion of PBOW and has yields of 15 gpm or less from limestone approximately 300 feet below grade. Zone three 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 depositions. Most zone three wells are poor yielding, many of them providing less than 3 gpm (D&M. 1997).

The two main water-bearing zones at PBOW are the overburden and the bedrock. The general flow direction in the overburden aquifer is to the north-northeast largely mirroring surface topography. The flow also corresponds somewhat to the topography of the top of the bedrock. Some groundwater overburden wells become dry at certain times of the year (IT, 1997). In contrast, the bedrock water-bearing zone is saturated year-round. The conceptual model of the site is that groundwater flow in the bedrock water-bearing zone migrates and is influenced by the frequency, orientation, density, and connectivity of the fractures. Similar to the overburden flow direction, groundwater in the bedrock flows to the north-northeast. A more detailed discussion of hydrogeological information is presented in Section 6.0.

2.3 Climatological Setting

The climate of Erie County is continental, with cold and cloudy winters and warm, humid summers. The county's first freezing temperature is typically in October, and its last freezing temperature is typically in April. Average annual precipitation for Sandusky from 1961 to 1990 was 34.05 inches. Within that time period, February had the lowest monthly rainfall average with 1.65 inches, whereas July had a high of 3.70 inches. The weather changes every few days as cold fronts move through the region. Wind is from the southwest 55 percent of the time (Morrison Knudsen Corporation [MK], 1994; D&M, 1997). A discussion of more recent climatological data obtained as part of this investigation is presented in Section 6.2.4.

3.0 Summary of Previous Environmental Studies

Previous investigations of site hydrogeology and groundwater contamination were documented in an *Engineering Report of the Contamination Evaluation* (IT, 1991), a *Site Inspection Report* (MK, 1994), a *Site Management Plan* (ICI, 1995), a *Site-Wide Groundwater Investigation Draft Report* (D&M, 1996), a *Site-Wide Groundwater Investigation Report* (IT, 1997), and a *Site-Wide Groundwater Monitoring Report (1997-1998)* (IT, 1999).

3.1 Summary of Existing Site Data

The discussion of existing site data will focus on the primary areas to be investigated under this RI, which include the three TNT manufacturing areas (TNTA, TNTB, and TNTC), the WARWP and the PRRWP.

3.1.1 TNT Areas

TNT was manufactured in three areas, designated TNTA, TNTB, and TNTC (Figure 1-2). Each area had production lines consisting of a mono house, a bi-tri house, a fortifier house, and a wash house used in the manufacture of TNT. In addition, other buildings (e.g., nailing houses, wastewater settling tanks, and DNT sweating and graining houses) were present at each site. Each TNT area is discussed in the following paragraphs.

3.1.1.1 TNT Area A

The former TNTA occupies approximately 114 acres of land in the northeastern part of PBOW. Columbus Avenue bisects the site, as shown in Figures 1-2 and 3-1. NASA constructed its administration building on the east side of Columbus Avenue in the central portion of former TNT process buildings at TNTA (Buildings 121 and 122). TNTA was used during World War II as a manufacturing facility for TNT and DNT. During PBOW operations, TNTA had four TNT lines consisting of five buildings each, and two DNT lines, each consisting of one building (Figure 3-1). Wastewater from TNTA was routed to the PRRWP through underground flumes and sewer lines. Very little aboveground evidence of the former PBOW structures and features remains in the area, other than abandoned railroad tracks, ditches, and water valves.

Significant previous remediation activities have been performed in TNTA. According to the records review report (D&M, 1995), TNTA was decontaminated along with two other TNT areas in 1955 and again in 1966. The decontamination at TNTA was reportedly very thorough. Significant subsurface contamination was removed, including underground flumes and sewer lines. Approximately 16,000 pounds of TNT were removed from TNTA.

Previous environmental investigations in this area include a 1993 site inspection by MK (MK, 1994) and a 1994 TNT Areas site investigation by D&M (D&M, 1997). The MK inspection of the TNTA site included one soil sample, one collocated sample each of surface water and sediments, and three groundwater samples. No nitroaromatic residues were detected in any of these samples.

The 1994 Dames and Moore investigation collected a total of 36 soil samples from 28 borings in TNTA. Borings were placed in and around former buildings that were associated with the TNT production lines. In addition, one soil boring was installed in a ditch north of Maintenance Road. A wide range of nitroaromatic compounds were detected, including concentrations of TNT up to 580 milligrams per kilogram (mg/kg) near the Wastewater Settling Tanks and 53 mg/kg near the Fortifier House. One boring (TNTA-S22-0.0/2.0) located near the Mono House exhibited 2,4-DNT and 2,6-DNT concentrations of 45 mg/kg and 47 mg/kg, respectively.

IT conducted a site-wide groundwater investigation at PBOW in 1996 (IT, 1997) and again in November 1997 (IT, 1998). Both investigations included collection of groundwater samples from wells in TNTA. There are seven existing monitoring wells in TNTA. Five are overburden wells (MK-MW22, -MW23, -MW24, and PB-TNTA-MW10, -MW11) and two are bedrock wells (PB-BED-MW17, -MW18). MK-MW24 is located on the south perimeter of TNTA, hydraulically upgradient of the site, and PB-BED-MW17 and MK-MW23 are located on the north perimeter of TNTA, downgradient of the site. PB-BED-MW18 is located along the east perimeter of TNTA, hydraulically cross-gradient of the site. Three wells, PB-TNTA-MW10 and -MW11 and MK-MW22, are located within TNTA.

During both sampling events, no wells exhibited nitroaromatic concentrations exceeding preliminary remediation goal (PRG) levels. Two overburden wells, MK-MW23, and -MW24, had concentrations of dissolved manganese exceeding the screening level. In addition, detected arsenic concentrations in MK-MW23 exceeded PRG values in both the filtered and unfiltered phases during the 1997 sampling. Bedrock wells PB-BED-MW17 and -MW18 had detected concentrations of benzene above its respective PRG. Well PB-BED-MW17 also had detected concentrations of cyanide and methylene chloride above allowable PRG values.

In May 1998, IT again conducted a site-wide sampling event. No nitroaromatic compounds were detected above PRG limits. Overburden well MK-MW23 showed bis(2ethylhexyl)phthalate above PRG values. Metals, including aluminum, antimony, arsenic, chromium, and manganese, were found to be above PRG values in well MK-MW23 in the unfiltered sample. Of the bedrock wells, naphthalene and methylene chloride were detected above PRG values in well PB-BED-MW17, and benzene and naphthalene were above limits in well PB-BED-MW18. In well PB-BED-MW17, arsenic was the only metal detected above its PRG values, and that was in the filtered sample.

The last week of June through October 2000, IT conducted an RI of TNTA to determine the nature and extent of contamination in surface soil, subsurface soil, surface water, and sediment. Four hundred twenty-seven soil samples were collected for field screening analysis of nitroaromatics, 39 confirmation samples, and 10 (9 on-site, 1 off-site) surface water and 15 (10 on-site, 5 off-site) sediment samples. It was determined that most of the nitroaromatic-impacted soil above PRG levels was encountered within 1 to 5 feet of the former building foundations. A total of 21 soil samples were recorded with nitroaromatic compounds above PRG levels, with the largest sample concentration of 2,4,6-TNT being located at the Wash House, Building 146 (530 mg/kg) in a sample collected at 4 to 6 feet below ground surface (bgs). DNT Nitrating, Building 195, detected 6 nitroaromatic compounds in soil samples with concentrations above PRG levels (total DNT and 2,4,6-TNT). On-site surface water results indicated that nitroaromatics, VOCs, SVOCs, and metals were present, while sediment analytical results showed that nitroaromatics, VOCs, SVOCs, polychlorinated biphenyls (PCB), and metals were present (IT, 2000a).

3.1.1.2 TNT Area B

TNTB comprises an area of approximately 55 acres in the south-central portion of PBOW, immediately north of West Sheid Road, as shown on Figures 1-2 and 3-2. All of the buildings that were present during the TNT manufacturing period have been demolished and the site has been regraded. Figure 3-2 presents a site map showing the locations of all former buildings. Significant aboveground evidence of former PBOW facilities exists at TNTB in the form of roads, hydrants, and ditches. In addition, aboveground water valves indicate the presence of underground utilities. Two NASA facilities present at the site are currently active, the Hypersonic Tunnel Facility and the Nitrogen Dewar Tanks (Figure 3-2). The Hypersonic Tunnel Facility, located in the northwest portion of TNTB, consists of a single building, aboveground and underground piping and utilities, and paved parking areas. The Nitrogen Dewar Tanks are located in the center of TNTB, with aboveground piping and underground utilities leading to the northwest and to the northeast off site (D&M, 1997).

In 1993, MK collected two surface water, two sediment, and two surface soil samples in the vicinity of TNTB. The samples were analyzed for VOCs, SVOCs, nitroaromatics, and dissolved metals. The surface water and sediment locations were SW07/SD07 and SW08/SD08. SW07 and SD07 were collected near the beginning of Ransom Brook, approximately 250 feet north of Magazine Road near the former red water settling tanks. SW08 and SD08 were collected north of TNTB, approximately 200 feet south of Fox Road and approximately 3,000 feet downgradient of SW07 and SD07 (ICI, 1995).

The surface water samples had no detections of VOCs or SVOCs. No metals were detected in the surface water at concentrations above their maximum contaminant level (MCL) or secondary MCL. The sediment sample collected at SD07 had detections of five VOCs and fourteen SVOCs. The only nitroaromatic detection was TNT at a concentration of 25 mg/kg. Eleven organic compounds were detected in sediment sample SD08, all at concentrations of 0.1 mg/kg or less. Detected organic compounds included two VOCs and nine SVOCs, eight of which were polynuclear aromatic hydrocarbons.

The two surface soil sample locations were designated SB09 and SS13. SB09 was collected from the borehole for monitoring well MK-MW17 shown on Figure 1-4. Sample SS13 was collected in the vicinity of the railroad tracks southwest of the Fortifier House, Building 463 (ICI, 1995). VOCs (toluene and xylenes), SVOCs (bis[2-ethylhexyl]phthalate), and nitroaromatics (TNT and 2,6-DNT) were detected in the surface soil. Nitroaromatics were present at SB09, with TNT detected at a concentration of 12 mg/kg.

Two overburden monitoring wells were installed at TNTB in July 1993 by MK. Well MK-MW16 is located upgradient, and well MK-MW17 is located downgradient of TNTB at the locations shown on Figure 3-2. Groundwater samples collected from both wells were analyzed for VOCs, SVOCs, nitroaromatics, and dissolved metals. No VOCs or nitroaromatics were detected in either of the wells. Metals were not detected at levels that exceeded MCLs or secondary MCLs. One SVOC, bis(2-ethylhexyl)phthalate, was detected at a concentration of 12 micrograms per liter (μg/L) in MK-MW17.

In October 1994, as part of the TNT Areas site investigation, Dames and Moore sampled the soil at 26 locations at TNTB. All samples were collected between 0.5 and 3.5 feet bgs. Eighteen of the 26 locations were sampled at one depth, and 8 locations were sampled at two depths. The samples were analyzed for nitroaromatics and metals. Nitroaromatics were detected in 18 of the 26 locations, and most locations had at least one sample with a concentration greater than 1.0 mg/kg. Concentrations of nitroaromatics detected in excess of 10,000 mg/kg were present in soils at the Bi-Tri House for Line 5 (Building 452) and the DNT Sweating and Graining House (Building 412).

In December 1994, D&M sampled both MK-MW16 and MK-MW17 as part of the TNT Areas site investigation. Samples from the wells were analyzed for nitroaromatics, nitrates, and total and dissolved concentrations of 14 metals, the 13 priority pollutant metals plus manganese. MK-MW16 did not exhibit any detections of nitroaromatics. The downgradient well MK-MW17 had TNT at a detected concentration of 6.5 µg/L and 3-nitrotoluene at a detected concentration of 5.3 µg/L. Nitrates were detected, but at concentrations below PRGs. Nine metals were detected in overburden groundwater: arsenic, beryllium, cadmium, copper, lead, manganese, nickel, thallium, and zinc. Six of the metals (copper, lead, manganese, nickel, thallium, and zinc) were detected in both wells. Arsenic and manganese were the only metals that exceeded PRGs (D&M, 1997).

In September and October 1996, IT collected groundwater samples from MK-MW16 and MK-MW17 as part of the site-wide groundwater investigation. Both groundwater samples were analyzed for VOCs, SVOCs, metals, pesticides, PCBs, cyanide, and nitroaromatics. SVOCs, pesticides, and cyanide were not detected, and VOCs were not detected above PRGs. The metals detected above PRGs included arsenic, iron, lead, and manganese. Five nitroaromatics were detected above PRGs at MK-MW17. The maximum concentration of any nitroaromatic detected in MK-MW17 was 11 µg/L of 2,6-DNT (IT, 1999).

In 1997, IT installed two bedrock wells near TNTB. TNTB-BEDGW-001 was installed northwest of the site to monitor bedrock groundwater downgradient of TNTB, and TNTB-BEDGW-002 was installed southeast of TNTB to monitor bedrock groundwater upgradient of the site.

In November 1997 and May 1998, as part of the semiannual monitoring portion of the groundwater investigation, overburden wells MK-MW16 and MK-MW17 were sampled by IT. Overburden groundwater samples were analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters (alkalinity, chloride, hardness, sulfate, nitrate, total dissolved solids, total organic carbon, and total suspended solids) (IT, 1999).

During 1997, no VOCs, SVOCs, cyanide, or water quality parameters exceeded PRGs. Overburden groundwater samples analyzed for dissolved metals exceeded PRGs for arsenic.

iron, and manganese in MK-MW17 and iron and manganese in upgradient well MK-MW16. Only one nitroaromatic compound, 4-amino-2,6-DNT (4-A2,6-DNT), was detected above its PRG. This exceedance occurred only in downgradient well MK-MW17. No SVOCs, cyanide, or water quality parameters exceeded PRGs in bedrock wells TNTB-BEDGW-001 and -002. Two VOCs, benzene and methylene chloride, were detected at concentrations above their PRGs in well TNTB-BEDGW-002. No nitroaromatics were detected in either well. Filtered and unfiltered bedrock groundwater samples in TNTB-BEDGW-001, analyzed for metals, exhibited PRG exceedances for iron (IT, 1999).

In May 1998, IT again sampled groundwater from site-wide monitoring wells. Overburden well MK-MW17 exhibited only the nitroaromatic compound 4-A2,6-DNT above the PRG limit. No VOCs or SVOCs were above PRGs. Metals above the PRG levels in the overburden wells were limited to iron and manganese in MK-MW16 and arsenic, iron, lead, and manganese in MK-MW17, all in the filtered groundwater samples. Benzene was found above its PRG level in the bedrock wells. Detected metals above PRG limits in the bedrock wells were only arsenic and iron in TNTB-BEDGW-001 in the filtered phase (IT, 1999).

In October and November 1998, IT conducted an RI of TNTB to determine the nature and extent of contamination in surface soil, subsurface soil, surface water, and sediment. Three hundred ninety-one soil samples were collected for field-screening analysis of nitroaromatics, and 40 confirmation samples, two surface water, and five sediment samples were collected. It was determined that most of the nitroaromatic-impacted soil above PRG levels was encountered within 1 to 5 feet of the former building foundations. A total of 23 soil samples with nitroaromatic compounds above PRG levels were recorded, with the highest detected 2,4,6-TNT concentration (6,900 mg/kg) being located at the Bi-Tri House Building 452 in a 0 to 1 foot bgs sample. Wash House, Building 456, exhibited 6 soil samples above PRG levels with 2,4,6-TNT, 4-A2,6-DNT and 2-A4,6-DNT nitroaromatics. Surface water results indicated that only VOCs and metals were present, while sediment analytical results showed VOCs, SVOCs, and metals. Based on the low concentrations of the contaminants in the soil both were concluded that the compounds were not attributable to former site activities (IT, 2000b).

3.1.1.3 TNT Area C

The former TNTC occupies approximately 119 acres of land in the southwestern portion of PBOW, as shown in Figures 1-2 and 3-3. NASA currently uses some of the remaining structures in the area for storage purposes. TNTC was used during World War II as a manufacturing facility for TNT and DNT. During PBOW operations, TNTC contained five TNT lines consisting of five building each (Figure 3-3). Wastewater from TNTC was routed to the PRRWP through underground flumes and sewer lines.

Presently, the area is largely overgrown with trees and brush; however, some of the roads, building foundations, and remnants of utilities from former TNT operations are still recognizable. According to the records review report, TNTC was decontaminated along with the two other TNT areas in 1955 and again in 1966 (D&M, 1995). However, the decontamination at TNTC was reportedly not as thorough as that at TNTA, and significant subsurface contamination associated with underground flumes and sewer lines is probably still present.

Previous environmental investigations in this area include a 1993 site inspection by MK (MK, 1994) and a 1994 TNT Areas site investigation by D&M (D&M, 1997). The MK inspection of the TNTC site included two surface soil samples and one collocated pair of surface water and sediment samples. Organic compounds were not detected in the surface water sample nor in the collocated sediment sample. Toluene was detected in both surface soil samples at concentrations below the quantitation limit.

A total of 30 soil samples were collected from 26 borings within the TNTC site during the 1994 D&M investigation. Boring locations were placed in and around former buildings that were associated with the TNT production lines (Line 12 - Buildings 626, 612, and 604). A wide range of nitroaromatic compounds were detected, including TNT at concentrations up to 2.7 mg/kg (near Building 626) and 2,4-DNT up to 8.7 mg/kg (near Building 626).

IT conducted a site-wide groundwater investigation at PBOW in 1996 (IT, 1997) and again in 1997 (IT, 1998). The investigations included collection of groundwater samples from four overburden monitoring wells (PB-TNTC-MW03, PB-TNTC-MW04, PB-TNTC-MW05, and PB-TNTC-MW06) in 1996 and five wells (the previously sampled four wells and IT-MW09) in 1997. One bedrock monitoring well, PB-BED-MW13, was also sampled during both events.

No VOCs were detected in the overburden groundwater in 1996 or 1997. The SVOC bis-(2-ethylhexyl)phthalate was detected above its PRG in PB-TNTC-MW06 in 1997. Nitroaromatics were not detected during either sampling event. Manganese was detected in three wells at dissolved-phase concentrations above its PRG in 1996. Total iron exceeded the PRG in all four overburden wells sampled in 1996. In 1997, only manganese was found to exceed its PRG in the dissolved and total phases (IT, 1999).

Several constituents were detected in the bedrock well PB-BED-MW13 in 1996 and 1997. Two nitroaromatics, 4-A-2,6-DNT and 2.6-DNT, were detected above their PRGs in 1996. The only VOC detected above its PRG was benzene in 1996 and 1997. SVOCs bis(2-ethylhexyl)phthalate and naphthalene had detected concentrations exceeding their PRGs in 1997. The only metal detected at concentrations above its PRG was barium in 1996 (IT, 1999).

In May 1998, site-wide groundwater sampling results showed VOC contaminant bis(2-ethylhexyl)phthalate above PRG levels in overburden well IT-MW09. Arsenic and manganese (unfiltered) exceeded PRG levels in well TNTC-MW03, arsenic (unfiltered) in well TNTC-MW05, and manganese (filtered and unfiltered) in well TNTC-MW06. Bedrock well PB-BED-MW13 showed VOC and SVOC contaminants (benzene, methylene chloride, bis[2-ethylhexyl]phthalate, and naphthalene) above PRG levels. No metals were detected above PRG limits (IT, 1999).

The last week of June through October 2000, IT conducted an RI of TNTC to determine the nature and extent of contamination in surface soil, subsurface soil, surface water, and sediment. Three hundred eighty-three soil samples were collected for field-screening analysis of nitroaromatics, and 40 confirmation samples, 10 surface water samples, and 15 sediment samples were collected for a confirmatory analysis. As at TNTB, it was determined that most of the nitroaromatic-impacted soil above PRG levels was encountered within 1 to 5 feet of the former building foundations. A total of 26 soil samples detected with nitroaromatic compounds above PRG levels were recorded, with the highest sample concentration of 2,4,6-TNT (54,969 mg/kg) being located at the Bi-Tri House (Building 682) in a 0.25 to 1.25 foot bgs sample. Fortifier House (Building 603) detected 8 nitroaromatic compounds in soil samples with concentrations above PRG levels (2-A4,6-DNT and total DNT). Surface water results indicated that only VOCs and metals were present, while sediment analytical results showed VOCs, SVOCs, and metals. Based on the low concentrations of the contaminants in the soil, surface water, and sediment concentrations were concluded not to be attributable to former site activities (IT, 2001c).

3.1.2 Red Water Pond Areas

3.1.2.1 West Area Red Water Pond

The WARWP is located on the western edge of PBOW, near the intersection of Cambell Street and Fox Road and to the north and west of Pipe Creek, as shown in Figures 1-2 and 3-4. Two former red water pond areas in the WARWP have been identified through the use of aerial photographs, site reconnaissance, and the presence of nitroaromatic compounds in soil and groundwater. Prior to 1985, numerous studies were conducted of the surface water and sediment from the red water pond areas. The Ohio National Guard conducted surface sediment screening for TNT and DNT. The highest values found in the screened sediments were less than 1 mg/kg. IT was contracted in 1989 to conduct near-surface sediment sampling to determine the presence or absence of residual chemical contamination from PBOW operations. Soil sample analysis showed that dinitrobenzene (DNB), trinitrobenzene, DNT, and TNT were present in the soils at the WARWP. In 1991, SAIC confirmed that hazardous substances had been released into the environment at the WARWP (USACE, 1997).

A site inspection in 1993 by MK to determine the potential risk to human health and the environment indicated low levels of VOCs and SVOCs in the sediments around Pipe Creek near the WARWP area but found no contaminant concentrations of VOCs, SVOCs, or nitroaromatics in the surface water. MK also installed four groundwater monitoring wells and had the groundwater analyzed for the above contaminants. Laboratory analysis did not indicate the presence of VOCs, SVOCs, or nitroaromatics in the groundwater samples near Pipe Creek.

Additional groundwater investigations were conducted in 1994 by D&M and again in 1996 and 1997 by IT. D&M installed overburden and bedrock wells near the WARWP to determine the hydrogeologic conditions and the presence of any VOCs, SVOCs, or nitroaromatics. The investigation indicated that groundwater flow was generally north toward Lake Erie and exhibited a strong downward vertical component.

Significant concentrations of nitroaromatics were also found adjacent to the former red water ponds in both the overburden and bedrock aquifers. VOCs and SVOCs were also present in the bedrock wells. Manganese was detected at concentrations above its PRG (D&M, 1997).

The investigations by IT indicated that the overburden material had been impacted by nitroaromatic compounds in the central portion of the WARWP and that inorganic compounds were present at concentrations exceeding PRGs throughout the area. IT determined that the bedrock aquifer was impacted by nitroaromatics and other organic and inorganic compounds north of the WARWP, but not in the central portion of the area. IT recommended additional subsurface investigations to determine the nature and extent of contamination in these areas, after background levels were established for metals in groundwater (IT, 1997). Groundwater sampling of the WARWP groundwater wells in November 1997 and May 1998 indicated continued elevated levels of nitroaromatics (IT, 1999).

IT conducted a soil and groundwater risk and direct-push investigation in June and November 1998 at the WARWP. A total of 19 surface soil, 37 subsurface soil, and 14 groundwater samples were collected. Four nitroaromatic compounds were detected in soil samples in direct-push borings DP09, DP10, DP11, and DP18. Nitroaromatics 2,4-DNT (1.4 mg/kg) and 2,6-DNT (1.5 mg/kg) exceeded the PRG limits in the 4 to 6 feet sample in DP10. Groundwater samples with detected nitroaromatics exceeding PRG levels included DP08, DP09, DP12, DP13, DP15, and DP17. A maximum nitroaromatic concentration of 680 µg/L 1,3,5-TNB, 270 µg/L 1,3-DNB, and 950 µg/L 2,4-DNT was detected in DP13, 7.1 µg/L 2,4,6-TNT was detected in DP11 and 2.7 µg/L 2,6-DNT was detected in DP09 (IT, 2000b).

3.1.2.2 Pentolite Road Red Water Ponds

The PRRWP are located in the north-central portion of the PBOW facility, north of Maintenance Road and south-southeast of the Reactor Building Area across Pentolite Road, as shown in Figures 1-2 and 3-5. In 1989, IT conducted an evaluation to determine whether residual chemical contamination was present in the overburden soils and groundwater. Significant concentrations of nitroaromatics (2,4-DNT and 2,6-DNT) and sodium above background levels (ICI, 1995) were detected in the overburden soils in the PRRWP area (IT, 1991).

In 1993, MK conducted a site inspection to assess the threat posed to human health and the environment and to determine the need for additional investigations. Surface soil and sediment samples were collected and analyzed from a drainage ditch along Pentolite Road, north of the PRRWP area. No samples from the Pentolite Road ditch showed detectable levels of VOCs, SVOCs, or nitroaromatics (MK, 1994).

In 1994, D&M conducted an investigation of groundwater quality in both the overburden and bedrock aquifers in the PRRWP area. The investigation indicated that groundwater flow in the area was generally north toward Lake Erie and exhibited a strong vertical component. The presence of groundwater in the overburden aquifer was also found to be seasonally dependent. Results of groundwater analysis indicated that greater concentrations of nitroaromatics were present in the overburden wells than in the bedrock wells (D&M, 1997).

A site-wide groundwater investigation performed by IT in 1996 determined that the overburden aquifer had been impacted by nitroaromatic compounds and that the bedrock aquifer had been impacted by BTEX, SVOCs, and nitroaromatics (IT, 1997). Groundwater sampling events in November 1997 and May 1998 indicated continued elevated concentrations of nitroaromatic compounds (IT, 1999).

IT conducted a soil and groundwater risk and direct-push investigation in June and November 1998 at the PPRWP. A total of 20 surface soil, 39 subsurface soil, and 20 groundwater samples were collected. Nitroaromatic compounds were detected in soil samples in direct-push borings DP01, DP02, DP03, DP06, DP09, DP10, DP11, and DP16. Maximum concentrations above PRG limits included 9.3 mg/kg 1,3-DNB and 25 mg/kg 2,4-DNT in DP03 (4 to 5 feet), 1.7 mg/kg 2,6-DNT in DP10 (9 to 10 feet), and 2.7 mg/kg 4A-2,6-DNT in boring DP11 (0 to 2 feet). Groundwater samples with detected nitroaromatics exceeding PRG levels included DP01, DP03, DP04, DP06, DP07, DP08, DP10, DP11, DP12, and DP13. A maximum nitroaromatic concentration of 600 µg/L 1,3,5-TNB was detected in DP11, 4,800 µg/L 1,3-DNB, 6,800 µg/L 2,4-DNT in DP03, and 400 µg/L 2,6-DNT was detected in DP10 (IT, 2000b).

4.0 Field Activities

4.1 Introduction

The original statement of work for the groundwater RI included the following field activities: collection of 135 direct-push groundwater samples, screening analysis of the direct-push groundwater samples for nitroaromatics, subsurface soil sampling, installation and development of 10 bedrock wells and 15 overburden wells, confirmation analysis of selected groundwater samples from 23 (new and existing) overburden monitoring wells and 26 (new and existing) bedrock wells, permeability testing, land surveying, and IDW management.

The field investigation was initiated in July 2001 to perform the direct-push screening investigation. During the direct-push investigation in the TNT Areas, 32 of the 135 temporary piezometers were installed. Of these 32 piezometers, 26 lacked sufficient groundwater for sample collection. Based on the lack of groundwater, the USACE and the Ohio Environmental Protection Agency (OEPA) agreed that further installation of temporary piezometers to monitor the overburden groundwater should be postponed. This would include all efforts for the overburden groundwater RI, including installation of the additional temporary piezometers and installation of the planned 15 overburden monitoring wells.

Based on these changes, field activities in 2001 associated with the groundwater RI that were completed included: screening analysis for nitroaromatics in 6 groundwater samples collected from direct-push temporary piezometers, subsurface soil sampling, installation and development of 10 bedrock wells, groundwater sampling from 8 (existing) overburden monitoring wells and 26 (new and existing) bedrock wells, permeability testing, land surveying, and IDW management.

4.2 Direct-Push Groundwater Sampling

As mentioned above, due to lack of groundwater, the direct-push groundwater sampling field effort was discontinued prior to installation of all of the planned 135 temporary piezometer groundwater sampling points. Direct-push drilling occurred at 32 locations (13 borings at TNTA, 5 at TNTB, and 14 at TNTC) and groundwater samples were collected from 6 locations (2 samples from each TNT area). Figures 4-1, 4-2, and 4-3 show planned and actual sample locations. Direct-push drilling and sampling procedures were followed during this work. Appendix A shows hazardous, toxic, and radiologic waste (HTRW) drilling logs and temporary piezometer construction diagrams.

Direct-push drilling locations were selected from known soil "hot spots" identified during previous investigations at TNTA, TNTB, and TNTC in an attempt to determine if the overburden groundwater was contaminated at these locations. A Prosonic Geoprobe DT66 all-terrain, track-mounted geoprobe rig, consisting of a hydraulic drive unit, stainless-steel sampling point, and sampling rods, was positioned at the selected boring location, and a hydraulically powered percussion hammer drove a 3.25-inch outer-diameter (OD) solid steel probe to refusal. A temporary piezometer was installed and time allowed for groundwater to migrate into the borehole.

Water level, if present, was measured the following day. The groundwater sample was collected using either a peristaltic pump or a disposable bailer. As specified in the SSAP, all groundwater samples were analyzed for VOCs and nitroaromatics using the screening-level 8330 analytical method (IT, 2001). Due to groundwater volume, water quality field measurements were recorded for only 5 of the 6 samples. Table 4-1 contains a summary of groundwater samples collected during the direct-push temporary piezometer field effort. Appendix B provides sample collection logs. Table 4-2 presents water quality readings for groundwater collected during the direct-push field event.

After either the groundwater sample was collected or the temporary piezometer was determined to be dry, the piezometer was removed and the borehole was filled to the surface with granulated bentonite. All piezometer material was decontaminated and disposed of into the sanitary trash.

4.3 Soil Sampling

A total of 24 soil samples were collected from 12 locations in conjunction with the monitoring well installation field event. Soil sample collection followed drilling and collection procedures outlined in the IT SSAP (IT, 2001). Appendix C contains HTRW drill logs for the soil borings. Two soil samples were collected from each of three locations at each red water pond area to support feasibility studies for the sites and better define the depth of nitroaromatic contamination. Two soil samples were also collected from each of two locations at TNT Areas A, B, and C to further define the depth of nitroaromatic contamination. All samples were collected at known hot spots identified in previous investigations and were analyzed for target compound list VOCs, nitroaromatics, and target analyte list metals. A split from each sample was also subjected to the synthetic precipitation leaching procedure (SPLP), and the leachate was analyzed for nitroaromatics. Appendix B provides collection logs of the soil samples, and Table 4-3 provides a summary of the soil samples collected.

TNTA. Four soil samples were collected from two soil borings completed near 2001 direct-push "hot spot" sample locations, as shown on Figure 4-1. One sample in each pair was collected below the water table, and the other was collected directly above the water table. Soil sample SO012A (DNT Nitrating Building 195) was collected near former sample SO012 from depths of 0.5 to 1.5 feet and 4 to 6 feet; SO080A (Wash House Building 146) was collected at depths of 0.5 to 1.5 feet and 8 to 10 feet near sample SO080.

TNTB. Four soil samples were collected from two soil borings completed near 2001 direct-push "hot spot" sample locations, as shown on Figure 4-2. One sample in each pair was collected below the water table, and the other was collected directly above the water table. Soil sample SS295A (Wash House Building 458) was collected near former sample SS295 from depths of 0 to 1 foot and 2.5 to 3.5 feet, and soil sample SS375A (Bi-Tri House Building 452) was collected at depths of 4 to 6 and 8 to 10 feet near sample SS375.

TNTC. Four soil samples were collected from two soil borings completed near 2001 direct-push "hotspot" sample locations, as shown on Figure 4-3. One sample in each pair was collected below the water table, and the other was collected directly above the water table. Soil sample AB066A (Acid & Fume Recovery Building 629) was collected near former sample AB066 from depths of 2.5 to 3.5 feet and 8 to 10 feet, and soil sample AB123A (Fortifier House Building 603) was collected at depths 4 to 6 feet and 6 to 7 feet near sample AB123.

West Area Ponds. Six soil samples were collected from three soil borings completed near 1998 direct-push "hot spot" sample locations, as shown on Figure 4-4. One sample in each pair was collected below the water table, and the other was collected directly above the water table. DP09A soil was collected near former sample DP-09 from depths of 4 to 4.9 feet and 11 to 12 feet; DP13A was collected at depths 4.1 to 5.1 feet and 11 to 12 feet near sample DP10; and sample DP16A was collected from depths of 3.5 to 4 feet and 11 to 12 feet near former soil sample DP16.

Pentolite Road Ponds. Six soil samples were collected from three soil borings completed near 1998 direct-push "hot spot" sample locations, as shown on Figure 4-5. One sample in each pair was collected below the water table, and the other was collected directly above the water table. DP03A soil was collected near former sample DP-03 from depths of 4.3 to 4.8 feet and 11 to 12 feet; sample DP10A was collected at depths 8.4 to 8.9 feet and 10.5 feet to 12 feet near sample DP10; and sample DP11A was collected from depths of 2.6 to 3.1 and 11 feet to 12 feet near former soil sample DP11.

4.4 Monitoring Well Installation

Because groundwater was not encountered during direct-push drilling, no overburden monitoring wells were installed. Ten 2-inch diameter bedrock monitoring wells were installed as part of the 2001 groundwater RI. Figure 2-2 (site map with wells and lines of cross-section) shows the site-wide locations of the newly installed wells along with the pre-existing monitoring wells. Three of the bedrock wells, PB-BED-MW24, PB-BED-MW25, and PB-BED-MW26, monitor groundwater entering PBOW and are designated as background wells. Two bedrock wells, PB-BED-MW22 and PB-BED-MW27, monitor groundwater leaving PBS at the northern property boundary area; one bedrock well, TNTB-BEDGW-004, monitors groundwater leaving TNTB; one bedrock well, PB-BED-MW23, monitors groundwater leaving the PRRWP area and entering the Reactor Area; and three bedrock wells, TNTA-BEDGW-001, TNTB-BEDGW-003, and TNTC-BEDGW-001, were located at previous soil investigation "hot spots".

Monitoring wells were installed in accordance with guidelines specified in the USACE Engineering Manual EM-1110-1-4000 (USACE, 1994) and following the procedures in the site-wide SAP (IT, 1996a). Specifically, monitoring wells were installed as described below.

Bedrock monitoring well installation began in August 2001. All bedrock wells were installed as double-cased monitoring wells. A Boart Longyear BK81 truck-mounted rotary drill rig was used to drill a pilot borehole in the overburden soil. The boring was advanced using 4.25-inch inside diameter (ID) and 8-inch OD hollow-stem augers to the depth of auger refusal. Soil core samples were continuously collected from the ground surface to the terminating depth using a 1.4-inch ID stainless steel split spoon. Soil cores were visually examined by an IT field geologist and documented on the HTRW drilling logs (Appendix D). Photographs of the rock cores were taken and are presented in Appendix E. During this phase of work, borehole material was not analyzed for chemical parameters, except for disposal characterization as described in Section 6.0. After determining depth to bedrock, the borehole was then reamed with 8.25-inch ID and 12-inch OD hollow-stem augers to bedrock or auger refusal. The augers were left in the borehole to hold back overburden materials, and bedrock was cut with a 8-inch tri-cone roller bit until several feet into competent bedrock was determined to have been drilled. Black steel casing (6-inch ID by 6 5/8-inch OD) was installed, pressure grouted into the bedrock and allowed to cure for a minimum of 48 hours.

Bedrock was then cored using a BK81 or Cantera C2-250 truck-mounted drill rig. Coring was conducted through the center of the black steel casing using a 3-inch OD PQ bit attached to a 5-foot long core barrel. Cutting bedrock with the PQ bit left a 6-inch OD borehole. Rock cores were visually examined and a lithology description prepared. Bedrock well completion in most boreholes was accomplished using a 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) riser pipe and 10 to 20 foot sections of 0.010-inch factory-slotted screen. No monitoring well completion material was installed into well PB-BED-MW23 because a depth to groundwater could not be determined.

The construction details for the new monitoring wells at the site are summarized in Table 4-4. Drilling logs and well construction diagrams are included in Appendix D.

4.5 Monitoring Well Development

All newly constructed monitoring wells were developed after completion of well construction. Well development was performed by surging and bailing with a polyethelyene disposable bailer or surging and pumping using a Grundfos submersible pump. The method of development chosen depended upon groundwater yield in the well. A well development log was completed for each well to document well development progress, field parameters, and other pertinent information. Photographs of development water and well development logs are included in Appendices E and F, respectively.

4.6 Groundwater Sampling

Groundwater sampling was conducted from September 25 through October 10, 2001, during and after the new monitoring well installation. The sampled wells included the 10 newly installed bedrock wells. Groundwater samples were collected from a total of 4 pre-existing overburden monitoring wells and 23 (new and pre-existing) bedrock wells. Table 4-1 shows a list of the primary groundwater samples collected. The pre-existing bedrock and overburden monitoring wells sampled were selected by the USACE based on the groundwater investigation conducted in 1997. A total of 34 primary groundwater samples were to be collected. A sample could not be collected from bedrock monitoring well PB-BED-MW26 due to the low yield of the well. Bedrock well AA1-BEDGW-001 was not sampled because extremely high H_2S vapors were encountered at the well. Overburden wells MK-MW16, TNTA-MW10, and TNTC-MW03 could not be sampled because they were dry. Overburden monitoring well IT-MW01 could not be sampled because a dent in the riser prohibited the bailer or pump from entering the well. Groundwater samples were analyzed for nitroaromatics, metals (filtered and unfiltered), VOCs, SVOCs, and water quality parameters (alkalinity, chloride, cyanide, hardness, nitrate, sulfate, total dissolved solids, total organic carbon, total suspended solids, and turbidity). In addition, two free-phase samples were collected from monitoring wells TNTA-BEDGW-001 (sample number FP7001) and PB-BED-MW16 (sample number FP7002). The free-phase samples were analyzed for VOCs, diesel range organics (DRO), and gasoline range organics (GRO).

Samples were collected from 28 wells, as listed in Table 4-1. Groundwater monitoring well locations are shown on Figures 3-1 through 3-5 and on Figure 2-2. Final field measurements of groundwater samples are presented in Table 4-2.

Sampling of newly installed monitoring wells took place no sooner than 14 days after well development was completed. Two procedures were made available for purging and sampling 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 low-flow sampling (i.e., water level dropped 6 inches or more), removal of 3 to 5 volumes of groundwater was performed.

Groundwater recharge rates permitted 17 of the 28 wells to be sampled with the low-flow sampling methodology. A bladder pump was used to complete the sampling. The pump was inserted into the screened portion of the monitoring well and the well was pumped at a rate that minimized drawdown. Typically, purging rates were on the order of 200 to 500 milliliters per minute. The purge rate was set such that drawdown in the well was never greater than 0.5 foot. Water chemistry parameters (hydrogen ion concentration [pH], oxidation-reduction potential [Eh], conductivity, temperature, dissolved oxygen, and turbidity) were monitored for stability.

If pre-pumping (static) water level was above the top of the well screen and drawdown exceeded 0.5 foot even at the lowest setting of the pump, low-flow sampling could not be conducted. In this situation, an attempt was made to remove 3 to 5 volumes of groundwater without allowing the water level to drop below the top of the well screen. If the water level dropped to the screened level, purging activities were stopped. If the recharge rate was adequate, 3 to 5 volumes of groundwater were removed. If the recharge rate was slow, purging was considered complete, and the monitoring well was sampled.

Another instance when low-flow sampling could not be conducted was if the static water level was below the top of the well screen during the initial measurement and drawdown exceeded 0.5 foot even at the lowest setting of the pump. In this situation, recharge was so low that adequate purging of the well could not be achieved even over a period of days. In this case, the well was sampled without purging.

Samples collected for metals 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 bailer), a hand-operated 0.45-micrometer filter was used. Sample filtration, preservation, packing, and shipment were performed in accordance with Section 5.4 of the site-wide QAPP (IT, 1996b).

4.7 Hydraulic Conductivity Testing

A rising and/or falling head slug test was performed at the newly installed monitoring wells to acquire information on the hydraulic conductivity of each water-bearing zone. A slug test was not conducted in monitoring well PB-BED-MW26 due to lack of groundwater, nor in TNTA-BEDGW-001 due to an erratic water-level reading. Equipment used in the test included:

- Ten-pounds-per-square-inch pressure transducer equipped with an atmospheric pressure compensation tube
- HERMIT 1000C Environmental Data Logger
- Five-foot-long or ten-foot-long, 1.5-inch-diameter PVC slug.

The slug test was set up by lowering the pressure transducer more than 5 feet below the static water level to a point above which the PVC slug could be fully immersed in the well water without interfering with the transducer. The data logger allows water level changes to be recorded at desired time intervals. The slug was inserted in the well and the water level allowed to return to static level. The rising test was started by initializing the data logger and removing the slug from the well. The water level recovery versus elapsed time was recorded for later analysis. The test was considered completed when the water column above the pressure transducer had returned to 95 percent of the original level. Following the test, the data recorded by the data logger was recovered and stored on diskette. The raw data were inspected in the field for consistency and completeness. The slug test data were analyzed using the computer program AQTESOLV® for Windows (Geraghty and Miller Environmental Services, 1989). The hydraulic conductivity testing data are included in Appendix G, along with a description of the method used in the data analysis.

4.8 Decontamination Procedures

Decontamination of drill rigs, downhole tools, and sampling equipment was performed in accordance with Section 4.4.3 of the SAP (IT, 1996a). 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 equipment, including water level indicators, slugs, and transducers, was decontaminated by rinsing in sequence with soapy water, deionized water, methanol, and a final rinse with deionized water. Equipment was then air dried before use. The bladder pump was decontaminated by running the decontamination fluids through the pump head. Tubing was not decontaminated because new tubing was used for each well.

4.9 Land Survey

All temporary piezometer, soil boring, and new bedrock monitoring well locations were surveyed in August and September 2001 by an Ohio-registered professional land surveyor. Horizontal coordinates were surveyed to the closest 0.1 foot and referenced to the Ohio State Plane Coordinate System. Vertical coordinates (land surface elevation and top-of-casing elevation) were surveyed to the nearest 0.01 foot and referenced to the 1929 National Geodetic Vertical Datum. Complete land survey data are included in Appendix H.

4.10 IDW Management

IDW generated during the 2001 groundwater remedial RI included soil, groundwater, rock cores, decontamination water, and personnel protective equipment. All IDW was managed and handled in accordance with procedures described in the SAP (IT, 1996a).

Decontamination water, development and purge water, and groundwater generated during well installation was initially stored in 55-gallon drums and transferred to the central staging area located north of Pentolite Road. At the staging area, it was pumped into two 1,500-gallon carboys, sampled, and removed on November 19, 2001 by U.S. Liquids of Detroit, Inc. following the proper procedures. All water was transported to the U.S. Liquids office in Detroit, Michigan, treated, and disposed of at the facility. Soil generated during soil boring sampling and monitoring well installation was collected in drums, labeled with contained material, content volume, date of generation, and source of origin as applicable. All drums, a total of 107, were also removed by U.S. Liquids of Detroit, Inc. on November 19, 2001. Soil was also taken to the U.S. Liquids facility in Detroit, Michigan, treated, and residuals disposed of at the Woodland Meadows landfill in Detroit. Soiled personal protective equipment generated during the project was double-bagged and placed in the on-site industrial dumpster.

5.0 Analytical Program

Primary and field duplicate project samples were analyzed by Severn Trent Laboratories, Inc. of Knoxville, Tennessee. Analyses for water quality parameters were provided by Severn Trent's Canton, Ohio, laboratory. Quality assurance samples and field splits were analyzed by Paragon Analytics, Inc., Fort Collins, Colorado. IT Corporation performed data validation. The validation summary is provided in Appendix I. The analytical results are summarized in Appendix J. Tables of detected hits that exclude "B" qualified data are included in Appendix K. A data quality evaluation is located in Appendix L. The groundwater analytical data were compared to U.S. Environmental Protection Agency (EPA) Region 9 PRGs, defined in Section 5.4. The PRG tables (Section 6.2) include compounds detected above the PRG screening concentrations only.

5.1 Analytical Program and Methodologies

Chemical analyses for the investigation were performed in accordance with guidelines detailed in the EPA's *Test Methods for Evaluating Solid Waste (SW-846), Physical/Chemical Methods*, Third Edition, September 1986 (EPA, 1986) and subsequent revisions. The groundwater samples and associated quality assurance/quality control (QA/QC) samples were analyzed for VOCs, SVOCs, metals, nitroaromatics, and several water quality parameters. Soil samples were analyzed for VOCs, SVOCs, metals, nitroaromatics, and nitroaromatics following SPLP extraction. Methods used for analysis are summarized in Table 5-1.

All data analyzed were reviewed for accuracy and completeness. One hundred percent of the data analyzed were subjected to data validation following guidelines in the *EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 (EPA, 1999) and *EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, February 1994 (EPA, 1994a). 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 *Region III Modifications to National Functional Guidelines for Organic Data Review*, September 1994 (EPA, 1994b) and *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* (EPA, 1993). The procedure is outlined in Section 5.3.

5.2 Data Quality Evaluation

The reliability of the sampling and analytical procedures used during the investigation was demonstrated by implementing the project-specific quality assurance procedures specified in the site-wide SAP (IT, 1996a) and QAPP (IT, 1996b) 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 in samples because of headspace and calibration problems. Only non-detects were rejected. Detects were qualified "J," estimated. Nitroaromatic results in the field-split samples BD3045 and BD3047 were rejected for poor surrogate and matrix spike recoveries. Calibration recoveries were poor also. A complete evaluation of the analytical results is given in the data quality evaluation found in Appendix I..

5.3 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 5X or 10X 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 5X or 10X of the blank result, the sample result is qualified "B." The "J" qualifier is not used.
- For inorganics, if the sample result is greater than the instrument detection limit but less than 5X of the blank result, the sample result is qualified "B."

- If the sample result is greater than 5X or 10X of 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.

5.4 Screening Criteria

The analytical data were screened against PRGs published in EPA Region 9 tables. With a few exceptions, PRGs are chemical concentrations that correspond to a one-in-one million [10^{-6}] cancer risk or a noncarcinogenic hazard quotient of 1 in soil, air, and water.

The Region 9 PRG table combines EPA toxicity values with exposure factors to estimate "safe" contaminant concentrations in soil, air, and water. In situations where a PRG is exceeded, further evaluation of the risks that may be posed by site contaminants is appropriate. Residential concentrations are used for screening.

No attempt was made to develop PRGs for ubiquitous, nutritionally essential elements unlikely to be toxic at concentrations ordinarily found in environmental media and for which toxicity values are unavailable (e.g., calcium, magnesium, potassium, and sodium). PRGs used in the screening of groundwater investigation data are presented in Section 6.0 tables. PRGs for tap water were used to screen contaminants in groundwater. It was assumed that household use of groundwater results in the most restrictive contamination levels.

6.0 Investigation Results

6.1 Quarterly Groundwater Level Measurements

A total of four site-wide quarterly groundwater level measurement events have taken place since the last groundwater summary report presented in June 1999 (IT, 1999). These site-wide measuring events were conducted by ICI for the USACE. Groundwater levels were measured in September 2000 and January, August, and November 2001. IT received the water-level data and used it to assist in better defining the groundwater hydrology. Table 6-1 lists a summary of the groundwater elevation measurements.

6.2 Geologic and Hydrogeologic Investigation Results

This section presents updated information and revisions of interpretations made of geologic and hydrogeologic data presented in the last site-wide groundwater summary investigation report (IT, 1999). During 2001 bedrock monitoring well installation and groundwater sampling, free-phase hydrocarbon was encountered in several of the wells (PB-BED-MW23, PB-BED-MW24, PB-BED-MW27, PB-BED-MW16, and TNTA-BEDGW-001). As noted on the teleconference log generated on November 18, 1998 regarding BTEX (Appendix M) and in Section 2.2.2, traces of natural petroleum are common in the local quarries mining the Delaware Limestone. Table 6-2 shows the hydrocarbon detected by each of the new bedrock monitoring wells. Hydraulic conductivity results of the new bedrock monitoring wells are shown on Table 6-3 with results from the other bedrock wells. Contour maps of water level elevations in the overburden have been generated from the August and November 2001 data and are presented in Figures 6-1 and 6-2. Contours of water level elevations in the bedrock for the same time period are presented in Figures 6-3 and 6-4.

6.2.1 Hydrogeology of Overburden Water-Bearing Zone

Groundwater elevations in the overburden water-bearing zone fluctuated less than 3 feet in the four water level measurements collected as part of this investigation. Groundwater flow in the overburden is predominantly to the north-northeast. The general flow direction in the overburden aquifer largely mirrors the surface topography and corresponds to the topography of the top of the bedrock. This is demonstrated by comparing the top-of-bedrock map (Figure 2-8) with the overburden groundwater elevation contour maps (Figures 6-1 and 6-2). In the southeastern portion of the site, groundwater flow has a relatively uniform horizontal hydraulic gradient to the north-northeast. On the northwest side of the site, the flow is toward a groundwater low mapped southwest of the Reactor Building Area. Figure 6-5 shows groundwater flow in both the overburden and bedrock water-bearing zones in the vicinity of the Reactor Building Area for August 2001 and Figure 6-6 shows the same information for November 2001. There is a distinct southwestern flow toward the reactor buildings in the overburden in that area, possibly as a result of active sump pumps believed to be pumping within and at the base of the overburden at that location. Both maps show very similar groundwater flow direction as previously presented by the November 1997 and May 1998 maps in the June 1999 *Groundwater Summary Report* (IT, 1999).

Hydraulic gradients were calculated for three transects across the site for the November and August 1997 and May and February 1998. Flow along the western side of the site is toward the north-northwest to a groundwater low at a gradient ranging from 0.0086 foot per foot (ft/ft) to 0.011 ft/ft. Flow at the center of the site was to the north at a very consistent gradient over time ranging from 0.0044 to 0.0053 ft/ft. Groundwater on the east-central portion of the site flowed to the northeast at a gradient ranging from 0.0049 to 0.0060 ft/ft (IT, 1999). Hydraulic conductivity of the overburden water-bearing zone measured by slug tests performed in the site wells ranged from 0.74 ft/day to 211.68 ft/day, as shown in Table 6-3. The calculated geometric mean for the five wells tested was 8.75 ft/day. All slug test data is presented in Appendix G.

Groundwater elevation in the overburden fluctuates seasonally, irrespective of the area of the site. Figure 6-7 shows the similarity among four select overburden wells. Consistent fluctuations in other overburden wells may imply a significant horizontal connectivity across the overburden water-bearing zone. However, these levels in the overburden may be influenced by changes in water levels in the bedrock water-bearing zone, possibly indicating greater vertical than horizontal hydraulic conductivity in the overburden (IT, 1999).

6.2.2 Geology and Hydrogeology of Bedrock Water-Bearing Zone

In previous reports, bedrock at the site has largely been discussed as one unit. In this report, formations within the bedrock have been differentiated to explain enigmatic groundwater levels and fluctuations over time in many of the site wells. After comparing the geologic plan view map (by the ODNR) with the five cross-sections (discussed in Section 2.0), the bedrock will be discussed both as a whole and as three separate units (the Ohio Shale, the Olentangy Shale, and the Delaware Limestone) where appropriate (IT, 1999).

Horizontal hydraulic gradients in the bedrock were calculated for three transects across the site for November and August 1997 and May and February 1998. Bedrock groundwater flow along the western side of the site is toward the north-northeast with a gradient of 0.004 to 0.0286 ft/ft.

Bedrock groundwater flow in the center of the site was predominantly to the north-northeast with a gradient ranging from 0.0038 to 0.0110 ft/ft. At the east-central portion of the site, bedrock groundwater flow is to the northeast with a gradient ranging from 0.0023 to 0.0038 ft/ft (IT, 1999). Groundwater elevation in the bedrock water-bearing zone typically had little fluctuation in wells monitoring the Ohio Shale and the Olentangy Shale (Figures 6-8 and 6-9, respectively): however, wells monitoring the Delaware Limestone showed significant elevation fluctuations over time (Figure 6-10). Wells constructed in the Delaware Limestone in the Reactor Facility Area (wells REACTOR 1, 2, and 3) showed the greatest variation over time, with water levels fluctuating as much as 25 feet (Figure 6-10). Another well shown on Figure 6-10, PB-BED-MW13, fluctuates similarly to those of Reactor Facility Area (REACTOR 1, 2, and 3). PB-BED-MW13, which monitors the Delaware Limestone, is located along a bedrock low that trends along the west side of the site to the Reactor Facility Area. The similar extreme fluctuations in these wells suggest there may be a hydraulic connection between these two areas. Eight sump pumps are present in the Reactor Facility Area at the locations shown on Figures 6-5 and 6-6. The frequency and rate that these wells pump are unknown. However, it is possible that these wells may draw a significant amount of water from the top of the bedrock low, causing drawdown as far as PB-BED-MW13 and possibly causing flow from the overburden water-bearing zone to the Reactor Facility Area, as shown on both Figures 6-5 and 6-6 (IT, 1999).

Hydraulic conductivities in the bedrock measured by slug tests performed in the site wells shows that the range is from 0.003 ft/day to 22.18 ft/day. This range also demonstrates the variability in hydraulic conductivity of the bedrock across the site. Of the sixteen wells tested, those installed in the Ohio Shale were shown to have the highest hydraulic conductivities at 22.18 ft/day in IT-ABG-BEDGW-001 and 17.9 ft/day in IT-TNTB-BEDGW-002, as shown on Table 6-3. In contrast, hydraulic conductivities in the other wells (wells installed in the Delaware Limestone and the Olentangy Shale) had conductivities two to three orders of magnitude lower. The geometric mean conductivity for all bedrock wells is 0.354 ft/day.

Natural petroleum and H_2S, a byproduct of anaerobic petroleum degradation, have been present in some of the lithologic units at the site. After evaluating the boring logs that had noted petroleum during drilling and the wells in which monitoring equipment had detected H_2S, it is apparent that petroleum and H_2S are naturally occurring at the site to a significant degree only in the Delaware Limestone (IT, 1999).

6.2.3 Hydraulic Connection Between Zones

Vertical hydraulic gradients, calculated for five well pairs, revealed two general trends across the site (Table 6-4). Well pairs on the western and northern portions of the site showed a strong downward gradient from the overburden to bedrock. The greatest difference in water levels occurred in the overburden/Delaware Limestone well pair IT-AA1-GW002/IT-AA1-BED-GW001, with approximately 25 feet of difference in the water levels and an average vertical gradient over time of 0.6 ft/ft downward from the overburden to the bedrock. In contrast, the central and southern portions of the site showed very similar groundwater elevations in the overburden and the bedrock, particularly in well pair ABG-GW002/ABG-BED-GW001. This may indicate that the groundwater in the overburden and the Ohio Shale located on that portion of the site have a high degree of connectivity (IT, 1999).

6.2.4 Influence of Precipitation on Water Levels

Although previous investigations have indicated that there is a strong connection between precipitation and groundwater elevations, no clear correlation exists between monthly precipitation rates and water level elevations in site wells. Figure 6-12 shows the precipitation rates in Sandusky, Ohio, from January 1994 to December 2001. However, when comparing the limited number of seasonal groundwater elevation measurements collected from the site, shown in Table 6-1 with aquifer recharge (Figure 6-13), a seasonal correlation appears to be present. Recharge at PBOW was obtained by subtracting potential evapotranspiration rates (from Cleveland, Ohio data) and calculated runoff rates from rainfall. Appendix N shows previous calculations and reference information along with newly acquired rainfall data required for this calculation.

Figure 6-13 demonstrates that there is a strong correlation between seasons of the year and calculated monthly aquifer recharge rates at PBOW. Recharge to the overburden is calculated to be highest in the winter months (December, January, or February) for 8 of the 9 years shown. A lag time should, however, occur from the time the rain infiltrates the soil to the time it reaches the water table. At PBOW, this lag time should be weeks from the time of precipitation. The lag time depends largely upon the infiltration capacity of the soil, the thickness of the overburden in the areas of recharge, and, in the winter, frozen ground. Thus, the groundwater elevations should typically be highest in February or March. Although Figure 6-12 shows that the greatest rainfall occurs in summer months, Figure 6-13 shows that recharge rates are actually lower during that season. This is because evapotranspiration is highest in the mid to late summer in north-central Ohio. Similar to the lag time for the groundwater high, a lag time in the groundwater low should also occur. Thus, groundwater elevations should be lowest in early fall.

Figures 6-12 and 6-13 show that both precipitation and recharge rates were similar for most of the years measured. However, in 1994 the annual precipitation was approximately 25 percent lower than the average annual rate in Sandusky. Correspondingly, the lowest water levels measured in site wells occurred in December 1994. This reveals that significant fluctuation in groundwater wells can occur during drought conditions such as in 1994.

6.3 Groundwater Sampling Events

In September through October 2001 groundwater samples representative of low groundwater level (or dry season) conditions were collected. The samples were collected from the same overburden and bedrock monitoring wells sampled in November 1997 and May 1998 as well as from the new wells installed in 2001. Samples representative of high groundwater level (or wet season) conditions are expected to be collected in April 2002. Eight pre-existing and 15 newly installed overburden monitoring wells were scheduled to be sampled during the 2001 dry season event; but, because of the lack of overburden groundwater, the residuum monitoring wells were not installed. Sixteen pre-existing bedrock wells (as compared to 17 wells sampled during November and May 1998) and the 10 newly installed bedrock wells were sampled during the 2001 dry season groundwater investigation. Bedrock well REACTOR 1, which was sampled during November 1997 and May 1998, was not sampled.

The first quarterly sampling event of background bedrock monitoring wells was also conducted during the September and October 2001 groundwater investigation. A quarterly sampling schedule was chosen for these wells to obtain background bedrock groundwater data to determine if similar patterns or trends of chemical constituents are present and thus establish background groundwater constituent concentrations for the bedrock groundwater.

6.4 Analytical Results

The following sections present the blank-corrected results of the first semiannual sampling event by monitored water-bearing zone and geographic location within the site. November 2000 PRGs have been used to evaluate the detected constituents. Only analytes exceeding PRGs are shown on figures. As a comparison tool, the November 1997 and May 1998 results, compared to PRGs, are also shown on the figures with the 2001 data, but analytical results are not discussed. Analytes detected below PRGs are not discussed in detail nor shown on figures but are presented in the referenced data tables. All analytical data is presented in Appendices J and K.

6.4.1 West Area Red Water Ponds Area

No pre-existing overburden monitoring wells were sampled. Bedrock monitoring well PB-BED-MW14 is located downgradient (northeast) of the WARWP shown on Figure 6-14. Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.1.1 Overburden

No pre-existing overburden monitoring wells were sampled during the 2001 dry season event and none are scheduled for sampling during the 2002 wet season event.

6.4.1.2 Bedrock

2001 Dry Season Sampling Event. Arsenic and thallium were the only constituents detected in PB-BED-MW14 above the PRGs. Concentrations exceeded the PRG limits in both the filtered and unfiltered samples. Two VOCs (acetone and methylene chloride) and eleven other metals were detected in both the total and dissolved-phase samples but were below PRG limits. Table 6-5 presents the detected analytes and the water quality parameters.

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.1.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.2 Pentolite Road Red Water Ponds Area

No overburden monitoring wells were sampled. One pre-existing monitoring well, PB-BED-MW15, and one newly installed well, PB-BED-MW23, are located at the PRRWP area. Both bedrock wells are located downgradient (north) of the area, as shown on Figure 6-15. Groundwater samples were analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters as previously discussed.

6.4.2.1 Overburden

No overburden monitoring wells were sampled during the 2001 dry season event and none are scheduled for sampling during the 2002 wet season event.

6.4.2.2 Bedrock

2001 Dry Season Sampling Event. 2,4,6-TNT was detected in monitoring well PB-BED-MW15 but was below the PRG level. Two VOCs, benzene and methylene chloride, were detected above PRG levels in both PB-BED-MW15 and PB-BED-MW23. Acetone and toluene were also detected above PRG limits in well PB-BED-MW23. SVOC naphthalene was detected in both wells, and bis(2-ethylhexyl)phthalate was above its PRG in well PB-BED-MW23. Arsenic and manganese were the only total and dissolved metals to exceed PRG limits (Table 6-5).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.2.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2001).

6.4.3 TNT Manufacturing Area A

Two groundwater samples were collected during the direct-push operations at TNTA. One sample, DP14, was collected downgradient of the Bi-Tri House (Building 142), and the other sample, DP21, was collected downgradient of the Bi-Tri House (Building 132). Groundwater collected from the temporary piezometers in 2001 was analyzed only for VOCs and nitroaromatics by the screening method, as previously discussed. Figure 4-1 shows groundwater analytical results above PRG limits from the 2001 direct-push groundwater sampling along with the 2000 groundwater sampling direct-push locations.

Two overburden wells were scheduled to be sampled. Overburden monitoring well TNTA-MW10 is located north of Maintenance Road, downgradient of Wash House (Building 136). Well TNTA-MW11 is located south of Maintenance Road, downgradient of Wash House (Building 146). Overburden well TNTA-MW10 was dry and, due to a small water column, only a limited sample volume was collected from TNTA-MW11. Groundwater from TNTA-MW11 was analyzed for VOCs, SVOCs, nitroaromatics, dissolved metals, and total organic carbon. Three bedrock wells (PB-BED-MW17, PB-BED-MW18, and TNTA-BEDGW-001) are present at TNTA. Bedrock well PB-BED-MW17 is located downgradient of the TNTA area, PB-BED-MW18 is positioned side-gradient (east) of TNTA, and well TNTA-BEDGW-001 is located at the northwest corner (downgradient) of former Wash House (Building 146) (Figure 6-16). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.3.1 Temporary Piezometers

No nitroaromatics or VOCs were detected in the screening groundwater sample from DP14. A total of 8 nitroaromatic compounds were detected in the screening groundwater sample from DP21, 5 of which exceeded PRG limits. Detected nitroaromatics included 2,4,6-TNT, 2,4-DNT, 2,6-DNT, 4-A2,6-DNT, and 2-A4,6-DNT. Acetone and chloroform were also detected, but only chloroform exceeded the PRG limit (Table 6-6).

6.4.3.2 Overburden

2001 Dry Season Sampling Event. Three nitroaromatic compounds were detected in well TNTA-MW11 but were below the PRG levels. Arsenic and iron were detected above PRG levels in the unfiltered metals (Table 6-7).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.3.3 Bedrock

2001 Dry Season Sampling Event. 2,6-DNT was detected above its PRG limit in downgradient bedrock monitoring well PB-BED-MW17. Both amino DNT isomers were detected in TNTA-BEDGW-001 but were below the PRG limits. VOC methylene chloride was above PRG action limits in all three bedrock wells and chloromethane exceeded the limit in well PB-BED-MW18. Benzene, toluene, and total xylene constituents were all above PRGs in monitoring well TNTA-BEDGW-001. SVOC naphthalene was detected above the PRG in wells PB-BED-MW17 and TNTA-BEDGW-001. Bis(2-ethylhexyl)phthalate and chrysene were above their PRG levels in well TNTA-BEDGW-001. Arsenic was the only metal above PRG limits in both the total and dissolved phases in well PB-BED-MW17. Arsenic and manganese were above the PRG limits in well TNTA-BEDGW-001, but only in the unfiltered metals sample (Table 6-8).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.3.4 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.4 TNT Manufacturing Area B

Two groundwater samples were collected during the direct-push investigation at TNTB. One sample, DP02, was collected downgradient of the Fortifier House (Building 453), and the other sample, DP03, was collected downgradient of the Bi-Tri House (Building 452) (Figure 4-2). Groundwater collected from the temporary piezometers was analyzed only for VOCs and nitroaromatics by the screening method, as previously discussed.

Two overburden wells were scheduled to be sampled. Overburden monitoring well MK-MW16, paired with TNTB-BEDGW-002, is located south of West Scheid Road and MK-MW17 is located downgradient of the TNTB area. Overburden well MK-MW16 was dry, so no sample was collected. Four bedrock wells (TNTB-BEDGW-001, -002, -003, and -004) are present in TNTB. Bedrock well TNTB-BEDGW-001 is located downgradient of the TNTB area, TNTB-BEDGW-002 is positioned upgradient of the site, TNTB-BEDGW-003 is located downgradient of Bi-Tri House (Building 452), and TNTB-BEDGW-004 is located downgradient of Wash House (Building 458) (Figure 6-17). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.4.1 Temporary Piezometers

No nitroaromatics or VOCs were detected in the screening groundwater sample from DP02. 2,4,6-TNT was detected in the groundwater from DP03 but at a level below the PRG. One VOC (acetone) was detected but was also below the PRG limit (Table 6-6).

6.4.4.2 Overburden

2001 Dry Season Sampling Event. Four nitroaromatic compounds were detected in well MK-MW17 (2,4,6-TNT, 2,4-DNT, 2-A4,6-DNT, and 4-A2,6-DNT), all above the allowable PRGs. Nitroaromatic 2,4-DNT, detected as an SVOC, was above the PRG limit, along with indeno(1,2,3-cd)pyrene. Arsenic, iron, and manganese were detected above PRG levels in both the filtered and unfiltered metals samples (Table 6-9).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.4.3 Bedrock

2001 Dry Season Sampling Event. No nitroaromatics were detected in the bedrock wells at TNTB. One VOC (benzene) was detected above the allowable PRG in wells TNTB-BEDGW-003 and TNTB-BEDGW-004. Arsenic was found above PRG levels in both the filtered and unfiltered metals samples in well TNTB-BEDGW-003. Iron, lead, and manganese in well TNTB-BEDGW-003 were above the PRG limits in the unfiltered metals sample, and manganese was above the PRG limit in the unfiltered sample in well TNTB-BEDGW-004 (Table 6-10).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.4.4 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.5 TNT Manufacturing Area C

Two groundwater samples were collected during the direct-push operations at TNTC. One sample, DP13, was collected downgradient of the Wash House (Building 616), and the other sample, DP19, was collected downgradient of the Fortifier House (Building 693). Groundwater collected from the temporary piezometers was analyzed only for VOCs and nitroaromatics by the screening method previously discussed. Figure 4-3 shows groundwater analytical results above PRG limits from the 2001 direct-push groundwater sampling along with the locations of the 2000 groundwater sampling direct-push.

Three overburden wells were scheduled to be sampled. Overburden monitoring well TNTC-MW03 is located north (downgradient) of TNTC and west (side-gradient) of Waste Water Settling Basins (Building 657), TNTC-MW04 is located downgradient of Wash House (Building 626), and TNTC-MW05 is located downgradient of Wash House (Building 606). Overburden well TNTC-MW03 was dry, so no sample was collected. Two bedrock wells (PB-BED-MW13 and TNTC-BEDGW-001) are present in TNTC. Bedrock well PB-BED-MW13 is located downgradient of the TNTC area, and TNTC-BEDGW-001 is located at the Fortifier House (Building 683) (Figure 6-18). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.5.1 Temporary Piezometers

No nitroaromatics were detected in the screening groundwater sample from DP13. One VOC (acetone) was detected in DP13 but below PRG limits. Nitroaromatic 2,4,6-TNT was detected above its PRG in the groundwater in DP19 (Table 6-6).

6.4.5.2 Overburden

2001 Dry Season Sampling Event. No nitroaromatics, VOCs, or SVOCs were detected above the PRG limits in the overburden wells at TNTC. Thallium was detected in the unfiltered metals sample of TNTC-MW04 above the PRG limits. Manganese and thallium were both found to exceed the PRG limits in the filtered and unfiltered phases, while arsenic and iron only exceeded the limits in the total metals sample (Table 6-11).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.5.3 Bedrock

2001 Dry Season Sampling Event. No nitroaromatics were detected in the bedrock wells at TNTC. Two VOCs, benzene (PB-BED-MW13) and methylene chloride (PB-BED-MW13 and TNTC-BEDGW-001) were detected above the allowable PRGs. Two SVOCs (bis[2-ethylhexyl]phthalate and naphthalene) were above the limits in well PB-BED-MW13. Thallium was detected above PRG limits in the total metals samples in well PB-BED-MW13. Arsenic was found to exceed the PRG limits in both the total and dissolved metals samples in well TNTC-BEDGW-001 (Table 6-12).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.5.4 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.6 Acid Areas and Maintenance Shop Area

No overburden monitoring wells were sampled. Five bedrock monitoring wells were scheduled to be sampled during the 2001 groundwater remedial investigation in the vicinity of the three acid areas. Of these, one well (AA1-BEDGW-001) is located at Acid Area 1 (AA1) (Figure 6-19). No groundwater sample was collected from this well due to very high H_2S vapors. Two wells (AA2-BEDGW-001 and PB-BED-MW19) are located at Acid Area 2 (AA2) (Figure 6-20), one well (AA3-BEDGW-001) is located at Acid Area 3 (AA3) (Figure 6-21), and one well (IT-MNTA-BEDGW-001) is located in the Maintenance Shop Area (MNTA) north of AA1 (Figure 6-19). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.6.1 Overburden

No overburden monitoring wells were sampled during the 2001 dry season event and none are scheduled for sampling during the 2002 wet season event.

6.4.6.2 Bedrock

2001 Dry Season Sampling Event. Only one nitroaromatic compound (2,4,6-TNT) was detected in the bedrock wells at AA2 (well AA2-BEDGW-001), but it was below the allowable PRG. Both of the two sampled bedrock wells at AA2 exhibited detectable concentrations of VOCs and SVOCs during the October 2001 sampling event. In AA2-BEDGW-001, PRGs were exceeded by benzene, chloromethane, methylene chloride, and naphthalene, while PB-BED-MW19 exhibited benzene, methylene chloride, and naphthalene at concentrations above the PRGs. Of the detected metals in AA2-BEDGW-001, only total arsenic, manganese, and thallium and dissolved arsenic and manganese were present at concentrations above the PRGs. In PB-BED-MW19, no inorganic constituents exceeded PRGs (Table 6-13).

Only one nitroaromatic compound (2-A4,6-DNT) was detected in well AA3-BEDGW-001, but it was below the allowable PRG limit. Only one VOC (benzene) was detected above PRG limits. Detected inorganic constituents in AA3-BEDGW-001 were as many as six different total and dissolved metals; of these, only thallium exceeded the PRG in the dissolved phase (Table 6-13).

Monitoring well MNTA-BEDGW-001, located at MNTA, exhibited no detectable concentrations of nitroaromatics. VOCs found above PRG levels included benzene and methylene chloride; SVOCs included bis(2-ethylhexyl)phthalate and naphthalene. Of the detected metals, arsenic (total) and thallium (total and dissolved) exceeded the PRGs (Table 6-13).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.6.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.7 Additional Burning Ground Area

No overburden monitoring wells were sampled. One bedrock monitoring well (ABG-BEDGW-001) was sampled during the 2001 dry season sampling event at the additional burning grounds area (ABG) (Figure 6-22). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.7.1 Overburden

No overburden monitoring wells were sampled during the 2001 dry season event and none are scheduled for sampling during the 2002 wet season event.

6.4.7.2 Bedrock

2001 Dry Season Sampling Event. No nitroaromatics or VOCs were detected above the PRG limits in the overburden wells at the ABG. Three SVOCs (benzo[a]pyrene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene) were detected in well ABG-BEDGW-001 above PRG limits (Table 6-14).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.7.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.8 Upper Toluene Tanks Area

No overburden monitoring wells were sampled. One bedrock monitoring well (PB-BED-MW16) is located downgradient from the upper toluene storage tank area (Figure 6-23). This well was analyzed for VOCs, SVOCs, nitroaromatics, PCBs, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.8.1 Overburden
No overburden monitoring wells were sampled during the 2001 dry season event and none are scheduled for sampling during the 2002 wet season event.

6.4.8.2 Bedrock

2001 Dry Season Sampling Event. No nitroaromatics were detected above the PRG limits in bedrock well PB-BED-MW16. Four VOCs (acetone, benzene, methylene chloride, and total xylenes) were detected above allowable PRG levels. Several SVOCs were detected, but only naphthalene exceeded the PRG. A total of eight different filtered and unfiltered metals were detected in the groundwater sample, but only thallium exceeded the PRG limit in the filtered sample (Table 6-15).

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.8.3 Summary of Sampling Events
The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.9 Downgradient Perimeter Wells
Two newly installed bedrock monitoring wells (PB-BED-MW22 and PB-BED-MW27) were sampled during the 2001 dry season sampling event (Figure 6-24). Groundwater was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

6.4.9.1 Overburden
No downgradient perimeter overburden monitoring wells are present.

6.4.9.2 Bedrock

2001 Dry Season Sampling Event. Two nitroaromatics (2,4-DNT and 2,6-DNT) were detected above the PRG levels (Table 6-16). Both of the sampled bedrock wells exhibited detectable concentrations of VOCs and SVOCs during the October 2001 sampling event. In PB-BED-MW22, the PRG was exceeded by benzene, while PB-BED-MW27 exhibited benzene, methylene chloride, and naphthalene at concentrations above the PRGs. Four metals were detected in the total and dissolved groundwater samples in well PB-BED-MW22, but none exceeded PRG limits. Ten metals were detected in groundwater from well PB-BED-MW27, but only arsenic and iron in the total phase were above the PRG limits.

2002 Wet Season Sampling Event. Fieldwork is scheduled for April 2002.

6.4.9.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.4.10 Background Monitoring Wells

Five bedrock wells were selected to be sampled on a quarterly basis to determine background bedrock groundwater values. These background bedrock monitoring wells include PB-BED-MW20, PB-BED-MW24, PB-BED-MW25, BG8-BEDGW-001, and PB-BED-MW26 (Figure 6-25). Overburden well IT-MW01 is sampled as part of the dry/wet season sampling events and due to its location has previously been considered as providing information relative to possible background overburden groundwater values. Groundwater from these wells was analyzed for VOCs, SVOCs, nitroaromatics, metals (total and dissolved), cyanide, and water quality parameters, as previously discussed.

Groundwater sampling of overburden monitoring well IT-MW01 was attempted on September 27, 2001, but could not be performed. An indentation of the PVC riser (2 feet below the top of the casing) prevented sampling equipment (pump and bailer) from entering into the well. No groundwater sample was collected from bedrock well PB-BED-MW26 due to lack of groundwater.

6.4.10.1 Overburden

IT-MW01 could not be sampled during the 2001 dry season event. Repair and or adjustments to the well will attempt to be made during the 2002 wet season event scheduled for April 2002.

6.4.10.2 Bedrock

First Quarterly Sampling Event (September-October 2001). No nitroaromatic compounds were detected in any of the background monitoring wells (Table 6-17). VOCs benzene and methylene chloride were detected above PRG limits in well PB-BED-MW24, and benzene and chloroform were detected above limits in well PB-BED-MW25. No SVOCs were detected in any of the wells above PRG limits. Only groundwater from well PB-BED-MW20 showed metals above allowable PRGs. Barium was detected in both the total and dissolved metal samples, while arsenic was found above its PRG limit in only the dissolved sample.

Second Quarterly Sampling Event (January 2002). Fieldwork occurred in January 2002. Sample results are under review.

Third Quarterly Sampling Event. Fieldwork is scheduled to occur during 2002 wet season event April 2002.

Fourth Quarterly Sampling Event. Fieldwork is scheduled for July 2002.

6.4.10.3 Summary of Sampling Events

The summary will be provided in the Data Summary and Evaluation Report at the completion of the first year of quarterly background sampling (September 2001 through 4th round expected to occur in July 2002).

6.5 Free-Phase Sampling Results

Three monitoring wells were found to contain a floating free-phase liquid (AA1-BEDGW-001, TNTA-BEDGW-001, and PB-BED-MW16) during the 2001 groundwater sampling. The thickness of the product in the wells was measured to be 0.63 feet in AA1-BEDGW-001, and 0.5 feet in TNTA-BEDGW-001, and 0.05 feet thick in PB-BED-MW16. All product floating on top of the groundwater in the monitoring wells was removed prior to sampling and disposed of properly with the IDW.

To determine analytical quality of the free-phase floating liquid, two samples were collected. The first sample was recovered from monitoring well TNTA-BEDGW-001 and the second from monitoring well PB-BED-MW16. The samples were analyzed for VOCs, GRO, and DRO (Table 6-18).

TNTA-BEDGW-001. Benzene, methylene chloride, and total xylenes were above the PRG limits. GRO were detected at a concentration of 160,000 parts per billion (ppb) while DRO were detected at 31,000 ppb.

PB-BED-MW16. Benzene, methylene chloride, trichloroethene, and total xylenes were detected above the PRG limits. GROs were detected at a concentration of 52,000 ppb, while DRO were detected at 4,800 ppb.

6.6 Soil Sampling Results

Twenty-four soil samples were collected at known hot spots identified during previous investigations. Specifically, one soil sample was collected from the zone immediately above the water table, and one soil sample was collected below the water table. Three former soil sample locations were revisited at the WARWP (former soil sample locations DP09, DP13, and DP16) (Figure 4-4), three at the PRRWP (DP03, DP10, and DP16) (Figure 4-5), two at TNTA (SO012 and SO080) (Figure 4-1), two at TNTB (SS295 and SS375)(Figure 4-2), and two at TNTC (SO066 and SO123) (Figure 4-3). Analytical results for all soil samples compared to PRGs are shown on Table 6-19. All soil sample locations were relocated by Ohio registered professional land surveyors in September 2001. Soil was analyzed for VOCs, nitroaromatics, metals, and SPLP nitroaromatics.

6.6.1 West Area Red Water Ponds

Former Location DP09. Groundwater was encountered in soil boring DP09A at depth of 4.9 feet bgs. One soil sample was collected at a depth of 4 to 4.9 feet bgs and the other from 11 to 12 feet bgs. Three nitroaromatics were detected in the sample from 4 to 4.9 feet but were below PRGs. Six nitroaromatics were detected in the sample from 11 to 12 feet bgs, with one (2,4-DNT) above the PRG limit. Both samples showed 2,4-DNT above the PRG limit for SPLP nitroaromatics. VOCs were detected in both samples but were below PRG limits. Arsenic was above PRG levels in both soil samples, and iron was above the PRG limit in only the 11 to 12 foot sample.

Former Location DP13. Groundwater was encountered in soil boring DP13A at a depth of 5.1 feet bgs. One soil sample was collected at a depth of 4.1 to 5.1 feet bgs and the other at 11 to 12 feet bgs. Two nitroaromatics were detected in the sample from 4.1 to 5.1 feet but were below PRGs. Four nitroaromatics were detected in the sample at 11 to 12 feet bgs with one (2,4-DNT) above the PRG limit. Only the sample collected at a depth of 11 to 12 feet exhibited nitroaromatics (1,3-DNB and 2,4-DNT) above the PRG limits for the SPLP nitroaromatics. VOCs were detected in both samples but were below PRG limits. Several metals were detected in both samples; arsenic was found to be above PRG levels in both samples, and iron was above the PRG limit in only the 11 to 12 foot sample.

Former Location DP16. Groundwater was encountered in soil boring DP16A at a depth of 4.5 feet bgs. One soil sample was collected at a depth of 3.5 to 4.0 feet bgs and the other at 11 to 12 feet bgs. One nitroaromatic was detected in the sample at 3.5 to 4.0 feet and two were detected in the 11 to 12 foot sample; but both were below PRGs. Only the sample collected at a depth of 3.5 to 4.0 feet exhibited nitroaromatics (2,4-DNT, 2,6-DNT, and 2,4,6-TNT) above the PRG limits for SPLP for nitroaromatics. VOCs were detected in both samples but both were below PRG limits. Several metals were detected in both samples: arsenic and iron were above acceptable PRG levels.

6.6.2 Pentolite Road Red Water Ponds

Former Location DP03. Groundwater was encountered in soil boring DP03A at a depth of 4.8 feet bgs. One soil sample was collected at a depth of 4.3 to 4.8 feet bgs and the other at 11 to 12 feet bgs. Three nitroaromatics were detected in the sample from 4.3 to 4.8 feet and one (2,4-DNT) was above PRG limits. Four nitroaromatics were detected in the sample from 11 to 12 feet bgs, but all were below their PRGs. Only the sample collected at a depth of 4.3 to 4.8 feet exhibited nitroaromatics (1,3-DNB, 2,4-DNT, and 2,6-DNT) above the PRG limits for SPLP for nitroaromatics. VOCs were detected in both samples, but both were below PRG limits. Arsenic was above PRG levels in both soil samples: iron was above the PRG limit in only the 11 to 12 foot sample.

Former Location DP010. Groundwater was encountered in soil boring DP10A at depth of 8.9 feet bgs. One soil sample was collected at a depth of 8.4 to 8.9 feet bgs and the other at 10.5 to 12 feet bgs. Four nitroaromatics were detected in the sample from 8.4 to 8.9 feet and two (2,4-DNT and 2,6-DNT) were above PRG limits. Four nitroaromatics were detected in the sample 11-12 feet bgs; three (2,4-DNT, 2,6-DNT, and 1,3-DNB) were above the PRGs. No SPLP nitroaromatics were detected in either sample. VOCs were detected in both samples but both were below PRG limits. Several metals were detected in both soil samples, but only arsenic and iron were above acceptable PRG levels.

Former Location DP011. Groundwater was encountered in soil boring DP11A at depth of 4.4 feet bgs. One soil sample was collected at a depth of 2.6 to 3.1 feet bgs and the other at 11 to 12 feet bgs. Seven nitroaromatics were detected in the sample 2.6 to 3.1 feet; one (2,4-DNT) was above the PRG limit. Seven nitroaromatics were also detected in the sample from 11 to 12 feet bgs; one (2,4-DNT) was above the PRG. No SPLP nitroaromatics were detected in either sample. VOCs were detected in both samples but both were below PRG limits. Several metals were detected in both soil samples, but arsenic was the only metal above the acceptable PRG level.

6.6.3 TNT Manufacturing Area A

Former Location TNTA-SO080. Groundwater was not encountered in soil boring SO080A. One soil sample was collected at a depth of 0.5 to 1.5 feet bgs and the other at 8 to 10 feet bgs. Two nitroaromatics (2,4-DNT and 2,4,6-TNT) were detected in the sample from 0.5 to 1.5 feet; both above PRG limits. One nitroaromatic (2,4,6-TNT) was detected in the sample 8 to 10 feet bgs and was above the PRG limit. Both samples also exhibited the nitroaromatic 2,4,6-TNT above the PRG limit for SPLP nitroaromatics. VOCs were detected in both samples but were below PRG limits. Arsenic was the only metal above PRG levels in both soil samples.

Former Location TNTA-SO012. Groundwater was not encountered in soil boring SO012A. One soil sample was collected at a depth of 0.5 to 1.5 feet bgs and the other 4 to 6 feet bgs. Two nitroaromatics (2,4-DNT and 2,6-DNT) were detected in the sample from 0.5 to 1.5 feet and in the sample 4 to 6 feet; both were above PRG limits. Three nitroaromatics (2,4-DNT, 2,6-DNT, and 2,4,6-TNT) were detected in the sample 0.5 to 1.5 feet bgs and two (2,4-DNT, 2,6-DNT) that were above the PRG limits for SPLP nitroaromatics. VOCs were detected in both samples but were below PRG limits. Several metals were detected in both soil samples, arsenic was above the PRG limit in both samples, and iron was above the PRG level in the 4-6 foot sample.

6.6.4 TNT Manufacturing Area B

Former Location TNTB-SS295. Groundwater was not encountered in soil boring SS295A. One soil sample was collected at a depth of 0.0 to 1 feet bgs and the other at 2.5 to 3.5 feet bgs. Five nitroaromatics were detected in the sample from 0.5 to 1.5 feet, and two (2,4-DNT and 2,4,6-TNT) were above PRG limits. Five nitroaromatics were also detected in the sample from 2.5 to 3.5 feet bgs but were below PRG limits. No samples contained nitroaromatics above the PRG limit for SPLP. VOCs were detected in both samples but were below PRG limits. Several metals were detected in both soil samples. Arsenic was above PRG levels in both samples, and iron was above the PRG limit in the 2.5 to 3.5 foot sample.

Former Location TNTB-SS375. Groundwater was not encountered in soil boring SS375A. One soil sample was collected at a depth of 4 to 6 feet bgs and the other at 8 to 10 feet bgs.

Three nitroaromatics were detected in the sample from 4 to 6 feet; all three (2,4-DNT, 2,6-DNT, and 2,4,6-TNT) were above PRG limits. Four nitroaromatics were detected in the sample 8 to 10 feet; all four (2-A4,6-DNT, 2,4-DNT, 2,6-DNT, and 2,4,6-TNT) were above PRG limits. Both samples showed 2,4-DNT, 2,6-DNT, and 2,4,6-TNT above the PRG limits for SPLP nitroaromatics. VOCs were detected in both samples but were below PRG limits. Several metals were detected in both soil samples, but arsenic was the only metal above PRG levels in both samples.

6.6.5 TNT Manufacturing Area C

Former Location TNTC-SBO464. Groundwater was not encountered in soil boring SBO464A. One soil sample was collected at a depth of 4 to 5.7 feet bgs and the other at 6 to 7 feet bgs. Six nitroaromatics were detected in the sample from 4 to 5.7 feet; two (4-A4,6-DNT and 2,6-DNT) were above PRG limits. Seven nitroaromatics were also detected in the sample from 6 to 7 feet bgs, and two (2,4-DNT and 2,6-DNT) were above the PRG limits. Five nitroaromatics were detected in the sample from 4 to 5.7 feet bgs, and all five (2-A2,6-DNT, 4-A4,6-DNT, 2,4-DNT, 2,6-DNT, and 2,4,6-TNT) were above the PRG limits for SPLP nitroaromatics. Six nitroaromatics were detected in the 6 to 7 foot soil sample and three (2,4-DNT, 2,6-DNT, and 2,4,6-TNT) were above PRG limits for SPLP nitroaromatics. VOCs were detected in both samples but all were below PRG limits. Several metals were detected in both soil samples, but arsenic was the only metal above PRG levels.

Former Location TNTC-SBO066. Groundwater was not encountered in soil boring SBO066A. One soil sample was collected at a depth of 2.5 to 3.4 feet bgs and the other at 8 to 9.3 feet bgs. Four nitroaromatics were detected in the sample from 2.5 to 3.4 feet, and all were below PRG limits. Two nitroaromatics were also detected in the sample from 8 to 9.3 feet bgs, and they were also below the PRG limits. No nitroaromatics were detected in either sample above the PRG limits for SPLP nitroaromatics. VOCs were detected in both samples, but all were below PRG limits. Several metals were detected in both soil samples, but arsenic was the only metal above PRG levels.

7.0 Site Conceptual Exposure Model

Exposure is the actual or potential for contact of a receptor with a chemical or physical agent through an identifiable pathway in the environment. An exposure assessment estimates the type and magnitude of potential exposure of a receptor to COPC found at or migrating from a site (EPA, 1989). An exposure assessment includes the following steps (IT, 1999):

- Characterize the physical setting.
- Identify the contaminant sources, release mechanisms. and migration pathways.
- Identify the potentially exposed receptors.
- Identify the potential exposure pathways.

The site conceptual exposure model (SCEM) provides the basis for identifying and evaluating the potential risks to human health in a future baseline risk assessment (RA). Two SCEMs are provided for this report. The first is a generalized SCEM which includes the receptors appropriate to all plausible land-use scenarios, and the potential exposure pathways (Figure 7-1). The second is an SCEM limited to groundwater pathways, transport mechanisms, and receptors (Figure 7-2). Figure 7-2 applies to the data contained in this report (IT, 1999).

Graphically presenting all possible pathways by which a potential receptor may be exposed, including all sources, release and transport pathways, and exposure routes, facilitates consistent and comprehensive evaluation of risk to human health, and helps ensure that potential pathways are not overlooked. The elements of an SCEM include (IT, 1999):

- Source (i.e., initially contaminated environmental media)
- Contaminant release mechanisms
- Contaminant transport pathways
- Intermediate or transport media
- Exposure media
- Receptors
- Routes of exposure.

Contaminant release mechanisms and transport pathways are not required for direct receptor contact with a contaminated source medium.

The receptors and pathways in Figure 7-1 reflect plausible scenarios developed from information regarding site background and history, topography, climate, and site usage as presented in the scope of work and the site-wide GWI (IT, 1997c). Asterisks identify exposure pathways that are complete and addressed in the RA. Justification for exclusion of other pathways is provided in the footnotes on the figure (IT, 1999).

Contaminant Sources, Release Mechanisms, and Migration Pathways. The sources of DOD related groundwater contamination on site are TNT and related nitroaromatic compounds produced as part of the manufacturing process of TNT. Nitroaromatics were released directly to surface water ponds as part of the manufacturing process of TNT. Some of the pond water contaminants were sorbed into pond sediment or were precipitated out of solution and deposited onto the sediment. In addition, above- and below-ground process lines leaked or broke releasing nitroaromatics to the surface and/or subsurface soil. Over-land flow and runoff have spread soil-bound contamination over the surrounding soil, some of which may have reached surface water streams or ponds. Infiltration of contamination from the soil or sediment to the underlying groundwater also occurred. In turn, this contaminated groundwater migrated downgradient, some of which was released into streams, ponds, or marshy areas (IT, 1999).

Receptors and Exposure Pathways. Receptors are selected to represent the upper bound on exposure from all plausibly exposed groups of people at the site. Most RA are based on a reasonable maximum exposure (RME) assumption. The intent of the RME assumption is to estimate the highest exposure level that could reasonably be expected to occur, but not necessarily the worst possible case (EPA, 1989, 1991). It is interpreted as reflecting the 90th to 95th percentile on exposure.

Three receptors provide the most plausible potential for human exposure to groundwater (IT, 1999):

- On-Site Worker (current and future, including the construction worker and trainee)
- Sportsman (current and future, including the hunter and fisherman)
- On-Site Resident (future).

Although Plum Brook is not active, exposure potential exists for workers frequenting contaminated areas particularly, if they drink site groundwater for an extended period of time. A future on-site resident, using an on-site well, is proposed as a plausible scenario under future land use scenarios. Sportsmen may be exposed by direct exposure to site chemicals or by ingestion of contaminated fish or venison. These animals can bioaccumulate certain chemicals obtained through their food and will be evaluated as potential exposure pathways. The construction worker scenario is included within the on-site worker receptor scenario. However, it is not relevant to Figure 7-2 because its principal exposure is subsurface soil rather than groundwater. Sufficiently frequent access to the site by a trespasser is considered unlikely and this scenario is not included (IT, 1999).

8.0 Conclusions

Conclusions will be presented in the Data Summary and Evaluation Report at the completion of the sampling events in July 2002.

9.0 Recommendations

Recommendations will be presented in the Data Summary and Evaluation Report at the completion of the sampling events in July 2002.

10.0 References

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TABLES

Table 4-1

Summary of Groundwater Samples Collected
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Sample Identification	Sample Date	Sample Number
Direct-Push Temporary Piezometers			
TNTA-DP14	TNTA-DP14-BA3014	08/02/01	BA3014
TNTA-DP21	TNTA-DP21-BA3021	08/01/01	BA3021
TNTB-DP02	TNTB-DP02-BB3002	08/06/01	BB3002
TNTB-DP03	TNTB-DP03-BB3003	08/01/01	BB3003
TNTC-DP13	TNTC-DP13-BC3013	08/01/01	BC3013
TNTC-DP19	TNTC-DP19-BC3019	08/06/01	BC3019
Monitoring Wells (First Quarterly and First Semi-Annual Sampling)			
PB-BED-MW20	PB-BED-MW20-BD3026	09/26/01	BD3026
IT-AA3-BEDGW-001	IT-AA3-BEDGW-001-BD3005	09/27/01	BD3005
IT-BG8-BEDGW-001	IT-BG8-BEDGW-001-BD3007	09/27/01	BD3007
IT-TNTB-BEDGW-002	IT-TNTB-BEDGW-002-BD3010	09/27/01	BD3010
IT-ABG-BEDGW-001	IT-ABG-BEDGW-001-BD3006	09/28/01	BD3006
IT-ABG-BEDGW-001	IT-ABG-BEDGW-01-BD3006R	10/05/01	BD3006R
IT-TNTB-BEDGW-001	IT-TNTB-BEDGW-001-BD3009	09/28/01	BD3009
PB-BED-MW14	PB-BED-MW14-BD3018	09/28/01	BD3018
MK-MW17	MK-MW17-BD3012	10/01/01	BD3012
PB-BED-MW18	PB-BED-MW18-BD3024	10/02/01	BD3024
IT-MNTA-BEDGW-001	IT-MNTA-BEDGW-001-BD3008	10/03/01	BD3008
PB-BED-MW13	PB-BED-MW13-BD3017	10/03/01	BD3017
PB-BED-MW17	PB-BED-MW17-BD3021	10/03/01	BD3021
PB-TNTA-MW11	PB-TNTA-MW11-BD3034	10/03/01	BD3034
PB-TNTC-MW5	PB-TNTC-MW5-BD3035	10/03/01	BD3035
PB-BED-MW19	PB-BED-MW19-BD3025	10/04/01	BD3025
PB-TNTC-MW4	PB-TNTC-MW4-BD3043	10/04/01	BD3043
TNTC-BEDGW-001	TNTC-BEDGW-001-BD3042	10/04/01	BD3042
IT-TNTB-BEDGW-001	IT-TNTB-BEDGW-001-BD3009R	10/05/01	BD3009R
PB-BED-MW14	PB-BED-MW14-BD3018R	10/05/01	BD3018R
PB-BED-MW25	PB-BED-MW25-BD3030	10/05/01	BD3030
TNTB-BEDGW-004	TNTB-BEDGW-004-BD3041	10/05/01	BD3041
IT-AA2-BEDGW-001	IT-AA2-BEDGW-001-BD3004	10/08/01	BD3004
PB-BED-MW22	PB-BED-MW22-BD3027	10/08/01	BD3027
TNTA-BEDGW-001	TNTA-BEDGW-001-FP7001	10/08/01	FP7001
TNTB-BEDGW-003	TNTB-BEDGW-003-BD3038	10/08/01	BD3038
PB-BED-MW15	PB-BED-MW15-BD3019	10/09/01	BD3019
PB-BED-MW23	PB-BED-MW23-BD3028	10/09/01	BD3028
PB-BED-MW24	PB-BED-MW24-BD3029	10/09/01	BD3029
PB-BED-MW27	PB-BED-MW27-BD3032	10/09/01	BD3032
TNTA-BEDGW-001	TNTA-BEDGW-001-BD3037	10/09/01	BD3037
PB-BED-MW16	PB-BED-MW16-BD3020	10/10/01	BD3020
PB-BED-MW16	PB-BED-MW16-FP7002	10/10/01	FP7002

"R" at the end of the sample number indicates the sample was recollected and certain parameters reanalyzed.

Table 4-2

Final Field Measurements of Groundwater Samples
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Date	Time	Low-Flow Sampled	PID (ppm)	Eh (mV)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Dissolved O_2 (ppm)	Temperature (°C)	Volume Purged (gal)
Direct-Push Temporary Piezometers											
TNTA-DP14	8/2/01	1025	No	NM	-131	6.66	0.901	999	2.46	18.36	None
TNTA-DP21	8/1/01	1712	No	NM	162	7.19	1.39	723	3.34	19.50	None
TNTB-DP02	8/6/01	1145	No	NM	No readings recorded due to insufficient water volume.						None
TNTB-DP03	8/1/01	1533	No	NM	50	6.23	0.635	999	2.01	18.49	None
TNTC-DP13	8/1/01	1620	No	NM	-10	6.84	0.790	999	2.49	20.50	None
TNTC-DP19	8/6/01	1210	No	NM	281	6.73	2.29	523	6.32	17.73	None
Overburden Wells (First Quarterly and First Semi-Annual Sampling)											
IT-MW01	9/27/01	1040	NA	NM	No sample collected, well dry.						
MK-MW16	9/26/01	NA	NA	NM							
MK-MW17	10/1/01	1235	Yes	0.0	79	5.13	0.96	6.8	0.00	16.53	2.37
TNTA-MW10	10/1/01	NA	NA	NM	No sample collected, well dry.						
TNTA-MW11	10/3/01	1645	No	NM	No readings recorded due to insufficient water volume.						
TNTC-MW03	10/2/01	0800	NA	NM	No sample collected due to insufficient water volume.						
TNTC-MW04	10/4/01	1045	No	0.0	-7	7.38	2.76	18.8	0.76	14.27	1.59
TNTC-MW05	10/3/01	0915	No	0.0	59	6.11	1.60	688.0	11.80	13.00	0
Bedrock Wells (First Ququarterly and First Semi-Annual Sampling)											
AA1-BEDGW-001	10/10/01	NA	NA	269	No sample collected due to extremely high H_2S vapors.						
AA2-BEDGW-001	10/8/01	1145	Yes	60	-144	9.49	1.24	76.4	0.00	10.65	1.0
AA3-BEDGW-001	9/27/01	1615	Yes	10.2	-343	13.15	2.74	20.1	0.00	11.30	3.17
ABG-BEDGW-001	9/28/01	0920	Yes	0.0	-100	8.57	0.617	27.9	0.00	13.83	4.76
ABG-BEDGW-001R	10/5/01	1545	Yes	0.0	-51	8.80	0.9	6.6	0.66	13.50	5.81
BG8-BEDGW-001	9/27/01	1220	Yes	0.0	-339	13.03	3.75	0.0	0.00	12.65	2.97
MNTA-BEDGW-001	10/3/01	1020	Yes	1257	-328	14.36	8.94	145.0	0.00	18.50	5.15
TNTB-BEDGW-001	9/28/01	1635	Yes	32.0	-297	11.86	2.23	0.0	0.00	12.54	5.28
TNTB-BEDGW-001R	10/5/01	1200	Yes	NM	-335	12.22	3.79	3.9	0.00	12.44	2.5
TNTB-BEDGW-002	9/27/01	0830	Yes	0.0	-364	13.72	0.830	0.0	0.00	11.49	1.06
TNTB-BEDGW-003	10/8/01	0940	No	0.0	No sample collected due to insufficient water volume.						
TNTB-BEDGW-004	10/5/01	0900	Yes	0.8	-43	7.54	0.349	182.0	2.89	12.07	4.5
PB-BED-MW13	10/3/01	1515	No	0.0	-368	12.33	11.3	49.7	0.00	15.77	23
PB-BED-MW14	9/28/01	1140	Yes	75.6	-14	7.28	4.28	5.0	0.00	10.38	1.98
PB-BED-MW14R	10/5/01	1530	Yes	7.7	5	6.76	4.19	282.0	0.00	10.17	2.5
PB-BED-MW15	10/9/01	0850	No	>2000	-325	12.56	5.37	29.7	0.00	9.97	13.5
PB-BED-MW16	10/10/01	1135	No	NM	Water quality readings not recorded due to oily film on groundwater.						20

Table 4-2

Final Field Measurements of Groundwater Samples
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Date	Time	Low-Flow Sampled	PID (ppm)	Eh (mV)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Dissolved O_2 (ppm)	Temperature (°C)	Volume Purged (gal)
PB-BED-MW17	10/3/01	1500	Yes	>2000	-386	15.18	5.79	134.0	0.00	16.50	2
PB-BED-MW18	10/2/01	1435	Yes	64.1	-363	12.37	23.1	17.6	0.00	12.58	2.38
PB-BED-MW19	10/4/01	1315	Yes	873.0	-1416	14.29	1.43	307.0	0.00	18.40	2.85
PB-BED-MW20	9/26/01	1415	No	0.0	-73	8.95	53.60	53.5	0.00	10.54	10.33
PB-BED-MW22	10/8/01	1020	Yes	18.3	-263	10.25	0.78	5.2	0.00	11.40	3
PB-BED-MW23	10/9/01	1145	No	215.0							
PB-BED-MW24	10/9/01	0935	Yes		-144	9.38	1.81	73.3	5.32	11.20	2.99
PB-BED-MW25	10/5/01	0920	Yes	0.0	-237	10.58	1.89	5.7	2.41	11.90	3.67
PB-BED-MW26	10/10/01	NA	No	3.6	No sample collected due to insufficient water volume.						
PB-BED-MW27	10/9/01	1115	No	197	Water quality readings not recorded due to oily film on groundwater						1.75
TNTA-BEDGW-001	10/9/01	1450	No	268	Due to insufficient water volume and LNAPL, water quality readings were not recorded.						
TNTC-BEDGW-001	10/4/01	1315	Yes	129	-357	12.87	2.98	44.0	0.00	12.26	11.89

"R" at the end of the well identification number indicates the sample was recollected and certain parameters reanalyzed.
PID - Photoionization detector.
ppm - Parts per million.
Eh - Oxidation-reduction potential.
mV - Millivolts.
µmhos/cm - Micromhos per centimeter.
NTU - Nephelometric turbidity unit.
O_2 - Oxygen.
°C - Degrees Celsius.
gal - Gallon.

Table 4-3

Summary of Soil Samples Collected
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Area	Sample Identification	Sample Depth (ft)	Sample Date	Sample Number
TNT Area A	TNTA-SO012A	0.5-1.5	09/26/01	BD0007
	TNTA-SO012A	4-6	09/26/01	BD0008
	TNTA-SO080A	0.5-1.5	09/26/01	BD0009
	TNTA-SO080A	8-10	09/26/01	BD0012
TNT Area B	TNTB-SS295A	0-1	09/27/01	BD0013
	TNTB-SS295A	2.5-3.5	09/27/01	BD0014
	TNTB-SS375A	4-6	09/27/01	BD0015
	TNTB-SS375A	8-10	09/27/01	BD0016
TNT Area C	TNTC-SO066A	2.5-3.5	09/28/01	BD0017
	TNTC-SO066A	8-10	09/28/01	BD0018
	TNTC-SO123A	4-6	09/28/01	BD0021
	TNTC-SO123A	6-7	09/28/01	BD0022
	TNTC-SO066A	2.5-3.5	10/02/01	BD0017R
	TNTC-SO066A	8-10	10/02/01	BD0018R
	TNTC-SO123A	4-6	10/02/01	BD0021R
	TNTC-SO123A	6-7	10/02/01	BD0022R
Pentolite Road Red Water Ponds	PRRP-DP03A	4.3-4.8	09/27/01	BD0001
	PRRP-DP03A	11-12	09/27/01	BD0002
	PRRP-DP10A	8.4-8.9	09/26/01	BD0003
	PRRP-DP10A	10.5-12	09/26/01	BD0004
	PRRP-DP11A	2.6-3.1	09/26/01	BD0005
	PRRP-DP11A	11-12	09/26/01	BD0006
West Area Red Water Ponds	WARP-DP09A	4-4.9	09/27/01	BD0023
	WARP-DP09A	11-12	09/27/01	BD0024
	WARP-DP13A	4.1-5.1	09/27/01	BD0025
	WARP-DP13A	11-12	09/27/01	BD0028
	WARP-DP16A	3.5-4	09/28/01	BD0029
	WARP-DP16A	11-12	09/28/01	BD0030
	WARP-DP16A	3.5-4	10/02/01	BD0029R
	WARP-DP16A	11-12	10/02/01	BD0030R

"R" at the end of the sample number indicates the sample was recollected and certain parameters reanalyzed.

Table 4-4

Monitoring Well Construction Details
2001 Groundwater Remedial Investigation
Former Plumbrook Ordnance Works, Sandusky, Ohio

Well ID	Well Depth (feet bgs)	Date Installed	Installed By	Casing Type	Casing Diameter (inches)	Borehole Diameter (inches)	Screen Interval (feet bgs)	Top of Filter Pack (feet bgs)	TOC Elevation (feet msl)	Ground Elevation (feet msl)	Well Location
AA1-GW-002	22.00	9/19/97	IT	PVC (40)	2"	8.25"	6.75-21.75	6	640.85	638.60	AA1 area; S of tracks, N of road
AA2-GW-002	18.50	9/22/97	IT	PVC (40)	2"	8.25"	8.25-18.25	5.5	643.95	641.50	N of road at AA2 area
AA3-GW-002	16.00	9/18/97	IT	PVC (40)	2"	8.25"	5.75-15.75	3.0	636.11	634.10	NE of Ransom/Maintenance Rd intersection,
ABG-GW-002	6.75	9/11/97	IT	PVC (40)	2"	8.25"	2.50-8.50	2.0	661.06	658.20	W of Snake/Fox Rd intersection
EB-GM-01	27.00	1990	EBASCO	NA	NA	NA	NA	NA	640.45	637.70	NE of Bldg.8210
EB-GM-02	28.00	1990	EBASCO	NA	NA	NA	NA	NA	637.52	634.90	N of Bldg.7131
EB-GM-03	18.00	1990	EBASCO	NA	NA	NA	NA	NA	636.90	636.20	Behind Bldg.7131
EB-GM-04	16.00	1990	EBASCO	NA	NA	NA	NA	NA	636.34	633.60	SW of Bldg.7122
EB-GM-05	18.00	1990	EBASCO	NA	NA	NA	NA	NA	639.70	637.00	NE corner of Bldg.7121
EB-GM-06	18.00	1990	EBASCO	NA	NA	NA	NA	NA	639.61	637.00	SE corner of Bldg.7121
EB-PS-02	18.00	1990	EBASCO	NA	NA	NA	NA	NA	636.53	635.70	NW of Bldg 8133
EB-PS-03	18.00	1990	EBASCO	NA	NA	NA	NA	NA	637.15	634.40	NE of Bldg 8133
EB-PS-04	16.00	1990	EBASCO	NA	NA	NA	NA	NA	637.87	635.30	N of Bldg.8133
EB-RA-01	16.00	12/4/90	EBASCO	Stainless	2	8	5.5 - 15.5	4	633.97	631.40	Pentolite Rd at PBRF
EB-RA-02	20.00	12/13/90	EBASCO	Stainless	2	8	7.75 - 17.75	6	633.95	631.30	NE of Bldg.1134
EB-RA-03	22.00	12/13/90	EBASCO	Stainless	2	8	8.75 - 21.75	5	633.63	630.90	W of Bldg.1131
EB-RA-04	10.00	1990	EBASCO	Stainless	2	8	4.75 - 9.75	2.75	633.54	630.70	S W of Bldg.1131
EB-RA-05	10.00	1990	EBASCO	Stainless	2	8	4.75 - 8.75	2.75	633.34	630.60	S of Bldg.1131
EB-RA-06	10.00	1990	EBASCO	Stainless	2	8	3.7 - 8.7	3.4	632.64	630.10	S of Bldg.1153
EB-SP-01	9.50	1990	EBASCO	NA	NA	8	NA	NA	855.07	852.30	S of Bldg.9115
EB-SP-03	9.50	1990	EBASCO	NA	NA	8	NA	NA	657.73	655.10	N of Bldg.1461
EB-SP-04	9.50	1990	EBASCO	NA	NA	8	NA	NA	658.02	655.25	W of Bldg.1411 Boiler Room
EB-SP-05	9.50	1990	EBASCO	NA	NA	8	NA	NA	657.00	654.50	SW of Bldg.1411 Boiler Room
EB-SP-06	8.00	1990	EBASCO	NA	NA	8	NA	NA	658.25	655.40	S of Bldg.1411
GCL-MW01	11.03	3/12/92	H+GLC	Stainless	1	8	5.99 - 10.97	4	674.81	671.40	SE of the Snake Rd burn pit
GCL-MW02A	22.15	3/11/92	H+GLC	Stainless	1	8	12.09 - 22.09	8.9	672.98	669.70	N of the Snake Rd burn pit
GCL-MW02B	9.83	3/12/92	H+GLC	Stainless	1	8	4.82 - 9.82	3.75	673.42	669.60	N of the Snake Rd burn pit
GCL-MW03	10.60	3/12/92	H+GLC	Stainless	1	8	4.56 - 9.45	3	672.57	669.55	W of the Snake Rd burn pit
IT-MW01	9.00	1989	IT	PVC	2	8	4.0 - 9.0	2	678.19	674.50	Scheid Road Burn Ground
IT-MW02	18.30	1989	IT	PVC	2	8	6.0 - 16.0	3.8	639.28	636.37	West Area RWP
IT-MW05	21.00	1989	IT	PVC	2	8	8.5 - 18.5	6.5	634.67	631.59	Pentolite Road RWP
IT-MW06	18.50	1989	IT	PVC	2	8	8.0 - 16.0	4.1	631.70	628.50	Reactor Facility / PRA
IT-MW07	5.50	1996	IT	PVC	2	4.25	0.5 - 5.5	none	635.03	632.30	West Area RWP, temporary
IT-MW08	13.40	1996	IT	PVC	2	8.25	3.1 - 13.1	3.6	633.18	630.60	West Area RWP
IT-MW09	14.60	1996	IT	PVC	2	8.25	4.1 - 14.1	2	647.45	645.40	TNT Area C
IT-MW10	19.60	1996	IT	PVC	2	8.25	9.3 - 19.3	8.6	644.80	642.20	West Area RWP
MK-MW09	15.00	1993	MK	PVC	2	10	6.0 - 15.0	3	645.61	642.95	West Area RWP
MK-MW10	14.00	1993	MK	PVC	2	10	4.0 - 14.0	2	640.57	637.74	West Area RWP

Table 4-4

Monitoring Well Construction Details
2001 Groundwater Remedial Investigation
Former Plumbrook Ordnance Works, Sandusky, Ohio

Well ID	Well Depth (feet bgs)	Date Installed	Installed By	Casing Type	Casing Diameter (inches)	Borehole Diameter (inches)	Screen Interval (feet bgs)	Top of Filter Pack (feet bgs)	TOC Elevation (feet msl)	Ground Elevation (feet msl)	Well Location
MK-MW11	13.00	1993	MK	PVC	2	10	3.0 - 13.0	2	637.36	634.39	West Area RWP
MK-MW12	13.00	1993	MK	PVC	2	10	3.0 - 13.0	2	640.93	638.10	Pipe Creek
MK-MW14	11.50	1993	MK	PVC	2	10	4.0 - 9.0	2	661.26	678.50	Toluene Tank No. 645
MK-MW15	9.00	1993	MK	PVC	2	10	4.0 - 9.0	2	680.63	677.80	Toluene Tank No. 655
MK-MW16	8.00	1993	MK	PVC	2	10	2.0 - 7.0	1	674.00	671.01	TNT Area B
MK-MW17	6.00	1993	MK	PVC	2	10	2.0 - 6.0	1	664.32	660.65	TNT Area B
MK-MW19	13.00	1993	MK	PVC	2	10	3.0 - 13.0	2	639.13	636.20	Garage Maintenance Area
MK-MW20	23.00	1993	MK	PVC	2	10	5.0 - 20.0	3	637.51	634.30	Toluene Tank No. 265
MK-MW22	8.50	1993	MK	PVC	2	10	2.5 - 7.5	1.5	637.73	635.24	TNT Area A
MK-MW23	16.00	1993	MK	PVC	2	10	6.0 - 16.0	4	639.11	636.63	TNT Area A
MK-MW24	9.50	1993	MK	PVC	2	10	4.5 - 9.5	2.5	656.80	654.12	TNT Area A
PB-MW01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE of Bldg.9206
PB-MW02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NW of Bldg.9206
PB-MW03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SE of Bldg.9206
PB-MW04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SW of Bldg.9206
PR-MW07	22.30	1994	D&M	PVC	2	8	4.3 - 22.3	3	633.67	631.16	Pentolite Road RWP
PR-MW08	27.50	1994	D&M	PVC	2	8	5.0 - 27.5	4	634.70	632.18	Pentolite Road RWP
PR-MW09	19.00	1994	D&M	PVC	2	8	4.0 - 19.0	3	633.38	630.36	Pentolite Road RWP
TNTA-MW10	11.00	1994	D&M	PVC	2	8	3.0 - 11.0	2.5	639.86	637.16	TNT Area A
TNTA-MW11	11.40	1994	D&M	PVC	2	8	3.4 - 11.4	2.5	640.16	637.54	TNT Area A
TNTC-MW03	14.00	1994	D&M	PVC	2	8	6.0 - 14.0	3.2	645.09	642.25	TNT Area C
TNTC-MW04	18.80	1994	D&M	PVC	2	8	8.8 - 18.8	6	654.11	651.57	TNT Area C
TNTC-MW05	29.70	1994	D&M	PVC	2	8	4.7 - 29.7	3.7	651.49	648.75	TNT Area C
TNTC-MW06	12.20	1994	D&M	PVC	2	8	3.2 - 12.2	2.5	659.08	656.50	TNT Area C
WA-MW01	22.30	1994	D&M	PVC	2	8	4.3 - 22.3	3.7	644.11	642.00	West Area RWP
WA-MW02	13.00	1994	D&M	PVC	2	8	3.0 - 12.0	2.5	633.33	630.84	West Area RWP
Bedrock Monitoring Wells											
AA1-BEDGW-001	65.00	9/24/97	IT	Steel to 27', PVC (40) to 65'	10" to 27', 2" to 65'	14.25" to 27', 6" to 66'	49.75-64.75	45	641.04	638.80	S of storage yd, N of RR tracks
AA2-BEDGW-001	43.00	10/2/97	IT	Steel to 20', PVC (40) to 43'	10" to 20', 2" to 43'	14.25" to 20', 6" to 44'	27.75-42.75	23	644.06	641.60	AA2 area in woods, 70' N of road
AA3-BEDGW-001	53.00	10/5/97	IT	Steel to 28', PVC (40) to 53'	10" to 28', 2" to 53'	14.25" to 28', 6" to 54'	37.75-52.75	33.0	636.43	634.10	NE of Ransom/Maintenance Rd intersection
ABG-BEDGW-001	21.00	9/10/97	IT	Steel to 7', PVC (40) to 21'	10" to 7', 2" to 21'	14.25" to 7', 6" to 22'	10.75-20.75	9.0	660.59	658.20	SW of Snake/Fox Rd intersection
BG8-BEDGW-001	20.00	9/20/97	IT	Steel to 4', PVC (40) to 20'	10" to 4', 2" to 20'	14.25" to 4', 6" to 21'	4.75-19.75	4	676.66	673.70	NW of Campbell/ Patrol Rd intersection
MNTA-BEDGW-001	64.00	9/22/97	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	44	638.40	636.05	90 ft E of Bldg 7123, 15 ft west of ditch

Table 4-4

Monitoring Well Construction Details
2001 Groundwater Remedial Investigation
Former Plumbrook Ordnance Works, Sandusky, Ohio

Well ID	Well Depth (feet bgs)	Date Installed	Installed By	Casing Type	Casing Diameter (inches)	Borehole Diameter (inches)	Screen Interval (feet bgs)	Top of Filter Pack (feet bgs)	TOC Elevation (feet msl)	Ground Elevation (feet msl)	Well Location
PB-BED-MW13	75.50	1994	D&M	PVC	4	3 (A)	29.5 (B)	none	647.95	645.49	TNT Area C
PB-BED-MW14	62.20	1994	D&M	PVC	4	3 (A)	23.2 (B)	none	645.72	642.73	West Area RWP
PB-BED-MW15	74.40	1994	D&M	PVC	4	3 (A)	42.9 (B)	none	631.31	628.76	Pentolite Road RWP
PB-BED-MW16	74.00	1994	D&M	PVC	4	3 (A)	24.8 (B)	none	635.70	633.38	Pentolite Road RWP
PB-BED-MW17	64.40	1994	D&M	PVC	4	3 (A)	19.4 (B)	none	629.65	627.02	TNT Area A
PB-BED-MW18	75.40	1994	D&M	PVC	4	3 (A)	24.4 (B)	none	651.18	648.51	TNT Area A
PB-BED-MW19	49.50	1994	D&M	PVC	4	3 (A)	17.6 (B)	none	642.75	640.19	West Area RWP
PB-BED-MW20	49.60	1994	D&M	PVC	4	3 (A)	14.5 (B)	none	676.01	673.25	BG Well - Southern PBS
PB-BED-MW22	42.00	9/10/01	IT	PVC	2	6	27-42	25	629 67	627.22	Downgradient boundary, North of reactor area
PB-BED-MW23	73.00	9/8/01	IT	PVC	2	6	53-73	49	633 71	631 11	South of reactor area, south of Pentolite Rd
PB-BED-MW24	41.00	9/13/01	IT	PVC	2	6	25 5-40.5	23 5	645 98	644.20	Background well, West of WARWP
PB-BED-MW25	38.00	9/12/01	IT	PVC	2	6	27.5-37 5	25.5	684 59	681.99	Background well, West of TNT area B
PB-BED-MW26	57.75	9/10/01	IT	PVC	2	6	42.25-57 25	40	677 21	674 61	SE Background well, SE of TNT Area B
PB-BED-MW27	105.00	9/8/01	IT	Steel to 26.50'	6" to 26 5, 6" to 105'	12" to 18.8', 8" to 26 5", 6" to 105'	26 5-105	none	627.14	625 24	Downgradient boundary, E-NE of reactor area
TNTA-BEDGW-001	85.00	9/13/01	IT	PVC	2	6	70-85	67	638 79	636.99	TNTA, E of Maint Rd/Shortcut Rd intersect
TNTB-BEDGW-001	24.00	9/31/97	IT	Steel to 9', PVC (40) to 24'	10" to 9', 2" to 24'	14.25" to 9', 6" to 25'	8.75-23.75	7.5	662.43	659.80	48 ft S of Emergency B Rd
TNTB-BEDGW-002	24.20	9/24/97	IT	Steel to 8', PVC (40) to 24.2'	10" to 8', 2" to 24.2'	14.25" to 8', 6" to 25.2'	13.95-23.95	11.2	673.35	670.10	S of Scheid Rd, 40 ft E of MK-MW16
TNTB-BEDGW-003	43.00	9/8/01	IT	PVC	2	6	32.5-42 5	30.5	683.11	681 34	TNTB, Bldg 452, S of N Magazine Rd
TNTB-BEDGW-004	25.50	9/7/01	IT	PVC	2	6	15-25	13	668 63	666.78	TNTB, Bldg 456, S of N Magazine Rd
TNTC-BEDGW-001	85.00	9/12/01	IT	PVC	2	6	70-85	67	667.04	664.04	TNTC, Bldg 683
REACTOR1	80.00	6/3/60	NASA	NA	NA	8	34.5 B)	none	630.51	630.45	Reactor Facility / PRA
REACTOR2	40.00	5/24/60	NASA	NA	NA	8	33 (B)	none	631.05	631.00	Reactor Facility / PRA
REACTOR3	40.00	5/16/60	NASA	NA	NA	8	32 (B)	none	631.21	631.10	Reactor Facility / PRA
REACTOR4	50.00	5/19/60	NASA	NA	NA	8	32.5 (B)	none	630.63	630.44	Reactor Facility / PRA
REACTOR5	85.00	9/22/58	NASA	NA	NA	5.8	35.6 (B)	none	NA	NA	Reactor Facility / PRA

Wells *not* highlighted were installed in 2001.
Coordinates scaled to the Ohio State Plane coordinate system, North Zone, NAD 1983 Vertical datum is NAVD 1929
A - 3-inch diameter open borehole into bedrock.
B - Depth at which PVC casing ends; remainder of well is open borehole in bedrock.

BG - Background location.
bgs - Below ground surface
msl - Mean sea level
NA - Information not available
PBS - Plum Brook Station.
PRA - Pentolite Road Area
PVC - Polyvinyl chloride.
PVC (40) - Schedule 40 polyvinyl chloride.
RWP - Red Water Ponds
TOC - Top of casing

Table 5-1

Summary of Analytical Parameters and Methods
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Matrix	Analytical Parameters[a]	Analytical Method[b]
Groundwater (Direct Push)	TCL Volatile Organic Compounds	SW-846 5030/8260B
	Nitroaromatic Compounds	SW-846 8330 Screen
Groundwater (Monitoring Well)	TCL Volatile Organic Compounds	SW-846 5030/8260B
	CL Semivolatile Organic Compound	SW-846 3510C/8270C
	Nitroaromatic Compounds	SW-846 8330M
	TAL Metals (T/D)	SW-846 3005A/6010B/7470A
	Turbidity	EPA 180.1
	Alkalinity	EPA 310.1
	Hardness	EPA 130.2
	Total Organic Carbon	SW-846 9060
	Total Dissolved Solids	EPA 160.1
	Total Suspended Solids	EPA 160.2
	Chloride	EPA 325.2
	Cyanide, total	SW-846 9012A
	Nitrate	EPA 353.2
	Sulfate	EPA 375.4
Free Phase	TCL Volatile Organic Compounds	SW-846 5035/8260B
	Diesel Range Organics	SW-846 8015B
	Gasoline Range Organics	SW-846 8015B
Soil	TCL Volatile Organic Compounds	SW-846 5035/8260B
	CL Semivolatile Organic Compound	SW-846 3550C/8270C
	Nitroaromatic Compounds	SW-846 8330
	TAL Metals	SW-846 3050B/6010B/7471A
	SPLP Nitroaromatics	SW-846 1312/8330
Soil IDW	TCLP Volatile Organic Compounds	SW-846 1311/8260B
	CLP Semivolatile Organic Compound	SW-846 1311/8270C
	TCLP Metals	SW-846 1311/6010B/7471A
	Ignitability	SW-846 1010
	Corrosivity	SW-846 1110
	Reactivity	7.3.3.2/7.3.4.2

[a]Target analyte list (TAL) and target compound list (TCL) are used to designate parameter lists with requirements for Contract Laboratory Program (CLP) method quality control or data reporting packa
[b] Analyses found in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* Third E and *Methods for Chemical Analysis of Water and Wastes*, March 1983 and their subsequent revisio

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Coordinates (Ohio Plane)[a] Easting (x)	Northing (y)	Top of Casing Elevation[a] (ft msl)	Ground Elevation[a] (ft msl)	Groundwater Elevation Measurements (feet above mean sea level [msl]) 12/1994[b]	0319/95[c]	10/1996[d]	8/27	8/27/1997[e]	11/12	11/12/1997[f]	2/24	02/24/1998[g]
IT-AA1-BEDGW-001	1917719	623069	641.04	638.80	--	--	--	--	--	30.52	610.52	30.50	610.54
IT-AA1-GW002	1917728	623068	640.85	638.60	--	--	--	--	--	6.22	634.63	3.05	637.80
IT-AA2-BEDGW-001	1909552	623600	644.06	641.60	--	--	--	--	--	13.11	630.95	11.58	632.48
IT-AA2-GW-002	1909481	623589	643.95	641.50	--	--	--	--	--	--	dry	--	dry
IT-AA3-BEDGW-001	1914957	625037	636.43	634.10	--	--	--	--	--	23.22	613.21	21.53	614.90
IT-AA3-GW-002	1914956	625028	636.11	634.10	--	--	--	--	--	6.30	629.81	3.88	632.23
IT-ABG-BEDGW-001	1921506	621580	660.59	658.20	--	--	--	--	--	6.09	654.50	3.55	657.04
IT-ABG-GW-002	1921516	621579	661.06	658.20	--	--	--	--	--	6.55	654.51	3.95	657.11
PB-BED-MW13	1912175	621044	647.95	645.49	607.85	619.29	621.79	27.80	620.15	27.08	620.87	48.47	599.48
PB-BED-MW14	1910457	622720	645.72	642.73	621.76	624.39	625.23	18.51	627.21	19.72	626.00	16.44	629.28
PB-BED-MW15	1919283	626179	631.31	628.76	603.54	598.91	610.22	29.95	601.36	21.12	610.19	20.34	610.97
PB-BED-MW16	1920594	623299	635.70	633.36	571.38	633.68	630.17	11.80	623.90	7.41	628.29	2.28	633.42
PB-BED-MW17	1924121	625417	629.65	627.02	602.57	602.90	602.76	26.48	603.17	27.75	601.90	26.85	602.80
PB-BED-MW18	1925483	623849	651.18	648.51	625.05	620.39	621.68	30.58	620.60	30.22	620.96	30.55	620.63
PB-BED-MW19	1910174	623869	642.75	640.19	621.07	623.52	622.92	19.85	622.90	20.55	622.20	19.00	623.75
PB-BED-MW20	1922952	612423	676.01	673.25	661.35	661.28	661.98	14.28	661.73	14.42	661.59	13.98	662.03
PB-BED-MW22	1918367	629778	629.67	627.22	--	--	--	--	--	--	--	--	--
PB-BED-MW23	1918150	625838	633.71	631.11	--	--	--	--	--	--	--	--	--
PB-BED-MW24	1908168	622916	645.98	644.20	--	--	--	--	--	--	--	--	--
PB-BED-MW25	1914458	617821	684.59	681.99	--	--	--	--	--	--	--	--	--
PB-BED-MW26	1920274	613878	677.21	674.61	--	--	--	--	--	--	--	--	--
PB-BED-MW27	1920791	627896	627.14	625.24	--	--	--	--	--	--	--	--	--
IT-BG8-BEDGW-001	1909857	618635	676.56	673.70	--	--	--	--	--	6.38	670.18	8.11	668.45
EB-GM-01	1918339	623563	640.45	637.70	--	--	--	8.77	631.68	9.29	631.16	7.35	633.10
EB-GM-02	1917822	624435	637.52	634.90	--	--	--	10.76	626.76	9.46	628.06	4.91	632.61
EB-GM-03	1917775	624131	638.90	636.20	--	--	--	6.28	632.62	7.38	631.52	5.81	633.09
EB-GM-04	1917442	624052	636.34	633.60	--	--	--	5.56	630.78	5.55	630.79	3.27	633.07
EB-GM-05	1917802	623872	639.70	637.00	--	--	--	6.24	633.46	7.57	632.13	5.80	633.90
EB-GM-06	1917799	623723	639.61	637.00	--	--	--	6.08	633.53	7.36	632.25	5.92	633.69
EB-PS-02	1920061	624344	638.53	635.70	--	--	--	5.97	632.56	5.87	632.66	4.81	633.72
EB-PS-03	1920187	624324	637.15	634.40	--	--	--	5.65	631.50	6.35	630.80	5.62	631.53
EB-PS-04	1920259	624298	637.87	635.30	--	--	--	8.87	629.00	9.00	628.87	7.30	630.57
EB-RA-01	1917783	625964	633.97	631.40	--	--	--	6.61	627.36	7.88	626.09	5.63	628.34
EB-RA-02	1918282	626944	633.95	631.30	--	--	--	8.10	625.85	8.72	625.43	6.52	627.43
EB-RA-03	1918346	626788	633.63	630.90	--	--	--	--	dry	--	dry	9.09	624.54
EB-RA-04	1918389	626731	633.54	630.70	--	--	--	8.07	625.47	10.36	623.18	7.12	626.42

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Coordinates (Ohio Plane)[a] Easting (x)	Northing (y)	Top of Casing Elevation[a] (ft msl)	Ground Elevation[a] (ft msl)	Groundwater Elevation Measurements (feet above mean sea level [msl]) 12/1994[b]	0319/95[c]	10/1996[d]	8/27	8/27/1997[e]	11/12	11/12/1997[f]	2/24	02/24/1998[g]
EB-RA-05	1918492	626717	633.34	630.60	--	--	--	7.95	625.39	8.87	624.47	6.87	626.47
EB-RA-06	1918750	626748	632.64	630.10	--	--	--	8.65	623.99	7.86	624.78	5.20	627.44
EB-SP-01	1927550	613598	655.07	652.30	--	--	--	6.43	648.64	7.55	647.52	5.54	649.53
EB-SP-03	1926836	613398	657.73	655.10	--	--	--	5.26	652.47	6.94	650.79	4.26	653.47
EB-SP-04	1926937	613162	658.02	655.25	--	--	--	7.20	650.82	8.18	649.84	4.21	653.81
EB-SP-05	1926897	613051	657.00	654.50	--	--	--	5.08	651.92	6.17	650.83	4.92	652.08
EB-SP-06	1927074	613056	658.25	655.40	--	--	--	6.80	651.45	8.10	650.15	7.04	651.21
GCL-MW01	1921255	617560	674.81	671.40	--	--	--	8.32	666.49	8.81	666.00	4.57	670.24
GCL-MW02A	1920961	617937	672.96	669.70	--	--	--	7.57	665.39	7.79	665.17	4.65	668.31
GCL-MW02B	1920984	617941	673.42	669.60	--	--	--	8.32	665.10	8.41	665.01	4.59	668.83
GCL-MW03	1920777	617641	672.57	669.55	--	--	--	6.00	666.57	6.61	665.96	4.20	668.37
IT-MW01	1915525	616901	678.19	674.50	--	--	--	5.45	672.74	7.00	671.19	4.66	673.53
IT-MW02	1910265	622512	639.28	636.37	627.32	633.75	629.33	8.09	631.19	9.78	629.50	5.68	633.60
IT-MW05	1919475	625346	634.67	631.59	620.19	629.62	623.36	9.88	624.79	10.45	624.22	4.42	630.25
IT-MW06	1918768	628642	631.70	628.50	--	--	--	8.34	623.36	9.21	622.49	4.01	627.69
IT-MW07[i]	1909862	622076	635.03	632.30	--	--	--	--	dry	--	dry	--	dry
IT-MW08	1911132	622498	633.16	630.60	--	--	619.96	8.22	624.94	10.72	622.44	2.91	630.25
IT-MW09	1910699	620956	647.45	645.40	--	--	dry	6.00	641.45	7.24	640.21	4.72	642.73
IT-MW10	1909485	623027	644.80	642.20	--	--	626.41	11.25	633.55	12.12	632.68	8.20	636.60
MK-MW09	1908872	623901	645.61	642.95	--	--	--	6.09	639.52	6.49	639.12	5.00	640.61
MK-MW10	1910564	623860	640.57	637.74	626.66	--	632.23	7.13	633.44	8.49	632.08	7.15	633.42
MK-MW11	1910564	623860	637.36	634.39	625.22	631.36	628.89	7.13	630.23	8.14	629.22	5.92	631.44
MK-MW12	1908764	621233	640.93	638.10	--	--	--	9.86	631.07	10.78	630.15	7.45	633.48
MK-MW14	1913325	618311	681.26	678.50	--	--	--	8.17	673.09	8.72	672.54	4.62	676.64
MK-MW15	1913304	618488	680.63	677.80	--	--	--	8.22	672.41	8.80	671.83	4.92	675.71
MK-MW16	1918011	616834	674.00	671.01	667.14	669.36	668.42	5.97	668.03	7.75	666.25	5.14	668.86
MK-MW17	1917613	618572	664.32	660.65	659.58	661.10	660.56	4.32	660.00	4.75	659.57	3.68	660.64
MK-MW19	1917535	623871	639.13	636.20	--	--	--	7.99	631.14	6.83	632.30	3.67	635.46
MK-MW20	1920539	622912	637.51	634.30	--	--	--	4.97	632.54	4.78	632.73	6.61	630.90
MK-MW22	1923776	624339	637.73	635.24	628.85	631.55	630.07	8.20	629.53	8.24	629.49	6.94	630.79
MK-MW23	1925354	624657	639.11	636.63	620.88	628.12	632.14	8.49	630.62	8.02	631.09	5.61	633.50
MK-MW24	1923302	622264	656.80	654.12	648.31	650.77	649.61	7.08	649.72	7.22	649.58	6.25	650.55

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Coordinates (Ohio Plane)[a] Easting (x)	Northing (y)	Top of Casing Elevation[a] (ft msl)	Ground Elevation[a] (ft msl)	Groundwater Elevation Measurements (feet above mean sea level [msl]) 12/1994[b]	0319/95[c]	10/1996[d]	8/27	8/27/1997[e]	11/12	11/12/1997[f]	2/24	02/24/1998[g]
IT-MNTA-BEDGW-001	1918699	623808	638.40	636.05	--	--	--	--	--	28.04	610.36	27.05	611.35
PB-PR-MW07	1919021	624996	633.67	631.18	626.32	631.65	629.64	5.35	628.32	5.06	628.61	2.21	631.46
PB-PR-MW08	1919309	624889	634.70	632.18	624.55	629.98	627.56	6.66	628.04	7.72	626.98	4.90	629.80
PB-PR-MW09	1919510	625092	633.38	630.38	622.92	630.12	626.57	6.50	626.88	7.85	625.53	3.36	630.02
REACTOR1	1917983	626773	630.51	630.45	--	--	--	15.32	615.19	22.06	608.45	33.25	597.26
REACTOR2	1918003	626661	631.05	631.00	614.71	601.89	--	15.40	615.65	4.81	626.24	28.53	602.52
REACTOR3	1918148	626685	631.21	631.10	--	--	--	14.60	616.61	22.17	609.04	37.45	593.76
REACTOR4	1918147	626630	630.83	630.44	--	--	--	--	--	--	--	--	--
PB-TNTA-MW10	1923399	623864	639.86	637.18	633.71	637.04	635.62	4.16	635.70	4.67	635.19	3.10	636.76
PB-TNTA-MW11	1922744	623518	640.18	637.54	630.50	632.82	633.56	5.49	634.69	5.16	635.02	4.78	635.40
IT-TNTA-BEDGW-001	1922580	623447	638.79	636.99	--	--	--	--	--	--	--	--	--
IT-TNTB-BEDGW-001	1917218	618738	662.43	659.80	--	--	--	--	--	4.11	658.32	5.60	656.83
IT-TNTB-BEDGW-002	1918021	616835	673.35	670.10	--	--	--	--	--	6.91	666.44	2.89	670.46
IT-TNTB-BEDGW-003	1918710	618103	683.11	681.34	--	--	--	--	--	--	--	--	--
IT-TNTB-BEDGW-004	1918572	618469	668.63	666.78	--	--	--	--	--	--	--	--	--
IT-TNTC-BEDGW-001	1912853	620254	667.04	664.04	--	--	--	--	--	--	--	--	--
PB-TNTC-MW03	1911391	621465	645.09	642.25	dry	639.20	635.01	8.07	637.02	9.27	635.82	3.80	641.29
PB-TNTC-MW04	1910470	620413	654.11	651.57	634.87	651.07	648.51	6.15	647.96	7.62	646.49	3.32	650.79
PB-TNTC-MW05	1911811	620692	651.49	648.75	628.01	647.62	643.28	5.62	645.87	5.60	645.89	3.02	648.47
PB-TNTC-MW06	1913006	620429	659.08	656.50	651.93	655.20	654.58	4.46	654.62	5.71	653.37	3.72	655.36
PB-WA-MW01	1909948	622641	644.11	642.00	--	--	--	14.00	630.11	16.15	627.96	4.09	640.02
PB-WA-MW02	1910176	622124	633.33	630.84	--	--	--	3.89	629.44	4.46	628.87	1.53	631.80

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Groundwater Elevation Measurements (feet above mean sea level (msl))									
	5/5	05/05/1998[h]	9/20[i]	09/20/00	1/17[i]	01/17/01	8/15[i]	08/15/01	11/15[i]	11/15/01
IT-AA1-BEDGW-001	29.1	611.94	14.30	626.74	--	--	31 00	610 04	32 16	608.88
IT-AA1-GW002	3.42	637.43	4.20	636.65	3.60	637.25	7.32	633.53	4.38	636.47
IT-AA2-BEDGW-001	9.89	634.17	14.30	629.76	--	--	13.25	630.81	15.91	628.15
IT-AA2-GW-002	--	dry	13.20	630.75	7.50	636.45	16 57	627.38	20.58	623.37
IT-AA3-BEDGW-001	21.62	614.81	25.20	611.23	24.90	611.53	25.61	610.82	27.58	608.85
IT-AA3-GW-002	3.97	632.14	5.10	631.01	4.00	632.11	8.80	627.31	6.82	629.29
IT-ABG-BEDGW-001	5.60	654.99	5.80	654.79	4.20	656.39	7.80	652.79	5.99	654 60
IT-ABG-GW-002	4.92	656.14	5.80	655.26	4.60	656.46	8.51	652.55	6.46	654.60
PB-BED-MW13	*41.40*	*606.55*	*27.90*	*620.05*	*28.40*	*619.55*	*30.31*	*617.64*	*45.60*	*602 35*
PB-BED-MW14	15.99	629.73	18.80	626.92	17.90	627.82	19.63	626 09	21.73	623.99
PB-BED-MW15	19.79	611.52	20.40	610.91	18.80	612.51	17.13	614.18	31.18	600.13
PB-BED-MW16	2.74	632.96	5.00	630.70	--	--	5.29	630.41	30.14	605.56
PB-BED-MW17	26.40	603 25	29.80	599.85	0.00	629.65	29.33	600.32	31.50	598.15
PB-BED-MW18	30.72	620.46	30.90	620.28	31.80	619.38	31.79	619.39	33.10	618.08
PB-BED-MW19	18.45	624.30	21.20	621.55	21.90	620.85	25.38	617.38	24.91	617.84
PB-BED-MW20	13.29	662.72	13.80	662.21	13.80	662.21	13.75	662 26	14.48	661.53
PB-BED-MW22	--	--	--	--	--	--	--	--	--	--
PB-BED-MW23	--	--	--	--	--	--	--	--	--	--
PB-BED-MW24	--	--	--	--	--	--	--	--	--	--
PB-BED-MW25	--	--	--	--	--	--	--	--	--	--
PB-BED-MW26	--	--	--	--	--	--	--	--	--	--
PB-BED-MW27	--	--	--	--	--	--	--	--	--	--
IT-BG8-BEDGW-001	5.86	670.70	5.40	671.16	6.00	670.56	9.04	667.52	5 57	670.99
EB-GM-01	7.97	632.48	8.40	632.05	8.60	631.85	9.71	630.74	8.57	631.88
EB-GM-02	5.14	632.38	7.80	629.72	5.10	632.42	14.04	623.48	14 83	622 69
EB-GM-03	5.99	632.91	6.00	632.90	6.40	632.50	7.60	631.30	6.81	632.09
EB-GM-04	3.91	632.43	4.60	631.74	3 90	632.44	10.28	626.06	4.57	631 77
EB-GM-05	dry	dry	6.40	633.30	6.90	632.80	7 48	632 22	7.05	632.65
EB-GM-06	6.00	633.61	6.30	633.31	6 80	632.81	7 23	632.38	7.65	631.96
EB-PS-02	4.90	633.63	5.70	632.83	4.50	634.03	7 27	631.26	5 96	632.57
EB-PS-03	5.52	631.63	5.70	631.45	6.30	630.85	6 27	630.88	6.35	630.80
EB-PS-04	5.26	632.61	8.40	629 47	8.60	629.27	9 43	628.45	8.60	629.27
EB-RA-01	5.75	628.22	6.40	627.57	5.90	628.07	9.35	624.62	7.42	626.55
EB-RA-02	6.72	627.23	7.10	626 85	7.30	626 65	10 45	623.50	9.50	624.45
EB-RA-03	9.70	623 93	12.60	621.03	15.70	617.93	16.03	617.61	14.27	619.36
EB-RA-04	7.53	*626.01*	8.60	624.94	9.80	623.74	11.30	622.24	9 18	624.36

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Groundwater Elevation Measurements (feet above mean sea level [msl])									
	6/5	06/05/1998[h]	9/20[i]	09/20/00	1/17[i]	01/17/01	8/15[i]	08/15/01	11/15[i]	11/15/01
EB-RA-05	7.07	626.27	7.10	626.24	7.40	625.94	10.10	623.24	8.29	625.05
EB-RA-06	4.49	628.15	6.10	626.54	5.20	627.44	9.66	622.98	6.76	625.88
EB-SP-01	5.78	649.29	7.40	647.67	6.50	648.57	9.34	645.73	7.89	647.18
EB-SP-03	4.21	653.52	4.80	652.93	--	--	7.07	650.66	5.94	651.79
EB-SP-04	7.20	650.82	7.40	650.62	--	--	7.76	650.26	7.80	650.22
EB-SP-05	4.96	652.04	5.40	651.60	--	--	7.03	649.97	5.95	651.05
EB-SP-06	7.24	651.01	6.40	651.85	--	--	7.63	650.63	7.63	650.62
GCL-MW01	4.98	669.83	6.80	668.01	6.90	667.91	10.12	664.69	8.94	665.87
GCL-MW02A	4.85	668.11	5.60	667.36	4.90	668.06	9.20	663.76	6.34	666.62
GCL-MW02B	5.00	668.42	6.10	667.32	5.20	668.22	9.67	663.75	6.88	666.54
GCL-MW03	4.50	668.07	5.30	667.27	4.60	667.97	8.25	664.32	5.60	666.97
IT-MW01	4.60	673.59	5.30	672.89	4.80	673.39	8.12	670.07	5.60	672.59
IT-MW02	5.79	633.49	6.95	632.33	5.80	633.48	11.66	627.62	9.88	629.40
IT-MW05	4.76	629.91	8.80	625.87	6.40	628.27	12.35	622.32	14.15	620.52
IT-MW06	4.02	627.68	--	--	--	--	10.48	621.22	10.08	621.62
IT-MW07[j]	--	dry	3.90	631.13	2.70	632.33	6.81	628.22	--	--
IT-MW08	3.12	630.04	6.60	626.56	5.20	627.96	12.18	620.98	14.38	618.78
IT-MW09	5.02	642.43	8.30	639.15	6.80	640.65	9.50	637.95	7.06	640.39
IT-MW10	6.19	636.61	10.30	634.50	9.50	635.30	16.06	628.74	14.09	630.71
MK-MW09	4.99	640.62	5.80	639.81	5.60	640.01	9.21	636.40	6.35	639.26
MK-MW10	5.22	635.35	5.60	634.97	5.20	635.37	9.33	631.24	6.98	633.59
MK-MW11	6.51	630.85	6.80	630.56	6.50	630.86	12.07	625.29	7.99	629.37
MK-MW12	8.38	632.55	--	--	9.40	631.53	11.50	629.43	10.39	630.54
MK-MW14	4.81	676.45	7.50	673.76	6.00	675.26	9.56	671.68	9.50	671.76
MK-MW15	4.86	675.77	7.40	673.23	6.80	673.83	9.13	671.50	8.75	671.88
MK-MW16	5.10	668.90	5.90	668.10	6.10	667.90	8.49	665.51	6.77	667.23
MK-MW17	3.90	660.42	5.10	659.22	4.90	659.42	5.78	658.55	5.10	659.22
MK-MW19	4.56	634.57	4.90	634.23	4.80	634.33	8.30	630.83	5.68	633.45
MK-MW20	5.85	631.66	5.50	632.01	--	--	5.57	631.94	6.12	631.39
MK-MW22	7.42	630.31	7.80	629.93	6.90	630.83	9.60	628.13	7.28	630.45
MK-MW23	6.54	632.57	7.40	631.71	7.30	631.81	10.35	628.76	7.11	632.00
MK-MW24	6.18	650.62	7.50	649.30	6.10	650.70	9.39	647.41	8.24	648.56

Table 6-1

Summary of Groundwater Elevation Measurements
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well Identification	Groundwater Elevation Measurements (feet above mean sea level [msl])									
	5/5	05/05/1998[h]	9/20[i]	09/20/00	1/17[i]	01/17/01	8/15[i]	08/15/01	11/15[i]	11/15/01
IT-MNTA-BEDGW-001	25.60	612.80	--	--	--	--	29.40	609.00	30.99	607.41
PB-PR-MW07	2.17	631 50	--	--	--	--	5.63	628.05	5.08	628.59
PB-PR-MW08	4.37	630.33	--	--	--	--	7.19	627.51	6 82	627.88
PB-PR-MW09	3.40	629 98	--	--	--	--	8 70	624.68	6 40	626.98
REACTOR1	32.30	598.21	25.50	605.01	31 80	598.71	30.20	600.31	28.64	601.87
REACTOR2	27.50	603.55	27.40	603.65	27 10	603.95	0.13	630.93	0.00	631.05
REACTOR3	37.08	594.13	35.60	595.61	35.20	596.01	34.43	596.78	34.43	596.78
REACTOR4	--	--	20.40	610.43	20.30	610.53	20.65	610.18	20.40	610.43
PB-TNTA-MW10	3.24	636.62	4.80	635.06	2.90	636.96	8.03	631.83	5.60	634.26
PB-TNTA-MW11	4.34	635.84	6.20	633.98	3.10	637.08	7.30	632.88	9.40	630.78
IT-TNTA-BEDGW-001	--	--	--	--	--	--	--	--	--	--
IT-TNTB-BEDGW-001	2.91	659.52	3.60	658.83	3.60	658.83	4.78	657.65	3.83	658.60
IT-TNTB-BEDGW-002	7.67	665.68	6.20	667.15	5.60	667.75	8.20	665.15	6.48	666.87
IT-TNTB-BEDGW-003	--	--	--	--	--	--	--	--	--	--
IT-TNTB-BEDGW-004	--	--	--	--	--	--	--	--	--	--
IT-TNTC-BEDGW-001	--	--	--	--	--	--	--	--	--	--
PB-TNTC-MW03	4.95	640.14	6 80	638.29	4.20	640.89	11.46	633.63	11.31	633.78
PB-TNTC-MW04	3.21	659.90	6.80	647.31	4.00	650.11	7.80	646.31	6.66	647.45
PB-TNTC-MW05	3.10	648.39	5.20	646.29	3.60	647.89	7.76	643.73	17.60	633.89
PB-TNTC-MW06	3.81	655.27	4.90	654.18	4.10	654.98	6.68	652.40	4.89	654.19
PB-WA-MW01	4.70	639.41	14.20	629.91	9.20	634.91	17.65	626.46	21.12	622.99
PB-WA-MW02	1.54	631.79	3.90	629.43	1.90	631.43	4.74	628.59	3.39	629.94

[a] Northings and Eastings are scaled to the Ohio State Plane Coordinate System (North Zone), NAD 1983 Vertical datum to NGVD 1929.

[b] Data from Dames & Moore, Sitewide Groundwater Investigation Final Report (4/97)

[c] Data from Dames & Moore, Sitewide Groundwater Investigation Final Report (4/97)

[d] Data from IT Corporation, Site-Wide Groundwater Investigation Report (9/97).

[e] Data from IT Corporation, 1st Quarterly Water Level Measurement Event Report (10/97).

[f] Data from IT Corporation, 2nd Quarterly Water Level Measurement and 1st Semi-Annual Groundwater Sampling Event Report (5/98).

[g] Data from IT Corporation, 3rd Quarterly Water Level Measurement Event Report (6/97).

[h] Data from IT Corporation, 4th Quarterly Water Level Measurement and 2nd Semi-Annual Groundwater Sampling Event Report (6/99).

[i] Data received from ICI field measurements (2/02).

[j] Symbol denotes data are not available.

[m] Product in well No measurement recorded.

[n] Temporary piezometer.

Table 6-2

Detected Hydrocarbon in 2001 Bedrock Drilling
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Monitoring Well	Date Drilled	Location	Depth to Bedrock (ft)	Bedrock (refusal - ft)	Depth to Limestone/Unit [a] (ft)	Depth Drilled (ft)	on/H_2S Odor Detected[b]	Hydrocarbon Stained Core[c] (ft)	Comments
PB-BED-MW22	8/24/01-9/10/01	Downgradient Boundary, North of Reactor Area	19.5	19.5	19.5/Delaware	43	20-24.5	40-43	
PB-BED-MW23	8/25/01-9/6/01	South of Reactor Area and Pentolite Road	26.3	26.3	26.3/Delaware	74	30-74	33-74	Hydrocarbon observed seepng from rock core.
PB-BED-MW24	8/26/01-9/13/01	Upgradient Boundary, West of West Red Water Ponds (Background)	17.3	17.3	17.3/Delaware	41.5	26.5-40.0	31.5-41.5	Hydrocarbon observed seepng from rock core. Gas discharge? (gurgling) heard during water recharge.
PB-BED-MW25	8/26/01-9/11/01	Upgradient Boundary, West of TNT Area B (Background)	8.8	15	21.5/Olentangy Shale	38.5	33.5-38.5	None	
PB-BED-MW26	8/27/01-9/10/01	Southeast Upgradient Boundary, Southeast of TNT B (Background)	6.5	24.5	41.5/Prout	58.5	32.6-43.0	None	
PB-BED-MW27	8/23/01-9/8/01	Downgradient Boundary, East-Northeast of Reactor Area	18.8	18.8	20.0/Delaware	105	95-105	41-105	Hydrocarbon observed seepng from rock core.
TNTA-BEDGW-001	9/24/01-9/13/01	TNT Area A, Near Maintenance and Short Cut Rd, At Former Bldg 146	8.5	25	51/Delaware	86	None	68-85	A thickness of approx. 3.5 feet free-phase hydrocarbon was encountered prior to sampling.
TNTB-BEDGW-003	8/30/01-9/8/01	TNT Area B, South of North Magazine Rd, North of Former Bldg 456	4.3	18	35.1/Prout	43.3	None	None	
TNTB-BEDGW-004	8/29/01-9/7/01	TNT Area B, South of North Magazine Rd, At Former Bldg 452	4.9	6.3	16.3/Prout	26.1	None	None	
TNTC-BEDGW-001	8/28/01-9/12/01	TNT Area C, At Former Bldg 683	14.5	55.3	58.0/Olentangy Shale	86	None	None	

Notes

[a] Limestone unit interpretations from Regional Geologic Map, Summary Report, Site-Wide Groundwater Monitoring (1997-1998) (IT, 1999).

[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 E)

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

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

Table 6-3

Summary of Hydraulic Conductivity Testing Results
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Well No.	Date Tested	Aquifer Response	Saturated Aquifer Thickness (Assumed)	Test Type	Transmissivities T (ft^2/day)	Hydraulic Conductivities K (ft/min)	Hydraulic Conductivities K (cm/sec)	Hydraulic Conductivities K (ft/day)
OVERBURDEN								
IT-MW-08		Unconfined		Rising		3.32E-03	1.69E-03	4.78E+00
		Unconfined		Rising		7.16E-03	3.64E-03	1.03E+01
		Unconfined		Rising		9.57E-03	4.86E-03	1.38E+01
IT-AA1-GW-002	10/10/97	Unconfined	22.13	Rising	1.63E+01	5.13E-04	2.61E-04	7.39E-01
IT-AA2-GW-002	---	---	dry	---	---	---	---	---
IT-AA3-GW-002	10/8/97	Unconfined	18.02	Rising	7.63E+01	2.94E-03	1.49E-03	4.23E+00
IT-ABG-GW-002	10/8/97	Unconfined	9.58	Rising	2.03E+03	1.47E-01	7.47E-02	2.12E+02
Maximum					***2.03E+03***	***1.47E-01***	***7.47E-02***	***2.12E+02***
Minimum					***1.63E+01***	***5.13E-04***	***2.61E-04***	***7.39E-01***
Geometric Mean					***1.36E+02***	***6.08E-03***	***3.09E-03***	***8.75E+00***
BEDROCK								
PB-BED-MW22	11/13/01	Unconfined	14.21	Rising	3.69E+00	1.80E-04	9.16E-05	2.59E-01
PB-BED-MW23	11/14/01	Unconfined	8.27	Rising	5.41E-01	4.54E-05	2.31E-05	6.54E-02
PB-BED-MW24	11/13/01	Unconfined	15.32	Falling	2.35E+01	1.07E-03	5.42E-04	1.54E+00
				Rising	2.81E+01	1.28E-03	6.48E-04	1.84E+00
PB-BED-MW25	11/14/01	Unconfined	25.55	Falling	1.40E+02	3.81E-03	1.94E-03	5.48E+00
				Rising	1.23E+02	3.33E-03	1.69E-03	4.80E+00
PB-BED-MW26	slug test was not performed due to low water column in the well							
PB-BED-MW27	11/14/01	Unconfined	59.26	Rising	1.37E-01	1.61E-06	8.16E-07	2.31E-03
IT-AA1-BEDGW-00	10/7/97	Unconfined	35.82	Rising	2.67E+00	5.17E-05	2.63E-05	7.44E-02
IT-AA2-BEDGW-00	10/7/97	Unconfined	31.40	Rising	1.02E+00	2.26E-05	1.15E-05	3.25E-02
IT-BG8-BEDGW-00	10/8/97	Unconfined	16.64	Rising	5.73E+00	2.39E-04	1.21E-04	3.44E-01
IT-ABG-BEDGW-00	10/8/97	Unconfined	17.65	Rising	3.91E+02	1.54E-02	7.83E-03	2.22E+01
IT-TNTB-BEDGW-0	10/8/97	Unconfined	22.73	Rising	1.33E+00	4.07E-05	2.07E-05	5.86E-02
IT-TNTB-BEDGW-0	10/8/97	Unconfined	19.68	Rising	3.51E+02	1.24E-02	6.30E-03	1.79E+01
IT-MNTA-BEDGW-0	*10/8/97*	*Unconfined*	38.14	*Rising*	1.19E+00	2.17E-05	1.10E-05	3.12E-02
IT-AA3-BEDGW-00	10/8/97	Unconfined	30.81	Rising	1.14E+01	2.58E-04	1.31E-04	3.72E-01
TNTA-BEDGW-001	slug test was not performed due to low water column in the well							
TNTB-BEDGW-003	11/13/01	Unconfined	11.68	Falling	insufficient data			
				Rising	2.82E-02	1.68E-06	8.52E-07	2.41E-03
TNTB-BEDGW-004	11/13/01	Unconfined	18.36	Falling	4.03E+01	1.53E-03	7.75E-04	2.20E+00
				Rising	8.51E+01	3.22E-03	1.64E-03	4.63E+00
TNTC-BEDGW-001	11/14/01	Unconfined	28.59	Falling	8.66E+00	2.10E-04	1.07E-04	3.03E-01
				Rising	5.46E+00	1.33E-04	6.74E-05	1.91E-01
Maximum					***3.91E+02***	***1.54E-02***	***7.83E-03***	***2.22E+01***
Minimum					***2.82E-02***	***1.61E-06***	***8.16E-07***	***2.31E-03***
Geometric Mean					***7.71E+00***	***2.46E-04***	***1.25E-04***	***3.54E-01***

Table 6-4

Well Pair Vertical Hydraulic Gradients
2001 Groundwater Remedial Investigation
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 8/27/97	11/12/97	2/24/98	5/5/98	Average Vertical Gradient (ft/ft)
Pair 1	IT-AA1-GW002	OB/OS	22	6.8-21.9	638.6	624.25	NA	634.63	637.80	637.43	
	IT-AA1-BED-GW001	DL	65.0	49.8-64	638.8	581.90	NA	610.52	610.54	611.94	
	Distance between Center of Monitored Zones										
	Vertical Gradient						NA	0.563	0.637	0.596	0.599
Pair 2	IT-AA2-GW-002	OB/OLS	18.5	8.3-18.3	641.5	628.20	NA	DRY	DRY	643.95	
	IT-AA2-BED-GW001	DL	54	27.8-42.8	641.6	606.30	NA	630.95	632.48	634.17	
	Distance between Center of Monitored Zones					21.90					
	Vertical Gradient						NA	NA	NA	0.447	0.447
Pair 3	AA3-GW002	OB	16	5.8-15.8	634.1	623.30	NA	629.81	632.23	622.14	
	AA3-BED-GW001	DL	53	37.8-52.8	634.1	588.80	NA	613.21	614.9	614.81	
	Distance between Center of Monitored Zones					34.50					
	Vertical Gradient						NA	0.481	0.502	0.212	0.398
Pair 4	ABG-GW002	OB	6.8	2.5-6.5	658.2	653.70	NA	654.51	657.11	657.06	
	ABG-BED-GW001	OS	21	10.8-20.8	658.2	642.40	NA	654.5	657.04	656.99	
	Distance between Center of Monitored Zones					11.30					
	Vertical Gradient	OB/OS					NA	0.001	0.006	0.006	0.004
Pair 5	MK-MW16	OB/OS	8	2-7	671.01	666.51	NA	666.25	669.18	669.22	
	TNTB-BED-GW002	OS	24.2	14-24	670.10	651.10	NA	666.44	670.46	665.68	
	Distance between Center of Monitored Zones					15.41					
	Vertical Gradient						NA	-0.012	-0.81	0.223	0.044

OB - Overburden.
OS - Ohio State.
OLS - Olentangy shale.
DL - Delaware limestone.

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	West Area Red Water									
		Sample Location:	PB-BED-MW14									
		Sample Number:	5900		5905		5905R		BD3018		BD3018R	
		Sample Date:	18-Nov-97		16-May-98		18-May-98		28-Sep-01		5-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives												
Dinitrotoluene, 2,4-	µg/L	0.099										
Dinitrotoluene, 2,6-	µg/L	0.099										
Trinitrotoluene, 2,4,6-	µg/L	2.2										
Volatiles												
Acetone	µg/L	610									9.4	B
Benzene	µg/L	0.35	1.1									
Carbon disulfide	µg/L	1000	1.3				0.25	J				
Chlorobenzene	µg/L	110										
Chloroform	µg/L	0.16										
Ethylbenzene	µg/L	1300	0.59	J								
Methylene chloride	µg/L	4.3									1.4	B
Toluene	µg/L	720	1.7	B								
Trichloroethane, 1,1,2-	µg/L	0.2										
Xylenes, total	µg/L	1400	3.9									
Semivolatiles												
Bis(2-ethylhexyl)phthalate	µg/L	4.8										
Butyl benzyl phthalate	µg/L	7300										
Di-n-butyl phthalate	µg/L	3600										
Diethyl phthalate	µg/L	29000										
Dimethylphenol, 2,4-	µg/L	730										
Dinitro-2-methylphenol, 4,6-	µg/L	NE					28	NJ				
Dinitrophenol, 2,4-	µg/L	73					14	J				
Dinitrotoluene, 2,4-	µg/L	0.099					16					
Fluorene	µg/L	240										
Isophorone	µg/L	71										
Methylnaphthalene, 2-	µg/L	NE										
Methylphenol, 2-	µg/L	1800										
Methylphenol, 4-	µg/L	180										
Naphthalene	µg/L	6.2										
Nitrobenzene	µg/L	3.4					5.8	J				
Phenanthrene	µg/L	NE										
Phenol	µg/L	22000										
n-Nitrosodiphenylamine	µg/L	14										

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	West Area Red Water									
		Sample Location:	PB-BED-MW14									
		Sample Number:	5900		5905		5905R		BD3018		BD3018R	
		Sample Date:	18-Nov-97		16-May-98		18-May-98		28-Sep-01		5-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Metals - Unfiltered												
Aluminum	µg/L	36000	374	J					64.9	B		
Arsenic	µg/L	0.045							6.1	J		
Barium	µg/L	2600							49.5	J		
Chromium	µg/L	110	10.2						1.6	J		
Cobalt	µg/L	2200							102			
Copper	µg/L	1400							30.7			
Iron	µg/L	11000	923		427	J			164			
Manganese	µg/L	880	54		32				65.2			
Nickel	µg/L	730	42.3		45.5				111			
Selenium	µg/L	180							5.5			
Thallium	µg/L	2.4							6	B		
Vanadium	µg/L	260							2.4	B		
Zinc	µg/L	11000	39.8		42.2	B			10.8	J		
Metals - Filtered												
Aluminum	µg/L	36000							54.9	B		
Arsenic	µg/L	0.045							6.6	J		
Barium	µg/L	2600							50.8	J		
Chromium	µg/L	110							1.9	J		
Cobalt	µg/L	2200			65.4				105			
Copper	µg/L	1400							27			
Iron	µg/L	11000			269				145			
Manganese	µg/L	880	29.1		32.6				68			
Nickel	µg/L	730	40.7		71.3				117			
Selenium	µg/L	180							8.2	B		
Thallium	µg/L	2.4							7.2	B		
Vanadium	µg/L	260							2.4	J		
Zinc	µg/L	11000	32.4		53.9	B			12.6	J		

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	West Area Red Water									
		Sample Location:	PB-BED-MW14									
		Sample Number:	5900		5905		5905R		BD3018		BD3018R	
		Sample Date:	18-Nov-97		16-May-98		18-May-98		28-Sep-01		5-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Water Quality Parameters												
Alkalinity	µg/L	NE	210000		500000				482000			
Chloride	µg/L	NE	79000		3000				72200			
Cyanide, total	µg/L	6.2	16		44							
Hardness	µg/L	NE	640000		730000				1200000			
Nitrate	µg/L	NE	300									
Nitrate	µg/L	NE			24000						22000	
Sulfate	µg/L	NE	610000		630000				1440000			
Turbidity	NTU	NE									4.2	
Total dissolved solids	µg/L	NE	2500000		2300000				3570000			
Total organic carbon	µg/L	NE	190000		160000				617000			
Total suspended solids	µg/L	NE	37000		23000				11000			

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Pentolite Road Red Water Area							
		Sample Location:	PB-BED-MW15						PB-BED-MW23	
		Sample Number:	5910		5915		BD3019		BD3028	
		Sample Date:	18-Nov-97		28-May-98		9-Oct-01		9-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives										
Dinitrotoluene, 2,4-	µg/L	0.099			0.89					
Dinitrotoluene, 2,6-	µg/L	0.099			0.89					
Trinitrotoluene, 2,4,6-	µg/L	2.2					1.6			
Volatiles										
Acetone	µg/L	610					170	J	1600	J
Benzene	µg/L	0.35	570		780		670		2100	
Carbon disulfide	µg/L	1000								
Chlorobenzene	µg/L	110			5.5	J				
Chloroform	µg/L	0.16	8.4	B						
Ethylbenzene	µg/L	1300	130		140		150	J	190	J
Methylene chloride	µg/L	4.3	31	B	83	B	120	J	160	J
Toluene	µg/L	720	490		550		630		910	
Trichloroethane, 1,1,2-	µg/L	0.2			4.9	J				
Xylenes, total	µg/L	1400	920		880		1000		1300	
Semivolatiles										
Bis(2-ethylhexyl)phthalate	µg/L	4.8	37		28	B	2.2	J	7.1	J
Butyl benzyl phthalate	µg/L	7300							1.5	J
Di-n-butyl phthalate	µg/L	3600							1.1	J
Diethyl phthalate	µg/L	29000							1.2	J
Dimethylphenol, 2,4-	µg/L	730	6.7	J	10		5.6	J	42	
Dinitro-2-methylphenol, 4,6-	µg/L	NE								
Dinitrophenol, 2,4-	µg/L	73								
Dinitrotoluene, 2,4-	µg/L	0.099								
Fluorene	µg/L	240	1.7	J						
Isophorone	µg/L	71	4.2	J	3.8	J				
Methylnaphthalene, 2-	µg/L	NE	31		37		25		22	
Methylphenol, 2-	µg/L	1800	3	J	6.7	J	3.3	J	25	
Methylphenol, 4-	µg/L	180	3.9	J	7.7	J	4.2	J	21	
Naphthalene	µg/L	6.2	22		31		24		21	
Nitrobenzene	µg/L	3.4								
Phenanthrene	µg/L	NE	2.2	J	2	J	0.98	J	1.3	J
Phenol	µg/L	22000	18		32		12		80	
n-Nitrosodiphenylamine	µg/L	14							0.64	J

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Pentolite Road Red Water Area							
		Sample Location:	PB-BED-MW15						PB-BED-MW23	
		Sample Number:	5910		5915		BD3019		BD3028	
		Sample Date:	18-Nov-97		28-May-98		9-Oct-01		9-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Metals - Unfiltered										
Aluminum	µg/L	36000			513	J	51.1	B	350	
Arsenic	µg/L	0.045							**4.2**	B
Barium	µg/L	2600	605		1710		481		64.2	J
Chromium	µg/L	110			20.6				15	
Cobalt	µg/L	2200							5.9	J
Copper	µg/L	1400			39.5				4.8	J
Iron	µg/L	11000	930		4810				7280	
Manganese	µg/L	880	26.3		139		5.6	J	**1170**	
Nickel	µg/L	730					3.8	J	13.6	J
Selenium	µg/L	180								
Thallium	µg/L	2.4			**50.8**					
Vanadium	µg/L	260								
Zinc	µg/L	11000	30.6		105	B			18	J
Metals - Filtered										
Aluminum	µg/L	36000					64.5	B	93.6	B
Arsenic	µg/L	0.045							**2.9**	J
Barium	µg/L	2600	555		1390		484		54.4	J
Chromium	µg/L	110							1.5	J
Cobalt	µg/L	2200							2.6	J
Copper	µg/L	1400								
Iron	µg/L	11000							3060	
Manganese	µg/L	880					5.2	J	**988**	
Nickel	µg/L	730					2.4	J	5	J
Selenium	µg/L	180								
Thallium	µg/L	2.4			**62.2**					
Vanadium	µg/L	260								
Zinc	µg/L	11000	30.9		47.3	B				

Table 6-5

Detected Constituents in Bedrock Monitoring Wells
West and Pentolite Area Red Water Ponds
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Pentolite Road Red Water Area							
		Sample Location:	PB-BED-MW15						PB-BED-MW23	
		Sample Number:	5910		5915		BD3019		BD3028	
		Sample Date:	18-Nov-97		28-May-98		9-Oct-01		9-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Water Quality Parameters										
Alkalinity	µg/L	NE	85000		500000		382000		227000	
Chloride	µg/L	NE	1400000		2200000		1910000		2480000	
Cyanide, total	µg/L	6.2								
Hardness	µg/L	NE	1500000		1800000		855000		5410000	J
Nitrate	µg/L	NE								
Nitrate	µg/L	NE								
Sulfate	µg/L	NE			82000		89200		85800	
Turbidity	NTU	NE					203		324	
Total dissolved solids	µg/L	NE	3200000		3800000		2570000		3080000	
Total organic carbon	µg/L	NE	11000		13000		8400		6200	
Total suspended solids	µg/L	NE	7000		13000				292000	

µg/L - Micrograms per liter.
NTU - Nephelometric turbidity unit.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-6

Detected Constituents in Temporary Piezometers
TNT Manufacturing Areas A, B, and C
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Area:			TNT Area A		TNT Area B		TNT Area C			
Sample Location:			TNTA-DP21		TNTB-DP03		TNTC-DP13		TNTC-DP19	
Sample Number:			BA3021		BB3003		BC3013		BC3019	
Sample Date:			1-Aug-01		1-Aug-01		1-Aug-01		6-Aug-01	
Parameter	Units	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives										
4-Amino-2,6-dinitrotoluene	µg/L	2.2	3.9							
2-Amino-4,6-dinitrotoluene	µg/L	2.2	4.3							
2,4-Dinitrotoluene	µg/L	0.099	9.5							
2,6-Dinitrotoluene	µg/L	0.099	4.9							
2-Nitrotoluene	µg/L	61	24							
3-Nitrotoluene	µg/L	61	1.3							
4-Nitrotoluene	µg/L	61	3.1							
2,4,6-Trinitrotoluene	µg/L	2.2	4.1		0.14				4	
Volatiles										
Acetone	µg/L	610	8.8		10		8.8			
Chloroform	µg/L	0.16	1							

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
Val Qlfr - Validation qualifier.

Table 6-7

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area A
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	PB-TNTA-MW10				PB-TNTA-MW11					
		Sample No:	5610		5615		5620		5625		BD3034	
		Sample Date:	18-Nov-97		29-May-98		18-Nov-97		29-May-98		3-Oct-01	
Parameter	Units	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlf	Result	Val Qlfr
Explosives												
Amino-2,6-dinitrotolu	µg/L	2.2									1.5	
Amino-4,6-dinitrotolu	µg/L	2.2									2.1	
Dinitrotoluene, 2,4-	µg/L	0.099										
Trinitrotoluene, 2,4,6-	µg/L	2.2									0.29	
Volatiles												
Acetone	µg/L	610	35	J	7.6	J					2.8	B
Carbon disulfide	µg/L	1000										
Methylene chloride	µg/L	4.3			2.1	B			0.95	B		
Toluene	µg/L	720			0.25	B			0.26	B		
Xylenes, total	µg/L	1400										
Semivolatiles												
Benzo(ghi)perylene	µg/L	NE										
Bis(2-ethylhexyl)phth	µg/L	4.8										
Dinitrotoluene, 2,4-	µg/L	0.099										
Indeno(1,2,3-cd)pyre	µg/L	0.092										
Metals - Filtered												
Aluminum	µg/L	36000										
Arsenic	µg/L	0.045										
Barium	µg/L	2600	338									
Beryllium	µg/L	73										
Cadmium	µg/L	18										
Cobalt	µg/L	2200										
Copper	µg/L	1400										
Iron	µg/L	11000	7610		9330							
Lead	µg/L	15										
Manganese	µg/L	880	1440		1370		865		355			
Mercury	µg/L	11										
Nickel	µg/L	730										
Selenium	µg/L	180										
Thallium	µg/L	2.4										
Zinc	µg/L	11000	25		22.7	B	45.4					

Table 6-7

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area A
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	PB-TNTA-MW10				PB-TNTA-MW11					
		Sample No:	5610		5615		5620		5625		BD3034	
		Sample Date:	18-Nov-97		29-May-98		18-Nov-97		29-May-98		3-Oct-01	
Parameter	Units	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlf	Result	Val Qlfr
Metals - Unfiltered												
Aluminum	µg/L	36000	877	J	2280	J	3170	J	2990	J	8950	J
Arsenic	µg/L	0.045	12.2		14.5		10.5				7.2	J
Barium	µg/L	2600	373								88.4	J
Beryllium	µg/L	73										
Cadmium	µg/L	18									1.2	B
Chromium	µg/L	110					15.6		12.2		18.2	J
Cobalt	µg/L	2200									10	J
Copper	µg/L	1400									15.9	J
Iron	µg/L	11000	18200		18700		13300		6610		16400	J
Lead	µg/L	15			5.6		10.4		3.2		9.4	J
Manganese	µg/L	880	1530		1250		1030		444		383	J
Mercury	µg/L	11										
Nickel	µg/L	730									22.4	J
Selenium	µg/L	180										
Thallium	µg/L	2.4										
Vanadium	µg/L	260									17.8	J
Zinc	µg/L	11000	27		48.1	B	47.1		37.5	B	39.2	J
Water Quality Parameters												
Alkalinity	µg/L		490000		410000		450000		460000			
Chloride	µg/L		47000		100000		140000		180000			
Hardness	µg/L		1100000		730000		940000		680000			
Nitrate	µg/L											
Nitrate	µg/L											
Sulfate	µg/L		160000		100000		150000		93000			
Total dissolved solids	µg/L		780000		760000		1000000		1000000			
Total organic carbon	µg/L		4200		2000		4500		3000		4300	
Total suspended soli	µg/L		7000				140000		7000			

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-8

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area A
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Location:			PB-BED-MW17						PB-BED-MW18						TNTA-BEDGW-001	
Sample Number:			5930		5935		BD3021		5940		5945		BD3024		BD3037	
Sample Date:			20-Nov-97		29-May-98		3-Oct-01		19-Nov-97		19-May-98		2-Oct-01		9-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives																
Amino-2,6-dinitrotoluen	µg/L	2.2													1.3	
Amino-4,6-dinitrotoluen	µg/L	2.2													0.33	
Dinitrobenzene, 1,3-	µg/L	3.6							1							
Dinitrotoluene, 2,4-	µg/L	0.099									0.49					
Dinitrotoluene, 2,6-	µg/L	0.099					0.3	J			3.6					
Nitrobenzene	µg/L	3.4	0.34						2							
Trinitrobenzene, 1,3,5-	µg/L	1100							1.5							
Volatiles																
Acetone	µg/L	610					87	B			34	J	88	J		
Benzene	µg/L	0.35	10	J					11		5.7				700	J
Butanone, 2-	µg/L	1900														
Carbon disulfide	µg/L	1000	40	J					32		7.9					
Chloromethane	µg/L	1.5											35	J		
Dichloroethane, 1,1-	µg/L	810														
Ethylbenzene	µg/L	1300	79		9.9	J	120		32		88		32	J	240	J
Methylene chloride	µg/L	4.3	18	B	65	B	41	J			2.4	B	47	J	330	J
Toluene	µg/L	720	140		20	B	180		21		53				730	J
Xylenes, total	µg/L	1400	360		46		550		170		420		150		1400	
Semivolatiles																
Bis(2-ethylhexyl)phthala	µg/L	4.8			6.8	B	4	J	3.5	J	16	B			8.6	J
Chrysene	µg/L	9.2													15	J
Dibenzofuran	µg/L	24													12	J
Dimethylphenol, 2,4-	µg/L	730			2.8	J	3.8	J	5.1	J	11		7.2	J	13	J
Fluorene	µg/L	240													28	J
Isophorone	µg/L	71														
Methylnaphthalene, 2-	µg/L	NE			20		9.2	J	2.2	J	5	J	1.6	J	470	
Methylphenol, 2-	µg/L	1800					1.1	J	2.6	J	3.3	J	2.6	J		
Methylphenol, 4-	µg/L	180					2	J	2.8	J	4	J	1.2	J	9.8	J
Naphthalene	µg/L	6.2			18		9.8	J	3.8	J	10		3.1	J	170	
Phenanthrene	µg/L	NE					0.99	J							74	J
Phenol	µg/L	22000					2.6	J	21	J			3.5	J	13	J
Metals - Unfiltered																
Aluminum	µg/L	36000	396	B			106	J	283	J			54.6	B		
Arsenic	µg/L	0.045					5.4	J							10.8	J
Barium	µg/L	2600	948		800		912		893		942		916		1000	J
Beryllium	µg/L	73													1.1	B
Chromium	µg/L	110														
Cobalt	µg/L	2200													6.4	J

Table 6-8

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area A
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Location:			PB-BED-MW17						PB-BED-MW18						TNTA-BEDGW-001	
Sample Number:			5930		5935		BD3021		5940		5945		BD3024		BD3037	
Sample Date:			20-Nov-97		29-May-98		3-Oct-01		19-Nov-97		19-May-98		2-Oct-01		9-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Copper	µg/L	1400													3.2	J
Iron	µg/L	11000	1580		456		160		476	B	166		40	J	127	J
Lead	µg/L	15														
Manganese	µg/L	880	124		20.4		21.6		36.8		80.8		41.8		11700	J
Mercury	µg/L	11							1						0.067	J
Nickel	µg/L	730													75.7	J
Selenium	µg/L	180														
Thallium	µg/L	2.4														
Vanadium	µg/L	260														
Zinc	µg/L	11000	49.9		30.8	B			31						297	J
Metals - Filtered																
Aluminum	µg/L	36000					77.8	B					55.4	B	239	J
Arsenic	µg/L	0.045			13.1		2.7	J								
Barium	µg/L	2600	1100		871		911		1010		994		938		382	J
Chromium	µg/L	110														
Copper	µg/L	1400														
Iron	µg/L	11000													856	J
Lead	µg/L	15			6.8											
Manganese	µg/L	880					9.8	J	35.9		80.9		37.7		54.6	J
Nickel	µg/L	730														
Selenium	µg/L	180														
Vanadium	µg/L	260													12.5	J
Zinc	µg/L	11000	33.3	J	73.4	B					23.5	B			17.1	J
Water Quality Parameters																
Alkalinity	µg/L	NE	830000		930000		741000		120000		550000		170000			
Chloride	µg/L	NE	1800000		1600000		2420000		6900000		1200000		9450000			
Cyanide, total	µg/L	6.2	320													
Hardness	µg/L	NE	1800000		1300000		1680000		4000000		10000000		3980000			
Nitrate	µg/L	NE														
Sulfate	µg/L	NE	59000		80000		53600		16000		18000		56500			
Total dissolved solids	µg/L	NE	3000000		2900000		2680000		12000000		33000000		13400000			
Total organic carbon	µg/L	NE	1200		3000		5700		6500		3000		2500	J	12300	
Total suspended solids	µg/L	NE			4000		53000		61000		100000		33000			

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-9

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	MK-MW16				MK-MW17					
		Sample No:	5780		5785		5790		5795		BD3012	
		Sample Date:	21-Nov-97		18-May-98		21-Nov-97		27-May-98		1-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives												
Amino-2,6-dinitrotoluene, 4-	µg/L	2.2					3.6		5.7		21	
Amino-4,6-dinitrotoluene, 2-	µg/L	2.2									24	
Dinitrotoluene, 2,4-	µg/L	0.099							1.7		6.6	
Trinitrotoluene, 2,4,6-	µg/L	2.2							0.68		23	
Volatiles												
Acetone	µg/L	610			5.2	J					4	B
Carbon disulfide	µg/L	1000										
Methylene chloride	µg/L	4.3	0.4	B	0.52	B	0.39	B	0.28	B		
Toluene	µg/L	720							0.21	B		
Xylenes, total	µg/L	1400										
Semivolatiles												
Benzo(ghi)perylene	µg/L	NE									0.97	J
Bis(2-ethylhexyl)phthalate	µg/L	4.8	2.4	J	2.8	B						
Dinitrotoluene, 2,4-	µg/L	0.099							1.8	J	2	J
Indeno(1,2,3-cd)pyrene	µg/L	0.092									1	J
Metals - Filtered												
Aluminum	µg/L	36000	1080		663				7430		3390	
Arsenic	µg/L	0.045							22		6.5	J
Barium	µg/L	2600									23.4	J
Beryllium	µg/L	73									2.3	J
Cadmium	µg/L	18									0.54	J
Cobalt	µg/L	2200			51.9		72.9		56.7		105	
Copper	µg/L	1400			39.2				32.2		2.2	B
Iron	µg/L	11000	2410		5970		34100		41600		14800	
Lead	µg/L	15			7.4				17			
Manganese	µg/L	880	6900		8850		1260		1170		1830	
Mercury	µg/L	11					0.3					
Nickel	µg/L	730	47.2		81.7		140		131		248	
Selenium	µg/L	180	5									
Thallium	µg/L	2.4							10.1	B		
Zinc	µg/L	11000	54.7	J	141	B	87.7	J	157		231	

Table 6-9

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	MK-MW16				MK-MW17					
		Sample No:	5780		5785		5790		5795		BD3012	
		Sample Date:	21-Nov-97		18-May-98		21-Nov-97		27-May-98		1-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Metals - Unfiltered												
Aluminum	µg/L	36000	4990	J	1180		1830	J	6920	J	3310	
Arsenic	µg/L	0.045					12.6		18.7		6.6	J
Barium	µg/L	2600									23.1	J
Beryllium	µg/L	73									2	J
Cadmium	µg/L	18									0.58	B
Chromium	µg/L	110										
Cobalt	µg/L	2200			69.8		78.8		54.9		101	
Copper	µg/L	1400							32.9		6.7	J
Iron	µg/L	11000	19800		20700	J	44300		41900		14300	
Lead	µg/L	15	8	B			4.4	B	16.4			
Manganese	µg/L	880	6970		13600		1410		1120		1770	
Mercury	µg/L	11										
Nickel	µg/L	730	61.8		108		156		130		240	
Selenium	µg/L	180	5				5.1					
Thallium	µg/L	2.4										
Vanadium	µg/L	260										
Zinc	µg/L	11000	75.5		209		137		152		214	
Water Quality Parameters												
Alkalinity	µg/L		36000		320000		38000				2700	B
Chloride	µg/L		3000	B	3000		4000	B	6000		4800	
Hardness	µg/L		490000		750000		440000		490000		443000	
Nitrate	µg/L											
Nitrate	µg/L											
Sulfate	µg/L		470000		550000		300000		330000		504000	
Total dissolved solids	µg/L		290000		800000		660000		590000		764000	
Total organic carbon	µg/L		2500		2000		3400		3000		2700	
Total suspended solids	µg/L				9000		5000		120000		5000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-10

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	IT-TNTB-BEDGW-001								IT-TNTB-BEDGW-002					
		Sample Number:	5420		5425		BD3009		BD3009R		5430		5435		BD3010	
		Sample Date:	17-Nov-97		18-May-98		28-Sep-01		5-Oct-01		16-Nov-97		18-May-98		27-Sep-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives																
Amino-2,6-dinitrotoluene, 4-	µg/L	2.2														
Amino-4,6-dinitrotoluene, 2-	µg/L	2.2														
Dinitrobenzene, 1,3-	µg/L	3.6														
Dinitrotoluene, 2,4-	µg/L	0.099														
Dinitrotoluene, 2,6-	µg/L	0.099														
Nitrobenzene	µg/L	3.4														
Trinitrobenzene, 1,3,5-	µg/L	1100														
Volatiles																
Acetone	µg/L	610			1.9	B			3	B					2	B
Benzene	µg/L	0.35	0.14	J							0.91	J				
Butanone, 2-	µg/L	1900														
Carbon disulfide	µg/L	1000	0.82	J	7.2						6.4					
Chloromethane	µg/L	1.5														
Dichloroethane, 1,1-	µg/L	810			0.19	J										
Ethylbenzene	µg/L	1300									0.85	J				
Methylene chloride	µg/L	4.3							0.5	B	4.8	B	3.1	B		
Toluene	µg/L	720	0.22	B												
Xylenes, total	µg/L	1400	0.44	B							12					
Semivolatiles																
Bis(2-ethylhexyl)phthalate	µg/L	4.8	3.6	J	13	B					3	J	3.1	B		
Chrysene	µg/L	9.2														
Dibenzofuran	µg/L	24														
Dimethylphenol, 2,4-	µg/L	730														
Fluorene	µg/L	240														
Isophorone	µg/L	71														
Methylnaphthalene, 2-	µg/L	NE														
Methylphenol, 2-	µg/L	1800														
Methylphenol, 4-	µg/L	180														
Naphthalene	µg/L	6.2														
Phenanthrene	µg/L	NE														
Phenol	µg/L	22000									2.3	J				
Metals - Unfiltered																
Aluminum	µg/L	36000	654		1130	J			69.7	B	317				48.3	B
Arsenic	µg/L	0.045			12.9											
Barium	µg/L	2600			1100				1410		326		406		391	J
Beryllium	µg/L	73														
Chromium	µg/L	110														
Cobalt	µg/L	2200														

Table 6-10

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	IT-TNTB-BEDGW-001								IT-TNTB-BEDGW-002					
		Sample Number:	5420		5425		BD3009		BD3009R		5430		5435		BD3010	
		Sample Date:	17-Nov-97		18-May-98		28-Sep-01		5-Oct-01		16-Nov-97		18-May-98		27-Sep-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Copper	µg/L	1400	33.9		80.9				6	B					2	B
Iron	µg/L	11000	41700		13000				132		1030		168	J		
Lead	µg/L	15	3.9		6.2						4.8		7.1			
Manganese	µg/L	880	677		196				35.3		85.4		36.6		31.4	J
Mercury	µg/L	11														
Nickel	µg/L	730	42.1													
Selenium	µg/L	180														
Thallium	µg/L	2.4														
Vanadium	µg/L	260														
Zinc	µg/L	11000	48.8		150	J			9.1	J	73.9		39.6	B	5	B
Metals - Filtered																
Aluminum	µg/L	36000							76.3	B					48.9	B
Arsenic	µg/L	0.045														
Barium	µg/L	2600			1040				1380		384		414		391	J
Chromium	µg/L	110														
Copper	µg/L	1400														
Iron	µg/L	11000	16300		302						586					
Lead	µg/L	15									3					
Manganese	µg/L	880	694		278				36		71		36.5		31.6	J
Nickel	µg/L	730							2.1	J						
Selenium	µg/L	180														
Vanadium	µg/L	260														
Zinc	µg/L	11000											40.4	B		
Water Quality Parameters																
Alkalinity	µg/L	NE	180000		360000		381000				220000		380000		432000	
Chloride	µg/L	NE	90000		600000		704000				91000		74000		77900	
Cyanide, total	µg/L	6.2														
Hardness	µg/L	NE	360000		650000		443000				450000		530000		414000	
Nitrate	µg/L	NE														
Sulfate	µg/L	NE	140000		120000		72500				90000		140000		152000	
Total dissolved solids	µg/L	NE	730000		1200000		1390000				760000		7600000		776000	
Total organic carbon	µg/L	NE	12000		5000		4900				5000		4000		3700	
Total suspended solids	µg/L	NE	480000		9000						5000		6000			

Table 6-10

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	TNTB-BEDGW-003		TNTB-BEDGW-004	
		Sample Number:	BD3038		BD3041	
		Sample Date:	8-Oct-01		5-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr
Explosives						
Amino-2,6-dinitrotoluene, 4-	µg/L	2.2				
Amino-4,6-dinitrotoluene, 2-	µg/L	2.2				
Dinitrobenzene, 1,3-	µg/L	3.6				
Dinitrotoluene, 2,4-	µg/L	0.099				
Dinitrotoluene, 2,6-	µg/L	0.099				
Nitrobenzene	µg/L	3.4				
Trinitrobenzene, 1,3,5-	µg/L	1100				
Volatiles						
Acetone	µg/L	610	110	J	36	J
Benzene	µg/L	0.35	**17**		**1.4**	J
Butanone, 2-	µg/L	1900	75	J		
Carbon disulfide	µg/L	1000	8			
Chloromethane	µg/L	1.5				
Dichloroethane, 1,1-	µg/L	810				
Ethylbenzene	µg/L	1300				
Methylene chloride	µg/L	4.3	1.5	B	0.5	B
Toluene	µg/L	720	5.2		1.3	J
Xylenes, total	µg/L	1400				
Semivolatiles						
Bis(2-ethylhexyl)phthalate	µg/L	4.8	2	J		
Chrysene	µg/L	9.2				
Dibenzofuran	µg/L	24				
Dimethylphenol, 2,4-	µg/L	730				
Fluorene	µg/L	240				
Isophorone	µg/L	71				
Methylnaphthalene, 2-	µg/L	NE				
Methylphenol, 2-	µg/L	1800				
Methylphenol, 4-	µg/L	180				
Naphthalene	µg/L	6.2				
Phenanthrene	µg/L	NE				
Phenol	µg/L	22000	2.2	J		
Metals - Unfiltered						
Aluminum	µg/L	36000	16900		1010	
Arsenic	µg/L	0.045	**22.7**			
Barium	µg/L	2600	1500		51.3	J
Beryllium	µg/L	73	1.5	B		
Chromium	µg/L	110	32.3		1 3	
Cobalt	µg/L	2200	18.7	J		

Table 6-10

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area B
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	TNTB-BEDGW-003		TNTB-BEDGW-004	
		Sample Number:	BD3038		BD3041	
		Sample Date:	8-Oct-01		5-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr
Copper	µg/L	1400	99.2		10.9	J
Iron	µg/L	11000	35000		8090	
Lead	µg/L	15	15.7			
Manganese	µg/L	880	1140		928	
Mercury	µg/L	11	0.079	J		
Nickel	µg/L	730	71.2		5.4	J
Selenium	µg/L	180	14.4			
Thallium	µg/L	2.4				
Vanadium	µg/L	260	48.6	J	2.3	J
Zinc	µg/L	11000	184		37.5	
Metals - Filtered						
Aluminum	µg/L	36000	96.7	B	69	B
Arsenic	µg/L	0.045	4.9	J		
Barium	µg/L	2600	628		40.8	J
Chromium	µg/L	110	1.2	J		
Copper	µg/L	1400	2.4	B		
Iron	µg/L	11000			5670	
Lead	µg/L	15				
Manganese	µg/L	880	1.6	J	812	
Nickel	µg/L	730			2	J
Selenium	µg/L	180	20.4			
Vanadium	µg/L	260	8.5	J		
Zinc	µg/L	11000			19.9	J
Water Quality Parameters						
Alkalinity	µg/L	NE	86300		126000	
Chloride	µg/L	NE	1460000		7400	
Cyanide, total	µg/L	6.2				
Hardness	µg/L	NE	453000		229000	
Nitrate	µg/L	NE	48	J		
Sulfate	µg/L	NE	86200		129000	
Total dissolved solids	µg/L	NE	2180000		347000	
Total organic carbon	µg/L	NE	12100	J	3600	B
Total suspended solids	µg/L	NE	1430000		65000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-11

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area C
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	PB-TNTC-MW3				PB-TNTC-MW4						PB-TNTC-MW6					
		Sample No:	5630		5635		5640		5645		BD3043		5660		5665		BD3035	
		Sample Date:	21-Nov-97		18-May-98		24-Nov-97		18-May-98		4-Oct-01		21-Nov-97		18-May-98		3-Oct-01	
Parameter	Units	PRGs	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlfr
Explosives																		
Amino-2,6-dinitrotoluene, 4-	µg/L	2.2																
Amino-4,6-dinitrotoluene, 2-	µg/L	2.2																
Dinitrotoluene, 2,4-	µg/L	0.099																
Trinitrotoluene, 2,4,6-	µg/L	2.2															0.61	
Volatiles																		
Acetone	µg/L	610							2.5	B	39	B					3.7	B
Carbon disulfide	µg/L	1000											0.51	B				
Methylene chloride	µg/L	4.3			0.47	B					1.5	B	0.43	B	0.51	B		
Toluene	µg/L	720																
Xylenes, total	µg/L	1400									3.3	J						
Semivolatiles																		
Benzo(ghi)perylene	µg/L	NE																
Bis(2-ethylhexyl)phthalate	µg/L	4.8																
Dinitrotoluene, 2,4-	µg/L	0.099																
Indeno(1,2,3-cd)pyrene	µg/L	0.092																
Metals - Filtered																		
Aluminum	µg/L	36000					432				64.8	B					433	
Arsenic	µg/L	0.045																
Barium	µg/L	2600									24	J					64.1	J
Beryllium	µg/L	73																
Cadmium	µg/L	18																
Cobalt	µg/L	2200									7.5	J					6.7	J
Copper	µg/L	1400																
Iron	µg/L	11000	132	B			403	B									515	
Lead	µg/L	15					11						4.2					
Manganese	µg/L	880	2900		617		1120		582		688		522		452		1180	
Mercury	µg/L	11																
Nickel	µg/L	730	77.1				56.8				15.6	J					6.7	J
Selenium	µg/L	180					11.4											
Thallium	µg/L	2.4															6.9	B
Zinc	µg/L	11000	28.5	J	45.5	B	52	J			64.7				27	B	3.2	J

Table 6-11

Detected Constituents in Overburden Monitoring Wells
TNT Manufacturing Area C
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	PB-TNTC-MW3				PB-TNTC-MW4						PB-TNTC-MW5					
		Sample No:	5630		5635		5640		5645		BD3043		5650		5655		BD3035	
		Sample Date:	21-Nov-97		18-May-98		24-Nov-97		18-May-98		4-Oct-01		21-Nov-97		18-May-98		3-Oct-01	
Parameter	Units	PRGs	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlf	Result	Val Qlfr
Metals - Unfiltered																		
Aluminum	µg/L	36000			6030		3820	J	4570	J	1800	J	3490	J	5230		6160	J
Arsenic	µg/L	0.045			18.6		21.6						10.1		21.3		8.8	J
Barium	µg/L	2600									29.5	J					203	J
Beryllium	µg/L	73																
Cadmium	µg/L	18																
Chromium	µg/L	110			30		25.2		11		3.4	J	18.4		28		13.9	J
Cobalt	µg/L	2200	67.5								7.2	J					16.7	J
Copper	µg/L	1400			31.5						6.7	B			31		19.5	J
Iron	µg/L	11000	805		23500	J	17400		8230		3050		13900		22700	J	13300	J
Lead	µg/L	15			13.6		14.5		3.2				13.8		20.1		10.5	J
Manganese	µg/L	880	2950		973		800		715		613		713		616		1620	J
Mercury	µg/L	11																
Nickel	µg/L	730	120				52.4				10.4	J					17.2	J
Selenium	µg/L	180					7.2											
Thallium	µg/L	2.4									6.4	B					[illegible]	B
Vanadium	µg/L	260									3.1	J					14.4	J
Zinc	µg/L	11000	34.5		80.8	B	58.7		41.2	B	25.2		53		56.3	B	31	J
Water Quality Parameters																		
Alkalinity	µg/L		270000		350000		330000		250000		350000		320000		380000		296000	
Chloride	µg/L		17000		14000		23000		27000		19800		50000		26000		46900	
Hardness	µg/L		13000000		1800000		9200000		720000		1120000		500000		850000		517000	
Nitrate	µg/L						91000	J										
Nitrate	µg/L								400						200			
Sulfate	µg/L		2000000		1300000		1100000		990000		839000	J	430000		240000		423000	
Total dissolved solids	µg/L		3000000		2900000		2100000		1600000		1650000		1000000		1200000		1020000	
Total organic carbon	µg/L		2400		3000		2600		3000		5700		3000		3000		2100	
Total suspended solids	µg/L				150000		5000		280000		48000		7000		240000		355000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier

Table 6-12

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area C
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

(Page 1 of 2)

		Sample Location:	PB-BED-MW13						TNTC-BEDGW-001	
		Sample Number:	5890		5895		BD3017		BD3042	
		Sample Date:	13-Nov-97		29-May-98		3-Oct-01		4-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives										
Amino-2,6-dinitrotoluene, 4-	µg/L	2.2								
Amino-4,6-dinitrotoluene, 2-	µg/L	2.2								
Dinitrobenzene, 1,3-	µg/L	3.6								
Dinitrotoluene, 2,4-	µg/L	0.099								
Dinitrotoluene, 2,6-	µg/L	0.099								
Nitrobenzene	µg/L	3.4								
Trinitrobenzene, 1,3,5-	µg/L	1100								
Volatiles										
Acetone	µg/L	610							54	B
Benzene	µg/L	0.35	130	D	47		270	J		
Butanone, 2-	µg/L	1900								
Carbon disulfide	µg/L	1000	5.8							
Chloromethane	µg/L	1.5								
Dichloroethane, 1,1-	µg/L	810								
Ethylbenzene	µg/L	1300	73	D	57		120	J	22	J
Methylene chloride	µg/L	4.3			51	B	43	J	160	J
Toluene	µg/L	720	170	D	120		270	J		
Xylenes, total	µg/L	1400	520	D	540		1200	J	190	
Semivolatiles										
Bis(2-ethylhexyl)phthalate	µg/L	4.8	39		55	J	7.7	J		
Chrysene	µg/L	9.2								
Dibenzofuran	µg/L	24								
Dimethylphenol, 2,4-	µg/L	730	16		13	J	22			
Fluorene	µg/L	240					1	J		
Isophorone	µg/L	71			2.7	J				
Methylnaphthalene, 2-	µg/L	NE	20		14	J	25		4.5	J
Methylphenol, 2-	µg/L	1800	4.1	J	3.3	J	6.6	J		
Methylphenol, 4-	µg/L	180	4.7	J	3.3	J	6.9	J		
Naphthalene	µg/L	6.2	15		10	J	27		5.2	J
Phenanthrene	µg/L	NE					1.3	J		
Phenol	µg/L	22000	62		69	J	12			
Metals - Unfiltered										
Aluminum	µg/L	36000					96.8	J	130	B
Arsenic	µg/L	0.045							4.1	J
Barium	µg/L	2600	1550				2090	J	29.4	J
Beryllium	µg/L	73								
Chromium	µg/L	110								
Cobalt	µg/L	2200								

Table 6-12

Detected Constituents in Bedrock Monitoring Wells
TNT Manufacturing Area C
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Location:	PB-BED-MW13						TNTC-BEDGW-001	
		Sample Number:	5890		5895		BD3017		BD3042	
		Sample Date:	13-Nov-97		29-May-98		3-Oct-01		4-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Copper	µg/L	1400					6.1	J		
Iron	µg/L	11000	244	B	207		106	J	66.6	J
Lead	µg/L	15								
Manganese	µg/L	880	17.4		41.9		29.1	J	271	
Mercury	µg/L	11								
Nickel	µg/L	730							2.3	J
Selenium	µg/L	180								
Thallium	µg/L	2.4					6	B		
Vanadium	µg/L	260								
Zinc	µg/L	11000	47.2				5.6	J		
Metals - Filtered										
Aluminum	µg/L	36000					80.9	B	82.5	B
Arsenic	µg/L	0.045							6	J
Barium	µg/L	2600	1680		208		2090	J	30.8	J
Chromium	µg/L	110								
Copper	µg/L	1400								
Iron	µg/L	11000	116	B						
Lead	µg/L	15								
Manganese	µg/L	880			43.8		28.1	J	290	
Nickel	µg/L	730							2.3	J
Selenium	µg/L	180								
Vanadium	µg/L	260								
Zinc	µg/L	11000	30.1				5	J		
Water Quality Parameters										
Alkalinity	µg/L	NE	430000		300000		402000		440000	
Chloride	µg/L	NE	2500000				4290000		274000	
Cyanide, total	µg/L	6.2								
Hardness	µg/L	NE	1600000		450000		2050000		1720000	
Nitrate	µg/L	NE								
Sulfate	µg/L	NE	13000		5000		78400		1340000	J
Total dissolved solids	µg/L	NE	4800000		510000		5970000		2350000	
Total organic carbon	µg/L	NE	9600		2000		6600		2500	B
Total suspended solids	µg/L	NE	16000				23000		18000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-13

Detected Constituents in Bedrock Monitoring Wells
Acid Areas 1, 2, 3, and Maintenance Shop Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Acid Area 1				Acid Area 2											
		Location Code:	IT-AA1-BEDGW-001				IT-AA2-BEDGW-001						PB-BED-MW19					
		Sample No:	5450		5455		5460		5465		BD3004		5950		5955		BD3026	
		Sample Date:	16-Nov-97		12-May-98		20-Nov-97		12-May-98		8-Oct-01		14-Nov-97		16-May-98		4-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives																		
Amino-4,6-dinitrotoluene, 2	µg/L	2.2																
Dinitrobenzene, 1,3-	µg/L	3.6							0.81				0.22					
Dinitrotoluene, 2,4-	µg/L	0.099			0.23				2.5									
Dinitrotoluene, 2,6-	µg/L	0.099							1.2									
Nitrobenzene	µg/L	3.4											0.32					
Nitrotoluene, 2-	µg/L	61			1.1													
Nitrotoluene, 3-	µg/L	61			0.31										0.62			
RDX	µg/L	0.61			2.8													
Tetryl	µg/L	NE			2.4													
Trinitrotoluene, 2,4,6-	µg/L	2.2									1.6							
Volatiles																		
Acetone	µg/L	610							41	J	54	B	68	J			66	B
Benzene	µg/L	0.35	11	J	31		33		130		45	J	11		1.9	J	46	
Bromomethane	µg/L	8.7															7.9	J
Butanone, 2-	µg/L	1900							18	J								
Carbon disulfide	µg/L	1000	29	J	63		5.5	J	1.7	J			2		6.9			
Chlorobenzene	µg/L	110					21	J										
Chloromethane	µg/L	1.5							10		30	J						
Ethylbenzene	µg/L	1300	7.7	J	39		23	J	43		64	J	5.1		1.2	J	17	J
Methylene chloride	µg/L	4.3	8.8	B	4.4	B	7.4	B	3.2	B	100	J			2.3	B	30	J
Toluene	µg/L	720	18	B	50		32	B	20				8.9		1.5	B	21	J
Xylenes, total	µg/L	1400	150		500		200		220		360		38		10		180	
Semivolatiles																		
Bis(2-ethylhexyl)phthalate	µg/L	4.8	28		23	B			6.6	B			6.8	J	24	B		
Chrysene	µg/L	9.2																
Dimethylphenol, 2,4-	µg/L	730			3.6	J	1.3	J	8.6	J	2.5	J						
Dinitrotoluene, 2,4-	µg/L	0.099																
Fluorene	µg/L	240																
Isophorone	µg/L	71	2.9	J														
Methylnaphthalene, 2-	µg/L	NE	28		31		1.3	J	5.6	J	9.8	J	3.3	J	1.5	J	12	
Methylphenol, 2-	µg/L	1800							1.6	J								
Methylphenol, 4-	µg/L	180							1.6	J								
Naphthalene	µg/L	6.2	16		18				8.1	J	12		2.1	J			8.6	J
Phenanthrene	µg/L	NE			2.3	J											0.82	J
Phenol	µg/L	22000	43		15				74		2.2	J	55				1.2	J

Table 6-13

Detected Constituents in Bedrock Monitoring Wells
Acid Areas 1, 2, 3, and Maintenance Shop Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Acid Area 1										Acid Area 2					
		Location Code:	IT-AA1-BEDGW-001				IT-AA2-BEDGW-001						PB-BED-MW19					
		Sample No:	5450		5455		5460		5465		BD3004		5950		5955		BD3025	
		Sample Date:	16-Nov-97		12-May-98		20-Nov-97		12-May-98		8-Oct-01		14-Nov-97		16-May-98		4-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Metals - Unfiltered																		
Aluminum	µg/L	36000	637		468		1060	J	10200		1170						94.8	B
Arsenic	µg/L	0.045	16.5		21.2				34.2		9.1	J						
Barium	µg/L	2600	1060		1330		220		645		843		1520		1800		1060	
Chromium	µg/L	110	12.7						307		2.4	J	10				1.2	J
Cobalt	µg/L	2200							63 3		5.9	J						
Copper	µg/L	1400	26.2						62.7		3.6	B	61.7				99	
Iron	µg/L	11000	1920		2540		5240		51600		7210		376	B	141	J	149	
Lead	µg/L	15					6.5	B	38.6				6.8					
Manganese	µg/L	880	575		732		522		5130		1030		30.4				2.2	J
Nickel	µg/L	730							238		3.7	J					13.8	J
Thallium	µg/L	2.4									5.3	B						
Vanadium	µg/L	260							108									
Zinc	µg/L	11000	32.8		38.3	B	55		137	B	10 2	J	62.3		29.5	B	144	
Metals - Filtered																		
Aluminum	µg/L	36000									75.6	B					86	B
Arsenic	µg/L	0.045			19.6						3.7	J						
Barium	µg/L	2600	1260		1490		212		279		724		1520		1740		1080	
Beryllium	µg/L	73									0.56	B						
Iron	µg/L	11000	137	B			106	B			1300							
Manganese	µg/L	880	516		696		351		995		946				16.3		4	J
Nickel	µg/L	730															7.9	J
Thallium	µg/L	2.4																
Zinc	µg/L	11000	105		66.3	B	66.2	J	29.1	B	7.1	J	57.4		24.4	B	5.2	J
Water Quality Parameters																		
Alkalinity	µg/L	NE	830000		900000		510000		600000		552000		310000		750000		707000	
Chloride	µg/L	NE	1900000		3000000	J	47000		53000	J	68100		330000		280000		248000	
Cyanide, total	µg/L	6.2													16			
Hardness	µg/L	NE	1800000		2000000		700000		860000		360000		1700000		750000		905000	
Sulfate	µg/L	NE	7000		40000	J	48000		70000	J	31700		14000		49000		27700	J
Turbidity	NTU	NE									313						662	
Total dissolved solids	µg/L	NE	3600000		730000		750000		310000		716000		1200000		590000		1110000	
Total organic carbon	µg/L	NE	16000		11000	J	7400		6000	J	3100		16000		9000		8600	
Total suspended solids	µg/L	NE	6000		330000		4000				113000		41000		5000		199000	

Table 6-13

Detected Constituents in Bedrock Monitoring Wells
Acid Areas 1, 2, 3, and Maintenance Shop Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Area:			Acid Area 3						Maintenance Shop					
Location Code:			IT-AA3-BEDGW-001						IT-MNTA-BEDGW-001					
Sample No:			5470		5475		BD3005		5440		5445		BD3008	
Sample Date:			19-Nov-97		14-May-98		27-Sep-01		20-Nov-97		28-May-98		3-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives														
Amino-4,6-dinitrotoluene, 2	µg/L	2.2					0.2							
Dinitrobenzene, 1,3-	µg/L	3.6									0.86			
Dinitrotoluene, 2,4-	µg/L	0.099									2			
Dinitrotoluene, 2,6-	µg/L	0.099									0.34			
Nitrobenzene	µg/L	3.4												
Nitrotoluene, 2-	µg/L	61												
Nitrotoluene, 3-	µg/L	61												
RDX	µg/L	0.61												
Tetryl	µg/L	NE												
Trinitrotoluene, 2,4,6-	µg/L	2.2												
Volatiles														
Acetone	µg/L	610	36	J			22	B						
Benzene	µg/L	0.35					11				19		110	J
Bromomethane	µg/L	8.7												
Butanone, 2-	µg/L	1900												
Carbon disulfide	µg/L	1000	4.2	J					3.7	J	21			
Chlorobenzene	µg/L	110												
Chloromethane	µg/L	1.5												
Ethylbenzene	µg/L	1300					4	J			7.7		61	J
Methylene chloride	µg/L	4.3	2.1	B	160	B	2.2	B	5.1	B	2.6	B	200	J
Toluene	µg/L	720			29	B	11				18		140	J
Xylenes, total	µg/L	1400					28		8.2	B	150		490	
Semivolatiles														
Bis(2-ethylhexyl)phthalate	µg/L	4.8	5.8	J					3.9	J	6.5	B	5	J
Chrysene	µg/L	9.2											0.8	J
Dimethylphenol, 2,4-	µg/L	730							1.7	J	1.8	J		
Dinitrotoluene, 2,4-	µg/L	0.099									1.3	J		
Fluorene	µg/L	240											1.6	J
Isophorone	µg/L	71												
Methylnaphthalene, 2-	µg/L	NE							1.9	J	1.2	J	21	
Methylphenol, 2-	µg/L	1800												
Methylphenol, 4-	µg/L	180												
Naphthalene	µg/L	6.2							2.3	J			11	
Phenanthrene	µg/L	NE											2.8	J
Phenol	µg/L	22000	3.1	J					17		11			

Table 6-13

Detected Constituents in Bedrock Monitoring Wells
Acid Areas 1, 2, 3, and Maintenance Shop Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Acid Area 3						Maintenance Shop					
		Location Code:	IT-AA3-BEDGW-001						IT-MNTA-BEDGW-001					
		Sample No:	5470		5475		BD3005		5440		5445		BD3008	
		Sample Date:	19-Nov-97		14-May-98		27-Sep-01		20-Nov-97		28-May-98		3-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Metals - Unfiltered														
Aluminum	µg/L	36000			397		59.6	B	249	B			119	J
Arsenic	µg/L	0.045											2.9	J
Barium	µg/L	2600					102	J	424		457		381	
Chromium	µg/L	110					1.6	B					2.9	J
Cobalt	µg/L	2200												
Copper	µg/L	1400											24.3	J
Iron	µg/L	11000	168	B	450		126		6400		481		978	
Lead	µg/L	15												
Manganese	µg/L	880	74.6		83.8		28.7		849		181		641	
Nickel	µg/L	730												
Thallium	µg/L	2.4			10.1	B							5.4	B
Vanadium	µg/L	260											2.1	B
Zinc	µg/L	11000	29.2		67.6	B			34.4	B	68	B	16.2	J
Metals - Filtered														
Aluminum	µg/L	36000					50.2	B					86	B
Arsenic	µg/L	0.045												
Barium	µg/L	2600					99.5	J	449		596		387	
Beryllium	µg/L	73												
Iron	µg/L	11000							298	B				
Manganese	µg/L	880	57.6		51.3		23.9		899		183		621	
Nickel	µg/L	730												
Thallium	µg/L	2.4					6.4	B					4.8	B
Zinc	µg/L	11000	23		42.8	B			24.8	J	32.8	B		
Water Quality Parameters														
Alkalinity	µg/L	NE	670000		790000		750000		670000				630000	
Chloride	µg/L	NE	790000		860000	J	451000		55000		3800000		4130000	
Cyanide, total	µg/L	6.2												
Hardness	µg/L	NE	13000000		860000		630000		2000000		2100000		1660000	
Sulfate	µg/L	NE			8000	J	31100		62000		64000			
Turbidity	NTU	NE					179						392	
Total dissolved solids	µg/L	NE	1900000		1800000		1440000		5300000		7200000		5860000	
Total organic carbon	µg/L	NE	5300	J	2000	J	840	J	11000		7000		3900	
Total suspended solids	µg/L	NE	38000		54000				4000		29000		79000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-14

Detected Constituents in Bedrock Monitoring Well
Additional Burning Ground Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Additional Burning Ground							
		Sample Location:	IT-ABG-BEDGW-01							
		Sample Number:	5480		5485		BD3006		BD3006R	
		Sample Date:	13-Nov-97		13-May-98		28-Sep-01		5-Oct-01	
Parameter	Units	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Volatiles										
Acetone	µg/L	610							2.7	B
Carbon disulfide	µg/L	1000			0.97	J				
Methylene chloride	µg/L	4.3			0.41	B				
Trichloroethene	µg/L	1.6	0.25	J						
Semivolatiles										
Benzo(a)pyrene	µg/L	0.0092					**1.2**	J		
Benzo(ghi)perylene	µg/L	NE					1.7	J		
Chrysene	µg/L	9.2					0.54	J		
Dibenz(a,h)anthracene	µg/L	0.0092					**1.2**	J		
Indeno(1,2,3-cd)pyrene	µg/L	0.092					**1.7**	J		
Metals - Unfiltered										
Aluminum	µg/L	36000	522						45.3	B
Arsenic	µg/L	0.045	**11.7**							
Barium	µg/L	2600							89.2	J
Iron	µg/L	11000	8890		5770				7900	
Lead	µg/L	15	6.9		**20.2**					
Manganese	µg/L	880	**912**		745				846	
Mercury	µg/L	11	3.6							
Zinc	µg/L	11000	27.7		37.4	B			14.9	J
Metals - Filtered										
Aluminum	µg/L	36000			408				67.6	B
Barium	µg/L	2600							88	J
Beryllium	µg/L	73							0.55	B
Iron	µg/L	11000	7260		5580				7400	
Manganese	µg/L	880	**990**		813				818	
Zinc	µg/L	11000			38.9	B			14.3	J
Water Quality Parameters										
Alkalinity	µg/L	NE	280000		270000		370000			
Chloride	µg/L	NE	2000	B	3000	J	4400			
Hardness	µg/L	NE	500000		530000		552000			
Sulfate	µg/L	NE	140000		190000	J	163000			
Turbidity	NTU	NE							64.2	
Total dissolved solids	µg/L	NE	640000		600000		644000			
Total organic carbon	µg/L	NE	3800		3000	J	7000			
Total suspended solids	µg/L	NE	11000		7000		21000			

µg/L - Micrograms per liter.
NTU - Nephelometric turbidity level.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-15

Detected Constituents in Bedrock Monitoring Well
Upper Toluene Tanks Area
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Upper Toluene Tanks Area					
		Sample Location:	PB-BED-MW16					
		Sample Number:	5920		5925		BD3020	
		Sample Date:	24-Nov-97		1-Jun-98		10-Oct-01	
Parameter	Units	PRGs	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Volatiles								
Acetone	µg/L	610					930	J
Benzene	µg/L	0.35	490		450	J	800	J
Ethylbenzene	µg/L	1300	130		140	J	200	J
Methylene chloride	µg/L	4.3	8.8	B	100	B	52	J
Toluene	µg/L	720	390		350	J	590	J
Xylenes, total	µg/L	1400	1100		1000	J	1500	
Semivolatiles								
Bis(2-ethylhexyl)phthalate	µg/L	4.8	920	J	4.9	B	2.4	J
Chrysene	µg/L	9.2					0.87	J
Dibenzofuran	µg/L	24					1.2	J
Dichlorobenzene, 1,3-	µg/L	5.5			4.4	J		
Dimethylphenol, 2,4-	µg/L	730					3	J
Fluorene	µg/L	240					2.8	J
Methylnaphthalene, 2-	µg/L	NE					64	
Methylphenol, 2-	µg/L	1800					1.6	J
Methylphenol, 4-	µg/L	180					1.7	J
Naphthalene	µg/L	6.2					62	
Phenanthrene	µg/L	NE					5.1	J
Phenol	µg/L	22000					4.6	J
Trichlorobenzene, 1,2,4-	µg/L	190			1.6	J		
Trichlorophenol, 2,4,5-	µg/L	3600			35			
Metals - Unfiltered								
Aluminum	µg/L	36000	502	J	11000		36.2	B
Barium	µg/L	2600	463		612		147	J
Chromium	µg/L	110	24.4		105			
Cobalt	µg/L	2200					2.4	J
Copper	µg/L	1400			84.9			
Iron	µg/L	11000	1140		45900		73.2	J
Lead	µg/L	15			40.4			
Manganese	µg/L	880	133		2200		2.9	J
Nickel	µg/L	730			54.7		10.8	J
Thallium	µg/L	2.4			101			
Vanadium	µg/L	260	64.7		126			
Zinc	µg/L	11000	30		235			
Metals - Filtered								
Aluminum	µg/L	36000					55.2	B
Barium	µg/L	2600	389		523		143	J
Chromium	µg/L	110	13.6		14.8			
Nickel	µg/L	730					10.2	J
Thallium	µg/L	2.4			53.1		6.4	B
Vanadium	µg/L	260	58.3		50.6			
Zinc	µg/L	11000					4.2	J
Water Quality Parameters								
Alkalinity	µg/L	NE	1600000		1700000		1060000	
Chloride	µg/L	NE	88000		140000		370000	
Hardness	µg/L	NE	5300000		2000000		1650000	
Sulfate	µg/L	NE	150000		37000		212000	
Turbidity	NTU	NE					3.6	
Total dissolved solids	µg/L	NE	6400000		4000000		1950000	
Total organic carbon	µg/L	NE	8400		14000		6800	
Total suspended solids	µg/L	NE	7000		330000		12000	

µg/L - Micrograms per liter.
NTU - Nephelometric turbidity unit.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-16

Detected Constituents in Bedrock Monitoring Wells
Downgradient Perimeter Wells
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Downgradient Perimeter Monitoring Wells			
		Sample Location:	PB-BED-MW22		PB-BED-MW27	
		Sample Number:	BD3027		BD3032	
		Sample Date:	8-Oct-01		9-Oct-01	
Parameter	Unit	PRG	Result	Val Qlfr	Result	Val Qlfr
Explosives						
Dinitrotoluene, 2,4-	µg/L	0.099			1.5	
Dinitrotoluene, 2,6-	µg/L	0.099			1.1	
Trinitrotoluene, 2,4,6-	µg/L	2.2	0.27			
Volatiles						
Acetone	µg/L	610	4.8	B	210	J
Benzene	µg/L	0.35	0.6	J	130	J
Ethylbenzene	µg/L	1300	1	J	100	J
Methylene chloride	µg/L	4.3	0.63	B	98	J
Toluene	µg/L	720	1.2	J	120	J
Xylenes, total	µg/L	1400	6.4		560	
Semivolatiles						
Bis(2-ethylhexyl)phthalate	µg/L	4.8			2.9	J
Dimethylphenol, 2,4-	µg/L	730			3.1	J
Methylnaphthalene, 2-	µg/L	NE	1.7	J	24	
Naphthalene	µg/L	6.2			17	
Phenanthrene	µg/L	NE			1.4	J
Phenol	µg/L	22000			1.3	J
Metals - Unfiltered						
Aluminum	µg/L	36000	353		152	J
Arsenic	µg/L	0.045			4	B
Barium	µg/L	2600	649		133	J
Chromium	µg/L	110			7.1	J
Cobalt	µg/L	2200			3.1	J
Copper	µg/L	1400			13.3	J
Iron	µg/L	11000	284		43100	
Manganese	µg/L	880	38.1		680	
Nickel	µg/L	730			12.4	J
Zinc	µg/L	11000			21 6	
Metals - Filtered						
Aluminum	µg/L	36000	69.3	B	58	B
Barium	µg/L	2600	634		126	J
Iron	µg/L	11000			144	
Manganese	µg/L	880	34.3		141	
Nickel	µg/L	730			2	J
Water Quality Parameters						
Alkalinity	µg/L	NE	410000		473000	
Chloride	µg/L	NE	43400		260000	
Hardness	µg/L	NE	412000		1910000	
Sulfate	µg/L	NE	27100		1280000	
Turbidity	NTU	NE	129		188	
Total dissolved solids	µg/L	NE	489000		2560000	
Total organic carbon	µg/L	NE	1700		3700	
Total suspended solids	µg/L	NE	9000		200000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NTU - Nephelometric turbidity unit.
NE - Not established.

Tab[illegible]-17

Detected Constituents in Bedrock Monitoring Wells
Background Monitoring Wells
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Background Wells											
		Sample Location:	IT-BG8-BEDGW-001						PB-BED-MW20					
		Sample Number:	5410		5415		BD3007		5960		5965		BD3026	
		Sample Date:	17-Nov-97		15-May-98		27-Sep-01		17-Nov-97		28-May-98		26-Sep-01	
Parameter	**Unit**	**PRG**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**
Volatiles														
Acetone	µg/L	610											1.2	J
Benzene	µg/L	0.35							**0.93**	J	**1.6**		0.25	J
Carbon disulfide	µg/L	1000	0.65	J							0.17	J		
Chloroform	µg/L	0.16												
Ethylbenzene	µg/L	1300							0.15	J				
Methyl-2-pentanone, 4-	µg/L	160												
Methylene chloride	*µg/L*	*4.3*	*0.37*	*B*					*0.3*	*B*	*0.49*	*B*		
Toluene	µg/L	720							0.73	B	0.95	B		
Xylenes, total	µg/L	1400	0.38	B					2.6		0.91	J		
Semivolatiles														
Bis(2-ethylhexyl)phthalate	µg/L	4.8	1.7	J	4	B					**5.4**	B	2.9	J
Dimethylphenol, 2,4-	µg/L	730												
Methylnaphthalene, 2-	µg/L	NE							1.1	J				
Naphthalene	µg/L	6.2												
Phenol	µg/L	22000												
Metals - Unfiltered														
Aluminum	µg/L	36000	9020		307		51.6	B	3290		678	J	207	J
Arsenic	µg/L	0.045	**17.6**											
Barium	*µg/L*	*2600*	*520*				*285*		***19000***		***16400***		***23900***	
Chromium	µg/L	110	18.2				1.4	B					7.6	B
Cobalt	µg/L	2200											7.1	J
Copper	µg/L	1400	59.5						32.8				15.8	B
Iron	µg/L	11000	**22600**		1230	J	204		**13200**		6770		5920	J
Lead	µg/L	15	**26.3**		6.8									
Manganese	µg/L	880	**2240**		130		71.6		180		153		189	J
Nickel	µg/L	730											3.5	J
Zinc	µg/L	11000	126		49.7	B			41.6		42.1	B	5.3	
Metals - Filtered														
Aluminum	µg/L	36000					56.6	B					40.9	B
Arsenic	µg/L	0.045											**2.8**	J
Barium	*µg/L*	*2600*	*368*				*279*		***21000***		***4950***		***24400***	
Cobalt	µg/L	2200											6.4	J
Copper	µg/L	1400											2	B
Iron	µg/L	11000	563				169		2310		1320		5350	
Manganese	µg/L	880	**1300**		658		73.5		162		47		188	
Mercury	µg/L	11									0.24			
Nickel	µg/L	730											2.9	J
Zinc	µg/L	11000			44.9	B							3.3	J

Table 6-17

Detected Constituents in Bedrock Monitoring Wells
Background Monitoring Wells
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Background Wells											
		Sample Location:	IT-BG8-BEDGW-001						PB-BED-MW20					
		Sample Number:	5410		5415		BD3007		5960		5965		BD3026	
		Sample Date:	17-Nov-97		15-May-98		27-Sep-01		17-Nov-97		28-May-98		26-Sep-01	
Parameter	Unit	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Water Quality Parameters														
Alkalinity	µg/L	NE	350000		180000		357000		240000		260000		255000	
Chloride	µg/L	NE	780000		34000		932000		19000000		21000000		22400000	
Hardness	µg/L	NE	1000000		340000		719000		20000000		10000000		9360000	
Nitrate	µg/L	NE	200											
Nitrate	µg/L	NE			7300									
Sulfate	µg/L	NE	70000		45000		28300							
Turbidity	NTU	NE					104						48.4	
Total dissolved solids	µg/L	NE	1800000		300000		1990000		32000000		24000000		27400000	J
Total organic carbon	µg/L	NE			1000								500	J
Total suspended solids	µg/L	NE	10000		280000		4000		74000		90000		125000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NTU - Nephelometric turbidity unit.
NE - Not established.

Table 6-17

Detected Constituents in Bedrock Monitoring Wells
Background Monitoring Wells
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Background Wells			
		Sample Location:	PB-BED-MW24		PB-BED-MW25	
		Sample Number:	BD3029		BD3030	
		Sample Date:	9-Oct-01		5-Oct-01	
Parameter	Unit	PRG	Result	Val Qlfr	Result	Val Qlfr
Volatiles						
Acetone	µg/L	610	120	J	1.7	B
Benzene	µg/L	0.35	60		0.37	J
Carbon disulfide	µg/L	1000			0.48	J
Chloroform	µg/L	0.16			1.1	
Ethylbenzene	µg/L	1300	19	J	0.22	J
Methyl-2-pentanone, 4-	µg/L	160			0.3	J
Methylene chloride	µg/L	4.3	21	J	0.3	B
Toluene	µg/L	720	58		0.8	J
Xylenes, total	µg/L	1400	110		1.5	
Semivolatiles						
Bis(2-ethylhexyl)phthalate	µg/L	4.8			0.86	J
Dimethylphenol, 2,4-	µg/L	730	1.1	J		
Methylnaphthalene, 2-	µg/L	NE	3.6	J		
Naphthalene	µg/L	6.2	2.9	J		
Phenol	µg/L	22000	1.4	J		
Metals - Unfiltered						
Aluminum	µg/L	36000	37.8	J	78.2	B
Arsenic	µg/L	0.045				
Barium	µg/L	2600	932		226	
Chromium	µg/L	110				
Cobalt	µg/L	2200				
Copper	µg/L	1400				
Iron	µg/L	11000	48.3	J	795	
Lead	µg/L	15				
Manganese	µg/L	880	24.8		89	
Nickel	µg/L	730				
Zinc	µg/L	11000			7.7	J
Metals - Filtered						
Aluminum	µg/L	36000	55.1	B	68.7	B
Arsenic	µg/L	0.045				
Barium	µg/L	2600	942		224	
Cobalt	µg/L	2200				
Copper	µg/L	1400				
Iron	µg/L	11000			713	
Manganese	µg/L	880	22.1		87	
Mercury	µg/L	11				
Nickel	µg/L	730				
Zinc	µg/L	11000			3	J

Table 6-17

Detected Constituents in Bedrock Monitoring Wells
Background Monitoring Wells
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Background Wells			
		Sample Location:	PB-BED-MW24		PB-BED-MW25	
		Sample Number:	BD3029		BD3030	
		Sample Date:	*9-Oct-01*		*5-Oct-01*	
Parameter	**Unit**	**PRG**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**
Water Quality Parameters						
Alkalinity	µg/L	NE	697000		278000	
Chloride	µg/L	NE	149000		404000	
Hardness	µg/L	NE	566000		627000	
Nitrate	µg/L	NE				
Nitrate	µg/L	NE				
Sulfate	µg/L	NE	21400		121000	
Turbidity	NTU	NE	266		21.7	
Total dissolved solids	µg/L	NE	948000		1000000	
Total organic carbon	µg/L	NE	3000		4000	B
Total suspended solids	µg/L	NE			4000	

µg/L - Micrograms per liter.
PRG - Preliminary remedial goal.
NTU - Nephelometric turbidity unit.
NE - Not established.

Table 6-18

Free-Phase Analytical Results
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

Sample Area:			Upper Toluene Tanks Area		TNT Area A	
Sample Location:			PB-BED-MW16		TNTA-BEDGW-001	
Sample Number:			FP7002		FP7001	
Sample Date:			10-Oct-01		8-Oct-01	
Parameter	Unit	PRG	Result	Val Qlfr	Result	Val Qlfr
Volatiles						
Acetone	mg/kg	610	30			
Benzene	mg/kg	0.35	**25**		**89**	
Ethylbenzene	mg/kg	1300	200		680	
Methylene chloride	mg/kg	4.3	**42**		**210**	
Toluene	mgkg	720	120		610	
Trichloroethene	mg/kg	1.6	**4.6**			
Xylenes, total	mg/kg	1400	**1600**		**3800**	
Range Organics						
Diesel Range Organics	mg/kg	NE	4800		31000	
Gasoline	mg/kg	NE	52000		160000	

mg/kg - Milligrams per kilogram.
PRG - Preliminary remedial goal.
NE - Not established.
Val Qlfr - Validation qualifier.

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

(Page 1 of 8)

		Sample Area:	Pentolite Road Red Water Pond Area											
		Sample Location:	PRRP-DP03				PRRP-DP10				PRRP-DP11			
		Sample Number:	BD0001		BD0002		BD0003		BD0004		BD0005		BD0006	
		Sample Date:	27-Sep-01		27-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01	
		Sample Depth:	4.3 to 4.8		11 to 12		8.4 to 8.9		11 to 12		2.6 to 3.1		11 to 12	
Parameter	**Units**	**PRG**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**
Explosives														
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.3									1.1		0.27	
Amino-4,6-dinitrotoluene, 2-	mg/kg	3.3									1.1		0.16	J
Dinitrobenzene, 1,3-	mg/kg	6.1	4.6		0.064	J	3.3		9.3		0.062	J	1.1	
Dinitrotoluene, 2,4-	mg/kg	0.72	14		0.48		12		26		1.3		0.91	
Dinitrotoluene, 2,6-	mg/kg	0.72			0.48		1.3		2.9		0.57		0.25	
Nitrotoluene, 2-	mg/kg	370												
Nitrotoluene, 3-	mg/kg	370												
Nitrotoluene, 4-	mg/kg	370												
Trinitrobenzene, 1,3,5-	mg/kg	1800	31		1		18		25		0.2	J	5.2	
Trinitrotoluene, 2,4,6-	mg/kg	16									1.4		0.23	J
Explosive Leachate														
Amino-2,6-dinitrotoluene, 4-	µg/L													
Amino-4,6-dinitrotoluene, 2-	µg/L													
Dinitrobenzene, 1,3-	µg/L		160											
Dinitrotoluene, 2,4-	µg/L		430											
Dinitrotoluene, 2,6-	µg/L		66											
Nitrotoluene, 2-	µg/L													
Nitrotoluene, 3-	µg/L													
Nitrotoluene, 4-	µg/L													
Trinitrobenzene, 1,3,5-	µg/L		780										26	J
Trinitrotoluene, 2,4,6-	µg/L													
Volatiles														
Acetone	mg/kg	1600	0.34	J	0.014	B	0.016	B	0.01	B	0.015	B	0.018	B
Carbon disulfide	mg/kg	360			0.0029	J								
Ethylbenzene	mg/kg	230												
Methylene chloride	mg/kg	8.9	0.0083	B	0.0079	B	0.0051	B	0.006	B	0.0057	B	0.007	B
Toluene	mg/kg	520	0.0008	J	0.0008	J	0.0009	J	0.001	J	0.0008	J	0.001	J

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	Pentolite Road Red Water Pond Area											
		Sample Location:	PRRP-DP03				PRRP-DP10				PRRP-DP11			
		Sample Number:	BD0001		BD0002		BD0003		BD0004		BD0005		BD0006	
		Sample Date:	27-Sep-01		27-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01	
		Sample Depth:	4.3 to 4.8		11 to 12		8.4 to 8.9		11 to 12		2.6 to 3.1		11 to 12	
Metals														
Aluminum	mg/kg	76000	8820		9820		10700	J	13500	J	8410	J	7960	J
Antimony	mg/kg	31			0.55	J	0.6	J	0.71	J				
Arsenic	mg/kg	0.39	**5.4**		**9**		**11.6**	J	**18.3**	J	**4.7**	J	**6.7**	J
Barium	mg/kg	5400	63.6		76.5		112		103		51.4		54	
Beryllium	mg/kg	150	0.62		0.67		0.76	B	0.9	B	0.55	B	0.57	B
Cadmium	mg/kg	37	0.13	J	0.38	J	0.16	J	0.45	J	0.18	B	0.34	B
Chromium	mg/kg	210	13.7		16.2		17.4	J	21.8	J	13	J	13.5	J
Cobalt	mg/kg	4700	5.2	J	12.7		7.6	J	10.9	J	5.5	J	9.4	J
Copper	mg/kg	2900	10.2		25.3		19.5		27.8		9.9		20.7	
Iron	mg/kg	23000	16600		**24900**		**25200**	J	**32700**	J	14300	J	18700	J
Lead	mg/kg	400	9.1		12.7		14.7	J	14.3	J	9.2	J	10.2	J
Manganese	mg/kg	1800	270	J	587	J	474	J	710	J	309	J	413	J
Mercury	mg/kg	23	0.023	B			0.014	B	0.025	B	0.015	B	0.013	B
Nickel	mg/kg	1600	15.6		30.4		24.9	J	35.7	J	14.1	J	25.2	J
Selenium	mg/kg	390												
Thallium	mg/kg	5.2			0.62	B	0.78	B	1.1	J			0.8	J
Vanadium	mg/kg	550	22.3		23.3		29.1	J	31.5	J	16.7	J	19.8	J
Zinc	mg/kg	23000	43.2		65.8		56.2	J	84.4	J	48.2	J	64.2	J

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	TNT Area A								TNT Area B							
		Sample Location:	TNTA-SO012				TNTA-SO080				TNTB-SS295				TNTB-SS375			
		Sample Number:	BD0007		BD0008		BD0009		BD0012		BD0013		BD0014		BD0015		BD0016	
		Sample Date:	26-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01	
		Sample Depth:	.5 to 1.5		4 to 6		.5 to 1.5		8 to 10		0 to 1		2.5 to 3.5		4 to 6		4 to 6	
Parameter	**Units**	**PRG**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**
Explosives																		
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.3									2.3		0.35					
Amino-4,6-dinitrotoluene, 2-	mg/kg	3.3									2.4		0.43				150	
Dinitrobenzene, 1,3-	mg/kg	6.1																
Dinitrotoluene, 2,4-	mg/kg	0.72	4600		8		130	J			2.8		0.54		2400		2100	
Dinitrotoluene, 2,6-	mg/kg	0.72	5600		6.5						2		0.4		1500		630	
Nitrotoluene, 2-	mg/kg	370																
Nitrotoluene, 3-	mg/kg	370																
Nitrotoluene, 4-	mg/kg	370																
Trinitrobenzene, 1,3,5-	mg/kg	1800																
Trinitrotoluene, 2,4,6-	mg/kg	16					12000	J	260		2.7		0.55		3100		2200	
Explosive Leachate																		
Amino-2,6-dinitrotoluene, 4-	µg/L																	
Amino-4,6-dinitrotoluene, 2-	µg/L																	
Dinitrobenzene, 1,3-	µg/L																	
Dinitrotoluene, 2,4-	µg/L		140000		84	B									100000		84000	
Dinitrotoluene, 2,6-	µg/L		110000		57										74000		24000	
Nitrotoluene, 2-	µg/L																	
Nitrotoluene, 3-	µg/L																	
Nitrotoluene, 4-	µg/L																	
Trinitrobenzene, 1,3,5-	µg/L																	
Trinitrotoluene, 2,4,6-	µg/L		17000				80000		4400						71000		77000	
Volatiles																		
Acetone	mg/kg	1600	0.012	B	0.052	B	4.4	J	0.0079	J	0.045	B	0.15	J	0.012	B	0.009	J
Carbon disulfide	mg/kg	360																
Ethylbenzene	mg/kg	230																
Methylene chloride	mg/kg	8.9	0.0068	B	0.006	B	0.0061	B	0.0042	B	0.0067	B	0.0074	B	0.0087	B	0.008	B
Toluene	mg/kg	520	0.0014	J	0.001	J	0.0009	J	0.0007	J	0.0008	J	0.0008	J	0.0008	J	0.001	J

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	TNT Area A								TNT Area B							
		Sample Location:	TNTA-SO012				TNTA-SO080				TNTB-SS295				TNTB-SS375			
		Sample Number:	BD0007		BD0008		BD0009		BD0012		BD0013		BD0014		BD0015		BD0016	
		Sample Date:	26-Sep-01		26-Sep-01		26-Sep-01		26-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01	
		Sample Depth:	.5 to 1.5		4 to 6		.5 to 1.5		8 to 10		0 to 1		2.5 to 3.5		4 to 6		4 to 6	
Metals																		
Aluminum	mg/kg	76000	3080	J	3370	J	3680	J	11200	J	6040		8110		2850		1800	
Antimony	mg/kg	31			0.61	J					1.8	J	1.2	J	0.84	J		
Arsenic	mg/kg	0.39	6.6	J	9.8	J	3	J	8.2	J	12.8		17		3.4		2.9	
Barium	mg/kg	5400	24.2		16.3	J	41.7	J	16.6	J	105		294		14.6	J	7.9	J
Beryllium	mg/kg	150	0.22	B	0.4	B	0.31	B	0.7	B	0.72		1.2		0.22	B	0.17	B
Cadmium	mg/kg	37			0.66	B	0.31	B	0.093	B	0.5	J	0.41	J				
Chromium	mg/kg	210	6	J	5.5	J	8.1	J	21	J	47.2		9.6		13.2		5.2	
Cobalt	mg/kg	4700	3.4	B	7	J	3.8	B	17.2	J	9.5		15.2		2.7	J	2.3	J
Copper	mg/kg	2900	10.3		19.9		7.2	B	12.8		35.1		38.8		4.9		4.5	
Iron	mg/kg	23000	20500	J	26100	J	9780	J	22900	J	18100		28000		10400		6450	
Lead	mg/kg	400	43.3	J	10.8	J	60.4	J	8	J	105		18		19.9		15.1	
Manganese	mg/kg	1800	101	J	1390	J	177	J	512	J	419		914	J	129	J	119	J
Mercury	mg/kg	23			0.036	B	0.051	B			0.053		0.087		0.011	B		
Nickel	mg/kg	1600	9.4	J	23.8	J	9.4	J	44.6	J	26.7		51		7.4		6	
Selenium	mg/kg	390									0.5	J	0.68					
Thallium	mg/kg	5.2			1	B					1.4		2.1					
Vanadium	mg/kg	550	19.3	J	9.9	J	14.5	J	16.9	J	17		22.7		10.9		7.6	
Zinc	mg/kg	23000	65.9	J	111	J	63.4	J	44.4	J	132		69.6		22.3		16.7	

KN2\PBOW\2001 GWRI\TABLES\Soil Anal - PRGs xls(tab6-19sochi)\3/15/02(10 13 AM)

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	TNT Area C							
		Sample Location:	TNTC-SO066				TNTC-SO464			
		Sample Number:	BD0017R		BD0018R		BD0021R		BD0022R	
		Sample Date:	2-Oct-01		2-Oct-01		2-Oct-01		2-Oct-01	
		Sample Depth:	2.5 to 3.4		8 to 9.3		4 to 5.7		6 to 7	
Parameter	Units	PRG	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr	Result	Val Qlfr
Explosives										
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.3	0.12	J			**3.7**			
Amino-4,6-dinitrotoluene, 2-	mg/kg	3.3	0.11	J			2.5			
Dinitrobenzene, 1,3-	mg/kg	6.1								
Dinitrotoluene, 2,4-	mg/kg	0.72	0.23	J			0.67		**33**	
Dinitrotoluene, 2,6-	mg/kg	0.72	0.098	J			**2.4**		**18**	
Nitrotoluene, 2-	mg/kg	370			0.59				4	
Nitrotoluene, 3-	mg/kg	370							0.8	J
Nitrotoluene, 4-	mg/kg	370			0.33				2.4	
Trinitrobenzene, 1,3,5-	mg/kg	1800					0.3		0.5	J
Trinitrotoluene, 2,4,6-	mg/kg	16					6.5		4	
Explosive Leachate										
Amino-2,6-dinitrotoluene, 4-	µg/L						**67**			
Amino-4,6-dinitrotoluene, 2-	µg/L						**44**			
Dinitrobenzene, 1,3-	µg/L									
Dinitrotoluene, 2,4-	µg/L						**25**	J	**580**	
Dinitrotoluene, 2,6-	µg/L						**96**		**420**	
Nitrotoluene, 2-	µg/L				30	J			210	
Nitrotoluene, 3-	µg/L								28	J
Nitrotoluene, 4-	µg/L								74	
Trinitrobenzene, 1,3,5-	µg/L									
Trinitrotoluene, 2,4,6-	µg/L						**140**		**60**	
Volatiles										
Acetone	mg/kg	1600	0.27		0.017	J	0.023		0.03	
Carbon disulfide	mg/kg	360								
Ethylbenzene	mg/kg	230								
Methylene chloride	mg/kg	8.9	0.003	B	0.003	B	0.004	B	0.003	B
Toluene	mg/kg	520							8E-04	J

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

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		Sample Area:	TNT Area C							
		Sample Location:	TNTC-SO066				TNTC-SO464			
		Sample Number:	BD0017R		BD0018R		BD0021R		BD0022R	
		Sample Date:	2-Oct-01		2-Oct-01		2-Oct-01		2-Oct-01	
		Sample Depth:	2.5 to 3.4		8 to 9.3		4 to 5.7		6 to 7	
Metals										
Aluminum	mg/kg	76000	4280	J	6100	J	3950	J	4970	J
Antimony	mg/kg	31								
Arsenic	mg/kg	0.39	**3.3**	B	**3**	B	**2.9**	B	**3.3**	B
Barium	mg/kg	5400	51.5	J	44.9	J	12	J	43.7	J
Beryllium	mg/kg	150	0.41	B	0.45	B	0.27	B	0.46	B
Cadmium	mg/kg	37	0.082	B	0.11	B	0.083	B	0.2	B
Chromium	mg/kg	210	8.4	J	12.3	J	8.2	J	9.7	J
Cobalt	mg/kg	4700	3.2	J	13	J	3.1	J	12	J
Copper	mg/kg	2900	8.2		17.6		10.6		15.4	
Iron	mg/kg	23000	20200	J	16400	J	11600	J	21600	J
Lead	mg/kg	400	24.7	J	21.5	J	97.6	J	10.1	J
Manganese	mg/kg	1800	529	J	516	J	122	J	796	J
Mercury	mg/kg	23	0.3		0.059	J				
Nickel	mg/kg	1600	9.3	J	30.1	J	8.2	J	30.2	J
Selenium	mg/kg	390								
Thallium	mg/kg	5.2								
Vanadium	mg/kg	550	21	J	10.1	J	10.1	J	8.6	J
Zinc	mg/kg	23000	52.9	J	47.3	J	56.2	J	75.6	J

Table 6-19

Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	West Area Red Water Pond Area											
		Sample Location:	WARP-DP09				WARP-DP13				WARP-DP16			
		Sample Number:	BD0023		BD0024		BD0025		BD0028		BD0029R		BD0030R	
		Sample Date:	27-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01		2-Oct-01		2-Oct-01	
		Sample Depth:	4 to 4.9		11 to 12		4.1 to 5.1		11 to 12		3.5 to 4		11 to 12	
Parameter	**Units**	**PRG**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**	**Result**	**Val Qlfr**
Explosives														
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.3			0.16	J								
Amino-4,6-dinitrotoluene, 2-	mg/kg	3.3			0.11	J								
Dinitrobenzene, 1,3-	mg/kg	6.1			0.31				2.4				0.033	J
Dinitrotoluene, 2,4-	mg/kg	0.72	0.71		2.7		0.29		6.5		0.052	J		
Dinitrotoluene, 2,6-	mg/kg	0.72	0.35		0.27				0.64	J				
Nitrotoluene, 2-	mg/kg	370												
Nitrotoluene, 3-	mg/kg	370												
Nitrotoluene, 4-	mg/kg	370												
Trinitrobenzene, 1,3,5-	mg/kg	1800			1.7		0.16	J	11				1.6	
Trinitrotoluene, 2,4,6-	mg/kg	16	1											
Explosive Leachate														
Amino-2,6-dinitrotoluene, 4-	µg/L													
Amino-4,6-dinitrotoluene, 2-	µg/L													
Dinitrobenzene, 1,3-	µg/L								51					
Dinitrotoluene, 2,4-	µg/L		18	B	52	B			100	B	46			
Dinitrotoluene, 2,6-	µg/L										26	J		
Nitrotoluene, 2-	µg/L													
Nitrotoluene, 3-	µg/L													
Nitrotoluene, 4-	µg/L													
Trinitrobenzene, 1,3,5-	µg/L								110					
Trinitrotoluene, 2,4,6-	µg/L										23	J		
Volatiles														
Acetone	mg/kg	1600	0.53	J	0.017	B	0.33	J					0.18	
Carbon disulfide	mg/kg	360												
Ethylbenzene	mg/kg	230					0.001	J						
Methylene chloride	mg/kg	8.9	0.008	B	0.0088	B	0.008	B	0.0081	B	0.003	B	0.0052	B
Toluene	mg/kg	520			0.0007	J	0.004	J	0.0008	J				

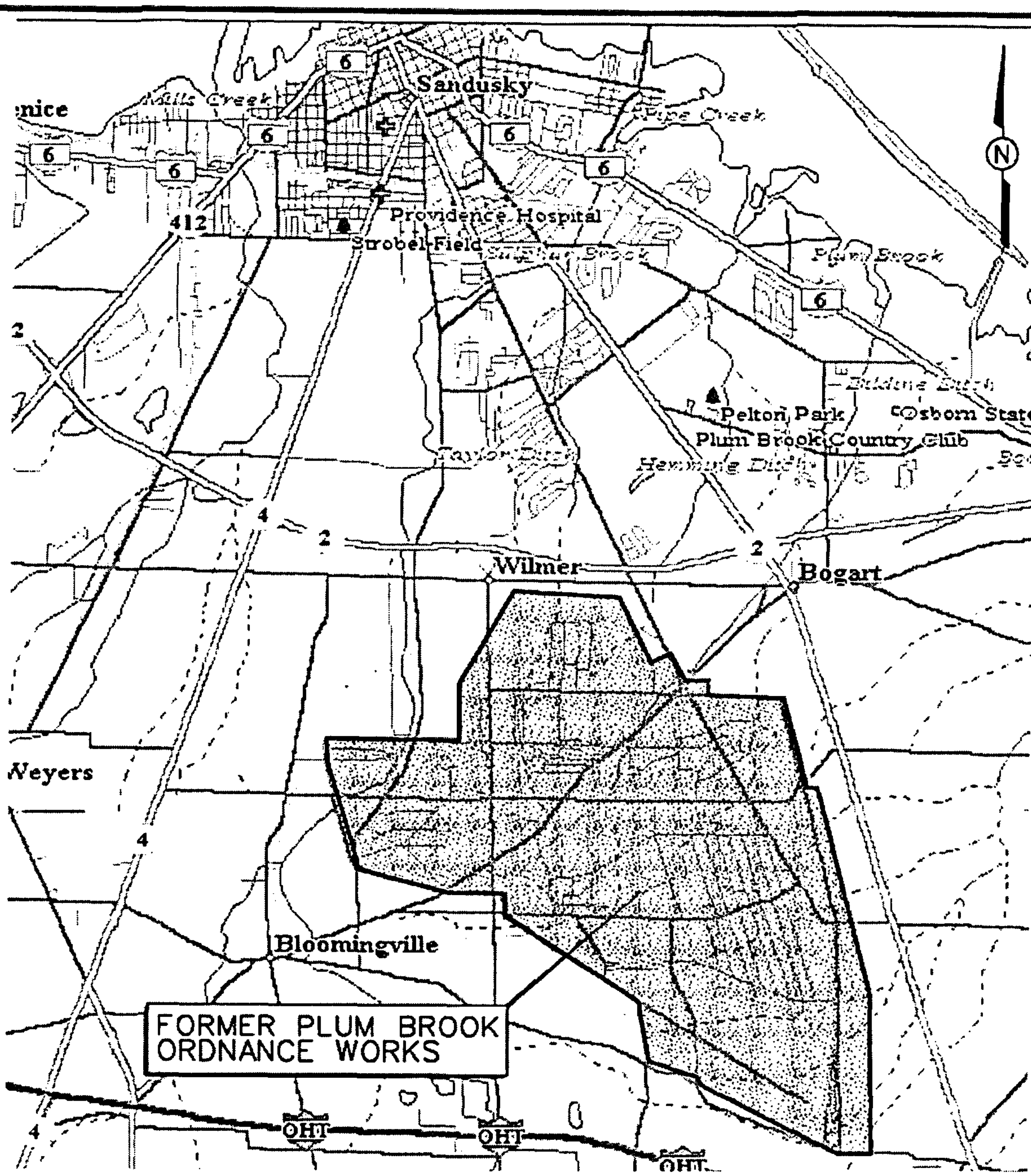
Table 6-19

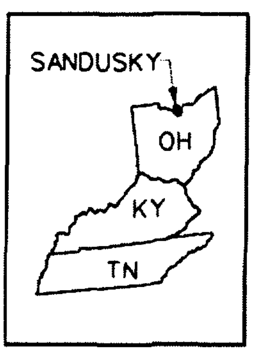
Soil Sample Analytical Results Compared to PRGs
2001 Groundwater Remedial Investigation
Former Plum Brook Ordnance Works, Sandusky, Ohio

		Sample Area:	West Area Red Water Pond Area											
		Sample Location:	WARP-DP09				WARP-DP13				WARP-DP16			
		Sample Number:	BD0023		BD0024		BD0025		BD0028		BD0029R		BD0030R	
		Sample Date:	27-Sep-01		27-Sep-01		27-Sep-01		27-Sep-01		2-Oct-01		2-Oct-01	
		Sample Depth:	4 to 4.9		11 to 12		4.1 to 5.1		11 to 12		3.5 to 4		11 to 12	
Metals														
Aluminum	mg/kg	76000	6980		9320		4340		11400		10700	J	12500	J
Antimony	mg/kg	31							0.64	J	0.56	J		
Arsenic	mg/kg	0.39	**6.1**		**12.7**		**2.6**		**20.3**		**10.3**	J	**6.8**	J
Barium	mg/kg	5400	49.8		65.4		32.6		73.5		102	J	94.9	J
Beryllium	mg/kg	150	0.45	B	0.64	J	0.34	B	0.79		0.75	B	0.83	B
Cadmium	mg/kg	37	0.22	J	0.23	J	0.11	J	0.27	J	0.17	B	0.16	B
Chromium	mg/kg	210	23.2		16.3		6.4		18.7		16.7	J	19.8	J
Cobalt	mg/kg	4700	3.8	J	14.2		5.5	J	13.8		14.2	J	11.7	J
Copper	mg/kg	2900	10.1		23.8		4.9		23.5		22.3		18.8	
Iron	mg/kg	23000	12000		**24300**		8370		**30300**		**26100**	J	**25600**	J
Lead	mg/kg	400	12		10.7		5.7		10.6		13	J	9.6	J
Manganese	mg/kg	1800	236	J	748	J	184	J	592	J	1500	J	377	J
Mercury	mg/kg	23	0.044		0.027	J	0.017	J			0.021	J		
Nickel	mg/kg	1600	10.7		37.7		7.4		36.9		37.9	J	30	J
Selenium	mg/kg	390												
Thallium	mg/kg	5.2	1.1	B	0.91	B			0.94	B	0.71	J		
Vanadium	mg/kg	550	16		22		12.1		26.1		23.3	J	23.9	J
Zinc	mg/kg	23000	33.3		63.5		23.3		75.7		74.9	J	57.7	J

mg/kg - Milligrams per kilogram.
µg/L - Micrograms per liter.
PRG - *Preliminary remedial goal*
Val Qlfr - Validation qualifier.

FIGURES





NOT TO SCALE

FIGURE 1-1
VICINITY MAP

FORMER PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 12/16/97 | DATE LAST REV.: 10/30/01 | DRAFT. CHCK. BY: | INITIATOR: D. KESSLER | DWG. NO.: 773781ES.201
DRAWN BY: D. BILLINGSLEY | DRAWN BY: bvanderg | ENGR. CHCK. BY: D. KESSLER | PROJ. MGR.: M. SPANGBERG | PROJ NO.: 773781

01:08:56 10/30/01 bvanderg c:\cadd\des gn\773\01es.001

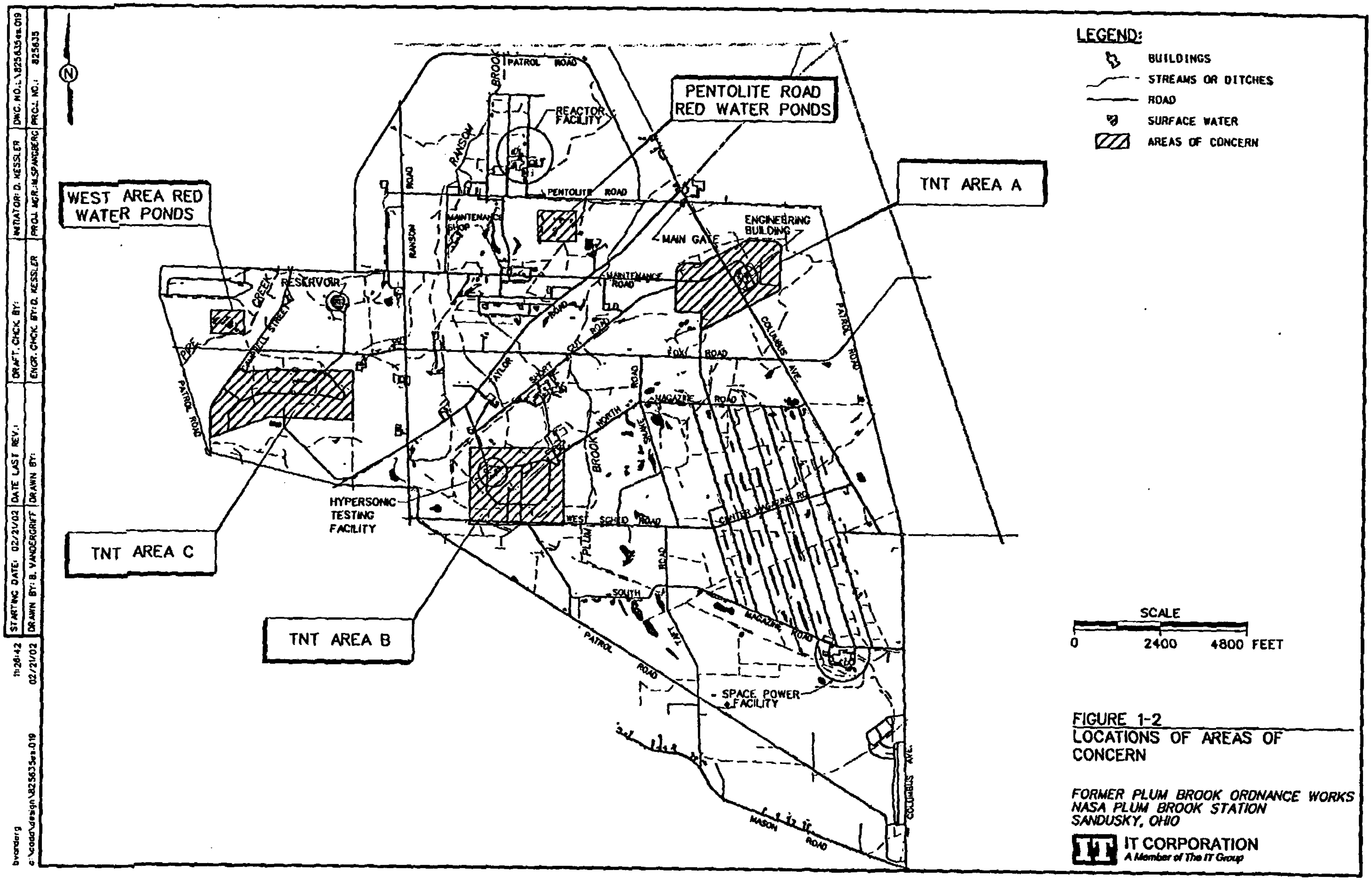
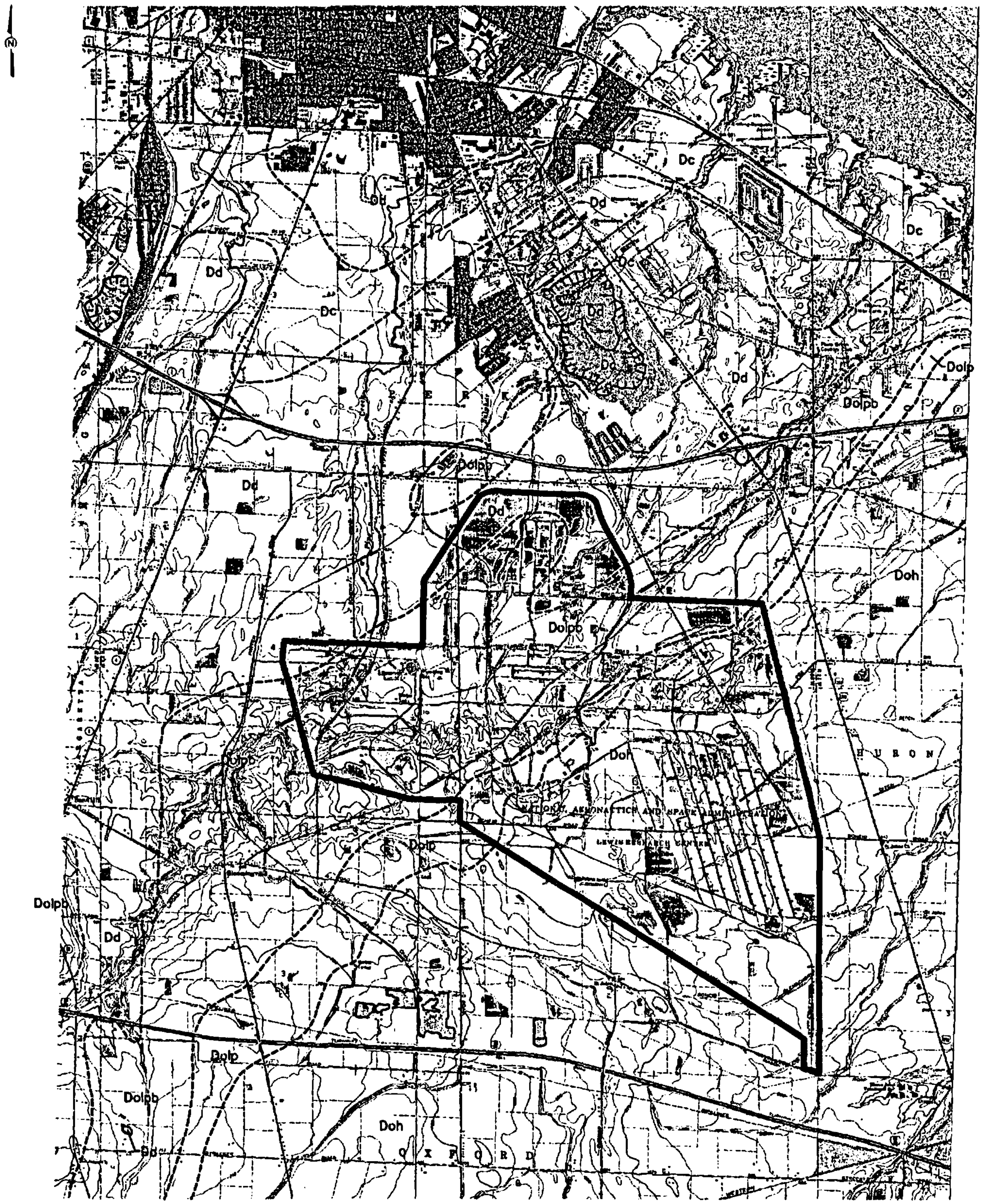


FIGURE 1-2
LOCATIONS OF AREAS OF CONCERN

FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group



LEGEND:

Doh	OHIO SHALE
Dolp	PROUT LIMESTONE MEMBER (OLENTANGY SHALE)
Dolpb	PLUM BROOK SHALE MEMBER (OLENTANGY SHALE)
Dd	DELAWARE LIMESTONE
Dc	COLUMBUS LIMESTONE
— — —	CONTACT SOLID LINE WHERE EXPOSED, DASHED WHERE CONCEALED BY SEDIMENTS

REFERENCE:

NOTES:

LINES WERE ADJUSTED BASED ON 2001 BEDROCK MONITORING WELLS.

IT CORPORATION

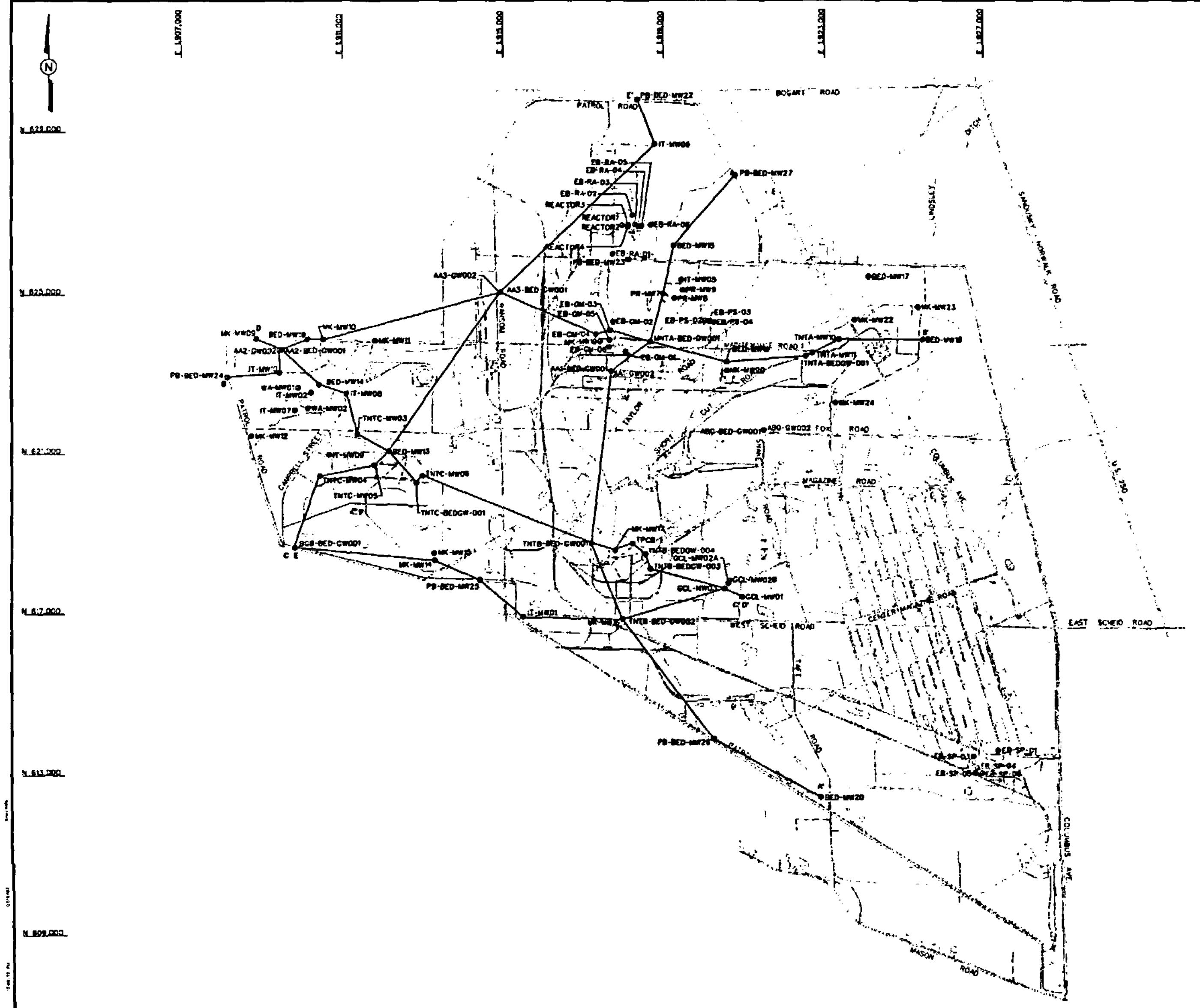
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 2-1
REGIONAL GEOLOGIC MAP

2500 FEET

771481

771481S.?17



LEGEND:

ABG-BED-GW001 MONITORING WELL LOCATION

TPCB-1 SOIL BORING LOCATION

BUILDING

RAILROAD

SURFACE WATER

DITCH

FENCE (PBOW BOUNDARY)

A —— A' GEOLOGIC CROSS-SECTION LINE

NOTES:

1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 5 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).

2. SOIL BORING TPCB-1 NOT SURVEYED. APPROXIMATE LOCATION BASED ON FIELD NOTES. LITHOLOGIC DEPTHS USED ONLY FOR CROSS-SECTION CONSTRUCTION.

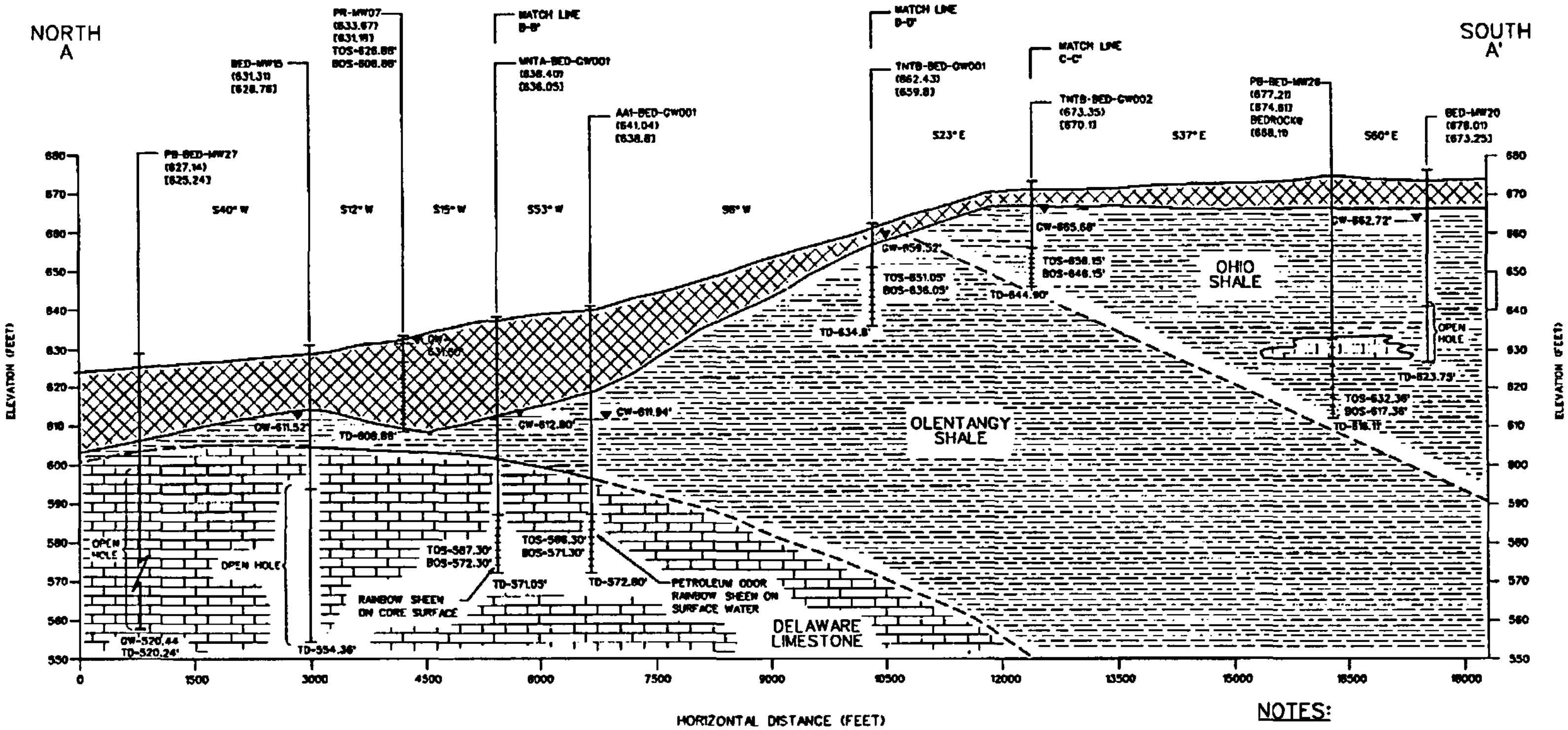
SCALE
0 1200 2400 FEET

IT CORPORATION

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 2-2
SITE MAP WITH WELLS AND
LINES OF CROSS-SECTION

AREA	JOB NO.	DRAWING NO.	REV
SITEWIDE	771481	771481ES.196	



CROSS SECTION A-A'

LEGEND:

OVERBURDEN		GW-627.68'	GROUNDWATER ELEVATION (NOVEMBER 5, 2001)
SHALE		BED-MW15	WELL ID
LIMESTONE		(631.31)	CASING ELEVATION
CONTACT AREA UNCERTAIN		[628.76]	GROUND SURFACE ELEVATION
		TD-610.80'	TOTAL DEPTH OF BOREHOLE
		TOS	TOP OF SCREEN
		BOS	BOTTOM OF SCREEN
		N15° E	BEARING OF CROSS-SECTION SEGMENT

HORIZONTAL SCALE: 0 1500 3000 FEET

VERTICAL SCALE: 0 30 60 FEET

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM (1983).
2. REFERENCE- PRELIMINARY OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SERVICES, OPEN FILE MAP BG-D306

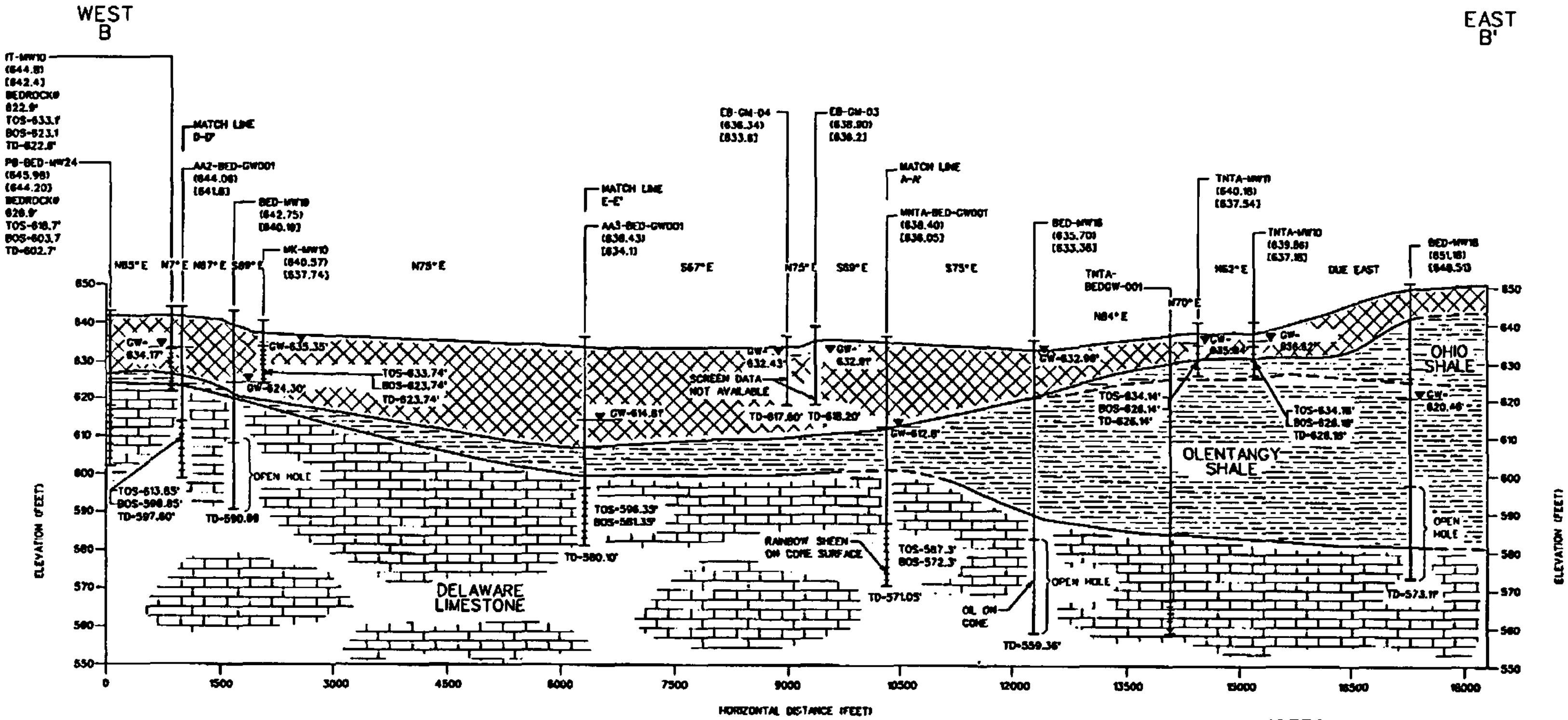
FIGURE 2-3
GEOLOGIC CROSS-SECTION A-A'

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 1/4/99 | DRAWN BY: R. SPIRES | DATE LAST REV.: | DRAWN BY: | DRAFT CHCK. BY: C. TUNIN | ENGR CHCK. BY: D. KESSLER | INITIATOR: D. KESSLER | PROJ. MGR.: R. THOMPSON | DWG. NO.: 77148ies54 | PROJ. NO.: 771481

02 1143
03/13/02



CROSS SECTION B-B'

LEGEND:

OVERBURDEN		GW-627.68'	GROUNDWATER ELEVATION (NOVEMBER 2001)
		BED-MW15	WELL ID
SHALE		(631.31)	CASING ELEVATION
		[628.78]	GROUND SURFACE ELEVATION
LIMESTONE		TD-610.80'	TOTAL DEPTH OF BOREHOLE
		TOS	TOP OF SCREEN
– – – –	CONTACT AREA UNCERTAIN	BOS	BOTTOM OF SCREEN
		N15°E	BEARING OF CROSS-SECTION SEGMENT

HORIZONTAL SCALE:
0 1500 3000 FEET

VERTICAL SCALE:
0 30 60 FEET

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM (1983).
2. REFERENCE- PRELIMINARY OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SERVICES, OPEN FILE MAP BG-D3DG

FIGURE 2-4
GEOLOGIC CROSS-SECTION B-B'

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 1/4/99 | DATE LAST REV.: | DRAFT CHCK. BY: | INITIATOR: D. KESSLER | DWG. NO.: 771481es.155
DRAWN BY: R. SPRES | DRAWN BY: | ENGR. CHCK. BY: D. KESSLER | PROJ. MGR.: P. THOMPSON | PROJ. NO.: 771481

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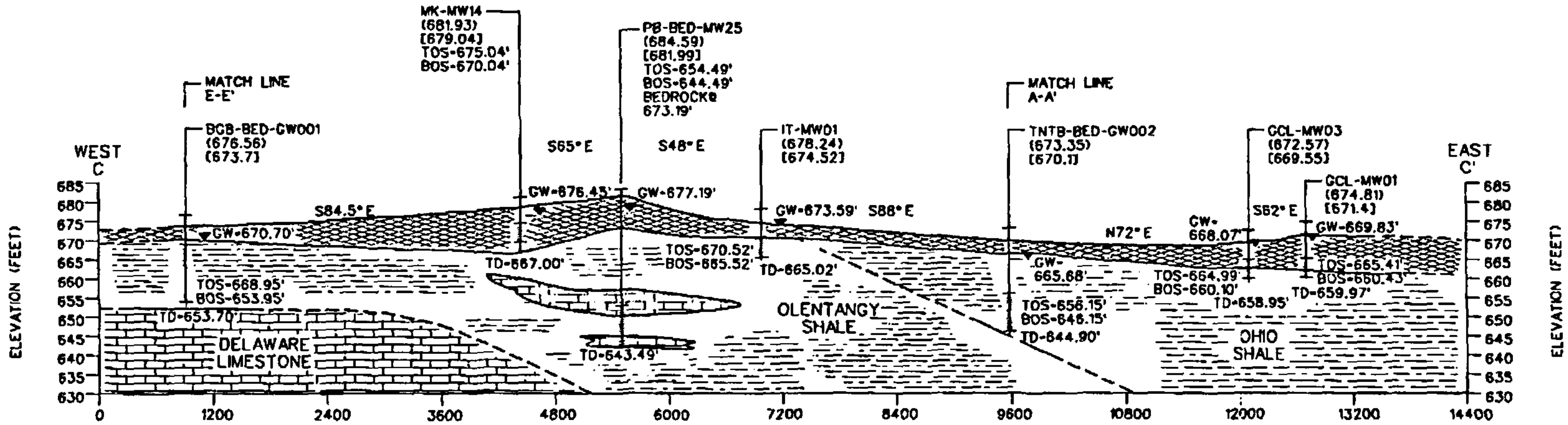

CROSS SECTION C-C'

LEGEND:

OVERBURDEN	GW-627.68'	GROUNDWATER ELEVATION (NOVEMBER 2001)
	BED-MW15	WELL ID
SHALE	(631.31)	CASING ELEVATION
	[628.76]	GROUND SURFACE ELEVATION
LIMESTONE	TD-610.80'	TOTAL DEPTH OF BOREHOLE
	TOS	TOP OF SCREEN
- - - - CONTACT AREA UNCERTAIN	BOS	BOTTOM OF SCREEN
	N15° E	BEARING OF CROSS-SECTION SEGMENT

HORIZONTAL SCALE:
0 1200 2400 FEET

VERTICAL SCALE:
0 30 60 FEET

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM (1983).
2. REFERENCE- PRELIMINARY OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SERVICES, OPEN FILE MAP BG-D3OG

FIGURE 2-5
GEOLOGIC CROSS-SECTION C-C'

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 05/26/99 | DATE LAST REV.: | DRAFT CHCK. BY: C. TUALN | INITIATOR: D. KESSLER | DWG. NO.: ...77748...
DRAWN BY R. SPIRES | DRAWN BY: | ENGR. CHCK. BY D. KESSLER | PROJ. MGR.: P. THOMPSON | PROJ. NO.: 77145
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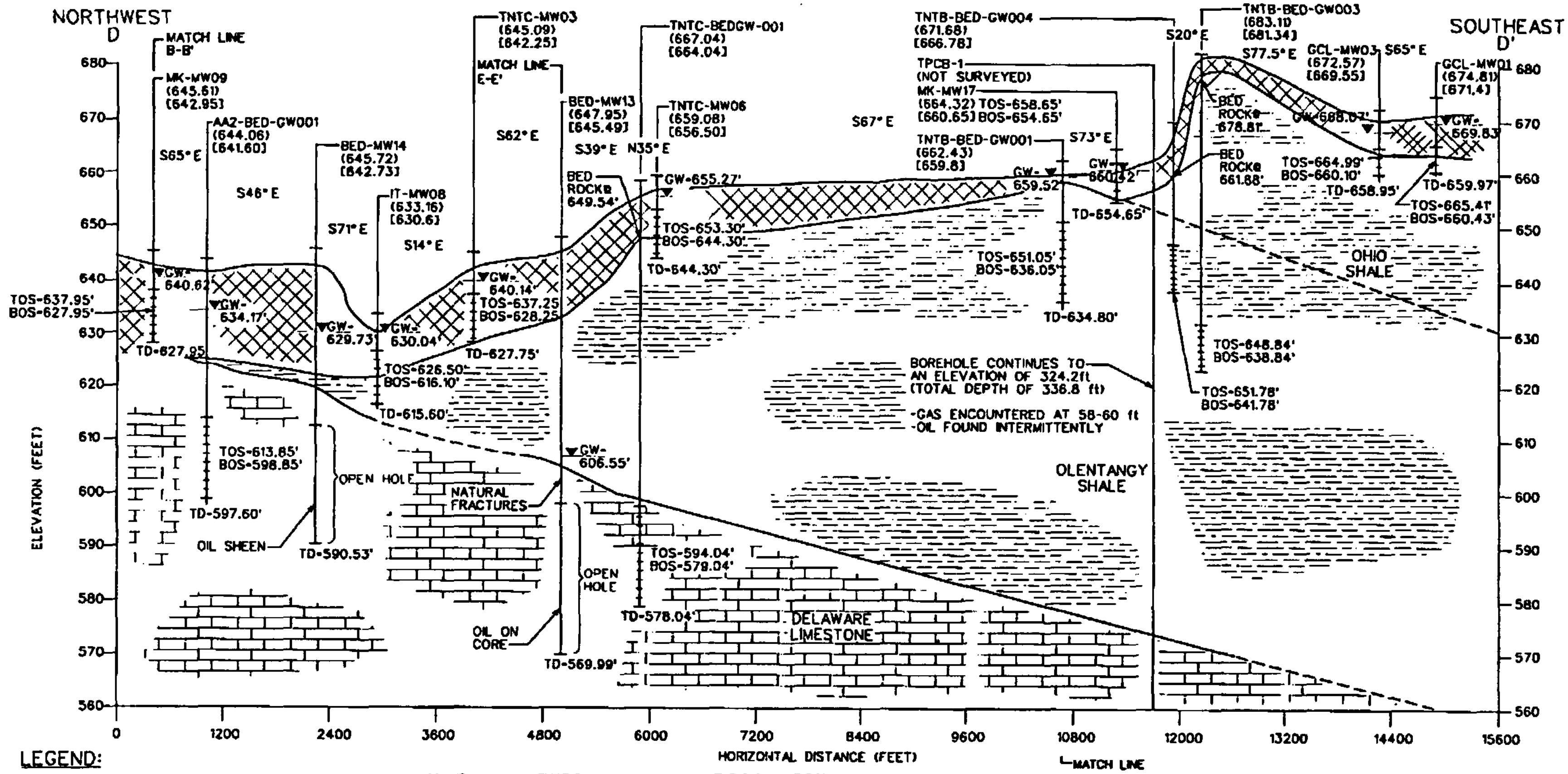

LEGEND:

OVERBURDEN	GW-627.68'	GROUNDWATER ELEVATION (NOVEMBER 2001)
SHALE	BED-MW15	WELL ID
LIMESTONE	(631.31)	CASING ELEVATION
CONTACT AREA UNCERTAIN	[628.76]	GROUND SURFACE ELEVATION
	TD-610.80'	TOTAL DEPTH OF BOREHOLE
	TOS	TOP OF SCREEN
	BOS	BOTTOM OF SCREEN
	N15° E	BEARING OF CROSS-SECTION SEGMENT

CROSS SECTION D-D'

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM (1983).
2. REFERENCE- PRELMINARY OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SERVICES, OPEN FILE MAP BG-D3DG

HORIZONTAL SCALE: 0 1200 2400 FEET

VERTICAL SCALE: 0 20 40 FEET

FIGURE 2-6
GEOLOGIC CROSS-SECTION D-D'

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

DWG. NO.: 774849s.157 | PROJ. NO.: 774811
INITIATOR: HAGEGEORGE | PROJ. MGR.: SPANGBERG
DRAFT CHCK. BY: C. TUMLIN | ENGR. CHCK BY: HAGEGEORGE
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 05/25/99 | DRAWN BY: E. BRADSHAW
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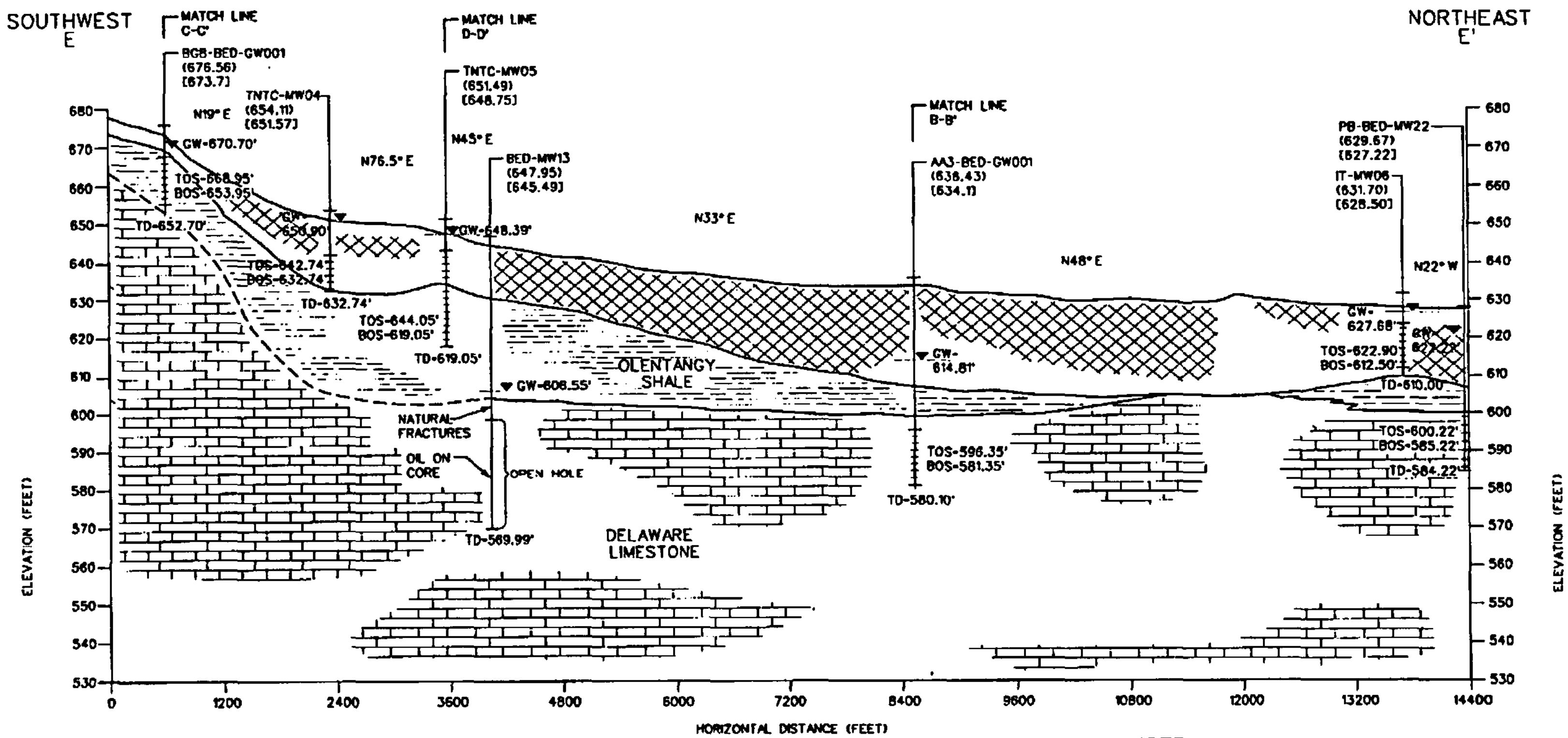


CROSS SECTION E-E'

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM (1983).
2. REFERENCE- PRELIMINARY OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL SERVICES, OPEN FILE MAP BG-D3DG

LEGEND:

OVERBURDEN	GW-627.68'	GROUNDWATER ELEVATION (NOVEMBER 2001)
SHALE	BED-MW15	WELL ID
	(631.31)	CASING ELEVATION
LIMESTONE	[628.76]	GROUND SURFACE ELEVATION
	TD-610.80'	TOTAL DEPTH OF BOREHOLE
	TOS	TOP OF SCREEN
	BOS	BOTTOM OF SCREEN
CONTACT AREA UNCERTAIN	N15° E	BEARING OF CROSS-SECTION SEGMENT

HORIZONTAL SCALE: 0 1200 2400 FEET

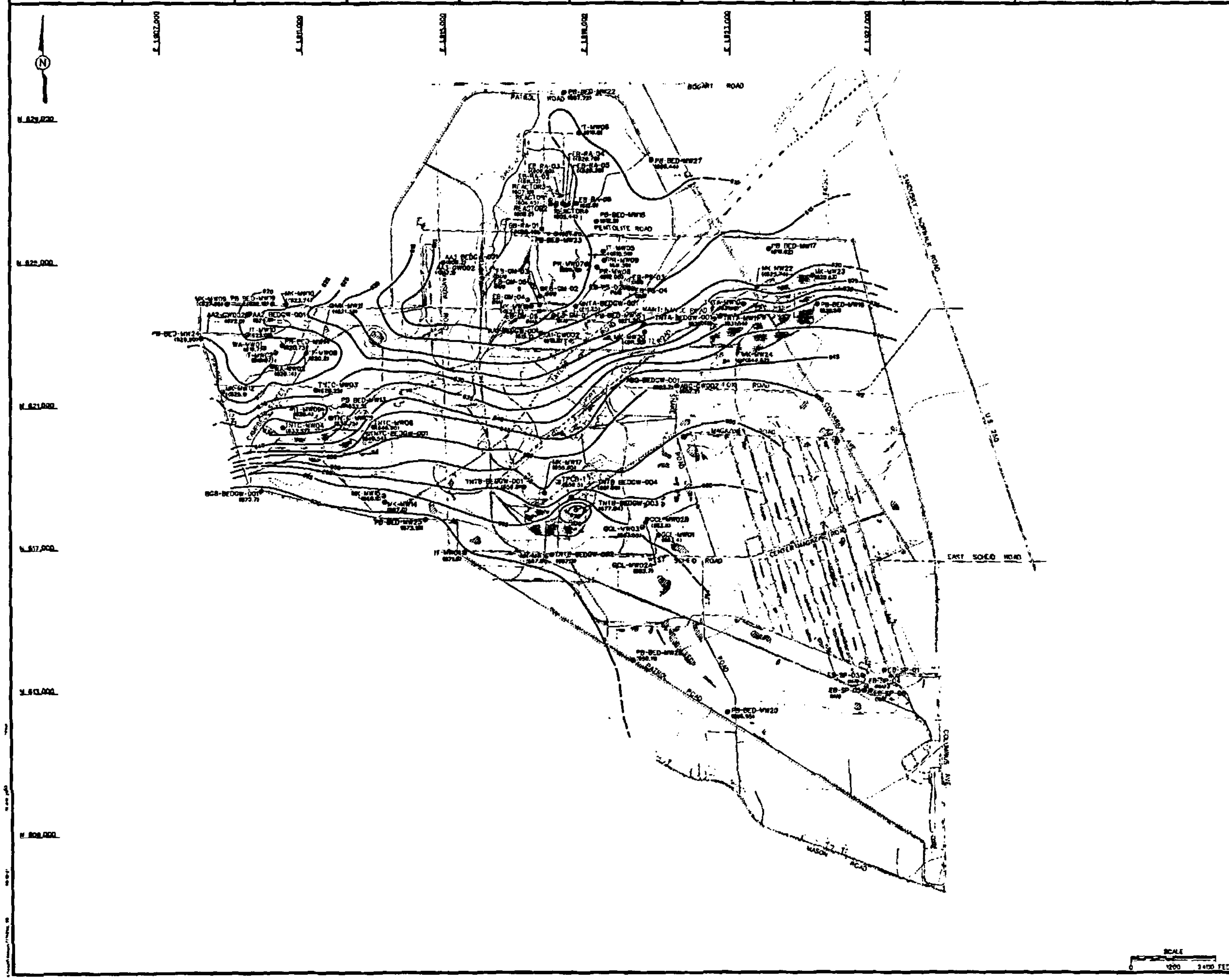
VERTICAL SCALE: 0 30 60 FEET

FIGURE 2-7
GEOLOGIC CROSS-SECTION E-E'

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 05/26/99 | DATE LAST REV. | DRAWN BY: T. BRADSHAW | ENGR. CHCK. BY: HAGEGEORGE | PROJ. MGR.: P. THOMPSON | INITIATOR: HAGEGEORGE | DWG. NO.: 77'48' | PROJ. NO.: 77'48'



LEGEND:

IT-MW06	OVERBURDEN MONITORING WELL LOCATION
ABG-BEDGW-001	BEDROCK MONITORING WELL LOCATION
TPCB-1	SOIL BORING LOCATION
	BUILDING
	RAILROAD
	SURFACE WATER
	DITCH
	FENCE (PBOW BOUNDARY)
	BEDROCK ELEVATION (FT-MSL)
670	BEDROCK ELEVATION CONTOUR (FT-MSL)
	LESS THAN ELEVATION INDICATED. BORING DID NOT ENCOUNTER BEDROCK.
	DRILL LOG NOT AVAILABLE

NOTES:

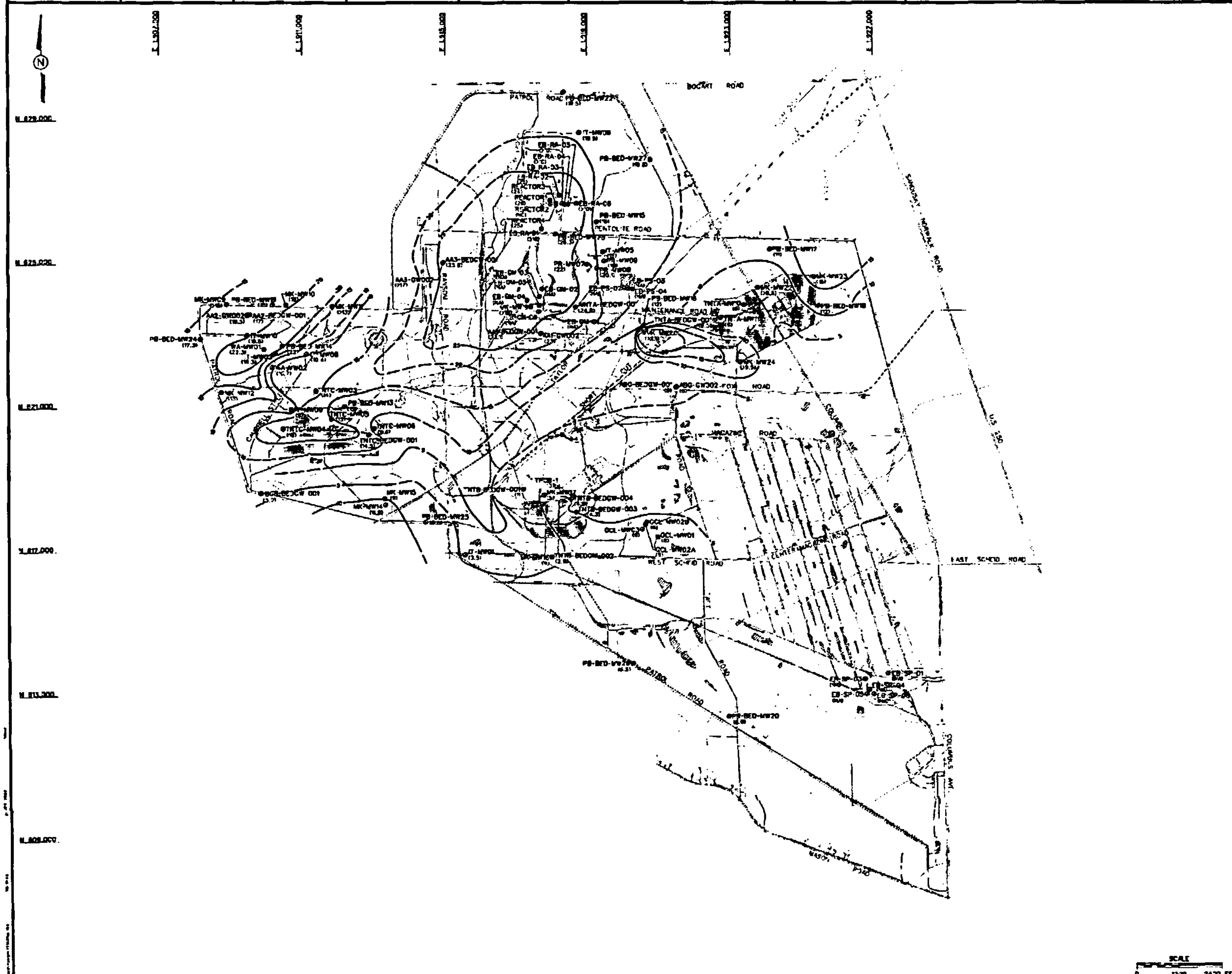
1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 5 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).
2. SOIL BORING TPCB-1 NOT SURVEYED. APPROXIMATE LOCATION BASED ON FIELD NOTES. LITHOLOGIC DEPTHS USED ONLY FOR CROSS-SECTION CONSTRUCTION.
3. TOP OF BEDROCK ELEVATION MAP BASED ON LITHOLOGY ENCOUNTERED DURING MONITORING WELL INSTALLATION ONLY.

Shaw Environmental, Inc.

2002 GROUNDWATER DATA SUMMARY AND EVALUATION REPORT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 2-8
TOP OF BEDROCK ELEVATION CONTOUR MAP

AREA	JOB NO.	DRAWING NO.	REV
SITEWIDE	771481	771481ES.95	



LEGEND:

IT-MW06	OVERBURDEN MONITORING WELL LOCATION
ABG-BEDGW-001	BEDROCK MONITORING WELL LOCATION
TPCB-1	SOIL BORING LOCATION
	BUILDING
	RAILROAD
	SURFACE WATER
	DITCH
	FENCE (PBOW BOUNDARY)
	OVERBURDEN THICKNESS (FT)
	OVERBURDEN THICKNESS CONTOUR (FT)
	GREATER THAN INDICATED THICKNESS
	DRILL LOG NOT AVAILABLE

NOTES:

1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 3 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).
2. SOIL BORING TPCB-1 NOT SURVEYED. APPROXIMATE LOCATION BASED ON FIELD NOTES. LITHOLOGIC DEPTHS USED ONLY FOR CROSS-SECTION CONSTRUCTION.

SCALE
0 1200 2400 FEET

Shaw Environmental, Inc.

2002 GROUNDWATER DATA SUMMARY
AND EVALUATION REPORT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 2-9
OVERBURDEN THICKNESS CONTOUR MAP

AREA	JOB NO.	DRAWING NO	REV
SITEWIDE	771481	771481ES.194	

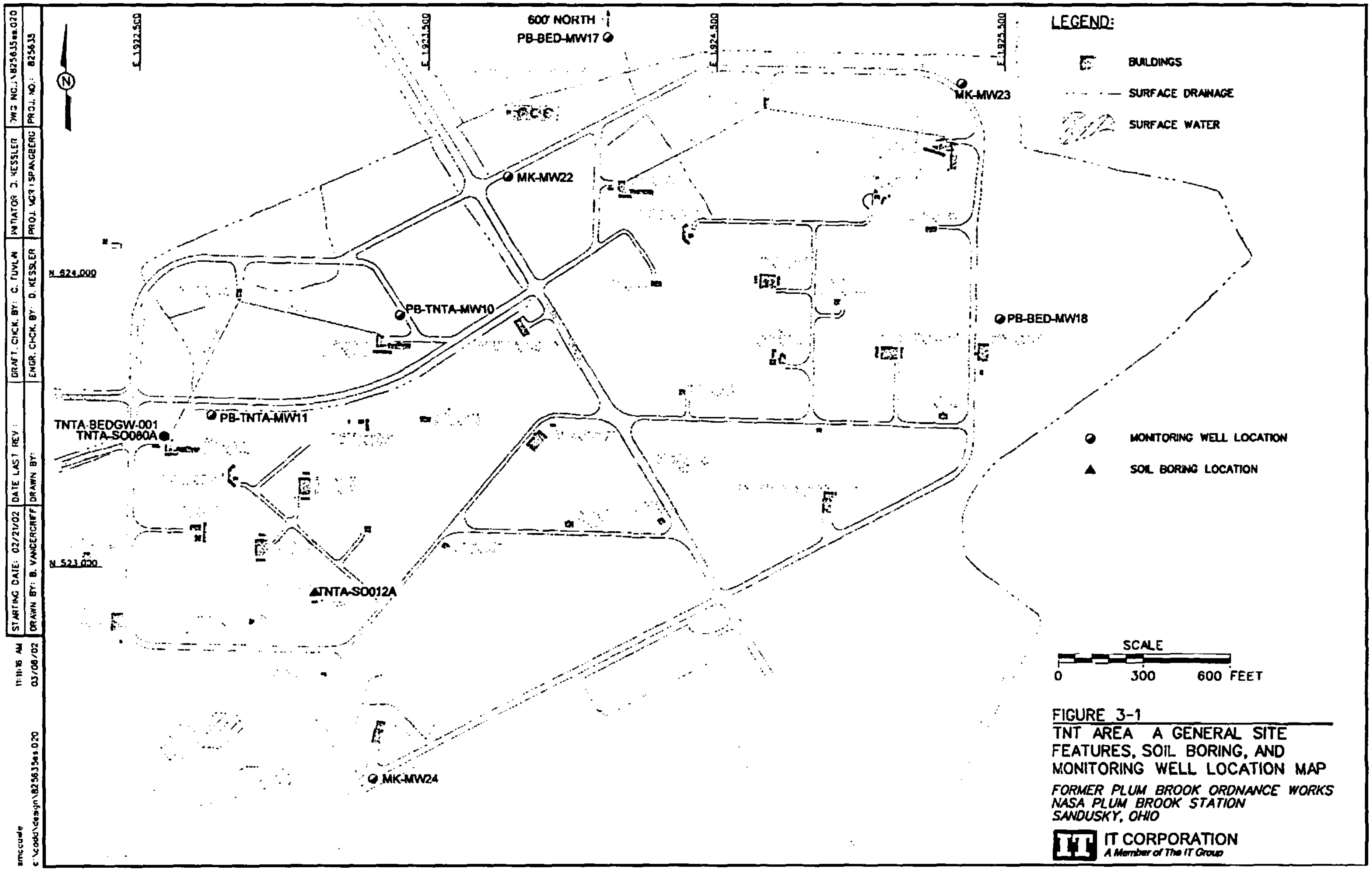


FIGURE 3-1
TNT AREA A GENERAL SITE FEATURES, SOIL BORING, AND MONITORING WELL LOCATION MAP

FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
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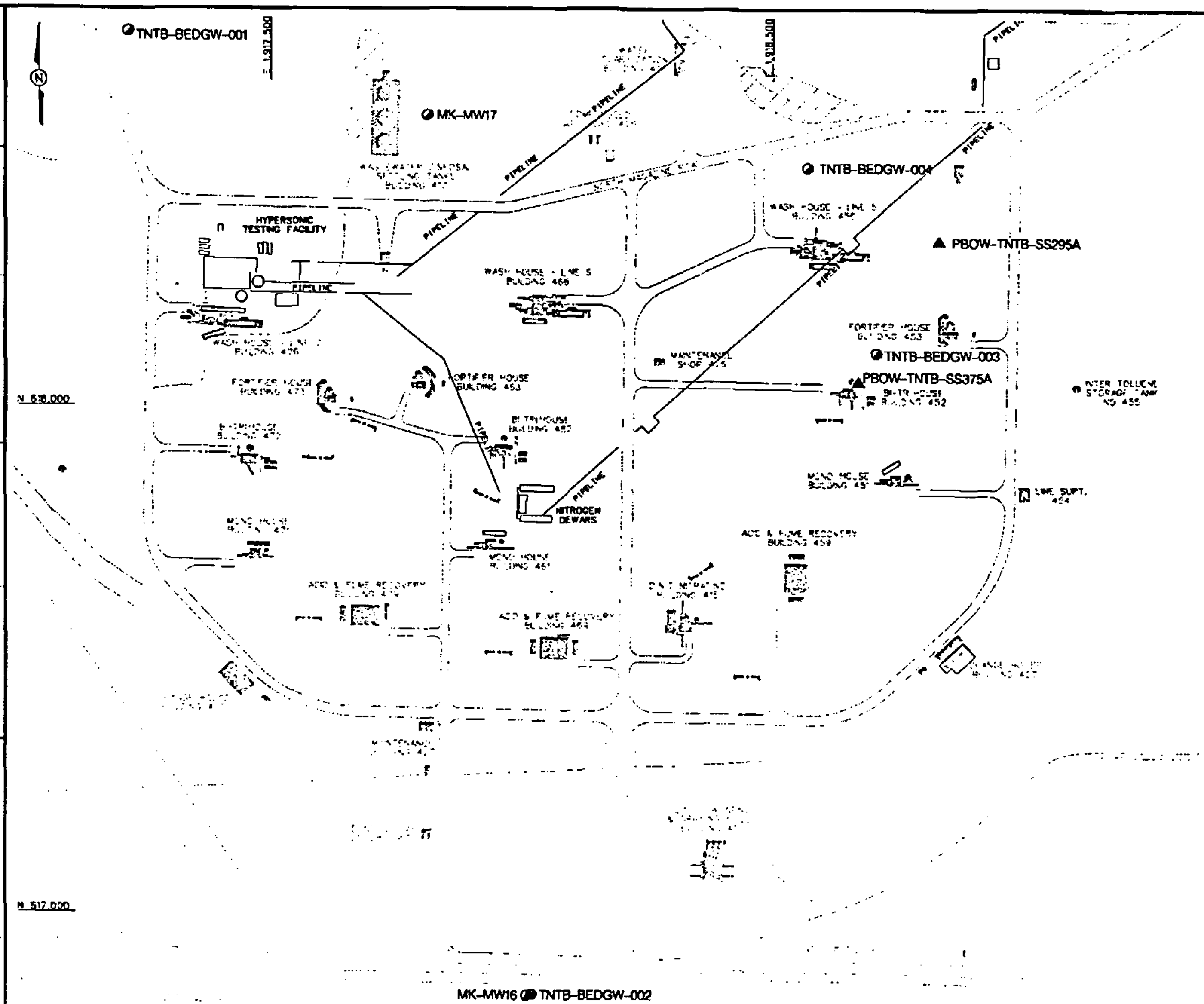

FIGURE 3-2
TNT AREA B GENERAL SITE FEATURES, SOIL BORING, AND MONITORING WELL LOCATION MAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 02/21/02	DATE LAST REV.:	DRAFT. CHCK. BY: C. TUMLA	INITIATOR: D. KESSLER
DRAWN BY: D. VANDERGRIFF	DRAWN BY:	ENGR. CHCK. BY: D. KESSLER	PROJ. MGR.: SPANGGERG

DWG. NO.: \825635es.025
PROJ. NO.: 825635
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03/14/02
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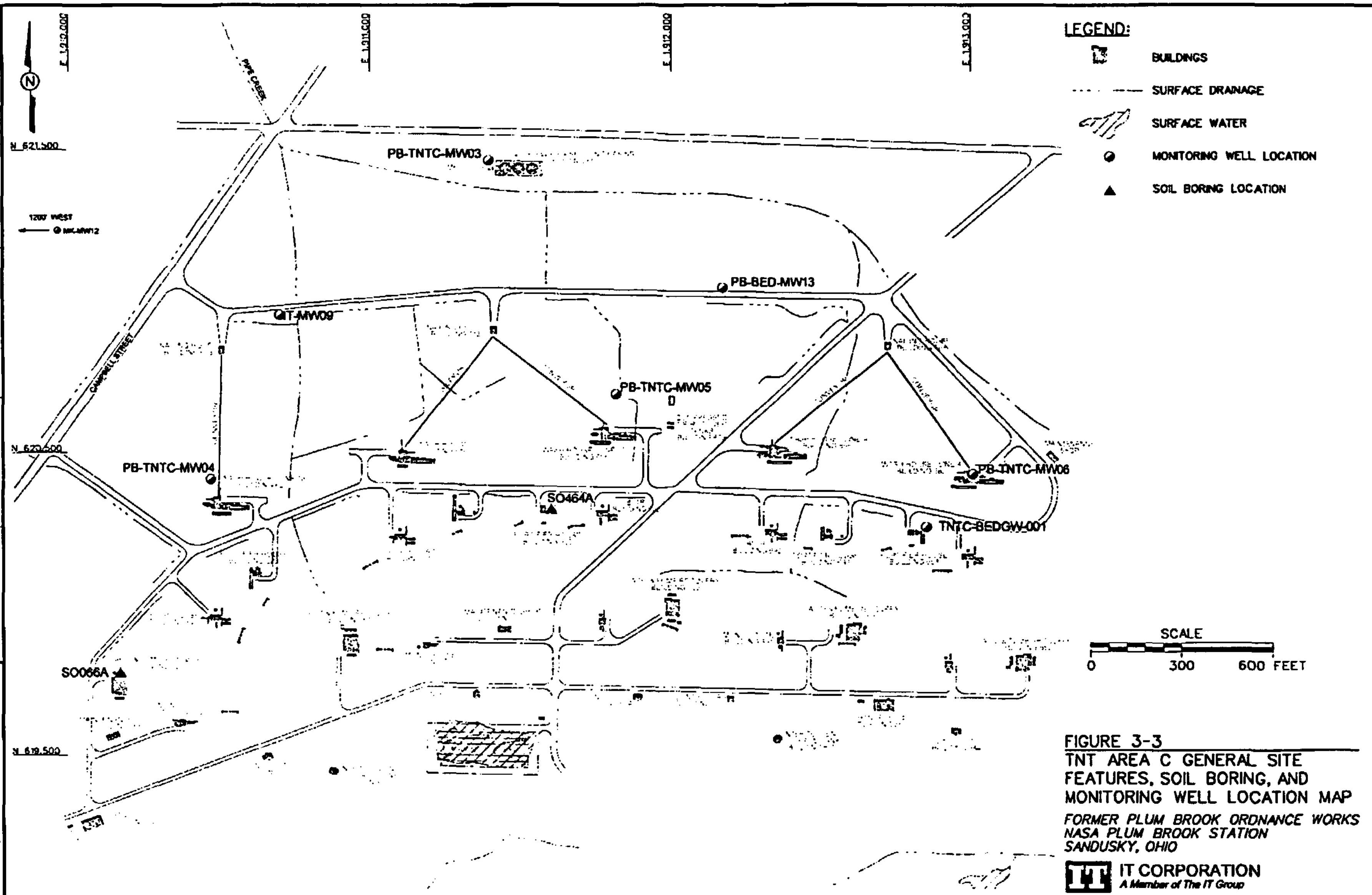

FIGURE 3-3
TNT AREA C GENERAL SITE FEATURES, SOIL BORING, AND MONITORING WELL LOCATION MAP

FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 02/21/02	DATE LAST REV.:	DRAFT. CHCK. BY: C. TUMLIN	INITIATOR: D. KESSLER	DWG NO.: \825635es.022	
DRAWN BY: B. VANDERGRIFF	DRAWN BY:	ENGR. CHCK. BY: D. KESSLER	PROJ. MGR.: P. THOMPSON	PROJ. NO.: 825635	

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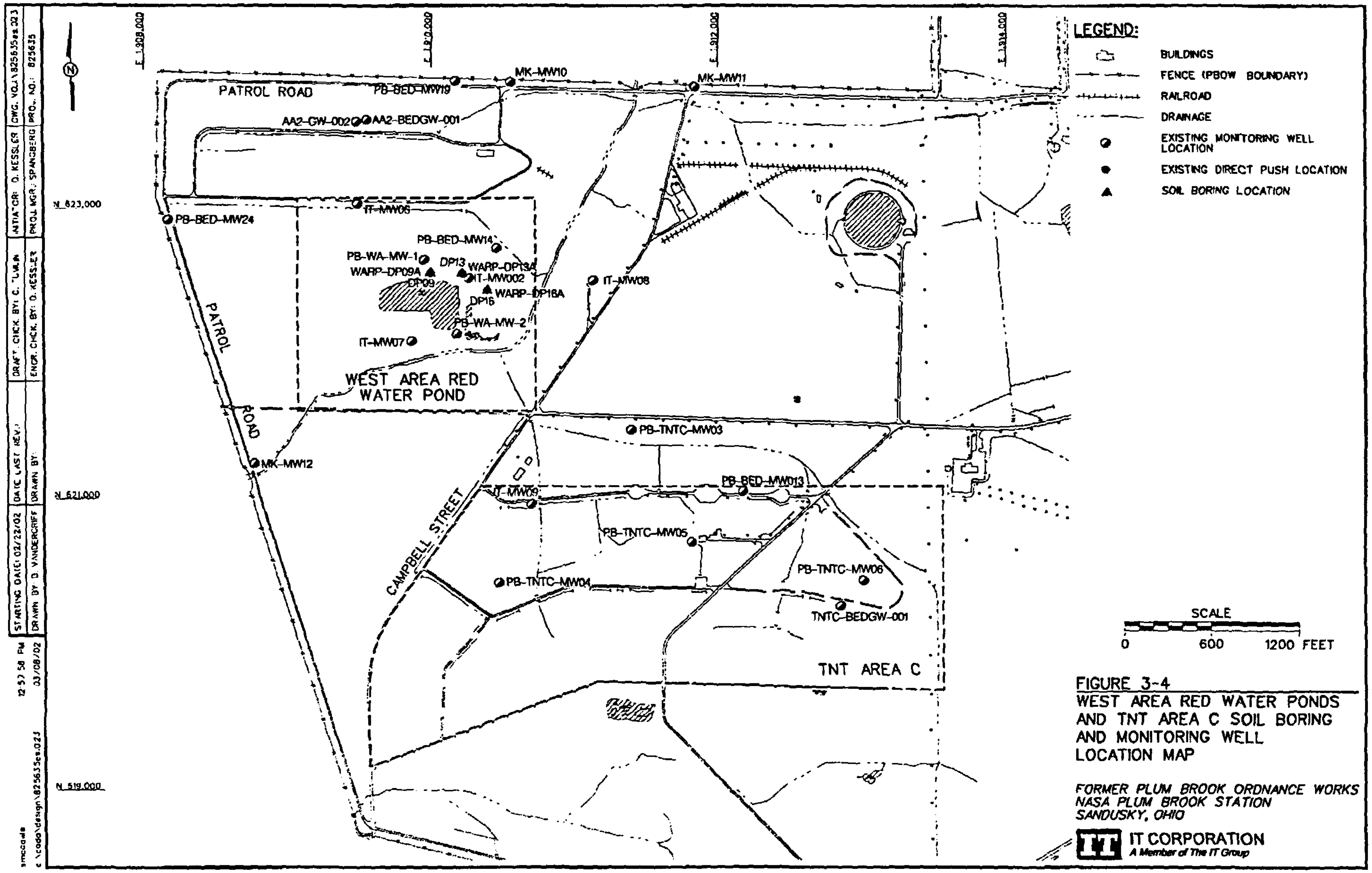
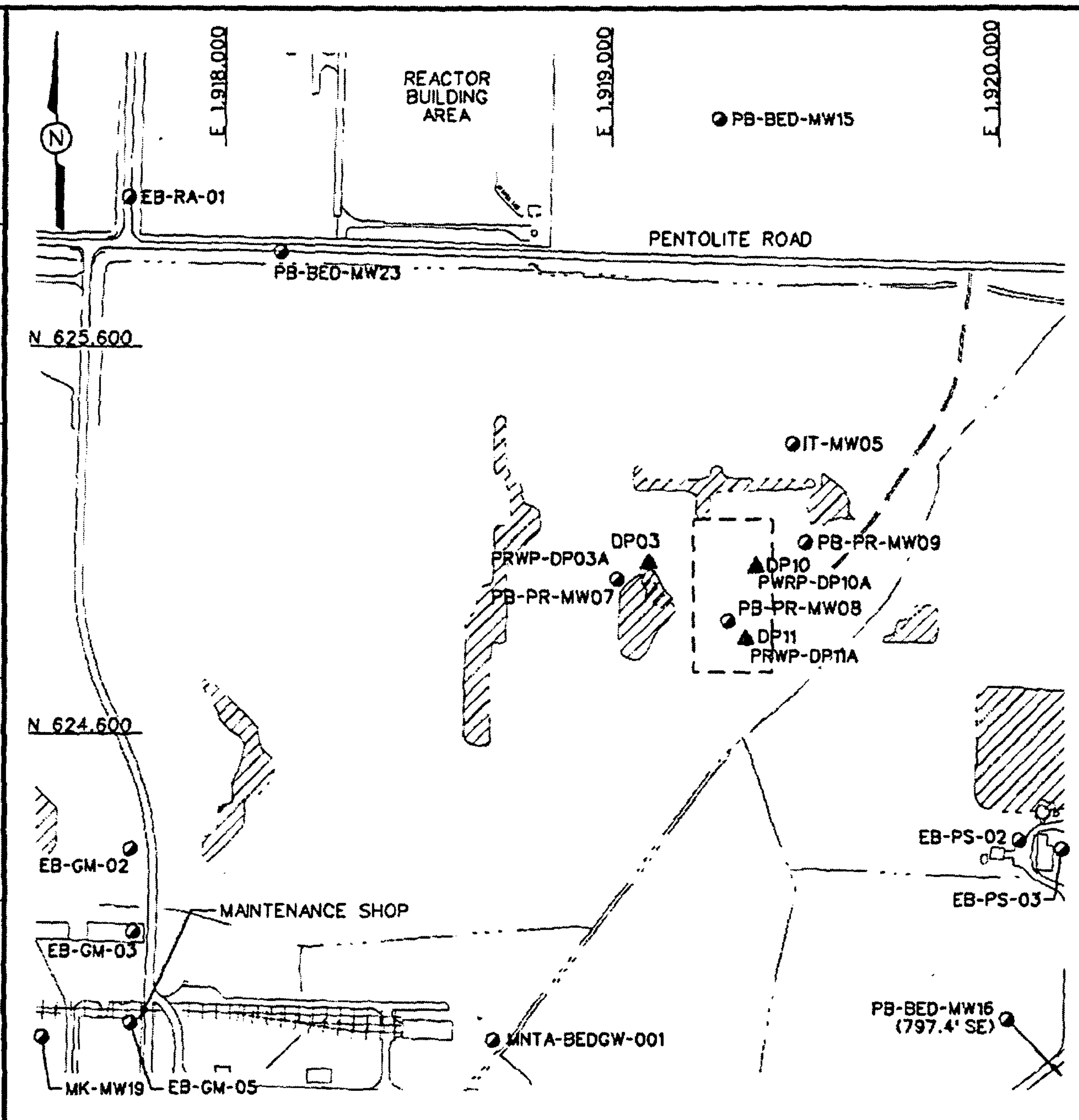


FIGURE 3-4
WEST AREA RED WATER PONDS AND TNT AREA C SOIL BORING AND MONITORING WELL LOCATION MAP

FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO



LEGEND:

BUILDINGS

RAILROAD

SURFACE WATER

SURFACE WATER DRAINAGE

APPROXIMATE HISTORICAL LOCATION OF PONDS

FENCE (PBOW BOUNDARY)

IT-MW02 EXISTING MONITORING WELL LOCATION

EXISTING DIRECT PUSH LOCATION

SOIL BORING LOCATION

SCALE

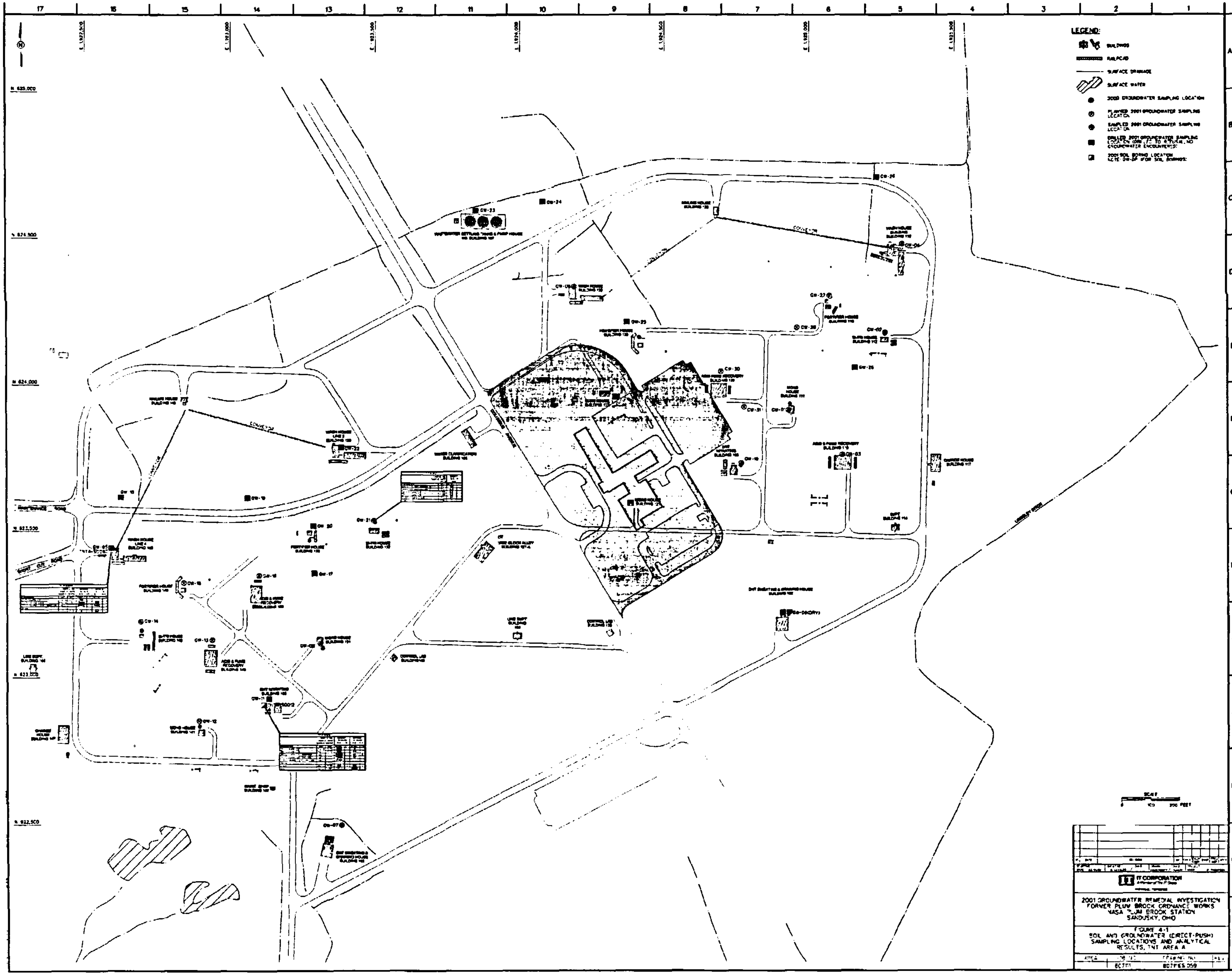
0 400 800 FEET

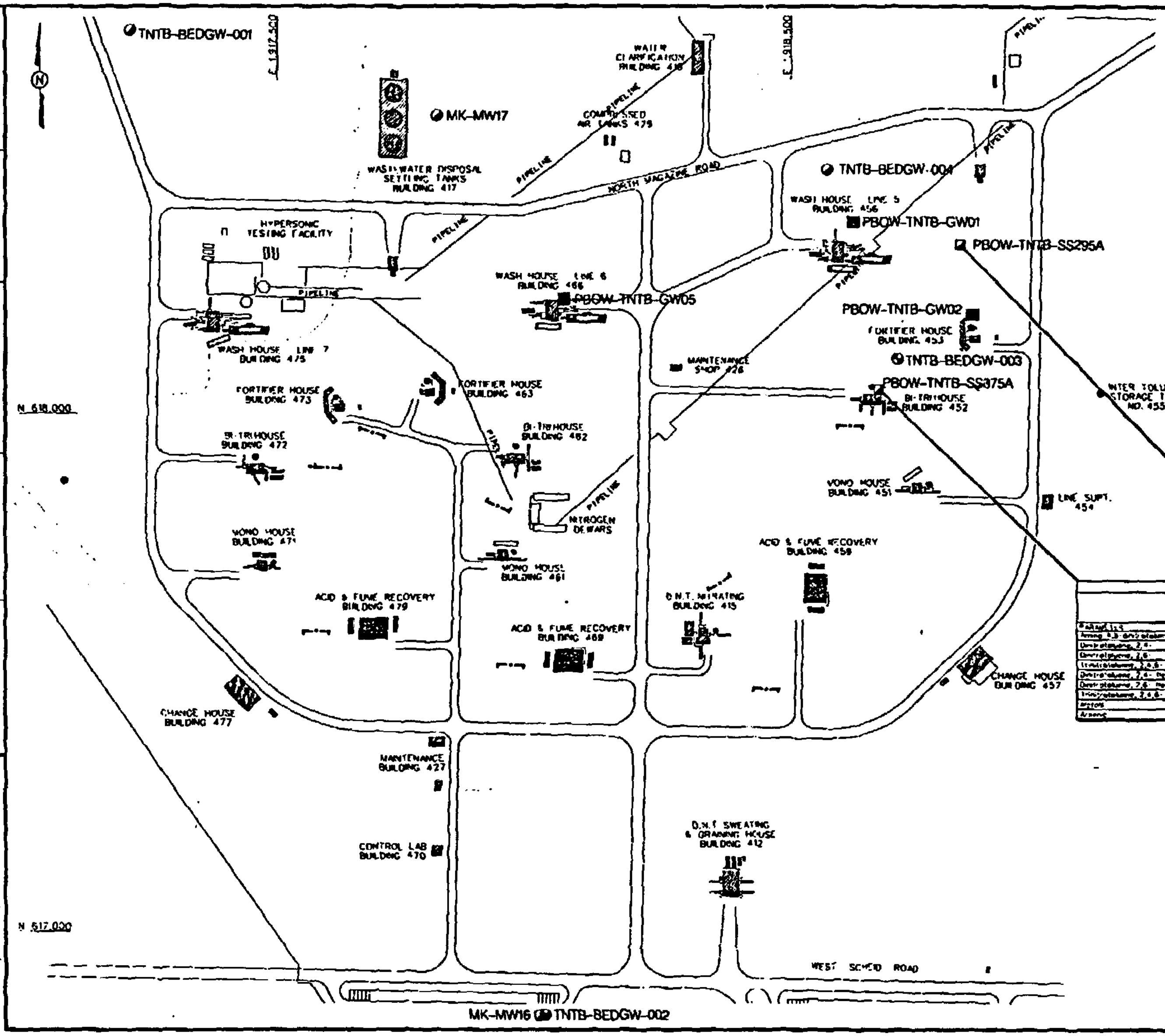
FIGURE 3-5
PENTOLITE ROAD RED WATER PONDS SOIL BORING AND MONITORING WELL LOCATION MAP

PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

DWG. NO.: 825635ES.024
PROJ. NO.: 825635
INITIATOR: D. KESSLER
PROJ. MGR.: P. THOMPSON
DRAFT CHCK. BY: C. TUMLIN
ENGR CHCK. BY: D. KESSLER
STARTING DATE: 02/22/02
DATE LAST REV.:
DRAWN BY: B. VANDERGRIFT
DRAWN BY:


LEGEND:
BUILDINGS
RAILROAD
SURFACE DRAINAGE
SURFACE WATER
2000 GROUNDWATER SAMPLING LOCATION
PLANNED 2001 GROUNDWATER SAMPLING LOCATION
SAMPLED 2001 GROUNDWATER SAMPLING LOCATION
DRILLED 2001 GROUNDWATER SAMPLING LOCATION (DRILLED TO REFUSAL, NO GROUNDWATER ENCOUNTERED)
2001 SOIL BORING LOCATION
0 100 200 FEET
IT CORPORATION
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
FIGURE 4-1
SOIL AND GROUNDWATER (DIRECT-PUSH) SAMPLING LOCATIONS AND ANALYTICAL RESULTS, TNT AREA A
807711
807PES.059



LEGEND:

BUILDINGS

SURFACE DRAINAGE

SURFACE WATER

MONITORING WELL LOCATION

SOIL BORING LOCATION

SAMPLED 2001 GROUNDWATER SAMPLING LOCATION

DRILLED 2001 GROUNDWATER SAMPLING LOCATION (DRILLED TO REFUSAL, NO GROUNDWATER ENCOUNTERED)

NOTE:

NO SHADOW BOXES FOR GROUNDWATER ANALYTICAL (DIRECT-PUSH) BECAUSE VALUES WERE BELOW PRG LIMITS.

TNTB-SS2[illegible]						
	SAMPLE NO.		B00013		B00014	
	SAMPLE DATE		9/27/01		9/27/01	
	SAMPLE DEPTH		0.0 - 1.0		2.5 - 3.5	
Parameter	Unit	PRG	Result	VQ	Result	VQ
Dinitrotoluene, 2,4-	mg/kg	0.72	2.8		0.54	
Dinitrotoluene, 2,6-	mg/kg	0.72	2		0.4	
Metals						
Arsenic	mg/kg	0.39	12.8		17	
Iron	mg/kg	23000	8100		28000	

TNTB-SS3[illegible]						
	SAMPLE NO.		B00015		B00016	
	SAMPLE DATE		9/27/01		9/27/01	
	SAMPLE DEPTH		4.0 - 6.0		8.0 - 10.0	
Parameter	Unit	PRG	Result	VQ	Result	VQ
Amino-4,6-dinitrotoluene, 2-	mg/kg	33			150	
Dinitrotoluene, 2,4-	mg/kg	0.72	2400		2100	
Dinitrotoluene, 2,6-	mg/kg	0.72	1500		630	
Trinitrotoluene, 2,4,6-	mg/kg	16	3100		2200	
Dinitrotoluene, 2,4- (leachate)	ug/L		100000		84000	
Dinitrotoluene, 2,6- (leachate)	ug/L		74000		24000	
Trinitrotoluene, 2,4,6- (leachate)	ug/L		71000		77000	
Metals						
Arsenic	mg/kg	0.39	3.4		2.8	

SCALE

0 200 400 FEET

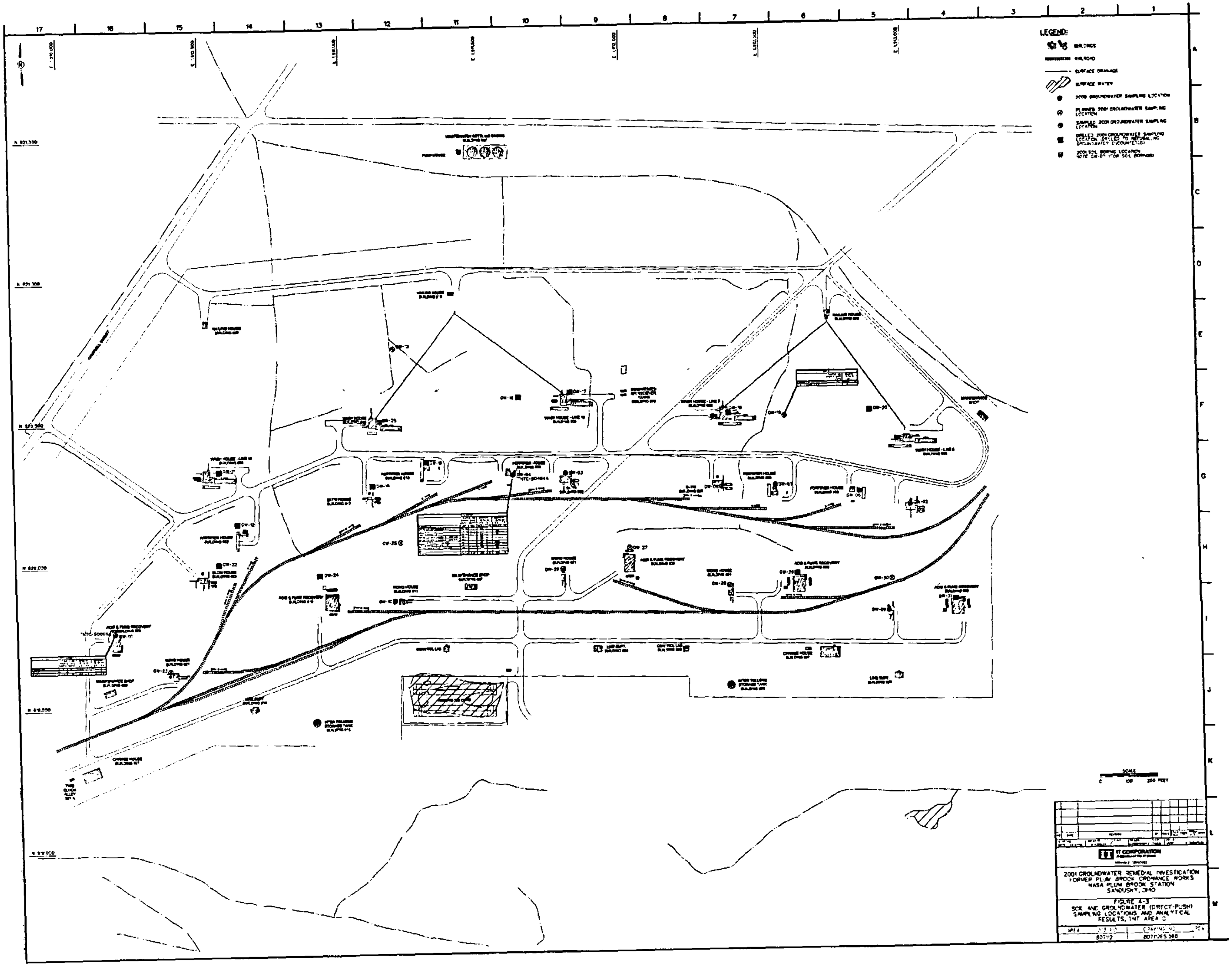
FIGURE 4-2
SOIL AND GROUNDWATER (DIRECT PUSH) SAMPLING LOCATIONS AND ANALYTICAL RESULTS, TNT AREA B

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 02/21/02 | DRAWN BY: B. VANDERGRIFF | DATE LAST REV.: | DRAWN BY: | DRAFT. CHCK. BY: C. LAUN | ENGR CHCK. BY: D. KESSLER | INITIATOR: D. KESSLER | PROJ. MGR: P. THOMPSON | DWG. NO.: 825635es021 | PROJ. NO.: 825635

10-20-48
03/13/02
bvanderg
c:\cadd\design\825635es021


LEGEND:
RAILROAD
SURFACE DRAINAGE
SURFACE WATER
SCALE
0 100 200 FEET
IT CORPORATION
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
FIGURE 4-3
SOIL AND GROUNDWATER (DIRECT-PUSH)
SAMPLING LOCATIONS AND ANALYTICAL
RESULTS, TNT AREA C
807112
807112FS.060

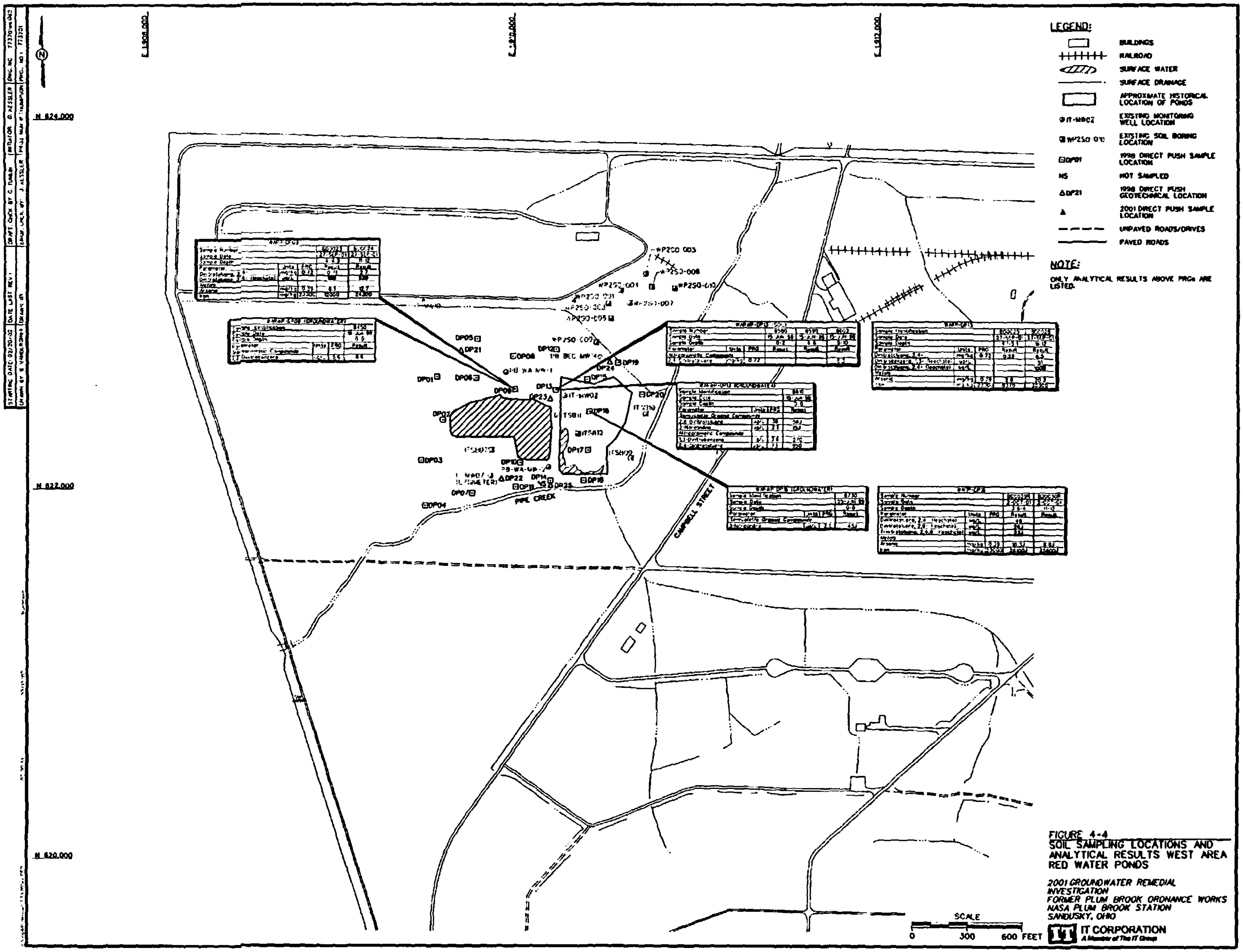


FIGURE 4-4
SOIL SAMPLING LOCATIONS AND ANALYTICAL RESULTS WEST AREA RED WATER PONDS

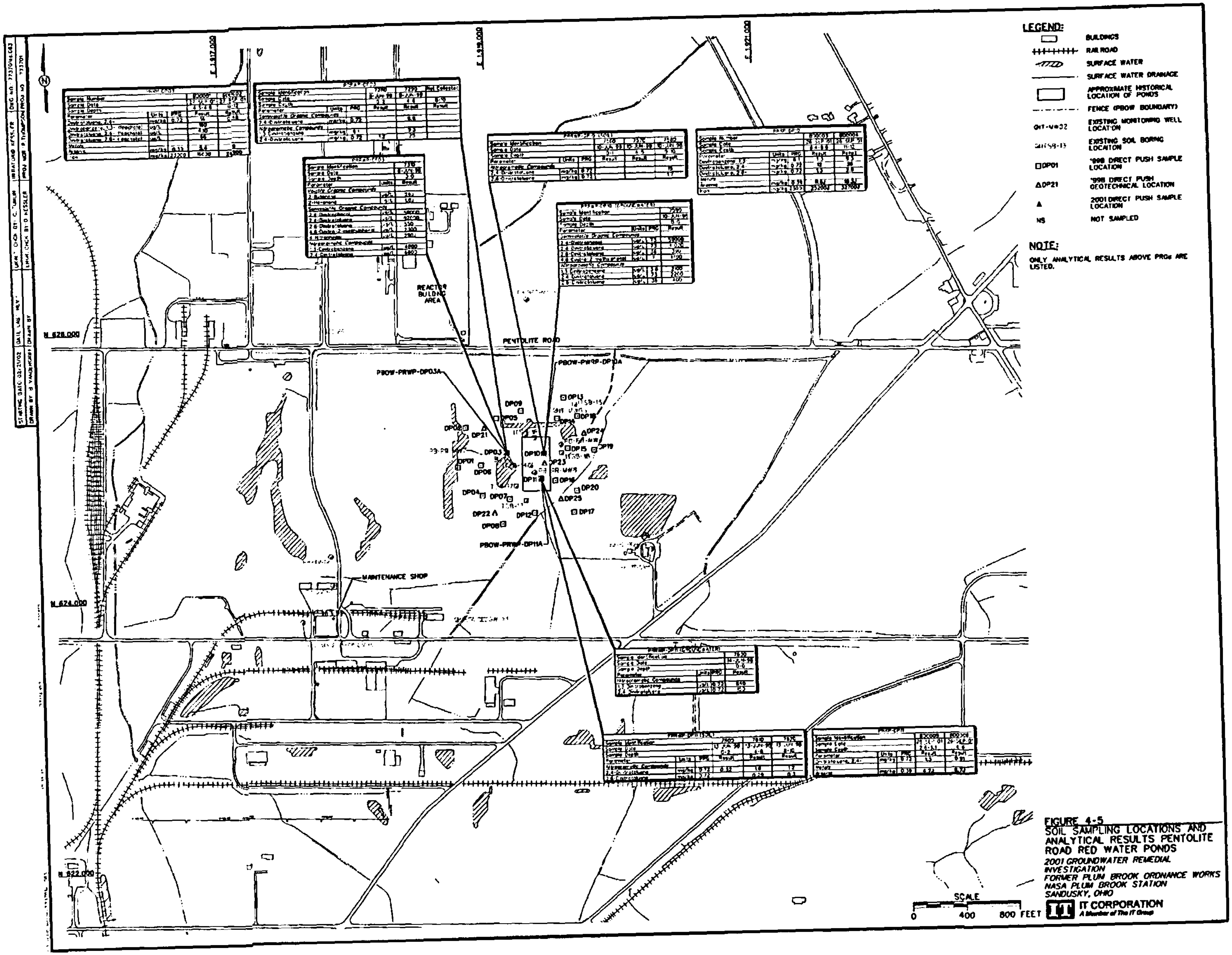
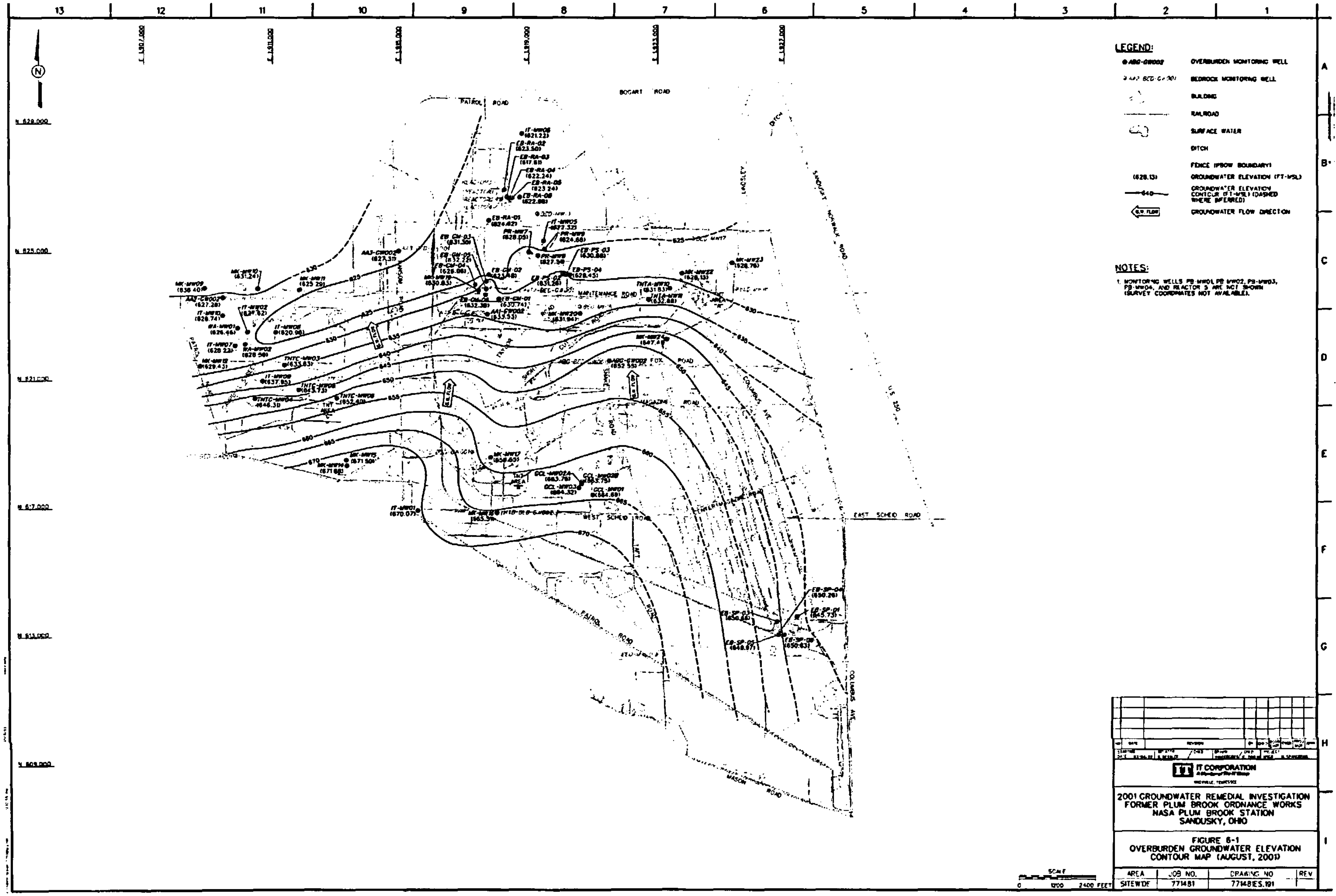


FIGURE 4-5
SOIL SAMPLING LOCATIONS AND ANALYTICAL RESULTS PENTOLITE ROAD RED WATER PONDS
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

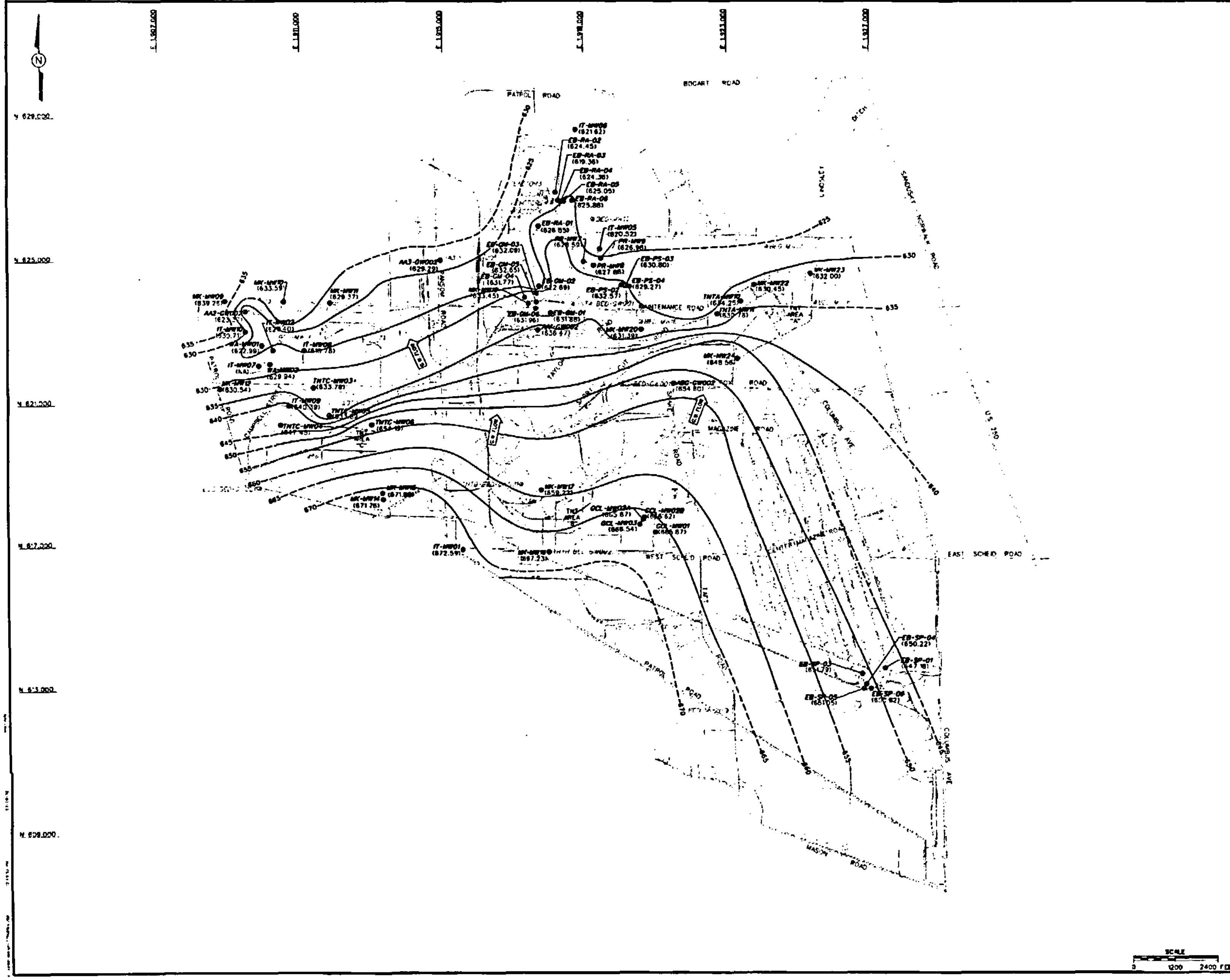


IT CORPORATION

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 6-1
OVERBURDEN GROUNDWATER ELEVATION CONTOUR MAP (AUGUST, 2001)

AREA	JOB NO.	DRAWING NO.	REV
SITEWIDE	771481	771481ES.191	



LEGEND:

● ABC-GW002	OVERBURDEN MONITORING WELL
AA2-BED GW-01	BEDROCK MONITORING WELL
	BUILDING
	RAILROAD
	SURFACE WATER
	DITCH
	FENCE (PBOW BOUNDARY)
(630.45)	GROUNDWATER ELEVATION (FT-MSL)
—630—	GROUNDWATER ELEVATION CONTOUR (FT-MSL) (DASHED WHERE INFERRED)
G.W. FLOW	GROUNDWATER FLOW DIRECTION

NOTES:

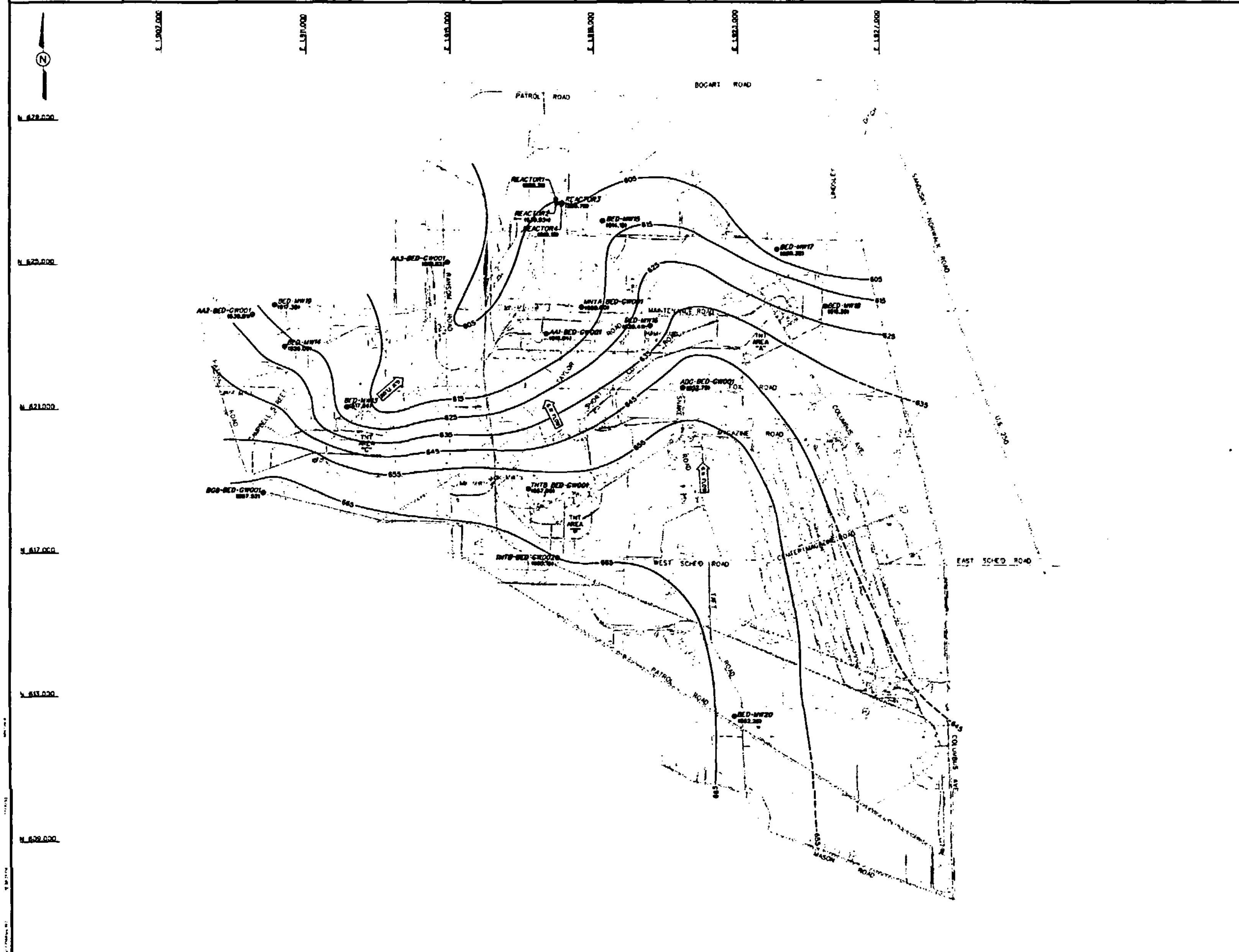
1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 5 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).

IT CORPORATION

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 6-2
OVERBURDEN GROUNDWATER ELEVATION
CONTOUR MAP (NOVEMBER, 2001)

AREA	JOB NO.	DRAWING NO.	REV
SITEWIDE	771481	771481ES.200	



LEGEND:

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- GROUNDWATER ELEVATION (FT-MSL)
- NOT MEASURED
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR (FT-MSL) (DASHED WHERE INFERRED)
- BUILDING
- RAILROAD
- SURFACE WATER
- DITCH
- FENCE (PBOW BOUNDARY)

NOTES:

1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 5 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).
2. GROUNDWATER ELEVATION OF REACTOR #2 AND REACTOR #4 NOT USED IN CONTOURING.

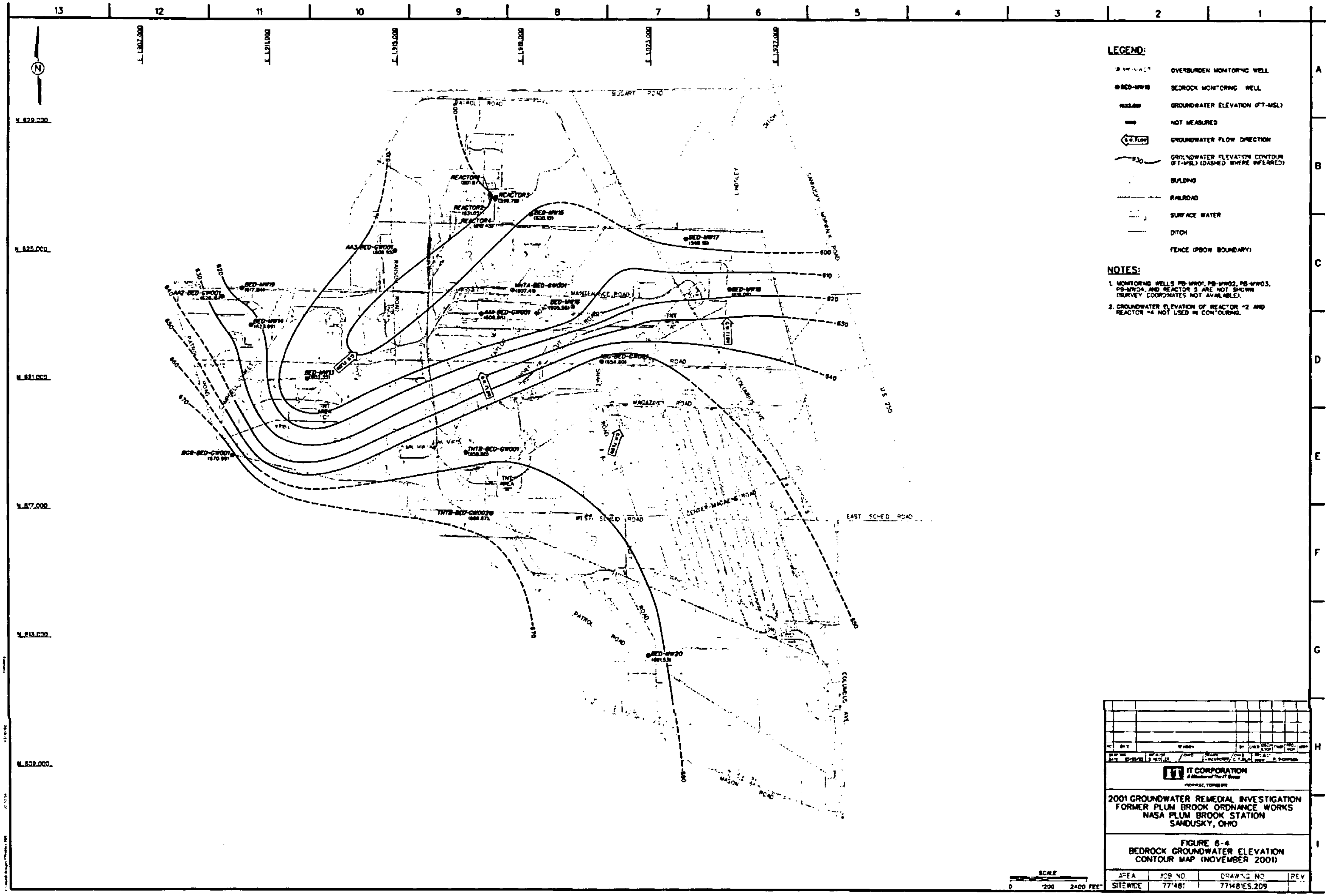
SCALE
0 1200 2400 FEET

IT CORPORATION

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 6-3
BEDROCK GROUNDWATER ELEVATION
CONTOUR MAP (AUGUST 2001)

AREA	JOB NO	DRAWING NO.	REV
SITEWIDE	771481	771481ES.192	



LEGEND:
OVERBURDEN MONITORING WELL
BEDROCK MONITORING WELL
GROUNDWATER ELEVATION (FT-MSL)
NOT MEASURED
GROUNDWATER FLOW DIRECTION
GROUNDWATER ELEVATION CONTOUR (FT-MSL) (DASHED WHERE INFERRED)
BUILDING
RAILROAD
SURFACE WATER
DITCH
FENCE (PBOW BOUNDARY)
NOTES:
1. MONITORING WELLS PB-MW01, PB-MW02, PB-MW03, PB-MW04, AND REACTOR 5 ARE NOT SHOWN (SURVEY COORDINATES NOT AVAILABLE).
2. GROUNDWATER ELEVATION OF REACTOR #2 AND REACTOR #4 NOT USED IN CONTOURING.
BEDROCK ROAD
PATROL ROAD
MAINTENANCE ROAD
MAGAZINE ROAD
CENTER MAGAZINE ROAD
EAST SCHEID ROAD
COLUMBUS AVE.
MASON ROAD
U.S. 250
REACTOR3
BED-MW15
BED-MW17
BED-MW19
BED-MW16
BED-MW20
AA3-BED-GW001
AA2-BED-GW001
BCB-BED-GW001
TNTB-BED-GW001
TNTB-BED-GW002
600
610
620
630
640
650
660
670
680
SCALE
0
1200
2400 FEET
IT CORPORATION
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
FIGURE 6-4
BEDROCK GROUNDWATER ELEVATION
CONTOUR MAP (NOVEMBER 2001)
AREA
SITEWIDE
JOB NO.
771481
DRAWING NO.
771481ES.209
REV

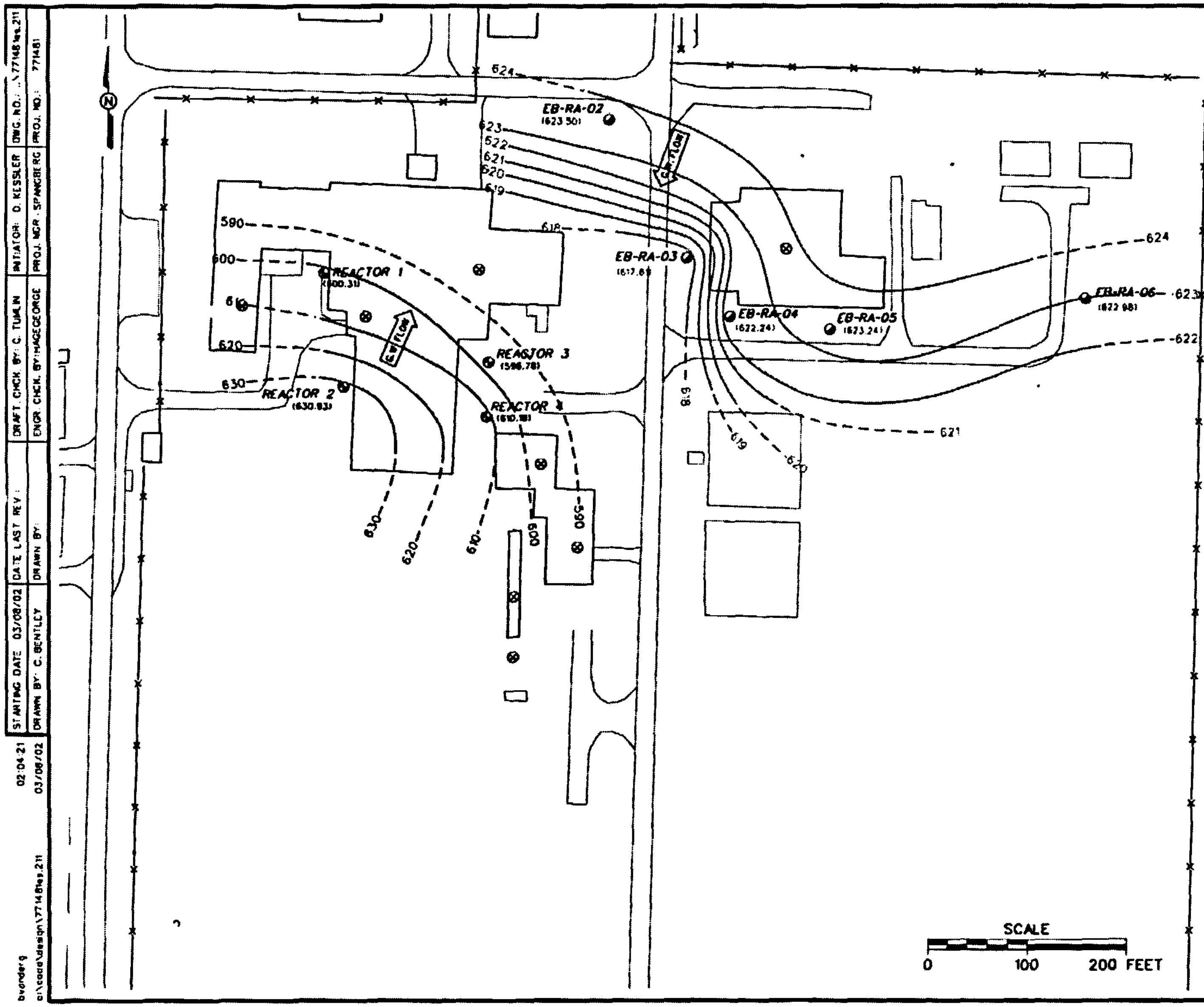


FIGURE 6-5
GROUNDWATER ELEVATION CONTOUR MAP, REACTOR FACILITY AREA (AUGUST 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
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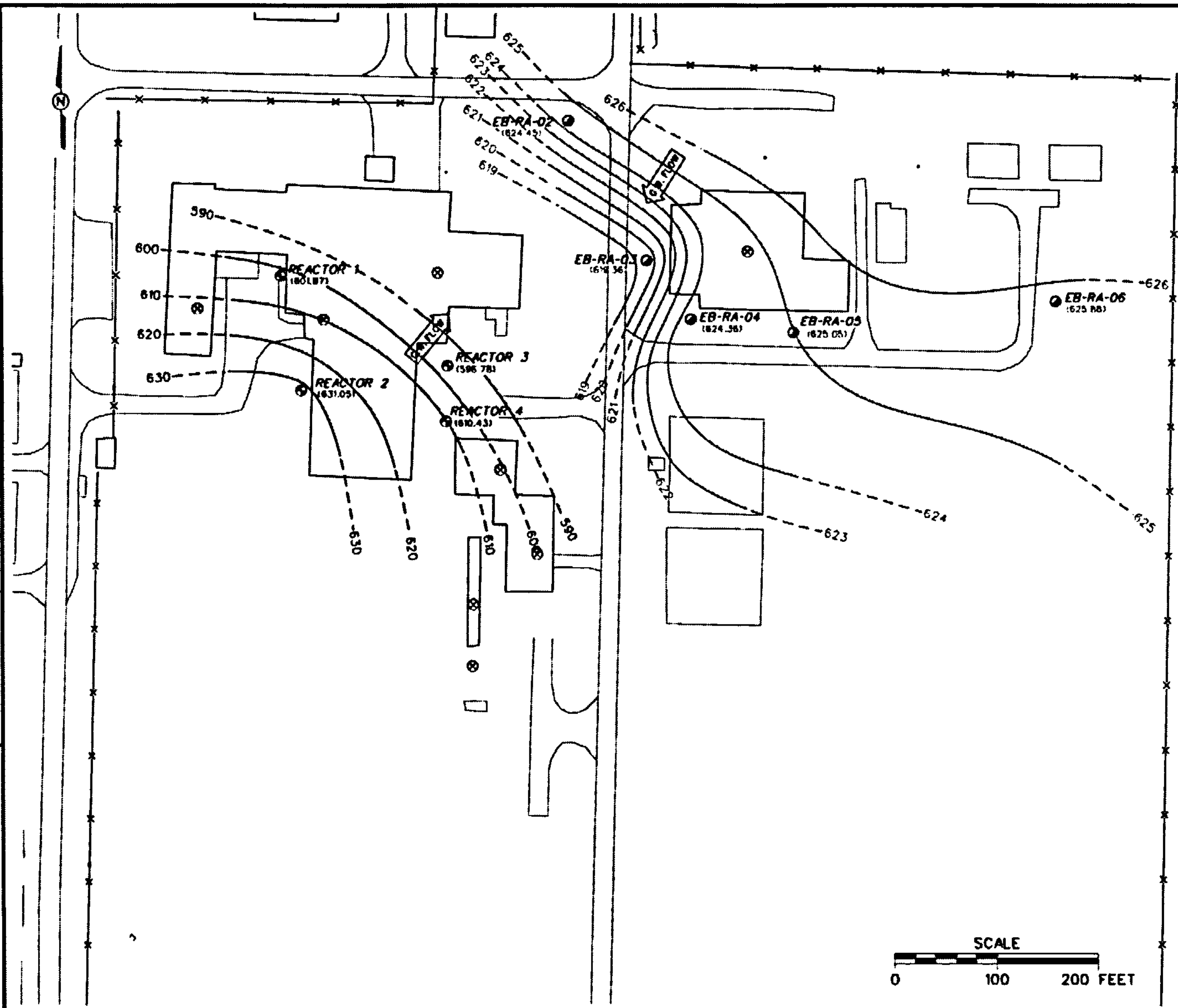


LEGEND:

EB-RA-06	OVERBURDEN MONITORING WELL LOCATION
REACTOR 1	BEDROCK MONITORING WELL LOCATION
	SUMP WELL
(631.05)	GROUNDWATER ELEVATION (FT-MSL) IN BEDROCK MONITORING WELLS
600	GROUNDWATER ELEVATION CONTOUR IN BEDROCK MONITORING WELLS
(625.88)	GROUNDWATER ELEVATION IN OVERBURDEN MONITORING WELLS (FT-MSL)
624	GROUNDWATER ELEVATION CONTOUR IN OVERBURDEN MONITORING WELLS (FT-MSL)
GW FLOW	GROUNDWATER FLOW
	BUILDINGS
	FENCE

NOTES:

1. LOCATIONS OF SUMP WELLS ARE APPROXIMATE. SUMP WELLS HAVE NOT BEEN SURVEYED.

FIGURE 6-6
GROUNDWATER ELEVATION CONTOUR MAP, REACTOR FACILITY AREA (NOVEMBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

STARTING DATE: 03/08/02 | DRAWN BY: C. BENTLEY | DATE LAST REV.: | DRAWN BY: | DRAFT. CHCK. BY: C. TEMAN | ENGR. CHCK. BY: HAGEGEORGE | INITIATOR: D. KESSLER | PROJ. MGR: SPANGBERG | DWG. NO.: ...\771481es.212 | PROJ. NO.: 771481

02:05:08 03/08/02
bvanderg
c:\cadd\design\771481es.212

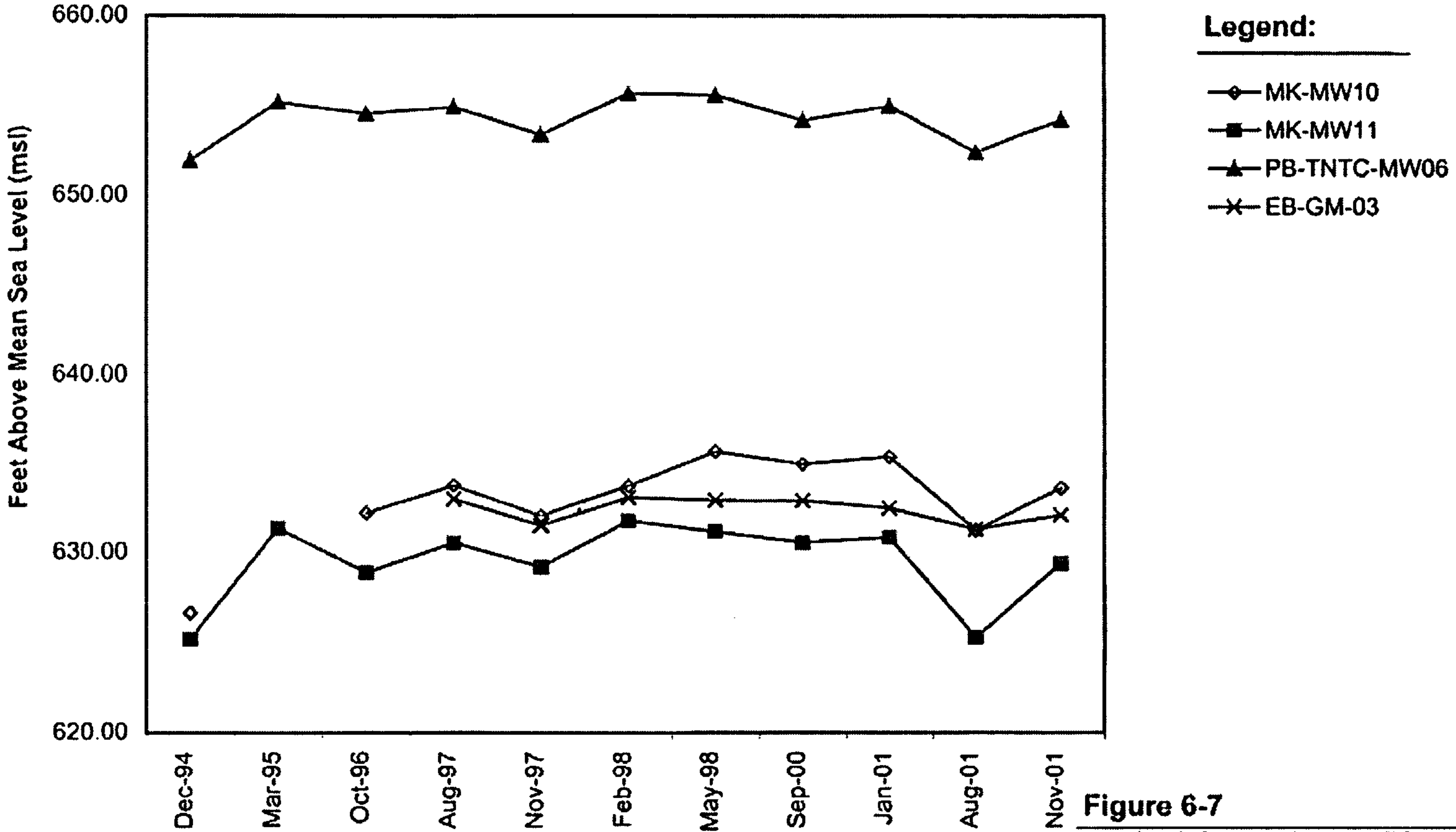


Figure 6-7
Typical Groundwater Elevation Fluctuation, Overburden Wells

IT CORPORATION

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

KN/4379/Figs.xls(typobj/3/6/02(8:01 AM)

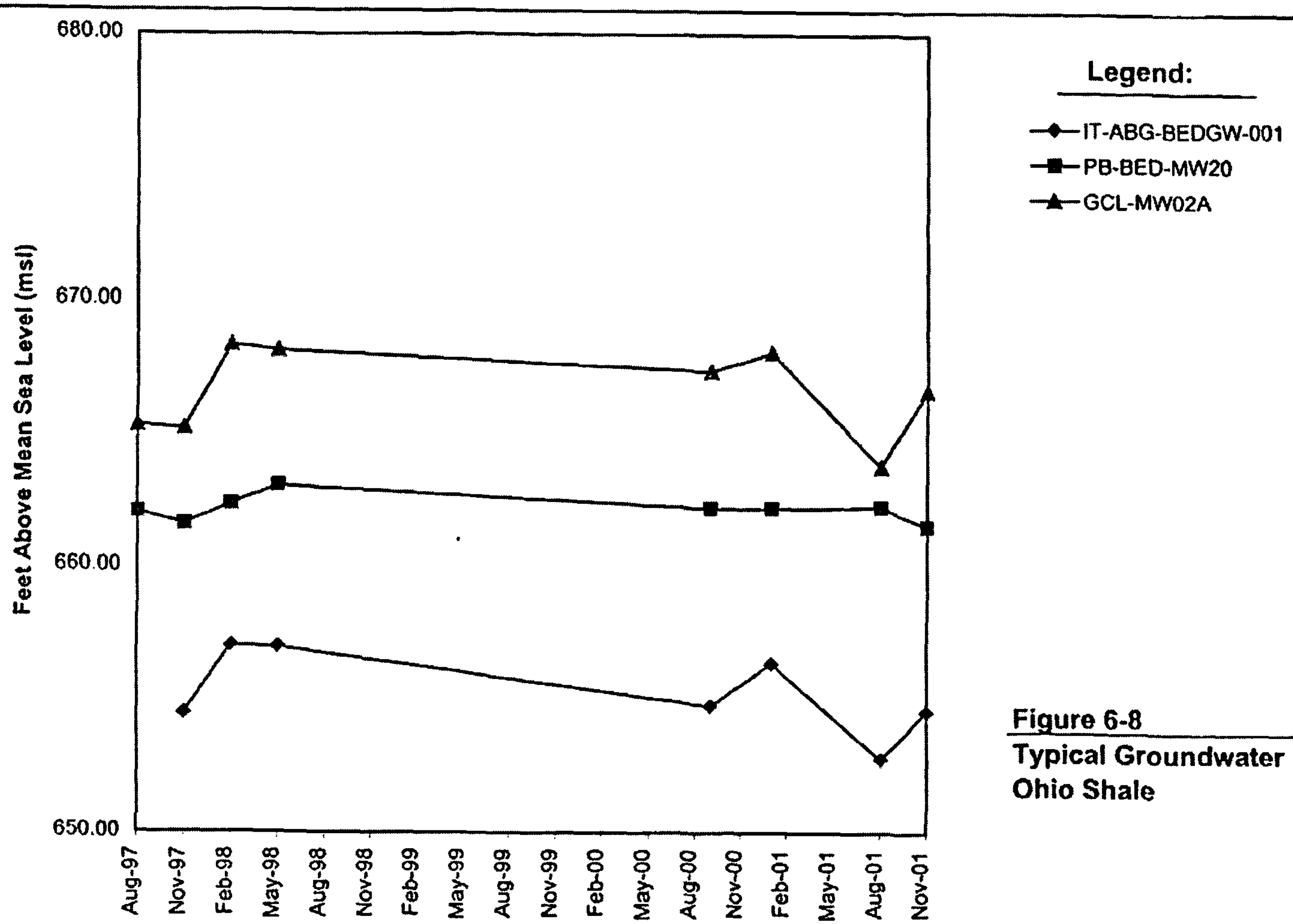


Figure 6-8

Typical Groundwater Fluctuation, Ohio Shale

IT CORPORATION

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

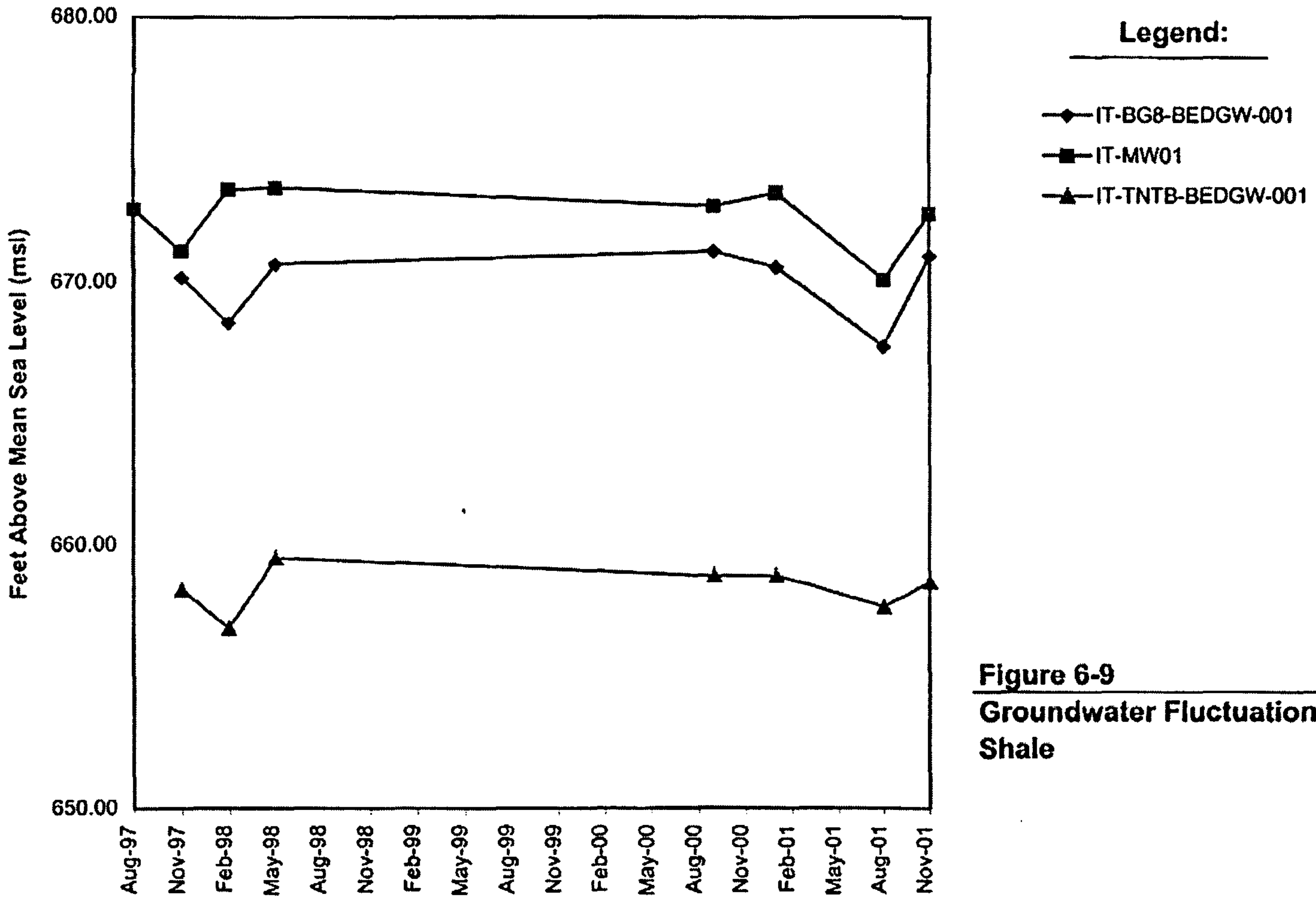


Figure 6-9

Groundwater Fluctuation, Olentangy Shale

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

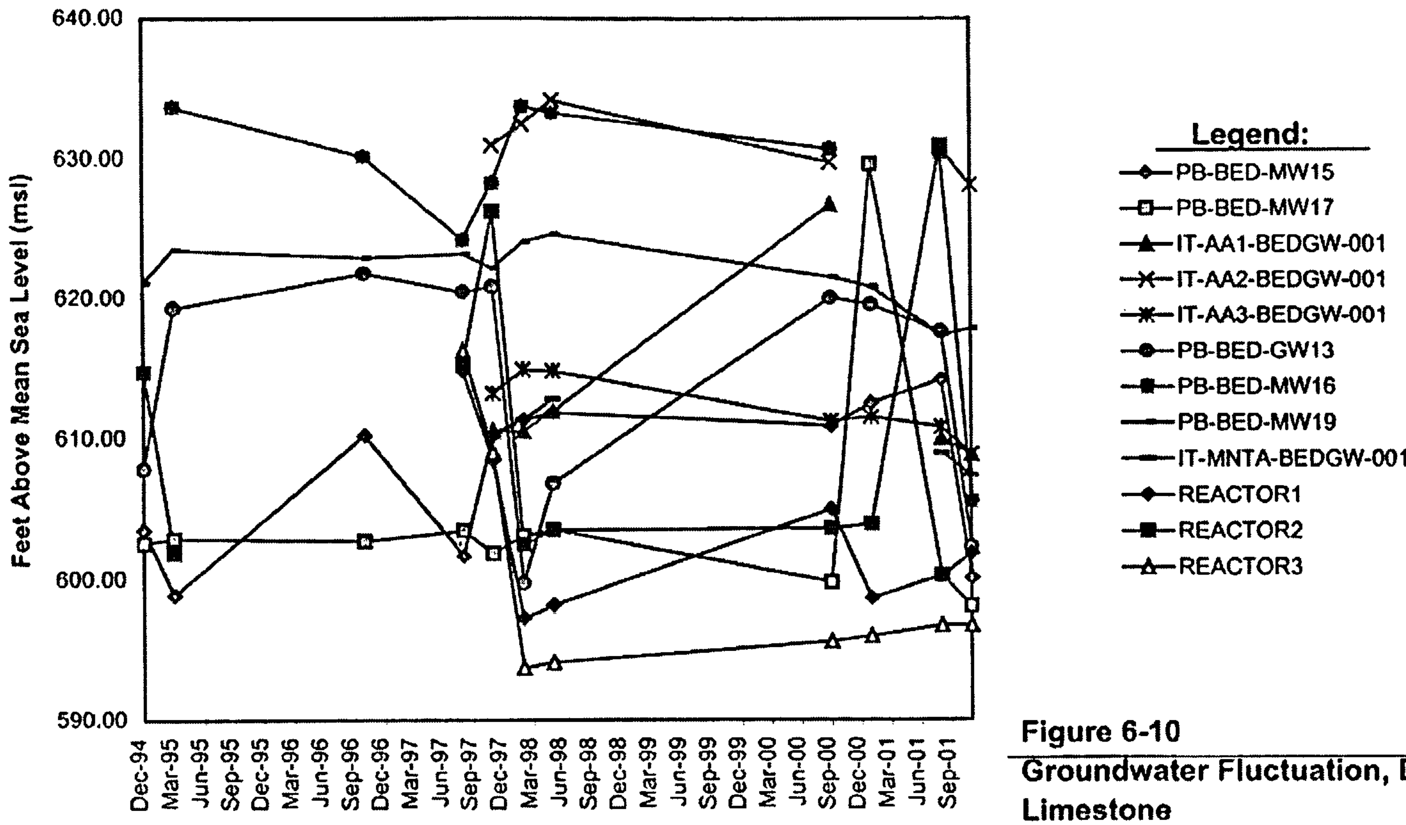


Figure 6-10
Groundwater Fluctuation, Delaware Limestone

IT CORPORATION

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

KN/4379/Figures.xls(Figure 6-10)/3/8/02(3:35 PM)

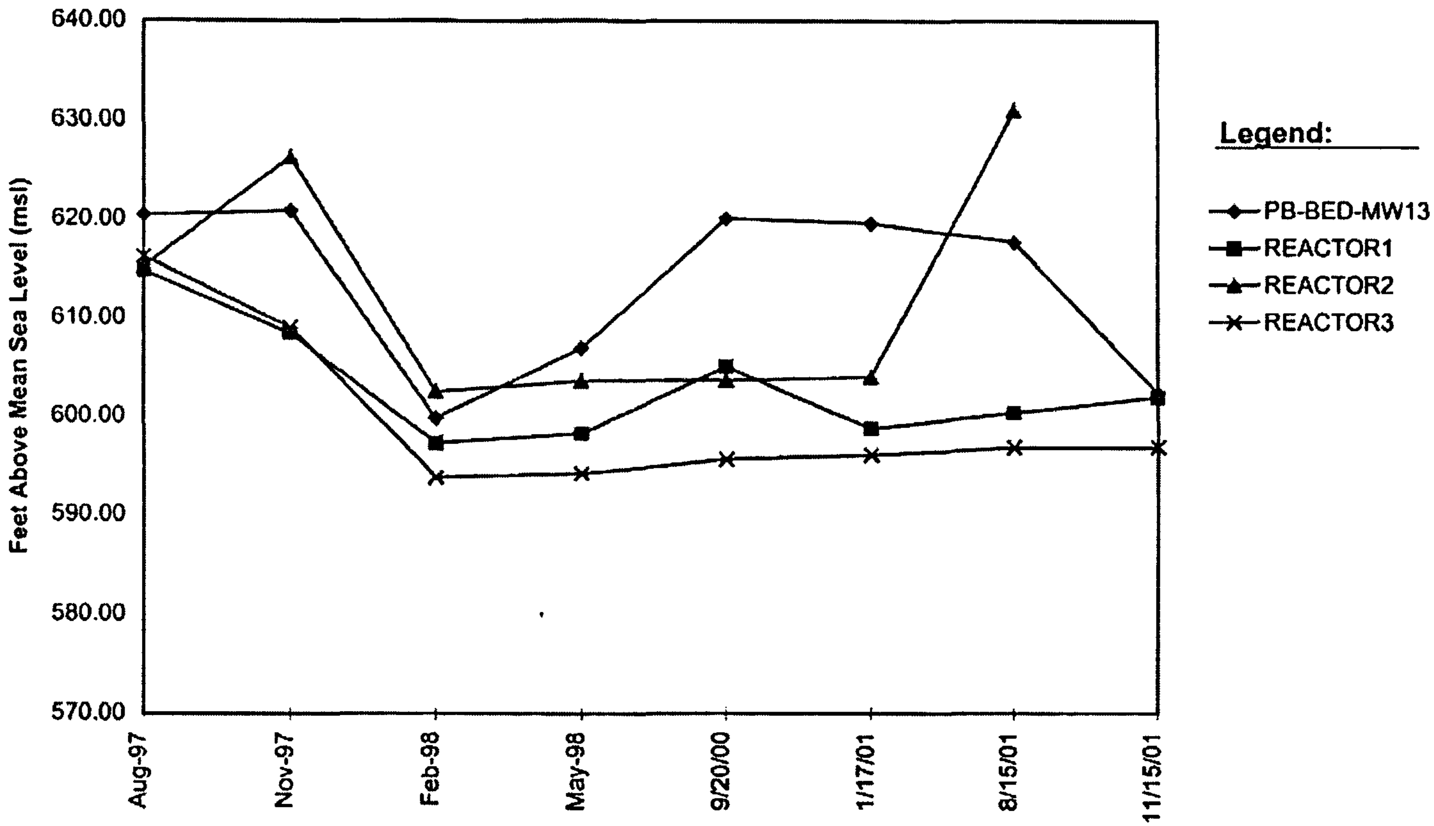


Figure 6-11

Typical Groundwater Fluctuation, Reactor Wells 1, 2, 3 and PB-BED-MW13

IT CORPORATION

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

KN/4379/Figs.xls(reactors13)/3/8/02(3:31 PM)

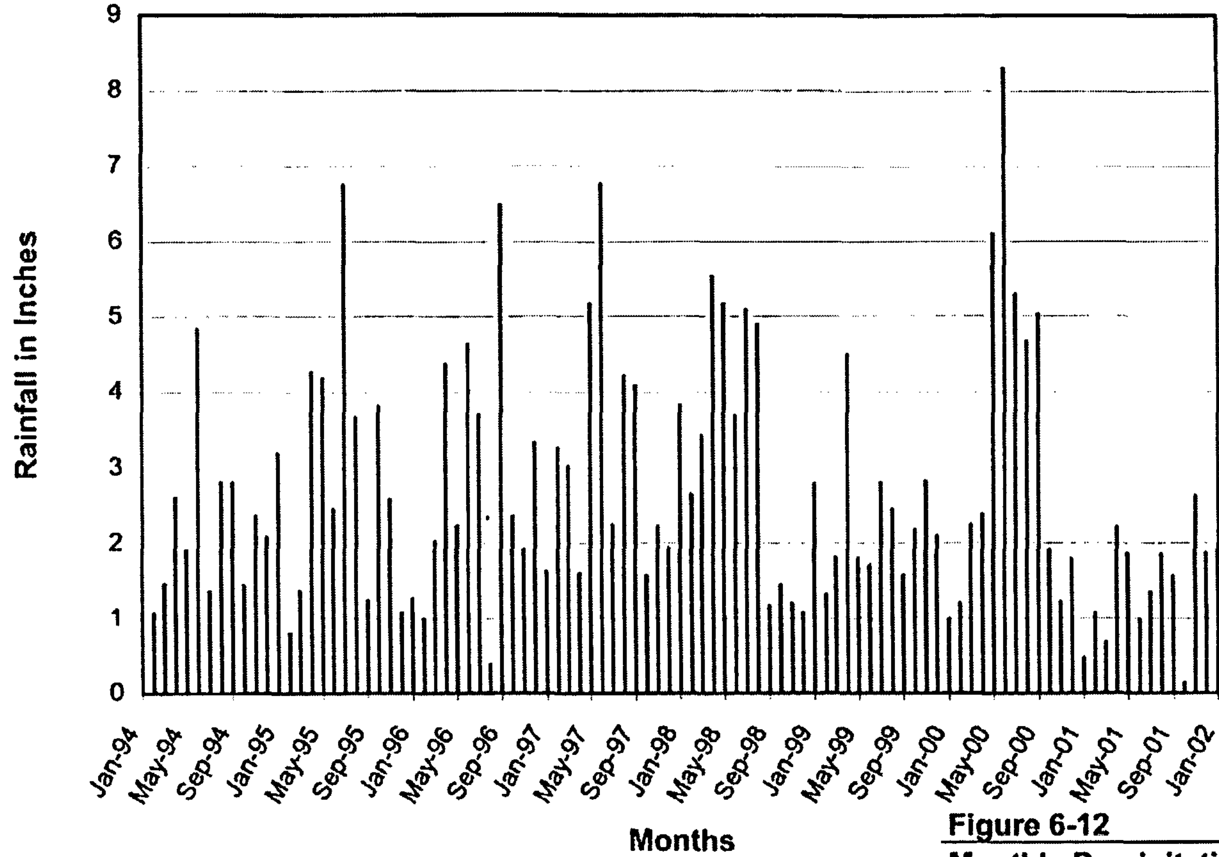


Figure 6-12
Monthly Precipitation Data, January 1994 Through December 2001

IT CORPORATION

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

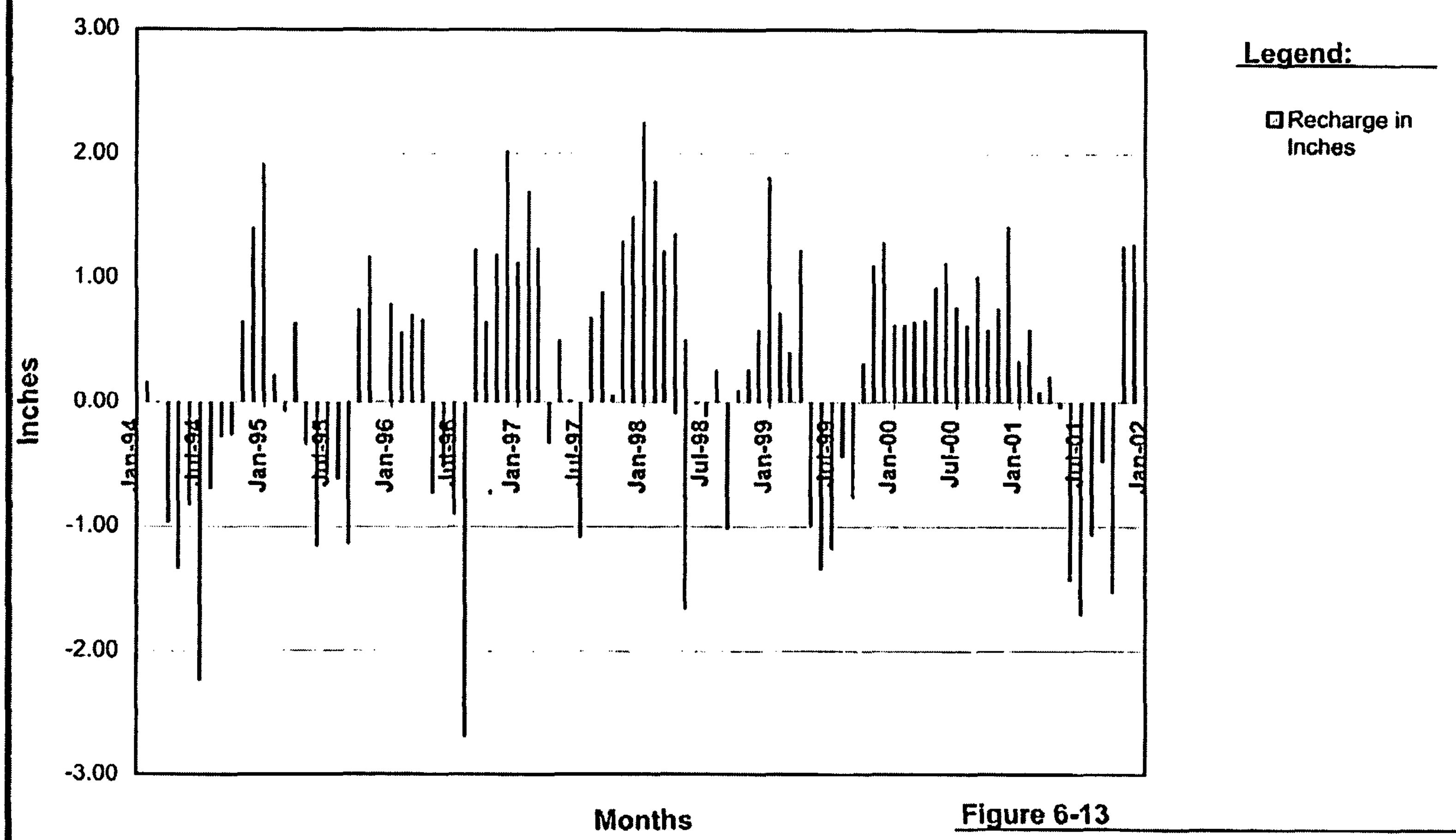
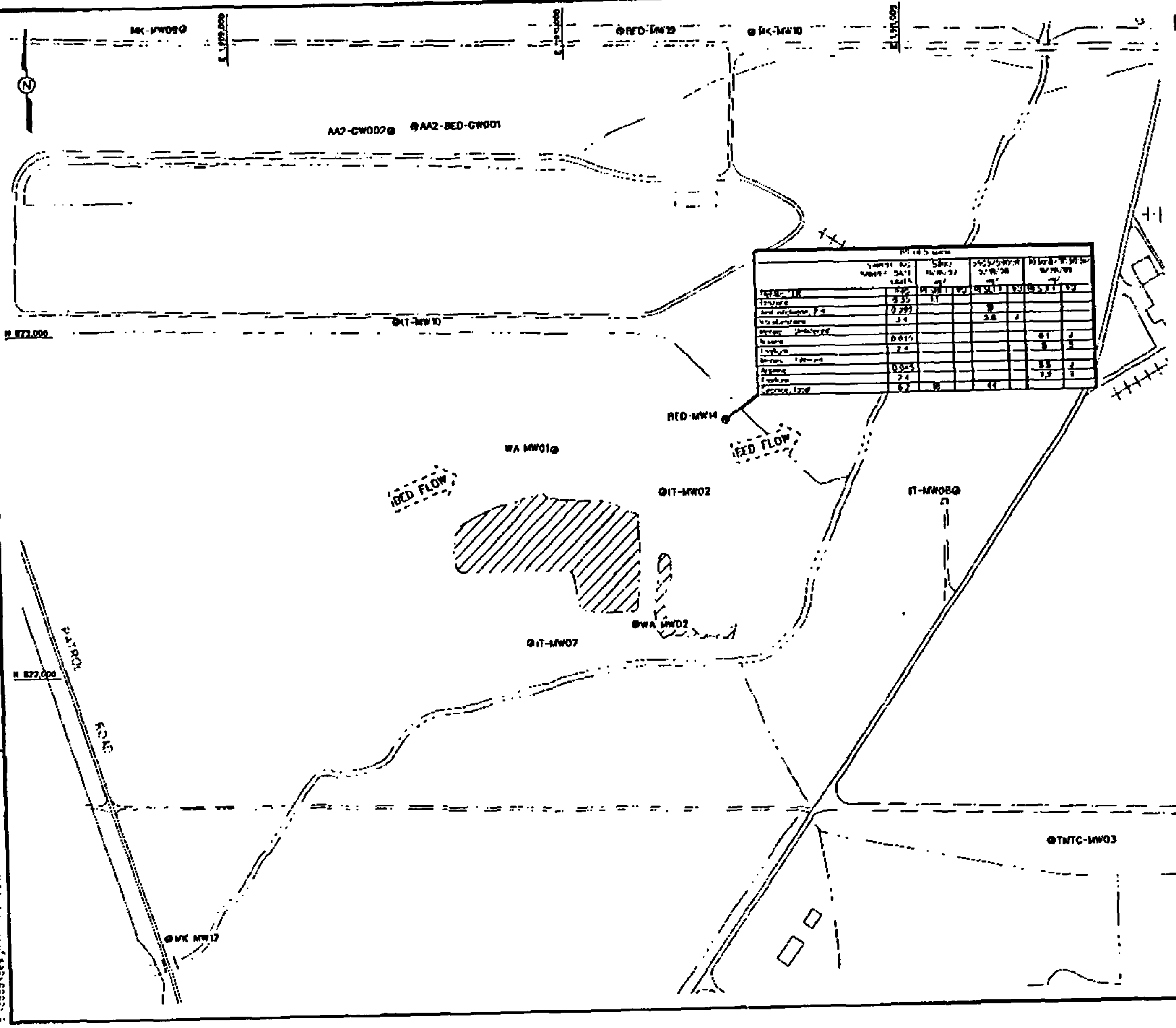


Figure 6-13

Calculated Monthly Recharge Rates at Site

Former Plum Brook Ordnance Works
NASA Plum Brook Station
Sandusky, Ohio

KN/4379/Mo_rechg.xls(Recharge)/3/8/02(3:35 PM)



LEGEND:

IT-MW02	OVERBURDEN MONITORING WELL LOCATION
BED MW14	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	RAILROAD
	SURFACE WATER
	DITCH
—X—	FENCE
BED FLOW	BEDROCK GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.

SCALE

0 300 600 FEET

FIGURE 6-14
DETECTED CONSTITUENTS AT WEST AREA RED WATER PONDS ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & SEPTEMBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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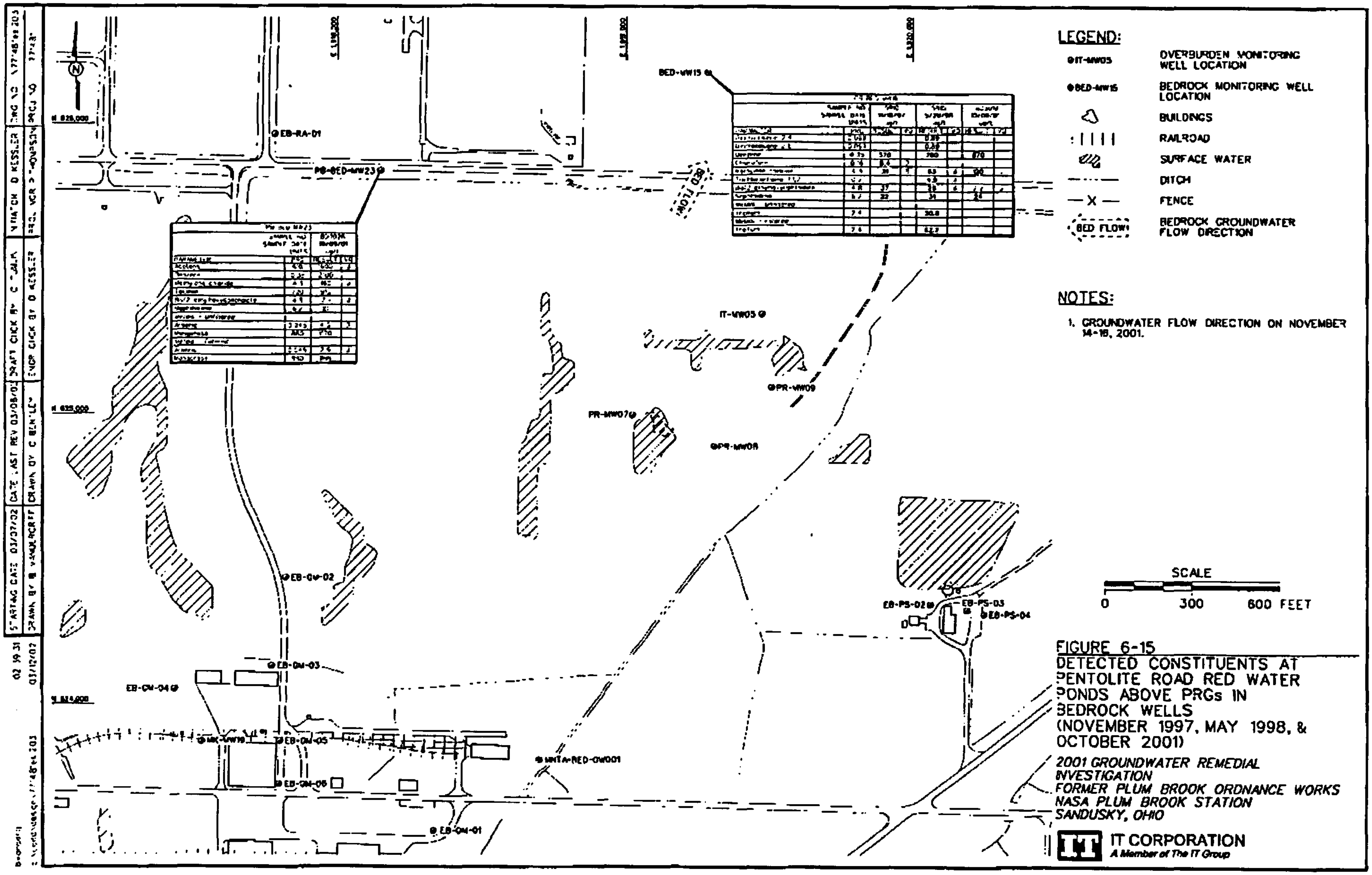
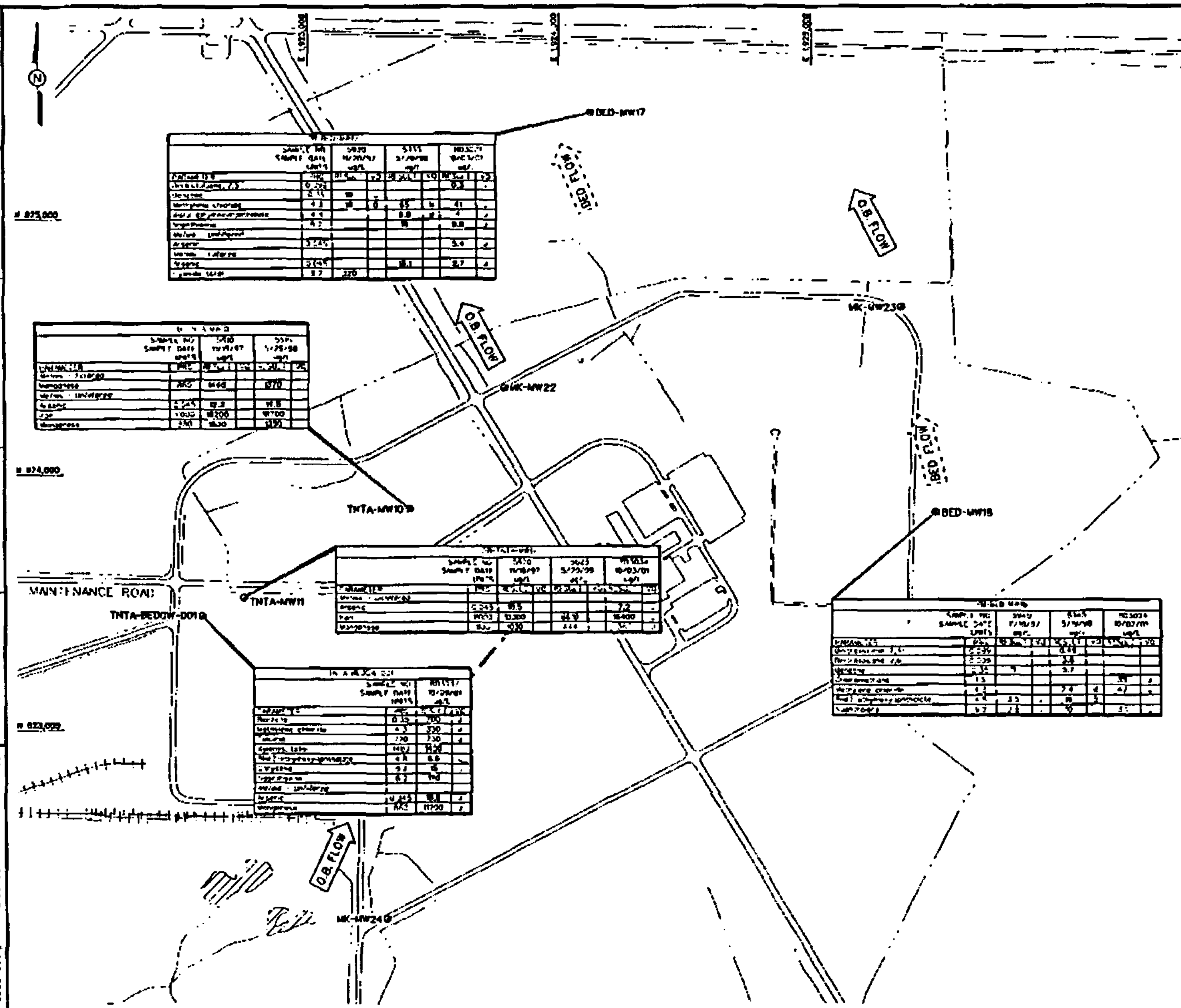


FIGURE 6-15
DETECTED CONSTITUENTS AT PENTOLITE ROAD RED WATER PONDS ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO



LEGEND:

MK-MW22	OVERBURDEN MONITORING WELL LOCATION
ABG-BED-GW001	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	RAILROAD
	SURFACE WATER
	DITCH
—X—	FENCE
O.B. FLOW	OVERBURDEN GROUNDWATER FLOW DIRECTION
BED FLOW	BEDROCK GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.

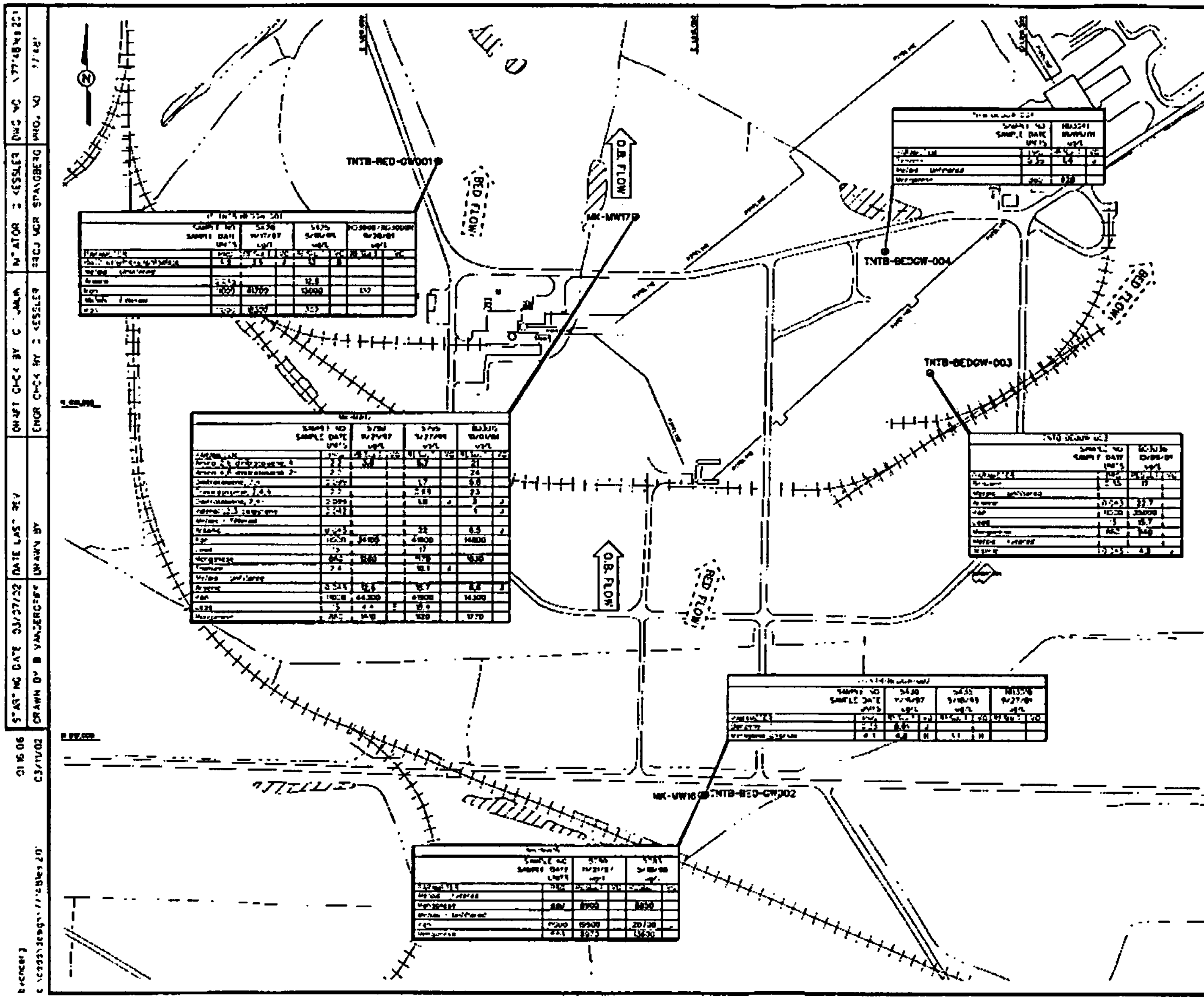
SCALE

0 400 800 FEET

FIGURE 6-16
DETECTED CONSTITUENTS AT TNT MANUFACTURING AREA A ABOVE PRGs IN OVERBURDEN/BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group



LEGEND:

MK-MW16	OVERBURDEN MONITORING WELL LOCATION
IT-TNTB-BED-GW002	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	RAILROAD
	SURFACE WATER
	DITCH
O.B. FLOW	OVERBURDEN GROUNDWATER FLOW DIRECTION
BED FLOW	BEDROCK GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.

SCALE

0 300 600 FEET

FIGURE 6-17

DETECTED CONSTITUENTS AT TNT MANUFACTURING AREA B ABOVE PRGs IN OVERBURDEN/BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & SEPTEMBER-OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

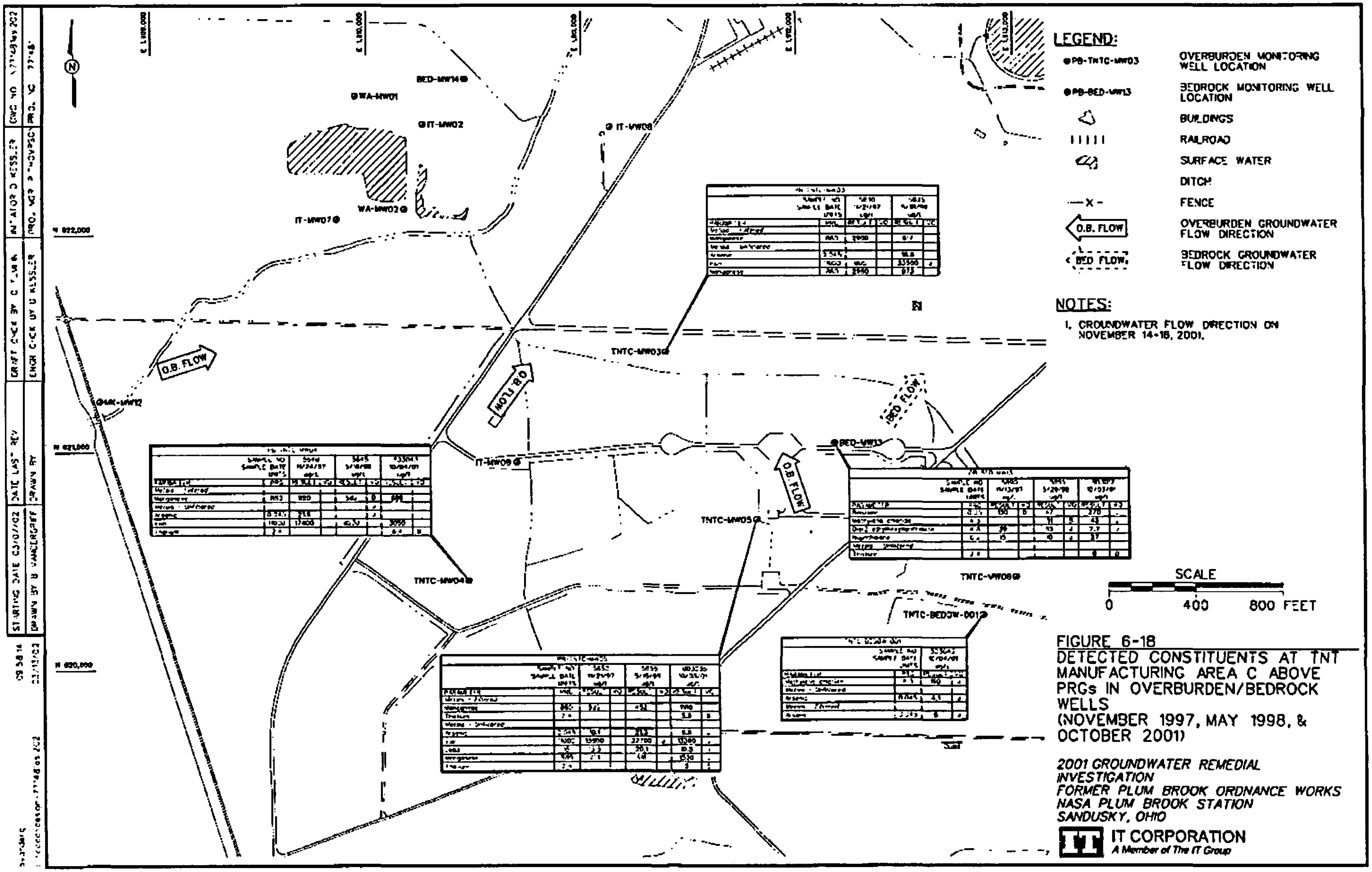


FIGURE 6-18
DETECTED CONSTITUENTS AT TNT MANUFACTURING AREA C ABOVE PRGs IN OVERBURDEN/BEDROCK WELLS
(NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

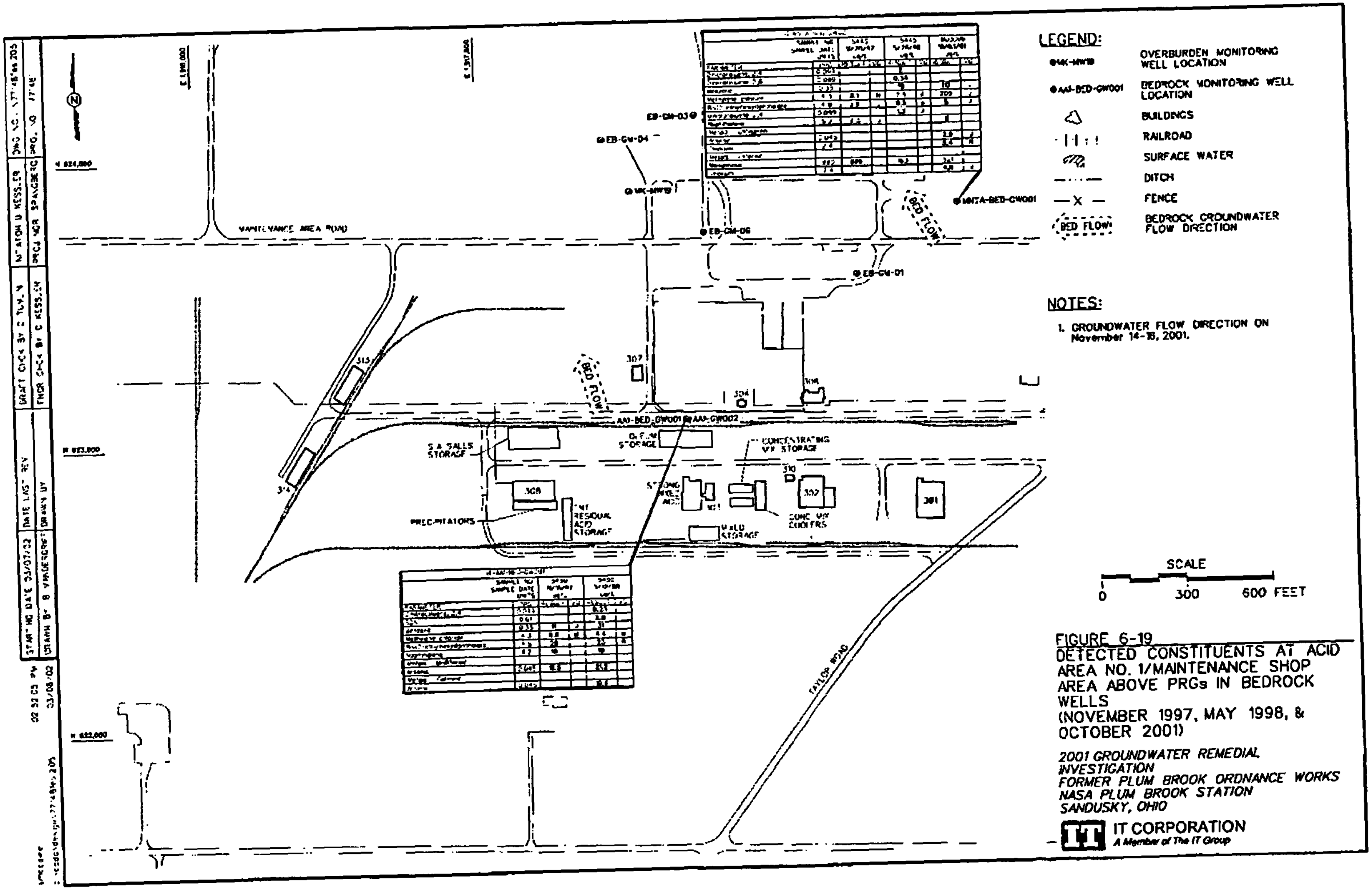
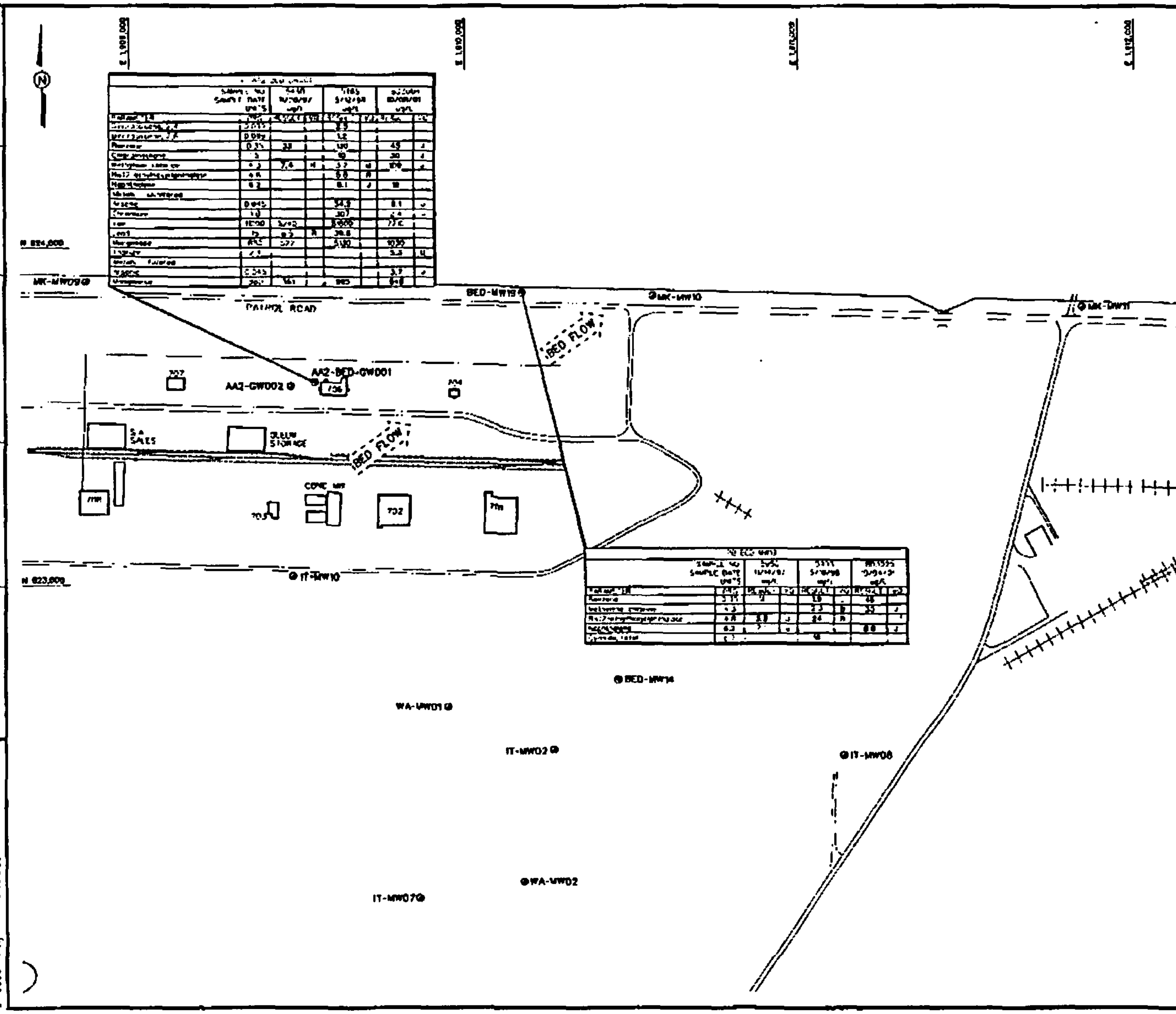


FIGURE 6-19
DETECTED CONSTITUENTS AT ACID AREA NO. 1/MAINTENANCE SHOP AREA ABOVE PRGs IN BEDROCK WELLS
(NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group



LEGEND:

MK-MW10	OVERBURDEN MONITORING WELL LOCATION
AA2-BED-GW001	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	AREA OF STORAGE TANKS
	RAILROAD
	ABANDONED RAILROAD
	SURFACE WATER
	DITCH
— X —	FENCE
	NATURAL GAS
BED FLOW	BEDROCK GROUNDWATER FLOW DIRECTION

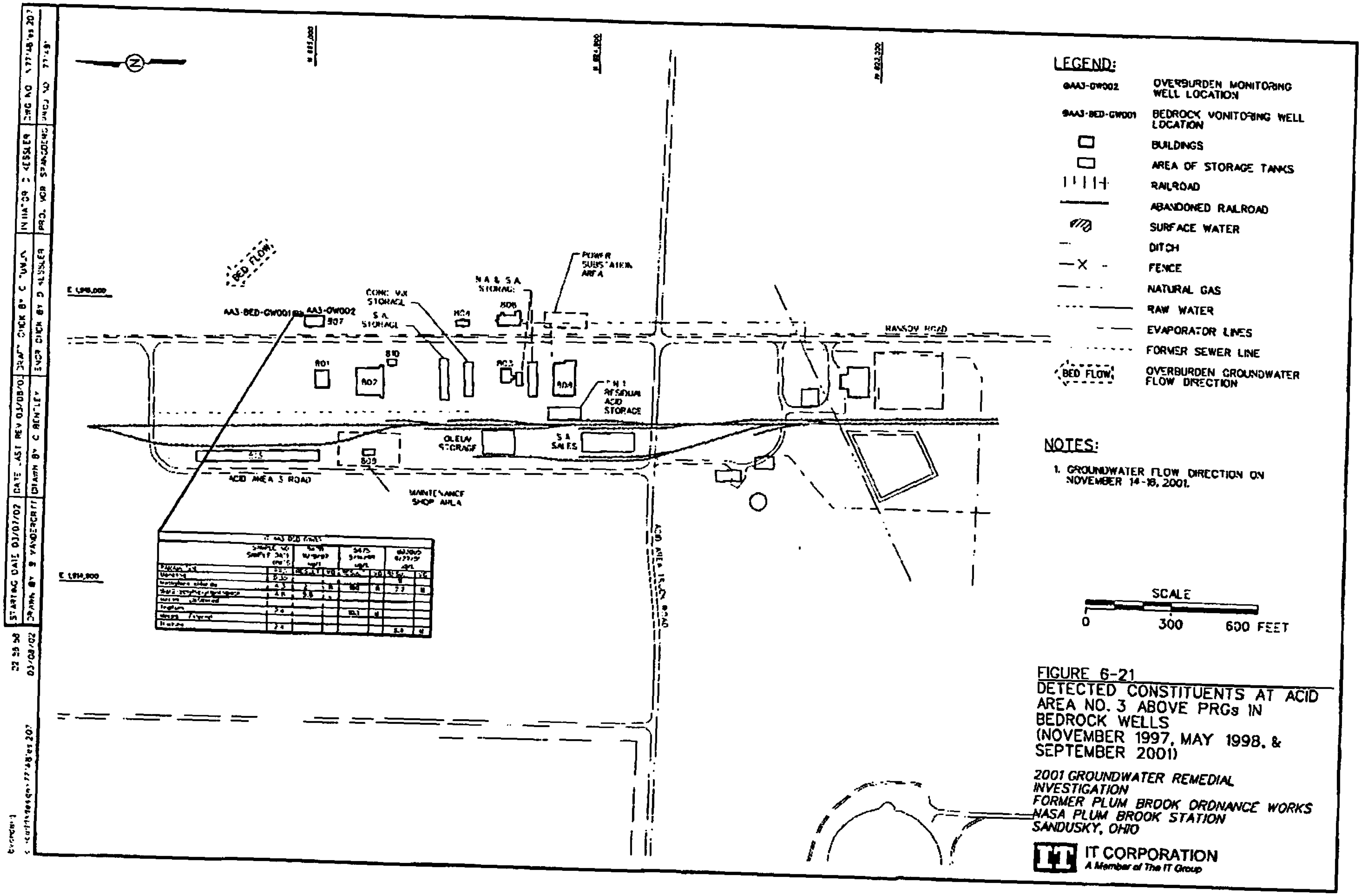
NOTES:

1. GROUNDWATER FLOW DIRECTION ON November 14-16, 2001.

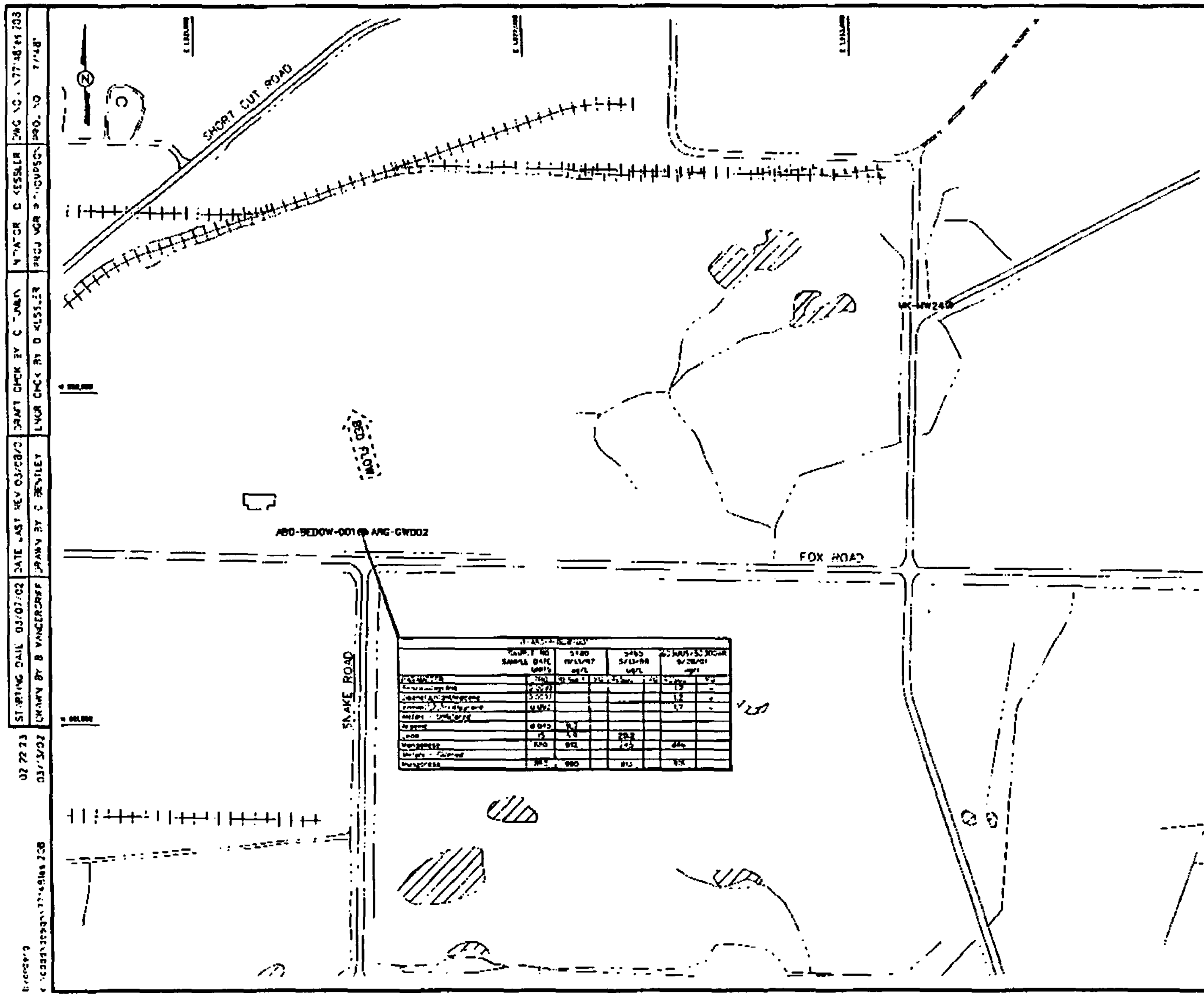
FIGURE 6-20
DETECTED CONSTITUENTS AT ACID AREA NO. 2 ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group



LEGEND:
AA3-GW002 OVERBURDEN MONITORING WELL LOCATION
AA3-BED-GW001 BEDROCK MONITORING WELL LOCATION
BUILDINGS
AREA OF STORAGE TANKS
RAILROAD
ABANDONED RAILROAD
SURFACE WATER
DITCH
FENCE
NATURAL GAS
RAW WATER
EVAPORATOR LINES
FORMER SEWER LINE
BED FLOW OVERBURDEN GROUNDWATER FLOW DIRECTION
NOTES:
1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.
SCALE
0
300
600 FEET
BED FLOW
AA3-BED-GW001
AA3-GW002
807
801
802
810
808
809
CONC. WA STORAGE
S.A. STORAGE
N.A. & S.A. STORAGE
POWER SUBSTATION AREA
T.N.T. RESIDUAL ACID STORAGE
OLEUM STORAGE
S.A. SALES
MAINTENANCE SHOP AREA
ACID AREA 3 ROAD
ACID AREA 3 ROAD
FIGURE 6-21
DETECTED CONSTITUENTS AT ACID AREA NO. 3 ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & SEPTEMBER 2001)
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
IT CORPORATION
A Member of The IT Group
STARTING DATE 03/07/02
DRAWN BY B. VANDERCRITT
DATE LAST REV. 03/08/02
DRAWN BY C. BENTLEY



LEGEND:

● ABG-GW002	OVERBURDEN MONITORING WELL LOCATION
● ABG-BED-GW001	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	RAILROAD
	SURFACE WATER
	DITCH
BED FLOW	OVERBURDEN GROUNDWATER FLOW DIRECTION

NOTES:

1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.

SCALE

0 300 600 FEET

FIGURE 6-22
DETECTED CONSTITUENTS AT ADDITIONAL BURNING GROUND AREA ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, SEPTEMBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
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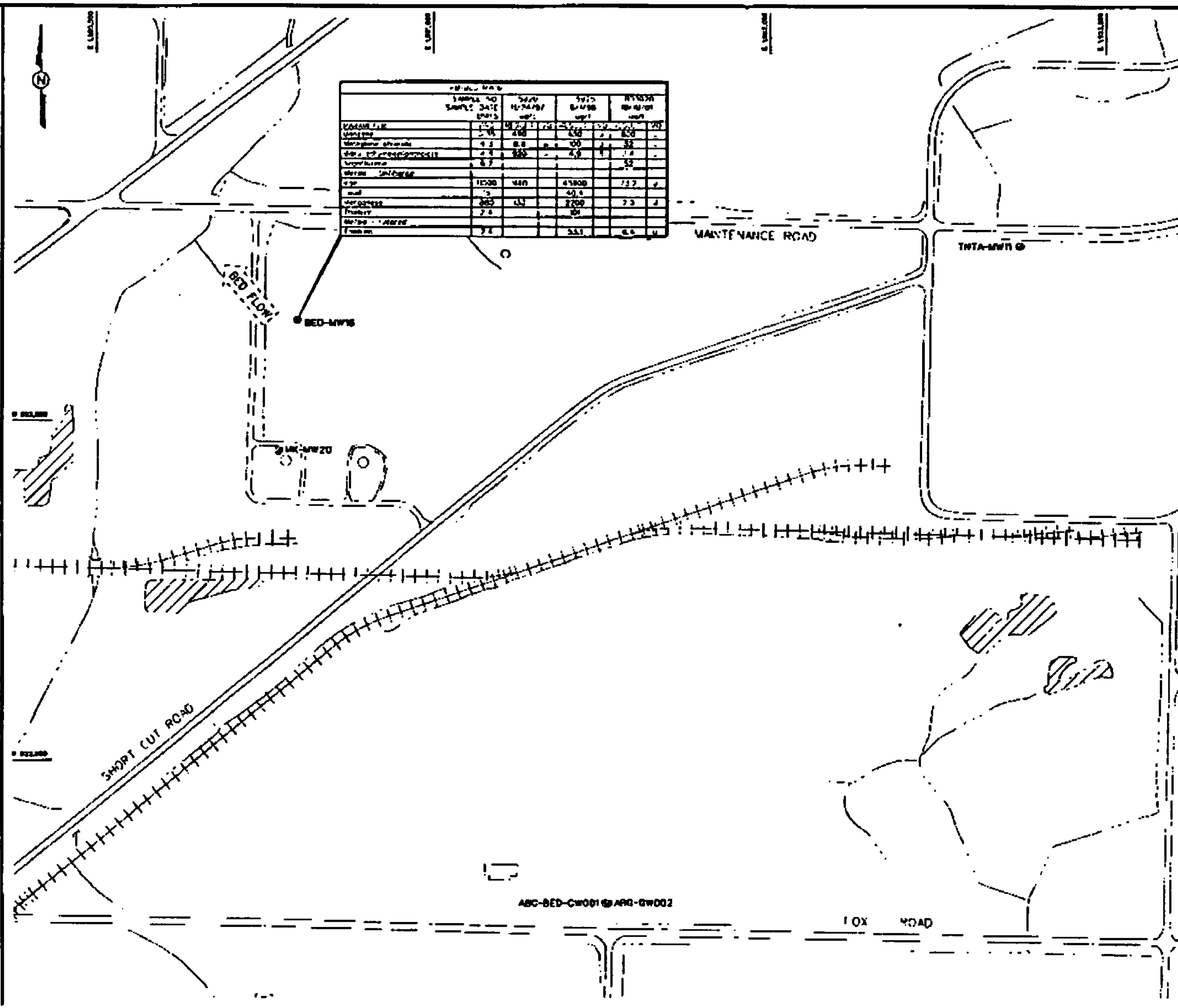


LEGEND:

MK-MW20	OVERBURDEN MONITORING WELL LOCATION
BED-MW16	BEDROCK MONITORING WELL LOCATION
	BUILDINGS
	RAILROAD
	SURFACE WATER
	DITCH
BED FLOW	BEDROCK GROUNDWATER FLOW DIRECTION

NOTES: 1. GROUNDWATER FLOW DIRECTION ON NOVEMBER 14-16, 2001.

SCALE

0 300 600 FEET

FIGURE 6-23
DETECTED CONSTITUENTS AT UPPER TOLUENE TANKS AREA ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

IT CORPORATION
A Member of The IT Group

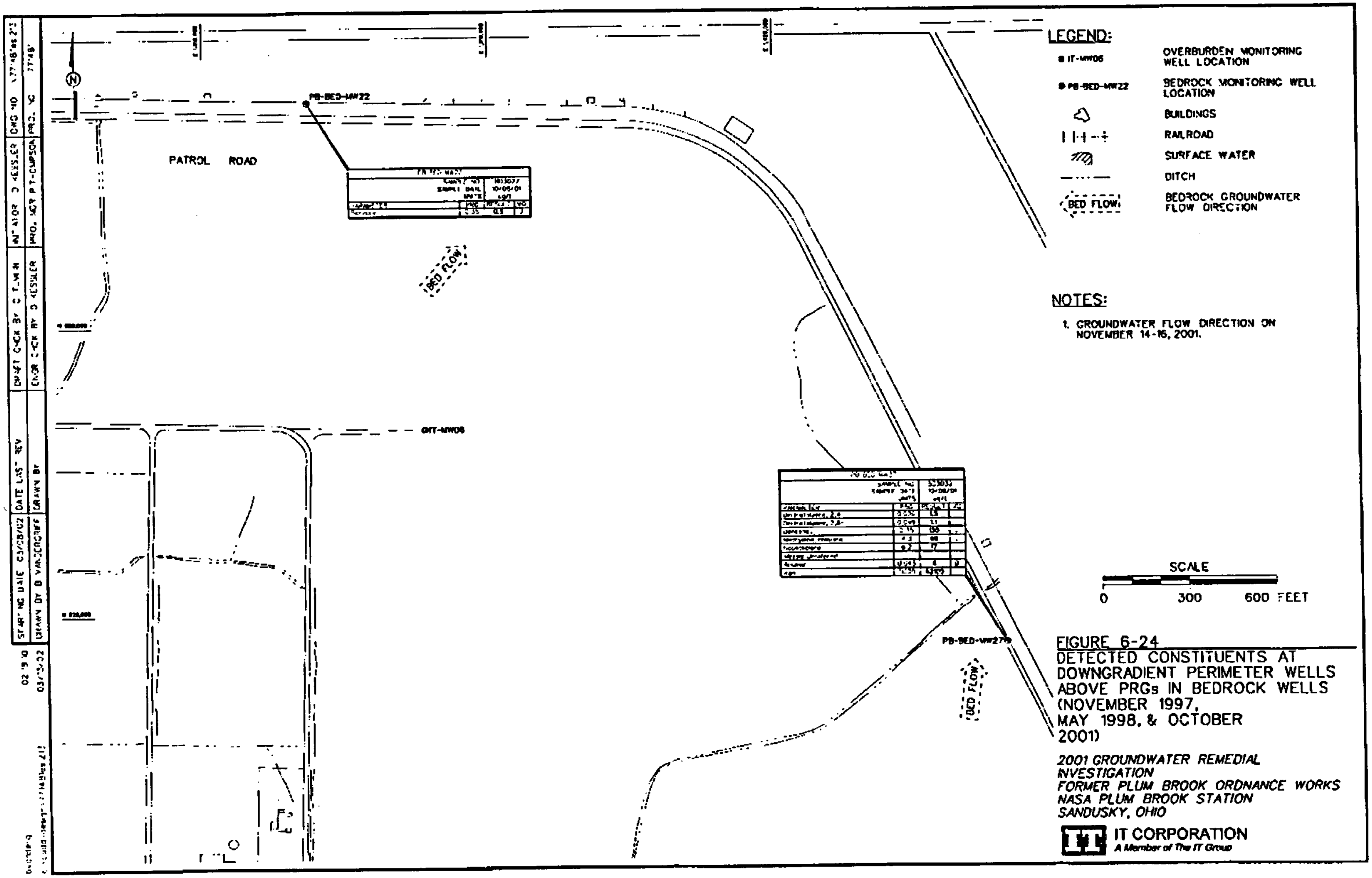
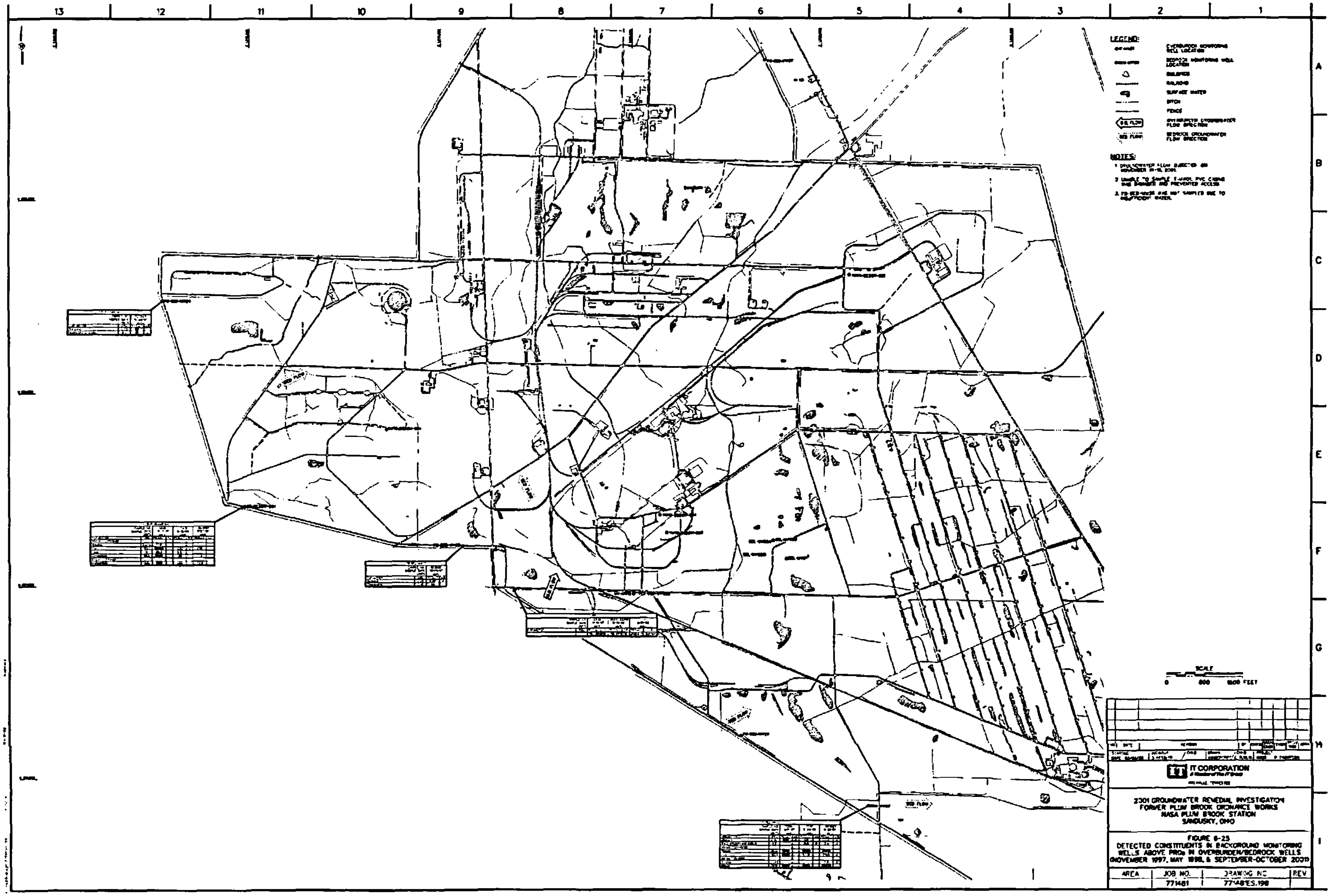


FIGURE 6-24
DETECTED CONSTITUENTS AT DOWNGRADIENT PERIMETER WELLS ABOVE PRGs IN BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & OCTOBER 2001)

2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO



IT CORPORATION

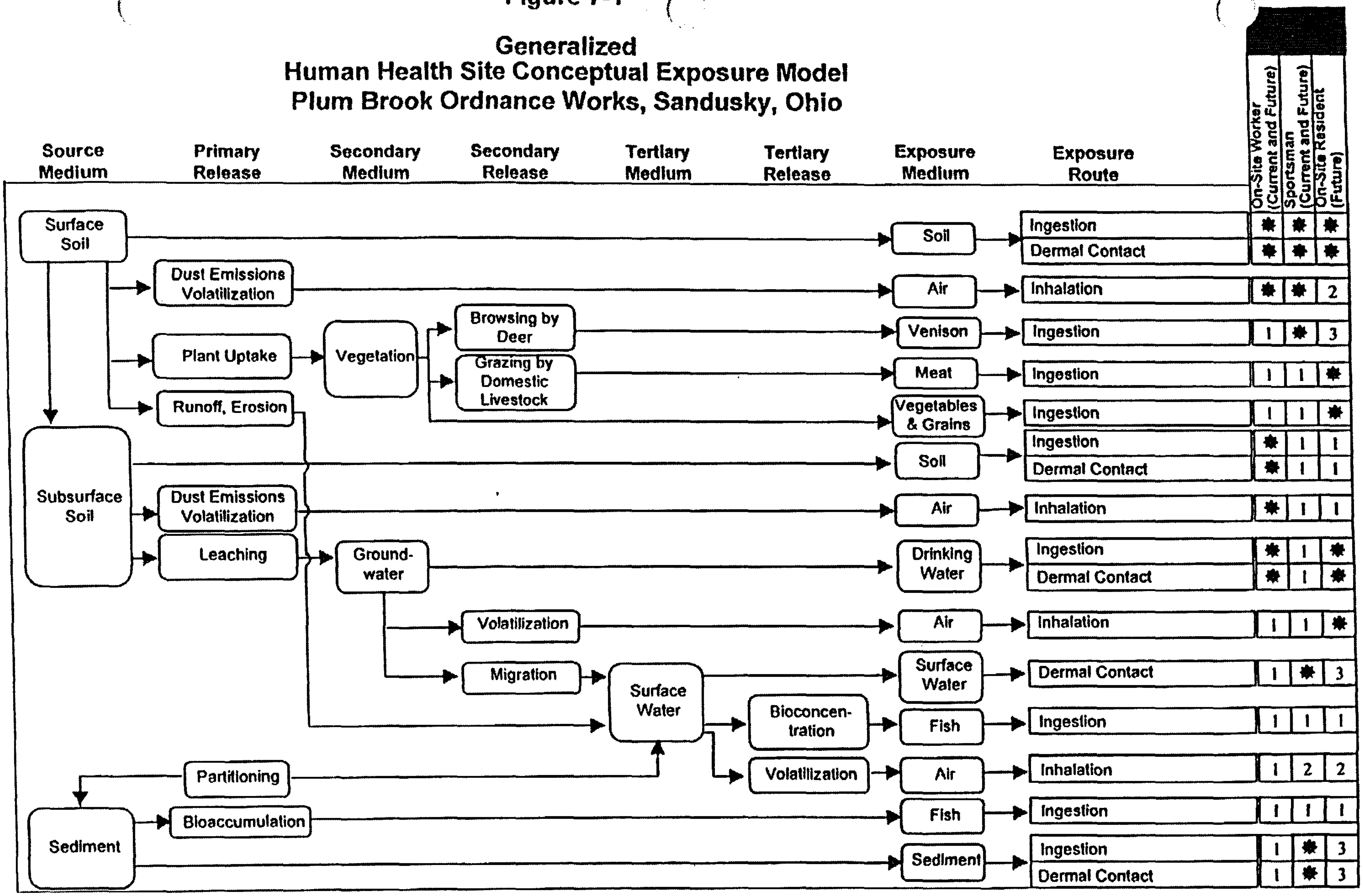
2001 GROUNDWATER REMEDIAL INVESTIGATION
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

FIGURE 6-25
DETECTED CONSTITUENTS IN BACKGROUND MONITORING WELLS ABOVE PRGs IN OVERBURDEN/BEDROCK WELLS (NOVEMBER 1997, MAY 1998, & SEPTEMBER-OCTOBER 2000)

AREA	JOB NO.	DRAWING NO.	REV
	771481	771481ES.198	

Figure 7-1

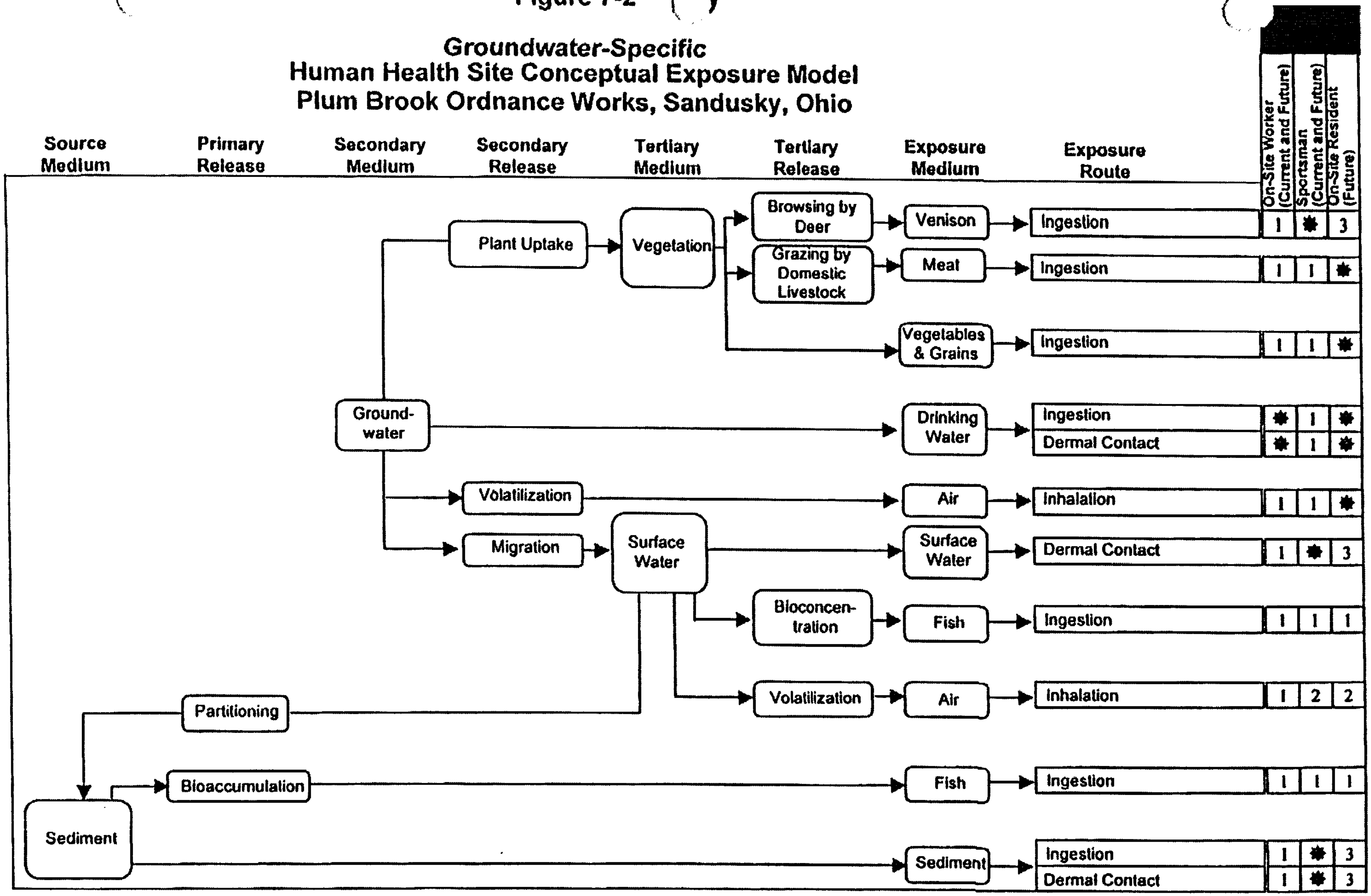
Generalized
Human Health Site Conceptual Exposure Model
Plum Brook Ordnance Works, Sandusky, Ohio



✱ Complete exposure pathway to be evaluated.
1 = Incomplete exposure pathway.
2 = Although theoretically complete exposure pathway, large dilution factor of outdoor air obviates the need to quantify this pathway.
3 = This pathway is quantified for the sportsman and is not quantified separately for the on-site resident.

Figure 7-2

Groundwater-Specific
Human Health Site Conceptual Exposure Model
Plum Brook Ordnance Works, Sandusky, Ohio



✱ Complete exposure pathway to be evaluated.
1 = Incomplete exposure pathway.
2 = Although theoretically complete exposure pathway, large dilution factor of outdoor air obviates the need to quantify this pathway.
3 = This pathway is quantified for the sportsman and is not quantified separately for the on-site resident.

KN/4379/FIG7-2.PPT/1/14/99 4:32 PM

APPENDIX B

SAMPLE COLLECTION LOGS

DIRECT-PUSH GROUNDWATER SAMPLE COLLECTION LOGS

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE W

Manager: Mike Spangberg

RFA / COC Number: PB08002015TC

Location Code: TNTA-DP14

Sample Number: BA3014

Sample Name: PBOW-01-GW-TNTA-DP14-BA3014-(0000)

Sampling Method: DP

Sample Type: GW

Sample Purpose: REG

Collection Date: 8-2-01

Collection Time: 10:25

Start Depth: 7.62

End Depth: 10.0' TD

Sample Matrix: WATER

Sample Team: S [illegible] D. Tindell

QC Partners:

(TB) TB080201 (ER) — (FB) —

ERPIMS Values:

Sacode: —

Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
EXPL-HPLC-SC	N	B	1	1	L	Amb. Glass

Comments: Sample collected w/ peristaltic pump and disposable plastic tubing. Performed no purging.

DP14-GW-14

Sketch Location:

Ph: 6.66

Cond: 0.901

turb: 999.0

DO: 2.46

tmp: 18.36

Dep: 28.5

Sal: 0.04

TDS: 0.56

σt: 0

ORP: -131

Logged BY / Date: [signature] 8-2-01

Reviewed BY / Date: [signature] 08/10/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE W
Manager: Mike Spangberg

RFA / COC Number: PB08-01 STL

Location Code: TNTA-DP21
Sample Number: BA3021
Sample Name: PBOW-01-GW-TNTA-DP21-BA3021-(0000)
Sampling Method: DP
Sample Type: GW *Sample Purpose:* REG

Collection Date: 8-1-01
Collection Time: 17.12
Start Depth: 9.76
End Depth: 10.5' TD
Sample Matrix: WATER

QC Partners:
(TB) TRIP BLANK 080101 (ER) ——— (FB) ———

Sample Team: Sheldon McLeod, Dave Tindell

ERPIMS Values:
Sacode: ———
Lot Control#: ———

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
EXPL-HPLC-SC	N	B	1	1	L	Amb. Glass

Comments: Sampled using peristaltic pump and new plastic tubing. Performed no purging.
DP21 = GW-21

Sketch Location:

Ph = 7.19
ConD = 1.39 s/cm
turb = 723.0 NTU
DO = 3.34 g/L
temp: 19.50 °C
DEP = 1.9 m
SAL = 0.06 %
TDS = 0.9 g/L

σ t.0
ORP = 162 mV

Logged BY / Date: Sheldon McLeod 8-1-01

Reviewed BY / Date: [signature] 08

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE W
Manager: Mike Spangberg

RFA / COC Number: PB08-065+L

Location Code: TNTB-DP02
Sample Number: BB3002
Sample Name: PBOW-01-GW-TNTB-DP02-BB3002-(0000)
Sampling Method: DP
Sample Type: GW
Sample Purpose: REG

Collection Date: 8/6/01
Collection Time: 1145
Start Depth: 13.60'
End Depth: 15.10'
Sample Matrix: WATER
Sample Team: DKK/SM

QC Partners:
(TB) TB080601 (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
EXPL-HPLC-SC	N	B	1	1	L	Amb. Glass -3/4 Full

Comments:
- Collected w/ 2" ~~ploy~~ poly, unweighted bailer.
- Collected no water quality readings. Insufficient sample volume
- DP02 = GW-02 Depth to water = 13.60', Stick-up = 4.55 Ft

Sketch Location:

TNT Area B. Collected from 2" temporary piezometer.

Logged BY / Date: David Kesler
Reviewed BY / Date: David Kesler 8/6/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE W**

Manager: Mike Spangberg

RFA / COC Number: PB08-01552

Location Code: TNTB-DP03

Sample Number: BB3003

Sample Name: PBOW-01-GW-TNTB-DP03-BB3003-(0000)

Sampling Method: DP

Sample Type: GW

Sample Purpose: REG

Collection Date: 8-1-01

Collection Time: 15:33

Start Depth: 15.28

End Depth: 18.71

Sample Matrix: WATER

Sample Team: Sheldon McLeod/David Tindell

QC Partners:

(TB) TB 080101 (ER) — (FB) —

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
EXPL-HPLC-SC	N	B	2	1	L	Amb. Glass

Comments: Sampled using peristaltic pump and new plastic tubing. Performed no purging

DP03 = GW-03

Sketch Location:

Ph: 6.23

Cond: 0.635

turb: 999.0

DO: 2.01

temp: 18.49

Dep: -1.0

Sal: 0.03

tds: 0.40

σt: 0

ORP: 50 mV

time: 15:33

Logged BY / Date: Sheldon McLeod 8-1-01

Reviewed BY / Date: [signature] 08/10/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE W

Manager: Mike Spangberg

RFA / COC Number: PB08-01STL

Location Code: TNTC-DP13
Sample Number: BC3013
Sample Name: PBOW-01-GW-TNTC-DP13-BC3013-(0000)
Sampling Method: DP
Sample Type: GW
Sample Purpose: REG

Collection Date: 8-01-01
Collection Time: 16:30
Start Depth: ~~6.84~~ 6.38 ~~9.37~~
End Depth: 9.39
Sample Matrix: WATER
Sample Team: Sheldon McLeod/David Tindell

QC Partners:
TB) TB080101 (ER) —— (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL;SEP
EXPL-HPLC-SC	N	B	1	1	L	Amb. Glass

Comments: Sampled using peristaltic pump and new plastic tubing
Performed no purging
DP13 = GW-13

Sketch Location:

Ph: 6.84
cond: 0.790
turb: 999.0
DO = 2.49 g/L
temp = 20.5°C
Dep. 0.2
Sal = 0.03

tds: 0.50 g/L
σt: 0
ORP = -10

Logged BY / Date: Sheldon McLeod 8-1-01

Reviewed BY / Date: [signature] 08/10/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE W
Manager: Mike Spangberg

RFA / COC Number: PB08-06561

Location Code: TNTC-DP19
Sample Number: BC3019
Sample Name: PBOW-01-GW-TNTC-DP19-BC3019-(0000)
Sampling Method: DP
Sample Type: GW *Sample Purpose:* REG

Collection Date: 8/6/01
Collection Time: 1210
Start Depth: 7.38'
End Depth: 9.88
Sample Matrix: WATER
Sample Team: DKK/SM

QC Partners:
TB) TB080601 (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
EXPL-HPLC-SC	N	B	1	1	L	Amb. Glass

Comments: - Collected w/ 2" poly, unweighted, disposable bailer

- DP19 = GW-19

Sketch Location:

TNT Area C. Collected from 2" temporary piezometer.

pH = ~~6.49~~ 6.73 DKK
Cond (mS/cm) = 2.29
Turb (NTU) = 523.0
DO (mg/L) = 6.32
Temp (°C) = 17.73
DEL =
SAL (%) 0.11
TDS (g/L) = 1.5
σt = 0
ORP (mV) = 281

Logged BY / Date: David Kessler 8/6/01 *Reviewed BY / Date:* David Kessler 8/6/01

SOIL SAMPLE COLLECTION LOGS

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SPL-K

Location Code: PRRP-DP03A
Sample Number: BD0001
Sample Name: PBOW-01-SO-PRRP-DP03-BD0001-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-27-01
Collection Time: 09:13
Start Depth: 4.3
End Depth: 4.8
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:
Pentolite Rd Area

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 Reviewed BY / Date: David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PBOW0927STL-K

Location Code: PRRP-DP03A

Sample Number: BD0002

Sample Name: PBOW-01-SO-PRRP-DP03-BD0002-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 9-27-01

Collection Time: 0923

Start Depth: 11

End Depth: 12

Sample Matrix: SOIL

Sample Team: H Adams / D Kessler

QC Partners:

TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Rentschler Rd Red Water Pond

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01

Reviewed BY / Date: David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PB092601 STLN

Location Code: PRRP-DP10A

Sample Number: BD0003

Sample Name: PBOW-01-SO-PRRP-DP10-BD0003-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 9-26-01

Collection Time: 12:20

Start Depth: 8.4

End Depth: 8.9

Sample Matrix: SOIL

Sample Team: H Adams / D Kessler

QC Partners:

(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:

Sacode: ____

Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

PRWP

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01

Reviewed BY / Date: David Kessler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PB092601STLN

Location Code: PRRP-DP10A
Sample Number: BD0004
Sample Name: PBOW-01-SO-PRRP-DP10-BD0004-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-26-01
Collection Time: 12:25
Start Depth: 10.5
End Depth: 12.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

(Columns Qty, Size, Units, Type under heading "Containers")

Comments:

Pentolite Rd Red water Pond

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01

Reviewed BY / Date: David Kessler

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PB092601STLN

Location Code: PRRP-DP10A
Sample Number: BD0004-MS
Sample Name: PBOW-01-SO-PRRP-DP10-BD0004-MS-(00-0
Sampling Method: DP
Sample Type: SO *Sample Purpose:* MS

Collection Date: 9-26-01
Collection Time: 12:25
Start Depth: 10.5
End Depth: 12.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ________ (ER) ________ (FB) ________

ERPIMS Values:
Sacode: ________
Lot Control#: ________

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:
PRRWP

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01 *Reviewed BY / Date:* David Kessler 9/21/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PB0926015TZN

Location Code: PRRP-DP10A
Sample Number: BD0004-MSD
Sample Name: PBOW-01-SO-PRRP-DP10-BD0004-MSD-(00
Sampling Method: DP
Sample Type: SO
Sample Purpose: MSD

Collection Date: 9-26-01
Collection Time: 12:20
Start Depth: 10.5
End Depth: 12.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

PRRWP

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01
Reviewed BY / Date: David Kessler

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PB092601SCLN

Location Code: PRRP-DP11A

Sample Number: BD0005

Sample Name: PBOW-01-SO-PRRP-DP11-BD0005-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

QC Partners:

(TB) ______ (ER) ______ (FB) ______

Collection Date: 9-26-01

Collection Time: 15:35

Start Depth: HRA ~~3.2'~~ ~~3.1~~ 2.6

End Depth: ~~3.7~~ HRA ~~3.~~ 3.1

Sample Matrix: SOIL

Sample Team: H Adams / D Kessler

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

PRRUP

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01

Reviewed BY / Date: David Kessler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PB092601SFLW

Location Code: PRRP-DP11A

Sample Number: BD0006

Sample Name: PBOW-01-SO-PRRP-DP11-BD0006-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 9-26-01

Collection Time: 1605

Start Depth: 11

End Depth: 12

Sample Matrix: SOIL

Sample Team: H ADAMS / D KESSLER

QC Partners:

(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

PRRWP - DP11

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01

Reviewed BY / Date: David Kessler 9/11/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PB092601STLN

Location Code: TNTA-SO012A
Sample Number: BD0007
Sample Name: PBOW-01-SO-TNTA-SO012-BD0007-(00-00) 0.5-~~1.5~~ 1.5
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-26-01
Collection Time: ~~0~~ 08:20
Start Depth: 0.5
End Depth: 1.5
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3 ✓	5	oz	ENCORE
EXPLOSIVES	N	B	1 ✓	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1 ✓	4	oz	CWM

Comments:
~~Bl~~ TNTA - Bldg ~~[illegible]~~ 195 DKK

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01 *Reviewed BY / Date:* David Kessler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PB092601SGLN

Location Code: TNTA-SO012 A
Sample Number: BD0008 4-6
Sample Name: PBOW-01-SO-TNTA-SO012-BD0008-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 09-26-01
Collection Time: 09:35
Start Depth: 4.0
End Depth: 6.0
Sample Matrix: SOIL
Sample Team: H ADAMS / D KESSLER

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTA- Bldg 155

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01 *Reviewed BY / Date:* David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PB092601SSLN

Location Code: TNTA-SO080 A
Sample Number: BD0009
Sample Name: PBOW-01-SO-TNTA-SO080-BD0009-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 9-26-01
Collection Time: 10:15
Start Depth: 0.5'
End Depth: 1.5'
Sample Matrix: SOIL
Sample Team: H ADAMS / D KESSLER

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTA - Bldg 146

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01 *Reviewed BY / Date:* David Kessler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PB092601SSLN

Location Code: TNTA-SO080 A
Sample Number: BD0010
Sample Name: PBOW-01-SO-TNTA-SO080-BD0010-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: FD

Collection Date: 9-26-01
Collection Time: 10:15
Start Depth: 0.5'
End Depth: 1.5'
Sample Matrix: SOIL
Sample Team: H ADAMS / D Kesch

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTA- Bldg 146

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01
Reviewed BY / Date: David Kesch 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: ~~PBOW-07~~ PB092601SO2 N

Location Code: TNTA-SO080 A
Sample Number: BD0012
Sample Name: PBOW-01-SO-TNTA-SO080-BD0012-(00-00)
Sampling Method: DP
Sample Type: SO   *Sample Purpose:* REG

Collection Date: 9-26-01
Collection Time: 10:45
Start Depth: 8.0'
End Depth: 10.0'
Sample Matrix: SOIL
Sample Team: H ADAMS / D KESSLER

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTA - Bldg 146

Sketch Location:

Logged BY / Date: Hugh Adams 9/26/01   *Reviewed BY / Date:* David Kessler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 0927 STL-K

Location Code: TNTB-SS295A
Sample Number: BD0013
Sample Name: PBOW-01-SO-TNTB-SS295-BD0013-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-27-01
Collection Time:
Start Depth: 0.0
End Depth: 1.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTB- Bldg 456

Sketch Location:

Recl. 7 dkbr, sl dmp si w/ br f gr sd; decomposed dkgr-br sh; mottled w/ br cl; tan sh + gr plastic piece

Logged BY / Date: Hugh Adams 9/26/01 *Reviewed BY / Date:* David Kesseh 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PBOW092755C-15

Location Code: TNTB-SS295A

Sample Number: BD0014

Sample Name: PBOW-01-SO-TNTB-SS295-BD0014-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 9-27-01

Collection Time: 14:40

Start Depth: 2.5

End Depth: 3.5

Sample Matrix: SOIL

Sample Team: H Adams / D Kerder

QC Partners:

(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTB - Bldg 456

Sketch Location:

Field Split taken @ this location also.

Sample # 15 @ BD0031

Logged BY / Date: Hugh Adams 9/27/01

Reviewed BY / Date: David Kerder 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SFL-K

Location Code: TNTB-SS375A-(SB09)
Sample Number: BD0015
Sample Name: PBOW-01-SO-TNTB-SS375-BD0015-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

QC Partners:
(TB) ____ (ER) ____ (FB) ____

Collection Date: 9-27-01
Collection Time: 11:15
Start Depth: 4.0
End Depth: 6.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTB- Bldg 452

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW092701L-K

Location Code: TNTB-SS375A(5009)
Sample Number: BD0016
Sample Name: PBOW-01-SO-TNTB-SS375-BD0016-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 9-27-01
Collection Time: 11:20
Start Depth: ~~WL 40~~ 8
End Depth: ~~WL 60~~ 10
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

(Containers: Qty, Size, Units, Type)

Comments:

TNTB - Bldg 452

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW092751C-1K

Location Code: TNTB-SS375A
Sample Number: BD0016-MS
Sample Name: PBOW-01-SO-TNTB-SS375-BD0016-MS-(00-
Sampling Method: DP
Sample Type: SO
Sample Purpose: MS

Collection Date: 9-27-01
Collection Time: 11:15
Start Depth: 4.0
End Depth: 6.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:
TNTB- Bldg 452

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01
Reviewed BY / Date: David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 0927 STC-K

Location Code: TNTB-SS375A
Sample Number: BD0016-MSD
Sample Name: PBOW-01-SO-TNTB-SS375-BD0016-MSD-(0
Sampling Method: DP
Sample Type: SO *Sample Purpose:* MSD

QC Partners:
(TB) ______ (ER) ______ (FB) ______

Collection Date: 9-27-01
Collection Time: 11:15
Start Depth: 4.0
End Depth: 6.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Containers: Qty, Size, Units, Type

Comments:

TNTB Bldg 452

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kosh 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBOW 0928 STL-K

Location Code: TNTC-SO066 A

Sample Number: BD0017

Sample Name: PBOW-01-SO-TNTC-SO066-BD0017-(00-00)

Sampling Method: DP

Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-28-01

Collection Time: 15:00

Start Depth: 2.5

End Depth: 3.5

Sample Matrix: SOIL

Sample Team: H Adams / D Kessler

QC Partners:

(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTC- Bldg 629

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01 *Reviewed BY / Date:* David Kessler 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBOW092855L-K

Location Code: TNTC-SO066A

Sample Number: BD0018

Sample Name: PBOW-01-SO-TNTC-SO066-BD0018-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 9-28-01

Collection Time: 15:25

Start Depth: 8.0

End Depth: 10.0

Sample Matrix: SOIL

Sample Team: H Adams / D Kessler

QC Partners:

(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTC - Bldg 629

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01

Reviewed BY / Date: David Kessler 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW0928SRL-1K

Location Code: TNTC-SO066A
Sample Number: BD0019
Sample Name: PBOW-01-SO-TNTC-SO066-BD0019-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* FD

Collection Date: 9-28-01
Collection Time: 15:25
Start Depth: 8.0
End Depth: 10.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTC- Bldg 629

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01 *Reviewed BY / Date:* David Kessler 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW092855L-K

Location Code: TNTC-SO123A
Sample Number: BD0021
Sample Name: PBOW-01-SO-TNTC-SO123-BD0021-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-28-01
Collection Time: 16:26
Start Depth: 4
End Depth: 6
Sample Matrix: SOIL
Sample Team: H Adams / D. Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTC- Bldg- 603

Sketch Location:

Logged BY / Date: Hugh L Adams 9/28/01 *Reviewed BY / Date:* David Kessler 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBO-052855C-K

Location Code: TNTC-SO123A
Sample Number: BD0022
Sample Name: PBOW-01-SO-TNTC-SO123-BD0022-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-28-01
Collection Time: 16:30
Start Depth: ~~8.0~~ 6.0
End Depth: ~~10.0~~ 7.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kossk

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

TNTC - Bldg 603

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01 *Reviewed BY / Date:* David Kesch 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SP2N

Location Code: WARP-DP09A
Sample Number: BD0023
Sample Name: PBOW-01-SO-WARP-DP09-BD0023-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 9-27-01
Collection Time: 16:28
Start Depth: 4
End Depth: 4.9
Sample Matrix: SOIL
Sample Team: HAdams/D. Kush

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Containers

Comments:

Sketch Location:

~~FS sample collected @ same time.~~
HRA

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kush 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SFL-K

Location Code: WARP-DP09A
Collection Date: 9-27-01
Sample Number: BD0024
Collection Time: 16:36
Sample Name: PBOW-01-SO-WARP-DP09-BD0024-(00-00)
Start Depth: 11
Sampling Method: DP
End Depth: 12
Sample Type: SO
Sample Purpose: REG
Sample Matrix: SOIL

QC Partners:
(TB) ______ (ER) ______ (FB) ______

Sample Team: DK/HA

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

(Columns Qty, Size, Units and Type are under the heading "Containers".)

Comments:

Sketch Location:

Field Split BD0032 was collected with this sample.

Logged BY / Date: Hugh Adams 9/27/01
Reviewed BY / Date: David Kesh 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SR2-K

Location Code: WARP-DP13A
Sample Number: BD0025
Sample Name: PBOW-01-SO-WARP-DP13-BD0025-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 9-27-01
Collection Time: 15:30
Start Depth: 4.1
End Depth: 5.1
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01
Reviewed BY / Date: David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW092755L-K

Location Code: WARP-DP13A
Sample Number: BD0026
Sample Name: PBOW-01-SO-WARP-DP13-BD0026-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* FD

Collection Date: 9-27-01
Collection Time: 15:30
Start Depth: 4.1
End Depth: 5.1
Sample Matrix: SOIL
Sample Team: H Adams / D. Kosh

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kosh 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927PARA

Location Code: WARP-DP13A
Sample Number: BD0027
Sample Name: PBOW-01-SO-WARP-DP13-BD0027-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: FS

Collection Date: 9-27-01
Collection Time: 15:45
Start Depth: 11.0
End Depth: 12.0
Sample Matrix: SOIL
Sample Team: H Adams / D Keesler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01 *Reviewed BY / Date:* David Kesler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBOW0927SS2-K

Location Code: WARP-DP13A

Collection Date: 9-27-01

Sample Number: BD0028

Collection Time: 15:45

Sample Name: PBOW-01-SO-WARP-DP13-BD0028-(00-00)

Start Depth: 11.0

Sampling Method: DP

End Depth: 12.0

Sample Type: SO

Sample Purpose: REG

Sample Matrix: SOIL

QC Partners:

(TB) ______ (ER) ______ (FB) ______

Sample Team: H Adams / D Kessler

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/27/01

Reviewed BY / Date: David Kessler 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 092801-K

Location Code: WARP-DP16A
Sample Number: BD0029
Sample Name: PBOW-01-SO-WARP-DP16-BD0029-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 9-28-01
Collection Time: 13:05
Start Depth: 3.5
End Depth: 4.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01 *Reviewed BY / Date:* David Kessler

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 0528 SSL-K

Location Code: WARP-DP16A
Sample Number: BD0030
Sample Name: PBOW-01-SO-WARP-DP16-BD0030-(00-00)
Sampling Method: DP
Sample Type: SO   *Sample Purpose:* REG

QC Partners:
(TB) ______ (ER) ______ (FB) ______

Collection Date: 9-28-01
Collection Time: 13:25
Start Depth: 11
End Depth: 12
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 9/28/01   *Reviewed BY / Date:* David Kush 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PBOW100201STC-K

Location Code: TNTC-SO066 A

Sample Number: BD0017 R

Sample Name: PBOW-01-SO-TNTC-SO066-BD0017-(00-00)

Sampling Method: DP

Sample Type: SO

Sample Purpose: REG

Collection Date: 10-02-01

Collection Time: 08:45

Start Depth: 2.5

End Depth: 3.4

Sample Matrix: SOIL

Sample Team: H Adams / D Kesil

QC Partners:

(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:

Sacode: ______

Lot Control#: ______

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01

Reviewed BY / Date: David Kesel 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW 100201 SSL-K

Location Code: TNTC-SO066 A
Sample Number: BD0018 R
Sample Name: PBOW-01-SO-TNTC-SO066-BD0018-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 10-02-01
Collection Time: 10:25
Start Depth: 8
End Depth: 10
Sample Matrix: SOIL
Sample Team: H. Adams / D Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01 *Reviewed BY / Date:* David Kessler 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100201STL-IS

Location Code: TNTC-SO066A
Sample Number: BD0019R
Sample Name: PBOW-01-SO-TNTC-SO066-BD0019-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* FD

QC Partners:
(TB) ______ (ER) ______ (FB) ______

Collection Date: 10-02-01
Collection Time: 10:25
Start Depth: 8.0
End Depth: 10.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kesler

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01 *Reviewed BY / Date:* David Kesler 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100201SFZ-K

Location Code: TNTC-SO123 A
Sample Number: BD0021 R
Sample Name: PBOW-01-SO-TNTC-SO123-BD0021-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 10-02-01
Collection Time: 11:15
Start Depth: 4.0
End Depth: 6.0
Sample Matrix: SOIL
Sample Team: H Adams / D. Kessler

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01   *Reviewed BY / Date:* David Kesh 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBO-00201 STL-K

Location Code: TNTC-SO123 A
Sample Number: BD0022 R
Sample Name: PBOW-01-SO-TNTC-SO123-BD0022-(00-00)
Sampling Method: DP
Sample Type: SO
Sample Purpose: REG

Collection Date: 10-02-01
Collection Time: 11:20
Start Depth: 6.0
End Depth: 7.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessle

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

(Qty, Size, Units and Type are under the heading "Containers".)

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01
Reviewed BY / Date: David Kessle 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW10020151L-K

Location Code: WARP-DP16 A
Sample Number: BD0029R
Sample Name: PBOW-01-SO-WARP-DP16-BD0029-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 10-02-01
Collection Time: 08:37
Start Depth: 3.5
End Depth: 4.0
Sample Matrix: SOIL
Sample Team: H Adams / D Kessler

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01
Reviewed BY / Date: David Kessler 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100201STL-K

Location Code: WARP-DP16A
Sample Number: BD0030 R
Sample Name: PBOW-01-SO-WARP-DP16-BD0030-(00-00)
Sampling Method: DP
Sample Type: SO *Sample Purpose:* REG

Collection Date: 10-02-01
Collection Time: 08:50
Start Depth: 10
End Depth: 12
Sample Matrix: SOIL
Sample Team: HAdams / DKosk

QC Partners:
(TB) ____ (ER) ____ (FB) ____

ERPIMS Values:
Sacode: ____
Lot Control#: ____

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	5	oz	ENCORE
EXPLOSIVES	N	B	1	4	oz	CWM
METALS3	N	B	1	4	oz	CWM
SPLP EXPLOSIVES	N	C	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/2/01 *Reviewed BY / Date:* David Kosh 10/2/01

GROUNDWATER SAMPLE COLLECTION LOGS

INTERNATIONAL TECHNOLOGY CORPORATION

Dry Not sampled

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: ——

Location Code: IT-MW01
Sample Number: BD30
Sample Name: PBOW-01-GW- -(00-00)
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 9/27/01
Collection Time: 1040
Start Depth:
End Depth:
Sample Matrix: WATER
Sample Team:

QC Partners:
(TB) ______ (ER) ______ (FB) ______

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: • Not sampled. Riser is dented. Will not allow bailer to pass by. Water column 1.2 Ft.

Sketch Location:

Logged BY / Date: ______

Reviewed BY / Date: David Keah 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: IT-MW01
Sample Number: BD30

Not sampled.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

Logged BY / Date: ____________

Reviewed BY / Date: David Kesh 9/27/6

INTERNATIONAL TECHNOLOGY CORPORATION

Dry

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number:

Location Code:	MK-MW16	*Collection Date:*	
Sample Number:	BD3011	*Collection Time:*	
Sample Name:	PBOW-01-GW-MK-MW16-BD3011-(00-00)	*Start Depth:*	
Sampling Method:	LF	*End Depth:*	
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER

QC Partners:

(TB) (ER) (FB)

Sample Team:

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Dry 9/26/01

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: MK-MW16
Sample Number: BD3011

Dry 9/26/01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

Logged BY / Date: ____________ *Reviewed BY / Date:* ____________

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100101STL-N F-K

Location Code: MK-MW17
Sample Number: BD3012
Sample Name: PBOW-01-GW-MK-MW17-BD3012-(00-00)
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10/01/01
Collection Time: 1235
Start Depth: 7.5'
End Depth: 7.5'
Sample Matrix: WATER
Sample Team: RT/NS

QC Partners:
(TB) TB100101A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Low-Flow Sampling Method Used

Sketch Location: ~~See back~~ OK

Logged BY / Date: [signature] 10/01/01 *Reviewed BY / Date:* David Kessel 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: MK-MW17
Sample Number: BD3012

Low-Flow Method Used

PURGE RECORD:

Initial	Time(24hr) 10/1/01	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
JLT	1145	5.24							
	1200	5.27	82	4.90	0.95	17.2	0.0	16.54	~200ml/min
	1205								
	1210	5.27	69	5.38	0.95	14.1	0.0	16.44	
	1215	5.27	75	5.34	0.96	12.3	0.0	16.45	
	1220	5.27	76	5.20	0.96	7.3	0.0	16.38	
	1225	5.27	80	5.19	0.95	6.4	0.0	16.53	
	1230	5.27	79	5.12	0.96	6.9	0.0	16.54	
JLT 10/01/01	~~1235~~	~~5~~							
Sample:	1235	5.27	79	5.13	0.96	6.8	0.0	16.53	2.37 gal

5.28 after sampling

Logged BY / Date: [signature] 10/01/01 *Reviewed BY / Date:* David Keasi 10/2/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635
Project Name: PBOW Groundwater
Investigation Site: TNTB
RFA/COC Number:

Collection Date: 10/01/01
Collection Time: 1235
Sample Filtered (Yes / No): Metals only
Weather/Temp: Sunny 60

Form Completed By: R. Thompson
Sampler(s): RT / N. Sirck
Reviewed By: David Kish

Sample Number: P B O W - 0 1 - G W - MK MW - 1 7 B D 3 - 0 1 2 0 0 0 - 0 -

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: MK-MW17
Well Secure (Yes / No):
Well Labeled (Yes / No):
Well Condition: Good
Screen Height: 10'
Casing Type: Sch. 40 PVC

Outside Casing Dia. (in): 2 in
Depth to Product (ft): —
Total Well Depth (ft): 8.45 (TOC)
Depth to Water (ft): 5.24
Water Column (ft): 3.21
Elev. Ref. for Water Level:

Odor: None
Vapor Monitor Type: (PID) / VRAE
- Vapor Monitor S/N: 0.0 1.0
- Reading (ppm): —
Remarks: Low flow method

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 = 3.21 ft x .164 Gal/ft = .526 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 ((4)^2 - (2)^2) = .492 gal/ft
Filter Pack Volume (gal) = ((Screen Height + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height 0 ft + 3.21 ft) x .492 gal/ft) x 0.3 = .474 gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = .526 gal + .474 gal = 1.0 gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
1.0	2.0	3.0	-	

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3		Low		Flow					
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: —

Location Code: PB-TNTA-MW10
Sample Number: BD3033
Sample Name: PBOW-01-GW-PB-TNTA-MW10-BD3033-(0(
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 10/01/01
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: WATER
Sample Team: RT/NS

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Dry, no samples taken

Sketch Location:

Logged BY / Date: [signature] 10/01/01 *Reviewed BY / Date:* David Kersh 10/6/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: PB-TNTA-MW10
Sample Number: BD3033

10/1/01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		Dry							
Sample:									

Logged BY / Date: [signature] 10/01/01 *Reviewed BY / Date:* David Kussh 10/6/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100301STL-K ; TN

Location Code:	PB-TNTA-MW11	*Collection Date:*	10-03-01
Sample Number:	BD3034	*Collection Time:*	16:45
Sample Name:	PBOW-01-GW-PB-TNTA-MW11-BD3034-(0(	*Start Depth:*	12.0' TOC
Sampling Method:	LF	*End Depth:*	12.91' TOC
Sample Type:	GW	*Sample Matrix:*	WATER
Sample Purpose:	REG	*Sample Team:*	H Adams / W Sark

QC Partners:
(TB) TB 100301A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	X 1	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
~~METALS3-W-F~~	~~Y~~	~~D~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~ DKK
METALS3-W	N	E	1	500	mL	HDPE
~~HARDNESS~~	~~N~~	~~F~~	~~1~~	~~250~~	~~mL~~	~~HDPE~~
TOC	N	G	2	40	mL	GVIAL,SEP
~~CYANIDE~~	~~N~~	~~H~~	~~1~~	~~1000~~	~~mL~~	~~HDPE~~
~~ALKALINITY~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~CHLORIDE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~NITRATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~SULFATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TDS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TSS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TURB 180.1~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~

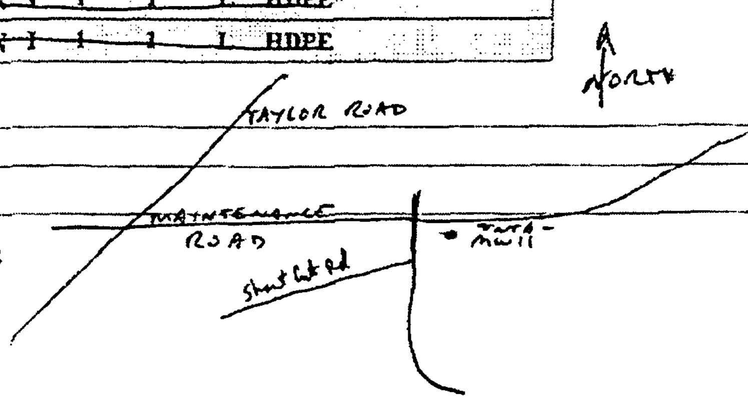
← KNOX

← NORTH CANTON

Incomplete bottle set was filled & submitted to lab

Comments:

Sketch Location:



Logged BY / Date: Hugh Adams 10/3/01 *Reviewed BY / Date:* David Kuch 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-TNTA-MW11

Sample Number: BD3034

10/1/01 Depth to water - 8.39 Ft, TD - 13.19 Ft, 4.80 Ft (water column). Bailing indicates excellent recharge.

10/2/01 Depth to water 10.40 Ft. TD = 13.20 Ft, 2.80 Ft (water column). Not enough water for bladder pump to work (not enough head). will bail and sample 10/3/01. Removed 2 gal water. TD=12.86 Ft

10/3/01 Depth to water 12.0 Ft, TD = 13.20 Ft, 1.20 Ft (water column). Collected selected parameters.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
HRA	16:30	12.0'							

only 1.2 feet of water is in the well. Discussed w/ Dave Kessler ; were told to collect as many samples as we could beginning with VOA's, Nitroaromatics, Metals, semivoas.

Collected: VOA's 3 40 ml vials
Nitro/semi 2 1 l amber glass
Metals 1 HDPE
TOC's 2 40 ml vials

No field parameters were recorded for this location

Sample:

water was milky in appearance (NOT CLEAR)

Logged BY / Date: Hugh Adams 10/3/01 *Reviewed BY / Date:* David Kersh 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number:

Location Code: TNTC-MW03
Sample Number: BD30
Sample Name: PBOW-01-GW- -(00-00)
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date:
Collection Time:
Start Depth:
End Depth:
Sample Matrix: WATER
Sample Team:

QC Partners:
(TB) (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

DRY

Comments:

Sketch Location:

Logged BY / Date: *Reviewed BY / Date:*

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: ____________

Location Code: TNTC-MW03
Sample Number: BD30
Sample Name: PBOW-01-GW- -(00-00)
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: ____________
Collection Time: ____________
Start Depth: ____________
End Depth: ____________
Sample Matrix: WATER
Sample Team: ____________

QC Partners:
(TB) ____________ (ER) ____________ (FB) ____________

ERPIMS Values:
Sacode: ____________
Lot Control#: ____________

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Not sampled. — Dry

Sketch Location:

Logged BY / Date: ____________ *Reviewed BY / Date:* ____________

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100401SSL-N-K

Location Code:	TNTC-mw04	*Collection Date:*	10-04-01
Sample Number:	BD3043	*Collection Time:*	10:45
Sample Name:		*Start Depth:*	~~10.24' BTOC~~ 16' TOC
Sampling Method:	LF	*End Depth:*	16' TOC
Sample Type:	GW	*Sample Matrix:*	WATER
Sample Purpose:	REG	*Sample Team:*	H Adams / N. Serik

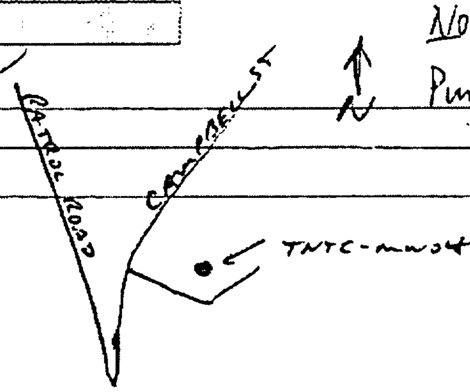
QC Partners:
(TB) TB100401A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Sampled Using Low-Flow Method DLK ? NO low-flow Purged with pump.

Sketch Location:



Logged BY / Date: Hugh Adams 10/4/01

Reviewed BY / Date: David Kusek 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: TNTC-MW07

Sample Number: BD3043

Sampled using Low-Flow Method DKK

- Set up pumping equipment to sample using low-flow method. Water level dropped > 6". Continued pumping at 400 ml/min and water level brought down to 11 ft (10/2/01). Discontinued purge to prevent screen exposure.
- Recharge measured on 10/3/01 to be 0.35 Ft. Collected no sample.
- Recharge measured on 10/4/01 to be 0.76 Ft. Collected sample.

PURGE RECORD:

Initial	Time(24hr) 10/4/01	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
HRA	10:10	10.24'							
INSTALLED PUMP		9.33							
	10:30	PUMPED enough H_2O to fill Horiba cell							
			48	6.79	2.23	42.5	3.40	14.69	∅
@ 100 ml/min		10.87'	8	7.03	2.26	44.6	0.69	14.12	
		11.16	-2	7.30	2.26	23.0	0.59	14.15	1.2 l
	11:45	~~11.45~~ 11.61	-7.0	7.38	2.26	18.8	0.76	14.27	<2.0 l
	11:50	11.65	4.0	7.11	2.23	7.4	1.45	13.63	
	11:55	12.31	31.0	6.73	2.07	129.0	2.17	13.88	≤ 6.0 l
	1045								
Sample:	BD3043	11.61	-7.0	7.38	2.26	18.8	0.76	14.27	

Bottom of pump set @ 16' from TOC

Logged BY / Date: Hugh Adams 10/4/01

Reviewed BY / Date: David Kesh 10/4/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635
Project Name: PBOW Groundwater
Investigation Site: TNT AREA C
RFA/COC Number:

Collection Date: 10-4-01
Collection Time: 10:45
Sample Filtered (Yes / No): yes for metals otherwise NO
Weather/Temp: OVERCAST/SPRINKLES/64°F

Form Completed By: H. Adams
Sampler(s): Hugh Adams / Nick Sirek
Reviewed By: David Kosch

Sample Number: P B O W – 0 1 – G W – T N T C – M W 0 4 – B D 3 0 4 3 – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: TNTC-MW04
Well Secure (Yes / No): Yes
Well Labeled (Yes / No): YES
Well Condition: Good
Screen Height: 9'
Casing Type: PVC 2"

Outside Casing Dia. (in): 8" 2"
Depth to Product (ft): —
Total Well Depth (ft): 18.8 BGS
Depth to Water (ft): 10.24
Water Column (ft): 7.56
Elev. Ref. for Water Level: TOP OF CASING

Odor:
Vapor Monitor Type: PID / VRAE
- Vapor Monitor S/N: 1
- Reading (ppm): ∅ 1
Remarks: BORE HOLE DIA = 8"

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height _____ ft + _____ ft) x _____ gal/ft) x 0.3 = _____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = _____ gal + _____ gal = _____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

No Purge Hydropunch BDTC

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	µmhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100301SFL-K & N

Location Code: PB-TNTC-MW5
Sample Number: BD3035
Sample Name: PBOW-01-GW-PB-TNTC-MW5-BD3035-(00-
Sampling Method: ~~LF~~ BAILER
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10-03-01
Collection Time: 09:15
Start Depth: 28.57' fm TOC
End Depth: 31.20 fm TOC
Sample Matrix: WATER
Sample Team: N. Sirek / H Adams

QC Partners:
(TB) TB100301A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

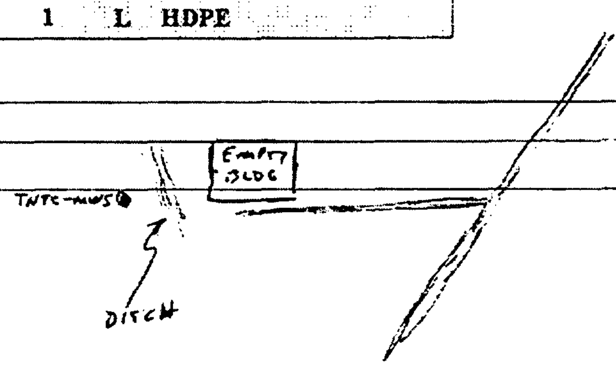
(Containers: Qty, Size, Units, Type)

pH 6.11
conductivity 1.60
Turbidity 658
DO ~~3.12~~ 11.8
Temp 13.0°C
ORP 59 mv

N

Comments:

Sketch Location:



Logged BY / Date: Hugh Adams 10/3/01
Reviewed BY / Date: David Kissh 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: PB-TNTC-MW5

Sample Number: BD3035

Water level determined to be in screen - Used bailer to sample.
Insufficient water volume present to collect MS/MSD AS PLANNED.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	0835	28.57 (TD = 32.28') 3.71' water column							
Sample:	0915	Start 28.57 Finish 31.20	59	6.11	1.60	688	11.8	13.0	

Logged BY / Date: Hugh Adams 10/3/01 *Reviewed BY / Date:* Dennis Kessler 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: ~~[illegible]~~

Location Code: IT-AA1-BEDGW-001
Sample Number: BD3001
Sample Name: PBOW-01-GW-IT-AA1-BEDGW-001-BD3001
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 10/10/01
Collection Time: —
Start Depth: —
End Depth: —
Sample Matrix: WATER
Sample Team: N. Sinha, R. Thompson

QC Partners:
(TB) ~~[illegible]~~ (ER) ______ (FB) ______

ERPIMS Values:
Sacode: ______
Lot Control#: ______

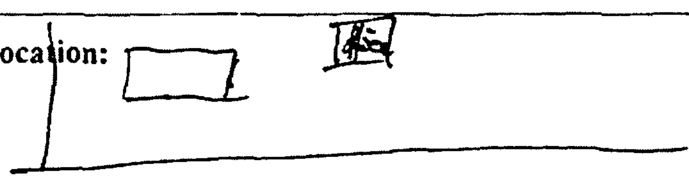
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

10/10/01 H_2O: 31.11'
TD: 65' (15' screen)

Bailed ~ 5 gal.

Comments: No sample collected due to H_2S off gassing

Sketch Location:



• AA1-BEDGW-001

Logged BY / Date: R. Thompson 10/10/01
Reviewed BY / Date: David Kesel 10/10/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: **IT-AA1-BEDGW-001**

Sample Number: **BD3001**

67.64
TD= 65 Ft, 2" casing, 6" borehole, 15 Ft PVC screen
10/4/01 { 0.63 Ft product recovered in bailer, Depth to water 30.88 Ft }

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

Logged BY / Date: R. Thompson 10/10/01

Reviewed BY / Date: David Koch 10/10/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date:	Form Completed By: D. Kessler
Project Name: PBOW Groundwater	Collection Time:	Sampler(s): D. Kessler
Investigation Site:	Sample Filtered (Yes / No):	R. Thompson
RFA/COC Number:	Weather/Temp:	Reviewed By:

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: AA1-BEDGW-001	Outside Casing Dia. (in): 2	Odor: Petroleum Odor
Well Secure (Yes / No): yes	Depth to Product (ft): ~~NA~~ 30.25	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): NO	Total Well Depth (ft): 67.64	- Vapor Monitor S/N: /
Well Condition: good – guard posts loose	Depth to Water (ft): 30.88	- Reading (ppm): 269 CO: 0 H2S: 0ppm LEL: 0% O2: 20.9%
Screen Height: 15	Water Column (ft): 36.76	Remarks:
Casing Type: PVC	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100801STL-K ÷ -N

Location Code: IT-AA2-BEDGW-001
Collection Date: 10-8-01
Sample Number: BD3004
Collection Time: 11:45
Sample Name: PBOW-01-GW-IT-AA2-BEDGW-001-BD3004
Start Depth: 36'
Sampling Method: LF
End Depth: 36'
Sample Type: GW
Sample Purpose: REG
Sample Matrix: WATER

QC Partners: MS/MSD
Sample Team: H Adams/W. Sieck

(TB) TB100801A (ER) (FB)

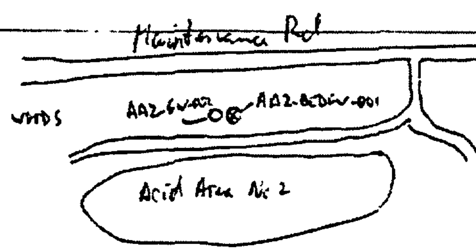
ERPIMS Values:
Sacode:
Lot Control#:

Pump placed @ 36' below TOC.

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Low-Flow Sampled

Sketch Location:
N↑



Logged BY / Date: Hugh Adams 10/8/01
Reviewed BY / Date: David Kesh 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

Location Code: IT-AA2-BEDGW-001

Sample Number: BD3004

Began pumping 11:10 - initial rate 180 ml/min - pump bottom positioned @ 36' Below TOC.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
START	11:10	15.47	-	-	-	-	-	-	
	11:15	16.38	-149	9.65	1.28	80.5	0.98	10.69	~300 ml (180 ml/min)
	11:20	16.43	-150	9.65	1.27	90.7	0.35	10.76	1[illegible] ml/min
	11:25	16.4[illegible]	-147	9.57	1.26	~~[illegible]~~ 100.0	0.07	10.69	
	11.30	16.50	-143	9.47	1.26	64.3	0.05	10.67	
	11:35	16.55	-144	9.45	1.25	74.9	0.00	10.67	3/4 gal (3 l) < 1 gallon
	1[illegible]:[illegible]0	16.65	-144	9.45	1.24	76.4	0.00	10.65	1+ gallons
BEGAN SAMPLING - flow rate increase to ~300-400 ml/min									
9 ambers, 2 l polys, 6 500 ml polys, 1 250 poly, 14 VOAs									
	1[illegible] 50	17.50	-188	10.21	1.21	150.0	0.00	10.16	
Adjusted flow back to 200 ml/min to reduce fluctuations in parameters									
	12:10	collected ~5 l + VOA's **color coming from well AD = 8 ppm							
	12.15	~~23.35~~ (wl)	-280	11.65	1.25	139.0	0.00	10.35	
	12:30	30.98	-313	12.18	1.25	107.0	0.00	10.21	
	12:40	32.21 ~~32~~	-320	12.22	1.29	110.0	0.00	10.23	
Sample:	12:45	32.31	-321	12.29	1.27	135.0	0.00	10.50	

Note: Water progressively discolored from clear to a final "sooty" appearance greyish-black coloration. Our opinion that this was shale "fines" from the lower portion of the water column.

Logged BY / Date: Hugh Adams 10/8/01 *Reviewed BY / Date:* David Kusch 10/8/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 10-8-01	Form Completed By: N. Adams	
Project Name: PBOW Groundwater	Collection Time: 1245	Sampler(s): N. Adams / Nick Sirek	
Investigation Site: Red Water Pond / Area 2	Sample Filtered (Yes / No):		
RFA/COC Number:	Weather/Temp:	Reviewed By:	

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: IT-AR2-BEDGW-001	Outside Casing Dia. (in): 2"	Odor: NONE
Well Secure (Yes / No): YES	Depth to Product (ft): None	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): YES	Total Well Depth (ft): (TABLE 43') MEASURED 45.64' TOC	- Vapor Monitor S/N: /
Well Condition: GOOD	Depth to Water (ft): 15.47'	- Reading (ppm): 60 1,0,0,0,2099.
Screen Height: 15'	Water Column (ft): 30.17'	Remarks:
Casing Type: PVC	Elev. Ref. for Water Level: TOP OF CASING	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height _____ ft + _____ ft) x _____ gal/ft) x 0.3 = _____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = _____ gal + _____ gal = _____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

No Flow

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBOW100801STL-K ; N

Location Code: IT-AA2-BEDGW-001

Sample Number: BD3004-MS

Sample Name: PBOW-01-GW-IT-AA2-BEDGW-001-BD300‹

Sampling Method: LF

Sample Type: GW *Sample Purpose:* MS

QC Partners:

(TB) TB 100801A (ER) —— (FB) ——

Collection Date: 10-8-01

Collection Time: 11:45

Start Depth: 36'

End Depth: 36'

Sample Matrix: WATER

Sample Team: HA / NS

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

See BD3004 -Reg

Logged BY / Date: Hugh Adams 10/8/01 *Reviewed BY / Date:* David Kerch 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100801 STL-K 1-N

Location Code: IT-AA2-BEDGW-001
Sample Number: BD3004-MSD
Sample Name: PBOW-01-GW-IT-AA2-BEDGW-001-BD300
Sampling Method: LF
Sample Type: GW   *Sample Purpose:* MSD

Collection Date: 10-08-01
Collection Time: 11:45
Start Depth: 36'
End Depth: 36'
Sample Matrix: WATER
Sample Team: H Adams/Nick Szeck

QC Partners:
(TB) TB100801A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

See BD3004 - Reg

Logged BY / Date: Hugh Adams 10/8/01   *Reviewed BY / Date:* David Kreck 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SSL-K ; -N

Location Code: IT-AA3-BEDGW-001
Sample Number: BD3005
Sample Name: PBOW-01-GW-IT-AA3-BEDGW-001-BD300!
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 09/27/01
Collection Time: 1615
Start Depth: 48.0'
End Depth: 48.0
Sample Matrix: WATER
Sample Team: ZT / NS

QC Partners:
(TB) ______ (ER) —— (FB) ——

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Sampled using low flow method

Sketch Location: See back

Logged BY / Date: [signature] 09/27/01 *Reviewed BY / Date:* David Kessler 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: IT-AA3-BEDGW-001
Sample Number: BD3005

Low Flow Sampling Method

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
RT	~~1535~~	~~2805~~ RT 09/27/01							400 mL/min
	~~1540~~								
	1545	27.55			2.72	20.2	0.0	11.29	
	1550	27.81	-340	13.16		18.7	0.0	11.37	
	1553	27.89	-339	13.15	2.76	20.4	0.0	12.37	
	1600	27.80	-334	13.01	2.74				
	1605	27.80	-335	13.00	2.74	19.7	0.0	12.07	
	1610	28.21	-341	13.12	2.75	20.8	0.0	11.29	
	~~16~~ RT 09/27/01								
Sample:	1615	28.12	-343	13.15	2.74	20.1	0.0	11.30	12000 ~~10000~~ mL/min RT 09/27/01 ~~2.64~~ gal/min 3.168

28.23 After Sampling

Logged BY / Date: [signature] 09/27/01 *Reviewed BY / Date:* David Kersch 10/02/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	09/27/01	Form Completed By:	R. Thompson
Project Name:	PBOW Groundwater	Collection Time:		Sampler(s):	R.T. / N. Sirek
Investigation Site:	AA3	Sample Filtered (Yes / No):	Metals only		
RFA/COC Number:		Weather/Temp:	overcast 55°F	Reviewed By:	

Sample Number: P B O W – 0 1 – G W – I T – A A 3 – B 3 D G W – 001 – BD3005

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number:	AA3-B3DGW001	Outside Casing Dia. (in):	2 in	Odor:	None
Well Secure (Yes / No):		Depth to Product (ft):	—	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):		Total Well Depth (ft):	53.0'	• Vapor Monitor S/N:	—
Well Condition:	Good	Depth to Water (ft):	28.88	• Reading (ppm):	PID - 10.2 / VRAE
Screen Height:	10.0'	Water Column (ft):	24.12	Remarks:	H2S - 0, O2 20.5, LEL 3
Casing Type:	Sch. 40 PVC	Elev. Ref. for Water Level:	—		Low Flow method

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

Low flow

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PB0928SEL-K1-W

Location Code: IT-ABG-BEDGW-01
Sample Number: BD3006
Sample Name: PBOW-01-GW-IT-ABG-BEDGW-001-BD300
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 09/28/01
Collection Time: 0920
Start Depth: 13.0'
End Depth: 13.0'
Sample Matrix: WATER
Sample Team: RT/NS

QC Partners:
(TB) TB0928010A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type	
~~VOLATILES3~~	~~N~~	~~A~~	~~3~~	~~40~~	~~mL~~	~~GVIAL,SEP~~	DKK
~~SEMIVOLATILES3~~	~~N~~	~~B~~	~~2~~	~~1~~	~~L~~	~~Amb. Glass~~	sht
EXPLOSIVES	N	C	1	1	L	Amb. Glass	
~~METALS3-W-F~~	~~Y~~	~~D~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~	DKK
~~METALS3-W~~	~~N~~	~~E~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~	e
HARDNESS	N	F	1	250	mL	HDPE	
TOC	N	G	2	40	mL	GVIAL,SEP	
~~CYANIDE~~	~~N~~	~~H~~	~~1~~	~~1000~~	~~mL~~	~~HDPE~~	e
ALKALINITY	N	I	1	1	L	HDPE	
CHLORIDE	N	I	1	1	L	HDPE	
~~NITRATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
SULFATE	N	I	1	1	L	HDPE	
TDS	N	I	1	1	L	HDPE	
TSS	N	I	1	1	L	HDPE	
~~TURB 180.1~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e

Comments: Low Flow Method

Sketch Location: See back

Logged BY / Date: [signature] 09/28/01 *Reviewed BY / Date:* David Kusch 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: **IT-ABG-BEDGW-01**
Sample Number: **BD3006**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
M	0835	7.22							2400 ml/m
	0840	7.22	-71	8.13	.552	163.0	0.0	14.02	
	0845	7.22	-92	8.48	.602	57.2	0.0	13.89	
	0850	7.22	-93	8.49	.604	42.5	0.0	13.94	
	0855	7.22	-97	8.55	.610	39.2	0.0	13.85	
	0900	7.22	-99	8.57	.615	28.6	0.0	13.89	
	0905	7.22		8.57	.617	28.8	0.0	13.79	
	0910	7.22	-100	8.58	.617	28.4	0.0	13.80	
	0915	7.22	-100						
									18000 ml/min
Sample:	0920	7.22	-100	8.57	.617	27.9	0.0	13.83	4.76 gal DK

7.23 after sampling

Low Flow Method

Logged BY / Date: [signature] 07/27/01 *Reviewed BY / Date:* David Kerr 10/2/01

GROUNDWATER SAMPLING FOR

IT CORPORATION

Project Number: 825635
Project Name: PBOW Groundwater
Investigation Site: ABG-BDGW-001
RFA/COC Number:

Collection Date: 09/28/01
Collection Time: 0920
Sample Filtered (Yes / No): Metal Only
Weather/Temp: Overcast 45° F

Form Completed By: R. Thompson
Sampler(s): RT / [illegible]
Reviewed By: David [illegible]

Sample Number: P B O W - 0 1 - G W - - - - -

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: ABG-BDGW-001
Well Secure (Yes / No):
Well Labeled (Yes / No):
Well Condition: Good
Screen Height: 15.0'
Casing Type: Sch. 40 PVC

Outside Casing Dia. (in): 2in
Depth to Product (ft): —
Total Well Depth (ft): 20.0'
Depth to Water (ft): 7.22
Water Column (ft): 12.78
Elev. Ref. for Water Level: —

Odor: None
Vapor Monitor Type: PID / VRAE
- Vapor Monitor S/N: — /
- Reading (ppm): 0.0 / 0.0
Remarks: Low Flow Method

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 Rack: 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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + ____ ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ____ gal + ____ gal = ____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2		Low Flow							
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100501 STL-K J-N

Location Code: IT-ABG-BEDGW-01
Sample Number: BD3006R
Sample Name: PBOW-01-GW-IT-ABG-BEDGW-001-BD300
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 10/5/01
Collection Time: 1545
Start Depth: 16'
End Depth: 16'
Sample Matrix: WATER
Sample Team: D. Kesh / R. Thompson

QC Partners:
(TB) TB100501A (ER) —— (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
~~SEMIVOLATILES3~~	~~N~~	~~B~~	~~2~~	~~1~~	~~L~~	~~Amb. Glass~~
~~EXPLOSIVES~~	~~N~~	~~C~~	~~1~~	~~1~~	~~L~~	~~Amb. Glass~~ DKK
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
~~HARDNESS~~	~~N~~	~~F~~	~~1~~	~~250~~	~~mL~~	~~HDPE~~
~~TOC~~	~~N~~	~~G~~	~~2~~	~~40~~	~~mL~~	~~GVIAL,SEP~~
CYANIDE	N	H	1	1000	mL	HDPE
~~ALKALINITY~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~CHLORIDE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
NITRATE	N	I	1	1	L	HDPE
~~SULFATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TDS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TSS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
TURB 180.1	N	I	1	1	L	HDPE

Comments: Collected using low flow - Heavy Steady Rain

Sketch Location:

Logged BY / Date: David Kesh 10/5/01 Reviewed BY / Date: David Kesh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: **IT-ABG-BEDGW-01**

Sample Number: **BD3006R**

Static Water level = 7.24' TD = 21 ft. Pump set at 16 ft.

Resampled using low-flow

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	1430								Rate same as last time, 400 ml/min
	1440	7.18	-57	8.56	0.862	94.7	6.42	14.1	
	1445	7.17	-52	8.32	0.869	76.9	6.19	13.9	
	1450	7.15	-52	8.34	0.870	77.9	6.09	13.7	
	1455	7.15	-53	8.39	0.876	71.5	5.91	13.2	2.64 gal
Pump stopped Batteries low ∴ Replaced	1515	7.11	-54	8.69	0.864	71.5	5.52	13.8	
	1520	7.11	-54	8.79	0.883	26.0	1.19	13.8	— shook cell, pumps.
	1525	7.10	-52	8.66	0.871	16.6	0.17	13.8	
	1530	7.11	-50	8.56	0.858	15.4	0.88	13.8	
	1535	7.11	-57	8.50	0.890	9.0	1.00	13.8	
	1540	7.11	-52	8.61	0.890	7.8	0.78	13.7	
	1545	7.03	-51	8.80	0.900	6.6	0.66	13.5	3.17 gal
Sample:	1545	7.03	-51	8.80	0.900	6.6	0.66	13.5	5.81 gal

Heavy, steady rain

Logged BY / Date: David Kessler 10/05/01 *Reviewed BY / Date:* David Kessler 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927SEL-K I-N

Location Code: IT-BG8-BEDGW-001
Sample Number: BD3007
Sample Name: PBOW-01-GW-IT-BG8-BEDGW-001-BD300'
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

QC Partners:
(TB) — (ER) — (FB) —

Collection Date: 09/27/01
Collection Time: 1220
Start Depth: 12.5
End Depth: 12.5
Sample Matrix: WATER
Sample Team: RT / NS

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Low-Flow Sampled

Comments: PID 0.0 URAE: 24 LEL, O_2 20

Sketch Location: See back

Logged BY / Date: [signature] 09/27/01 *Reviewed BY / Date:* David Kusa 10/02/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: IT-BG8-BEDGW-001
Sample Number: BD3007

Low Flow Sampling Method

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
At	1155	6.45	-318	12.69	3.60	41.4	0.0	14.32	450 mL/m
	1200	6.45	-325	12.87	3.59	55.7	0.0	13.46	
	1205	6.45	-331	12.96	3.80	0.0	0.0	13.00	
	1210	6.45	-336	13.02	3.78	0.1	0.0	12.79	
	1215	6.45	-334	13.05	3.77	0.4	0.0	12.70	5000 mL/m
Sampled	at 1220								2.38 gal/min
									11250 ml
Sample:	1220	6.45	-339	13.03	3.75	0.0	0.0	12.65	2.97 gal/final

6.45 After Sampling

Logged BY / Date: [signature] 09/27/01 *Reviewed BY / Date:* David Keasler 10/2/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	09/27/01	Form Completed By:	R. Thompson
Project Name:	PBOW Groundwater	Collection Time:		Sampler(s):	R.T. / D. Sirek
Investigation Site:	BG8	Sample Filtered (Yes / No):	Metals only		
RFA/COC Number:		Weather/Temp:	Partly Cloudy 50°F	Reviewed By:	David Kosh

Sample Number: P B O W – 0 1 – G W – I T – B G 8 – B E D G W – 001 – BD3007

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number:	BG8-BEDGW-001	Outside Casing Dia. (in):	2 in	Odor:	none
Well Secure (Yes / No):	Yes	Depth to Product (ft):	—	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):	Yes, hardly Readable	Total Well Depth (ft):	20.0'	- Vapor Monitor S/N:	—
Well Condition:	Good	Depth to Water (ft):	6.0'	- Reading (ppm):	PID 0.0; VRAE 24 LEL
Screen Height:	15.0'	Water Column (ft):	14.0'	Remarks:	Low method O2 20
Casing Type:	Sch. 40 PVC	Elev. Ref. for Water Level:	—		

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°C	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: ~~P3OW100301SSC-K~~ F-N

Location Code: IT-MNTA-BEDGW-001
Sample Number: BD3008
Sample Name: PBOW-01-GW-IT-MNTA-BEDGW-001-BD3(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10/3/01
Collection Time: ~~1015~~ 1020
Start Depth: 30.48
End Depth: 30.48
Sample Matrix: WATER
Sample Team: R. Thompson / D. Kessler

QC Partners:
(TB) TB100301A (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: ~~Waiting on Engineering Controls~~ DKS

Low Flow Sample Method

Sketch Location:

Logged BY / Date: David Kessler 10/3/01 *Reviewed BY / Date:* David Kessler 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

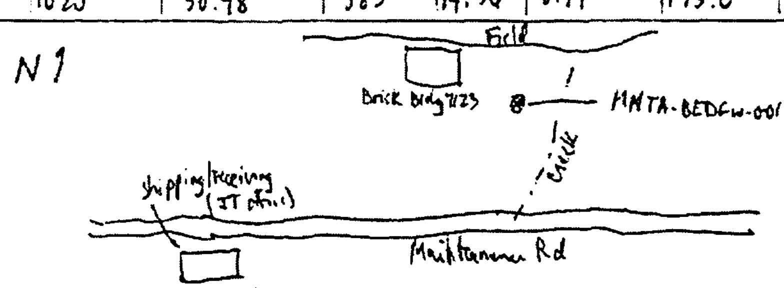
Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: **IT-MNTA-BEDGW-001**
Sample Number: **BD3008**

Low Flow Sampling Method
Pumping ~200ml @ min
Pump at 54 ft

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
[illegible]	0915	30.10	-368	13.98	9.40	118.0	0.00	14.0	
	0920	30.49	-370	13.99	9.40	83.8	0.00	14.2	
	0925	30.49	-369	13.90	9.13	148.0	0.00	15.3	
	0930	30.48	-369	13.92	9.34	203.0	0.00	16.0	— Bubbles
	0935	30.46	-370	13.82	9.25	269.0	0.00	16.8	
	0940	30.49	-371	13.78	9.57	145.0	0.00	17.0	
	0945	30.49	-373	13.78	9.48	134.0	0.00	17.3	
	0950	30.49	-375	13.78	9.36	174.0	0.00	17.7	
	0955	30.48	-376	Blinking... 14.33	9.31	~~201.0~~ 173	0.00	18.1	
	1000	30.48	-378	14.35	9.19	195	0.00	18.1	
	1005	30.48	-379	14.39	9.08	129	0.00	18.3	
	1010	30.48	-380	14.51	8.99	140.0	0.00	18.4	
	1015	30.48	-380	14.39	9.20	135.0	0.00	18.5	
Sample:	1020	30.48	-383	14.36	8.94	145.0	0.00	18.5	~5.15 gal



Logged BY / Date: David Kesh 10/3/01 *Reviewed BY / Date:* David Kesh 10/3/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 10/3/01	Form Completed By: D. Kessler
Project Name: PBOW Groundwater	Collection Time: 1020	Sampler(s): D. Kessler
Investigation Site:	Sample Filtered (Yes / No):	R. Thompson
RFA/COC Number:	Weather/Temp: Sunny, strong breeze, warm	Reviewed By: David Kessler

Sample Number: P B O W – 0 1 – G W – – – DD 3 0 0 8 – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: MNTA-BEDGW-001	Outside Casing Dia. (in): 2"	Odor: Strong H_2S
Well Secure (Yes / No): Needs 3216 Lock	Depth to Product (ft): —	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): No	Total Well Depth (ft): 64	- Vapor Monitor S/N: H844511 /
Well Condition: Good	Depth to Water (ft): 30.29	- Reading (ppm): 1257 ppm / 7500
Screen Height: 15 Ft	Water Column (ft): 33.71	Remarks: Using Fan to evacuate strong fumes
Casing Type: PVC	Elev. Ref. for Water Level:	Low Flow Sampling Method

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (2)^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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Low Flow

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0928STL-K i-N

Location Code: 7 NTB-BEDGW-001
Sample Number: PBOW-01-GW-IT-TWTD-BEDGW-001-BD3009
Sample Name: BD3009
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 09/28/01
Collection Time: 1635
Start Depth: 19.0'
End Depth: 19.0'
Sample Matrix: WATER
Sample Team: RL/NS

QC Partners:
(TB) TB092801A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
~~VOLATILES3~~	~~N~~	~~A~~	~~3~~	~~40~~	~~mL~~	~~GVIAL,SEP~~ DKK
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
~~METALS3-W-F~~	~~Y~~	~~D~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~
~~METALS3-W~~	~~N~~	~~E~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
~~NITRATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
~~TURB 180.1~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~

Comments: Low Flow Sampling Method

Sketch Location:

See back

Logged BY / Date: [signature] 09/28/01 Reviewed BY / Date: David Kusch 10/02/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: TNTB-BED6W-001
Sample Number: BD3009

Used Low-Flow Sampling Method

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
At	1555	4.51							500mL/min
	1600	4.55	-220	10.66	.812	0	0.0	13.28	
	1605	4.57	-232	10.89	.836	0	0.0	13.01	
	1610	4.59	-251	11.16	.880	0	0.0	12.84	
	1615	4.58	-255	11.23	1.67	0	0.0	12.81	
	1620	4.59	-278	11.53	1.88	0	0.0	12.64	
	1625	4.61	-290	11.74	2.09	0	0.0	12.63	
	1630	4.63	-298	11.85	2.20	0	0.0	12.58	
	1635	4.63	-297	11.84	2.23	0	0.0	12.54	
									20000 mL/min
Sample:	1635	4.63	-297	11.84	2.23	0	0.0	12.54	5.28 gal

4.69 after Sampling

Cleaned sensors at 1610 on U-22 (Flashing -10.0); no effect

Low Flow Sampling Method

Logged BY / Date: [signature] 09/24/01 *Reviewed BY / Date:* David Kusch 10/2/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 09/28/01	Form Completed By: R. Thompson
Project Name: PBOW Groundwater	Collection Time: 1635	Sampler(s): RT / N. Sirek
Investigation Site: TNTB	Sample Filtered (Yes / No): Metals Only	
RFA/COC Number:	Weather/Temp: Partly Cloudy 60°	Reviewed By: David Keuh

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: TNTB-BEDGW-001	Outside Casing Dia. (in): 2 in	Odor: None
Well Secure (Yes / No):	Depth to Product (ft): —	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No):	Total Well Depth (ft): 24.0	- Vapor Monitor S/N: PID: 0.0 LEL 3, CO 0.0
Well Condition: Good	Depth to Water (ft): 4.51	- Reading (ppm): H₂S 0, O₂ 19.9
Screen Height: 15.0	Water Column (ft): 19.49	Remarks: Low Flow
Casing Type: Sch. 40 PVC	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + ____ ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ____ gal + ____ gal = ____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Low Flow

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW-100501 SFL-IC jw

Location Code: IT-TNTB-BEDGW-001
Sample Number: BD3009 R
Sample Name: PBOW-01-GW-IT-TNTB-BEDGW-001-BD30
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 10-5-01
Collection Time: 12:00
Start Depth: 4.23
End Depth: 4.33
Sample Matrix: WATER
Sample Team: H. Adams / N. Sirek

QC Partners:
(TB) TB100501A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
~~SEMIVOLATILES3~~	~~N~~	~~B~~	~~2~~	~~1~~	~~L~~	~~Amb. Glass~~
~~EXPLOSIVES~~	~~N~~	~~C~~	~~1~~	~~1~~	~~L~~	~~Amb. Glass~~
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
~~HARDNESS~~	~~N~~	~~F~~	~~1~~	~~250~~	~~mL~~	~~HDPE~~
~~TOC~~	~~N~~	~~G~~	~~2~~	~~40~~	~~mL~~	~~GVIAL,SEP~~
~~CYANIDE~~	~~N~~	~~H~~	~~1~~	~~1000~~	~~mL~~	~~HDPE~~
~~ALKALINITY~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~CHLORIDE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
NITRATE	N	I	1	1	L	HDPE
~~SULFATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TDS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TSS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
TURB 180.1	N	I	1	1	L	HDPE

DKK

Comments: Re-Sampled using low-flow method

Sketch Location:

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Kosh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: IT-TNTB-BEDGW-001
Sample Number: BD3009 R

Low Flow Method used to Recollect selected parameters

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	11:45	4.23	-321	12.07	3.72	6.4	0.00	12.58	~1 gallon
		Pumping Rate	~400	~1 /	minute				
	11:50	4.15	-328	12.15	3.78	4.8	0.00	12.57	
			-333	12.21	3.79	4.2	0.00	12.50	2½ gal 400ml/min
		Hint of	H₂S odor	although		meters	limit	show measurable	levels
	1200	4.33	-335	12.22	3.79	7.9	0.00	12.44	
Sample:	1200	4.33	-335	12.22	3.79	3.9	0.00	12.44	~~bottle~~ 9500 ml / 2.5 gal

Logged BY / Date: Hugh Adams 10/5/01

Reviewed BY / Date: David Kesh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW0927572-K jw

Location Code:	IT-TNTB-BEDGW-002	*Collection Date:*	9/27/01
Sample Number:	BD3010	*Collection Time:*	0830
Sample Name:	PBOW-01-GW-IT-TNTB-BEDGW-002-BD30	*Start Depth:*	19.0'
Sampling Method:	LF	*End Depth:*	19.0'
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER
		Sample Team:	KT / BS

QC Partners:
(TB) — (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Low-Flow Sampled

Comments: High PH > 13 Strong H_2SO_4 (Rotten eggs) odor

Sketch Location: See back

Logged BY / Date: BS / KT 9/27/01 *Reviewed BY / Date:* David Kwosh 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

IT-TNTB-BED6W-002

Location Code: ~~MK-MWI6~~ 09/27/01

Sample Number: BD301D

Low-Flow Sampling

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
HS	0810	7.51	-333	13.18	0.811	82.3	0.0	11.80	200ml/min
	0815	7.52	-354	13.65	0.818	-3.7(0)	0.0	11.58	
	0820	7.53	-359	13.71	0.816	-4.8(0)	0.0	11.53	
	0825	7.52	-363	13.73	0.830	-2.9(0)	0.0	11.52	
	0830								
Sample:	0830	7.52	-364	13.72	0.830	-6.2(0)	0.0	11.49	1.06 gal

Logged BY / Date: [signature] 09/27/01

Reviewed BY / Date: David Kusch 10/2/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 09/27/01	Form Completed By: R. Thompson
Project Name: PBOW Groundwater	Collection Time: 0830	Sampler(s): RT / N. Sisrek
Investigation Site: MK-MW17 TNTB	Sample Filtered (Yes / No):	
RFA/COC Number:	Weather/Temp: Rainy ~50° F	Reviewed By: David Kozel

Sample Number: P B O W – 0 1 – G W – I T – T N T B – B E D G W – 0 02 – 60 30 10

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number: ~~MK-MW17~~ BED-002	Outside Casing Dia. (in): 2 in	Odor: Yes / Sulphur
Well Secure (Yes / No): No	Depth to Product (ft): —	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): not clear	Total Well Depth (ft): 24.2	- Vapor Monitor S/N: H84571 / 00977
Well Condition: Good	Depth to Water (ft): 7.54	- Reading (ppm): 0.0 / 0.0
Screen Height: 10.0'	Water Column (ft): 16.66	Remarks: Low Flow method used
Casing Type: Sch. 40 PVC	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

RJ 9/27/01

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

RJ 9/27/01

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 100801STL-K I-N

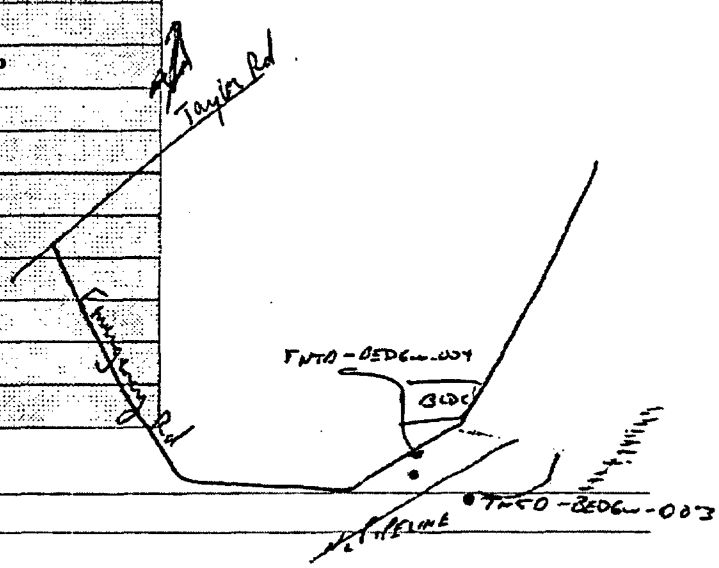
Location Code: TNTB-BEDGW-003
Sample Number: BD3038
Sample Name: PBOW-01-GW-TNTB-BEDGW-003-BD3038-
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10-8-01
Collection Time: 09:40
Start Depth: BAILER USED
End Depth:
Sample Matrix: WATER
Sample Team: H Adams / R. Sicak

QC Partners:
(TB) TB100801A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE



Comments:

Sketch Location:

Logged BY / Date: Hugh Adams 10/8/01 *Reviewed BY / Date:* David Keech 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: TNTB-BEDGW-003

Sample Number: BD3038

SAMPLE COLLECTED WITH BAILER - NO ~~S~~LOW FLOW done on this well, due to very poor recharge rate.

Hand pump unit used to filter ~~metals~~ dissolved metals bottle content

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	10/8/01 0845	31.25 (TD= 41.23)							
Sample:	0940								

No water quality measurements taken due to very poor recharge and limited supply of groundwater.

After collection 38.41

Logged BY / Date: Hugh Adams 10/8/01 *Reviewed BY / Date:* David Keeth 10/8/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 12-8-01	Form Completed By: H Adams
Project Name: PBOW Groundwater	Collection Time: 08:40	Sampler(s): H Adams / Nick Sisk
Investigation Site: AREA B	Sample Filtered (Yes / No): Metals	
RFA/COC Number:	Weather/Temp: Light Breeze 40's	Reviewed By: David Keith

Sample Number: P B O W – 0 1 – G W – T N T B – B E D G W – 0 0 3 B D 3 0 3 8 –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number: ~~BS~~ TNTB-BEDGW-003	Outside Casing Dia. (in): 2	Odor: NO
Well Secure (Yes / No): YES	Depth to Product (ft): NA	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): YES	Total Well Depth (ft): 41.23	- Vapor Monitor S/N: 1
Well Condition: NEW	Depth to Water (ft): 31.25	- Reading (ppm): ϕ 1 ϕ, 0, 20.5%
Screen Height: 10'	Water Column (ft): 9.98'	Remarks: 38.41 = WL after sampling
Casing Type: 2" PVC	Elev. Ref. for Water Level: TOP OF CASING	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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

NO WATER PURGED – SAMPLE COLLECTED FROM in. 1/1 VOLUME IN WELL

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + ____ ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ____ gal + ____ gal = ____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 100501 SCL-K 1-N

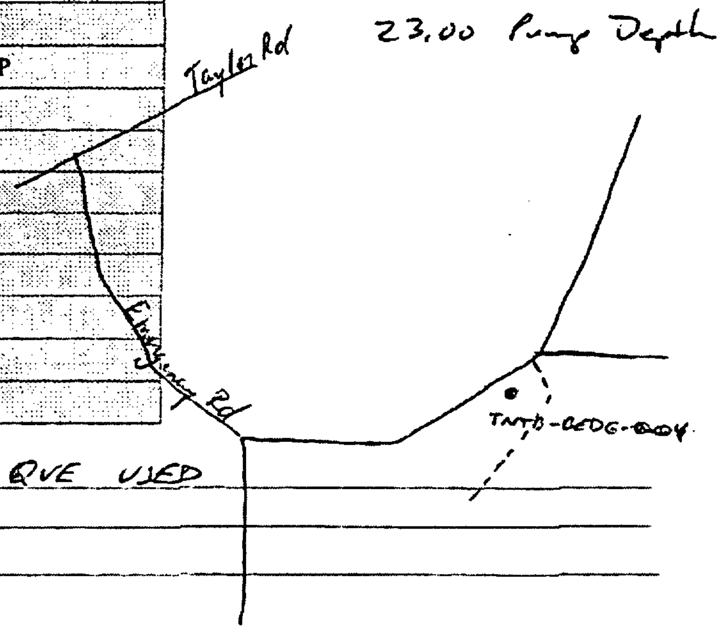
Location Code: TNTB-BEDGW-004
Collection Date: 10-5-01
Sample Number: BD3041
Collection Time: 09:00
Sample Name: PBOW-01-GW-TNTB-BEDGW-004-BD3041-
Start Depth: 9.2'
Sampling Method: LF
End Depth: 9.4'
Sample Type: GW
Sample Purpose: REG
Sample Matrix: WATER
QC Partners:
(TB) TB 100501 A (ER) (FB)
Sample Team: H Adams/N. Sirch

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

26.75 TD

23.00 Pump Depth



Comments: LOW FLOW TECHNIQUE USED

Sketch Location:

Logged BY / Date: Hugh Adams 10/5/01
Reviewed BY / Date: David Kirsch 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: TNTB-BEDGW-004
Sample Number: BD3041

10/5/01 Depth to water = 9.2 Ft, TD = 26.75 Ft., Pump at 23.00 Ft

PURGE RECORD:

Initial 10/5/01	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	0815	9.2							
	0825	9.2	-68	7.99	0.393	355	1.7	12.09	1 gal
	0835	9.2	-54	7.74	.310	339	1.86	12.13	2.0 gal
	0840	9.2	-49	7.64	0.359	233	2.24	12.10	2.5 gal
	0845	9.25	-46	7.60	0.354	194	2.41	12.12	3.0 gal
	0850	9.25	-45	7.57	0.351	175	2.[illegible]	12.10	3.5 gal
	0855	9.25	-43	7.54	0.349	182	2.89	12.07	4.5 gal
	0905	9.25	-41	7.50	0.344	1430	3.56	12.07	
	0920	9.35	-43	7.52	0.341	~~108~~ 108	4.00	12.05	4.0 gal
	0925	9.40	-45	7.55	0.341	108	4.03	12.06	
Sample:	0900	9.25	-43	7.54	0.349	182	2.89	12.07	

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Kesh 11/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100S01PARA

Location Code: TNTB-BEDGW-004
Sample Number: BD3049
Sample Name:
Sampling Method: LF
Sample Type: GW
Sample Purpose: FS

Collection Date: 10-5-01
Collection Time: 08:00
Start Depth: 9.3'
End Depth: 9.40'
Sample Matrix: WATER
Sample Team: H Adams / Nick St...

QC Partners:
(TB) T4100S01B (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

SEE BD ~~2~~3041

TAKEN WITH SAMPLE BD3041 (REG) & BD3050 (FD)

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Kersh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: TNTB-BEDGW-004
Sample Number: BD3049
(FS)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		See BD3041							
Sample:									

Logged BY / Date: H. Adams 10/5/01 *Reviewed BY / Date:* David Kesh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100501SSL-K

Location Code: TNTB-BEDGW-004
Sample Number: BD3050
Sample Name:
Sampling Method: LF
Sample Type: GW
Sample Purpose: FD

Collection Date: 10-5-01
Collection Time: 08:00
Start Depth: 9.2'
End Depth: 9.4'
Sample Matrix: WATER
Sample Team: H Adams / Nick Sirak

QC Partners:
(TB) TB100501A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

TAKEN WITH SAMPLES BD3041 (REG) & BD3049 (FS)

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Leech 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: TNTB-BEDGW-004

Sample Number: BD3050 (FD)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		See BD3041							
Sample:									

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Kesch 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

DM-BED-MW13

RFA / COC Number: PBOW 100301 STL-K ?-N

Location Code:	PB-BED-MW13	*Collection Date:*	10-03-01
Sample Number:	BD3017	*Collection Time:*	15:15
Sample Name:	PBOW-01-GW-PB-BED-MW13-BD3017-(00-(	*Start Depth:*	68.15' TOC
Sampling Method:	LF	*End Depth:*	72.45 TOC
Sample Type:	GW	*Sample Matrix:*	WATER
Sample Purpose:	REG	*Sample Team:*	H Adams / N Sinek

QC Partners:
(TB) TB100301 A (ER) — (FB) —

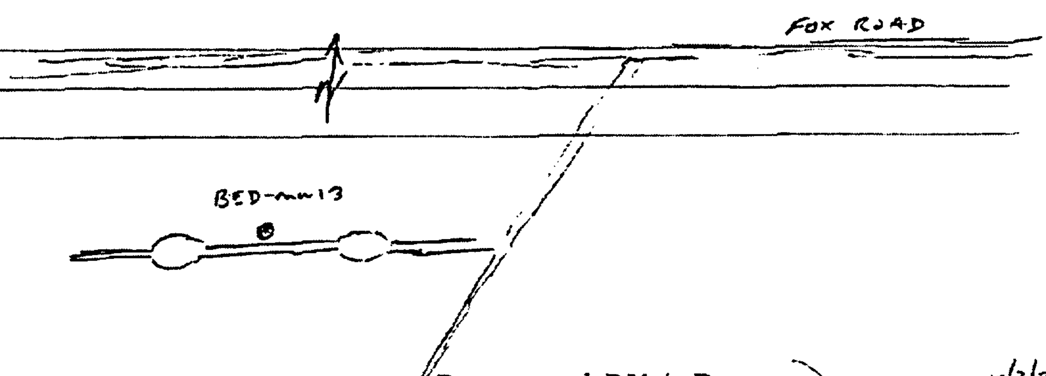
ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

~~[illegible]~~
4 hours purge followed by sampling using submerged pump

Comments:

Sketch Location:



Logged BY / Date: Hugh Adams 10/3/01

Reviewed BY / Date: David Kreh 10/3/01

32.25

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW13
Sample Number: BD3017

water level 10/2/01 = 31.23 ft
water level 10/3/01 = 30.78 ft, TD = 75.5 ft, screen ~~40-75.5 ft~~ 46 ft (open hole)

Removed 3 well volumes

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/2 ~~10/3~~	0916	31.23							
~~HG 10/4~~ 10/3	~~10:00~~ 1030	~~34.47~~ 30.78' 32.00							400 ml/min

Low flow purging showed no stabilization of water level. reducing pump to lowest pumping rate water level continued to drop.
Decision was made to remove 3 well volumes or to dryness. Initial pumping produced clear greenish/yellow water – Continued pumping (>1 hour) water became cloudy & produced high H_2S odors LEL readings approached 500 ppm (see FADL) – Continued pumping yielded clear, colorless water with H_2S odor still present.
Sample collected after 4 hours of purging as per work plan.

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	11:14	39.15	-356	12.57	8.65	274	0.82	11.99	~2½ gal 5 gal
	12:30	46.9							12 gal
~~Sample~~	12:40	48.0	-371	12.70	9.53	436	ø	12.0	~15 gal
	13:35	59.52							
	14:30		-375	12.42	9.91	74.71	0.0	15.17	
	14:45		-369	12.39	11.00	44.5	ø	14.92	
sample:	15:00		-368	12.33	11.3	45.7	ø	15.77	~23 gallons

Logged BY / Date: Hugh Adams 10/3/01   Reviewed BY / Date: David Kesah 10/3/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10/3/01	Form Completed By:	Hugh Adams D. Kessler
Project Name:	PBOW Groundwater	Collection Time:	1515	Sampler(s):	Hugh Adams / Nick Sisk
Investigation Site:	PB BED-MW13	Sample Filtered (Yes / No):	yes - Metals only		
RFA/COC Number:		Weather/Temp:	Breezy, warm ~70°F, sunny	Reviewed By:	David Kessler

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number:	PB BED-MW13	Outside Casing Dia. (in):	4" outside / 3" open hole	Odor:	
Well Secure (Yes / No):	Yes	Depth to Product (ft):	None	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):	Yes	Total Well Depth (ft):	75.5	- Vapor Monitor S/N:	1
Well Condition:	Good	Depth to Water (ft):	30.78	- Reading (ppm):	0.0 (CO=0 H2S=0 LEL=0 O2=20.7) at start
Screen Height:	46 ft open hole	Water Column (ft):	44.72	Remarks:	
Casing Type:	open hole	Elev. Ref. for Water Level:			

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (3)^2) = 0.37 gal/ft

Well Volume (gallons) = Water Column (ft) x Gal/ft = 44.72 ft x 0.37 Gal/ft = 16.55 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 ((3)^2 - ( )^2) = 0.37~~ gal/ft

Filter Pack Volume (gal) = ((Screen Height + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + Open hole ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = —— gal + 16.55 gal = 16.55 gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
16.55	33.10	49.65		

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3	See page 2 of Sample Collection Log								
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW092851C-K / N

Location Code: PB-BED-MW14
Sample Number: BD3018
Sample Name: PBOW-01-GW-PB-BED-MW14-BD3018-(00-(
Sampling Method: LF
Sample Type: GW
Sample Purpose: REG

Collection Date: 09/28/01
Collection Time: 1140
Start Depth: 21.62
End Depth: 21.91
Sample Matrix: WATER
Sample Team: RT / NS

QC Partners:
(TB) TB092801A (ER) —— (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type	
~~VOLATILES3~~	~~N~~	~~A~~	~~3~~	~~40~~	~~mL~~	~~GVIAL,SEP~~	e DKK
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass	
EXPLOSIVES	N	C	1	1	L	Amb. Glass	
METALS3-W-F	Y	D	1	500	mL	HDPE	
METALS3-W	N	E	1	500	mL	HDPE	
HARDNESS	N	F	1	250	mL	HDPE	
TOC	N	G	2	40	mL	GVIAL,SEP	
CYANIDE	N	H	1	1000	mL	HDPE	
ALKALINITY	N	I	1	1	L	HDPE	
CHLORIDE	N	I	1	1	L	HDPE	
~~NITRATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e DKK
SULFATE	N	I	1	1	L	HDPE	
TDS	N	I	1	1	L	HDPE	
TSS	N	I	1	1	L	HDPE	
~~TURB 180.1~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e

Comments: Low Flow Sampling Method

Sketch Location: See back

Logged BY / Date: [signature] 09/28/01 *Reviewed BY / Date:* David Kresh

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW14
Sample Number: BD3018

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
M	1110	21.62							250mL/M
	1115	21.62	28	6.39	4.08	137.6	1.02	10.60	
	1120	21.79	-8	7.18	4.11	168.0	0.0	10.40	
	1125	21.84	-25	7.45	4.16	0.0	0.0	10.39	
	1130	21.84	-27	7.49	4.15	0.0	0.0	10.35	
9/28/01	1135	21.88	-23	7.41	4.16	0.6	0.0	10.32	
Sample time of interval parameters -	1140	21.91	-14	7.28	4.28	5.0	0.0	10.38	7500 mL 1.98 gal
									~~8750 mL~~
Sample: ~~1145~~									~~2.31~~ gal

22.03 after Sampling

Low Flow Sampling Method

Logged BY / Date: [signature] 09/28/01 *Reviewed BY / Date:* David Kersh 10/2/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 09/28/01	Form Completed By: R. Thompson
Project Name: PBOW Groundwater	Collection Time: 1140	Sampler(s): RT / N. Sirek
Investigation Site: West Area RW Ponds	Sample Filtered (Yes / No): Metals only	
RFA/COC Number:	Weather/Temp: Overcast 50°	Reviewed By: ~~[illegible]~~ David Kreuh

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number: BED-MW14	Outside Casing Dia. (in): 4 in	Odor: None
Well Secure (Yes / No):	Depth to Product (ft): –	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No):	Total Well Depth (ft): 52.2'	- Vapor Monitor S/N: — +
Well Condition: Good (Paint?)	Depth to Water (ft): 21.62'	- Reading (ppm): PID: 75.6 / VRAE
Screen Height: 29' (D)	Water Column (ft): 30.58	Remarks: O_2 19.3, H_2S 0.0, LEL 89
Casing Type: Sch. 40 PVC	Elev. Ref. for Water Level:	Low Flow Method

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height _______ ft + _______ ft) x _______ gal/ft) x 0.3 = _______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = _______ gal + _______ gal = _______ gal

LOW FLOW

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100501 552-K & N

Location Code: PB-BED-MW14
Sample Number: BD3018R
Sample Name: PBOW-01-GW-PB-BED-MW14-BD3018-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10-5-01
Collection Time: 15:30
Start Depth: ~~21.52~~ 37'
End Depth: —
Sample Matrix: WATER
Sample Team: H. Adams / N. Silek

QC Partners:
(TB) TB100501A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type	
VOLATILES3	N	A	3	40	mL	GVIAL,SEP	
~~SEMIVOLATILES3~~	~~N~~	~~B~~	~~2~~	~~1~~	~~L~~	~~Amb. Glass~~	PDUL
~~EXPLOSIVES~~	~~N~~	~~C~~	~~1~~	~~1~~	~~L~~	~~Amb. Glass~~	e
~~METALS3-W-F~~	~~Y~~	~~D~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~	e
~~METALS3-W~~	~~N~~	~~E~~	~~1~~	~~500~~	~~mL~~	~~HDPE~~	e
~~HARDNESS~~	~~N~~	~~F~~	~~1~~	~~250~~	~~mL~~	~~HDPE~~	e
~~TOC~~	~~N~~	~~G~~	~~2~~	~~40~~	~~mL~~	~~GVIAL,SEP~~	e
~~CYANIDE~~	~~N~~	~~H~~	~~1~~	~~1000~~	~~mL~~	~~HDPE~~	e
~~ALKALINITY~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
~~CHLORIDE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
NITRATE	N	I	1	1	L	HDPE	
~~SULFATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
~~TDS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
~~TSS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~	e
TURB 180.1	N	I	1	1	L	HDPE	

TD = 52.2
open borehole 29'
Pump placed 15' off btm
@ 37.0'

PID: 7.7 ppm
VRAE:
0 CO
5 LEL
0 H_2S
20.6 O_2

Comments: Resampled using low-flow method

Sketch Location:

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Leach 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW14
Sample Number: BD3018R

WATER COLORED RED — WITH SOME DARKENING IN COLOR AS PUMPING PROGRESSED PROBABLY RESULTING IN INCREASING TURBIDITY

PURGE RECORD:

Initial 10/5/01	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
BEGAN PUMPING	14:45	21.52	FIRST WATER SEEN WITHIN 5 minutes						
	14:50	21.64	23	6.49	4.22	93.6	1.63	10.40°C	~1 liter
	14:55	21.6	-14	7.09	4.25	95.1	0.00	10.36	
	15:00		-17	7.13	4.26	119.0	0.00	10.32	.75 GAL
	15:05	21.72	-13	7.08	4.23	158.0	0.00	10.28	
	15:10	21.73	-9	6.99	4.22	170.0	0.00	10.25	1.5 gal
	15:15		-4	6.92	4.23	231.0	0.00	10.23	
	15:20	21.70	-1	6.87	4.23	270.0	0.00	10.23	
ADJUSTED PUMP RATE TO ~300 ml/min.									
	15:25		2	6.81	4.19	394.0	0.00	10.19	
SAMPLES COLLECTED	*15:30	21.74	5	6.76	4.19	282	0.00	10.17	2½ gallons
	15:35	21.78	8	6.70	4.20	348	0.00	10.20	
Sample:	1530	21.74 start / 21.78 Finish	5	6.76	4.19	282	0.00	10.17	2½ gal

Logged BY / Date: Hugh Adams 10/5/01 *Reviewed BY / Date:* David Kush 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW10 0901SSL-K f N

Location Code: PB-BED-MW15
Sample Number: BD3019
Sample Name: PBOW-01-GW-PB-BED-MW15-BD3019-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10-9-01
Collection Time: 08:50
Start Depth: —
End Depth: —
Sample Matrix: WATER
Sample Team: N Adams/N. Sicek

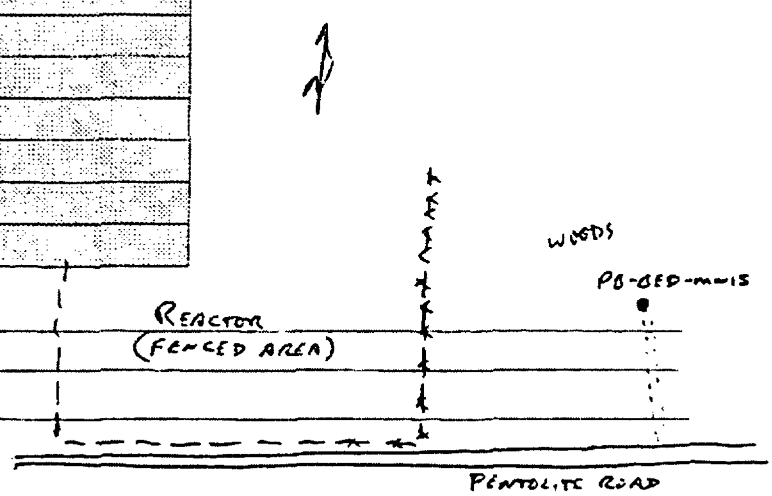
QC Partners:
(TB) TB100901A (ER) (FB)

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments:
Could not conduct low-flow.

Sketch Location:



Logged BY / Date: Hugh Adams 10/9/01 *Reviewed BY / Date:* David Kessel 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW15
Sample Number: BD3019

Pump at 55 Ft
Flow rate ~~150~~ 160 ppt ml @ min. Can not perform low-flow (water level lowered 0.5')

Static water level 16.71 Ft 10/3/01
14.00 Ft 10/4/01 1018

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	1710	17.06	-295	13.76	5.04	99.3	3.75	12.6	
	1715	17.06	-295	13.77	5.02	108.0	4.02	13.3	
Adjusted Rate	1720	17.06	-297	13.70	4.99	125.0	3.35	15.1	
10/3/01	1730	17.69	-310	14.07	4.96		0.10	12.7	2 gal
10/4/01	1020	18.00							T
	1045	18.49	-294	11.73	5.13	10.6	0.33	12.4	500 ml
[illegible]	1430	18.89							
	14:45	26.12 after 5 gallons removed							
	14:55	31.74' TOC after 10 gallons removed							
	15:00	32.58 Final WL after bailing ~10.3 gallons							
	PLAN TO SAMPLE WELL ON 10/9/01								
10/9/01	08 30	32.35 WL	PRIOR TO PUMP PLACEMENT						
	08:45	32.65	-289	12.02	5.34	65.0	1.58	10.21	~400 ml/min
	08.55	33.10	-321	12.56	5.22	55.3	0.15	9.95	~250 ml/min Reduce
	09:10	33.58	-325	12.62	5.12	75.3	0.01	9.86	
Sample:	09:15	34.80	-325	12.56	5.37	29.7	0.00	9.97	

TOTAL VOLUME PUMPED =
13.5 ~~X~~ gallons + sample volumes (10/3-10/9)

PID = 0.0 ppm
VRAE = Ø, CO
Ø
Ø H_2S
21.0 O_2

Logged BY / Date: Hugh Adams 10/9/01 *Reviewed BY / Date:* David Kesh 10/15/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10-05-01
Project Name:	PBOW Groundwater	Collection Time:	08:50
Investigation Site:		Sample Filtered (Yes / No):	Metals
RFA/COC Number:	PBOW100101STL-K FN	Weather/Temp:	

Form Completed By: D. Kessler / H Adams
Sampler(s): D. Kessler, R. Thompson
Reviewed By: David Kessler

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number:	PB-BED-MW15	Outside Casing Dia. (in):	4" PVC / 3" open borehole	Odor:	Distinct H_2S odor, Petroleum odor
Well Secure (Yes / No):	yes	Depth to Product (ft):	NA	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):	yes	Total Well Depth (ft):	74.4	- Vapor Monitor S/N:	/
Well Condition:	Good	Depth to Water (ft):	16.71	- Reading (ppm):	>2000 / H_2S: 0 ppm
Screen Height:	31.5 Ft (open bedrock)	Water Column (ft):	57.57	Remarks:	
Casing Type:	PVC / Open Hole	Elev. Ref. for Water Level:			

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Volume of Water in Casing: Gallons/foot = $0.041 \times d^2$, where d is casing diameter in inches = (0.041 x (~~4~~ 3)²) = 0.37 gal/ft
Well Volume (gallons) = Water Column (ft) x Gal/ft = 57.57 ft x 0.37 Gal/ft = 21.30 gallons

Volume of Water in Filter Pack: Gallons/foot = $0.041 \times (D^2 - d^2)$, 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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ft + ft) x gal/ft) x 0.3 = gallons
open borehole

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ~~gal +~~ gal = 21.30 gal (open borehole)

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
21.30	42.60	63.90		

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW 101001 SSL-N & K

Location Code: PB-BED-MW16
Sample Number: BD3020
Sample Name: PBOW-01-GW-PB-BED-MW16-BD3020-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10/10/01
Collection Time: ~~9:25~~ 11:35
Start Depth: ~~5.39~~ (36.61')
End Depth: ~~6.11~~ (21.92')
Sample Matrix: WATER
Sample Team: Al Sich, R. Thompson

QC Partners:
(TB) TB101001A (ER) —— (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

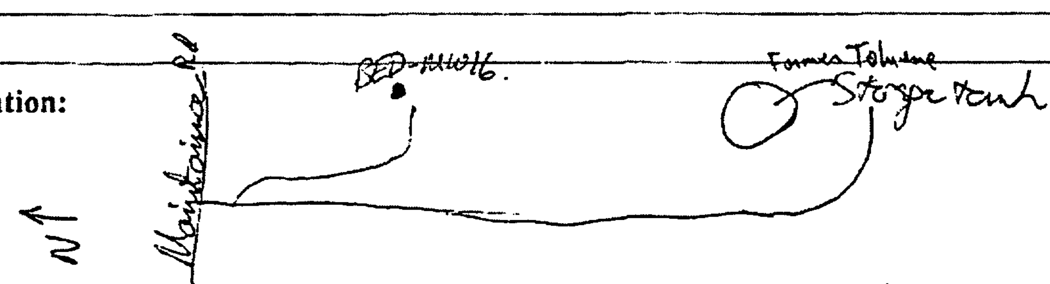
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
✓ VOLATILES3	N	A	3	40	mL	GVIAL,SEP
✓ SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
✓ EXPLOSIVES	N	C	1	1	L	Amb. Glass
✓ METALS3-W-F	Y	D	1	500	mL	HDPE
✓ METALS3-W	N	E	1	500	mL	HDPE
✓ HARDNESS	N	F	1	250	mL	HDPE
✓ TOC	N	G	2	40	mL	GVIAL,SEP
✓ CYANIDE	N	H	1	1000	mL	HDPE
✓ ALKALINITY	N	I	1	1	L	HDPE
✓ CHLORIDE	N	I	1	1	L	HDPE
✓ NITRATE	N	I	1	1	L	HDPE
✓ SULFATE	N	I	1	1	L	HDPE
✓ TDS	N	I	1	1	L	HDPE
✓ TSS	N	I	1	1	L	HDPE
✓ TURB 180.1	N	I	1	1	L	HDPE

10/10/01 H_2O : 5.39 (BTOC)
TD : 74' (BTOC)

See collection log (FP7002)

Comments: Very oily water / Collected ~80 mls of oily product (LNAPL)

Sketch Location:



Logged BY / Date: Nick Sirek 10/10/01 *Reviewed BY / Date:* David Kusch 10/10/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW16
Sample Number: BD3020

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	Readings	Not collected due to oily water that would permanently contaminate instruments. Purged ~ 20gal to top of screen and collected samples. 10/10/01 1135							
Sample:									

Logged BY / Date: Nick Sisk 10/10/01 *Reviewed BY / Date:* David Kasch 10/11/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100301SSL-K 1-N

Location Code:	PB-BED-MW17	*Collection Date:*	10/3/01
Sample Number:	BD3021	*Collection Time:*	1500
Sample Name:	PBOW-01-GW-PB-BED-MW17-BD3021-(00-(	*Start Depth:*	29.10
Sampling Method:	LF	*End Depth:*	29.10
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER

QC Partners:
(TB) TQ100301A (ER) ______ (FB) ______

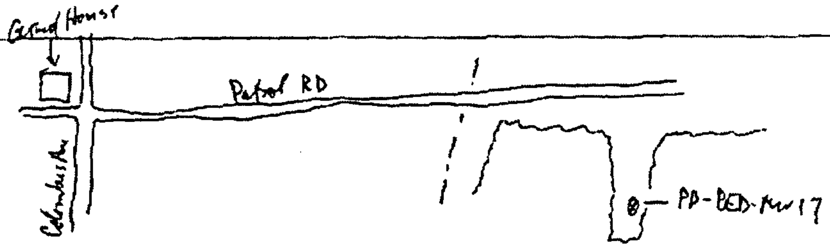
Sample Team: R. Thompson / D. Kessler

ERPIMS Values:
Sacode: ______
Lot Control#: ______

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Conducted Low-Flow Sample Collection. H_2S vapors extremely high

Sketch Location:



Logged BY / Date: David Kessler 10/3/01 *Reviewed BY / Date:* David Kessler 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW17
Sample Number: BD3021

Low Flow Sampling Method
Pumping at 200 ml@ min
Pump at 39 Ft

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	1405	29.4	-367	14.34	5.85	103.0	1.11	19.2	
	1410	28.71	-381	14.61	5.74	111.0	0.03	17.6	
	1415	28.45	-386	14.96	5.75	108.0	0.00	13.6	
	1420	28.51	-383	14.95	5.44	113.0	0.00	16.6	
	1425	28.55	-380	14.65	5.70	114.0	0.00	16.8	
	1430	28.61	-384	15.09	5.71	119.0	0.00	15.8	
	1435	28.99	-385	15.11	5.86	121.0	0.00	16.0	
	1440	29.05	-386	15.24	5.76	113.0	0.00	16.2	
	1445	29.13	-386	15.14	5.83	124.0	0.00	16.4	2 gal
Sample:	1500 ~~1300~~	29.10	-386	15.18	5.79	134.0	0.00	16.5	

Logged BY / Date: David Kissel 10/3/01 *Reviewed BY / Date:* David Kissel 10/3/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 10/3/01	Form Completed By: D. Kessler
Project Name: PBOW Groundwater	Collection Time: 1500	Sampler(s): D. Kessler / R. Thompson
Investigation Site: PBOW TNTA	Sample Filtered (Yes / No):	
RFA/COC Number:	Weather/Temp: Sunny, warm (75°) strong breeze	Reviewed By: David Kessler

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number: PB-BED-MW17	Outside Casing Dia. (in): 3"	Odor: Strong H_2S
Well Secure (Yes / No): Needs	Depth to Product (ft): None	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): yes	Total Well Depth (ft): 64.4	- Vapor Monitor S/N: /
Well Condition: fair (Severe H_2S corrosion of protective casing)	Depth to Water (ft): 29.4	- Reading (ppm): >2000 / >500
Screen Height: 45 Ft	Water Column (ft): 35.0	Remarks: Used fan positioned over/beside well to evacuate fumes.
Casing Type: open hole	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + ____ ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ____ gal + ____ gal = ____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	~~mV~~ O_2 ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2					Flow				
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100201SFC-N / -K

Location Code: PB-BED-MW18
Sample Number: BD3024
Sample Name PBOW-01-GW-PB-BED-MW18-BD3024-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10/02/01
Collection Time: 1435
Start Depth: 45.0
End Depth: 45.
Sample Matrix: WATER
Sample Team: RT/NS

QC Partners:
(TB) TB100101A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Low Flow Sampling Method

Sketch Location: See back

Logged BY / Date: [signature] 10/02/01 *Reviewed BY / Date:* David Kosh 10/02/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW18
Sample Number: BD3024

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
At	1400	31.99							300 mL/min
	1405	32.31	-334	12.05	22.5	61.0	0.70	12.38	
	1410	32.31	-342	12.25	22.5	48.6	0.0	12.42	
	1415	32.31	-349	12.32	22.7	33.0	0.0	12.53	
	1420	32.31	-356	12.37	22.9	18.8	0.0	12.48	
	1425	32.31	-362	12.41	22.9	17.7	0.0	12.52	
	1430	32.38	-363	12.37	23.1	17.5	0.0	12.58	
Sample:	1435	32.38	-363	12.37	23.1	17.6	0.0	12.58	~2.38 gal

Low Flow Sampling Method

Logged BY / Date: [signature] 10/04/01 *Reviewed BY / Date:* David Kosh 10/02/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10/02/01	Form Completed By:	R. Thompson
Project Name:	PBOW Groundwater	Collection Time:	1435	Sampler(s):	RT/N. Sirek
Investigation Site:	PB-BED-MW18	Sample Filtered (Yes / No):	Metals only		
RFA/COC Number:		Weather/Temp:	Sunny 65°F	Reviewed By:	David Kesek

Sample Number: P B O W - 0 1 - G W - P B B E D - M W 1 8 B - D 3 0 2 4 0 - 0 -

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number:	PB-BED-MW18	Outside Casing Dia. (in):	2 in	Odor:	None
Well Secure (Yes / No):		Depth to Product (ft):	—	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):		Total Well Depth (ft):	75.4	- Vapor Monitor S/N:	64.1 10
Well Condition:	Good	Depth to Water (ft):	31.99	- Reading (ppm):	—
Screen Height:	51.0'	Water Column (ft):		Remarks:	Low Flow
Casing Type:	Open hole	Elev. Ref. for Water Level:			

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE[See Note A]
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE[See Note A]	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100401SSL-K f-N

Location Code:	PB-BED-MW19	*Collection Date:*	10/04/01
Sample Number:	BD3025	*Collection Time:*	1315
Sample Name:	PBOW-01-GW-PB-BED-MW19-BD3025-(00-(	*Start Depth:*	35.0
Sampling Method:	LF	*End Depth:*	35.0
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER
		Sample Team:	DC/RT

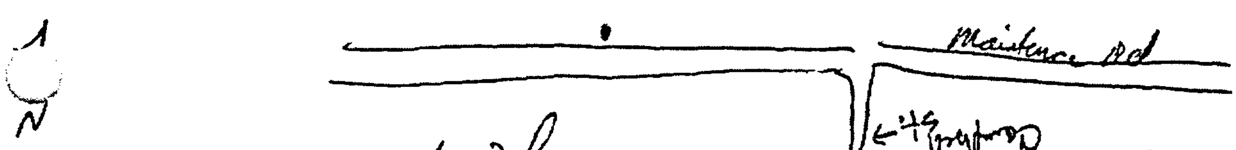
QC Partners:
(TB) TB100401A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Conducted low-flow w/ > 6" draw down

Sketch Location: ~~SC~~ PB-Bed-MW-19



Logged BY / Date: [signature] 10/04/01 *Reviewed BY / Date:* David Kusak 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW19
Sample Number: BD3025

TD-49.5 Ft, 32 Ft @ 3" open borehole.
Static water: 26.12

- Pump set at 32 Ft. Pumping at ~180 ml/min. Water level lowered to 26.62 Ft → ~~Cannot conduct low flow~~ DKK
- ~~Cont~~ Since water level within screened interval, continued pumping at ~180 ml/min waiting for parameters to stabilize.

Basically conducted low-flow even though water level dropped > 6". Water stabilized around 27.3 Ft.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
~~26.12~~	1145	26.12	—	—	—	—	—	—	
	1215	26.92	-351	13.34	6.04	191.0	0.50	14.5	
	1220	27.08	-363	13.52	5.70	181.0	0.47	15.4	
	1225	27.11	-386	13.84	5.07	192.0	0.35	16.2	
	1230	27.18	-394	14.00	4.57	181.0	0.34	16.6	
	1235	27.22	-404	14.39	4.06	194.0	0.23	17.1	
	1240	27.25	-409	14.78	3.48	201.0	0.02	17.5	
	1245	27.27	-440	14.92	3.12	171.0	0.0	18.2	
	1250	27.29	-438	14.86	1.10	272.0	0.0	18.7	
	1255	27.29	-425	14.21	1.15	278.0	0.0	18.4	
	1300	27.22	-423	14.17	1.16	289.0	0.0	18.7	
	1305	27.26	-415	14.36	1.21	291.0	0.0	18.6	
	1310	27.22	-407	14.39	1.38	302.0	0.0	18.6	
	1315	27.32	-416	14.29	1.43	307.0	0.0	18.4	
Sample:	1315	27.32	-416	14.29	1.43	307.0	0.0	18.4	2.85 gal

white bio mass material within purge water ~~a~~ (liquid snow flake appearance)

Logged BY / Date: David Kessler 10/4/01 Reviewed BY / Date: David Kessler 10/4/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10/4/01
Project Name:	PBOW Groundwater	Collection Time:	1315
Investigation Site:	PB-BED-MW19	Sample Filtered (Yes / No):	yes
RFA/COC Number:		Weather/Temp:	cloudy, warm (70°), rain

Form Completed By: D. Kessler
Sampler(s): D. Kessler, R. Thompson
Reviewed By: David Kessler

Sample Number: P B O W – 0 1 – G W – – – B D 3 0 2 5 – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number:	PB-BED-MW19	Outside Casing Dia. (in):	4"	Odor:	
Well Secure (Yes / No):	321	Depth to Product (ft):	NA	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):	No	Total Well Depth (ft):	49.5	- Vapor Monitor S/N:	/
Well Condition:	Good	Depth to Water (ft):	26.12	- Reading (ppm):	873 / LEL-35% O2-20.4 CO-0ppm H2S-0ppm
Screen Height:	32'	Water Column (ft):	23.38	Remarks:	
Casing Type:	3" open hole 17.5-49.5	Elev. Ref. for Water Level:			

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where d is casing diameter in inches = (0.041 x (3)^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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

Hydrasleeve

NA

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBGW100501PARA

Location Code: PB-BED-MW19

Collection Date: 10/04/01

Sample Number: BD3045

Collection Time: 1315

Sample Name: PBGW-01-GW-PB-BED-MW19-BD3045-00-

Start Depth: 35.0'

Sampling Method: LF

End Depth: 35.0'

Sample Type: GW

Sample Purpose: FS

Sample Matrix: WATER

QC Partners:

Sample Team: RT/DK

(TB) TB100501B (ER) — (FB) —

ERPIMS Values:

Sacode: —

Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location: See Sample log BD3025

Logged BY / Date: [signature] 10/04/01 Reviewed BY / Date: Dennis Koch 10/4/01

INTERNATIONAL
TECHNOLOGY
CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: ~~BD30~~ PB-BED-MW19
Sample Number: BD3045 (FS)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		See sample BD3025 DKK							
Sample:									

Logged BY / Date: D. Kessler 10/4/01 *Reviewed BY / Date:* David Kessler 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

RFA / COC Number: PBOW100401STL-K ~~PBOW100501 HRA STL-K~~

Location Code: PB-BED-MW19

Sample Number: BD3046

Sample Name: PBOW-01-GW-PB BED-MW19-BD3046-(00

Sampling Method: LF

Sample Type: GW

Sample Purpose: FD

Collection Date: 10/04/01

Collection Time: 1315

Start Depth: 35.0'

End Depth: 35.0'

Sample Matrix: WATER

Sample Team: RT/DK

QC Partners:

(TB) TB1005016 (ER) — (FB) —

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location: See Sample log BD 3025

Logged BY / Date: [signature] 10/04/01

Reviewed BY / Date: David Kesch 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW19
Sample Number: BD3046 (FD)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

See sample No. BD3025
DKK

Logged BY / Date: David Kersh 10/4/01 *Reviewed BY / Date:* David Kersh 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PB0926SSLN ; 466107

Location Code: PB-BED-MW20
Sample Number: BD3026
Sample Name: PBOW-01-GW-PB-BED-MW20-BD3026-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

QC Partners:
(TB) (ER) — (FB) —

Collection Date: 09/26/01
Collection Time: 1415
Start Depth: 39.0'
End Depth: 39.0'
Sample Matrix: WATER
Sample Team: RT/NS

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Purged 3 well volumes for sample collection

Sketch Location: See back

Logged BY / Date: [signature] 09/26/01 *Reviewed BY / Date:* David Kesek 10/6/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: **PB-BED-MW20**
Sample Number: **BD3026**

(Could low flow)
Sample collected by removing 3-5 well volumes.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
~~JB~~	1045	13.96'	-80	8.82	55.0	22.7	0.68	10.80	600ml/min
	1050	" "	-94	9.45	54.4	35.6	0.0	10.60	↓
	1055	14.05'	-92	9.41	54.4	68.7	0.0	10.55	
	1100	16.96	-91	9.40	54.3	87.9	0.0	10.52	
	1105	17.12	-91	9.38	53.9	86.5	0.0	10.54	100ml/min
	1110	17.15	-49	8.65	53.8	88.7	0.0	10.70	↓
	1120	17.15	-44	8.60	53.7	97.4	0.0	10.66	
	1130	17.35	-65	8.86	54.0	89.1	0.0	10.53	800ml/min
	1140	18.0	-78	9.13	54.0	86.1	0.0	10.52	
	1150	20.70	-87	9.25	54.1	92.2	0.0	10.50	
	1200	21.5	-91	9.30	53.9	83.6	0.0	10.50	
	Stopped purge to recharge well at 12:00 → 12:50 Recharge 23.8 → 14.5'								
	1240	14.2	-57	8.42	53.8	56.8	0.0	10.79	800ml/min
	1250		-76	9.03	53.5	47.3	0.0	10.61	
~~Sample:~~	1310		-92	9.26	53.5	59.6	0.0	10.58	
	1330	← water level meter faulty.	-94	9.29	54.7	61.4	0.0	10.54	
			-73	8.95	53.6	53.5	0.0	10.54	

Low Flow 76" drawdown ↓ 35 well volume " 24 gal

Sample: 1415

Logged BY / Date: JB 9/26/01   Reviewed BY / Date: David Kash 10/6/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 09/26/01
Project Name: PBOW Groundwater	Collection Time: 1415
Investigation Site: BED-MW20	Sample Filtered (Yes / No): Metals only
RFA/COC Number:	Weather/Temp: Overcast 45°F

Form Completed By: R Thompson
Sampler(s): RT / N Sireli
Reviewed By: David Kersh 10/4/01

Sample Number: P B O W - 0 1 - G W - P B B E D - M W 2 0 - B D 3 0 7 6 - -

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: BED-MW20	Outside Casing Dia. (in): 2 in	Odor: none
Well Secure (Yes / No):	Depth to Product (ft): —	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No):	Total Well Depth (ft): 45.5	- Vapor Monitor S/N: low O6
Well Condition: Good	Depth to Water (ft): 13.96	- Reading (ppm): 0.0
Screen Height: no screen	Water Column (ft): 35.54	Remarks: Low flow attempted. 26 in
Casing Type: Schd. 40 PVC	Elev. Ref. for Water Level: —	drawdown. Purging 3 well Vol.

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 = 35.54 ft x .164 Gal/ft = 5.83 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) = .205 gal/ft
Filter Pack Volume (gal) = ((Screen Height + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ~~35.54~~ 0 ft + 0 ft) x .205 gal/ft) x 0.3 = ~~10.72~~ 2.19 gallons RT 09/26/01

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = 2.19 gal + 5.83 gal = 8.02 gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
8.02	16.04	24.06		

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3		See page 2 of Sample Collection log.							
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B /7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 100801 STL-K ½-N

Location Code: PB-BED-MW22
Sample Number: BD3027
Sample Name: PBOW-01-GW-PB-BED-MW22-BD3027-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

QC Partners:
(TB) TB 100801A (ER) — (FB) —

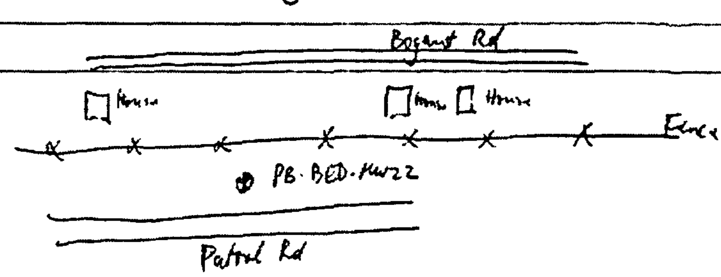
Collection Date: 10/8/01
Collection Time: 1020
Start Depth: 35
End Depth: 37
Sample Matrix: WATER
Sample Team: DKK/RT

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Conducted low-flow sampling

Sketch Location:
N↑



Logged BY / Date: David Kessler 10/8/01 *Reviewed BY / Date:* David Kessler 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: **PB-BED-MW22**

Sample Number: **BD3027**

10/8/01 - Static Water 30.75 ft, TD: 44.46 ft (TOC), Screen at 29.46 ft. (water within screened interval)
- Pump set at 35 ft. Pumping rate 200 ml/min
Water within screened interval. Obtained stabilized parameters. Sampled. 1020

- pH did not calibrate error 5 - clean/broken sensor.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/8/01	0900	30.75							
	0930	31.24	-240	10.10?	0.739	85.4	0.05	10.9	200 ml/min
	0935	31.33	-237	10.06	0.746	58.8	1.30	10.9	
	0940	31.35	-242	10.10	0.749	36.9	0.00	10.8	
	0945	31.46	-245	10.22	0.750	29.2	0.00	10.8	
	0950	31.53	-249	10.24	0.753	46.3	0.00	10.9	
	0955	31.38	-257	10.24	0.750	28.8	0.00	11.1	— Pump stopped.
	~~0950~~ 1000	31.48	-258	10.22	0.~~7~~60	26.2	0.00	11.1	
	1005	31.48	-261	10.22	0.765	19.5	0.00	11.1	
	1010	31.51	-263	10.21	0.766	7.3	0.00	11.2	
	1015	31.51	-265	10.24	0.766	6.0	0.00	11.4	
	1020	31.51	-263	10.25	0.777	5.2	0.00	11.4	2.5 gal
Sample:	1020	31.51	-263	10.25	0.777	5.2	0.00	11.4	

1200 (After Sampling) 31.51 — 3 gal

Conducted low-flow sampling.

Logged BY / Date: David Kesel 10/8/01 *Reviewed BY / Date:* David Kesel 10/8/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date: 10/8/01	Form Completed By: D. Kessler
Project Name: PBOW Groundwater	Collection Time: 1020	Sampler(s): D. Kessler
Investigation Site: PB-BED-MW22	Sample Filtered (Yes / No): yes	R. Thompson
RFA/COC Number:	Weather/Temp: Sunny, clear, cold 45°	Reviewed By: David Kessler

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: PB-BED-MW22	Outside Casing Dia. (in): 2"	Odor: Distinct H_2S odor
Well Secure (Yes / No): No - Needs 3214 lock	Depth to Product (ft): NA	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No): No	Total Well Depth (ft): 44.46	- Vapor Monitor S/N: /
Well Condition: Excellent	Depth to Water (ft): 30.75	- Reading (ppm): 18.3 / H_2S = 351 ppm
Screen Height: 15 Ft	Water Column (ft): 13.71	Remarks: Water within screened interval. Obtained stabilized parameters. Sampled Basically low-flow with > 6" drawdown.
Casing Type: PVC	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ____ ft + ____ ft) x ____ gal/ft) x 0.3 = ____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ____ gal + ____ gal = ____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE		31.51							2.5 gal

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100801SSL-KJ-N

Location Code: PB-BED-MW22
Sample Number: ~~BD3053~~ BD3027 MS
Sample Name:
Sampling Method: LF
Sample Type: GW
Sample Purpose: MS
QC Partners:
(TB) TB100801A (ER) — (FB) —

Collection Date: 10/8/01
Collection Time: 1020
Start Depth: 35'
End Depth: 37'
Sample Matrix: WATER
Sample Team: DKK/RT

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

See Sample No. 3027

Logged BY / Date: David Keith 10/8/01 *Reviewed BY / Date:* David Keith 11/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: PC-BED-MW22
Sample Number: ~~BD3053~~ BD3027 MS

MS*

See Sample No. 3027

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

Logged BY / Date: David Kessler 10/8/01 *Reviewed BY / Date:* David Kessler 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PBOW10080152-K1-N

Location Code: PB-BED-MW22

Sample Number: ~~BD305~~ BD3027 MSD

Sample Name

Sampling Method: LF

Sample Type: GW

Sample Purpose: MSD

QC Partners:

(TB) TB100801A (ER) — (FB) —

Collection Date: 3/8/01

Collection Time: 1020

Start Depth: 35'

End Depth: 37'

Sample Matrix: WATER

Sample Team: DKK/RT

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

See Sample No. 3027

Logged BY / Date: David Keelan 10/8/01 *Reviewed BY / Date:* David Keelan 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: PB - BED - MW22

Sample Number: ~~BD3054~~ BD3027 MSD

MSD

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
			See	Sample No.		3027			
Sample:									

Logged BY / Date: David Kesh 10/8/01 *Reviewed BY / Date:* David Kesh 10/8/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW 100901STL-A j-N

Location Code:	PB-BED-MW23	*Collection Date:*	10/9/01
Sample Number:	BD3028	*Collection Time:*	1145
Sample Name:	PBOW-01-GW-PB-BED-MW23-BD3028-(00-(	*Start Depth:*	65.84
Sampling Method:	LF	*End Depth:*	70.84'
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER
		Sample Team:	D. Kessler/R. Thompson

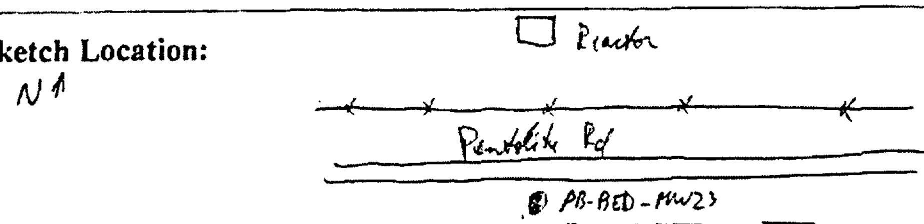
QC Partners:
(TB) TB100901A (ER) ——— (FB) ———

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Because water level within screened portion of well, ~~Est~~ recharge rate very slow, collected sample.

Sketch Location:



Logged BY / Date: David Kessler 10/9/01 *Reviewed BY / Date:* David Kessler 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: **PB-BED-MW23**
Sample Number: **BD3028**

Static Water Level: 63.80 Ft. TD: 75.60 Ft. 20 screen, 11.80 Ft water column.

- Can not low flow. Began purge of 3 well volumes. After removal of ~~3 bailers~~ ~~(~~ 3rd bail ~~)~~, water level has dropped 2.50 Ft. Very slow recharge rate measured, water level within screen. Will return tomorrow, measure recharge. Sample

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	1540	64.63 (1 bailer)	-19	7.76	5.70	0	7.97	11.0	0.25
	1545	65.42 (2nd bailer)	-15	7.73	5.62	999	8.66	11.2	0.50
10/8/01	1550	66.30 (3rd bailer)	-23	7.83	5.80	999	5.71	10.7	0.75
10/9/01	1100	65.84							
Sample:	1145	65.84							

End depth = 70.84

Logged BY / Date: David Kessel 10/8/01 *Reviewed BY / Date:* David Kessel 10/9/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10/9/01	Form Completed By:	D. Kessler
Project Name:	PBOW Groundwater	Collection Time:	1145	Sampler(s):	D. Kessler
Investigation Site:	PB-BED-MW23	Sample Filtered (Yes / No):	yes		R. Thompson
RFA/COC Number:		Weather/Temp:	partly cloudy, warm (65)	Reviewed By:	David Kessler

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number:	PB-BED-MW23	Outside Casing Dia. (in):	2"	Odor:	Distinct # PAH odor
Well Secure (Yes / No):	Needs 3216 lock	Depth to Product (ft):	NA	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):		Total Well Depth (ft):	75.60	- Vapor Monitor S/N:	/
Well Condition:	Excellent (new)	Depth to Water (ft):	63.80	- Reading (ppm):	215 / CO=0 LEL=OVR H2S=0 O2=20.7
Screen Height:	20 ft (53-73 ft)	Water Column (ft):	11.80	Remarks:	
Casing Type:	PVC	Elev. Ref. for Water Level:			Water within screen, very low recharge, sampled

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 = 11.80 ft x 0.164 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 ((6 $)^2$ - (2 $)^2$) = 1.31 gal/ft

Filter Pack Volume (gal) = ((Screen Height + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ⁄ ft + 11.80 ft) x 1.31 gal/ft) x 0.3 = 4.64 gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = 4.64 gal + 1.94 gal = 6.58 gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
6.58	13.16	19.74		

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100801SS2-K7-N

Location Code: PB-BED-MW24
Sample Number: BD3029
Sample Name: PBOW-01-GW-PB-BED-MW24-BD3029-(00-(
Sampling Method: LF
Sample Type: GW   *Sample Purpose:* REG

Collection Date: 10/09/01
Collection Time: 0935
Start Depth: 36.0'
End Depth: 36.0
Sample Matrix: WATER
Sample Team: RT

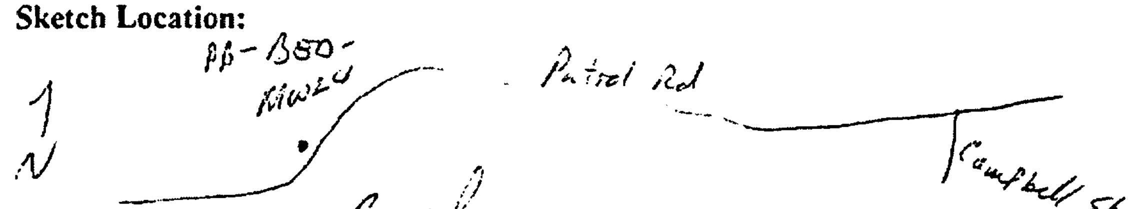
QC Partners:
(TB) TB100901A   (ER) ——   (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Sampled Using Low-Flow Method

Sketch Location:



Logged BY / Date: [signature] 10/09/01   *Reviewed BY / Date:* David Kesel 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: **PB-BED-MW24**

Sample Number: **BD3029**

10/8/01: Static water level = 28.79, TD: 42.78 Ft, water column 13.89, 15Ft screen. water within screen.
Pump set at 36 Ft.
[illegible] pH Calibration (U-22 Horiba -E5) Turbidity in question · water looks much clearer

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/8/01	1625	28.79							200 mL/M
10/9/01	0840	29.03	-30	8.16	1.96	187.0	5.12	11.0	
[illegible]	0845	29.00	-48	8.36	1.94	36.2	6.88	11.0	
	0850	29.01	-88	8.48	1.87	37.2	7.32	10.9	
	0853	29.01	-109	9.12	1.83	27.5	6.38	11.0	
	0900	29.05	-120	9.33	1.81	34.4	5.29	11.0	
	0905		-131	9.44	1.83	53.7	2.08	11.0	
	0910	29.05	-137	9.47	1.82	32.6	4.00	11.0	
	0915	29.05	-141	9.50	1.79	34.5 (-16.6 [illegible])	4.49	11.0	
	0920	29.07	-147	9.57	1.77		[illegible]	11.1	
	0925	29.07	-141	9.33	1.82	76.8	5.11	11.2	
	0930	29.07	-103	9.33	1.81	73.9	3.59	11.2	
Sample interval	0935	29.07	-144	9.38	1.81	73.3	5.32	11.2	
		29.09 after Sampling							11000 mL
Sample:	0935	29.07	-144	9.38	1.81	73.3	5.32	11.2	2.9? gal.

Sampled Using Low-Flow method

Logged BY / Date: [signature] 10/09/01 *Reviewed BY / Date:* David Kessler 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100501SE2-K 1N

Location Code: PB-BED-MW25
Sample Number: BD3030
Sample Name: PBOW-01-GW-PB-BED-MW25-BD3030-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10/5/01
Collection Time: 0920
Start Depth: ~~16.50~~ 35.0'
End Depth: ~~16.52~~ 35.0'
Sample Matrix: WATER
Sample Team: B. Kessler / R. Thompson

QC Partners:
(TB) TB100501A (ER) —— (FB) ——

ERPIMS Values:
Sacode:
Lot Control#:

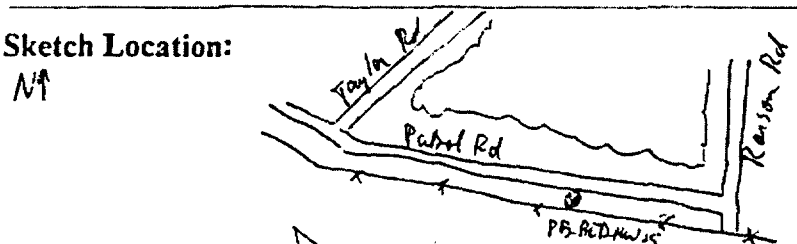
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

FS BD3051 collected with this sample

FD BD3052 collected with this sample

Comments: Conducted low flow sampling

Sketch Location:



Logged BY / Date: David Kessler 10/5/01 *Reviewed BY / Date:* David Kessler 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW25
Sample Number: BD3030

10/5/01 Static water level 16.43. TD = 40.60 Ft. 10 Ft Screen. Pump at 35 Ft., water column 24.17 Ft. Able to conduct low flow sampling. Pumping 290 ml/min. Water level fluctuates between 16.43 - 16.58

Excellent low-flow sampling well.

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
	0835	16.43	-139	8.63	1.65	65.2	4.80	12.4	
	0840	16.50	-163	8.96	1.71	45.7	4.25	12.2	
	0845	16.48	-183	9.38	1.78	47.2	3.97	12.1	
	0850	16.49	-193	9.56	1.82	53.0	3.77	12.1	
	0855	16.52	-201	9.63	1.83	47.7	3.78	12.1	
	0900	16.54	-218	9.90	1.84	52.7	3.33	12.0	
	0905	16.51	-236	10.15	1.85	68.2	2.81	12.0	
	0910	16.50	-255	10.43	1.89	83.1	2.65	12.0	
	0915	16.48	-269	10.62	1.89	85.9	2.50	11.9	
	0920	16.52	-237	10.58	1.89	83.0	2.41	11.9	~3.5 gal 13500 ml @ min
Sample:	0920	16.52	-237	10.58	1.89	5.7	2.41	11.9	3.5 gal

Air bubbles caused turbidity reading to be high. Believe turbidity reading to be below 10 NTU.

Logged BY / Date: David Kessh 10/5/01 *Reviewed BY / Date:* David Kessh 10/5/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	**Collection Date:** 10/15/01	**Form Completed By:** D. Kessler
Project Name: PBOW Groundwater	**Collection Time:** 0920	**Sampler(s):** D. Kessler, R. Thompson
Investigation Site:	**Sample Filtered (Yes / No):** Yes	
RFA/COC Number:	**Weather/Temp:** cloudy, cool (50), sprinkles	**Reviewed By:** David Kessler

Sample Number: P B O W – 0 1 – G W – – – – – –

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number: PB-BED-MW25	**Outside Casing Dia. (in):** 2	**Odor:**
Well Secure (Yes / No): No: Needs 3216 lock	**Depth to Product (ft):** NA	**Vapor Monitor Type:** PID / VRAE
Well Labeled (Yes / No): No	**Total Well Depth (ft):** 40.60	**- Vapor Monitor S/N:** /
Well Condition: Excellent	**Depth to Water (ft):** 16.43	**- Reading (ppm):** 0.0 / (0-2 ppm, [illegible] LEL→100%, O2 20.9
Screen Height: 10 Ft	**Water Column (ft):**	**Remarks:**
Casing Type: PVC	**Elev. Ref. for Water Level:**	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Low Flow Sampling

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 ((6)^2 - (2)^2) = _____ gal/ft

Filter Pack Volume (gal) = ((Screen Height + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height _____ ft + _____ ft) x _____ gal/ft) x 0.3 = _____ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = _____ gal + _____ gal = _____ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100501PARA

Location Code: PB-BOO-MW25
Sample Number:
Sample Name: BD3051
Sampling Method: LF
Sample Type: GW
Sample Purpose: FS

Collection Date: 10/05/01
Collection Time: 0920
Start Depth: 35.0'
End Depth: 35.0
Sample Matrix: WATER
Sample Team: DK/RT

QC Partners:
(TB) TB100501A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Containers Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location: See Sample log BD3030

Logged BY / Date: David Kisch 10/5/01 *Reviewed BY / Date:* David Kisch 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

Location Code: PB-BED-MW25
Sample Number: BD3051 (FS)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

See Sample Collection log No. 3030

Logged BY / Date: David Kesh 10/5/01 *Reviewed BY / Date:* David Kesh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100501STL-1K

Location Code: PB-BED-MW25
Sample Number:
Sample Name: BD3052
Sampling Method: LF
Sample Type: GW
Sample Purpose: FD

Collection Date: 10/05/01
Collection Time: 0920
Start Depth: 35.0'
End Depth: 35.0'
Sample Matrix: WATER
Sample Team: DK/RT

QC Partners:
(TB) TB100501A (ER) — (FB) —

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location: See Sample log BD3030

Logged BY / Date: David Kersh 10/5/01 *Reviewed BY / Date:* David Kersh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

Location Code: PB-BED-MW25

Sample Number: BD3052 (FD)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:									

See sample collection log BD3030

Logged BY / Date: David Kosh 10/5/01 *Reviewed BY / Date:* David Kosh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: —

Location Code: PB-BED-MW26
Sample Number: BD3031
Sample Name: PBOW-01-GW-PB-BED-MW26-BD3031-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

QC Partners:
(TB) — (ER) — (FB) —

Collection Date: 10/10/01
Collection Time: NA
Start Depth: —
End Depth: —
Sample Matrix: WATER
Sample Team: N. Sinks, R. Thompson

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

10/10/01 H_2O: 58.81' (BTOC)
TD: 60.20' (BTOC)

Comments: Not enough water to collect sample.

Sketch Location:

N

Patrol Rd.

PB-BED-MW26

Logged BY / Date: Roger Thompson *Reviewed BY / Date:* David Kesack 10/16/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW26
Sample Number: BD3031

10/9/01 - Static - 57.35 ft. TD = 60.35 ft., .5 ft screen, 3.03 ft water column.
Will bail water to determine if recharge is present

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/9/01	1355	57.32'							
	1410	58.22		~~8.16~~					0.20 gal
	1412	58.69'	-38	8.16	15.2	999	3.75	13.2	0.30 gal
	1416	58.81'	-37	8.19	15.5	999	3.01	12.9	0.35 gal
Stopped bailing to measure recharge	1423	59.08	-37	8.20	15.7	999	2.86	12.7	0.40 gal
	1430	59.07							
	1435	59.06							
	1443	58.98							
	1447	58.90							
end recharge cycle	1457	58.87							
10/10/01	1010	58.81							
Sample:									

* Collected no sample due to insufficient water volume.

Logged BY / Date: David Kessler 10/9/01 *Reviewed BY / Date:* David Kessler 10/10/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number: 825635	Collection Date:	Form Completed By: David Kesch
Project Name: PBOW Groundwater	Collection Time: No sample collected (Insufficient volume)	Sampler(s): David Kesch, Roger Thompson
Investigation Site: PB-BED-~~GW~~ MW26	Sample Filtered (Yes / No):	
RFA/COC Number:	Weather/Temp: partly sunny, warm	Reviewed By: David Kesch

Sample Number: P B O W – 0 1 – G W – – – – –

MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: PB-BED-MW26	Outside Casing Dia. (in): 2"	Odor: Distinct petro
Well Secure (Yes / No): No - Needs 3216 lock	Depth to Product (ft): None	Vapor Monitor Type: PID / VRAE
Well Labeled (Yes / No):	Total Well Depth (ft): 60.35	- Vapor Monitor S/N: 1
Well Condition: Excellent - New	Depth to Water (ft): 57.32'	- Reading (ppm): 3.6 / CO: 0, H2S: 0, LEL: 0, O2: 13.4
Screen Height: 15 ft	Water Column (ft): 3.03	Remarks:
Casing Type: PVC	Elev. Ref. for Water Level:	

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 = 3.03 ft x 0.164 Gal/ft = 0.50 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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ___ ft + 3.03 ft) x 1.31 gal/ft) x 0.3 = ~~1.19~~ 1.19 gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = 1.19 gal + 0.50 gal = 1.69 gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)
1.69	3.38	5.07		

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2									
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100901SEL-KFN

Location Code: PB-BED-MW27
Sample Number: BD3032
Sample Name: PBOW-01-GW-PB-BED-MW27-BD3032-(00-(
Sampling Method: LF
Sample Type: GW *Sample Purpose:* REG

Collection Date: 10-9-01
Collection Time: 11:15
Start Depth:
End Depth:
Sample Matrix: WATER
Sample Team: H Adams / N. Sieck

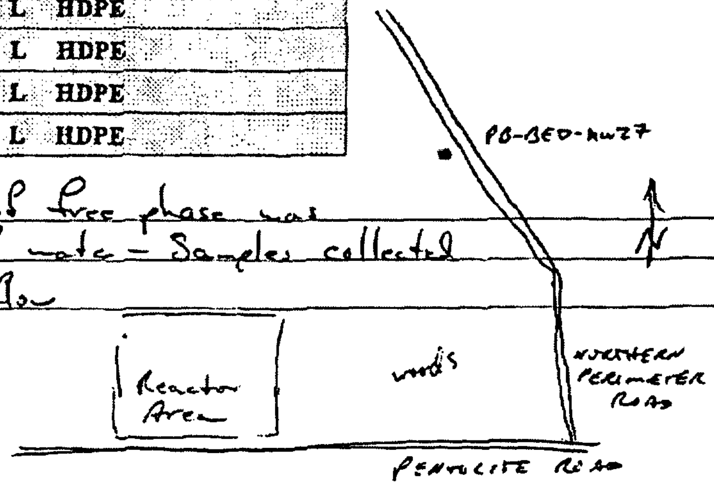
QC Partners:
(TB) TB100901A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

Comments: Small amount of free phase was found ~~on~~ on surface of water - Samples collected by bailer not slow flow

Sketch Location:



Logged BY / Date: Hugh Adams 10/9/01 *Reviewed BY / Date:* David Kerch 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: PB-BED-MW27
Sample Number: BD3032

Small amount of hydrocarbon material was see on surface of water.

10/10 Static water level 51.13 ft, TD= 111.35, Screen 26.5-111.35 ft (84.85)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/9/01	10:00	51.13	-335	12.09	3.14	24.9	6.79	12.16	500 ml
	10:15		-318	12.38	3.19	34.5	7.98	11.30	3000 ml
	10:20	52.83'	-329	12.42	3.21	53.5	7.27	11.18	1 2/3 gal.
	10:32	52.81' recharge 0.02' @ 12 min							
Sample:	1115								1.66 gal

SAMPLES COLLECTED USING BAILER VS LOW FLOW PUMPING. NO ASSOCIATED MS/MSD VOLUMES WERE COLLECT. THEREFORE SAMPLE NOS. BD3032-MS & BD3032-MSD WERE NOT USED.

Logged BY / Date: Hugh Adams 10/9/01 *Reviewed BY / Date:* David Kesh 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

No HARDNESS ALKA CYA

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

RFA / COC Number: PBOW100901 ... -K ...

Location Code:	TNTA-BEDGW-001	*Collection Date:*	10/9/01
Sample Number:	BD3037	*Collection Time:*	1450
Sample Name:	PBOW-01-GW-TNTA-BEDGW-001-BD3037-	*Start Depth:*	79.0'
Sampling Method:	LF	*End Depth:*	Dry
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER

QC Partners:

(TB) TB100901A (ER) (FB)

Sample Team: D Smith / R. Thompson

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
✓ VOLATILES3	N	A	3	40	mL	GVIAL,SEP
✓ SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
✓ EXPLOSIVES	N	C	1	1	L	Amb. Glass
✓ METALS3-W-F	Y	D	1	500	mL	HDPE
✓ METALS3-W	N	E	1	500	mL	HDPE
~~HARDNESS~~	~~N~~	~~F~~	~~1~~	~~250~~	~~mL~~	~~HDPE~~
✓ TOC	N	G	2	40	mL	GVIAL,SEP
~~CYANIDE~~	~~N~~	~~H~~	~~1~~	~~1000~~	~~mL~~	~~HDPE~~ DKK
~~ALKALINITY~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~CHLORIDE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~NITRATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~SULFATE~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TDS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TSS~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~
~~TURB 180.1~~	~~N~~	~~I~~	~~1~~	~~1~~	~~L~~	~~HDPE~~

½ volume

15:30 PID = 26? ppm + VRAE = >500 ppm H_2S within enclosure around well casing.

Not collected due to well volume

Not collected due to well volume

Comments: Water inc. sediment w/depth. Not able to collect all Required Samples due to lack of water volume in well.
- Collected free-phase (product) sample.

Sketch Location:

Nick Sirek 10/9/01

Logged BY / Date: ~~[signature] 10/9/01~~

Reviewed BY / Date: David Kesel 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: TNTA-BEDGW-001
Sample Number: BD3037
10/8/01 - Depth to water = 77.58 ft
10/9/01 - Depth to water = 79.00 ft

3" to 6" of product in well (believed to be natural hydrocarbon). Collected sample.

PURGE RECORD:

	Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
10/8/01	~~1400~~	15:30	77.58	Not collected due to LNAPL (sticky, oily)						P.D 268 H_2O >500 @ well
10/9/01			79.00'							
Sample:	1450									

Nick Sisk 10/9/01

Logged BY / Date: [signature]

Reviewed BY / Date: David Kresh 10/9/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

RFA / COC Number: PBOW100401STL-K;N

Location Code:	TNTC-BEDGW-001	*Collection Date:*	10-4-01
Sample Number:	BD3042	*Collection Time:*	13:15
Sample Name:	PBOW-01-GW-TNTC-BEDGW-001-BD3042-	*Start Depth:*	59.63
Sampling Method:	LF	*End Depth:*	60.27
Sample Type:	GW *Sample Purpose:* REG	*Sample Matrix:*	WATER

QC Partners:
(TB) TB100401A (ER) — (FB) —

Sample Team: HAdams/NSieck

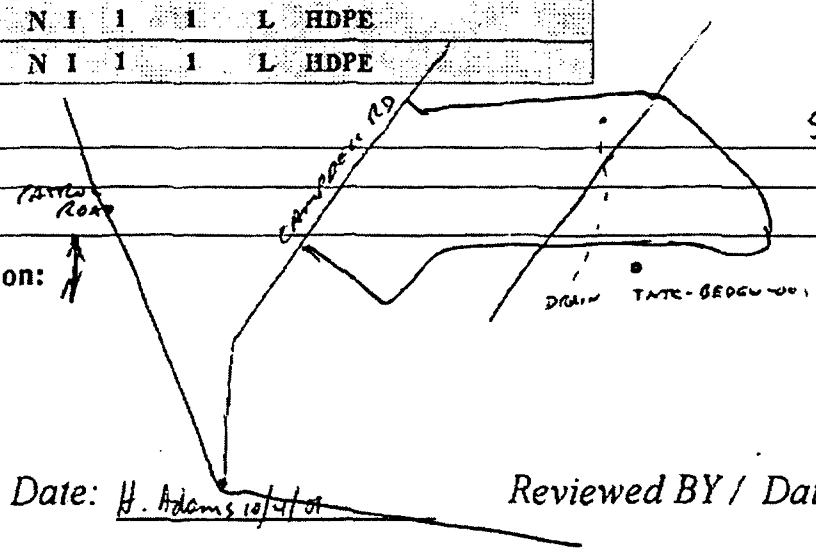
ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE
HARDNESS	N	F	1	250	mL	HDPE
TOC	N	G	2	40	mL	GVIAL,SEP
CYANIDE	N	H	1	1000	mL	HDPE
ALKALINITY	N	I	1	1	L	HDPE
CHLORIDE	N	I	1	1	L	HDPE
NITRATE	N	I	1	1	L	HDPE
SULFATE	N	I	1	1	L	HDPE
TDS	N	I	1	1	L	HDPE
TSS	N	I	1	1	L	HDPE
TURB 180.1	N	I	1	1	L	HDPE

88.5' TD

Comments: Sampled using Low Flow

Sketch Location:



Logged BY / Date: H. Adams 10/4/01

Reviewed BY / Date: David Kesel 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: TNTC-BEDGW-001
Sample Number: BD3042

88.5' TD

PURGE RECORD:

Initial	Time(24hr) 10/4/01	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
HRA	11:35	59.63							
inserted	pump	59.66							
	12:30	59.3	-327	12.56	3.01	125.0	1.20	13.43	~1000 m
	12:35	59.1	-333	12.65	2.96	124.0	0.70	13.53	
	12:45	59.14	-346	12.74	2.96	92.1	0.00	13.49	
	12:55	59.48	-353	12.81	2.99	93.1	0.00	13.57	
	13:10	59.43	-357	12.89	2.98	5557.0	0.00	12.44	
sampling began	13:15	59.68	-357	12.87	2.98	44.0	0.00	12.26	
	13:40	60.18	-363	12.88	2.98	25.2	0.00	12.66	
	14:25	60.41	-350	12.64	2.98	19.0	0.00	12.02	
Sample:	1315	59.68	-357	12.87	2.98	44.0	0.00	12.26	11.89 gal

11:35 High H_2S levels ≥ 500 ppm ; PID 123 ppm
Turbidity flux due to many small bubbles collecting inside probe container.

Logged BY / Date: Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kesh 10/4/01

GROUNDWATER SAMPLING FORM

IT CORPORATION

Project Number:	825635	Collection Date:	10-4-01	Form Completed By:	Hugh Adams
Project Name:	PBOW Groundwater	Collection Time:	13:15	Sampler(s):	Hugh Adams, Nick Sisek
Investigation Site:		Sample Filtered (Yes / No):	Metals (dissolved)		
RFA/COC Number:		Weather/Temp:		Reviewed By:	David Kesh

Sample Number: P B O W - 0 1 - G W - T N T C - B E D G W - 0 0 1 0 D 8 - 0 4 - 2

MONITORING WELL INFORMATION (use top of casing (TOC) for all measurements)

Well Number:	TNTC-BEDGW-001	Outside Casing Dia. (in):	3".	Odor:	H_2S odor present
Well Secure (Yes / No):	YES (NEW)	Depth to Product (ft):	NA.	Vapor Monitor Type:	PID / VRAE
Well Labeled (Yes / No):	YES	Total Well Depth (ft):	~~100~~ 88.5'	- Vapor Monitor S/N:	1
Well Condition:	NEW	Depth to Water (ft):	59.63	- Reading (ppm):	129 / >500 ppm TOC
Screen Height:	15'	Water Column (ft):	40.27'	Remarks:	H_2S values in breathing zone acceptable (~1 ppm)
Casing Type:	PVC	Elev. Ref. for Water Level:	TOP OF CASING		

MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

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 + lesser of 2 ft or water column) x gal/ft) x porosity (0.3) = ((Screen Height ______ ft + ______ ft) x ______ gal/ft) x 0.3 = ______ gallons

Purge Well Volume: Purge Well Volume = Filter Pack Volume + Well Volume = ______ gal + ______ gal = ______ gal

1 x Purge Well Volume (gal.)	2 x Purge Well Volume (gal.)	3 x Purge Well Volume (gal.)	4 x Purge Well Volume (gal.)	5 x Purge Well Volume (gal.)

Purge Cycle	Time (24 hr)	Depth to Water	Conductivity	pH	Eh	Temperature	Turbidity	Diss. O_2	Purge Volume
Units:		Feet	umhos/cm	Standard Units	ppm	°F	NTU	ppm	gallons
Purge Vol 1									
Purge Vol 2		LOW FLOW							
Purge Vol 3									
Purge Vol 4									
Purge Vol 5									
SAMPLE									

SAMPLE ANALYTICAL INFORMATION

Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)	Requested Analysis	Method	Sample Container(s)
Nitroaromatics	Mod. 8330	2 - 1 Liter Amber Glass	Total Organic Carbon	9060	2 - 40 mL Glass Vials	Nitrate	353.2	1 - 1 Liter HDPE See Note A
TCL Volatile Organics	5030 / 8260B	3 - 40 mL Glass Vials	Total Cyanide	9010A/9012	1 - 1 Liter HDPE	Sulfate	375.3	A. Sample for alkalinity, chloride, nitrate, sulfate, TSS, TDS, and turbidity combined in one 1-liter HDPE container.
TCL SVOCs	3510C / 8270C	2 - 1 Liter Amber Glass	Hardness	130.2	1 - 250 mL HDPE	Tot. Suspended Solids	160.2	
Total TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Alkalinity	310.1	1 - 1 Liter HDPE See Note A	Total Dissolved Solids	160.1	
Dissolved TAL Metals	3005A/6010B / 7470A	1 - 500 mL HDPE	Chloride	325.3		Turbidity	180.1	

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW 100501 PARA

Location Code: TNTC-BEDGW-001
Sample Number: BD3047
Sample Name:
Sampling Method: LF
Sample Type: GW
Sample Purpose: FS

Collection Date: 10-4-01
Collection Time: 10:45
Start Depth: 16' TOC
End Depth: 16' TOC
Sample Matrix: WATER
Sample Team: H Adams/N Sirek

QC Partners:
(TB) TB100501B (ER) — (FB) —

ERPIMS Values: —
Sacode:
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

Associated with Sample ~~BD3043~~ BD3042 DLK
Shipped day after collect as authorized by Vicki Graves

Logged BY / Date: Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kesh 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**

Manager: Mike Spangberg

Location Code: TNTC-BEDGW-001

Sample Number: ~~BD30~~ → BD3047

1st water reached surface @ 11:25 Am – Initial pumping rate seems slow – measured it at 150 ml/min

FS

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		See Sample BD3042							
Sample:									

Logged BY / Date: Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kreel 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 **PLUM BROOK ORDNANCE WK**
Manager: Mike Spangberg

RFA / COC Number: PBOW100401 STL-K

Location Code: TNTC-BEDGW-001
Sample Number: BD 3048
Sample Name:
Sampling Method: LF
Sample Type: GW
Sample Purpose: FD

Collection Date: 10-4-01
Collection Time: 10:45
Start Depth: 16' TOC
End Depth: 16' TOC
Sample Matrix: WATER
Sample Team: H Adams / N Sirek

QC Partners:
(TB) TB100401A (ER) — (FB) —

ERPIMS Values:
Sacode: —
Lot Control#: —

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOLATILES3	N	A	3	40	mL	GVIAL,SEP
SEMIVOLATILES3	N	B	2	1	L	Amb. Glass
EXPLOSIVES	N	C	1	1	L	Amb. Glass
METALS3-W-F	Y	D	1	500	mL	HDPE
METALS3-W	N	E	1	500	mL	HDPE

Comments:

Sketch Location:

Duplicate sample of ~~BD3043~~ BD3042 DKK

Logged BY / Date: Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kusch 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION

Sample Collection Log

Project: 825635 PLUM BROOK ORDNANCE WK
Manager: Mike Spangberg

Location Code: TNTC-BEDGW-001
Sample Number: BD3048

FD

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
		See Sample No. BD3042							
Sample:									

Logged BY / Date: Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kessel 10/4/01

APPENDIX C

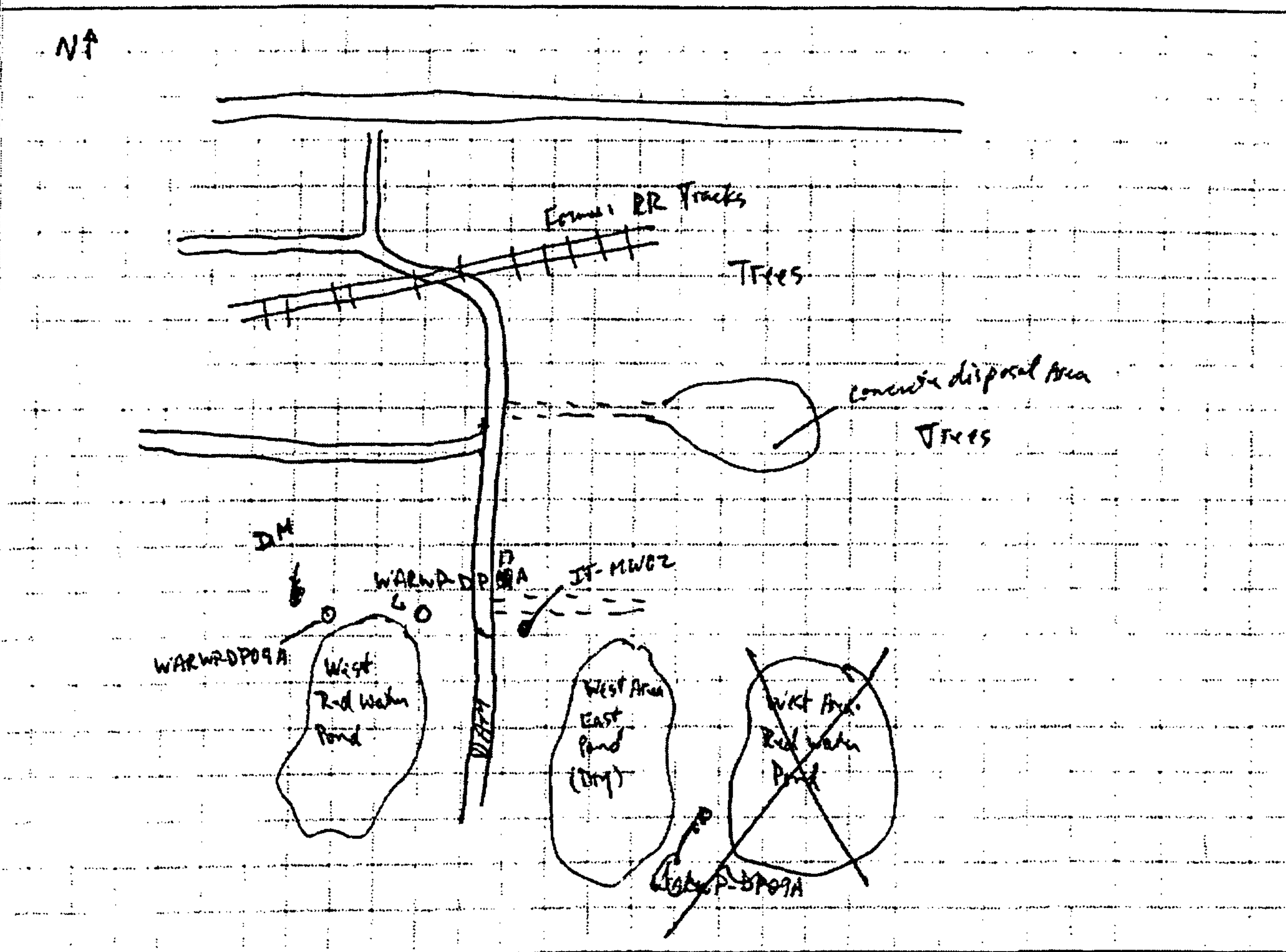
SOIL BORING HTRW DRILL LOGS

HTRW DRILLING LOG

DISTRICT: Nashville TN	HOLE NUMBER: WARWP-DP09A	SHEET 1 OF 3 SHEETS
1. COMPANY NAME: IT Corporation	2. DRILL SUBCONTRACTOR: Boart Longyear	
3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH	
5. NAME OF DRILLER: Paul Dickinson	6. MANUFACTURER'S DESIGNATION OF DRILL: BK81	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~2"~~ 2.5" ID Stainless Steel split-spoons.	8. HOLE LOCATION: See Sketch - WARP Former location DP-09	
	9. SURFACE ELEVATION: 639.02 Ft; N: 622546.61 E: 1909995.23	
	10. DATE STARTED: 9/27/01	11. DATE COMPLETED: 9/27/01
12. OVERBURDEN THICKNESS: NA Unknown	15. DEPTH GROUNDWATER ENCOUNTERED: See Sketch ~~[illegible]~~ 4.9 Ft	
13. DEPTH DRILLED INTO ROCK: -0-	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12 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	NA	NA	NA %
22. DISPOSITION OF HOLE	**BACKFILLED**	**MONITORING WELL**	**OTHER (SPECIFY)**	**23. SIGNATURE OF INSPECTOR**		
	yes-Bent.	NA	NA	David Kessler		

LOCATION SKETCH/COMMENTS SCALE:



PROJECT: PBOW	HOLE NO.: WARWP-DP09A

HTRW DRILLING LOG (continuation sheet)

Hole Number: WARWP-DP09A

Project: PBow | Company: D. Kessler | Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech Sample or Core Box No	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
	0	Fill: (Loose, (10YR 3/2) very dark grayish br, vfg. SAND, some silt 0.4	Sm		NA			Began drilling 9/27/01 1623
	1	Fill: (Soft, (10YR 7/2) light gray, LIME SLUDGE, coal fragments, pieces (0.5-1"), silty sand in fractures, dry 2		2.1			2.0/2.0	SB-1 1623
	2	Fill: (Soft, (10YR 3/3) dark brown, mottled (light gray), silty SAND, vfg, 20% lime sludge, dry) 2.9					0.9/2.0	SB-2 1625
	3	Fill: (Soft, (10YR 7/2), light gray, LIME SLUDGE, coal fragments, silty SAND, very moist 4.9		1.9				
	4					4 BD0027 4.9	0.9/2.0	SB-3 1628 ∇ Encountered gw at 4.9 Ft
	5	Medium stiff, (10YR 3/4) dark yellowish brown, mottled (gray), high plasticity, ~~silt~~ clayey SILT, wet. Sand content 30% at 4.9 Ft		2.0				
	6–7	As above	mh				2.0/2.0	SB-4 1629
	7–8	Sand ≤ 5%		0.1				
	8–9	As above		0.3			2.0/2.0	SB-5 1635
10	10							

Project: PBow

Hole Number: WARWP-DP09A

HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP09A

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

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Log	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	Medium stiff, (10YR 3/4) dark yellowish brown, mottled (gray), high plasticity, clayey SILT, wet	MH	0.2	NA			SA-6 1636
	11					11 BD0032 (FS) BD0024		
	12	Total Depth 12 ft				12		
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

HTRW DRILLING LOG

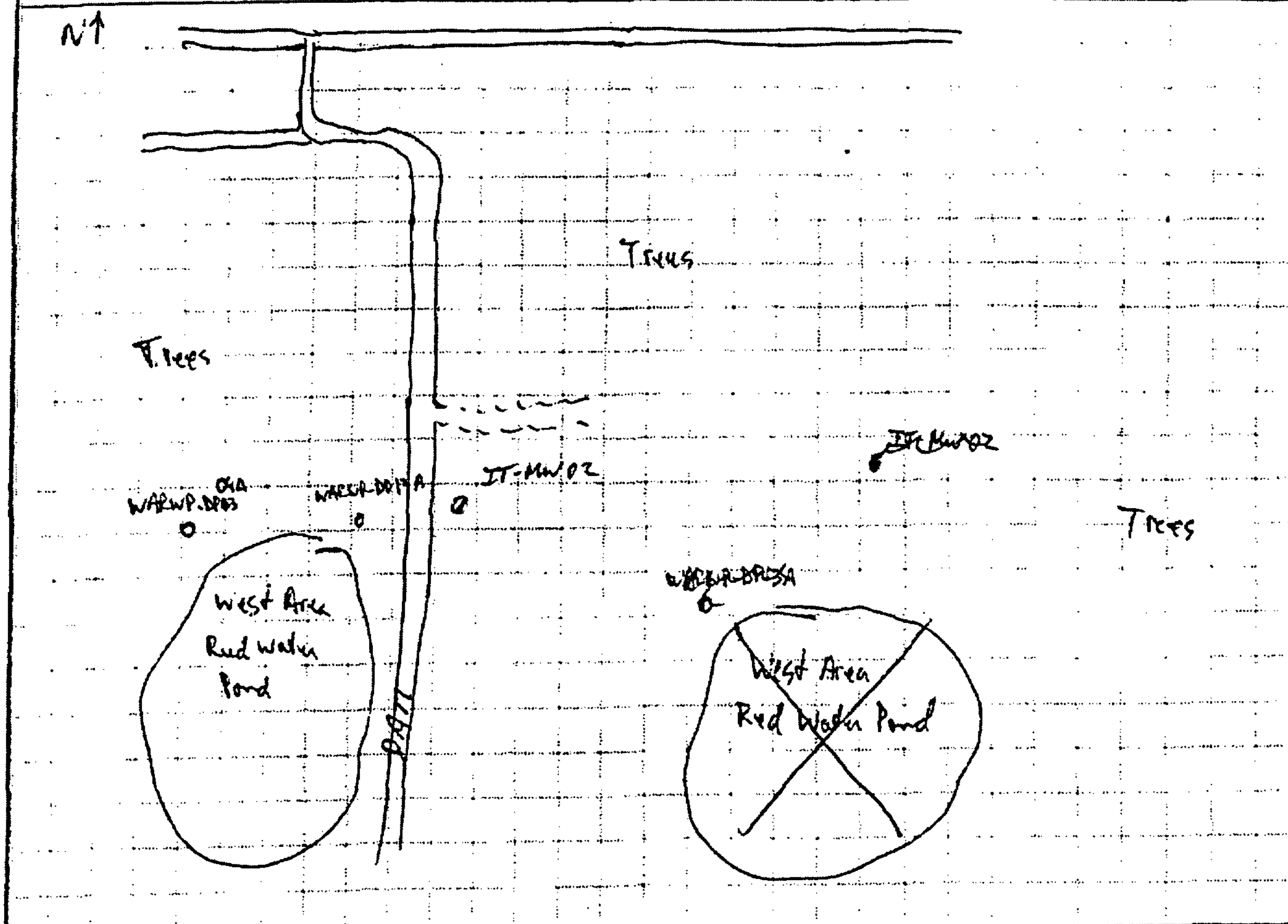
DISTRICT: Nashville, TN		HOLE NUMBER: WARWP-DP13A
1 COMPANY NAME: IT Corporation	2 DRILL SUBCONTRACTOR: Boart Longyear	SHEET 1 OF 3 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Paul Dickinson	6 MANUFACTURER'S DESIGNATION OF DRILL: BK81	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~DS~~ ID Stainless Steel split-spoons. 2.5"	8 HOLE LOCATION: See Sketch WARWP Former sample point DP-13	
	9 SURFACE ELEVATION: 637.75 Ft N: 622543.21 E: 1910216.51	
	10 DATE STARTED: 9/27/01	11 DATE COMPLETED: 9/27/01
12 OVERBURDEN THICKNESS: NA (unknown)	15 DEPTH GROUNDWATER ENCOUNTERED: 5.1 Ft	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 12 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)**
	yes	yes	Nitros	NA	NA
22 DISPOSITION OF HOLE	**BACKFILLED**	**MONITORING WELL**	**OTHER (SPECIFY)**	**23 SIGNATURE OF INSPECTOR**	
	yes-bentonite	NA	NA	David Kesh	

21 TOTAL CORE RECOVERY: NA

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT: PBOW

HOLE NO. WARWP-DP13A

HTRW DRILLING LOG (continuation sheet)

Hole Number: WARWP-DP13A

Project: PBOW | Inspector: D. Kessler | Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Line	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
	0–1.0	Fill: (Soft, (10YR 5/4), yellowish brown, homogeous, low plasticity, clayey SILT, moist) 1.0	ml		NA		2.0/ 2.0	Began drilling 9/27/01 ~~1525~~ 1525; SB-1 1526
	1.0–5.1	Loose, (10YR 4/4) dark yellowish brown, very fine grain, very well sorted, SAND, trace silt (10%), friable, dry	SP	0.0				Lime sludge (moist nodules) present
	2–4						1.3/ 2.0	SB-2 1528
	3	As above, mottled (dark brown)		0.2				
	4–6	Silt content 30% at 5.0 Ft; Very moist 5.1		0.1		4.1 BD0025 BD0026 FD 5.1	1.4/ 2.0	SB-3 1530; ∇ Encountered groundwater 5.1'
	5.1–10	Stiff, (10YR 5/2) grayish brown, mottled (40% - yellowish brown), high plasticity, silty CLAY, wet	ch					
	6–8	as above		0.0			2.0/ 2.0	SB-4 1534
	8–10	As above		0.0			1.8/ 2.0	SB-5 ~~1534~~ 1536

Project: PBOW | Hole Number: WA~~R~~P-DP13A

HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP13A

Project: PBGW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS or Lithology	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	Stiff, (10YR 5/2) grayish brown, mottled (30% - yellowish brown), high plasticity, silty CLAY, saturated	ch	0.0	NA		2.0/2.0	SB-6 1545
	11					11 (FS) BD0027 BD0028 (FS) 12		
	12	Total Depth: 12 ft						
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

Project: PBGW

Hole Number: WARWP-DP13A

HTRW DRILLING LOG

DISTRICT: Nashville, TN		HOLE NUMBER: WARWP-DP16A
1. COMPANY NAME: IT Corporation	2. DRILL SUBCONTRACTOR: Boart Longyear	SHEET 1 of 3 SHEETS
3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH	
5. NAME OF DRILLER: Paul Dickinson	6. MANUFACTURER'S DESIGNATION OF DRILL: BK81	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~2.5~~ 2.5" ID Stainless Steel split-spoons.	8. HOLE LOCATION: See Sketch, WARWP- Former location DP-16	
	9. SURFACE ELEVATION: 632.83 Ft N: 622425.11 E: 1910395.07	
	10. DATE STARTED: 9/28/01	11. DATE COMPLETED: 9/28/01
12. OVERBURDEN THICKNESS: NA (unknown)	15. DEPTH GROUNDWATER ENCOUNTERED: 4.5 Ft	
13. DEPTH DRILLED INTO ROCK: -0-	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12 Ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

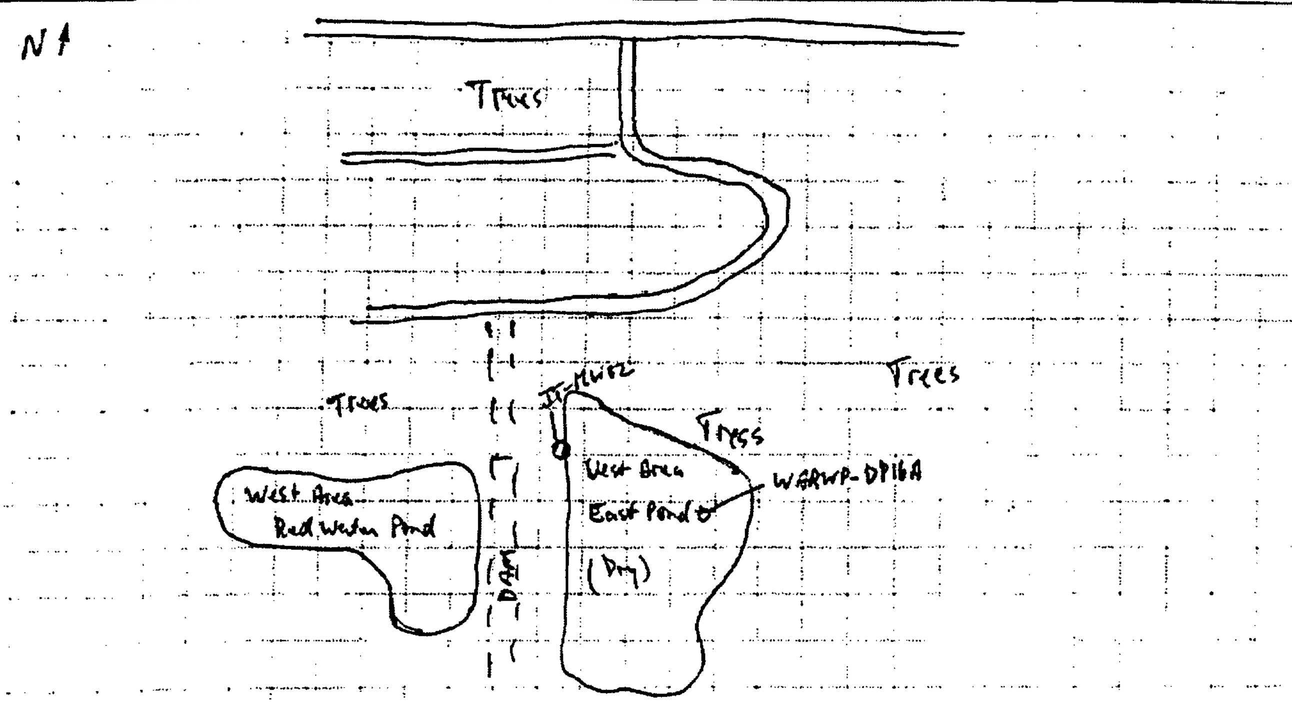
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes - Bent.	NA	NA	David Kesah

LOCATION SKETCH/COMMENTS

SCALE: Not to Scale



PROJECT: PBOW	HOLE NO. WARWP-DP16A

HTRW DRILLING LOG	(continuation sheet)	Hole Number: WARWR-DP16A
Project: PBOW	Geologist: D. Kessler	Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
		Fill: (Soft, (10YR 3/3) dark br, silty CLAY, moist) 0.3			NA			Began drilling 9/28/01 1303
	1	Fill: (Hard, (10YR 5/3) br, mottled (50% - yellowish br, black), low plasticity, silty CLAY, some organics, dry)	cl	0.0			1.6/2.0	SB-1 1303
	2	As above, gray "spots" (40%)	cl				1.2/2.0	SB-2 1305
	3	moist		0.0		3.5 ~~BD0029~~ BD0029R 4		soil (clay) compacted
	4	Medium stiff, (10YR 5/2) grayish brown, mottled (20% - brown), low plasticity, SILT, clay trace (10%), wet	ml	0.0			1.4/2.0	SB-3 1312 ▽ Encountered gw 4.5 Ft
	6	As above 6.6 - 7.5 Ft; Brown, medium grain sand (30%). 6.6		0.0			2.0/2.0	SB-4 1315
	7	color grading to (10YR 4/1) dark gray mottling (5%) yellowish br	ml					
	8	As above, high plasticity		0.0			1.6/2.0	SB-5 1320
	10							

Project: PBOW | Hole Number: WARWR-DP16A

HTRW DRILLING LOG (continuation sheet)

Hole Number: WARWP-DP16A

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Lithology	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	Medium stiff, (10YR 4/1) dark gray, 5% mottled (yel br), high plasticity, clayey SILT, saturated	mh	0.0	NA	11	2.0/2.0	SB-6 1325
	11					~~BD0030~~ BD0030R	12/2/03	0850
	12	Total Depth - 12.0 Feet				12		
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

Project: PBOW

Hole Number: WARWP-DP16A

HTRW DRILLING LOG

DISTRICT: Nashville, TN

HOLE NUMBER: PRRWP-DP03A

SHEET 1 OF 3 SHEETS

1 COMPANY NAME: IT Corporation

2 DRILL SUBCONTRACTOR: Boart Longyear

3 PROJECT: PBOW

4 LOCATION: NASA Plum Brook Station, Sandusky, OH

5 NAME OF DRILLER: Paul Dickinson

6 MANUFACTURER'S DESIGNATION OF DRILL: BK81

7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~1X~~ 2.5" ID Stainless Steel split-spoons

8 HOLE LOCATION: See Sketch - Pentolite Area Former location ~~stake~~ DP03

9 SURFACE ELEVATION: 631.56 Ft N: 625038.03 E: 1919102.57

10 DATE STARTED: 9/27/01

11 DATE COMPLETED: 9/27/01

12 OVERBURDEN THICKNESS: NA Unknown

15 DEPTH GROUNDWATER ENCOUNTERED: 4.8 Ft

13 DEPTH DRILLED INTO ROCK: - 0 -

16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA

14 TOTAL DEPTH OF HOLE: 12 Ft

17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

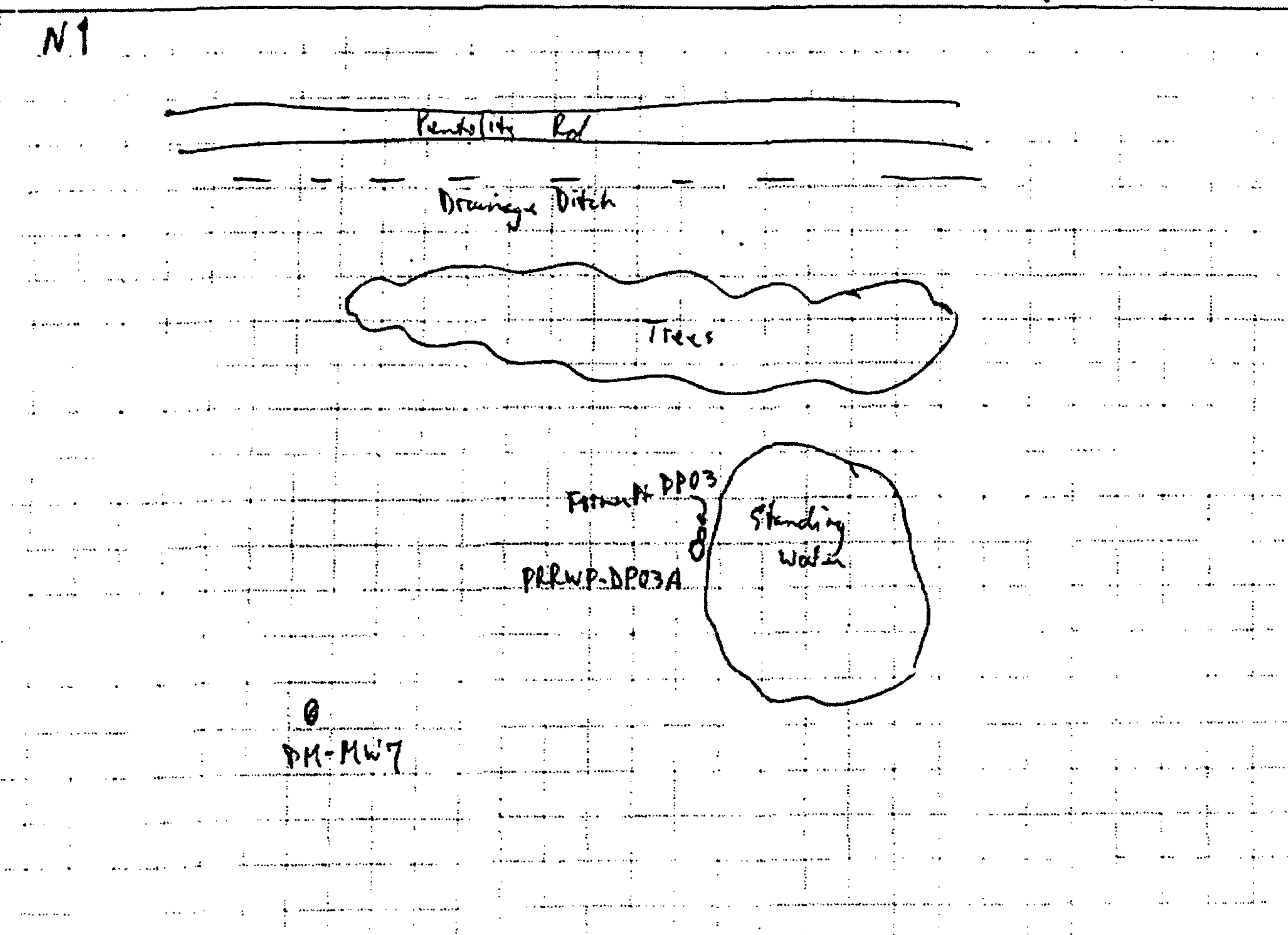
18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes-bent.	NA	NA	David Kessler

LOCATION SKETCH/COMMENTS

SCALE: Not to scale



PROJECT: PBOW

HOLE NO. PRRWP-DP03A

HTRW DRILLING LOG (continuation sheet)

Hole Number: PRRWP-DP03A

Project: PBOW | Geologist: D. Kesilu | Sheet 2 of 3 sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Log	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
	0–1.2	Fill: (Loose, (10YR 4/4) dark yellowish brown, mottled (very dark gray), very fine grain, SAND, little silt, very moist, organics (roots). 1.2	SP	0.0	NA		2.0/2.0	Began drilling 9/27/01 0900; SB-1 0900
	1.2–2.4	Fill: (Medium dense, (2.5Y 2.5/1) black, very fine grain, silty SAND, very moist) 2.4	SM					
	2.4–6	Fill: (~~Loose~~ Stiff, (10YR 4/4) dark yellowish brown, mottled (dark orange/gray), clay SILT, clayey SILT, high plasticity, trace very small pebble very moist 6	MH	0.4			2.0/2.0	SB-2 0903
	4–6			0.2		4.3 BD0001 4.8	1.7/2.0	SB-3 0913; ∇ Encountered groundwater 4.8'
	6–8	Medium stiff, (2.5Y 5/2) grayish brown, mottled (80% - yellow/brown), clay SILT, high plasticity, wet	MH	0.0			2.0/2.0	SB-4 0915
	8–10	color grading to (2.5Y 4/2) dark grayish brown.		0.0			2.0/2.0	SB-5 0920

Project: PBOW

Hole Number: PRRWP-DP03A

HTRW DRILLING LOG	(continuation sheet)	Hole Number PRRWP-DP03A
Project PBOW	Geologist D. Kessler	Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Type	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Medium stiff, (10YR 4/1) dark gray, mottled (brownish yellow) (20%), high plasticity, clayey SILT, saturated	mh	0.0	NA		2.0' / 2.0	SB-6-0923
	11					BD0002		
	12	Total Depth = 12.0 Ft						
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

Project PBOW — Hole Number PRRWP-DP03A

HTRW DRILLING LOG

DISTRICT: Nashville, TN		HOLE NUMBER: PRRWP-DP10A
1 COMPANY NAME: IT Corporation	2. DRILL SUBCONTRACTOR: Boart Longyear	SHEET 1 OF 3 SHEETS
3 PROJECT: PBOW	4 LOCATION: NASA Plum Brook Station, Sandusky, OH	
5 NAME OF DRILLER: Paul Dickinson	6 MANUFACTURER'S DESIGNATION OF DRILL: BK81	
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~1.5"~~ 2½" ID Stainless Steel split-spoons.	8 HOLE LOCATION: See Sketch	
	9 SURFACE ELEVATION: ~~DK See Sketch~~ 634.90 Ft N: 625028.74 E: 1919381.06	
	10. DATE STARTED: 9/26/01	11. DATE COMPLETED: 9/26/01
12 OVERBURDEN THICKNESS: NA unknown	15 DEPTH GROUNDWATER ENCOUNTERED: 8.9 Ft	
13 DEPTH DRILLED INTO ROCK: -0-	16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14 TOTAL DEPTH OF HOLE: 12 Ft	17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

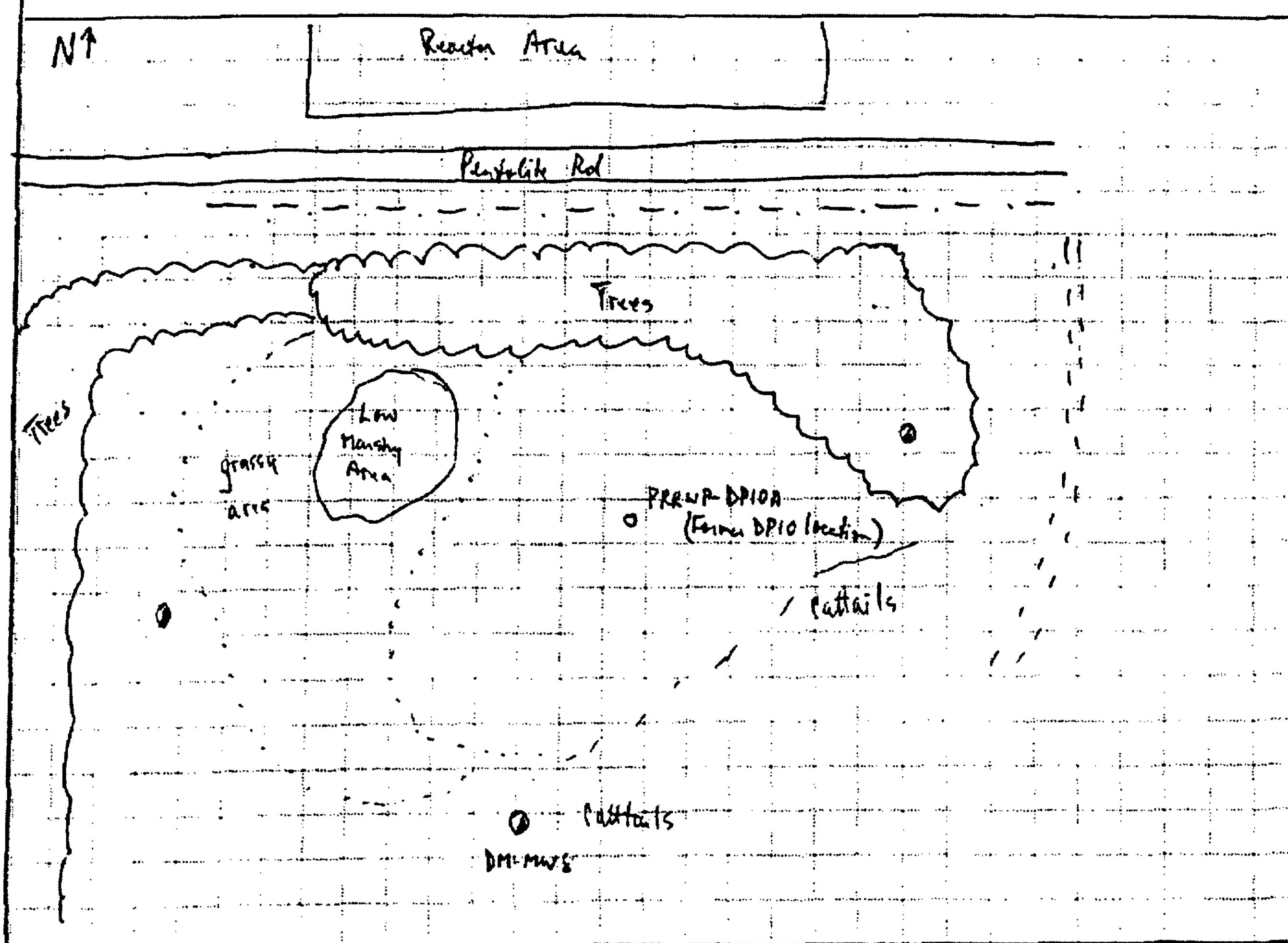
18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes	NA	NA	David Kesch

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT: PBOW	HOLE NO. PRRWP-DP10A

HTRW DRILLING LOG

(continuation sheet)

Hole Number: PRRWP-DP10A

Project: PBOW | Geologist: D. Kissler | Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	0	Weeds Fill: (Loose, (10YR 3/3) dark brown, silty SAND, organic, moist) 0.4	SM		NA			Began drilling 9/24/01 1155
	1	Fill: (Loose, 10YR ~~5/6~~ 4/6 dark yellowish brown, very fine grain SAND, dry very well sorted.) color grading to	SP	0.0			2.0/2.0	SB-1 1155
	2	(10YR 5/8) yellowish brown, mottled (very light br/tan)						SB-2 1200
	3	As above		0.0			1.6/2.0	
	4	As above gray silty SAND spots		0.0			2.0/2.0	SB-3 1210
	6	6.4						SB-4 1212
	7	Stiff, (2.5Y 2.5/1) black, mottled (dark br), silty CLAY, trace sand, trace organics, high plasticity, moist 7.1	CH	0.2			1.4/2.0	
	8	Medium stiff, (10YR 4/3) brown, mottled (light br / gray), high plasticity, clayey SILT, some sand (25%), very moist gray mottles 30%	MH	0.4		8.4 BD0003 8.9	1.8/2.0	SB-5 1220
	9	Color changing at 8.4 ft to (2.5Y 5/3) light olive brown, mottled brownish yellow ~~gray mottles (30%)~~ sand decreases wet w/depth						▽ Encountered groundwater 8.9 ft strange, sweet odor faint
	10							

Project: PBOW | Hole Number: PRRWP-DP10A

HTRW DRILLING LOG	(continuation sheet)	Hole Number: PRRWP-DP10A
Project: PBOW	Geologist: D. Kyssler	Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS or Lithic	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	10	Medium stiff, (2.5Y 5/3) light olive br., mottled (brownish yellow), high plasticity Clayey SILT, wet	MH	NM	NO	10.5 BD0004 MS, MSD 12	2.0/2.0	SB-6 1225
	12	Total Depth = 12 Ft						

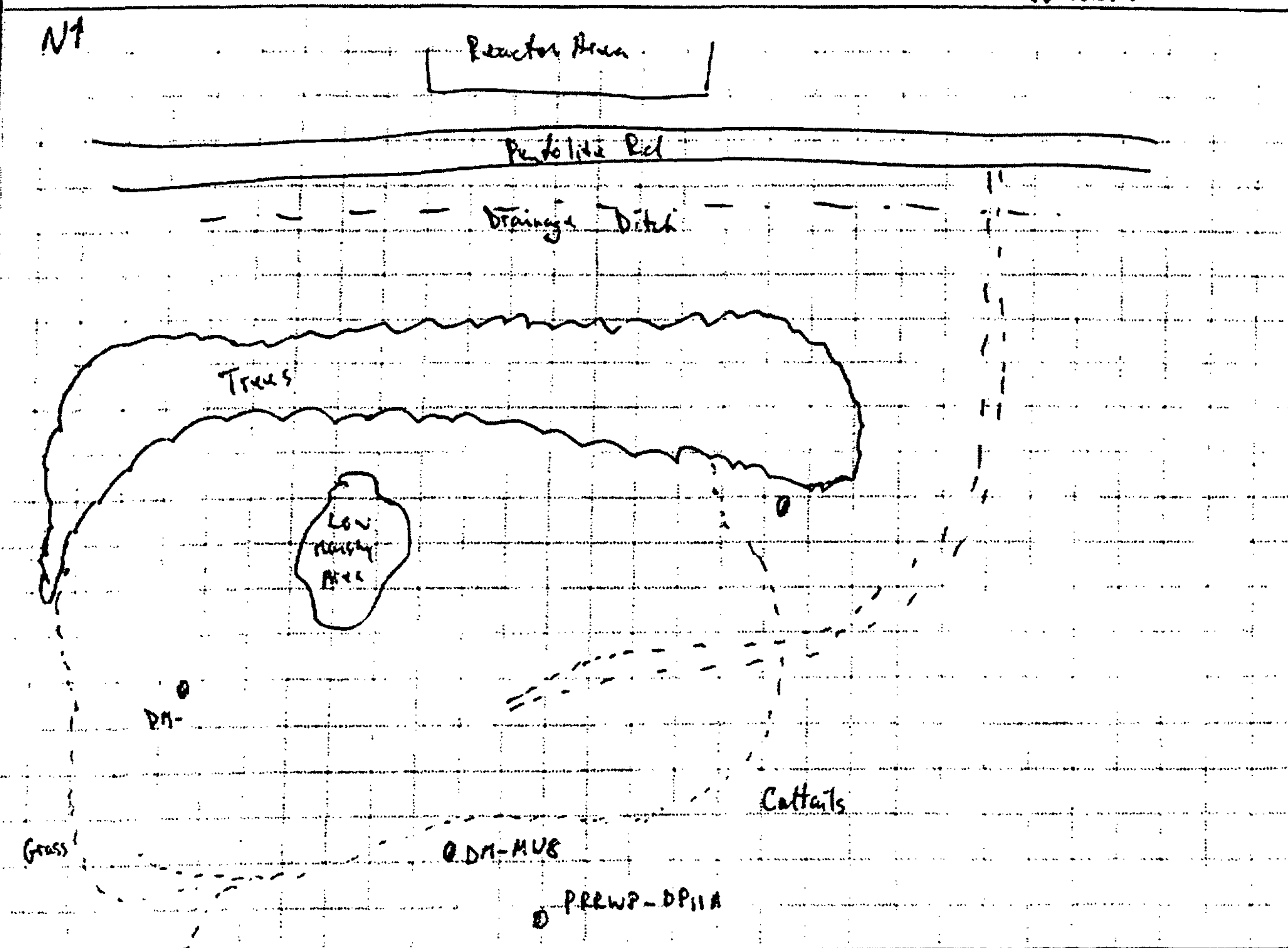
Project: PBOW
Hole Number: PRRWP-DP10A

HTRW DRILLING LOG

DISTRICT	Nashville, TN
HOLE NUMBER	PRRWP-DP11A
SHEET 1 OF 3 SHEETS	
1 COMPANY NAME	IT Corporation
2. DRILL SUBCONTRACTOR	Boart Longyear
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Paul Dickinson
6 MANUFACTURER'S DESIGNATION OF DRILL	BK81
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4¼" ID/8" OD HSA with ~~2"~~ 2½" ID Stain-less Steel split-spoons
8 HOLE LOCATION	See Sketch
9 SURFACE ELEVATION	631.77 Ft N: 624840.68 E: 1919354.54
10 DATE STARTED	9/26/01
11 DATE COMPLETED	9/26/01
12 OVERBURDEN THICKNESS	NA - unknown
15 DEPTH GROUNDWATER ENCOUNTERED	4.4 Ft
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14 TOTAL DEPTH OF HOLE	12 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	SPLP	NA	NA %
22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR		
	yes	NA	NA	David Kesch		

LOCATION SKETCH/COMMENTS SCALE: Not To Scale



PROJECT PBOW	HOLE NO. PRRWP-DP11A

HTRW DRILLING LOG (continuation sheet)

Hole Number: PRRWP-DP11A

Project: PBOW | Geologist: D. Kessler | Sheet 2 of 3 Sheets

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS Line	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No	Recovery (ft)	Remarks
		Cattails						
		Fill: (Loose (10YR 4/6) dark yellowish br, mottled (dark br), silty SAND, organic, cattail (roots), moist)	SP		N/A		2.0/	Began drilling 9/26/01 1533 SB-1 1534
	1	color changing at 1 ft to (2.5Y 3/3), light olive br, mottled brown), trace silt (10%)		0.0			2.0	
	2			0.0				
		As above color change to (10YR 4/4) dark yellowish br, mottled (black gray/black)	SP			2.6 BD0005 3.2	1.1/ 2.0	SB-2 1535
	3							
	4	very moist to wet 4.4						
		soft, (2.5Y 4/2) dark grayish brown mottled (br), high plasticity, clayey SILT, trace sand (5%), moist to wet	mh	0.3		~~DK 5.2 BD0015 5.7~~	1.7/ 2.0	SB-3 1543 ∇ encountered groundwater at 4.4 ft
	5	sand increases w/ depth						
	6	As above					2.0/ 2.0	SB-4 1548 ~~[illegible]~~ groundwater [illegible]
	7	vertical fracture 7.7 to 8.0 ft, wet		0.0				
	8	Color changes to (2.5Y 3/3) dark olive br, mottled (gray/black) sand 30%, saturated	mh	0.0			2.0/ 2.0	SB-5 1551
	9							
	10							

Project: PBOW | Hole Number: PRRWP-DP11A

HTRW DRILLING LOG	(continuation sheet)	Hole Number: PRRWP-DP11A
Project: PBOW	Geologist: D. Kessler	Sheet 3 of 3 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS/Litho	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Medium stiff, (2.5Y 3/3) dark olive br, mottled (grey/black/brown), sandy SILT, (30% very fine grain sand), high plasticity, wet	mh		NA			SB-6 1605
	11					11	2.0/	
						BD0006	2.0	
	12					12		
		Total Depth - 12.0 Ft						
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

Project: PBOW   Hole Number:

HTRW DRILLING LOG

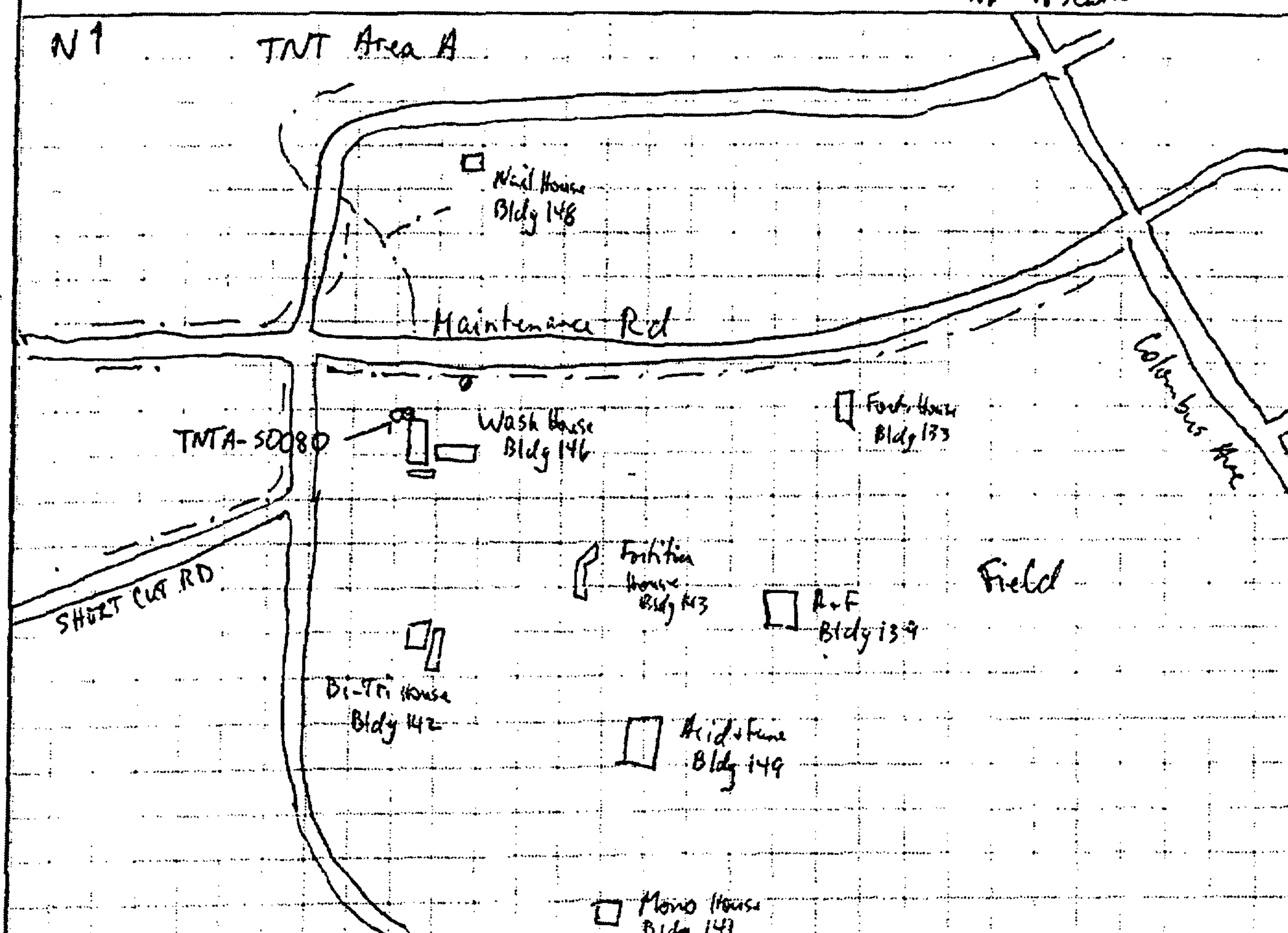
Field	Entry
DISTRICT	Nashville, TN
HOLE NUMBER	TNTA-SO080
SHEET 1 OF 2 SHEETS	
1. COMPANY NAME	IT Corporation
2. DRILL SUBCONTRACTOR	Boart Longyear
3. PROJECT	PBOW
4. LOCATION	NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER	Paul Dickinson
6. MANUFACTURER'S DESIGNATION OF DRILL	BK81
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4 1/4" ID/8" OD HSA with 1.4" ID Stain-less Steel split-spoons. and 2.5" ID spoon
8. HOLE LOCATION	See Sketch TNTA-Bldg 146
9. SURFACE ELEVATION	~~See Sketch~~ 636.69 Ft N: 623441.95 E: 1922581.90
10. DATE STARTED	9/26/01
11. DATE COMPLETED	9/26/01
12. OVERBURDEN THICKNESS	NA (unknown)
13. DEPTH DRILLED INTO ROCK	-0-
14. TOTAL DEPTH OF HOLE	10.0 Ft
15. DEPTH GROUNDWATER ENCOUNTERED	Overburden – not encountered
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
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	SPL Leachate	NA	NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes	NA	NA	David Kresch

LOCATION SKETCH/COMMENTS SCALE: Not to Scale



PROJECT PBOW HOLE NO. TNTA-SO080

HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA - S0080

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

Elev (ft)	Depth (ft) bgs	Description of Materials	USCS Unit	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
	0	Weeds Fill: (Very soft, (10YR 2/1) black, silty SAND, organics, moist)	Sm		NA			Began drilling 8/26/01 1015
		Fill: (Loose (10YR 4/4) dark yellowish brown, mottled (light brown/gray), very fine grain, SAND, little silt (15%), moist)		1.4 ~~0.6~~		0.5 BD0009 BD0010 (FD) 1.5	1.2/2.0	SB-1 1015 collected w/ 3' spoon
	1							
	2	2.3						SB-2 1020 Cille
	3	Hard, (2.5Y 5/1) gray, homogeneous, low plasticity, silty CLAY, blocky texture, trace black organics, dry trace rock fragments (1in - 1%, [illegible])		0.5			0.5/2.0	
	4							SB-3 1025
	5	As above		0.4			1.4/2.0	Petroleum/ sulfide odor distinct
	6							SB-4 1035
	7	laminations evident		1.2			1.5/2.0	Bedrock ?
	8	lime pebbles 8.3 – 8.5'		1.8		8 BD0011 ~~BD0012 (split)~~ bkk	1.7/2.0	SB-5 1045
	9							
	10	Total Depth = 10.0 ft				10		

Project: PBOW | Hole Number: TNTA-S0080

HTRW DRILLING LOG

DISTRICT: Nashville, TN		HOLE NUMBER: TNTA-S0012
1. COMPANY NAME: IT Corporation	2. DRILL SUBCONTRACTOR: Boart Longyear	SHEET 1 OF 2 SHEETS
3. PROJECT: PBOW	4. LOCATION: NASA Plum Brook Station, Sandusky, OH	
5. NAME OF DRILLER: Paul Dickinson	6. MANUFACTURER'S DESIGNATION OF DRILL: BK81	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 1.4" ID Stainless Steel split-spoons.	8. HOLE LOCATION: See Sketch TNTA-Bldg 195	
	9. SURFACE ELEVATION: 660.14 Ft N: 622905.61 E: 1923104.88	
	10. DATE STARTED: 9/26/01	11. DATE COMPLETED: 9/26/01
12. OVERBURDEN THICKNESS: NA unknown	15. DEPTH GROUNDWATER ENCOUNTERED: Overburden – not encountered	
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 6 Ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

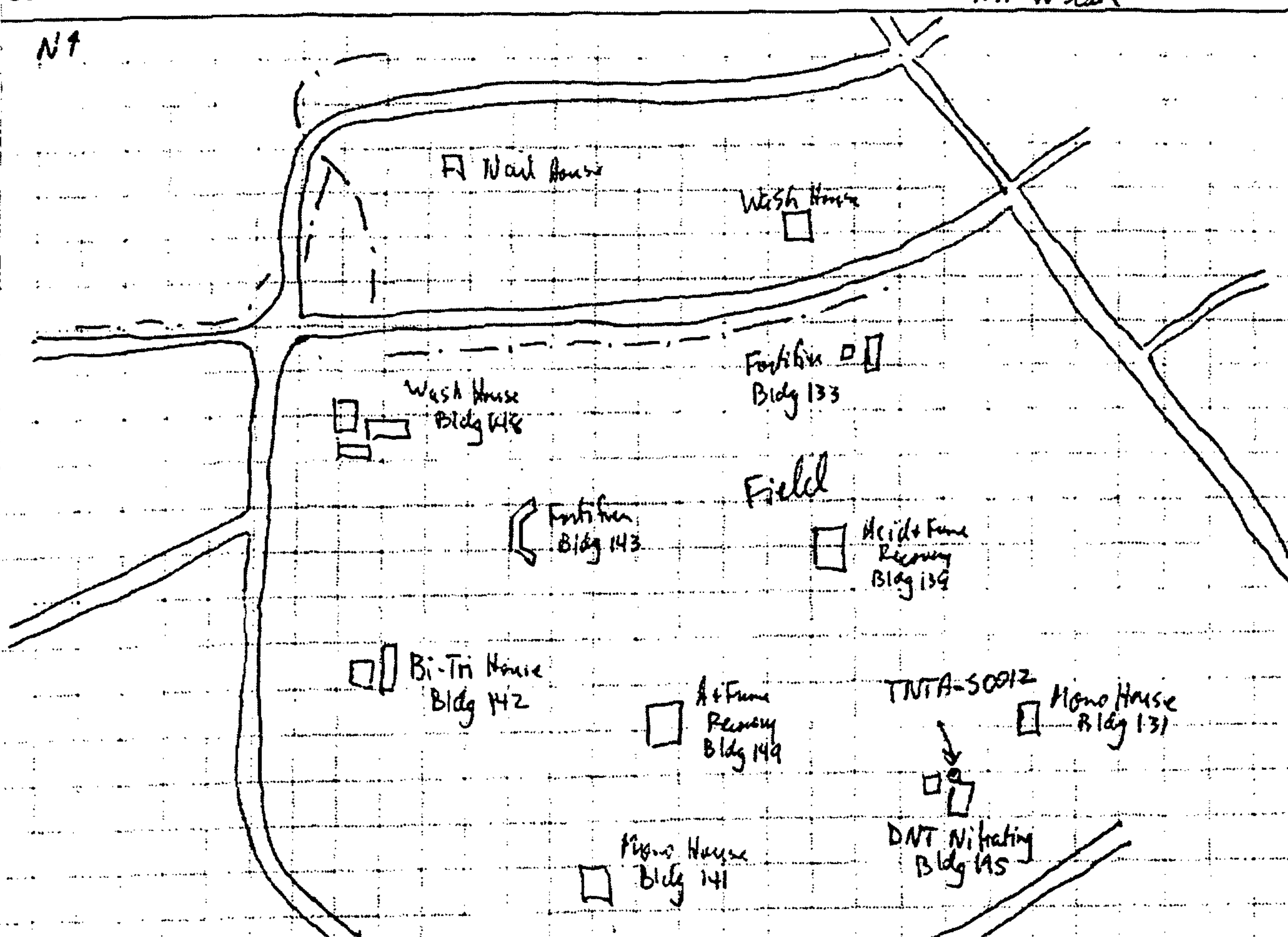
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes	NA	NA	David Kuseh

LOCATION SKETCH/COMMENTS

SCALE: Not to scale



PROJECT	HOLE NO.
PBOW	TNTA-S0012

HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-S0012

Project: PBGW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech. Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		WEEDS						
		Black silty SAND 0.2						
		Fill: (~~Stiff~~, (10YR 4/6) dark yellowishish brown, mottled (light br/red), very fine grain, silty SAND, dry, 5% subrounded, very coarse grain rock,	SP	0.0	NA	0.5 BD0007 1.5	1.3/ 2.0	Began drilling 9/24/01 0813 SB-1 0820
	1							
	2							SB-2 0822
		As above, cobbles/pebbles		0.0			1.1/ 2.0	
	3	3						
		K						
	4					4		
		Fill: (Medium stiff, (10YR 5/4) yellowish brown mottled (gray, orange, brown), low plasticity, sandy, silty CLAY, blocky texture, sandy 15%, shale fragments, dry)	CL	0.0		BD0008	2.0/ 2.0	SB-3 0935 (collected w/300lb hammer)
	5							
	6					6		
		Total Depth = 6.0 Ft						
	7							
	8							
	9							
	10							

Project: PBGW

Hole Number: TNTA-S0012

HTRW DRILLING LOG

DISTRICT	Nashville TN
HOLE NUMBER	TNTB-SS295
SHEET	1 OF 2 SHEETS
1 COMPANY NAME	IT Corporation
2 DRILL SUBCONTRACTOR	Boart Longyear
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Paul Dickinson
6 MANUFACTURER'S DESIGNATION OF DRILL	BK81
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4¼" ID/8" OD HSA with ~~2~~ 2.5" ID Stainless Steel split-spoons.
8 HOLE LOCATION	See Sketch - TNTB, Bldg 456, Former Sample #SS295
9 SURFACE ELEVATION	N: 618323.00 E: 1918833.09
10 DATE STARTED	9/27/01
11 DATE COMPLETED	9/27/01
12 OVERBURDEN THICKNESS	NA (Unknown)
15 DEPTH GROUNDWATER ENCOUNTERED	Groundwater not encountered
13 DEPTH DRILLED INTO ROCK	-0-
16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14 TOTAL DEPTH OF HOLE	4Ft
17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

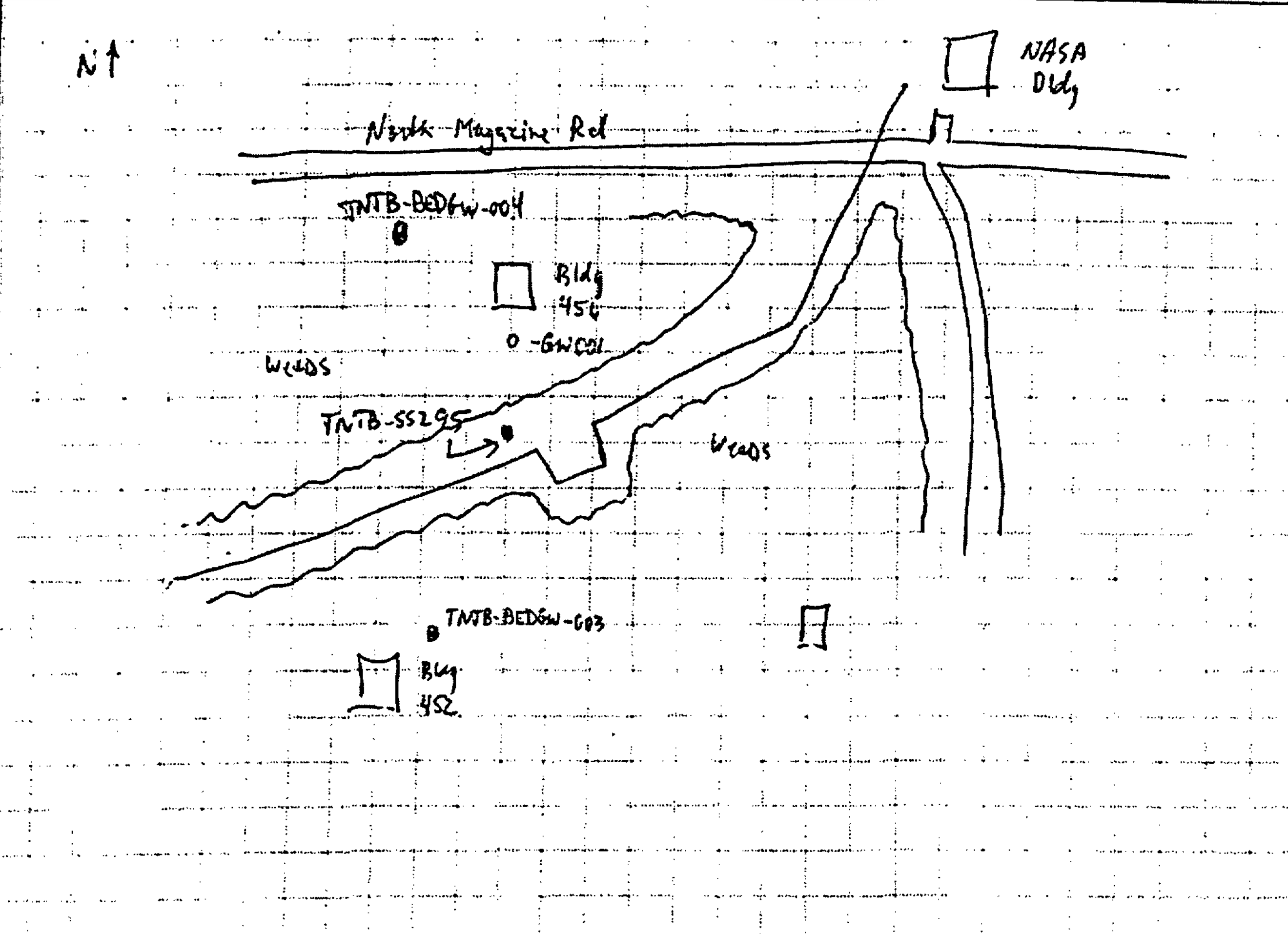
18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes - Bent.	NA	NA	David Kesh

LOCATION SKETCH/COMMENTS

SCALE: Not To Scale



PROJECT PBOW

HOLE NO. TNTB-SS295

HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-SS295

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
	0–1.0	Fill: (Loose, (10YR 4/4) dark yellowish brown, mottled (black) silty SAND, ~~mottled~~ organics, slate pieces, dry) 1.0	SM		NA	0 BD0013 1	1.7/2.0	Began drilling 9/27/01 SB-1 1415
	1.0–4.0	Fill: (Hard ~~Medium~~ ~~stiff~~, (10YR 3/2) very dark grayish brown, mottled (brown/black), low plasticity, silty CLAY, some sand (20%), fine to very coarse grain, dry)				2.5 BD0014 BD0031 (FS) 3.5	0.8/2.0 1.0/2.0	SB-2 1440
	4	Total Depth: 4 Ft						- Not enough recovery for sample 2-4 Ft - Will push again Again obtained 1Ft Recovery (sample ~~&~~ compacted)

Project: PBOW

Hole Number: TNTB-SS295

HTRW DRILLING LOG

DISTRICT	Nashville, TN
HOLE NUMBER	TNTB-~~612~~ SS375
SHEET	1 OF 2 SHEETS
1 COMPANY NAME	IT Corporation
2. DRILL SUBCONTRACTOR	Boart Longyear
3 PROJECT	PBOW
4 LOCATION	NASA Plum Brook Station, Sandusky, OH
5 NAME OF DRILLER	Paul Dickinson
6 MANUFACTURER'S DESIGNATION OF DRILL	BK81
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4¼" ID/8" OD HSA with ~~1.5~~ 2.5" ID Stainless Steel split-spoons.
8 HOLE LOCATION	See Sketch TNTD, Bldg 452, Former Sample 375
9 SURFACE ELEVATION	N: 618043.21 E: 1918673.57
10 DATE STARTED	9/27/01
11 DATE COMPLETED	9/27/01
12 OVERBURDEN THICKNESS	NA (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

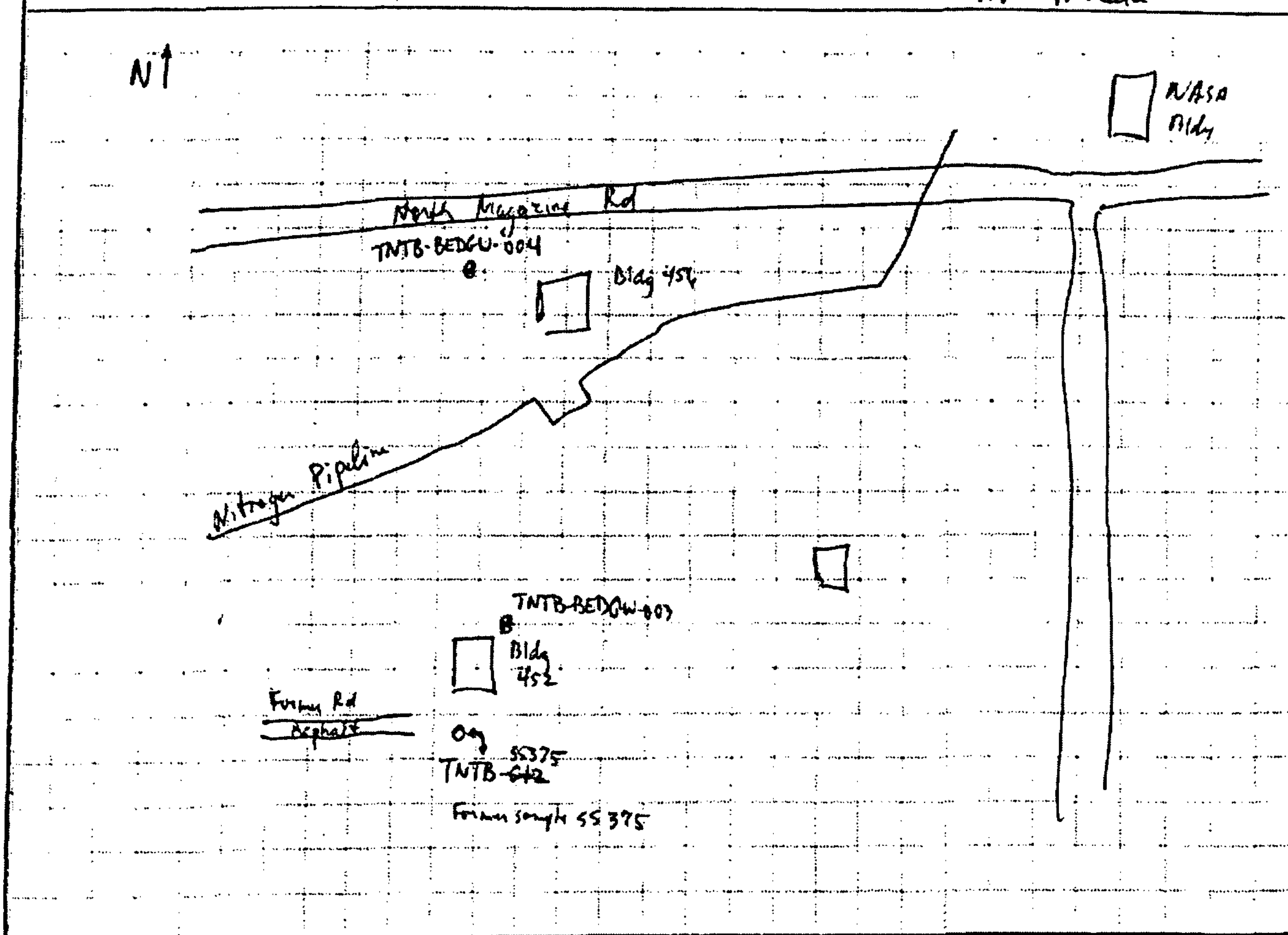
18 GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19 TOTAL NUMBER OF CORE BOXES		
	NA	NA	NA		

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

22 DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23 SIGNATURE OF INSPECTOR
	yes - Bent.	NA	NA	David Leach

LOCATION SKETCH/COMMENTS

SCALE: Not to Scale



PROJECT PBOW	HOLE NO TNTB-~~612~~ SS375

HTRW DRILLING LOG

(continuation sheet)

Hole Number: ~~CHDKE~~ TNTB-~~553~~ 55375

Project: PBGW | Geologist: D. Kessler | Sheet 2 of 2 sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
		Fill: (loose, (10YR 5/6) yellowish brown, very fine grain, very well sorted, SAND, trace silt, dry)	SP	0.0	NA		1.5/ 2.0	Began drilling 9/27/01 1110 SB-1
	1	1.1 Fill: loose, white/grey, SAND/GRAVEL 1.3	gm	0.3				
	2	Very loose (10YR 5/6), yellowish brown, mottled (10% - dark reddish brown), very fine grain, very well sorted, SAND, trace silt, dry	SP	0.0			2.0/ 2.0	SB-2 1112
	3							
	4	As above		0.0		BD0015	1.3/ 2.0	SB-3 1115
	5							
	6	As above	SP	0.0			2.0/ 2.0	SB-4 1118
	7							
	8	As above		0.0		BD0016 MS MSD	2.0/ 2.0	SB-5 ~~E~~ 1120
	9							
10	10	Total Depth = 10.0 Ft						

Project: PBGW | Hole Number: ~~TNTB-55375~~

TNTB-55375 DKK

HTRW DRILLING LOG

Field	Entry
DISTRICT	Nashville, TN
HOLE NUMBER	TNTC-AB0464A
SHEET 1 OF 2 SHEETS	
1. COMPANY NAME	IT Corporation
2. DRILL SUBCONTRACTOR	Boart Longyear
3. PROJECT	PBOW
4. LOCATION	NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER	Paul Dickinson
6. MANUFACTURER'S DESIGNATION OF DRILL	BK81
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4¼" ID/8" OD HSA with ~~2"~~ 2.5" ID Stain-less Steel split-spoons.
8. HOLE LOCATION	See Sketch TNTC Bldg 603 Former location 464
9. SURFACE ELEVATION	666.85 Ft N: 620308.33 E: 1911597.37
10. DATE STARTED	9/28/01
11. DATE COMPLETED	9/28/01
12. OVERBURDEN THICKNESS	7 Ft
13. DEPTH DRILLED INTO ROCK	1 Ft
14. TOTAL DEPTH OF HOLE	8 Ft
15. DEPTH GROUNDWATER ENCOUNTERED	Not encountered
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

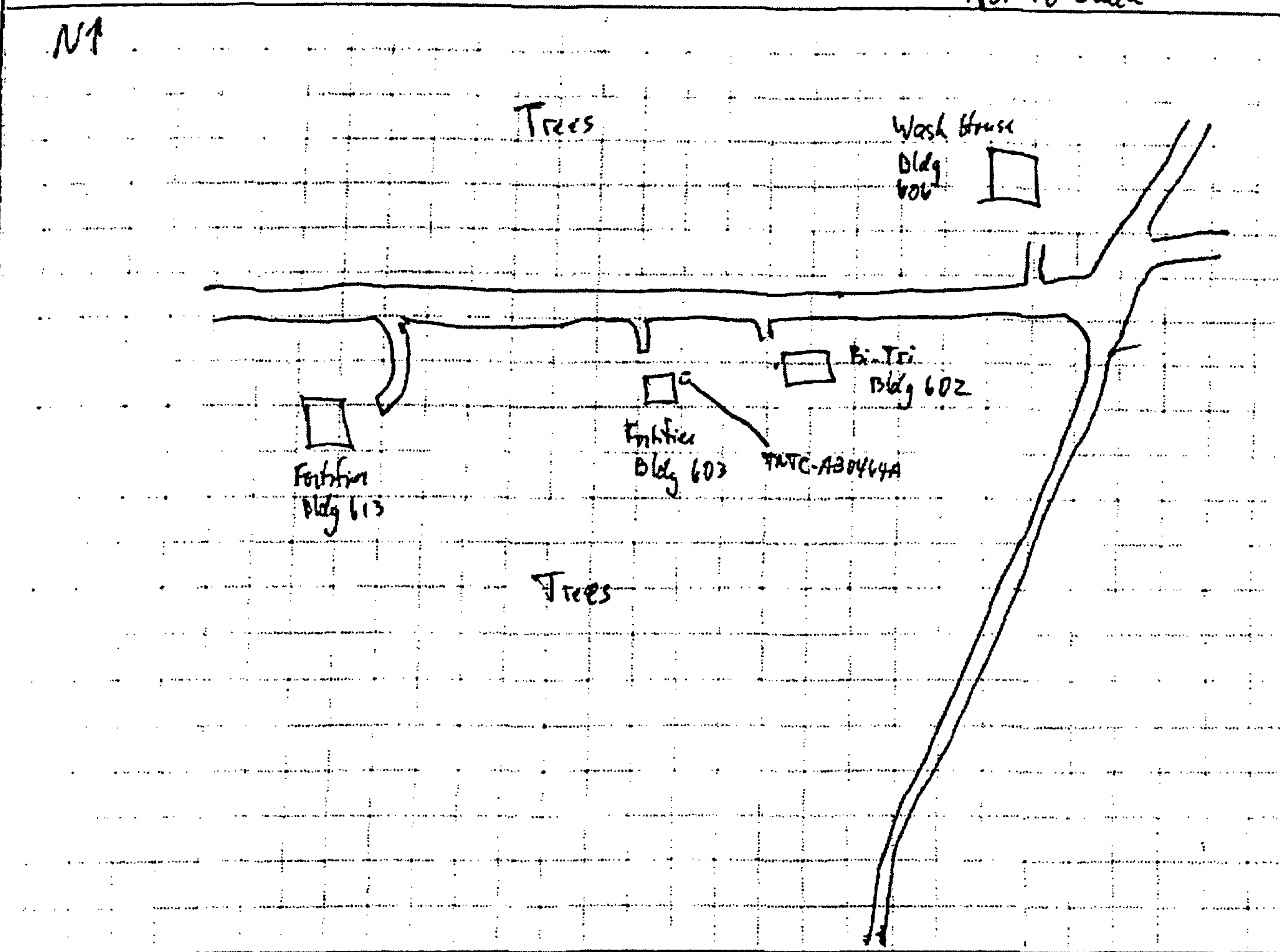
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes - Bent	NA	NA	David Kessh

LOCATION SKETCH/COMMENTS

SCALE: Not To Scale



PROJECT PBOW

HOLE NO. TNTC-AB0464A

HTRW DRILLING LOG (continuation sheet)

Hole Number: TNTC-AB0464A

Project: PBCW | Geologist: D. Kessler | Sheet 2 of 2 sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Unit	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
	0	Fill: (Loose, (10YR 4/6) dark yellowish br, vfg, SAND, trace silt, very well sorted, dry)	SP	0.0	NA		1.4/2.0	Began drilling 9/28/01 1620; SB-1 1620
	2.3 – 2.4	Crushed GRAVEL						
		Fill: (Very Loose, (10YR 6/6) brownish yellow, vfg, SAND, trace silt, very well sorted, trace silt nodules (20 x 10mm), dry)	SP	0.0			1.5/2.0	SB-2 1621
	4	As above		0.0		~~BD0021~~ BD0021R	1.7/2.0	dup 10/2/01 1115; SB-3 1626; Rusty red color in streaks ~~5.~~ 5.4-5.7'
	5.7	Large LM cobble in shoe 5.7 ft						
	6	As above				~~BD0022~~ BD0022R	2.0/2.0	dup 10/2/01 1120; SB-4 1630; Rusty red colored stain 6.3-6.6 ft. Contaminate?
	7	Bedrock: Decomposed, heavily weathered, SHALE, thinly laminated, sts bracioped fossils,		0.0				62 blows w/ 300 lb hammer for last 6"
	8	Total Depth = 8.0 ft						~~SB-5~~ TMKA

Project: PBCW

Hole Number: TNTC-AB0464A

HTRW DRILLING LOG

Field	Entry
DISTRICT	Nashville, TN
HOLE NUMBER	TNTC-AB0066A
SHEET	1 OF 2 SHEETS
1. COMPANY NAME	IT Corporation
2. DRILL SUBCONTRACTOR	Boart Longyear
3. PROJECT	PBOW
4. LOCATION	NASA Plum Brook Station, Sandusky, OH
5. NAME OF DRILLER	Paul Dickinson
6. MANUFACTURER'S DESIGNATION OF DRILL	BK81
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	4¼" ID/8" OD HSA with 1.5" ID Stainless Steel split-spoons 2.5"
8. HOLE LOCATION	See Sketch - TNT Area C, Bldg 629, Former Stake 066
9. SURFACE ELEVATION	669.31 Ft; N: 619768.03; E: 1910167.01
10. DATE STARTED	9/28/01
11. DATE COMPLETED	9/28/01
12. OVERBURDEN THICKNESS	9.8 Ft
13. DEPTH DRILLED INTO ROCK	0.2 Ft
14. TOTAL DEPTH OF HOLE	10 Ft
15. DEPTH GROUNDWATER ENCOUNTERED	Not encountered
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

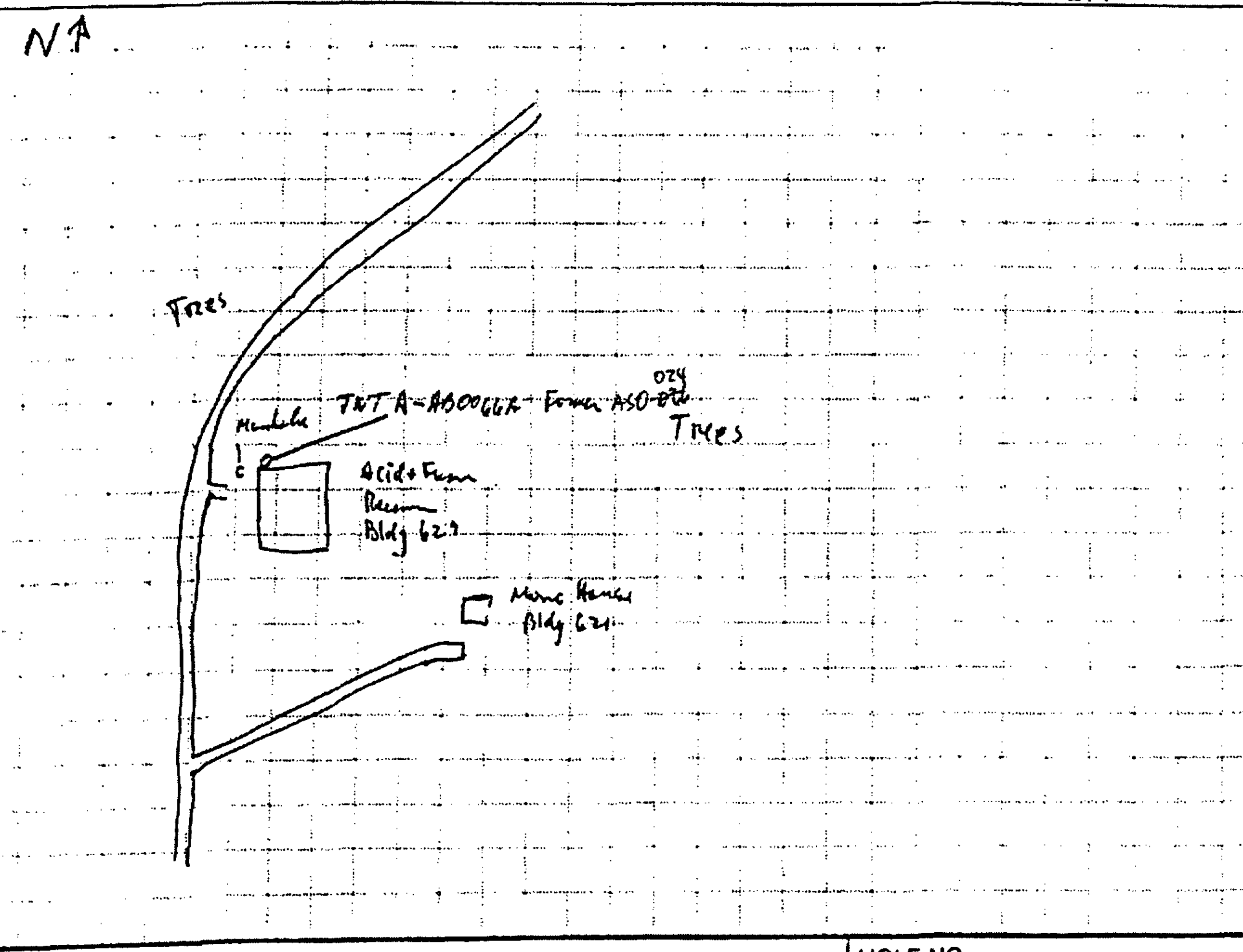
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

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

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	yes - Bent.	NA	NA	David Kesah

LOCATION SKETCH/COMMENTS

SCALE: Not To Scale



PROJECT	HOLE NO.
PBOW	TNTC-AB0066A

HTRW DRILLING LOG (continuation sheet)

Hole Number: TNTC-AB0066A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

Elev (ft)	Depth (ft bgs)	Description of Materials	USCS Code	Field Screening Results (ppm)	Geotech Sample or Core Box No.	Analytical Sample No.	Recovery (ft)	Remarks
		Grass						
		Fill: (Soft, (7.5YR 7/4) dark brown, low plasticity, sandy SILT, 40% sand, organics, pebbles, concrete frags, dry) black ash/cinders 0.8	ml		NA		1.2/ 2.0	Began drilling 9/28/01 1445; SB-1 1445
	1	Concrete 1.2		0.0				
	2	Fill: (Loose, (10YR 4/6) dark yellowish brown, very fine grain, SAND, little silt (20%), dry) rock pebbles, 1" color change at 3.1 ft; (10YR 5/3) brown.	Sm					start new borehole 6" east
	3			0.0		2.5 ~~BD0017~~ BD0017R 3.4	1.4/ 2.0	SB-2 1500; DK 10/02/01 0945
	4	As above						
	5			0.0			1.1/ 2.0	SB-3 1505
	6	Very hard, (10YR 5/1) grey, mottled (2% - yellow br), low plasticity, silty CLAY, dry						
	7		cl	0.0			2.0/ 2.0	SB-4 1510
	8					8		
	9	3 9.8 DK		0.0		~~BD0018~~ BD0018R BD0019R FD 9.3	1.3/ 2.0	DK 10/02/01 1125; SB-5 1525
	10	weathered SHALE,				Rck		

Project: BBOW Total Depth: 10.0 ft

Hole Number: TNTC-AB0066A

APPENDIX F

WELL DEVELOPMENT LOGS

COMPLETED 9/22/01

GOOD

IT CORPORATION

Well Development Log

Project Number: 825635
Project Name: PBOW
Form Completed by: CARLOS GRANDE
Well Developed by/firm: BART LONGYEAR

Site ID:
Location ID: PB BED MW 22
Date Started: 9/21/01

Monitoring Well Information

Development Method:
Development Equipment: GRUNDFOS PUMP & BAILER

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 30.15
Total depth of Well (ft): 44.45

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) = 0.16 gal/ft
Well Volume (gallons) = Water Column (ft) x Gal/ft = 14.3 ft x 0.16 gal/ft = 2.28 gallons

50 GALLONS LOST

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) = (14.3)ft x (1.31) gal/ft x 0.3 = 5.62 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 5.61 gal + 2.28 gal = 7.89 gal.

39.45
50.00
89.45

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
7.89	15.78	23.67	31.56	39.45

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)	ORP Redox (mV)	Comments
0935	3	36.13	8373	GRAY	15.10	7.13	0.915	3.08	-84	0930 BEGAN BAILING
0945	4.5	40.10	1609	GRAY	15.19	7.11	0.869		-68.4	
0950	5.5	WELL DRY								
1004	6.5	WELL DRY								
1026	7.0	40.20	1615	GRAY	16.42	7.34	0.849	1.84		WELL DRY,
1040	9.0	42.90	1578.4	GRAY	13.13	6.88	0.984	5.01	-110	BAILING
1050	12.0	40.10	1598.5	GRAY	13.06	6.85	1.00	2.22	-122	
1100	14.00	42.90	1597	GRAY	12.79	6.86	0.967	1.58	-127	
1120	16.5	43.00	1158	LIGHT GRAY WHITE	12.92	6.80	1.08	2.30	-116	

BEGAN DEVELOPMENT

COMPLETED GOOD 9/22/01

IT CORPORATION

Well Development Log

Page 2 of 3

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID: PBOW
Location ID: PBBTED MW22
Date Started: 9/21/01

Monitoring Well Information

Development Method: ______
Development Equipment: ______

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 30.15
Total depth of Well (ft): 44.45

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) = ______ 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 diameter in inches & d is casing diameter in inches = 0.041 x ((______)^2 - (______)^2) = ______ gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (______)ft x (______) gal/ft x 0.3 = ______ gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ______ gal + ______ 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
7.89	15.78	23.67	31.56	39.45

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~~ ORP (mV)	Comments
1150	17.0	31.9	406.3	GRAY	13.06	6.77	1.106	4.92	-132.5	
1220	20.5	43.16	728	GRAY	12.57	6.91	1.16	5.03	-113.8	
1221	—	—	WELL BAILED			DRY				
1420	~~23.4~~ 23.5	37.2	1235.8	GRAY	12.98	6.87	1.13	4.61	-117.6	1410 BEGAN BAILING
1430	26.5	42.5	1284	GRAY	12.43	6.80	1.14	3.50	-125.3	
1440	28.0	43.5	366	GRAY	12.51	6.74	1.10	3.88	-140.8	
0850	28.0	30.15	486	GRAY CLOUDY	11.97	6.92	1.00	—	-115.0	9/22/01
0906	31	34.60	1134	GRAY CLOUDY	11.97	6.84	0.969	13.02	-125.8	
0915	33	38.40	912	GRAY CLOUDY	11.92	6.77	1.07	12.26	-163	

COMPLETED 9/22/01
GOOD

IT CORPORATION

Well Development Log

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID:
Location ID: PBBEDMW22
Date Started: 9/21/01

Monitoring Well Information

Development Method:
Development Equipment: PUMP - GRUNFOS & BAILER

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 30.15
Total depth of Well (ft): 44.45

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) = _____ 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 diameter in inches & d is casing diameter in inches = 0.041 x ((_____)^2 - (_____)^2) = _____ gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (_____)ft x (_____) gal/ft x 0.3 = _____ gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = _____ gal + _____ 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
7.89	15.78	23.67	31.56	39.45

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)	ORP Redox (mV)	Comments
0928	37	40.05	113	GREY CLOUDY	12.04	6.95	1.09	—	-111	9/22/01
0932	39	42.30	23	CLEAR	11.95	6.78	1.11	—	-148.8	
0945	42	42.50	~~33~~ 26.0	CLEAR	11.91	6.46	1.19	—	-159	
0950	43	42.85	23.0	CLEAR	11.93	6.76	1.19	—	-161	

IT CORPORATION

Well Development Log

Project Number: 825135
Project Name: Plum Brook
Form Completed by: R Pederis
Well Developed by/firm: Boart Longyear

Site ID: Plum Brook
Location ID: PB-BGD-MW23
Date Started: 9/14/01

Monitoring Well Information

Development Method: grundfos pump
Development Equipment:

Screen Height (ft): 20
Filter pack lenght (ft): 25
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 44
Total depth of Well (ft): 78

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 = 29 ft x 0.164 gal/ft = 4.72 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) = 1.312 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (25)ft x (.164) gal/ft x 0.3 = ~~4~~ 1.23 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 1.23 gal + 4.72 gal = 5.95 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
5.95				29.75

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
440	30	dry 65	1524.8	gray	16.3	7.23	1.855	11.36		
500	30	67	1511.8	l. gray	13.6	7.19	2.404	9.54		

COMPLETED 9/21/01

GOOD

IT CORPORATION

Well Development Log

Page 1 of 2

Project Number: 825635

Project Name: PBOW

Form Completed by: CHRIS GRANDE

Well Developed by/firm: BOART LONG YEAR

Site ID:

Location ID: PBBRD MW 24

Date Started: 9/19/01

Monitoring Well Information

Development Method:

Development Equipment: BAILING GRUNDFOS PUMP

Screen Height (ft): 15

Filter pack lenght (ft): 17

Casing Diameter (in): 2"

Begining Measurements (BTOC)

Depth to Water (ft): 28.03

Total depth of Well (ft): 42.75

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 $)^2$) = 0.16 gal/ft.

Well Volume (gallons) = Water Column (ft) x Gal/ft = 14.72 ft x 0.16 gal/ft = 2.35 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) = (14.72 ft x (1.31) gal/ft x 0.3 = ~~10.86~~ gal 5.78

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ~~10.86~~ 5.78 gal + 2.35 gal = ~~13.21~~ gal. 8.13

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
~~13.21~~ 8.13	~~26.42~~ 16.26	~~39.63~~ 24.39	~~52.84~~ 32.52	~~66.05~~ 40.65

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)	ORP ~~Redox~~ (mV)	Comments
	1620	0	28.03	1568	DARK GRAY	12.56	6.99	1.759	0.95	-95.7	STRONG ROTTEN EGG ODOR
	1645	5	41.20	1567	DARKER GRAY	12.22	6.35	1.67	3.60	-223.4	WELL DRY
	1710		34.50								
	1715	5.5	34.50	1567	DARK GRAY	12.27	5.98	1.735	7.47	-269	
9/19/01	1725	6.3	42.00								WELL DRY AGAIN
9/20/01	1415	7.3	29.00	1079	GRAY	12.85	6.85	1.800	18.33		9/20/01 PUMPING
	1430	10.3	29.73	1713	GRAY	12.64	6.75	1.81	20.33	-234.9	
	1440	15.3	29.80	1347.7	GRAY	13.06	6.77	1.82	14.20	-231.2	
	1503	20	39.50	407	GRAY	18.65	6.8	1.76	16.92	-240	

COMPLETE 9/21/01
GOOD

IT CORPORATION

Well Development Log

Project Number: 826635
Project Name: PBOW
Form Completed by: CHRIS GRONDE
Well Developed by/firm: BOART LONGYEAR

Site ID: ~~PB-BED MW24~~
Location ID: PB-BED MW24
Date Started: 9/19/01

Monitoring Well Information

Development Method: ____________
Development Equipment: ____________

Screen Height (ft): ____________
Filter pack lenght (ft): ____________
Casing Diameter (in): ____________

Begining Measurements (BTOC)
Depth to Water (ft): ____________
Total depth of Well (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) = ________ 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 diameter in inches & d is casing diameter in inches = 0.041 x ((______)^2 - (______)^2) = ________ gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (________)ft x (________) gal/ft x 0.3 = ________ gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ________ gal + ________ 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
8.13	16.26	24.39	32.52	40.65

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~~ ORP (mV)	Comments
1525	22	37.89	402	GRAY	21.58	6.86	1.76	17.16	-230	
1537	24	35.5	4662	GRAY	23.84	6.83	1.77	20.03	-225	9/20/01
1540	24	39.5	201	GRAY	18.23	6.73	1.75	14.16	~~122~~ -234	
1550	26	40.8	347	GRAY	16.93	6.73	1.37	17.68	-164	28.60 WATER 9/21/01
1555	28	— WELL DRY								
1605	33	38.8	857	GRAY	15.68	6.62	1.78	19.15	-188	
1610	38	39.02	452	GRAY	15.76	6.61	1.80	21.08	-182.5	
1620	44	39.73	85.6	CLEAR	16.05	6.57	1.78	21.83	-183.5	
1630	51	39.90	14.7	CLEAR	15.92	6.53	1.75	18.71	-198.7	
1635	54	3998	19.8	CLEAR	16.2	6.55	1.77	18.0	-200.8	

COMPLETED GOOD 9/19/02

IT CORPORATION

Well Development Log

Project Number: 825635
Project Name: PBDW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID: PB BFED MW25
Location ID:
Date Started: 9/19/02

Development Method: BAILER
Development Equipment: GRUNDFOS PUMP BEGAN PUMPING 0850

Monitoring Well Information
Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 16.88
Total depth of Well (ft): 40.5

Monitoring Well Purge Calculations

PUMPING AT 1.5GPM

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (2)^2) = 0.16 gal/ft
Well Volume (gallons) = Water Column (ft) x Gal/ft = 23.62 ft x 0.16 gal/ft = 3.77 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)^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) = (23.6)ft x (2.46) gal/ft x 0.3 = 12.54 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 12.54 gal + 3.77 gal = 16.31 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
16.31	32.62	48.93	65.24	81.55

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)	ORP ~~Redox~~ (mV)	Comments
0830	0	16.88	1577.5	CLOUDY	14.32	8.14	1.036	1.43		BAILED
0855	8.0	21.28	1168.	CLOUDY	14.56	7.47	1.289	2.54	53.8	BEGAN DEVELOPING WITH PUMP
0905	23.0									STOPPED PURGING PUMP SET 38' FROM TOC
0915	23.0									BEGAN PUMPING
0925	38	21.3	390	CLOUDY	13.81	7.17	1.496	4.05	-126	
0935	53	21.83	169	CLOUDY	13.72	7.12	1.574	5.15	-129	
0955	83	20.60	357	CLOUDY	13.94	7.14	1.64	3.34	-136.	
1005	98	20.61	62.5	CLEAR	13.84	7.01	1.64	3.52	-156.9	
1010	105.5	20.65	31.0	CLEAR	13.75	6.98	1.639	3.03	-153.4	
1015	113.0	20.67	28.8	CLEAR	13.85	6.96	1.639	3.07	-139.7	
1025	128	20.62	26.3		13.98	6.98	1.643	3.29	-152.9	

1027 → END DEVELOPMENT

NOT ENOUGH WATER IN WELL

COMPLETED 9/21/01

IT CORPORATION

Well Development Log

Page 1 of 2

Project Number: ~~PBOW~~ 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDR
Well Developed by/firm: BOART LONGYEAR

Site ID:
Location ID: ~~PB BED MW~~26
Date Started: 9/19/01

Monitoring Well Information

Development Method: SURGE & PUMP
Development Equipment: GRUNDFOS PUMP & BAILING

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2

Begining Measurements (BTOC)
Depth to Water (ft): 42.62
Total depth of Well (ft): 60.15

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 $)^2$) = 0.16 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 17.53 ft x 0.16 gal/ft = 2.80 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 $)^2$ - (2 $)^2$) = ~~2.46~~ 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) = (17)ft x (~~2.46~~ 1.31) gal/ft x 0.3 = ~~14.28~~ 6.68 gal

Purge Well Volume:
Purge well Volume = Filter pack volume + Well Volume = ~~14.28~~ 6.68 gal + 2.80 gal = ~~17.08~~ 9.48 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
~~17.08~~ 9.48	18.96	~~51.24~~ 28.44	~~68.32~~ 37.92	~~85~~ 47.4

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~~ ORP (mV)	Comments
1220	4	57.	1596	GRAY	18.30	7.48	3.653	6.39	63.6	
1230										BEGAN BAILING
1255	5.0	53.57	1576	GRAY	14.30	7.48	3.99	3.08	24.4	
1308	7.0	58.80								
1320	—	55.60								
1535	7.0	53.44	1396	GRAY	13.60	7.51	5.84	3.04	104	BEGAN BAILING
1545	8.5	59.00	1571	GRAY	13.29	7.43	5.74	2.84	36.4	WELL DRY
1610	9.0	59.5	1619	GRAY	17.58	7.60	6.28	0.88	-94.2	

9/19/00

9/20/01

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NOT ENOUGH WATER IN WELL ~~TO~~

COMPLETED AS OF 9/21/02

IT CORPORATION

Well Development Log

Project Number: 825635

Project Name:

Form Completed by: CHRIS GRANDE

Well Developed by/firm: BOART LONGYEAR

Site ID:

Location ID: PBOFD MW26

Date Started: 9/19/02

Monitoring Well Information

Development Method:

Development Equipment: BAILER

Screen Height (ft): 15

Filter pack lenght (ft): 17

Casing Diameter (in): 2"

Begining Measurements (BTOC)

Depth to Water (ft): 42.62

Total depth of Well (ft): 60.15

Monitoring Well Purge Calculations

SEE PAGE 1

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where 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 diameter in inches & d is casing diameter in inches = 0.041 x ((____)^2 - (____)^2) = ____ gal/ft.

Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (____)ft x (____) gal/ft x 0.3 = ____ gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ____ gal + ____ 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

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)	ORP ~~Redox~~ (mV)	Comments	
1510	9.25	56.20	1034	GRAY	12.85	7.49	7.031	0.73	-44	WATERLEVEL 56.20	9/21/02
1518	9.50			WELL	BAILED		DRY				
1410		58.61								TOW = 60.27	9/22/02

NOT ENOUGH WATER IN WELL AS OF 9/22/01

IT CORPORATION

A Member of The IT Group

Well Development Log

Project Number: 823635

Project Name: PBOW

Form Completed by: CHRIS GRANDE

Well Developed by/firm: BOART LONGYEAR

Site ID:

Location ID: PBBED MW27

Date Started: 9/22/01

Monitoring Well Information

Development Method:

Development Equipment: BAILER

Screen Height (ft): OPEN HOLE

Filter pack lenght (ft):

Casing Diameter (in):

Begining Measurements (BTOC)

Depth to Water (ft): 54.55

Total depth of Well (ft): 106.8

Monitoring Well Purge Calculations

Volume of Water in Casing: Gallons/foot = 0.041 x d^2, where casing diameter in inches = (0.041 x (6)^2) = 1.476 gal/ft

Well Volume (gallons) = Water Column (ft) x Gal/ft = 52.25 ft x 1.476 gal/ft = 77.12 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 ((_____)^2 - (_____)^2) = _____ gal/ft.

Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (_____)ft x (_____) gal/ft x 0.3 = _____ gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = _____ gal + _____ 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
77.12	154.24	231.365	308.485	385.605

10

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~~ ORP (mV)	Comments
1100	6.0	60.00	642.4	GRAY	16.8	6.78	3.07	—	-222.5	BEGAN PUMPING
1110	14.00	67.33	483.9	GRAY CLOUDY	16.5	6.63	3.11	—	-232.7	
1120	24.00	75.00	449A	GRAY CLOUDY	15.38	6.62	3.13	—	-234.6	
1132	34.00	86.55	752.0	GRAY CLOUDY	15.48	6.62	3.176	—	-237.0	
1145	45.00	97.45	1099	GRAY CLOUDY	16.57	6.66	3.19	—	-232.4	
1151	50.0	102.50	1296	GRAY CLOUDY	16.72	6.64	3.19	—	-235.9	
1154	53.00	104.8 WELL DRY								

NOT ENOUGH WATER IN WELL

IT CORPORATION

Well Development Log

Page 1 of 1

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID:
Location ID: INTABED GW 001
Date Started: 9/20/01

Monitoring Well Information

Development Method: ~~BAILER~~ SURGE & PUMP
Development Equipment: GRUNDFOS PUMP

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 30.35
Total depth of Well (ft): 85.45
TDW ~~86.15 ft~~ 9/22/01 1340

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) = 0.16 gal/ft.
Well Volume (gallons) = Water Column (ft) x Gal/ft = 55.10 ft x 0.16 gal/ft = 8.8 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) = (17)ft x (1.31) gal/ft x 0.3 = 6.68 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 6.68 gal + 8.8 gal = 15.48 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
15.48	30.96	46.44	61.92	77.4

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~~ ORP (mV)	Comments
1727	3.5	48.7	1617	WHITE GRAY	17.32	11.75	1.76	3.64	-170	9/20/01
1735	8.0	83.	761	WHITE GRAY	17.81	11.83	1.66	2.93	-42.6	
1808	9.5	83.2		GRAY WHITE						
9/21/01 0825	10.5	83.0	16.08	WHITE GRAY	14.98	11.41	2.09	14.52	-115.0	9/21/01
0800	12.5	79.25	1592	GRAY	12.42	10.24	2.79	54.36		9/22/01 BAILING
0815	14.5	81.00	1620							WELL BAILED DRY 9/22/01
1340	14.5	82.69								

82.69
86.15 TDW

IT CORPORATION

Well Development Log

Project Number: 825635
Project Name: PBOW
Form Completed by: R. Paleris
Well Developed by/firm: ~~[illegible]~~ Boart Longyear

Site ID: Plum Brook
Location ID: INTB-BEDGW-008
Date Started: 9-14-01

Development Method: submersible pump
Development Equipment:

Monitoring Well Information

Screen Height (ft): 10
Filter pack lenght (ft): 13
Casing Diameter (in): 2"

Begining Measurements (BTOC)

Depth to Water (ft): 15.73
Total depth of Well (ft): 42.5

42.50
15.73
26.77

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 = 26.77 ft x 0.164 gal/ft = 4.39 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) = 1.312 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (~~26.77~~ 13)ft x (0.164) gal/ft x 0.3 = ~~5.75~~ 1.317 gal ~~2.132~~ 0.63

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ~~1.317~~ .63 gal + 4.39 gal = ~~5.707~~ 2.76 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
2.76				13.8

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
1110	~~8~~ 9	dry								removed 15 gal at beginning
1115	9	dry								

* drillers lost ~~10~~ gallons in hole. DKK

IT CORPORATION

Well Development Log

Page 1 of 1

Project Number: 825635
Project Name: PBOW
Form Completed by: Reed Podesis
Well Developed by/firm: IT / Boart Environmental

Site ID: Plum Brook
Location ID: TNT B-BED-MW-4
Date Started: 9-11-01

Monitoring Well Information

Development Method: submersible pump
Development Equipment:

Screen Height (ft): 10
Filter pack lenght (ft): 16.41
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 9.69
Total depth of Well (ft): 26.1

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 = 16.41 ft x 0.164 gal/ft = 2.69 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) = 1.312 gal/ft.
Filter Pack Volume (gal) = (the less of the filter pack lenght or water column) x gal/ft x porosity (0.3) = (16.41) ft x (0.164) gal/ft x 0.3 = 0.807 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 0.807 gal + 2.69 gal = 3.497 gal.

5
11.82
1.85
11.77

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
3.497	6.994	10.491		

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
920	1	11.82	1528	brown	16.97	7.98	.675	28.0		
945	~~3~~ 8.7	11.54	127.6	clear	16.13	7.31	.566	5.87		
1005	~~8~~ 10	11.64	50.5	clear	16.79	6.80	.566	5.39		
1010	11	11.62	99.1	clear	16.70	6.91	.566	5.35		
1015	12	11.59	47.2	clear	16.72	6.87	.565	5.29		Surged after, several times
120	50	13.85	503.0	grey clear	17.06	7.48	.605	9.15		
145	80	14.42	58.1	clear	15.38	7.00	.605	10.87		
~~200~~ 155	100	14.50	28.7	clear	14.88	6.75	.616	10.46		
200	110	14.55	22.6	clear	15.12	6.72	.633	10.81		

n:\shared\common\dsmgroup\id_forms\DevPage 1/7/13/00

COMPLETED 9/20/01
GOOD

IT CORPORATION

Well Development Log

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID:
Location ID: TNTC BEDGW 001
Date Started: 9/19/01

Development Method: BAILER & 9/19/01
Development Equipment: GRUNDFOS PUMP WITH SURGING

Monitoring Well Information
Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)
Depth to Water (ft): 59.35
Total depth of Well (ft): 87.8

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) = 0.16 gal/ft
Well Volume (gallons) = Water Column (ft) x Gal/ft = 28.45 ft x 0.16 gal/ft = 4.55 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) = (~~28.45~~ 17) ft x (~~0.16~~ 1.31) gal/ft x 0.3 = 6.69 gal

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = 6.69 ~~17~~ gal + 4.55 ~~1.31~~ gal = 11.24 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
11.24	22.48	33.72	44.96	56.2

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
1800	0	59.35	190.3	CLEAR CLOUDY	12.74	6.66	1.32	7.88	-280.9	
1820	4	66.65	246	CLOUDY	12.79	6.57	1.46	15.92	-286.5	
1830	6	67.67	147.5	CLOUDY CLEAR	12.31	6.38	1.81	9.71	-278.9	STOPPED BAILING WELL
0810		59.50								BEGAN PUMPING 9/20/01
0835	12									
0853	16	78.00	850.7	GRAY	16.68	7.27	2.37	18.01	-160	PUMPING RATE = 3/4 GPM
0900	20	85.00								RAN DRY
0925	25	83.00	175.5	CLOUDY	14.84	6.80	2.51	10.30	-218.3	
0941	26	65.0	733.7	GRAY	15.33	6.71	2.66	8.16	-245	

COMPLETED 7/20/01
GOOD

IT CORPORATION

Well Development Log

Page 2 of 2

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONG YEAR

Site ID:
Location ID: JNTC BED GW 002
Date Started: 9/19/01

Development Method: BAILED 9/19/01
Development Equipment: GRUNFOS PUMP WITH SURGING 09/20/01

Monitoring Well Information

Screen Height (ft): 15
Filter pack lenght (ft): 17
Casing Diameter (in): 2"

Begining Measurements (BTOC)

Depth to Water (ft):
Total depth of Well (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) 0.16 gal/ft
Well Volume (gallons) = Water Column (ft) x Gal/ft = 28.45 ft x 0.16 gal/ft = 4.55 gallons

20 GALS OF FLUID LOST

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~~ 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) = (17) ft x (~~2.46~~) gal/ft x 0.3 = ~~12.55~~ gal 6.69

Purge Well Volume: Purge well Volume = Filter pack volume + Well Volume = ~~12.55~~ 6.69 gal + 4.55 gal = 11.24 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
11.24 ~~15.01~~ ~~17.1~~	22.48 ~~34.02~~	33.72 ~~51.30~~	44.96 ~~68.04~~	~~85.05~~

~~73~~ 56.2
+20
76.2

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)	ORP Redox (mV)	Comments
0950	36.00	84.30	142.2	CLOUDY CLEAR	15.26	6.70	2.60	10.69	-243.3	0955 WELL PUMPED DRY
1020	40.00	80.65	60.6	CLEAR	15.44	6.72	2.82	10.21	-254	
1030	48.00	83.00	22.2	CLEAR	16.31	6.76	2.81	12.70	-244	
1040	56.00	83.10	15.6	CLEAR	16.93	6.73	2.88	13.43	-251.	
1050	64.00									
1110	64.50	72.00	741.9	CLOUDY GRAY	16.45	6.74	2.94	12.04	-255.6	
1115	70.00	80.0	120.0	CLOUDY	15.48	6.69	2.96	10.34	-257.0	
1125	78.00	81.9	81.00	CLEAR	17.55	6.71	2.98	14.61	-258.6	
1130	81.00	81.4	12.7	CLEAR	17.92	6.70	2.98	15.85	-255.1	
1135	85	81.6	16.8	CLEAR	17.39	6.66	3.00	11.55	-259.1	
1140	89	83.0	29.5	CLEAR	18.0	6.67	3.00	9.81	-260	

APPENDIX G

HYDRAULIC CONDUCTIVITY DATA

Aquifer Test Results

Plum Brook Ordnance Works
Sandusky, OH
Project Number 825635

1.0 Purpose

This aquifer test in the form of slug testing was conducted to estimate the hydraulic conductivity of geologic materials in the vicinity of eight monitoring wells at the Plum Brook Ordnance works, Sandusky, Ohio. Newly installed during the 2001 Site-Wide Groundwater Remedial Investigation, the following wells were tested:

- PB-BED-MW22 (Bedrock)
- PB-BED-MW23 (Bedrock)
- PB-BED-MW24 (Bedrock)
- PB-BED-MW25 (Bedrock)
- PB-BED-MW27 (Bedrock)
- TNTB-BEDGW-003 (Bedrock)
- TNTB-BEDGW-004 (Bedrock)
- TNTC-BEDGW-001 (Bedrock)

2.0 Method

The methods of Bouwer and Rice (1976), as implemented through the computer program AQTESOLV® for Windows (HydroSOLVE, Inc. 1989), was used to calculate the hydraulic conductivity near a well. The calculation was based on the rate of water level change after adding a slug of known volume to the well (Falling Test) or sudden removal of a volume of water (Rising Test).

3.0 Theory

The Bouwer and Rice (1976) method for unconfined aquifers is based on the following equation:

$$Q = 2\pi \, K L_e \frac{y}{\ln(R_e / r_w)}. \qquad 1$$

where:

Q is the flux to the well (length^3/time), K is the hydraulic conductivity of the aquifer (length/time), L_e is the length of screen contributing water to the well (length), y is the difference between the water level in the well and the equilibrium water table (length), R_e is the aquifer radius over which water level changes are dissipated (length) and r_w is the boring radius (length).

The instantaneous change in water level in the well, dy/dt, is given by:

$$dy/dt = -Q/\pi r_c^2 \qquad 2$$

Where πr_c^2 1 is the cross sectional area of the well.

Combining equations (1) and (2) yields:

$$\frac{1}{y}dy = -\frac{2KL_e}{r_c^2 \ln(R_e/r_w)}dt \qquad 3$$

Integration of (3) between y_o at time t = 0 and y_t at time t and solving for K yields:

$$K = \left[\frac{r_c^2 \ln(R_e/r_w)}{2L_e}\right]\frac{1}{t}\ln\frac{y_o}{y_t} \qquad 4$$

K and the factor in square brackets are constants. Therefore, field data plotted as $\ln(y_t)$ versus t should lie on a straight line with slope,

$$-\frac{2KL_e}{r_c^2 \ln(R_e/r_w)}. \qquad 5$$

The factor $\ln(R_e/r_w)$ in (4) is an empirical function of aquifer and well geometry. For partially penetrating wells:

$$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{A + B\ln[(H-L_w)/r_w]}{L_e/r_w}\right]^{-1}, \qquad 6$$

where $\ln[(H-L_w)/r_w] \leq 6$.

For fully penetrating wells:

$$\ln\frac{R_e}{r_w} = \left(\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right)^{-1}. \qquad 7$$

The dimensionless parameters A, B, and C are empirical functions of well geometry as determined by electric analog modeling (Bouwer and Rice, 1976).

Hydraulic conductivity is calculated from (4) using the slope and y-intercept of a line fit to the field data and $\ln(R_e/r_w)$ from (6) or (7).

4.0 Assumptions

The Bouwer and Rice (1976) method for unconfined aquifers is based on the assumptions that:

- The aquifer is homogeneous, isotropic and unconfined.
- Drawdown is negligible compared to aquifer thickness.
- Vadose zone flow is negligible.
- Well losses are negligible.

5.0 Procedure

The following steps were followed in estimating the aquifer hydraulic conductivity:

a) Define the aquifer and well geometry using the following parameters (Table 1):

H	Aquifer saturated thickness (assumed)
L_e	Length of saturated well screen
L_w	Static height of water in well
r_c	Radius of well casing
r_w	Radius of boring
Φ	Porosity of filter pack (Assumed to be 30 percent. Porosity of unconsolidated sand ranges from 25 to 50 percent [Freeze and Cherry, 1979])
y_o	Initial change in water level

b) Using the field data to determine whether water level fluctuations occurred within the screened interval of the well.

When $L_w = L_e$. Water level fluctuations occurred in the screened section of the well. Modify r_c to account for filter pack storage according to:

$$r_c^* = \left[r_c^2 + \phi(r_w^2 - r_c^2)\right]^{1/2} \qquad 8$$

When $L_w > L_e$. Water level fluctuations occurred above the screened portion of the well. Note that the filter pack porosity in this case does not affect subsequent calculations, therefore, r_c is used in calculation.

c) Input geometric parameters listed above and time versus drawdown data.

d) Perform hydraulic conductivity calculations. Hydraulic conductivity is calculated interactively using AQTESOLV® for Windows. AQTESOLV® is used to display field data, which is then visually matched with a best-fit line. AQTESOLV® then calculates the hydraulic conductivity from the input geometric data and slope and y-intercept of the best-fit line.

6.0 Results

The slug tests were performed from November 13 through 15, 2001. Both falling and rising tests were conducted in PB-BED-MW22, PB-BED-MW23, TNTB-BEDGE-003, TNTB-BEDGE-004, and TNTC-BEDGE-001 while only rising test was conducted in PB-BED-MW22, PB-BED-MW23, and PB-BED-MW27 because the water level prior to the test was below the top of the screen. Two monitoring wells were originally planned for slug testing but were not tested. PB-BED-MW-26 had an insufficient water column (about 2 ft) for a meaning test and was therefore not tested. Another well TNTA-BEDGW-001 exhibited an erratic water level fluctuation between August 2001 and November. The depth to water measurement at this location was 11.18 ft below ground surface in August and was 158.8 ft prior to the test, indicating that this location was not suitable for aquifer testing purpose.

Table 1 summarizes the depth to groundwater, the total well depth, and the geometric data of each well tested. Values of calculated hydraulic conductivity (K) and transmissivity (T) are summarized in Table 2. The hydraulic conductivity values of the tested well are range from 0.00231 ft/day (PB-BED-MW27) to 5.48 ft/day (PB-BED-MW25) with a geometric mean of 0.358 ft/day. The transmissivity (T) was also calculated for each test using an assumed aquifer saturated thickness for each location. T values are summarized in Table 2.

7.0 References

Bouwer, H. and R. C. Rice, 1976, "A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells," ***Water Resources Research***, Vol. 12, No. 3, pp. 423-428.

Cooper, H. H., J. D. Bredehoeft, and I. S. Papadopulos, 1967, "Response of a Finite Diameter Well to an Instantaneous Change of Water," ***Water Resources Research***, Vol. 3, No. 1, pp. 263-269.

Freeze, R. A., and J. A. Cherry, 1979, ***Groundwater***, Prentice-Hall, Englewood Cliffs, New Jersey, 604 p.

Geraghty and Miller Environmental Services, 1989, AQTESOLV, Aquifer Test Design and Analysis Software, Version 1.1.

Table 1

Summary of Monitoring Well Geometry Data
PBOW, Sandusky, OH

Well No.	Water Level (TOC) (ft)	Total Depth (TOC) (ft)	H (Assumed)	r_c (ft)	r_w (ft)	L_e (ft)	L_w (ft)
PB-BED-MW22	30.24	44.45	14.21	0.08	0.25	15	14.21
PB-BED-MW23	67.33	75.6	8.27	0.08	0.25	20	8.27
PB-BED-MW24	27.46	42.78	15.32	0.08	0.25	15	15.32
PB-BED-MW25	15.05	40.6	25.55	0.08	0.25	10	25.55
PB-BED-MW26	58.02	60.15	2.13	0.08	0.25	15	2.13
PB-BED-MW27	48.44	107.7	59.26	0.08	0.25	78.5	59.26
TNTA-BEDGW-001	80.2	85.45	5.25	0.08	0.25	15	5.25
TNTB-BEDGW-003	29.55	41.23	11.68	0.08	0.25	10	11.68
TNTB-BEDGW-004	8.39	26.75	18.36	0.08	0.25	10	18.36
TNTC-BEDGW-001	59.03	87.62	28.59	0.08	0.25	15	28.59

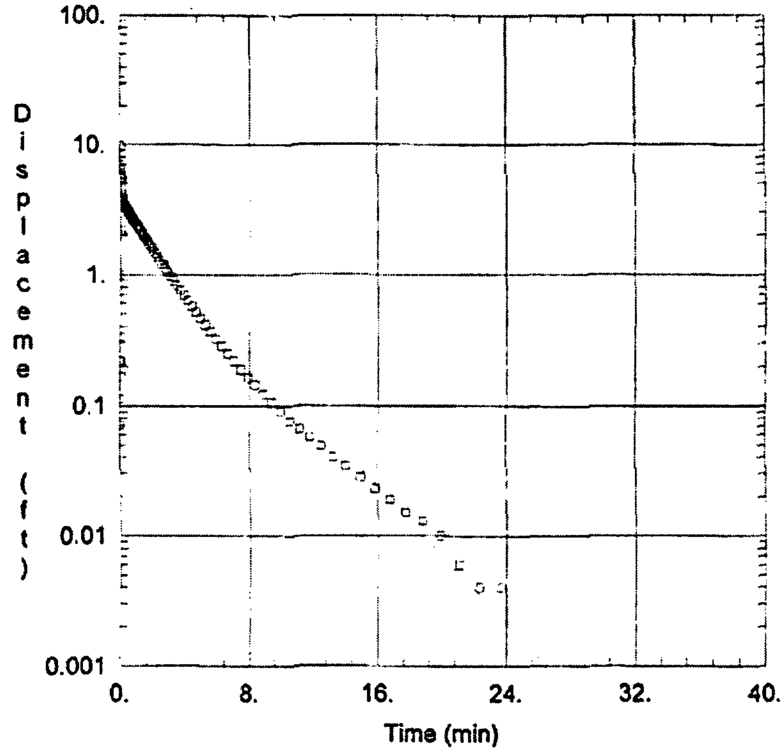
Note: H ---- Aquifer saturated thickness (assumed)
r_c ---- Radius of well casing
r_w ---- Radius of boring
L_e ---- Length of saturated well screen
L_w ---- Static height of water in well
Φ ---- Porosity of filter pack (Assumed to be 30 percent. Porosities of unconsolidated sand range from 25 to 50 percent [Freeze and Cherry, 1979])

Table 2

Summary of Hydraulic Conductivities
PBOW, Sandusky, OH

Well No.	Date Tested	Aquifer Response	Saturated Aquifer Thickness (Assumed)	Test Type	Transmisivities T (ft^2/day)	Hydraulic Conductivities K (ft/min)	Hydraulic Conductivities K (cm/sec)	Hydraulic Conductivities K (ft/day)
PB-BED-MW22	11/13/01	Unconfined	14.21	Rising	3.69E+00	1.80E-04	9.16E-05	2.59E-01
PB-BED-MW23	11/14/01	Unconfined	8.27	Rising	5.41E-01	4.54E-05	2.31E-05	6.54E-02
PB-BED-MW24	11/13/01	Unconfined	15.32	Falling	2.35E+01	1.07E-03	5.42E-04	1.54E+00
				Rising	2.81E+01	1.28E-03	6.48E-04	1.84E+00
PB-BED-MW25	11/14/01	Unconfined	25.55	Falling	1.40E+02	3.81E-03	1.94E-03	5.48E+00
				Rising	1.23E+02	3.33E-03	1.69E-03	4.80E+00
PB-BED-MW26	slug test was not performed due to low water column in the well							
PB-BED-MW27	11/14/01	Unconfined	59.26	Rising	1.37E-01	1.61E-06	8.16E-07	2.31E-03
TNTA-BEDGW-001	slug test was not performed due to low water column in the well							
TNTB-BEDGW-003	11/13/01	Unconfined	11.68	Falling	insufficient data			
				Rising	2.82E-02	1.68E-06	8.52E-07	2.41E-03
TNTB-BEDGW-004	11/13/01	Unconfined	18.36	Falling	4.03E+01	1.53E-03	7.75E-04	2.20E+00
				Rising	8.51E+01	3.22E-03	1.64E-03	4.63E+00
TNTC-BEDGW-001	11/14/01	Unconfined	28.59	Falling	9.36E+00	2.27E-04	1.16E-04	3.27E-01
				Rising	5.46E+00	1.33E-04	6.74E-05	1.91E-01
Maximum					***1.40E+02***	***3.81E-03***	***1.94E-03***	***5.48E+00***
Minimum					***2.82E-02***	***1.61E-06***	***8.16E-07***	***2.31E-03***
Geometric Mean					***7.06E+00***	***2.49E-04***	***1.26E-04***	***3.58E-01***

Time Versus Drawdown Data



FALLING TEST ANALYSIS

Data Set: C:\...\cgw1f.aqt
Date: 02/21/02 Time: 15:26:24

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: TNTC-BEDGW-001
Test Date: 11/14/01

AQUIFER DATA

Saturated Thickness: 28.59 ft
Anisotropy Ratio (Kz/Kr): 1.

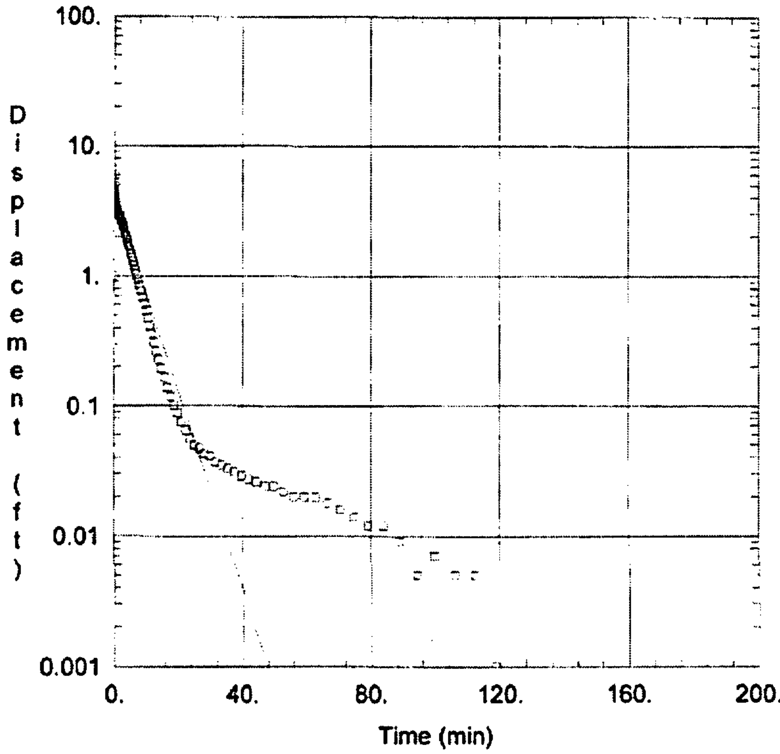
WELL DATA (CGW-001)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 28.59 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002274 ft/min
y0 = 2.852 ft



RISING TEST ANALYSIS

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Date: 02/21/02 Time: 14:11:12

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: TNTC-BEDGW-001
Test Date: 11/14/01

AQUIFER DATA

Saturated Thickness: 28.59 ft
Anisotropy Ratio (Kz/Kr): 1.

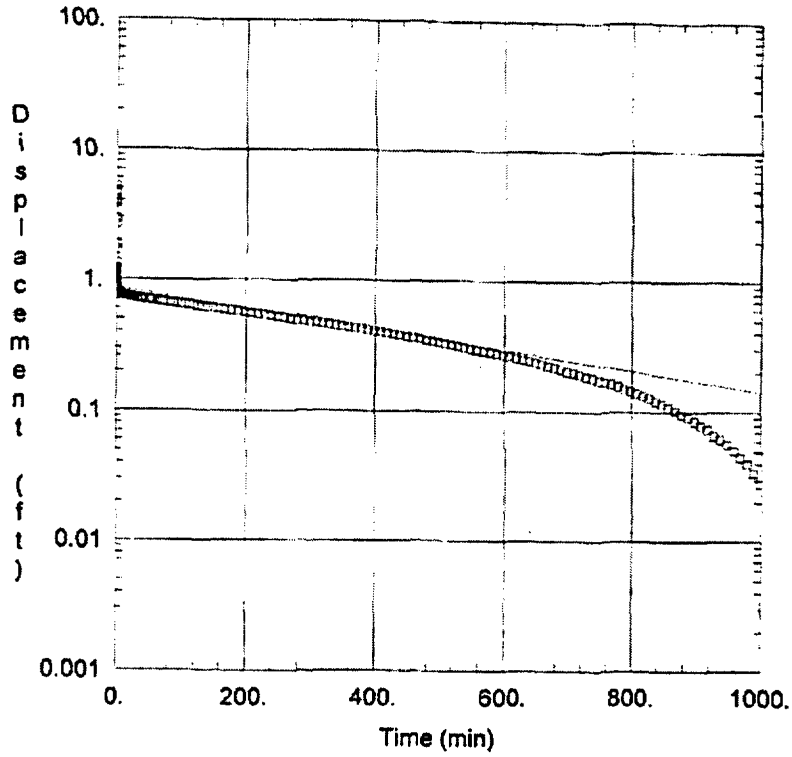
WELL DATA (CGW-001)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 28.59 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001326 ft/min
y0 = 4.318 ft



RISING TEST ANALYSIS

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PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: TNTB-BEDGW-003
Test Date: 11/13/01

AQUIFER DATA

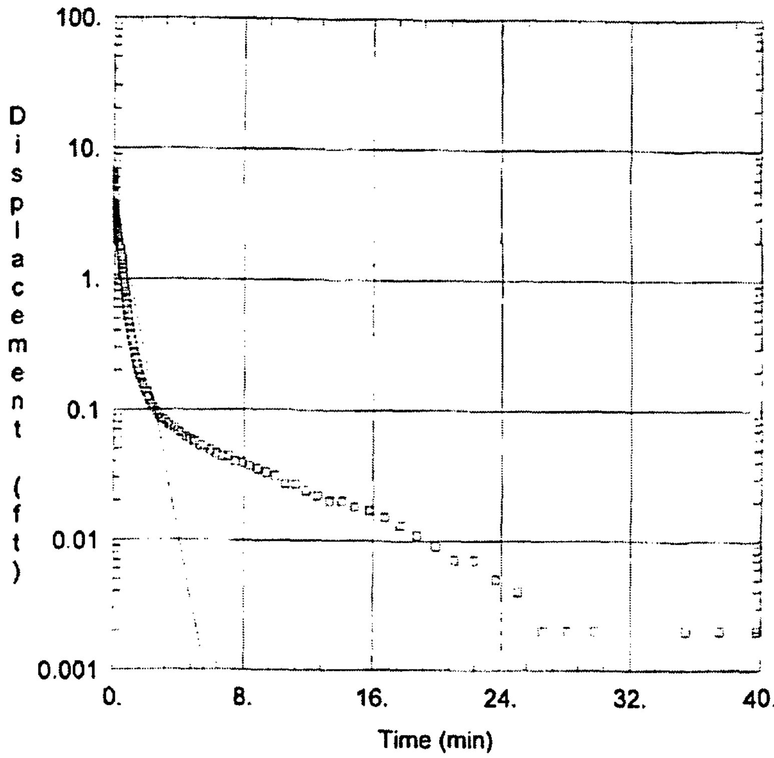
Saturated Thickness: 11.68 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GW-003)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 11.68 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.676E-06 ft/min
y0 = 0.8637 ft



FALLING TEST ANALYSIS

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Date: 02/21/02 Time: 14:15:07

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: TNTB-BEDGW-004
Test Date: 11/13/01

AQUIFER DATA

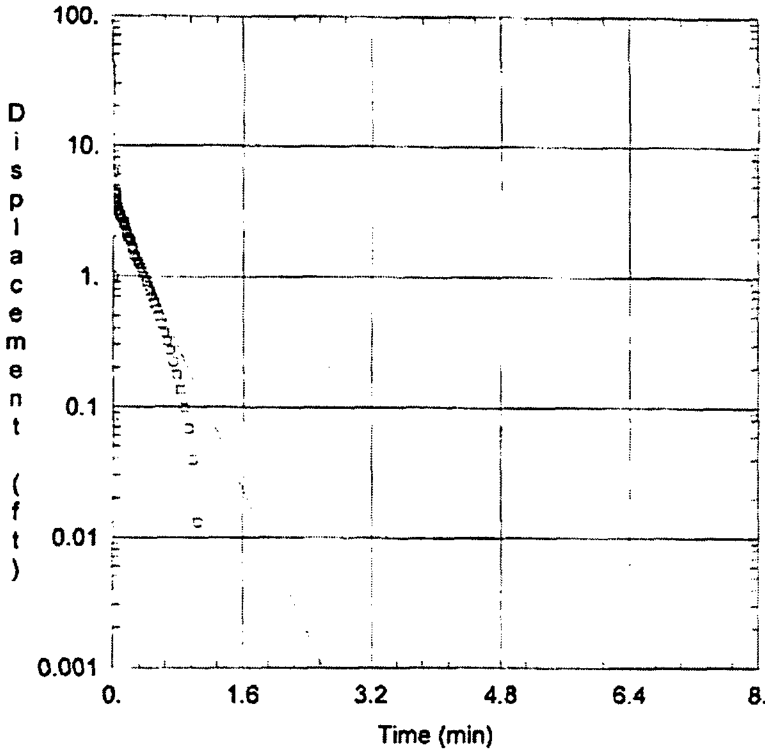
Saturated Thickness: 18.36 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GW-004)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 18.36 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001525 ft/min
y0 = 4.318 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\gw4r.aqt
Date: 02/21/02 Time: 14:15:30

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: TNTB-BEDGW-004
Test Date: 11/13/01

AQUIFER DATA

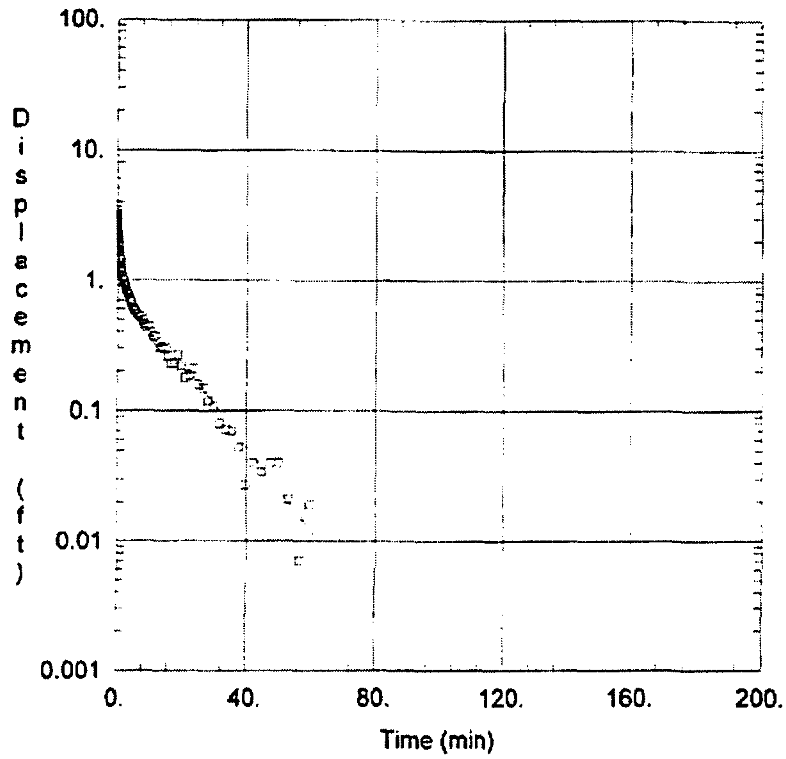
Saturated Thickness: 18.36 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GW-004)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 18.36 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.003218 ft/min
y0 = 3.554 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw22r.aqt
Date: 02/21/02 Time: 14:16:02

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW22
Test Date: 11/13/01

AQUIFER DATA

Saturated Thickness: 14.21 ft
Anisotropy Ratio (Kz/Kr): 1.

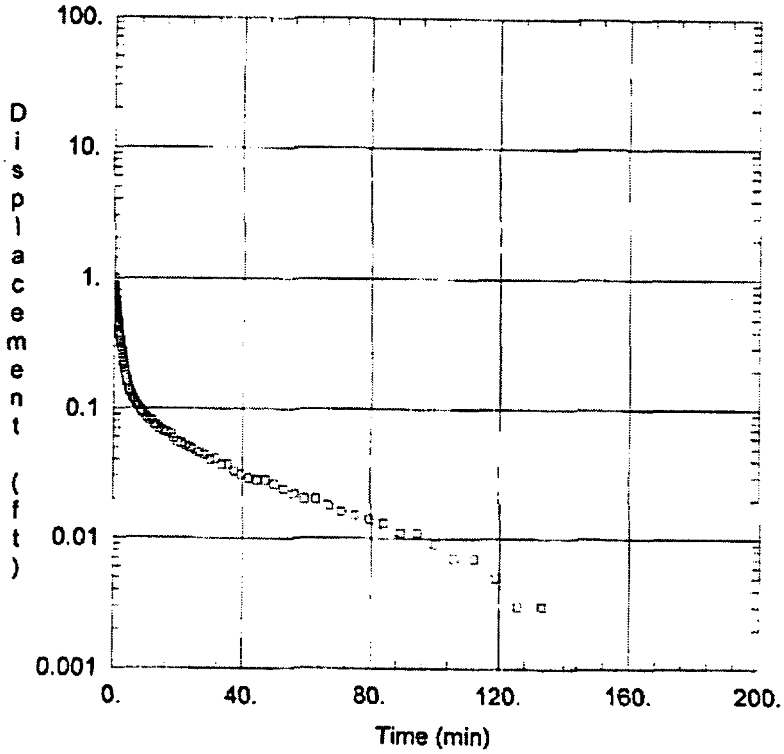
WELL DATA (MW-22)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 14.21 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0001802 ft/min
y0 = 1.054 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw23r.aqt
Date: 02/21/02 Time: 14:16:30

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW23
Test Date: 11/14/01

AQUIFER DATA

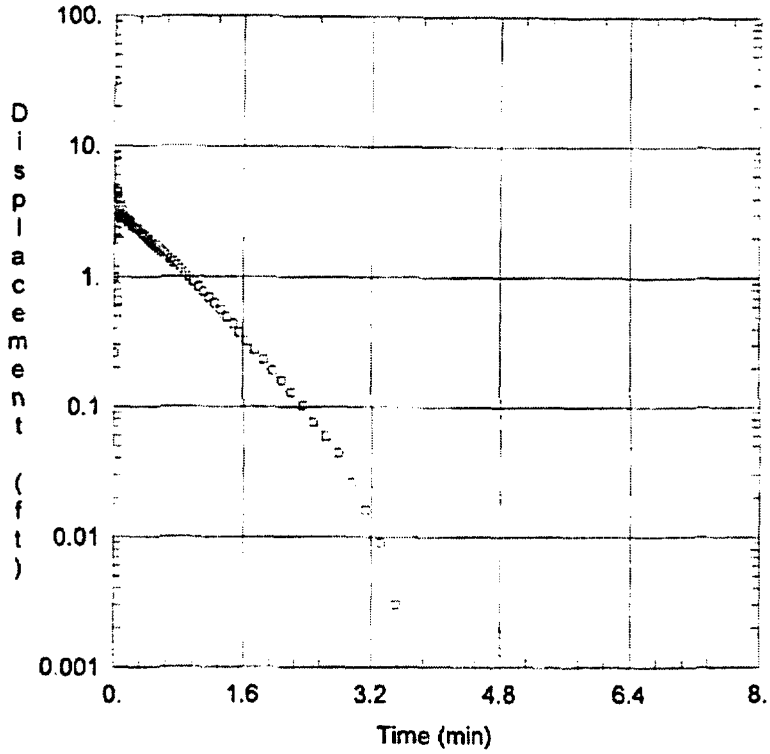
Saturated Thickness: 8.27 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 8.27 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.542E-05 ft/min
y0 = 0.1244 ft



FALLING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw24f.aqt
Date: 02/21/02 Time: 14:16:52

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW24
Test Date: 11/13/01

AQUIFER DATA

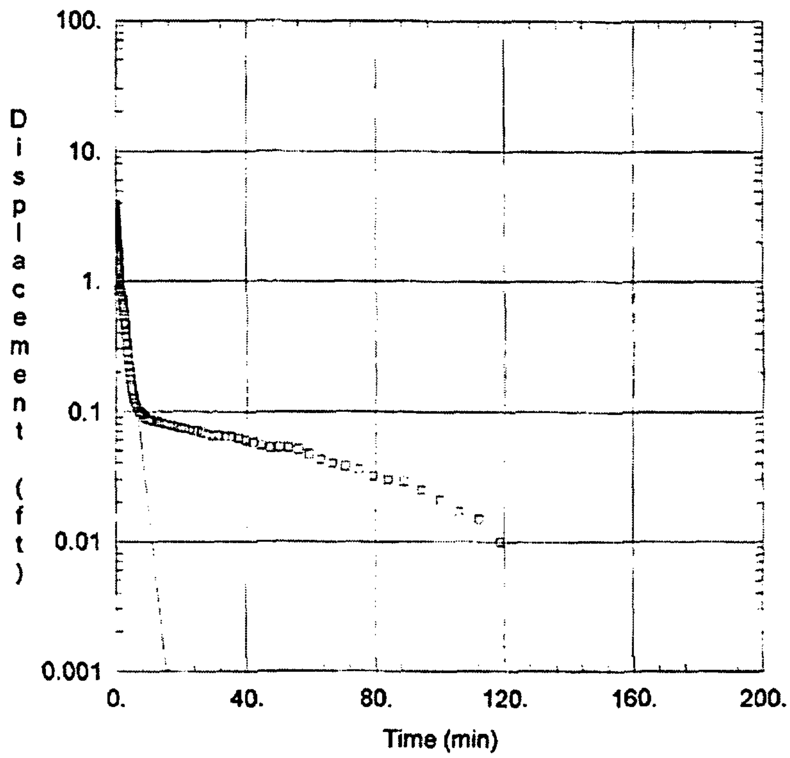
Saturated Thickness: 15.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-24)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 15.32 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001067 ft/min
y0 = 3.94 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw24r.aqt
Date: 02/21/02 Time: 14:18:08

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW23
Test Date: 11/13/01

AQUIFER DATA

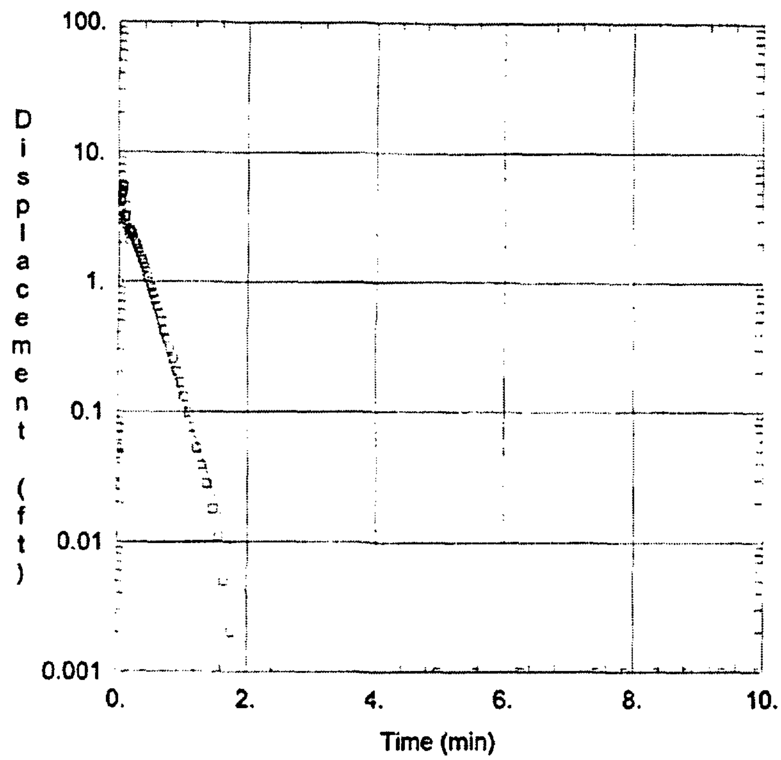
Saturated Thickness: 15.32 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 15.32 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001275 ft/min
y0 = 3.18 ft



FALLING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw25f.aqt
Date: 02/21/02 Time: 14:19:18

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW25
Test Date: 11/13/01

AQUIFER DATA

Saturated Thickness: 25.55 ft
Anisotropy Ratio (Kz/Kr): 1.

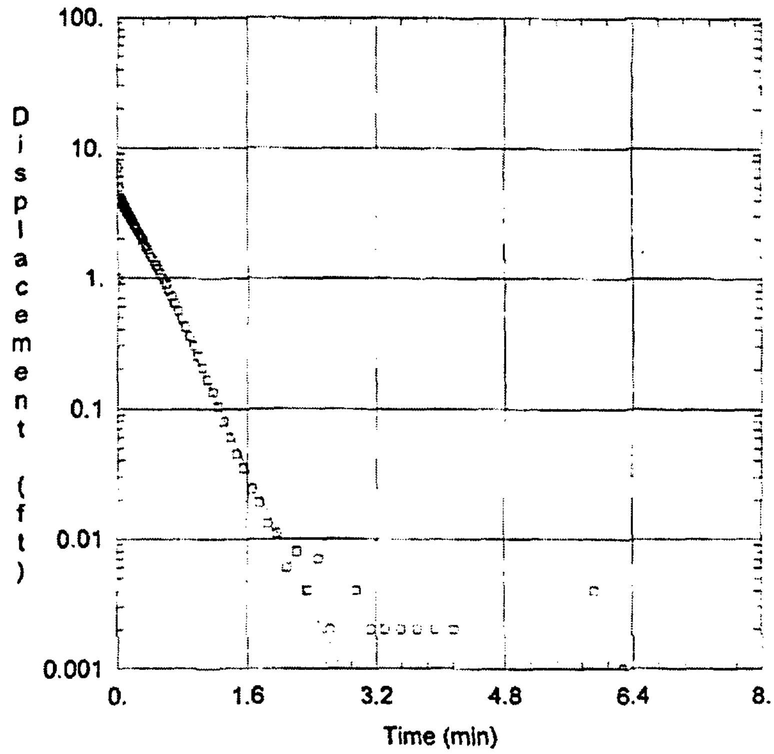
WELL DATA (MW-25)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 25.55 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003808 ft/min
y0 = 4.458 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw25r.aqt
Date: 02/21/02 Time: 14:19:52

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW25
Test Date: 11/13/01

AQUIFER DATA

Saturated Thickness: 25.55 ft
Anisotropy Ratio (Kz/Kr): 1.

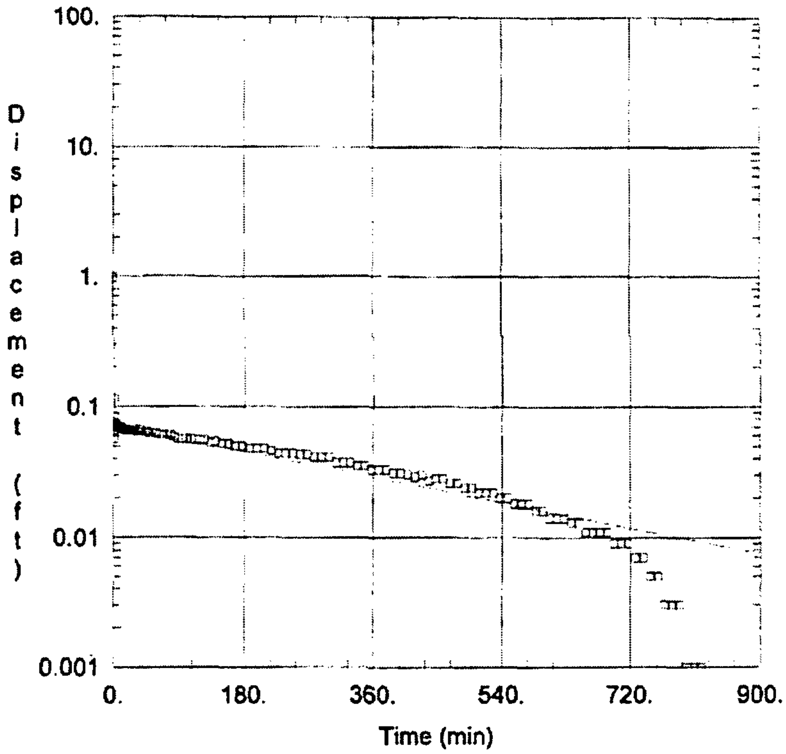
WELL DATA (MW-25)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 25.55 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003333 ft/min
y0 = 4.729 ft



RISING TEST ANALYSIS

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\mw27r.aqt
Date: 02/21/02 Time: 14:20:11

PROJECT INFORMATION

Company: IT
Client: USACE
Project: 825635 04000000
Test Location: PBOW, Sandusky, OH
Test Well: PB-BED-MW27
Test Date: 11/14/01

AQUIFER DATA

Saturated Thickness: 59.26 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-27)

Initial Displacement: 1. ft
Wellbore Radius: 0.25 ft
Screen Length: 78.5 ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.08 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 59.26 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.606E-06 ft/min
y0 = 0.07082 ft

APPENDIX H

LAND SURVEY DATA

2001 - PBOW Survey Data
Monitoring Wells, Temporary Piezometers, and Soil Borings

M&S ID#	N (y)	E (x)	Riser Elevation	*Ground Elevation	I.T. DESIGNATION
PMW22	629778.465	1918366.518	629.67	627.22	PB-BED-MW22
PMW23	625837.856	1918150.334	633.71	631.11	PB-BED-MW23
MW24	622916.444	1908168.033	645.98	644.2	PB-BED-MW24
MW25	617820.942	1914457.628	684.59	681.99	PB-BED-MW25
PMW26	613878.45	1920274.330	677.21	674.61	PB-BED-MW26
PMW21	627896.268	1920791.393	627.14**	625.24	PB-BED-MW27
1421	623446.555	1922580.206	638.79	636.99	TNTA-BEDGW-001
GW003	618102.551	1918710.111	683.11	681.34	TNTB-BEDGW-003
GW04a	618468.655	1918572.329	668.63	666.78	TNTB-BEDGW-004
GW02a	620253.524	1912852.629	667.04	664.04	TNTC-BEDGW-001

Elevation of the well indicated by the double asterisk (**), is reported to the lip of the metal casing, the lip being further defined as the rim of the un-hinged portion of the casing when the well is open.

Temporary Piezometer Locations: TNT AREA "A"

M&S ID#	N (y)	E (x)	Ground Elevation	I.T. DESIGNATION
AGW11	622927.387	1923122.509	660.78	PBOW-TNTA-GW11
AGW14	623190.957	1922681.123	651.03	PBOW-TNTA-GW14
AGW17	623355.606	1923280.926	657.67	PBOW-TNTA-GW17
AGW18	623615.678	1922615.978	635.99	PBOW-TNTA-GW18
AGW19	623612.675	1923052.195	640.78	PBOW-TNTA-GW19
AGW20	623518.063	1923277.547	650.07	PBOW-TNTA-GW20
AGW21	623536.519	1923487.366	653.45	PBOW-TNTA-GW21
AGW22	623786.499	1923374.405	636.96	PBOW-TNTA-GW22
AGW23	624594.636	1923848.627	630.05	PBOW-TNTA-GW23
AGW24	624626.183	1924076.124	630.71	PBOW-TNTA-GW24
AGW25	624216.2087	1924365.209	647.27	PBOW-TNTA-GW25
AGW26	624710.322	1925228.323	635.59	PBOW-TNTA-GW26
AGW29	624060.502	1925148.986	651.70	PBOW-TNTA-GW29

Temporary Piezometer Locations: TNT AREA "B"

M&S ID#	N (y)	E (x)	Ground Elevation	I.T. DESIGNATION
GW01	618367.591	1918624.926	666.70	PBOW-TNTB-GW01
GW02a	618188.481	1918855.644	675.42	PBOW-TNTB-GW02
GW003	618102.551	1918710.111	680.81	PBOW-TNTB-GW03
BGW04	617135.012	1918389.937	671.48	PBOW-TNTB-GW04
GW05a	618217.994	1918058.619	668.41	PBOW-TNTB-GW05

Temporary Piezometer Locations: TNT AREA "C"

M&S ID#	N (y)	E (x)	Ground Elevation	I.T. DESIGNATION
CGW11	620331.710	1910550.710	653.83	PBOW-TNTC-GW11
CGW12	620146.522	1910611.696	662.05	PBOW-TNTC-GW12
CGW13	620758.676	1911179.138	646.45	PBOW-TNTC-GW13
CGW14	620274.222	1911096.543	665.86	PBOW-TNTC-GW14
CGW15	620356.049	1911289.110	663.64	PBOW-TNTC-GW15
CGW16	620580.093	1911620.405	652.40	PBOW-TNTC-GW16
CGW17	620595.298	1911806.326	654.39	PBOW-TNTC-GW17
1422	620512.153	1912367.605	656.21	PBOW-TNTC-GW18
1424	620501.150	1912567.123	653.19	PBOW-TNTC-GW19
1427	620516.741	1912868.095	650.61	PBOW-TNTC-GW20
CGW22	620004.907	1910543.651	667.56	PBOW-TNTC-GW22
CGW24	619961.510	1910900.212	673.99	PBOW-TNTC-GW24
CGW29	619944.630	1912604.500	675.09	PBOW-TNTC-GW29
CGW31	619846.540	1913163.050	673.35	PBOW-TNTC-GW31

Soil Borings

M&S ID#	N (y)	E (x)	I.T. DESIGNATION
575	625038.03	1919102.57	PBOW-PRWP-DP03A
583	624840.68	1919354.54	PBOW-PRWP-DP11A
587	625028.14	1919381.06	PBOW-PWRP-DP10A
600	622543.21	1910216.51	PBOW-WRWP-DP13A
619	622546.61	1909995.23	PBOW-WRWP-DP09A
621	622425.11	1910395.07	PBOW-WRWP-DP16A
1069	618043.21	1918673.57	PBOW-TNTB-SS375A
1080	618323.00	1918833.09	PBOW-TNTB-SS295A

M & S CONTROL POINTS USED:

M&S ID#	N (y)	E (x)	ELEV.
68	620384.34	1912011.51	662.63
1137	623519.65	1922494.73	638.67
1139	623137.9	1922479.99	652.75
1305	620363.23	1912296.61	662.99
1310	620524.21	1912187.81	653.25
1423	620366.89	1912542.66	662.89
1425	620319.01	1912809.24	662.82
6	621515.91	1921536.94	
10	620366.08	1921493.74	
55	622733.16	1910235.74	
59	622538.8	1910286.75	
94	624985.39	1919003.31	
95	624663.49	1919144.88	
597	622610.14	1910150.91	
1428	622395.48	1910271.94	
1429	618585.17	1919007.83	

Notes:

[1]Ground Elevation not provided by survey crew. Elevation obtained by subtracting riser height from TOC elevation.

A) SAMPLE STAKES AT NINE PREVIOUS SAMPLE LOCATIONS WERE RECOVERED AND/OR REPLACED BY CONVENTIONAL LAND SURVEYING TECHNIQUES. A TOPCON GTS-303 ELECTRONIC TOTAL STATION WAS USED TO MEASURE ANGLES AND DISTANCES FROM CONTROL POINTS PREVIOUSLY ESTABLISHED BY MURPHY AND SACKS SURVEYORS. WHERE AN EXISTING SAMPLE STAKE WAS NOT RECOVERED, STAKES WERE RESET AT A HORIZONTAL TOLERANCE OF 0.10' +/-.

B) WHERE POSSIBLE, NEW SAMPLE POINTS WERE COLLECTED BY DIRECT STATIC DIFFERENTIAL GPS OBSERVATION USING THREE LEICA SR-261 RECEIVERS. GPS VECTORS WERE ADJUSTED HOLDING FIXED STATION "CLARK" USING LEICA SKI SOFTWARE (VERSION 2.30), PRODUCING A LEAST SQUARES ADJUSTMENTS OF THE WGS 84 POSITIONS. A LOOP OF 5,409 METERS USING THE UNADJUSTED VECTORS PASSING THE FIXED AND DERIVED CONTROL YIELDS A LOOP PRECISION OF 1 PART IN 177,490. COORDINATE VALUES ARE REPORTED IN OHIO STATE PLANE SYSTEM, NORTH ZONE (NAD 1983.) A COMBINED SCALE FACTOR OF 0.9999270034 WAS USED IN THIS CALCULATION. VERTICAL DATUM IS NGVD 1929. VALUES OBTAINED ARE WITHIN THE HORIZONTAL TOLERANCE OF 0.10' +/- AND THE VERTICAL TOLERANCE OF 0.01' +/-.

C) WHEN DIRECT GPS OBSERVATION PROVED IMPOSSIBLE NEW SAMPLE LOCATIONS (M&S ID# 1421, 1422, 1424, 1427) WERE LOCATED BY CONVENTIONAL SURVEY TECHNIQUES AS DESCRIBED IN SECTION "A", ABOVE. VALUES OBTAINED ARE WITHIN THE HORIZONTAL TOLERANCE OF 0.10' +/- AND THE VERTICAL TOLERANCE OF 0.01' +/- .

GPS CONTROL:

MONUMENT "CLARK" WAS ESTABLISHED BY M&S IN 1996 AS A PERMANANT, ON-SITE GPS CONTROL STATION. HORIZONTAL VALUES WERE DERIVED FROM NGS MONUMENT "SKYWAY RM 2" AND VERTICAL VALUES FROM FIRST ORDER CONTROL BENCHMARK J 318 USING A CLOSED, ADJUSTED GPS TRAVERSE. VALUES FOR MONUMENT "CLARK" ARE:

NORTHING (y) 191,029.0899m
EASTING (x) 585,910.9777m
COORDINATE REFERENCE SYSTEM IS NAD 83 (OHIO STATE PLANE NORTH ZONE)
ELLIPSOID ELEVATION 190.6255m (NGVD 29)
REFERENCE ELLIPSOID IS WGS 1984
GEOID HEIGHT -35.1900m
EPOCH IS GEOID 93

APPENDIX J

CHEMICAL ANALYTICAL DATA SUMMARY

Laboratory and Validation Qualifier Definitions
Plum Brook Ordnance Works

Qualifier	Lab	Definition
Laboratory - Organic		
B	STL/Paragon	The compound was detected in the sample and in an associated method blank.
E	STL/Paragon	The compound was detected. The concentration exceeds the calibration range of the instrument.
D	STL	Dilution.
G	STL	Elevated reporting limit due to matrix interference.
J	STL/Paragon	The compound was positively identified; the reported value is an estimated concentration between the method detection limit and the reporting limit.
I	STL	Matrix interference
U	STL/Paragon	Not detected. The compound was analyzed for, but not detected above the associated reporting limit.
Laboratory - Inorganic		
B	STL/Paragon	The analyte was positively identified; the reported value is an estimated concentration between the method detection limit and the reporting limit.
E	STL/Paragon	The analyte was detected. The concentration is estimated because of the presence of interference.
J	STL/Paragon	The compound was detected in the sample and in an associated method blank.
N	STL/Paragon	Spiked sample recovery not within control limits
U	STL/Paragon	Not detected. The analyte was analyzed for, but not detected above the associated reporting limit.
Validation - All		
B		The analyte was not detected significantly above the levels found in the associated method blank or field blanks
J		The compound/analyte was positively identified; the reported value is an estimated concentration.
R		Rejected due to severe deficiencies in the analytical process or supporting quality control data. The presence or absence of the compound/analyte cannot be verified.
U		Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
UJ		Not detected. The associated reporting limit may be inaccurate or imprecise.

Samples with 'nv' denotation have not been validated.

Plum Brook Ordnance Works
Direct Push Groundwater
Data Summary

Report Date: 03/04/02

		Location Code:	TNTA-DP14			TNTA-DP21			TNTB-DP02			TNTB-DP03		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BA3014			BA3021			BB3002			BB3003		
		Sample Date:	02-AUG-01			01-AUG-01			06-AUG-01			01-AUG-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	0.20	U	nv	3.9		nv	0.20	U	nv	0.20	U	nv
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	nv	4.3		nv	0.20	U	nv	0.20	U	nv
Dinitrobenzene, 1,3-		ug/L	0.20	U	nv	0.60	I U	nv	0.20	U	nv	0.20	U	nv
Dinitrotoluene, 2,4-		ug/L	0.20	U	nv	9.5		nv	0.20	U	nv	0.20	U	nv
Dinitrotoluene, 2,6-		ug/L	0.20	U	nv	4.9		nv	0.20	U	nv	0.20	U	nv
HMX		ug/L	0.50	U	nv	1.5	U	nv	0.50	U	nv	0.50	U	nv
Nitrobenzene		ug/L	0.20	U	nv	0.60	U	nv	0.20	U	nv	0.20	U	nv
Nitrotoluene, 2-		ug/L	0.68	G U	nv	24		nv	0.20	U	nv	0.20	U	nv
Nitrotoluene, 3-		ug/L	0.20	U	nv	1.3		nv	0.20	U	nv	0.20	U	nv
Nitrotoluene, 4-		ug/L	0.20	U	nv	3.1		nv	0.20	U	nv	0.20	U	nv
RDX		ug/L	0.50	U	nv	1.5	U	nv	0.50	U	nv	0.50	U	nv
Tetryl		ug/L	0.20	U	nv	0.60	U	nv	0.20	U	nv	0.20	U	nv
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	nv	0.60	U	nv	0.20	U	nv	0.20	U	nv
Trinitrotoluene, 2,4,6-		ug/L	0.20	U	nv	4.1		nv	0.20	U	nv	0.14	J	nv
VOLATILES														
Acetone		ug/L	20	U	nv	8.8	J	nv	17	J	nv	10	J	nv
Benzene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Bromodichloromethane		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Bromoform		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Bromomethane		ug/L	10	U	nv	10	U	nv	10	U	nv	10	U	nv
Butanone, 2-		ug/L	20	U	nv	20	U	nv	20	U	nv	20	U	nv
Carbon disulfide		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Carbon tetrachloride		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Chlorobenzene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Chloroethane		ug/L	10	U	nv	10	U	nv	10	U	nv	10	U	nv
Chloroform		ug/L	5.0	U	nv	1.0	J	nv	5.0	U	nv	5.0	U	nv
Chloromethane		ug/L	10	U	nv	10	U	nv	10	U	nv	10	U	nv
Dibromochloromethane		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloroethane, 1,1-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv

Plum Brook Ordnance Works
Direct Push Groundwater
Data Summary

Report Date: 03/04/02

			Location Code:	TNTC-DP13			TNTC-DP19		
			Associated Site:	BASEWIDE			BASEWIDE		
			Sample No:	BC3013			BC3019		
			Sample Date:	01-AUG-01			06-AUG-01		
User Test Group									
Parameter	*Flt*	*Units*		*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES									
Amino-2,6-dinitrotoluene, 4-		ug/L		0.20	U	nv	1.5	G U	nv
Amino-4,6-dinitrotoluene, 2-		ug/L		0.20	U	nv	1.1	G U	nv
Dinitrobenzene, 1,3-		ug/L		0.20	U	nv	0.20	U	nv
Dinitrotoluene, 2,4-		ug/L		0.20	U	nv	0.20	U	nv
Dinitrotoluene, 2,6-		ug/L		0.20	U	nv	0.68	G U	nv
HMX		ug/L		0.50	U	nv	0.50	U	nv
Nitrobenzene		ug/L		0.20	U	nv	0.20	U	nv
Nitrotoluene, 2-		ug/L		0.20	U	nv	0.20	U	nv
Nitrotoluene, 3-		ug/L		0.20	U	nv	0.20	U	nv
Nitrotoluene, 4-		ug/L		0.20	U	nv	0.20	U	nv
RDX		ug/L		0.50	U	nv	0.50	U	nv
Tetryl		ug/L		0.20	U	nv	0.20	U	nv
Trinitrobenzene, 1,3,5-		ug/L		0.20	U	nv	0.20	U	nv
Trinitrotoluene, 2,4,6-		ug/L		0.20	U	nv	4.0		nv
VOLATILES									
Acetone		ug/L		8.8	J	nv	20	U	nv
Benzene		ug/L		5.0	U	nv	5.0	U	nv
Bromodichloromethane		ug/L		5.0	U	nv	5.0	U	nv
Bromoform		ug/L		5.0	U	nv	5.0	U	nv
Bromomethane		ug/L		10	U	nv	10	U	nv
Butanone, 2-		ug/L		20	U	nv	20	U	nv
Carbon disulfide		ug/L		5.0	U	nv	0.75	J	nv
Carbon tetrachloride		ug/L		5.0	U	nv	5.0	U	nv
Chlorobenzene		ug/L		5.0	U	nv	5.0	U	nv
Chloroethane		ug/L		10	U	nv	10	U	nv
Chloroform		ug/L		5.0	U	nv	5.0	U	nv
Chloromethane		ug/L		10	U	nv	10	U	nv
Dibromochloromethane		ug/L		5.0	U	nv	5.0	U	nv
Dichloroethane, 1,1-		ug/L		5.0	U	nv	5.0	U	nv

Report Date: 03/04/02

			TNTA-DP14			TNTA-DP21			TNTB-DP02			TNTB-DP03		
Location Code:			TNTA-DP14			TNTA-DP21			TNTB-DP02			TNTB-DP03		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BA3014			BA3021			BB3002			BB3003		
Sample Date:			02-AUG-01			01-AUG-01			06-AUG-01			01-AUG-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Dichloroethane, 1,2-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloroethene, 1,1-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloroethene, 1,2-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloropropane, 1,2-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloropropene, cis-1,3-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Dichloropropene, trans-1,3-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Ethylbenzene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Hexanone, 2-		ug/L	20	U	nv	20	U	nv	20	U	nv	20	U	nv
Methyl-2-pentanone, 4-		ug/L	20	U	nv	20	U	nv	20	U	nv	20	U	nv
Methylene chloride		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Styrene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Tetrachloroethane, 1,1,2,2-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Tetrachloroethene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Toluene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Trichloroethane, 1,1,1-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Trichloroethane, 1,1,2-		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Trichloroethene		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv
Vinyl chloride		ug/L	10	U	nv	10	U	nv	10	U	nv	10	U	nv
Xylenes, total		ug/L	5.0	U	nv	5.0	U	nv	5.0	U	nv	5.0	U	nv

Plum Brook Ordnance Works
Direct Push Groundwater
Data Summary

Report Date 03/04/02

		Location Code:	TNTC-DP13			TNTC-DP19		
		Associated Site:	BASEWIDE			BASEWIDE		
		Sample No:	BC3013			BC3019		
		Sample Date:	01-AUG-01			06-AUG-01		
User Test Group								
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES								
Dichloroethane, 1,2-		ug/L	5.0	U	nv	5.0	U	nv
Dichloroethene, 1,1-		ug/L	5.0	U	nv	5.0	U	nv
Dichloroethene, 1,2-		ug/L	5.0	U	nv	5.0	U	nv
Dichloropropane, 1,2-		ug/L	5.0	U	nv	5.0	U	nv
Dichloropropene, cis-1,3-		ug/L	5.0	U	nv	5.0	U	nv
Dichloropropene, trans-1,3-		ug/L	5.0	U	nv	5.0	U	nv
Ethylbenzene		ug/L	5.0	U	nv	5.0	U	nv
Hexanone, 2-		ug/L	20	U	nv	20	U	nv
Methyl-2-pentanone, 4-		ug/L	20	U	nv	20	U	nv
Methylene chloride		ug/L	5.0	U	nv	5.0	U	nv
Styrene		ug/L	5.0	U	nv	5.0	U	nv
Tetrachloroethane, 1,1,2,2-		ug/L	5.0	U	nv	5.0	U	nv
Tetrachloroethene		ug/L	5.0	U	nv	5.0	U	nv
Toluene		ug/L	5.0	U	nv	5.0	U	nv
Trichloroethane, 1,1,1-		ug/L	5.0	U	nv	5.0	U	nv
Trichloroethane, 1,1,2-		ug/L	5.0	U	nv	5.0	U	nv
Trichloroethene		ug/L	5.0	U	nv	5.0	U	nv
Vinyl chloride		ug/L	10	U	nv	10	U	nv
Xylenes, total		ug/L	5.0	U	nv	5.0	U	nv

Plum Brook Ordnance Works
Soils
Data Summary

Report Date: 03/06/02

	Location Code:	PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0001			BD0002			BD0003			BD0004		
	Sample Date:	27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	*Sample Depth:*	4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	1.2	U	U	0.25	I U	U	0.75	I U	U	1.2	I U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	1.2	U	U	0.25	I U	U	0.75	I U	U	1.2	I U	U
Dinitrobenzene, 1,3-	mg/kg	4.6			0.064	J	J	3.3			9.3		
Dinitrotoluene, 2,4-	mg/kg	14			0.48			12			26		
Dinitrotoluene, 2,6-	mg/kg	1.2	I U	U	0.48			1.3			2.9		
HMX	mg/kg	2.5	U	U	0.50	U	U	1.5	U	U	2.5	U	U
Nitrobenzene	mg/kg	1.2	U	U	0.25	U	U	0.75	I U	U	1.2	U	U
Nitrotoluene, 2-	mg/kg	1.2	U	U	0.25	U	U	1.0	G U	U	1.3	G U	U
Nitrotoluene, 3-	mg/kg	1.2	U	U	0.25	U	U	0.75	I U	U	1.2	I U	U
Nitrotoluene, 4-	mg/kg	1.2	U	U	0.25	U	U	0.75	I U	U	1.2	U	U
RDX	mg/kg	4.3	G U	U	0.50	U	U	2.3	G U	U	4.6	G U	U
Tetryl	mg/kg	3.2	U	U	0.65	U	U	2.0	U	U	3.2	U	U
Trinitrobenzene, 1,3,5-	mg/kg	31			1.0			18			25		
Trinitrotoluene, 2,4,6-	mg/kg	1.2	U	U	0.25	I U	U	0.75	I U	UJ	1.2	I U	UJ
GEN CHEMISTRY													
% moisture	Percent	19.3			20.0			17.5			22.2		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	40	U	U	40	U	U						
Amino-4,6-dinitrotoluene, 2-	ug/L	40	U	U	40	U	U						
Dinitrobenzene, 1,3-	ug/L	160			40	U	U						
Dinitrotoluene, 2,4-	ug/L	430	B		40	U	U						
Dinitrotoluene, 2,6-	ug/L	66			40	U	U						
HMX	ug/L	100	U	U	100	U	U						
Nitrobenzene	ug/L	40	U	U	40	U	U						
Nitrotoluene, 2-	ug/L	40	U	U	40	U	U						
Nitrotoluene, 3-	ug/L	40	U	U	40	U	U						
Nitrotoluene, 4-	ug/L	40	U	U	40	U	U						
RDX	ug/L	100	I U	U	100	U	U						

Report Date: 03/06/02

	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	1.1			0.27			250	I U	U	5.0	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	1.1			0.16	J	J	250	U	U	5.0	U	U
Dinitrobenzene, 1,3-	mg/kg	0.062	J	J	1.1			250	U	U	5.0	U	U
Dinitrotoluene, 2,4-	mg/kg	1.3			0.91			4600			8.0		
Dinitrotoluene, 2,6-	mg/kg	0.57			0.25			5600			6.5		
HMX	mg/kg	0.50	U	U	0.50	U	U	500	U	U	10	U	U
Nitrobenzene	mg/kg	0.25	U	U	0.25	U	U	250	U	U	5.0	U	U
Nitrotoluene, 2-	mg/kg	0.25	U	U	0.25	U	U	250	U	U	5.0	U	U
Nitrotoluene, 3-	mg/kg	0.25	U	U	0.25	I U	U	250	U	U	5.0	U	U
Nitrotoluene, 4-	mg/kg	0.25	U	U	0.25	U	U	250	U	U	5.0	U	U
RDX	mg/kg	0.50	U	U	0.65	G U	U	500	U	U	10	U	U
Tetryl	mg/kg	0.65	U	U	0.65	U	U	650	U	U	13	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.20	J	J	5.2			250	U	U	5.0	U	U
Trinitrotoluene, 2,4,6-	mg/kg	1.4			0.23	J	J	490	G U	U	27	G U	U
GEN CHEMISTRY													
% moisture	Percent	13.0			21.8			10.4			9.3		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Amino-4,6-dinitrotoluene, 2-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Dinitrobenzene, 1,3-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Dinitrotoluene, 2,4-	ug/L	40	U	U	40	U	U	140000	B		84	B	B
Dinitrotoluene, 2,6-	ug/L	40	U	U	40	U	U	110000			57		
HMX	ug/L	100	U	U	100	U	U	10000	U	U	100	U	U
Nitrobenzene	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Nitrotoluene, 2-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Nitrotoluene, 3-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
Nitrotoluene, 4-	ug/L	40	U	U	40	U	U	4000	U	U	40	U	U
RDX	ug/L	100	U	U	100	U	U	10000	U	U	100	U	U

Report Date: 03/06/02

	Location Code:	TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0009			BD0012			BD0013			BD0014		
	Sample Date:	26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group	Sample Depth:	.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	500	U	U	7.5	U	U	2.3			0.35		
Amino-4,6-dinitrotoluene, 2-	mg/kg	500	U	U	7.5	U	U	2.4			0.43		
Dinitrobenzene, 1,3-	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
Dinitrotoluene, 2,4-	mg/kg	130	J	J	7.5	IU	U	2.8			0.54		
Dinitrotoluene, 2,6-	mg/kg	500	U	U	7.5	U	U	2.0			0.40		
HMX	mg/kg	1000	U	U	15	U	U	0.50	U	U	0.50	U	U
Nitrobenzene	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 2-	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 3-	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 4-	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
RDX	mg/kg	1000	U	U	15	U	U	0.50	U	U	0.50	U	U
Tetryl	mg/kg	1300	U	U	20	U	U	0.65	U	U	0.65	U	U
Trinitrobenzene, 1,3,5-	mg/kg	500	U	U	7.5	U	U	0.25	U	U	0.25	U	U
Trinitrotoluene, 2,4,6-	mg/kg	12000		J	260			2.7			0.55		
GEN CHEMISTRY													
% moisture	Percent	12.9			11.0			21.9			19.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Amino-4,6-dinitrotoluene, 2-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Dinitrobenzene, 1,3-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Dinitrotoluene, 2,4-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Dinitrotoluene, 2,6-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
HMX	ug/L	10000	U	U	500	U	U	100	U	U	100	U	U
Nitrobenzene	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Nitrotoluene, 2-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Nitrotoluene, 3-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Nitrotoluene, 4-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
RDX	ug/L	10000	U	U	500	U	U	100	U	U	100	U	U

Report Date: 03/06/02

	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	*Sample Depth:*	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	740	G U	U	150	U	U	0.12	J	J	0.25	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	150	I U	U	150	U	U	0.11	J	J	0.25	U	U
Dinitrobenzene, 1,3-	mg/kg	150	U	U	150	U	U	0.25	U	U	0.25	U	U
Dinitrotoluene, 2,4-	mg/kg	2400			2100			0.23	J	J	0.25	U	U
Dinitrotoluene, 2,6-	mg/kg	1500			630			0.098	J	J	0.25	U	U
HMX	mg/kg	300	U	U	300	U	U	0.50	U	U	0.50	U	U
Nitrobenzene	mg/kg	150	U	U	150	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 2-	mg/kg	150	U	U	150	U	U	0.25	U	U	0.59		
Nitrotoluene, 3-	mg/kg	150	U	U	150	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 4-	mg/kg	150	U	U	150	U	U	0.25	U	U	0.33		
RDX	mg/kg	300	U	U	300	U	U	0.50	U	U	0.50	U	U
Tetryl	mg/kg	390	U	U	390	U	U	0.65	U	U	0.65	U	U
Trinitrobenzene, 1,3,5-	mg/kg	150	U	U	150	U	U	0.25	U	U	0.25	U	U
Trinitrotoluene, 2,4,6-	mg/kg	3100			2200			0.25	U	U	0.25	U	U
GEN CHEMISTRY													
% moisture	Percent	9.7			6.2			4.7			13.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Amino-4,6-dinitrotoluene, 2-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Dinitrobenzene, 1,3-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Dinitrotoluene, 2,4-	ug/L	100000	B		84000	B		40	U	U	40	U	U
Dinitrotoluene, 2,6-	ug/L	74000			24000			40	U	U	40	U	U
HMX	ug/L	10000	U	U	10000	U	U	100	U	U	100	U	U
Nitrobenzene	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Nitrotoluene, 2-	ug/L	4000	U	U	4000	U	U	40	U	U	30	J	J
Nitrotoluene, 3-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Nitrotoluene, 4-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
RDX	ug/L	10000	U	U	10000	U	U	100	U	U	100	U	U

	Location Code:	TNTC-SO123			TNTC-SO123			WARP-DP09			WARP-DP09		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0021R			BD0022R			BD0023			BD0024		
	Sample Date:	02-OCT-01			02-OCT-01			27-SEP-01			27-SEP-01		
User Test Group	Sample Depth:	4.0 - 6			6.0 - 7			4.0 - 4.9			11.0 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.7			1.2	I U	U	0.25	U	UJ	0.16	J	J
Amino-4,6-dinitrotoluene, 2-	mg/kg	2.5			1.2	I U	U	0.25	U	U	0.11	J	J
Dinitrobenzene, 1,3-	mg/kg	0.25	U	U	1.2	U	U	0.25	U	U	0.31		
Dinitrotoluene, 2,4-	mg/kg	0.67			33			0.71			2.7		
Dinitrotoluene, 2,6-	mg/kg	2.4			18			0.35			0.27		
HMX	mg/kg	0.50	U	U	2.5	U	U	0.50	U	U	0.50	U	U
Nitrobenzene	mg/kg	0.25	U	U	1.2	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 2-	mg/kg	0.25	U	U	4.0			0.25	U	U	0.25	U	U
Nitrotoluene, 3-	mg/kg	0.25	U	U	0.80	J	J	0.25	U	U	0.25	U	U
Nitrotoluene, 4-	mg/kg	0.25	U	U	2.4			0.25	U	U	0.25	I U	U
RDX	mg/kg	0.50	U	U	2.5	U	U	0.50	U	U	0.50	I U	U
Tetryl	mg/kg	0.65	U	U	3.2	U	U	0.65	U	U	0.65	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.30			0.50	J	J	0.25	U	U	1.7		
Trinitrotoluene, 2,4,6-	mg/kg	6.5			4.0			1.0			0.25	I U	U
GEN CHEMISTRY													
% moisture	Percent	8.2			13.0			21.6			23.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	67			40	I U	U	40	U	U	40	U	U
Amino-4,6-dinitrotoluene, 2-	ug/L	44			40	U	U	40	U	U	40	U	U
Dinitrobenzene, 1,3-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Dinitrotoluene, 2,4-	ug/L	25	J	J	580			18	J B	B	52	B	B
Dinitrotoluene, 2,6-	ug/L	96			420			40	U	U	40	I U	U
HMX	ug/L	100	U	U	100	U	U	100	U	U	100	U	U
Nitrobenzene	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Nitrotoluene, 2-	ug/L	40	U	U	210			40	U	U	40	U	U
Nitrotoluene, 3-	ug/L	40	U	U	28	J	J	40	U	U	40	U	U
Nitrotoluene, 4-	ug/L	40	U	U	74			40	U	U	40	U	U
RDX	ug/L	100	U	U	100	U	U	100	U	U	100	U	U

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	Location Code:	WARP-DP13			WARP-DP13			WARP-DP16			WARP-DP16		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0025			BD0028			BD0029R			BD0030R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	*Sample Depth:*	4.1 - 5.1			11.0 - 12			3.5 - 4			11.0 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.25	U	UJ	0.75	U	U	0.25	U	U	0.25	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.25	U	U	0.75	U	U	0.25	U	U	0.25	U	U
Dinitrobenzene, 1,3-	mg/kg	0.25	U	U	2.4			0.25	U	U	0.033	J	J
Dinitrotoluene, 2,4-	mg/kg	0.29			6.5			0.052	J	J	0.25	U	U
Dinitrotoluene, 2,6-	mg/kg	0.25	IU	U	0.64	J	J	0.25	U	U	0.25	U	U
HMX	mg/kg	0.50	U	U	1.5	U	U	0.50	U	U	0.50	U	U
Nitrobenzene	mg/kg	0.25	U	U	0.75	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 2-	mg/kg	0.25	U	U	0.75	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 3-	mg/kg	0.25	U	U	0.75	U	U	0.25	U	U	0.25	U	U
Nitrotoluene, 4-	mg/kg	0.25	U	U	0.75	IU	U	0.25	U	U	0.25	U	U
RDX	mg/kg	0.50	U	U	1.5	IU	U	0.50	U	U	0.50	U	U
Tetryl	mg/kg	0.65	U	U	2.0	U	U	0.65	U	U	0.65	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.16	J	J	11			0.25	U	U	1.6		
Trinitrotoluene, 2,4,6-	mg/kg	0.25	U	U	0.75	IU	U	0.25	U	U	0.25	U	U
GEN CHEMISTRY													
% moisture	Percent	13.0			22.0			13.9			26.0		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Amino-4,6-dinitrotoluene, 2-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Dinitrobenzene, 1,3-	ug/L	40	U	U	51			40	U	U	40	U	U
Dinitrotoluene, 2,4-	ug/L	40	U	U	100	B	B	46			40	U	U
Dinitrotoluene, 2,6-	ug/L	40	U	U	40	U	U	26	J	J	40	U	U
HMX	ug/L	100	U	U	100	U	U	100	U	U	100	U	U
Nitrobenzene	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Nitrotoluene, 2-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Nitrotoluene, 3-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Nitrotoluene, 4-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
RDX	ug/L	100	U	U	100	U	U	100	U	U	100	U	U

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User Test Group / Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
Location Code:		PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
Associated Site:		BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:		BD0001			BD0002			BD0003			BD0004		
Sample Date:		27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
Sample Depth:		4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
LEACH-EXP													
Tetryl	ug/L	40	U	U	40	U	U						
Trinitrobenzene, 1,3,5-	ug/L	780			40	U	U						
Trinitrotoluene, 2,4,6-	ug/L	40	U	U	40	U	U						
METALS													
Aluminum	mg/kg	8820			9820			10700		J	13500		J
Antimony	mg/kg	7.4	U	U	0.55	B	J	0.60	B	J	0.71	B	J
Arsenic	mg/kg	5.4			9.0			11.6		J	18.3		J
Barium	mg/kg	63.6			76.5			112			103		
Beryllium	mg/kg	0.62			0.67			0.76		B	0.90		B
Cadmium	mg/kg	0.13	B	J	0.38	B	J	0.16	B	J	0.45	B	J
Calcium	mg/kg	2090			58200			5700		J	14200		J
Chromium	mg/kg	13.7			16.2			17.4		J	21.8		J
Cobalt	mg/kg	5.2	B	J	12.7			7.6		J	10.9		J
Copper	mg/kg	10.2			25.3			19.5			27.8		
Iron	mg/kg	16600			24900			25200		J	32700		J
Lead	mg/kg	9.1			12.7			14.7		J	14.3		J
Magnesium	mg/kg	2030			18100			3220		J	8860		J
Manganese	mg/kg	270		J	587		J	474		J	710		J
Mercury	mg/kg	0.023	B	B	0.041	U	U	0.014	B	B	0.025	B	B
Nickel	mg/kg	15.6			30.4			24.9		J	35.7		J
Potassium	mg/kg	591	B	J	2170			739			1800		
Selenium	mg/kg	0.62	U	U	0.62	U	U	0.61	U	U	0.64	U	U
Silver	mg/kg	1.2	U	U	1.2	U	U	1.2	U	U	1.3	U	U
Sodium	mg/kg	2930			2660			3500		J	5170		J
Thallium	mg/kg	1.2	U	U	0.62	B	B	0.78	B	B	1.1	B	J
Vanadium	mg/kg	22.3			23.3			29.1		J	31.5		J
Zinc	mg/kg	43.2			65.8			56.2		J	84.4		J

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	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
LEACH-EXP													
Tetryl	ug/L	40	U	U	40	U	U	4000	U	UJ	40	U	UJ
Trinitrobenzene, 1,3,5-	ug/L	40	U	U	26	J	J	4000	U	U	40	U	U
Trinitrotoluene, 2,4,6-	ug/L	40	U	U	40	U	U	17000			1200	G U	U
METALS													
Aluminum	mg/kg	8410		J	7960		J	3080		J	3370		J
Antimony	mg/kg	6.9	U	U	7.7	U	U	6.7	U	U	0.61	B	J
Arsenic	mg/kg	4.7		J	6.7		J	6.6		J	9.8		J
Barium	mg/kg	51.4			54.0			24.2			16.3	B	J
Beryllium	mg/kg	0.55	B	B	0.57	B	B	0.22	B	B	0.40	B	B
Cadmium	mg/kg	0.18	B	B	0.34	B	B	0.56	U	U	0.66		B
Calcium	mg/kg	8830		J	38600		J	2430		J	146000		J
Chromium	mg/kg	13.0		J	13.5		J	6.0		J	5.5		J
Cobalt	mg/kg	5.5	B	J	9.4		J	3.4	B	B	7.0		J
Copper	mg/kg	9.9			20.7			10.3			19.9		
Iron	mg/kg	14300		J	18700		J	20500		J	26100		J
Lead	mg/kg	9.2		J	10.2		J	43.3		J	10.8		J
Magnesium	mg/kg	3790		J	13800		J	796		J	44400		J
Manganese	mg/kg	309		J	413		J	101		J	1390		J
Mercury	mg/kg	0.015	B	B	0.013	B	B	0.037	U	U	0.036		B
Nickel	mg/kg	14.1		J	25.2		J	9.4		J	23.8		J
Potassium	mg/kg	759			1540			425	B	J	938		
Selenium	mg/kg	0.57	U	U	0.64	U	U	0.56	U	U	0.55	U	U
Silver	mg/kg	1.1	U	U	1.3	U	U	1.1	U	U	1.1	U	U
Sodium	mg/kg	1250		J	1480		J	558	U	U	155	B	J
Thallium	mg/kg	1.1	U	U	0.80	B	J	1.1	U	U	1.0	B	B
Vanadium	mg/kg	16.7		J	19.8		J	19.3		J	9.9		J
Zinc	mg/kg	48.2		J	64.2		J	65.9		J	111		J

	Location Code:	TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0009			BD0012			BD0013			BD0014		
	Sample Date:	26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group	*Sample Depth:*	.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
LEACH-EXP													
Tetryl	ug/L	4000	U	UJ	200	U	UJ	40	U	U	40	U	U
Trinitrobenzene, 1,3,5-	ug/L	4000	U	U	200	U	U	40	U	U	40	U	U
Trinitrotoluene, 2,4,6-	ug/L	80000			4400			40	U	U	40	U	U
METALS													
Aluminum	mg/kg	3680		J	11200		J	6040			8110		
Antimony	mg/kg	6.9	U	U	6.7	U	U	1.8	B	J	1.2	B	J
Arsenic	mg/kg	3.0		J	8.2		J	12.8			17.0		
Barium	mg/kg	41.7		J	16.6	B	J	105			294		
Beryllium	mg/kg	0.31	B	B	0.70		B	0.72			1.2		
Cadmium	mg/kg	0.31	B	B	0.093	B	B	0.50	B	J	0.41	B	J
Calcium	mg/kg	34000		J	47500		J	8990			4080		
Chromium	mg/kg	8.1		J	21.0		J	47.2			9.6		
Cobalt	mg/kg	3.8	B	B	17.2		J	9.5			15.2		
Copper	mg/kg	7.2		B	12.8			35.1			38.8		
Iron	mg/kg	9780		J	22900		J	18100			28000		
Lead	mg/kg	60.4		J	8.0		J	105			18.0		
Magnesium	mg/kg	3990		J	8740		J	2070			1100		
Manganese	mg/kg	177		J	512		J	419			914		J
Mercury	mg/kg	0.051		B	0.037	U	U	0.053			0.087		
Nickel	mg/kg	9.4		J	44.6		J	26.7			51.0		
Potassium	mg/kg	624			2900			1040			940		
Selenium	mg/kg	0.57	U	U	0.56	U	U	0.50	B	J	0.68		
Silver	mg/kg	1.1	U	U	1.1	U	U	1.3	U	U	1.2	U	U
Sodium	mg/kg	73.6	B	J	274	B	J	640	U	U	96.7	B	J
Thallium	mg/kg	1.1	U	U	1.1	U	U	1.4			2.1		
Vanadium	mg/kg	14.5		J	16.9		J	17.0			22.7		
Zinc	mg/kg	63.4		J	44.4		J	132			69.6		

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	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	Sample Depth:	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
LEACH-EXP													
Tetryl	ug/L	4000	U	UJ	4000	U	UJ	40	U	U	40	U	U
Trinitrobenzene, 1,3,5-	ug/L	4000	U	U	4000	U	U	40	U	U	40	U	U
Trinitrotoluene, 2,4,6-	ug/L	71000			77000			40	U	U	40	U	U
METALS													
Aluminum	mg/kg	2850			1800			4280		J	6100		J
Antimony	mg/kg	0.84	B	J	6.4	U	U	6.3	U	U	6.9	U	U
Arsenic	mg/kg	3.4			2.9			3.3		B	3.0		B
Barium	mg/kg	14.6	B	J	7.9	B	J	51.5		J	44.9		J
Beryllium	mg/kg	0.22	B	B	0.17	B	B	0.41	B	B	0.45	B	B
Cadmium	mg/kg	0.55	U	U	0.53	U	U	0.082	B	B	0.11	B	B
Calcium	mg/kg	1680			1210			7650		J	71300		J
Chromium	mg/kg	13.2			5.2			8.4	J	J	12.3	J	J
Cobalt	mg/kg	2.7	B	J	2.3	B	J	3.2	B	J	13.0		J
Copper	mg/kg	4.9			4.5			8.2			17.6		
Iron	mg/kg	10400			6450			20200		J	16400		J
Lead	mg/kg	19.9			15.1			24.7		J	21.5		J
Magnesium	mg/kg	770			605			2960		J	3620		J
Manganese	mg/kg	129		J	119		J	529		J	516		J
Mercury	mg/kg	0.011	B	B	0.035	U	U	0.30			0.059		J
Nickel	mg/kg	7.4			6.0			9.3		J	30.1		J
Potassium	mg/kg	306	B	J	255	B	J	220	B	J	2190		
Selenium	mg/kg	0.55	U	U	0.53	U	U	0.52	U	U	0.58	U	U
Silver	mg/kg	1.1	U	U	1.1	U	U	1.0	U	U	1.2	U	U
Sodium	mg/kg	554	U	U	533	U	U	525	U	U	137	B	J
Thallium	mg/kg	1.1	U	U	1.1	U	U	1.0	U	U	1.2	U	U
Vanadium	mg/kg	10.9			7.6			21.0		J	10.1		J
Zinc	mg/kg	22.3			16.7			52.9		J	47.3		J

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User Test Group		Location Code:	TNTC-SO123			TNTC-SO123			WARP-DP09			WARP-DP09		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD0021R			BD0022R			BD0023			BD0024		
		Sample Date:	02-OCT-01			02-OCT-01			27-SEP-01			27-SEP-01		
		Sample Depth:	4.0 - 6			6.0 - 7			4.0 - 4.9			11.0 - 12		
Parameter		Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
LEACH-EXP														
	Tetryl	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
	Trinitrobenzene, 1,3,5-	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
	Trinitrotoluene, 2,4,6-	ug/L	140			60			40	U	U	40	U	U
METALS														
	Aluminum	mg/kg	3950		J	4970		J	6980			9320		
	Antimony	mg/kg	6.5	U	U	6.9	U	U	7.7	U	U	7.8	U	U
	Arsenic	mg/kg	2.9		B	3.3		B	6.1			12.7		
	Barium	mg/kg	12.0	B	J	43.7		J	49.8			65.4		
	Beryllium	mg/kg	0.27	B	B	0.46	B	B	0.45	B	B	0.64	B	J
	Cadmium	mg/kg	0.083	B	B	0.20	B	B	0.22	B	J	0.23	B	J
	Calcium	mg/kg	9510		J	151000		J	83900			2560		
	Chromium	mg/kg	8.2	J	J	9.7	J	J	23.2			16.3		
	Cobalt	mg/kg	3.1	B	J	12.0		J	3.8	B	J	14.2		
	Copper	mg/kg	10.6			15.4			10.1			23.8		
	Iron	mg/kg	11600		J	21600		J	12000			24300		
	Lead	mg/kg	97.6		J	10.1		J	12.0			10.7		
	Magnesium	mg/kg	644		J	2620		J	6410			4020		
	Manganese	mg/kg	122		J	796		J	236		J	748		J
	Mercury	mg/kg	0.036	U	U	0.038	U	U	0.044			0.027	B	J
	Nickel	mg/kg	8.2		J	30.2		J	10.7			37.7		
	Potassium	mg/kg	349	B	J	2150			407	B	J	1250		
	Selenium	mg/kg	0.54	U	U	0.57	U	U	0.64	U	U	0.65	U	U
	Silver	mg/kg	1.1	U	U	1.1	U	U	1.3	U	U	1.3	U	U
	Sodium	mg/kg	545	U	U	251	B	J	638	U	U	91.3	B	J
	Thallium	mg/kg	1.1	U	U	1.1	U	U	1.1	B	B	0.91	B	B
	Vanadium	mg/kg	10.1		J	8.6		J	16.0			22.0		
	Zinc	mg/kg	56.2		J	75.6		J	33.3			63.5		

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User Test Group / Parameter	Units	WARP-DP13 BASEWIDE BD0025 27-SEP-01 4.1 - 5.1 Result	Qual	VQ	WARP-DP13 BASEWIDE BD0028 27-SEP-01 11.0 - 12 Result	Qual	VQ	WARP-DP16 BASEWIDE BD0029R 02-OCT-01 3.5 - 4 Result	Qual	VQ	WARP-DP16 BASEWIDE BD0030R 02-OCT-01 11.0 - 12 Result	Qual	VQ
LEACH-EXP													
Tetryl	ug/L	40	U	U	40	U	U	40	U	U	40	U	U
Trinitrobenzene, 1,3,5-	ug/L	40	U	U	110			40	U	U	40	U	U
Trinitrotoluene, 2,4,6-	ug/L	40	U	U	40	U	U	23	J	J	40	U	U
METALS													
Aluminum	mg/kg	4340			11400			10700		J	12500		J
Antimony	mg/kg	6.9	U	U	0.64	B	J	0.56	B	J	8.1	U	U
Arsenic	mg/kg	2.6			20.3			10.3		J	6.8		J
Barium	mg/kg	32.6			73.5			102		J	94.9		J
Beryllium	mg/kg	0.34	B	B	0.79			0.75		B	0.83		B
Cadmium	mg/kg	0.11	B	J	0.27	B	J	0.17	B	B	0.16	B	B
Calcium	mg/kg	974			23100			6430		J	34300		J
Chromium	mg/kg	6.4			18.7			16.7	J	J	19.8	J	J
Cobalt	mg/kg	5.5	B	J	13.8			14.2		J	11.7		J
Copper	mg/kg	4.9			23.5			22.3			18.8		
Iron	mg/kg	8370			30300			26100		J	25600		J
Lead	mg/kg	5.7			10.6			13.0		J	9.6		J
Magnesium	mg/kg	901			9230			5590		J	10400		J
Manganese	mg/kg	184		J	592		J	1500		J	377		J
Mercury	mg/kg	0.017	B	J	0.042	U	U	0.021	B	J	0.045	U	U
Nickel	mg/kg	7.4			36.9			37.9		J	30.0		J
Potassium	mg/kg	328	B	J	1790			755			2850		
Selenium	mg/kg	0.57	U	U	0.64	U	U	0.58	U	U	0.68	U	U
Silver	mg/kg	1.1	U	U	1.3	U	U	1.2	U	U	1.4	U	U
Sodium	mg/kg	387	B	J	244	B	J	683			630	B	J
Thallium	mg/kg	1.1	U	U	0.94	B	B	0.71	B	J	1.4	U	U
Vanadium	mg/kg	12.1			26.1			23.3		J	23.9		J
Zinc	mg/kg	23.3			75.7			74.9		J	57.7		J

Plum Brook Ordnance Works
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Data Summary

Report Date: 03/06/02

User Test Group	Location Code:	PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0001			BD0002			BD0003			BD0004		
	Sample Date:	27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
	Sample Depth:	4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	.34	J D	J	.014	J B	B	.016	J B	B	.01	J B	B
		1.1	B E	R									
Benzene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Bromodichloromethane	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Bromoform	mg/kg	.0062	U	U	.0062	U	UJ	.0061	U	U	.0064	U	U
Bromomethane	mg/kg	.012	U	UJ	.012	U	UJ	.012	U	UJ	.013	U	UJ
Butanone, 2-	mg/kg	.025	U	U	.025	U	U	024	U	U	.026	U	U
Carbon disulfide	mg/kg	.0062	U	U	.0029	J	J	.0061	U	U	.0064	U	U
Carbon tetrachloride	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Chlorobenzene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Chloroethane	mg/kg	.012	U	U	.012	U	U	.012	U	U	.013	U	U
Chloroform	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Chloromethane	mg/kg	.012	U	U	.012	U	U	.012	U	U	.013	U	U
Dibromochloromethane	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloroethane, 1,1-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloroethane, 1,2-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloroethene, 1,1-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloroethene, 1,2-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloropropane, 1,2-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloropropene, cis-1,3-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Dichloropropene, trans-1,3-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Ethylbenzene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Hexanone, 2-	mg/kg	.025	U	U	.025	U	U	.024	U	U	.026	U	U
Methyl-2-pentanone, 4-	mg/kg	.025	U	U	.025	U	U	.024	U	U	.026	U	U
Methylene chloride	mg/kg	.0083	B	B	.0079	B	B	.0051	J B	B	.0061	J B	B
Styrene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0062	U	U	.0062	U	UJ	.0061	U	U	.0064	U	U
Tetrachloroethene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Toluene	mg/kg	.00077	J	J	.00078	J	J	.00089	J	J	.0011	J	J
Trichloroethane, 1,1,1-	mg/kg	.0062	U	U	.0062	U	U	0061	U	U	.0064	U	U

Report Date: 03/06/02

	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	.015	J B	B	.018	J B	B	.012	J B	B	.052	B	B
Benzene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Bromodichloromethane	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Bromoform	mg/kg	.0057	U	U	.0064	U	UJ	.0056	U	UJ	.0055	U	UJ
Bromomethane	mg/kg	.011	U	UJ	.013	U	UJ	.011	U	UJ	.011	U	UJ
Butanone, 2-	mg/kg	.023	U	U	.026	U	U	.022	U	U	.022	U	U
Carbon disulfide	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Carbon tetrachloride	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Chlorobenzene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U
Chloroethane	mg/kg	.011	U	U	.013	U	U	.011	U	U	.011	U	U
Chloroform	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Chloromethane	mg/kg	.011	U	U	.013	U	U	.011	U	U	.011	U	U
Dibromochloromethane	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloroethane, 1,1-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloroethane, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloroethene, 1,1-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloroethene, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloropropane, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloropropene, cis-1,3-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Dichloropropene, trans-1,3-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U
Ethylbenzene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U
Hexanone, 2-	mg/kg	.023	U	U	.026	U	U	.022	U	UJ	.022	U	U
Methyl-2-pentanone, 4-	mg/kg	.023	U	U	.026	U	U	.022	U	UJ	.022	U	U
Methylene chloride	mg/kg	.0057	B	B	.007	B	B	.0068	B	B	.0059	B	B
Styrene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0057	U	U	.0064	U	UJ	.0056	U	UJ	.0055	U	UJ
Tetrachloroethene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U
Toluene	mg/kg	.00081	J	J	.00098	J	J	.0014	J	J	.0014	J	J
Trichloroethane, 1,1,1-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U

Report Date: 03/06/02

	Location Code:	TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0009			BD0012			BD0013			BD0014		
	Sample Date:	26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group	Sample Depth:	.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	4.4	D	J	.0079	J	J	.045	B	B	.15	B	J
		6	B E	R									
Benzene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Bromodichloromethane	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Bromoform	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	UJ
Bromomethane	mg/kg	.011	U	UJ	.011	U	UJ	.013	U	UJ	.012	U	UJ
Butanone, 2-	mg/kg	.023	U	U	.022	U	U	.026	U	U	.025	U	U
Carbon disulfide	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Carbon tetrachloride	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Chlorobenzene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Chloroethane	mg/kg	.011	U	U	.011	U	U	.013	U	U	.012	U	U
Chloroform	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Chloromethane	mg/kg	.011	U	U	.011	U	U	.013	U	U	.012	U	U
Dibromochloromethane	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloroethane, 1,1-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloroethane, 1,2-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloroethene, 1,1-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloroethene, 1,2-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloropropane, 1,2-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloropropene, cis-1,3-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Dichloropropene, trans-1,3-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Ethylbenzene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Hexanone, 2-	mg/kg	.023	U	U	.022	U	U	.026	U	U	.025	U	U
Methyl-2-pentanone, 4-	mg/kg	.023	U	U	.022	U	U	.026	U	U	.025	U	U
Methylene chloride	mg/kg	.0061	B	B	.0042	J B	B	.0067	B	B	0074	B	B
Styrene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	UJ
Tetrachloroethene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Toluene	mg/kg	.00086	J	J	.00074	J	J	.00075	J	J	.00079	J	J
Trichloroethane, 1,1,1-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U

Plum Brook Ordnance Works
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Report Date: 03/06/02

User Test Group	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
	Sample Depth:	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	.012	J B	B	.0088	J	J	.27			.017	J	J
Benzene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Bromodichloromethane	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Bromoform	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Bromomethane	mg/kg	.011	U	UJ	.011	U	UJ	.01	U	UJ	.012	U	UJ
Butanone, 2-	mg/kg	.022	U	U	.021	U	U	.021	U	U	.023	U	U
Carbon disulfide	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Carbon tetrachloride	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Chlorobenzene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Chloroethane	mg/kg	.011	U	U	.011	U	U	.01	U	U	.012	U	U
Chloroform	mg/kg	.0055	U	U	.0053	U	U	0052	U	U	.0058	U	U
Chloromethane	mg/kg	.011	U	U	.011	U	UJ	.01	U	UJ	.012	U	UJ
Dibromochloromethane	mg/kg	.0055	U	U	.0053	U	U	0052	U	U	.0058	U	U
Dichloroethane, 1,1-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Dichloroethane, 1,2-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Dichloroethene, 1,1-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Dichloroethene, 1,2-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Dichloropropane, 1,2-	mg/kg	.0055	U	U	.0053	U	U	0052	U	U	.0058	U	U
Dichloropropene, cis-1,3-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Dichloropropene, trans-1,3-	mg/kg	.0055	U	U	.0053	U	U	0052	U	U	.0058	U	U
Ethylbenzene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Hexanone, 2-	mg/kg	.022	U	U	.021	U	U	.021	U	U	.023	U	U
Methyl-2-pentanone, 4-	mg/kg	.022	U	U	.021	U	U	.021	U	U	.023	U	U
Methylene chloride	mg/kg	.0087	B	B	.0081	B	B	.0031	J B	B	.0034	J B	B
Styrene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Tetrachloroethene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Toluene	mg/kg	.00078	J	J	.0011	J	J	.0052	U	U	.0058	U	U
Trichloroethane, 1,1,1-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U

	Location Code:	TNTC-SO123			TNTC-SO123			WARP-DP09			WARP-DP09		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0021R			BD0022R			BD0023			BD0024		
	Sample Date:	02-OCT-01			02-OCT-01			27-SEP-01			27-SEP-01		
User Test Group	Sample Depth:	4.0 - 6			6.0 - 7			4.0 - 4.9			11.0 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	.023			.03			.53	B	J	.017	J B	B
Benzene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Bromodichloromethane	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Bromoform	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Bromomethane	mg/kg	.011	U	UJ	.011	U	UJ	.013	U	UJ	.013	U	UJ
Butanone, 2-	mg/kg	.022	U	U	.023	U	U	.026	U	U	.026	U	U
Carbon disulfide	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Carbon tetrachloride	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Chlorobenzene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Chloroethane	mg/kg	.011	U	U	.011	U	U	.013	U	U	.013	U	U
Chloroform	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Chloromethane	mg/kg	.011	U	UJ	.011	U	UJ	.013	U	U	.013	U	U
Dibromochloromethane	mg/kg	.0054	U	U	0057	U	U	.0064	U	U	.0065	U	U
Dichloroethane, 1,1-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Dichloroethane, 1,2-	mg/kg	.0054	U	U	0057	U	U	.0064	U	U	0065	U	U
Dichloroethene, 1,1-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Dichloroethene, 1,2-	mg/kg	.0054	U	U	0057	U	U	.0064	U	U	.0065	U	U
Dichloropropane, 1,2-	mg/kg	.0054	U	U	0057	U	U	.0064	U	U	.0065	U	U
Dichloropropene, cis-1,3-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Dichloropropene, trans-1,3-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Ethylbenzene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Hexanone, 2-	mg/kg	.022	U	U	.023	U	U	.026	U	U	.026	U	U
Methyl-2-pentanone, 4-	mg/kg	.022	U	U	.023	U	U	.026	U	U	.026	U	U
Methylene chloride	mg/kg	0044	J B	B	.0029	J B	B	.008	B	B	.0088	B	B
Styrene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Tetrachloroethene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	0065	U	U
Toluene	mg/kg	.0054	U	U	.0008	J	J	.0064	U	U	.00071	J	J
Trichloroethane, 1,1,1-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U

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Data Summary

Report Date: 03/06/02

	Location Code:	WARP-DP13			WARP-DP13			WARP-DP16			WARP-DP16		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0025			BD0028			BD0029R			BD0030R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	Sample Depth:	4.1 - 5.1			11.0 - 12			3.5 - 4			11.0 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Acetone	mg/kg	.33		J	.026	U	UJ	.023	U	U	.18		
Benzene	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Bromodichloromethane	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Bromoform	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Bromomethane	mg/kg	.011	U	UJ	.013	U	UJ	.012	U	UJ	.014	U	UJ
Butanone, 2-	mg/kg	.023	U	U	.026	U	U	.023	U	U	.027	U	U
Carbon disulfide	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Carbon tetrachloride	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Chlorobenzene	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Chloroethane	mg/kg	.011	U	U	.013	U	U	.012	U	U	.014	U	U
Chloroform	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Chloromethane	mg/kg	.011	U	UJ	.013	U	U	.012	U	UJ	.014	U	UJ
Dibromochloromethane	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloroethane, 1,1-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloroethane, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloroethene, 1,1-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloroethene, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloropropane, 1,2-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloropropene, cis-1,3-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Dichloropropene, trans-1,3-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Ethylbenzene	mg/kg	.0013	J	J	.0064	U	U	.0058	U	U	.0068	U	U
Hexanone, 2-	mg/kg	.023	U	U	.026	U	U	.023	U	U	.027	U	U
Methyl-2-pentanone, 4-	mg/kg	.023	U	U	.026	U	U	.023	U	U	.027	U	U
Methylene chloride	mg/kg	.0081	B	B	.0081	B	B	.0034	J B	B	.0052	J B	B
Styrene	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Tetrachloroethene	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Toluene	mg/kg	.0038	J	J	.00081	J	J	.0058	U	U	.0068	U	U
Trichloroethane, 1,1,1-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U

		PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Location Code:	PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0001			BD0002			BD0003			BD0004		
	Sample Date:	27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	*Sample Depth:*	4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Trichloroethene	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Vinyl chloride	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U
Xylenes, total	mg/kg	.0062	U	U	.0062	U	U	.0061	U	U	.0064	U	U

Report Date: 03/06/02

	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Trichloroethene	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Vinyl chloride	mg/kg	.0057	U	U	.0064	U	U	.0056	U	U	.0055	U	U
Xylenes, total	mg/kg	.0057	U	U	.0064	U	U	.0056	U	UJ	.0055	U	U

	Location Code:	TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0009			BD0012			BD0013			BD0014		
	Sample Date:	26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group	*Sample Depth:*	.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Trichloroethene	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Vinyl chloride	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U
Xylenes, total	mg/kg	.0057	U	U	.0056	U	U	.0064	U	U	.0062	U	U

Report Date: 03/06/02

User Test Group	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
	Sample Depth:	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Trichloroethene	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Vinyl chloride	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U
Xylenes, total	mg/kg	.0055	U	U	.0053	U	U	.0052	U	U	.0058	U	U

	Location Code:	TNTC-SO123			TNTC-SO123			WARP-DP09			WARP-DP09		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0021R			BD0022R			BD0023			BD0024		
	Sample Date:	02-OCT-01			02-OCT-01			27-SEP-01			27-SEP-01		
User Test Group	*Sample Depth:*	4.0 - 6			6.0 - 7			4.0 - 4.9			11.0 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Trichloroethene	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Vinyl chloride	mg/kg	.0054	U	U	.0057	U	U	.0064	U	U	.0065	U	U
Xylenes, total	mg/kg	.0054	U	U	.0057	U	U	0064	U	U	.0065	U	U

	Location Code:	WARP-DP13			WARP-DP13			WARP-DP16			WARP-DP16		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0025			BD0028			BD0029R			BD0030R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	Sample Depth:	4.1 - 5.1			11.0 - 12			3.5 - 4			11.0 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES													
Trichloroethane, 1,1,2-	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Trichloroethene	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Vinyl chloride	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U
Xylenes, total	mg/kg	.0057	U	U	.0064	U	U	.0058	U	U	.0068	U	U

Report Date: 03/04/02

		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*		*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES															
Amino-2,6-dinitrotoluene, 4-		ug/L	0.99	G U	U	0.20	U	U	0.20	U	U			
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Dinitrobenzene, 1,3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Dinitrotoluene, 2,4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Dinitrotoluene, 2,6-		ug/L	6.3	G U	U	0.20	U	U	0.20	U	U			
HMX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U			
Nitrobenzene		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Nitrotoluene, 2-		ug/L	0.20	I U	U	0.20	U	U	0.20	U	U			
Nitrotoluene, 3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Nitrotoluene, 4-		ug/L	0.20	I U	U	0.20	U	U	0.20	U	U			
RDX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U			
Tetryl		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
Trinitrotoluene, 2,4,6-		ug/L	1.6			0.20	U	U	0.20	U	U			
GEN CHEMISTRY														
Alkalinity		ug/L	552000	J	J	750000	J	J	370000	J	J			
Chloride		ug/L	68100			451000			4400					
Cyanide, total		ug/L	10	U	U	10	U	UJ				10	U	U
Hardness		ug/L	360000			630000			552000					
Nitrate		ug/L	100	U	U	100	U	U				100	U	U
Sulfate		ug/L	31700			31100			163000					
Total dissolved solids		ug/L	716000			1440000			644000					
Total organic carbon		ug/L	3100			840	B	J	7000					
Total suspended solids		ug/L	113000			4000	U	U	21000					
Turbidity		NTU	313	J	J	179	J	J				64.2	J	J
METALS														
Aluminum	Y	ug/L	75.6	B	B	50.2	B	B				67.6	B	B
Aluminum		ug/L	1170	J	J	59.6	B J	B				45.3	B J	B

Report Date: 03/04/02

			Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3007			BD3008			BD3009			BD3009R		
			Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group	Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES															
	Amino-2,6-dinitrotoluene, 4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Dinitrobenzene, 1,3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Dinitrotoluene, 2,4-		ug/L	0.20	U	U	0.20	I U	U	0.20	U	U			
	Dinitrotoluene, 2,6-		ug/L	0.20	U	U	0.24	G U	UJ	0.20	U	U			
	HMX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U			
	Nitrobenzene		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Nitrotoluene, 2-		ug/L	0.20	U	U	2.5	G U	U	0.20	U	U			
	Nitrotoluene, 3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Nitrotoluene, 4-		ug/L	0.20	U	U	0.68	G U	U	0.20	U	U			
	RDX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U			
	Tetryl		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
	Trinitrotoluene, 2,4,6-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U			
GEN CHEMISTRY															
	Alkalinity		ug/L	357000	J	J	630000	J	J	381000	J	J			
	Chloride		ug/L	932000			4130000			704000					
	Cyanide, total		ug/L	10	U	UJ	10	U	UJ	10	U	UJ			
	Hardness		ug/L	719000			1660000			443000					
	Nitrate		ug/L	100	U	U	100	U	U				100	U	U
	Sulfate		ug/L	28300			5000	U	U	72500					
	Total dissolved solids		ug/L	1990000			5860000			1390000					
	Total organic carbon		ug/L	1000	U	U	3900			4900					
	Total suspended solids		ug/L	4000			79000			4000	U	U			
	Turbidity		NTU	104	J	J	392	J	J				68.4	J	J
METALS															
	Aluminum	Y	ug/L	56.6	B	B	86.0	B	B				76.3	B	B
	Aluminum		ug/L	51.6	B J	B	119	B	J				69.7	B J	B

Report Date: 03/04/02

			Location Code:	IT-TNTB-BEDGW-002		MK-MW17			PB-BED-MW13			PB-BED-MW14		
			Associated Site:	BASEWIDE		BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3010		BD3012			BD3017			BD3018		
			Sample Date:	27-SEP-01		01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group / *Parameter*	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	0.20	U	U	21			2.0	G U	U	1.0	U	U
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	24			0.20	U	U	1.0	U	U
Dinitrobenzene, 1,3-		ug/L	0.20	U	U	1.0	U	U	0.20	U	U	1.0	U	U
Dinitrotoluene, 2,4-		ug/L	0.20	U	U	5.6			0.20	U	U	1.0	U	U
Dinitrotoluene, 2,6-		ug/L	0.20	U	U	10	G U	U	1.1	G U	UJ	1.0	U	U
HMX		ug/L	0.50	U	U	2.5	U	U	0.50	I U	U	2.5	U	U
Nitrobenzene		ug/L	0.20	U	U	1.0	U	U	1.0	G U	U	1.0	U	U
Nitrotoluene, 2-		ug/L	0.20	U	U	1.0	U	U	2.0	G U	U	1.0	U	U
Nitrotoluene, 3-		ug/L	0.20	U	U	1.0	U	U	0.20	U	U	1.0	U	U
Nitrotoluene, 4-		ug/L	0.20	U	U	1.0	U	U	0.23	G U	U	1.0	U	U
RDX		ug/L	0.50	U	U	2.5	U	U	2.8	G U	U	2.5	U	U
Tetryl		ug/L	0.20	U	U	1.0	U	U	1.0	G U	U	1.0	U	U
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	1.0	U	U	0.20	U	U	1.0	U	U
Trinitrotoluene, 2,4,6-		ug/L	0.20	U	U	23			0.23	G U	U	1.0	U	U
GEN CHEMISTRY														
Alkalinity		ug/L	432000	J	J	2700	B J	B	402000	J	J	482000	J	J
Chloride		ug/L	77900			4800			4290000			72200		
Cyanide, total		ug/L	10	U	UJ	10	U	UJ	10	U	UJ	10	U	UJ
Hardness		ug/L	414000			443000			2050000			1200000		
Nitrate		ug/L	100	U	U	100	U	U	100	U	U			
Sulfate		ug/L	152000			504000			78400			1440000		
Total dissolved solids		ug/L	776000			764000			5970000			3570000		
Total organic carbon		ug/L	3700			2700			6600			617000		
Total suspended solids		ug/L	4000	U	U	5000			23000			11000		
Turbidity		NTU	178	J	J	2.5	J	J	76.8	J	J			
METALS														
Aluminum	Y	ug/L	48.9	B	B	3390			80.9	B	B	54.9	B	B
Aluminum		ug/L	48.3	B J	B	3310			96.8	B	J	64.9	B	B

			Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3018R			BD3019			BD3020			BD3021		
			Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group	Parameter	Flt.	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES															
	Amino-2,6-dinitrotoluene, 4-		ug/L				0.62	G U	U	2.1	G U	U	2.7	G U	U
	Amino-4,6-dinitrotoluene, 2-		ug/L				0.20	U	U	0.52	G U	U	0.20	U	U
	Dinitrobenzene, 1,3-		ug/L				0.20	U	U	0.20	U	U	0.20	I U	U
	Dinitrotoluene, 2,4-		ug/L				0.28	G U	U	0.20	U	U	0.20	U	U
	Dinitrotoluene, 2,6-		ug/L				2.4	G U	UJ	1.9	G U	UJ	0.30		J
	HMX		ug/L				0.50	I U	U	0.50	U	U	0.50	I U	U
	Nitrobenzene		ug/L				0.20	U	U	0.89	G U	U	1.0	G U	U
	Nitrotoluene, 2-		ug/L				0.20	U	U	0.20	U	U	6.3	G U	U
	Nitrotoluene, 3-		ug/L				0.20	U	U	0.20	U	U	0.21	G U	U
	Nitrotoluene, 4-		ug/L				0.20	U	U	0.20	U	U	4.0	G U	U
	RDX		ug/L				0.50	U	U	1.5	G U	U	0.50	U	U
	Tetryl		ug/L				0.20	U	U	0.20	U	U	0.20	U	U
	Trinitrobenzene, 1,3,5-		ug/L				0.20	U	U	0.20	U	U	0.20	U	U
	Trinitrotoluene, 2,4,6-		ug/L				1.6			0.34	G U	U	0.20	U	U
GEN CHEMISTRY															
	Alkalinity		ug/L				382000	J	J	1060000	J	J	741000	J	J
	Chloride		ug/L				1910000			370000			2420000		
	Cyanide, total		ug/L				10	U	U	10	U	U	10	U	UJ
	Hardness		ug/L				855000			1650000			1680000		
	Nitrate		ug/L	22000			1000	U	U	1000	G U	U	100	U	U
	Sulfate		ug/L				89200			212000			53600		
	Total dissolved solids		ug/L				2570000			1950000			2680000		
	Total organic carbon		ug/L				8400			6800			5700		
	Total suspended solids		ug/L				4000	U	U	12000			53000		
	Turbidity		NTU	4.2	J	J	203			3.6			57.4	J	J
METALS															
	Aluminum	Y	ug/L				64.5	B	B	55.2	B	B	77.8	B	B
	Aluminum		ug/L				51.1	B	B	36.2	B	B	106	B	J

		Location Code:	PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3024			BD3025			BD3026			BD3027		
		Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	***Flt.***	***Units***	***Result***	***Qual***	***VQ***	***Result***	***Qual***	***VQ***	***Result***	***Qual***	***VQ***	***Result***	***Qual***	***VQ***
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	1.8	G U	U	2.1	G U	U	0.20	U	U	0.20	U	U
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrobenzene, 1,3-		ug/L	0.20	I U	U	0.20	I U	U	0.20	U	U	0.20	U	U
Dinitrotoluene, 2,4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrotoluene, 2,6-		ug/L	0.27	G U	UJ	0.20	U	UJ	0.20	U	U	0.20	U	U
HMX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U	0.50	U	U
Nitrobenzene		ug/L	1.9	G U	U	1.1	G U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 2-		ug/L	0.20	I U	U	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 3-		ug/L	0.27	G U	U	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
RDX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U	0.50	U	U
Tetryl		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrotoluene, 2,4,6-		ug/L	0.20	U	U	0.20	I U	U	0.20	U	U	0.27		
GEN CHEMISTRY														
Alkalinity		ug/L	170000	J	J	707000	J	J	255000	J	J	410000	J	J
Chloride		ug/L	9450000			248000	J	J	22400000			43400		
Cyanide, total		ug/L	10	U	UJ	10	U	UJ	10	U	U	10	U	U
Hardness		ug/L	3980000			905000			9360000			412000		
Nitrate		ug/L	100	U	UJ	2000	G U	U	100	U	U	100	U	U
Sulfate		ug/L	56500			27700		J	5000	U	UJ	27100		
Total dissolved solids		ug/L	13400000			1110000			27400000		J	489000		
Total organic carbon		ug/L	2500	B	J	8600			500	B	J	1700		
Total suspended solids		ug/L	33000			199000			125000			9000		
Turbidity		NTU	99.2	J	J	662	J	J	48.4	J	J	129	J	J
METALS														
Aluminum	Y	ug/L	55.4	B	B	86.0	B	B	40.9	B	B	69.3	B	B
Aluminum		ug/L	54.6	B	B	94.8	B J	B	207	J	J	353	J	J

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		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3028			BD3029			BD3030			BD3032		
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	2.6	G U	U	0.20	U	U	0.20	U	U	0.20	U	U
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrobenzene, 1,3-		ug/L	0.98	G U	U	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrotoluene, 2,4-		ug/L	1.9	G U	U	0.20	I U	U	0.20	U	U	1.5		
Dinitrotoluene, 2,6-		ug/L	6.0	G U	UJ	0.44	G U	U	0.20	U	UJ	1.1		
HMX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U	0.50	U	U
Nitrobenzene		ug/L	0.21	G U	U	0.20	U	U	0.37	G U	U	0.20	U	U
Nitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
RDX		ug/L	0.50	U	U	0.61	G U	U	0.50	U	U	0.50	I U	U
Tetryl		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrotoluene, 2,4,6-		ug/L	0.86	G U	U	0.20	I U	U	0.20	U	U	0.33	G U	U
GEN CHEMISTRY														
Alkalinity		ug/L	227000	J	J	697000	J	J	278000	J	J	473000	J	J
Chloride		ug/L	2480000			149000			404000			260000		
Cyanide, total		ug/L	10	U	UJ	10	U	UJ	10	U	U	10	U	UJ
Hardness		ug/L	5410000		J	566000			627000			1910000		
Nitrate		ug/L	1000	U	U	1000	U	U	100	U	U	1000	U	U
Sulfate		ug/L	85800			21400			121000			1280000		
Total dissolved solids		ug/L	3080000			948000			1000000			2560000		
Total organic carbon		ug/L	6200			3000			4000	B	B	3700		
Total suspended solids		ug/L	292000			4000	U	U	4000			200000		
Turbidity		NTU	324			266			21.7	J	J	188		
METALS														
Aluminum	Y	ug/L	93.6	B	B	55.1	B	B	68.7	B	B	58.0	B	B
Aluminum		ug/L	350			37.8	B	J	78.2	B J	B	152	B	J

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			Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3034			BD3043			BD3035			BD3037		
			Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES															
Amino-2,6-dinitrotoluene, 4-		ug/L		1.5			0.20	U	U	0.20	U	U	1.3		
Amino-4,6-dinitrotoluene, 2-		ug/L		2.1			0.20	U	U	0.20	U	U	0.33		
Dinitrobenzene, 1,3-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	0.33	G U	U
Dinitrotoluene, 2,4-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	1.8	G U	U
Dinitrotoluene, 2,6-		ug/L		0.20	U	UJ	0.20	U	UJ	0.20	U	UJ	1.1	G U	U
HMX		ug/L		0.50	U	U	0.50	U	U	0.50	U	U	0.50	U	U
Nitrobenzene		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	0.20	I U	U
Nitrotoluene, 2-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	8.1	G U	U
Nitrotoluene, 3-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 4-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	2.6	G U	U
RDX		ug/L		0.50	U	U	0.50	U	U	0.50	U	U	0.50	U	U
Tetryl		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrobenzene, 1,3,5-		ug/L		0.20	U	U	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrotoluene, 2,4,6-		ug/L		0.29			0.20	U	U	0.61			1.0	G U	U
GEN CHEMISTRY															
Alkalinity		ug/L					350000	J	J	296000	J	J			
Chloride		ug/L					19800			46900					
Cyanide, total		ug/L					10	U	U	10	U	U			
Hardness		ug/L					1120000			517000					
Nitrate		ug/L					2000	G U	U	100	U	U			
Sulfate		ug/L					839000		J	423000					
Total dissolved solids		ug/L					1650000			1020000					
Total organic carbon		ug/L		4300			5700			2100			12300		
Total suspended solids		ug/L					48000			355000					
Turbidity		NTU					73.5	J	J	520	J	J			
METALS															
Aluminum	Y	ug/L					64.8	B	B	433			239		J
Aluminum		ug/L		8950		J	1800	J	J	6160		J	200	U	UJ

		Location Code:	TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3038			BD3041			BD3042	
		Sample Date:	08-OCT-01			05-OCT-01			04-OCT-01	
User Test Group										
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES											
Amino-2,6-dinitrotoluene, 4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Amino-4,6-dinitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrobenzene, 1,3-		ug/L	0.20	U	U	0.20	U	U	0.20	I U	U
Dinitrotoluene, 2,4-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Dinitrotoluene, 2,6-		ug/L	0.20	U	U	0.20	U	UJ	0.20	I U	UJ
HMX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U
Nitrobenzene		ug/L	0.22	G U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 2-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 3-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Nitrotoluene, 4-		ug/L	0.20	I U	U	0.20	U	U	0.20	U	U
RDX		ug/L	0.50	U	U	0.50	U	U	0.50	U	U
Tetryl		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrobenzene, 1,3,5-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
Trinitrotoluene, 2,4,6-		ug/L	0.20	U	U	0.20	U	U	0.20	U	U
GEN CHEMISTRY											
Alkalinity		ug/L	86300	J	J	126000	J	J	440000	J	J
Chloride		ug/L	1460000			7400			274000		
Cyanide, total		ug/L	10	U	U	10	U	U	10	U	U
Hardness		ug/L	453000			229000			1720000		
Nitrate		ug/L	48	B	J	100	U	U	2000	G U	U
Sulfate		ug/L	86200			129000			1340000		J
Total dissolved solids		ug/L	2180000			347000			2350000		
Total organic carbon		ug/L	12100	B	J	3600	B	B	2500	B	B
Total suspended solids		ug/L	1430000			65000			18000		
Turbidity		NTU	370	J	J	91.2	J	J	172	J	J
METALS											
Aluminum	Y	ug/L	96.7	B	B	69.0	B	B	82.5	B	B
Aluminum		ug/L	16900	J	J	1010	J	J	130	B J	B

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		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Antimony	Y	ug/L	60.0	U	U	60.0	U	U				60.0	U	U
Antimony		ug/L	60.0	U	U	60.0	U	U				60.0	U	U
Arsenic	Y	ug/L	3.7	B	J	10.0	U	U				10.0	U	U
Arsenic		ug/L	9.1	B	J	10.0	U	U				10.0	U	U
Barium	Y	ug/L	724			99.5	B	J				88.0	B	J
Barium		ug/L	843			102	B	J				89.2	B	J
Beryllium	Y	ug/L	0.56	B	B	5.0	U	U				0.55	B	B
Beryllium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Cadmium	Y	ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Cadmium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Calcium	Y	ug/L	59300			122000						169000		
Calcium		ug/L	81800			122000	J	J				172000		
Chromium	Y	ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Chromium		ug/L	2.4	B	J	1.6	B J	B				10.0	U	U
Cobalt	Y	ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Cobalt		ug/L	5.9	B	J	50.0	U	U				50.0	U	U
Copper	Y	ug/L	25.0	U	U	25.0	U	U				25.0	U	U
Copper		ug/L	3.6	B	B	25.0	U	U				25.0	U	U
Iron	Y	ug/L	1300			100	U	U				7400		
Iron		ug/L	7210			126						7900		
Lead	Y	ug/L	3.0	U	U	3.0	U	U				3.0	U	U
Lead		ug/L	3.0	U	U	3.0	U	U				3.0	U	U
Magnesium	Y	ug/L	54600			80900						33000		
Magnesium		ug/L	60000			80700						33200		
Manganese	Y	ug/L	946			23.9						818		
Manganese		ug/L	1030			28.7						846		
Mercury	Y	ug/L	.2	U	U	.2	U	U				.2	U	U
Mercury		ug/L	.2	U	U	2	U	U				.2	U	U
Nickel	Y	ug/L	40.0	U	U	40.0	U	U				40.0	U	U
Nickel		ug/L	3.7	B	J	40.0	U	U				40.0	U	U

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			IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
Location Code:			IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3007			BD3008			BD3009			BD3009R		
Sample Date:			27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Antimony	Y	ug/L	60.0	U	U	60.0	U	U				60.0	U	U
Antimony		ug/L	60.0	U	U	60.0	U	U				60.0	U	U
Arsenic	Y	ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Arsenic		ug/L	10.0	U	U	2.9	B	J				10.0	U	U
Barium	Y	ug/L	279			387						1380		
Barium		ug/L	285			381						1410		
Beryllium	Y	ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Beryllium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Cadmium	Y	ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Cadmium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Calcium	Y	ug/L	125000			298000						107000		
Calcium		ug/L	124000	J	J	299000						111000		
Chromium	Y	ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Chromium		ug/L	1.4	B J	B	2.9	B	J				10.0	U	U
Cobalt	Y	ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Cobalt		ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Copper	Y	ug/L	25.0	U	U	25.0	U	U				25.0	U	U
Copper		ug/L	25.0	U	U	24.3	B	J				6.0	B	B
Iron	Y	ug/L	169			100	U	U				100	U	U
Iron		ug/L	204			978						132		
Lead	Y	ug/L	3.0	U	U	3.0	U	U				3.0	U	U
Lead		ug/L	3.0	U	U	3.0	U	U				3.0	U	U
Magnesium	Y	ug/L	77600			227000						68200		
Magnesium		ug/L	77300			224000						70100		
Manganese	Y	ug/L	73.5			621						36.0		
Manganese		ug/L	71.6			641						35.3		
Mercury	Y	ug/L	.2	U	U	.2	U	U				.2	U	U
Mercury		ug/L	.2	U	U	.2	U	U				.2	U	U
Nickel	Y	ug/L	40.0	U	U	40.0	U	U				2.1	B	J
Nickel		ug/L	40.0	U	U	40.0	U	U				40.0	U	U

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		Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3010			BD3012			BD3017			BD3018	
		Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01	
User Test Group													
Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS														
Antimony	Y	ug/L	60.0	U	UJ	60.0	U	U	60.0	U	UJ	60.0	U	U
Antimony		ug/L	60.0	U	UJ	60.0	U	U	60.0	U	UJ	60.0	U	U
Arsenic	Y	ug/L	10.0	U	UJ	6.5	B	J	10.0	U	UJ	5.5	B	J
Arsenic		ug/L	10.0	U	UJ	6.6	B	J	10.0	U	UJ	6.1	B	J
Barium	Y	ug/L	391		J	23.4	B	J	2090		J	50.8	B	J
Barium		ug/L	391		J	23.1	B	J	2090		J	49.5	B	J
Beryllium	Y	ug/L	5.0	U	UJ	2.3	B	J	5.0	U	UJ	5.0	U	U
Beryllium		ug/L	5.0	U	UJ	2.0	B	J	5.0	U	UJ	5.0	U	U
Cadmium	Y	ug/L	5.0	U	UJ	0.54	B	J	5.0	U	UJ	5.0	U	U
Cadmium		ug/L	5.0	U	UJ	0.58	B	B	5.0	U	UJ	5.0	U	U
Calcium	Y	ug/L	104000		J	119000			416000		J	223000		
Calcium		ug/L	102000	J	J	115000			418000		J	215000		
Chromium	Y	ug/L	10.0	U	UJ	10.0	U	U	10.0	U	UJ	1.9	B	J
Chromium		ug/L	10.0	U	UJ	10.0	U	U	10.0	U	UJ	1.6	B	J
Cobalt	Y	ug/L	50.0	U	UJ	105			50.0	U	UJ	105		
Cobalt		ug/L	50.0	U	UJ	101			50.0	U	UJ	102		
Copper	Y	ug/L	25.0	U	UJ	2.2	B	B	25.0	U	UJ	27.0		
Copper		ug/L	2.0	B J	B	6.7	B	J	6.1	B	J	30.7		
Iron	Y	ug/L	100	U	UJ	14800			100	U	UJ	145		
Iron		ug/L	100	U	UJ	14300			106		J	164		
Lead	Y	ug/L	3.0	U	UJ	3.0	U	U	3.0	U	UJ	3.0	U	U
Lead		ug/L	3.0	U	UJ	3.0	U	U	3.0	U	UJ	3.0	U	U
Magnesium	Y	ug/L	40900		J	33300			202000		J	153000		
Magnesium		ug/L	40300		J	32100			201000		J	146000		
Manganese	Y	ug/L	31.6		J	1830			28.1		J	68.0		
Manganese		ug/L	31.4		J	1770			29.1		J	65.2		
Mercury	Y	ug/L	.2	U	UJ	.2	U	U	.2	U	UJ	.2	U	U
Mercury		ug/L	.2	U	UJ	.2	U	U	.2	U	UJ	.2	U	U
Nickel	Y	ug/L	40.0	U	UJ	248			40.0	U	UJ	117		
Nickel		ug/L	40.0	U	UJ	240			40.0	U	U	111		

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	Location Code:		PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17	
	Associated Site:		BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
	Sample No:		BD3018R			BD3019			BD3020			BD3021	
	Sample Date:		05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01	
User Test Group													
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Antimony	Y	ug/L				60.0	U	U	60.0	U	UJ	60.0	U	U
Antimony		ug/L				60.0	U	U	60.0	U	UJ	60.0	U	U
Arsenic	Y	ug/L				10.0	U	U	10.0	U	UJ	2.7	B	J
Arsenic		ug/L				10.0	U	U	10.0	U	UJ	5.4	B	J
Barium	Y	ug/L				484			143	B	J	911		
Barium		ug/L				481			147	B	J	912		
Beryllium	Y	ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Beryllium		ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Cadmium	Y	ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Cadmium		ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Calcium	Y	ug/L				199000			644000		J	252000		
Calcium		ug/L				199000			645000		J	260000		
Chromium	Y	ug/L				10.0	U	U	10.0	U	UJ	10.0	U	U
Chromium		ug/L				10.0	U	U	10.0	U	UJ	10.0	U	U
Cobalt	Y	ug/L				50.0	U	U	50.0	U	UJ	50.0	U	U
Cobalt		ug/L				50.0	U	U	2.4	B	J	50.0	U	U
Copper	Y	ug/L				25.0	U	U	25.0	U	UJ	25.0	U	U
Copper		ug/L				25.0	U	U	25.0	U	UJ	25.0	U	U
Iron	Y	ug/L				100	U	U	100	U	UJ	100	U	U
Iron		ug/L				100	U	U	73.2	B	J	160		
Lead	Y	ug/L				3.0	U	U	3.0	U	UJ	3.0	U	U
Lead		ug/L				3.0	U	U	3.0	U	UJ	3.0	U	U
Magnesium	Y	ug/L				171000			43.9	B	B	235000		
Magnesium		ug/L				169000			303	B	J	230000		
Manganese	Y	ug/L				5.2	B	J	15.0	U	UJ	9.8	B	J
Manganese		ug/L				5.6	B	J	2.9	B	J	21.6		
Mercury	Y	ug/L				.2	U	U	2	U	UJ	.2	U	U
Mercury		ug/L				.2	U	U	.2	U	UJ	.2	U	U
Nickel	Y	ug/L				2.4	B	J	10.2	B	J	40.0	U	U
Nickel		ug/L				3.8	B	J	10.8	B	J	40.0	U	U

		Location Code:	PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3024			BD3025			BD3026			BD3027		
		Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Antimony	Y	ug/L	60.0	U	U	60.0	U	U	60.0	U	U	60.0	U	U
Antimony		ug/L	60.0	U	U	60.0	U	U	60.0	U	U	60.0	U	U
Arsenic	Y	ug/L	10.0	U	U	10.0	U	U	2.8	B	J	10.0	U	U
Arsenic		ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Barium	Y	ug/L	938			1080			24400			634		
Barium		ug/L	916			1060			23900			649		
Beryllium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Beryllium		ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Cadmium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Cadmium		ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Calcium	Y	ug/L	720000			202000			2110000			117000		
Calcium		ug/L	724000			221000			2060000	J	J	122000		
Chromium	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Chromium		ug/L	10.0	U	U	1.2	B	J	7.6	B J	B	10.0	U	U
Cobalt	Y	ug/L	50.0	U	U	50.0	U	U	6.4	B	J	50.0	U	U
Cobalt		ug/L	50.0	U	U	50.0	U	U	7.1	B	J	50.0	U	U
Copper	Y	ug/L	25.0	U	U	25.0	U	U	2.0	B	B	25.0	U	U
Copper		ug/L	25.0	U	U	99.0			15.8	B J	B	25.0	U	U
Iron	Y	ug/L	100	U	U	100	U	U	5350			100	U	U
Iron		ug/L	40.0	B	J	149			5920		J	284		
Lead	Y	ug/L	30.0	U	U	3.0	U	U	60.0	U	U	3.0	U	U
Lead		ug/L	3.0	U	U	3.0	U	U	60.0	U	U	3.0	U	U
Magnesium	Y	ug/L	534000			81000			965000			34700		
Magnesium		ug/L	534000			66200			943000		J	35900		
Manganese	Y	ug/L	37.7			4.0	B	J	188			34.3		
Manganese		ug/L	41.8			2.2	B	J	189		J	38.1		
Mercury	Y	ug/L	.2	U	U	.2	U	U	.2	U	U	.2	U	U
Mercury		ug/L	.2	U	U	2	U	U	.2	U	U	.2	U	U
Nickel	Y	ug/L	40.0	U	U	7.9	B	J	2.9	B	J	40.0	U	U
Nickel		ug/L	40.0	U	U	13.8	B	J	3.5	B	J	40.0	U	U

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			Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3028			BD3029			BD3030			BD3032		
			Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS															
Antimony	Y	ug/L		60.0	U	U	60.0	U	U	60.0	U	U	60.0	U	U
Antimony		ug/L		60.0	U	U	60.0	U	U	60.0	U	U	60.0	U	U
Arsenic	Y	ug/L		2.9	B	J	10.0	U	U	10.0	U	U	10.0	U	U
Arsenic		ug/L		4.2	B	B	10.0	U	U	10.0	U	U	4.0	B	B
Barium	Y	ug/L		54.4	B	J	942			224			126	B	J
Barium		ug/L		64.2	B	J	932			226			133	B	J
Beryllium	Y	ug/L		5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Beryllium		ug/L		5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Cadmium	Y	ug/L		5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Cadmium		ug/L		5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Calcium	Y	ug/L		279000			159000			128000			427000		
Calcium		ug/L		369000			158000			134000			462000		
Chromium	Y	ug/L		1.5	B	J	10.0	U	U	10.0	U	U	10.0	U	U
Chromium		ug/L		15.0			10.0	U	U	10.0	U	U	7.1	B	J
Cobalt	Y	ug/L		2.6	B	J	50.0	U	U	50.0	U	U	50.0	U	U
Cobalt		ug/L		5.9	B	J	50.0	U	U	50.0	U	U	3.1	B	J
Copper	Y	ug/L		25.0	U	U	25.0	U	U	25.0	U	U	25.0	U	U
Copper		ug/L		4.8	B	J	25.0	U	U	25.0	U	U	13.3	B	J
Iron	Y	ug/L		3060			100	U	U	713			144		
Iron		ug/L		7280			48.3	B	J	795			43100		
Lead	Y	ug/L		3.0	U	U	3.0	U	U	3.0	U	U	3.0	U	U
Lead		ug/L		3.0	U	U	3.0	U	U	3.0	U	U	3.0	U	U
Magnesium	Y	ug/L		203000			78500			76800			162000		
Magnesium		ug/L		210000			78500			79500			166000		
Manganese	Y	ug/L		988			22.1			87.0			141		
Manganese		ug/L		1170			24.8			89.0			680		
Mercury	Y	ug/L		.2	U	U	.2	U	U	.2	U	U	.2	U	U
Mercury		ug/L		2	U	U	.2	U	U	.2	U	U	.2	U	U
Nickel	Y	ug/L		5.0	B	J	40.0	U	U	40.0	U	U	2.0	B	J
Nickel		ug/L		13.6	B	J	40.0	U	U	40.0	U	U	12.4	B	J

			PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
Location Code:			PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3034			BD3043			BD3035			BD3037		
Sample Date:			03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Antimony	Y	ug/L				60.0	U	U	60.0	U	U	60.0	U	UJ
Antimony		ug/L	60.0	U	UJ	60.0	U	U	60.0	U	UJ	60.0	U	UJ
Arsenic	Y	ug/L				10.0	U	U	10.0	U	U	10.0	U	UJ
Arsenic		ug/L	7.2	B	J	10.0	U	U	8.8	B	J	10.8		J
Barium	Y	ug/L				24.0	B	J	64.1	B	J	382		J
Barium		ug/L	88.4	B	J	29.5	B	J	203		J	1000		J
Beryllium	Y	ug/L				5.0	U	U	5.0	U	U	5.0	U	UJ
Beryllium		ug/L	5.0	U	UJ	5.0	U	U	5.0	U	UJ	1.1	B	B
Cadmium	Y	ug/L				5.0	U	U	5.0	U	U	5.0	U	UJ
Cadmium		ug/L	1.2	B	B	5.0	U	U	5.0	U	UJ	5.0	U	UJ
Calcium	Y	ug/L				252000			129000			425000		J
Calcium		ug/L	209000		J	262000			137000		J	12000000		J
Chromium	Y	ug/L				10.0	U	U	10.0	U	U	10.0	U	UJ
Chromium		ug/L	18.2		J	3.4	B	J	13.9		J	10.0	U	UJ
Cobalt	Y	ug/L				7.5	B	J	6.7	B	J	50.0	U	UJ
Cobalt		ug/L	10	B	J	7.2	B	J	16.7	B	J	6.4	B	J
Copper	Y	ug/L				25.0	U	U	25.0	U	U	25.0	U	UJ
Copper		ug/L	15.9	B	J	6.7	B	B	19.5	B	J	3.2	B	J
Iron	Y	ug/L				100	U	U	515			856		J
Iron		ug/L	16400		J	3050			13300		J	127		J
Lead	Y	ug/L				3.0	U	U	3.0	U	U	3.0	U	UJ
Lead		ug/L	9.4		J	3.0	U	U	10.5		J	15.0	U	UJ
Magnesium	Y	ug/L				138000			47400			26400		J
Magnesium		ug/L	63200		J	121000			48300		J	711000		J
Manganese	Y	ug/L				686			1180			54.6		J
Manganese		ug/L	383		J	613			1520		J	11700		J
Mercury	Y	ug/L				.2	U	U	.2	U	U	.2	U	UJ
Mercury		ug/L	.2	U	UJ	.2	U	U	.2	U	UJ	.067	B	J
Nickel	Y	ug/L				15.6	B	J	6.7	B	J	40.0	U	UJ
Nickel		ug/L	22.4	B	J	10.4	B	J	17.2	B	J	75.7		J

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		Location Code:	TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3038			BD3041			BD3042	
		Sample Date:	08-OCT-01			05-OCT-01			04-OCT-01	

User Test Group Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS											
Antimony	Y	ug/L	60.0	U	U	60.0	U	U	60.0	U	U
Antimony		ug/L	60.0	U	U	60.0	U	U	60.0	U	U
Arsenic	Y	ug/L	4.9	B	J	10.0	U	U	6.0	B	J
Arsenic		ug/L	22.7			10.0	U	U	4.1	B	J
Barium	Y	ug/L	628			40.8	B	J	30.8	B	J
Barium		ug/L	1500			51.3	B	J	29.4	B	J
Beryllium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U
Beryllium		ug/L	1.5	B	B	5.0	U	U	5.0	U	U
Cadmium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U
Cadmium		ug/L	5.0	U	U	5.0	U	U	5.0	U	U
Calcium	Y	ug/L	107000			72000			427000		
Calcium		ug/L	217000			81600			439000		
Chromium	Y	ug/L	1.2	B	J	10.0	U	U	10.0	U	U
Chromium		ug/L	32.3			1.3	B	J	10.0	U	U
Cobalt	Y	ug/L	50.0	U	U	50.0	U	U	50.0	U	U
Cobalt		ug/L	18.7	B	J	50.0	U	U	50.0	U	U
Copper	Y	ug/L	2.4	B	B	25.0	U	U	25.0	U	U
Copper		ug/L	99.2			10.9	B	J	25.0	U	U
Iron	Y	ug/L	100	U	U	5670			100	U	U
Iron		ug/L	35000			8090			66.6	B	J
Lead	Y	ug/L	15.0	U	U	3.0	U	U	3.0	U	U
Lead		ug/L	15.7			3.0	U	U	3.0	U	U
Magnesium	Y	ug/L	133	B	J	20900			147000		
Magnesium		ug/L	72500			24500			150000		
Manganese	Y	ug/L	1.6	B	J	812			290		
Manganese		ug/L	1140			928			271		
Mercury	Y	ug/L	.2	U	U	.2	U	U	.2	U	U
Mercury		ug/L	.079	B	J	.2	U	U	.2	U	U
Nickel	Y	ug/L	40.0	U	U	2.0	B	J	2.3	B	J
Nickel		ug/L	71.2			5.4	B	J	2.3	B	J

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		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L	27500		J	43100						1640	B	J
Potassium		ug/L	30100		J	43900						1670	B	J
Selenium	Y	ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Selenium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Silver	Y	ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Silver		ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Sodium	Y	ug/L	127000			293000						4670	B	J
Sodium		ug/L	132000			293000						4610	B	J
Thallium	Y	ug/L	10.0	U	U	6.4	B J	B				10.0	U	U
Thallium		ug/L	5.3	B	B	10.0	U	U				10.0	U	U
Vanadium	Y	ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Vanadium		ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Zinc	Y	ug/L	7.1	B	J	20.0	U	U				14.3	B	J
Zinc		ug/L	10.2	B	J	20.0	U	U				14.9	B	J
SEMIVOLATILES														
Acenaphthene		ug/L	10	U	U	20	U	U	10	U	U			
Acenaphthylene		ug/L	10	U	U	20	U	U	10	U	U			
Anthracene		ug/L	10	U	U	20	U	U	10	U	U			
Benzo(a)anthracene		ug/L	10	U	U	20	U	U	10	U	U			
Benzo(a)pyrene		ug/L	10	U	U	20	U	U	1.2	J	J			
Benzo(b)fluoranthene		ug/L	10	U	U	20	U	U	10	U	U			
Benzo(ghi)perylene		ug/L	10	U	U	20	U	U	1.7	J	J			
Benzo(k)fluoranthene		ug/L	10	U	U	20	U	U	10	U	U			
Bis(2-chloroethoxy)methane		ug/L	10	U	U	20	U	U	10	U	U			
Bis(2-chloroethyl)ether		ug/L	10	U	U	20	U	U	10	U	U			
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	20	U	U	10	U	U			
Bis(2-ethylhexyl)phthalate		ug/L	10	U	U	20	U	U	10	U	U			
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	20	U	U	10	U	U			
Butyl benzyl phthalate		ug/L	10	U	U	20	U	U	10	U	U			

Report Date: 03/04/02

		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L	40700			97200						46900		
Potassium		ug/L	41100			98800		J				48500		
Selenium	Y	ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Selenium		ug/L	5.0	U	U	5.0	U	U				5.0	U	U
Silver	Y	ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Silver		ug/L	10.0	U	U	10.0	U	U				10.0	U	U
Sodium	Y	ug/L	459000			1350000						520000		
Sodium		ug/L	459000			1330000						535000		
Thallium	Y	ug/L	10.0	U	U	4.8	B	B				10.0	U	U
Thallium		ug/L	10.0	U	U	5.4	B	B				10.0	U	U
Vanadium	Y	ug/L	50.0	U	U	50.0	U	U				50.0	U	U
Vanadium		ug/L	50.0	U	U	2.1	B	B				50.0	U	U
Zinc	Y	ug/L	20.0	U	U	20.0	U	U				20.0	U	U
Zinc		ug/L	20.0	U	U	16.2	B	J				9.1	B	J
SEMIVOLATILES														
Acenaphthene		ug/L	10	U	U	10	U	U	10	U	U			
Acenaphthylene		ug/L	10	U	U	10	U	U	10	U	U			
Anthracene		ug/L	10	U	U	10	U	U	10	U	U			
Benzo(a)anthracene		ug/L	10	U	U	10	U	U	10	U	U			
Benzo(a)pyrene		ug/L	10	U	U	10	U	U	10	U	U			
Benzo(b)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U			
Benzo(ghi)perylene		ug/L	10	U	U	10	U	U	10	U	U			
Benzo(k)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U			
Bis(2-chloroethoxy)methane		ug/L	10	U	U	10	U	U	10	U	U			
Bis(2-chloroethyl)ether		ug/L	10	U	U	10	U	U	10	U	U			
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	10	U	U	10	U	U			
Bis(2-ethylhexyl)phthalate		ug/L	10	U	U	5.0	J	J	10	U	U			
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U			
Butyl benzyl phthalate		ug/L	10	U	U	10	U	U	10	U	U			

Report Date: 03/04/02

		Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3010			BD3012			BD3017			BD3018	
		Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01	
User Test Group / *Parameter*	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L	7540		J	4130	B	J	96700		J	43800		J
Potassium		ug/L	7540		J	4060	B	J	96900		J	42100		
Selenium	Y	ug/L	5.0	U	UJ	5.0	U	U	5.0	U	UJ	8.2		B
Selenium		ug/L	5.0	U	UJ	5.0	U	U	5.0	U	UJ	5.5		
Silver	Y	ug/L	10.0	U	UJ	10.0	U	U	10.0	U	UJ	10.0	U	U
Silver		ug/L	10.0	U	UJ	10.0	U	U	10.0	U	UJ	10.0	U	U
Sodium	Y	ug/L	109000		J	6090			1230000		J	662000		
Sodium		ug/L	109000		J	6070			1190000		J	629000		
Thallium	Y	ug/L	10.0	U	UJ	10.0	U	U	10.0	U	UJ	7.2	B	B
Thallium		ug/L	10.0	U	UJ	10.0	U	U	6.0	B	B	5.0	B	B
Vanadium	Y	ug/L	50.0	U	UJ	50.0	U	U	50.0	U	UJ	2.4	B	J
Vanadium		ug/L	50.0	U	UJ	50.0	U	U	50.0	U	UJ	2.4	B	B
Zinc	Y	ug/L	20.0	U	UJ	231			5.0	B	J	12.6	B	J
Zinc		ug/L	5.0	B J	B	214			5.6	B	J	10.8	B	J
SEMIVOLATILES														
Acenaphthene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Acenaphthylene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Anthracene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Benzo(a)anthracene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Benzo(a)pyrene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Benzo(b)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Benzo(ghi)perylene		ug/L	10	U	U	0.97	J	J	10	U	U	250	U	U
Benzo(k)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Bis(2-chloroethoxy)methane		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Bis(2-chloroethyl)ether		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Bis(2-ethylhexyl)phthalate		ug/L	10	U	U	10	U	U	7.7	J	J	250	U	U
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Butyl benzyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	250	U	U

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

		Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3018R			BD3019			BD3020			BD3021		
		Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L				62200			17800		J	62600		
Potassium		ug/L				62100			18600		J	62700		J
Selenium	Y	ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Selenium		ug/L				5.0	U	U	5.0	U	UJ	5.0	U	U
Silver	Y	ug/L				10.0	U	U	10.0	U	UJ	10.0	U	U
Silver		ug/L				10.0	U	U	10.0	U	UJ	10.0	U	U
Sodium	Y	ug/L				572000			85600		J	549000		
Sodium		ug/L				566000			88200		J	545000		
Thallium	Y	ug/L				10.0	U	U	6.4	B J	B	10.0	U	U
Thallium		ug/L				10.0	U	U	10.0	U	UJ	10.0	U	U
Vanadium	Y	ug/L				50.0	U	U	50.0	U	UJ	50.0	U	U
Vanadium		ug/L				50.0	U	U	50.0	U	UJ	50.0	U	U
Zinc	Y	ug/L				20.0	U	U	4.2	B	J	20.0	U	U
Zinc		ug/L				20.0	U	U	20.0	U	UJ	20.0	U	U
SEMIVOLATILES														
Acenaphthene		ug/L				10	U	U	10	U	U	10	U	U
Acenaphthylene		ug/L				10	U	U	10	U	U	10	U	U
Anthracene		ug/L				10	U	U	10	U	U	10	U	U
Benzo(a)anthracene		ug/L				10	U	U	10	U	U	10	U	U
Benzo(a)pyrene		ug/L				10	U	U	10	U	U	10	U	U
Benzo(b)fluoranthene		ug/L				10	U	U	10	U	U	10	U	U
Benzo(ghi)perylene		ug/L				10	U	U	10	U	U	10	U	U
Benzo(k)fluoranthene		ug/L				10	U	U	10	U	U	10	U	U
Bis(2-chloroethoxy)methane		ug/L				10	U	U	10	U	U	10	U	U
Bis(2-chloroethyl)ether		ug/L				10	U	U	10	U	U	10	U	U
Bis(2-chloroisopropyl)ether		ug/L				10	U	U	10	U	U	10	U	U
Bis(2-ethylhexyl)phthalate		ug/L				2.2	J	J	2.4	J	J	4.0	J	J
Bromophenyl phenyl ether, 4-		ug/L				10	U	U	10	U	U	10	U	U
Butyl benzyl phthalate		ug/L				10	U	U	10	U	U	10	U	U

Report Date: 03/04/02

			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Location Code:			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3024			BD3025			BD3026			BD3027		
Sample Date:			02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L	149000			42100			87400	B	J	4080	B	J
Potassium		ug/L	150000			43800			85800	B	J	4340	B	J
Selenium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Selenium		ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Silver	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Silver		ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Sodium	Y	ug/L	2560000			94900			8100000			18700		
Sodium		ug/L	2580000			75400			7980000		J	19300		
Thallium	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Thallium		ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Vanadium	Y	ug/L	50.0	U	U	50.0	U	U	50.0	U	U	50.0	U	U
Vanadium		ug/L	50.0	U	U	50.0	U	U	50.0	U	U	50.0	U	U
Zinc	Y	ug/L	20.0	U	U	5.2	B	J	3.3	B	J	20.0	U	U
Zinc		ug/L	20.0	U	U	144			5.3	B J		20.0	U	U
SEMIVOLATILES														
Acenaphthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Acenaphthylene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(a)anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(a)pyrene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(b)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(ghi)perylene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(k)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroethoxy)methane		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroethyl)ether		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-ethylhexyl)phthalate		ug/L	10	U	U	10	U	U	2.9	J	J	10	U	U
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Butyl benzyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U

		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3028			BD3029			BD3030			BD3032		
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Potassium	Y	ug/L	75500		J	30700		J	17000			42200		J
Potassium		ug/L	77700			32100			17600			41500		
Selenium	Y	ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Selenium		ug/L	5.0	U	U	5.0	U	U	5.0	U	U	5.0	U	U
Silver	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Silver		ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Sodium	Y	ug/L	596000			90500			109000			95500		
Sodium		ug/L	590000			90800			112000			96000		
Thallium	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Thallium		ug/L	10.0	U	U	10.0	U	U	10.0	U	U	10.0	U	U
Vanadium	Y	ug/L	50.0	U	U	50.0	U	U	50.0	U	U	50.0	U	U
Vanadium		ug/L	50.0	U	U	50.0	U	U	50.0	U	U	50.0	U	U
Zinc	Y	ug/L	20.0	U	U	20.0	U	U	3.0	B	J	20.0	U	U
Zinc		ug/L	18.0	B	J	20.0	U	U	7.7	B	J	21.6		
SEMIVOLATILES														
Acenaphthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Acenaphthylene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(a)anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(a)pyrene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(b)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(ghi)perylene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Benzo(k)fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroethoxy)methane		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroethyl)ether		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Bis(2-ethylhexyl)phthalate		ug/L	7.1	J	J	10	U	U	0.86	J	J	2.9	J	J
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Butyl benzyl phthalate		ug/L	1.5	J	J	10	U	U	10	U	U	10	U	U

			Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3034			BD3043			BD3035			BD3037		
			Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS															
Potassium	Y	ug/L					21100			12700			128000		J
Potassium		ug/L		16500		J	15600			14200		J	94200		J
Selenium	Y	ug/L					5.0	U	U	5.0	U	U	5.0	U	UJ
Selenium		ug/L		5.0	U	UJ	5.0	U	U	5.0	U	UJ	5.0	U	UJ
Silver	Y	ug/L					10.0	U	U	10.0	U	U	10.0	U	UJ
Silver		ug/L		10.0	U	UJ	10.0	U	U	10.0	U	UJ	10.0	U	UJ
Sodium	Y	ug/L					78800			143000			705000		J
Sodium		ug/L		66700		J	57400			139000		J	442000		J
Thallium	Y	ug/L					10.0	U	U	5.9	B	B	10.0	U	UJ
Thallium		ug/L		10.0	U	UJ	6.4	B	B	5.0	B	B	10.0	U	UJ
Vanadium	Y	ug/L					50.0	U	U	50.0	U	U	12.5	B	J
Vanadium		ug/L		17.8	B	J	3.1	B	J	14.4	B	J	50.0	U	UJ
Zinc	Y	ug/L					64.7			3.2	B	J	17.1	B	J
Zinc		ug/L		39.2		J	25.2			31.0		J	297		J
SEMIVOLATILES															
Acenaphthene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Acenaphthylene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Anthracene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Benzo(a)anthracene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Benzo(a)pyrene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Benzo(b)fluoranthene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Benzo(ghi)perylene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Benzo(k)fluoranthene		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Bis(2-chloroethoxy)methane		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Bis(2-chloroethyl)ether		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Bis(2-chloroisopropyl)ether		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Bis(2-ethylhexyl)phthalate		ug/L		10	U	U	10	U	U	10	U	U	8.6	J	J
Bromophenyl phenyl ether, 4-		ug/L		10	U	U	10	U	U	10	U	U	100	U	U
Butyl benzyl phthalate		ug/L		10	U	U	10	U	U	10	U	U	100	U	U

			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Location Code:			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3038			BD3041			BD3042		
Sample Date:			08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group											
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS											
Potassium	Y	ug/L	191000		J	2480	B	J	22500		
Potassium		ug/L	121000		J	2920	B	J	22400		
Selenium	Y	ug/L	20.4			5.0	U	U	5.0	U	U
Selenium		ug/L	14.4			5.0	U	U	5.0	U	U
Silver	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U
Silver		ug/L	10.0	U	U	10.0	U	U	10.0	U	U
Sodium	Y	ug/L	428000			7480			55300		
Sodium		ug/L	605000			7520			56500		
Thallium	Y	ug/L	10.0	U	U	10.0	U	U	10.0	U	U
Thallium		ug/L	10.0	U	U	10.0	U	U	10.0	U	U
Vanadium	Y	ug/L	8.5	B	J	50.0	U	U	50.0	U	U
Vanadium		ug/L	48.6	B	J	2.3	B	J	50.0	U	U
Zinc	Y	ug/L	20.0	U	U	19.9	B	J	20.0	U	U
Zinc		ug/L	184			37.5			20.0	U	U
SEMIVOLATILES											
Acenaphthene		ug/L	10	U	U	19	U	UJ	10	U	U
Acenaphthylene		ug/L	10	U	U	19	U	UJ	10	U	U
Anthracene		ug/L	10	U	U	19	U	UJ	10	U	U
Benzo(a)anthracene		ug/L	10	U	U	19	U	UJ	10	U	U
Benzo(a)pyrene		ug/L	10	U	U	19	U	UJ	10	U	U
Benzo(b)fluoranthene		ug/L	10	U	U	19	U	UJ	10	U	U
Benzo(ghi)perylene		ug/L	10	U	U	19	U	UJ	10	U	U
Benzo(k)fluoranthene		ug/L	10	U	U	19	U	UJ	10	U	U
Bis(2-chloroethoxy)methane		ug/L	10	U	U	19	U	UJ	10	U	U
Bis(2-chloroethyl)ether		ug/L	10	U	U	19	U	UJ	10	U	U
Bis(2-chloroisopropyl)ether		ug/L	10	U	U	19	U	UJ	10	U	U
Bis(2-ethylhexyl)phthalate		ug/L	2.0	J	J	19	U	UJ	10	U	U
Bromophenyl phenyl ether, 4-		ug/L	10	U	U	19	U	UJ	10	U	U
Butyl benzyl phthalate		ug/L	10	U	U	19	U	UJ	10	U	U

Report Date: 03/04/02

Location Code:			IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3004			BD3005			BD3006			BD3006R		
Sample Date:			08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L	10	U	U	20	U	U	10	U	U			
Chloro-3-methylphenol, 4-		ug/L	10	U	U	20	U	U	10	U	U			
Chloroaniline, 4-		ug/L	10	U	U	20	U	U	10	U	U			
Chloronaphthalene, 2-		ug/L	10	U	U	20	U	U	10	U	U			
Chlorophenol, 2-		ug/L	10	U	U	20	U	U	10	U	U			
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	20	U	U	10	U	U			
Chrysene		ug/L	10	U	U	20	U	U	0.54	J	J			
Di-n-butyl phthalate		ug/L	10	U	U	20	U	U	10	U	U			
Di-n-octyl phthalate		ug/L	10	U	U	20	U	U	10	U	U			
Dibenz(a,h)anthracene		ug/L	10	U	U	20	U	U	1.2	J	J			
Dibenzofuran		ug/L	10	U	U	20	U	U	10	U	U			
Dichlorobenzene, 1,2-		ug/L	10	U	U	20	U	U	10	U	U			
Dichlorobenzene, 1,3-		ug/L	10	U	U	20	U	U	10	U	U			
Dichlorobenzene, 1,4-		ug/L	10	U	U	20	U	U	10	U	U			
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	100	U	U	50	U	U			
Dichlorophenol, 2,4-		ug/L	10	U	U	20	U	U	10	U	U			
Diethyl phthalate		ug/L	10	U	U	20	U	U	10	U	U			
Dimethyl phthalate		ug/L	10	U	U	20	U	U	10	U	U			
Dimethylphenol, 2,4-		ug/L	2.5	J	J	20	U	U	10	U	U			
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	100	U	U	50	U	U			
Dinitrophenol, 2,4-		ug/L	50	U	U	100	U	UJ	50	U	UJ			
Dinitrotoluene, 2,4-		ug/L	10	U	U	20	U	U	10	U	U			
Dinitrotoluene, 2,6-		ug/L	10	U	U	20	U	U	10	U	U			
Fluoranthene		ug/L	10	U	U	20	U	U	10	U	U			
Fluorene		ug/L	10	U	U	20	U	U	10	U	U			
Hexachlorobenzene		ug/L	10	U	U	20	U	U	10	U	U			
Hexachlorobutadiene		ug/L	10	U	U	20	U	U	10	U	U			
Hexachlorocyclopentadiene		ug/L	50	U	U	100	U	U	50	U	U			
Hexachloroethane		ug/L	10	U	U	20	U	U	10	U	U			
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	20	U	U	1.7	J	J			

Report Date: 03/04/02

			Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3007			BD3008			BD3009			BD3009R		
			Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES															
Carbazole		ug/L		10	U	U	10	U	U	10	U	U			
Chloro-3-methylphenol, 4-		ug/L		10	U	U	10	U	U	10	U	U			
Chloroaniline, 4-		ug/L		10	U	U	10	U	U	10	U	U			
Chloronaphthalene, 2-		ug/L		10	U	U	10	U	U	10	U	U			
Chlorophenol, 2-		ug/L		10	U	U	10	U	U	10	U	U			
Chlorophenyl phenyl ether, 4-		ug/L		10	U	U	10	U	U	10	U	U			
Chrysene		ug/L		10	U	U	0.80	J	J	10	U	U			
Di-n-butyl phthalate		ug/L		10	U	U	10	U	U	10	U	U			
Di-n-octyl phthalate		ug/L		10	U	U	10	U	U	10	U	U			
Dibenz(a,h)anthracene		ug/L		10	U	U	10	U	U	10	U	U			
Dibenzofuran		ug/L		10	U	U	10	U	U	10	U	U			
Dichlorobenzene, 1,2-		ug/L		10	U	U	10	U	U	10	U	U			
Dichlorobenzene, 1,3-		ug/L		10	U	U	10	U	U	10	U	U			
Dichlorobenzene, 1,4-		ug/L		10	U	U	10	U	U	10	U	U			
Dichlorobenzidine, 3,3'-		ug/L		50	U	U	50	U	U	50	U	U			
Dichlorophenol, 2,4-		ug/L		10	U	U	10	U	U	10	U	U			
Diethyl phthalate		ug/L		10	U	U	10	U	U	10	U	U			
Dimethyl phthalate		ug/L		10	U	U	10	U	U	10	U	U			
Dimethylphenol, 2,4-		ug/L		10	U	U	10	U	U	10	U	U			
Dinitro-2-methylphenol, 4,6-		ug/L		50	U	U	50	U	U	50	U	U			
Dinitrophenol, 2,4-		ug/L		50	U	UJ	50	U	U	50	U	UJ			
Dinitrotoluene, 2,4-		ug/L		10	U	U	10	U	U	10	U	U			
Dinitrotoluene, 2,6-		ug/L		10	U	U	10	U	U	10	U	U			
Fluoranthene		ug/L		10	U	U	10	U	U	10	U	U			
Fluorene		ug/L		10	U	U	1.6	J	J	10	U	U			
Hexachlorobenzene		ug/L		10	U	U	10	U	U	10	U	U			
Hexachlorobutadiene		ug/L		10	U	U	10	U	U	10	U	U			
Hexachlorocyclopentadiene		ug/L		50	U	U	50	U	U	50	U	U			
Hexachloroethane		ug/L		10	U	U	10	U	U	10	U	U			
Indeno(1,2,3-cd)pyrene		ug/L		10	U	U	10	U	U	10	U	U			

Report Date: 03/04/02

			IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
Location Code:			IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3010			BD3012			BD3017			BD3018		
Sample Date:			27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group / *Parameter*	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chloro-3-methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chloroaniline, 4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chloronaphthalene, 2-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chlorophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Chrysene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Di-n-butyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Di-n-octyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dibenz(a,h)anthracene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dibenzofuran		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dichlorobenzene, 1,2-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dichlorobenzene, 1,3-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dichlorobenzene, 1,4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Dichlorophenol, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Diethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dimethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Dimethylphenol, 2,4-		ug/L	10	U	U	10	U	U	22			250	U	U
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Dinitrophenol, 2,4-		ug/L	50	U	UJ	50	U	UJ	50	U	U	1200	U	UJ
Dinitrotoluene, 2,4-		ug/L	10	U	U	2.0	J	J	10	U	U	250	U	U
Dinitrotoluene, 2,6-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Fluorene		ug/L	10	U	U	10	U	U	1.0	J	J	250	U	U
Hexachlorobenzene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Hexachlorobutadiene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Hexachlorocyclopentadiene		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Hexachloroethane		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	1.0	J	J	10	U	U	250	U	U

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

Report Date: 03/04/02

		Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3018R			BD3019			BD3020			BD3021		
		Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L				10	U	U	10	U	U	10	U	U
Chloro-3-methylphenol, 4-		ug/L				10	U	U	10	U	U	10	U	U
Chloroaniline, 4-		ug/L				10	U	U	10	U	U	10	U	U
Chloronaphthalene, 2-		ug/L				10	U	U	10	U	U	10	U	U
Chlorophenol, 2-		ug/L				10	U	U	10	U	U	10	U	U
Chlorophenyl phenyl ether, 4-		ug/L				10	U	U	10	U	U	10	U	U
Chrysene		ug/L				10	U	U	0.87	J	J	10	U	U
Di-n-butyl phthalate		ug/L				10	U	U	10	U	U	10	U	U
Di-n-octyl phthalate		ug/L				10	U	U	10	U	U	10	U	U
Dibenz(a,h)anthracene		ug/L				10	U	U	10	U	U	10	U	U
Dibenzofuran		ug/L				10	U	U	1.2	J	J	10	U	U
Dichlorobenzene, 1,2-		ug/L				10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,3-		ug/L				10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,4-		ug/L				10	U	U	10	U	U	10	U	U
Dichlorobenzidine, 3,3'-		ug/L				50	U	U	50	U	U	50	U	U
Dichlorophenol, 2,4-		ug/L				10	U	U	10	U	U	10	U	U
Diethyl phthalate		ug/L				10	U	U	10	U	U	10	U	U
Dimethyl phthalate		ug/L				10	U	U	10	U	U	10	U	U
Dimethylphenol, 2,4-		ug/L				5.6	J	J	3.0	J	J	3.8	J	J
Dinitro-2-methylphenol, 4,6-		ug/L				50	U	U	50	U	U	50	U	U
Dinitrophenol, 2,4-		ug/L				50	U	U	50	U	U	50	U	U
Dinitrotoluene, 2,4-		ug/L				10	U	U	10	U	U	10	U	U
Dinitrotoluene, 2,6-		ug/L				10	U	U	10	U	U	10	U	U
Fluoranthene		ug/L				10	U	U	10	U	U	10	U	U
Fluorene		ug/L				10	U	U	2.8	J	J	10	U	U
Hexachlorobenzene		ug/L				10	U	U	10	U	U	10	U	U
Hexachlorobutadiene		ug/L				10	U	U	10	U	U	10	U	U
Hexachlorocyclopentadiene		ug/L				50	U	U	50	U	U	50	U	U
Hexachloroethane		ug/L				10	U	U	10	U	U	10	U	U
Indeno(1,2,3-[illegible])pyrene		ug/L				10	U	U	10	U	U	10	U	U

			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Location Code:			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3024			BD3025			BD3026			BD3027		
Sample Date:			02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloro-3-methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloroaniline, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloronaphthalene, 2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chlorophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chrysene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Di-n-butyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Di-n-octyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dibenz(a,h)anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dibenzofuran		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,3-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Dichlorophenol, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Diethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dimethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dimethylphenol, 2,4-		ug/L	7.2	J	J	10	U	U	10	U	U	10	U	U
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Dinitrophenol, 2,4-		ug/L	50	U	U	50	U	U	50	U	UJ	50	U	U
Dinitrotoluene, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dinitrotoluene, 2,6-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Fluorene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorobenzene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorobutadiene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorocyclopentadiene		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Hexachloroethane		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U

Report Date: 03/04/02

		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3028			BD3029			BD3030			BD3032	
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01	
User Test Group													
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloro-3-methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloroaniline, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chloronaphthalene, 2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chlorophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Chrysene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Di-n-butyl phthalate		ug/L	1.1	J	J	10	U	U	10	U	U	10	U	U
Di-n-octyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dibenz(a,h)anthracene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dibenzofuran		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,3-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzene, 1,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Dichlorophenol, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Diethyl phthalate		ug/L	1.2	J	J	10	U	U	10	U	U	10	U	U
Dimethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dimethylphenol, 2,4-		ug/L	42			1.1	J	J	10	U	U	3.1	J	J
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Dinitrophenol, 2,4-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Dinitrotoluene, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Dinitrotoluene, 2,6-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Fluorene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorobenzene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorobutadiene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Hexachlorocyclopentadiene		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Hexachloroethane		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U

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			PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Carbazole		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chloro-3-methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chloroaniline, 4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chloronaphthalene, 2-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chlorophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Chrysene		ug/L	10	U	U	10	U	U	10	U	U	15	J	J
Di-n-butyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Di-n-octyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dibenz(a,h)anthracene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dibenzofuran		ug/L	10	U	U	10	U	U	10	U	U	12	J	J
Dichlorobenzene, 1,2-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dichlorobenzene, 1,3-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dichlorobenzene, 1,4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Dichlorophenol, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Diethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dimethyl phthalate		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dimethylphenol, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	13	J	J
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Dinitrophenol, 2,4-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Dinitrotoluene, 2,4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Dinitrotoluene, 2,6-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Fluoranthene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Fluorene		ug/L	10	U	U	10	U	U	10	U	U	28	J	J
Hexachlorobenzene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Hexachlorobutadiene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Hexachlorocyclopentadiene		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Hexachloroethane		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

Report Date: 03/04/02

		Location Code:	TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3038			BD3041			BD3042	
		Sample Date:	08-OCT-01			05-OCT-01			04-OCT-01	
User Test Group										
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES											
Carbazole		ug/L	10	U	U	19	U	UJ	10	U	U
Chloro-3-methylphenol, 4-		ug/L	10	U	U	19	U	UJ	10	U	U
Chloroaniline, 4-		ug/L	10	U	U	19	U	UJ	10	U	U
Chloronaphthalene, 2-		ug/L	10	U	U	19	U	UJ	10	U	U
Chlorophenol, 2-		ug/L	10	U	U	19	U	UJ	10	U	U
Chlorophenyl phenyl ether, 4-		ug/L	10	U	U	19	U	UJ	10	U	U
Chrysene		ug/L	10	U	U	19	U	UJ	10	U	U
Di-n-butyl phthalate		ug/L	10	U	U	19	U	UJ	10	U	U
Di-n-octyl phthalate		ug/L	10	U	U	19	U	UJ	10	U	U
Dibenz(a,h)anthracene		ug/L	10	U	U	19	U	UJ	10	U	U
Dibenzofuran		ug/L	10	U	U	19	U	UJ	10	U	U
Dichlorobenzene, 1,2-		ug/L	10	U	U	19	U	UJ	10	U	U
Dichlorobenzene, 1,3-		ug/L	10	U	U	19	U	UJ	10	U	U
Dichlorobenzene, 1,4-		ug/L	10	U	U	19	U	UJ	10	U	U
Dichlorobenzidine, 3,3'-		ug/L	50	U	U	96	U	UJ	50	U	U
Dichlorophenol, 2,4-		ug/L	10	U	U	19	U	UJ	10	U	U
Diethyl phthalate		ug/L	10	U	U	19	U	UJ	10	U	U
Dimethyl phthalate		ug/L	10	U	U	19	U	UJ	10	U	U
Dimethylphenol, 2,4-		ug/L	10	U	U	19	U	UJ	10	U	U
Dinitro-2-methylphenol, 4,6-		ug/L	50	U	U	96	U	UJ	50	U	U
Dinitrophenol, 2,4-		ug/L	50	U	U	96	U	UJ	50	U	U
Dinitrotoluene, 2,4-		ug/L	10	U	U	19	U	UJ	10	U	U
Dinitrotoluene, 2,6-		ug/L	10	U	U	19	U	UJ	10	U	U
Fluoranthene		ug/L	10	U	U	19	U	UJ	10	U	U
Fluorene		ug/L	10	U	U	19	U	UJ	10	U	U
Hexachlorobenzene		ug/L	10	U	U	19	U	UJ	10	U	U
Hexachlorobutadiene		ug/L	10	U	U	19	U	UJ	10	U	U
Hexachlorocyclopentadiene		ug/L	50	U	U	96	U	UJ	50	U	U
Hexachloroethane		ug/L	10	U	U	19	U	UJ	10	U	U
Indeno(1,2,3-cd)pyrene		ug/L	10	U	U	19	U	UJ	10	U	U

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		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Isophorone		ug/L	10	U	U	20	U	U	10	U	U			
Methylnaphthalene, 2-		ug/L	9.8	J	J	20	U	U	10	U	U			
Methylphenol, 2-		ug/L	10	U	U	20	U	U	10	U	U			
Methylphenol, 4-		ug/L	10	U	U	20	U	U	10	U	U			
Naphthalene		ug/L	12			20	U	U	10	U	U			
Nitroaniline, 2-		ug/L	50	U	U	100	U	U	50	U	U			
Nitroaniline, 3-		ug/L	50	U	U	100	U	U	50	U	U			
Nitroaniline, 4-		ug/L	50	U	U	100	U	U	50	U	U			
Nitrobenzene		ug/L	10	U	U	20	U	U	10	U	U			
Nitrophenol, 2-		ug/L	10	U	U	20	U	U	10	U	U			
Nitrophenol, 4-		ug/L	50	U	U	100	U	U	50	U	U			
Pentachlorophenol		ug/L	50	U	U	100	U	U	50	U	U			
Phenanthrene		ug/L	10	U	U	20	U	U	10	U	U			
Phenol		ug/L	2.2	J	J	20	U	U	10	U	U			
Pyrene		ug/L	10	U	U	20	U	U	10	U	U			
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	20	U	U	10	U	U			
Trichlorophenol, 2,4,5-		ug/L	10	U	U	20	U	U	10	U	U			
Trichlorophenol, 2,4,6-		ug/L	10	U	U	20	U	U	10	U	U			
n-Nitroso-di-n-propylamine		ug/L	10	U	U	20	U	U	10	U	U			
n-Nitrosodiphenylamine		ug/L	10	U	U	20	U	U	10	U	U			
VOLATILES														
Acetone		ug/L	54	J	B	22	J	B				2.7	J	B
Benzene		ug/L	45	J	J	11						1.0	U	U
Bromodichloromethane		ug/L	100	U	U	5.0	U	U				1.0	U	U
Bromoform		ug/L	100	U	UJ	5.0	U	UJ				1.0	U	UJ
Bromomethane		ug/L	200	U	UJ	10	U	U				2.0	U	UJ
Butanone, 2-		ug/L	500	U	R	25	U	R				5.0	U	R
Carbon disulfide		ug/L	100	U	U	5.0	U	U				1.0	U	U
Carbon tetrachloride		ug/L	100	U	UJ	5.0	U	UJ				1.0	U	UJ

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		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Isophorone		ug/L	10	U	U	10	U	U	10	U	U			
Methylnaphthalene, 2-		ug/L	10	U	U	21			10	U	U			
Methylphenol, 2-		ug/L	10	U	U	10	U	U	10	U	U			
Methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U			
Naphthalene		ug/L	10	U	U	11			10	U	U			
Nitroaniline, 2-		ug/L	50	U	U	50	U	U	50	U	U			
Nitroaniline, 3-		ug/L	50	U	U	50	U	U	50	U	U			
Nitroaniline, 4-		ug/L	50	U	U	50	U	U	50	U	U			
Nitrobenzene		ug/L	10	U	U	10	U	U	10	U	U			
Nitrophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U			
Nitrophenol, 4-		ug/L	50	U	U	50	U	U	50	U	U			
Pentachlorophenol		ug/L	50	U	U	50	U	U	50	U	U			
Phenanthrene		ug/L	10	U	U	2.8	J	J	10	U	U			
Phenol		ug/L	10	U	U	10	U	U	10	U	U			
Pyrene		ug/L	10	U	U	10	U	U	10	U	U			
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	10	U	U	10	U	U			
Trichlorophenol, 2,4,5-		ug/L	10	U	U	10	U	U	10	U	U			
Trichlorophenol, 2,4,6-		ug/L	10	U	U	10	U	U	10	U	U			
n-Nitroso-di-n-propylamine		ug/L	10	U	U	10	U	U	10	U	U			
n-Nitrosodiphenylamine		ug/L	10	U	U	10	U	U	10	U	U			
VOLATILES														
Acetone		ug/L	10	U	R	2000	U	R				3.0	J	B
Benzene		ug/L	1.0	U	U	110	J	J				2.0	U	U
Bromodichloromethane		ug/L	1.0	U	U	200	U	U				2.0	U	U
Bromoform		ug/L	1.0	U	UJ	200	U	UJ				2.0	U	UJ
Bromomethane		ug/L	2.0	U	U	400	U	U				4.0	U	UJ
Butanone, 2-		ug/L	5.0	U	R	1000	U	R				10	U	R
Carbon disulfide		ug/L	1.0	U	U	200	U	U				2.0	U	U
Carbon tetrachloride		ug/L	1.0	U	UJ	200	U	UJ				2.0	U	UJ

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		Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3010			BD3012			BD3017			BD3018		
		Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Isophorone		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Methylnaphthalene, 2-		ug/L	10	U	U	10	U	U	25			250	U	U
Methylphenol, 2-		ug/L	10	U	U	10	U	U	6.6	J	J	250	U	U
Methylphenol, 4-		ug/L	10	U	U	10	U	U	6.9	J	J	250	U	U
Naphthalene		ug/L	10	U	U	10	U	U	27			250	U	U
Nitroaniline, 2-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Nitroaniline, 3-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Nitroaniline, 4-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Nitrobenzene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Nitrophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Nitrophenol, 4-		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Pentachlorophenol		ug/L	50	U	U	50	U	U	50	U	U	1200	U	U
Phenanthrene		ug/L	10	U	U	10	U	U	1.3	J	J	250	U	U
Phenol		ug/L	10	U	U	10	U	U	12			250	U	U
Pyrene		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Trichlorophenol, 2,4,5-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
Trichlorophenol, 2,4,6-		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
n-Nitroso-di-n-propylamine		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
n-Nitrosodiphenylamine		ug/L	10	U	U	10	U	U	10	U	U	250	U	U
VOLATILES														
Acetone		ug/L	2.0	J	B	4.0	J	B	1000	U	R			
Benzene		ug/L	1.0	U	U	1.0	U	U	270		J			
Bromodichloromethane		ug/L	1.0	U	U	1.0	U	U	100	U	UJ			
Bromoform		ug/L	1.0	U	UJ	1.0	U	UJ	100	U	UJ			
Bromomethane		ug/L	2.0	U	U	2.0	U	U	200	U	UJ			
Butanone, 2-		ug/L	5.0	U	R	5.0	U	R	500	U	R			
Carbon disulfide		ug/L	1.0	U	U	1.0	U	U	100	U	UJ			
Carbon tetrachloride		ug/L	1.0	U	UJ	1.0	U	UJ	100	U	UJ			

			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
		Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3018R			BD3019			BD3020			BD3021		
		Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Isophorone		ug/L				10	U	U	10	U	U	10	U	U
Methylnaphthalene, 2-		ug/L				25			64			9.2	J	J
Methylphenol, 2-		ug/L				3.3	J	J	1.6	J	J	1.1	J	J
Methylphenol, 4-		ug/L				4.2	J	J	1.7	J	J	2.0	J	J
Naphthalene		ug/L				24			52			9.8	J	J
Nitroaniline, 2-		ug/L				50	U	U	50	U	U	50	U	U
Nitroaniline, 3-		ug/L				50	U	U	50	U	U	50	U	U
Nitroaniline, 4-		ug/L				50	U	U	50	U	U	50	U	U
Nitrobenzene		ug/L				10	U	U	10	U	U	10	U	U
Nitrophenol, 2-		ug/L				10	U	U	10	U	U	10	U	U
Nitrophenol, 4-		ug/L				50	U	U	50	U	U	50	U	U
Pentachlorophenol		ug/L				50	U	U	50	U	U	50	U	U
Phenanthrene		ug/L				0.98	J	J	5.1	J	J	0.99	J	J
Phenol		ug/L				12			4.6	J	J	2.6	J	J
Pyrene		ug/L				10	U	UJ	10	U	UJ	10	U	U
Trichlorobenzene, 1,2,4-		ug/L				10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,5-		ug/L				10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,6-		ug/L				10	U	U	10	U	U	10	U	U
n-Nitroso-di-n-propylamine		ug/L				10	U	U	10	U	U	10	U	U
n-Nitrosodiphenylamine		ug/L				10	U	U	10	U	U	10	U	U
VOLATILES														
Acetone		ug/L	9.4	J	B	170	J	J	930	B	J	87	J	B
Benzene		ug/L	5.0	U	UJ	670			800		J	100	U	U
Bromodichloromethane		ug/L	5.0	U	UJ	200	U	U	50	U	U	100	U	U
Bromoform		ug/L	5.0	U	UJ	200	U	UJ	50	U	U	100	U	UJ
Bromomethane		ug/L	10	U	UJ	400	U	UJ	100	U	U	200	U	U
Butanone, 2-		ug/L	25	U	R	1000	U	R	250	U	R	500	U	R
Carbon disulfide		ug/L	5.0	U	UJ	200	U	U	50	U	U	100	U	U
Carbon tetrachloride		ug/L	5.0	U	UJ	200	U	UJ	50	U	U	100	U	UJ

			Location Code:	PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3024			BD3025			BD3026			BD3027		
			Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES															
Isophorone		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Methylnaphthalene, 2-		ug/L		1.6	J	J	12			10	U	U	1.7	J	J
Methylphenol, 2-		ug/L		2.6	J	J	10	U	U	10	U	U	10	U	U
Methylphenol, 4-		ug/L		1.2	J	J	10	U	U	10	U	U	10	U	U
Naphthalene		ug/L		3.1	J	J	8.6	J	J	10	U	U	10	U	U
Nitroaniline, 2-		ug/L		50	U	U	50	U	U	50	U	U	50	U	U
Nitroaniline, 3-		ug/L		50	U	U	50	U	U	50	U	U	50	U	U
Nitroaniline, 4-		ug/L		50	U	U	50	U	U	50	U	U	50	U	U
Nitrobenzene		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Nitrophenol, 2-		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Nitrophenol, 4-		ug/L		50	U	U	50	U	U	50	U	U	50	U	U
Pentachlorophenol		ug/L		50	U	U	50	U	U	50	U	U	50	U	U
Phenanthrene		ug/L		10	U	U	0.82	J	J	10	U	U	10	U	U
Phenol		ug/L		3.5	J	J	1.2	J	J	10	U	U	10	U	U
Pyrene		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Trichlorobenzene, 1,2,4-		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,5-		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,6-		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
n-Nitroso-di-n-propylamine		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
n-Nitrosodiphenylamine		ug/L		10	U	U	10	U	U	10	U	U	10	U	U
VOLATILES															
Acetone		ug/L		88	J	J	66	J	B	1.2	J	J	4.8	J	B
Benzene		ug/L		100	U	U	46			0.25	J	J	0.60	J	J
Bromodichloromethane		ug/L		100	U	U	33	U	U	1.0	U	U	2.0	U	U
Bromoform		ug/L		100	U	UJ	33	U	UJ	1.0	U	U	2.0	U	UJ
Bromomethane		ug/L		200	U	U	7.9	J	J	2.0	U	UJ	4.0	U	U
Butanone, 2-		ug/L		500	U	R	170	U	R	5.0	U	U	10	U	R
Carbon disulfide		ug/L		100	U	U	33	U	U	1.0	U	U	2.0	U	U
Carbon tetrachloride		ug/L		100	U	UJ	33	U	UJ	1.0	U	U	2.0	U	UJ

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

Report Date: 03/04/02

User Test Group / Parameter	Elt	Units	PB-BED-MW23 Result	Qual	VQ	PB-BED-MW24 Result	Qual	VQ	PB-BED-MW25 Result	Qual	VQ	PB-BED-MW27 Result	Qual	VQ
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3028			BD3029			BD3030			BD3032		
Sample Date:			09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
SEMIVOLATILES														
Isophorone		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Methylnaphthalene, 2-		ug/L	22			3.6	J	J	10	U	U	24		
Methylphenol, 2-		ug/L	25			10	U	U	10	U	U	10	U	U
Methylphenol, 4-		ug/L	21			10	U	U	10	U	U	10	U	U
Naphthalene		ug/L	21			2.9	J	J	10	U	U	17		
Nitroaniline, 2-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Nitroaniline, 3-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Nitroaniline, 4-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Nitrobenzene		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Nitrophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Nitrophenol, 4-		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Pentachlorophenol		ug/L	50	U	U	50	U	U	50	U	U	50	U	U
Phenanthrene		ug/L	1.3	J	J	10	U	U	10	U	U	1.4	J	J
Phenol		ug/L	80			1.4	J	J	10	U	U	1.3	J	J
Pyrene		ug/L	10	U	UJ	10	U	UJ	10	U	U	10	U	UJ
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,5-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
Trichlorophenol, 2,4,6-		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
n-Nitroso-di-n-propylamine		ug/L	10	U	U	10	U	U	10	U	U	10	U	U
n-Nitrosodiphenylamine		ug/L	0.64	J	J	10	U	U	10	U	U	10	U	U
VOLATILES														
Acetone		ug/L	1600	J	J	120	J B	J	1.7	J	B	210	J B	J
Benzene		ug/L	2100			60			0.37	J	J	130	J	J
Bromodichloromethane		ug/L	200	U	U	40	U	U	1.0	U	U	180	U	U
Bromoform		ug/L	200	U	UJ	40	U	U	1.0	U	UJ	180	U	U
Bromomethane		ug/L	400	U	UJ	80	U	U	2.0	U	UJ	360	U	U
Butanone, 2-		ug/L	1000	U	R	200	U	R	5.0	U	R	890	U	R
Carbon disulfide		ug/L	200	U	U	40	U	U	0.48	J	J	180	U	U
Carbon tetrachloride		ug/L	200	U	UJ	40	U	U	1.0	U	UJ	180	U	U

Report Date: 03/04/02

		Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES														
Isophorone		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Methylnaphthalene, 2-		ug/L	10	U	U	10	U	U	10	U	U	470		
Methylphenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Methylphenol, 4-		ug/L	10	U	U	10	U	U	10	U	U	9.8	J	J
Naphthalene		ug/L	10	U	U	10	U	U	10	U	U	170		
Nitroaniline, 2-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Nitroaniline, 3-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Nitroaniline, 4-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Nitrobenzene		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Nitrophenol, 2-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Nitrophenol, 4-		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Pentachlorophenol		ug/L	50	U	U	50	U	U	50	U	U	500	U	U
Phenanthrene		ug/L	10	U	U	10	U	U	10	U	U	74	J	J
Phenol		ug/L	10	U	U	10	U	U	10	U	U	13	J	J
Pyrene		ug/L	10	U	U	10	U	U	10	U	U	100	U	UJ
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Trichlorophenol, 2,4,5-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
Trichlorophenol, 2,4,6-		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
n-Nitroso-di-n-propylamine		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
n-Nitrosodiphenylamine		ug/L	10	U	U	10	U	U	10	U	U	100	U	U
VOLATILES														
Acetone		ug/L	2.8	J	B	39	J	B	3.7	J	B	2000	U	R
Benzene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	700		J
Bromodichloromethane		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Bromoform		ug/L	1.0	U	UJ	5.0	U	UJ	1.0	U	UJ	200	U	UJ
Bromomethane		ug/L	2.0	U	U	10	U	UJ	2.0	U	U	400	U	UJ
Butanone, 2-		ug/L	5.0	U	R	25	U	R	5.0	U	R	1000	U	R
Carbon disulfide		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Carbon tetrachloride		ug/L	1.0	U	UJ	5.0	U	UJ	1.0	U	UJ	200	U	UJ

User Test Group / Parameter	Flt	Units	TNTB-BEDGW-003 Result	Qual	VQ	TNTB-BEDGW-004 Result	Qual	VQ	TNTC-BEDGW-001 Result	Qual	VQ
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3038			BD3041			BD3042		
Sample Date:			08-OCT-01			05-OCT-01			04-OCT-01		
SEMIVOLATILES											
Isophorone		ug/L	10	U	U	19	U	UJ	10	U	U
Methylnaphthalene, 2-		ug/L	10	U	U	19	U	UJ	4.5	J	J
Methylphenol, 2-		ug/L	10	U	U	19	U	UJ	10	U	U
Methylphenol, 4-		ug/L	10	U	U	19	U	UJ	10	U	U
Naphthalene		ug/L	10	U	U	19	U	UJ	5.2	J	J
Nitroaniline, 2-		ug/L	50	U	U	96	U	UJ	50	U	U
Nitroaniline, 3-		ug/L	50	U	U	96	U	UJ	50	U	U
Nitroaniline, 4-		ug/L	50	U	U	96	U	UJ	50	U	U
Nitrobenzene		ug/L	10	U	U	19	U	UJ	10	U	U
Nitrophenol, 2-		ug/L	10	U	U	19	U	UJ	10	U	U
Nitrophenol, 4-		ug/L	50	U	U	96	U	UJ	50	U	U
Pentachlorophenol		ug/L	50	U	U	96	U	UJ	50	U	U
Phenanthrene		ug/L	10	U	U	19	U	UJ	10	U	U
Phenol		ug/L	2.2	J	J	19	U	UJ	10	U	U
Pyrene		ug/L	10	U	U	19	U	UJ	10	U	U
Trichlorobenzene, 1,2,4-		ug/L	10	U	U	19	U	UJ	10	U	U
Trichlorophenol, 2,4,5-		ug/L	10	U	U	19	U	UJ	10	U	U
Trichlorophenol, 2,4,6-		ug/L	10	U	U	19	U	UJ	10	U	U
n-Nitroso-di-n-propylamine		ug/L	10	U	U	19	U	UJ	10	U	U
n-Nitrosodiphenylamine		ug/L	10	U	U	19	U	UJ	10	U	U
VOLATILES											
Acetone		ug/L	110		J	36		J	54	J	B
Benzene		ug/L	17			1.4	J	J	100	U	U
Bromodichloromethane		ug/L	5.0	U	U	2.0	U	U	100	U	U
Bromoform		ug/L	5.0	U	UJ	2.0	U	UJ	100	U	UJ
Bromomethane		ug/L	10	U	UJ	4.0	U	UJ	200	U	UJ
Butanone, 2-		ug/L	75		J	10	U	R	500	U	R
Carbon disulfide		ug/L	8.0			2.0	U	U	100	U	U
Carbon tetrachloride		ug/L	5.0	U	UJ	2.0	U	UJ	100	U	UJ

			Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3004			BD3005			BD3006			BD3006R		
			Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group															
Parameter	Flt.	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES															
Chlorobenzene		ug/L		100	U	U	5.0	U	U				1.0	U	U
Chloroethane		ug/L		200	U	U	10	U	U				2.0	U	UJ
Chloroform		ug/L		100	U	U	5.0	U	U				1.0	U	U
Chloromethane		ug/L		30	J	J	10	U	U				2.0	U	U
Dibromochloromethane		ug/L		100	U	UJ	5.0	U	UJ				1.0	U	UJ
Dichloroethane, 1,1-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Dichloroethane, 1,2-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Dichloroethene, 1,1-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Dichloroethene, 1,2-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Dichloropropane, 1,2-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Dichloropropene, cis-1,3-		ug/L		100	U	UJ	5.0	U	UJ				1.0	U	UJ
Dichloropropene, trans-1,3-		ug/L		100	U	UJ	5.0	U	UJ				1.0	U	UJ
Ethylbenzene		ug/L		64	J	J	4.0	J	J				1.0	U	U
Hexanone, 2-		ug/L		500	U	U	25	U	U				5.0	U	U
Methyl-2-pentanone, 4-		ug/L		500	U	U	25	U	U				5.0	U	U
Methylene chloride		ug/L		100	J B	J	2.2	J B	B				2.0	U	U
Styrene		ug/L		100	U	U	5.0	U	U				1.0	U	U
Tetrachloroethane, 1,1,2,2-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Tetrachloroethene		ug/L		100	U	U	5.0	U	U				1.0	U	U
Toluene		ug/L		100	U	U	11						1.0	U	U
Trichloroethane, 1,1,1-		ug/L		100	U	U	5.0	U	UJ				1.0	U	UJ
Trichloroethane, 1,1,2-		ug/L		100	U	U	5.0	U	U				1.0	U	U
Trichloroethene		ug/L		100	U	U	5.0	U	U				1.0	U	U
Vinyl chloride		ug/L		100	U	U	5.0	U	U				1.0	U	U
Xylenes, total		ug/L		360			28						1.0	U	U

		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Chlorobenzene		ug/L	1.0	U	U	200	U	U				2.0	U	U
Chloroethane		ug/L	2.0	U	U	400	U	U				4.0	U	UJ
Chloroform		ug/L	1.0	U	U	200	U	U				2.0	U	U
Chloromethane		ug/L	2.0	U	U	400	U	U				4.0	U	U
Dibromochloromethane		ug/L	1.0	U	UJ	200	U	U				2.0	U	UJ
Dichloroethane, 1,1-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Dichloroethane, 1,2-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Dichloroethene, 1,1-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Dichloroethene, 1,2-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Dichloropropane, 1,2-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Dichloropropene, cis-1,3-		ug/L	1.0	U	UJ	200	U	UJ				2.0	U	UJ
Dichloropropene, trans-1,3-		ug/L	1.0	U	UJ	200	U	UJ				2.0	U	UJ
Ethylbenzene		ug/L	1.0	U	U	61	J	J				2.0	U	U
Hexanone, 2-		ug/L	5.0	U	U	1000	U	U				10	U	U
Methyl-2-pentanone, 4-		ug/L	5.0	U	U	1000	U	U				10	U	U
Methylene chloride		ug/L	2.0	U	U	200	J B	J				0.50	J B	B
Styrene		ug/L	1.0	U	U	200	U	U				2.0	U	U
Tetrachloroethane, 1,1,2,2-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Tetrachloroethene		ug/L	1.0	U	U	200	U	U				2.0	U	U
Toluene		ug/L	1.0	U	U	140	J	J				2.0	U	U
Trichloroethane, 1,1,1-		ug/L	1.0	U	UJ	200	U	UJ				2.0	U	UJ
Trichloroethane, 1,1,2-		ug/L	1.0	U	U	200	U	U				2.0	U	U
Trichloroethene		ug/L	1.0	U	U	200	U	U				2.0	U	U
Vinyl chloride		ug/L	1.0	U	U	200	U	U				2.0	U	U
Xylenes, total		ug/L	1.0	U	U	490						2.0	U	U

Report Date: 03/04/02

			Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3010			BD3012			BD3017			BD3018		
			Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group															
Parameter	Flt.	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES															
Chlorobenzene		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Chloroethane		ug/L		2.0	U	U	2.0	U	U	200	U	UJ			
Chloroform		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Chloromethane		ug/L		2.0	U	U	2.0	U	U	200	U	UJ			
Dibromochloromethane		ug/L		1.0	U	UJ	1.0	U	UJ	100	U	UJ			
Dichloroethane, 1,1-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Dichloroethane, 1,2-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Dichloroethene, 1,1-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Dichloroethene, 1,2-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Dichloropropane, 1,2-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Dichloropropene, cis-1,3-		ug/L		1.0	U	UJ	1.0	U	UJ	100	U	UJ			
Dichloropropene, trans-1,3-		ug/L		1.0	U	UJ	1.0	U	UJ	100	U	UJ			
Ethylbenzene		ug/L		1.0	U	U	1.0	U	U	120		J			
Hexanone, 2-		ug/L		5.0	U	U	5.0	U	U	500	U	UJ			
Methyl-2-pentanone, 4-		ug/L		5.0	U	U	5.0	U	U	500	U	UJ			
Methylene chloride		ug/L		2.0	U	U	2.0	U	U	43	J B	J			
Styrene		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Tetrachloroethane, 1,1,2,2-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Tetrachloroethene		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Toluene		ug/L		1.0	U	U	1.0	U	U	270		J			
Trichloroethane, 1,1,1-		ug/L		1.0	U	UJ	1.0	U	UJ	100	U	UJ			
Trichloroethane, 1,1,2-		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Trichloroethene		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Vinyl chloride		ug/L		1.0	U	U	1.0	U	U	100	U	UJ			
Xylenes, total		ug/L		1.0	U	U	1.0	U	U	1200		J			

			Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3018R			BD3019			BD3020			BD3021		
			Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES															
Chlorobenzene		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Chloroethane		ug/L		10	U	UJ	400	U	U	100	U	U	200	U	U
Chloroform		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Chloromethane		ug/L		10	U	UJ	400	U	U	100	U	U	200	U	U
Dibromochloromethane		ug/L		5.0	U	UJ	200	U	UJ	50	U	U	100	U	UJ
Dichloroethane, 1,1-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Dichloroethane, 1,2-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Dichloroethene, 1,1-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Dichloroethene, 1,2-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Dichloropropane, 1,2-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Dichloropropene, cis-1,3-		ug/L		5.0	U	UJ	200	U	UJ	50	U	U	100	U	U
Dichloropropene, trans-1,3-		ug/L		5.0	U	UJ	200	U	UJ	50	U	U	100	U	UJ
Ethylbenzene		ug/L		5.0	U	UJ	150	J	J	200		J	120		
Hexanone, 2-		ug/L		25	U	UJ	1000	U	UJ	250	U	UJ	500	U	U
Methyl-2-pentanone, 4-		ug/L		25	U	UJ	1000	U	UJ	250	U	UJ	500	U	U
Methylene chloride		ug/L		1.4	J B	B	120	J B	J	52	J B	J	41	J B	J
Styrene		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Tetrachloroethane, 1,1,2,2-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Tetrachloroethene		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Toluene		ug/L		5.0	U	UJ	630			590		J	180		
Trichloroethane, 1,1,1-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	UJ
Trichloroethane, 1,1,2-		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Trichloroethene		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Vinyl chloride		ug/L		5.0	U	UJ	200	U	U	50	U	U	100	U	U
Xylenes, total		ug/L		5.0	U	UJ	1000			1500			550		

			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Location Code:			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3024			BD3025			BD3026			BD3027		
Sample Date:			02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Chlorobenzene		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Chloroethane		ug/L	200	U	U	67	U	UJ	2.0	U	U	4.0	U	U
Chloroform		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Chloromethane		ug/L	35	J	J	67	U	U	2.0	U	UJ	4.0	U	UJ
Dibromochloromethane		ug/L	100	U	UJ	33	U	UJ	1.0	U	U	2.0	U	UJ
Dichloroethane, 1,1-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Dichloroethane, 1,2-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Dichloroethene, 1,1-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Dichloroethene, 1,2-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Dichloropropane, 1,2-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Dichloropropene, cis-1,3-		ug/L	100	U	UJ	33	U	UJ	1.0	U	U	2.0	U	UJ
Dichloropropene, trans-1,3-		ug/L	100	U	UJ	33	U	UJ	1.0	U	U	2.0	U	UJ
Ethylbenzene		ug/L	32	J	J	17	J	J	1.0	U	U	1.0	J	J
Hexanone, 2-		ug/L	500	U	U	170	U	U	5.0	U	U	10	U	U
Methyl-2-pentanone, 4-		ug/L	500	U	U	170	U	U	5.0	U	U	10	U	U
Methylene chloride		ug/L	47	J B	J	30	J B	J	2.0	U	UJ	0.63	J B	B
Styrene		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Tetrachloroethane, 1,1,2,2-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Tetrachloroethene		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Toluene		ug/L	100	U	U	21	J	J	1.0	U	U	1.2	J	J
Trichloroethane, 1,1,1-		ug/L	100	U	UJ	33	U	U	1.0	U	U	2.0	U	U
Trichloroethane, 1,1,2-		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Trichloroethene		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Vinyl chloride		ug/L	100	U	U	33	U	U	1.0	U	U	2.0	U	U
Xylenes, total		ug/L	150			180			1.0	U	U	6.4		

Report Date. 03/04/02

			Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3028			BD3029			BD3030			BD3032		
			Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES															
Chlorobenzene		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Chloroethane		ug/L		400	U	U	80	U	U	2.0	U	UJ	360	U	U
Chloroform		ug/L		200	U	U	40	U	U	1.1			180	U	U
Chloromethane		ug/L		400	U	U	80	U	U	2.0	U	U	360	U	U
Dibromochloromethane		ug/L		200	U	UJ	40	U	U	1.0	U	UJ	180	U	U
Dichloroethane, 1,1-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Dichloroethane, 1,2-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Dichloroethene, 1,1-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Dichloroethene, 1,2-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Dichloropropane, 1,2-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Dichloropropene, cis-1,3-		ug/L		200	U	UJ	40	U	U	1.0	U	UJ	180	U	U
Dichloropropene, trans-1,3-		ug/L		200	U	UJ	40	U	U	1.0	U	UJ	180	U	U
Ethylbenzene		ug/L		190	J	J	19	J	J	0.22	J	J	100	J	J
Hexanone, 2-		ug/L		1000	U	UJ	200	U	UJ	5.0	U	U	890	U	UJ
Methyl-2-pentanone, 4-		ug/L		1000	U	UJ	200	U	UJ	0.30	J	J	890	U	UJ
Methylene chloride		ug/L		160	J B	J	21	J B	J	0.30	J B	B	98	J B	J
Styrene		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Tetrachloroethane, 1,1,2,2-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Tetrachloroethene		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Toluene		ug/L		910			58			0.80	J	J	120	J	J
Trichloroethane, 1,1,1-		ug/L		200	U	U	40	U	U	1.0	U	UJ	180	U	U
Trichloroethane, 1,1,2-		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Trichloroethene		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Vinyl chloride		ug/L		200	U	U	40	U	U	1.0	U	U	180	U	U
Xylenes, total		ug/L		1300			110			1.5			560		

			PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Chlorobenzene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Chloroethane		ug/L	2.0	U	U	10	U	UJ	2.0	U	U	400	U	U
Chloroform		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Chloromethane		ug/L	2.0	U	U	10	U	U	2.0	U	U	400	U	U
Dibromochloromethane		ug/L	1.0	U	UJ	5.0	U	UJ	1.0	U	UJ	200	U	UJ
Dichloroethane, 1,1-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Dichloroethane, 1,2-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Dichloroethene, 1,1-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Dichloroethene, 1,2-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Dichloropropane, 1,2-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Dichloropropene, cis-1,3-		ug/L	1.0	U	UJ	5.0	U	UJ	1.0	U	UJ	200	U	UJ
Dichloropropene, trans-1,3-		ug/L	1.0	U	UJ	5.0	U	UJ	1.0	U	UJ	200	U	UJ
Ethylbenzene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	240		J
Hexanone, 2-		ug/L	5.0	U	U	25	U	U	5.0	U	U	1000	U	UJ
Methyl-2-pentanone, 4-		ug/L	5.0	U	U	25	U	U	5.0	U	U	1000	U	UJ
Methylene chloride		ug/L	2.0	U	U	1.5	J B	B	2.0	U	U	330	J B	J
Styrene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Tetrachloroethane, 1,1,2,2-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Tetrachloroethene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Toluene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	730		J
Trichloroethane, 1,1,1-		ug/L	1.0	U	UJ	5.0	U	U	1.0	U	U	200	U	U
Trichloroethane, 1,1,2-		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Trichloroethene		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Vinyl chloride		ug/L	1.0	U	U	5.0	U	U	1.0	U	U	200	U	U
Xylenes, total		ug/L	1.0	U	U	3.3	J	J	1.0	U	U	1400		

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

Report Date: 03/04/02

			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Location Code:			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3038			BD3041			BD3042		
Sample Date:			08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group											
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES											
Chlorobenzene		ug/L	5.0	U	U	2.0	U	U	100	U	U
Chloroethane		ug/L	10	U	U	4.0	U	UJ	200	U	UJ
Chloroform		ug/L	5.0	U	U	2.0	U	U	100	U	U
Chloromethane		ug/L	10	U	UJ	4.0	U	U	200	U	U
Dibromochloromethane		ug/L	5.0	U	UJ	2.0	U	UJ	100	U	UJ
Dichloroethane, 1,1-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Dichloroethane, 1,2-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Dichloroethene, 1,1-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Dichloroethene, 1,2-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Dichloropropane, 1,2-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Dichloropropene, cis-1,3-		ug/L	5.0	U	UJ	2.0	U	UJ	100	U	UJ
Dichloropropene, trans-1,3-		ug/L	5.0	U	UJ	2.0	U	UJ	100	U	UJ
Ethylbenzene		ug/L	5.0	U	U	2.0	U	U	22	J	J
Hexanone, 2-		ug/L	25	U	U	10	U	U	500	U	U
Methyl-2-pentanone, 4-		ug/L	25	U	U	10	U	U	500	U	U
Methylene chloride		ug/L	1.5	J B	B	0.50	J B	B	160	J B	J
Styrene		ug/L	5.0	U	U	2.0	U	U	100	U	U
Tetrachloroethane, 1,1,2,2-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Tetrachloroethene		ug/L	5.0	U	U	2.0	U	U	100	U	U
Toluene		ug/L	5.2			1.3	J	J	100	U	U
Trichloroethane, 1,1,1-		ug/L	5.0	U	U	2.0	U	UJ	100	U	U
Trichloroethane, 1,1,2-		ug/L	5.0	U	U	2.0	U	U	100	U	U
Trichloroethene		ug/L	5.0	U	U	2.0	U	U	100	U	U
Vinyl chloride		ug/L	5.0	U	U	2.0	U	U	100	U	U
Xylenes, total		ug/L	5.0	U	U	2.0	U	U	190		

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Data Summary

Report Date: 03/04/02

			Location Code:	PB-BED-MW16			TNTA-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE		
			Sample No:	FP7002			FP7001		
			Sample Date:	10-OCT-01			08-OCT-01		
User Test Group									
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ
RANGE ORGANICS									
Diesel Range Organics		mg/kg		4800			31000		
Gasoline Range Organics		mg/kg		52000			160000		
VOLATILES									
Acetone		mg/kg		30	J B		500	U	U
Benzene		mg/kg		25	J	J	89	J	J
Bromodichloromethane		mg/kg		30	U	U	120	U	U
Bromoform		mg/kg		30	U	U	120	U	U
Bromomethane		mg/kg		62	U	U	250	U	U
Butanone, 2-		mg/kg		120	U	U	500	U	U
Carbon disulfide		mg/kg		30	U	U	120	U	U
Carbon tetrachloride		mg/kg		30	U	U	120	U	U
Chlorobenzene		mg/kg		30	U	U	120	U	U
Chloroethane		mg/kg		62	U	U	250	U	U
Chloroform		mg/kg		30	U	U	120	U	U
Chloromethane		mg/kg		62	U	U	250	U	U
Dibromochloromethane		mg/kg		30	U	U	120	U	U
Dichloroethane, 1,1-		mg/kg		30	U	U	120	U	U
Dichloroethane, 1,2-		mg/kg		30	U	U	120	U	U
Dichloroethene, 1,1-		mg/kg		30	U	U	120	U	U
Dichloroethene, 1,2-		mg/kg		30	U	U	120	U	U
Dichloropropane, 1,2-		mg/kg		30	U	U	120	U	U
Dichloropropene, cis-1,3-		mg/kg		30	U	U	120	U	U
Dichloropropene, trans-1,3-		mg/kg		30	U	U	120	U	U
Ethylbenzene		mg/kg		200			680		
Hexanone, 2-		mg/kg		120	U	U	500	U	U
Methyl-2-pentanone, 4-		mg/kg		120	U	U	500	U	U
Methylene chloride		mg/kg		42	B		210	B	
Styrene		mg/kg		30	U	U	120	U	U
Tetrachloroethane, 1,1,2,2-		mg/kg		30	U	U	120	U	U

		Location Code:	PB-BED-MW16			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE		
		Sample No:	FP7002			FP7001		
		Sample Date:	10-OCT-01			08-OCT-01		
User Test Group								
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES								
Tetrachloroethene		mg/kg	30	U	U	120	U	U
Toluene		mg/kg	120			610		
Trichloroethane, 1,1,1-		mg/kg	30	U	U	120	U	U
Trichloroethane, 1,1,2-		mg/kg	30	U	U	120	U	U
Trichloroethene		mg/kg	4.6	J	J	120	U	U
Vinyl chloride		mg/kg	62	U	U	250	U	U
Xylenes, total		mg/kg	1600	B		3800	B	

APPENDIX K

DETECTED HITS SUMMARY EXCLUDING "B" QUALIFIERS

Plum Brook Ordnance Works
Direct Push Groundwater
Detected Hits

Report Date: 03/04/02

		Location Code:	TNTA-DP14			TNTA-DP21			TNTB-DP02			TNTB-DP03		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BA3014			BA3021			BB3002			BB3003		
		Sample Date:	02-AUG-01			01-AUG-01			06-AUG-01			01-AUG-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	3.9		nv	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	4.3		nv	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	9.5		nv	-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L	-	-	-	4.9		nv	-	-	-	-	-	-
Nitrotoluene, 2-		ug/L	-	-	-	24		nv	-	-	-	-	-	-
Nitrotoluene, 3-		ug/L	-	-	-	1.3		nv	-	-	-	-	-	-
Nitrotoluene, 4-		ug/L	-	-	-	3.1		nv	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-		ug/L	-	-	-	4.1		nv	-	-	-	0.14	J	nv
VOLATILES														
Acetone		ug/L	-	-	-	8.8	J	nv	17	J	nv	10	J	nv
Carbon disulfide		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform		ug/L	-	-	-	1.0	J	nv	-	-	-	-	-	-

Plum Brook Ordnance Works
Direct Push Groundwater
Detected Hits

Report Date: 03/04/02

			Location Code:	TNTC-DP13			TNTC-DP19		
			Associated Site:	BASEWIDE			BASEWIDE		
			Sample No:	BC3013			BC3019		
			Sample Date:	01-AUG-01			06-AUG-01		
User Test Group									
Parameter	*Flt*	*Units*		*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES									
Amino-2,6-dinitrotoluene, 4-		ug/L		-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L		-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L		-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L		-	-	-	-	-	-
Nitrotoluene, 2-		ug/L		-	-	-	-	-	-
Nitrotoluene, 3-		ug/L		-	-	-	-	-	-
Nitrotoluene, 4-		ug/L		-	-	-	-	-	-
Trinitrotoluene, 2,4,6-		ug/L		-	-	-	4.0		nv
VOLATILES									
Acetone		ug/L		8.8	J	nv	-	-	-
Carbon disulfide		ug/L		-	-	-	0.75	J	nv
Chloroform		ug/L		-	-	-	-	-	-

	Location Code:	PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0001			BD0002			BD0003			BD0004		
	Sample Date:	27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	mg/kg	4.6			0.064	J	J	3.3			9.3		
Dinitrotoluene, 2,4-	mg/kg	14			0.48			12			26		
Dinitrotoluene, 2,6-	mg/kg	-	-	-	0.48			1.3			2.9		
Nitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	mg/kg	31			1.0			18			25		
Trinitrotoluene, 2,4,6-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
GEN CHEMISTRY													
% moisture	Percent	19.3			20.0			17.5			22.2		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	-	-	-	-	-	-						
Amino-4,6-dinitrotoluene, 2-	ug/L	-	-	-	-	-	-						
Dinitrobenzene, 1,3-	ug/L	160			-	-	-						
Dinitrotoluene, 2,4-	ug/L	430	B		-	-	-						
Dinitrotoluene, 2,6-	ug/L	66			-	-	-						
Nitrotoluene, 2-	ug/L	-	-	-	-	-	-						
Nitrotoluene, 3-	ug/L	-	-	-	-	-	-						
Nitrotoluene, 4-	ug/L	-	-	-	-	-	-						
Trinitrobenzene, 1,3,5-	ug/L	780			-	-	-						
Trinitrotoluene, 2,4,6-	ug/L	-	-	-	-	-	-						
METALS													
Aluminum	mg/kg	8820			9820			10700		J	13500		J
Antimony	mg/kg	-	-	-	0.55	B	J	0.60	B	J	0.71	B	J
Arsenic	mg/kg	5.4			9.0			11.6		J	18.3		J

	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	Sample Depth:	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	1.1			0.27			-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	1.1			0.16	J	J	-	-	-	-	-	-
Dinitrobenzene, 1,3-	mg/kg	0.062	J	J	1.1			-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	1.3			0.91			4600			8.0		
Dinitrotoluene, 2,6-	mg/kg	0.57			0.25			5600			6.5		
Nitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	mg/kg	0.20	J	J	5.2			-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	mg/kg	1.4			0.23	J	J	-	-	-	-	-	-
GEN CHEMISTRY													
% moisture	Percent	13.0			21.8			10.4			9.3		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	-	-	-	-	-	-	140000	B				
Dinitrotoluene, 2,6-	ug/L	-	-	-	-	-	-	110000			57		
Nitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	ug/L	-	-	-	26	J	J	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	ug/L	-	-	-	-	-	-	17000			-	-	-
METALS													
Aluminum	mg/kg	8410		J	7960		J	3080		J	3370		J
Antimony	mg/kg	-	-	-	-	-	-	-	-	-	0.61	B	J
Arsenic	mg/kg	4.7		J	6.7		J	6.6		J	9.8		J

Location Code:		TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
Associated Site:		BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:		BD0009			BD0012			BD0013			BD0014		
Sample Date:		26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group / Sample Depth:		.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	-	-	-	-	-	-	2.3			0.35		
Amino-4,6-dinitrotoluene, 2-	mg/kg	-	-	-	-	-	-	2.4			0.43		
Dinitrobenzene, 1,3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	130	J	J	-	-	-	2.8			0.54		
Dinitrotoluene, 2,6-	mg/kg	-	-	-	-	-	-	2.0			0.40		
Nitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	mg/kg	12000		J	260			2.7			0.55		
GEN CHEMISTRY													
% moisture	Percent	12.9			11.0			21.9			19.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	ug/L	80000			4400			-	-	-	-	-	-
METALS													
Aluminum	mg/kg	3680		J	11200		J	6040			8110		
Antimony	mg/kg	-	-	-	-	-	-	1.8	B	J	1.2	B	J
Arsenic	mg/kg	3.0		J	8.2		J	12.8			17.0		

Report Date: 03/06/02

	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	Sample Depth:	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	-	-	-	-	-	-	0.12	J	J	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	-	-	-	150	U	U	0.11	J	J	-	-	-
Dinitrobenzene, 1,3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	mg/kg	2400			2100			0.23	J	J	-	-	-
Dinitrotoluene, 2,6-	mg/kg	1500			630			0.098	J	J	-	-	-
Nitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	0.59		
Nitrotoluene, 3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	0.33		
Trinitrobenzene, 1,3,5-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	mg/kg	3100			2200			-	-	-	-	-	-
GEN CHEMISTRY													
% moisture	Percent	9.7			6.2			4.7			13.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	100000	B		84000	B		-	-	-	-	-	-
Dinitrotoluene, 2,6-	ug/L	74000			24000			-	-	-	-	-	-
Nitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	30	J	J
Nitrotoluene, 3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	ug/L	71000			77000			-	-	-	-	-	-
METALS													
Aluminum	mg/kg	2850			1800			4280		J	6100		J
Antimony	mg/kg	0.84	B	J	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	3.4			2.9								

Report Date: 03/06/02

User Test Group / Parameter	Units	TNTC-SO123 Result	Qual	VQ	TNTC-SO123 Result	Qual	VQ	WARP-DP09 Result	Qual	VQ	WARP-DP09 Result	Qual	VQ
Associated Site:		BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:		BD0021R			BD0022R			BD0023			BD0024		
Sample Date:		02-OCT-01			02-OCT-01			27-SEP-01			27-SEP-01		
Sample Depth:		4.0 - 6			6.0 - 7			4.0 - 4.9			11.0 - 12		
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	3.7			-	-	-	-	-	-	0.16	J	J
Amino-4,6-dinitrotoluene, 2-	mg/kg	2.5			-	-	-	-	-	-	0.11	J	J
Dinitrobenzene, 1,3-	mg/kg	-	-	-	-	-	-	-	-	-	0.31		
Dinitrotoluene, 2,4-	mg/kg	0.67			33			0.71			2.7		
Dinitrotoluene, 2,6-	mg/kg	2.4			18			0.35			0.27		
Nitrotoluene, 2-	mg/kg	-	-	-	4.0			-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	-	-	-	0.80	J	J	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	2.4			-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	mg/kg	0.30			0.50	J	J	-	-	-	1.7		
Trinitrotoluene, 2,4,6-	mg/kg	6.5			4.0			1.0			-	-	-
GEN CHEMISTRY													
% moisture	Percent	8.2			13.0			21.6			23.4		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	67			-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	ug/L	44			-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	25	J	J	580								
Dinitrotoluene, 2,6-	ug/L	96			420			-	-	-	-	-	-
Nitrotoluene, 2-	ug/L	-	-	-	210			-	-	-	-	-	-
Nitrotoluene, 3-	ug/L	-	-	-	28	J	J	-	-	-	-	-	-
Nitrotoluene, 4-	ug/L	-	-	-	74			-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	ug/L	140			60			-	-	-	-	-	-
METALS													
Aluminum	mg/kg	3950		J	4970		J	6980			9320		
Antimony	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg							6.1			12.7		

	Location Code:	WARP-DP13			WARP-DP13			WARP-DP16			WARP-DP16		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0025			BD0028			BD0029R			BD0030R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	*Sample Depth:*	4.1 - 5.1			11.0 - 12			3.5 - 4			11.0 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES													
Amino-2,6-dinitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	mg/kg	-	-	-	2.4			-	-	-	0.033	J	J
Dinitrotoluene, 2,4-	mg/kg	0.29			6.5			0.052	J	J	-	-	-
Dinitrotoluene, 2,6-	mg/kg	-	-	-	0.64	J	J	-	-	-	-	-	-
Nitrotoluene, 2-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	mg/kg	0.16	J	J	11			-	-	-	1.6		
Trinitrotoluene, 2,4,6-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
GEN CHEMISTRY													
% moisture	Percent	13.0			22.0			13.9			26.0		
LEACH-EXP													
Amino-2,6-dinitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrobenzene, 1,3-	ug/L	-	-	-	51			-	-	-	-	-	-
Dinitrotoluene, 2,4-	ug/L	-	-	-				46			-	-	-
Dinitrotoluene, 2,6-	ug/L	-	-	-	-	-	-	26	J	J	-	-	-
Nitrotoluene, 2-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 3-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrotoluene, 4-	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrobenzene, 1,3,5-	ug/L	-	-	-	110			-	-	-	-	-	-
Trinitrotoluene, 2,4,6-	ug/L	-	-	-	-	-	-	23	J	J	-	-	-
METALS													
Aluminum	mg/kg	4340			11400			10700		J	12500		J
Antimony	mg/kg	-	-	-	0.64	B	J	0.56	B	J	-	-	-
Arsenic	mg/kg	2.6			20.3			10.3		J	6.8		J

Report Date: 03/06/02

User Test Group	Location Code:	PRRP-DP03			PRRP-DP03			PRRP-DP10			PRRP-DP10		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0001			BD0002			BD0003			BD0004		
	Sample Date:	27-SEP-01			27-SEP-01			26-SEP-01			26-SEP-01		
	Sample Depth:	4.3 - 4.8			11.0 - 12			8.4 - 8.9			10.5 - 12		
Parameter	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS													
Barium	mg/kg	63.6			76.5			112			103		
Beryllium	mg/kg	0.62			0.67								
Cadmium	mg/kg	0.13	B	J	0.38	B	J	0.16	B	J	0.45	B	J
Calcium	mg/kg	2090			58200			5700		J	14200		J
Chromium	mg/kg	13.7			16.2			17.4		J	21.8		J
Cobalt	mg/kg	5.2	B	J	12.7			7.6		J	10.9		J
Copper	mg/kg	10.2			25.3			19.5			27.8		
Iron	mg/kg	16600			24900			25200		J	32700		J
Lead	mg/kg	9.1			12.7			14.7		J	14.3		J
Magnesium	mg/kg	2030			18100			3220		J	8860		J
Manganese	mg/kg	270		J	587		J	474		J	710		J
Mercury	mg/kg				-	-	-						
Nickel	mg/kg	15.6			30.4			24.9		J	35.7		J
Potassium	mg/kg	591	B	J	2170			739			1800		
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	2930			2660			3500		J	5170		J
Thallium	mg/kg	-	-	-							1.1	B	J
Vanadium	mg/kg	22.3			23.3			29.1		J	31.5		J
Zinc	mg/kg	43.2			65.8			56.2		J	84.4		J
VOLATILES													
Acetone	mg/kg	.34	J D	J									
		1.1	B E	R									
Carbon disulfide	mg/kg	-	-	-	.0029	J	J	-	-	-	-	-	-
Ethylbenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	.00077	J	J	.00078	J	J	.00089	J	J	.0011	J	J

	Location Code:	PRRP-DP11			PRRP-DP11			TNTA-SO012			TNTA-SO012		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0005			BD0006			BD0007			BD0008		
	Sample Date:	26-SEP-01			26-SEP-01			26-SEP-01			26-SEP-01		
User Test Group	*Sample Depth:*	2.6 - 3.1			11.0 - 12			.5 - 1.5			4.0 - 6		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS													
Barium	mg/kg	51.4			54.0			24.2			16.3	B	J
Beryllium	mg/kg												
Cadmium	mg/kg							-	-	-			
Calcium	mg/kg	8830		J	38600		J	2430		J	146000		J
Chromium	mg/kg	13.0		J	13.5		J	6.0		J	5.5		J
Cobalt	mg/kg	5.5	B	J	9.4		J				7.0		J
Copper	mg/kg	9.9			20.7			10.3			19.9		
Iron	mg/kg	14300		J	18700		J	20500		J	26100		J
Lead	mg/kg	9.2		J	10.2		J	43.3		J	10.8		J
Magnesium	mg/kg	3790		J	13800		J	796		J	44400		J
Manganese	mg/kg	309		J	413		J	101		J	1390		J
Mercury	mg/kg							-	-	-			
Nickel	mg/kg	14.1		J	25.2		J	9.4		J	23.8		J
Potassium	mg/kg	759			1540			425	B	J	938		
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	1250		J	1480		J	-	-	-	155	B	J
Thallium	mg/kg	-	-	-	0.80	B	J	-	-	-			
Vanadium	mg/kg	16.7		J	19.8		J	19.3		J	9.9		J
Zinc	mg/kg	48.2		J	64.2		J	65.9		J	111		J
VOLATILES													
Acetone	mg/kg												
Carbon disulfide	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	.00081	J	J	.00098	J	J	.0014	J	J	.0014	J	J

	Location Code:	TNTA-SO080			TNTA-SO080			TNTB-SS295			TNTB-SS295		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0009			BD0012			BD0013			BD0014		
	Sample Date:	26-SEP-01			26-SEP-01			27-SEP-01			27-SEP-01		
User Test Group	*Sample Depth:*	.5 - 1.5			8.0 - 10			.0 - 1			2.5 - 3.5		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS													
Barium	mg/kg	41.7		J	16.6	B	J	105			294		
Beryllium	mg/kg							0.72			1.2		
Cadmium	mg/kg							0.50	B	J	0.41	B	J
Calcium	mg/kg	34000		J	47500		J	8990			4080		
Chromium	mg/kg	8.1		J	21.0		J	47.2			9.6		
Cobalt	mg/kg				17.2		J	9.5			15.2		
Copper	mg/kg				12.8			35.1			38.8		
Iron	mg/kg	9780		J	22900		J	18100			28000		
Lead	mg/kg	60.4		J	8.0		J	105			18.0		
Magnesium	mg/kg	3990		J	8740		J	2070			1100		
Manganese	mg/kg	177		J	512		J	419			914		J
Mercury	mg/kg				-	-	-	0.053			0.087		
Nickel	mg/kg	9.4		J	44.6		J	26.7			51.0		
Potassium	mg/kg	624			2900			1040			940		
Selenium	mg/kg	-	-	-	-	-	-	0.50	B	J	0.68		
Sodium	mg/kg	73.6	B	J	274	B	J	-	-	-	96.7	B	J
Thallium	mg/kg	-	-	-	-	-	-	1.4			2.1		
Vanadium	mg/kg	14.5		J	16.9		J	17.0			22.7		
Zinc	mg/kg	63.4		J	44.4		J	132			69.6		
VOLATILES													
Acetone	mg/kg	4.4	D	J	.0079	J	J				.15	B	J
		6	B E	R									
Carbon disulfide	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	.00086	J	J	.00074	J	J	.00075	J	J	.00079	J	J

Plum Brook Ordnance Works
Soils
Detected Hits

	Location Code:	TNTB-SS375			TNTB-SS375			TNTC-SO066			TNTC-SO066		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0015			BD0016			BD0017R			BD0018R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	*Sample Depth:*	4.0 - 6			4.0 - 6			2.5 - 3.4			8.0 - 10		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS													
Barium	mg/kg	14.6	B	J	7.9	B	J	51.5		J	44.9		J
Beryllium	mg/kg												
Cadmium	mg/kg	-	-	-	-	-	-						
Calcium	mg/kg	1680			1210			7650		J	71300		J
Chromium	mg/kg	13.2			5.2			8.4	J	J	12.3	J	J
Cobalt	mg/kg	2.7	B	J	2.3	B	J	3.2	B	J	13.0		J
Copper	mg/kg	4.9			4.5			8.2			17.6		
Iron	mg/kg	10400			6450			20200		J	16400		J
Lead	mg/kg	19.9			15.1			24.7		J	21.5		J
Magnesium	mg/kg	770			605			2960		J	3620		J
Manganese	mg/kg	129		J	119		J	529		J	516		J
Mercury	mg/kg				-	-	-	0.30			0.059		J
Nickel	mg/kg	7.4			6.0			9.3		J	30.1		J
Potassium	mg/kg	306	B	J	255	B	J	220	B	J	2190		
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	-	-	-	-	-	-	-	-	-	137	B	J
Thallium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	10.9			7.6			21.0		J	10.1		J
Zinc	mg/kg	22.3			16.7			52.9		J	47.3		J
VOLATILES													
Acetone	mg/kg				.0088	J	J	.27			.017	J	J
Carbon disulfide	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	.00078	J	J	.0011	J	J	-	-	-	-	-	-

Plum Brook Ordnance Works

Soils

Detected Hits

Report Date: 03/06/02

		Location Code:	TNTC-SO123			TNTC-SO123		
		Associated Site:	BASEWIDE			BASEWIDE		
		Sample No:	BD0021R			BD0022R		
		Sample Date:	02-OCT-01			02-OCT-01		
User Test Group		Sample Depth:	4.0 - 6			6.0 - 7		
Parameter		Units	Result	Qual	VQ	Result	Qual	VQ
METALS								
	Barium	mg/kg	12.0	B	J	43.7		J
	Beryllium	mg/kg						
	Cadmium	mg/kg						
	Calcium	mg/kg	9510		J	151000		J
	Chromium	mg/kg	8.2	J	J	9.7	J	J
	Cobalt	mg/kg	3.1	B	J	12.0		J
	Copper	mg/kg	10.6			15.4		
	Iron	mg/kg	11600		J	21600		J
	Lead	mg/kg	97.6		J	10.1		J
	Magnesium	mg/kg	644		J	2620		J
	Manganese	mg/kg	122		J	796		J
	Mercury	mg/kg	-	-	-	-	-	-
	Nickel	mg/kg	8.2		J	30.2		J
	Potassium	mg/kg	349	B	J	2150		
	Selenium	mg/kg	-	-	-	-	-	-
	Sodium	mg/kg	-	-	-	251	B	J
	Thallium	mg/kg	-	-	-	-	-	-
	Vanadium	mg/kg	10.1		J	8.6		J
	Zinc	mg/kg	56.2		J	75.6		J
VOLATILES								
	Acetone	mg/kg	.023			.03		
	Carbon disulfide	mg/kg	-	-	-	-	-	-
	Ethylbenzene	mg/kg	-	-	-	-	-	-
	Toluene	mg/kg	-	-	-	.0008	J	J

		Location Code:	WARP-DP09			WARP-DP09		
		Associated Site:	BASEWIDE			BASEWIDE		
		Sample No:	BD0023			BD0024		
		Sample Date:	27-SEP-01			27-SEP-01		
User Test Group		Sample Depth:	4.0 - 4.9			11.0 - 12		
Parameter		Units	Result	Qual	VQ	Result	Qual	VQ
METALS								
	Barium	mg/kg	49.8			65.4		
	Beryllium	mg/kg				0.64	B	J
	Cadmium	mg/kg	0.22	B	J	0.23	B	J
	Calcium	mg/kg	83900			2560		
	Chromium	mg/kg	23.2			16.3		
	Cobalt	mg/kg	3.8	B	J	14.2		
	Copper	mg/kg	10.1			23.8		
	Iron	mg/kg	12000			24300		
	Lead	mg/kg	12.0			10.7		
	Magnesium	mg/kg	6410			4020		
	Manganese	mg/kg	236		J	748		J
	Mercury	mg/kg	0.044			0.027	B	J
	Nickel	mg/kg	10.7			37.7		
	Potassium	mg/kg	407	B	J	1250		
	Selenium	mg/kg	-	-	-	-	-	-
	Sodium	mg/kg	-	-	-	91.3	B	J
	Thallium	mg/kg						
	Vanadium	mg/kg	16.0			22.0		
	Zinc	mg/kg	33.3			63.5		
VOLATILES								
	Acetone	mg/kg	.53	B	J			
	Carbon disulfide	mg/kg	-	-	-	-	-	-
	Ethylbenzene	mg/kg	-	-	-	-	-	-
	Toluene	mg/kg	-	-	-	.00071	J	J

Report Date: 03/06/02

	Location Code:	WARP-DP13			WARP-DP13			WARP-DP16			WARP-DP16		
	Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:	BD0025			BD0028			BD0029R			BD0030R		
	Sample Date:	27-SEP-01			27-SEP-01			02-OCT-01			02-OCT-01		
User Test Group	*Sample Depth:*	4.1 - 5.1			11.0 - 12			3.5 - 4			11 0 - 12		
Parameter	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS													
Barium	mg/kg	32.6			73.5			102		J	94.9		J
Beryllium	mg/kg				0.79								
Cadmium	mg/kg	0.11	B	J	0.27	B	J						
Calcium	mg/kg	974			23100			6430		J	34300		J
Chromium	mg/kg	6.4			18.7			16.7	J	J	19.8	J	J
Cobalt	mg/kg	5.5	B	J	13 8			14.2		J	11.7		J
Copper	mg/kg	4.9			23.5			22.3			18.8		
Iron	mg/kg	8370			30300			26100		J	25600		J
Lead	mg/kg	5.7			10.6			13.0		J	9.6		J
Magnesium	mg/kg	901			9230			5590		J	10400		J
Manganese	mg/kg	184		J	592		J	1500		J	377		J
Mercury	mg/kg	0.017	B	J	-	-	-	0.021	B	J	-	-	-
Nickel	mg/kg	7.4			36.9			37.9		J	30.0		J
Potassium	mg/kg	328	B	J	1790			755			2850		
Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/kg	387	B	J	244	B	J	683			630	B	J
Thallium	mg/kg	-	-	-				0.71	B	J	-	-	-
Vanadium	mg/kg	12.1			26.1			23.3		J	23.9		J
Zinc	mg/kg	23.3			75.7			74.9		J	57.7		J
VOLATILES													
Acetone	mg/kg	.33		J	-	-	-	-	-	-	.18		
Carbon disulfide	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	.0013	J	J	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	.0038	J	J	.00081	J	J	-	-	-	-	-	-

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	-	-	-	-	-	-			
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	0.20	U	U	-	-	-			
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-			
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-			
Trinitrotoluene, 2,4,6-		ug/L	1.6			-	-	-	-	-	-			
GEN CHEMISTRY														
Alkalinity		ug/L	552000	J	J	750000	J	J	370000	J	J			
Chloride		ug/L	68100			451000			4400					
Hardness		ug/L	360000			630000			552000					
Nitrate		ug/L	-	-	-	-	-	-				-	-	-
Sulfate		ug/L	31700			31100			163000					
Total dissolved solids		ug/L	716000			1440000			644000					
Total organic carbon		ug/L	3100			840	B	J	7000					
Total suspended solids		ug/L	113000			-	-	-	21000					
Turbidity		NTU	313	J	J	179	J	J				64.2	J	J
METALS														
Aluminum	Y	ug/L												
Aluminum		ug/L	1170	J	J									
Arsenic	Y	ug/L	3.7	B	J	-	-	-				-	-	-
Arsenic		ug/L	9.1	B	J	-	-	-				-	-	-
Barium	Y	ug/L	724			99.5	B	J				88.0	B	J
Barium		ug/L	843			102	B	J				89.2	B	J
Beryllium	Y	ug/L				-	-	-						
Beryllium		ug/L	-	-	-	-	-	-				-	-	-
Cadmium	Y	ug/L	-	-	-	-	-	-				-	-	-
Cadmium		ug/L	-	-	-	-	-	-				-	-	-
Calcium	Y	ug/L	59300			122000						169000		
Calcium		ug/L	81800			122000	J	J				172000		

		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Elt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	-	-	-	-	-	-			
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	-	-	-	-	-	-			
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-			
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-			
Trinitrotoluene, 2,4,6-		ug/L	-	-	-	-	-	-	-	-	-			
GEN CHEMISTRY														
Alkalinity		ug/L	357000	J	J	630000	J	J	381000	J	J			
Chloride		ug/L	932000			4130000			704000					
Hardness		ug/L	719000			1660000			443000					
Nitrate		ug/L	-	-	-	-	-	-				-	-	-
Sulfate		ug/L	28300			-	-	-	72500					
Total dissolved solids		ug/L	1990000			5860000			1390000					
Total organic carbon		ug/L	-	-	-	3900			4900					
Total suspended solids		ug/L	4000			79000			-	-	-			
Turbidity		NTU	104	J	J	392	J	J				68.4	J	J
METALS														
Aluminum	Y	ug/L												
Aluminum		ug/L				119	B	J						
Arsenic	Y	ug/L	-	-	-	-	-	-				-	-	-
Arsenic		ug/L	-	-	-	2.9	B	J				-	-	-
Barium	Y	ug/L	279			387						1380		
Barium		ug/L	285			381						1410		
Beryllium	Y	ug/L	-	-	-	-	-	-				-	-	-
Beryllium		ug/L	-	-	-	-	-	-				-	-	-
Cadmium	Y	ug/L	-	-	-	-	-	-				-	-	-
Cadmium		ug/L	-	-	-	-	-	-				-	-	-
Calcium	Y	ug/L	125000			298000						107000		
Calcium		ug/L	124000	J	J	299000						111000		

Report Date: 03/04/02

			Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3010			BD3012			BD3017			BD3018		
			Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group	Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES															
	Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	21			-	-	-	-	-	-
	Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	24			-	-	-	-	-	-
	Dinitrotoluene, 2,4-		ug/L	-	-	-	5.6			-	-	-	-	-	-
	Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
	Trinitrotoluene, 2,4,6-		ug/L	-	-	-	23			-	-	-	-	-	-
GEN CHEMISTRY															
	Alkalinity		ug/L	432000	J	J				402000	J	J	482000	J	J
	Chloride		ug/L	77900			4800			4290000			72200		
	Hardness		ug/L	414000			443000			2050000			1200000		
	Nitrate		ug/L	-	-	-	-	-	-	-	-	-			
	Sulfate		ug/L	152000			504000			78400			1440000		
	Total dissolved solids		ug/L	776000			764000			5970000			3570000		
	Total organic carbon		ug/L	3700			2700			6600			617000		
	Total suspended solids		ug/L	-	-	-	5000			23000			11000		
	Turbidity		NTU	178	J	J	2.5	J	J	76.8	J	J			
METALS															
	Aluminum	Y	ug/L				3390								
	Aluminum		ug/L				3310			96.8	B	J			
	Arsenic	Y	ug/L	-	-	-	6.5	B	J	-	-	-	5.5	B	J
	Arsenic		ug/L	-	-	-	6.6	B	J	-	-	-	6.1	B	J
	Barium	Y	ug/L	391		J	23.4	B	J	2090		J	50.8	B	J
	Barium		ug/L	391		J	23.1	B	J	2090		J	49.5	B	J
	Beryllium	Y	ug/L	-	-	-	2.3	B	J	-	-	-	-	-	-
	Beryllium		ug/L	-	-	-	2.0	B	J	-	-	-	-	-	-
	Cadmium	Y	ug/L	-	-	-	0.54	B	J	-	-	-	-	-	-
	Cadmium		ug/L	-	-	-				-	-	-	-	-	-
	Calcium	Y	ug/L	104000		J	119000			416000		J	223000		
	Calcium		ug/L	102000	J	J	115000			418000		J	215000		

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			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
Location Code:			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3018R			BD3019			BD3020			BD3021		
Sample Date:			05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L				-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L				-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L				-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L				-	-	-	-	-	-	0.30		J
Trinitrotoluene, 2,4,6-		ug/L				1.6			-	-	-	-	-	-
GEN CHEMISTRY														
Alkalinity		ug/L				382000	J	J	1060000	J	J	741000	J	J
Chloride		ug/L				1910000			370000			2420000		
Hardness		ug/L				855000			1650000			1680000		
Nitrate		ug/L	22000			-	-	-	-	-	-	-	-	-
Sulfate		ug/L				89200			212000			53600		
Total dissolved solids		ug/L				2570000			1950000			2680000		
Total organic carbon		ug/L				8400			6800			5700		
Total suspended solids		ug/L				-	-	-	12000			53000		
Turbidity		NTU	4.2	J	J	203			3.6			57.4	J	J
METALS														
Aluminum	Y	ug/L												
Aluminum		ug/L										106	B	J
Arsenic	Y	ug/L				-	-	-	-	-	-	2.7	B	J
Arsenic		ug/L				-	-	-	-	-	-	5.4	B	J
Barium	Y	ug/L				484			143	B	J	911		
Barium		ug/L				481			147	B	J	912		
Beryllium	Y	ug/L				-	-	-	-	-	-	-	-	-
Beryllium		ug/L				-	-	-	-	-	-	-	-	-
Cadmium	Y	ug/L				-	-	-	-	-	-	-	-	-
Cadmium		ug/L				-	-	-	-	-	-	-	-	-
Calcium	Y	ug/L				199000			644000		J	252000		
Calcium		ug/L				199000			645000		J	260000		

		Location Code:	PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3024			BD3025			BD3026			BD3027		
		Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-		ug/L	-	-	-	-	-	-	-	-	-	0.27		
GEN CHEMISTRY														
Alkalinity		ug/L	170000	J	J	707000	J	J	255000	J	J	410000	J	J
Chloride		ug/L	9450000			248000	J	J	22400000			43400		
Hardness		ug/L	3980000			905000			9360000			412000		
Nitrate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate		ug/L	56500			27700		J	-	-	-	27100		
Total dissolved solids		ug/L	13400000			1110000			27400000		J	489000		
Total organic carbon		ug/L	2500	B	J	8600			500	B	J	1700		
Total suspended solids		ug/L	33000			199000			125000			9000		
Turbidity		NTU	99.2	J	J	662	J	J	48.4	J	J	129	J	J
METALS														
Aluminum	Y	ug/L												
Aluminum		ug/L							207	J	J	353	J	J
Arsenic	Y	ug/L	-	-	-	-	-	-	2.8	B	J	-	-	-
Arsenic		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Barium	Y	ug/L	938			1080			24400			634		
Barium		ug/L	916			1060			23900			649		
Beryllium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	Y	ug/L	720000			202000			2110000			117000		
Calcium		ug/L	724000			221000			2060000	J	J	122000		

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		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3028			BD3029			BD3030			BD3032		
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group														
Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	1.5		
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-	1.1		
Trinitrotoluene, 2,4,6-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
GEN CHEMISTRY														
Alkalinity		ug/L	227000	J	J	697000	J	J	278000	J	J	473000	J	J
Chloride		ug/L	2480000			149000			404000			260000		
Hardness		ug/L	5410000		J	566000			627000			1910000		
Nitrate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate		ug/L	85800			21400			121000			1280000		
Total dissolved solids		ug/L	3080000			948000			1000000			2560000		
Total organic carbon		ug/L	6200			3000						3700		
Total suspended solids		ug/L	292000			-	-	-	4000			200000		
Turbidity		NTU	324			266			21.7	J	J	188		
METALS														
Aluminum	Y	ug/L												
Aluminum		ug/L	350			37.8	B	J				152	B	J
Arsenic	Y	ug/L	2.9	B	J	-	-	-	-	-	-	-	-	-
Arsenic		ug/L				-	-	-	-	-	-			
Barium	Y	ug/L	54.4	B	J	942			224			126	B	J
Barium		ug/L	64.2	B	J	932			226			133	B	J
Beryllium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	Y	ug/L	279000			159000			128000			427000		
Calcium		ug/L	369000			158000			134000			462000		

		Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES														
Amino-2,6-dinitrotoluene, 4-		ug/L	1.5			-	-	-	-	-	-	1.3		
Amino-4,6-dinitrotoluene, 2-		ug/L	2.1			-	-	-	-	-	-	0.33		
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-		ug/L	0.29			-	-	-	0.61			-	-	-
GEN CHEMISTRY														
Alkalinity		ug/L				350000	J	J	296000	J	J			
Chloride		ug/L				19800			46900					
Hardness		ug/L				1120000			517000					
Nitrate		ug/L				-	-	-	-	-	-			
Sulfate		ug/L				839000		J	423000					
Total dissolved solids		ug/L				1650000			1020000					
Total organic carbon		ug/L	4300			5700			2100			12300		
Total suspended solids		ug/L				48000			355000					
Turbidity		NTU				73.5	J	J	520	J	J			
METALS														
Aluminum	Y	ug/L							433			239		J
Aluminum		ug/L	8950		J	1800	J	J	6160		J	-	-	-
Arsenic	Y	ug/L				-	-	-	-	-	-	-	-	-
Arsenic		ug/L	7.2	B	J	-	-	-	8.8	B	J	10.8		J
Barium	Y	ug/L				24.0	B	J	64.1	B	J	382		J
Barium		ug/L	88.4	B	J	29.5	B	J	203		J	1000		J
Beryllium	Y	ug/L				-	-	-	-	-	-	-	-	-
Beryllium		ug/L	-	-	-	-	-	-	-	-	-			
Cadmium	Y	ug/L				-	-	-	-	-	-	-	-	-
Cadmium		ug/L				-	-	-	-	-	-	-	-	-
Calcium	Y	ug/L				252000			129000			425000		J
Calcium		ug/L	209000		J	262000			137000		J	12000000		J

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		Location Code:	TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3038			BD3041			BD3042		
		Sample Date:	08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group / *Parameter*	*Elt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
EXPLOSIVES											
Amino-2,6-dinitrotoluene, 4-		ug/L	-	-	-	-	-	-	-	-	-
Amino-4,6-dinitrotoluene, 2-		ug/L	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,6-		ug/L	-	-	-	-	-	-	-	-	-
Trinitrotoluene, 2,4,6-		ug/L	-	-	-	-	-	-	-	-	-
GEN CHEMISTRY											
Alkalinity		ug/L	86300	J	J	126000	J	J	440000	J	J
Chloride		ug/L	1460000			7400			274000		
Hardness		ug/L	453000			229000			1720000		
Nitrate		ug/L	48	B	J	-	-	-	-	-	-
Sulfate		ug/L	86200			129000			1340000		J
Total dissolved solids		ug/L	2180000			347000			2350000		
Total organic carbon		ug/L	12100	B	J						
Total suspended solids		ug/L	1430000			65000			18000		
Turbidity		NTU	370	J	J	91.2	J	J	172	J	J
METALS											
Aluminum	Y	ug/L									
Aluminum		ug/L	16900	J	J	1010	J	J			
Arsenic	Y	ug/L	4.9	B	J	-	-	-	6.0	B	J
Arsenic		ug/L	22.7			-	-	-	4.1	B	J
Barium	Y	ug/L	628			40.8	B	J	30.8	B	J
Barium		ug/L	1500			51.3	B	J	29.4	B	J
Beryllium	Y	ug/L	-	-	-	-	-	-	-	-	-
Beryllium		ug/L				-	-	-	-	-	-
Cadmium	Y	ug/L	-	-	-	-	-	-	-	-	-
Cadmium		ug/L	-	-	-	-	-	-	-	-	-
Calcium	Y	ug/L	107000			72000			427000		
Calcium		ug/L	217000			81600			439000		

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		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L	-	-	-	-	-	-				-	-	-
Chromium		ug/L	2.4	B	J							-	-	-
Cobalt	Y	ug/L	-	-	-	-	-	-				-	-	-
Cobalt		ug/L	5.9	B	J	-	-	-				-	-	-
Copper	Y	ug/L	-	-	-	-	-	-				-	-	-
Copper		ug/L				-	-	-				-	-	-
Iron	Y	ug/L	1300			-	-	-				7400		
Iron		ug/L	7210			126						7900		
Lead	Y	ug/L	-	-	-	-	-	-				-	-	-
Lead		ug/L	-	-	-	-	-	-				-	-	-
Magnesium	Y	ug/L	54600			80900						33000		
Magnesium		ug/L	60000			80700						33200		
Manganese	Y	ug/L	946			23.9						818		
Manganese		ug/L	1030			28.7						846		
Mercury	Y	ug/L	-	-	-	-	-	-				-	-	-
Mercury		ug/L	-	-	-	-	-	-				-	-	-
Nickel	Y	ug/L	-	-	-	-	-	-				-	-	-
Nickel		ug/L	3.7	B	J	-	-	-				-	-	-
Potassium	Y	ug/L	27500		J	43100						1640	B	J
Potassium		ug/L	30100		J	43900						1670	B	J
Selenium	Y	ug/L	-	-	-	-	-	-				-	-	-
Selenium		ug/L	-	-	-	-	-	-				-	-	-
Sodium	Y	ug/L	127000			293000						4670	B	J
Sodium		ug/L	132000			293000						4610	B	J
Thallium	Y	ug/L	-	-	-							-	-	-
Thallium		ug/L				-	-	-				-	-	-
Vanadium	Y	ug/L	-	-	-	-	-	-				-	-	-
Vanadium		ug/L	-	-	-	-	-	-				-	-	-
Zinc	Y	ug/L	7.1	B	J	-	-	-				14.3	B	J
Zinc		ug/L	10.2	B	J	-	-	-				14.9	B	J

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		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L	-	-	-	-	-	-				-	-	-
Chromium		ug/L				2.9	B	J				-	-	-
Cobalt	Y	ug/L	-	-	-	-	-	-				-	-	-
Cobalt		ug/L	-	-	-	-	-	-				-	-	-
Copper	Y	ug/L	-	-	-	-	-	-				-	-	-
Copper		ug/L	-	-	-	24.3	B	J						
Iron	Y	ug/L	169			-	-	-				-	-	-
Iron		ug/L	204			978						132		
Lead	Y	ug/L	-	-	-	-	-	-				-	-	-
Lead		ug/L	-	-	-	-	-	-				-	-	-
Magnesium	Y	ug/L	77600			227000						68200		
Magnesium		ug/L	77300			224000						70100		
Manganese	Y	ug/L	73.5			621						36.0		
Manganese		ug/L	71.6			641						35.3		
Mercury	Y	ug/L	-	-	-	-	-	-				-	-	-
Mercury		ug/L	-	-	-	-	-	-				-	-	-
Nickel	Y	ug/L	-	-	-	-	-	-				2.1	B	J
Nickel		ug/L	-	-	-	-	-	-				-	-	-
Potassium	Y	ug/L	40700			97200						46900		
Potassium		ug/L	41100			98800		J				48500		
Selenium	Y	ug/L	-	-	-	-	-	-				-	-	-
Selenium		ug/L	-	-	-	-	-	-				-	-	-
Sodium	Y	ug/L	459000			1350000						520000		
Sodium		ug/L	459000			1330000						535000		
Thallium	Y	ug/L	-	-	-							-	-	-
Thallium		ug/L	-	-	-							-	-	-
Vanadium	Y	ug/L	-	-	-	-	-	-				-	-	-
Vanadium		ug/L	-	-	-							-	-	-
Zinc	Y	ug/L	-	-	-	-	-	-				-	-	-
Zinc		ug/L	-	-	-	16.2	B	J				9.1	B	J

		Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3010			BD3012			BD3017			BD3018		
		Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L	-	-	-	-	-	-	-	-	-	1.9	B	J
Chromium		ug/L	-	-	-	-	-	-	-	-	-	1.6	B	J
Cobalt	Y	ug/L	-	-	-	105			-	-	-	105		
Cobalt		ug/L	-	-	-	101			-	-	-	102		
Copper	Y	ug/L	-	-	-				-	-	-	27.0		
Copper		ug/L				6.7	B	J	6.1	B	J	30.7		
Iron	Y	ug/L	-	-	-	14800			-	-	-	145		
Iron		ug/L	-	-	-	14300			106		J	164		
Lead	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	Y	ug/L	40900		J	33300			202000		J	153000		
Magnesium		ug/L	40300		J	32100			201000		J	146000		
Manganese	Y	ug/L	31.6		J	1830			28.1		J	68.0		
Manganese		ug/L	31.4		J	1770			29.1		J	65.2		
Mercury	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Mercury		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	Y	ug/L	-	-	-	248			-	-	-	117		
Nickel		ug/L	-	-	-	240			-	-	-	111		
Potassium	Y	ug/L	7540		J	4130	B	J	96700		J	43800		J
Potassium		ug/L	7540		J	4060	B	J	96900		J	42100		
Selenium	Y	ug/L	-	-	-	-	-	-	-	-	-			
Selenium		ug/L	-	-	-	-	-	-	-	-	-	5.5		
Sodium	Y	ug/L	109000		J	6090			1230000		J	662000		
Sodium		ug/L	109000		J	6070			1190000		J	629000		
Thallium	Y	ug/L	-	-	-	-	-	-	-	-	-			
Thallium		ug/L	-	-	-	-	-	-						
Vanadium	Y	ug/L	-	-	-	-	-	-	-	-	-	2.4	B	J
Vanadium		ug/L	-	-	-	-	-	-	-	-	-			
Zinc	Y	ug/L	-	-	-	231			5.0	B	J	12.6	B	J
Zinc		ug/L				214			5.6	B	J	10.8	B	J

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

		Location Code:	PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3018R			BD3019			BD3020			BD3021		
		Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L				-	-	-	-	-	-	-	-	-
Chromium		ug/L				-	-	-	-	-	-	-	-	-
Cobalt	Y	ug/L				-	-	-	-	-	-	-	-	-
Cobalt		ug/L				-	-	-	2.4	B	J	-	-	-
Copper	Y	ug/L				-	-	-	-	-	-	-	-	-
Copper		ug/L				-	-	-	-	-	-	-	-	-
Iron	Y	ug/L				-	-	-	-	-	-	-	-	-
Iron		ug/L				-	-	-	73.2	B	J	160		
Lead	Y	ug/L				-	-	-	-	-	-	-	-	-
Lead		ug/L				-	-	-	-	-	-	-	-	-
Magnesium	Y	ug/L				171000						235000		
Magnesium		ug/L				169000			303	B	J	230000		
Manganese	Y	ug/L				5.2	B	J	-	-	-	9.8	B	J
Manganese		ug/L				5.6	B	J	2.9	B	J	21.6		
Mercury	Y	ug/L				-	-	-	-	-	-	-	-	-
Mercury		ug/L				-	-	-	-	-	-	-	-	-
Nickel	Y	ug/L				2.4	B	J	10.2	B	J	-	-	-
Nickel		ug/L				3.8	B	J	10.8	B	J	-	-	-
Potassium	Y	ug/L				62200			17800		J	62600		
Potassium		ug/L				62100			18600		J	62700		J
Selenium	Y	ug/L				-	-	-	-	-	-	-	-	-
Selenium		ug/L				-	-	-	-	-	-	-	-	-
Sodium	Y	ug/L				572000			85600		J	549000		
Sodium		ug/L				566000			88200		J	545000		
Thallium	Y	ug/L				-	-	-				-	-	-
Thallium		ug/L				-	-	-	-	-	-	-	-	-
Vanadium	Y	ug/L				-	-	-	-	-	-	-	-	-
Vanadium		ug/L				-	-	-	-	-	-	-	-	-
Zinc	Y	ug/L				-	-	-	4.2	B	J	-	-	-
Zinc		ug/L				-	-	-	-	-	-	-	-	-

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

		Location Code:	PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3024			BD3025			BD3026			BD3027		
		Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chromium		ug/L	-	-	-	1.2	B	J				-	-	-
Cobalt	Y	ug/L	-	-	-	-	-	-	6.4	B	J	-	-	-
Cobalt		ug/L	-	-	-	-	-	-	7.1	B	J	-	-	-
Copper	Y	ug/L	-	-	-	-	-	-				-	-	-
Copper		ug/L	-	-	-	99.0						-	-	-
Iron	Y	ug/L	-	-	-	-	-	-	5350			-	-	-
Iron		ug/L	40.0	B	J	149			5920		J	284		
Lead	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	Y	ug/L	534000			81000			965000			34700		
Magnesium		ug/L	534000			66200			943000		J	35900		
Manganese	Y	ug/L	37.7			4.0	B	J	188			34.3		
Manganese		ug/L	41.8			2.2	B	J	189		J	38.1		
Mercury	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Mercury		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	Y	ug/L	-	-	-	7.9	B	J	2.9	B	J	-	-	-
Nickel		ug/L	-	-	-	13.8	B	J	3.5	B	J	-	-	-
Potassium	Y	ug/L	149000			42100			87400	B	J	4080	B	J
Potassium		ug/L	150000			43800			85800	B	J	4340	B	J
Selenium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	Y	ug/L	2560000			94900			8100000			18700		
Sodium		ug/L	2580000			75400			7980000		J	19300		
Thallium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	Y	ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	Y	ug/L	-	-	-	5.2	B	J	3.3	B	J	-	-	-
Zinc		ug/L	-	-	-	144			5.3	B J		-	-	-

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			Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3028			BD3029			BD3030			BD3032		
			Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS															
Chromium	Y	ug/L		1.5	B	J	-	-	-	-	-	-	-	-	-
Chromium		ug/L		15.0			-	-	-	-	-	-	7.1	B	J
Cobalt	Y	ug/L		2.6	B	J	-	-	-	-	-	-	-	-	-
Cobalt		ug/L		5.9	B	J	-	-	-	-	-	-	3.1	B	J
Copper	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Copper		ug/L		4.8	B	J	-	-	-	-	-	-	13.3	B	J
Iron	Y	ug/L		3060			-	-	-	713			144		
Iron		ug/L		7280			48.3	B	J	795			43100		
Lead	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Lead		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	Y	ug/L		203000			78500			76800			162000		
Magnesium		ug/L		210000			78500			79500			166000		
Manganese	Y	ug/L		988			22.1			87.0			141		
Manganese		ug/L		1170			24.8			89.0			680		
Mercury	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Mercury		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Nickel	Y	ug/L		5.0	B	J	-	-	-	-	-	-	2.0	B	J
Nickel		ug/L		13.6	B	J	-	-	-	-	-	-	12.4	B	J
Potassium	Y	ug/L		75500		J	30700		J	17000			42200		J
Potassium		ug/L		77700			32100			17600			41500		
Selenium	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Selenium		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Sodium	Y	ug/L		596000			90500			109000			95500		
Sodium		ug/L		590000			90800			112000			96000		
Thallium	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Thallium		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	Y	ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Vanadium		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Zinc	Y	ug/L		-	-	-	-	-	-	3.0	B	J	-	-	-
Zinc		ug/L		18.0	B	J	-	-	-	7.7	B	J	21.6		

Plum Brook Ordnance Works
Monitoring Wells Groundwater
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		Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
METALS														
Chromium	Y	ug/L				-	-	-	-	-	-	-	-	-
Chromium		ug/L	18.2		J	3.4	B	J	13.9		J	-	-	-
Cobalt	Y	ug/L				7.5	B	J	6.7	B	J	-	-	-
Cobalt		ug/L	10	B	J	7.2	B	J	16.7	B	J	6.4	B	J
Copper	Y	ug/L				-	-	-	-	-	-	-	-	-
Copper		ug/L	15.9	B	J				19.5	B	J	3.2	B	J
Iron	Y	ug/L				-	-	-	515			856		J
Iron		ug/L	16400		J	3050			13300		J	127		J
Lead	Y	ug/L				-	-	-	-	-	-	-	-	-
Lead		ug/L	9.4		J	-	-	-	10.5		J	-	-	-
Magnesium	Y	ug/L				138000			47400			26400		J
Magnesium		ug/L	63200		J	121000			48300		J	711000		J
Manganese	Y	ug/L				686			1180			54.6		J
Manganese		ug/L	383		J	613			1520		J	11700		J
Mercury	Y	ug/L				-	-	-	-	-	-	-	-	-
Mercury		ug/L	-	-	-	-	-	-	-	-	-	.067	B	J
Nickel	Y	ug/L				15.6	B	J	6.7	B	J	-	-	-
Nickel		ug/L	22.4	B	J	10.4	B	J	17.2	B	J	75.7		J
Potassium	Y	ug/L				21100			12700			128000		J
Potassium		ug/L	16500		J	15600			14200		J	94200		J
Selenium	Y	ug/L				-	-	-	-	-	-	-	-	-
Selenium		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	Y	ug/L				78800			143000			705000		J
Sodium		ug/L	66700		J	57400			139000		J	442000		J
Thallium	Y	ug/L				-	-	-				-	-	-
Thallium		ug/L	-	-	-							-	-	-
Vanadium	Y	ug/L				-	-	-	-	-	-	12.5	B	J
Vanadium		ug/L	17.8	B	J	3.1	B	J	14.4	B	J	-	-	-
Zinc	Y	ug/L				64.7			3.2	B	J	17.1	B	J
Zinc		ug/L	39.2		J	25.2			31.0		J	297		J

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

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	Location Code:		TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
	Associated Site:		BASEWIDE			BASEWIDE			BASEWIDE		
	Sample No:		BD3038			BD3041			BD3042		
	Sample Date:		08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
METALS											
Chromium	Y	ug/L	1.2	B	J	-	-	-	-	-	-
Chromium		ug/L	32.3			1.3	B	J	-	-	-
Cobalt	Y	ug/L	-	-	-	-	-	-	-	-	-
Cobalt		ug/L	18.7	B	J	-	-	-	-	-	-
Copper	Y	ug/L				-	-	-	-	-	-
Copper		ug/L	99.2			10.9	B	J	-	-	-
Iron	Y	ug/L	-	-	-	5670			-	-	-
Iron		ug/L	35000			8090			66.6	B	J
Lead	Y	ug/L	-	-	-	-	-	-	-	-	-
Lead		ug/L	15.7			-	-	-	-	-	-
Magnesium	Y	ug/L	133	B	J	20900			147000		
Magnesium		ug/L	72500			24500			150000		
Manganese	Y	ug/L	1.6	B	J	812			290		
Manganese		ug/L	1140			928			271		
Mercury	Y	ug/L	-	-	-	-	-	-	-	-	-
Mercury		ug/L	.079	B	J	-	-	-	-	-	-
Nickel	Y	ug/L	-	-	-	2.0	B	J	2.3	B	J
Nickel		ug/L	71.2			5.4	B	J	2.3	B	J
Potassium	Y	ug/L	191000		J	2480	B	J	22500		
Potassium		ug/L	121000		J	2920	B	J	22400		
Selenium	Y	ug/L	20.4			-	-	-	-	-	-
Selenium		ug/L	14.4			-	-	-	-	-	-
Sodium	Y	ug/L	428000			7480			55300		
Sodium		ug/L	605000			7520			56500		
Thallium	Y	ug/L	-	-	-	-	-	-	-	-	-
Thallium		ug/L	-	-	-	-	-	-	-	-	-
Vanadium	Y	ug/L	8.5	B	J	-	-	-	-	-	-
Vanadium		ug/L	48.6	B	J	2.3	B	J	-	-	-
Zinc	Y	ug/L	-	-	-	19.9	B	J	-	-	-
Zinc		ug/L	184			37.5			-	-	-

		Location Code:	IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3004			BD3005			BD3006			BD3006R		
		Sample Date:	08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	1.2	J	J			
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	1.7	J	J			
Bis(2-ethylhexyl)phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Butyl benzyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Chrysene		ug/L	-	-	-	-	-	-	0.54	J	J			
Di-n-butyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	1.2	J	J			
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-			
Diethyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Dimethylphenol, 2,4-		ug/L	2.5	J	J	-	-	-	-	-	-			
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-			
Fluorene		ug/L	-	-	-	-	-	-	-	-	-			
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	1.7	J	J			
Methylnaphthalene, 2-		ug/L	9.8	J	J	-	-	-	-	-	-			
Methylphenol, 2-		ug/L	-	-	-	-	-	-	-	-	-			
Methylphenol, 4-		ug/L	-	-	-	-	-	-	-	-	-			
Naphthalene		ug/L	12			-	-	-	-	-	-			
Phenanthrene		ug/L	-	-	-	-	-	-	-	-	-			
Phenol		ug/L	2.2	J	J	-	-	-	-	-	-			
n-Nitrosodiphenylamine		ug/L	-	-	-	-	-	-	-	-	-			
VOLATILES														
Acetone		ug/L												
Benzene		ug/L	45	J	J	11						-	-	-
Bromomethane		ug/L	-	-	-	-	-	-				-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-				-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-				-	-	-
Chloroform		ug/L	-	-	-	-	-	-				-	-	-
Chloromethane		ug/L	30	J	J	-	-	-				-	-	-
Ethylbenzene		ug/L	64	J	J	4.0	J	J				-	-	-

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			IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	-	-	-			
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	-	-	-			
Bis(2-ethylhexyl)phthalate		ug/L	-	-	-	5.0	J	J	-	-	-			
Butyl benzyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Chrysene		ug/L	-	-	-	0.80	J	J	-	-	-			
Di-n-butyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	-	-	-			
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-			
Diethyl phthalate		ug/L	-	-	-	-	-	-	-	-	-			
Dimethylphenol, 2,4-		ug/L	-	-	-	-	-	-	-	-	-			
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-			
Fluorene		ug/L	-	-	-	1.6	J	J	-	-	-			
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	-	-	-			
Methylnaphthalene, 2-		ug/L	-	-	-	21			-	-	-			
Methylphenol, 2-		ug/L	-	-	-	-	-	-	-	-	-			
Methylphenol, 4-		ug/L	-	-	-	-	-	-	-	-	-			
Naphthalene		ug/L	-	-	-	11			-	-	-			
Phenanthrene		ug/L	-	-	-	2.8	J	J	-	-	-			
Phenol		ug/L	-	-	-	-	-	-	-	-	-			
n-Nitrosodiphenylamine		ug/L	-	-	-	-	-	-	-	-	-			
VOLATILES														
Acetone		ug/L	-	-	-	-	-	-						
Benzene		ug/L	-	-	-	110	J	J				-	-	-
Bromomethane		ug/L	-	-	-	-	-	-				-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-				-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-				-	-	-
Chloroform		ug/L	-	-	-	-	-	-				-	-	-
Chloromethane		ug/L	-	-	-	-	-	-				-	-	-
Ethylbenzene		ug/L	-	-	-	61	J	J				-	-	-

Report Date: 03/04/02

			Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3010			BD3012			BD3017			BD3018		
			Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES															
Benzo(a)pyrene		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L		-	-	-	0.97	J	J	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L		-	-	-	-	-	-	7.7	J	J	-	-	-
Butyl benzyl phthalate		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Chrysene		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L		-	-	-	-	-	-	22			-	-	-
Dinitrotoluene, 2,4-		ug/L		-	-	-	2.0	J	J	-	-	-	-	-	-
Fluorene		ug/L		-	-	-	-	-	-	1.0	J	J	-	-	-
Indeno(1,2,3-cd)pyrene		ug/L		-	-	-	1.0	J	J	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L		-	-	-	-	-	-	25			-	-	-
Methylphenol, 2-		ug/L		-	-	-	-	-	-	6.6	J	J	-	-	-
Methylphenol, 4-		ug/L		-	-	-	-	-	-	6.9	J	J	-	-	-
Naphthalene		ug/L		-	-	-	-	-	-	27			-	-	-
Phenanthrene		ug/L		-	-	-	-	-	-	1.3	J	J	-	-	-
Phenol		ug/L		-	-	-	-	-	-	12			-	-	-
n-Nitrosodiphenylamine		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES															
Acetone		ug/L								-	-	-			
Benzene		ug/L		-	-	-	-	-	-	270		J			
Bromomethane		ug/L		-	-	-	-	-	-	-	-	-			
Butanone, 2-		ug/L		-	-	-	-	-	-	-	-	-			
Carbon disulfide		ug/L		-	-	-	-	-	-	-	-	-			
Chloroform		ug/L		-	-	-	-	-	-	-	-	-			
Chloromethane		ug/L		-	-	-	-	-	-	-	-	-			
Ethylbenzene		ug/L		-	-	-	-	-	-	120		J			

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

			Location Code:			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3018R			BD3019			BD3020			BD3021		
		Sample Date:	05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group Parameter	Flt.	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES														
Benzo(a)pyrene		ug/L				-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L				-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L				2.2	J	J	2.4	J	J	4.0	J	J
Butyl benzyl phthalate		ug/L				-	-	-	-	-	-	-	-	-
Chrysene		ug/L				-	-	-	0.87	J	J	-	-	-
Di-n-butyl phthalate		ug/L				-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L				-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L				-	-	-	1.2	J	J	-	-	-
Diethyl phthalate		ug/L				-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L				5.6	J	J	3.0	J	J	3.8	J	J
Dinitrotoluene, 2,4-		ug/L				-	-	-	-	-	-	-	-	-
Fluorene		ug/L				-	-	-	2.8	J	J	-	-	-
Indeno(1,2,3-cd)pyrene		ug/L				-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L				25			64			9.2	J	J
Methylphenol, 2-		ug/L				3.3	J	J	1.6	J	J	1.1	J	J
Methylphenol, 4-		ug/L				4.2	J	J	1.7	J	J	2.0	J	J
Naphthalene		ug/L				24			52			9.8	J	J
Phenanthrene		ug/L				0.98	J	J	5.1	J	J	0.99	J	J
Phenol		ug/L				12			4.6	J	J	2.6	J	J
n-Nitrosodiphenylamine		ug/L				-	-	-	-	-	-	-	-	-
VOLATILES														
Acetone		ug/L				170	J	J	930	B	J			
Benzene		ug/L	-	-	-	670			800		J	-	-	-
Bromomethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene		ug/L	-	-	-	150	J	J	200		J	120		

			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Location Code:			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3024			BD3025			BD3026			BD3027		
Sample Date:			02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L	-	-	-	-	-	-	2.9	J	J	-	-	-
Butyl benzyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L	7.2	J	J	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L	1.6	J	J	12			-	-	-	1.7	J	J
Methylphenol, 2-		ug/L	2.6	J	J	-	-	-	-	-	-	-	-	-
Methylphenol, 4-		ug/L	1.2	J	J	-	-	-	-	-	-	-	-	-
Naphthalene		ug/L	3.1	J	J	8.6	J	J	-	-	-	-	-	-
Phenanthrene		ug/L	-	-	-	0.82	J	J	-	-	-	-	-	-
Phenol		ug/L	3.5	J	J	1.2	J	J	-	-	-	-	-	-
n-Nitrosodiphenylamine		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES														
Acetone		ug/L	88	J	J				1.2	J	J			
Benzene		ug/L	-	-	-	46			0.25	J	J	0.60	J	J
Bromomethane		ug/L	-	-	-	7.9	J	J	-	-	-	-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane		ug/L	35	J	J	-	-	-	-	-	-	-	-	-
Ethylbenzene		ug/L	32	J	J	17	J	J	-	-	-	1.0	J	J

Report Date: 03/04/02

		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3028			BD3029			BD3030			BD3032	
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01	
User Test Group													
Parameter	Flt	Units	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
SEMIVOLATILES														
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L	7.1	J	J	-	-	-	0.86	J	J	2.9	J	J
Butyl benzyl phthalate		ug/L	1.5	J	J	-	-	-	-	-	-	-	-	-
Chrysene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate		ug/L	1.1	J	J	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate		ug/L	1.2	J	J	-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L	42			1.1	J	J	-	-	-	3.1	J	J
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L	22			3.6	J	J	-	-	-	24		
Methylphenol, 2-		ug/L	25			-	-	-	-	-	-	-	-	-
Methylphenol, 4-		ug/L	21			-	-	-	-	-	-	-	-	-
Naphthalene		ug/L	21			2.9	J	J	-	-	-	17		
Phenanthrene		ug/L	1.3	J	J	-	-	-	-	-	-	1.4	J	J
Phenol		ug/L	80			1.4	J	J	-	-	-	1.3	J	J
n-Nitrosodiphenylamine		ug/L	0.64	J	J	-	-	-	-	-	-	-	-	-
VOLATILES														
Acetone		ug/L	1600	J	J	120	J B	J				210	J B	J
Benzene		ug/L	2100			60			0.37	J	J	130	J	J
Bromomethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-	0.48	J	J	-	-	-
Chloroform		ug/L	-	-	-	-	-	-	1.1			-	-	-
Chloromethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene		ug/L	190	J	J	19	J	J	0.22	J	J	100	J	J

Report Date: 03/04/02

		Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3034			BD3043			BD3035			BD3037		
		Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Elt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES														
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L	-	-	-	-	-	-	-	-	-	8.6	J	J
Butyl benzyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene		ug/L	-	-	-	-	-	-	-	-	-	15	J	J
Di-n-butyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-	12	J	J
Diethyl phthalate		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	13	J	J
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene		ug/L	-	-	-	-	-	-	-	-	-	28	J	J
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L	-	-	-	-	-	-	-	-	-	470		
Methylphenol, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylphenol, 4-		ug/L	-	-	-	-	-	-	-	-	-	9.8	J	J
Naphthalene		ug/L	-	-	-	-	-	-	-	-	-	170		
Phenanthrene		ug/L	-	-	-	-	-	-	-	-	-	74	J	J
Phenol		ug/L	-	-	-	-	-	-	-	-	-	13	J	J
n-Nitrosodiphenylamine		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
VOLATILES														
Acetone		ug/L										-	-	-
Benzene		ug/L	-	-	-	-	-	-	-	-	-	700		J
Bromomethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Butanone, 2-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene		ug/L	-	-	-	-	-	-	-	-	-	240		J

Report Date: 03/04/02

		Location Code:	TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3038			BD3041			BD3042		
		Sample Date:	08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group											
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
SEMIVOLATILES											
Benzo(a)pyrene		ug/L	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene		ug/L	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate		ug/L	2.0	J	J	-	-	-	-	-	-
Butyl benzyl phthalate		ug/L	-	-	-	-	-	-	-	-	-
Chrysene		ug/L	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate		ug/L	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene		ug/L	-	-	-	-	-	-	-	-	-
Dibenzofuran		ug/L	-	-	-	-	-	-	-	-	-
Diethyl phthalate		ug/L	-	-	-	-	-	-	-	-	-
Dimethylphenol, 2,4-		ug/L	-	-	-	-	-	-	-	-	-
Dinitrotoluene, 2,4-		ug/L	-	-	-	-	-	-	-	-	-
Fluorene		ug/L	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene		ug/L	-	-	-	-	-	-	-	-	-
Methylnaphthalene, 2-		ug/L	-	-	-	-	-	-	4.5	J	J
Methylphenol, 2-		ug/L	-	-	-	-	-	-	-	-	-
Methylphenol, 4-		ug/L	-	-	-	-	-	-	-	-	-
Naphthalene		ug/L	-	-	-	-	-	-	5.2	J	J
Phenanthrene		ug/L	-	-	-	-	-	-	-	-	-
Phenol		ug/L	2.2	J	J	-	-	-	-	-	-
n-Nitrosodiphenylamine		ug/L	-	-	-	-	-	-	-	-	-
VOLATILES											
Acetone		ug/L	110		J	36		J			
Benzene		ug/L	17			1.4	J	J	-	-	-
Bromomethane		ug/L	-	-	-	-	-	-	-	-	-
Butanone, 2-		ug/L	75		J	-	-	-	-	-	-
Carbon disulfide		ug/L	8.0			-	-	-	-	-	-
Chloroform		ug/L	-	-	-	-	-	-	-	-	-
Chloromethane		ug/L	-	-	-	-	-	-	-	-	-
Ethylbenzene		ug/L	-	-	-	-	-	-	22	J	J

			IT-AA2-BEDGW-001			IT-AA3-BEDGW-001			IT-ABG-BEDGW-01			IT-ABG-BEDGW-01		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3004			BD3005			BD3006			BD3006R		
Sample Date:			08-OCT-01			27-SEP-01			28-SEP-01			05-OCT-01		
User Test Group / *Parameter*	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-				-	-	-
Methylene chloride		ug/L	100	J B	J							-	-	-
Toluene		ug/L	-	-	-	11						-	-	-
Xylenes, total		ug/L	360			28						-	-	-

Report Date: 03/04/02

		Location Code:	IT-BG8-BEDGW-001			IT-MNTA-BEDGW-001			IT-TNTB-BEDGW-001			IT-TNTB-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3007			BD3008			BD3009			BD3009R		
		Sample Date:	27-SEP-01			03-OCT-01			28-SEP-01			05-OCT-01		
User Test Group														
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-				-	-	-
Methylene chloride		ug/L	-	-	-	200	J B	J						
Toluene		ug/L	-	-	-	140	J	J				-	-	-
Xylenes, total		ug/L	-	-	-	490						-	-	-

		Location Code:	IT-TNTB-BEDGW-002			MK-MW17			PB-BED-MW13			PB-BED-MW14	
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE	
		Sample No:	BD3010			BD3012			BD3017			BD3018	
		Sample Date:	27-SEP-01			01-OCT-01			03-OCT-01			28-SEP-01	
User Test Group													
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-	-	-	-			
Methylene chloride		ug/L	-	-	-	-	-	-	43	J B	J			
Toluene		ug/L	-	-	-	-	-	-	270		J			
Xylenes, total		ug/L	-	-	-	-	-	-	1200		J			

			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
Location Code:			PB-BED-MW14			PB-BED-MW15			PB-BED-MW16			PB-BED-MW17		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3018R			BD3019			BD3020			BD3021		
Sample Date:			05-OCT-01			09-OCT-01			10-OCT-01			03-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride		ug/L				120	J B	J	52	J B	J	41	J B	J
Toluene		ug/L	-	-	-	630			590		J	180		
Xylenes, total		ug/L	-	-	-	1000			1500			550		

Report Date: 03/04/02

			PB-BED-MW18			PB-BED-MW19			PB-BED-MW20			PB-BED-MW22		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3024			BD3025			BD3026			BD3027		
		Sample Date:	02-OCT-01			04-OCT-01			26-SEP-01			08-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride		ug/L	47	J B	J	30	J B	J	-	-	-			
Toluene		ug/L	-	-	-	21	J	J	-	-	-	1.2	J	J
Xylenes, total		ug/L	150			180			-	-	-	6.4		

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

			PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
		Location Code:	PB-BED-MW23			PB-BED-MW24			PB-BED-MW25			PB-BED-MW27		
		Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
		Sample No:	BD3028			BD3029			BD3030			BD3032		
		Sample Date:	09-OCT-01			09-OCT-01			05-OCT-01			09-OCT-01		
User Test Group														
Parameter	*Flt.*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES														
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-	0.30	J	J	-	-	-
Methylene chloride		ug/L	160	J B	J	21	J B	J				98	J B	J
Toluene		ug/L	910			58			0.80	J	J	120	J	J
Xylenes, total		ug/L	1300			110			1.5			560		

Plum Brook Ordnance Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

			Location Code:	PB-TNTA-MW11			PB-TNTC-MW4			PB-TNTC-MW5			TNTA-BEDGW-001		
			Associated Site:	BASEWIDE			BASEWIDE			BASEWIDE			BASEWIDE		
			Sample No:	BD3034			BD3043			BD3035			BD3037		
			Sample Date:	03-OCT-01			04-OCT-01			03-OCT-01			09-OCT-01		
User Test Group															
Parameter	Flt	Units		Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ	Result	Qual	VQ
VOLATILES															
Methyl-2-pentanone, 4-		ug/L		-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride		ug/L		-	-	-				-	-	-	330	J B	J
Toluene		ug/L		-	-	-	-	-	-	-	-	-	730		J
Xylenes, total		ug/L		-	-	-	3.3	J	J	-	-	-	1400		

			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Location Code:			TNTB-BEDGW-003			TNTB-BEDGW-004			TNTC-BEDGW-001		
Associated Site:			BASEWIDE			BASEWIDE			BASEWIDE		
Sample No:			BD3038			BD3041			BD3042		
Sample Date:			08-OCT-01			05-OCT-01			04-OCT-01		
User Test Group / *Parameter*	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
VOLATILES											
Methyl-2-pentanone, 4-		ug/L	-	-	-	-	-	-	-	-	-
Methylene chloride		ug/L							160	J B	J
Toluene		ug/L	5.2			1.3	J	J	-	-	-
Xylenes, total		ug/L	-	-	-	-	-	-	190		

Plum Brook [illegible] Works
Monitoring Wells Groundwater
Detected Hits

Report Date: 03/04/02

		Location Code:	PB-BED-MW16			TNTA-BEDGW-001		
		Associated Site:	BASEWIDE			BASEWIDE		
		Sample No:	FP7002			FP7001		
		Sample Date:	10-OCT-01			08-OCT-01		
User Test Group								
Parameter	*Flt*	*Units*	*Result*	*Qual*	*VQ*	*Result*	*Qual*	*VQ*
RANGE ORGANICS								
Diesel Range Organics		mg/kg	4800			31000		
Gasoline Range Organics		mg/kg	52000			160000		
VOLATILES								
Acetone		mg/kg	30	J B		-	-	-
Benzene		mg/kg	25	J	J	89	J	J
Ethylbenzene		mg/kg	200			680		
Methylene chloride		mg/kg	42	B		210	B	
Toluene		mg/kg	120			610		
Trichloroethene		mg/kg	4.6	J	J	-	-	-
Xylenes, total		mg/kg	1600	B		3800	B	

APPENDIX L

DATA QUALITY EVALUATIONS

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List of Acronyms

AR/COC	Analysis Request/Chain of Custody
CFR	Code of Federal Regulations
CI	Chemical Investigation
DI	deionized
DQO	data quality objectives
EPA	U.S. Environmental Protection Agency
ID	identification
IT	IT Corporation
LCS	laboratory control sample
MB	material blank or method blank
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NFG	national functional guidelines
PQL	practical quanitation limit
PBOW	Plum Brook Ordnance Works
QA/QC	quality assurance/quality control
SAP	quality assurance project plan
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
SDG	Sample Delivery Group
SOP	Standard Operating Procedures
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compounds

L.1.0 Introduction

This appendix of the Groundwater Investigation of TNT Areas and Red Water Ponds Report for presents results of the quality assurance/quality control (QA/QC) measures implemented for the sampling and analysis activities at the Plum Brook Ordnance Works (PBOW) – Sandusky, Ohio. The quality indicators from every aspect of the data collection have been reviewed, and an assessment of the data with regard to project-specific objectives is presented. Successful execution of project-specific objectives and procedures provides strong support for the acceptance of the data generated as adequate for the purpose of evaluating the analytical results from this assessment at PBOW.

IT Corporation (IT) conducted field-sampling activities at PBOW from August to October 2001. Severn Trent Laboratories in Knoxville, Tennessee and Canton, Ohio analyzed the project samples. Field split samples were analyzed by Paragon Analytics of Fort Collins, Colorado. All data analyzed were reviewed for accuracy and completeness. One hundred percent of the data analyzed were subjected to data validation following guidelines in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 (EPA, 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, February 1994. The criteria for blank evaluation were based on those detailed in *Region III Modifications to National Functional Guidelines for Organic Data Review* (September 1994) and *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses.* (April 1993). 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). To verify that these DQOs were met, field measurements, sampling and handling procedures, laboratory analysis and reporting, and all nonconformances and discrepancies in the data were examined to determine compliance with the appropriate and applicable procedures defined in the SAP. The results of this review are presented in the following sections, with all analytical outliers or nonconformances discussed where they occurred.

This report is divided into three subsections. Section L.2.0 discusses the field investigation and QC procedures used during the sampling effort. Section L.3.0 outlines the analytical program and the associated QC activities performed. The final part of this document, Section L.4.0, summarizes the data findings and their overall impact on the usability of the analytical data.

L.2.0 Field Sampling and QC Activities

IT was retained by the U. S. Army Corps of Engineers, Nashville District to conduct investigation and sampling activities at PBOW. Field activities at this site included collection of direct push and monitoring well groundwater samples, soil samples and 2 free phase product samples. The collection of these samples along with their associated QA and QC samples are discussed in this section of the Data Quality Evaluation (DQE).

All project and field duplicate samples collected were submitted to STL. Sample shipments from the field were performed under custody and documented using standard IT Analysis Request/Chain of Custody (AR/COC) forms. These forms provided project-specific analytical specifications and QC instructions to the laboratory. A formal COC transfer record was prepared and included with these forms to document custody during sample transportation, storage, and disposition by the laboratory. Table L-1 summarizes the field sample number, location, sample type, date of collection, and sample delivery group for each sample collected. Table L-2 summarizes the detected compounds in the method blanks associated with the PBOW samples.

L.2.1 Trip Blanks

Aqueous samples designated for volatile organic compound (VOC) analysis may be susceptible to contamination by diffusion of organic compounds into the sample container. Trip blanks are analyzed in order to assess the potential for contamination to be introduced to an aqueous volatile sample during transport and handling procedures. A trip blank is a sample of analyte-free deionized (DI) water that is prepared at the laboratory, shipped to the field with sample containers, and returned to the laboratory with the water matrix samples receiving VOC analysis. A trip blank is then analyzed for volatile organics using the same sample preparation and analysis procedures used for the actual field samples. Sixteen trip blank samples were collected.

The data validator applied the 5X-10X rule to the samples for the analytes detected. The following samples were qualified "B" by the data validator indicating that sample results are indicative of blank contamination:

Lot Number	Sample Affected	Blank Contaminant	Validation Qualifier
01-10-024	BD3045, BD3047, BD3049	Acetone	B
	BD3045, BD3047, BD3049, BD3051	Methylene Chloride	B
H1I280106	BD3005	Acetone	B
	BD3005	Methylene Chloride	B
H1J020107	BD3012	Acetone	B
H1J040177	BD3021, BD3034, BD3035	Acetone	B
H1J050186	BD3025, BD3042, BD3043, BD3046, BD3048	Acetone	B
	BD3043	Methylene Chloride	B
H1J060123	BD3006R, BD3009R, BD3018R, BD3030, BD3052	Acetone	B
	BD3009R, BD3018R, BD3030, BD3041, BD3050, BD3052	Methylene Chloride	B
H1J090111	BD3004, BD3027	Acetone	B
	BD3027, BD3038	Methylene Chloride	B

L.2.2 Field Duplicates

Field duplicate samples are collected and submitted to the laboratory for analysis along with their corresponding original sample. The data generated from the analysis of field duplicate samples are used to evaluate the precision of the sample collection and analysis procedures. It is difficult to collect and analyze soil samples in duplicate due to the heterogeneous nature of a soil. High relative percent difference (RPD) between an original sample and its field duplicate may indicate a difference in sample matrix or sample collection rather than true problems with precision of sample analysis. Also, when estimated "J" or nondetected "U" results are reported, there is a potential for increased variability between the primary and duplicate sample results

Field duplicate samples were collected at a frequency of approximately one for every ten samples collected (10 percent). Seven field duplicate samples were collected during this sampling event.

Table L-3 compares the original and field duplicate results and shows the RPDs calculated for those detected compounds. Compounds not presented in the table were not detected in either the original or field duplicate samples. In cases where duplicates were performed and one result is less than the reporting limit, but greater than the method detection limit, the RPD is reported, but should be considered an estimated value.

The acceptance criterion of 30 percent RPD for waters and 50 percent for soils was used to evaluate these sample results. In most cases, original and field duplicate data compared well as demonstrated by the RPDs calculated. RPD is calculated by using the following formula:

$$RPD = \left| \frac{A - B}{(A + B)/2} \right| \quad x \quad 100$$

where:

RPD	=	relative percent difference
A	=	original result
B	=	field duplicate result.

L.2.5 Field Split Samples

Split samples were collected in conjunction with field duplicate samples and sent to Paragon Analytics. The split samples were submitted to the laboratory for the same analysis as their corresponding field duplicates and original field samples. The split samples are used to determine if data results are reproducible when analyzed by two different laboratories. Results are also evaluated to determine if a contracted laboratory's preparation and analysis procedures are in control and meet the approved method criteria. Paragon's compound lists for 8260B and 8270C were more extensive than needed for the project. Although all compounds were validated, only the TCL list is discussed in this DQE.

Field split samples were collected at a frequency of approximately one for every ten regular samples. Seven split samples were collected during this sampling event.
Table L-3 compares the original and field split results and shows the RPDs calculated for those detected compounds. Compounds not presented in the table were not detected in either the original or field split samples.

L.3.0 Analytical Program and QC Activities

The project QA/QC program described in the SAP was followed for the collection and laboratory analysis of samples. Each of the analytical methods used require that method-specific QA/QC protocols be followed during sample analysis. These protocols are a critical part of the methods employed and were followed by the laboratory during sample analysis. Specific measures included detailed record keeping procedures, instrument calibrations, and analysis of method blanks, blank spikes, MS/MSD, surrogates, and internal standards. The following SW-846 and USEPA Methods were used to analyze PBOW samples:

Parameter	SW-846 Method
Volatiles	SW-846 8260B
Semivolatiles	SW-846 8270C
Nitroaromatic Compounds	SW-846 8330
Metals	SW-846 6010B/7470A/7471A
Gasoline/Diesel Range Organics	SW-846 8015B
Turbidity	EPA 180.1
Alkalinity	EPA 310.1
TOC	SW-846 9060
Hardness	EPA 130.2
Total Dissolved Solids	EPA 160.1
Total Suspended Solids	EPA 160.2
Chloride	EPA 325.2
Total Cyanide	SW-846 9012A
Nitrate	EPA 353.2
Sulfate	EPA 375.4

Appendix K contains validated analytical data summaries for the samples collected during this field investigation. The QA/QC criteria defined in the SAP were used by the validator to evaluate the data for all parameters for which criteria were provided. If acceptance criteria were not provided in the SAP, laboratory-derived acceptance criteria were used by the validator to qualify data or the criteria established in the analytical method were used. Any qualifiers added to these data by the data validator are included in the summaries.

L.3.1 Laboratory QA/QC Procedures

The following sections discuss specific QA/QC protocols required and performed by the laboratory during this investigation.

L.3.1.1 Method/Calibration Blanks

Method blanks are analyzed with each analytical "batch" processed on a per matrix (i.e., soil and water) basis. Method blanks are carried step-wise through the same analytical procedure as their associated field samples including the addition of solvents, surrogate and standard spikes, and reagents as required in the analysis process. The purpose of a method blank is to identify any possible contaminants that may be introduced to the sample as a result of any part of the analytical process. Table L-2 summarizes the compounds detected in associated blanks by lot number. The data validator evaluated all blank data associated with each sample. When estimated or positive concentrations of compounds/analytes were reported in the corresponding field samples, associated samples were evaluated and qualified using the 5X-10X rule.

For some analyses, an initial and continuing calibration blank are performed throughout the run sequence. These blanks verify the presence of carry over contamination for the analytes of interest.

Qualifiers applied to samples based on detects in the method or calibration blanks are summarized below:

Lot Number	Sample Number Affected	Blank Contaminant	Blank	Validation Qualifier
Volatiles				
01-10-024	BD3045, BD3047, BD3049, BD3051	Methylene chloride	Method	B
H1I270167	BD0003, BD0004, BD0005, BD0006, BD0007, BD0008	Acetone	Method	B
H1I270167	BD0003, BD0004, BD0005, BD0006, BD0007, BD0008, BD0009, BD0010, BD0011, BD0012	Methylene chloride	Method	B
H1I280106	BD0002, BD0013, BD0015, BD0024	Acetone	Method	B
H1I280106	BD0001, BD0002, BD0013, BD0014, BD0015, BD0016, BD0023, BD0024, BD0025, BD0026, BD0028, BD3005	Methylene chloride	Method	B

Lot Number	Sample Number Affected	Blank Contaminant	Blank	Validation Qualifier
H1J030106	BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R	Methylene chloride	Method	B
H1J060123	BD3009R, BD3018R, BD3030, BD3041, BD3050, BD3052	Methylene chloride	Method	B
H1J090111	BD3027, BD3038	Methylene chloride	Method	B
Metals				
01-09-139	BD0027, BD0032	Selenium	Method	B
01-10-024	BD3045, BD3047, BD3049, BD3051(F)	Aluminum	Calibration	B
	BD3045	Antimony	Calibration	B
	BD3045, BD3045(F)	Chromium	Method/Calibration	B
	BD3045, BD3049, BD3049(F), BD3051, BD3051(F)	Cobalt	Calibration	B
	BD3045, BD3047, BD3047(F)	Iron	Method/Calibration	B
	BD3051(F)	Manganese	Calibration	B
	BD3047, BD3047(F), BD3051, BD3051(F)	Zinc	Calibration	B
H1I270167	BD3026(F)	Aluminum	Calibration	B
	BD0003, BD0004, BD0005, BD0006, BD0007, BD0008, BD0009, BD0010, BD0012	Beryllium	Calibration	B
	BD0005, BD0006, BD0008, BD0009, BD0010, BD0012	Cadmium	Calibration	B
	BD3026	Chromium	Method	B
	BD0007, BD0009, BD0010	Cobalt	Calibration	B
	BD0009, BD3026, BD3026(F)	Copper	Method/Calibration	B
	BD0003, BD0004, BD0005, BD0006, BD0008, BD0009, BD0010	Mercury	Calibration	B
	BD0003, BD0008	Thallium	Calibration	B
	BD3026	Zinc	Method	B
H1I280106	BD3005, BD3005(F), BD3007, BD3007(F), BD3010, BD3010(F)	Aluminum	Method/Calibration	B
	BD0015, BD0016, BD0023, BD0025, BD0026	Beryllium	Calibration	B
	BD3005, BD3007	Chromium	Method/Calibration	B
	BD3010	Copper	Method/Calibration	B
	BD0001, BD0015	Mercury	Calibration	B

Lot Number	Sample Number Affected	Blank Contaminant	Blank	Validation Qualifier
	BD0002, BD0023, BD0024, BD0028, BD3005(F)	Thallium	Method/Calibration	B
	BD3010	Zinc	Method	B
H1J010131	BD3018, BD3018(F)	Aluminum	Calibration	B
	BD3018(F)	Selenium	Calibration	B
	BD3018, BD3018(F)	Thallium	Calibration	B
	BD3018	Vanadium	Calibration	B
HIJ020107	BD3012	Cadmium	Calibration	B
	BD3012(F)	Copper	Calibration	B
H1J030106	BD3024, BD3024(F)	Aluminum	Calibration	B
	BD0017R, BD0018R, BD0019R, BD0021R, BD0022R	Arsenic	Calibration	B
	BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R	Beryllium	Calibration	B
	BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R	Cadmium	Calibration	B
H1J040177	BD3008(F), BD3017(F), BD3021(F)	Aluminum	Calibration	B
	BD3034	Cadmium	Calibration	B
	BD3008, BD3008(F), BD3017, BD3035, BD3035(F)	Thallium	Calibration	B
	BD3008	Vanadium	Calibration	B

Lot Number	Sample Number Affected	Blank Contaminant	Blank	Validation Qualifier
H1J050186	BD3025, BD3025(F), BD3042, BD3042(F), BD3043(F), BD3046, BD3046(F), BD3048, BD3048(F)	Aluminum	Method/Calibration	B
	BD3043	Copper	Calibration	B
	BD3043	Thallium	Calibration	B
H1J060123	BD3006R, BD3006R(F), BD3009R, BD3009R(F), BD3030, BD3030(F), BD3041(F), BD3050(F), BD3052, BD3052(F)	Aluminum	Method/Calibration	B
	BD3006R(F), BD3050(F)	Beryllium	Calibration	B
	BD3009R, BD3050	Copper	Calibration	B
H1J090111	BD3004(F), BD3027(F), BD3038(F)	Aluminum	Calibration	B
	BD3004(F), BD3038	Beryllium	Calibration	B
	BD3004, BD3038(F)	Copper	Calibration	B
	BD3004	Thallium	Calibration	B
H1J100121	BD3019, BD3019(F), BD3028(F), BD3029(F)	Aluminum	Calibration	B
	BD3028, BD3032	Arsenic	Calibration	B
	BD3037	Beryllium	Calibration	B
H1J110141	BD3020, BD3020(F)	Aluminum	Calibration	B
	BD3020(F)	Magnesium	Calibration	B
	BD3020(F)	Thallium	Method/Calibration	B
SPLP Explosives				
H1I270167	BD0008	2,4-Dinitrotoluene	Method	B
H1I280106	BD0023, BD0024, BD0028	2,4-Dinitrotoluene	Method	B
Alkalinity				
HIJ020107	BD3012	Total Alkalinity	Method	B

L.3.1.2 Matrix Spikes and Laboratory Control Spikes

Two types of spikes were generally performed for all analyses: matrix spikes (MS) and laboratory control samples (LCS). MS compounds are spiked into an aliquot of a field sample. LCS compounds are spiked into a blank matrix. The spiked compounds are representative compounds that are quantified during performance of the method. Recovery of the spiked compound is used as an assessment of analytical accuracy on the sample matrix analyzed. These results are useful in distinguishing sample matrix interferences from analysis interferences through a comparison of MS and LCS recovery data. Often, spikes are performed in duplicate (as an MSD or LCS duplicate). In this manner, the precision of the assessment can be quantified as the RPD of the original and duplicate spike.

Matrix spikes were assigned at a frequency of 1 for every 20 field samples collected. Three MS/MSDs were assigned in the field to samples BD0004, BD0016, BD3004, and BD3027. These samples correspond to locations PRRP-DP10, TNTB-SS375, IT-AA2-BEDGW-001, and PB-BED-MW22 respectively. Additional sample volume was provided to the laboratory for the MS/MSD analyses. This sampling frequency meets the collection criteria for this program as specified in the SAP. In addition to the overall collection frequency, the analytical method requires that the laboratory analyze 1 set of spikes per analytical batch. To comply with this method requirement, the laboratory may have to analyze "batch" QC with a work order. The validator evaluated the "batch" QC. The laboratory statistically determined target acceptance limits were used to assess the spike recovery and RPD.

The MS/MSD criteria were met with the exception of the following, which exhibited % recoveries and/or RPDs outside QC limits:

Lot Number	Sample Number Affected	Compound(s)	Validation Qualifier
Explosives			
01-10-124	BD3045, BD3047, BD3049, BD3051	Tetryl	UJ/R*
Metals			
H1I270167	BD0003, BD0004, BD0005, BD0006, BD0007, BD0008, BD0009, BD0010, BD0012, BD3026	Calcium, Magnesium	J
H1I280106	BD0001, BD0002, BD0014, BD0015, BD0016, BD0023, BD0024, BD0025, BD0026, BD0028	Manganese	J

*R -Rejected due to 0% recovery of surrogate

LCS results are used to evaluate lab method performance in the same manner as the MS/MSD results except the LCS is not performed on an actual field sample matrix. A LCS is prepared for each analytical "batch" for each parameter and matrix analyzed.

All LCS recoveries met the established QC criteria with the exception of the following:

Lot Number	Sample Number Affected	Compound(s)	Validation Qualifier
Volatiles			
01-10-024	BD3045, BD3047, BD3049, BD3051	Methylene chloride	B
Semivolatiles			
01-10-024	BD3045, BD3047, BD3049, BD3051	Hexachlorocyclopentadiene	UJ
H1J100121	BD3019, BD3028, BD3029, BD3032, BD3037	Pyrene	UJ
H1J110141	BD3020	Pyrene	UJ
Explosives			
01-10-024	BD3045, BD3047, BD3049, BD3051	Tetryl	*R

*R - Rejected due to 0% recovery of the surrogate   B - Blank contamination

L.3.1.3 Calibration

Several analytes were qualified because of unacceptable performance in the calibration standards. For specific examples refer to the validation report in Appendix J and Table L-5.

L.3.2 Reporting Limits

Practical quantitation limits (PQL) or RLs. used for this project are those statistically determined by the laboratories. The analytical program executed for this project required the use of SW-846 methods. which specify the procedure for calculating the PQLs presented. Each laboratory is required to demonstrate method performance through method detection limit (MDL) studies for every method employed. These studies are required to be laboratory-specific so that individual laboratory variables such as equipment brands, reagent suppliers, and chemist technique are factored into the performance study. MDLs are established using controlled matrices (i.e., DI water). The PQL calculation adjusts the limit by a predetermined mathematical factor for the analysis of actual environmental sample matrices (i.e. soil, groundwater, etc.). For purposes of clarity and consistency with respect to terminology, the term "reporting limit" has been substituted for PQL when referencing the limit of detection reported by the laboratory for each individual sample and parameter. The actual values reported have been corrected for all necessary dilutions, dryness, and interference factors as applicable based on the resulting analytical data for a sample.

Standard operating procedures (SOP) address MDLs, PQLs, and RLs when dealing with low concentrations of analytes in samples. These limits are generally defined as follows:

- ***MDL.*** The minimum concentration of an analyte that can be determined with 99 percent confidence that the true value is greater than zero.

- ***PQL.*** The lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

- ***RL.*** This number is equivalent to the PQL.

An MDL is the lower limit at which the laboratory can differentiate a measurement from background. The MDL is determined in accordance with the procedures in 40 CFR Part 136. A PQL, or RL, is the lower limit at which a measurement becomes meaningful. This measurement (the PQL or the RL) is generally a multiple of three to five times the MDL.

All samples were handled and analyzed as expected without significant changes to the anticipated project RLs due to matrix interference or high dilutions.

L.3.3 Holding Times/Preservation

All laboratory results submitted for this investigation have been reviewed with respect to laboratory adherence to extraction and analysis holding times. Maximum sample extraction and analysis hold times were those specified in USACE document EM200-1-3.

All holding time criteria were acceptable for the samples collected except BD3026 and BD3041.

Five samples were qualified because of improper sample preservation. They were BD3017, BD3020, BD3034, BD3035, and BD3045.

L.4.0 Data Evaluation and Usability

The analytical data review process identified a few analytical nonconformance issues that were noted during this analytical prograL. These anomalies have been discussed in the previous sections of this appendix. Table L-4 summarizes all compounds requiring qualifier application due to an anomalies discovered during data validation. Table L-5 defines the reason codes for qualification and Table L-6 defines the data validation qualifiers.

The following definitions are used for defining precision, accuracy, representativeness, completeness, and comparability as they have been applied to this evaluation.

Precision. Precision is a measurement of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision data were obtained through the analysis and evaluation of duplicate QA samples. Accuracy was determined through the analysis and evaluation of method blanks, LCSs, trip blanks, equipment rinsates, and MS samples.

Accuracy. Accuracy is a measurement of bias in a system and is expressed as a percent recovery. These QA samples were collected and/or analyzed at the frequency established in the SAP, verifying the completeness element of the DQOs along with the evaluation of holding times and reporting limits. Percent recovery is calculated as follows:

$$Percent\ \text{Recovery} = \left(\frac{(x-s)}{T}\right) * 100$$

Where:

X = the lab determined concentration of a spiked sample

S = the sample native concentration prior to spike

T = the true concentration of the spike

Relative Percent Difference is calculated as follows:

$$\text{Re}lative\ Percent\ Difference = \left[\frac{|D1 - D2|}{\frac{D1 + D2}{2}}\right] * 100$$

Where:

D1 and D2 = the results of duplicate measurements

Representativeness. Representativeness is a qualitative parameter that expresses the degree to which sample data actually represent the matrix and site conditions. For example, in conducting ground water monitoring, representativeness requires proper location of wells and the collection of samples under consistent, documented procedures. Wells are located based upon the results of the hydrological study in progress and are designed to provide maximum coverage of the flow conditions. Requirements and procedures for sample collection and handling are designed to maximize sample representativeness. Representativeness also can be monitored by reviewing field documentation and by performing field audits.

The samples were collected using IT SOPs and were fully documented through the use of standard IT field forms. Samples are representative of the matrix and site sampled.

Completeness. Completeness is a measure of the amount of valid data that are obtained during a sampling event as compared to the amount of data planned to be collected under optimum conditions. Some data for this project were qualified as estimated in the validation process because of the outliers noted in the MS recoveries, duplicate results for certain elements, and various other calibration and inductively coupled plasma serial dilution results. A total of 76 data points were qualified as rejected in the validation process due to various QC criteria as described in the previous sections of this report. Precision is calculated as follows:

$$Completeness\ \% = \left(\frac{D_r}{D_c}\right) X\ 100$$

Where:

D_r = the number of data points for which valid results are reported

D_c = the number of valid samples/data points that are collected and reach the laboratory for analysis.

During this task, 54 samples were collected resulting in approximately 9300 analytical records. Less than 1 percent of the data points were rejected due to anomalies discovered during the **validation** process. Using the above calculation, 99% completeness is achieved for the task.

Comparability. Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Comparability ensures that results for the sampling event can be compared with data from other past and/or future sampling programs. Comparability for this sampling event was achieved through the use of established and recognized techniques and accepted standard EPA methods. All samples collected and analyzed were subjected to the same sampling, handling, preparation, analysis, reporting, and validation criteria for the purpose of achieving comparability goals within the data set.

L.4.1 Statement of Data Usability

The overall results of the analyses, as discussed in this evaluation, suggest that representative samples were collected and analyzed, and the results are indicative of the media analyzed, with the exception of the few anomalies noted. The data do reflect expected site conditions and are usable for their intended purpose.

Tables L-1 through L-6 summarize the analytical program and the results for the data validation effort for all samples collected by IT at PBOW.

Table L-1
Sample Cross-reference
Plum Brook Ordnance Works

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	Lot Number
Direct Push Groundwater	TNTA-DP14	BA3014	2-Aug-01	REG	H1H030124
	TNTA-DP21	BA3021	1-Aug-01	REG	H1H020118
	TNTB-DP02	BB3002	6-Aug-01	REG	H1H070218
	TNTB-DP02	BB3002	6-Aug-01	REG	H1H070257
	TNTB-DP03	BB3003	1-Aug-01	REG	H1H020118
	TNTC-DP13	BC3013	1-Aug-01	REG	H1H020118
	TNTC-DP19	BC3019	6-Aug-01	REG	H1H070218
	TNTC-DP19	BC3019	6-Aug-01	REG	H1H070257
Monitoring Well Groundwater	IT-AA2-BEDGW-001	BD3004	8-Oct-01	REG	H1J090111
	IT-AA3-BEDGW-001	BD3005	27-Sep-01	REG	H1I280106
	IT-ABG-BEDGW-01	BD3006	28-Sep-01	REG	H1J010131
	IT-ABG-BEDGW-01	BD3006R	5-Oct-01	REG	H1J060123
	IT-BG8-BEDGW-001	BD3007	27-Sep-01	REG	H1I280106
	IT-MNTA-BEDGW-001	BD3008	3-Oct-01	REG	H1J040177
	IT-TNTB-BEDGW-001	BD3009	28-Sep-01	REG	H1J010131
	IT-TNTB-BEDGW-001	BD3009R	5-Oct-01	REG	H1J060123
	IT-TNTB-BEDGW-002	BD3010	27-Sep-01	REG	H1I280106
	MK-MW17	BD3012	1-Oct-01	REG	H1J020107
	PB-BED-MW13	BD3017	3-Oct-01	REG	H1J040177
	PB-BED-MW14	BD3018	28-Sep-01	REG	H1J010131
	PB-BED-MW14	BD3018R	5-Oct-01	REG	H1J060123
	PB-BED-MW15	BD3019	9-Oct-01	REG	H1J100121
	PB-BED-MW16	BD3020	10-Oct-01	REG	H1J110141
	PB-BED-MW17	BD3021	3-Oct-01	REG	H1J040177
	PB-BED-MW18	BD3024	2-Oct-01	REG	H1J030106
	PB-BED-MW19	BD3046	4-Oct-01	FD	H1J050186
	PB-BED-MW19	BD3045	4-Oct-01	FS	01-10-024
	PB-BED-MW19	BD3025	4-Oct-01	REG	H1J050186
	PB-BED-MW20	BD3026	26-Sep-01	REG	H1I270167
	PB-BED-MW22	BD3027	8-Oct-01	REG	H1J090111
	PB-BED-MW23	BD3028	9-Oct-01	REG	H1J100121
	PB-BED-MW24	BD3029	9-Oct-01	REG	H1J100121
	PB-BED-MW25	BD3052	5-Oct-01	FD	H1J060123
	PB-BED-MW25	BD3051	5-Oct-01	FS	01-10-024
	PB-BED-MW25	BD3030	5-Oct-01	REG	H1J060123
	PB-BED-MW27	BD3032	9-Oct-01	REG	H1J100121
	PB-TNTA-MW11	BD3034	3-Oct-01	REG	H1J040177
	PB-TNTC-MW4	BD3043	4-Oct-01	REG	H1J050186
	PB-TNTC-MW5	BD3035	3-Oct-01	REG	H1J040177
	TNTA-BEDGW-001	BD3037	9-Oct-01	REG	H1J100121
	TNTB-BEDGW-003	BD3038	8-Oct-01	REG	H1J090111
	TNTB-BEDGW-004	BD3050	5-Oct-01	FD	H1J060123
	TNTB-BEDGW-004	BD3049	5-Oct-01	FS	01-10-024
	TNTB-BEDGW-004	BD3041	5-Oct-01	REG	H1J060123
	TNTC-BEDGW-001	BD3048	4-Oct-01	FD	H1J050186
	TNTC-BEDGW-001	BD3047	4-Oct-01	FS	01-10-024
	TNTC-BEDGW-001	BD3042	4-Oct-01	REG	H1J050186

Table L-1
Sample Cross-reference
Plum Brook Ordnance Works

Sample Type	Sample Location	Sample Number	Sample Date	Sample Purpose	Lot Number
Monitoring Well	PB-BED-MW16	FP7002	10-Oct-01	REG	H1J120206
Product	TNTA-BEDGW-001	FP7001	8-Oct-01	REG	H1J120206
Soil	PRRP-DP03	BD0001	27-Sep-01	REG	H1I280106
	PRRP-DP03	BD0002	27-Sep-01	REG	H1I280106
	PRRP-DP10	BD0003	26-Sep-01	REG	H1I270167
	PRRP-DP10	BD0004	26-Sep-01	REG	H1I270167
	PRRP-DP11	BD0005	26-Sep-01	REG	H1I270167
	PRRP-DP11	BD0006	26-Sep-01	REG	H1I270167
	TNTA-SO012	BD0007	26-Sep-01	REG	H1I270167
	TNTA-SO012	BD0008	26-Sep-01	REG	H1I270167
	TNTA-SO080	BD0010	26-Sep-01	FD	H1I270167
	TNTA-SO080	BD0009	26-Sep-01	REG	H1I270167
	TNTA-SO080	BD0012	26-Sep-01	REG	H1I270167
	TNTB-SS295	BD0031	27-Sep-01	FS	01-09-139
	TNTB-SS295	BD0013	27-Sep-01	REG	H1I280106
	TNTB-SS295	BD0014	27-Sep-01	REG	H1I280106
	TNTB-SS375	BD0015	27-Sep-01	REG	H1I280106
	TNTB-SS375	BD0016	27-Sep-01	REG	H1I280106
	TNTC-SO066	BD0019R	2-Oct-01	FD	H1J030106
	TNTC-SO066	BD0017R	2-Oct-01	REG	H1J030106
	TNTC-SO066	BD0018R	2-Oct-01	REG	H1J030106
	TNTC-SO123	BD0021R	2-Oct-01	REG	H1J030106
	TNTC-SO123	BD0022R	2-Oct-01	REG	H1J030106
	WARP-DP09	BD0032	27-Sep-01	FS	01-09-139
	WARP-DP09	BD0023	27-Sep-01	REG	H1I280106
	WARP-DP09	BD0024	27-Sep-01	REG	H1I280106
	WARP-DP13	BD0026	27-Sep-01	FD	H1I280106
	WARP-DP13	BD0027	27-Sep-01	FS	01-09-139
	WARP-DP13	BD0025	27-Sep-01	REG	H1I280106
	WARP-DP13	BD0028	27-Sep-01	REG	H1I280106
	WARP-DP16	BD0029R	2-Oct-01	REG	H1J030106
	WARP-DP16	BD0030R	2-Oct-01	REG	H1J030106

Table L-2

Summary of Compounds Detected in Method Blanks
Plum Brook Ordnance Works

Lot Number	Sample Number	Sample Date	Sample Purpose	Parameter	Result	Units	Lab Qualifier
01-09-139	IP011003-2-2	3-Oct-01	BLK	Aluminum	2.1	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Barium	-0.038	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Beryllium	-0.016	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Calcium	18	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Cobalt	-0.053	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Iron	5.8	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Magnesium	-2.7	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Manganese	0.053	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Potassium	5.9	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Selenium	0.2	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Sodium	13	mg/kg	B
	IP011003-2-2	3-Oct-01	BLK	Zinc	0.31	mg/kg	B
	VL010928-2-2	28-Sep-01	BLK	Methylene chloride	12	ug/kg	
	VL010928-2-2	28-Sep-01	BLK	Naphthalene	5	ug/kg	J
	VL011003-2-1	3-Oct-01	BLK	Methylene chloride	6.7	ug/kg	
01-10-024	HG011011-1-2	11-Oct-01	BLK	Mercury	-3.60E-05	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Barium	-0.00055	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Calcium	0.11	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Chromium	-0.0007	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Iron	0.02	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Magnesium	0.0087	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Manganese	-0.00022	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Potassium	0.37	mg/L	B
	IP011016-2-2	16-Oct-01	BLK	Sodium	0.15	mg/L	B
	VL011008-1-1	8-Oct-01	BLK	Methylene chloride	9	ug/L	
H1H030124	EHJGQBW	2-Aug-01	BLK	Methylene chloride	3.1	ug/L	J
H1H070257	EHPLDBW	6-Aug-01	BLK	Methylene chloride	7.3	ug/L	
H1I170126	EKLJ8BW	14-Sep-01	BLK	Methylene chloride	0.32	ug/L	J
	EKQP5BS	14-Sep-01	BLK	Reactive Sulfide	7.3	mg/kg	B
	EKQP6BS	14-Sep-01	BLK	Reactive Cyanide	12.5	mg/kg	B
H1I270167	ELC50BW	26-Sep-01	BLK	Thallium	6.3	ug/L	B
	ELC5WBW	26-Sep-01	BLK	Aluminum	27.2	ug/L	B
	ELC5WBW	26-Sep-01	BLK	Calcium	39.2	ug/L	B
	ELC5WBW	26-Sep-01	BLK	Chromium	1.5	ug/L	B
	ELC5WBW	26-Sep-01	BLK	Copper	6.4	ug/L	B
	ELC5WBW	26-Sep-01	BLK	Zinc	7.4	ug/L	B
	ELCCABW	26-Sep-01	BLK	Turbidity	0.03	NTU	B
	ELEMEBS	25-Sep-01	BLK	Acetone	9.2	ug/kg	J
	ELEMEBS	25-Sep-01	BLK	Methylene chloride	4	ug/kg	J
	ELFW0BW	26-Sep-01	BLK	Alkalinity	4.3	mg/L	B
	ELGTFBS	27-Sep-01	BLK	Methylene chloride	3.2	ug/kg	J
	ELXWABS	26-Sep-01	BLK	Dinitrotoluene, 2,4-	22	ug/L	J
H1I280106	ELC50BW	26-Sep-01	BLK	Thallium	6.3	ug/L	B
	ELF98BW	27-Sep-01	BLK	Turbidity	0.02	NTU	B

Table L-2

Summary of Compounds Detected In Method Blanks
Plum Brook Ordnance Works

Lot Number	Sample Number	Sample Date	Sample Purpose	Parameter	Result	Units	Lab Qualifier
H1J010131	ELEKEBW	28-Sep-01	BLK	Bis(2-ethylhexyl)phthalate	9.3	ug/L	J
	ELF9LBW	28-Sep-01	BLK	Alkalinity	4	mg/L	B
H1J020107	EL8TMBS	28-Sep-01	BLK	Reactive Cyanide	12.5	mg/kg	B
	ELJL4BS	29-Sep-01	BLK	Barium	0.02	mg/L	B
	ELL05BW	2-Oct-01	BLK	Methylene chloride	0.31	ug/L	J
	ELLQLBW	25-Sep-01	BLK	Turbidity	0.04	NTU	B
	ELVE2BW	1-Oct-01	BLK	Alkalinity	4.5	mg/L	B
H1J030106	ELLGLBW	2-Oct-01	BLK	Turbidity	0.03	NTU	B
	ELP9MBS	2-Oct-01	BLK	Chromium	0.13	mg/kg	B
	ELQFKBW	3-Oct-01	BLK	Methylene chloride	0.18	ug/L	J
	ELT94BW	2-Oct-01	BLK	Alkalinity	3.9	mg/L	B
H1J040177	ELLQMBW	3-Oct-01	BLK	Turbidity	0.02	NTU	B
	ELTGRBW	3-Oct-01	BLK	Methylene chloride	0.27	ug/L	J
	ELVWKBW	3-Oct-01	BLK	Alkalinity	2	mg/L	B
H1J050186	ELN2RBW	4-Oct-01	BLK	Turbidity	0.02	NTU	B
	ELVA8BW	4-Oct-01	BLK	Alkalinity	2	mg/L	B
	EM5FDBW	13-Oct-01	BLK	Chloride	0.66	mg/L	B
H1J060123	ELRMPBW	5-Oct-01	BLK	Turbidity	0.02	NTU	
	ELV8KBW	3-Oct-01	BLK	Methylene chloride	0.2	ug/L	J
	ELVANBW	3-Oct-01	BLK	Alkalinity	2	mg/L	B
	ELWJEBW	4-Oct-01	BLK	Aluminum	65.1	ug/L	B
H1J090111	EL2P1BW	8-Oct-01	BLK	Methylene chloride	0.3	ug/L	J
	ELVWMBW	8-Oct-01	BLK	Alkalinity	2.3	mg/L	B
	ELVWPBW	8-Oct-01	BLK	Turbidity	0.02	NTU	B
	ELX6GBW	8-Oct-01	BLK	Methylene chloride	0.31	ug/L	J
H1J100121	EL1HRBS	6-Oct-01	BLK	Barium	0.0096	mg/L	B
	EL5V4BW	12-Oct-01	BLK	Methylene chloride	0.82	ug/L	J
	EL6XEBW	9-Oct-01	BLK	Alkalinity	1.7	mg/L	B
	EL7VWBS	6-Oct-01	BLK	Barium	0.015	mg/L	B
	EL85PBW	9-Oct-01	BLK	Thallium	5.6	ug/L	B
	EL9ANBW	15-Oct-01	BLK	Acetone	0.66	ug/L	J
	EL9ANBW	15-Oct-01	BLK	Methylene chloride	0.22	ug/L	J
	EMT0TBS	4-Oct-01	BLK	Reactive Cyanide	12.5	mg/kg	B
H1J110141	EMJXNBW	10-Oct-01	BLK	Alkalinity	2.8	mg/L	B
H1J120174	EM1J8BS	10-Oct-01	BLK	Reactive Cyanide	12.5	mg/kg	B
	EM1JPBS	10-Oct-01	BLK	Reactive Sulfide	89.4	mg/kg	B
	EMCJ5BW	11-Oct-01	BLK	Methylene chloride	0.32	ug/L	J
	EMJF3BW	11-Oct-01	BLK	Trinitrotoluene, 2,4,6-	0.083	ug/L	J
H1J120206	EL7P5BW	8-Oct-01	BLK	Acetone	0.79	mg/kg	J
	EL7P5BW	8-Oct-01	BLK	Bromomethane	0.44	mg/kg	J
	EL7P5BW	8-Oct-01	BLK	Chloromethane	0.32	mg/kg	J
	EL7P5BW	8-Oct-01	BLK	Methylene chloride	1.6	mg/kg	
	EL7P5BW	8-Oct-01	BLK	Xylenes, total	0.13	mg/kg	J

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			BASEWIDE			Relative Percent Difference between REG and FD	Relative Percent Difference between REG and FS
LOCATION_CODE				PB-BED-MW19			PB-BED-MW19			PB-BED-MW19				
SAMPLE_NO				BD3025			BD3046			BD3045				
SAMPLE_DATE				4-Oct-01			4-Oct-01			4-Oct-01				
SAMPLE_PURPOSE				REG			FD			FS				
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual		
EXPLOSIVES	Amino-4,6-dinitrotoluene, 2-	ug/L	N	0.2	U	U	0.2	U	U	0.14	J	J	0.00	35.29
METALS	Aluminum	ug/L	N	94.8	B J	B	89	B J	B	61	B	B	6.31	43.39
METALS	Aluminum	ug/L	Y	86	B	B	76.7	B	B	200	U	UJ	11.43	79.72
METALS	Antimony	ug/L	N	60	U	U	60	U	U	2.2	B	B	0.00	185.85
METALS	Arsenic	ug/L	N	10	U	U	10	U	U	3.2	B	J	0.00	103.03
METALS	Barium	ug/L	N	1060			982			950			7.64	10.95
METALS	Barium	ug/L	Y	1080			1090		J	980		J	0.92	9.71
METALS	Calcium	ug/L	N	221000			207000			220000			6.54	0.45
METALS	Calcium	ug/L	Y	202000			200000		J	210000		J	1.00	3.88
METALS	Chromium	ug/L	N	1.2	B	J	10	U	U	1.1	B	B	157.14	8.70
METALS	Chromium	ug/L	Y	10	U	U	10	U	UJ	0.4	B	B	0.00	184.62
METALS	Cobalt	ug/L	N	50	U	U	50	U	U	1.1	B	J	0.00	191.39
METALS	Cobalt	ug/L	Y	50	U	U	50	U	UJ	0.39	B	B	0.00	196.90
METALS	Copper	ug/L	N	99			89.9			36			9.63	93.33
METALS	Iron	ug/L	N	149			143			140			4.11	6.23
METALS	Iron	ug/L	Y	100	U	U	100	U	UJ	34	B	B	0.00	98.51
METALS	Magnesium	ug/L	N	66200			65000			58000			1.83	13.20
METALS	Magnesium	ug/L	Y	81000			81500		J	78000		J	0.62	3.77
METALS	Manganese	ug/L	N	2.2	B	J	1.9	B	J	2.1	B	J	14.63	4.65
METALS	Manganese	ug/L	Y	4	B	J	3.5	B	J	2.9	B	J	13.33	31.88
METALS	Nickel	ug/L	N	13.8	B	J	12.7	B	J	12	B	J	8.30	13.95
METALS	Nickel	ug/L	Y	7.9	B	J	8.7	B	J	7.4	B	J	9.64	6.54
METALS	Potassium	ug/L	N	43800			41400			42000			5.63	4.20
METALS	Potassium	ug/L	Y	42100			41800		J	43000		J	0.72	2.12
METALS	Sodium	ug/L	N	75400			71700			64000			5.03	16.36
METALS	Sodium	ug/L	Y	94900			95600		J	84000		J	0.73	12.19
METALS	Thallium	ug/L	N	10	U	U	10	U	U	4.8	B	J	0.00	70.27
METALS	Vanadium	ug/L	N	50	U	U	50	U	U	0.65	B	J	0.00	194.87
METALS	Zinc	ug/L	N	144			135			120			6.45	18.18
METALS	Zinc	ug/L	Y	5.2	B	J	20	U	UJ	20	U	UJ	117.46	117.46
SEMIVOLATILES	Benzo(ghi)perylene	ug/L	N	10	U	U	10	U	U	2.3	J	J	0.00	125.20
SEMIVOLATILES	Bis(2-ethylhexyl)phthalate	ug/L	N	10	U	U	1.6	J	J	2.9	J	J	144.83	110.08
SEMIVOLATILES	Methylnaphthalene, 2-	ug/L	N	12			12			11	J	J	0.00	8.70
SEMIVOLATILES	Naphthalene	ug/L	N	8.6	J	J	8.9	J	J	8.4	J	J	3.43	2.35
SEMIVOLATILES	Phenanthrene	ug/L	N	0.82	J	J	0.89	J	J	11	U	U	8.19	172.25
SEMIVOLATILES	Phenol	ug/L	N	1.2	J	J	1.3	J	J	11	U	U	8.00	160.66
VOLATILES	Acetone	ug/L	N	66	J	B	59	J	B	78		B	11.20	16.67
VOLATILES	Benzene	ug/L	N	46			54			49			16.00	6.32
VOLATILES	Bromomethane	ug/L	N	7.9	J	J	40	U	UJ	10	U	U	134.03	23.46
VOLATILES	Butanone, 2-	ug/L	N	170	U	R	100	U	R	11	J	J	51.85	175.69
VOLATILES	Carbon disulfide	ug/L	N	33	U	U	2.1	J	J	4.9	J	J	176.07	148.28
VOLATILES	Ethylbenzene	ug/L	N	17	J	J	19	J	J	16			11.11	6.06
VOLATILES	Methylene chloride	ug/L	N	30	J B	J	7.4	J B	J	2	J,B	B	120.86	175.00
VOLATILES	Toluene	ug/L	N	21	J	J	24			21			13.33	0.00
VOLATILES	Xylenes, total	ug/L	N	180			210			160			15.38	11.76

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			BASEWIDE			Relative Percent Difference between	Relative Percent Difference between
LOCATION_CODE				PB-BED-MW25			PB-BED-MW25			PB-BED-MW25				
SAMPLE_NO				BD3030			BD3052			BD3051				
SAMPLE_DATE				5-Oct-01			5-Oct-01			5-Oct-01				
SAMPLE_PURPOSE				REG			FD			FS			REG and FD	REG and FS
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual		
METALS	Aluminum	ug/L	N	78.2	B J	B	72.1	B J	B	200	U	U	8.12	87.56
METALS	Aluminum	ug/L	Y	68.7	B	B	83.2	B	B	24	B	B	19.09	96.44
METALS	Barium	ug/L	N	226			231			200			2.19	12.21
METALS	Barium	ug/L	Y	224			226			200			0.89	11.32
METALS	Calcium	ug/L	N	134000			137000			130000			2.21	3.03
METALS	Calcium	ug/L	Y	128000			133000			130000			3.83	1.55
METALS	Cobalt	ug/L	N	50	U	U	50	U	U	1.3	B	B	0.00	189.86
METALS	Cobalt	ug/L	Y	50	U	U	5.6	B	J	0.2	B	B	159.71	198.41
METALS	Iron	ug/L	N	795			830			710			4.31	11.30
METALS	Iron	ug/L	Y	713			740			660			3.72	7.72
METALS	Magnesium	ug/L	N	79500			80800			76000			1.62	4.50
METALS	Magnesium	ug/L	Y	76800			79400			77000			3.33	0.26
METALS	Manganese	ug/L	N	89			93.5			83			4.93	6.98
METALS	Manganese	ug/L	Y	87			86.2			81		B	0.92	7.14
METALS	Nickel	ug/L	N	40	U	U	40	U	U	5.2	B	J	0.00	153.98
METALS	Nickel	ug/L	Y	40	U	U	2.7	B	J	1.4	B	J	174.71	186.47
METALS	Potassium	ug/L	N	17600			18100			20000			2.80	12.77
METALS	Potassium	ug/L	Y	17000			17500			20000			2.90	16.22
METALS	Sodium	ug/L	N	112000			114000			96000			1.77	15.38
METALS	Sodium	ug/L	Y	109000			112000			98000			2.71	10.63
METALS	Zinc	ug/L	N	7.7	B	J	7.9	B	J	6.6	B	B	2.56	15.38
METALS	Zinc	ug/L	Y	3	B	J	5	B	J	4.2	B	B	50.00	33.33
SEMIVOLATILES	Benzo(ghi)perylene	ug/L	N	10	U	U	10	U	U	16	U	U	0.00	46.15
SEMIVOLATILES	Bis(2-ethylhexyl)phthalate	ug/L	N	0.86	J	J	10	U	U	16	U	U	168.32	179.60
VOLATILES	Acetone	ug/L	N	1.7	J	B	1.9	J	B	20	U	R	11.11	168.66
VOLATILES	Benzene	ug/L	N	0.37	J	J	0.4	J	J	0.46	J	J	7.79	21.69
VOLATILES	Bromomethane	ug/L	N	2	U	UJ	2	U	UJ	10	U	U	0.00	133.33
VOLATILES	Butanone, 2-	ug/L	N	5	U	R	5	U	R	20	U	U	0.00	120.00
VOLATILES	Carbon disulfide	ug/L	N	0.48	J	J	0.44	J	J	0.96	J	J	8.70	66.67
VOLATILES	Chloroform	ug/L	N	1.1			1.1			1.1	J	J	0.00	0.00
VOLATILES	Chloromethane	ug/L	N	2	U	U	0.11	J	J	10	U	U	179.15	133.33
VOLATILES	Ethylbenzene	ug/L	N	0.22	J	J	0.24	J	J	5	U	U	8.70	183.14
VOLATILES	Methyl-2-pentanone, 4-	ug/L	N	0.3	J	J	0.38	J	J	20	U	U	23.53	194.09
VOLATILES	Methylene chloride	ug/L	N	0.3	J B	B	0.27	J B	B	2.3	J,B	B	10.53	153.85
VOLATILES	Tetrachloroethane, 1,1,2,2-	ug/L	N	1	U	U	0.24	J	J	5	U	U	122.58	133.33
VOLATILES	Toluene	ug/L	N	0.8	J	J	0.9	J	J	0.93	J	J	11.76	15.03
VOLATILES	Xylenes, total	ug/L	N	1.5			1.7			10	U	U	12.50	147.83

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			BASEWIDE			Relative Percent Difference between REG and FD	Relative Percent Difference between REG and FS
LOCATION_CODE				TNTB-BEDGW-004			TNTB-BEDGW-004			TNTB-BEDGW-004				
SAMPLE_NO				BD3041			BD3050			BD3049				
SAMPLE_DATE				5-Oct-01			5-Oct-01			5-Oct-01				
SAMPLE_PURPOSE				REG			FD			FS				
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual		
METALS	Aluminum	ug/L	N	1010	J	J	1150	J	J	160	B	B	12.96	145.30
METALS	Aluminum	ug/L	Y	69	B	B	64.9	B	B	200	U	U	6.12	97.40
METALS	Barium	ug/L	N	51.3	B	J	51.5	B	J	41	B	J	0.39	22.32
METALS	Barium	ug/L	Y	40.8	B	J	40.5	B	J	36	B	J	0.74	12.50
METALS	Beryllium	ug/L	Y	5	U	U	0.52	B	B	5	U	U	162.32	0.00
METALS	Calcium	ug/L	N	81600			80500			80000			1.36	1.98
METALS	Calcium	ug/L	Y	72000			71600			72000			0.56	0.00
METALS	Chromium	ug/L	N	1.3	B	J	1.3	B	J	10	U	U	0.00	153.98
METALS	Cobalt	ug/L	N	50	U	U	50	U	U	1.3	B	B	0.00	189.86
METALS	Cobalt	ug/L	Y	50	U	U	50	U	U	0.21	B	B	0.00	198.33
METALS	Copper	ug/L	N	10.9	B	J	5.6	B	B	5.8	B	J	64.24	61.08
METALS	Iron	ug/L	N	8090			7990			6600			1.24	20.29
METALS	Iron	ug/L	Y	5670			5620			5300			0.89	6.75
METALS	Magnesium	ug/L	N	24500			24200			23000			1.23	6.32
METALS	Magnesium	ug/L	Y	20900			20800			20000			0.48	4.40
METALS	Manganese	ug/L	N	928			918			840			1.08	9.95
METALS	Manganese	ug/L	Y	812			809			760			0.37	6.62
METALS	Nickel	ug/L	N	5.4	B	J	4.8	B	J	3.2	B	J	11.76	51.16
METALS	Nickel	ug/L	Y	2	B	J	40	U	U	2	B	J	180.95	0.00
METALS	Potassium	ug/L	N	2920	B	J	2940	B	J	3000			0.68	2.70
METALS	Potassium	ug/L	Y	2480	B	J	2470	B	J	3000			0.40	18.98
METALS	Sodium	ug/L	N	7520			7450			6800			0.94	10.06
METALS	Sodium	ug/L	Y	7480			7410			6900			0.94	8.07
METALS	Vanadium	ug/L	N	2.3	B	J	2.3	B	J	0.65	B	J	0.00	111.86
METALS	Zinc	ug/L	N	37.5			33.6			29			10.97	25.56
METALS	Zinc	ug/L	Y	19.9	B	J	22			21			10.02	5.38
VOLATILES	Acetone	ug/L	N	36		J	40		J	51		B	10.53	34.48
VOLATILES	Benzene	ug/L	N	1.4	J	J	1.4		J	1.6	J	J	0.00	13.33
VOLATILES	Methylene chloride	ug/L	N	0.5	J B	B	0.8	J B	B	2.6	J,B	B	46.15	135.48
VOLATILES	Toluene	ug/L	N	1.3	J	J	1.2		J	1.4	J	J	8.00	7.41

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			BASEWIDE			Relative	Relative
LOCATION_CODE				TNTC-BEDGW-001			TNTC-BEDGW-001			TNTC-BEDGW-001			Percent	Percent
SAMPLE_NO				BD3042			BD3048			BD3047			Difference	Difference
SAMPLE_DATE				4-Oct-01			4-Oct-01			4-Oct-01			between	between
SAMPLE_PURPOSE				REG			FD			FS			REG and FD	REG and FS
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	Result	Qual	ValQual		
EXPLOSIVES	Amino-4,6-dinitrotoluene, 2-	ug/L	N	0.2	U	U	0.2	U	U	0.051	J	J	0.00	118.73
EXPLOSIVES	Trinitrotoluene, 2,4,6-	ug/L	N	0.2	U	U	0.2	U	U	0.04	J	J	0.00	133.33
METALS	Aluminum	ug/L	N	130	B J	B	120	B J	B	34	B	B	8.00	117.07
METALS	Aluminum	ug/L	Y	82.5	B	B	82.3	B	B	200	U	U	0.24	83.19
METALS	Arsenic	ug/L	N	4.1	B	J	4.1	B	J	3.9	B	J	0.00	5.00
METALS	Arsenic	ug/L	Y	6	B	J	5.4	B	J	6.1	B	J	10.53	1.65
METALS	Barium	ug/L	N	29.4	B	J	27.9	B	J	25	B	J	5.24	16.18
METALS	Barium	ug/L	Y	30.8	B	J	31.4	B	J	28	B	J	1.93	9.52
METALS	Calcium	ug/L	N	439000			424000			470000			3.48	6.82
METALS	Calcium	ug/L	Y	427000			423000			470000			0.94	9.59
METALS	Cobalt	ug/L	N	50	U	U	50	U	U	0.68	B	J	0.00	194.63
METALS	Cobalt	ug/L	Y	50	U	U	50	U	U	0.31	B	J	0.00	197.54
METALS	Iron	ug/L	N	66.6	B	J	55.1	B	J	63	B	B	18.90	5.56
METALS	Iron	ug/L	Y	100	U	U	100	U	U	22	B	B	0.00	127.87
METALS	Magnesium	ug/L	N	150000			144000			140000			4.08	6.90
METALS	Magnesium	ug/L	Y	147000			146000			140000			0.68	4.88
METALS	Manganese	ug/L	N	271			254			240			6.48	12.13
METALS	Manganese	ug/L	Y	290			298			280			2.72	3.51
METALS	Nickel	ug/L	N	2.3	B	J	40	U	U	2.3	B	J	178.25	0.00
METALS	Nickel	ug/L	Y	2.3	B	J	2.7	B	J	2.4	B	J	16.00	4.26
METALS	Potassium	ug/L	N	22400			20900			24000			6.93	6.90
METALS	Potassium	ug/L	Y	22500			22700			26000			0.88	14.43
METALS	Sodium	ug/L	N	56500			53800			52000			4.90	8.29
METALS	Sodium	ug/L	Y	55300			55000			53000			0.54	4.25
METALS	Zinc	ug/L	N	20	U	U	20	U	U	5	B	B	0.00	120.00
METALS	Zinc	ug/L	Y	20	U	U	20	U	U	3.9	B	B	0.00	134.73
SEMIVOLATILES	Methylnaphthalene, 2-	ug/L	N	4.5	J	J	3	J	J	2.7	J	J	40.00	50.00
SEMIVOLATILES	Naphthalene	ug/L	N	5.2	J	J	3.2	J	J	2.8	J	J	47.62	60.00
VOLATILES	Acetone	ug/L	N	54	J	B	69	J	B	16	J	B	24.39	108.57
VOLATILES	Benzene	ug/L	N	100	U	U	21	J	J	19			130.58	136.13
VOLATILES	Carbon disulfide	ug/L	N	100	U	U	50	U	U	1.6	J	J	66.67	193.70
VOLATILES	Chloroform	ug/L	N	100	U	U	50	U	U	1.5	J	J	66.67	194.09
VOLATILES	Ethylbenzene	ug/L	N	22	J	J	24	J	J	23			8.70	4.44
VOLATILES	Methylene chloride	ug/L	N	160	J B	J	30	J B	J	1.7	J,B	B	136.84	195.79
VOLATILES	Tetrachloroethane, 1,1,2,2-	ug/L	N	100	U	U	50	U	U	1.1	J	J	66.67	195.65
VOLATILES	Toluene	ug/L	N	100	U	U	19	J	J	17			136.13	141.88
VOLATILES	Xylenes, total	ug/L	N	190			190			170			0.00	11.11

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				TNTA-SO080			TNTA-SO080			Percent
SAMPLE_NO				BD0009			BD0010			Difference
SAMPLE_DATE				26-Sep-01			26-Sep-01			
SAMPLE_PURPOSE				REG			FD			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Dinitrotoluene, 2,4-	mg/kg	N	130	J	J	150	U	U	14.29
EXPLOSIVES	Trinitrotoluene, 2,4,6-	mg/kg	N	12000		J	4900		J	84.02
SPLP EXPLOSIVES	Trinitrotoluene, 2,4,6-	ug/L	N	80000			78000			2.53
METALS	Aluminum	mg/kg	N	3680		J	3490		J	5.30
METALS	Arsenic	mg/kg	N	3		J	3.2		J	6.45
METALS	Barium	mg/kg	N	41.7		J	19.8	B	J	71.22
METALS	Beryllium	mg/kg	N	0.31	B	B	0.3	B	B	3.28
METALS	Cadmium	mg/kg	N	0.31	B	B	0.4	B	B	25.35
METALS	Calcium	mg/kg	N	34000		J	33100		J	2.68
METALS	Chromium	mg/kg	N	8.1		J	7.8		J	3.77
METALS	Cobalt	mg/kg	N	3.8	B	B	3.7	B	B	2.67
METALS	Copper	mg/kg	N	7.2		B	9.5			27.54
METALS	Iron	mg/kg	N	9780		J	9150		J	6.66
METALS	Lead	mg/kg	N	60.4		J	63		J	4.21
METALS	Magnesium	mg/kg	N	3990		J	3370		J	16.85
METALS	Manganese	mg/kg	N	177		J	221		J	22.11
METALS	Mercury	mg/kg	N	0.051		B	0.14		B	93.19
METALS	Nickel	mg/kg	N	9.4		J	9.2		J	2.15
METALS	Potassium	mg/kg	N	624			459	B	J	30.47
METALS	Sodium	mg/kg	N	73.6	B	J	552	U	U	152.94
METALS	Vanadium	mg/kg	N	14.5		J	13		J	10.91
METALS	Zinc	mg/kg	N	63.4		J	74.1		J	15.56
VOLATILES	Acetone	mg/kg	N	4.4	D	J	1.1	D	J	120.00
VOLATILES	Methylene chloride	mg/kg	N	0.0061	B	B	0.006	B	B	1.65
VOLATILES	Toluene	mg/kg	N	0.00086	J	J	0.00081	J	J	5.99

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				TNTB-SS295			TNTB-SS295			Percent
SAMPLE_NO				BD0014			BD0031			Difference
SAMPLE_DATE				27-Sep-01			27-Sep-01			
SAMPLE_PURPOSE				REG			FS			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Amino-2,6-dinitrotoluene, 4-	mg/kg	N	0.35			0.5		J	35.29
EXPLOSIVES	Amino-4,6-dinitrotoluene, 2-	mg/kg	N	0.43			1.1		J	87.58
EXPLOSIVES	Dinitrotoluene, 2,4-	mg/kg	N	0.54			0.18	J	J	100.00
EXPLOSIVES	Dinitrotoluene, 2,6-	mg/kg	N	0.4			0.26	U	U	42.42
EXPLOSIVES	Trinitrotoluene, 2,4,6-	mg/kg	N	0.55			0.2	J	J	93.33
SPLP EXPLOSIVES	Amino-2,6-dinitrotoluene, 4-	ug/L	N	40	U	U	0.98		J	190.43
SPLP EXPLOSIVES	Amino-4,6-dinitrotoluene, 2-	ug/L	N	40	U	U	2		J	180.95
SPLP EXPLOSIVES	Dinitrotoluene, 2,4-	ug/L	N	40	U	U	0.47		J	195.35
SPLP EXPLOSIVES	Trinitrotoluene, 2,4,6-	ug/L	N	40	U	U	0.58		J	194.28
METALS	Aluminum	mg/kg	N	8110			8700			7.02
METALS	Antimony	mg/kg	N	1.2	B	J	2.6			73.68
METALS	Arsenic	mg/kg	N	17			41			82.76
METALS	Barium	mg/kg	N	294			360			20.18
METALS	Beryllium	mg/kg	N	1.2			1.5			22.22
METALS	Cadmium	mg/kg	N	0.41	B	J	3.1	U	U	153.28
METALS	Calcium	mg/kg	N	4080			3300			21.14
METALS	Chromium	mg/kg	N	9.6			12			22.22
METALS	Cobalt	mg/kg	N	15.2			25			48.76
METALS	Copper	mg/kg	N	38.8			68			54.68
METALS	Iron	mg/kg	N	28000			92000			106.67
METALS	Lead	mg/kg	N	18			26			36.36
METALS	Magnesium	mg/kg	N	1100			1000			9.52
METALS	Manganese	mg/kg	N	914		J	1000			8.99
METALS	Mercury	mg/kg	N	0.087			0.13	U	U	39.63
METALS	Nickel	mg/kg	N	51			140			93.19
METALS	Potassium	mg/kg	N	940			870			7.73
METALS	Selenium	mg/kg	N	0.68			3.9			140.61
METALS	Sodium	mg/kg	N	96.7	B	J	50	B	J	63.67
METALS	Thallium	mg/kg	N	2.1			3	B	J	35.29
METALS	Vanadium	mg/kg	N	22.7			33			36.98
METALS	Zinc	mg/kg	N	69.6			180			88.46
VOLATILES	Acetone	mg/kg	N	0.15	B	J	0.021	U	R	150.88
VOLATILES	Methylene chloride	mg/kg	N	0.0074	B	B	0.0053	U	U	33.07
VOLATILES	Toluene	mg/kg	N	0.00079	J	J	0.0053	U	U	148.11

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				TNTC-SO066			TNTC-SO066			Percent
SAMPLE_NO				BD0018R			BD0019R			Difference
SAMPLE_DATE				2-Oct-01			2-Oct-01			
SAMPLE_PURPOSE				REG			FD			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Nitrotoluene, 2-	mg/kg	N	0.59			0.39			40.82
EXPLOSIVES	Nitrotoluene, 4-	mg/kg	N	0.33			0.28			16.39
SPLP EXPLOSIVES	Dinitrotoluene, 2,4-	ug/L	N	40	U	U	34	J	J	16.22
SPLP EXPLOSIVES	Dinitrotoluene, 2,6-	ug/L	N	40	U	U	27	J	J	38.81
SPLP EXPLOSIVES	Nitrotoluene, 2-	ug/L	N	30	J	J	40	U	U	28.57
METALS	Aluminum	mg/kg	N	6100		J	6110		J	0.16
METALS	Arsenic	mg/kg	N	3		B	2.4		B	22.22
METALS	Barium	mg/kg	N	44.9		J	23.4		J	62.96
METALS	Beryllium	mg/kg	N	0.45	B	B	0.43	B	B	4.55
METALS	Cadmium	mg/kg	N	0.11	B	B	0.073	B	B	40.44
METALS	Calcium	mg/kg	N	71300		J	66700		J	6.67
METALS	Chromium	mg/kg	N	12.3	J	J	12	J	J	2.47
METALS	Cobalt	mg/kg	N	13		J	8.9		J	37.44
METALS	Copper	mg/kg	N	17.6			14.9			16.62
METALS	Iron	mg/kg	N	16400		J	16400		J	0.00
METALS	Lead	mg/kg	N	21.5		J	9.8		J	74.76
METALS	Magnesium	mg/kg	N	3620		J	3670		J	1.37
METALS	Manganese	mg/kg	N	516		J	407		J	23.62
METALS	Mercury	mg/kg	N	0.059		J	0.02	B	J	98.73
METALS	Nickel	mg/kg	N	30.1		J	26.9		J	11.23
METALS	Potassium	mg/kg	N	2190			2160			1.38
METALS	Sodium	mg/kg	N	137	B	J	129	B	J	6.02
METALS	Vanadium	mg/kg	N	10.1		J	9.6		J	5.08
METALS	Zinc	mg/kg	N	47.3		J	44.5		J	6.10
VOLATILES	Acetone	mg/kg	N	0.017	J	J	0.0086	J	J	65.63
VOLATILES	Methylene chloride	mg/kg	N	0.0034	J B	B	0.0037	J B	B	8.45
VOLATILES	Toluene	mg/kg	N	0.0058	U	U	0.00078	J	J	152.58

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				WARP-DP09			WARP-DP09			Percent
SAMPLE_NO				BD0024			BD0032			Difference
SAMPLE_DATE				27-Sep-01			27-Sep-01			
SAMPLE_PURPOSE				REG			FS			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Amino-2,6-dinitrotoluene, 4-	mg/kg	N	0.16	J	J	0.15	J	J	6.45
EXPLOSIVES	Amino-4,6-dinitrotoluene, 2-	mg/kg	N	0.11	J	J	0.25	U	U	77.78
EXPLOSIVES	Dinitrobenzene, 1,3-	mg/kg	N	0.31			2.6		J	157.39
EXPLOSIVES	Dinitrotoluene, 2,4-	mg/kg	N	2.7			0.25	U	U	166.10
EXPLOSIVES	Dinitrotoluene, 2,6-	mg/kg	N	0.27			2.2		J	156.28
EXPLOSIVES	RDX	mg/kg	N	0.5	I U	U	1.9		J	116.67
EXPLOSIVES	Trinitrobenzene, 1,3,5-	mg/kg	N	1.7			11		J	146.46
EXPLOSIVES	Trinitrotoluene, 2,4,6-	mg/kg	N	0.25	I U	U	0.27		J	7.69
SPLP EXPLOSIVES	Amino-2,6-dinitrotoluene, 4-	ug/L	N	40	U	U	0.33		J	196.73
SPLP EXPLOSIVES	Dinitrobenzene, 1,3-	ug/L	N	40	U	U	1.2		J	188.35
SPLP EXPLOSIVES	Dinitrotoluene, 2,4-	ug/L	N	52	B	B	7.7		J	148.41
SPLP EXPLOSIVES	RDX	ug/L	N	100	U	U	0.97		J	196.16
SPLP EXPLOSIVES	Trinitrobenzene, 1,3,5-	ug/L	N	40	U	U	3.9		J	164.46
SPLP EXPLOSIVES	Trinitrotoluene, 2,4,6-	ug/L	N	40	U	U	0.41		J	195.94
METALS	Aluminum	mg/kg	N	9320			12000			25.14
METALS	Antimony	mg/kg	N	7.8	U	U	1	B	J	154.55
METALS	Arsenic	mg/kg	N	12.7			14			9.74
METALS	Barium	mg/kg	N	65.4			80			20.08
METALS	Beryllium	mg/kg	N	0.64	B	J	0.62	B	J	3.17
METALS	Cadmium	mg/kg	N	0.23	B	J	0.079	B	J	97.73
METALS	Calcium	mg/kg	N	2560			2600			1.55
METALS	Chromium	mg/kg	N	16.3			19			15.30
METALS	Cobalt	mg/kg	N	14.2			16			11.92
METALS	Copper	mg/kg	N	23.8			30			23.05
METALS	Iron	mg/kg	N	24300			33000			30.37
METALS	Lead	mg/kg	N	10.7			16			39.70
METALS	Magnesium	mg/kg	N	4020			5200			25.60
METALS	Manganese	mg/kg	N	748		J	720			3.81
METALS	Mercury	mg/kg	N	0.027	B	J	0.13	U	U	131.21
METALS	Nickel	mg/kg	N	37.7			39			3.39
METALS	Potassium	mg/kg	N	1250			1400			11.32
METALS	Selenium	mg/kg	N	0.65	U	U	1	B	B	42.42
METALS	Sodium	mg/kg	N	91.3	B	J	150			48.65
METALS	Thallium	mg/kg	N	0.91	B	B	2.6	U	U	96.30
METALS	Vanadium	mg/kg	N	22			25			12.77
METALS	Zinc	mg/kg	N	63.5			71			11.15
VOLATILES	Acetone	mg/kg	N	0.017	J B	B	0.028		J	48.89
VOLATILES	Methylene chloride	mg/kg	N	0.0088	B	B	0.0066	U	U	28.57
VOLATILES	Toluene	mg/kg	N	0.00071	J	J	0.0066	U	U	161.15

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				WARP-DP13			WARP-DP13			Percent
SAMPLE_NO				BD0025			BD0026			Difference
SAMPLE_DATE				27-Sep-01			27-Sep-01			
SAMPLE_PURPOSE				REG			FD			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Dinitrotoluene, 2,4-	mg/kg	N	0.29			0.27			7.14
EXPLOSIVES	Trinitrobenzene, 1,3,5	mg/kg	N	0.16	J	J	0.11	J	J	37.04
METALS	Aluminum	mg/kg	N	4340			4900			12.12
METALS	Arsenic	mg/kg	N	2.6			2.8			7.41
METALS	Barium	mg/kg	N	32.6			31.5			3.43
METALS	Beryllium	mg/kg	N	0.34	B	B	0.38	B	B	11.11
METALS	Cadmium	mg/kg	N	0.11	B	J	0.13	B	J	16.67
METALS	Calcium	mg/kg	N	974			1070			9.39
METALS	Chromium	mg/kg	N	6.4			7			8.96
METALS	Cobalt	mg/kg	N	5.5	B	J	5.6	B	J	1.80
METALS	Copper	mg/kg	N	4.9			5.3			7.84
METALS	Iron	mg/kg	N	8370			9070			8.03
METALS	Lead	mg/kg	N	5.7			6.1			6.78
METALS	Magnesium	mg/kg	N	901			991			9.51
METALS	Manganese	mg/kg	N	184		J	198		J	7.33
METALS	Mercury	mg/kg	N	0.017	B	J	0.015	B	J	12.50
METALS	Nickel	mg/kg	N	7.4			7.9			6.54
METALS	Potassium	mg/kg	N	328	B	J	360	B	J	9.30
METALS	Sodium	mg/kg	N	387	B	J	466	B	J	18.52
METALS	Vanadium	mg/kg	N	12.1			13			7.17
METALS	Zinc	mg/kg	N	23.3			25.4			8.62
VOLATILES	Acetone	mg/kg	N	0.33		J	0.089		J	115.04
VOLATILES	Ethylbenzene	mg/kg	N	0.0013	J	J	0.001	J	J	26.09
VOLATILES	Methylene chloride	mg/kg	N	0.0081	B	B	0.008	B	B	1.24
VOLATILES	Toluene	mg/kg	N	0.0038	J	J	0.002	J	J	62.07

TABLE L-3

Summary of Original, Field Duplicate and Field Split Hits
Relative Percent Difference Calculations
Plum Brook Ordnance Works

GROUP_NAME				BASEWIDE			BASEWIDE			Relative
LOCATION_CODE				WARP-DP13			WARP-DP13			Percent
SAMPLE_NO				BD0027			BD0028			Difference
SAMPLE_DATE				27-Sep-01			27-Sep-01			
SAMPLE_PURPOSE				FS			REG			
Test Group	Parameter	Units	Filtered	Result	Qual	ValQual	Result	Qual	ValQual	
EXPLOSIVES	Amino-2,6-dinitrotoluene, 4-	mg/kg	N	0.14	J	J	0.75	U	U	137.08
EXPLOSIVES	Dinitrobenzene, 1,3-	mg/kg	N	0.32		J	2.4			152.94
EXPLOSIVES	Dinitrotoluene, 2,4-	mg/kg	N	0.25	U	U	6.5			185.19
EXPLOSIVES	Dinitrotoluene, 2,6-	mg/kg	N	0.26	U	U	0.64	J	J	84.44
EXPLOSIVES	RDX	mg/kg	N	0.37	J	J	1.5	I U	U	120.86
EXPLOSIVES	Trinitrobenzene, 1,3,5-	mg/kg	N	1.6		J	11			149.21
EXPLOSIVES	Trinitrotoluene, 2,4,6-	mg/kg	N	0.18	J	J	0.75	I U	U	122.58
METALS	Aluminum	mg/kg	N	11000			11400			3.57
METALS	Antimony	mg/kg	N	1.2	B	J	0.64	B	J	60.87
METALS	Arsenic	mg/kg	N	13			20.3			43.84
METALS	Barium	mg/kg	N	72			73.5			2.06
METALS	Beryllium	mg/kg	N	0.62	B	J	0.79			24.11
METALS	Cadmium	mg/kg	N	0.15	B	J	0.27	B	J	57.14
METALS	Calcium	mg/kg	N	48000			23100			70.04
METALS	Chromium	mg/kg	N	18			18.7			3.81
METALS	Cobalt	mg/kg	N	11			13.8			22.58
METALS	Copper	mg/kg	N	26			23.5			10.10
METALS	Iron	mg/kg	N	30000			30300			1.00
METALS	Lead	mg/kg	N	13			10.6			20.34
METALS	Magnesium	mg/kg	N	12000			9230			26.10
METALS	Manganese	mg/kg	N	610			592		J	3.00
METALS	Nickel	mg/kg	N	33			36.9			11.16
METALS	Potassium	mg/kg	N	1900			1790			5.96
METALS	Selenium	mg/kg	N	0.85	B	B	0.64	U	U	28.19
METALS	Sodium	mg/kg	N	350			244	B	J	35.69
METALS	Thallium	mg/kg	N	2.6	U	U	0.94	B	B	93.79
METALS	Vanadium	mg/kg	N	24			26.1			8.38
METALS	Zinc	mg/kg	N	64			75.7			16.75
VOLATILES	Methylene chloride	mg/kg	N	0.0052	U	U	0.0081	B	B	43.61
VOLATILES	Toluene	mg/kg	N	0.0052	U	U	0.00081	J	J	146.09

Table L-4
Summary of Data Validation Reason Codes
Plum Brook Ordnance Works

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	
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	
999	See hard copy for details.

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
01-09-139	BD0027	Explosives	1,3,5-Trinitrobenzene	J	18			
01-09-139	BD0027	Explosives	1,3-Dinitrobenzene	J	18			
01-09-139	BD0027	Explosives	4-Amino-2,6-Dinitrotoluene	J	18	15		
01-09-139	BD0027	Explosives	RDX	J	15	18		
01-09-139	BD0027	Metals	Selenium	B	06A	15		
01-09-139	BD0027	Volatiles	Acetone	R	04A	05A		
01-09-139	BD0027	Volatiles	Naphthalene	B	05B	06A	11A	11B
01-09-139	BD0031	Explosives	2,4-Dinitrotoluene	J	15	18		
01-09-139	BD0031	Explosives	2-Amino-4,6-Dinitrotoluene	J	18			
01-09-139	BD0031	Explosives	4-Amino-2,6-Dinitrotoluene	J	18			
01-09-139	BD0031	SPLP Explosives	1,3,5-Trinitrobenzene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	1,3-Dinitrobenzene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	2,4,6-Trinitrotoluene	J	07A			
01-09-139	BD0031	SPLP Explosives	2,4-Dinitrotoluene	J	07A	18		
01-09-139	BD0031	SPLP Explosives	2,6-Dinitrotoluene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	2-Amino-4,6-Dinitrotoluene	J	07A	18		
01-09-139	BD0031	SPLP Explosives	2-Nitrotoluene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	3-Nitrotoluene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	4-Amino-2,6-Dinitrotoluene	J	07A	18		
01-09-139	BD0031	SPLP Explosives	4-Nitrotoluene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	HMX	UJ	07A			
01-09-139	BD0031	SPLP Explosives	Nitrobenzene	UJ	07A			
01-09-139	BD0031	SPLP Explosives	RDX	UJ	07A			
01-09-139	BD0031	SPLP Explosives	Tetryl	UJ	07A			
01-09-139	BD0031	Volatiles	Acetone	R	04A	05A		
01-09-139	BD0031	Volatiles	Naphthalene	B	05B	06A	11A	11B
01-09-139	BD0032	Explosives	1,3,5-Trinitrobenzene	J	18			
01-09-139	BD0032	Explosives	1,3-Dinitrobenzene	J	18			
01-09-139	BD0032	Explosives	2,4,6-Trinitrotoluene	J	18			
01-09-139	BD0032	Explosives	2,6-Dinitrotoluene	J	18			
01-09-139	BD0032	Explosives	4-Amino-2,6-Dinitrotoluene	J	15	18		
01-09-139	BD0032	Explosives	RDX	J	18			
01-09-139	BD0032	Metals	Selenium	B	06A	15		
01-09-139	BD0032	SPLP Explosives	1,3,5-Trinitrobenzene	J	07A			
01-09-139	BD0032	SPLP Explosives	1,3-Dinitrobenzene	J	07A	18		
01-09-139	BD0032	SPLP Explosives	2,4,6-Trinitrotoluene	J	07A	18		
01-09-139	BD0032	SPLP Explosives	2,4-Dinitrotoluene	J	07A			
01-09-139	BD0032	SPLP Explosives	2,6-Dinitrotoluene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	2-Amino-4,6-Dinitrotoluene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	2-Nitrotoluene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	3-Nitrotoluene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	4-Amino-2,6-Dinitrotoluene	J	07A	18		
01-09-139	BD0032	SPLP Explosives	4-Nitrotoluene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	HMX	UJ	07A			
01-09-139	BD0032	SPLP Explosives	Nitrobenzene	UJ	07A			
01-09-139	BD0032	SPLP Explosives	RDX	J	07A	18		
01-09-139	BD0032	SPLP Explosives	Tetryl	UJ	07A			

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
01-09-139	BD0032	Volatiles	Acetone	J	04A	05A		
01-09-139	BD0032	Volatiles	Naphthalene	B	05B	06A	11A	11B
01-10-024	BD3045	Explosives	1,3,5-Trinitrobenzene	R	07A			
01-10-024	BD3045	Explosives	1,3-Dinitrobenzene	R	07A			
01-10-024	BD3045	Explosives	2,4,6-Trinitrololuene	R	07A			
01-10-024	BD3045	Explosives	2,4-Dinitrotoluene	R	05B	07A		
01-10-024	BD3045	Explosives	2,6-Dinitrotoluene	R	05B	07A		
01-10-024	BD3045	Explosives	2-Amino-4,6-Dinitrotoluene	J	15	07A		
01-10-024	BD3045	Explosives	2-Nitrotoluene	R	07A			
01-10-024	BD3045	Explosives	3-Nitrotoluene	R	07A			
01-10-024	BD3045	Explosives	4-Amino-2,6-Dinitrotoluene	R	07A			
01-10-024	BD3045	Explosives	4-Nitrotoluene	R	07A			
01-10-024	BD3045	Explosives	HMX	R	07A			
01-10-024	BD3045	Explosives	Nitrobenzene	R	07A			
01-10-024	BD3045	Explosives	RDX	R	07A			
01-10-024	BD3045	Explosives	Tetryl	R	08A	11B	07A	
01-10-024	BD3045	Metals	Aluminum	B	06B	15		
01-10-024	BD3045	Metals	Antimony	B	06B	15		
01-10-024	BD3045	Metals	Chromium	B	06A	06B	15	
01-10-024	BD3045	Metals	Mercury	UJ	01A			
01-10-024	BD3045	Semivolatiles	Benzidine	UJ	11A			
01-10-024	BD3045	Semivolatiles	Hexachlorocyclopentadiene	UJ	11A			
01-10-024	BD3045	Volatiles	Acetone	B	04A	05A	06D	
01-10-024	BD3045	Volatiles	Methylene chloride	B	06A	06D	11A	15
01-10-024	BD3045(F)	Metals	Aluminum	UJ	01A			
01-10-024	BD3045(F)	Metals	Antimony	UJ	01A			
01-10-024	BD3045(F)	Metals	Arsenic	UJ	01A			
01-10-024	BD3045(F)	Metals	Barium	J	01A			
01-10-024	BD3045(F)	Metals	Beryllium	UJ	01A			
01-10-024	BD3045(F)	Metals	Cadmium	UJ	01A			
01-10-024	BD3045(F)	Metals	Calcium	J	01A			
01-10-024	BD3045(F)	Metals	Chromium	B	06B	06A	15	01A
01-10-024	BD3045(F)	Metals	Cobalt	B	06B	15	01A	
01-10-024	BD3045(F)	Metals	Copper	UJ	01A			
01-10-024	BD3045(F)	Metals	Iron	B	06A	06B	15	
01-10-024	BD3045(F)	Metals	Lead	UJ	01A			
01-10-024	BD3045(F)	Metals	Magnesium	J	01A			
01-10-024	BD3045(F)	Metals	Managanese	J	15	01A		
01-10-024	BD3045(F)	Metals	Nickel	J	15	01A		
01-10-024	BD3045(F)	Metals	Potassium	J	01A			
01-10-024	BD3045(F)	Metals	Selenium	UJ	01A			
01-10-024	BD3045(F)	Metals	Silver	UJ	01A			
01-10-024	BD3045(F)	Metals	Sodium	J	01A			
01-10-024	BD3045(F)	Metals	Thallium	UJ	01A			
01-10-024	BD3045(F)	Metals	Vanadium	UJ	01A			
01-10-024	BD3045(F)	Metals	Zinc	UJ	01A			
01-10-024	BD3047	Explosives	1,3,5-Trinitrobenzene	R	07A			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
01-10-024	BD3047	Explosives	1,3-Dinitrobenzene	R	07A			
01-10-024	BD3047	Explosives	2,4,6-Trinitrololuene	J	15	07A		
01-10-024	BD3047	Explosives	2,4-Dinitrotoluene	R	07A			
01-10-024	BD3047	Explosives	2,6-Dinitrotoluene	R	05B	07A		
01-10-024	BD3047	Explosives	2-Amino-4,6-Dinitrotoluene	J	15	07A		
01-10-024	BD3047	Explosives	2-Nitrotoluene	R	07A			
01-10-024	BD3047	Explosives	3-Nitrotoluene	R	07A			
01-10-024	BD3047	Explosives	4-Amino-2,6-Dinitrotoluene	R	07A			
01-10-024	BD3047	Explosives	4-Nitrotoluene	R	07A			
01-10-024	BD3047	Explosives	HMX	R	07A			
01-10-024	BD3047	Explosives	Nitrobenzene	R	07A			
01-10-024	BD3047	Explosives	RDX	R	07A			
01-10-024	BD3047	Explosives	Tetryl	R	08A	11B	07A	
01-10-024	BD3047	Metals	Aluminum	B	06B	15		
01-10-024	BD3047	Metals	Iron	B	06A	06B	15	
01-10-024	BD3047	Metals	Zinc	B	06B	15		
01-10-024	BD3047	Semivolatiles	Benzidine	UJ	11A			
01-10-024	BD3047	Semivolatiles	Hexachlorocyclopentadiene	UJ	11A			
01-10-024	BD3047	Volatiles	Acetone	B	04A	05A	06D	15
01-10-024	BD3047	Volatiles	Acrolein	R	04A	05A		
01-10-024	BD3047	Volatiles	Methylene chloride	B	06A	06D	11A	15
01-10-024	BD3047(F)	Metals	Iron	B	06A	06B	15	
01-10-024	BD3047(F)	Metals	Zinc	B	06B	15		
01-10-024	BD3049	Explosives	2,6-Dinitrotoluene	UJ	05B			
01-10-024	BD3049	Explosives	Tetryl	UJ	08A	11B		
01-10-024	BD3049	Metals	Aluminum	B	06B	15		
01-10-024	BD3049	Metals	Cobalt	B	06B	15		
01-10-024	BD3049	Semivolatiles	Benzidine	UJ	11A			
01-10-024	BD3049	Semivolatiles	Hexachlorocyclopentadiene	UJ	11A			
01-10-024	BD3049	Volatiles	Acetone	B	04A	05A	06D	
01-10-024	BD3049	Volatiles	Methylene chloride	B	06A	06D	11A	15
01-10-024	BD3049(F)	Metals	Cobalt	B	06B	15		
01-10-024	BD3051	Explosives	2,6-Dinitrotoluene	UJ	05B			
01-10-024	BD3051	Explosives	Tetryl	UJ	08A	11B		
01-10-024	BD3051	Metals	Cobalt	B	06B	15		
01-10-024	BD3051	Metals	Zinc	B	06B	15		
01-10-024	BD3051	Semivolatiles	Benzoic acid	UJ	11A			
01-10-024	BD3051	Semivolatiles	Hexachlorocyclopentadiene	UJ	11B			
01-10-024	BD3051	Volatiles	Acetone	R	04A	05A		
01-10-024	BD3051	Volatiles	Acrolein	R	04A	05A		
01-10-024	BD3051	Volatiles	Methylene chloride	B	06A	06D	11A	15
01-10-024	BD3051(F)	Metals	Aluminum	B	06B	15		
01-10-024	BD3051(F)	Metals	Cobalt	B	06B	15		
01-10-024	BD3051(F)	Metals	Managanese	B	06B			
01-10-024	BD3051(F)	Metals	Zinc	B	06B	15		
H1I270167	BD0003	Explosives	2,4,6-Trinitrololuene	UJ	05B			
H1I270167	BD0003	Metals	Aluminum	J	13			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1I270167	BD0003	Metals	Arsenic	J	13			
H1I270167	BD0003	Metals	Beryllium	B	06B			
H1I270167	BD0003	Metals	Calcium	J	08A	13		
H1I270167	BD0003	Metals	Chromium	J	13			
H1I270167	BD0003	Metals	Cobalt	J	13			
H1I270167	BD0003	Metals	Iron	J	13			
H1I270167	BD0003	Metals	Lead	J	13			
H1I270167	BD0003	Metals	Magnesium	J	08A			
H1I270167	BD0003	Metals	Managanese	J	13			
H1I270167	BD0003	Metals	Mercury	B	06B	15		
H1I270167	BD0003	Metals	Nickel	J	13			
H1I270167	BD0003	Metals	Sodium	J	13			
H1I270167	BD0003	Metals	Thallium	B	06B	15		
H1I270167	BD0003	Metals	Vanadium	J	13			
H1I270167	BD0003	Metals	Zinc	J	13			
H1I270167	BD0003	Volatiles	Acetone	B	06A	05B	15	
H1I270167	BD0003	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0003	Volatiles	Methylene chloride	B	06A	04B	15	
H1I270167	BD0004	Explosives	2,4,6-Trinitrololuene	UJ	05B			
H1I270167	BD0004	Metals	Aluminum	J	13			
H1I270167	BD0004	Metals	Arsenic	J	13			
H1I270167	BD0004	Metals	Beryllium	B	06B			
H1I270167	BD0004	Metals	Calcium	J	08A	13		
H1I270167	BD0004	Metals	Chromium	J	13			
H1I270167	BD0004	Metals	Cobalt	J	13			
H1I270167	BD0004	Metals	Iron	J	13			
H1I270167	BD0004	Metals	Lead	J	13			
H1I270167	BD0004	Metals	Magnesium	J	08A			
H1I270167	BD0004	Metals	Managanese	J	13			
H1I270167	BD0004	Metals	Mercury	B	06B	15		
H1I270167	BD0004	Metals	Nickel	J	13			
H1I270167	BD0004	Metals	Sodium	J	13			
H1I270167	BD0004	Metals	Vanadium	J	13			
H1I270167	BD0004	Metals	Zinc	J	13			
H1I270167	BD0004	Volatiles	Acetone	B	06A	05B	15	
H1I270167	BD0004	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0004	Volatiles	Methylene chloride	B	06A	04B	15	
H1I270167	BD0005	Metals	Aluminum	J	13			
H1I270167	BD0005	Metals	Arsenic	J	13			
H1I270167	BD0005	Metals	Beryllium	B	06B	15		
H1I270167	BD0005	Metals	Cadmium	B	06B	15		
H1I270167	BD0005	Metals	Calcium	J	08A	13		
H1I270167	BD0005	Metals	Chromium	J	13			
H1I270167	BD0005	Metals	Cobalt	J	13	15		
H1I270167	BD0005	Metals	Iron	J	13			
H1I270167	BD0005	Metals	Lead	J	13			
H1I270167	BD0005	Metals	Magnesium	J	08A			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1I270167	BD0005	Metals	Managanese	J	13			
H1I270167	BD0005	Metals	Mercury	B	06B	15		
H1I270167	BD0005	Metals	Nickel	J	13			
H1I270167	BD0005	Metals	Sodium	J	13			
H1I270167	BD0005	Metals	Vanadium	J	13			
H1I270167	BD0005	Metals	Zinc	J	13			
H1I270167	BD0005	Volatiles	Acetone	B	06A	05B	15	
H1I270167	BD0005	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0005	Volatiles	Methylene chloride	B	06A	04B		
H1I270167	BD0006	Metals	Aluminum	J	13			
H1I270167	BD0006	Metals	Arsenic	J	13			
H1I270167	BD0006	Metals	Beryllium	B	06B	15		
H1I270167	BD0006	Metals	Cadmium	B	06B	15		
H1I270167	BD0006	Metals	Calcium	J	08A	13		
H1I270167	BD0006	Metals	Chromium	J	13			
H1I270167	BD0006	Metals	Cobalt	J	13			
H1I270167	BD0006	Metals	Iron	J	13			
H1I270167	BD0006	Metals	Lead	J	13			
H1I270167	BD0006	Metals	Magnesium	J	08A			
H1I270167	BD0006	Metals	Managanese	J	13			
H1I270167	BD0006	Metals	Mercury	B	06B	15		
H1I270167	BD0006	Metals	Nickel	J	13			
H1I270167	BD0006	Metals	Sodium	J	13			
H1I270167	BD0006	Metals	Vanadium	J	13			
H1I270167	BD0006	Metals	Zinc	J	13			
H1I270167	BD0006	Volatiles	1,1,2,2-Tetrachloroethane	UJ	10A			
H1I270167	BD0006	Volatiles	Acetone	B	06A	04B	15	
H1I270167	BD0006	Volatiles	Bromoform	UJ	10A			
H1I270167	BD0006	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0006	Volatiles	Methylene chloride	B	06A	04B		
H1I270167	BD0007	Metals	Aluminum	J	13			
H1I270167	BD0007	Metals	Arsenic	J	13			
H1I270167	BD0007	Metals	Beryllium	B	06B	15		
H1I270167	BD0007	Metals	Calcium	J	08A	13		
H1I270167	BD0007	Metals	Chromium	J	13			
H1I270167	BD0007	Metals	Cobalt	B	06B	15		
H1I270167	BD0007	Metals	Iron	J	13			
H1I270167	BD0007	Metals	Lead	J	13			
H1I270167	BD0007	Metals	Magnesium	J	08A			
H1I270167	BD0007	Metals	Managanese	J	13			
H1I270167	BD0007	Metals	Nickel	J	13			
H1I270167	BD0007	Metals	Vanadium	J	13			
H1I270167	BD0007	Metals	Zinc	J	13			
H1I270167	BD0007	SPLP Explosives	Tetryl	UJ	05B			
H1I270167	BD0007	Volatiles	1,1,2,2-Tetrachloroethane	UJ	10A			
H1I270167	BD0007	Volatiles	2-Hexanone	UJ	10A			
H1I270167	BD0007	Volatiles	4-Methyl-2-pentanone	UJ	10A			

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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 [1,2]			
					R1	R2	R3	R4
H1I270167	BD0007	Volatiles	Acetone	B	06A	05B	15	
H1I270167	BD0007	Volatiles	Bromoform	UJ	10A			
H1I270167	BD0007	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0007	Volatiles	Chlorobenzene	UJ	10A			
H1I270167	BD0007	Volatiles	Ethylbenzene	UJ	10A			
H1I270167	BD0007	Volatiles	Methylene chloride	B	06A	04B		
H1I270167	BD0007	Volatiles	Styrene	UJ	10A			
H1I270167	BD0007	Volatiles	Tetrachloroethene	UJ	10A			
H1I270167	BD0007	Volatiles	Toluene	J	07A	10A	15	
H1I270167	BD0007	Volatiles	trans-1,3-Dichloropropene	UJ	10A			
H1I270167	BD0007	Volatiles	Total xylenes	UJ	10A			
H1I270167	BD0008	Metals	Aluminum	J	13			
H1I270167	BD0008	Metals	Arsenic	J	13			
H1I270167	BD0008	Metals	Beryllium	B	06B	15		
H1I270167	BD0008	Metals	Cadmium	B	06B			
H1I270167	BD0008	Metals	Calcium	J	08A	13		
H1I270167	BD0008	Metals	Chromium	J	13			
H1I270167	BD0008	Metals	Cobalt	J	13			
H1I270167	BD0008	Metals	Iron	J	13			
H1I270167	BD0008	Metals	Lead	J	13			
H1I270167	BD0008	Metals	Magnesium	J	08A			
H1I270167	BD0008	Metals	Managanese	J	13			
H1I270167	BD0008	Metals	Mercury	B	06B			
H1I270167	BD0008	Metals	Nickel	J	13			
H1I270167	BD0008	Metals	Sodium	J	13	15		
H1I270167	BD0008	Metals	Thallium	B	06B	15		
H1I270167	BD0008	Metals	Vanadium	J	13			
H1I270167	BD0008	Metals	Zinc	J	13			
H1I270167	BD0008	SPLP Explosives	2,4-Dinitrotoluene	B	06A			
H1I270167	BD0008	SPLP Explosives	Tetryl	UJ	05B			
H1I270167	BD0008	Volatiles	1,1,2,2-Tetrachloroethane	UJ	10A			
H1I270167	BD0008	Volatiles	Acetone	B	06A	05B		
H1I270167	BD0008	Volatiles	Bromoform	UJ	10A			
H1I270167	BD0008	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0008	Volatiles	Methylene chloride	B	06A	04B		
H1I270167	BD0009	Explosives	2,4,6-Trinitrololuene	J	17			
H1I270167	BD0009	Metals	Aluminum	J	13			
H1I270167	BD0009	Metals	Arsenic	J	13			
H1I270167	BD0009	Metals	Barium	J	17			
H1I270167	BD0009	Metals	Beryllium	B	06B	15		
H1I270167	BD0009	Metals	Cadmium	B	06B	15		
H1I270167	BD0009	Metals	Calcium	J	08A	13		
H1I270167	BD0009	Metals	Chromium	J	13			
H1I270167	BD0009	Metals	Cobalt	B	06B	13	15	
H1I270167	BD0009	Metals	Copper	B	06B			
H1I270167	BD0009	Metals	Iron	J	13			
H1I270167	BD0009	Metals	Lead	J	13			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1I270167	BD0009	Metals	Magnesium	J	08A			
H1I270167	BD0009	Metals	Managanese	J	13			
H1I270167	BD0009	Metals	Mercury	B	06B	17		
H1I270167	BD0009	Metals	Nickel	J	13			
H1I270167	BD0009	Metals	Sodium	J	13	15		
H1I270167	BD0009	Metals	Vanadium	J	13			
H1I270167	BD0009	Metals	Zinc	J	13			
H1I270167	BD0009	SPLP Explosives	Tetryl	UJ	05B			
H1I270167	BD0009	Volatiles	Acetone	J	17			
H1I270167	BD0009	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0009	Volatiles	Methylene chloride	B	06A	04B		
H1I270167	BD0010	Explosives	2,4,6-Trinitrololuene	J	17			
H1I270167	BD0010	Metals	Aluminum	J	13			
H1I270167	BD0010	Metals	Arsenic	J	13			
H1I270167	BD0010	Metals	Barium	J	15	17		
H1I270167	BD0010	Metals	Beryllium	B	06B	15		
H1I270167	BD0010	Metals	Cadmium	B	06B	15		
H1I270167	BD0010	Metals	Calcium	J	08A	13		
H1I270167	BD0010	Metals	Chromium	J	13			
H1I270167	BD0010	Metals	Cobalt	B	06B	13	15	
H1I270167	BD0010	Metals	Iron	J	13			
H1I270167	BD0010	Metals	Lead	J	13			
H1I270167	BD0010	Metals	Magnesium	J	08A			
H1I270167	BD0010	Metals	Managanese	J	13			
H1I270167	BD0010	Metals	Mercury	B	06B	17		
H1I270167	BD0010	Metals	Nickel	J	13			
H1I270167	BD0010	Metals	Vanadium	J	13			
H1I270167	BD0010	Metals	Zinc	J	13			
H1I270167	BD0010	SPLP Explosives	Tetryl	UJ	05B			
H1I270167	BD0010	Volatiles	Acetone	J	17			
H1I270167	BD0010	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0010	Volatiles	Methylene chloride	B	06A	05B		
H1I270167	BD0012	Metals	Aluminum	J	13			
H1I270167	BD0012	Metals	Arsenic	J	13			
H1I270167	BD0012	Metals	Beryllium	B	06B			
H1I270167	BD0012	Metals	Cadmium	B	06B	15		
H1I270167	BD0012	Metals	Calcium	J	08A	13		
H1I270167	BD0012	Metals	Chromium	J	13			
H1I270167	BD0012	Metals	Cobalt	J	13			
H1I270167	BD0012	Metals	Iron	J	13			
H1I270167	BD0012	Metals	Lead	J	13			
H1I270167	BD0012	Metals	Magnesium	J	08A			
H1I270167	BD0012	Metals	Managanese	J	13			
H1I270167	BD0012	Metals	Nickel	J	13			
H1I270167	BD0012	Metals	Sodium	J	13	15		
H1I270167	BD0012	Metals	Vanadium	J	13			
H1I270167	BD0012	Metals	Zinc	J	13			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1I270167	BD0012	SPLP Explosives	Tetryl	UJ	05B			
H1I270167	BD0012	Volatiles	Acetone	J	05B	15		
H1I270167	BD0012	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD0012	Volatiles	Methylene chloride	B	06A	04B	15	
H1I270167	BD3026	Alkalinity	Alkalinity	J	02A			
H1I270167	BD3026	Metals	Aluminum	J	13			
H1I270167	BD3026	Metals	Calcium	J	08A	13		
H1I270167	BD3026	Metals	Chromium	B	06A	13	15	
H1I270167	BD3026	Metals	Cobalt	J	13	15		
H1I270167	BD3026	Metals	Copper	B	06A	15		
H1I270167	BD3026	Metals	Iron	J	13			
H1I270167	BD3026	Metals	Magnesium	J	08A			
H1I270167	BD3026	Metals	Managanese	J	13			
H1I270167	BD3026	Metals	Nickel	J	13	15		
H1I270167	BD3026	Metals	Potassium	J	13	15		
H1I270167	BD3026	Metals	Sodium	J	13			
H1I270167	BD3026	Metals	Zinc		13	15	06A	
H1I270167	BD3026	Semivolatiles	2,4-Dinitrophenol	UJ	04B			
H1I270167	BD3026	Sulfate	Sulfate	UJ	02B			
H1I270167	BD3026	Volatiles	Bromomethane	UJ	05B	04B		
H1I270167	BD3026	Volatiles	Chloromethane	UJ	05B			
H1I270167	BD3026	Volatiles	Methylene chloride	UJ	04B			
H1I270167	BD3026(F)	Metals	Aluminum	B	06B	15		
H1I270167	BD3026(F)	Metals	Copper	B	06B	15		
H1I270167	BD3026(F)	Metals	Potassium	J	13	15		
H1I280106	BD0001	Metals	Managanese	J	08A			
H1I280106	BD0001	Metals	Mercury	B	06B	15		
H1I280106	BD0001	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0001	Volatiles	Methylene chloride	B	06A	04B		
H1I280106	BD0002	Metals	Managanese	J	08A			
H1I280106	BD0002	Metals	Thallium	B	06B	15		
H1I280106	BD0002	Volatiles	1,1,2,2-Tetrachloroethane	UJ	10A			
H1I280106	BD0002	Volatiles	Acetone	B	05B	06A	15	
H1I280106	BD0002	Volatiles	Bromoform	UJ	10A			
H1I280106	BD0002	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0002	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0013	Volatiles	Acetone	B	05B	06A		
H1I280106	BD0013	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0013	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0014	Metals	Managanese	J	08A			
H1I280106	BD0014	Volatiles	1,1,2,2-Tetrachloroethane	UJ	10A			
H1I280106	BD0014	Volatiles	Acetone	J	05B			
H1I280106	BD0014	Volatiles	Bromoform	UJ	10A			
H1I280106	BD0014	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0014	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0015	Metals	Beryllium	B	06B	15		
H1I280106	BD0015	Metals	Managanese	J	08A			

Table L-5
Summary of Data Validation Qualifiers Assigned
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2)			
					R1	R2	R3	R4
H1I280106	BD0015	Metals	Mercury	B	06B	15		
H1I280106	BD0015	SPLP Explosives	Tetryl	UJ	05B			
H1I280106	BD0015	Volatiles	Acetone	B	05B	06A	15	
H1I280106	BD0015	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0015	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0016	Metals	Beryllium	B	06B	15		
H1I280106	BD0016	Metals	Managanese	J	08A			
H1I280106	BD0016	SPLP Explosives	Tetryl	UJ	05B			
H1I280106	BD0016	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0016	Volatiles	Chloromethane	UJ	05B			
H1I280106	BD0016	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0023	Explosives	4-Amino-2,6-Dinitrotoluene	UJ	05B			
H1I280106	BD0023	Metals	Beryllium	B	06B	15		
H1I280106	BD0023	Metals	Managanese	J	08A			
H1I280106	BD0023	Metals	Thallium	B	06B	15		
H1I280106	BD0023	SPLP Explosives	2,4-Dinitrotoluene	B	06A	15		
H1I280106	BD0023	Volatiles	Acetone	J	05B			
H1I280106	BD0023	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0023	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0024	Explosives	4-Amino-2,6-Dinitrotoluene	J	05B	15		
H1I280106	BD0024	Metals	Managanese	J	08A			
H1I280106	BD0024	Metals	Thallium	B	06B	15		
H1I280106	BD0024	SPLP Explosives	2,4-Dinitrotoluene	B	06A			
H1I280106	BD0024	Volatiles	Acetone	B	05B	06A	15	
H1I280106	BD0024	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0024	Volatiles	Methylene chloride	B	04B			
H1I280106	BD0025	Explosives	4-Amino-2,6-Dinitrotoluene	UJ	05B			
H1I280106	BD0025	Metals	Beryllium	B	06B	15		
H1I280106	BD0025	Metals	Managanese	J	08A			
H1I280106	BD0025	Volatiles	Acetone	J	17			
H1I280106	BD0025	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0025	Volatiles	Chloromethane	UJ	05B			
H1I280106	BD0025	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0025	Volatiles	Toluene	J	15	17		
H1I280106	BD0026	Explosives	4-Amino-2,6-Dinitrotoluene	UJ	05B			
H1I280106	BD0026	Metals	Beryllium	B	06B	15		
H1I280106	BD0026	Metals	Managanese	J	08A			
H1I280106	BD0026	Volatiles	Acetone	J	17			
H1I280106	BD0026	Volatiles	Bromomethane	UJ	04B	05B		
H1I280106	BD0026	Volatiles	Chloromethane	UJ	05B			
H1I280106	BD0026	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD0026	Volatiles	Toluene	J	15	17		
H1I280106	BD0028	Metals	Managanese	J	08A			
H1I280106	BD0028	Metals	Thallium	B	06B	15		
H1I280106	BD0028	SPLP Explosives	2,4-Dinitrotoluene	B	06A			
H1I280106	BD0028	Volatiles	Acetone	UJ	05B			
H1I280106	BD0028	Volatiles	Bromomethane	UJ	04B	05B		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1I280106	BD0028	Volatiles	Methylene chloride	B	04B	06A		
H1I280106	BD3005	Cyanide	Total Cyanide	UJ	01A			
H1I280106	BD3005	Metals	Aluminum	B	06A	06B	15	
H1I280106	BD3005	Metals	Chromium	B	06A	06B	15	
H1I280106	BD3005	Semivolatiles	2,4-Dinitrophenol	UJ	04B			
H1I280106	BD3005	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1I280106	BD3005	Volatiles	2-Butanone	R	04A	05A	05B	
H1I280106	BD3005	Volatiles	Acetone	B	04A	05A	06D	15
H1I280106	BD3005	Volatiles	Bromoform	UJ	04B	05B		
H1I280106	BD3005	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1I280106	BD3005	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3005	Volatiles	Dibromochloromethane	UJ	04B			
H1I280106	BD3005	Volatiles	Methylene chloride	B	06A	06D	15	
H1I280106	BD3005	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3005(F)	Metals	Aluminum	B	06B	15		
H1I280106	BD3005(F)	Metals	Thallium	B	06A	06B	15	
H1I280106	BD3007	Cyanide	Total Cyanide	UJ	01A			
H1I280106	BD3007	Metals	Aluminum	B	06A	06B	15	
H1I280106	BD3007	Metals	Chromium	B	06A	06B	15	
H1I280106	BD3007	Semivolatiles	2,4-Dinitrophenol	UJ	04B			
H1I280106	BD3007	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1I280106	BD3007	Volatiles	2-Butanone	R	04A	05A	05B	
H1I280106	BD3007	Volatiles	Acetone	R	04A	05A		
H1I280106	BD3007	Volatiles	Bromoform	UJ	04B	05B		
H1I280106	BD3007	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1I280106	BD3007	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3007	Volatiles	Dibromochloromethane	UJ	04B			
H1I280106	BD3007	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3007(F)	Metals	Aluminum	B	06B	15		
H1I280106	BD3010	Cyanide	Total Cyanide	UJ	01A			
H1I280106	BD3010	Metals	Aluminum	B	06A	06B	15	01A
H1I280106	BD3010	Metals	Antimony	UJ	01A			
H1I280106	BD3010	Metals	Arsenic	UJ	01A			
H1I280106	BD3010	Metals	Barium	J	01A			
H1I280106	BD3010	Metals	Beryllium	UJ	01A			
H1I280106	BD3010	Metals	Cadmium	UJ	01A			
H1I280106	BD3010	Metals	Calcium	J	01A			
H1I280106	BD3010	Metals	Chromium	UJ	01A			
H1I280106	BD3010	Metals	Cobalt	UJ	01A			
H1I280106	BD3010	Metals	Copper	B	06A	06B	15	
H1I280106	BD3010	Metals	Iron	UJ	01A			
H1I280106	BD3010	Metals	Lead	UJ	01A			
H1I280106	BD3010	Metals	Magnesium	J	01A			
H1I280106	BD3010	Metals	Managanese	J	01A			
H1I280106	BD3010	Metals	Mercury	UJ	01A			
H1I280106	BD3010	Metals	Nickel	UJ	01A			
H1I280106	BD3010	Metals	Potassium	J	01A			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2)			
					R1	R2	R3	R4
H1I280106	BD3010	Metals	Selenium	UJ	01A			
H1I280106	BD3010	Metals	Silver	UJ	01A			
H1I280106	BD3010	Metals	Sodium	J	01A			
H1I280106	BD3010	Metals	Thallium	UJ	01A			
H1I280106	BD3010	Metals	Vanadium	UJ	01A			
H1I280106	BD3010	Metals	Zinc	B	06A	15		
H1I280106	BD3010	Semivolatiles	2,4-Dinitrophenol	UJ	04B			
H1I280106	BD3010	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1I280106	BD3010	Volatiles	2-Butanone	R	04A	05A	05B	
H1I280106	BD3010	Volatiles	Acetone	B	04A	05A	15	
H1I280106	BD3010	Volatiles	Bromoform	UJ	04B	05B		
H1I280106	BD3010	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1I280106	BD3010	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3010	Volatiles	Dibromochloromethane	UJ	04B			
H1I280106	BD3010	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1I280106	BD3010(F)	Metals	Aluminum	B	06B	15	01A	
H1I280106	BD3010(F)	Metals	Antimony	UJ	01A			
H1I280106	BD3010(F)	Metals	Arsenic	UJ	01A			
H1I280106	BD3010(F)	Metals	Barium	J	01A			
H1I280106	BD3010(F)	Metals	Beryllium	UJ	01A			
H1I280106	BD3010(F)	Metals	Cadmium	UJ	01A			
H1I280106	BD3010(F)	Metals	Calcium	J	01A			
H1I280106	BD3010(F)	Metals	Chromium	UJ	01A			
H1I280106	BD3010(F)	Metals	Cobalt	UJ	01A			
H1I280106	BD3010(F)	Metals	Copper	UJ	01A			
H1I280106	BD3010(F)	Metals	Iron	UJ	01A			
H1I280106	BD3010(F)	Metals	Lead	UJ	01A			
H1I280106	BD3010(F)	Metals	Magnesium	J	01A			
H1I280106	BD3010(F)	Metals	Managanese	J	01A			
H1I280106	BD3010(F)	Metals	Mercury	UJ	01A			
H1I280106	BD3010(F)	Metals	Nickel	UJ	01A			
H1I280106	BD3010(F)	Metals	Potassium	J	01A			
H1I280106	BD3010(F)	Metals	Selenium	UJ	01A			
H1I280106	BD3010(F)	Metals	Silver	UJ	01A			
H1I280106	BD3010(F)	Metals	Sodium	J	01A			
H1I280106	BD3010(F)	Metals	Thallium	UJ	01A			
H1I280106	BD3010(F)	Metals	Vanadium	UJ	01A			
H1I280106	BD3010(F)	Metals	Zinc	UJ	01A			
H1J010131	BD3006	Semivolatiles	2,4-Dinitrophenol	UJ	04B	05B		
H1J010131	BD3009	Cyanide	Total Cyanide	UJ	01A			
H1J010131	BD3009	Semivolatiles	2,4-Dinitrophenol	UJ	04B	05B		
H1J010131	BD3018	Cyanide	Total Cyanide	UJ	01A			
H1J010131	BD3018	Metals	Aluminum	B	06B	15		
H1J010131	BD3018	Metals	Thallium	B	06B	15		
H1J010131	BD3018	Metals	Vanadium	B	06B	15		
H1J010131	BD3018	Semivolatiles	2,4-Dinitrophenol	UJ	04B	05B		
H1J010131	BD3018(F)	Metals	Aluminum	B	06B	15		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2)			
					R1	R2	R3	R4
H1J010131	BD3018(F)	Metals	Potassium	J	13			
H1J010131	BD3018(F)	Metals	Selenium	B	06B			
H1J010131	BD3018(F)	Metals	Thallium	B	06B	15		
H1J020107	BD3012	Alkalinity	TOTAL ALKALINITY	B	06A	15		
H1J020107	BD3012	Cyanide	Total Cyanide	UJ	01A			
H1J020107	BD3012	Metals	Cadmium	B	06B	15		
H1J020107	BD3012	Semivolatiles	2,4-Dinitrophenol	UJ	04B	05B		
H1J020107	BD3012	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J020107	BD3012	Volatiles	2-Butanone	R	04A	05A	05B	
H1J020107	BD3012	Volatiles	Acetone	B	04A	05A	06D	15
H1J020107	BD3012	Volatiles	Bromoform	UJ	04B	05B		
H1J020107	BD3012	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J020107	BD3012	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J020107	BD3012	Volatiles	Dibromochloromethane	UJ	04B			
H1J020107	BD3012	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J020107	BD3012(F)	Metals	Copper	B	06B	15		
H1J030106	BD0017R	Metals	Aluminum	J	13			
H1J030106	BD0017R	Metals	Arsenic	B	06B	13		
H1J030106	BD0017R	Metals	Barium	J	13			
H1J030106	BD0017R	Metals	Beryllium	B	06B	15		
H1J030106	BD0017R	Metals	Cadmium	B	06B	15		
H1J030106	BD0017R	Metals	Calcium	J	13			
H1J030106	BD0017R	Metals	Chromium	J	13			
H1J030106	BD0017R	Metals	Cobalt	J	13	15		
H1J030106	BD0017R	Metals	Iron	J	13			
H1J030106	BD0017R	Metals	Lead	J	13			
H1J030106	BD0017R	Metals	Magnesium	J	13			
H1J030106	BD0017R	Metals	Managanese	J	13			
H1J030106	BD0017R	Metals	Nickel	J	13			
H1J030106	BD0017R	Metals	Vanadium	J	13			
H1J030106	BD0017R	Metals	Zinc	J	13			
H1J030106	BD0017R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0017R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0017R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD0018R	Metals	Aluminum	J	13			
H1J030106	BD0018R	Metals	Arsenic	B	06B	13		
H1J030106	BD0018R	Metals	Barium	J	13	17		
H1J030106	BD0018R	Metals	Beryllium	B	06B	15		
H1J030106	BD0018R	Metals	Cadmium	B	06B	15		
H1J030106	BD0018R	Metals	Calcium	J	13			
H1J030106	BD0018R	Metals	Chromium	J	13			
H1J030106	BD0018R	Metals	Cobalt	J	13			
H1J030106	BD0018R	Metals	Iron	J	13			
H1J030106	BD0018R	Metals	Lead	J	13	17		
H1J030106	BD0018R	Metals	Magnesium	J	13			
H1J030106	BD0018R	Metals	Managanese	J	13			
H1J030106	BD0018R	Metals	Mercury	J	17			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1J030106	BD0018R	Metals	Nickel	J	13			
H1J030106	BD0018R	Metals	Vanadium	J	13			
H1J030106	BD0018R	Metals	Zinc	J	13			
H1J030106	BD0018R	Volatiles	Acetone	J	15	17		
H1J030106	BD0018R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0018R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0018R	Volatiles	Methylene chloride	B	06A	04A	15	
H1J030106	BD0019R	Metals	Aluminum	J	13			
H1J030106	BD0019R	Metals	Arsenic	B	06B	13		
H1J030106	BD0019R	Metals	Barium	J	13	17		
H1J030106	BD0019R	Metals	Beryllium	B	06B	15		
H1J030106	BD0019R	Metals	Cadmium	B	06B	15		
H1J030106	BD0019R	Metals	Calcium	J	13			
H1J030106	BD0019R	Metals	Chromium	J	13			
H1J030106	BD0019R	Metals	Cobalt	J	13			
H1J030106	BD0019R	Metals	Iron	J	13			
H1J030106	BD0019R	Metals	Lead	J	13	17		
H1J030106	BD0019R	Metals	Magnesium	J	13			
H1J030106	BD0019R	Metals	Managanese	J	13			
H1J030106	BD0019R	Metals	Mercury	J	15	17		
H1J030106	BD0019R	Metals	Nickel	J	13			
H1J030106	BD0019R	Metals	Vanadium	J	13			
H1J030106	BD0019R	Metals	Zinc	J	13			
H1J030106	BD0019R	Volatiles	Acetone	J	15	17		
H1J030106	BD0019R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0019R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0019R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD0021R	Metals	Aluminum	J	13			
H1J030106	BD0021R	Metals	Arsenic	B	06B	13		
H1J030106	BD0021R	Metals	Barium	J	13	15		
H1J030106	BD0021R	Metals	Beryllium	B	06B	15		
H1J030106	BD0021R	Metals	Cadmium	B	06B	15		
H1J030106	BD0021R	Metals	Calcium	J	13			
H1J030106	BD0021R	Metals	Chromium	J	13			
H1J030106	BD0021R	Metals	Cobalt	J	13	15		
H1J030106	BD0021R	Metals	Iron	J	13			
H1J030106	BD0021R	Metals	Lead	J	13			
H1J030106	BD0021R	Metals	Magnesium	J	13			
H1J030106	BD0021R	Metals	Managanese	J	13			
H1J030106	BD0021R	Metals	Nickel	J	13			
H1J030106	BD0021R	Metals	Vanadium	J	13			
H1J030106	BD0021R	Metals	Zinc	J	13			
H1J030106	BD0021R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0021R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0021R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD0022R	Metals	Aluminum	J	13			
H1J030106	BD0022R	Metals	Arsenic	B	06B	13		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1J030106	BD0022R	Metals	Barium	J	13			
H1J030106	BD0022R	Metals	Beryllium	B	06B	15		
H1J030106	BD0022R	Metals	Cadmium	B	06B	15		
H1J030106	BD0022R	Metals	Calcium	J	13			
H1J030106	BD0022R	Metals	Chromium	J	13			
H1J030106	BD0022R	Metals	Cobalt	J	13			
H1J030106	BD0022R	Metals	Iron	J	13			
H1J030106	BD0022R	Metals	Lead	J	13			
H1J030106	BD0022R	Metals	Magnesium	J	13			
H1J030106	BD0022R	Metals	Managanese	J	13			
H1J030106	BD0022R	Metals	Nickel	J	13			
H1J030106	BD0022R	Metals	Vanadium	J	13			
H1J030106	BD0022R	Metals	Zinc	J	13			
H1J030106	BD0022R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0022R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0022R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD0029R	Metals	Aluminum	J	13			
H1J030106	BD0029R	Metals	Arsenic	J	13			
H1J030106	BD0029R	Metals	Barium	J	13			
H1J030106	BD0029R	Metals	Beryllium	B	06B			
H1J030106	BD0029R	Metals	Cadmium	B	06B	15		
H1J030106	BD0029R	Metals	Calcium	J	13			
H1J030106	BD0029R	Metals	Chromium	J	13			
H1J030106	BD0029R	Metals	Cobalt	J	13			
H1J030106	BD0029R	Metals	Iron	J	13			
H1J030106	BD0029R	Metals	Lead	J	13			
H1J030106	BD0029R	Metals	Magnesium	J	13			
H1J030106	BD0029R	Metals	Managanese	J	13			
H1J030106	BD0029R	Metals	Nickel	J	13			
H1J030106	BD0029R	Metals	Vanadium	J	13			
H1J030106	BD0029R	Metals	Zinc	J	13			
H1J030106	BD0029R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0029R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0029R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD0030R	Metals	Aluminum	J	13			
H1J030106	BD0030R	Metals	Arsenic	J	13			
H1J030106	BD0030R	Metals	Barium	J	13			
H1J030106	BD0030R	Metals	Beryllium	B	06B			
H1J030106	BD0030R	Metals	Cadmium	B	06B	15		
H1J030106	BD0030R	Metals	Calcium	J	13			
H1J030106	BD0030R	Metals	Chromium	J	13			
H1J030106	BD0030R	Metals	Cobalt	J	13			
H1J030106	BD0030R	Metals	Iron	J	13			
H1J030106	BD0030R	Metals	Lead	J	13			
H1J030106	BD0030R	Metals	Magnesium	J	13			
H1J030106	BD0030R	Metals	Managanese	J	13			
H1J030106	BD0030R	Metals	Nickel	J	13			

Table L-5
Summary of Data Validation Qualifiers Assigned
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J030106	BD0030R	Metals	Vanadium	J	13			
H1J030106	BD0030R	Metals	Zinc	J	13			
H1J030106	BD0030R	Volatiles	Bromomethane	UJ	05B	04B		
H1J030106	BD0030R	Volatiles	Chloromethane	UJ	05B			
H1J030106	BD0030R	Volatiles	Methylene chloride	B	06A	04B	15	
H1J030106	BD3024	Cyanide	Total Cyanide	UJ	01A			
H1J030106	BD3024	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J030106	BD3024	Metals	Aluminum	B	06B	15		
H1J030106	BD3024	Nitrate	Nitrate	UJ	05B			
H1J030106	BD3024	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J030106	BD3024	Volatiles	2-Butanone	R	04A	05A	05B	
H1J030106	BD3024	Volatiles	Acetone	J	04A	05A	15	
H1J030106	BD3024	Volatiles	Bromoform	UJ	04B	05B		
H1J030106	BD3024	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J030106	BD3024	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J030106	BD3024	Volatiles	Dibromochloromethane	UJ	04B			
H1J030106	BD3024	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J030106	BD3024(F)	Metals	Aluminum	B	06B	15		
H1J040177	BD3008	Cyanide	Total Cyanide	UJ	01A			
H1J040177	BD3008	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J040177	BD3008	Metals	Potassium	J	13			
H1J040177	BD3008	Metals	Thallium	B	06B	15		
H1J040177	BD3008	Metals	Vanadium	B	15	06B		
H1J040177	BD3008	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J040177	BD3008	Volatiles	2-Butanone	R	04A	05A		
H1J040177	BD3008	Volatiles	Acetone	R	04A	05A	05B	
H1J040177	BD3008	Volatiles	Bromoform	UJ	04B	05B		
H1J040177	BD3008	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J040177	BD3008	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3008	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3008(F)	Metals	Aluminum	B	06B	15		
H1J040177	BD3008(F)	Metals	Thallium	B	06B	15		
H1J040177	BD3017	Cyanide	Total Cyanide	UJ	01A			
H1J040177	BD3017	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J040177	BD3017	Metals	Aluminum	J	01A			
H1J040177	BD3017	Metals	Antimony	UJ	01A			
H1J040177	BD3017	Metals	Arsenic	UJ	01A			
H1J040177	BD3017	Metals	Barium	J	01A			
H1J040177	BD3017	Metals	Beryllium	UJ	01A			
H1J040177	BD3017	Metals	Cadmium	UJ	01A			
H1J040177	BD3017	Metals	Calcium	J	01A			
H1J040177	BD3017	Metals	Chromium	UJ	01A			
H1J040177	BD3017	Metals	Cobalt	UJ	01A			
H1J040177	BD3017	Metals	Copper	J	15	01A		
H1J040177	BD3017	Metals	Iron	J	01A			
H1J040177	BD3017	Metals	Lead	UJ	01A			
H1J040177	BD3017	Metals	Magnesium	J	01A			

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Summary of Data Validation Qualifiers Assigned
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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2)			
					R1	R2	R3	R4
H1J040177	BD3017	Metals	Managanese	J	01A			
H1J040177	BD3017	Metals	Mercury	UJ	01A			
H1J040177	BD3017	Metals	Potassium	J	13	01A		
H1J040177	BD3017	Metals	Selenium	UJ	01A			
H1J040177	BD3017	Metals	Silver	UJ	01A			
H1J040177	BD3017	Metals	Sodium	J	01A			
H1J040177	BD3017	Metals	Thallium	B	06B	15	01A	
H1J040177	BD3017	Metals	Vanadium	UJ	01A			
H1J040177	BD3017	Metals	Zinc	J	15	01A		
H1J040177	BD3017	Volatiles	1,1,1-Trichloroethane	UJ	05B	01A		
H1J040177	BD3017	Volatiles	1,1,2,2-Tetrachloroethane	UJ	01A			
H1J040177	BD3017	Volatiles	1,1,2-Trichloroethane	UJ	01A			
H1J040177	BD3017	Volatiles	1,1-Dichloroethane	UJ	01A			
H1J040177	BD3017	Volatiles	1,1-Dichloroethene	UJ	01A			
H1J040177	BD3017	Volatiles	1,2-Dichloroethane	UJ	01A			
H1J040177	BD3017	Volatiles	1,2-Dichloroethene	UJ	01A			
H1J040177	BD3017	Volatiles	1,2-Dichloropropane	UJ	01A			
H1J040177	BD3017	Volatiles	2-Butanone	R	04A	05A	01A	
H1J040177	BD3017	Volatiles	2-Hexanone	UJ	01A			
H1J040177	BD3017	Volatiles	4-Methyl-2-pentanone	UJ	01A			
H1J040177	BD3017	Volatiles	Acetone	R	04A	05A	05B	01A
H1J040177	BD3017	Volatiles	Benzene	J	01A			
H1J040177	BD3017	Volatiles	Bromodichloromethane	UJ	01A			
H1J040177	BD3017	Volatiles	Bromoform	UJ	04B	05B	01A	
H1J040177	BD3017	Volatiles	Bromomethane	UJ	01A			
H1J040177	BD3017	Volatiles	Carbon disulfide	UJ	01A			
H1J040177	BD3017	Volatiles	Carbon tetrachloride	UJ	04B	05B	01A	
H1J040177	BD3017	Volatiles	Chlorobenzene	UJ	01A			
H1J040177	BD3017	Volatiles	Chloroethane	UJ	01A			
H1J040177	BD3017	Volatiles	Chloroform	UJ	01A			
H1J040177	BD3017	Volatiles	Chloromethane	UJ	01A			
H1J040177	BD3017	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B	01A	
H1J040177	BD3017	Volatiles	Dibromochloromethane	UJ	04B	01A		
H1J040177	BD3017	Volatiles	Ethylbenzene	J	01A			
H1J040177	BD3017	Volatiles	Methylene chloride	J	15	01A		
H1J040177	BD3017	Volatiles	Styrene	UJ	01A			
H1J040177	BD3017	Volatiles	Tetrachloroethene	UJ	01A			
H1J040177	BD3017	Volatiles	Toluene	J	01A			
H1J040177	BD3017	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B	01A	
H1J040177	BD3017	Volatiles	Trichloroethene	UJ	01A			
H1J040177	BD3017	Volatiles	Vinyl chloride	UJ	01A			
H1J040177	BD3017	Volatiles	Total xylenes	J	01A			
H1J040177	BD3017(F)	Metals	Aluminum	B	06B	15	01A	
H1J040177	BD3017(F)	Metals	Antimony	UJ	01A			
H1J040177	BD3017(F)	Metals	Arsenic	UJ	01A			
H1J040177	BD3017(F)	Metals	Barium	J	01A			
H1J040177	BD3017(F)	Metals	Beryllium	UJ	01A			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J040177	BD3017(F)	Metals	Cadmium	UJ	01A			
H1J040177	BD3017(F)	Metals	Calcium	J	01A			
H1J040177	BD3017(F)	Metals	Chromium	UJ	01A			
H1J040177	BD3017(F)	Metals	Cobalt	UJ	01A			
H1J040177	BD3017(F)	Metals	Copper	UJ	01A			
H1J040177	BD3017(F)	Metals	Iron	UJ	01A			
H1J040177	BD3017(F)	Metals	Lead	UJ	01A			
H1J040177	BD3017(F)	Metals	Magnesium	J	01A			
H1J040177	BD3017(F)	Metals	Managanese	J	01A			
H1J040177	BD3017(F)	Metals	Mercury	UJ	01A			
H1J040177	BD3017(F)	Metals	Nickel	UJ	01A			
H1J040177	BD3017(F)	Metals	Potassium	J	01A			
H1J040177	BD3017(F)	Metals	Selenium	UJ	01A			
H1J040177	BD3017(F)	Metals	Silver	UJ	01A			
H1J040177	BD3017(F)	Metals	Sodium	J	01A			
H1J040177	BD3017(F)	Metals	Thallium	UJ	01A			
H1J040177	BD3017(F)	Metals	Vanadium	UJ	01A			
H1J040177	BD3017(F)	Metals	Zinc	J	15	01A		
H1J040177	BD3021	Cyanide	Total Cyanide	UJ	01A			
H1J040177	BD3021	Explosives	2,6-Dinitrotoluene	J	05B			
H1J040177	BD3021	Metals	Potassium	J	13			
H1J040177	BD3021	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J040177	BD3021	Volatiles	2-Butanone	R	04A	05A		
H1J040177	BD3021	Volatiles	Acetone	B	04A	05A	05B	06D
H1J040177	BD3021	Volatiles	Bromoform	UJ	04B	05B		
H1J040177	BD3021	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J040177	BD3021	Volatiles	Dibromochloromethane	UJ	04B			
H1J040177	BD3021	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3021(F)	Metals	Aluminum	B	06B	15		
H1J040177	BD3034	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J040177	BD3034	Metals	Aluminum	J	01A			
H1J040177	BD3034	Metals	Antimony	UJ	01A			
H1J040177	BD3034	Metals	Arsenic	J	15	01A		
H1J040177	BD3034	Metals	Barium	J	15	01A		
H1J040177	BD3034	Metals	Beryllium	UJ	01A			
H1J040177	BD3034	Metals	Cadmium	B	06B	15	01A	
H1J040177	BD3034	Metals	Calcium	J	01A			
H1J040177	BD3034	Metals	Chromium	J	01A			
H1J040177	BD3034	Metals	Cobalt	J	15	01A		
H1J040177	BD3034	Metals	Copper	J	15	01A		
H1J040177	BD3034	Metals	Iron	J	01A			
H1J040177	BD3034	Metals	Lead	J	01A			
H1J040177	BD3034	Metals	Magnesium	J	01A			
H1J040177	BD3034	Metals	Managanese	J	01A			
H1J040177	BD3034	Metals	Mercury	UJ	01A			
H1J040177	BD3034	Metals	Nickel	J	15	01A		
H1J040177	BD3034	Metals	Potassium	J	13	01A		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1J040177	BD3034	Metals	Selenium	UJ	01A			
H1J040177	BD3034	Metals	Silver	UJ	01A			
H1J040177	BD3034	Metals	Sodium	J	01A			
H1J040177	BD3034	Metals	Thallium	UJ	01A			
H1J040177	BD3034	Metals	Vanadium	J	15	01A		
H1J040177	BD3034	Metals	Zinc	J	01A			
H1J040177	BD3034	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J040177	BD3034	Volatiles	2-Butanone	R	04A	05A		
H1J040177	BD3034	Volatiles	Acetone	B	04A	05A	05B	06D
H1J040177	BD3034	Volatiles	Bromoform	UJ	04B	05B		
H1J040177	BD3034	Volatiles	Carbon tetrachloride	UJ	05B	04B		
H1J040177	BD3034	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3034	Volatiles	Dibromochloromethane	UJ	04B			
H1J040177	BD3034	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3035	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J040177	BD3035	Metals	Aluminum	J	01A			
H1J040177	BD3035	Metals	Antimony	UJ	01A			
H1J040177	BD3035	Metals	Arsenic	J	15	01A		
H1J040177	BD3035	Metals	Barium	J	01A			
H1J040177	BD3035	Metals	Beryllium	UJ	01A			
H1J040177	BD3035	Metals	Cadmium	UJ	01A			
H1J040177	BD3035	Metals	Calcium	J	01A			
H1J040177	BD3035	Metals	Chromium	J	01A			
H1J040177	BD3035	Metals	Cobalt	J	15	01A		
H1J040177	BD3035	Metals	Copper	J	15	01A		
H1J040177	BD3035	Metals	Iron	J	01A			
H1J040177	BD3035	Metals	Lead	J	01A			
H1J040177	BD3035	Metals	Magnesium	J	01A			
H1J040177	BD3035	Metals	Managanese	J	01A			
H1J040177	BD3035	Metals	Mercury	UJ	01A			
H1J040177	BD3035	Metals	Nickel	J	15	01A		
H1J040177	BD3035	Metals	Potassium	J	13	01A		
H1J040177	BD3035	Metals	Selenium	UJ	01A			
H1J040177	BD3035	Metals	Silver	UJ	01A			
H1J040177	BD3035	Metals	Sodium	J	01A			
H1J040177	BD3035	Metals	Thallium	B	06B	15	01A	
H1J040177	BD3035	Metals	Vanadium	J	15	01A		
H1J040177	BD3035	Metals	Zinc	J	01A			
H1J040177	BD3035	Volatiles	2-Butanone	R	04A	05A	05B	
H1J040177	BD3035	Volatiles	Acetone	B	04A	05A	05B	06D
H1J040177	BD3035	Volatiles	Bromoform	UJ	04B			
H1J040177	BD3035	Volatiles	Carbon tetrachloride	UJ	04B			
H1J040177	BD3035	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3035	Volatiles	Dibromochloromethane	UJ	04B			
H1J040177	BD3035	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J040177	BD3035(F)	Metals	Thallium	B	06B	15		
H1J050186	BD3025	Cyanide	Total Cyanide	UJ	01A			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J050186	BD3025	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J050186	BD3025	Metals	Aluminum	B	06A	06B	15	
H1J050186	BD3025	Sulfate	Sulfate	J	05B			
H1J050186	BD3025	Volatiles	2-Butanone	R	04A	05A	05B	
H1J050186	BD3025	Volatiles	Acetone	B	06D	04A	05A	15
H1J050186	BD3025	Volatiles	Bromoform	UJ	04B	05B		
H1J050186	BD3025	Volatiles	Bromomethane	J	05B	15		
H1J050186	BD3025	Volatiles	Carbon tetrachloride	UJ	04B			
H1J050186	BD3025	Volatiles	Chloroethane	UJ	05B			
H1J050186	BD3025	Volatiles	cis-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3025	Volatiles	Dibromochloromethane	UJ	04B			
H1J050186	BD3025	Volatiles	Methylene chloride	J	15	17		
H1J050186	BD3025	Volatiles	trans-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3025(F)	Metals	Aluminum	B	06B	15		
H1J050186	BD3042	Alkalinity	TOTAL ALKALINITY	B	06B	15		
H1J050186	BD3042	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J050186	BD3042	Metals	Aluminum	B	06A	06B	15	
H1J050186	BD3042	Semivolatiles	2-Methylnaphthalene	J	15	17		
H1J050186	BD3042	Semivolatiles	Naphthalene	J	15	17		
H1J050186	BD3042	Sulfate	Sulfate	J	05B			
H1J050186	BD3042	Volatiles	2-Butanone	R	04A	05A	05B	
H1J050186	BD3042	Volatiles	Acetone	B	06D	04A	05A	15
H1J050186	BD3042	Volatiles	Bromoform	UJ	04B	05B		
H1J050186	BD3042	Volatiles	Bromomethane	UJ	05B			
H1J050186	BD3042	Volatiles	Carbon tetrachloride	UJ	04B			
H1J050186	BD3042	Volatiles	Chloroethane	UJ	05B			
H1J050186	BD3042	Volatiles	cis-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3042	Volatiles	Dibromochloromethane	UJ	04B			
H1J050186	BD3042	Volatiles	Methylene chloride	J	15	17		
H1J050186	BD3042	Volatiles	trans-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3042(F)	Metals	Aluminum	B	06B	15		
H1J050186	BD3043	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J050186	BD3043	Metals	Copper	B	06B	15		
H1J050186	BD3043	Metals	Thallium	B	06B	15		
H1J050186	BD3043	Sulfate	Sulfate	J	05B			
H1J050186	BD3043	Volatiles	2-Butanone	R	04A	05A	05B	
H1J050186	BD3043	Volatiles	Acetone	B	06D	04A	05A	15
H1J050186	BD3043	Volatiles	Bromoform	UJ	04B	05B		
H1J050186	BD3043	Volatiles	Bromomethane	UJ	05B			
H1J050186	BD3043	Volatiles	Carbon tetrachloride	UJ	04B			
H1J050186	BD3043	Volatiles	Chloroethane	UJ	05B			
H1J050186	BD3043	Volatiles	cis-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3043	Volatiles	Dibromochloromethane	UJ	04B			
H1J050186	BD3043	Volatiles	Methylene chloride	B	06D	15		
H1J050186	BD3043	Volatiles	trans-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3043(F)	Metals	Aluminum	B	06B	15		
H1J050186	BD3046	Explosives	2,6-Dinitrotoluene	UJ	05B			

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J050186	BD3046	Metals	Aluminum	B	06A	06B	15	
H1J050186	BD3046	Volatiles	2-Butanone	R	04A	05A	05B	
H1J050186	BD3046	Volatiles	Acetone	B	06D	04A	05A	15
H1J050186	BD3046	Volatiles	Bromoform	UJ	04B	05B		
H1J050186	BD3046	Volatiles	Bromomethane	UJ	05B			
H1J050186	BD3046	Volatiles	Carbon tetrachloride	UJ	04B			
H1J050186	BD3046	Volatiles	Chloroethane	UJ	05B			
H1J050186	BD3046	Volatiles	cis-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3046	Volatiles	Dibromochloromethane	UJ	04B			
H1J050186	BD3046	Volatiles	Methylene chloride	J	15	17		
H1J050186	BD3046	Volatiles	trans-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3046(F)	Metals	Aluminum	B	06B	15	01A	
H1J050186	BD3046(F)	Metals	Antimony	UJ	01A			
H1J050186	BD3046(F)	Metals	Arsenic	UJ	01A			
H1J050186	BD3046(F)	Metals	Barium	J	01A			
H1J050186	BD3046(F)	Metals	Beryllium	UJ	01A			
H1J050186	BD3046(F)	Metals	Cadmium	UJ	01A			
H1J050186	BD3046(F)	Metals	Calcium	J	01A			
H1J050186	BD3046(F)	Metals	Chromium	UJ	01A			
H1J050186	BD3046(F)	Metals	Cobalt	UJ	01A			
H1J050186	BD3046(F)	Metals	Copper	UJ	01A			
H1J050186	BD3046(F)	Metals	Iron	UJ	01A			
H1J050186	BD3046(F)	Metals	Lead	UJ	01A			
H1J050186	BD3046(F)	Metals	Magnesium	J	01A			
H1J050186	BD3046(F)	Metals	Managanese	J	01A	15		
H1J050186	BD3046(F)	Metals	Mercury	UJ	01A			
H1J050186	BD3046(F)	Metals	Nickel	J	01A	15		
H1J050186	BD3046(F)	Metals	Potassium	J	01A			
H1J050186	BD3046(F)	Metals	Selenium	UJ	01A			
H1J050186	BD3046(F)	Metals	Silver	UJ	01A			
H1J050186	BD3046(F)	Metals	Sodium	J	01A			
H1J050186	BD3046(F)	Metals	Thallium	UJ	01A			
H1J050186	BD3046(F)	Metals	Vanadium	UJ	01A			
H1J050186	BD3046(F)	Metals	Zinc	UJ	01A			
H1J050186	BD3048	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J050186	BD3048	Metals	Aluminum	B	06A	06B	15	
H1J050186	BD3048	Semivolatiles	2-Methylnaphthalene	J	15	17		
H1J050186	BD3048	Semivolatiles	Naphthalene	J	15	17		
H1J050186	BD3048	Volatiles	2-Butanone	R	04A	05A	05B	
H1J050186	BD3048	Volatiles	Acetone	B	06D	04A	05A	15
H1J050186	BD3048	Volatiles	Bromoform	UJ	04B	05B		
H1J050186	BD3048	Volatiles	Bromomethane	J	05B	15		
H1J050186	BD3048	Volatiles	Carbon tetrachloride	UJ	04B			
H1J050186	BD3048	Volatiles	Chloroethane	UJ	05B			
H1J050186	BD3048	Volatiles	cis-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3048	Volatiles	Dibromochloromethane	UJ	04B			
H1J050186	BD3048	Volatiles	Methylene chloride	J	15	17		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J050186	BD3048	Volatiles	trans-1,3-Dichloropropene	UJ	05B	04B		
H1J050186	BD3048(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3006R	Metals	Aluminum	B	06A	06B	15	
H1J060123	BD3006R	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3006R	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3006R	Volatiles	Acetone	B	04A	05A	06D	15
H1J060123	BD3006R	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3006R	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3006R	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3006R	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3006R	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3006R	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3006R	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3006R(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3006R(F)	Metals	Beryllium	B	06B	15		
H1J060123	BD3009R	Metals	Aluminum	B	06A	06B	15	
H1J060123	BD3009R	Metals	Copper	B	06B	15		
H1J060123	BD3009R	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3009R	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3009R	Volatiles	Acetone	B	04A	05A	06D	15
H1J060123	BD3009R	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3009R	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3009R	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3009R	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3009R	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3009R	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3009R	Volatiles	Methylene chloride	B	06A	06D	15	
H1J060123	BD3009R	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3009R(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3018R	Volatiles	1,1,1-Trichloroethane	UJ	05B	01A		
H1J060123	BD3018R	Volatiles	1,1,2,2-Tetrachloroethane	UJ	01A			
H1J060123	BD3018R	Volatiles	1,1,2-Trichloroethane	UJ	01A			
H1J060123	BD3018R	Volatiles	1,1-Dichloroethane	UJ	01A			
H1J060123	BD3018R	Volatiles	1,1-Dichloroethene	UJ	01A			
H1J060123	BD3018R	Volatiles	1,2-Dichloroethane	UJ	01A			
H1J060123	BD3018R	Volatiles	1,2-Dichloroethene	UJ	01A			
H1J060123	BD3018R	Volatiles	1,2-Dichloropropane	UJ	01A			
H1J060123	BD3018R	Volatiles	2-Butanone	R	04A	05A	05B	01A
H1J060123	BD3018R	Volatiles	2-Hexanone	UJ	01A			
H1J060123	BD3018R	Volatiles	4-Methyl-2-pentanone	UJ	01A			
H1J060123	BD3018R	Volatiles	Acetone	B	04A	05A	06D	15
H1J060123	BD3018R	Volatiles	Benzene	UJ	01A			
H1J060123	BD3018R	Volatiles	Bromodichloromethane	UJ	01A			
H1J060123	BD3018R	Volatiles	Bromoform	UJ	04B	05B	01A	
H1J060123	BD3018R	Volatiles	Bromomethane	UJ	05B	01A		
H1J060123	BD3018R	Volatiles	Carbon disulfide	UJ	01A			
H1J060123	BD3018R	Volatiles	Carbon tetrachloride	UJ	04B	05B	01A	

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J060123	BD3018R	Volatiles	Chlorobenzene	UJ	01A			
H1J060123	BD3018R	Volatiles	Chloroethane	UJ	05B	01A		
H1J060123	BD3018R	Volatiles	Chloroform	UJ	01A			
H1J060123	BD3018R	Volatiles	Chloromethane	UJ	01A			
H1J060123	BD3018R	Volatiles	cis-1,3-Dichloropropene	UJ	01A	04B	05B	
H1J060123	BD3018R	Volatiles	Dibromochloromethane	UJ	04B	01A		
H1J060123	BD3018R	Volatiles	Ethylbenzene	UJ	01A			
H1J060123	BD3018R	Volatiles	Methylene chloride	B	06A	06D	15	01A
H1J060123	BD3018R	Volatiles	Styrene	UJ	01A			
H1J060123	BD3018R	Volatiles	Tetrachloroethene	UJ	01A			
H1J060123	BD3018R	Volatiles	Toluene	UJ	01A			
H1J060123	BD3018R	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B	01A	
H1J060123	BD3018R	Volatiles	Trichloroethene	UJ	01A			
H1J060123	BD3018R	Volatiles	Vinyl chloride	UJ	01A			
H1J060123	BD3018R	Volatiles	Total xylenes	UJ	01A			
H1J060123	BD3030	Alkalinity	TOTAL ALKALINITY	B	06B			
H1J060123	BD3030	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J060123	BD3030	Metals	Aluminum	B	06A	06B	15	
H1J060123	BD3030	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3030	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3030	Volatiles	Acetone	B	04A	05A	06D	15
H1J060123	BD3030	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3030	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3030	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3030	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3030	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3030	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3030	Volatiles	Methylene chloride	B	06A	06D	15	
H1J060123	BD3030	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3030(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3041	Alkalinity	TOTAL ALKALINITY	B	06B			
H1J060123	BD3041	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J060123	BD3041	Semivolatiles	1,2,4-Trichlorobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	1,2-Dichlorobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	1,3-Dichlorobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	1,4-Dichlorobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,2'-Oxybis(1-chloropropane)	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4,5-Trichlorophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4,6-Trichlorophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4-Dichlorophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4-Dimethylphenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4-Dinitrophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,4-Dinitrotoluene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2,6-Dinitrotoluene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2-Chloronaphthalene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2-Chlorophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2-Methylnaphthalene	UJ	02A	02B		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J060123	BD3041	Semivolatiles	2-Methylphenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2-Nitroaniline	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	2-Nitrophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	3,3'-Dichlorobenzidine	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	3-Nitroaniline	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4,6-Dintitro-2-methylphenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Bromrophenyl phenyl ether	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Chloro-3-methylphenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Chloroaniline	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Chlorophenyl phenyl ether	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Methylphenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Nnitroanailine	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	4-Nitrophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Acenaphthene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Acenaphthylene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Anthracene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Benzo(a)anthracene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Benzo(a)pyrene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Benzo(b)fluoranthene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Benzo(ghi)perylene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Benzo(k)fluoranthene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Bis(2-chloroethoxy)methane	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Bis(2-chloroethyl) ether	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Bis(2-ethylhexyl) phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Butyl benzyl phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Carbazole	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Chrysene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Dibenz(a,h)anthracene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Dibenzofuran	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Diethyl phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Dimethyl phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Di-n-butyl phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Di-n-octyl phthalate	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Fluoranthene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Fluorene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Hexachlorobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Hexachlorobutadiene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Hexachlorocyclopentadiene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Hexachloroethane	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Indeno(1,2,3-cd)pyrene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Isophorone	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Naphthalene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Nitrobenzene	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	N-nitrosodi-n-propylamine	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	N-nitrosophenylamine	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Pentachlorophenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Phenanthrene	UJ	02A	02B		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J060123	BD3041	Semivolatiles	Phenol	UJ	02A	02B		
H1J060123	BD3041	Semivolatiles	Pyrene	UJ	02A	02B		
H1J060123	BD3041	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3041	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3041	Volatiles	Acetone	J	04A	05A		
H1J060123	BD3041	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3041	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3041	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3041	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3041	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3041	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3041	Volatiles	Methylene chloride	B	06A	06D	15	
H1J060123	BD3041	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3041(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3050	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J060123	BD3050	Metals	Copper	B	06B			
H1J060123	BD3050	Metals	Vanadium	J	15	17		
H1J060123	BD3050	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3050	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3050	Volatiles	Acetone	J	04A	05A	17	
H1J060123	BD3050	Volatiles	Benzene	J	17			
H1J060123	BD3050	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3050	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3050	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3050	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3050	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3050	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3050	Volatiles	Methylene chloride	B	06A	06D	15	
H1J060123	BD3050	Volatiles	Toluene	J	17			
H1J060123	BD3050	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3050(F)	Metals	Aluminum	B	06B	15		
H1J060123	BD3050(F)	Metals	Beryllium	B	06B	15		
H1J060123	BD3052	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J060123	BD3052	Metals	Aluminum	B	06A	06B	15	
H1J060123	BD3052	Volatiles	1,1,1-Trichloroethane	UJ	05B			
H1J060123	BD3052	Volatiles	2-Butanone	R	04A	05A	05B	
H1J060123	BD3052	Volatiles	Acetone	B	04A	05A	06D	15
H1J060123	BD3052	Volatiles	Bromoform	UJ	04B	05B		
H1J060123	BD3052	Volatiles	Bromomethane	UJ	05B			
H1J060123	BD3052	Volatiles	Carbon tetrachloride	UJ	04B	05B		
H1J060123	BD3052	Volatiles	Chloroethane	UJ	05B			
H1J060123	BD3052	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3052	Volatiles	Dibromochloromethane	UJ	04B			
H1J060123	BD3052	Volatiles	Methylene chloride	B	06A	06D	15	
H1J060123	BD3052	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J060123	BD3052(F)	Metals	Aluminum	B	06B	15		
H1J090111	BD3004	Metals	Copper	B	06B	15		

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SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1J090111	BD3004	Metals	Potassium	J	13			
H1J090111	BD3004	Metals	Thallium	B	06B	15		
H1J090111	BD3004	Volatiles	2-Butanone	R	04A	05A		
H1J090111	BD3004	Volatiles	Acetone	B	04A	05A	06D	15
H1J090111	BD3004	Volatiles	Bromoform	UJ	04B			
H1J090111	BD3004	Volatiles	Bromomethane	UJ	05B			
H1J090111	BD3004	Volatiles	Carbon tetrachloride	UJ	04B			
H1J090111	BD3004	Volatiles	Chloromethane	J	05B	15		
H1J090111	BD3004	Volatiles	cis-1,3-Dichloropropene	UJ	04B			
H1J090111	BD3004	Volatiles	Dibromochloromethane	UJ	04B			
H1J090111	BD3004	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J090111	BD3004(F)	Metals	Aluminum	B	06B	15		
H1J090111	BD3004(F)	Metals	Beryllium	B	06B	15		
H1J090111	BD3004(F)	Metals	Potassium	J	13			
H1J090111	BD3027	Metals	Potassium	J	13	15		
H1J090111	BD3027	Volatiles	2-Butanone	R	04A	05A		
H1J090111	BD3027	Volatiles	Acetone	B	04A	05A	05B	06D
H1J090111	BD3027	Volatiles	Bromoform	UJ	04B			
H1J090111	BD3027	Volatiles	Carbon tetrachloride	UJ	04B			
H1J090111	BD3027	Volatiles	Chloromethane	UJ	05B			
H1J090111	BD3027	Volatiles	cis-1,3-Dichloropropene	UJ	04B			
H1J090111	BD3027	Volatiles	Dibromochloromethane	UJ	04B			
H1J090111	BD3027	Volatiles	Methylene chloride	B	06A	06D	15	
H1J090111	BD3027	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J090111	BD3027(F)	Metals	Aluminum	B	15	06B		
H1J090111	BD3027(F)	Metals	Potassium	J	13	15		
H1J090111	BD3038	Metals	Beryllium	B	06B	15		
H1J090111	BD3038	Metals	Potassium	J	13			
H1J090111	BD3038	Nitrate	Nitrate	J	05B	15		
H1J090111	BD3038	Volatiles	2-Butanone	J	04A	05A		
H1J090111	BD3038	Volatiles	Acetone	J	04A	05A	05B	
H1J090111	BD3038	Volatiles	Bromoform	UJ	04B			
H1J090111	BD3038	Volatiles	Bromomethane	UJ	05B			
H1J090111	BD3038	Volatiles	Carbon tetrachloride	UJ	04B			
H1J090111	BD3038	Volatiles	Chloromethane	UJ	05B			
H1J090111	BD3038	Volatiles	cis-1,3-Dichloropropene	UJ	04B			
H1J090111	BD3038	Volatiles	Dibromochloromethane	UJ	04B			
H1J090111	BD3038	Volatiles	Methylene chloride	B	06A	06D	15	
H1J090111	BD3038	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J090111	BD3038(F)	Metals	Aluminum	B	06B	15		
H1J090111	BD3038(F)	Metals	Copper	B	06B	15		
H1J090111	BD3038(F)	Metals	Potassium	J	13			
H1J100121	BD3019	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J100121	BD3019	Metals	Aluminum	B	06B	15		
H1J100121	BD3019	Semivolatiles	Pyrene	UJ	11A			
H1J100121	BD3019	Volatiles	2-Butanone	R	04A	05B		
H1J100121	BD3019	Volatiles	2-Hexanone	UJ	05B			

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2] R1	R2	R3	R4
H1J100121	BD3019	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J100121	BD3019	Volatiles	Acetone	J	04A	05A	05B	15
H1J100121	BD3019	Volatiles	Bromoform	UJ	04B			
H1J100121	BD3019	Volatiles	Bromomethane	UJ	05B			
H1J100121	BD3019	Volatiles	Carbon tetrachloride	UJ	04B			
H1J100121	BD3019	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3019	Volatiles	Dibromochloromethane	UJ	04B			
H1J100121	BD3019	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3019(F)	Metals	Aluminum	B	06B	15		
H1J100121	BD3028	Cyanide	Total Cyanide	UJ	01A			
H1J100121	BD3028	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J100121	BD3028	Hardness	Hardness	J	01A			
H1J100121	BD3028	Metals	Arsenic	B	06B	15		
H1J100121	BD3028	Semivolatiles	Pyrene	UJ	11A			
H1J100121	BD3028	Volatiles	2-Butanone	R	04A	05B		
H1J100121	BD3028	Volatiles	2-Hexanone	UJ	05B			
H1J100121	BD3028	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J100121	BD3028	Volatiles	Acetone	J	04A	05A	05B	15
H1J100121	BD3028	Volatiles	Bromoform	UJ	04B			
H1J100121	BD3028	Volatiles	Bromomethane	UJ	05B			
H1J100121	BD3028	Volatiles	Carbon tetrachloride	UJ	04B			
H1J100121	BD3028	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3028	Volatiles	Dibromochloromethane	UJ	04B			
H1J100121	BD3028	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3028(F)	Metals	Aluminum	B	06B	15		
H1J100121	BD3028(F)	Metals	Potassium	J	13			
H1J100121	BD3029	Cyanide	Total Cyanide	UJ	01A			
H1J100121	BD3029	Semivolatiles	Pyrene	UJ	11A			
H1J100121	BD3029	Volatiles	2-Butanone	R	04A	05A	05B	
H1J100121	BD3029	Volatiles	2-Hexanone	UJ	05B			
H1J100121	BD3029	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J100121	BD3029	Volatiles	Acetone	J	04A	05A	15	
H1J100121	BD3029(F)	Metals	Aluminum	B	06B	15		
H1J100121	BD3029(F)	Metals	Potassium	J	13			
H1J100121	BD3032	Cyanide	Total Cyanide	UJ	01A			
H1J100121	BD3032	Metals	Arsenic	B	06B	15		
H1J100121	BD3032	Semivolatiles	Pyrene	UJ	11A			
H1J100121	BD3032	Volatiles	2-Butanone	R	04A	05A	05B	
H1J100121	BD3032	Volatiles	2-Hexanone	UJ	05B			
H1J100121	BD3032	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J100121	BD3032	Volatiles	Acetone	J	04A	05A	05B	
H1J100121	BD3032(F)	Metals	Aluminum	B	06B	15		
H1J100121	BD3032(F)	Metals	Potassium	J	13			
H1J100121	BD3037	Metals	Aluminum	UJ	01A			
H1J100121	BD3037	Metals	Antimony	UJ	01A			
H1J100121	BD3037	Metals	Arsenic	J	01A			
H1J100121	BD3037	Metals	Barium	J	01A			

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes (1,2) R1	R2	R3	R4
H1J100121	BD3037	Metals	Beryllium	B	06B	01A	15	
H1J100121	BD3037	Metals	Cadmium	UJ	01A			
H1J100121	BD3037	Metals	Calcium	J	01A			
H1J100121	BD3037	Metals	Chromium	UJ	01A			
H1J100121	BD3037	Metals	Cobalt	J	01A	15		
H1J100121	BD3037	Metals	Copper	J	01A	15		
H1J100121	BD3037	Metals	Iron	J	01A			
H1J100121	BD3037	Metals	Lead	UJ	01A			
H1J100121	BD3037	Metals	Magnesium	J	01A			
H1J100121	BD3037	Metals	Managanese	J	01A			
H1J100121	BD3037	Metals	Mercury	J	01A	15		
H1J100121	BD3037	Metals	Nickel	J	01A			
H1J100121	BD3037	Metals	Potassium	J	01A			
H1J100121	BD3037	Metals	Selenium	UJ	01A			
H1J100121	BD3037	Metals	Silver	UJ	01A			
H1J100121	BD3037	Metals	Sodium	J	01A			
H1J100121	BD3037	Metals	Thallium	UJ	01A			
H1J100121	BD3037	Metals	Vanadium	UJ	01A			
H1J100121	BD3037	Metals	Zinc	J	01A			
H1J100121	BD3037	Semivolatiles	Pyrene	UJ	11A			
H1J100121	BD3037	Volatiles	2-Butanone	R	04A	05B		
H1J100121	BD3037	Volatiles	2-Hexanone	UJ	05B			
H1J100121	BD3037	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J100121	BD3037	Volatiles	Acetone	R	04A	05A	05B	
H1J100121	BD3037	Volatiles	Benzene	J	01A			
H1J100121	BD3037	Volatiles	Bromoform	UJ	04B			
H1J100121	BD3037	Volatiles	Bromomethane	UJ	05B			
H1J100121	BD3037	Volatiles	Carbon tetrachloride	UJ	04B			
H1J100121	BD3037	Volatiles	cis-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3037	Volatiles	Dibromochloromethane	UJ	04B			
H1J100121	BD3037	Volatiles	Ethylbenzene	J	01A			
H1J100121	BD3037	Volatiles	Toluene	J	01A			
H1J100121	BD3037	Volatiles	trans-1,3-Dichloropropene	UJ	04B	05B		
H1J100121	BD3037(F)	Metals	Aluminum	J	01A			
H1J100121	BD3037(F)	Metals	Antimony	UJ	01A			
H1J100121	BD3037(F)	Metals	Arsenic	UJ	01A			
H1J100121	BD3037(F)	Metals	Barium	J	01A			
H1J100121	BD3037(F)	Metals	Beryllium	UJ	01A			
H1J100121	BD3037(F)	Metals	Cadmium	UJ	01A			
H1J100121	BD3037(F)	Metals	Calcium	J	01A			
H1J100121	BD3037(F)	Metals	Chromium	UJ	01A			
H1J100121	BD3037(F)	Metals	Cobalt	UJ	01A			
H1J100121	BD3037(F)	Metals	Copper	UJ	01A			
H1J100121	BD3037(F)	Metals	Iron	J	01A			
H1J100121	BD3037(F)	Metals	Lead	UJ	01A			
H1J100121	BD3037(F)	Metals	Magnesium	J	01A			
H1J100121	BD3037(F)	Metals	Managanese	J	01A			

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2]			
					R1	R2	R3	R4
H1J100121	BD3037(F)	Metals	Mercury	UJ	01A			
H1J100121	BD3037(F)	Metals	Nickel	UJ	01A			
H1J100121	BD3037(F)	Metals	Potassium	J	01A	13		
H1J100121	BD3037(F)	Metals	Selenium	UJ	01A			
H1J100121	BD3037(F)	Metals	Silver	UJ	01A			
H1J100121	BD3037(F)	Metals	Sodium	J	01A			
H1J100121	BD3037(F)	Metals	Thallium	UJ	01A			
H1J100121	BD3037(F)	Metals	Vanadium	J	01A	15		
H1J100121	BD3037(F)	Metals	Zinc	J	01A	15		
H1J110141	BD3020	Explosives	2,6-Dinitrotoluene	UJ	05B			
H1J110141	BD3020	Metals	Aluminum	B	06B	15	01A	
H1J110141	BD3020	Metals	Antimony	UJ	01A			
H1J110141	BD3020	Metals	Arsenic	UJ	01A			
H1J110141	BD3020	Metals	Barium	J	15	01A		
H1J110141	BD3020	Metals	Beryllium	UJ	01A			
H1J110141	BD3020	Metals	Cadmium	UJ	01A			
H1J110141	BD3020	Metals	Calcium	J	01A			
H1J110141	BD3020	Metals	Chromium	UJ	01A			
H1J110141	BD3020	Metals	Copper	UJ	01A			
H1J110141	BD3020	Metals	Iron	J	15	01A		
H1J110141	BD3020	Metals	Lead	UJ	01A			
H1J110141	BD3020	Metals	Magnesium	J	15	01A		
H1J110141	BD3020	Metals	Managanese	J	15	01A		
H1J110141	BD3020	Metals	Mercury	UJ	01A			
H1J110141	BD3020	Metals	Nickel	J	15	01A		
H1J110141	BD3020	Metals	Potassium	J	01A			
H1J110141	BD3020	Metals	Selenium	UJ	01A			
H1J110141	BD3020	Metals	Silver	UJ	01A			
H1J110141	BD3020	Metals	Sodium	J	01A			
H1J110141	BD3020	Metals	Thallium	UJ	01A			
H1J110141	BD3020	Metals	Vanadium	UJ	01A			
H1J110141	BD3020	Metals	Zinc	UJ	01A			
H1J110141	BD3020	Semivolatiles	Pyrene	UJ	11A			
H1J110141	BD3020	Volatiles	2-Butanone	R	04A	05A	05B	
H1J110141	BD3020	Volatiles	2-Hexanone	UJ	05B			
H1J110141	BD3020	Volatiles	4-Methyl-2-pentanone	UJ	05B			
H1J110141	BD3020	Volatiles	Acetone	J	04A	05A	05B	
H1J110141	BD3020	Volatiles	Benzene	J	01A			
H1J110141	BD3020	Volatiles	Ethylbenzene	J	01A			
H1J110141	BD3020	Volatiles	Toluene	J	01A			
H1J110141	BD3020(F)	Metals	Aluminum	B	06B	15	01A	
H1J110141	BD3020(F)	Metals	Antimony	UJ	01A			
H1J110141	BD3020(F)	Metals	Arsenic	UJ	01A			
H1J110141	BD3020(F)	Metals	Barium	J	15	01A		
H1J110141	BD3020(F)	Metals	Beryllium	UJ	01A			
H1J110141	BD3020(F)	Metals	Cadmium	UJ	01A			
H1J110141	BD3020(F)	Metals	Calcium	J	01A			

Table L-5
Summary of Data Validation Qualifiers Assigned
and Reason Codes for Qualification
Plum Brook Ordnance Works

SDG	Sample Number	Analysis	Parameter	VQ	Reason Codes [1,2]			
					R1	R2	R3	R4
H1J110141	BD3020(F)	Metals	Chromium	UJ	01A			
H1J110141	BD3020(F)	Metals	Cobalt	UJ	01A			
H1J110141	BD3020(F)	Metals	Copper	UJ	01A			
H1J110141	BD3020(F)	Metals	Iron	UJ	01A			
H1J110141	BD3020(F)	Metals	Lead	UJ	01A			
H1J110141	BD3020(F)	Metals	Magnesium	B	06B	15	01A	
H1J110141	BD3020(F)	Metals	Managanese	UJ	01A			
H1J110141	BD3020(F)	Metals	Mercury	UJ	01A			
H1J110141	BD3020(F)	Metals	Nickel	J	01A	15		
H1J110141	BD3020(F)	Metals	Potassium	J	01A			
H1J110141	BD3020(F)	Metals	Selenium	UJ	01A			
H1J110141	BD3020(F)	Metals	Silver	UJ	01A			
H1J110141	BD3020(F)	Metals	Sodium	J	01A			
H1J110141	BD3020(F)	Metals	Thallium	B	06A	06B	15	
H1J110141	BD3020(F)	Metals	Vanadium	UJ	01A			
H1J110141	BD3020(F)	Metals	Zinc	J	15	01A		

Footnotes:

[1] Table M-4 defines all reason codes.

[2] Reason code are assigned in order of their importance to the validation qualifiers applied with R1 being most important.

Definitions:

VQ = validation qualifier

Table L-6

Laboratory and Validation Qualifier Definitions
Plum Brook Ordnance Works

Qualifier	Lab	Definition
Laboratory - Organic		
B	STL/Paragon	The compound was detected in the sample and in an associated method blank.
E	STL/Paragon	The compound was detected. The concentration exceeds the calibration range of the instrument.
D	STL	Dilution.
G	STL	Elevated reporting limit due to matrix interference.
J	STL/Paragon	The compound was positively identified; the reported value is an estimated concentration between the method detection limit and the reporting limit.
I	STL	Matrix interference
U	STL/Paragon	Not detected. The compound was analyzed for, but not detected above the associated reporting limit.
Laboratory - Inorganic		
B	STL/Paragon	The analyte was positively identified; the reported value is an estimated concentration between the method detection limit and the reporting limit.
E	STL/Paragon	The analyte was detected. The concentration is estimated because of the presence of interference.
J	STL/Paragon	The compound was detected in the sample and in an associated method blank.
N	STL/Paragon	Spiked sample recovery not within control limits
U	STL/Paragon	Not detected. The analyte was analyzed for, but not detected above the associated reporting limit.
Validation - All		
B		The analyte was not detected significantly above the levels found in the associated method blank or field blanks
J		The compound/analyte was positively identified; the reported value is an estimated concentration.
R		Rejected due to severe deficiencies in the analytical process or supporting quality control data. The presence or absence of the compound/analyte cannot be verified.
U		Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
UJ		Not detected. The associated reporting limit may be inaccurate or imprecise.

Samples with 'nv' denotation have not been validated.

APPENDIX M

TELECONFERENCE NOTES ON BTEX IN QUARRY

INTERNATIONAL TECHNOLOGY CORPORATION

RECORD OF ☒ TELECON ☐ MEETING

Project Name	Number	Phase	Task	Subtask
PBOW				

Date: 11/18/98 Time: 1315

CALL FROM ☒ CALL TO ☐ NAME: DAVID Kessler

CALL FROM ☐ CALL TO ☒ NAME: Martin Jones (V.P.)

Telephone Number: 419-625-8141

Company Name: Wagner Quarry

Address:

City: Sandusky

State: OH Zip Code:

Other Participants — Name/Location/Representing:

Topic: BTEX in Bedrock

Summary (Decisions & Specific Actions Required by Named Persons):

Inquired about H_2S and BTEX in bedrock.

Martin Jones (VP - mechanical Engineer) said that the BTEX and H_2S in the bedrock is all natural. Very common in the limestone in the area. Hydrogen sulfide is particularly noticed from zones (in the quarry) around depths of ~90-120 ft and 130-160 ft. Oil can be found (in the area) in the limestone at the surface all the way to the base of the limestone. The organics are very common throughout this entire region. Low levels are seen as far away as Sandusky Rocks Co. (near intersection of Rt 4 and turnpike)

Required Action:

Prepared by (Signature): David Kessler

Distribution:
Original to Project File
Copy to Project Manager
Copy to Preparer

☒ Other Distribution (By Preparer)
Mike Spongberg, Rick Ellis
Mike Gunderson,

PAGE ___ OF ___

548A-6-87

APPENDIX N

RECHARGE CALCULATIONS

CLIENT NASHVILLE C.O.E.	JOB NUMBER 773206
SUBJECT CALCULATION OF MONTHLY RUNOFF @ PLUMBROOK ORDNANCE WORKS	
BASED ON SOIL CONSERVATION SERVICE TECH RELEASE #55, JUNE 1986 / ERIE COUNTY SOIL SURVEY REPORT OF PROGRESS, 1994 BY OHIO DEPT. OF NAT. RESOURCES	
BY LR ELLIS	CHECKED BY Jan Li
APPROVED BY	DATE 1/12/98

CALCULATION ASSUMPTIONS:

1. RUNOFF EQUATION FOR A STORM EVENT CAN BE USED FOR MONTHLY RUNOFF RATES

2. LAND USES CAN BE LARGELY DEFINED BY USING AN AERIAL PHOTO

3. THE SOIL NAMES IN THE 1994 ERIE COUNTY PROGRESS REPORT (FOR THE ERIE COUNTY SOIL SURVEY) CAN BE USED FOR CHARACTERIZATION OF THE ~~CN NUMBER~~ HYDROLOGIC SOIL GROUP (E.G. THE NAMES PEWAMO & BENNINGTON [IN THE PEWAMO-BENNINGTON ASSOC.] CAN BE LOOKED UP & THOSE TWO ARE CHARACTERISTIC OF THE WHOLE ASSOCIATION) - SEE ATTACHED ERIE COUNTY REPORT.

Eq.1 $$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Eq.2 $$S = 1000/CN - 10$$

Eq.3 $$I_a = 0.2S$$

Q = RUNOFF IN INCHES
P = RAINFALL IN INCHES
S = POTENTIAL MAXIMUM RETENTION AFTER RAINFALL BEGINS (INCHES)
I_a = INITIAL ABSTRACTION (INCHES) [WHICH IS ALL LOSSES BEFORE RUNOFF BEGINS]
CN = CURVE NUMBER [OBTAINED BY FIRST GETTING THE HYDROLOGIC NUMBER FOR EACH SOIL TYPE ON SCS TECH REPT TABLE 2.2a, THEN USING IT ON TABLE 2.2.

NOTES

* SEE CALC. SHEET 2 OF 3 FOR DERIVATION OF CN

* SEE ATTACHED EXCEL SPREADSHEET FOR MONTHLY RUNOFF CALCULATIONS USING $Q = \frac{(P-0.2S)^2}{(P+0.8S)}$

INTERNATIONAL TECHNOLOGY CORPORATION

By Rick Ellis Date 1/8/99 Subject Determining CN for PBOW Soil for Runoff Calc. Sheet No. 2 of __

Chkd. By J. Li Date 1/12/99 Proj. No. __

Use to yield this w/ Tech Rpt 55

Soil Name	General Location	Approx. Percentage PBOW of Site (Assoc)	(Each)	Approx. Curve No (Assoc, rounded)	(Each)	Land Use	Hydrol Soil Group
Pewamo-Bennington Assoc.	Extreme Southeast & Extreme Northeast	1/5		75		Thinly Wooded	
Pewamo					80		C/D
Bennington					70		C
Horrell-Fries-Colwood Assoc.	Central	1/2		75		1/2 (Good Cover) Open Spaces, 1/2 Wooded (Good Cover)	
Horrell					80		D
Fries					77		D
Colwood					66		B/D
Castalia-Millsdale-Milton-Ritchey Assoc.	North-Central (West to East Strip)	1/10		75		2/3 (Good Cover) Open Spaces, 1/3 Wooded (Good Cover)	
Castalia					74		C
Millsdale					70		B/D
Milton					74		C
Ritchey					80		D
Kibbie-Elnora-Tuscola-Colwood Assoc.	North-Western Portion of Site	1/5		58		Wooded (Good Cover)	
Kibbie					55		B
Elnora					55		B
Tuscola					55		B
Colwood					66		B/D
Total Avg CN				72			

Rain (P)	*Ia*	*S*	*Curve Number (CN)*	Runoff (Q)	Evapo-transpir- ation (E)	Evapo*0.6 (E est.)	Monthly Rechge
From Sandusky, OH rain gauge	*a=0.2*	*S=1000/CN-10*	*(see Table in Appendix ??)*	Q=(P-0.2S)^2 /P+0.8S	(From National Weather Service (Cleveland)		R = P-Q- E est
2.33	0.78	3.89	72	0.44	0.6	0.36	1.53
1.09	0.78	3.89	72	0.02	1.5	0.90	0.17
1.48	0.78	3.89	72	0.11	2.3	1.38	-0.01
2.62	0.78	3.89	72	0.59	5	3.00	-0.97
1.92	0.78	3.89	72	0.26	5	3.00	-1.34
4.86	0.78	3.89	72	2.09	6	3.60	-0.83
1.38	0.78	3.89	72	0.08	5.9	3.54	-2.24
2.83	0.78	3.89	72	0.71	4.7	2.82	-0.70
2.83	0.78	3.89	72	0.71	4	2.40	-0.28
1.46	0.78	3.89	72	0.10	2.7	1.62	-0.26
2.38	0.78	3.89	72	0.47	2.1	1.26	0.65
2.1	0.78	3.89	72	0.34	0.6	0.36	1.40
3.22	0.78	3.89	72	0.94	0.6	0.36	1.92
0.82	0.78	3.89	72	0.00	1	0.60	0.22
1.39	0.78	3.89	72	0.08	2.3	1.38	-0.07
4.28	0.78	3.89	72	1.66	3.3	1.98	0.64
4.2	0.78	3.89	72	1.60	4.9	2.94	-0.34
2.48	0.78	3.89	72	0.52	5.2	3.12	-1.16
6.77	0.78	3.89	72	3.63	6.2	3.72	-0.58
3.68	0.78	3.89	72	1.24	5.1	3.06	-0.62
1.25	0.78	3.89	72	0.05	3.9	2.34	-1.14
3.84	0.78	3.89	72	1.35	2.9	1.74	0.75
2.6	0.78	3.89	72	0.58	1.4	0.84	1.18
1.09	0.78	3.89	72	0.02	NA		
1.27	0.78	3.89	72	0.06	0.7	0.42	0.79
1	0.78	3.89	72	0.01	0.7	0.42	0.57
2.04	0.78	3.89	72	0.31	1.7	1.02	0.71
4.39	0.78	3.89	72	1.74	3.3	1.98	0.67
2.25	0.78	3.89	72	0.40	4.3	2.58	-0.73
4.66	0.78	3.89	72	1.94	5.4	3.24	-0.52
3.72	0.78	3.89	72	1.27	5.6	3.36	-0.91
0.4	0.78	3.89	72	0.04	5.1	3.06	-2.70
6.5	0.78	3.89	72	3.41	3.1	1.86	1.23
2.37	0.78	3.89	72	0.46	2.1	1.26	0.65
1.94	0.78	3.89	72	0.27	0.8	0.48	1.19
3.35	0.78	3.89	72	1.02	0.5	0.30	2.03
1.65	0.78	3.89	72	0.16	0.6	0.36	1.13
3.29	0.78	3.89	72	0.99	1	0.60	1.70
3.04	0.78	3.89	72	0.83	1.6	0.96	1.25
1.62	0.78	3.89	72	0.15	3	1.80	-0.33
5.19	0.78	3.89	72	2.34	3.9	2.34	0.51

Rain (P)	Ia	S	*Curve Number (CN)*	Runoff (Q)	Evapo-transpir- ation (E)	Evapo*0.6 (E est.)	Monthly Rechge
From Sandusky, OH rain gauge	*a=0.2*	*S=1000/CN-10*	*(see Table in Appendix ??)*	Q=(P-0.2S)^2 /P+0.8S	(From National Weather Service (Cleveland)		R = P-Q- E est
6.79	0.78	3.89	72	3.65	5.2	3.12	**0.02**
2.26	0.78	3.89	72	0.41	4.9	2.94	**-1.09**
4.23	0.78	3.89	72	1.62	3.2	1.92	**0.69**
4.11	0.78	3.89	72	1.54	2.8	1.68	**0.89**
1.58	0.78	3.89	72	0.14	2.3	1.38	**0.06**
2.24	0.78	3.89	72	0.40	0.9	0.54	**1.30**
1.95	0.78	3.89	72	0.27	0.3	0.18	**1.50**
3.85	0.78	3.89	72	1.36	0.4	0.24	**2.25**
2.67	0.78	3.89	72	0.62	0.5	0.30	**1.75**
3.45	0.78	3.89	72	1.09	1.9	1.14	**1.22**
1.62	0.78	3.89	72	0.15	2.6	1.56	**-0.09**
5.19	0.78	3.89	72	2.34	3.9	2.34	**0.51**
3.85	0.78	3.89	72	1.36	0.4	0.24	**2.25**
2.67	0.78	3.89	72	0.62	0.45	0.27	**1.78**
3.45	0.78	3.89	72	1.09	1.9	1.14	**1.22**
5.56	0.78	3.89	72	2.64	2.6	1.56	**1.36**
0.68	0.78	3.89	72	0.00	3.9	2.34	**-1.66**
3.71	0.78	3.89	72	1.26	4.1	2.46	**-0.01**
5.11	0.78	3.89	72	2.28	4.9	2.94	**-0.11**
4.91	0.78	3.89	72	2.13	4.2	2.52	**0.26**
1.18	0.78	3.89	72	0.04	3.6	2.16	**-1.02**
1.46	0.78	3.89	72	0.10	2.1	1.26	**0.10**
1.21	0.78	3.89	72	0.04	1.5	0.90	**0.27**
1.09	0.78	3.89	72	0.02	0.8	0.48	**0.59**
2.81	0.78	3.89	72	0.70	0.5	0.30	**1.81**
1.33	0.78	3.89	72	0.07	0.9	0.54	**0.72**
1.83	0.78	3.89	72	0.22	2	1.20	**0.41**
4.51	0.78	3.89	72	1.83	2.43	1.46	**1.22**
1.81	0.78	3.89	72	0.22	4.3	2.58	**-0.99**
1.72	0.78	3.89	72	0.18	4.8	2.88	**-1.34**
2.83	0.78	3.89	72	0.71	5.5	3.30	**-1.18**
2.48	0.78	3.89	72	0.52	4	2.40	**-0.44**
1.59	0.78	3.89	72	0.14	3.7	2.22	**-0.77**
2.2	0.78	3.89	72	0.38	2.5	1.50	**0.32**
2.84	0.78	3.89	72	0.71	1.7	1.02	**1.11**
2.11	0.78	3.89	72	0.34	0.8	0.48	**1.29**
1	0.78	3.89	72	0.01	0.6	0.36	**0.63**
1.21	0.78	3.89	72	0.04	0.9	0.54	**0.63**
2.26	0.78	3.89	72	0.41	2	1.20	**0.65**
2.4	0.78	3.89	72	0.48	2.1	1.26	**0.66**
6.12	0.78	3.89	72	3.09	3.5	2.10	**0.93**

Rain (P)	*Ia*	*S*	***Curve Number (CN)***	Runoff (Q)	Evapo-transpir- ation (E)	Evapo*0.6 (E est.)	Monthly Rechge
From Sandusky, OH rain gauge	*a=0.2*	*S=1000/CN-10*	*(see Table in Appendix ??)*	Q=(P-0.2S)^2 /P+0.8S	(From National Weather Service (Cleveland)		R = P-Q- E est
8.32	0.78	3.89	72	4.98	3.7	2.22	**1.12**
5.31	0.78	3.89	72	2.44	3.5	2.10	**0.77**
4.69	0.78	3.89	72	1.96	3.5	2.10	**0.63**
5.05	0.78	3.89	72	2.24	3	1.80	**1.01**
1.93	0.78	3.89	72	0.26	1.8	1.08	**0.59**
1.23	0.78	3.89	72	0.05	0.7	0.42	**0.76**
1.81	0.78	3.89	72	0.22	0.3	0.18	**1.41**
0.48	0.78	3.89	72	0.02	0.2	0.12	**0.34**
1.09	0.78	3.89	72	0.02	0.8	0.48	**0.59**
0.69	0.78	3.89	72	0.00	1	0.60	**0.09**
2.23	0.78	3.89	72	0.39	2.7	1.62	**0.22**
1.88	0.78	3.89	72	0.24	2.8	1.68	**-0.04**
0.98	0.78	3.89	72	0.01	4	2.40	**-1.43**
1.37	0.78	3.89	72	0.08	5	3.00	**-1.71**
1.87	0.78	3.89	72	0.24	4.5	2.70	**-1.07**
1.58	0.78	3.89	72	0.14	3.2	1.92	**-0.48**
0.15	0.78	3.89	72	0.12	2.6	1.56	**-1.53**
2.65	0.78	3.89	72	0.61	1.3	0.78	**1.26**
1.88	0.78	3.89	72	0.24	0.6	0.36	**1.28**
1.95	0.78	3.89	72	0.27	0.8	0.48	**1.20**

Attachment 1

Table 2-2.--Runoff curve numbers for selected agricultural, suburban, and urban land use. (Antecedent moisture condition II, and $I_a = 0.2S$)

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP			
	A	B	C	D
Cultivated land[1]: without conservation treatment	72	81	88	91
: with conservation treatment	62	71	78	81
Pasture or range land: poor condition	68	79	86	89
good condition	39	61	74	80
Meadow: good condition	30	58	71	78
Wood or Forest land: thin stand, poor cover, no mulch	45	66	77	83
good cover[2]	25	55	70	77
Open Spaces, lawns, parks, golf courses, cemeteries, etc.				
good condition: grass cover on 75% or more of the area	39	61	74	80
fair condition: grass cover on 50% to 75% of the area	49	69	79	84
Commercial and business areas (85% impervious)	89	92	94	95
Industrial districts (72% impervious)	81	88	91	93
Residential:[3]				
Average lot size — Average % Impervious[4]				
1/8 acre or less — 65	77	85	90	92
1/4 acre — 38	61	75	83	87
1/3 acre — 30	57	72	81	86
1/2 acre — 25	54	70	80	85
1 acre — 20	51	68	79	84
Paved parking lots, roofs, driveways, etc.[5]	98	98	98	98
Streets and roads:				
paved with curbs and storm sewers[5]	98	98	98	98
gravel	76	85	89	91
dirt	72	82	87	89

1/ For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, Aug. 1972.

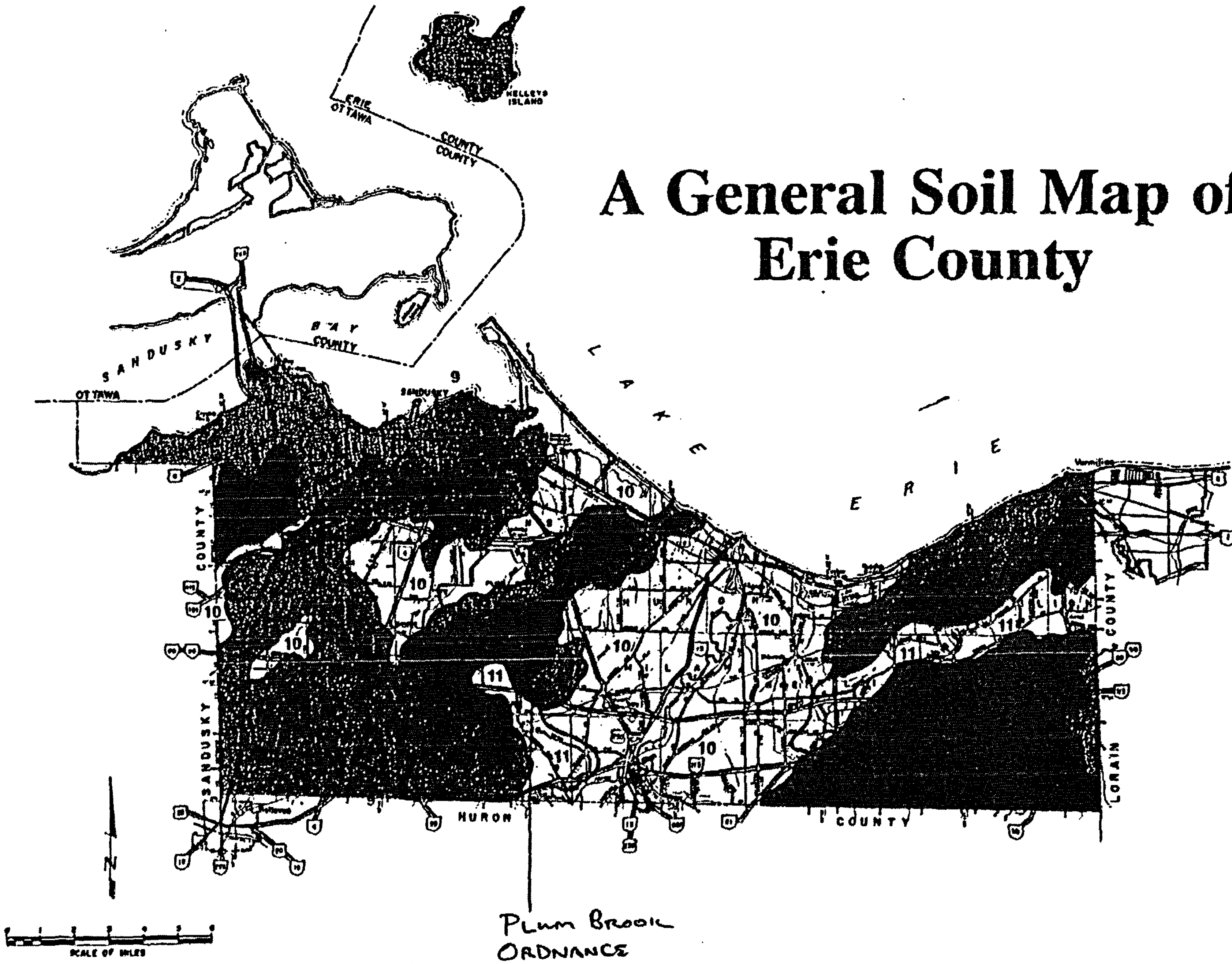
2/ Good cover is protected from grazing and litter and brush cover soil.

3/ Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to lawns where additional infiltration could occur.

4/ The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

5/ In some warmer climates of the country a curve number of 95 may be used.

A General Soil Map of Erie County



PLUM BROOK
ORDNANCE
WORKS

Soil Legend

VERY DEEP SOILS ON LAKE PLAINS

Toledo-Fulton Association: Nearly level, very poorly drained and somewhat poorly drained soils formed in lacustrine sediments.

Del Rey-Milford Association: Nearly level, somewhat poorly drained and very poorly drained soils formed in lacustrine sediments.

Weyers-Haplaquents-Sandusky Association: Level, very poorly drained soils formed in calcareous tufa and marl over lacustrine sediments.

VERY DEEP SOILS PRIMARILY ON TILL PLAINS

Bennington-Cardington-Haskins Association: Nearly level to sloping, somewhat poorly drained and moderately well drained soils formed in glacial till and loamy outwash sediments over glacial till or lacustrine sediments.

Pewamo-Bennington Association: Nearly level to gently sloping, very poorly drained and somewhat poorly drained soils formed in glacial till and lacustrine sediments.

Mahoning-Rawson-Ellsworth Association: Nearly level to sloping, somewhat poorly drained and moderately well drained soils formed in glacial till and loamy outwash over glacial till or lacustrine sediments.

SHALLOW TO DEEP SOILS ON BEDROCK-CONTROLLED TILL PLAINS AND LAKE PLAINS

Allis-Fries Association: Moderately deep, nearly level, somewhat poorly drained to very poorly drained soils formed in glacial till or lacustrine sediments over shale bedrock.

Hornell-Fries-Colwood Association: Moderately deep and deep, nearly level to gently sloping, somewhat poorly drained and very poorly drained soils formed in glacial till and lacustrine sediments over shale bedrock.

Castalia-Millsdale-Milton-Ritchey Association: Shallow to moderately deep, nearly level to moderately steep, well drained and very poorly drained soils formed in glacial till, lacustrine sediments and limestone residuum.

VERY DEEP SOILS ON OUTWASH PLAINS, LAKE PLAINS, DELTAS AND BEACH RIDGES

10 Kibbie-Elnora-Tuscola-Colwood Association: Nearly level to gently sloping, somewhat poorly drained, moderately well drained and very poorly drained soils formed in outwash, lacustrine and deltaic sediments.

11 Jimtown-Oshtemo-Millgrove Association: Nearly level to gently sloping, somewhat poorly drained, well drained and very poorly drained soils formed in outwash and beach sediments.

The general soil map shows the location of the 11 soil associations or general soil areas in Erie County. Each association typically consists of two to four major soils for which it is named and some soils of minor extent. The soils in each association occur together in a distinct and repetitive landscape pattern.

The general soil map is most useful for providing generalized information about the soil resources of Erie County. It is not suitable for planning the management of a farm or for selection of a building site because of its small scale.

Information on how to obtain more detailed soil maps in the county is given elsewhere in this publication. The following information about the 28 soils identified on the General Soil Map plus 32 other soil series in the county can also be obtained by request:

- Slope range
- Drainage class
- Permeability
- Available water capacity
- Seasonal high water table depth
- Depth to bedrock
- Shrink-swell potential

Some of the more common management concerns that can be identified in places from the detailed soil maps are slope, erosion, shallowness to bedrock, slow permeability, seasonal wetness, ponding, droughtiness, poor filtration, and flooding. Information about recommended management practices can be obtained from the Erie SWCD.

APPENDIX A

SECTION 15

2003 Groundwater Well Installation

(CATI, 2003a and 2003b)

9730 Martin Luther King, Jr. Hwy, Suite B-1, Lanham, MD 20706 (301) 306-7480 Fax (301) 306-7484
Email: ejhcati@aol.com www.catiinc.com

November 7, 2003

Ms. Sheryl Leeper
U.S. Army Corps of Engineers, Louisville District
600 Martin Luther King, Jr. Place
Louisville, KY 40202-2230

RE: Report for "Groundwater Well Installation" at the NASA Plum Brook Station, Sandusky, Ohio. PRAC Contract No. DACA27-02-D-0005, Task Order 003.

Dear Ms. Leeper.

CATI installed four (4) groundwater-monitoring wells (2 nested pairs – 1 shallow and 1 deep at each of two (2) locations) in accordance with the Scope of Work provided by the USACE dated September 09, 2003. CATI subcontractor, Bowser-Morner installed the above-mentioned wells utilizing sonic drilling technology.

The project started on Tuesday October 14, 2003 with the crew mobilizing to the site and a health and safety review. The crew was comprised of one supervisor and two technicians with CATI conducting oversight. Drilling commenced on October 15, 2003 at the first location (RA-07). The shallow well (RA-07S) was completed first with a total depth of 23.5 feet. The total depth of the deep well (RA-07D) was 55 feet.

Drilling commenced at the second location (RA-08) on Thursday, October 16, 2003. The total depth of the shallow well (RA-08S) was 22 feet and the depth of the deep well (RA-08D) was 55 feet.

On October 17, 2003 the well at location RA-07D was re-drilled after grout was observed in the well. The concrete pads and bollards were set at the remaining 3 wells.

On October 20-21, 2003, one crew member from Bowser-Morner was on site to develop the wells and complete site clean-up. CATI was not on-site during these two days.

Attached to this letter are the OEPA well logs (Attachment 1), CATI field notes (Attachment 2), and photographs (Attachment 3).

Please call with any questions and thank you for the opportunity to work with USACE.

Sincerely,
CATI Inc

Judy Myak
Project Manager

Cc: Mr. Edward J. Harris (CATI)

Attachment 1
OEPA Well Logs

TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 1939 Fountain Square Drive
Columbus, Ohio 43224-9971 Voice (614) 265-6739 Fax (614) 447-9503

970709

WELL LOCATION

County ERIE Township PERKINS

Owner/Builder PLUM BROOK ORDNANCE WORKS

Address of Well Location COLUMBUS RD

City SANDUSKY Zip Code +4 44870

Permit No. RA-082 Section/Lot No. N/A

Location of Well in State Plane coordinates, if available:

Use of Well MONITORING

N ☐ X ______ ft. or m

S ☐ Y ______ ft. or m

Elevation of Well ______ ft. or m

Datum Plane: ☐ NAD27 ☐ NAD83 Elevation Source ______

Source of Coordinates: ☐ GPS ☐ Survey ☐ Other ______

Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat. ______ Long. ______

North

S/A

West East

South

WELL TEST*

Pre-Pumping Static Level ______ ft. Date ______

Measured from: ☐ Top of Casing ☐ Ground Level ☐ Other ______

☐ Air ☐ Bailing ☐ Pumping* ☐ Other ______

Test Rate ______ gpm Duration of Test ______ hrs.

Feet of Drawdown ______ ft. Sustainable Yield ______ gpm

*Attach a copy of the pumping test record, per section 1521.05, ORC)

Copy Attached? ☐ Yes ☐ No Flowing Well? ☐ Yes ☐ No

Quality ______

PUMP/PITLESS

Type of pump ______ Capacity ______ gpm

Pump set at ______ ft. Pitless Type ______

Pump installed by ______

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm [illegible]

Address [illegible]

City, State, Zip [illegible]

Signed [illegible] Date 10/[illegible]

ODH Registration Number [illegible]

CONSTRUCTION DETAILS

☐ Rotary ☐ Cable ☐ Augered ☐ Driven ☒ Other Sonic

BOREHOLE/CASING (measured from ground surface)

☒ Borehole Diameter 7 inches Depth 23.5 ft.

Casing Diameter 2 in. Length 36 ft. Thickness SCH 40 in.

☒ Borehole Diameter 5 inches Depth 31.5 ft.

Casing Diameter 2 in. Length 31.5 ft. Thickness SCH 40 in.

Casing Height Above Ground 3.5 ft.

Type 1 ☐ Steel 1 ☐ Galv. 1 ☒ PVC 1 ☐
2 ☐ 2 ☐ 2 ☒ 2 ☐ Other ______

Joints 1 ☒ Threaded 1 ☐ Welded 1 ☐ Solvent 1 ☐
2 ☒ 2 ☐ 2 ☐ 2 ☐ Other* ______

SCREEN

Diameter 2" Slot Size .010 Screen Length 10 ft.

Type SLOTTED Material PVC

Set Between 55 ft. and 65 ft.

GRAVEL PACK (Filter Pack)

Material/Size SILICA #5 Volume/Weight Used [illegible]

Method of Installation POURED THROUGH CASING

Depth: Placed FROM 55 ft. TO 41.5 ft.

GROUT

Material: [illegible] Volume/Weight Used [illegible]

Method of Installation TREMIE

Depth: Placed FROM 32.5 ft. TO 1 ft.

DRILLING LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
TOPSOIL	0.0	1.0
[illegible] SILT, SAND w/CLAY	1.0	3
[illegible] SILT w/CLAY [illegible]	3	6
[illegible] SILT & CLAY	6	21
[illegible] GRAVELLY CLAY	21	23
[illegible] LIMESTONE	23	55

[illegible] 55.0

*If more space is needed to complete drilling log, use next consecutively numbered form.

Date of Well Completion [illegible] Total Depth of Well 55 ft.

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY TO - ODNR, DIVISION OF WATER, 1939 FOUNTAIN SQ. DRIVE, [illegible]

TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 1939 Fountain Square Drive
Columbus, Ohio 43224-9971 Voice (614) 265-6739 Fax (614) 447-9503

970708

WELL LOCATION

County: ERIE Township: PERKINS

Owner/Builder: [illegible]

Address of Well Location: Number ____ Street Name: [illegible] RD

City: SANDUSKY Zip Code +4: [illegible]

Permit No: [illegible] Section/Lot No (Circle One or Both): N/A

Location of Well in State Plane coordinates, if available: Use of Well: MONITORING

N ☐ X ____ ft or m

S ☐ Y ____ ft or m

Elevation of Well ____ ft or m

Datum Plane: ☐ NAD27 ☐ NAD83 Elevation Source ____

Source of Coordinates: ☐ GPS ☐ Survey ☐ Other ____

Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat ____ Long ____

North

W S/A E

South

CONSTRUCTION DETAILS

☐ Rotary ☐ Cable ☐ Augered ☐ Driven ☒ Other [illegible]

BOREHOLE/CASING (measured from ground surface)

1 ☒ Borehole Diameter 7 inches Depth 22 ft

Casing Diameter 2 in. Length 15.5 ft Thickness [illegible] in.

2 ☐ Borehole Diameter ____ inches Depth ____ ft

Casing Diameter ____ in. Length ____ ft Thickness ____ in.

Casing Height Above Ground 2.5 ft

Type: 1 ☐ 2 ☐ Steel; 1 ☐ 2 ☐ Galv.; 1 ☒ 2 ☐ PVC; 1 ☐ 2 ☐ Other ____

Joints: 1 ☒ 2 ☐ Threaded; 1 ☐ 2 ☐ Welded; 1 ☐ 2 ☐ Solvent; 1 ☐ 2 ☐ Other ____

SCREEN

Diameter 2" Slot Size .010 Screen Length 5 ft

Type [illegible] Material PVC

Set Between 22 ft. and 17 ft.

GRAVEL PACK (Filter Pack)

Material/Size [illegible] Volume/Weight Used [illegible]

Method of Installation [illegible]

Depth: Placed FROM 22 ft. TO 14 ft.

GROUT

Material [illegible] Volume/Weight Used [illegible]

Method of Installation [illegible]

Depth: Placed FROM 10 ft. TO 1 ft.

DRILLING LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
[illegible]	0	5
[illegible] silty sand w/ clay	5	12.5
[illegible] silty sand (wet)	12.5	9.5
[illegible] silty clay	9.5	18.5
[illegible] clay	18.5	22
[illegible]	22	22

[illegible]

WELL TEST*

Pre-Pumping Static Level ____ ft. Date ____

Measured from: ☐ Top of Casing ☐ Ground Level ☐ Other ____

☐ Air ☐ Bailing ☐ Pumping* ☐ Other ____

Test Rate ____ gpm Duration of Test ____ hrs

Feet of Drawdown ____ ft. Sustainable Yield ____ gpm

(Attach a copy of the pumping test record, per section 1521.05, ORC)

Is Copy Attached? ☐ Yes ☐ No Flowing Well? ☐ Yes ☐ No

Quality ____

PUMP/PITLESS

Type of pump ____ Capacity ____ gpm

Pump set at ____ ft. Pitless Type ____

Pump installed by ____

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm [illegible]

Address [illegible]

City, State, Zip [illegible]

Signed [illegible] Date [illegible]

ODH Registration Number [illegible]

☐ If more space is needed to complete drilling log, use next consecutively numbered form.

Date of Well Completion [illegible] Total Depth of Well 22 ft

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY TO - ODNR, DIVISION OF WATER, 1939 [illegible]

TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 1939 Fountain Square Drive
Columbus, Ohio 43224-9971 Voice (614) 265-6735 Fax (614) 447-9503

956877

WELL LOCATION

County: ERIE Township: PERKINS

Owner/Builder (Last name or Firm/First): ALUM GROVE LEGINAKEE UDGIES (first / last)

Address of Well Location (Number / Street Name): COLUMBUS RD

City: SANDUSKY Zip Code +4: 44870

Permit No.: EA-075 Section/Lot No. (Circle one or both): N/A

Location of Well in State Plane coordinates, if available: Use of Well: MONITORING

N ☐ X ______ . ______ +/- ______ ft. or m

S ☐ Y ______ . ______ +/- ______ ft. or m

Elevation of Well ______ . ______ +/- ______ ft. or m

Datum Plain ☐ NAD27 ☐ NAD83 Elevation Source ______

Source of Coordinates: ☐ GPS ☐ Survey ☐ Other ______

Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat ______ Long ______

North

W

S/A

E

South

WELL TEST*

Pre-Pumping Static Level ______ ft. Date ______

Measured from: ☐ Top of Casing ☐ Ground Level ☐ Other ______

☐ Air ☐ Bailing ☐ Pumping* ☐ Other ______

Test Rate ______ gpm Duration of Test ______ hrs.

Feet of Drawdown ______ ft Sustainable Yield ______ gpm

*Attach a copy of the pumping test record, per section 1521.05, ORC)

Is Copy Attached? ☐ Yes ☐ No Flowing Well? ☐ Yes ☐ No

Quality ______

PUMP/PITLESS

Type of pump ______ Capacity ______ gpm

Pump set at ______ ft Pitless Type ______

Pump installed by ______

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm: [illegible] [illegible] INC

Address: [illegible] [illegible] RD

City, State, Zip: [illegible] [illegible]

Signed: [illegible] Date: [illegible]

ODH Registration Number: [illegible]

CONSTRUCTION DETAILS

☐ Rotary ☐ Cable ☐ Augered ☐ Driven ☒ Other: [illegible]

BOREHOLE/CASING (measured from ground surface)

1☒ Borehole Diameter 7 inches Depth 23.5

Casing Diameter 2 in. Length 20.5 ft. Thickness SCH 40

2☐ Borehole Diameter ______ inches Depth ______

Casing Diameter ______ in. Length ______ ft. Thickness ______ in.

Casing Height Above Ground 2.0

Type: 1☐ 2☐ Steel; 1☐ 2☐ Galv; 1☒ 2☐ PVC; 1☐ 2☐ Other ______

Joints: 1☒ 2☐ Threaded; 1☐ 2☐ Welded; 1☐ 2☐ Solvent; 1☐ 2☐ Other ______

SCREEN

Diameter 2" Slot Size .10 Screen Length 5 ft.

Type SLOTTED Material PVC

Set Between 23.5 ft. and 18.5 ft.

GRAVEL PACK (Filter Pack)

Material/Size SILICA #5 Volume/Weight Used [illegible]

Method of installation TREMIE THROUGH CASING

Depth: Placed FROM 23.5 ft. TO 15 ft.

GROUT

Material BENTONITE Volume/Weight Used 2 [illegible]

Method of installation TREMIE

Depth: Placed FROM 15 ft. TO 1 ft.

DRILLING LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
TOPSOIL	0.0	1.5
BR CLAYEY SAND & SILT (WET)	1.5	8
GR CLAYEY SILT & SAND	8	9
GR SILTY CLAY	9	23
GR SHALE	23	23.5

[illegible] 23.5

*If more space is needed to complete drilling log, use next consecutively numbered form.

Date of Well Completion [illegible] Total Depth of Well 23.5 ft.

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY TO - ODNR, DIVISION OF WATER

TYPE OR USE PEN
SELF TRANSCRIBING
PRESS HARD

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 1939 Fountain Square Drive
Columbus, Ohio 43224-9971 Voice (614) 265-6739 Fax (614) 447-9503

964876

WELL LOCATION

County ERIE Township PERKINS

Owner/Builder PLUM BROOK ORDNANCE WORKS

Address of Well Location COLUMBUS RD

City SANDUSKY Zip Code +4 44870

Permit No. PA-077 Section/Lot No. N/A

Location of Well in State Plane coordinates, if available: Use of Well MONITORING

N ☐ X ______ ft. or m

S ☐ Y ______ ft. or m

Elevation of Well ______ ft. or m

Datum Plane ☐ NAD27 ☐ NAD83 Elevation Source ______

Source of Coordinates ☐ GPS ☐ Survey ☐ Other ______

Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat ______ Long ______

North

West S/A East

South

CONSTRUCTION DETAILS

☐ Rotary ☐ Cable ☐ Augered ☐ Driven ☑ Other SONIC

BOREHOLE/CASING (measured from ground surface)

☑ Borehole Diameter 7 inches Depth 25.5 ft

Casing Diameter 2 in. Length 22.5 ft. Thickness SCH 40 in

☑ Borehole Diameter 5 inches Depth 29.5 ft

Casing Diameter 2 in. Length 14.5 ft. Thickness SCH 40 in

Casing Height Above Ground 2.0 ft

Type: 1 ☐ 2 ☐ Steel; 1 ☐ 2 ☐ Galv; 1 ☑ 2 ☑ PVC; 1 ☐ 2 ☐ Other ______

Joints: 1 ☑ 2 ☑ Threaded; 1 ☐ 2 ☐ Welded; 1 ☐ 2 ☐ Solvent; 1 ☐ 2 ☐ Other ______

SCREEN

Diameter 2" Slot Size .10 Screen Length 10 ft.

Type SLOTTED Material PVC

Set Between 55 ft. and 45 ft.

GRAVEL PACK (filter pack)

Material/Size SILICA SAND [illegible] Volume/Weight Used [illegible]

Method of Installation POURED THROUGH CASING

Depth: Placed FROM 55 ft. TO 42.5 ft.

GROUT

Material BENTONITE Volume/Weight Used [illegible]

Method of Installation TREMIE

Depth: Placed FROM 35 ft. TO 1.0 ft.

DRILLING LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
TOPSOIL	0	1.5
[illegible] CLAYEY SAND (FILL)	1.5	3
[illegible] SANDY CLAY	3	3.5
[illegible] SILT + SAND	3.5	7
[illegible] SILTY CLAY	7	9
[illegible] CLAY	9	10
[illegible] SILTY SANDY CLAY	10	19
[illegible] CLAY	19	25.5
[illegible] LIMESTONE	25.5	55

TD @ 55.0

WELL TEST*

Pre-Pumping Static Level ______ ft. Date ______

Measured from ☐ Top of Casing ☐ Ground Level ☐ Other ______

☐ Air ☐ Bailing ☐ Pumping* ☐ Other ______

Test Rate ______ gpm Duration of Test ______ hrs.

Feet of Drawdown ______ ft. Sustainable Yield ______ gpm

(Attach a copy of the pumping test record, per section 1521.05, ORC)

Copy Attached? ☐ Yes ☐ No Flowing Well? ☐ Yes ☐ No

Quality ______

PUMP/PITLESS

Type of pump ______ Capacity ______ gpm

Pump set at ______ ft. Pitless Type ______

Pump installed by ______

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm [illegible]

Address [illegible]

City, State, Zip DAYTON OH [illegible]

Signed [illegible] Date [illegible]

ODH Registration Number [illegible]

*If more space is needed to complete drilling log, use next consecutive numbered form.

Date of Well Completion [illegible] Total Depth of Well 55 ft.

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling

ORIGINAL COPY TO: OHIO DIVISION OF WATER

Attachment 2
CATI Field Notes

NASA PLUM BROOK

10-14-03 2⁰⁰ AM MOBE ON SITE WITH CREW
FROM ROWSER-MORNER
- HEALTH AND SAFETY (JSA) REVIEW
- NASA REQUIRED JOB SITE CLEARANCE REVIEW
- SET UP FOR JOB AND SITE LAYOUT
- LANDED OUT AT 1⁰⁰ PM

10-15-03 7³⁰ AM TOOL BOX SAFETY MEETING
- SET UP AGAIN TO DRILL SHALLOW WELL AT NEW LOCATION
- 10³⁰ AM SHALLOW WELL DONE 23' BED ROCK
- BEGIN SET UP FOR DEEP WELL AT NEW LOCATION
- 11³⁰ AM SHUTDOWN FOR H2O TOWER DEMO
- 12³⁰ PM START BACK UP
- 3⁰⁵ PM DEEPWELL DONE DRILLING 54'
- 4⁰⁰ PM DEEPWELL PVC WELL INSTALLED
- 4³⁰ PM DECON AND CLEANUP
- WELLS AT THIS LOCATION TO BE LABELED RA-07S & RA-07D
- AT OTHER LOCATION RA-08S & RA-08D

NASA Plum Brook Station

1. Oct. 16, 2003 / Weather. light drizzle that stopped by 9am. Cold, Cloudy & Windy (temp ≈ 40°)

8 am Arrive @ main gate, watch safety video
8:30 meet w/ Sheryl Lepper, USACE
9 am Walk to second drill site, meet w/ Andy Coleman, USACE.

Drillers have started on shallow well. $\boxed{\text{RA-08S}}$ Safety mtg was held w/ Steve Neilson, USACE. Topic: ergonomics & evacuation routes. Hit bedrock @ 22'

10 am Andy Coleman left site.

Drillers continue w/ shallow well.

11:45 Move to second location, approx. 10' from shallow well. Begin drilling. $\boxed{\text{RA-08D}}$

12:15-1:15 lunch

1:30-5:30 Drill deep well. bedrock 22½', total depth 55'

5:30-6:15 Decon, Cleanup.

6:15 left site.

[signature] 10/16/03

Drill Crew Bowser-Morner

Super - Bruce Kirkpatrick

Don Null

Scott Widden.

Oversight CATI - Judy Wyatt.

NASA Plum Brook

Friday Oct. 17, 2003 Weather: Sunny ☼, cold (mid-40°

Crew: Bruce Kirkpatrick, Don Hull, Scott Widdon, Oversight: Jody Wyatt

7:30-8 Mob. on site, hold safety mtg. - topics safe work practices when working w/ concrete.

Today they will develop wells, set concrete pad, decon. + general clean up of site.

8-9 Check monitoring wells. At first drill site, deep well has grout. & Other wells all ok.

10 - Set up drill on well # RA-07D. Remove 1st pipe thread cracked. All other pipes in ground.

11 Scott leaves site to pick up more supplies from Toledo. (Bowser-Morner)

Drillers continue to re-drill # RA-07D

12:30-1:00 lunch

1:30 Scott returns w/ supplies

2:00 meet w/ Sheryl. She is ok w/ just 2 bollards at 2nd drill site. Bowser-Morner (Kanel) informed her that Scott would be returning on Monday to develop wells. Sheryl ok w/ that - CATI (me) does not have to be there.

2:00 Scott working at 2nd drill site digging holes

Bruce/Don working at 1st drill site drilling

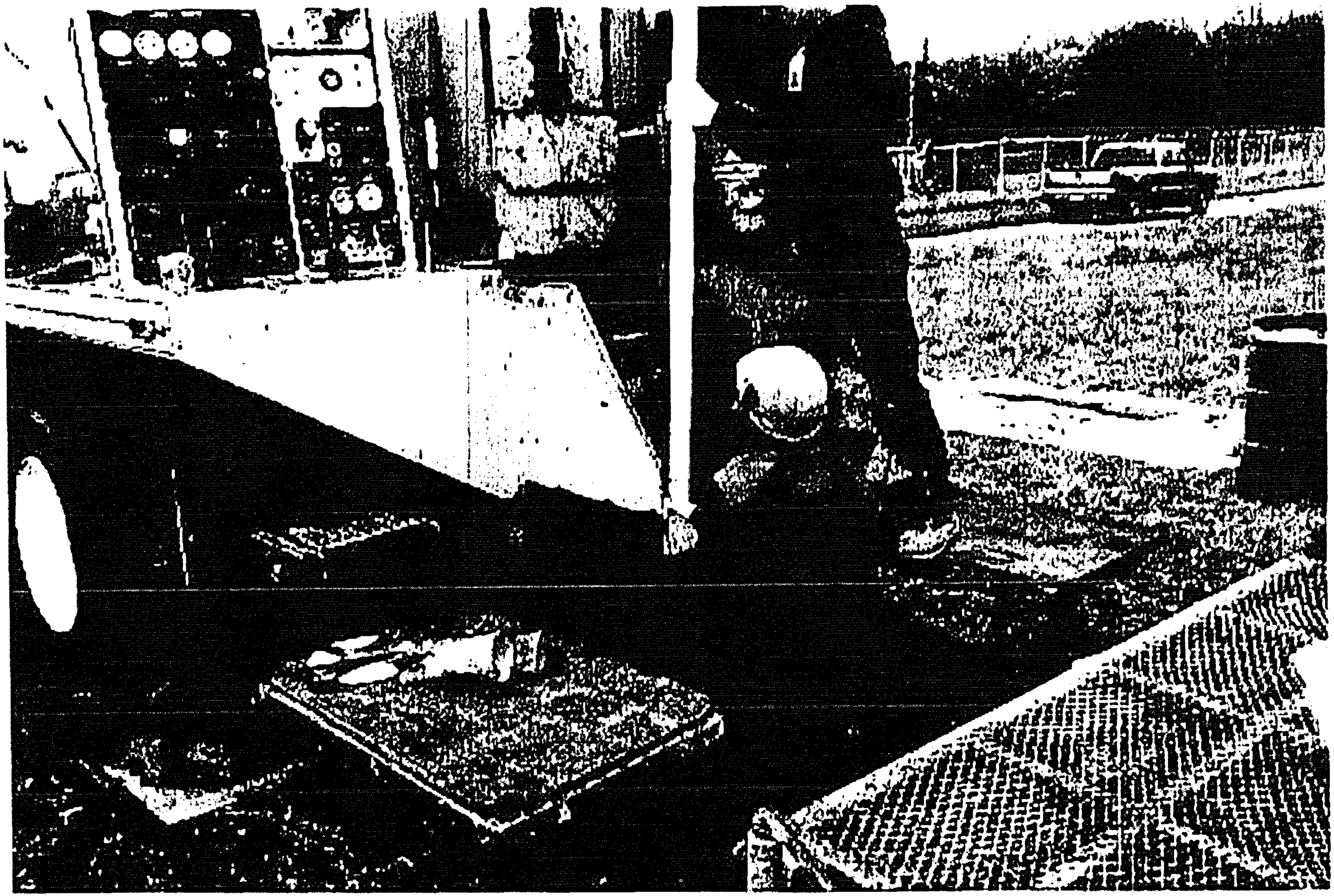
2:00-5:00 'Re-do' hole # RA-07D, Scott set concrete pads at RA-08S + RA-08D.

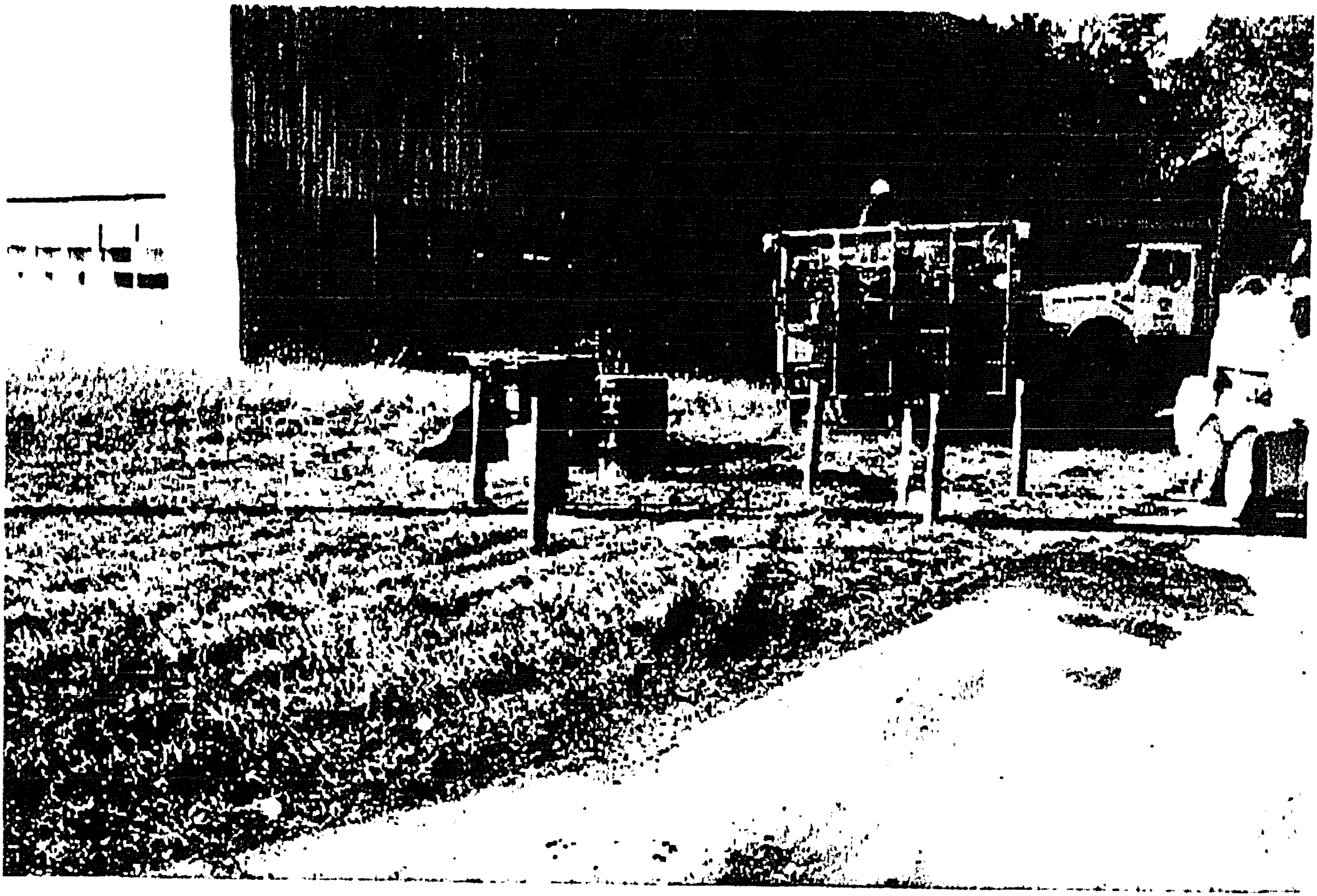
5:00-6:30 Decon.

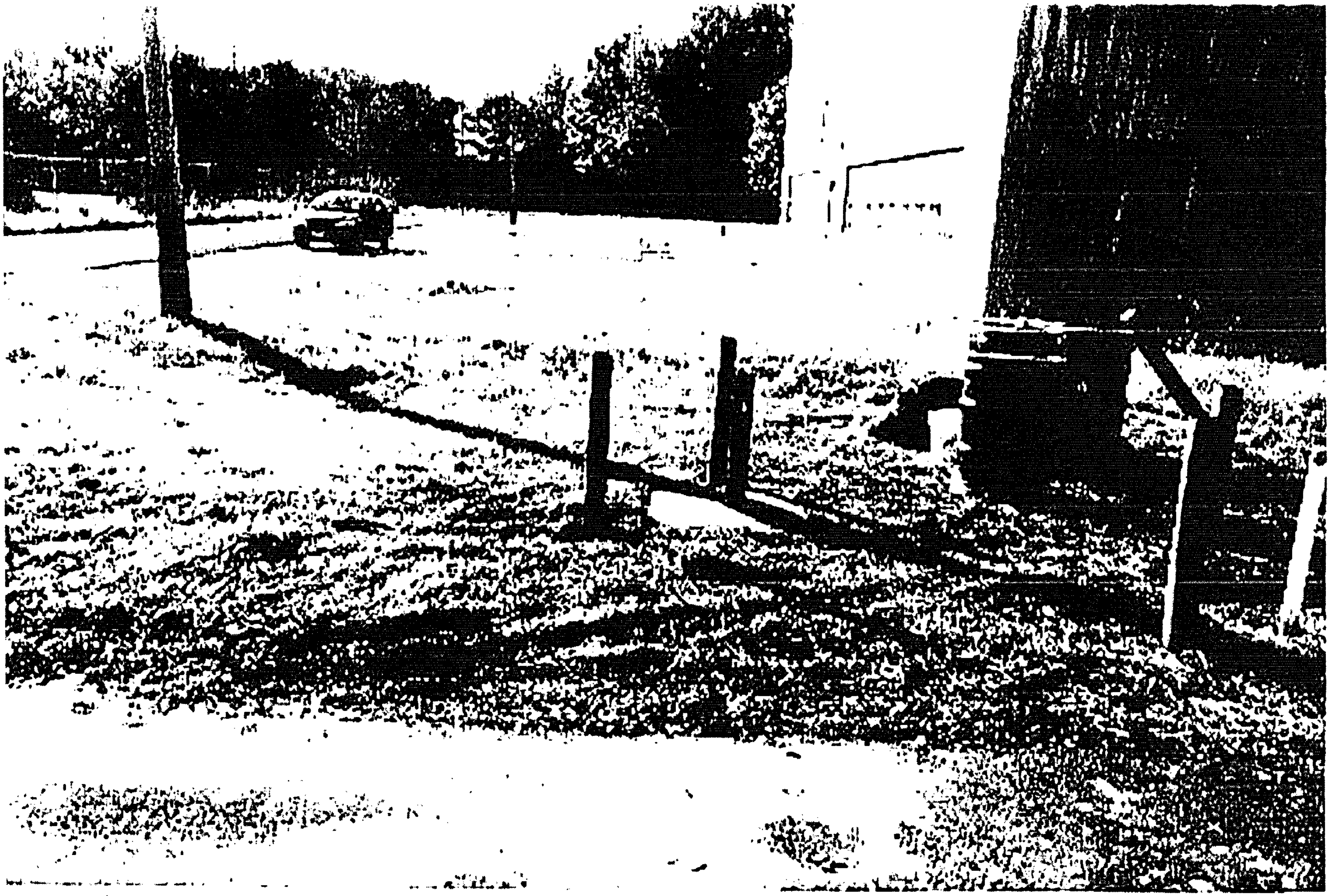
6:30 Left site. - met w/ Sheryl, gave info to Scott to get back into NASA Plum Brook on Monday by himself.

JW 10/17/03

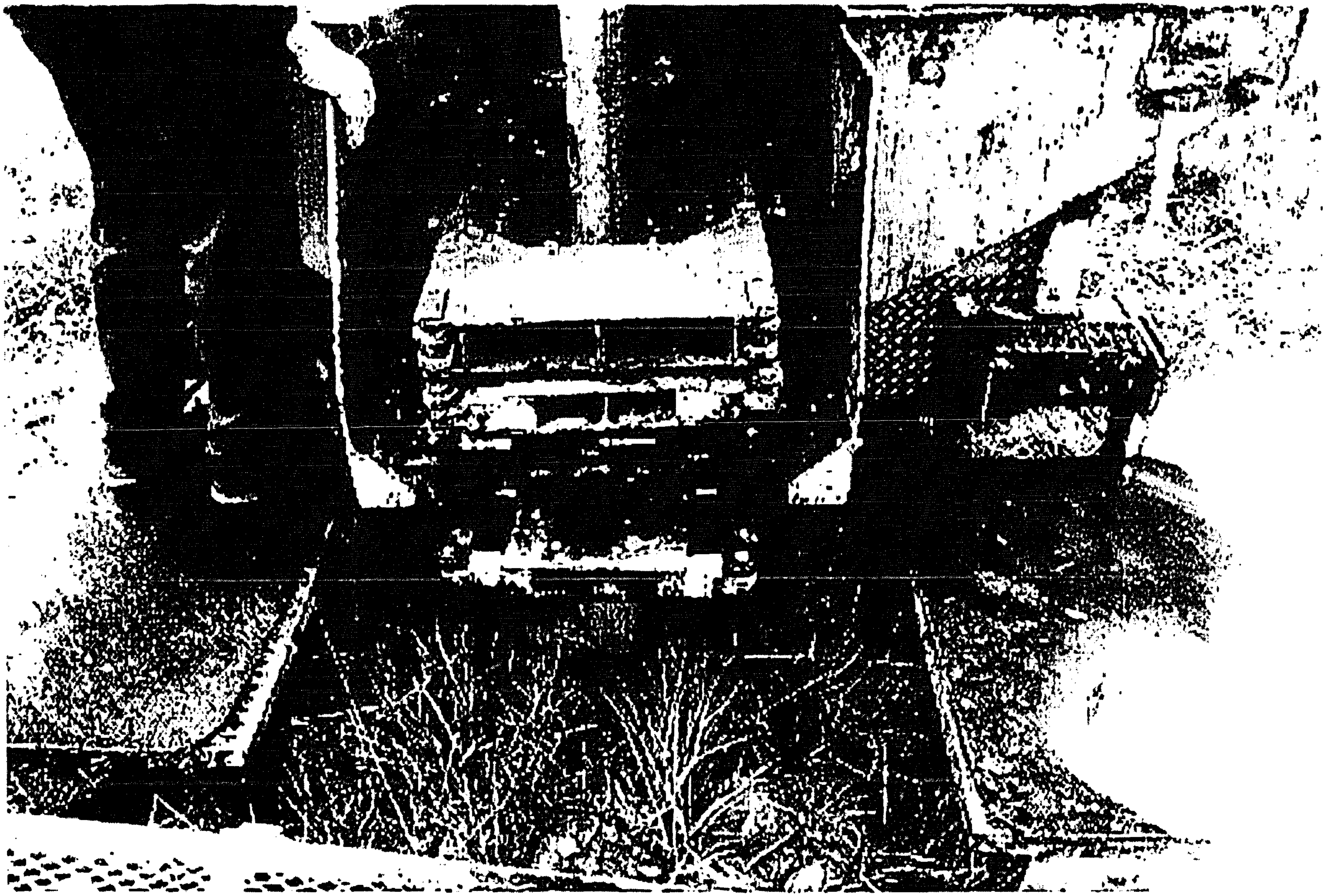
Attachment 3A
Photographs Well Location RA-07







Attachment 3B
Photographs Well Location RA-08



9730 Martin Luther King, Jr. Hwy, Suite B-1, Lanham, MD 20706 (301) 306-7480 Fax (301) 306-7484
Email. ehcati@aol.com www.catiinc.com

December 8, 2003

Ms. Sheryl Leeper
U.S. Army Corps of Engineers, Louisville District
PO Box 59
Louisville, KY 40201-0059

RE: Addendum for Report for "Groundwater Well Installation" at the NASA Plum Brook Station, Sandusky, Ohio. PRAC Contract No. DACA27-02-D-0005, Task Order 003.

Dear Ms. Leeper:

In November CATI sent a report on the installation of four (4) groundwater-monitoring wells (2 nested pairs – 1 shallow and 1 deep at each of two (2) locations). This work was performed October 14 – 21, 2003 by CATI and subcontractor Bowser-Morner. The report contained the OEPA well logs, CATI field notes, and photographs. Attached to this letter are the construction logs prepared by Bowser-Morner. This attachment serves as an addendum to the previous report.

Please call with any questions and thank you for the opportunity to work with USACE.

Sincerely,

CATI Inc.

FOR

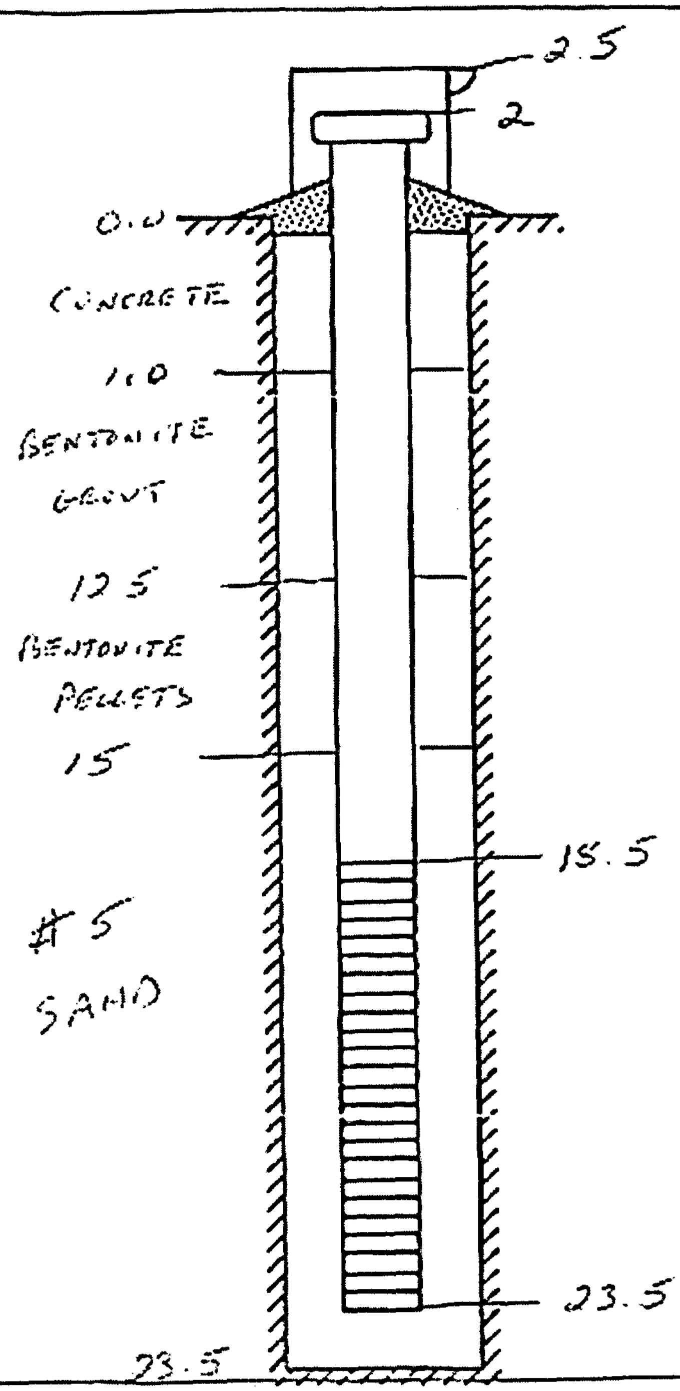
Judy Myck
Project Manager

Cc: Mr. Edward J. Harris (CATI)

LOG OF WELL NO.

RA-07S

129550	Job Number
10.15.03	Date Installed
BK	Technician
	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
.10	Screen Slot Size
23.5	Bottom of Boring
23.5	Bottom of Screen
18.5	Top of Screen
15	Top of Sand
12.5	Top of Bentonite Pellet
1.0	Top of Bentonite ~~Slurry~~ GROUT
0.0	Top of ~~Bentonite~~ / Cement ~~Grout~~
	Top of Soil Backfill
2	Top of Well Riser Pipe
2.5	Top of Guard Pipe
3	Initial Water Depth
11.25	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth

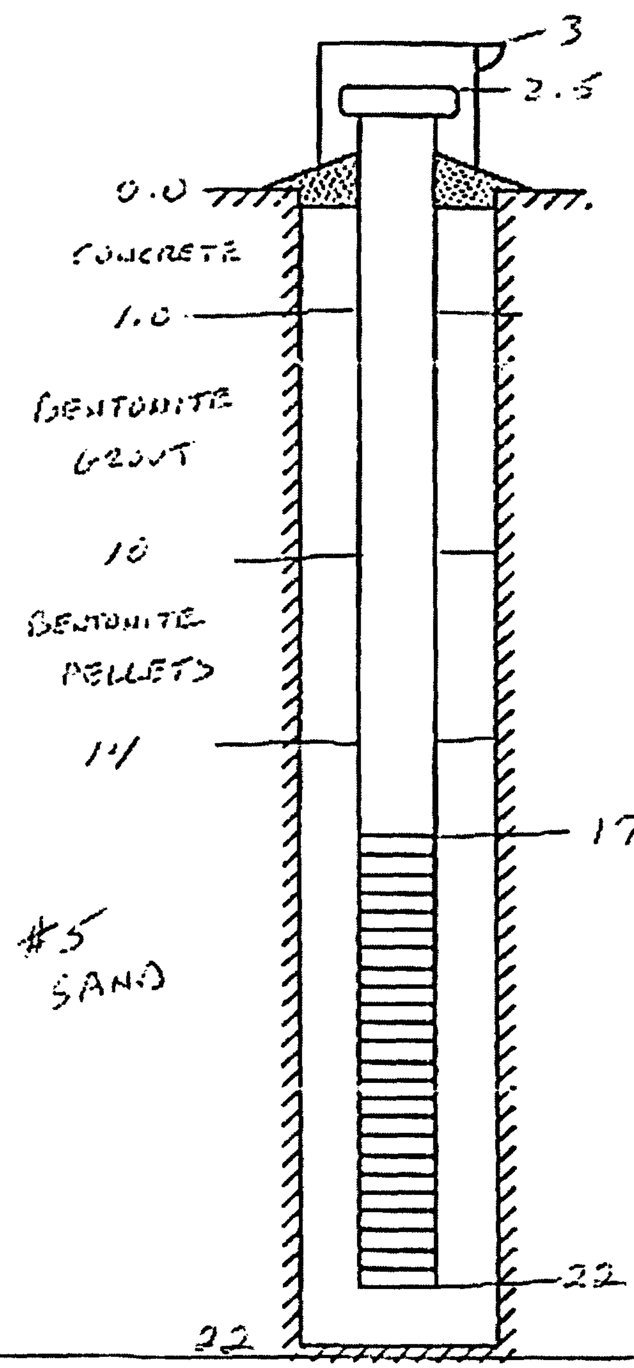


Remarks:

LOG OF WELL NO.

RA-085

129550	Job Number
10-16-03	Date Installed
BK	Technician
	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
.10	Screen Slot Size
22	Bottom of Boring
22	Bottom of Screen
17	Top of Screen
14	Top of Sand
10	Top of Bentonite Pellet
1.0	Top of Bentonite ~~Slurry~~ GROUT
0.0	Top of ~~Bentonite~~ / Cement ~~Grout~~
	Top of Soil Backfill
2.5	Top of Well Riser Pipe
3	Top of Guard Pipe
2	Initial Water Depth
5	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth



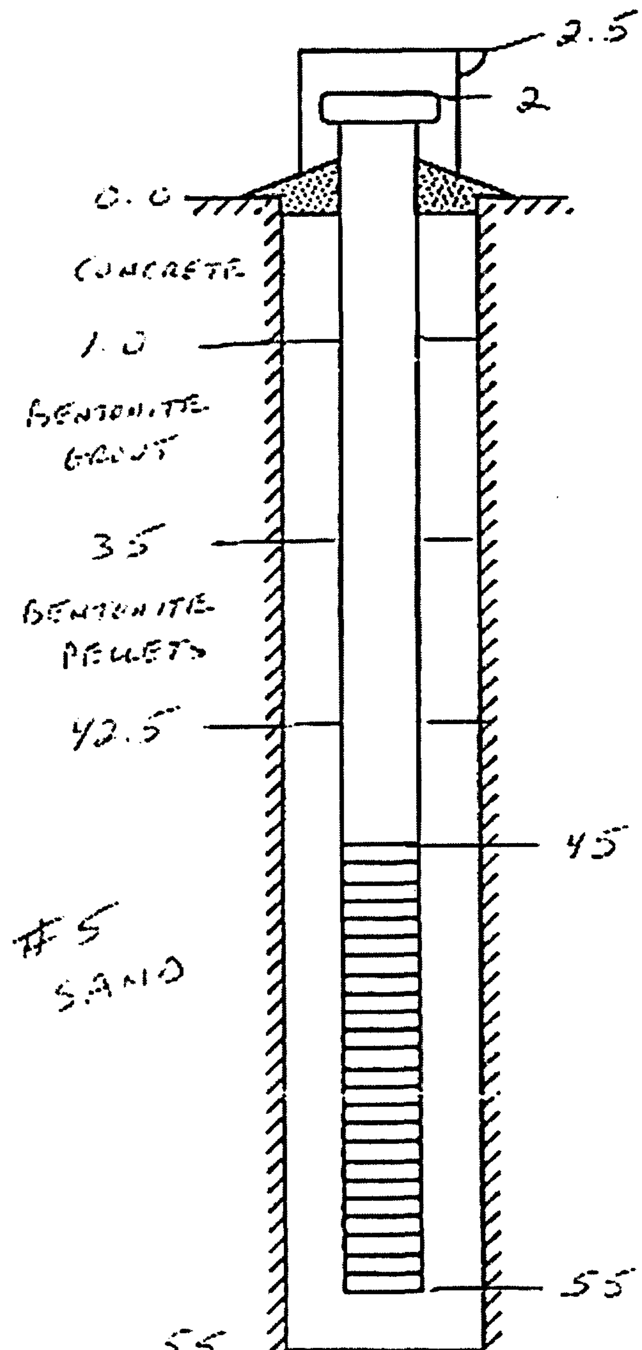
Remarks:

BOWSE
MORNE

LOG OF WELL NO.

RA-07D

129550	Job Number
10/17/03	Date Installed
BK	Technician
	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
.10	Screen Slot Size
55	Bottom of Boring
55	Bottom of Screen
45	Top of Screen
42.5	Top of Sand
35	Top of Bentonite Pellet
1.0	Top of Bentonite ~~Slurry~~ GROUT
0.0	Top of ~~Bentonite~~ / Cement ~~Grout~~
	Top of Soil Backfill
2	Top of Well Riser Pipe
2.5	Top of Guard Pipe
4	Initial Water Depth
15	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth

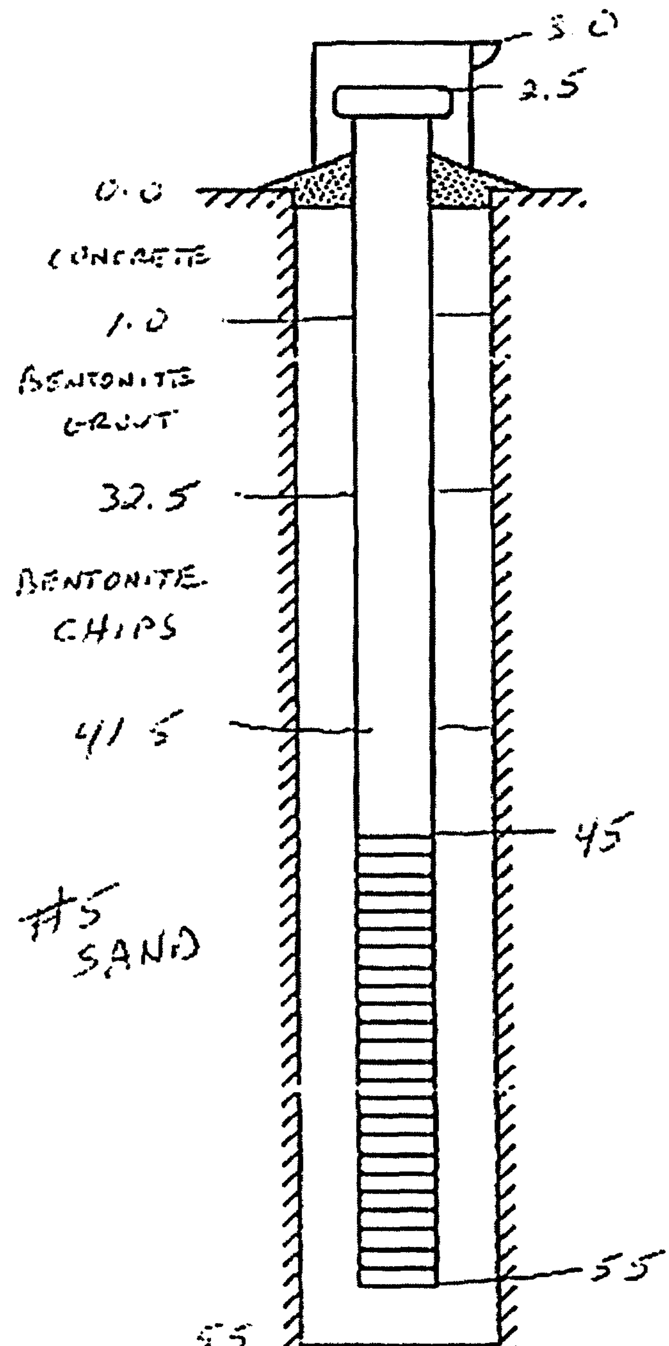


Remarks:

LOG OF WELL NO.

RA-08D

129550	Job Number
10-16-03	Date Installed
BK	Technician
	Surface Elevation
PVC	Riser Pipe Material
PVC	Screen Material
2"	Screen Diameter
.10	Screen Slot Size
55	Bottom of Boring
55	Bottom of Screen
45	Top of Screen
41.5	Top of Sand
32.5	Top of Bentonite ~~Pellet~~ CHIPS
1.0	Top of Bentonite ~~Slurry~~ GROUT
0.0	Top of ~~Bentonite~~ / Cement ~~Grout~~
	Top of Soil Backfill
2.5	Top of Well Riser Pipe
3	Top of Guard Pipe
3.0	Initial Water Depth
15	Completion of Water Depth
	24 Hour Water Depth
	48 Hour Water Depth
	Hour Water Depth



Remarks:

BOWSER MORNER