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

## Volume II
## Appendices

**Prepared for:**

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

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**IT Corporation**
**312 Directors Drive**
**Knoxville, Tennessee 37923**

**IT Project No. 825635**

**Revision 0**

**March 2002**

Appendix A

# APPENDIX A

# DIRECT-PUSH HTRW DRILL LOGS, TEMPORARY PIEZOMETER CONSTRUCTION DIAGRAMS

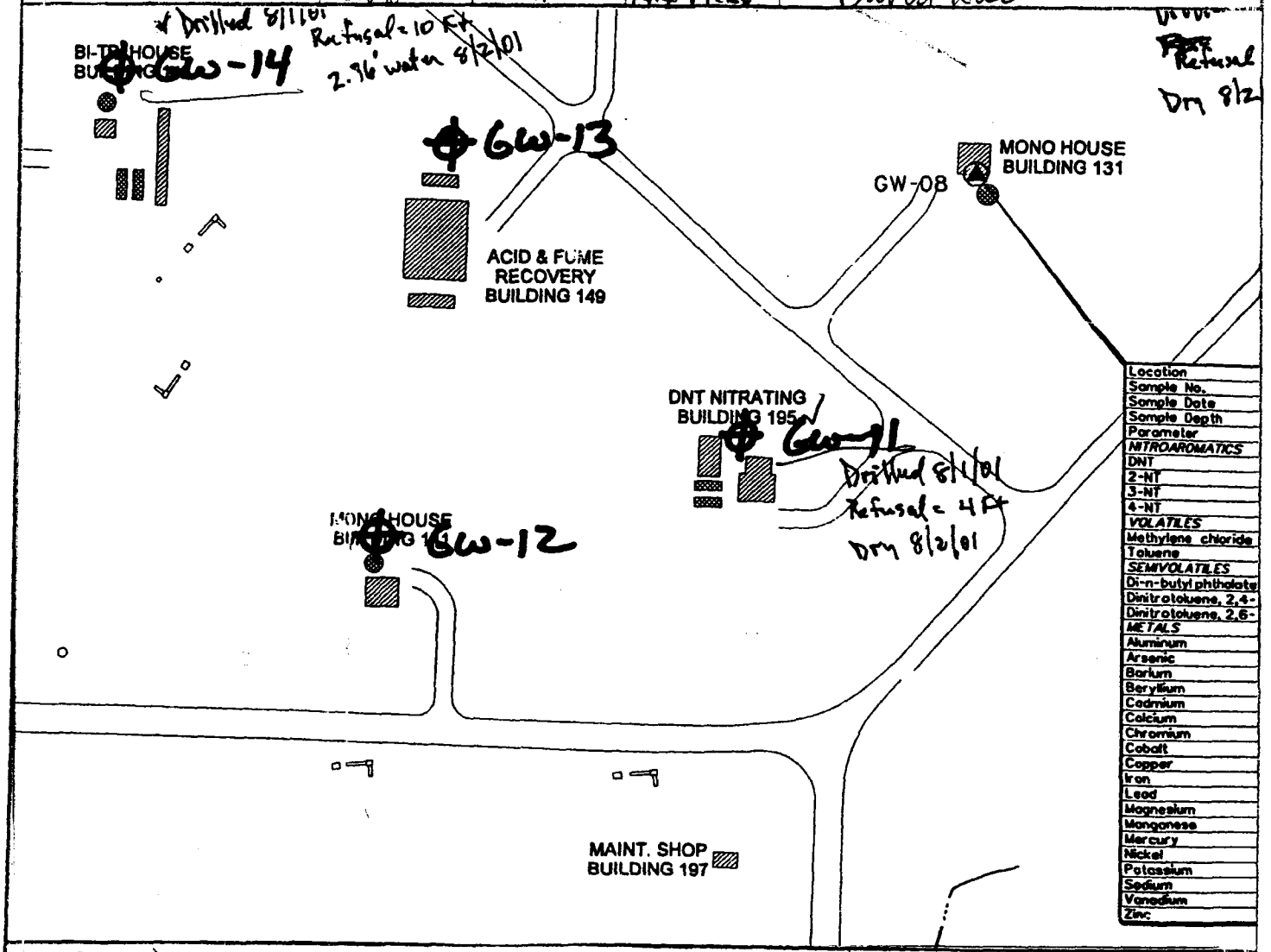
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-11 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 Inch OD probe. Temporary piezometer 2" OD Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 195 | |
| | 9. SURFACE ELEVATION: 660.78 Ft N: 622927.39 E: 1923122.51 | |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 4 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Dry 8/6/01 0805 | |
| 14. TOTAL DEPTH OF HOLE: 4 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Keach |




| Location |
|---|
| Sample No. |
| Sample Date |
| Sample Depth |
| Parameter |
| *NITROAROMATICS* |
| DNT |
| 2-NT |
| 3-NT |
| 4-NT |
| *VOLATILES* |
| Methylene chloride |
| Toluene |
| *SEMIVOLATILES* |
| Di-n-butyl phthalate |
| Dinitrotoluene, 2,4- |
| Dinitrotoluene, 2,6- |
| *METALS* |
| Aluminum |
| Arsenic |
| Barium |
| Beryllium |
| Cadmium |
| Calcium |
| Chromium |
| Cobalt |
| Copper |
| Iron |
| Lead |
| Magnesium |
| Manganese |
| Mercury |
| Nickel |
| Potassium |
| Sodium |
| Vanadium |
| Zinc |

| | |
|---|---|
| PROJECT: PBOW | HOLE NO: GW-11 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-11

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

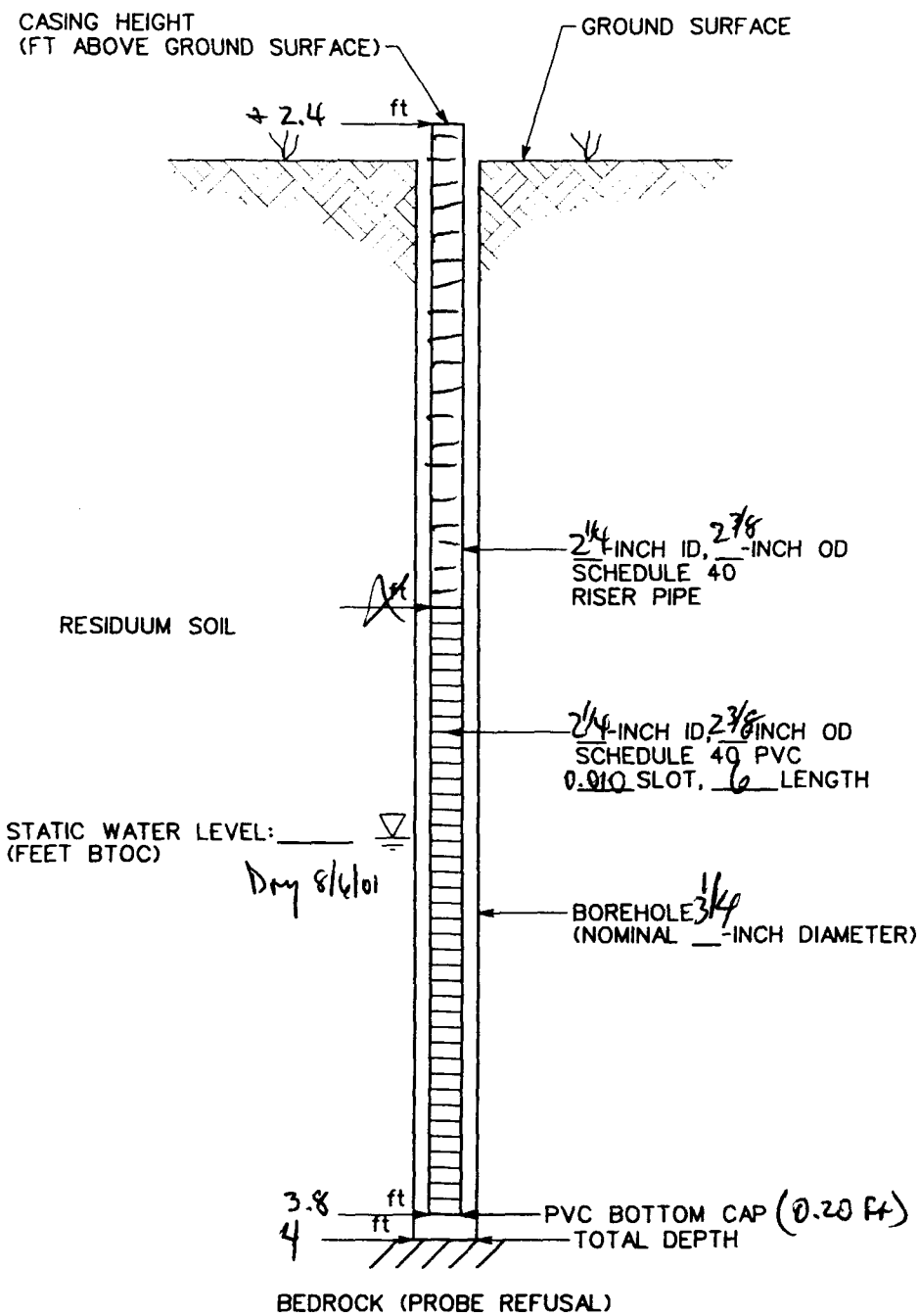
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Mown Weeds | NA | NA | NA | NA | NA | Began drilling |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | No lithologic samples collected. |
| | 4 | Probe Refusal @ 4 Ft<br>TD = 4 Ft | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 0 | | | | | | | |

Project: PBOW

Hole Number: GW-11

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INTA




**NOTES:**

PIEZOMETER NO.: GW-11

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

NOT TO SCALE

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| DWG. NO.: \825635ES.016 | INITIATOR: C. WILLIAMS | DRAFT. CHCK. BY: C. TUMLIN | DATE LAST REV.: |
| PROJ. NO.: 825635 | PROJ. MGR.: SPANGBERG | ENGR. CHCK. BY: C. WILLIAMS | DRAWN BY: |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF | | |

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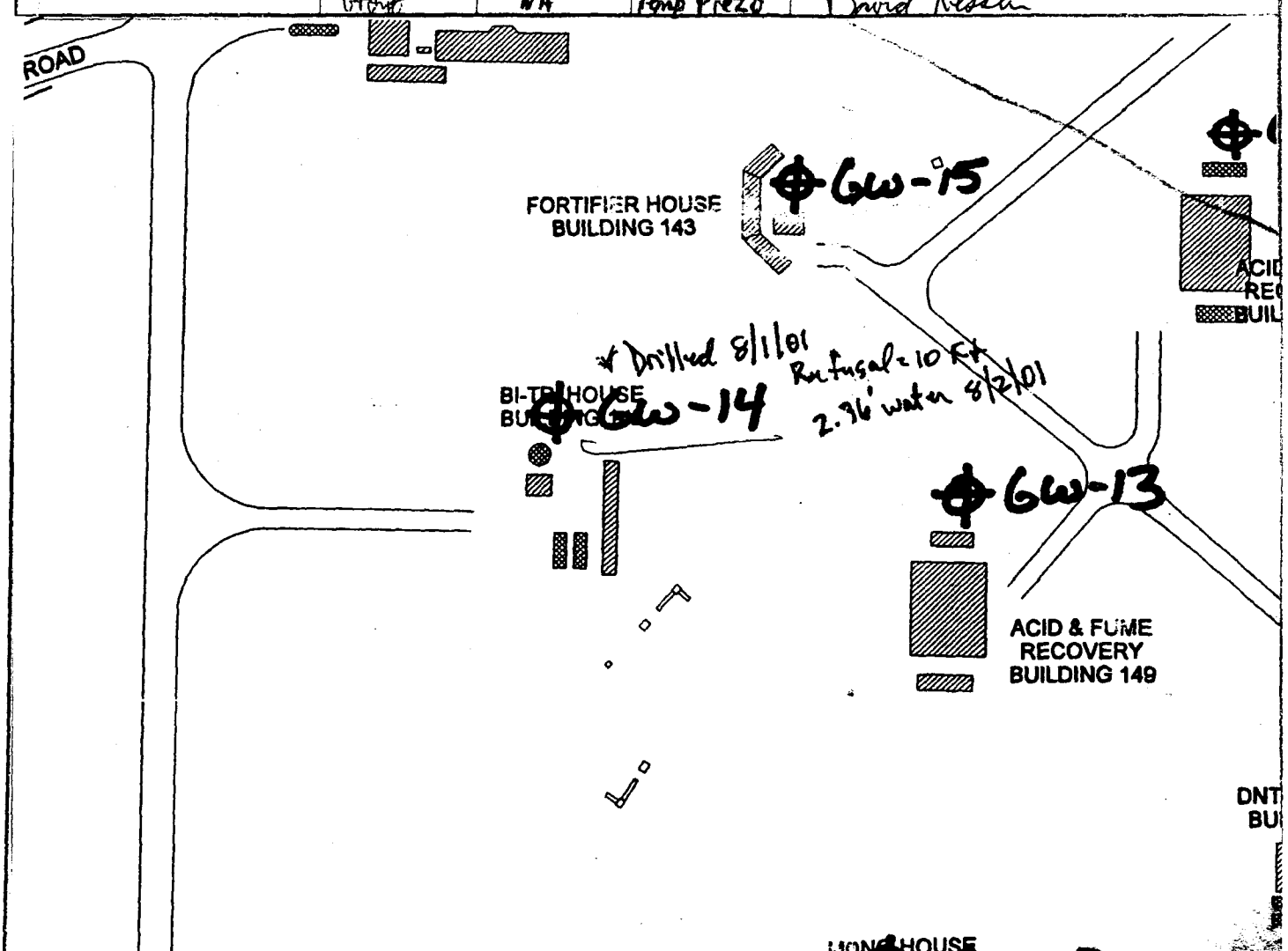
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-14 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 142 | |
| | 9. SURFACE ELEVATION: 651.03 Ft N: 623140.96 E: 1922681.12 | |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 10 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.70 Ft 8/6/01 0808 - Sampled | |
| 14. TOTAL DEPTH OF HOLE: 10 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| | |
|---|---|
| PROJECT: PBOW | HOLE NO: GW-14 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-14

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

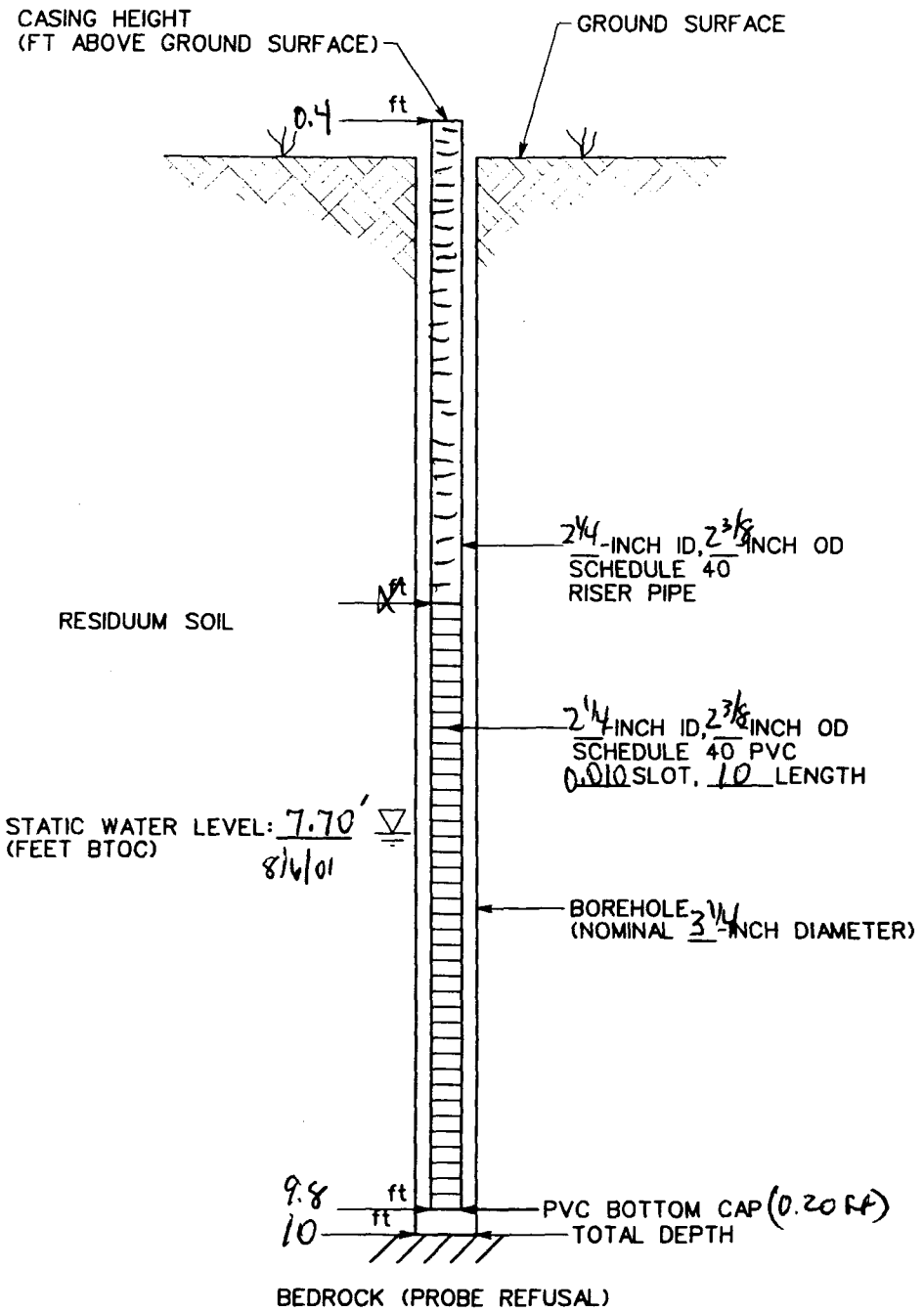
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | | NA | | NA | Began drilling 8/1/01 1545 |
| | 1 | | | O.D | | BA 3014 | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | Breathing Air PID = 0.0ppm |
| | 6 | | | | | | | VRAE: |
| | 7 | | | | | | | CO = 0 ppm LEL = 1 ppm $H_2S$ = 0 ppm $O_2$ = 21.2% |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | Probe Refused @ 10 ft TD = 10 ft | | | | | | |

Project: PBOW

Hole Number: GW-14

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT A




**NOTES:**

PIEZOMETER NO.: GW-14

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

NOT TO SCALE

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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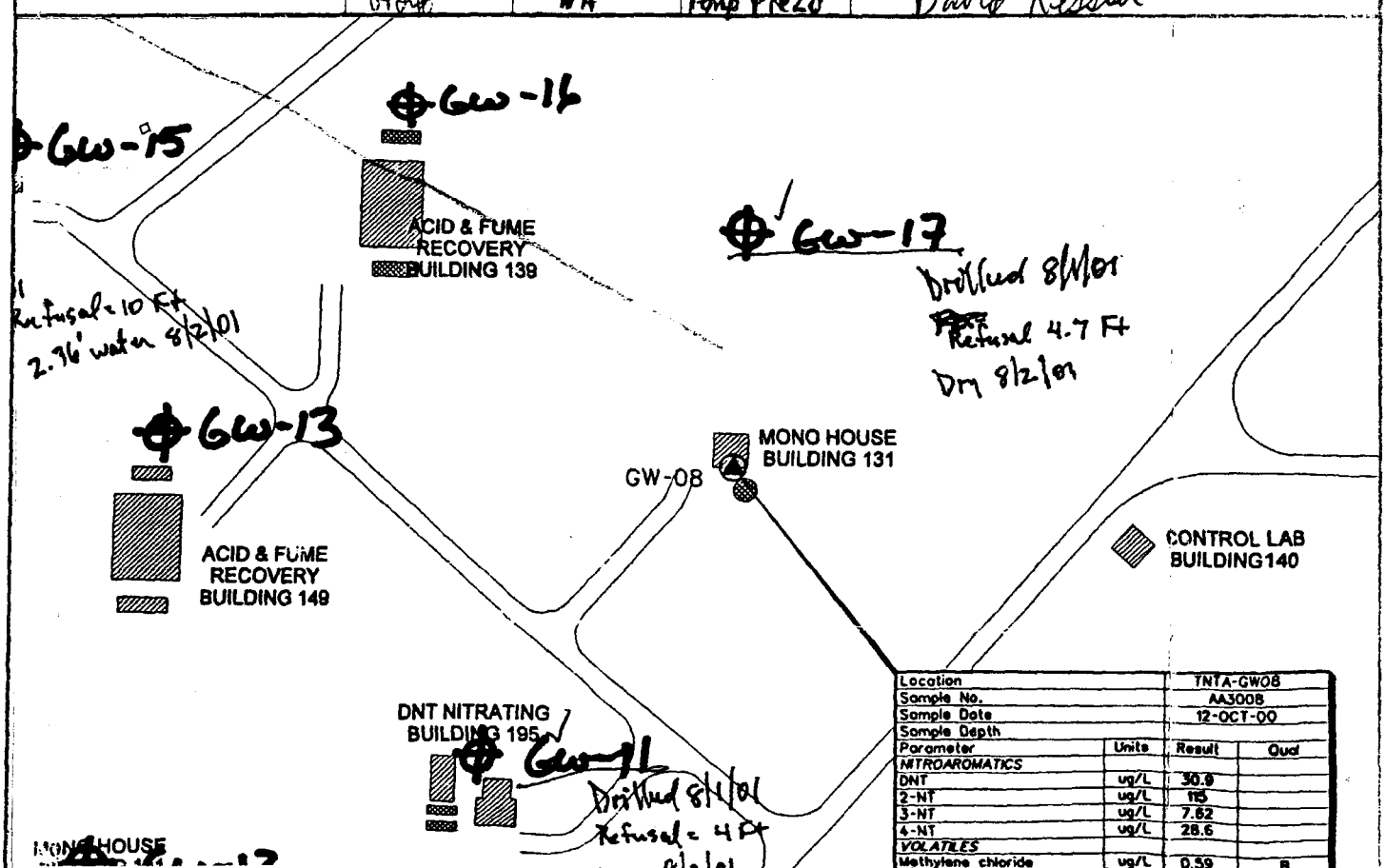
# HTRW DRILLING LOG

| | |
|---|---|
| DISTRICT | USACE - Nashville |
| HOLE NUMBER | GW-17 |
| 1. COMPANY NAME | IT Corporation |
| 2. DRILL SUBCONTRACTOR | Prosonic |
| SHEET / SHEETS | 1 OF 2 |
| 3. PROJECT | PBOW |
| 4. LOCATION | TNT Area A |
| 5. NAME OF DRILLER | Pete Goss |
| 6. MANUFACTURER'S DESIGNATION OF DRILL | Geoprobe DT 66 |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT | DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD Sch 40 PVC 0.010" slot screen |
| 8. HOLE LOCATION | Bldg 131 (Downgradient) |
| 9. SURFACE ELEVATION | 657.67 Ft N: 623355.61 E: 1923280.93 |
| 10. DATE STARTED | 8/1/01 |
| 11. DATE COMPLETED | 8/1/01 |
| 12. OVERBURDEN THICKNESS | 4.3 Ft |
| 13. DEPTH GROUNDWATER ENCOUNTERED | Groundwater not encountered |
| 14. DEPTH DRILLED INTO ROCK | 0.4 Ft |
| 15. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED | Dry 8/6/01 0802 |
| 16. TOTAL DEPTH OF HOLE | 4.7 Ft |
| 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) | — |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| Location | | TNTA-GW08 | |
|---|---|---|---|
| Sample No. | | AA3008 | |
| Sample Date | | 12-OCT-00 | |
| Sample Depth | | | |
| Parameter | Units | Result | Qual |
| NITROAROMATICS | | | |
| DNT | ug/L | 30.9 | |
| 2-NT | ug/L | 115 | |
| 3-NT | ug/L | 7.62 | |
| 4-NT | ug/L | 28.6 | |
| VOLATILES | | | |
| Methylene chloride | ug/L | 0.59 | B |

| PROJECT | PBOW | HOLE NO | GW-17 |
|---|---|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-17

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

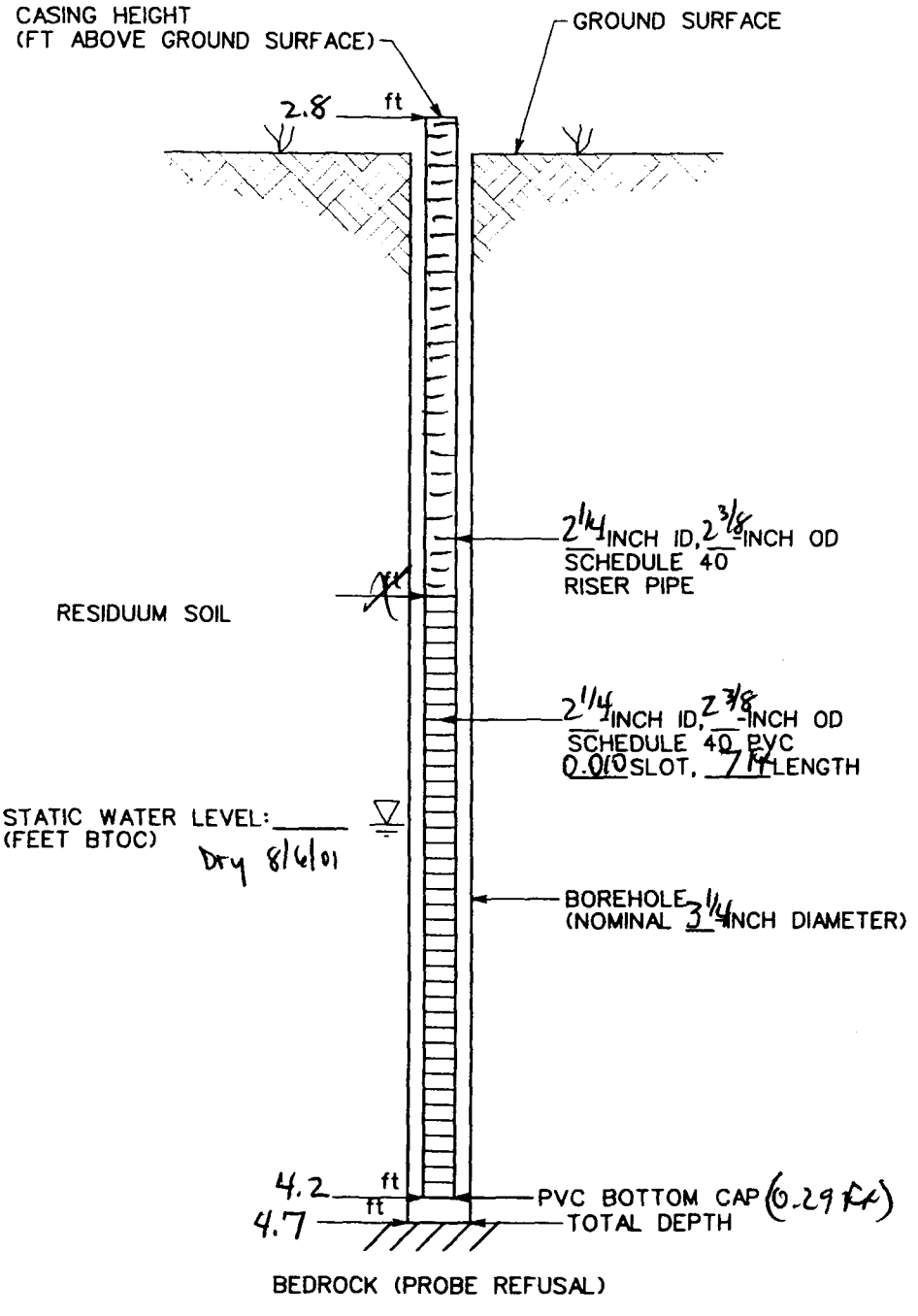
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | 0.0 | NA | NA | NA | Began drilling 8/1/01 1645 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | | SHALE, white, dry | | | | | | |
| | 5 | Probe Refusal @ 4.7 Ft TD = 4.7 Ft | | | | | | Breathing Air. PID = 0.0ppm |
| | 6 | | | | | | | Drilled in 0.4 Ft white shale |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 0 | | | | | | | |

Project: PBOW

Hole Number: GW-17

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TMA




**NOTES:**

PIEZOMETER NO.: GW-17

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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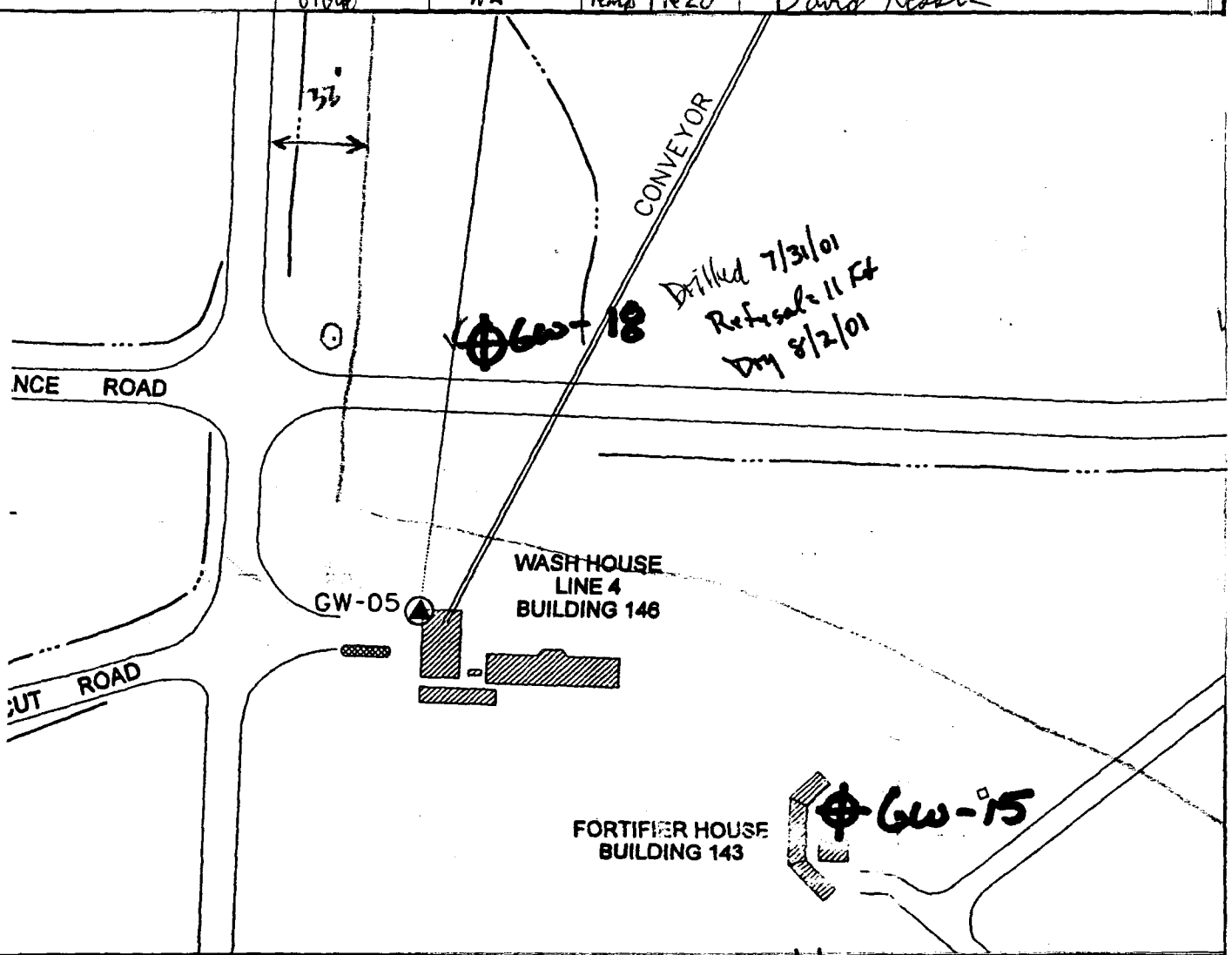
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | HOLE NUMBER: GW-18 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 1/4" DT 66 All terrain, track mounted geoprobe rig with 2.5 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC, 0.010" slot screen | 8. HOLE LOCATION: Downgradient Bldg 146 N: 623615.68 E: 1922615.98 | |
| | 9. SURFACE ELEVATION: 635.99 Ft | |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 11 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Dry 8/6/01 0728 | |
| 14. TOTAL DEPTH OF HOLE: 11 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| | |
|---|---|
| PROJECT: PBOW | HOLE NO. GW-18 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-18

Project: PBOW

Geologist: D. Kessler

Sheet 2 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 |
|---|---|---|---|---|---|---|---|---|
| | | Grass | NA | NA | NA | NA | NA | Began drilling 7/31/01 1630 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID Battery Being recharged. No Airquality readings taken |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-18

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-18

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

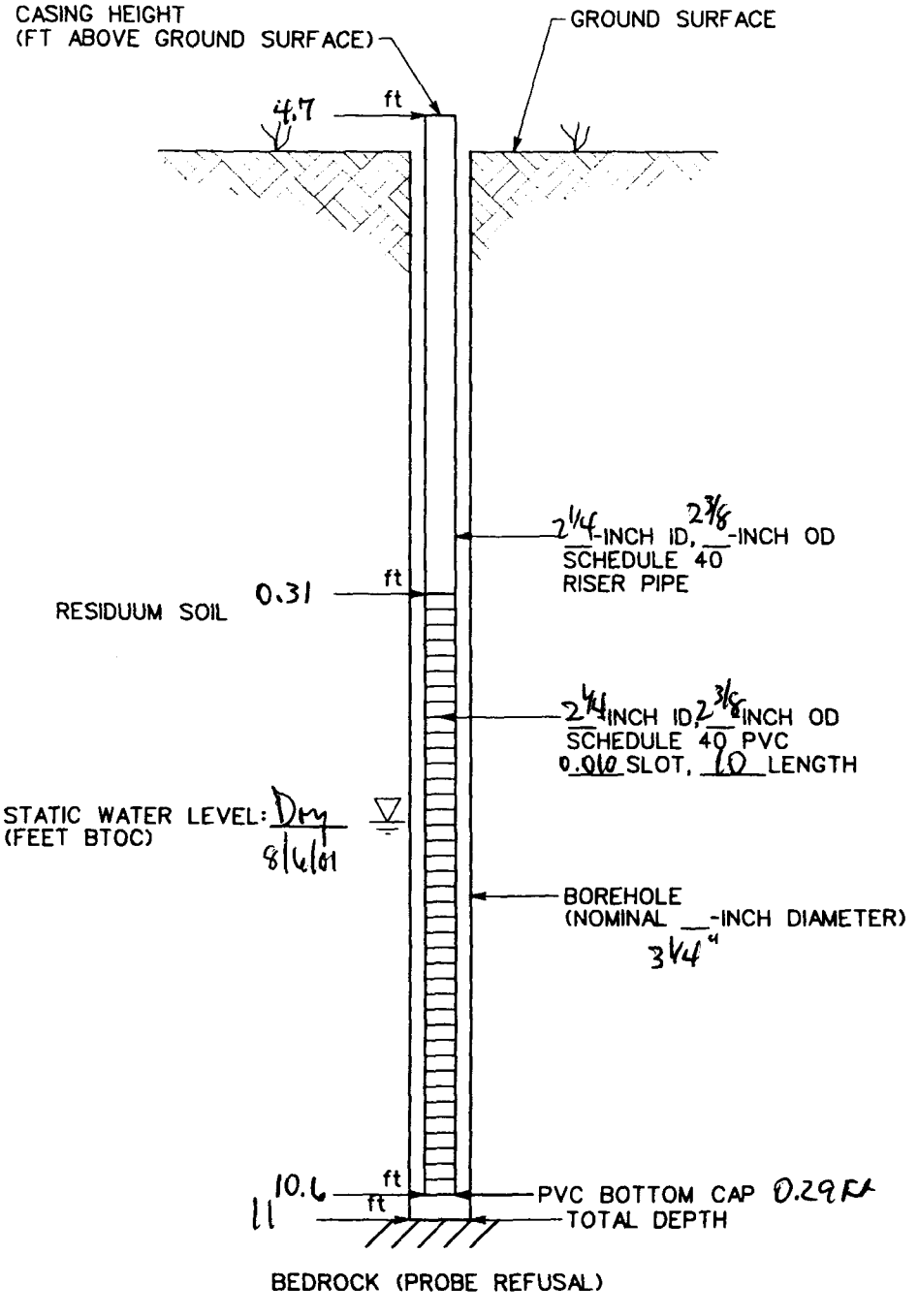
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | | NA | NA | NA | |
| | 11 | SILT (10YR 2.5/N) Black, soft | | | | | | |
| | | Probe Refusal @ 11 Ft | | | | | | |
| | | TD = 11 Ft | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: GW-18

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT A




**NOTES:**

PIEZOMETER NO.: GW-18

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.:\825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.:SPANGBERG | PROJ. NO.: 825635 |

10:02:05 07/30/01

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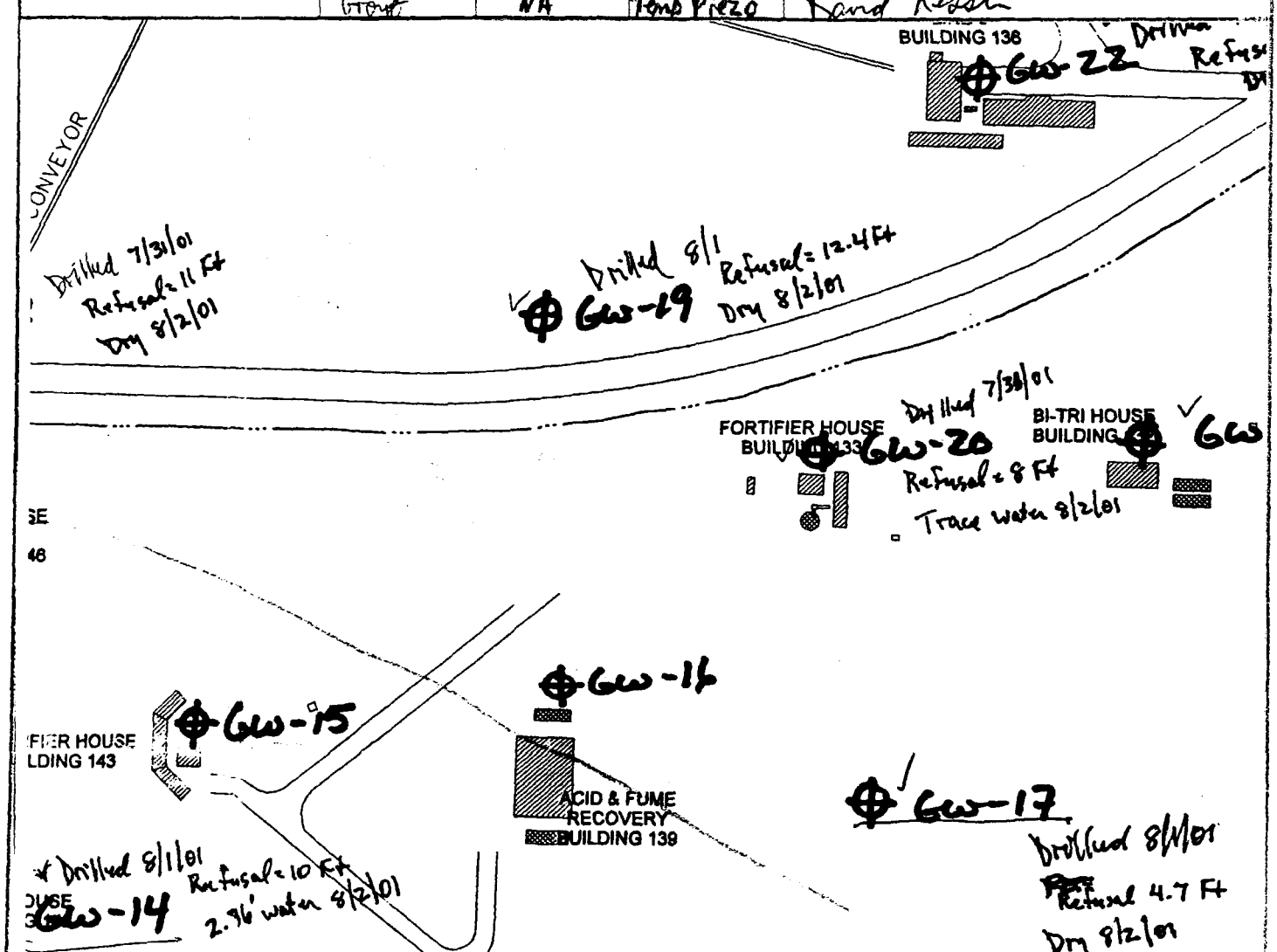
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-19 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 Inch OD probe. Temporary Piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 133 Down and side gradient (NW of Bldg) | |
| | 9. SURFACE ELEVATION: 640.78 Ft N: 623612.68 E: 1923052.20 | |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 12.4 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Dry 8/6/01 0733 | |
| 14. TOTAL DEPTH OF HOLE: 12.4 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| | |
|---|---|
| PROJECT: PBOW | HOLE NO: GW-19 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-19

Project: PBOW

Geologist: D. Kessler

Sheet 2 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 |
|---|---|---|---|---|---|---|---|---|
| | | | | | NA | NA | NA | Began drilling 8/1/01 0900 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID = 0.0 ppm |
| | | | | | | | | LEL: |
| | 6 | | | | | | | CO: 0 ppm<br>LEL - 1<br>$H_2S$ - 0 ppm<br>$O_2$ = 21.3 % |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | 0.0 | | | | |
| | 0 | | | | | | | |

Project: PBOW

Hole Number: GW-19

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-~~20~~ 19

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

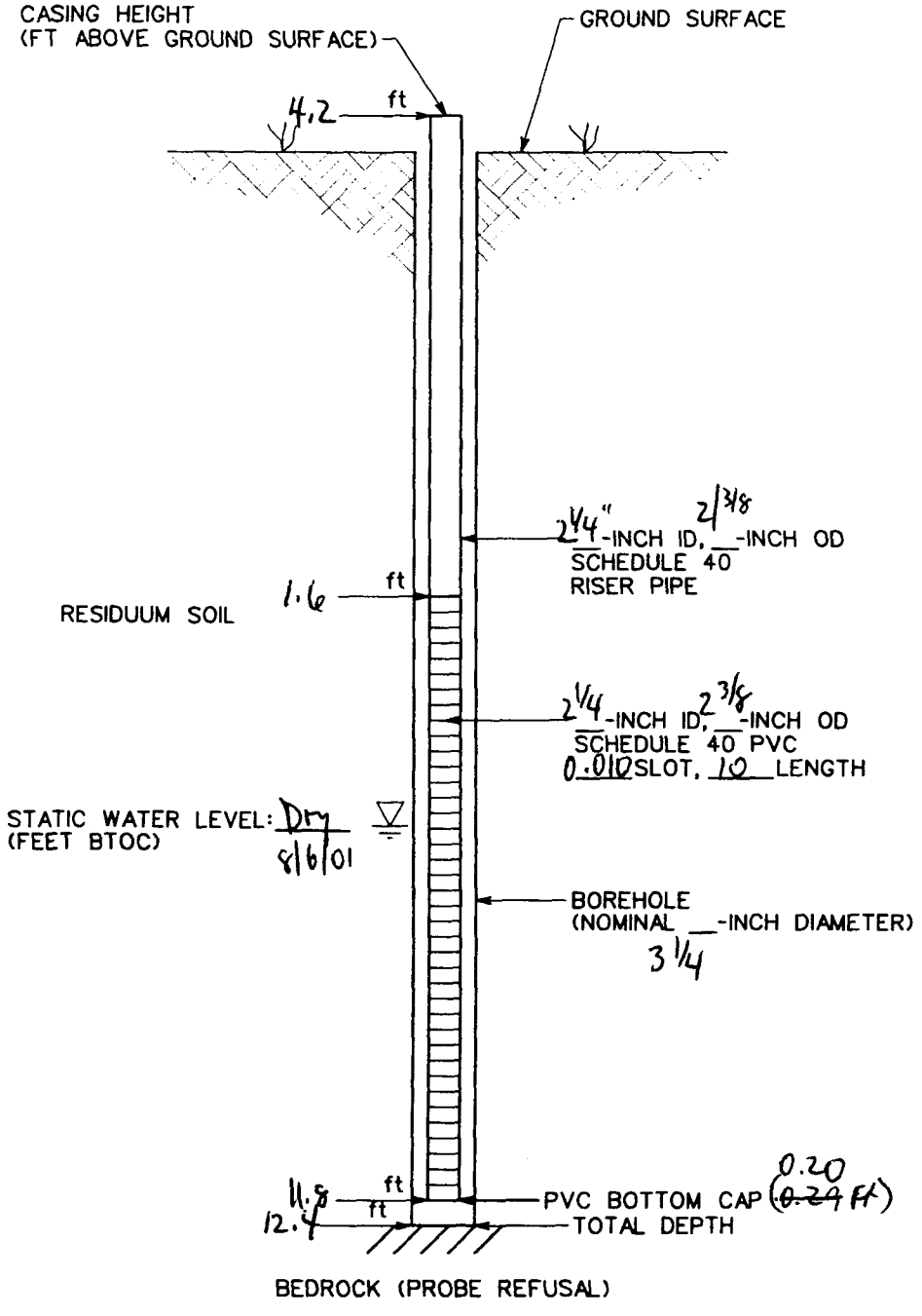
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | NA | NA | NA | NA | |
| | 11 | SAND, very fine grain, dark yellowish brown (10YR 4/6), moist. | | | | | | |
| | 12 | | | | | | | |
| | | Probe Refusal @ 12.4 ft<br>TD = 12.4 ft | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: GW-~~20~~ ~~19~~ 19

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT A




**NOTES:**

PIEZOMETER NO.: GW-19

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

10:02:05 07/30/01

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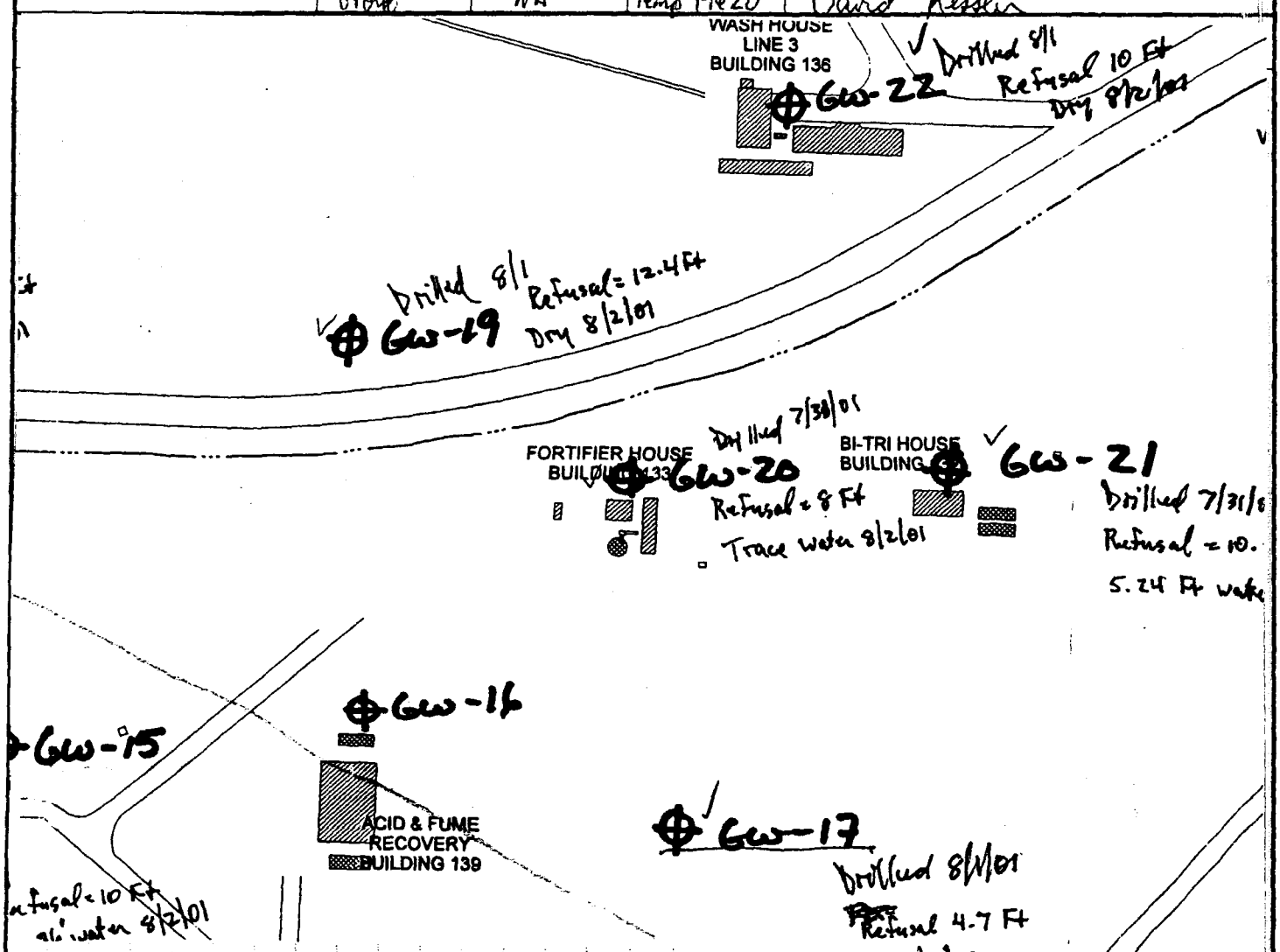
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-20 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area ~~B~~ A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3/4" DT 66 All terrain, track mounted geoprobe rig with 2 5/8 inch OD probe. Temporary Piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 133 | |
| | 9. SURFACE ELEVATION: 650.07 Ft | N: 623518.06 E: 1923277.55 |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 8 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.91 Ft 8/6/01 0800 – No sample (0.2 Ft water column) | |
| 14. TOTAL DEPTH OF HOLE: 8 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| PROJECT: PBOW | HOLE NO. GW-20 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet) TNTA

Hole Number: GW-20

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

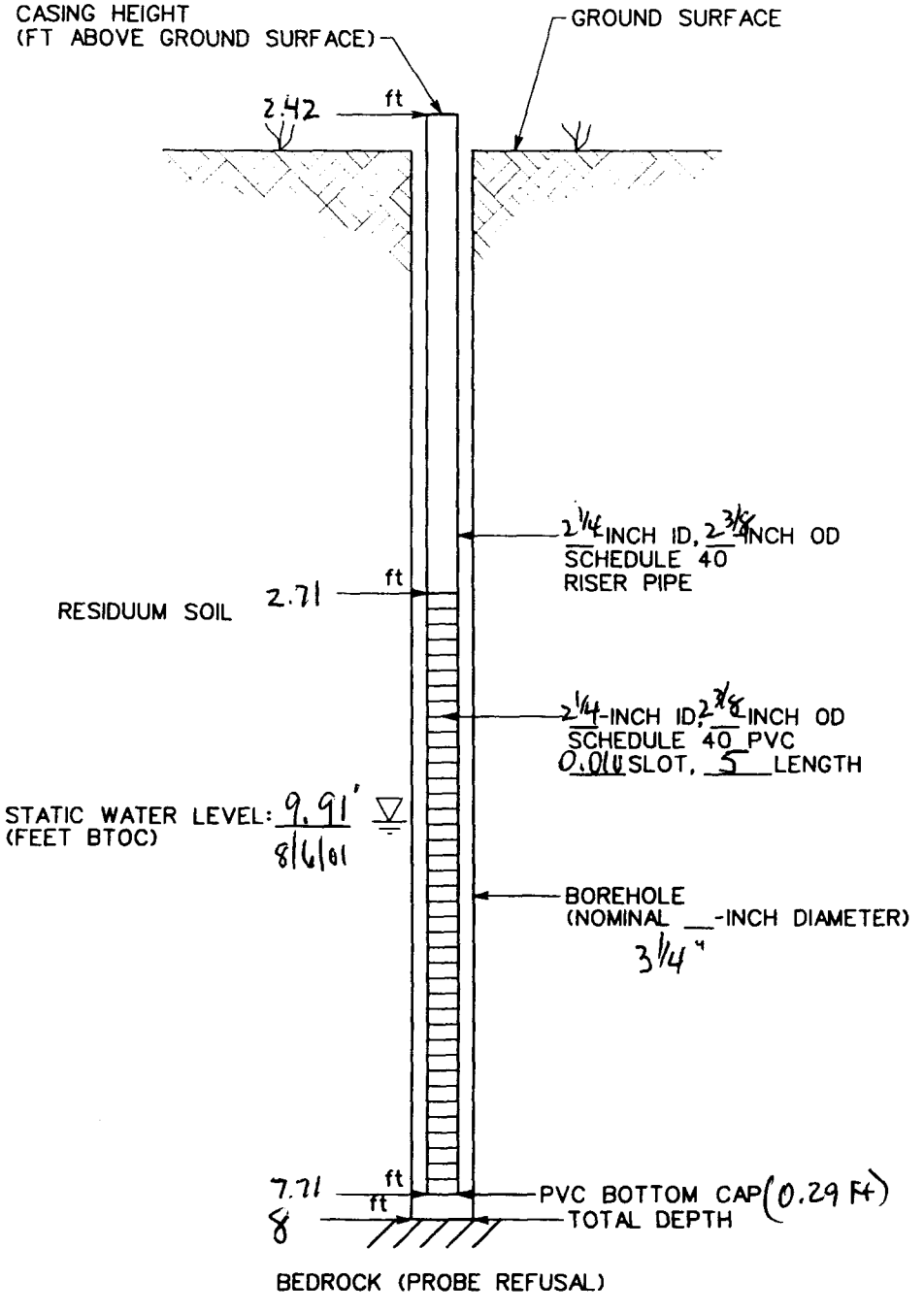
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Tall Grass | NA | NA | NA | NA | NA | Began drilling 7/31/01 1700 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID Battery being recharged. No air quality readings taken. |
| | 6 | | | | | | | |
| | 7 | SAND, very fine grain, very moist, dark gray/black | | | | | | |
| | 8 | Probe Refusal @ 8 ft TD = 8 ft | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-20

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTA




**NOTES:**

PIEZOMETER NO.: GW-20

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.:\825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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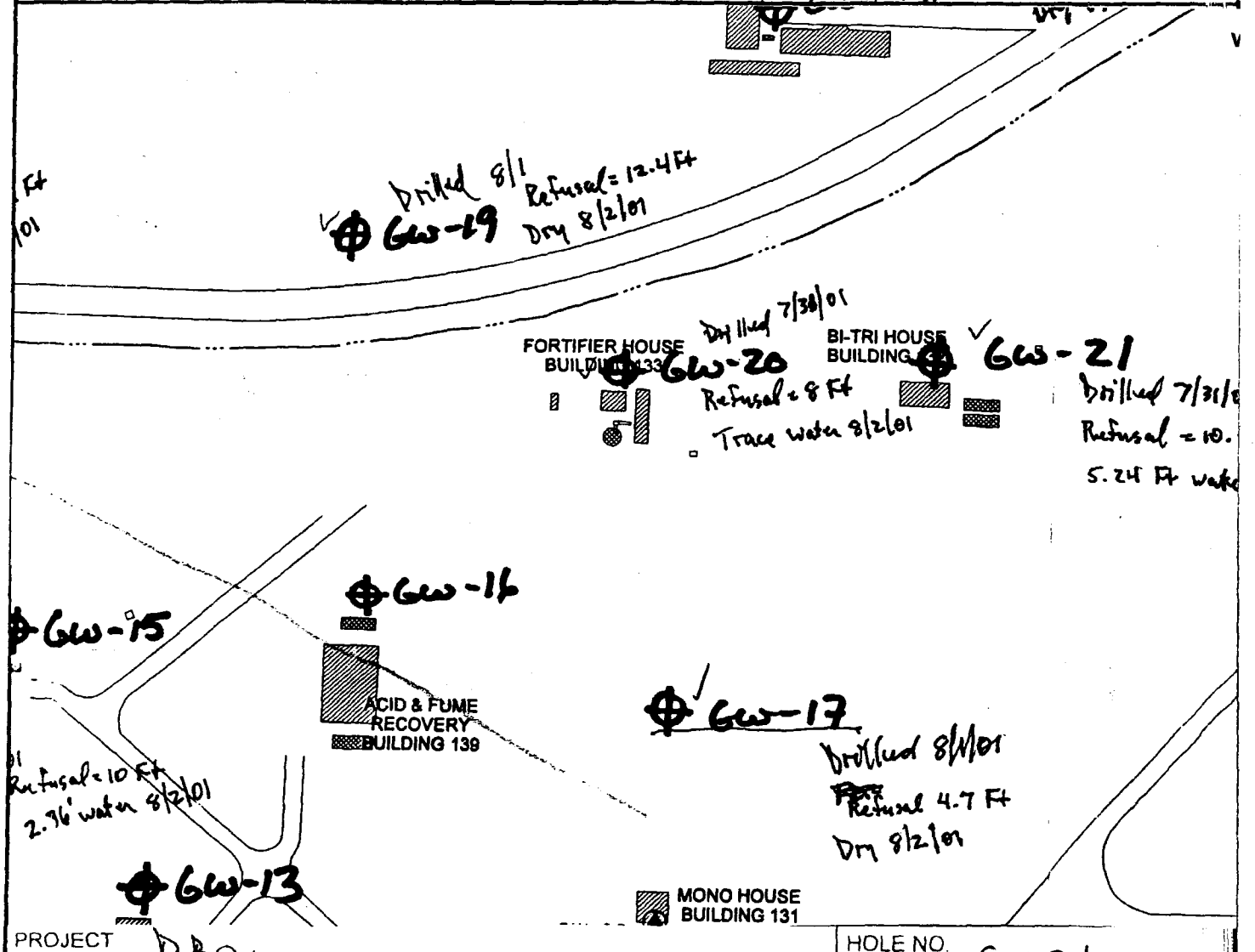
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-21 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Atosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area ~~B~~ A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 2 5/8 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC. 0.010" slot screen | 8. HOLE LOCATION: Bldg 132 | |
| | 9. SURFACE ELEVATION: 653.45 Ft | N: 623536.52 E: 1923487.37 |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 10.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 8.5 Ft | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 5.26 Ft (5.24 Ft water column 1700 8/1/01 (~24 hrs)) sampled | |
| 14. TOTAL DEPTH OF HOLE: 10.5 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Keesh |




PROJECT: PBOW

HOLE NO.: GW-21

# HTRW DRILLING LOG

(continuation sheet) TNTA

Hole Number: GW-21

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

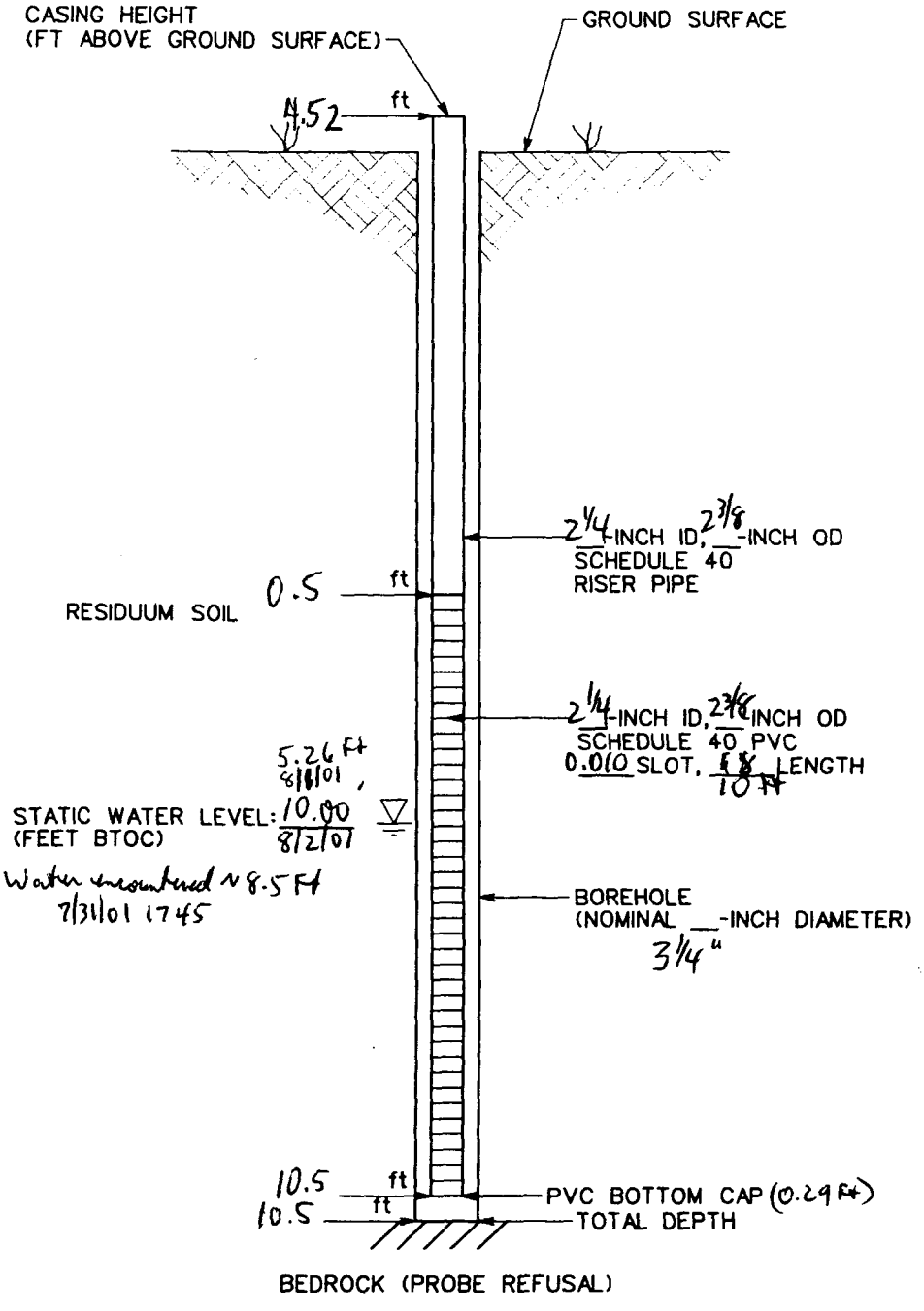
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Tall Grass | NA | NA | NA | | NA | Began drilling 7/31/01 1730 |
| | 1 | | | | | BA 3021 | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | No PID readings Battery being charged. |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | Probe Refusal 10.5 Ft TD = 10.5 Ft | | | | | | Water in borehole |

Project: PBOW

Hole Number: GW-21

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTA




**NOTES:**

PIEZOMETER NO.: GW-21

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/2/01

Used 3/4 bag (50 lbs sack) bentonite

NOT TO SCALE

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | DRAWN BY: |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

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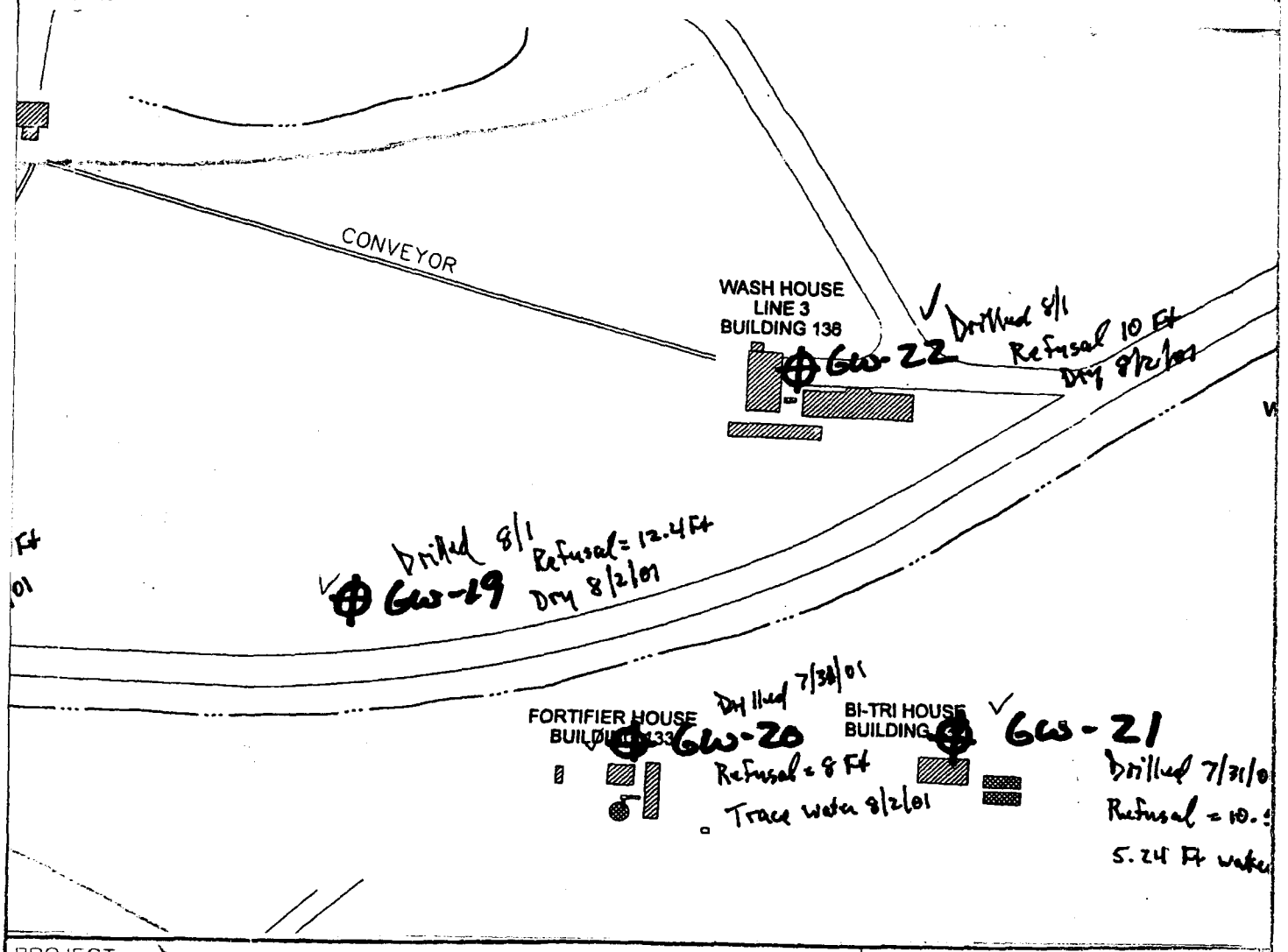
# HTRW DRILLING LOG

| | |
|---|---|
| DISTRICT | USACE - Nashville |
| HOLE NUMBER | GW-22 |
| 1. COMPANY NAME | ITT Corporation |
| 2. DRILL SUBCONTRACTOR | Prosonic |
| SHEET / OF SHEETS | 1 of 2 |
| 3. PROJECT | PBOW |
| 4. LOCATION | TNT Area A |
| 5. NAME OF DRILLER | Pete Goss |
| 6. MANUFACTURER'S DESIGNATION OF DRILL | Geoprobe DT 66 |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT | DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen |
| 8. HOLE LOCATION | Bldg 136 (Wash House) |
| 9. SURFACE ELEVATION | 636.96 Ft N: 623786.50 E: 1923374.41 |
| 10. DATE STARTED | 8/1/01 |
| 11. DATE COMPLETED | 8/1/01 |
| 12. OVERBURDEN THICKNESS | 10 Ft |
| 15. DEPTH GROUNDWATER ENCOUNTERED | Not encountered. |
| 13. DEPTH DRILLED INTO ROCK | -0- |
| 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED | Dry 8/6/01 0736 |
| 14. TOTAL DEPTH OF HOLE | 10 Ft |
| 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) | — |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| PROJECT | HOLE NO |
|---|---|
| PBOW | GW-22 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-22

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

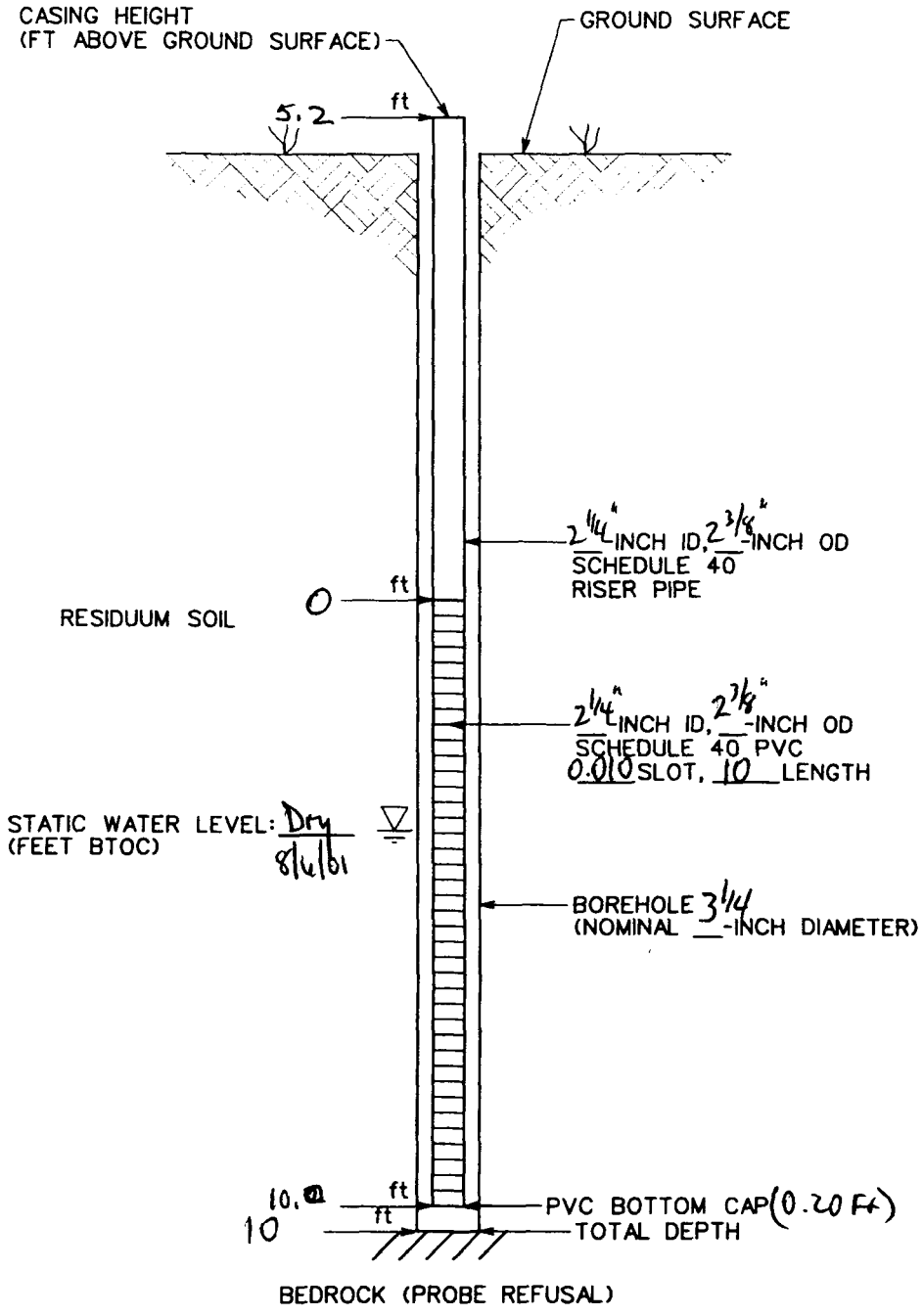
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Hummocky Grass | NA | | NA | NA | NA | Began drilling 8/1/01 0955 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | Breathing Air: 0.0 PID |
| | 6 | | | | | | | VRAE: CO: 0 ppm LEL: 1 ppm $H_2S$: 0 ppm $O_2$: 21.3% |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | Probe Refusal @ 10 Ft TD = 10 Ft. | | | | | | |

Project: PBOW

Hole Number: GW-22

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: JNTA




**NOTES:**

PIEZOMETER NO.: GW-22

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | |
| PROJ. NO.: 825635 | |
| INITIATOR: C. WILLIAMS | |
| PROJ. MGR.: SPANGBERG | |
| DRAFT. CHCK. BY: C. TUMLIN | |
| ENGR. CHCK. BY: C. WILLIAMS | |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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# HTRW DRILLING LOG

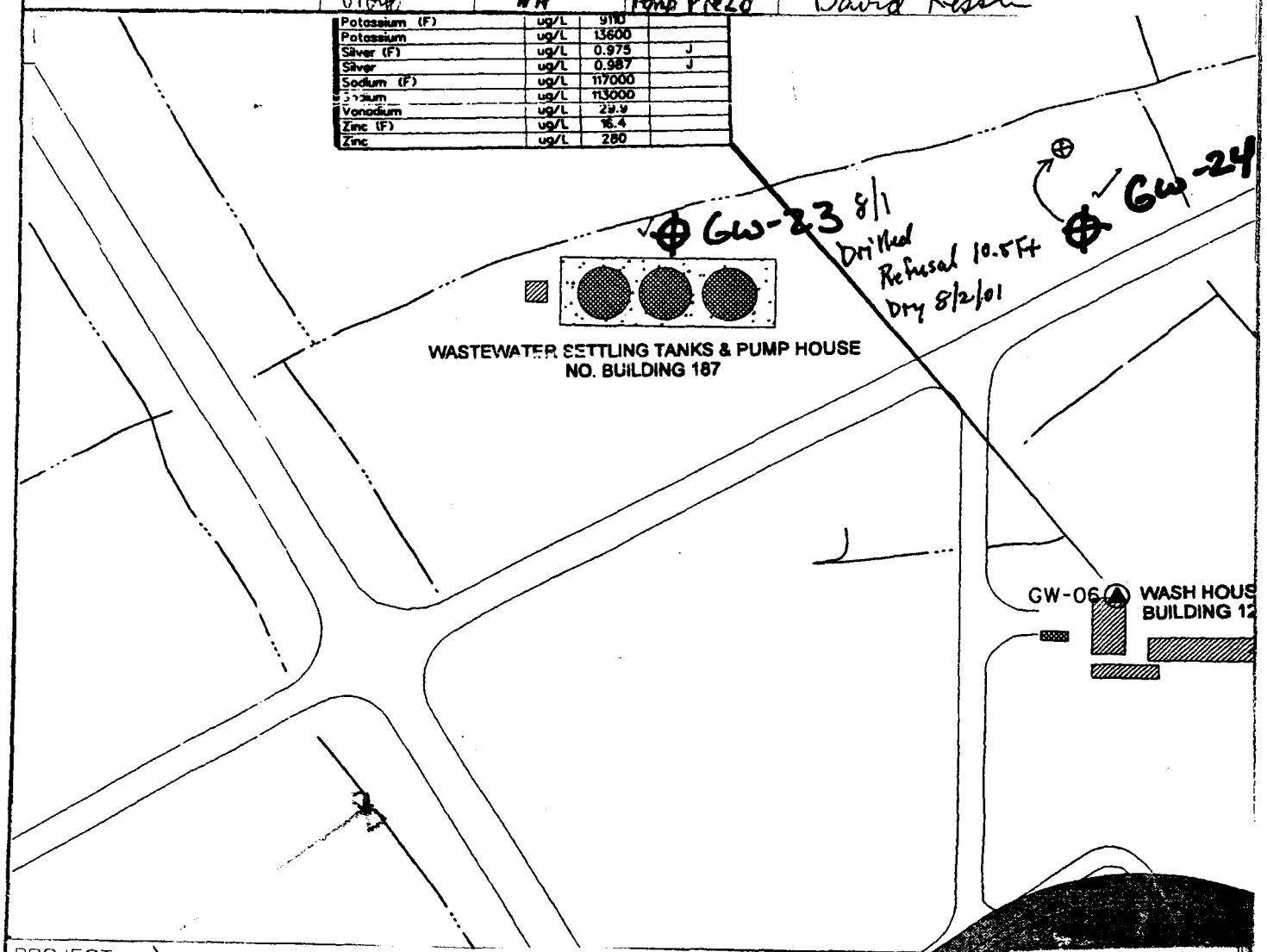
| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-23 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 136 | |
| | 9. SURFACE ELEVATION: 630.05 Ft | N: 624594.64 E: 1923848.63 |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 10.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Dry 8/6/01 0740 | |
| 14. TOTAL DEPTH OF HOLE: 10.5 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |

| | | | |
|---|---|---|---|
| Potassium (F) | ug/L | 9110 | |
| Potassium | ug/L | 13600 | |
| Silver (F) | ug/L | 0.975 | J |
| Silver | ug/L | 0.987 | J |
| Sodium (F) | ug/L | 117000 | |
| Sodium | ug/L | 113000 | |
| Vanadium | ug/L | 29.9 | |
| Zinc (F) | ug/L | 16.4 | |
| Zinc | ug/L | 280 | |




| | |
|---|---|
| PROJECT: PBOW | HOLE NO. GW-23 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-23

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

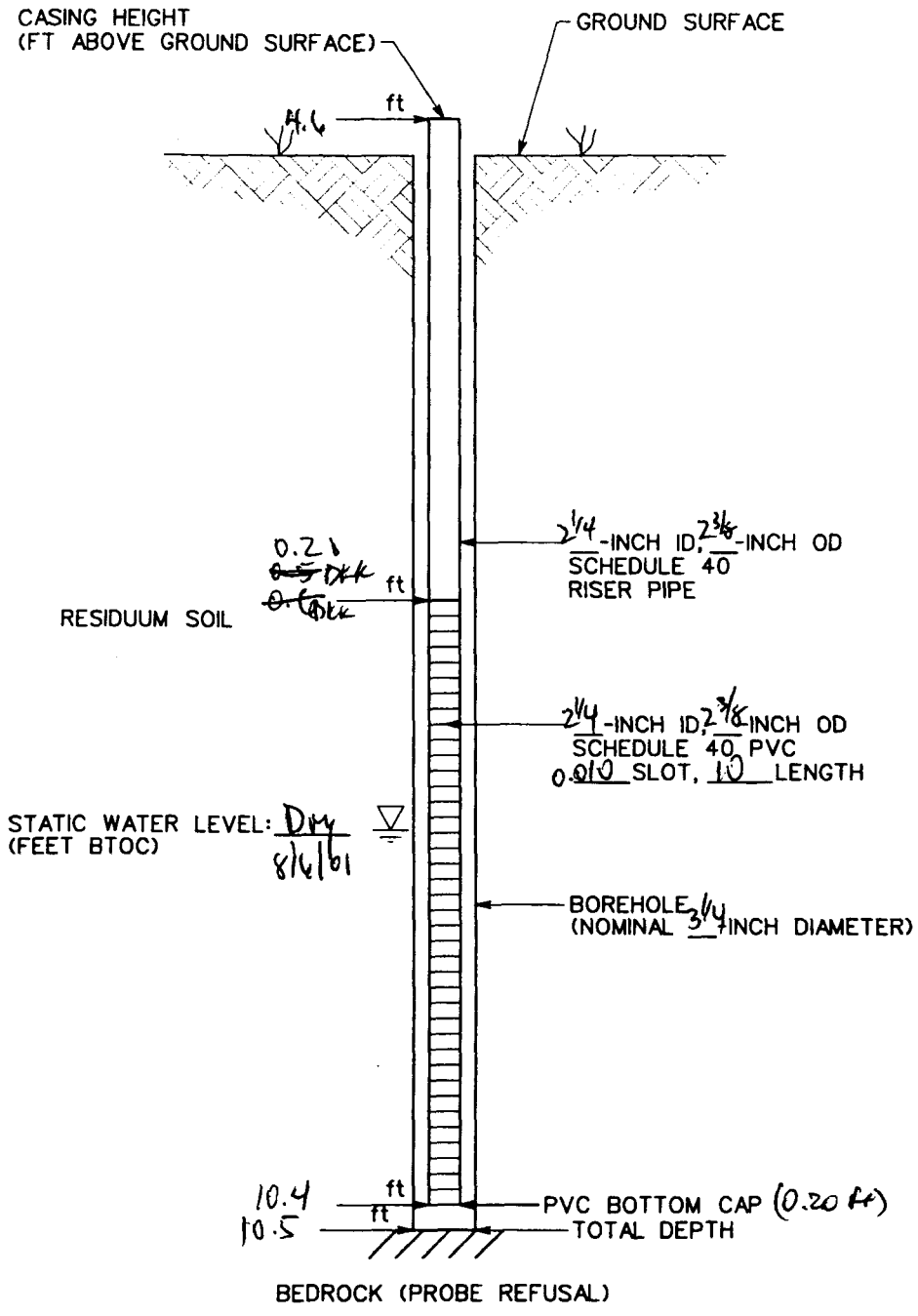
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Tall (Brown) Grass | NA | | NA | NA | NA | Began drilling 8/1/01 1100 |
| | 1 | | | 0.0 | | | | Non-flowing water in creek ~20 ft away (not FK) |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 6 | | | | | | | PID = 0.0 ppm |
| | | | | | | | | VRAE |
| | 6 | | | | | | | CO = 0 ppm |
| | | | | | | | | LEL = 0 ppm |
| | | | | | | | | $H_2S$ = 0 ppm |
| | | | | | | | | $O_2$ = 21.3% |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | Probe Refusal @ 10.5 ft TD = 10.5 ft | | | | | | |

Project: PBOW

Hole Number: GW-23

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INTA




**NOTES:**

PIEZOMETER NO.: GW-23

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

NOT TO SCALE

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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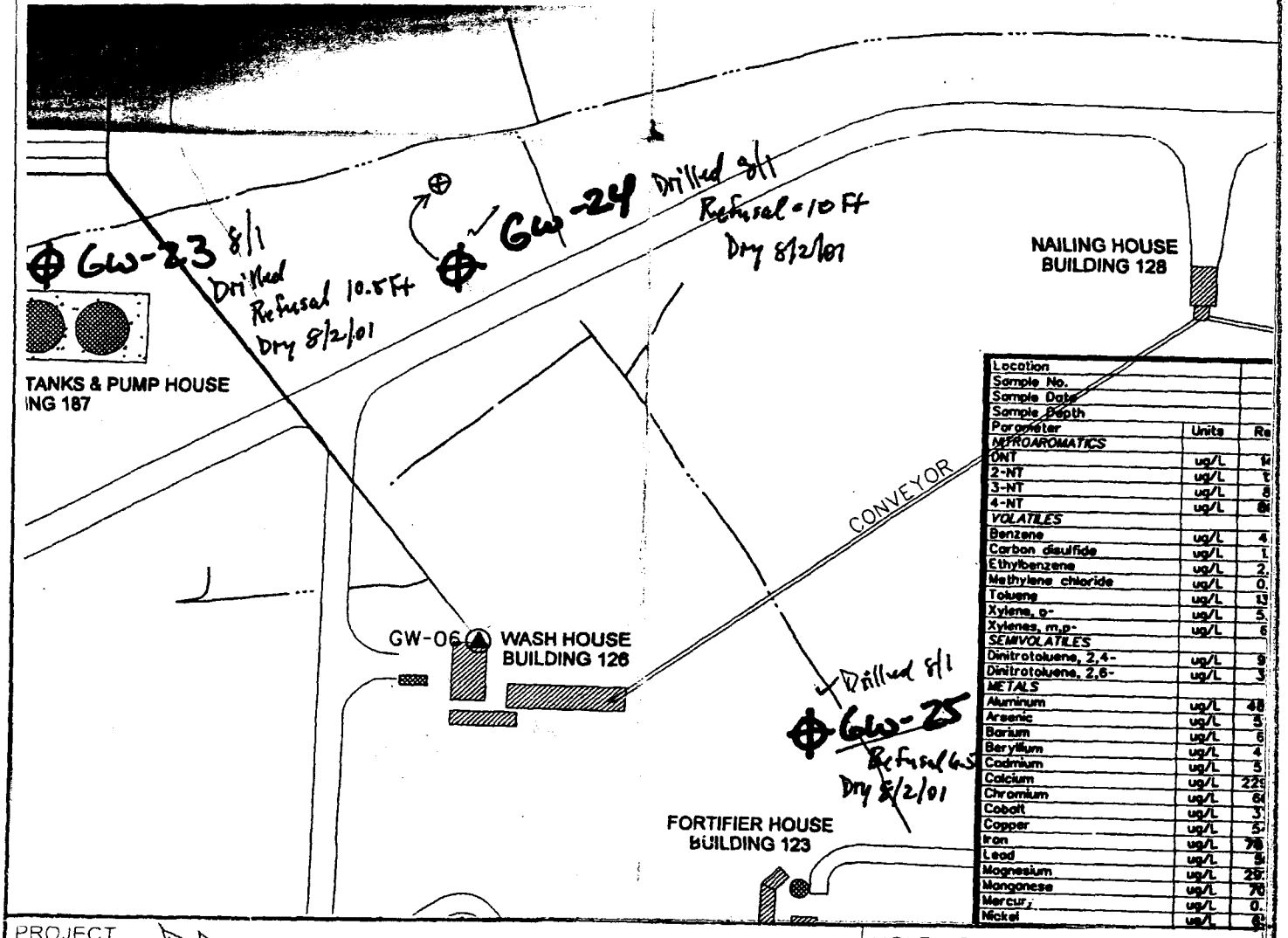
# HTRW DRILLING LOG

| | |
|---|---|
| DISTRICT | USACE - Nashville |
| HOLE NUMBER | GW-24 |
| 1. COMPANY NAME | IT Corporation |
| 2. DRILL SUBCONTRACTOR | Prosonic |
| SHEET / OF SHEETS | 1 of 2 |
| 3. PROJECT | PBOW |
| 4. LOCATION | TNT Area A |
| 5. NAME OF DRILLER | Pete Gross |
| 6. MANUFACTURER'S DESIGNATION OF DRILL | Geoprobe DT 66 |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT | DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen |
| 8. HOLE LOCATION | Bldg 187 |
| 9. SURFACE ELEVATION | 630.71 Ft N: 624626.18 E: 1924076.12 |
| 10. DATE STARTED | 8/1/01 |
| 11. DATE COMPLETED | 8/1/01 |
| 12. OVERBURDEN THICKNESS | 10 Ft |
| 13. DEPTH DRILLED INTO ROCK | -0- |
| 14. TOTAL DEPTH OF HOLE | 10 Ft |
| 15. DEPTH GROUNDWATER ENCOUNTERED | Groundwater not encountered |
| 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED | Dry 8/6/01 0743 |
| 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| Location | | |
|---|---|---|
| Sample No. | | |
| Sample Date | | |
| Sample Depth | | |
| Parameter | Units | Re |
| NITROAROMATICS | | |
| ONT | ug/L | 14 |
| 2-NT | ug/L | 1 |
| 3-NT | ug/L | 8 |
| 4-NT | ug/L | 8 |
| VOLATILES | | |
| Benzene | ug/L | 4 |
| Carbon disulfide | ug/L | 1 |
| Ethylbenzene | ug/L | 2 |
| Methylene chloride | ug/L | 0 |
| Toluene | ug/L | 13 |
| Xylene, o- | ug/L | 5 |
| Xylenes, m,p- | ug/L | 6 |
| SEMIVOLATILES | | |
| Dinitrotoluene, 2,4- | ug/L | 9 |
| Dinitrotoluene, 2,6- | ug/L | 3 |
| METALS | | |
| Aluminum | ug/L | 48 |
| Arsenic | ug/L | 5 |
| Barium | ug/L | 6 |
| Beryllium | ug/L | 4 |
| Cadmium | ug/L | 5 |
| Calcium | ug/L | 22 |
| Chromium | ug/L | 6 |
| Cobalt | ug/L | 3 |
| Copper | ug/L | 5 |
| Iron | ug/L | 78 |
| Lead | ug/L | 9 |
| Magnesium | ug/L | 25 |
| Manganese | ug/L | 70 |
| Mercury | ug/L | 0. |
| Nickel | ug/L | 8 |

| | |
|---|---|
| PROJECT | PBOW |
| HOLE NO. | GW-24 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-24

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

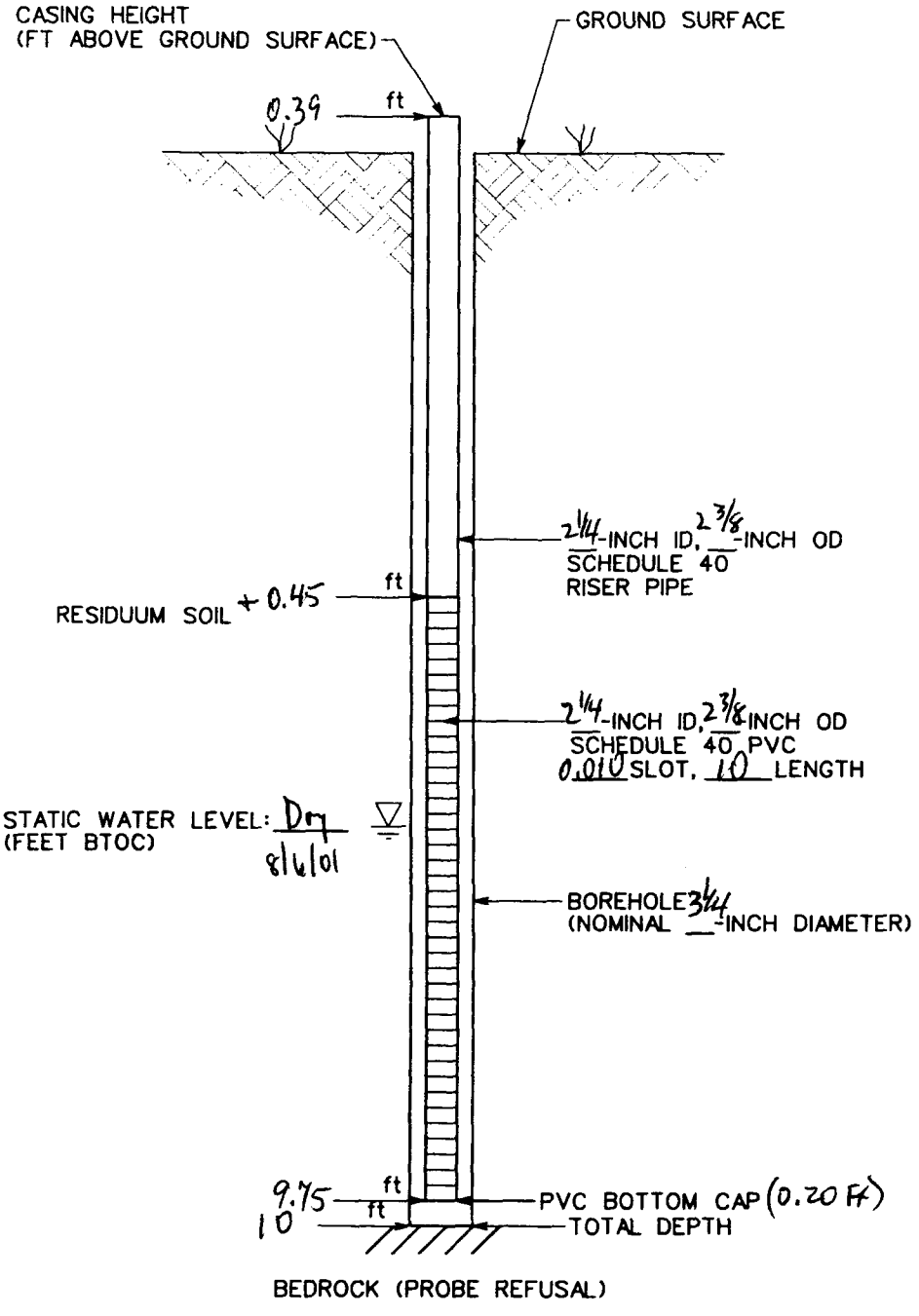
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | NA | | NA | NA | NA | Began drilling 8/1/01 1030 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | 0.0 | | | | Breathing Air PID: 0.0 ppm |
| | 6 | | | | | | | VRAE: CO: 0 ppm LEL: 1 ppm $H_2S$: 0 ppm $O_2$: 21.3% |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | CLAY, little sand, moist | | | | | | |
| | 0 | Probe Refusal @ 10 Ft TD: 10 Ft | | | | | | |

Project: PBOW

Hole Number: GW-24

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INTA




**NOTES:**

PIEZOMETER NO.: GW-24

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

DWG. NO.: \825635ES.016 | PROJ. NO.: 825635
INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG
DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF
10:02:05 07/30/01
bvanderg c:\cadd\design\825635es.016

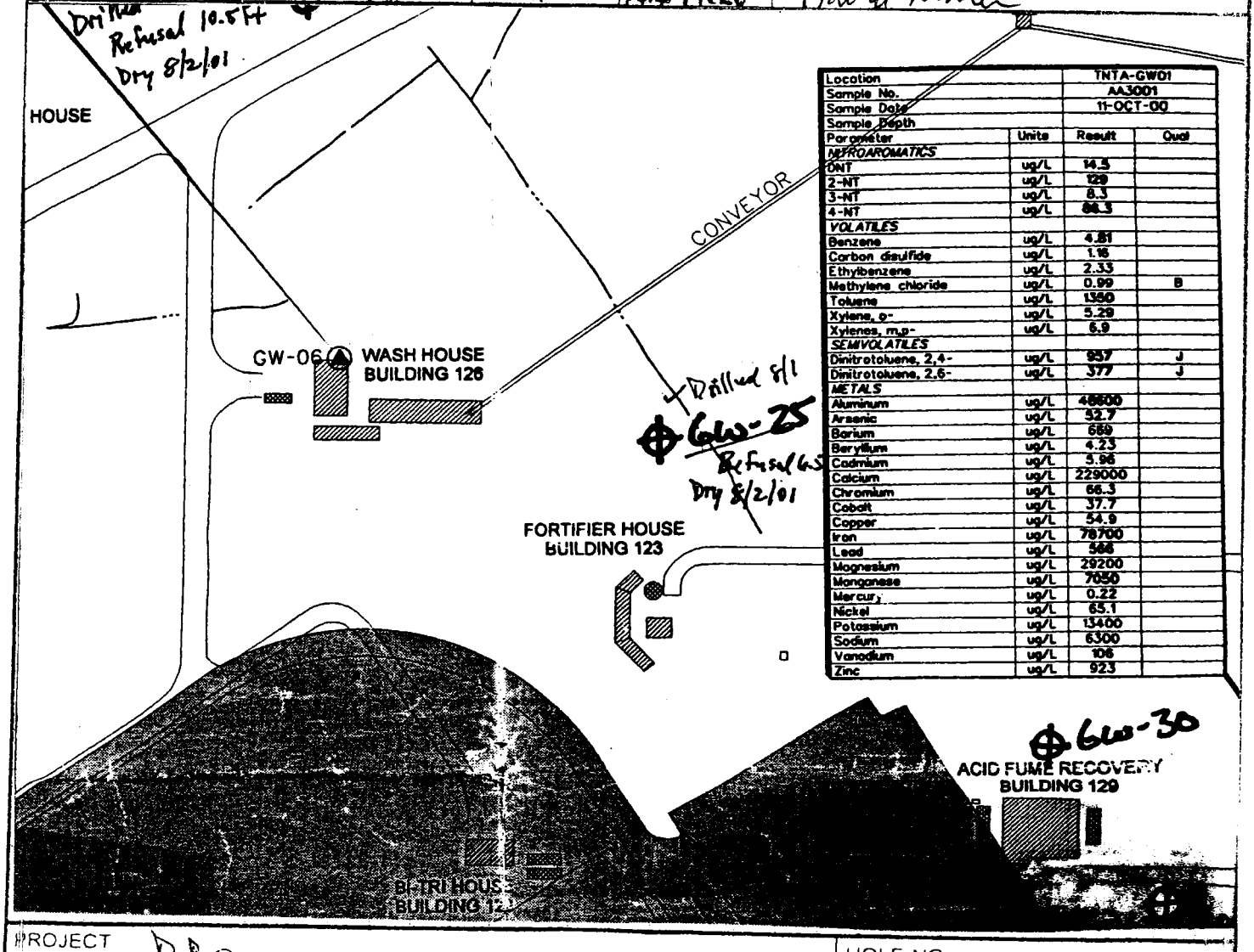
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-25 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Gross | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 Inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 123 (Downgradient) | |
| | 9. SURFACE ELEVATION: 647.27 Ft N: 624216.21 E: 1924365.21 | |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 6.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.60 Ft 8/6/01 0754 (0.3' water column - NO samp | |
| 14. TOTAL DEPTH OF HOLE: 6.5 FT | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| Location | | TNTA-GW01 | |
|---|---|---|---|
| Sample No. | | AA3001 | |
| Sample Date | | 11-OCT-00 | |
| Sample Depth | | | |
| Parameter | Units | Result | Qual |
| *NITROAROMATICS* | | | |
| DNT | ug/L | 14.5 | |
| 2-NT | ug/L | 129 | |
| 3-NT | ug/L | 8.3 | |
| 4-NT | ug/L | 88.3 | |
| *VOLATILES* | | | |
| Benzene | ug/L | 4.81 | |
| Carbon disulfide | ug/L | 1.16 | |
| Ethylbenzene | ug/L | 2.33 | |
| Methylene chloride | ug/L | 0.99 | B |
| Toluene | ug/L | 1360 | |
| Xylene, o- | ug/L | 5.29 | |
| Xylenes, m,p- | ug/L | 6.9 | |
| *SEMIVOLATILES* | | | |
| Dinitrotoluene, 2,4- | ug/L | 937 | J |
| Dinitrotoluene, 2,6- | ug/L | 377 | J |
| *METALS* | | | |
| Aluminum | ug/L | 48600 | |
| Arsenic | ug/L | 32.7 | |
| Barium | ug/L | 669 | |
| Beryllium | ug/L | 4.23 | |
| Cadmium | ug/L | 5.96 | |
| Calcium | ug/L | 229000 | |
| Chromium | ug/L | 66.3 | |
| Cobalt | ug/L | 37.7 | |
| Copper | ug/L | 54.9 | |
| Iron | ug/L | 78700 | |
| Lead | ug/L | 566 | |
| Magnesium | ug/L | 29200 | |
| Manganese | ug/L | 7050 | |
| Mercury | ug/L | 0.22 | |
| Nickel | ug/L | 65.1 | |
| Potassium | ug/L | 13400 | |
| Sodium | ug/L | 6300 | |
| Vanadium | ug/L | 106 | |
| Zinc | ug/L | 923 | |

PROJECT: PBOW

HOLE NO: GW-25

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-25

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

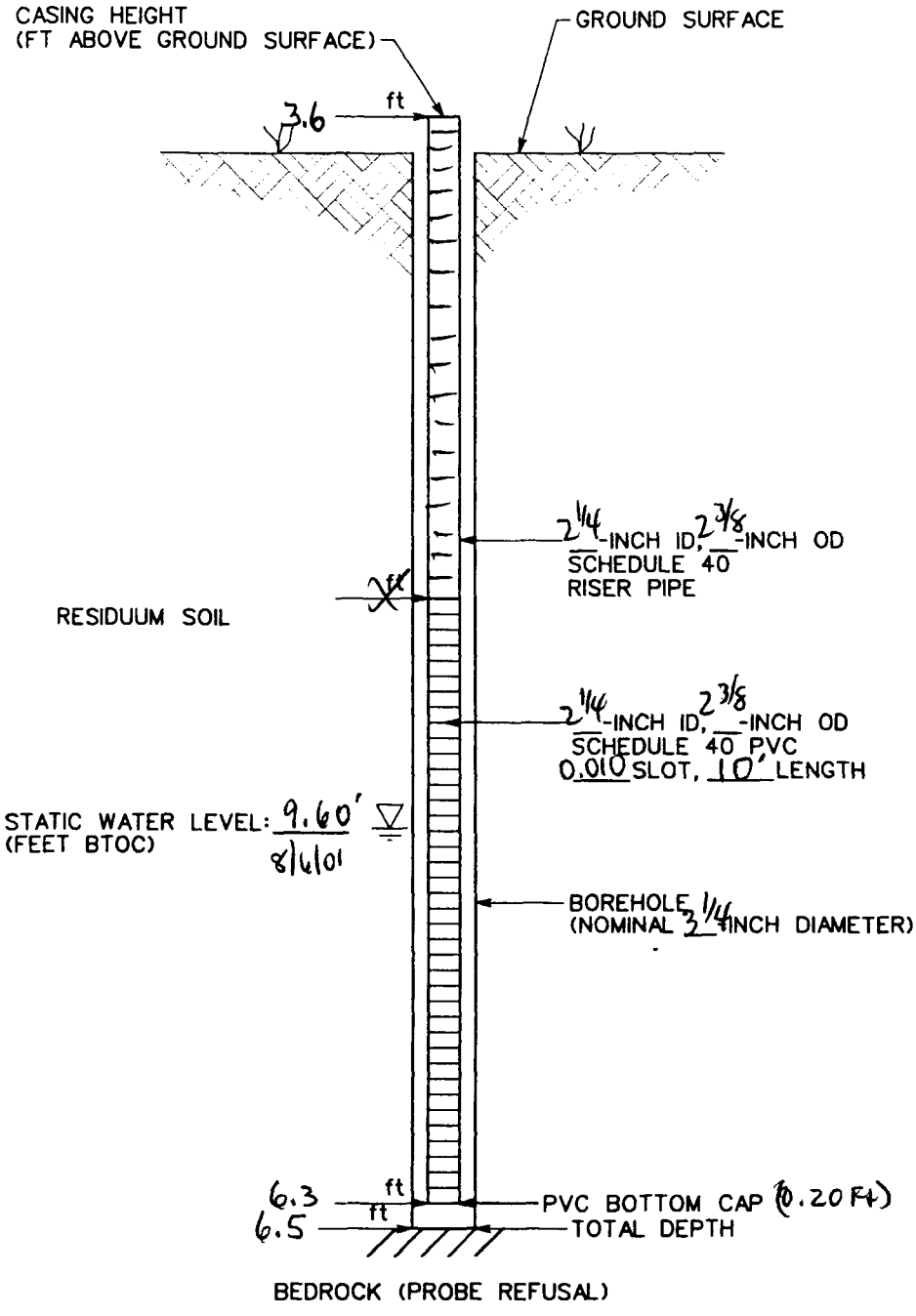
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Mown Weeds | | | | | | |
| | | | NA | | NA | NA | NA | Began drilling 8/1/01 1455 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | Breathing Air PID = 0.0 ppm |
| | 6 | | | | | | | VRAE: CO = 0 ppm LEL = 1 ppm $H_2S$ = 0 ppm $O_2$ = 21.3% |
| | 7 | Probe Refusal @ 6.5 ft TD = 6.5 ft | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | 0.0 | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-25

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTA




**NOTES:**

PIEZOMETER NO.: GW-25

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

NOT TO SCALE

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.:\825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

10:02:05 07/30/01 bvanderg c:\cadd\design\825635es.016

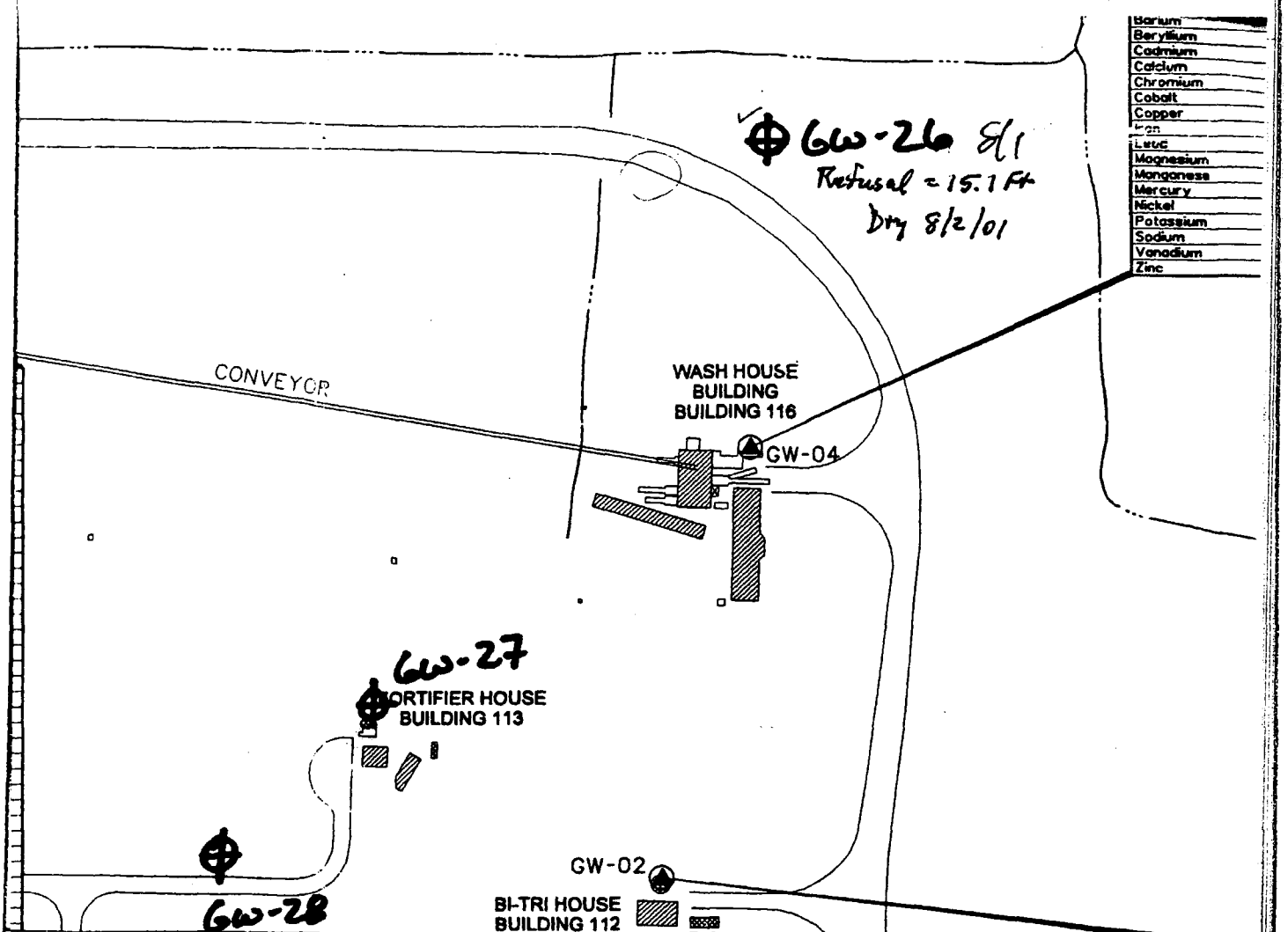
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | HOLE NUMBER: GW-26 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area A | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3 1/4 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 116 | |
| | 9. SURFACE ELEVATION: 635.59 Ft | N: 624710.32 E: 1925228.32 |
| | 10. DATE STARTED: 8/1/01 | 11. DATE COMPLETED: 8/1/01 |
| 12. OVERBURDEN THICKNESS: 15.1 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Dry 8/6/01 0745 | |
| 14. TOTAL DEPTH OF HOLE: 15.1 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| PROJECT | HOLE NO |
|---|---|
| PBOW | GW-26 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-26

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Mown Weeds | NA | | NA | NA | NA | Began drilling 8/1/01 1205 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID=0.0ppm |
| | | | | | | | | VRAE: |
| | 6 | | | | | | | CO= 0ppm |
| | | | | | | | | LEL= 0ppm |
| | 7 | | | | | | | ~~H2S~~ $H_2S$ = 0ppm |
| | | | | | | | | $O_2$ = 21.3% |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-26

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

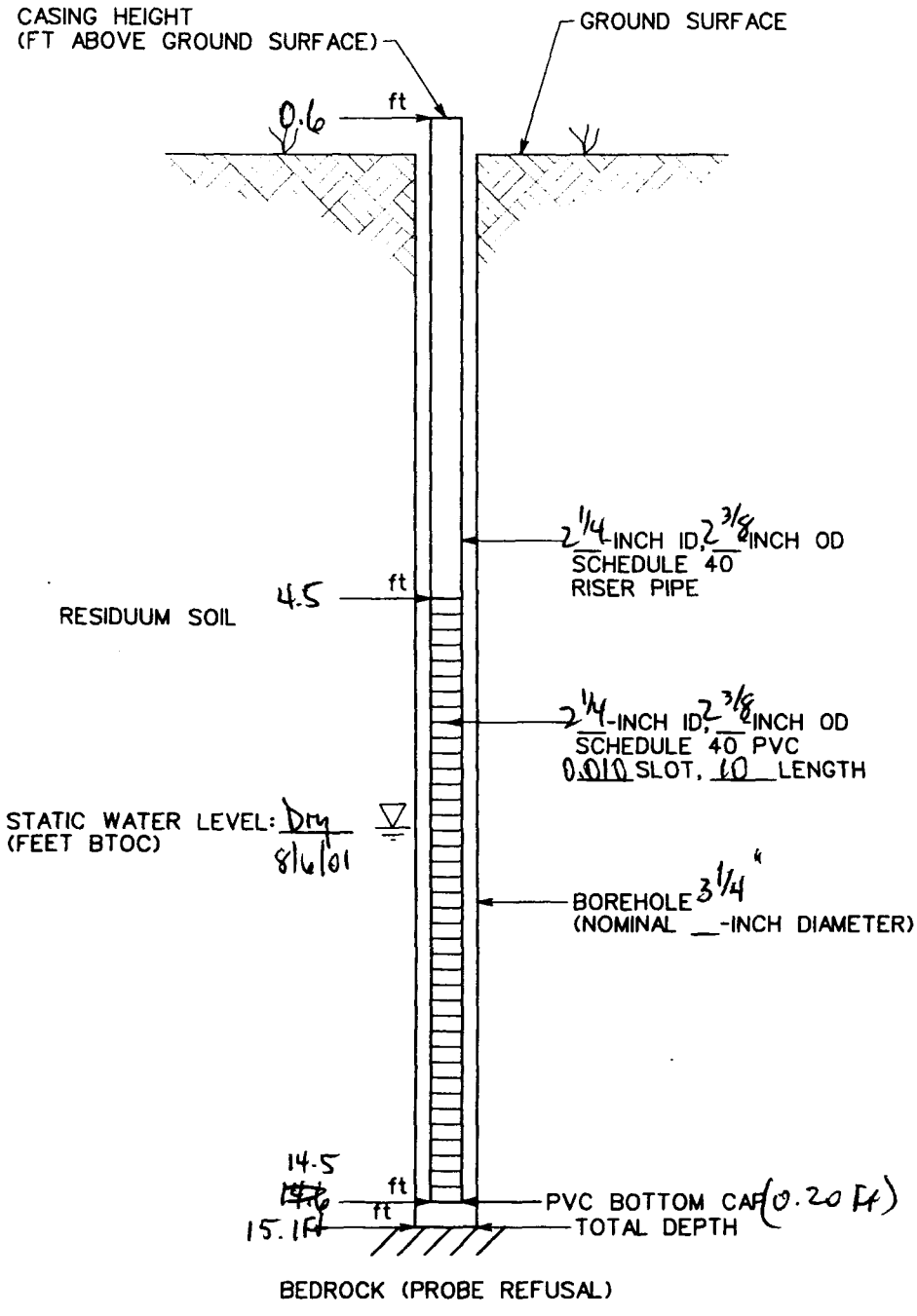
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USRS | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | 0.0 | NA | NA | NA | |
| | 11 | | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | | Probe Refusal @ 15.1 ft<br>TD = 15.1 ft | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: GW-26

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INTA




**NOTES:**

PIEZOMETER NO.: GW-26

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/28/01

NOT TO SCALE

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

10:02:05 07/30/01

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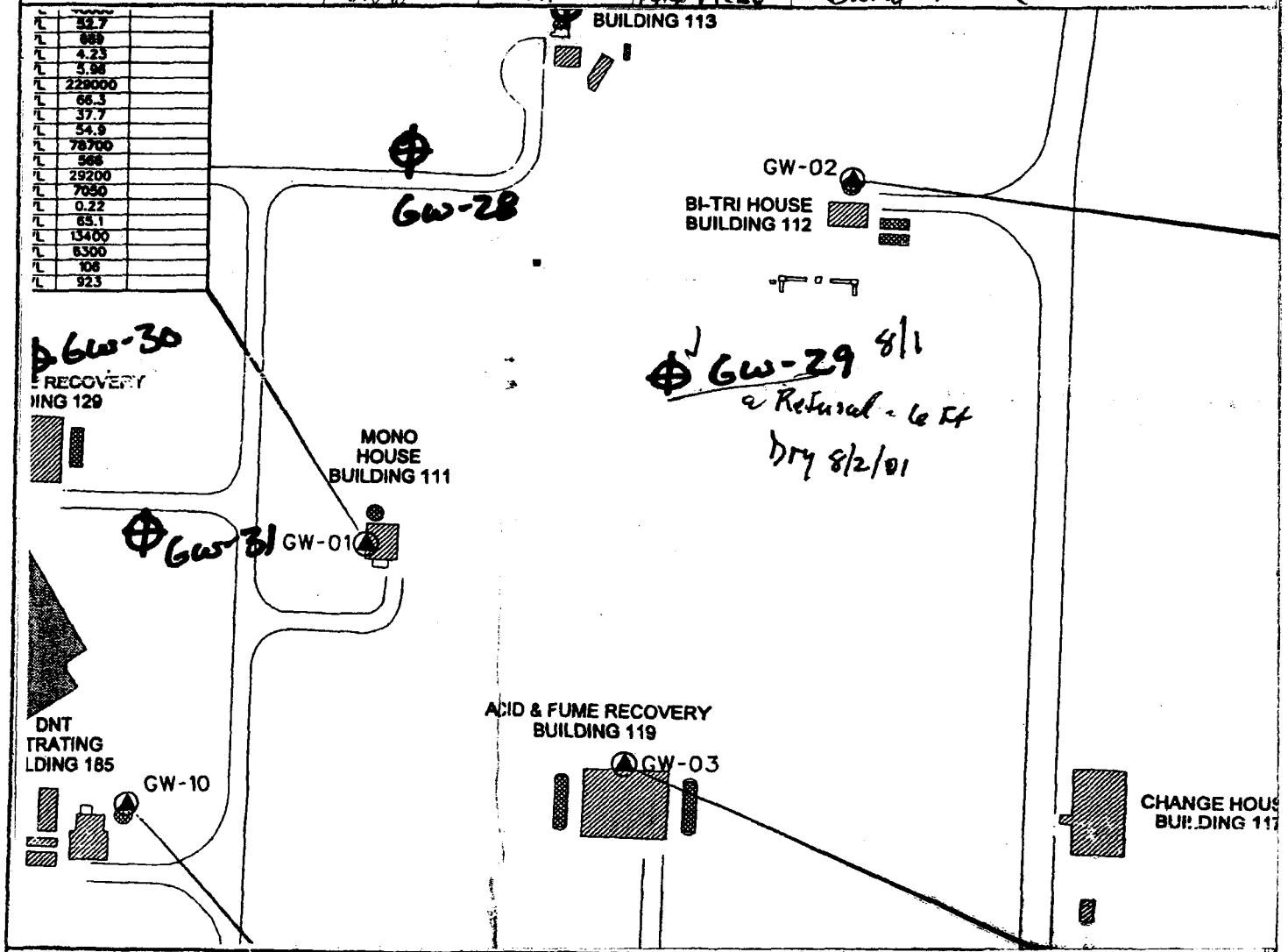
# HTRW DRILLING LOG

| | |
|---|---|
| DISTRICT | USACE - Nashville |
| HOLE NUMBER | GW-29 |
| 1. COMPANY NAME | IT Corporation |
| 2. DRILL SUBCONTRACTOR | Prosonic |
| SHEET / SHEETS | 1 OF 2 |
| 3. PROJECT | PBOW |
| 4. LOCATION | TNT Area A |
| 5. NAME OF DRILLER | Pete Gross |
| 6. MANUFACTURER'S DESIGNATION OF DRILL | Geoprobe DT 66 |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT | DT 66 All terrain, track mounted geoprobe rig with 3 1/4 Inch OD probe. Temporary Piezometer 2" OD Sch 40 PVC 0.010" slot screen |
| 8. HOLE LOCATION | Bldg 112 (Upgradient) |
| 9. SURFACE ELEVATION | 651.70 Ft N: 624060.50 E: 1925148.99 |
| 10. DATE STARTED | 8/1/01 |
| 11. DATE COMPLETED | 8/1/01 |
| 12. OVERBURDEN THICKNESS | 6 Ft |
| 13. DEPTH DRILLED INTO ROCK | -0- |
| 14. TOTAL DEPTH OF HOLE | 6 FT |
| 15. DEPTH GROUNDWATER ENCOUNTERED | Groundwater not encountered. |
| 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED | Dry 8/6/01 0749 |
| 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) | — |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| | |
|---|---|
| PROJECT | PBOW |
| HOLE NO. | GW-29 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-29

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

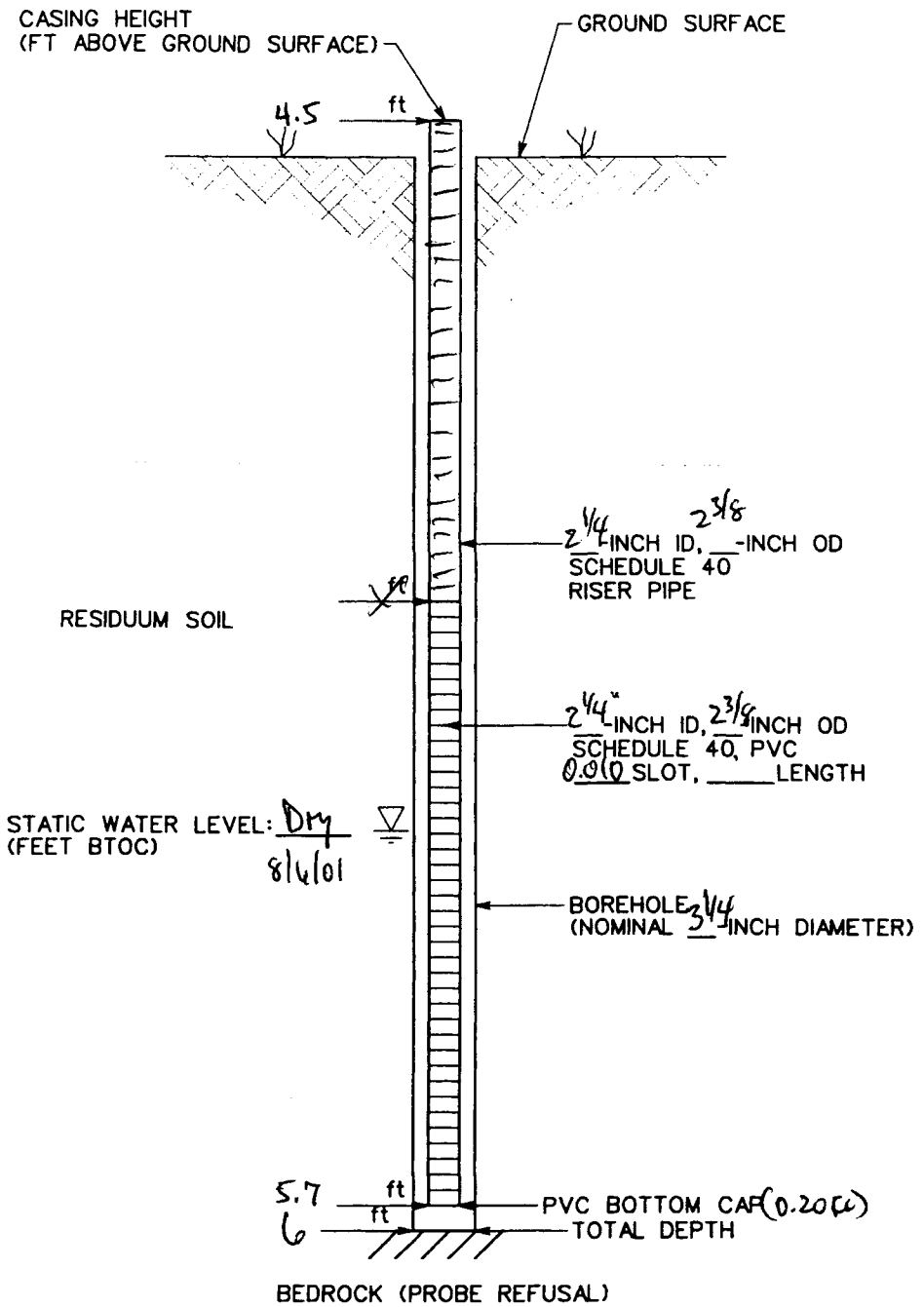
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Mown Weeds | NA | | NA | NA | NA | Began drilling 8/1/01 1420 |
| | 1 | | | 0.0 | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | Breathing Air: PID = 0.0 ppm |
| | 6 | Probe Refusal @ 6 Ft TD = 6 Ft | | | | | | VRAE: CO = 0 ppm LEL = 1 ppm $H_2S$ = 0 ppm $O_2$ = 21.2% |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-29

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTA




**NOTES:**

PIEZOMETER NO.: GW-29

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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07/30/01
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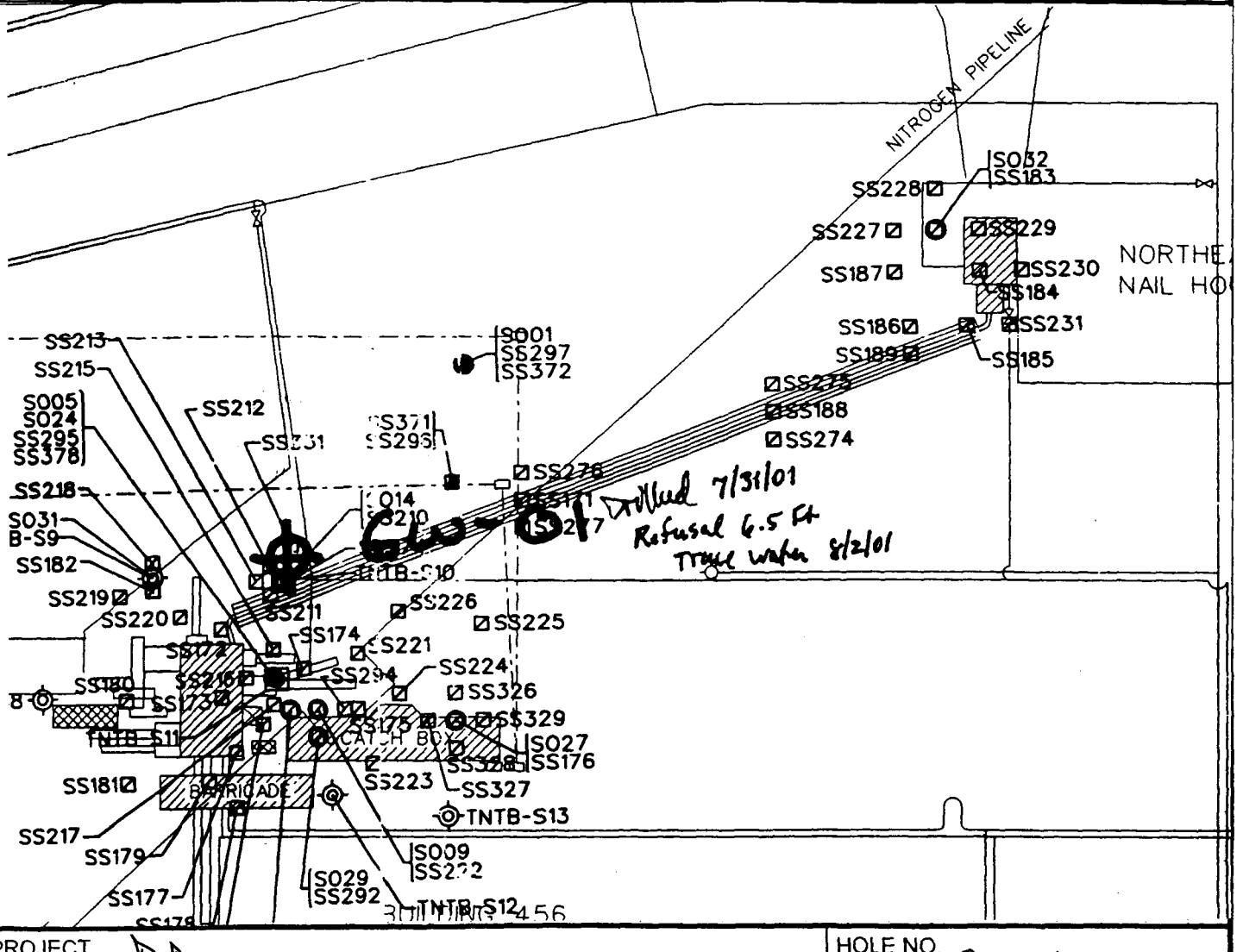
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | HOLE NUMBER: GW-01 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area B | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 2 5/8 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC. 0.010" slot screen | 8. HOLE LOCATION: Bldg 456 | |
| | 9. SURFACE ELEVATION: 666.70 Ft N: 618367.59 E: 1918624.93 | |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 6.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~dry~~ DRY 9.86 Ft 8/2/01 (0.14' water column) | |
| 14. TOTAL DEPTH OF HOLE: 6.5 Ft. | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): 9.85 Ft 8/6/01 (0.15' water column) - No Sample | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Keasler |




| PROJECT | HOLE NO. |
|---|---|
| PBOW | GW-01 |

# HTRW DRILLING LOG

(continuation sheet) TNTB

Hole Number: GW-01

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

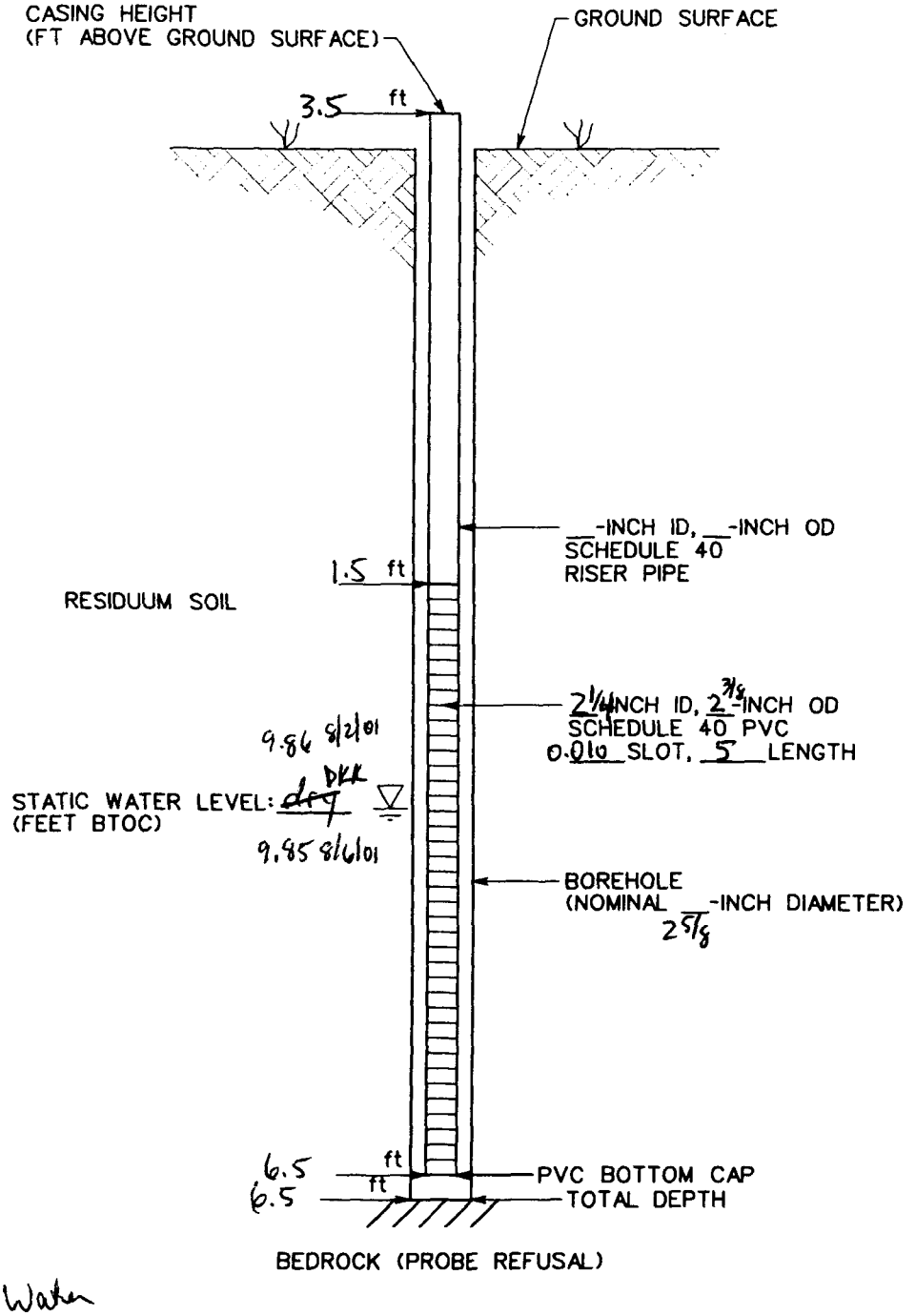
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | NA | NA | | Began drilling 7/31/01 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | 1st Attempt: 4 Ft<br>2nd Attempt: 4 Ft<br>3rd Attempt: 6.5 Ft |
| | 6 | | | | | | | Total 14.5 Ft<br>Location 12 Ft southeast stake |
| | 7 | Probe Refusal @ 6.5 Ft<br>TD = 6.5 Ft | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-01

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTB:GW-01




Trace Water

**NOTES:**

PIEZOMETER NO.: GW-01

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | | |
|---|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.:\825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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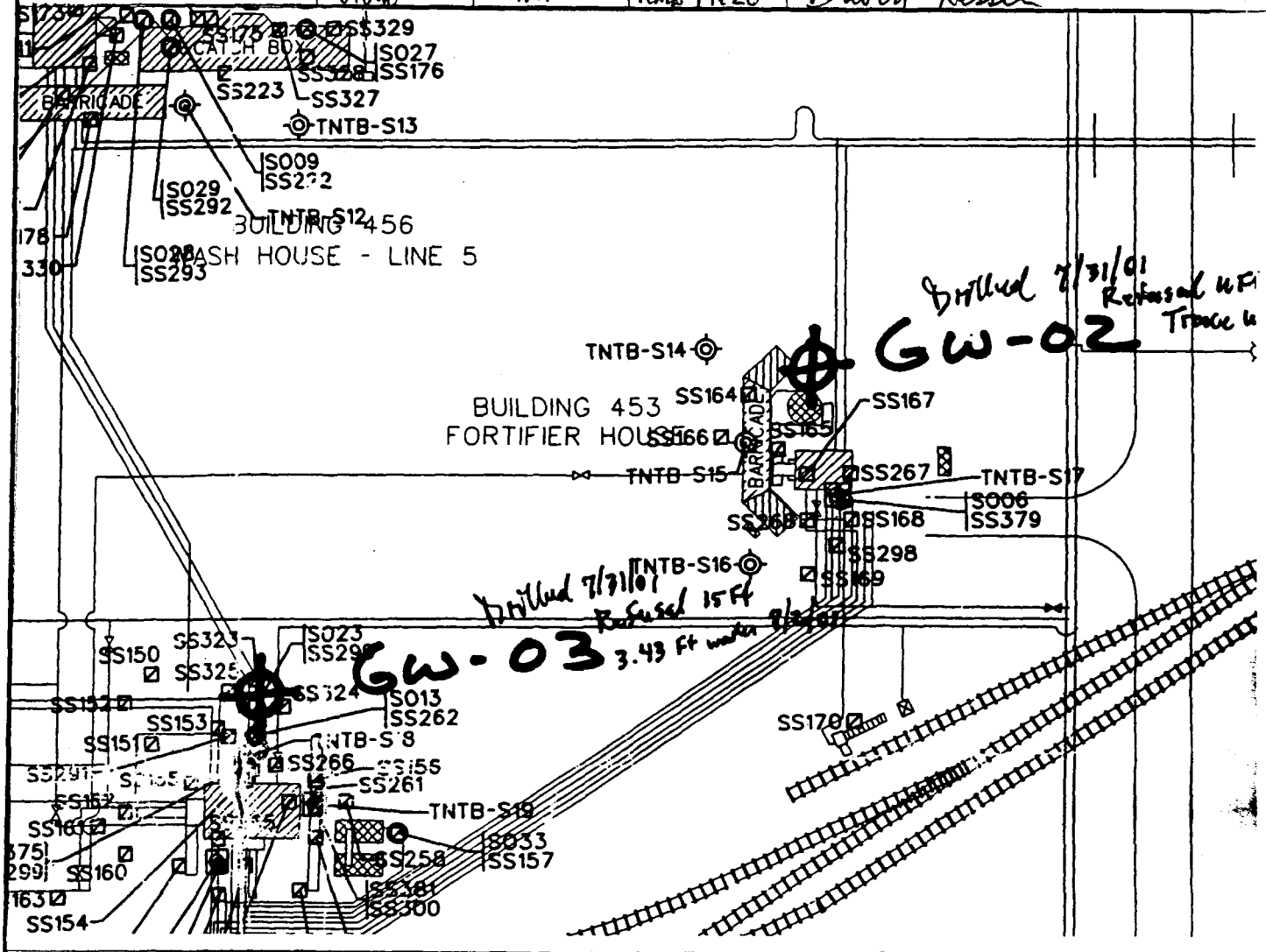
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-02 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area B | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3/4" DT 66 All terrain, track mounted geoprobe rig with 2 1/4 inch OD probe. Temporary Piezometer 2 3/8 OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 453 (Fortifier House) | |
| | 9. SURFACE ELEVATION: 675.42 Ft N: 618188.48 E: 1918855.64 | |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 11 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered. | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~dry~~ 13.60 Ft 8/6/01 1145 | |
| 14. TOTAL DEPTH OF HOLE: 11 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| PROJECT: PBOW | HOLE NO.: GW-02 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-02

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | NA | NA | NA | | NA | Began drilling 7/31/01 1210 |
| | 1 | | | | | BB 3002 | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID recharging |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-02

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: GW-02

Project: PBOW

Geologist: D. Kressler

Sheet 3 of 3 Sheets

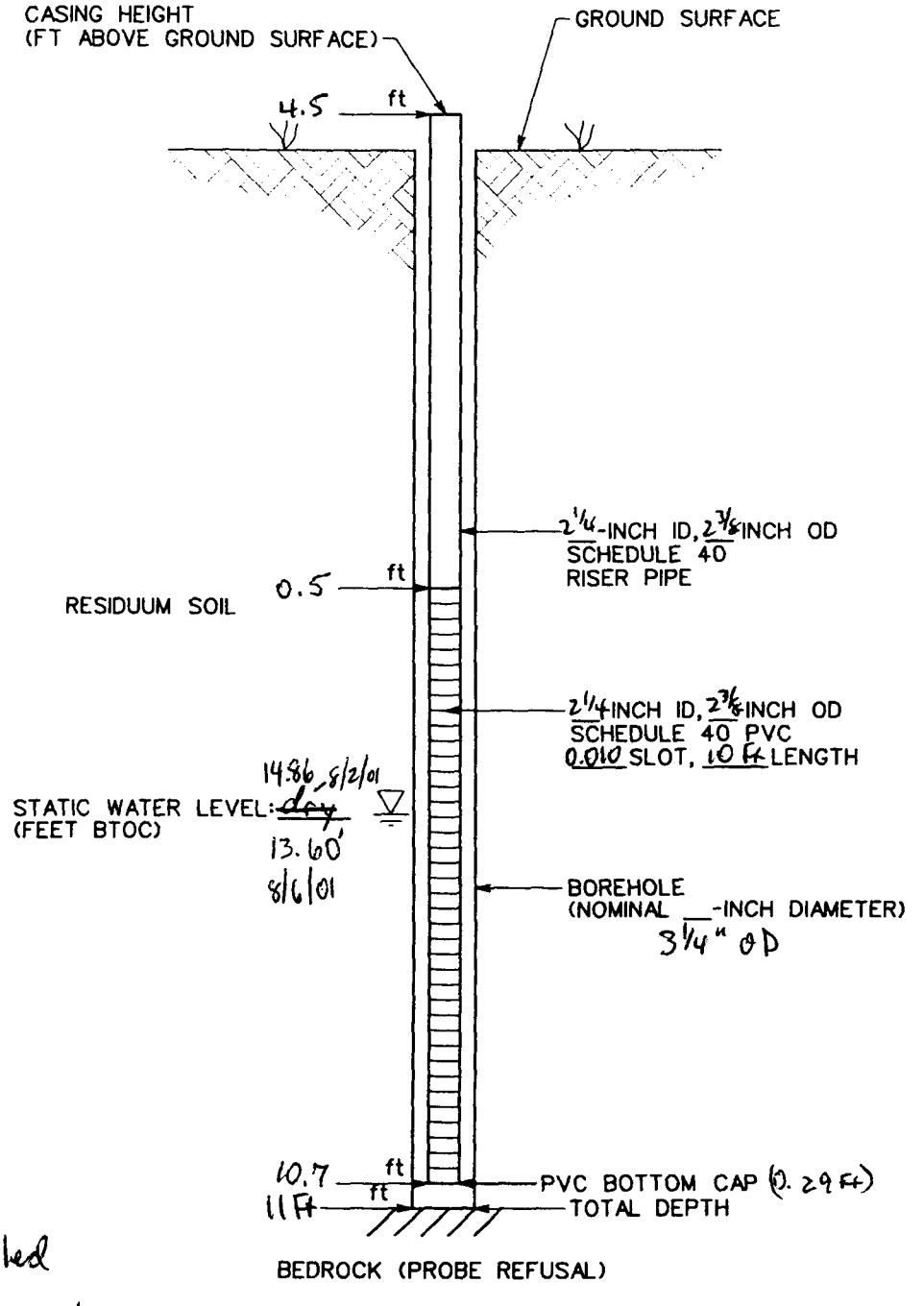
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NA | NA | | NA | |
| | 11 | Probe Refusal @ 11 ft. TD = 11 ft. | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: GW-02

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTB-GW02




Sampled

~~Free water~~

**NOTES:**

PIEZOMETER NO.: GW-02

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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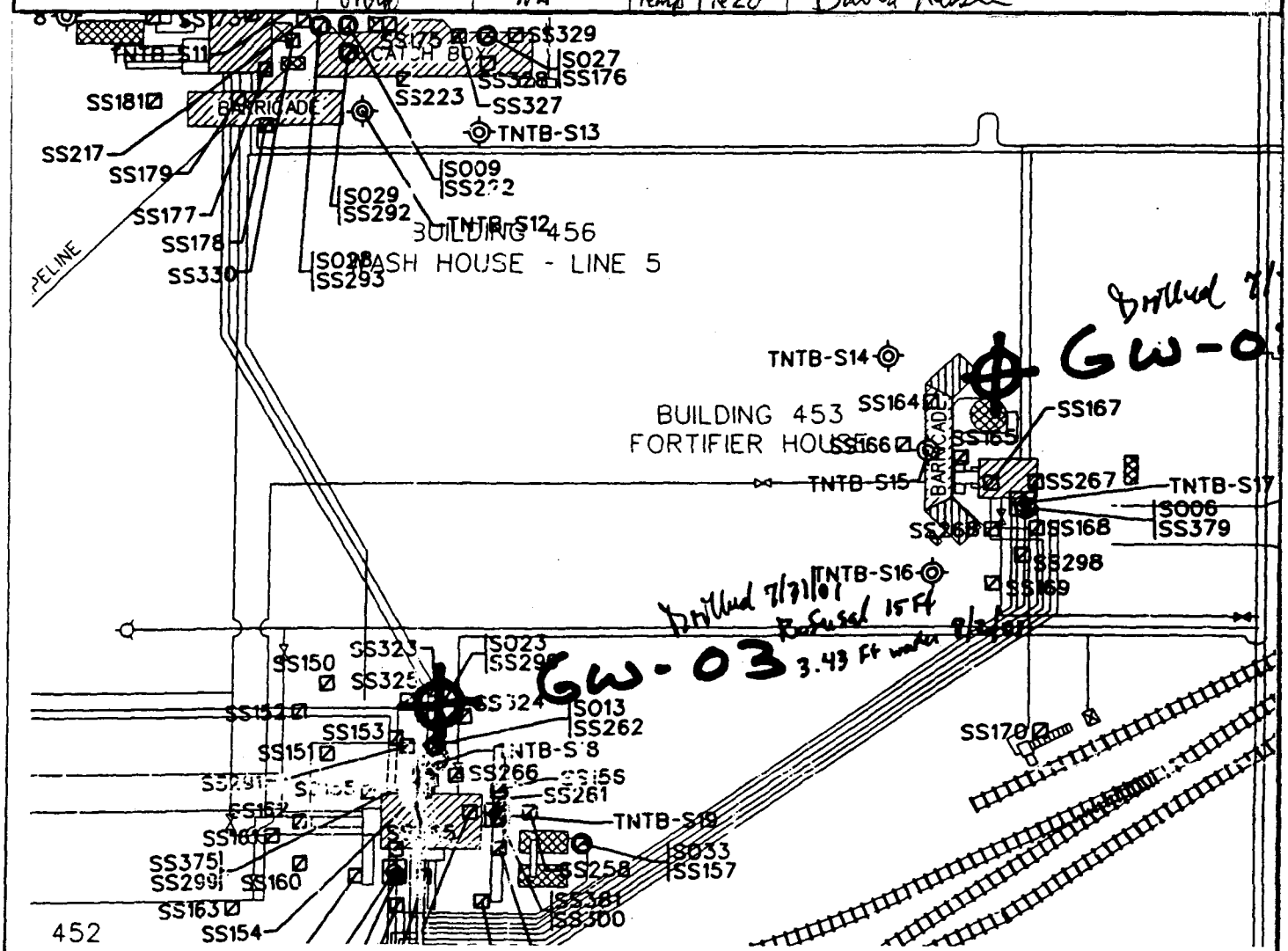
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | HOLE NUMBER: GW-003 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area B | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT 66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: DT 66 All terrain, track mounted geoprobe rig with 3/4 inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC. 0.010" slot screen | 8. HOLE LOCATION: Bldg 452 | |
| | 9. SURFACE ELEVATION: 680.81 Ft N: 618102.55 E: 1918710.11 | |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 15 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 15.31 ft, 8/2/01; 15.28 Ft 8/1/01 1533 - sampled | |
| 14. TOTAL DEPTH OF HOLE: 15 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kesler |




| PROJECT | HOLE NO. |
|---|---|
| PBOW | GW-003 |

# HTRW DRILLING LOG

(continuation sheet) TNT-B

Hole Number: GW-003

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | NA | NA | NA | | NA | Began drilling 7/31/01 1435 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID unit being recharged. No readings (air quality) taken. |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-003

# HTRW DRILLING LOG

(continuation sheet) TNTB

Hole Number: GW-003

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

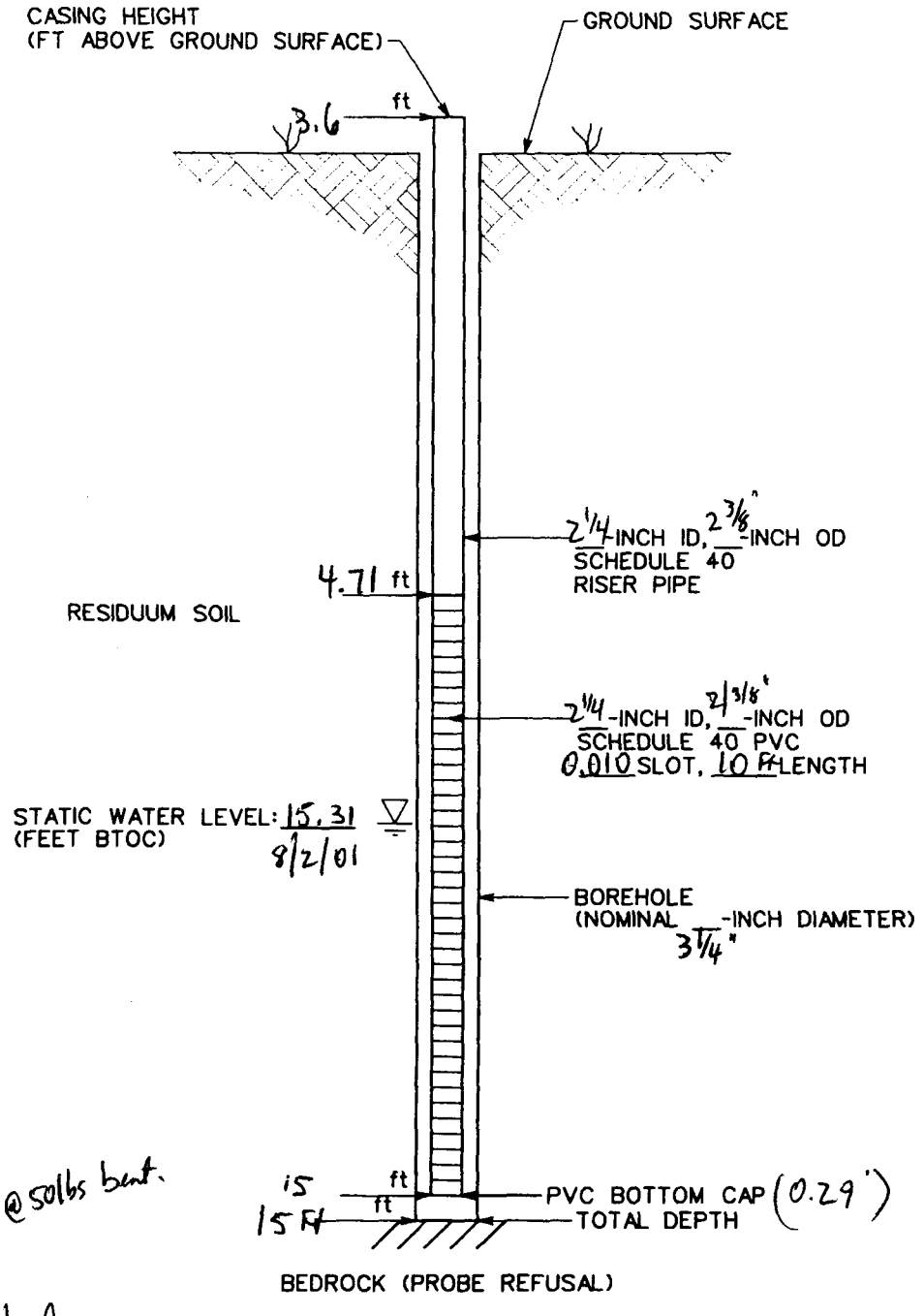
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | NA | | NA | | NA | |
| | | | | | | BB 3003 | | |
| | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | Probe Refusal @ 15 Ft TD = 15 Ft | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-003

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INTB-GW-003




2 1/2 bags @ 50lbs bent.

Sampled

**NOTES:**

PIEZOMETER NO.: GW-003
DATE INSTALLED: 7/31/01
DATE REMOVED: 8/2/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | |
| PROJ. NO.: 825635 | |
| INITIATOR: C. WILLIAMS | |
| PROJ. MGR.: SPANGBERG | |
| DRAFT. CHCK. BY: C. TUMLIN | |
| ENGR. CHCK. BY: C. WILLIAMS | |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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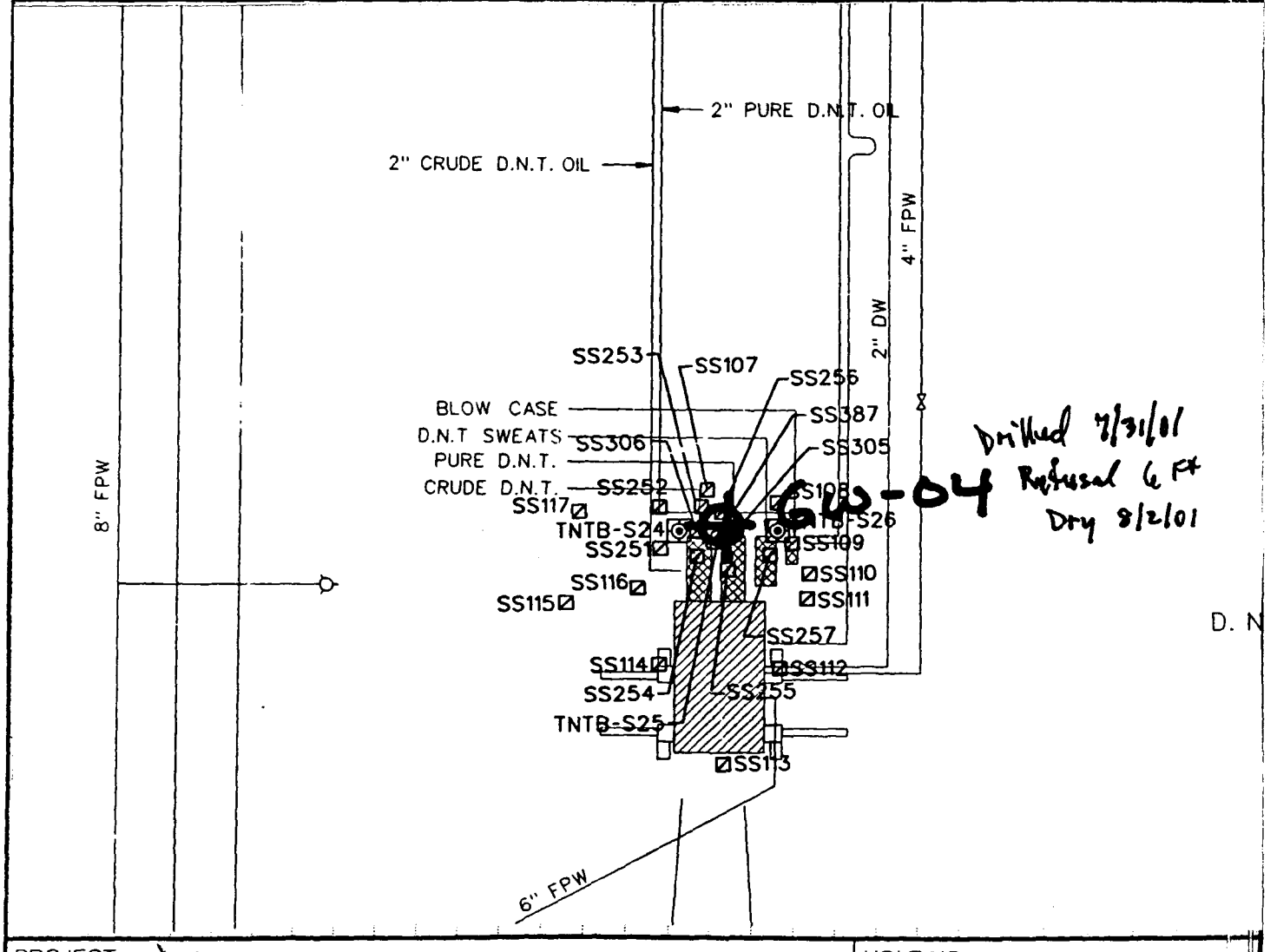
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-004 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area B | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 1/4" DT 66 AK terrain, track mounted geoprobe rig with ~~2 1/4~~ inch OD probe. Temporary piezometer 2" OD, Sch 40 PVC 0.010" slot screen | 8. HOLE LOCATION: Bldg 412 (DNT Sweating + Graining House) | |
| | 9. SURFACE ELEVATION: 671.48 Ft N: 617135.01 E: 1918389.94 | |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 6 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: dry 8/6/01 0825 | |
| 14. TOTAL DEPTH OF HOLE: 6 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| PROJECT: PBOW | HOLE NO. GW-004 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet) TNTB

Hole Number: GW-004

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

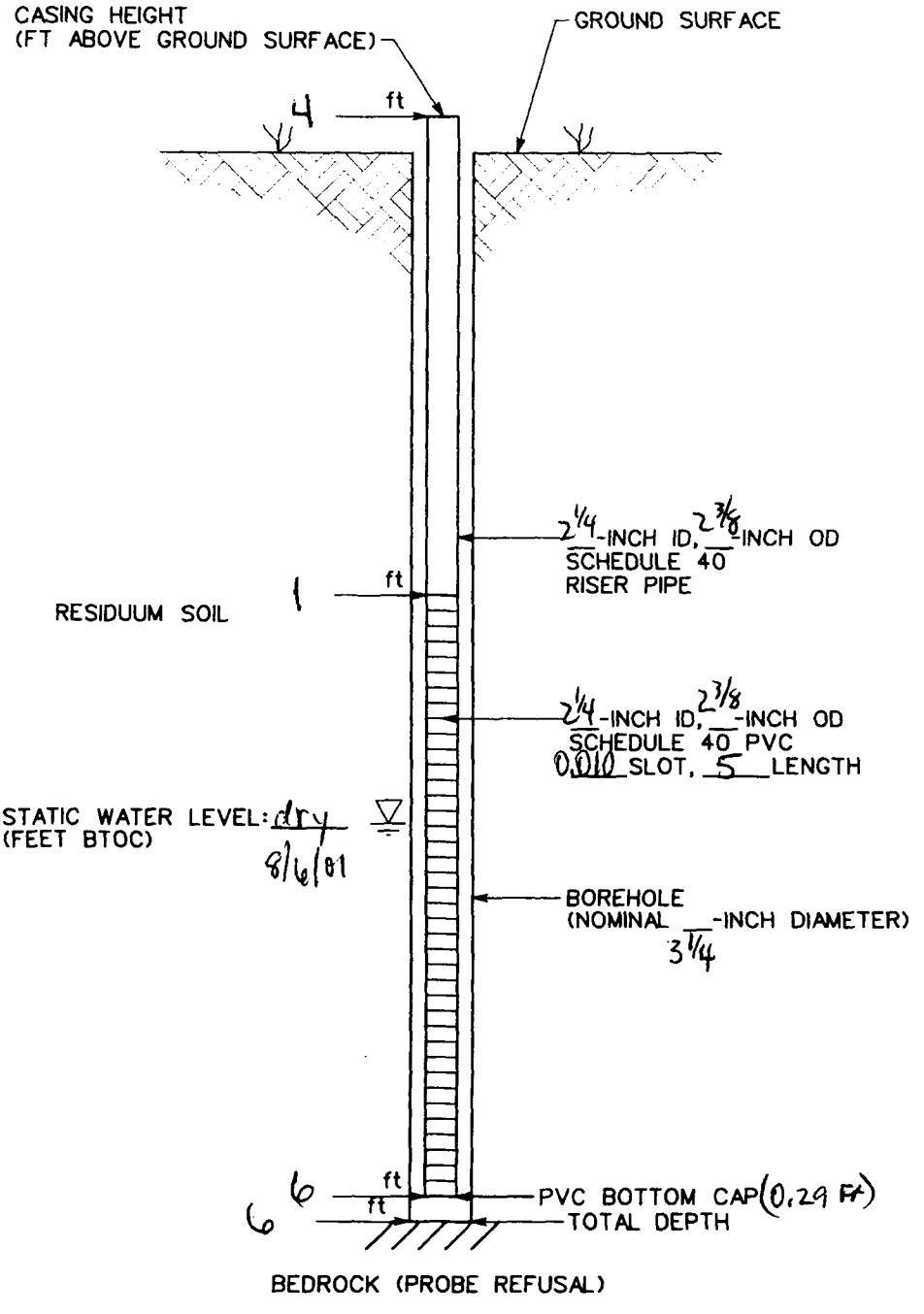
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | NA | NA | NA | NA | NA | Began drilling 7/31/01 1525 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | | | | | | | PID meter being recharged No air quality readings taken |
| | 6 | | | | | | | |
| | | Probe Refusal @ 6 Ft TD = 6 Ft | | | | | | |
| | 7 | | | | | | | 1st attempt Bedrock 4 Ft. 2nd attempt. Moved 20 Ft straight south. |
| | 8 | | | | | | | Shale present (outcrop) in nearby ditch. |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: GW-004

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTB - GW-004




Dry

**NOTES:**

PIEZOMETER NO.: GW-004

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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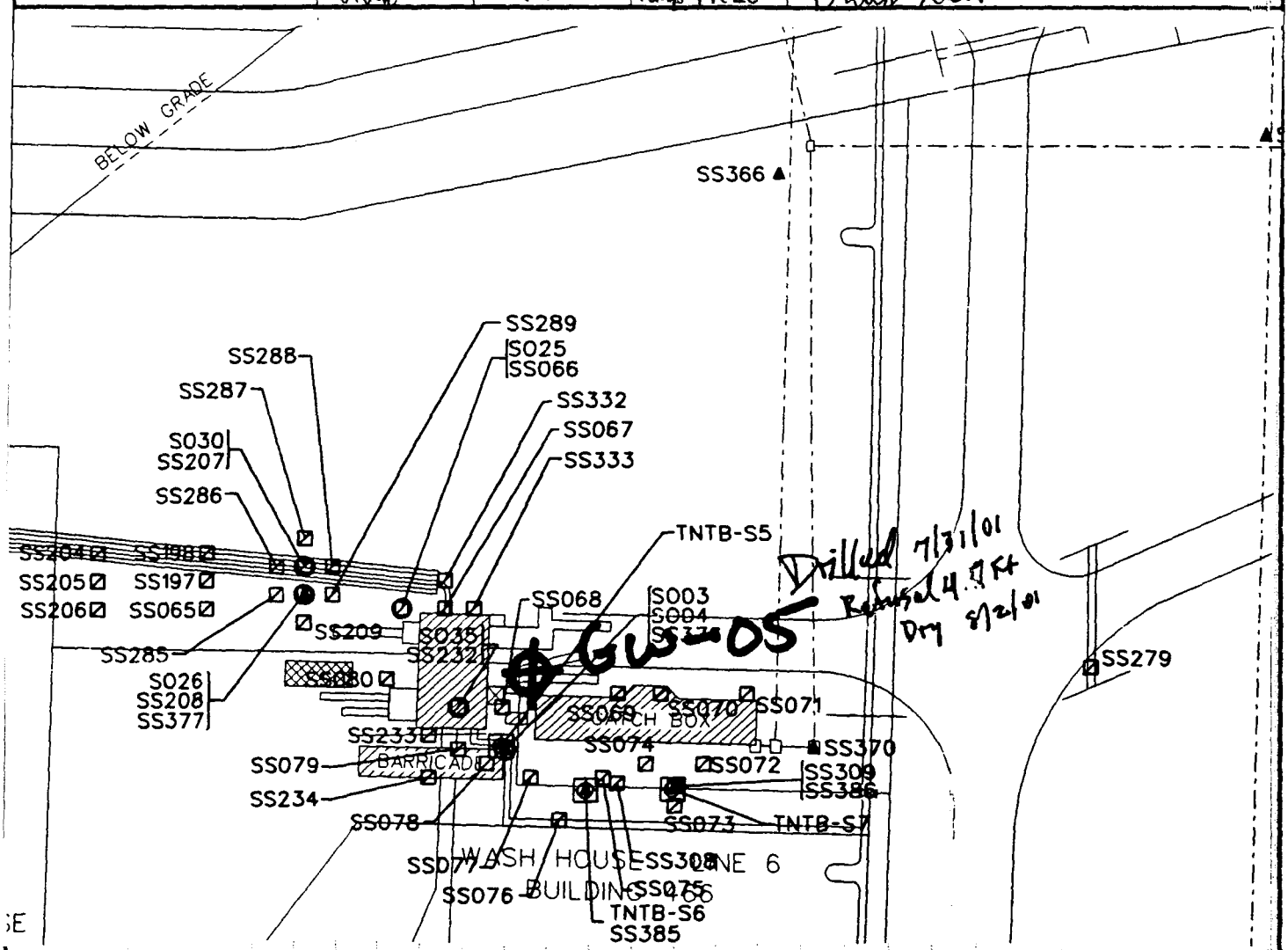
# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: USACE - Nashville | | HOLE NUMBER: GW-005 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Prosonic | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: TNT Area B | |
| 5. NAME OF DRILLER: Pete Goss | 6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe DT66 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3¼" DT 66 All terrain, track mounted geoprobe rig with 2.5 inch OD probe. Temporary Piezometer 2" OD, Sch 40 PVC. 0.010" slot screen | 8. HOLE LOCATION: Bldg 466 | |
| | 9. SURFACE ELEVATION: 668.41 Ft | N: 618217.99 E: 1918058.62 |
| | 10. DATE STARTED: 7/31/01 | 11. DATE COMPLETED: 7/31/01 |
| 12. OVERBURDEN THICKNESS: 4.7 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered | |
| 13. DEPTH DRILLED INTO ROCK: -0- | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: dry 8/6/01 0829 | |
| 14. TOTAL DEPTH OF HOLE: 4.7 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | David Kessler |




| | |
|---|---|
| PROJECT: PBOW | HOLE NO. GW-005 |

# HTRW DRILLING LOG

(continuation sheet) TNTB

Hole Number: GW-005

Project: PBOW

Geologist: D. Kessler

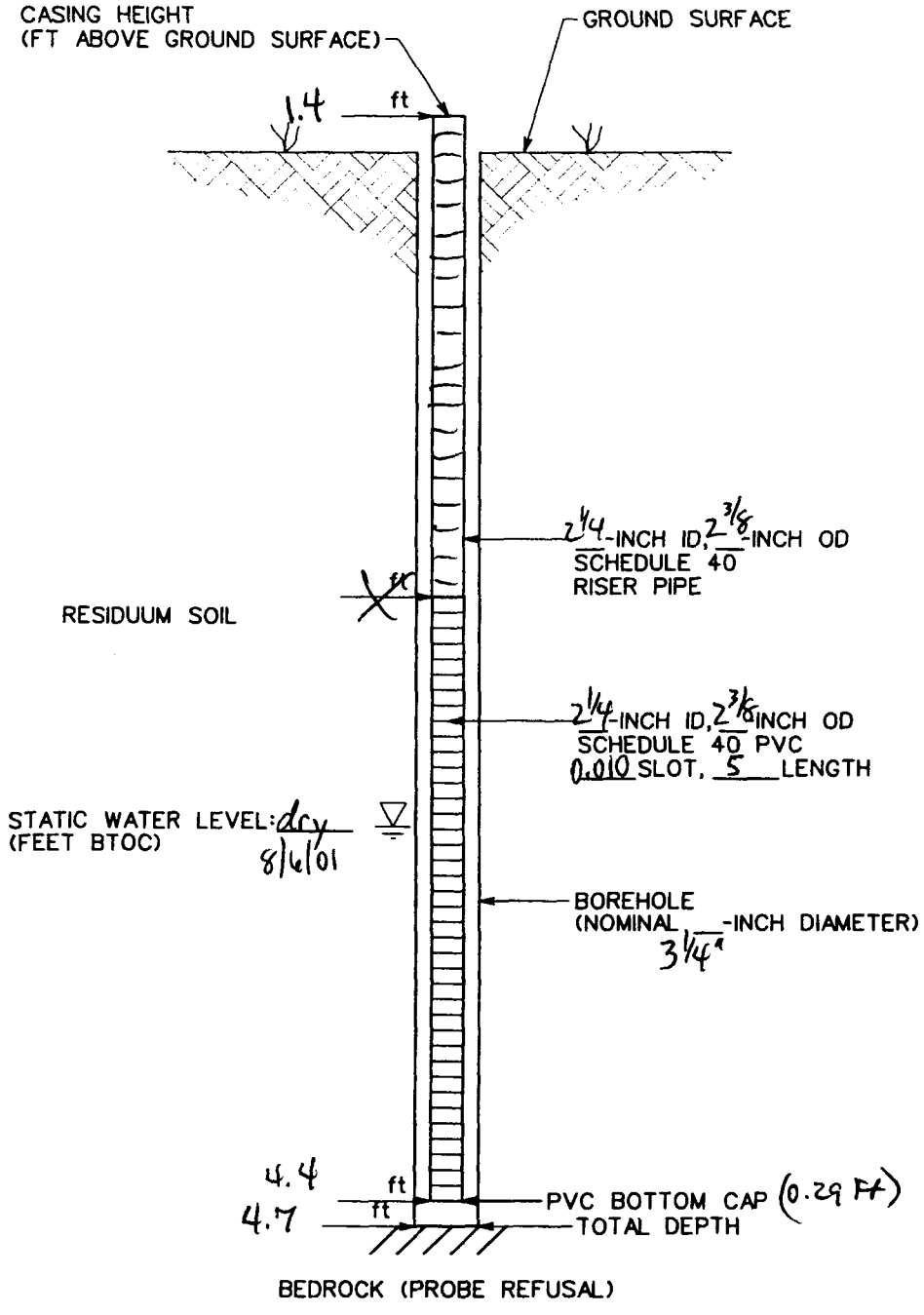
Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | GRASS | | | NA | NA | | Began drilling 7/31/01 1555 |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD temporary piezometer for groundwater sample collection. |
| | 3 | | | | | | | |
| | 4 | | | | | | | No lithologic samples collected. |
| | 5 | Probe Refusal @ 4.7 ft TD = 4.7 ft Shale fragments on tip | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW TNTB Hole Number: GW-005

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNTB GW-005




Dry

**NOTES:**

PIEZOMETER NO.: GW-005
DATE INSTALLED: 7/31/01
DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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TNT-C GW-11

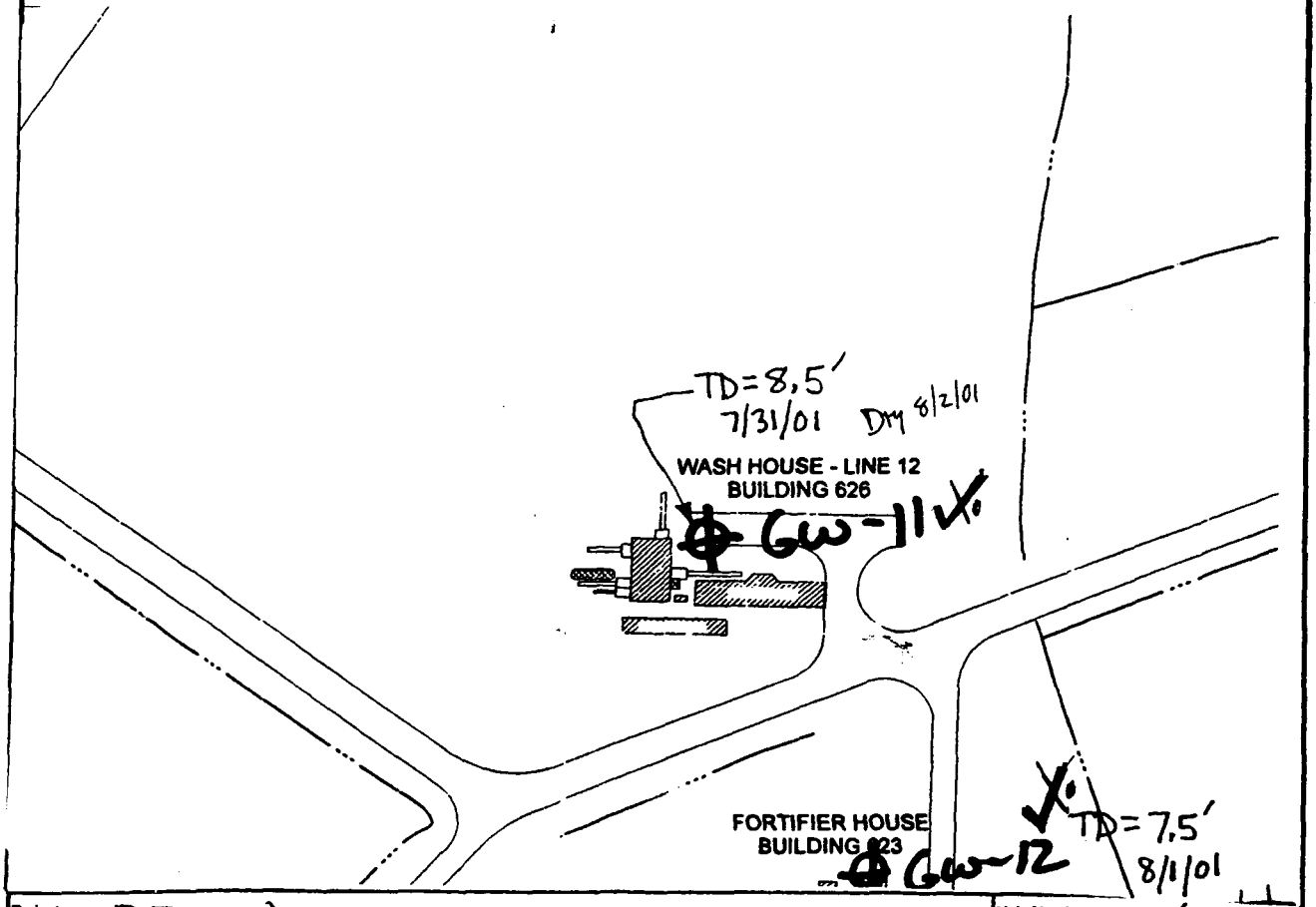
# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE- Nashville |
| Hole Number | TNT-C/GW-11 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C, Bldg 626 |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | 66DT All terrain tracked Geoprobe Rig w/ 3 3/4"OD Probe Temp piezometer 2"OD, Sch40 PVC w/ 0.010" slot screen |
| Northing | 620331.71 |
| Easting | 1910550.71 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 653.83 ft |
| Date Started | 7/31/01 |
| Date Completed | 7/31/01 |
| Overburden Thickness | 8.5' |
| Depth to Bedrock | 8.5' |
| Depth Groundwater Encountered | N/A |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | Dry 8/6/01 0913 |
| Total Depth of Hole | 8.5' |
| Other Water Level Measurements (Specify) | — |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| — | Grout | NA | Temp Piezo | Tony E. Nolan |




| | |
|---|---|
| Project | PBOW |
| Hole Number | TNT-C/GW-11 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-11

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

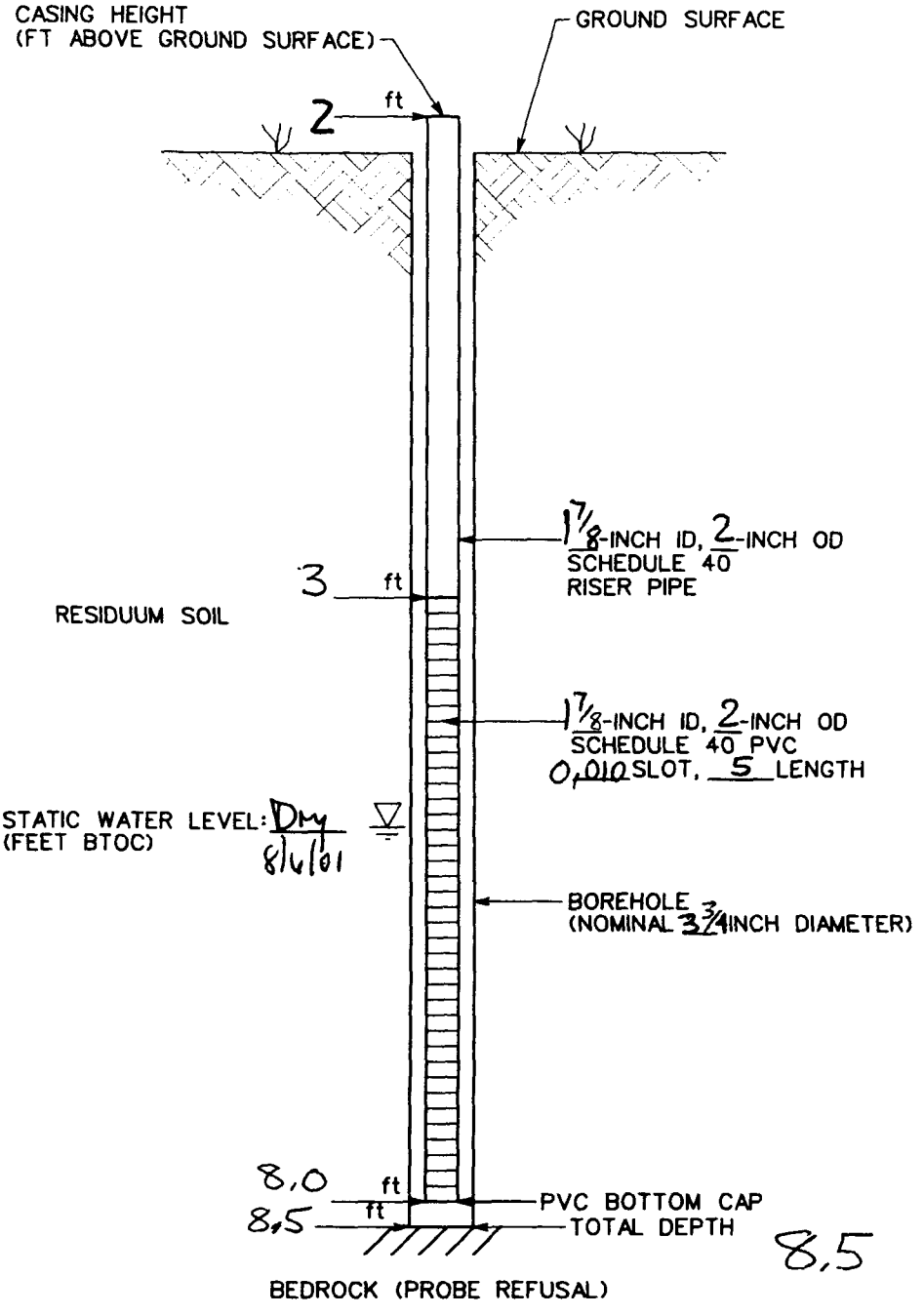
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | NA | NA | NA | |
| | 1 | | | | | | | |
| | 2 | | | | | | | TD = 8' Inserted 2" OD temporary piezometer for groundwater sample collection |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | No lithologic samples collected. |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | TD = 8.5' | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW-11

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-11




**NOTES:**

PIEZOMETER NO.: INT-C/GW-11

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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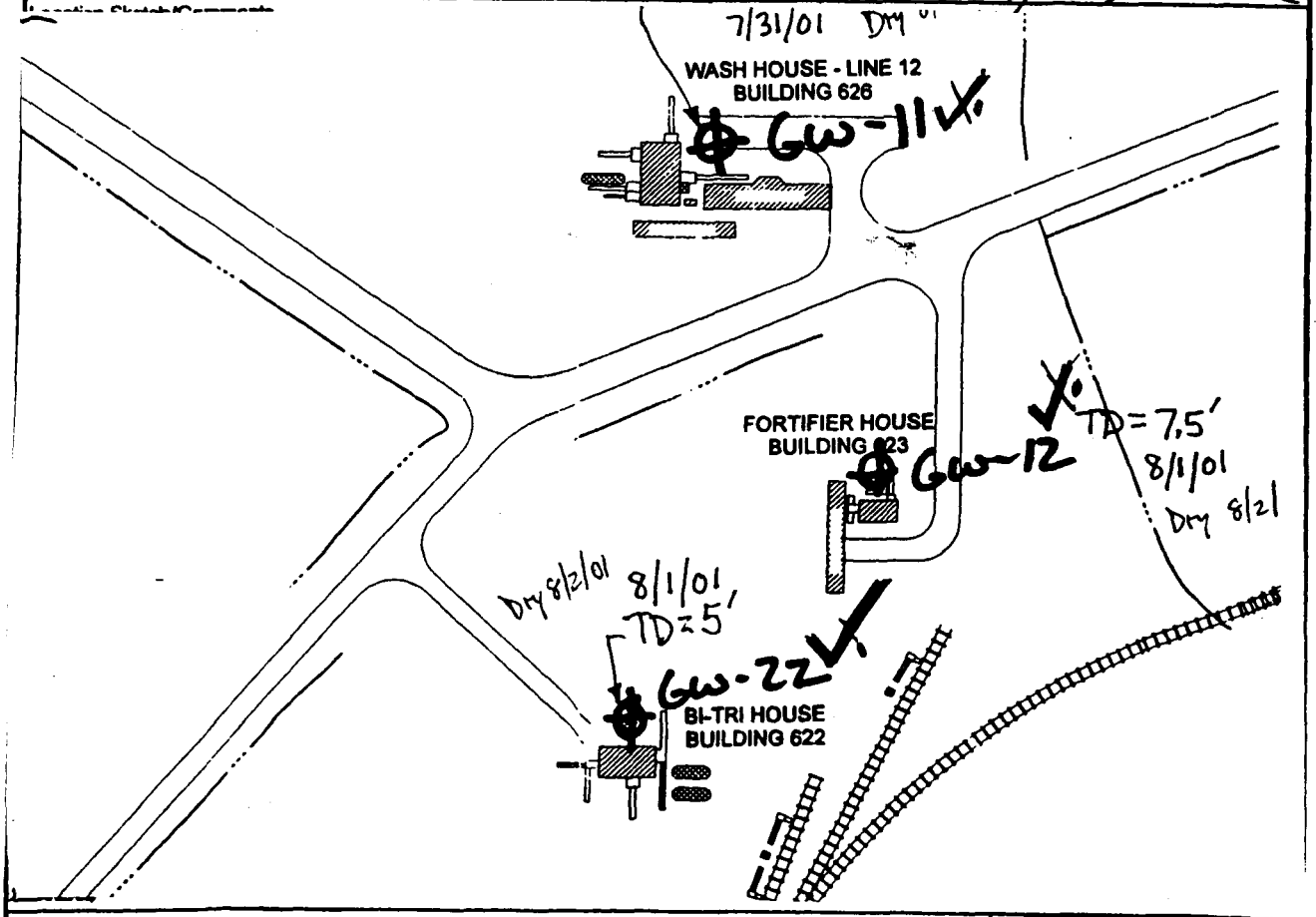
| HTRW DRILLING LOG | District: USACE Nashville | Hole Number: TNT-C GW-12 |
|---|---|---|
| Company Name: IT Corporation | Drilling Subcontractor: ProSonic | Sheet 1 of 2 Sheets |
| Project: PBOW | Location: TNT Area C, Bldg 623 | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: GeoProbe 66DT | |
| Sizes and Types of Drilling and Sampling Equipment: GeoProbe 66DT, 3 3/4" Probe, 2" Sch 40 PVC Piezometer | Northing: 620146.52 / Easting: 1910611.70 / NAD: 1983 / NGVD: 1929 | |
| | Surface Elevation: 662.05 Ft | |
| | Date Started: 8/1/01 | Date Completed: 8/1/01 |
| Overburden Thickness: 7.5' / Depth to Bedrock: 7.5' | Depth Groundwater Encountered: N/A | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0916 | |
| Total Depth of Hole: 7.5' | Other Water Level Measurements (Specify): | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| NA | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | | Piezo | Tony E. Nolan |

Location Sketch/Comments




| Project: PBOW | Hole Number: TNT-C/GW-12 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C GW-12

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

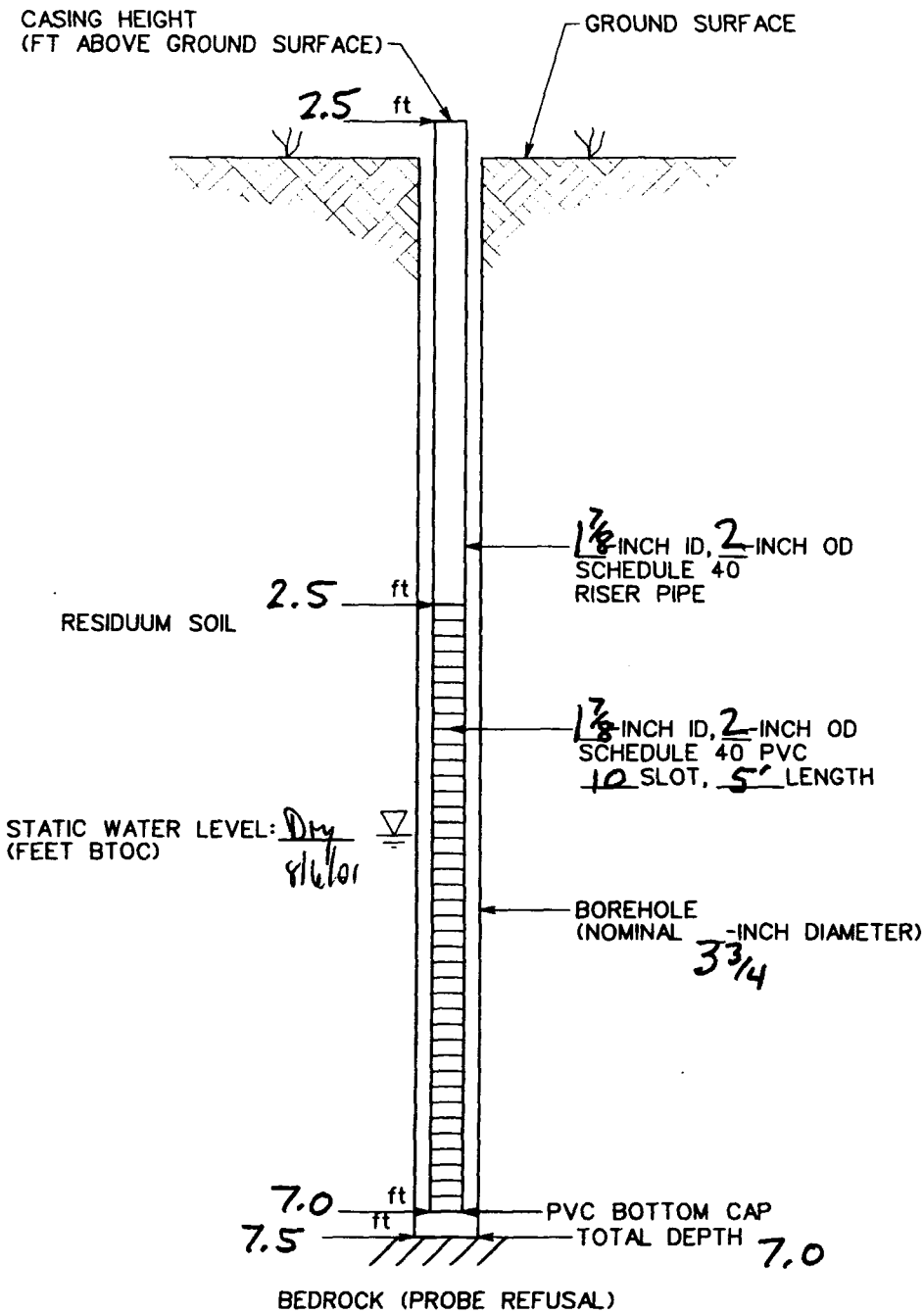
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifc | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | Inserted 2" Sch 40 PVC Piezometer (temporary) |
| | 2 | | | | | | | |
| | 3 | | | | | | | No Lithologic Samples Collected. |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | TD = 7.5' | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW-12

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-12




**NOTES:**

PIEZOMETER NO.: INT-C/GW-12

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE-Nashville |
| Hole Number | TNT-C/GW-13 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C Bldg 616 (Powergrid) |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | 66 DT All Terrain tracked GeoProbe Rig w/ 3 3/4" OD Probe & Temp Piezometer 2" OD Sch 40 PVC / w 0.010" slot screen |
| Northing | 620758.68 |
| Easting | 1911179.14 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 646.45 Ft |
| Date Started | 7/31/01 |
| Date Completed | 7/31/01 |
| Overburden Thickness | 8' |
| Depth to Bedrock | 8' |
| Depth Groundwater Encountered | N/A |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | 6.38 btoc after 24hrs (8/1/01) |
| Total Depth of Hole | 8' |
| Other Water Level Measurements (Specify) | — |

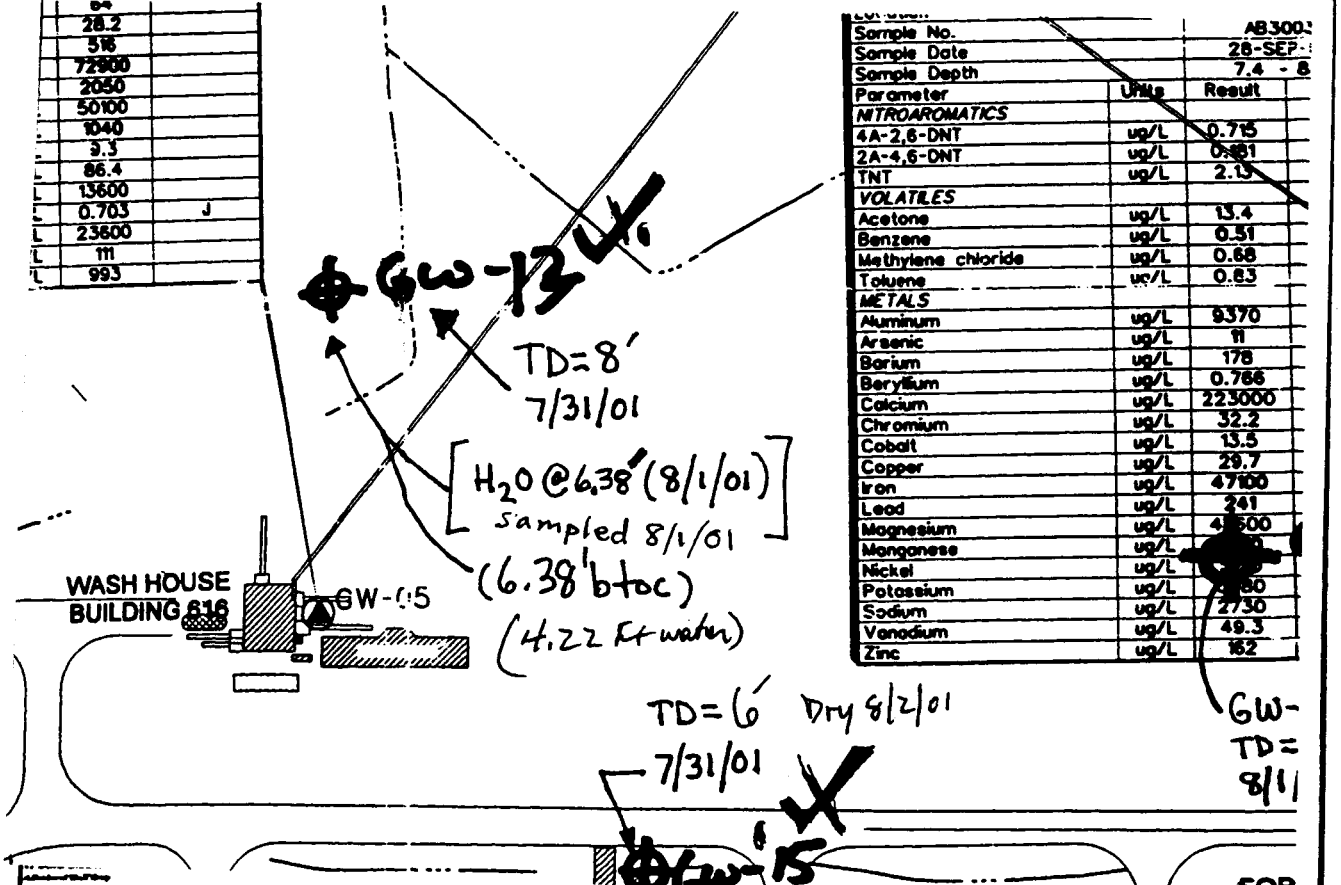
| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | yes | yes | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | Tony E. Nola |

| | | |
|---|---|---|
| | 28.2 | |
| | 516 | |
| | 72900 | |
| | 2050 | |
| | 50100 | |
| | 1040 | |
| | 3.3 | |
| | 86.4 | |
| L | 13600 | |
| L | 0.703 | J |
| L | 23600 | |
| L | 111 | |
| L | 993 | |

| Sample No. | | AB3003 |
|---|---|---|
| Sample Date | | 28-SEP- |
| Sample Depth | | 7.4 - 8 |
| Parameter | Units | Result |
| *NITROAROMATICS* | | |
| 4A-2,6-DNT | ug/L | 0.715 |
| 2A-4,6-DNT | ug/L | 0.881 |
| TNT | ug/L | 2.13 |
| *VOLATILES* | | |
| Acetone | ug/L | 13.4 |
| Benzene | ug/L | 0.51 |
| Methylene chloride | ug/L | 0.68 |
| Toluene | ug/L | 0.83 |
| *METALS* | | |
| Aluminum | ug/L | 9370 |
| Arsenic | ug/L | 11 |
| Barium | ug/L | 178 |
| Beryllium | ug/L | 0.766 |
| Calcium | ug/L | 223000 |
| Chromium | ug/L | 32.2 |
| Cobalt | ug/L | 13.5 |
| Copper | ug/L | 29.7 |
| Iron | ug/L | 47100 |
| Lead | ug/L | 241 |
| Magnesium | ug/L | 4[illegible]500 |
| Manganese | ug/L | [illegible] |
| Nickel | ug/L | [illegible] |
| Potassium | ug/L | [illegible]80 |
| Sodium | ug/L | 2730 |
| Vanadium | ug/L | 49.3 |
| Zinc | ug/L | 162 |




FOR

Project PBOW

Hole Number TNT-C/GW-13

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-13

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

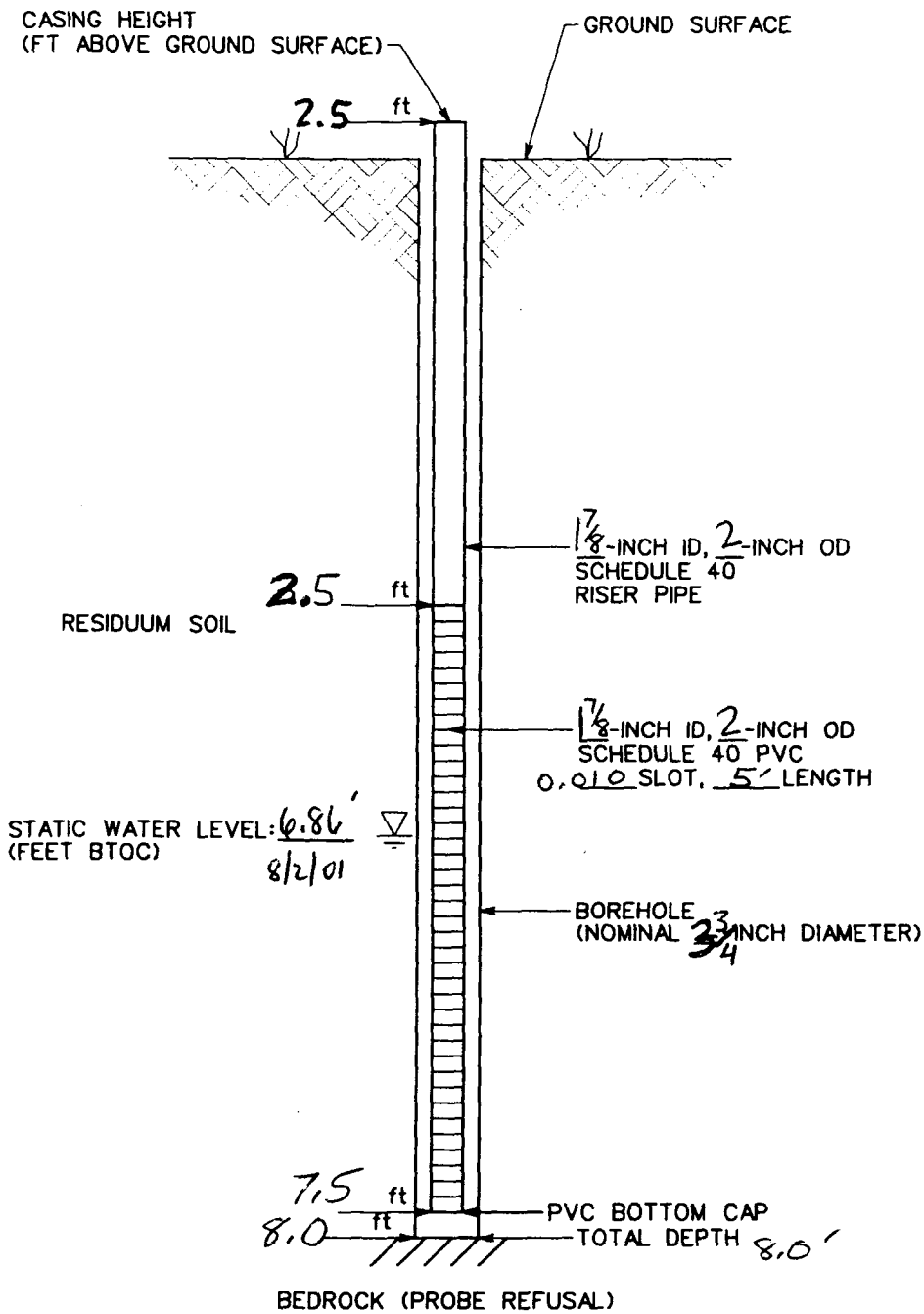
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Units | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | NA | | | Start DPT |
| | 1 | | | | | BC 3013 | | TD=8' Inserted temporary piezometer (2" OD) for groundwater sampling |
| | 2 | | | | | | | |
| | 3 | | | | | | | No lithologic samples collected. |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | TD=8' | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW-13

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C/GW-13




**NOTES:**

PIEZOMETER NO.: TNT-C/GW-13

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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07/30/01
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GW14

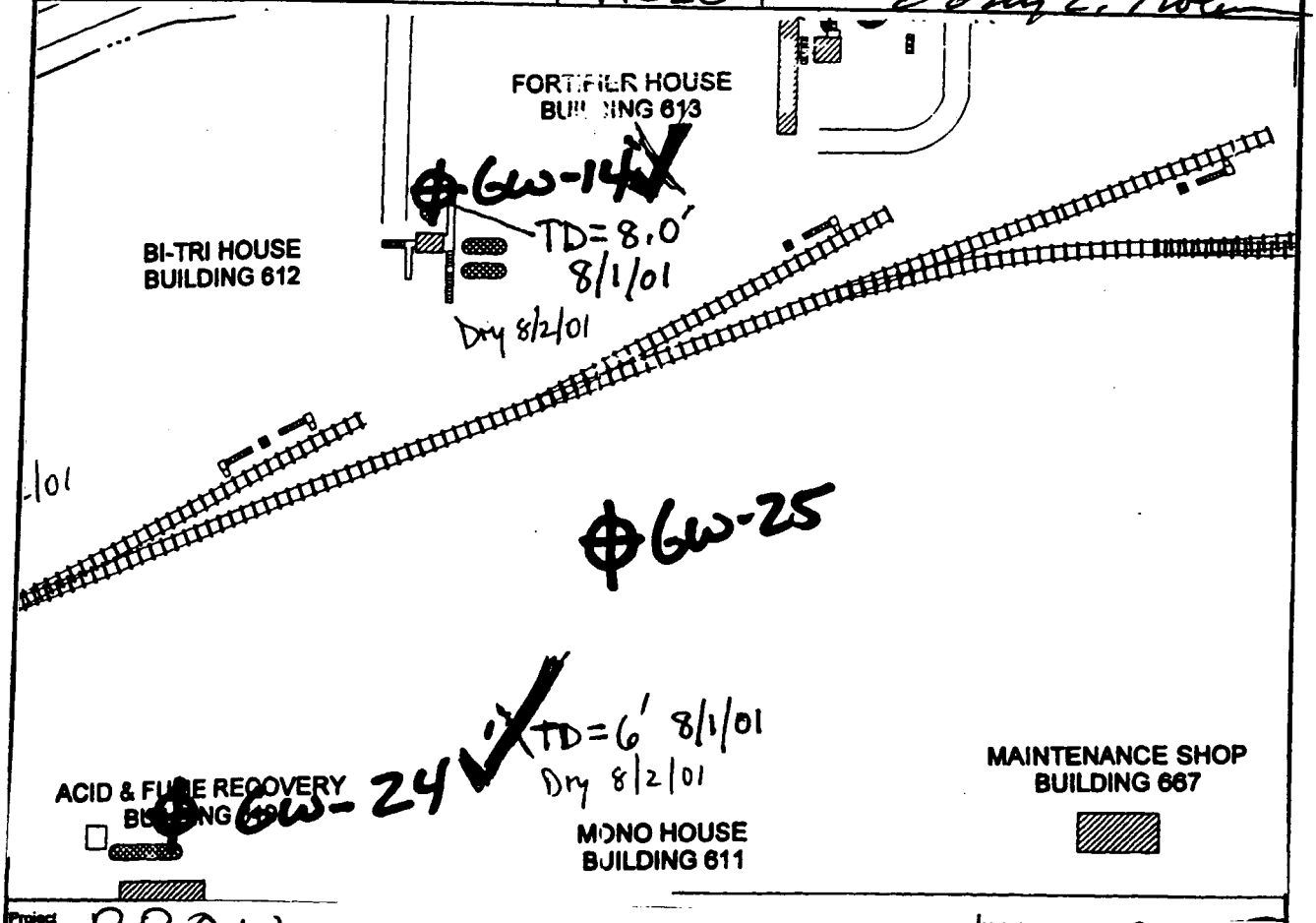
# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE Nashville |
| Hole Number | TNT-C/GW14 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C, Bldg 612 |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | GeoProbe 66DT; 3 3/4" Probe |
| Northing | 620274.22 |
| Easting | 1911096.54 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 665.86 ft |
| Date Started | 8/1/01 |
| Date Completed | 8/1/01 |
| Overburden Thickness | 8' |
| Depth to Bedrock | 8' |
| Depth Groundwater Encountered | N/A |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | Dry 8/6/01 0905 |
| Total Depth of Hole | 8' |
| Other Water Level Measurements (Specify) | — |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | — | — | Piezo | Tony E. Nolen |




| Project | Hole Number |
|---|---|
| PBOW | TNT-C GW14 |

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C GW-14

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

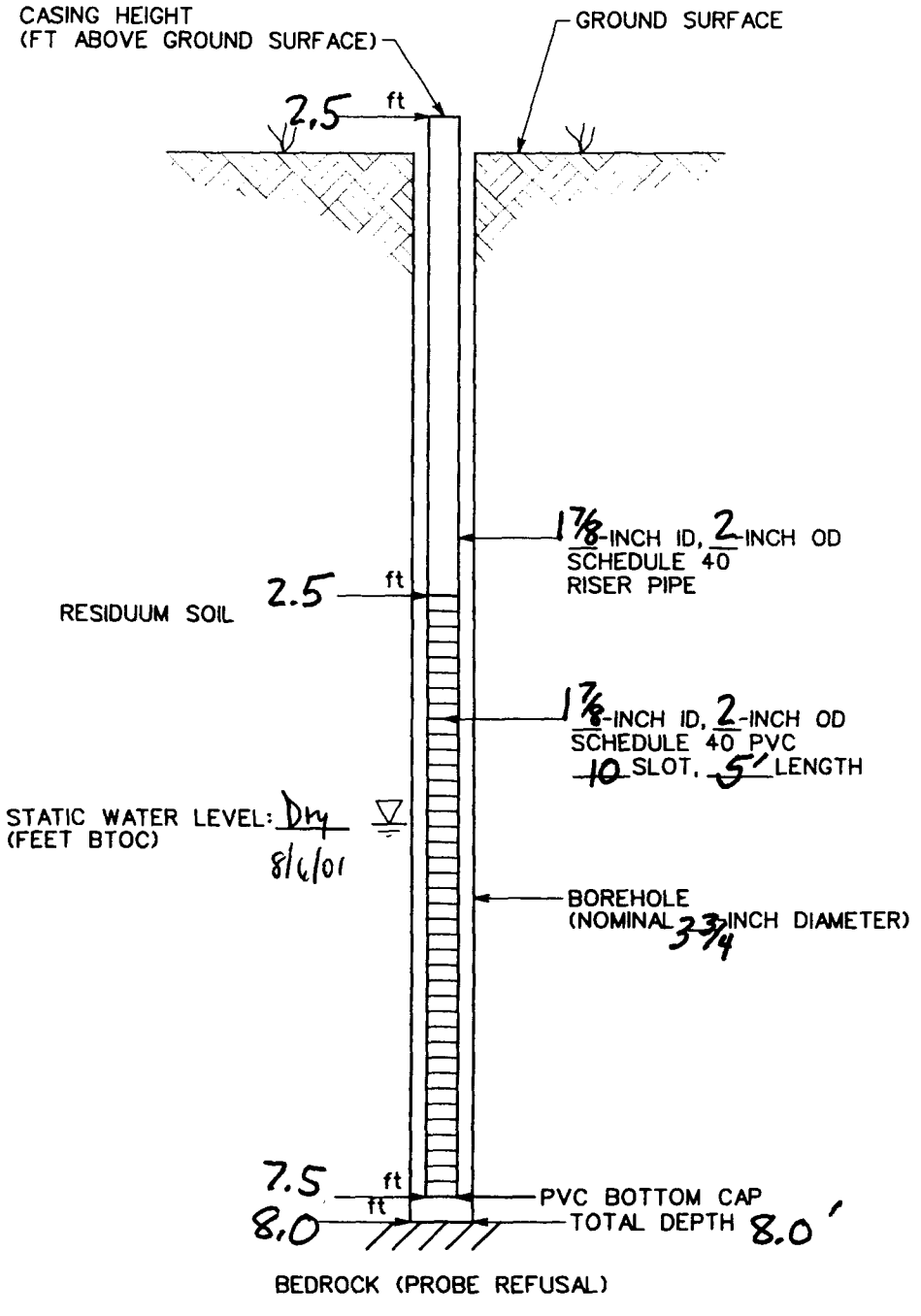
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Unit | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | | | | | | | | Inserted 2" PVC Sch 40 Piezometer |
| | 2 | | | | | | | |
| | 3 | | | | | | | NO Lithologic Samples Collected |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | | TD = 8' | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW14

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-14




**NOTES:**

PIEZOMETER NO.: INT-C/GW-14

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | |
| PROJ. NO.: 825635 | |
| INITIATOR: C. WILLIAMS | |
| PROJ. MGR.: SPANGBERG | |
| DRAFT. CHCK. BY: C. TUMLIN | |
| ENGR. CHCK. BY: C. WILLIAMS | |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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# HTRW DRILLING LOG

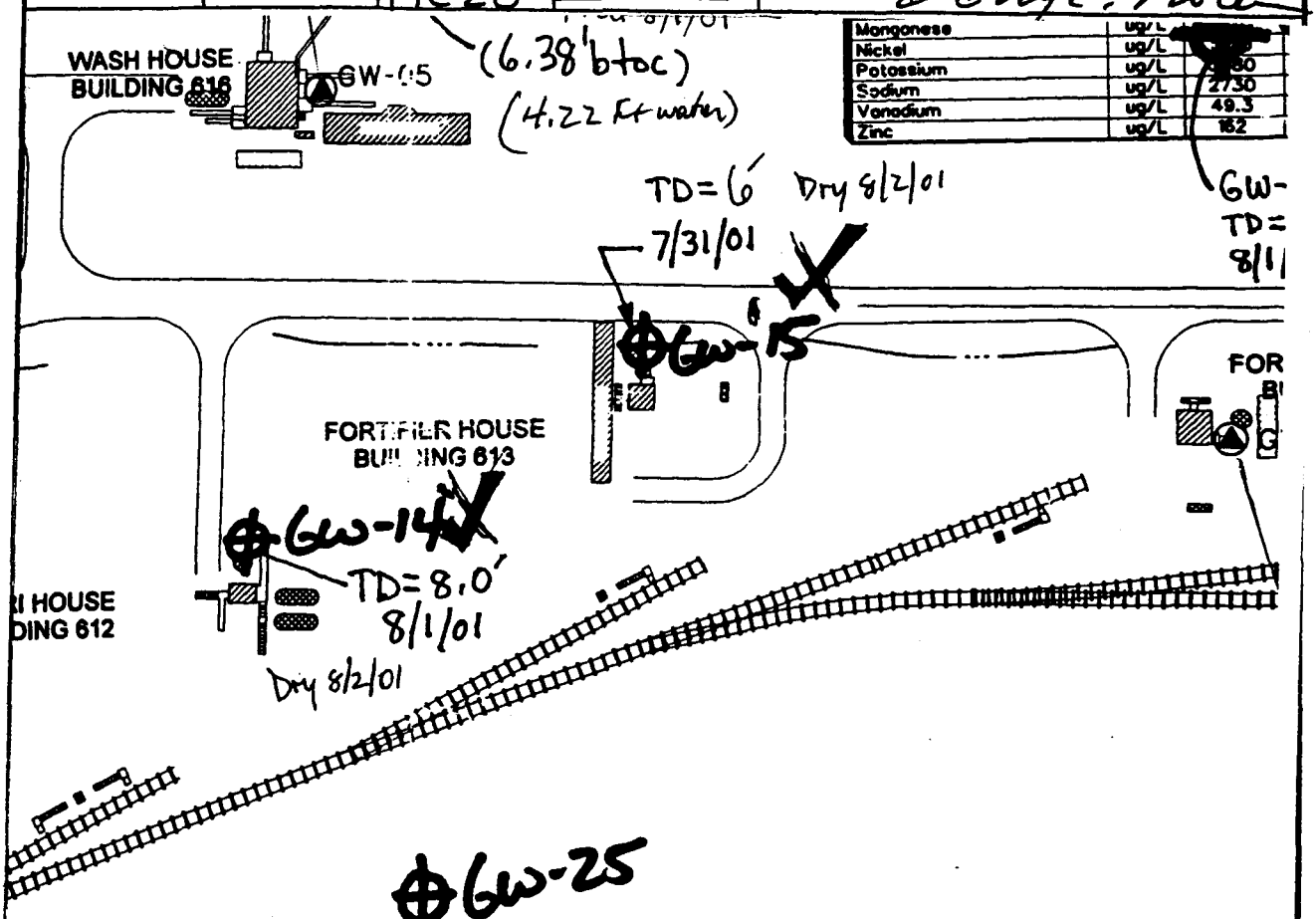
| | |
|---|---|
| District | USACE Nashville |
| Hole Number | TNT-C GW15 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C, Bldg 613 |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | 66DT GeoProbe 3 3/4" Probe |
| Northing | 620356.05 |
| Easting | 1911289.11 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 663.64 Ft |
| Date Started | 7-31-01 |
| Date Completed | 7-31-01 |
| Overburden Thickness | 6' |
| Depth to Bedrock | 6' |
| Depth Groundwater Encountered | NA |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | 9.8 Ft 8/6/01 0809 (0.3' water column - No sample) |
| Total Depth of Hole | 6' |
| Other Water Level Measurements (Specify) | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | PIEZO | | Tony E. Nolen |

| | | |
|---|---|---|
| Manganese | ug/L | [redacted] |
| Nickel | ug/L | [redacted] |
| Potassium | ug/L | [redacted] |
| Sodium | ug/L | 2730 |
| Vanadium | ug/L | 49.3 |
| Zinc | ug/L | 152 |




| Project | Hole Number |
|---|---|
| PBOW | TNT-C GW-15 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C / GW15

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

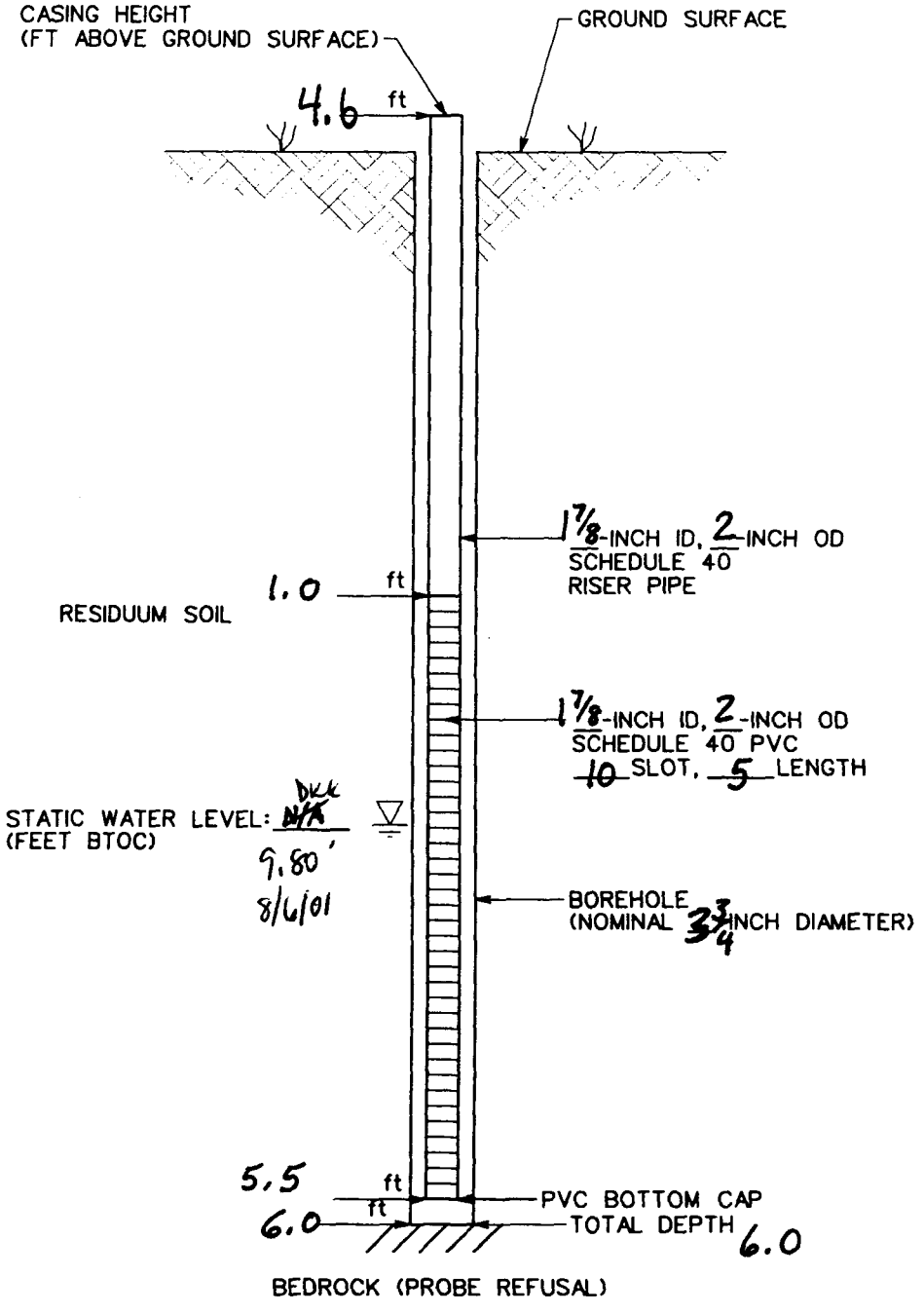
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | NA | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" OD PVC Sch 40 Piezometer |
| | 3 | | | | | | | NO Lithologic Samples |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | TD = 6' | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW-15

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-15




**NOTES:**

PIEZOMETER NO.: INT-C/GW-15

DATE INSTALLED: 7/31/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | DRAWN BY: |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

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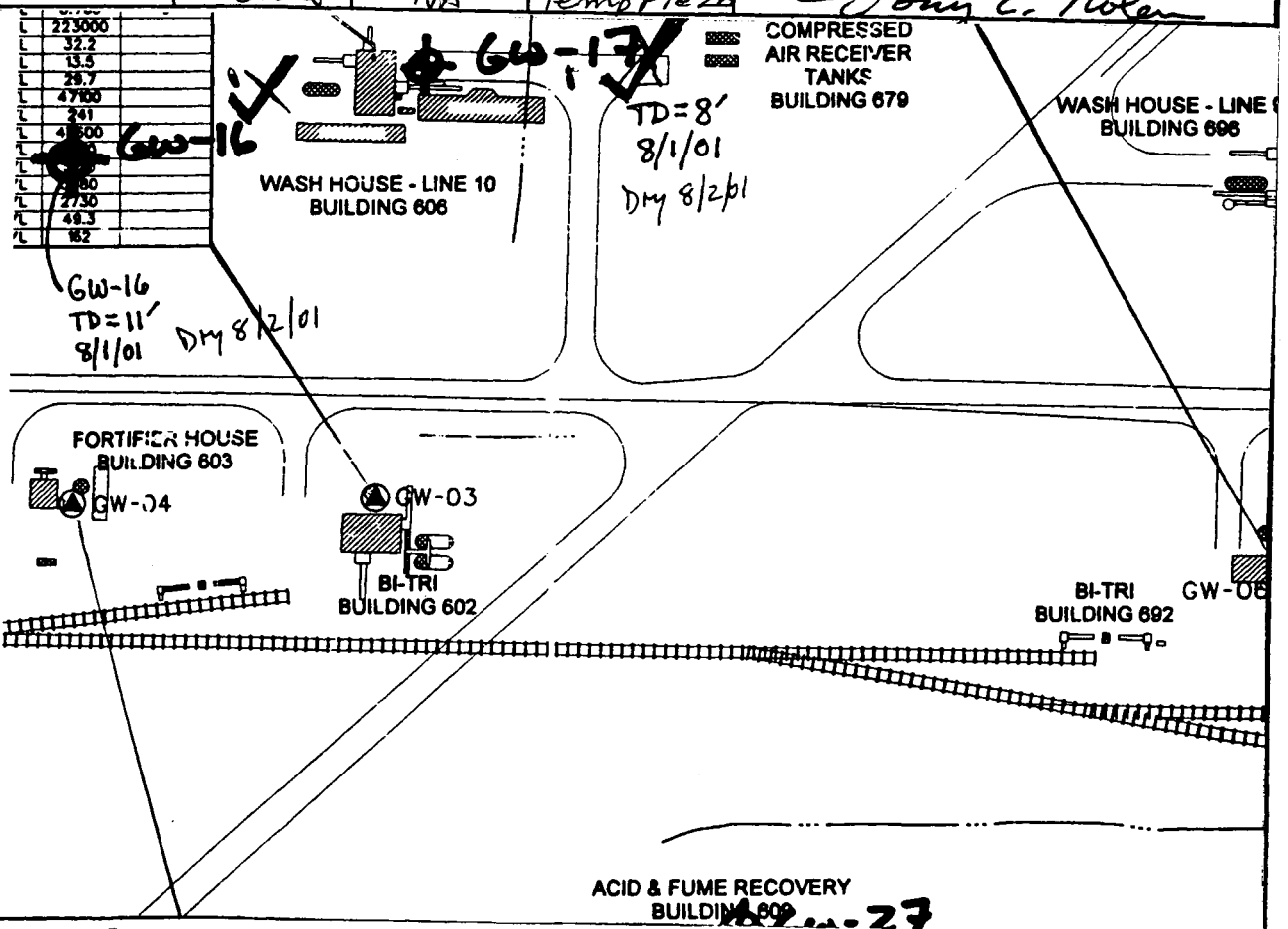
# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE • Nashville |
| Hole Number | TNT-C/GW-16 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 3 |
| Project | PBOW |
| Location | TNT Area C, Bldg 603 (Downgradient) |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66 DT |
| Sizes and Types of Drilling and Sampling Equipment | 66 DT All Terrain tracked GeoProbe Rig w/ 3 3/4" OD Probe. Temp Piezometer 2" OD Sch 40 PVC w/ 0.010" screen slots |
| Northing | 620580.09 |
| Easting | 1911620.41 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 652.40 Ft |
| Date Started | 7/31/01 |
| Date Completed | 8/1/01 |
| Overburden Thickness | 11' |
| Depth to Bedrock | 11' |
| Depth Groundwater Encountered | NA |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | Dry 8/6/01 0900 |
| Total Depth of Hole | 11' |
| Other Water Level Measurements (Specify) | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | Grout | NA | Temp Piezo | Tony E. Nolan |




| Project | Hole Number |
|---|---|
| PBOW | TNT-C/GW-16 |

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-16

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | Inserted 2" OD temp piezometer for ground water sample collection |
| | 2 | | | | | | | |
| | 3 | | | | | | | No lithologic samples collected. |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW-16

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-16

Project: PBOW

Geologist: T. Nolen

Sheet 3 of 3 Sheets

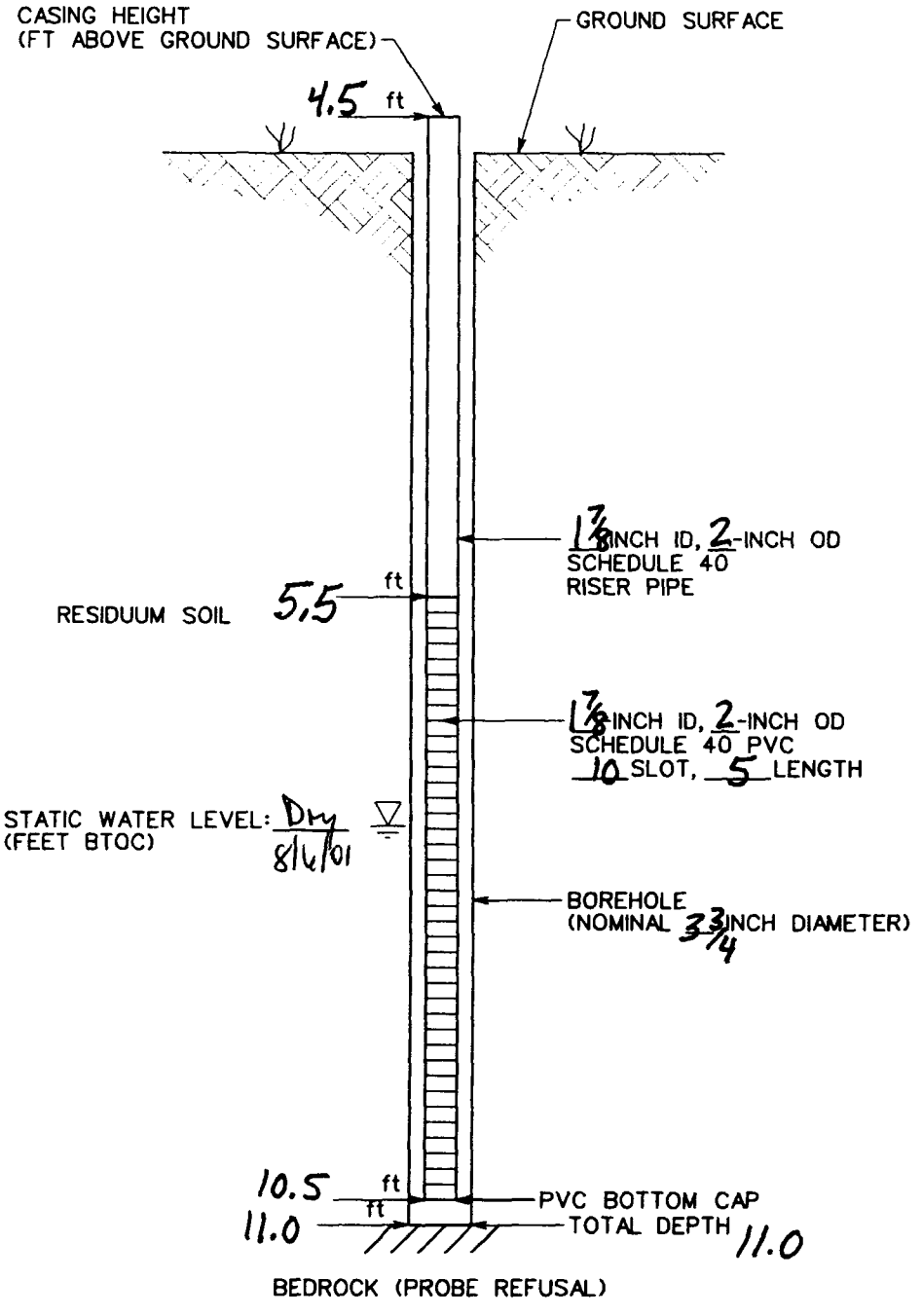
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | | | NM | NA | NA | NA | |
| | | TD = 11' | | | | | | |
| | 11 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 0 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW16

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C GW-16




**NOTES:**

PIEZOMETER NO.: TNT-C/GW-16

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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# HTRW DRILLING LOG

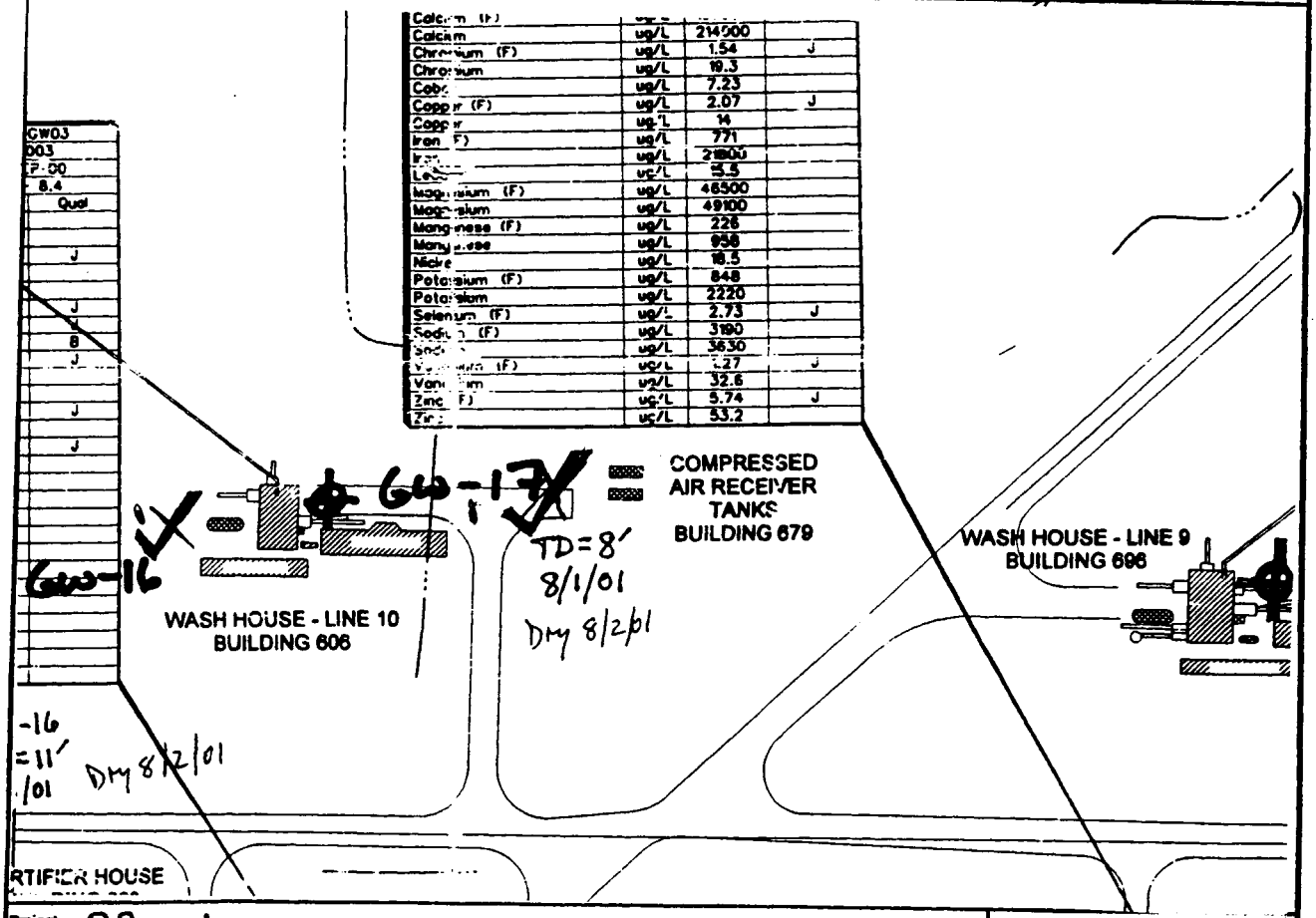
| | | | |
|---|---|---|---|
| HTRW DRILLING LOG | District: USACE - Nashville | Hole Number: TNT-C GW-17 | |
| Company Name: IT Corporation | Drilling Subcontractor: Pro Sonic | Sheet 1 of 2 Sheets | |
| Project: PBOW | Location: TNT Area C, Bldg 606 | | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: GEOPROBE 66DT | | |
| Sizes and Types of Drilling and Sampling Equipment: GEOPROBE 66DT 3 3/4" Probe | Northing: 620595.30 | Easting: 1911806.33 | NAD 1983 / NGVD 1929 |
| | Surface Elevation: 654.39 Ft | | |
| | Date Started: 8/1/01 | Date Completed: 8/1/01 | |
| Overburden Thickness: 8' | Depth to Bedrock: 8' | Depth Groundwater Encountered: NA | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0856 | | |
| Total Depth of Hole: 8' | Other Water Level Measurements (Specify): — | | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | MES | — | — | Tony E. Nolan |

| | | | |
|---|---|---|---|
| Calcium (F) | ug/L | 214000 | |
| Calcium | ug/L | 1.54 | J |
| Chromium (F) | ug/L | 19.3 | |
| Chromium | ug/L | 7.23 | |
| Cobalt | ug/L | 2.07 | J |
| Copper (F) | ug/L | 14 | |
| Copper | ug/L | 771 | |
| Iron (F) | ug/L | 21800 | |
| Iron | ug/L | 5.5 | |
| Lead | ug/L | 46500 | |
| Magnesium (F) | ug/L | 49100 | |
| Magnesium | ug/L | 226 | |
| Manganese (F) | ug/L | 958 | |
| Manganese | ug/L | 18.5 | |
| Nickel | ug/L | 848 | |
| Potassium (F) | ug/L | 2220 | |
| Potassium | ug/L | 2.73 | J |
| Selenium (F) | ug/L | 3190 | |
| Sodium (F) | ug/L | 3630 | |
| Sodium | ug/L | 1.27 | J |
| Vanadium (F) | ug/L | 32.6 | |
| Vanadium | ug/L | 5.74 | J |
| Zinc (F) | ug/L | 53.2 | |
| Zinc | ug/L | | |




| | |
|---|---|
| Project: PBOW | Hole Number: TNT-C GW-17 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: 7NT-C GW17

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

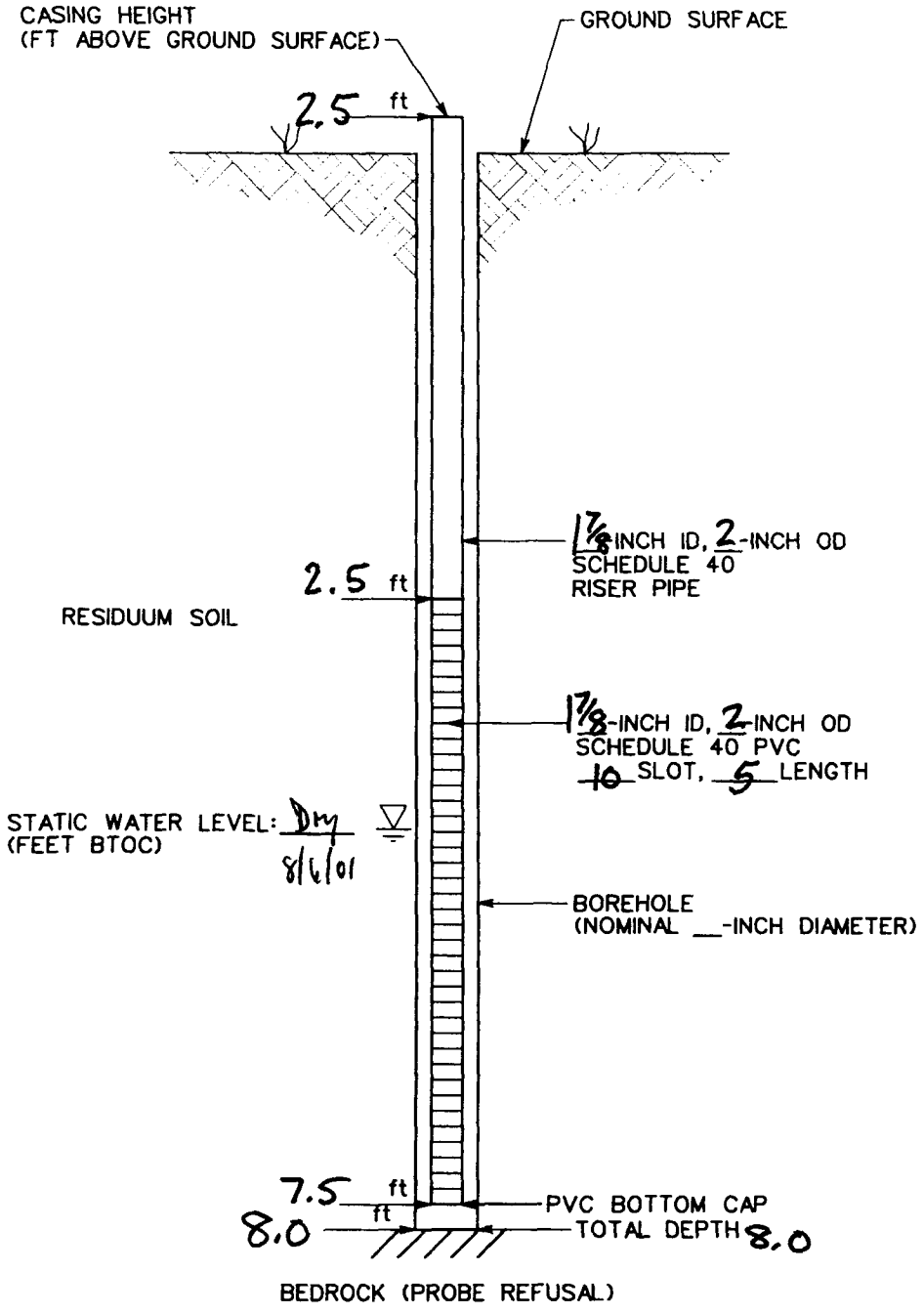
| Elev (ft) | Depth (ft) Bgs | Description of Materials | USCS/ Line | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" Sch 40 PVC temp Piezometer |
| | 3 | | | | | | | |
| | 4 | | | | | | | NO Lithologic Samples Collected |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | TD=8' | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project

Hole Number:

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C GW17




**NOTES:**

PIEZOMETER NO.: TNT-C/GW-17

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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# HTRW DRILLING LOG

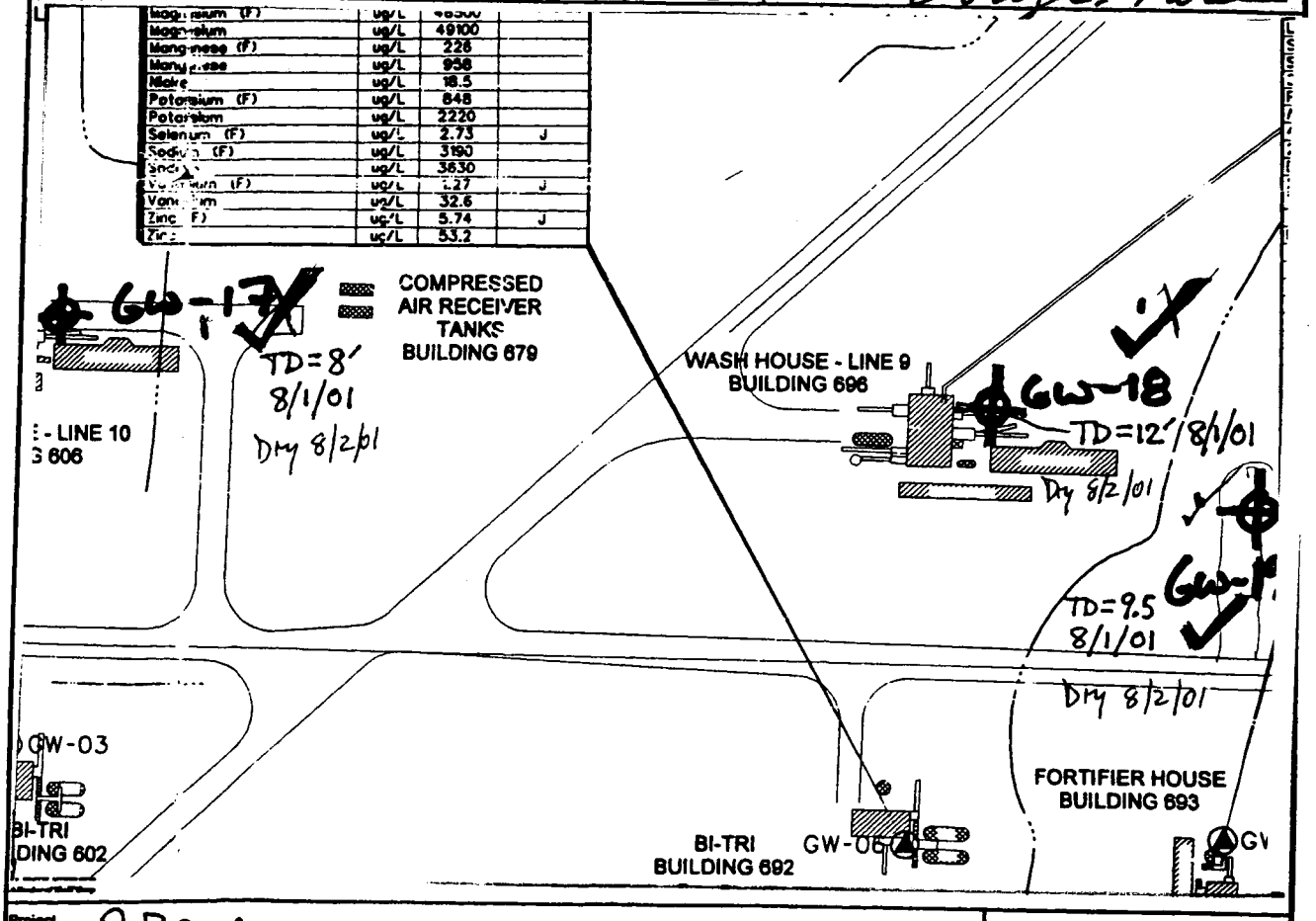
| | |
|---|---|
| District | USACE Nashville |
| Hole Number | TNT-C GW18 |
| Company Name | IT Corporation |
| Drilling Subcontractor | ProSonic |
| Sheet / Sheets | 1 of 3 |
| Project | PBOW |
| Location | TNT Area C, Bldg 696 |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | GeoPROBE 66DT 3/3/4" PROBE PVC 2" SCH 40 : PIEZOMETER |
| Northing | 620512.15 |
| Easting | 1912367.61 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 656.21 Ft |
| Date Started | 8/1/01 |
| Date Completed | 8/1/01 |
| Overburden Thickness | 12' |
| Depth to Bedrock | 12' |
| Depth Groundwater Encountered | NA |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | Dry 8/6/01 0848 |
| Total Depth of Hole | 12' |
| Other Water Level Measurements (Specify) | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | | PIEZO | Tony E. Nolan |

| | | | |
|---|---|---|---|
| Magnesium (F) | ug/L | 49100 | |
| Manganese (F) | ug/L | 226 | |
| Manganese | ug/L | 958 | |
| Mercury | ug/L | 18.5 | |
| Potassium (F) | ug/L | 848 | |
| Potassium | ug/L | 2220 | |
| Selenium (F) | ug/L | 2.73 | J |
| Sodium (F) | ug/L | 3190 | |
| Sodium | ug/L | 3830 | |
| Vanadium (F) | ug/L | 1.27 | J |
| Vanadium | ug/L | 32.6 | |
| Zinc (F) | ug/L | 5.74 | J |
| Zinc | ug/L | 53.2 | |




| | |
|---|---|
| Project | PBOW |
| Hole Number | TNT-C/GW18 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C GW-18

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | Inserted 2" PVC Sch 40 Piezometer |
| | 4 | | | | | | | No Lithologic Samples Collected. |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW-18

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C GW-18

Project: PBOW

Geologist: T. Nolen

Sheet 3 of 3 Sheets

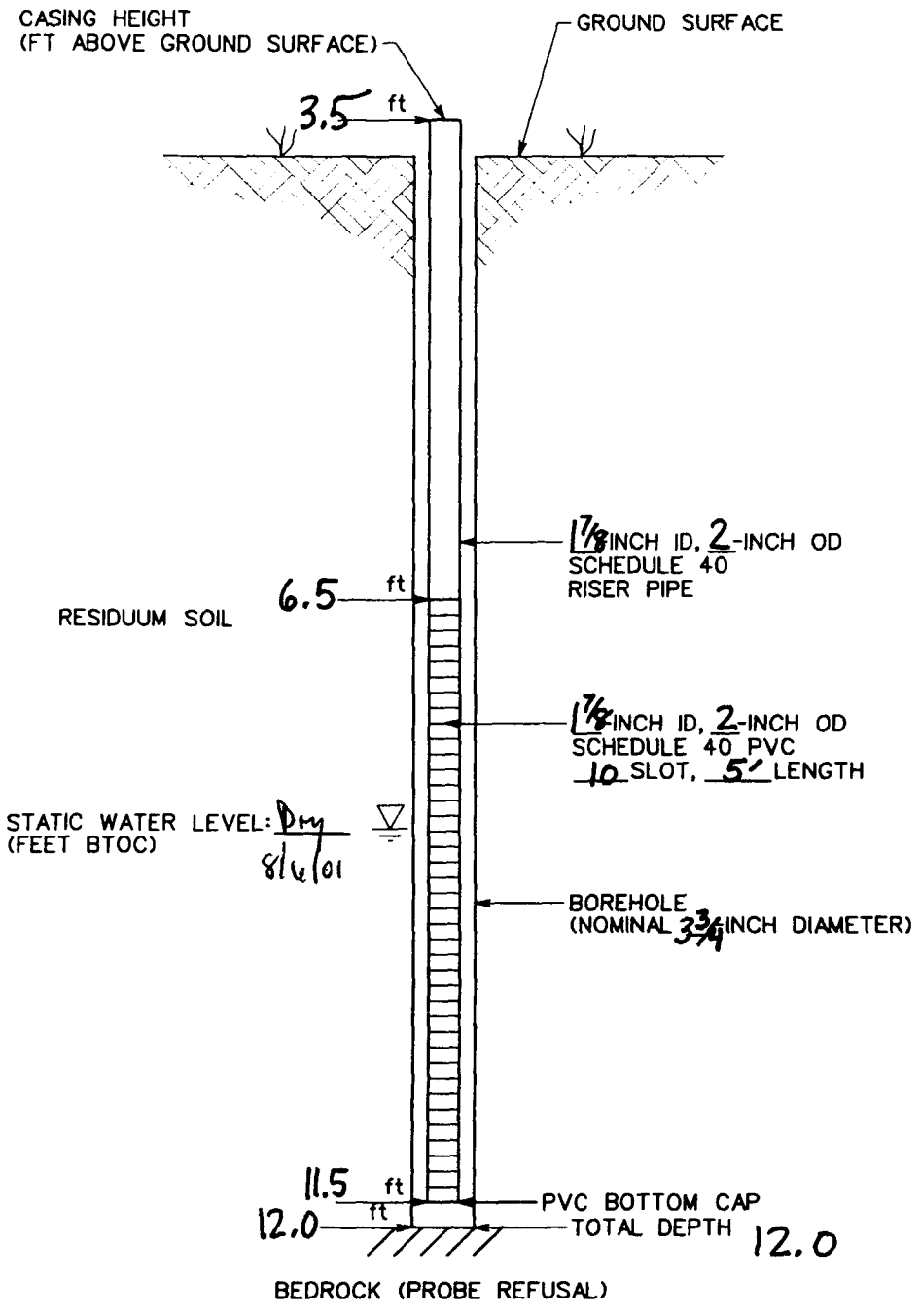
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | | | NM | NA | NA | NA | |
| | 11 | | | | | | | |
| | 12 | TD = 12' | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW-18

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-18




**NOTES:**

PIEZOMETER NO.: INT-C/GW-18

DATE INSTALLED: 8/6/01

DATE REMOVED: 8/6/01

NOT TO SCALE

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | DRAWN BY: |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

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# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE NASHVILLE |
| Hole Number | TNT-C/GW-19 |
| Company Name | IT Corporation |
| Drilling Subcontractor | Pro Sonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C, Bldg 693 (Downgrading) |
| Name of Driller | ~~Tony N~~ (TN) Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | GeoProbe 66DT; 3 3/4" Probe; 2" PVC Sch 40 Piezometer |
| Northing | 620501.15 |
| Easting | 1912567.12 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 653.19 Ft |
| Date Started | 8/1/01 |
| Date Completed | 8/1/01 |
| Overburden Thickness | 9.5' |
| Depth to Bedrock | 9.5' |
| Depth Groundwater Encountered | NA |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | 7.38 Ft 8/6/01 0852 (2.62' water column - sampled) |
| Total Depth of Hole | 9.5' |
| Other Water Level Measurements (Specify) | |

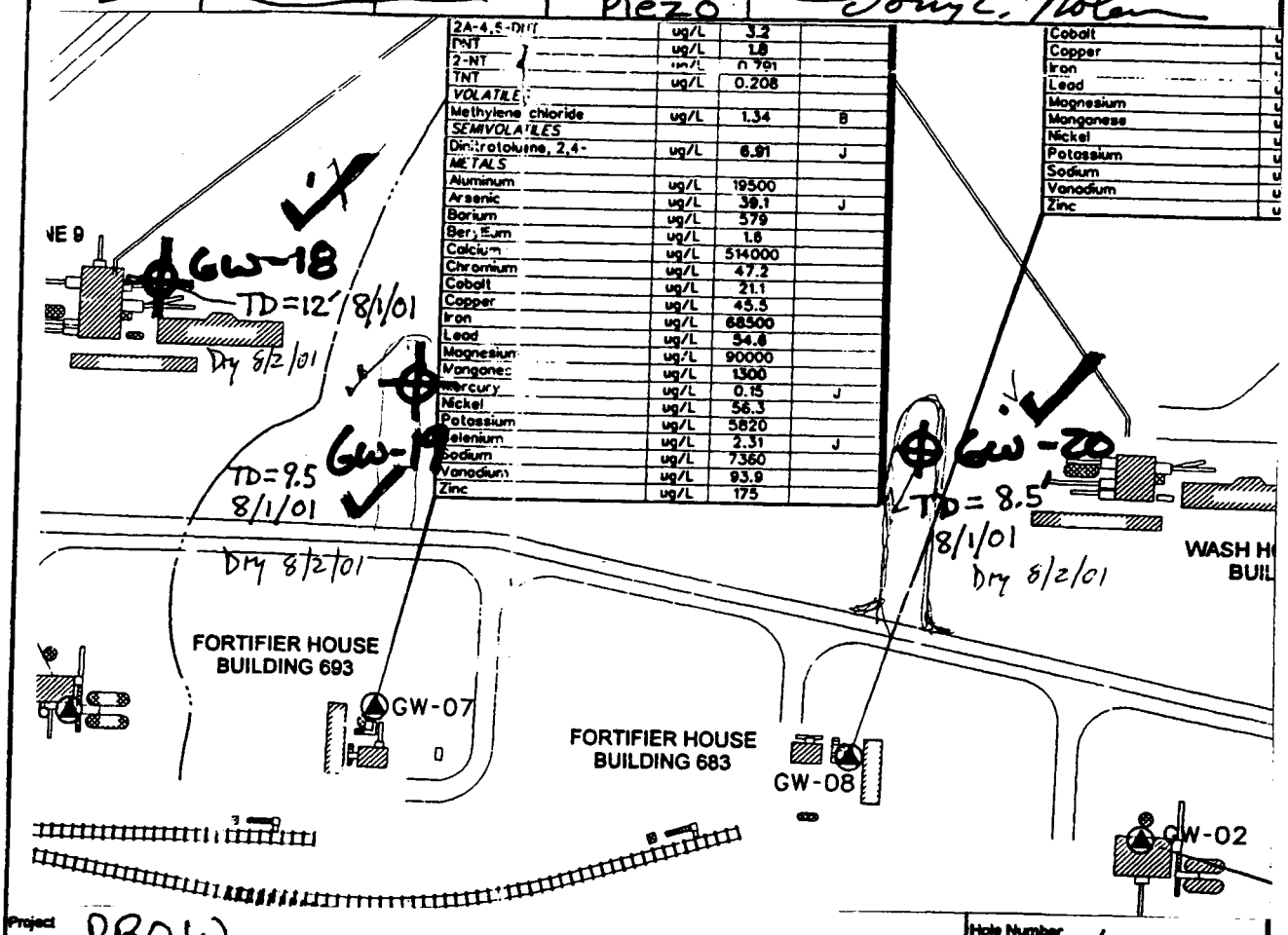
| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | yes | yes | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | | Piezo | Tony E. Nolan |

| | | | |
|---|---|---|---|
| 2A-4,5-DNT | ug/L | 3.2 | |
| PNT | ug/L | 1.8 | |
| 2-NT | ug/L | 0.791 | |
| TNT | ug/L | 0.208 | |
| VOLATILES | | | |
| Methylene chloride | ug/L | 1.34 | B |
| SEMIVOLATILES | | | |
| Dinitrotoluene, 2,4- | ug/L | 6.91 | J |
| METALS | | | |
| Aluminum | ug/L | 19500 | |
| Arsenic | ug/L | 39.1 | J |
| Barium | ug/L | 579 | |
| Beryllium | ug/L | 1.6 | |
| Calcium | ug/L | 514000 | |
| Chromium | ug/L | 47.2 | |
| Cobalt | ug/L | 21.1 | |
| Copper | ug/L | 45.5 | |
| Iron | ug/L | 68500 | |
| Lead | ug/L | 54.8 | |
| Magnesium | ug/L | 90000 | |
| Manganese | ug/L | 1300 | |
| Mercury | ug/L | 0.15 | J |
| Nickel | ug/L | 56.3 | |
| Potassium | ug/L | 5820 | |
| Selenium | ug/L | 2.31 | J |
| Sodium | ug/L | 7360 | |
| Vanadium | ug/L | 93.9 | |
| Zinc | ug/L | 175 | |

| | |
|---|---|
| Cobalt | U |
| Copper | U |
| Iron | U |
| Lead | U |
| Magnesium | U |
| Manganese | U |
| Nickel | U |
| Potassium | U |
| Sodium | U |
| Vanadium | U |
| Zinc | U |




Project PBOW

Hole Number TNT-C / GW-19

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-19

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

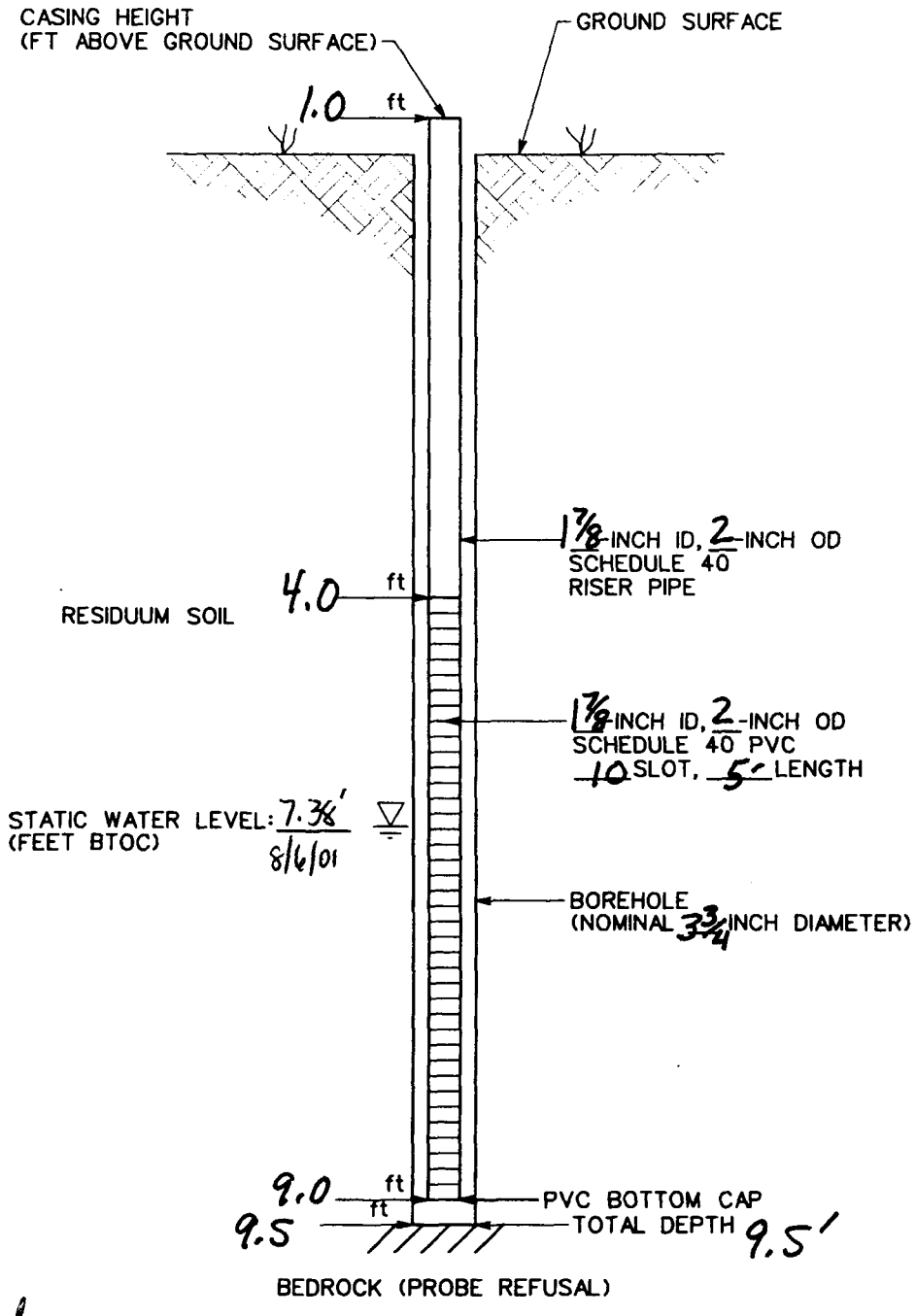
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | | NA | Begin DPT |
| | 1 | | | | | BC 3019 | | Inserted 2" Sch 40 PVC temp. Piezometer |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | NO LITHOLOGIC SAMPLES COLLECTED |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | TD= 9.5' | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW-19

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-19




Sampled

**NOTES:**

PIEZOMETER NO.: INT-C/GW-19

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | |
| PROJ. NO.: 825635 | |
| INITIATOR: C. WILLIAMS | |
| PROJ. MGR.: SPANGBERG | |
| DRAFT. CHCK. BY: C. TUMLIN | |
| ENGR. CHCK. BY: C. WILLIAMS | |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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# HTRW DRILLING LOG

| | |
|---|---|
| District | USACE Nashville |
| Hole Number | TNT-C/GW-20 |
| Company Name | IT Corporation |
| Drilling Subcontractor | Pro Sonic |
| Sheet / Sheets | 1 of 2 |
| Project | PBOW |
| Location | TNT Area C, Bldg 683 (Downgradient) |
| Name of Driller | Fred Herzog |
| Manufacturer's Designation of Drill | GeoProbe 66DT |
| Sizes and Types of Drilling and Sampling Equipment | GeoProbe 66 DT 3 3/4" Probe; 2" PVC Sch 40 Piezometer |
| Northing | 620516.74 |
| Easting | 1912868.10 |
| NAD | 1983 |
| NGVD | 1929 |
| Surface Elevation | 650.61 Ft |
| Date Started | 8/1/01 |
| Date Completed | 8/1/01 |
| Overburden Thickness | 8.5' |
| Depth to Bedrock | 8.5' |
| Depth Groundwater Encountered | NA |
| Depth Drilled into Rock | 0' |
| Depth to Water and Elapsed Time After Drilling Completed | Dry 8/6/01 0844 |
| Total Depth of Hole | 8.5' |
| Other Water Level Measurements (Specify) | — |

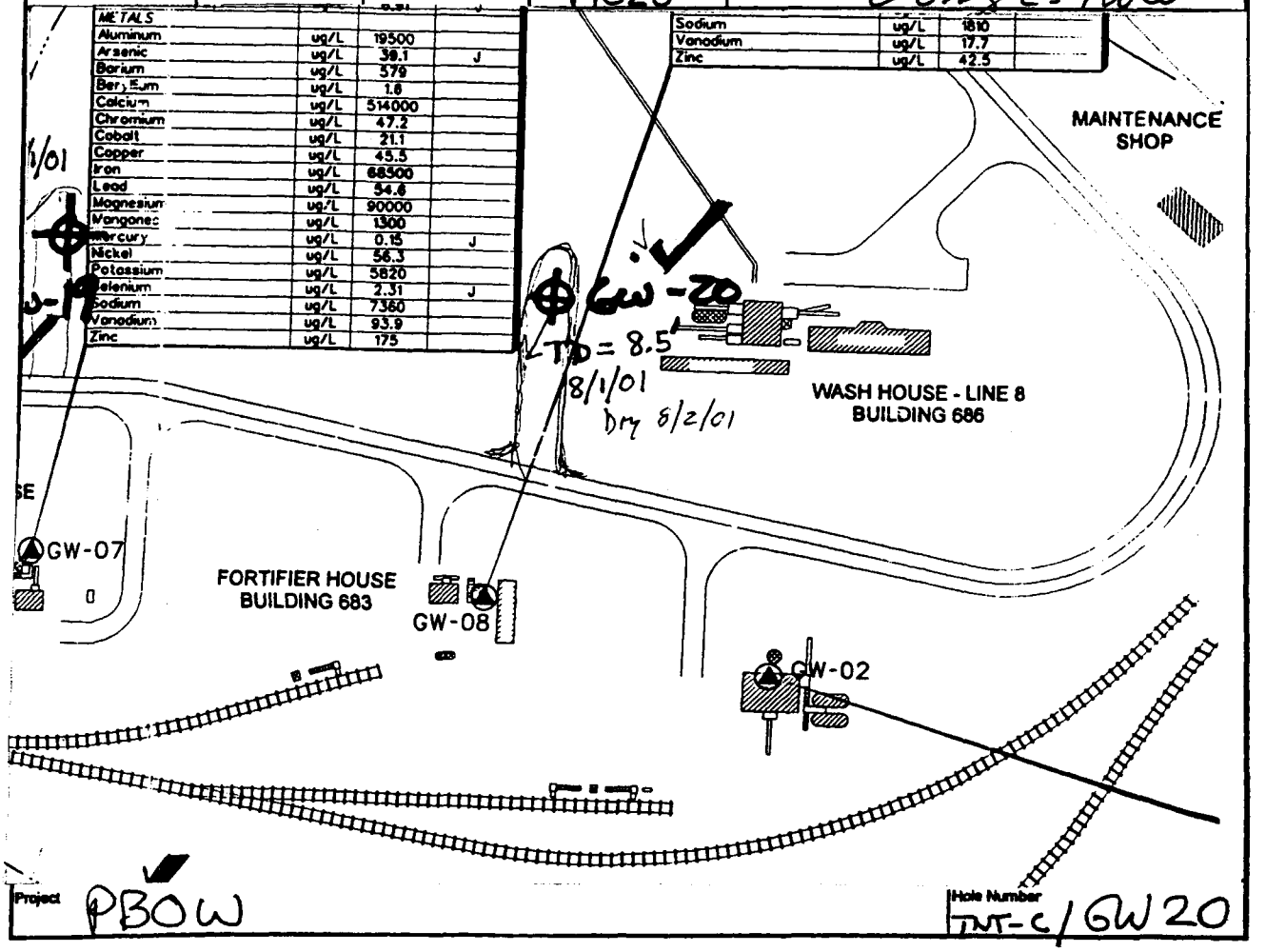
| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| — | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| — | | | PIEZO | Tom E. Nolen |

| METALS | | | |
|---|---|---|---|
| Aluminum | ug/L | 19500 | |
| Arsenic | ug/L | 38.1 | J |
| Barium | ug/L | 579 | |
| Beryllium | ug/L | 1.6 | |
| Calcium | ug/L | 514000 | |
| Chromium | ug/L | 47.2 | |
| Cobalt | ug/L | 21.1 | |
| Copper | ug/L | 45.5 | |
| Iron | ug/L | 68500 | |
| Lead | ug/L | 54.6 | |
| Magnesium | ug/L | 90000 | |
| Manganese | ug/L | 1300 | |
| Mercury | ug/L | 0.15 | J |
| Nickel | ug/L | 56.3 | |
| Potassium | ug/L | 5820 | |
| Selenium | ug/L | 2.31 | J |
| Sodium | ug/L | 7360 | |
| Vanadium | ug/L | 93.9 | |
| Zinc | ug/L | 175 | |

| | | | |
|---|---|---|---|
| Sodium | ug/L | 1810 | |
| Vanadium | ug/L | 17.7 | |
| Zinc | ug/L | 42.5 | |




Project PBOW

Hole Number TNT-C/GW20

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW20

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

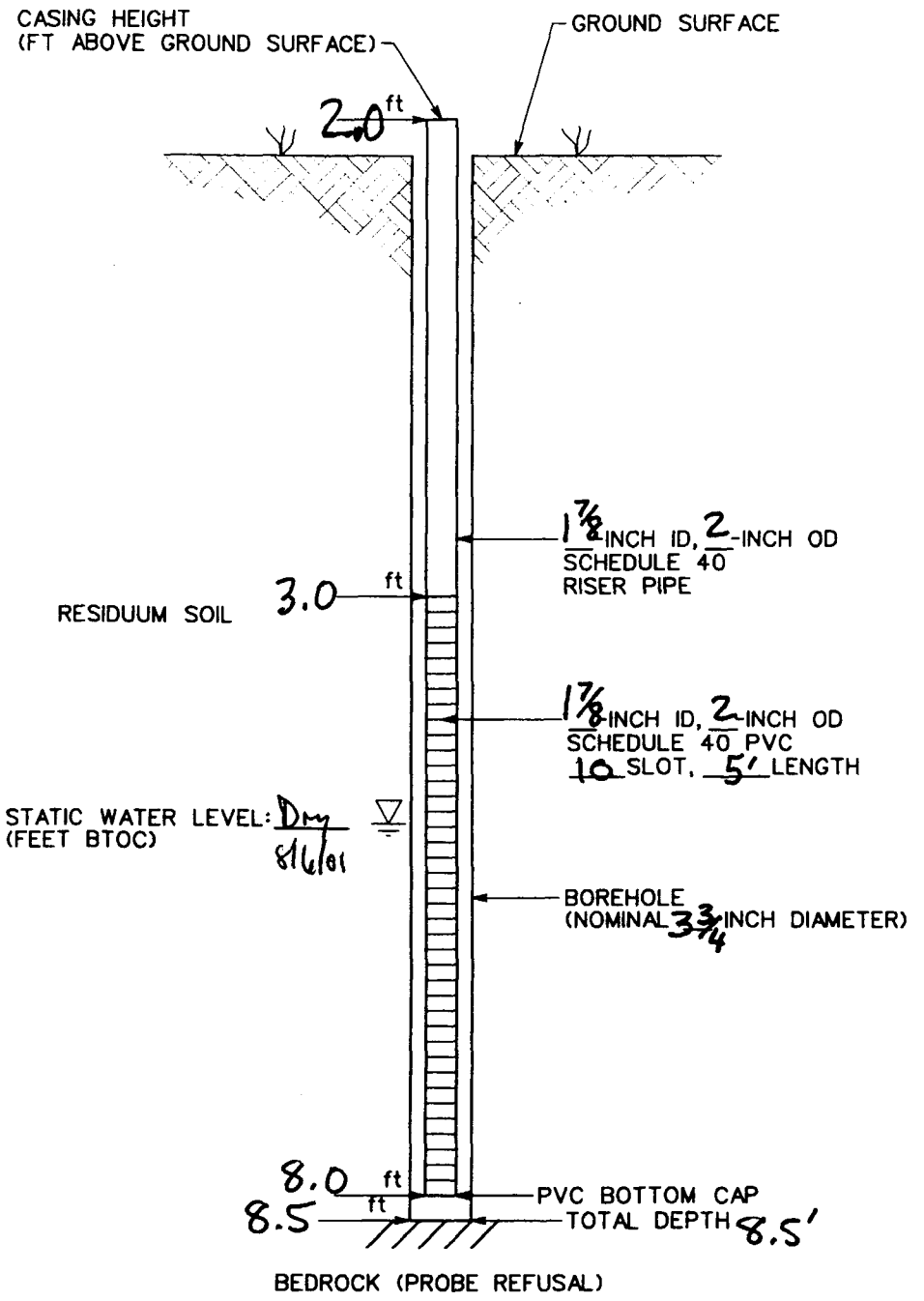
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NM | Begin DPT |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" PVC Sch 40 temp Piezometer |
| | 3 | | | | | | | |
| | 4 | | | | | | | No Lithologic Samples Collected |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | TD = 8.5' | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW-20

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C/GW-20




**NOTES:**

PIEZOMETER NO.: TNT-C/GW20

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | |
|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.:\825635ES.016 |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 |

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07/30/01

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| HTRW DRILLING LOG | District: USACE Nashville | Hole Number: TNT-C/GW-22 |
|---|---|---|
| Company Name: IT Corporation | Drilling Subcontractor: ProSonic | Sheet 1 of 2 Sheets |
| Project: PBOW | Location: TNT Area C, Bldg 622 | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: GEOPROBE 66DT | |
| Sizes and Types of Drilling and Sampling Equipment: GEOPROBE 66DT 3 3/4" PROBE 2" PVC Sch 40 PIEZOMETER | Northing: 620004.91 Easting: 1910543.65 NAD: 1983 NGVD: 1929 | |
| | Surface Elevation: 667.56 Ft | |
| | Date Started: 8/1/01 Date Completed: 8/1/01 | |
| Overburden Thickness: 5' Depth to Bedrock: 5' | Depth Groundwater Encountered: N/A | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0921 | |
| Total Depth of Hole: 5' | Other Water Level Measurements (Specify): | |

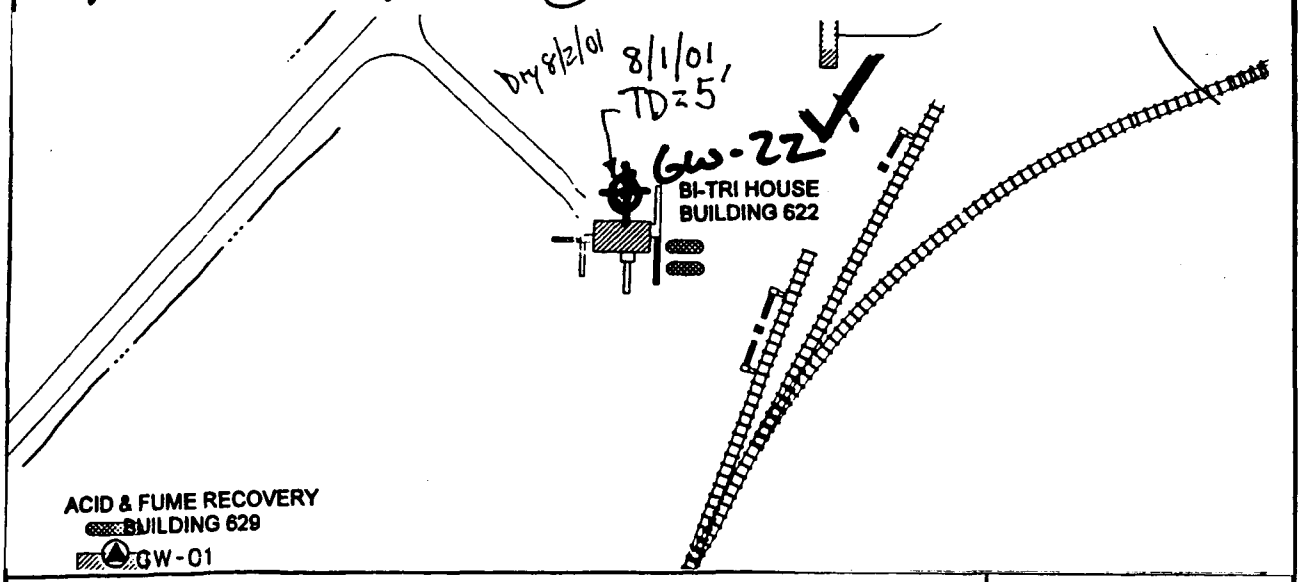
| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| NA | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | | Piezo | Tony E. Nolan |

Location Sketch/Comments — Scale: (not to scale)

Moved borehole 15' WNW of original location because of rock ledge/or rubble/debris; 1st try only reached 2.5' total depth. Move was downslope off the "knee" of the ~~ledge~~ TN ledge.




| Project: PBOW | Hole Number: TNT-C GW-22 |
|---|---|

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/ GW-22

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | Inserted 2" PVC Sch 40 Piezometer |
| | 2 | | | | | | | |
| | 3 | | | | | | | No Lithologic Samples |
| | 4 | | | | | | | |
| | 5 | TD = 5' | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

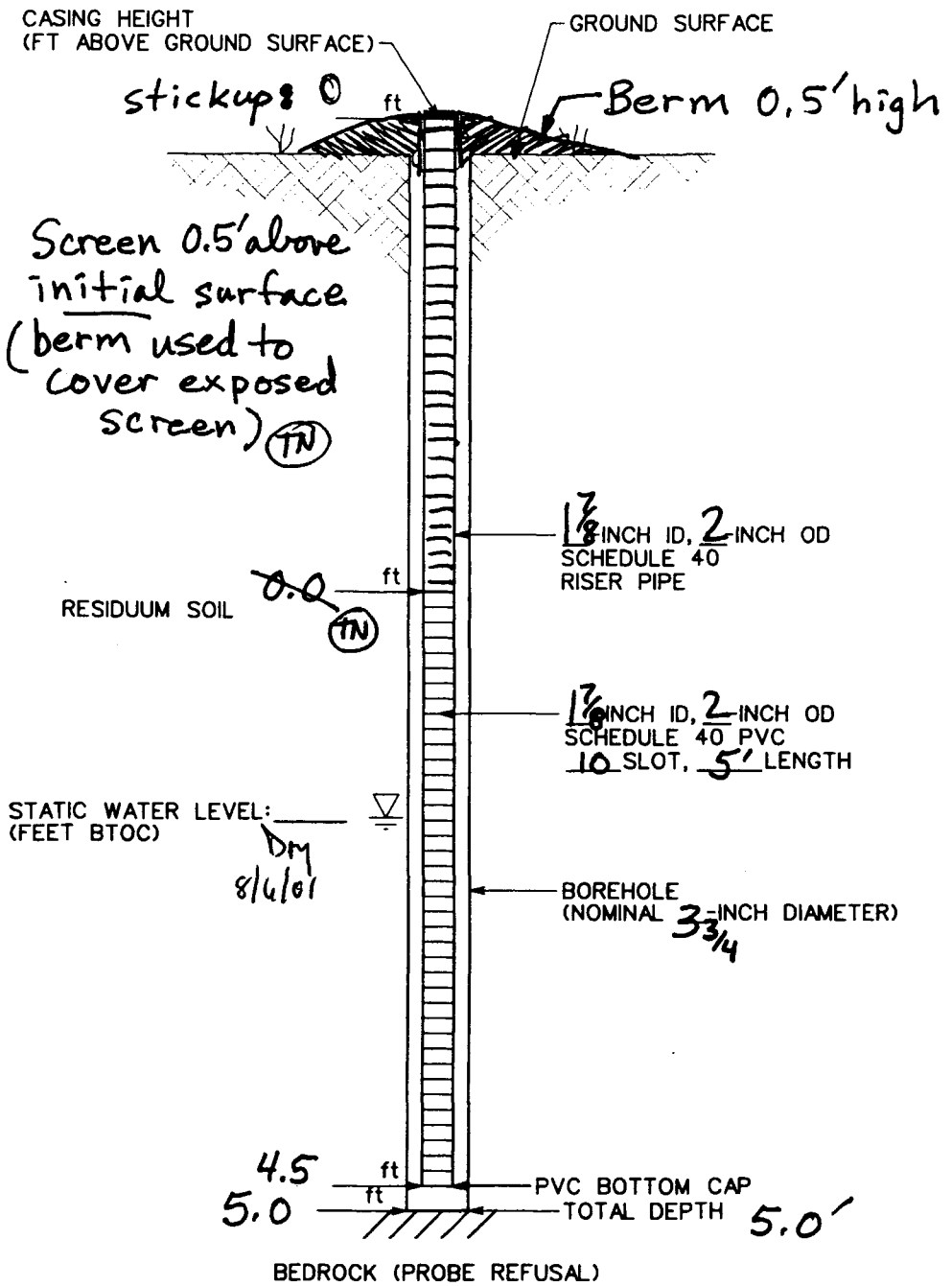
Project: PBOW

Hole Number: ~~TNT-C~~ ~~B~~ ~~GW-21~~

GW-22

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: INT-C/GW-22




**NOTES:**

PIEZOMETER NO.: INT-C GW-22

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/4/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | DRAWN BY: |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

10:02:05 07/30/01

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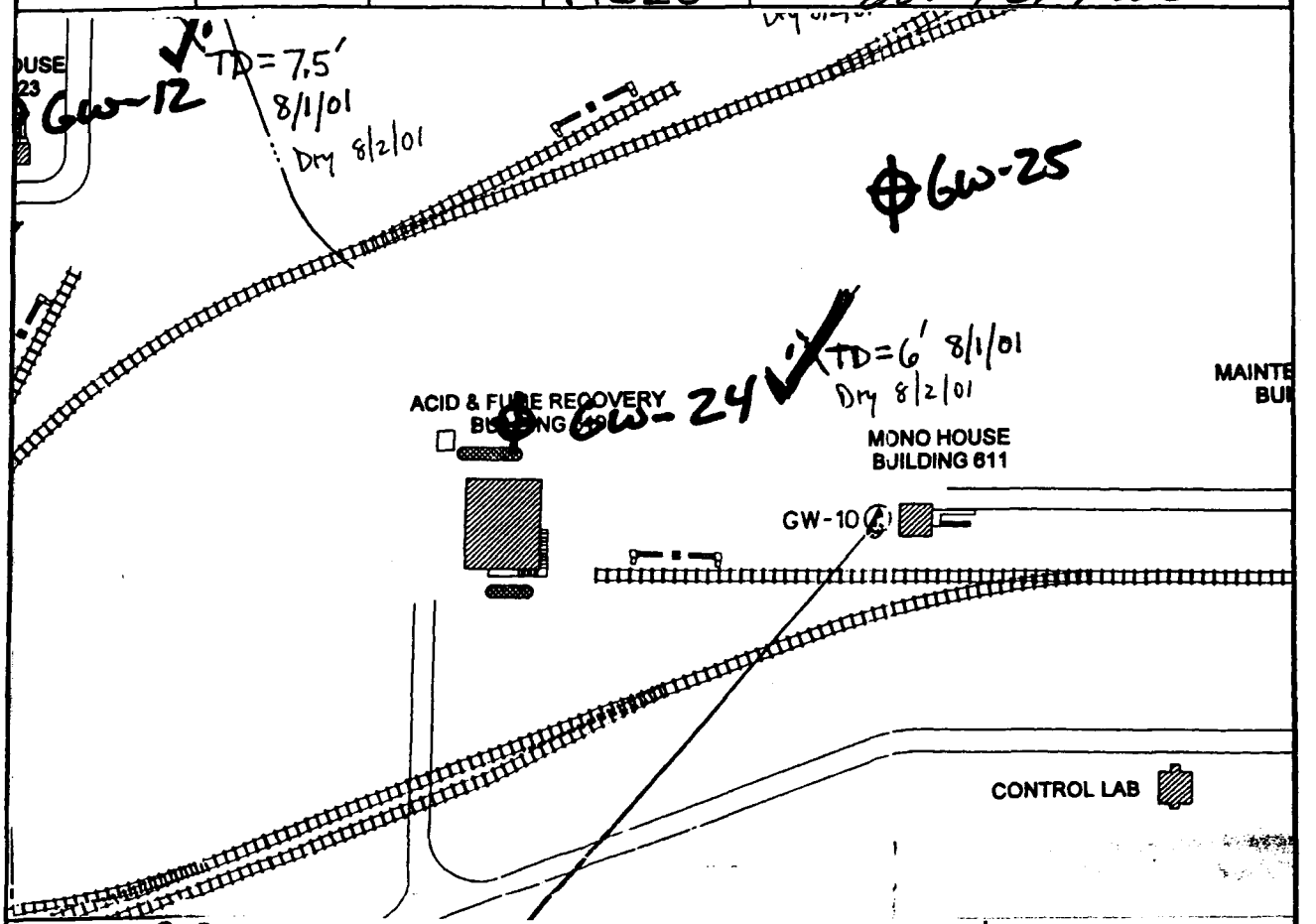
# HTRW DRILLING LOG

| | | | |
|---|---|---|---|
| District: USACE Nashville | | Hole Number: TNT-C GW24 | |
| Company Name: IT Corporation | Drilling Subcontractor: ProSonic | Sheet 1 of 2 Sheets | |
| Project: PBOW | Location: TNT Area C, Bldg 619 | | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: 66DT GeoProbe | | |
| Sizes and Types of Drilling and Sampling Equipment: 66 DT GeoProbe 3 3/4" Probe | Northing: 619961.51 | Easting: 1910900.21 | NAD 1983 / NGVD 1929 |
| | Surface Elevation: 673.99 Ft | | |
| | Date Started: 8/1/01 | Date Completed: 8/1/01 | |
| Overburden Thickness: 6' | Depth to Bedrock: 6' | Depth Groundwater Encountered: NA | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0927 | | |
| Total Depth of Hole: 6' | Other Water Level Measurements (Specify): | | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| NA | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | — | — | Piezo | Tony E. Nolan |




Project: PBOW

Hole Number: TNT-C / GW-24

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# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-24

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

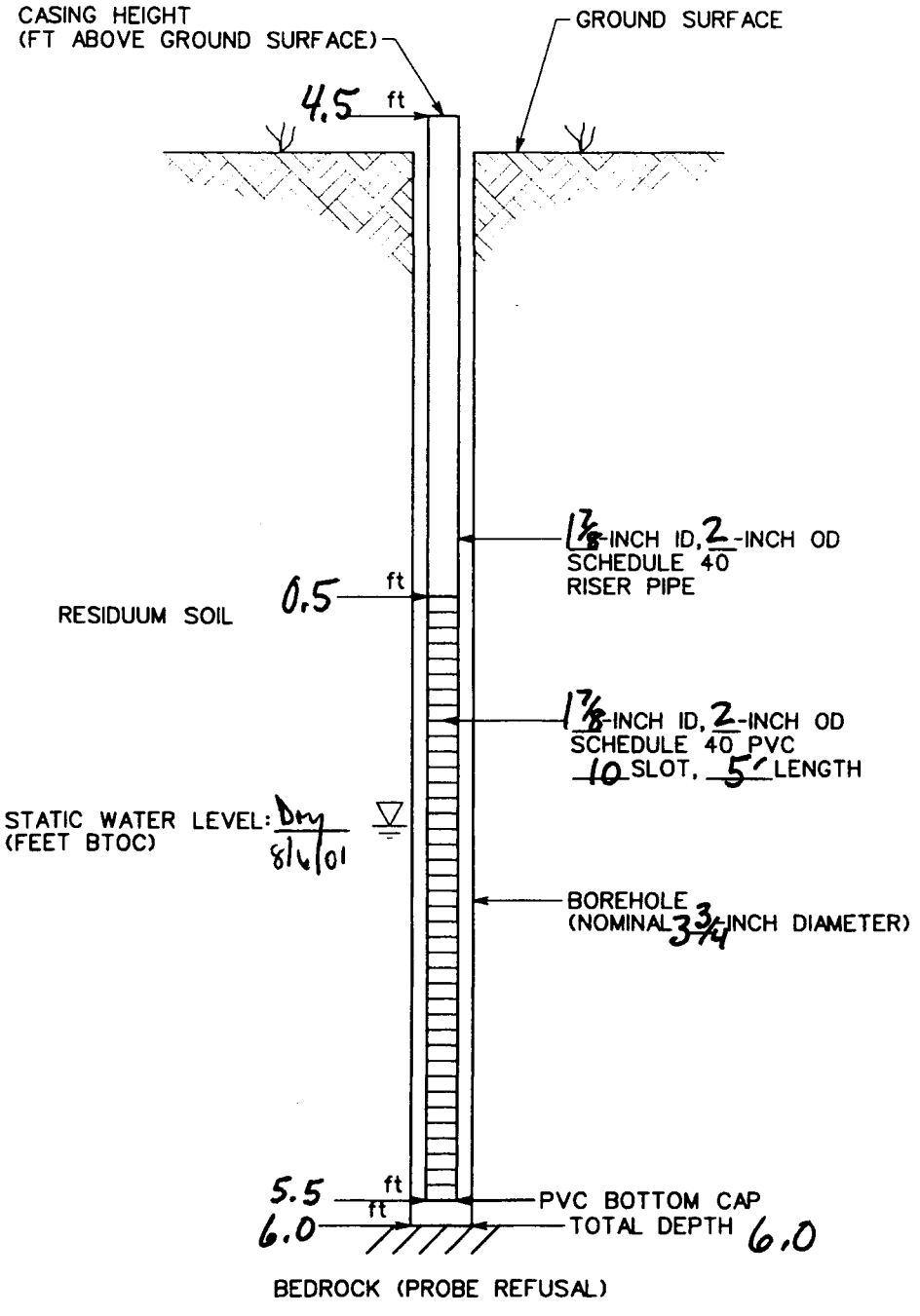
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Unit | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | Inserted 2" PVC Sch 40 temp. Piezometer |
| | 2 | | | | | | | |
| | 3 | | | | | | | No Lithologic Samples |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | TD=6' | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C GW24

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C/GW-24




**NOTES:**

PIEZOMETER NO.: TNT-C GW-24

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

**PIEZOMETER CONSTRUCTION DIAGRAM**

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | |
| PROJ. NO.: 825635 | |
| INITIATOR: C. WILLIAMS | |
| PROJ. MGR.: SPANGBERG | |
| DRAFT. CHCK. BY: C. TUMLIN | |
| ENGR. CHCK. BY: C. WILLIAMS | |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | |
| DRAWN BY: B. VANDERGRIFF | |

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07/30/01

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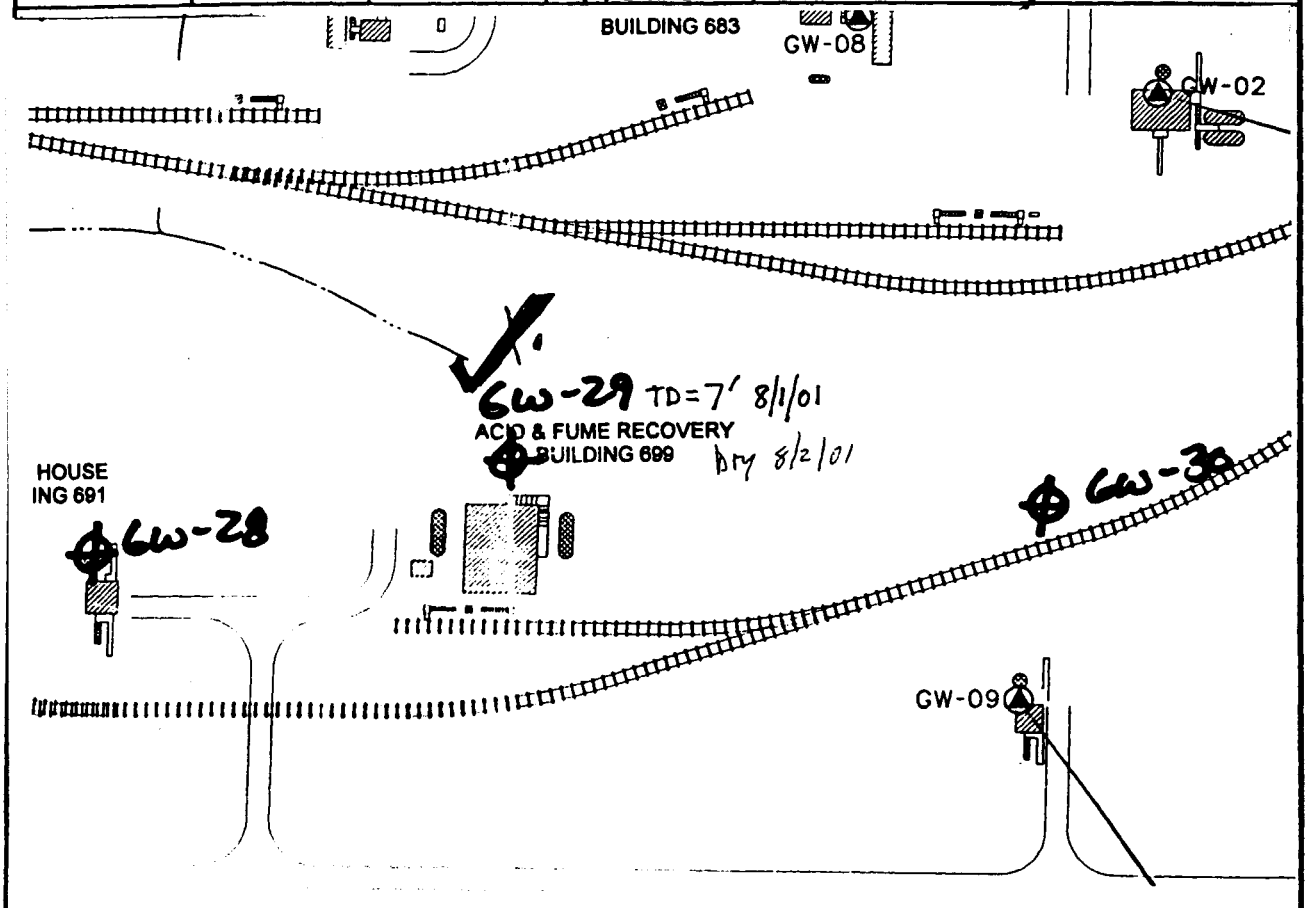
| HTRW DRILLING LOG | District: USACE Nashville | Hole Number: TNT-C/GW29 |
|---|---|---|
| Company Name: IT Corporation | Drilling Subcontractor: ProSonic | Sheet 1 of 2 Sheets |
| Project: PBOW | Location: TNT Area C, Bldg 699 | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: GeoProbe 66 DT | |
| Sizes and Types of Drilling and Sampling Equipment: GeoPROBE 66DT | Northing: 619944.63 / Easting: 1912604.50 / NAD: 1983 / NGVD: 1929 | |
| | Surface Elevation: 675.09 Ft | |
| | Date Started: 8/1/01 | Date Completed: 8/1/01 |
| Overburden Thickness: 7.0' / Depth to Bedrock: 7.0' | Depth Groundwater Encountered: N/A | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0932 | |
| Total Depth of Hole: 7.0' | Other Water Level Measurements (Specify): — | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | | | Piezo | Tony E. Nolen |




| Project: PBOW | Hole Number: TNT-C/GW29 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C/GW-29

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

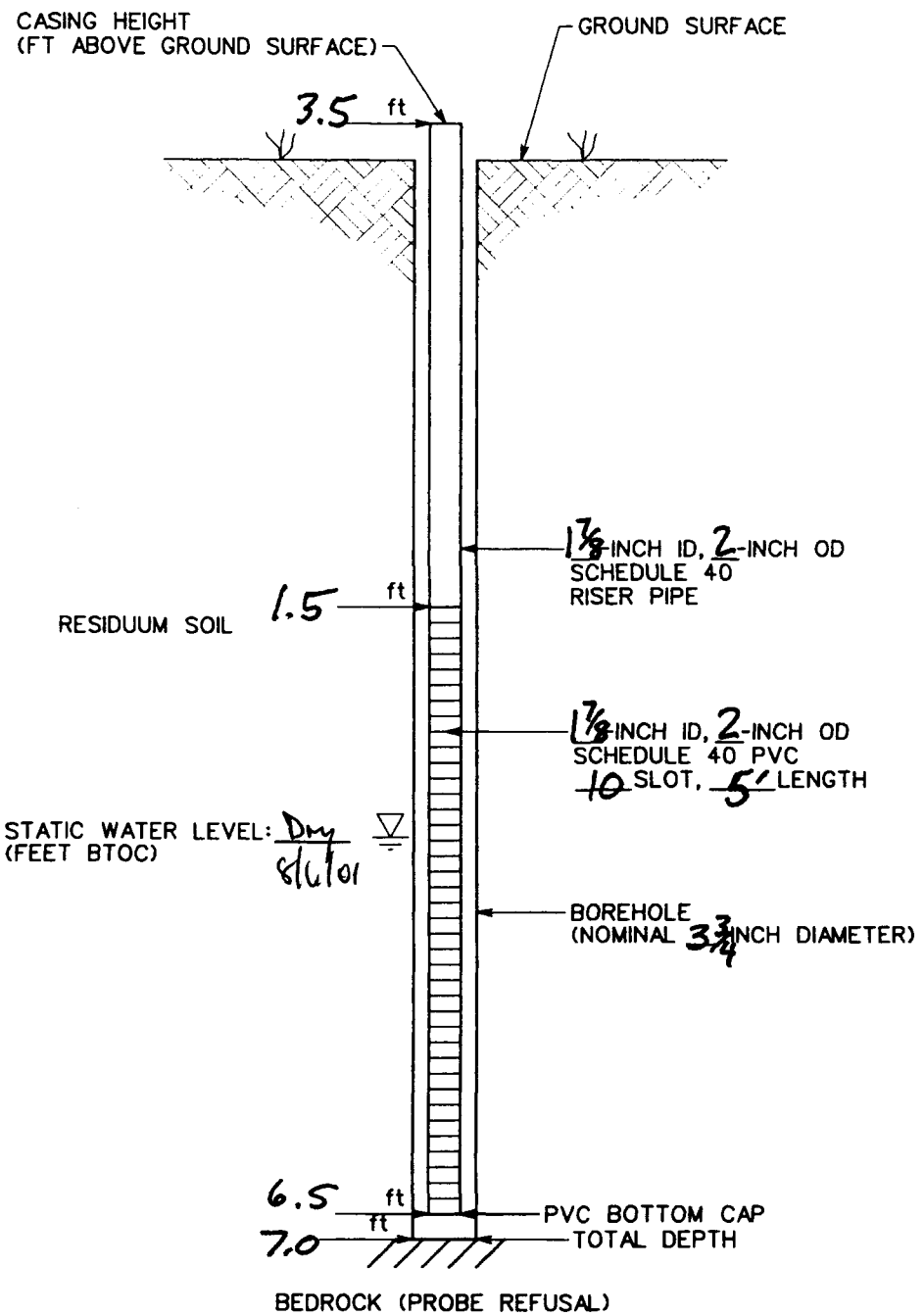
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | 2 | | | | | | | Inserted 2" Sch 40 PVC temp Piezometer |
| | 3 | | | | | | | No Lithologic Samples Collected |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | TD = 7' | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW29

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C/GW-29




**NOTES:**

PIEZOMETER NO.: TNT-C/GW-29

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | | | | | |
|---|---|---|---|---|---|
| STARTING DATE: 07/23/01 | DATE LAST REV.: | DRAFT. CHCK. BY: C. TUMLIN | INITIATOR: C. WILLIAMS | DWG. NO.: \825635ES.016 | |
| DRAWN BY: B. VANDERGRIFF | DRAWN BY: | ENGR. CHCK. BY: C. WILLIAMS | PROJ. MGR.: SPANGBERG | PROJ. NO.: 825635 | |

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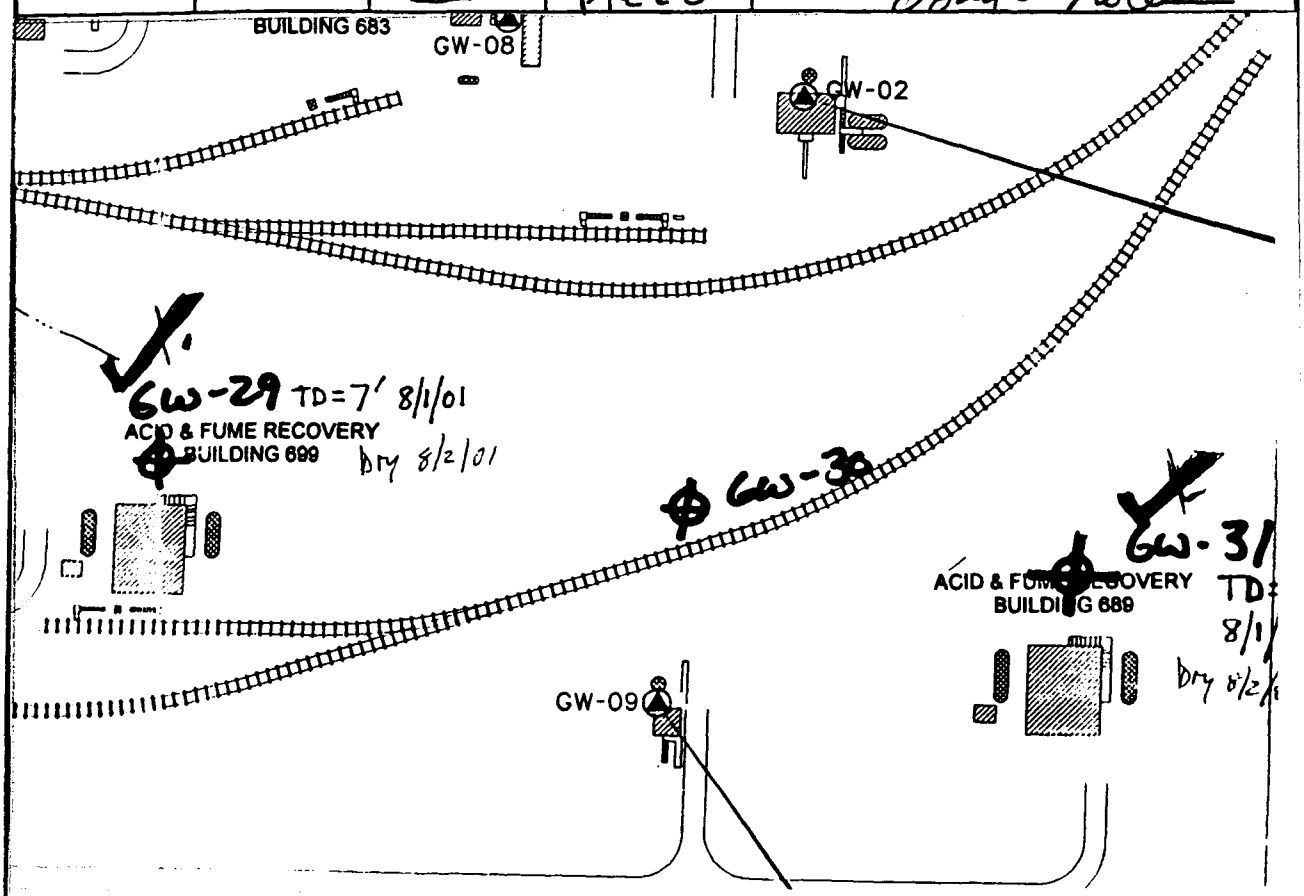
| HTRW DRILLING LOG | District: USACE Nashville | Hole Number: TNT-C/GW-31 |
|---|---|---|
| Company Name: IT Corporation | Drilling Subcontractor: Pro Sonic | Sheet 1 of 2 Sheets |
| Project: PBOW | Location: TNT Area C, Bldg 689 | |
| Name of Driller: Fred Herzog | Manufacturer's Designation of Drill: ~~ProSor~~ GeoProbe 66DT | |
| Sizes and Types of Drilling and Sampling Equipment: GEOPROBE 66DT | Northing: 619846.54 / Easting: 1913163.05 / NAD: 1983 / NGVD: 1929 | |
| | Surface Elevation: 673.35 Ft | |
| | Date Started: 8/1/01 | Date Completed: 8/1/01 |
| Overburden Thickness: 6' / Depth to Bedrock: 6' | Depth Groundwater Encountered: N/A | |
| Depth Drilled into Rock: 0' | Depth to Water and Elapsed Time After Drilling Completed: Dry 8/6/01 0936 | |
| Total Depth of Hole: 6' | Other Water Level Measurements (Specify): — | |

| Geotechnical Samples | Disturbed | Undisturbed | Total Number of Core Boxes |
|---|---|---|---|
| | NA | NA | NA |

| Samples for Chemical Analysis | VOC | Metals | Other | Other | Other | Total Core Recovery |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | NA |

| Disposition of Hole | Backfilled | Monitoring Well | Other | Signature of Geologist |
|---|---|---|---|---|
| | — | — | PIEZO | Tony E. Nole |




| Project: PBOW | Hole Number: GW-31 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNT-C GW31

Project: PBOW

Geologist: T. Nolen

Sheet 2 of 2 Sheets

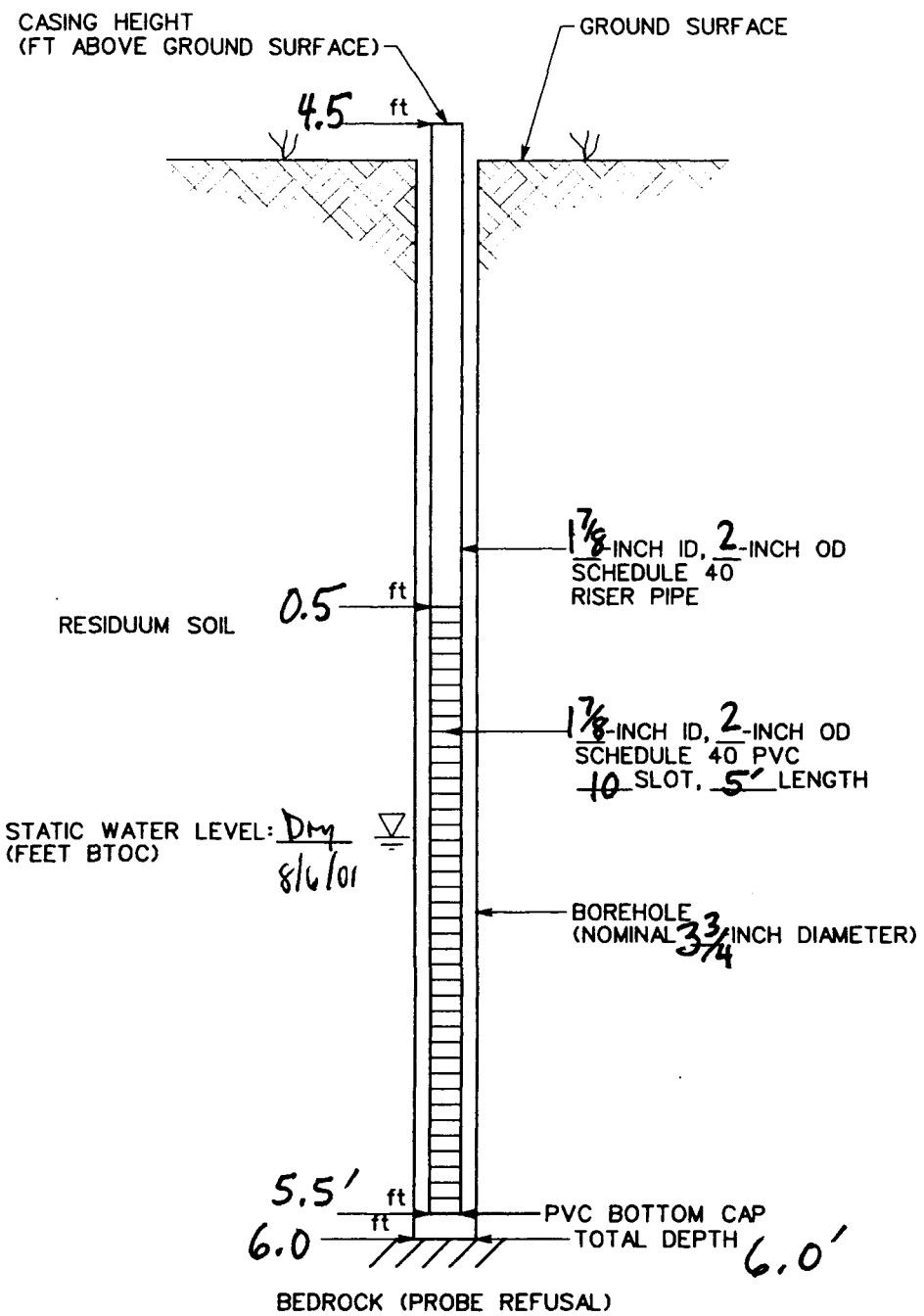
| Elev (ft) | Depth (ft) bgs | Description of Materials | Uscs/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | NM | N/A | NA | NA | Begin DPT |
| | 1 | | | | | | | |
| | | | | | | | | Insert 2" Sch 40 PVC Piezometer |
| | 2 | | | | | | | |
| | | | | | | | | No Lithologic Samples Collected. |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | TD=6' | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNT-C/GW31

# TYPICAL SHALLOW PIEZOMETER CONSTRUCTION DIAGRAM ABOVE GROUND COMPLETION

LOCATION: TNT-C/GW-31




**NOTES:**

PIEZOMETER NO.: TNT-C/GW-31

DATE INSTALLED: 8/1/01

DATE REMOVED: 8/6/01

PIEZOMETER CONSTRUCTION DIAGRAM

*prepared for:*
*USACE - NASHVILLE*
*PLUMBROOK ORDNANCE WORKS*

NOT TO SCALE

IT CORPORATION
*A Member of The IT Group*

| | |
|---|---|
| DWG. NO.: \825635ES.016 | PROJ. NO.: 825635 |
| INITIATOR: C. WILLIAMS | PROJ. MGR.: SPANGBERG |
| DRAFT. CHCK. BY: C. TUMLIN | ENGR. CHCK. BY: C. WILLIAMS |
| DATE LAST REV.: | |
| DRAWN BY: | |
| STARTING DATE: 07/23/01 | DRAWN BY: B. VANDERGRIFF |

10:02:05 07/30/01

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# 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:** PB080020 1STL

*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. Neal D. Tendel

**QC Partners:**

(TB) TB080201 (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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
temp: 18.36
Dep: 28.5
SAL: 0.04
TDS: 0.56

σ to 0
ORP: -131

*Logged BY / Date:* 8-1-01

*Reviewed BY / Date:* 08/01/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE W

**Manager:** Mike Spangberg

**RFA / COC Number:** PB08-01STL

*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~~ 10.5' TD

*Sample Matrix:* WATER

*Sample Team:* Sheldon McLeod, Dave Tindell

**QC Partners:**

(TB) TRIP BLANK 080101 (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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

σt = 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:** PBOB-06STL

*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#:*

**Containers**

| 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" ~~play~~ 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 Kessler

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

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE W

**Manager:** Mike Spangberg

**RFA / COC Number:** PB08-0155L

*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 Tinde

**QC Partners:**

(TB) TB 080101 (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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

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

ot = 0

ORP = 50 mV

time : 15:33

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

*Reviewed BY / Date:* 08/10/2

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:* 16:20

*Start Depth:* ~~6.84~~ ~~2.39~~ 6.38

*End Depth:* 9.39

*Sample Matrix:* WATER

*Sample Team:* Sheldon McLeod/David Tindell

**QC Partners:**

(TB) TB080101 (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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
ot = 0
ORP = -10

*Logged BY / Date:* [signature] 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#:*

**Containers**

| 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 = 6.73 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

Ot = 0

ORP (mV) = 281

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

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW09275TL-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#:*

**Containers**

| 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:** PBOW 0927 STL-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#:* _____

**Containers**

| 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:**

Bentonite 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 Krebs

**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 |

**Comments:**

PRWP

**Sketch Location:**

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

*Reviewed BY / Date:* David Krebs 9/27/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PB092601 SFLN

*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 Keesler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:**

Pentolite Rd Redwater Pond

**Sketch Location:**

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

*Reviewed BY / Date:* David Keesler 9/26/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PB092605FL N

*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 | 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:**

PRRWP

**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:** PB092601SCLN

*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#:* —

**Containers**

| 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:** PB092601SFLN

*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

*Collection Date:* 9-26-01

*Collection Time:* 15:35

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

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

*Sample Matrix:* SOIL

*Sample Team:* H Adams / D Kessler

**QC Partners:**

(TB) (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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

**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-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 | 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:**

PRRWP - DP11

**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:** PB092601STLN

*Location Code:* TNTA-SO012A

*Sample Number:* BD0007

*Sample Name:* PBOW-01-SO-TNTA-SO012-BD0007-(00-00) 0.5-1.5

*Sampling Method:* DP

*Sample Type:* SO *Sample Purpose:* REG

*Collection Date:* 9-26-01

*Collection Time:* 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#:*

**Containers**

| 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 195

**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

*Sample Name:* PBOW-01-SO-TNTA-SO012-BD0008-(00-00) 4-6

*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#:*

**Containers**

| 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 195

**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:** PB092601 55LN

*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#:* _____

**Containers**

| 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:** PB092601 STLN

*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 KESSLER

**QC Partners:**

(TB) (ER) (FB)

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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-01~~ PB092601SOL 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 | 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:**

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 SSL-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#:*

**Containers**

| 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:**

Rec'l. 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 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:* 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 Kerler

**QC Partners:**

(TB) (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 Kerler 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-(5809)

*Sample Number:* BD0015

*Sample Name:* PBOW-01-SO-TNTB-SS375-BD0015-(00-00)

*Sampling Method:* DP

*Sample Type:* SO

*Sample Purpose:* REG

*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#:* _____

**Containers**

| 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:** PBOW0927SCL-K

*Location Code:* TNTB-SS375A(5809)

*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:* ~~4.0~~ 8

*End Depth:* ~~6.0~~ 10

*Sample Matrix:* SOIL

*Sample Team:* H Adams / D Kessler

**QC Partners:**

(TB) (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 092755L-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#:*

**Containers**

| 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 STL-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

*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#:* _____

**Containers**

| 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 0928 SFL-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#:* _____

**Containers**

| 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#:*

**Containers**

| 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:** PBOW 0928 SSL-1R

*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 | 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:**

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:** PBOW0928STL-1K

*Location Code:* TNTC-SO123A

*Collection Date:* 9-28-01

*Sample Number:* BD0021

*Collection Time:* 16:25

*Sample Name:* PBOW-01-SO-TNTC-SO123-BD0021-(00-00)

*Start Depth:* 4

*Sampling Method:* DP

*End Depth:* 6

*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#:*

**Containers**

| 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 Kessler 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW 092835L-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 Kerr

**QC Partners:**

(TB) (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

| Analytical Suite | Containers 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 Kerr 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW092751

*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:* H Adams / D. Kerch

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:**

~~For sample collected @ same time.~~

HRA

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

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW092751L-K

*Location Code:* WARP-DP09A

*Sample Number:* BD0024

*Sample Name:* PBOW-01-SO-WARP-DP09-BD0024-(00-00)

*Sampling Method:* DP

*Sample Type:* SO *Sample Purpose:* REG

*Collection Date:* 9-27-01

*Collection Time:* 16:36

*Start Depth:* 11

*End Depth:* 12

*Sample Matrix:* SOIL

*Sample Team:* DK/HA

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:**

Field Split BD0032 was collected with this sample.

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

*Reviewed BY / Date:* David Kash 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:* 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#:* _____

**Containers**

| 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. Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:** 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 Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:** PBOW092752-1K

*Location Code:* WARP-DP13A

*Sample Number:* BD0028

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

*Sampling Method:* DP

*Sample Type:* SO

*Sample Purpose:* REG

*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 Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:** PBOW 092855L-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:* HAdams / D Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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 STL-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

*Collection Date:* 9-28-01

*Collection Time:* 13:25

*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#:* _____

**Containers**

| 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 9/28/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100201STL-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:* 09:45

*Start Depth:* 2.5

*End Depth:* 3.4

*Sample Matrix:* SOIL

*Sample Team:* H Adams / D Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:** PBOW 100201 SEL-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 Kesler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:** PBOW10020155L-1K

*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

*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 Kosta

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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 Kosta 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100201SR2-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#:* _____

**Containers**

| 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:** PBOW-00201 SR2-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 Kessler

**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 Kessler 10/2/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW00201STL-K

*Location Code:* **WARP-DP16** A

*Sample Number:* **BD0029** R

*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:** PBOW100201SFL-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:* H Adams / D Kessler

**QC Partners:**

(TB) _____ (ER) _____ (FB) _____

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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

# 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

*Collection Date:* 9/27/01

*Sample Number:* BD30

*Collection Time:* 1040

*Sample Name:* PBOW-01-GW- -(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#:*

**Containers**

| 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 Kesah 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 Kessler 9/27

INTERNATIONAL TECHNOLOGY CORPORATION

D&Y



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** _____

*Location Code:* MK-MW16

*Sample Number:* BD3011

*Sample Name:* PBOW-01-GW-MK-MW16-BD3011-(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#:* _____

**Containers**

| 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 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 1-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#:*

**Containers**

| 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 Used

**Sketch Location:** ~~See back OKK~~

*Logged BY / Date:* [illegible] 10/10/01 *Reviewed BY / Date:* David Kesh 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) |
|---|---|---|---|---|---|---|---|---|---|
| NT | 1145 | 5.24 | | | | | | | |
| | 1200 | 5.27 | 82 | 4.90 | 0.95 | 17.2 | 0.0 | 16.54 | ~200ml/min |
| | 1205 | 5.27 | 69 | 5.38 | 0.95 | 14.1 | 0.0 | 16.44 | |
| | 1210 | 5.27 | 75 | 5.34 | 0.96 | 12.3 | 0.0 | 16.45 | |
| | 1215 | 5.27 | 76 | 5.20 | 0.96 | 7.3 | 0.0 | 16.38 | |
| | 1220 | 5.27 | 80 | 5.19 | 0.95 | 6.4 | 0.0 | 16.53 | |
| | 1225 | 5.27 | 79 | 5.12 | 0.96 | 6.9 | 0.0 | 16.54 | |
| | 1230 | 5.27 | | | | | | | |
| NT 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 Kessler 10/2/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**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. Sirek
**Reviewed By:** David Kirsch

**Sample Number:** PBOW – 01 – GW – MKMW – 17BD3 – 012000 – 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 (TOW)
**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 / 0
**- Reading (ppm):** — / 1
**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 | | | | | | | | | |
| Purge Vol 4 | | | | | | | | | |
| Purge Vol 5 | | | | | | | | | |
| SAMPLE | | | | | | | | | |

Low Flow

## 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 | 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, no samples taken

**Sketch Location:**

*Logged BY / Date:* [signature] 10/01/01

*Reviewed BY / Date:* David Kessler 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) |
|---|---|---|---|---|---|---|---|---|---|
| | | D | R | g | | | | | |
| **Sample:** | | | | | | | | | |

*Logged BY / Date:* 10/01/01 *Reviewed BY / Date:* David Russell 10/6/

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

*Sample Number:* BD3034

*Sample Name:* PBOW-01-GW-PB-TNTA-MW11-BD3034-(0(

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10-03-01

*Collection Time:* 16:45

*Start Depth:* 12.0' TOC

*End Depth:* 12.91' TOC

*Sample Matrix:* WATER

*Sample Team:* HAdams / N Serik

**QC Partners:**

(TB) TB 100301A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

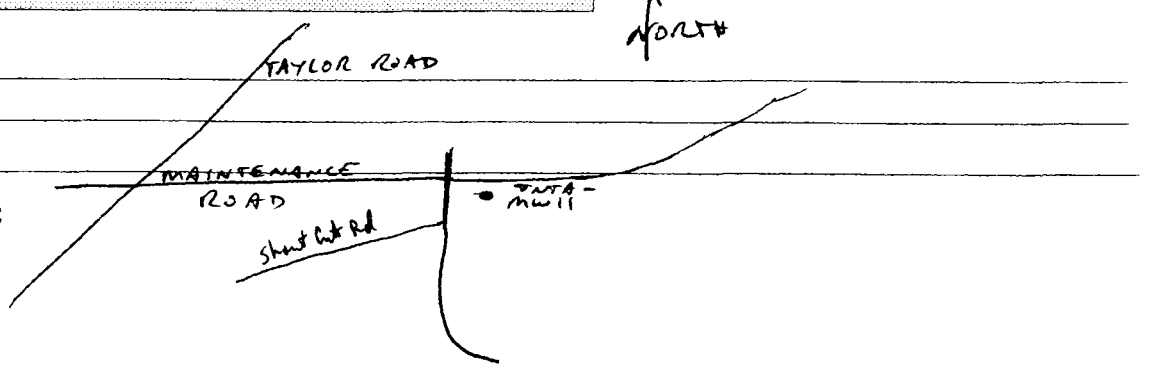
**Containers**

| Analytical Suite | Flt | Frtn | Qty | Size | Units | Type | |
|---|---|---|---|---|---|---|---|
| VOLATILES3 | N | A | 3 | 40 | mL | GVIAL,SEP | |
| SEMIVOLATILES3 | N | B | ~~2~~ 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 | ← KNOX |
| ~~HARDNESS~~ | ~~N~~ | ~~F~~ | ~~1~~ | ~~250~~ | ~~mL~~ | ~~HDPE~~ | |
| TOC | N | G | 2 | 40 | mL | GVIAL,SEP | ← NORTH CANTON |
| ~~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~~ | |

Incomplete bottle set was filled & submitted to lab

**Comments:**

**Sketch Location:**




*Logged BY / Date:* Hugh Adams 10/3/01

*Reviewed BY / Date:* David Kesch 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' | | | | | | | |
| | | | | | | | | | |
| Sample: | | | | | | | | | |

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, semivocs.

Collected: VOA's 3 40-ml vials
Nitro/SEmi 2 1l amber glass
Metals 1 HDPE
TOC's 2 40-ml vials

No field parameters were recorded for this location

Water was milky in appearance (NOT CLEAR)

Logged BY / Date: Hugh Adams 10/3/01 Reviewed BY / Date: David Kutch 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

*Collection Date:*

*Sample Number:* BD30

*Collection Time:*

*Sample Name:* PBOW-01-GW- -(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#:*

**Containers**

| 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 |

DM

**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

*Collection Date:* _____

*Sample Number:* **BD30**

*Collection Time:* _____

*Sample Name:* **PBOW-01-GW-** **-(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#:* _____

**Containers**

| 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: PBOW 100401 SEL-N 1-K

Location Code: TNTC-MW04

Sample Number: BD3043

Sample Name:

Sampling Method: LF

Sample Type: GW

Sample Purpose: REG

QC Partners:

(TB) TB100401A (ER) — (FB) —

Collection Date: 10-04-01

Collection Time: 10:45

Start Depth: ~~10'24' HOC~~ 16' TOC

End Depth: 16' TOC

Sample Matrix: WATER

Sample Team: H Adams / N. Sarik

ERPIMS Values:

Sacode:

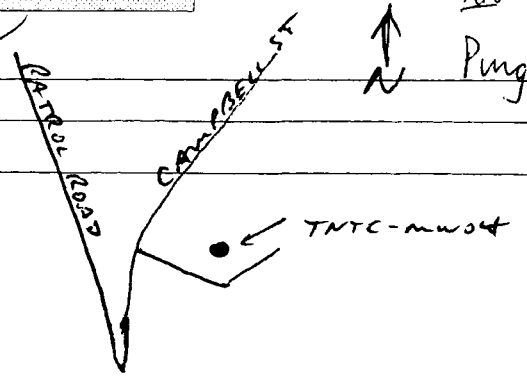
Lot Control#:

Containers

| 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 Kusak 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) |
|---|---|---|---|---|---|---|---|---|---|
| HOLA | 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 | ∅ |
| @ 100-1/min | | 10.87' | 8 | 7.03 | 2.26 | 44.6 | 0.69 | 14.12 | |
| | | 11.16 | -2 | 7.30 | 2.26 | 23.0 | 0.58 | 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 Kersh 10/4/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**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 NO otherwise
**Weather/Temp:** OVERCAST/SPRINKLES/64°F

**Form Completed By:** H. Adams
**Sampler(s):** Hugh Adams/Nick Sirek
**Reviewed By:** David Kistler

**Sample Number:** PBOW – 01 – GW – TNTC – MW04 – BD3043 – ___ – ___

## 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):** ~~0~~ 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.) |
|---|---|---|---|---|
| | | | | |

Not Kistler DRK

| Purge Cycle | Time (24 hr) | Depth to Water | Conductivity | pH | Eh | Temperature | Turbidity | Diss. $O_2$ | Purge Volume |
|---|---|---|---|---|---|---|---|---|---|
| Units: | | Feet | mmhos/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:** PBOW100301SRL-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' from TOC

*End Depth:* 31.20 from TOC

*Sample Matrix:* WATER

*Sample Team:* N. Sirck / H Adams

**QC Partners:**

(TB) TB100301A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

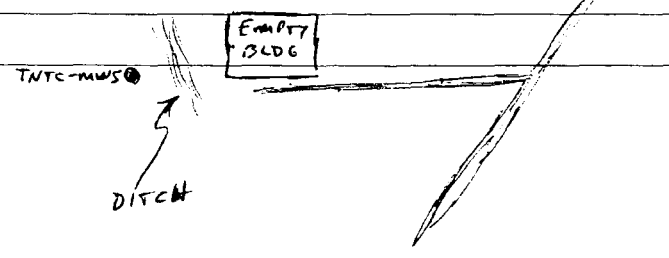
**Containers**

| 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 |

| | |
|---|---|
| pH | 6.14 |
| conductivity | 1.60 |
| Turbidity | 688 |
| DO | ~~3.12~~ 11.8 |
| Temp | 13.0°C |
| ORP | 59 mv |

**Comments:**

**Sketch Location:**




*Logged BY / Date:* Hugh Adams 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-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: David Kessler 10/3/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** ~~PBOW01A001SSL~~

*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. Sirk, R. Thompson

**QC Partners:**

(TB) ~~PBOW01A~~ (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

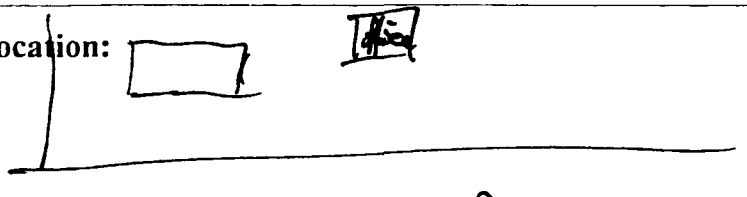
| Analytical Suite | Flt | Frtn | Qty | Size | Units | Type |
|---|---|---|---|---|---|---|
| VOLATILES3 | N | A | 3 | 40 | mL | GVIAL,SEP |
| SEMIVOLATILES3 | N | B | 2 | 1 | L | Amb. Glass |
| EXPLOSIVES | N | C | 1 | 1 | L | Amb. Glass |
| METALS3-W-F | Y | D | 1 | 500 | mL | HDPE |
| METALS3-W | 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 Kessler 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**

TD= ~~65~~ 67.64 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 Kersh 10/10/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:**
**RFA/COC Number:**

**Collection Date:**
**Collection Time:**
**Sample Filtered (Yes / No):**
**Weather/Temp:**

**Form Completed By:** D. Kessler
**Sampler(s):** D. Kessler, R. Thompson
**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:** AA/-BEDGW-001
**Well Secure (Yes / No):** yes
**Well Labeled (Yes / No):** NO
**Well Condition:** good – guard posts loose
**Screen Height:** 15'
**Casing Type:** PVC

**Outside Casing Dia. (in):** 2
**Depth to Product (ft):** ~~NA~~ 30.25
**Total Well Depth (ft):** 67.64
**Depth to Water (ft):** 30.88
**Water Column (ft):** 36.76
**Elev. Ref. for Water Level:**

**Odor:** Petroleum Odor
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 269 CO: 0 $H_2S$: Opp ~~LEL: OVR~~ $O_2$ = 20.9%
**Remarks:**

## 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:** PBOW100801SFL-K ; -N

*Location Code:* IT-AA2-BEDGW-001

*Sample Number:* BD3004

*Sample Name:* PBOW-01-GW-IT-AA2-BEDGW-001-BD3004

*Sampling Method:* LF

*Sample Type:* GW

*Sample Purpose:* REG

*Collection Date:* 10-8-01

*Collection Time:* 11:45

*Start Depth:* 36'

*End Depth:* 36'

*Sample Matrix:* WATER

*Sample Team:* H Adams / N. Sirook

**QC Partners:**

(TB) TB100801A (ER) (FB) MS/MSD

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

Pump placed @ 36' below TOC.

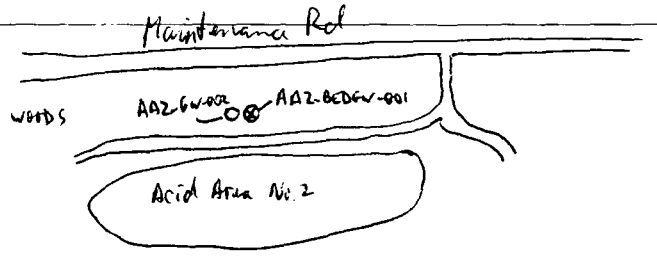
**Containers**

| 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 Sampled

**Sketch Location:**

N↑




*Logged BY / Date:* Hugh Adams 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:* **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 | 80.7 | 0.35 | 10.76 | |
| | 11:25 | 16.44 | -147 | 9.57 | 1.26 | ~~103~~ 100.0 | 0.07 | 10.69 | |
| | 11:30 | 16.50 | -143 | 9.47 | 1.26 | 64.3 | 0.05 | 10.67 | 3/4 GAL (3 l) |
| | 11:35 | 16.55 | -144 | 9.49 | 1.25 | 74.9 | 0.00 | 10.67 | < 1 gallon |
| | 11:40 | 16.65 | -144 | 9.49 | 1.24 | 76.4 | 0.00 | 10.65 | 1+ gallons |
| | BEGAN SAMPLING - FLOW RATE INCREASE TO ~300-400 ml/min | | | | | | | | |
| | 9 lambas, 2 l poly, 6 500-ml poly, 1 250 poly, 14 VOAs | | | | | | | | |
| | 11:50 | 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 *2 other coming from well PID = 8 ppm | | | | | | | |
| | 12:15 | 23.35 (ml) | -280 | 11.68 | 1.25 | 139.0 | 0.00 | 10.35 | |
| | 12:30 | 30.98 | -313 | 12.18 | 1.25 | 109.0 | 0.00 | 10.21 | |
| | 12:40 | 32.21 | -320 | 12.22 | 1.28 | 110.0 | 0.00 | 10.23 | |
| Sample: | 12:45 | 32.31 | -321 | 12.29 | 1.27 | 135.0 | 0.00 | 10.30 | |

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 Kesch 10/8/

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

| | | | | | |
|---|---|---|---|---|---|
| Project Number: | 825635 | Collection Date: | 10-8-01 | Form Completed By: | H. Adams |
| Project Name: | PBOW Groundwater | Collection Time: | 1245 | Sampler(s): | H. 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: | 1 |
| Well Condition: | GOOD | Depth to Water (ft): | 15.47' | - Reading (ppm): | 60 10,000,000 ppm |
| 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.) |
|---|---|---|---|---|
| | | | | |

| 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-BD3004

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* MS

*Collection Date:* 10-8-01

*Collection Time:* 11:45

*Start Depth:* 36'

*End Depth:* 36'

*Sample Matrix:* WATER

*Sample Team:* HA/NS

**QC Partners:**

(TB) TB 100801A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 Kesler 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-BD3004

*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 Sieck

**QC Partners:**

(TB) TB100801A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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 3004 - Reg

*Logged BY / Date:* Hugh Adams 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: PBOW0527SEL-K2-N

*Location Code:* IT-AA3-BEDGW-001

*Sample Number:* BD3005

*Sample Name:* PBOW-01-GW-IT-AA3-BEDGW-001-BD3005

*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) |
|---|---|---|---|---|---|---|---|---|---|
| M | ~~1535~~ | ~~28.08~~ M 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 | |
| | 1555 | 27.89 | -339 | 13.15 | 2.76 | 20.4 | 0.0 | 12.37 | |
| | 1600 | 27.80 | -334 | 13.01 | 2.74 | 19.7 | 0.0 | 12.07 | |
| | 1605 | 27.80 | -335 | 13.00 | 2.74 | 20.8 | 0.0 | 11.29 | |
| | 1610 | 28.21 | -341 | 13.12 | 2.75 | | | | |
| | ~~16~~ M 09/27/01 | | | | | | | | |
| | | | | | | | | | 12000 ~~10000~~ ml/min M 09/27/01 |
| **Sample:** | 1615 | 28.12 | -343 | 13.19 | 2.74 | 20.1 | 0.0 | 11.30 | ~~2.64~~ gal/min 3.168 |

28.23 After Sampling

*Logged BY / Date:* 09/27/01 *Reviewed BY / Date:* David Kessler 10/02/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** AA3
**RFA/COC Number:**

**Collection Date:** 09/27/01
**Collection Time:**
**Sample Filtered (Yes / No):** Metals only
**Weather/Temp:** Overcast 55°F

**Form Completed By:** R. Thompson
**Sampler(s):** R.T. / N. Sirek
**Reviewed By:**

**Sample Number:** PBOW – 01 – GW – TT – AA3 – BEDGW – 001 – B03005

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** AA3-BEDGW001
**Well Secure (Yes / No):**
**Well Labeled (Yes / No):**
**Well Condition:** Good
**Screen Height:** 10.0'
**Casing Type:** Sch. 40 PVC

**Outside Casing Dia. (in):** 2 in
**Depth to Product (ft):** —
**Total Well Depth (ft):** 53.0'
**Depth to Water (ft):** 28.88
**Water Column (ft):** 24.12
**Elev. Ref. for Water Level:** —

**Odor:** None
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** —
**- Reading (ppm):** PID 10.2 / VRAE
**Remarks:** $H_2S$ 16, $O_2$ 20.5, LEL 3
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

| 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:** PB092855L-IK ! -N

*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) TB092801A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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~~ | Stet |
| 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~~ | |

**Comments:** Low Flow Method

**Sketch Location:** See back

*Logged BY / Date:* [signature] 09/28/01 *Reviewed BY / Date:* David Kussin 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) |
|---|---|---|---|---|---|---|---|---|---|
| MT | 0835 | 7.22 | | | | | | | 2000 mL/min |
| | 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 | -100 | 8.59 | .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/min |

7.23 after sampling

Low Flow Method

*Logged BY / Date:* [signature] 07/27/01 *Reviewed BY / Date:* David Kessler 10/2

# GROUNDWATER SAMPLING FOR

IT CORPORATION
A Member of The IT Group

Project Number: 825635
Project Name: PBOW Groundwater
Investigation Site: ABG - BEDGW-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 Kuch

Sample Number: P B O W – 0 1 – G W – ____ – ____ – ____ – ____ – ____

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: ABG - BEDGW-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: — / 1
- 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 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 | | | | | | | | | |

LOW FLOW

## 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 STL-IC 1-N

*Location Code:* **IT-ABG-BEDGW-01**

*Sample Number:* **BD3006** R

*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. Kessler / R. Thompson

**QC Partners:**

(TB) TB100501A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

| Analytical Suite | Containers 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 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:* **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 | |
| Pump stopped Batteries low. ∴ Replaced | 1455 | 7.15 | -53 | 8.39 | 0.876 | 71.5 | 5.91 | 13.2 | 2.64 gal |
| | 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 | — shock 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 10/05/07 *Reviewed BY / Date:* David Kessler 10/5/07

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-BD3007**

*Sampling Method:* **LF**

*Sample Type:* **GW** *Sample Purpose:* **REG**

*Collection Date:* 09/27/01

*Collection Time:* 1220

*Start Depth:* 12.5

*End Depth:* 12.5

*Sample Matrix:* **WATER**

*Sample Team:* RT / NS

**QC Partners:**

(TB) — (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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:* Lyn Thompson 09/27/01

*Reviewed BY / Date:* David Kuase 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) |
|---|---|---|---|---|---|---|---|---|---|
| NA | 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 | -339 | 13.05 | 3.77 | 0.4 | 0.0 | 12.76 | |
| Sampled at 1220 | | | | | | | | | 9000 ml/m<br>2.38 gal/min |
| | | | | | | | | | 11250 ml/m |
| Sample: | 1220 | 6.45 | -339 | 13.03 | 3.75 | 0.0 | 0.0 | 12.65 | 2.97 gal/min |

6.45 After Sampling

Logged BY / Date: Thompson 09/27/01

Reviewed BY / Date: David Kessler 10/2/

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** BG8
**RFA/COC Number:**

**Collection Date:** 09/27/01
**Collection Time:**
**Sample Filtered (Yes / No):** Metals only
**Weather/Temp:** Partly Cloudy 50°F

**Form Completed By:** R. Thompson
**Sampler(s):** R.T. / N. Sirek
**Reviewed By:** David Kessler

**Sample Number:** PBOW – 01 – GW – IT – BG8 – BEDGW – 001 – BD3007

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** BG8-BEDGW-001
**Well Secure (Yes / No):**
**Well Labeled (Yes / No):** hardly readable
**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):** 6.0'
**Water Column (ft):** 14.0'
**Elev. Ref. for Water Level:** —

**Odor:** none
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** —
**- Reading (ppm):** PID 0.0; VRAE 24 LEL
**Remarks:** Low method O2 20

## 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:** PBOW100301SSC-IC 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#:*

**Containers**

| 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~~ DKK

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

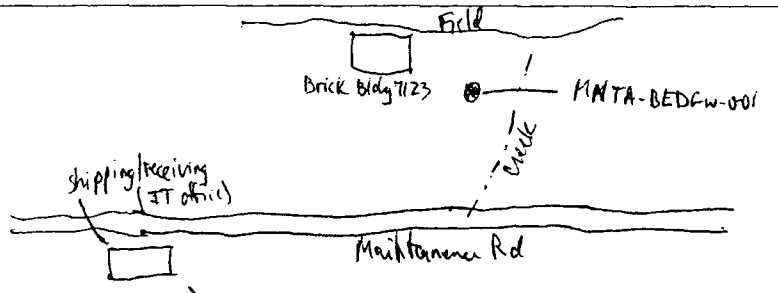
*Location Code:* **IT-MNTA-BEDGW-001**

*Sample Number:* **BD3008**

Low Flow Sampling Method
Pumping ~300ml @ 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) |
|---|---|---|---|---|---|---|---|---|---|
| ~~99+s~~ | 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 | 30.48 | -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 | ~~204.0~~ 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 | 9.00 | 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 Kresch 10/3/01 *Reviewed BY / Date:* David Kresch 10/3/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:**
**RFA/COC Number:**

**Collection Date:** 10/3/01
**Collection Time:** 1020
**Sample Filtered (Yes / No):**
**Weather/Temp:** Sunny, strong breeze, warm

**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 – – – BD 3 0 0 8 – –

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** MNTA-BEDFW-001
**Well Secure (Yes / No):** Needs 3216 Lock
**Well Labeled (Yes / No):** No
**Well Condition:** Good
**Screen Height:** 15 ft
**Casing Type:** PVC

**Outside Casing Dia. (in):** 2"
**Depth to Product (ft):** —
**Total Well Depth (ft):** 64
**Depth to Water (ft):** 30.29
**Water Column (ft):** 33.71
**Elev. Ref. for Water Level:**

**Odor:** Strong $H_2S$
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** H844511 / 0
**- Reading (ppm):** 1257 ppm / >500
**Remarks:** Using Fan to evacuate strong fumes
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.) |
|---|---|---|---|---|
| | | | | |

| 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 | | | | | | | | | |

Low Flow

## 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: PBOW0928 SEL-K & N

*Location Code:* NTB-BED GW-001

*Sample Number:* PBOW-01-GW-IT-TWTD-BED GW-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:* 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~~ |
| 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 Kessler 10/02/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

*Location Code:* TNTB-B806W-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 | | | | | | | 500 mL/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 | -296 | 11.85 | 2.20 | 0 | 0.0 | 12.58 | |
| | 1635 | 4.63 | -297 | 11.86 | 2.23 | 0 | 0.0 | 12.54 | |
| | | | | | | | | | 20000 mL/min |
| Sample: | 1635 | 4.63 | -297 | 11.86 | 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:* Roger Thompson 09/28/01 *Reviewed BY / Date:* David Kussch 10/2/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

| | | | | | |
|---|---|---|---|---|---|
| **Project Number:** | 825635 | **Collection Date:** | 09/28/01 | **Form Completed By:** | K. 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 Kenah |

**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: 32 / LEL 3, CO 0.0 |
| **Well Condition:** | Good | **Depth to Water (ft):** | 4.51 | **- Reading (ppm):** | / $H_2S$ 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.) |
|---|---|---|---|---|
| | | | | |

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-STL-IC JN

*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#:*

**Containers**

| 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:** Re-Sampled using low-flow method

**Sketch Location:**

*Logged BY / Date:* Hugh Adams 10/5/01

*Reviewed BY / Date:* David Kresh 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 | ml / 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 | $H_2S$ | odor | although | meters | don't | show measurable levels | |
| | 1200 | 4.33 | -335 | 12.22 | 3.79 | 3.9 | 0.00 | 12.44 | |
| **Sample:** | 1200 | 4.33 | -335 | 12.22 | 3.79 | 3.9 | 0.00 | 12.44 | ~~[illegible]~~ 9500 ml / 2.5 gal |

*Logged BY / Date:* Hugh Adams 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

**RFA / COC Number:** PBOW0927552-K jw

*Location Code:* IT-TNTB-BEDGW-002

*Sample Number:* BD3010

*Sample Name:* PBOW-01-GW-IT-TNTB-BEDGW-002-BD30

*Sampling Method:* LF

*Sample Type:* GW

*Sample Purpose:* REG

*Collection Date:* 9/27/01

*Collection Time:* 0830

*Start Depth:* 19.0'

*End Depth:* 19.0'

*Sample Matrix:* WATER

*Sample Team:* RT / BS

**QC Partners:**

(TB) — (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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:** High PH > 13 Strong $H_2SO_4$ (Rotten eggs) odor

**Sketch Location:** See back

*Logged BY / Date:* BS / RT 9/27/01

*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:* ~~MK-MW16~~ IT-TNTB-BED6W-002 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) |
|---|---|---|---|---|---|---|---|---|---|
| MS | 0810 | 7.51 | -333 | 13.18 | 0.811 | 823 | 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 Kersh 10/2/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

| | | | | | |
|---|---|---|---|---|---|
| **Project Number:** | 825635 | **Collection Date:** | 09/27/01 | **Form Completed By:** | R. Thompson |
| **Project Name:** | PBOW Groundwater | **Collection Time:** | 0830 | **Sampler(s):** | RT / N. Strek |
| **Investigation Site:** | ~~MK-MW17~~ TNTB | **Sample Filtered (Yes / No):** | | | |
| **RFA/COC Number:** | | **Weather/Temp:** | Raining ~50°F | **Reviewed By:** | David Kessler |

**Sample Number:** P B O W – 0 1 – G W – I T – T N T B – b E n G W – 0 0 2 – B D 3 0 1 0

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

| | | | | | |
|---|---|---|---|---|---|
| **Well Number:** | ~~MK-MW17~~ BGD-002 | **Outside Casing Dia. (in):** | 2 in | **Odor:** | yes / Sulphur |
| **Well Secure (Yes / No):** | Yes | **Depth to Product (ft):** | – | **Vapor Monitor Type:** | PID / VRAE |
| **Well Labeled (Yes / No):** | Yes / not clear | **Total Well Depth (ft):** | 24.2 | **- Vapor Monitor S/N:** | H84511 / 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.) |
|---|---|---|---|---|
| | | | | |

| Purge Cycle | Time (24 hr) | Depth to Water | Conductivity | pH | Eh / Temperature | Temperature / Eh | Turbidity | Diss. $O_2$ | Purge Volume |
|---|---|---|---|---|---|---|---|---|---|
| Units: | | Feet | umhos/cm | Standard Units | ppm | °F / ppm | 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 100801STL-K 1-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 / N. Sirek

**QC Partners:**

(TB) TB100801A (ER) — (FB) —

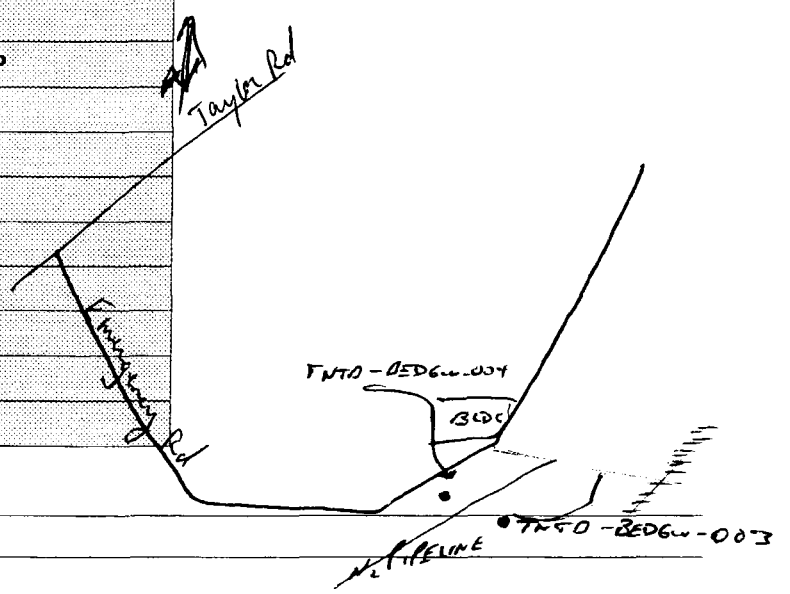
**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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 Kessler 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 LOW FLOW done on this well, due to very poor recharge rate.
Hand pump unit used to filter ~~metals~~ dissolved metals bottle conta

**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= 42.23) | | | | | | | |
| | No water quality measurements taken due to very poor recharge and limited supply of groundwater. | | | | | | | | |
| Sample: | 0940 | | | | | | | | |

After collection 38.41

*Logged BY / Date:* Hugh Adams 10/8/01 *Reviewed BY / Date:* David Keesler 10/8

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

| | | | | | |
|---|---|---|---|---|---|
| **Project Number:** | 825635 | **Collection Date:** | 10-8-01 | **Form Completed By:** | H Adams |
| **Project Name:** | PBOW Groundwater | **Collection Time:** | 05:40 | **Sampler(s):** | H Adams / Nick Sieck |
| **Investigation Site:** | AREA B | **Sample Filtered (Yes / No):** | Metals | | |
| **RFA/COC Number:** | | **Weather/Temp:** | Light Breeze 40's | **Reviewed By:** | David Keck |

**Sample Number:** PBOW - 01 - GW - TNTB - BEDGW - 003BD3038 -

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

| | | | | | |
|---|---|---|---|---|---|
| **Well Number:** | ~~BE~~ 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):** | 0 1/0, 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. not 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 STL-K 1-N

*Location Code:* TNTB-BEDGW-004

*Sample Number:* BD3041

*Sample Name:* PBOW-01-GW-TNTB-BEDGW-004-BD3041-

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10-5-01

*Collection Time:* 08:00

*Start Depth:* 9.2'

*End Depth:* 9.4'

*Sample Matrix:* WATER

*Sample Team:* H Adams / N. Sirek

**QC Partners:**

(TB) TB 100501A (ER) (FB)

**ERPIMS Values:**

*Sacode:*

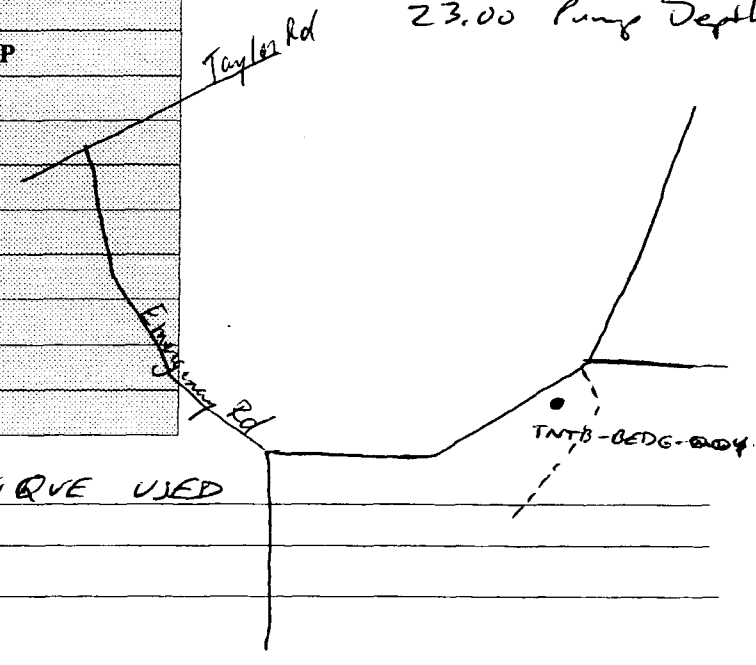
*Lot Control#:*

**Containers**

| 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 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:* **BD3041**

10/5/01 Depth to water = 9.2 ft, TD = 26.75 ft., Pump at 23.00 ft

## *PURGE RECORD:*

| Initial | Time(24hr) | DepthtoWater (ft) | Eh (mV) | pH (SU) | Conductivity (mS/cm) | Turbidity (NTU) | DissOxygen (ppm) | Temperature (C) | Purge Volume (gal) |
|---|---|---|---|---|---|---|---|---|---|
| 10/5/01 | 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 | 2.88 | 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 | 12.03 | |
| | 0920 | 9.35 | -43 | 7.52 | 0.341 | ~~108~~ 108 | 4.00 | 12.05 | 8.0 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 Kersch 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 **PLUM BROOK ORDNANCE WK**

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100501PARA

*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:* 09:00

*Start Depth:* 9.2'

*End Depth:* 9.40'

*Sample Matrix:* WATER

*Sample Team:* HAdams / Nick Sir

**QC Partners:**

(TB) TB100501B (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 BD3041

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) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Sample: | | | | | | | | | |

See BD 3041

*Logged BY / Date:* H. Adams 10/5/01 *Reviewed BY / Date:* David Kessler 10/5/01

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# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100501SEL-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 Sirek

QC Partners:

(TB) TB100501A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| Analytical Suite | Flt | Frtn | Qty | Size | Units | Type |
|---|---|---|---|---|---|---|
| VOLATILES3 | N | A | 3 | 40 | mL | GV1AL,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 Lessh 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 Kessler 10/5/

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

*Sample Number:* BD3017

*Sample Name:* PBOW-01-GW-PB-BED-MW13-BD3017-(00-(

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10-03-01

*Collection Time:* 15:15

*Start Depth:* 68.15' TOC

*End Depth:* 72.45 TOC

*Sample Matrix:* WATER

*Sample Team:* H Adams / N Sieck

**QC Partners:**

(TB) TB100301A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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:**

FOX ROAD

**Sketch Location:**

*Logged BY / Date:* Hugh Adams 10/3/01

*Reviewed BY / Date:* David Kreeh 10/3/01

32.28

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# 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~~ DEK | ORIG | 31.23 | | | | | | | |
| ~~10/4~~ 10/3 | 10:00 | ~~31.47~~ 30.78' | | | | | | | |
| | 1030 | 32.00 | | | | | | | 400 ml/min |

Low flow pumping 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 pumping as per work plan.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 11:14 | — | -356 | 12.57 | 8.65 | 274 | 0.82 | 11.99 | ~2½ gal |
| | | 39.15 | | | | | | | 5 gal |
| | 12:30 | 46.9 | | | | | | | 12 gal |
| ~~Sample:~~ | 12:40 | 48.0 | -371 | 12.70 | 9.53 | 436 | ∅ | 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 | ∅ | 14.92 | |
| sample: | 15:00 | | -368 | 12.33 | 11.3 | 49.7 | ∅ | 15.77 | ~23 gal |

*Logged BY / Date:* Hugh Adams 10/3/01 *Reviewed BY / Date:* David Kesler 10/3/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PB-BED-MW13
**RFA/COC Number:**

**Collection Date:** 10/3/01
**Collection Time:** 1515
**Sample Filtered (Yes / No):** yes - Metals only
**Weather/Temp:** Breezy, warm ~70°F, sunny

**Form Completed By:** ~~Hugh Adams~~ HAG D. Kessler
**Sampler(s):** Hugh Adams / Nick Sirek
**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
**Well Secure (Yes / No):** Yes
**Well Labeled (Yes / No):** Yes
**Well Condition:** Good
**Screen Height:** 46 ft open hole
**Casing Type:** open hole

**Outside Casing Dia. (in):** 4" outside / 3" open hole
**Depth to Product (ft):** None
**Total Well Depth (ft):** 75.5
**Depth to Water (ft):** 30.78
**Water Column (ft):** 44.72
**Elev. Ref. for Water Level:**

**Odor:**
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 0.0 1 CO=0 H2S=0 LEL=0 O2=20.7 } at start
**Remarks:**

## 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:** PBOW092851L-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 | Containers Flt | Frtn | Qty | Size | Units | Type | |
|---|---|---|---|---|---|---|---|
| ~~VOLATILES3~~ | ~~N~~ | ~~A~~ | ~~3~~ | ~~40~~ | ~~mL~~ | ~~GVIAL,SEP~~ | ~~EDKK~~ |
| 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~~ | EDKK |
| 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 | | | | | | | 250 mL/min |
| | 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 & interval parameters – | 1140 | 21.91 | -14 | 7.28 | 4.20 | 5.0 | 0.0 | 10.38 | |
| | | | | | | | | | 7500 mL 1.98 gal |
| | | | | | | | | | ~~8750 mL~~ |
| Sample: | ~~1145~~ | | | | | | | | ~~2.31 gal~~ |

22.02 after Sampling

Low Flow Sampling Method

Logged BY / Date: [signature] 09/28/01 Reviewed BY / Date: David Kessler 10/2/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

Project Number: 825635
Project Name: PBOW Groundwater
Investigation Site: West Area RW Ponds
RFA/COC Number:

Collection Date: 08/28/01
Collection Time: 1140
Sample Filtered (Yes / No): Metals only
Weather/Temp: Overcast 58°

Form Completed By: R. Thompson
Sampler(s): RT / N. Sirek
Reviewed By: ~~Low~~ David Kreck

Sample Number: P B O W – 0 1 – G W – ____ – ____ – ____ – ____ – ____

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

Well Number: BED-MW/4
Well Secure (Yes / No):
Well Labeled (Yes / No):
Well Condition: Good (Paint?)
Screen Height: 29' (D)
Casing Type: Sch. 40 PVC

Outside Casing Dia. (in): 4 in
Depth to Product (ft): —
Total Well Depth (ft): 52.2'
Depth to Water (ft): 21.62'
Water Column (ft): 30.58
Elev. Ref. for Water Level:

Odor: None
Vapor Monitor Type: PID / VRAE
- Vapor Monitor S/N: —
- Reading (ppm): PID: 75.6 / VRAE
Remarks: $O_2$ 19.9 $H_2S$ 0.0, LEL 89
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

| 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.) |
|---|---|---|---|---|
| | | | | |

DW HOW

| 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 3TL-K & N

*Location Code:* PB-BED-MW14

*Sample Number:* BD3018 R

*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:* A. 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 |

PDKK

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 | Time(24hr) | DepthtoWater (ft) | Eh (mV) | pH (SU) | Conductivity (mS/cm) | Turbidity (NTU) | DissOxygen (ppm) | Temperature (C) | Purge Volume (gal) |
|---|---|---|---|---|---|---|---|---|---|
| 10/5/01 | | | | | | | | | |
| BEGAN PUMPING | 14:45 | 21.52 | FIRST | WATER SEE | WITHIN | 5 min | | | |
| | 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 | 180.0 | 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 | 294.0 | 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 | 5 | 6.76 | 4.19 | 282 | 0.00 | 10.17 | 2½ gal |

21.78 Finish

*Logged BY / Date:* Hugh Adams 10/5/01

*Reviewed BY / Date:* David Kussh 10/5/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW10090015TL-KFN

*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:* H ADAMS/N. Sirek

**QC Partners:**

(TB) TB100901A (ER) (FB)

**ERPIMS Values:**

*Sacode:*

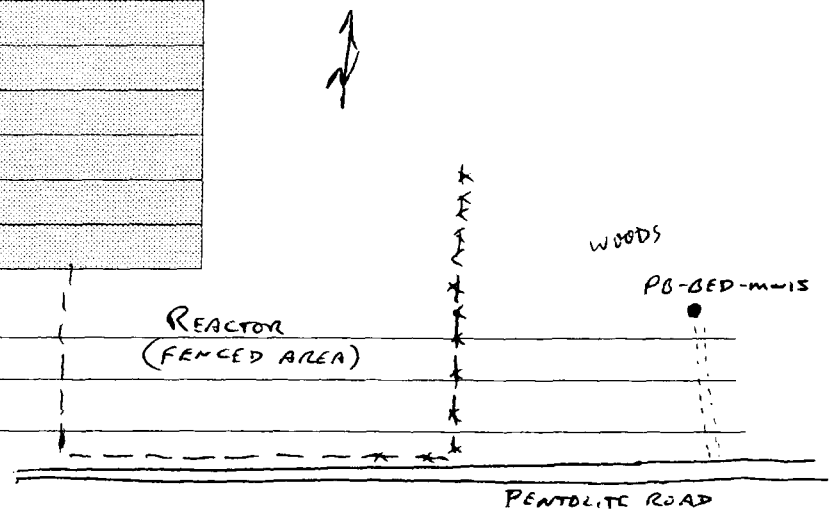
*Lot Control#:*

| 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 Kesah 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~~ 100 ml @ min. → Can not perform low-flow (water level lowered 0.5')

Static water level 16.71 Ft 10/3/01
18.00 Ft 10/4/01 1008

## 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 | 8.33 | 12.9 | 500 ml |
| 10/8/01 | | 1430 | 18.89 | | | | | | | |
| | | 14:45 | 26.13 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 | 69.0 | 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 Rel |
| | | 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 gallons + Sample volumes (10/3-10/9)

PID = 0.0 ppm
VOAE = Ø, CO
Ø
Ø $H_2S$
21.0 $O_2$

Logged BY / Date: Hugh Adams 10/9/01

Reviewed BY / Date: David Kersch 10/9/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
(A Member of The IT Group)

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:**
**RFA/COC Number:** PBOW100901SRC-K + N

**Collection Date:** 10-09-01
**Collection Time:** 08:50
**Sample Filtered (Yes / No):** METALS
**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
**Well Secure (Yes / No):** yes
**Well Labeled (Yes / No):** yes
**Well Condition:** Good
**Screen Height:** 31.5 ft (open bedrock)
**Casing Type:** PVC / open Hole

**Outside Casing Dia. (in):** 4" PVC / 3" open borehole
**Depth to Product (ft):** NA
**Total Well Depth (ft):** 74.4
**Depth to Water (ft):** 16.71
**Water Column (ft):** 57.57
**Elev. Ref. for Water Level:**

**Odor:** Distinct $H_2S$ odor, Petroleum odor
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** >2000 / $H_2S$: 0 ppm
**Remarks:**

## 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 = 57.57 ft x 0.37 Gal/ft = 21.30 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 = 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:** PBOW101001STL-N ≠ 1K

*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~~ (26.61')

*End Depth:* ~~6.77~~ (21.92')

*Sample Matrix:* WATER

*Sample Team:* N. Sirek, R. Thompson

**QC Partners:**

(TB) TB101001A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

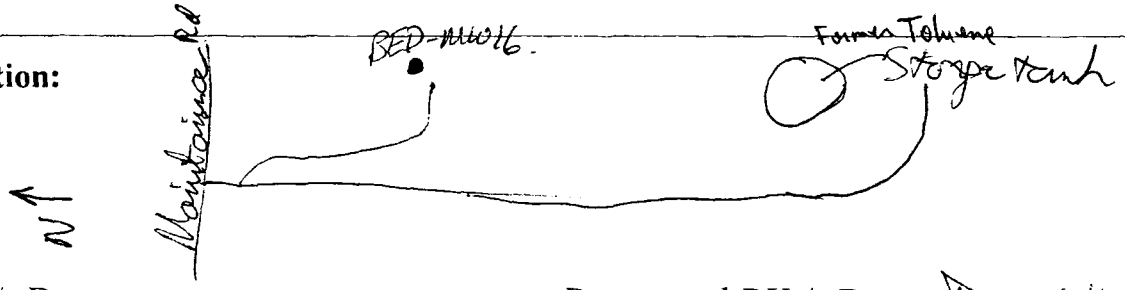
*Lot Control#:*

| 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)

**Comments:** Very oily water / Collected ~ 80 ml of oily product (LNAPL) See collection log (FP7002)

**Sketch Location:**




*Logged BY / Date:* Nick Sirek 10/10/01

*Reviewed BY / Date:* David Kessler 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 ~ 20 gal to top of screen and collected samples. | | | | | | 10/10/01 | 1135 |
| Sample: | | | | | | | | | |

*Logged BY / Date:* Nick Sirek 10/10/01 *Reviewed BY / Date:* David Kreek 10/1

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100301SEL-K 5-N

*Location Code:* PB-BED-MW17

*Sample Number:* BD3021

*Sample Name:* PBOW-01-GW-PB-BED-MW17-BD3021-(00-(

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10/3/01

*Collection Time:* 1500

*Start Depth:* 29.10

*End Depth:* 29.10

*Sample Matrix:* WATER

*Sample Team:* R. Thompson / D. Kessler

**QC Partners:**

(TB) TB100301A (ER) (FB)

**ERPIMS Values:**

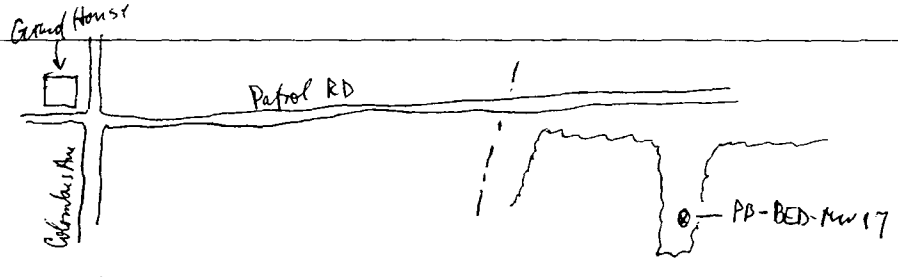
*Sacode:*

*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:** 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: | ~~1300~~ 1500 | 29.10 | -386 | 15.18 | 5.79 | 134.0 | 0.00 | 16.5 | |

*Logged BY / Date:* David Kessler 10/3/01 *Reviewed BY / Date:* David Kessler 10/3/

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PBOW - TNTA
**RFA/COC Number:**

**Collection Date:** 10/3/01
**Collection Time:** 1500
**Sample Filtered (Yes / No):**
**Weather/Temp:** Sunny, warm (75°), strong breeze

**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 – – – –

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** PB-BED-MW17
**Well Secure (Yes / No):** Needs
**Well Labeled (Yes / No):** yes
**Well Condition:** fair (Severe $H_2S$ corrosion of protective casing)
**Screen Height:** 45 Ft
**Casing Type:** open hole

**Outside Casing Dia. (in):** 3"
**Depth to Product (ft):** None
**Total Well Depth (ft):** 64.4
**Depth to Water (ft):** 29.4
**Water Column (ft):** 35.0
**Elev. Ref. for Water Level:**

**Odor:** Strong $H_2S$
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** >2000 / >500
**Remarks:** Used fan positioned over/beside well to evacuate fumes.

## 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 | | | | | | | | | |

Flow

## 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 | |
| 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 | |

A. Sample for alkalinity, chloride, nitrate, sulfate, TSS. TDS, and turbidity combined in one 1-liter HDPE container.

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100201STL-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/US

**QC Partners:**

(TB) FB100101A (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

**Sketch Location:** See back

*Logged BY / Date:* [illegible] 10/02/01 *Reviewed BY / Date:* David Kessler 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) |
|---|---|---|---|---|---|---|---|---|---|
| NT | 1400 | 31.99 | | | | | | | 300 ml/min |
| | 1405 | 32.31 | -334 | 12.05 | 22.5 | 61.0 | 0.70 | 12.88 | |
| | 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:* [illegible] 10/02/01

*Reviewed BY / Date:* David Kessler 10/02/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PB - BED - MW18
**RFA/COC Number:**

**Collection Date:** 10/02/01
**Collection Time:** 1435
**Sample Filtered (Yes / No):** Metals only
**Weather/Temp:** Sunny 65°F

**Form Completed By:** R. Thompson
**Sampler(s):** RT / N. Sirek
**Reviewed By:** David Kessler

**Sample Number:** PBOW - 01 - GW - PBBED - MW18B - D302410 - 0 -

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** PB-BED-MW18
**Well Secure (Yes / No):**
**Well Labeled (Yes / No):**
**Well Condition:** Good
**Screen Height:** 51.0'
**Casing Type:** Open hole

**Outside Casing Dia. (in):** 2in
**Depth to Product (ft):** —
**Total Well Depth (ft):** 75.4
**Depth to Water (ft):** 37.99
**Water Column (ft):**
**Elev. Ref. for Water Level:**

**Odor:** None
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 64.1 10
**- Reading (ppm):** —
**Remarks:** Low Flow

## 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 | |

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# Sample Collection Log

**Project:** 825635 **PLUM BROOK ORDNANCE WK**

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100401SCL-K ; -N

*Location Code:* **PB-BED-MW19**

*Sample Number:* **BD3025**

*Sample Name:* **PBOW-01-GW-PB-BED-MW19-BD3025-(00-(**

*Sampling Method:* **LF**

*Sample Type:* **GW** *Sample Purpose:* **REG**

**QC Partners:**

(TB) TB100401A (ER) — (FB) —

*Collection Date:* 10/04/01

*Collection Time:* 1315

*Start Depth:* 35.0

*End Depth:* 35.0

*Sample Matrix:* **WATER**

*Sample Team:* DK/RT

**ERPIMS Values:**

*Sacode:*

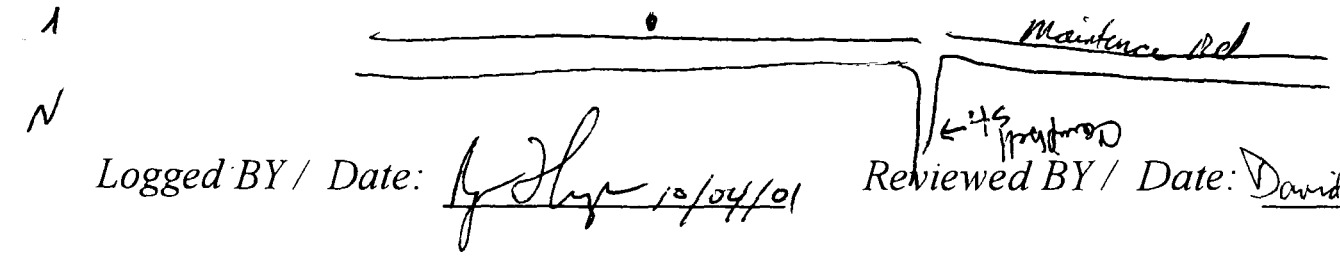
*Lot Control#:*

**Containers**

| 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:** PB-Bed-MW-19




*Logged BY / Date:* [signature] 10/04/01

*Reviewed BY / Date:* David Kissel 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 | 28.92 | -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 | 27.29 | -440 | 14.98 | 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 | 18.2 | |
| | 1300 | 27.26 | -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 (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
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PB-BED-MW19
**RFA/COC Number:**

**Collection Date:** 10/4/01
**Collection Time:** 1315
**Sample Filtered (Yes / No):** yes
**Weather/Temp:** cloudy, warm (70°), rain

**Form Completed By:** D. Kessler
**Sampler(s):** D. Kessler, R. Thompson
**Reviewed By:** David Kessler

**Sample Number:** PBOW – 01 – GW – ____ – ____ – BD3025 – ____ – ____

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** PB-BED-MW19
**Well Secure (Yes / No):** 321
**Well Labeled (Yes / No):** No
**Well Condition:** Good
**Screen Height:** 32'
**Casing Type:** 3" open hole 17.5-49.5

**Outside Casing Dia. (in):** 4"
**Depth to Product (ft):** NA
**Total Well Depth (ft):** 49.5
**Depth to Water (ft):** 26.12
**Water Column (ft):** 23.38
**Elev. Ref. for Water Level:**

**Odor:**
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 873 / LEL-75ppm O2-20.4 CO-0ppm H2S-0ppm
**Remarks:**

## 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

| 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.) |
|---|---|---|---|---|
| | | | | |

NA

| 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-BED-MW19

*Sample Number:* BD3045

*Sample Name:* PBOW-01-GW-PB-BED-MW19-BD3045-00-

*Sampling Method:* LF

*Sample Type:* GW

*Sample Purpose:* FS

*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) TB100501B (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* —

*Lot Control#:* —

**Containers**

| 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:* David Kresh 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

Manager: Mike Spangberg

*Location Code:* ~~BD30~~ PB BED MW 19

*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) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Sample: | | | | | | | | | |

See sample BD3025

DKK

*Logged BY / Date:* D. Kessler 10/4/01

*Reviewed BY / Date:* David Kessler 10/4/

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 **PLUM BROOK ORDNANCE WK**

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100401 STL-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) TB100501B (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 Kessler 10/4/01

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

*Location Code:* PB- BED- MW 19

*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) |
|---|---|---|---|---|---|---|---|---|---|
| | See Sample No. BD3025 DKK | | | | | | | | |
| Sample: | | | | | | | | | |

*Logged BY / Date:* David Kesh 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

**RFA / COC Number:** PB092650LN ; 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

*Collection Date:* 09/26/01

*Collection Time:* 1415

*Start Depth:* 39.0'

*End Depth:* 39.0'

*Sample Matrix:* WATER

*Sample Team:* RT / NS

**QC Partners:**

(TB) _____ (ER) — (FB) —

**ERPIMS Values:**

*Sacode:* _____

*Lot Control#:* _____

**Containers**

| 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:* Roger Thompson 09/26/01 *Reviewed BY / Date:* David Kessler 10/6/

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) |
|---|---|---|---|---|---|---|---|---|---|
| ~~AB~~. | 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 | |
| | 1115 | 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 | 600ml/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 | 10.74 | 600ml/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 | | -94 | 9.29 | 54.7 | 61.4 | 0.0 | 10.54 | |
| | | | | | 53.6 | 53.5 | 0.0 | 10.54 | |
| | | | -73 | 8.95 | | | | | |

Low Flow >6" drawdown → 35 well volumes = 24 gal

water level meter Faulty.

Sample: 1415

Logged BY / Date: [illegible] 9/26/01

Reviewed BY / Date: David Kessler 10/6/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** BED-MW20
**RFA/COC Number:**

**Collection Date:** 09/26/01
**Collection Time:** 1415
**Sample Filtered (Yes / No):** Metals only
**Weather/Temp:** Overcast 45°F

**Form Completed By:** R. Thompson
**Sampler(s):** MT / N Sirek
**Reviewed By:** David Kersch 10/16/01

**Sample Number:** PBOW-01-GW-PBRED-MW20-BD3026-

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** BED-MW20
**Well Secure (Yes / No):**
**Well Labeled (Yes / No):**
**Well Condition:** Good
**Screen Height:** No Screen
**Casing Type:** Schd. 40 PVC

**Outside Casing Dia. (in):** 2 in
**Depth to Product (ft):** —
**Total Well Depth (ft):** 45.5
**Depth to Water (ft):** 13.96
**Water Column (ft):** 35.54
**Elev. Ref. for Water Level:** —

**Odor:** none
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** low $O_2$ /
**- Reading (ppm):** 0.0 /
**Remarks:** Low flow attempted. 76 in draw down. 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 ~~0~~ 35.54 ft + 0 ft) x .205 gal/ft) x 0.3 = ~~0.72~~ 2.19 gallons

**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 SEL-K & -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**

*Collection Date:* 10/8/01

*Collection Time:* 1020

*Start Depth:* 35

*End Depth:* 37

*Sample Matrix:* **WATER**

*Sample Team:* DKK/RT

**QC Partners:**

(TB) TB 100801A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

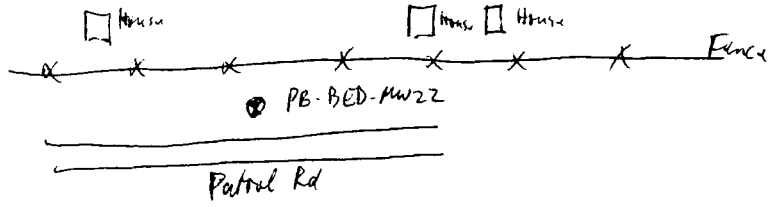
*Lot Control#:*

**Containers**

| 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 sampling.

**Sketch Location:**




*Logged BY / Date:* David Kresh 10/8/01 *Reviewed BY / Date:* David Kresh 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 | 0.754 | 28.8 | 0.00 | 11.1 | Pump stopped. |
| | 1000 | 31.48 | -258 | 10.22 | 0.760 | 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) 31.91

3 gal

Conducted low-flow sampling.

*Logged BY / Date:* David Kessler 10/8/01 *Reviewed BY / Date:* David Kessler 10/8/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

| | | | | | |
|---|---|---|---|---|---|
| **Project Number:** | 825635 | **Collection Date:** | 10/8/01 | **Form Completed By:** | D. Kessler |
| **Project Name:** | PBOW Groundwater | **Collection Time:** | 1020 | **Sampler(s):** | D. Kessler, R. Thompson |
| **Investigation Site:** | PB-BED-MW22 | **Sample Filtered (Yes / No):** | yes | | |
| **RFA/COC Number:** | | **Weather/Temp:** | Sunny, clear cold 45° | **Reviewed By:** | David Kreach |

**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 3216 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:** | 1 |
| **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 |
| **Casing Type:** | PVC | **Elev. Ref. for Water Level:** | | | |

## MONITORING WELL PURGE CALCULATIONS AND PURGE RECORD

Basically low-flowed with > 6" drawdown.

**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:** PBOW100801STL-KJ-N

*Location Code:* PB-BED-MW22

*Collection Date:* 10/8/01

*Sample Number:* ~~BD3051~~ BD3027 MS

*Collection Time:* 1020

*Sample Name:*

*Start Depth:* 35'

*Sampling Method:* LF

*End Depth:* 37'

*Sample Type:* GW

*Sample Purpose:* MS

*Sample Matrix:* WATER

QC Partners:

(TB) TB100801A (ER) — (FB) —

*Sample Team:* DKK/RT

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 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:* ~~BD3053~~ BD 3027 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: PBOW100801STL-K & -N

*Location Code:* PB-BED-MW22

*Sample Number:* ~~BD3054~~ BD3027 MSD

*Sample Name:*

*Sampling Method:* LF

*Sample Type:* GW

*Sample Purpose:* MSD

*Collection Date:* 3/8/01

*Collection Time:* 1020

*Start Depth:* 35'

*End Depth:* 37'

*Sample Matrix:* WATER

*Sample Team:* DKK/RT

QC Partners:

(TB) TB100801A (ER) — (FB) —

ERPIMS Values:

*Sacode:*

*Lot Control#:*

Containers

| 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 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:* ~~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 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:** PBOW100901SCL-A i-N

*Location Code:* PB-BED-MW23

*Sample Number:* BD3028

*Sample Name:* PBOW-01-GW-PB-BED-MW23-BD3028-(00-(

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10/9/01

*Collection Time:* 1145

*Start Depth:* 65.84

*End Depth:* 70.84'

*Sample Matrix:* WATER

*Sample Team:* D. Kessler/R. Thompson

**QC Partners:**

(TB) TB100901A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

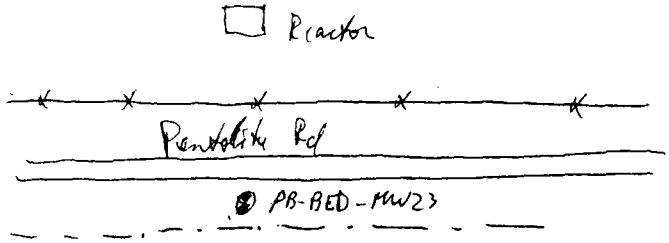
**Containers**

| 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:** Because water level within screened portion of well, ~~fast~~ recharge rate very slow, collected sample.

**Sketch Location:**

N ↑




*Logged BY / Date:* David Kessler 10/9/01 *Reviewed BY / Date:* David Kessler 10/9/01

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# 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 (0.75 gal)~~ ~~total~~ start DTW, 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 Kessler 10/8/01 *Reviewed BY / Date:* David Kessler 10/9/0

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PB-BED-MW23
**RFA/COC Number:**

**Collection Date:** 10/9/01
**Collection Time:** 1145
**Sample Filtered (Yes / No):** yes
**Weather/Temp:** partly cloudy, warm (65°)

**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 – ____ – ____ – ____ – ____ – ____

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** PB-BED-MW23
**Well Secure (Yes / No):** Needs 3216 lock
**Well Labeled (Yes / No):**
**Well Condition:** Excellent (new)
**Screen Height:** 20 ft (53-73 ft)
**Casing Type:** PVC

**Outside Casing Dia. (in):** 2"
**Depth to Product (ft):** NA
**Total Well Depth (ft):** 75.60
**Depth to Water (ft):** 63.80
**Water Column (ft):** 11.80
**Elev. Ref. for Water Level:**

**Odor:** Distinct PAH odor
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 215 / CO=0 H2S=0 LEL=OVR O2=20.7
**Remarks:** 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:** PBOW100801SSL-K-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) TB100801A (ER) — (FB) —

**ERPIMS Values:**

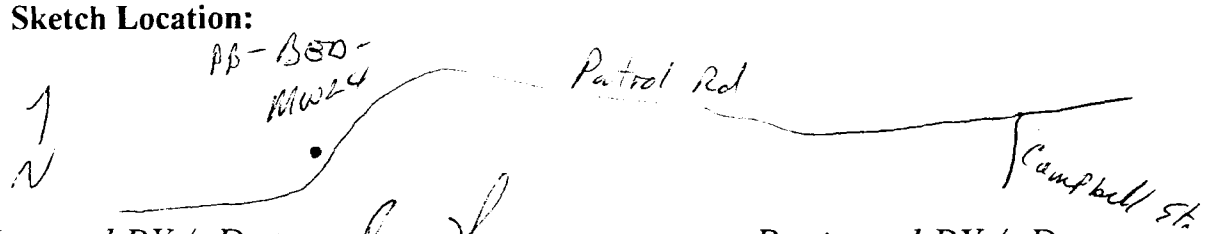
*Sacode:*

*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:** Sampled Using Low-Flow Method

**Sketch Location:**




*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

*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 | | | | | | | |
| 10/9/01 | 0840 | 29.00 | -30 | 8.16 | 1.96 | 187.0 | 5.12 | 11.0 | 200 ML/M |
| VT | 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 | |
| | 0855 | 29.01 | -109 | 9.22 | 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 | 4.49 | 11.0 | |
| | 0920 | 29.07 | -147 | 9.57 | 1.77 | (-10.6 Sensitivity) | 4.51 | 11.1 | |
| | 0925 | 29.07 | -141 | 9.33 | 1.82 | 76.8 | 5.11 | 11.2 | |
| | 0930 | 29.07 | -143 | 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 | 299 gal. |

Sampled Using Low-Flow method

*Logged BY / Date:* [signature] 10/09/01

*Reviewed BY / Date:* David Kessler 10/9/0

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100501552-K ; N

*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:* D. Kessler / R. Thompson

**QC Partners:**

(TB) TB100501A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 |

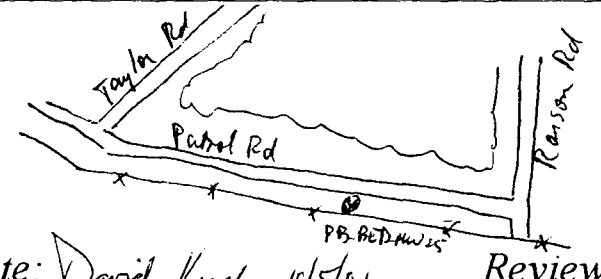
FS BD 3051 collected with this sample

FD BD 3052 collected with this sample

**Comments:** Conducted low flow sampling

**Sketch Location:**

N↑




*Logged BY / Date:* David Kessler 10/5/01 *Reviewed BY / Date:* David Kessler 10/5/01

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# 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 fluctuations 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 1350 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 Kessler 10/5/01 *Reviewed BY / Date:* David Kessler 10/5/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:**
**RFA/COC Number:**

**Collection Date:** 10/05/01
**Collection Time:** 0920
**Sample Filtered (Yes / No):**
**Weather/Temp:** cloudy, cool (50), sprinkles

**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 – ____ – ____ – ____ – ____ – ____

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** PB-BED-MW25
**Well Secure (Yes / No):** Needs 3216 lock
**Well Labeled (Yes / No):**
**Well Condition:** Excellent
**Screen Height:** 10 Ft
**Casing Type:** PVC

**Outside Casing Dia. (in):** 2
**Depth to Product (ft):** NA
**Total Well Depth (ft):** 40.60
**Depth to Water (ft):** 16.43
**Water Column (ft):**
**Elev. Ref. for Water Level:**

**Odor:**
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 0.0 / CO = 2 ppm, H2S = 0 ppm, LEL = >100%, O2 = 20.9
**Remarks:**

## 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 ((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.) |
|---|---|---|---|---|
| | | | | |

Sampling

| 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 | | Low | | | | | | | |
| 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 | |

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# Sample Collection Log

**Project:** 825635 **PLUM BROOK ORDNANCE WK**

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100501PARA

*Location Code:* PB-BOD-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) TB100501B (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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 Kresh 10/5/01 *Reviewed BY / Date:* David Kresh 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 Collection log Sample No. 3030

*Logged BY / Date:* David Kessler 10/5/01 *Reviewed BY / Date:* David Kessler 10/5/

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# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100501SEL-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#:*

**Containers**

| 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 Kessh 10/5/01 *Reviewed BY / Date:* David Kessh 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) |
|---|---|---|---|---|---|---|---|---|---|
| | See sample collection log BD3030 | | | | | | | | |
| Sample: | | | | | | | | | |

*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

**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

*Collection Date:* 10/10/01

*Collection Time:* NA

*Start Depth:* —

*End Depth:* —

*Sample Matrix:* WATER

*Sample Team:* N. Sinks, R. Thompson

**QC Partners:**

(TB) — (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

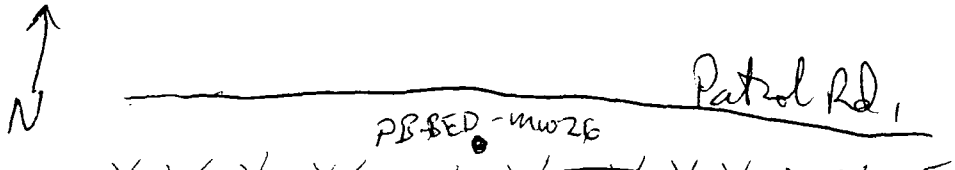
*Lot Control#:*

| 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 |

10/10/01 $H_2O$: 58.81' (BTOC)
TD: 60.20' (BTOC)

**Comments:** Not enough water to collect Sample.

**Sketch Location:**




*Logged BY / Date:* Roger Thompson

*Reviewed BY / Date:* David Kessler 10/10/01

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, 15 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
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:** PB-BED-~~GW~~ MW26
**RFA/COC Number:**

**Collection Date:**
**Collection Time:** No sample collected (Insufficient volume)
**Sample Filtered (Yes / No):**
**Weather/Temp:** partly sunny, warm

**Form Completed By:** David Kessler
**Sampler(s):** DAVID Kessler, Roger 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-MW26
**Well Secure (Yes / No):** No - Needs 3216 lock
**Well Labeled (Yes / No):**
**Well Condition:** Excellent - New
**Screen Height:** 15 ft
**Casing Type:** PVC

**Outside Casing Dia. (in):** 2"
**Depth to Product (ft):** None
**Total Well Depth (ft):** 60.35
**Depth to Water (ft):** 57.32'
**Water Column (ft):** 3.03
**Elev. Ref. for Water Level:**

**Odor:** Distinct petro
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 3.6 / CO=0, H2S=0, LEL=over, O2=13.4
**Remarks:**

## 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~~ 3.07 gallons 1.19

**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:** PBOW100901STL-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:* —

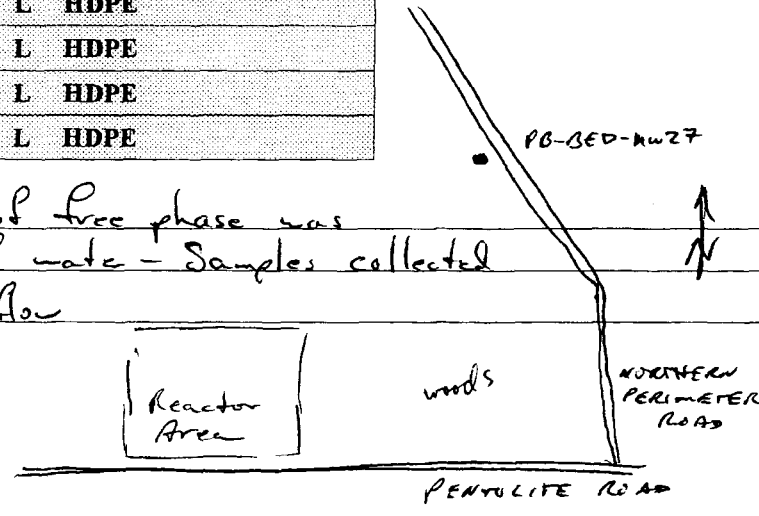
*Lot Control#:* —

**Containers**

| 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 ~~of~~ 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 Kessler 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 | | | | | | |
| | 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. | | | | | | | | |
| Sample: | 1115 | | | | | | | | 1.66 gal |

Logged BY / Date: Hugh Adams 10/9/01

Reviewed BY / Date: David Kessler 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 STZ-K & N

*Location Code:* TNTA-BEDGW-001

*Sample Number:* BD3037

*Sample Name:* PBOW-01-GW-TNTA-BEDGW-001-BD3037-

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10/9/01

*Collection Time:* 1450

*Start Depth:* 79.0'

*End Depth:* Dry.

*Sample Matrix:* WATER

*Sample Team:* D Sirek / R. Thompson

**QC Partners:**

(TB) TB100901 A (ER) (FB)

**ERPIMS Values:**

*Sacode:*

*Lot Control#:*

**Containers**

| 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~~ |

15:30 PID = 268 ppm + VRAE = >500 ppm $H_2S$. within enclosure around well casing.

½ volume

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 low water volume in well.
- Collected free-phase (product) sample.

**Sketch Location:**

Nick Sirek 10/9/01

*Logged BY / Date:* ~~10/9/01~~

*Reviewed BY / Date:* David Kresch 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 | HCB | 15:30 | 77.58 | | | | | | | P.D 268 $H_2O$ >500 @ WE |
| 10/9/01 | | | 79.00' | Not collected due to LNAPL (Sticky, oily) | | | | | | |
| Sample: | | 1450 | | | | | | | | |

Nick Sirek 10/9/01

*Logged BY / Date:* [signature]

*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:** PBOW100401SEL-KIN

*Location Code:* TNTC-BEDGW-001

*Sample Number:* BD3042

*Sample Name:* PBOW-01-GW-TNTC-BEDGW-001-BD3042-

*Sampling Method:* LF

*Sample Type:* GW *Sample Purpose:* REG

*Collection Date:* 10-4-01

*Collection Time:* 13:15

*Start Depth:* 59.63

*End Depth:* 60.27

*Sample Matrix:* WATER

*Sample Team:* H Adams / N Sirek

**QC Partners:**

(TB) TB100401A (ER) — (FB) —

**ERPIMS Values:**

*Sacode:*

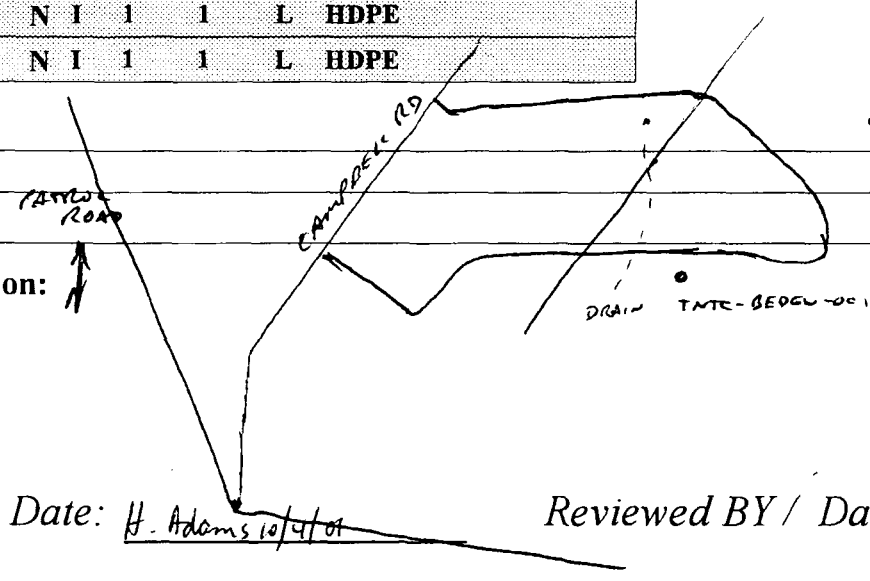
*Lot Control#:*

88.5' TD

| 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:** Sampled using Low Flow

**Sketch Location:**




*Logged BY / Date:* H. Adams 10/4/01

*Reviewed BY / Date:* David Kesler 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 10/4/01 | Time(24hr) | 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 | 2.89 | 93.1 | 0.00 | 13.57 | |
| | 13:10 | 59.43 | -357 | 12.89 | 2.99 | 57.0 | 0.00 | 12.44 | |
| SAMPLING → | 13:15 | 59.68 | -357 | 12.87 | 2.98 | 44.0 | 0.00 | 12.26 | |
| BEGAN | 13:40 | 60.18 | -363 | 12.88 | 2.98 | 25.3 | 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 ~~$H_2O$~~ $H_2S$ 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 Kersh 10/4/01

# GROUNDWATER SAMPLING FORM

IT CORPORATION
A Member of The IT Group

**Project Number:** 825635
**Project Name:** PBOW Groundwater
**Investigation Site:**
**RFA/COC Number:**

**Collection Date:** 10-4-01
**Collection Time:** 13:15
**Sample Filtered (Yes / No):** Metals (dissolved)
**Weather/Temp:**

**Form Completed By:** Hugh Adams
**Sampler(s):** Hugh Adams, Nick Sirek
**Reviewed By:** David Reash

**Sample Number:** PBOW-01-GW-TNTC-BEDGW-001BD3-04-2

## MONITORING WELL INFORMATION [use top of casing (TOC) for all measurements]

**Well Number:** TNTC-BEDGW-001
**Well Secure (Yes / No):** YES (NEW)
**Well Labeled (Yes / No):** YES
**Well Condition:** NEW
**Screen Height:** 15'
**Casing Type:** PVC

**Outside Casing Dia. (in):** 3".
**Depth to Product (ft):** NA.
**Total Well Depth (ft):** ~~NA 100'~~ 88.5'
**Depth to Water (ft):** 59.63
**Water Column (ft):** 40.27'
**Elev. Ref. for Water Level:** TOP OF CASING

**Odor:** $H_2S$ odor present
**Vapor Monitor Type:** PID / VRAE
**- Vapor Monitor S/N:** 1
**- Reading (ppm):** 129 / >500 ppm-TOC
**Remarks:** $H_2S$ values in breathing zone acceptable (~1 ppm)

## 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 100501PARA

*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#:* —

**Containers**

| 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 DKK

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:* ~~BD3047~~ → BD3047

1st water reached surface @ 11:25 Am – Initial pumping rate seems slow - measured it @ 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 Kressler 10/4

INTERNATIONAL TECHNOLOGY CORPORATION



# Sample Collection Log

**Project:** 825635 PLUM BROOK ORDNANCE WK

**Manager:** Mike Spangberg

**RFA / COC Number:** PBOW100401SEL-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#:* —

**Containers**

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Sample: | | | | | | | | | |

See Sample No. BD3042

*Logged BY / Date:* Hugh Adams 10/4/01 *Reviewed BY / Date:* David Kessler 10/4/

# APPENDIX C

# SOIL BORING HTRW DRILL LOGS

# HTRW DRILLING LOG

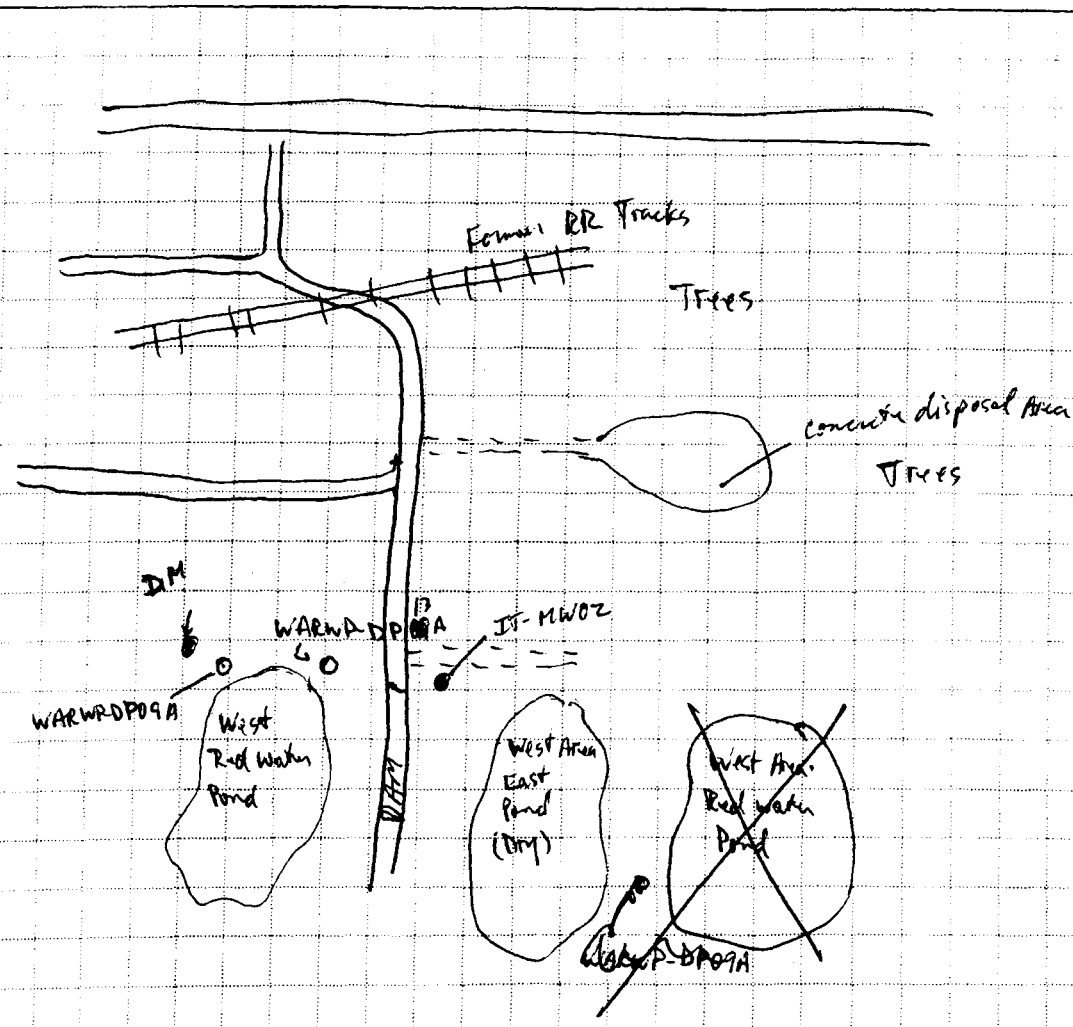
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: WARWP-DP09A |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 2.5" ID Stain-less 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~~ WH 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 Kesler |

LOCATION SKETCH/COMMENTS SCALE:




PROJECT: PBOW HOLE NO. WARWP-DP09A

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP09A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/USDA | Field Screening Results (ppm) | Geotech Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | | Fill: (brown, (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 | | | | | BD0023 | 0.9/ | SB-3 1628 |
| | 5 | Medium stiff, (10YR 3/4) dark yellowish brown, mottled (gray), high plasticity, ~~silt~~ clayey SILT, wet | | 2.0 | | 4.9 | 2.0 | ▽ Encountered gw at 4.9 ft |
| | 6 | Sand content 30% at 4.9 ft | | | | | 2.0/ 2.0 | SB-4 1629 |
| | 7 | As above | mh | 0.1 | | | | |
| | 8 | Sand 5% | | | | | | SB-5 1635 |
| | 9 | As above | | 0.3 | | | 2.0/ 2.0 | |
| | 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/USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Medium stiff, (10YR 3/4) dark yellowish brown, mottled (gray), high plasticity, clayey SILT, wet | MH | 0.2 | NA | | | SB-6 1636 |
| | 11 | | | | | 11 BD0032 (FS) BD0024 | | |
| | 12 | Total Depth: 12 Ft | | | | 12 | | |

Project: PBOW

Hole Number: WARWP-DP09A

# HTRW DRILLING LOG

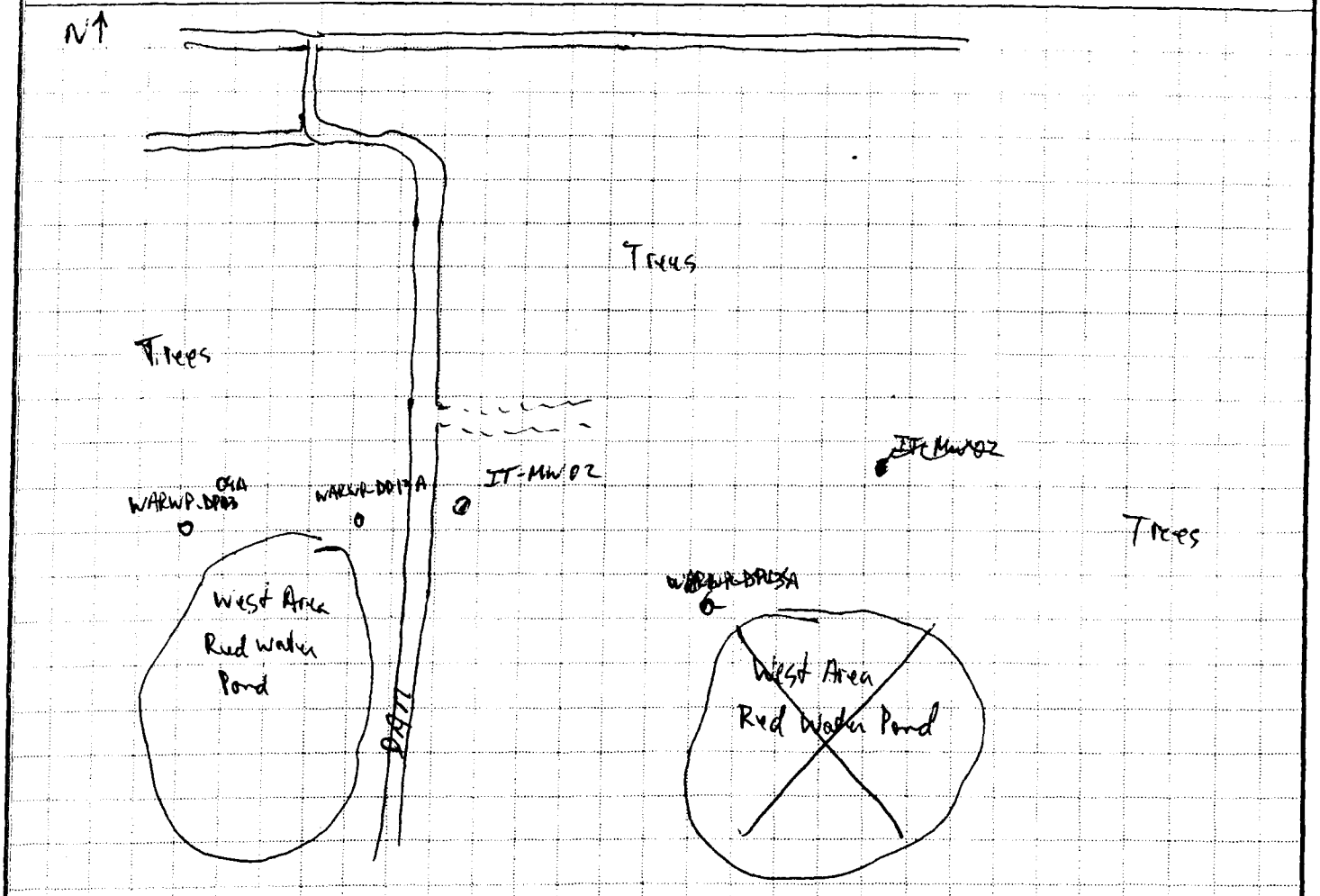
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: WARWP-DP13A | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4"4" ID/8"OD HSA with ~~DX~~ 2.5" ID Stain-less Steel split-spoons. | 8. HOLE LOCATION: See Sketch WARWP Form sample point DP-13 N: 622543.21 E: 1910216.51 | |
| | 9. SURFACE ELEVATION: 637.75 Ft | |
| | 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) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | yes | yes | Nitros | NA | NA | NA % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | yes-bentonite | NA | NA | David Keesh |

LOCATION SKETCH/COMMENTS SCALE:




| | |
|---|---|
| PROJECT: PBOW | HOLE NO. WARWP-DP13A |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP13A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/USDA | Field Screening Results (ppm) | Geotech Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | GRASS | | | | | | |
| | | Fill: (Soft, (10YR 5/4), yellowish brown, homogeneous, low plasticity, clayey SILT, moist) 1.0 | ml | | NA | | 2.0 | Began drilling 9/27/01 ~~1525~~ 1525 SB-1 1526 |
| | 1 | Loose, (10YR 4/4) dark yellowish brown, very fine grain, very well sorted, SAND, trace silt (10%), friable, dry | sp | 0.0 | | | 2.0 | Lime sludge (moist nodules) present |
| | 2 | | | | | | 1.3 | SB-2 1528 |
| | 3 | As above, mottled (dark brown) | | 0.2 | | | 2.0 | |
| | 4 | | | | | 4.1 | | |
| | | Silt content 30% at 5.0 ft very moist 5.1 | | 0.1 | | BD0025 BD0026 FD 5.1 | 1.4 2.0 | SB-3 1530 ▽ Encountered groundwater 5.1' |
| | 5 | Stiff, (10YR 5/2) grayish brown, mottled (40% - yellowish brown), high plasticity, silty CLAY, wet | ch | | | | | |
| | 6 | | | | | | 2.0 | SB-4 1534 |
| | 7 | as above | | 0.0 | | | 2.0 | |
| | 8 | As above | | | | | 1.8 | SB-5 ~~1534~~ DKG 1536 |
| | 9 | | | 0.0 | | | 2.0 | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: WARWP-DP13A

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP13A

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | 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 | C-C | NA | | 2.0/ 2.0 | SB-6 1545 |
| | 11 | | | | | 11 BD00027 (FS) BD0028 | | |
| | 12 | Total Depth: 12 Ft | | | | 12 | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: WARWP-DP13A

# HTRW DRILLING LOG

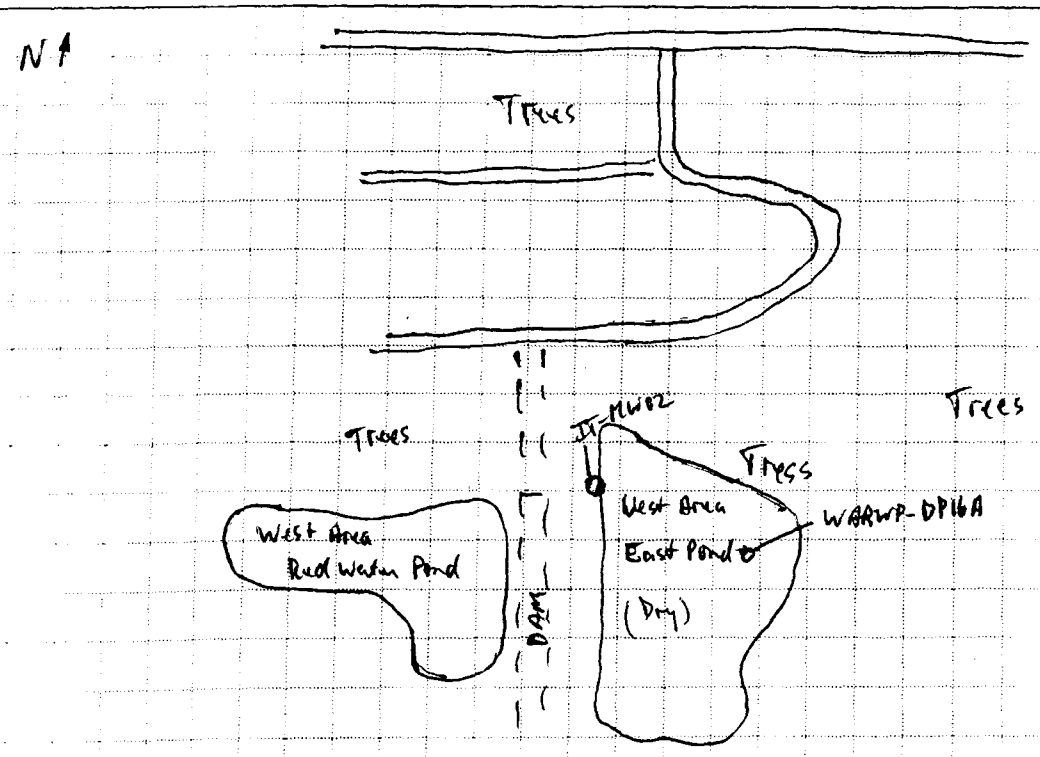
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: WARWP-DP16A |
| 1 COMPANY NAME: IT Corporation | 2 DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 3 SHEETS |
| 3 PROJECT: PBOW | 4 LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5 NAME OF DRILLER: Paul Dickinson | 6 MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 2.5" ID Stain-less 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 | Nitros | SPLP | NA | NA % |

| 22 DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23 SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | yes - Bent. | NA | NA | David Kesal |

LOCATION SKETCH/COMMENTS SCALE: Not to Scale




| PROJECT: PBOW | HOLE NO. WARWP-DP16A |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: WARWP-DP16A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/USM | 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 |
| | | 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 |
| | 1 | | | | | | | 1 |
| | 2 | | | | | | | 2 |
| | | As above, gray "spots" (40%) | cl | | | | 1.2/ 2.0 | SB-2 1305 |
| | 3 | moist | | 0.0 | | | | 3 |
| | | | | | | 3.5 BD0029 BD0029R 4 | | soil (clay) compacted DKK 10/2/01 0827 |
| | 4 | 4 | | | | | | 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 |
| | 5 | | | | | | | 5 |
| | 6 | As above | | | | | | 6 |
| | | 6.6 - 7.5 Ft; Brown, medium grain sand (30%) 6.6 | | | | | 2.0/ 2.0 | SB-4 1315 |
| | 7 | | | 0.0 | | | | 7 |
| | | Color grading to (10YR 4/1) dark gray mottling (5%) yellowish br | mh | | | | | |
| | 8 | As above, high plasticity | | | | | | 8 |
| | | | | | | | 1.6/ 2.0 | SB-5 1320 |
| | 9 | | | 0.0 | | | | 9 |
| | 10 | | | | | | | 10 |

Project: PBOW

Hole Number: WARWP-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/ USM | 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 | auth | 0.0 | NA | | 2.0 | SB-6 1325 |
| | 11 | | | | | 11 | 2.0 | |
| | | | | | | ~~BD0030~~ BD0030R | 10/21/01 | 0850 |
| | 12 | | | | | 12 | | |
| | | Total Depth = 12.0 Feet | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: WARWP-DP16A

# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: PRRWP-DP03A |
| 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: 4 1/4" ID/8" OD HSA with 1 1/2" ID Stainless Steel split-spoons. 2.5" | 8. HOLE LOCATION: See Sketch - Pentolite Area Former ~~stock~~ location 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 | |

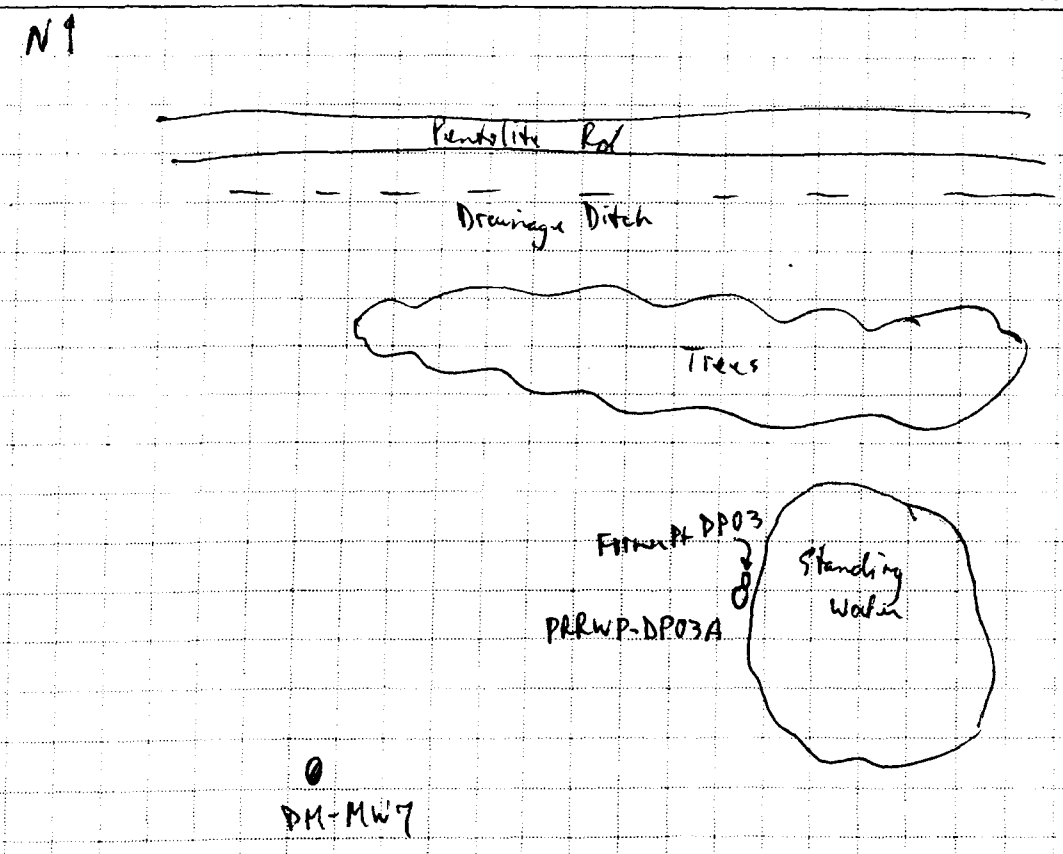
| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | NA |

| 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 Kreahl |

LOCATION SKETCH/COMMENTS

SCALE: Not to scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | PRRWP-DP03A |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PRRWP-DP03A

Project: PBGW

Contractor: D. Kesilu

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | 1 | 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 | Begin drilling 9/27/01 0900 SB-1 0900 |
| | 2 | Fill: (Medium dense, (2.5Y (2.5/1) black, very fine grain, silty SAND, very moist) 2.4 | SM | | | | | |
| | 3 | 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 | mh | 0.4 | | | 2.0/ 2.0 | SB-2 0903 |
| | 4 | | | | | 4.3 BD0001 4.8 | 1.7/ | SB-3 0913 ▽ Encountered groundwater 4.8' |
| | 5 | | | 0.2 | | | 2.0 | |
| | 6 | 6 | | | | | | |
| | 7 | 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 | Color grading to (2.5Y 4/2) dark grayish brown. | | 0.0 | | | | SB-5 0920 |
| | 9 | | | | | | 2.0/ 2.0 | |
| | 10 | | | | | | | |

Project: PBGW

Hole Number: PRRWP-DP03A

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PRRWP-DP03A

Project: PRGW

Geologist: D. Kressler

Sheet 3 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 11 | Medium stiff, (10 YR 4/1) dark gray, mottled (brownish yellow) (20%), high plasticity, clayey SILT, saturated | mh | 0.0 | NA | BD0002 | 2.0 / 2.0 | SB-6-0923 |
| | 12 | Total Depth = 12.0 Ft | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PRGW

Hole Number: PRRWP-DP03A

# HTRW DRILLING LOG

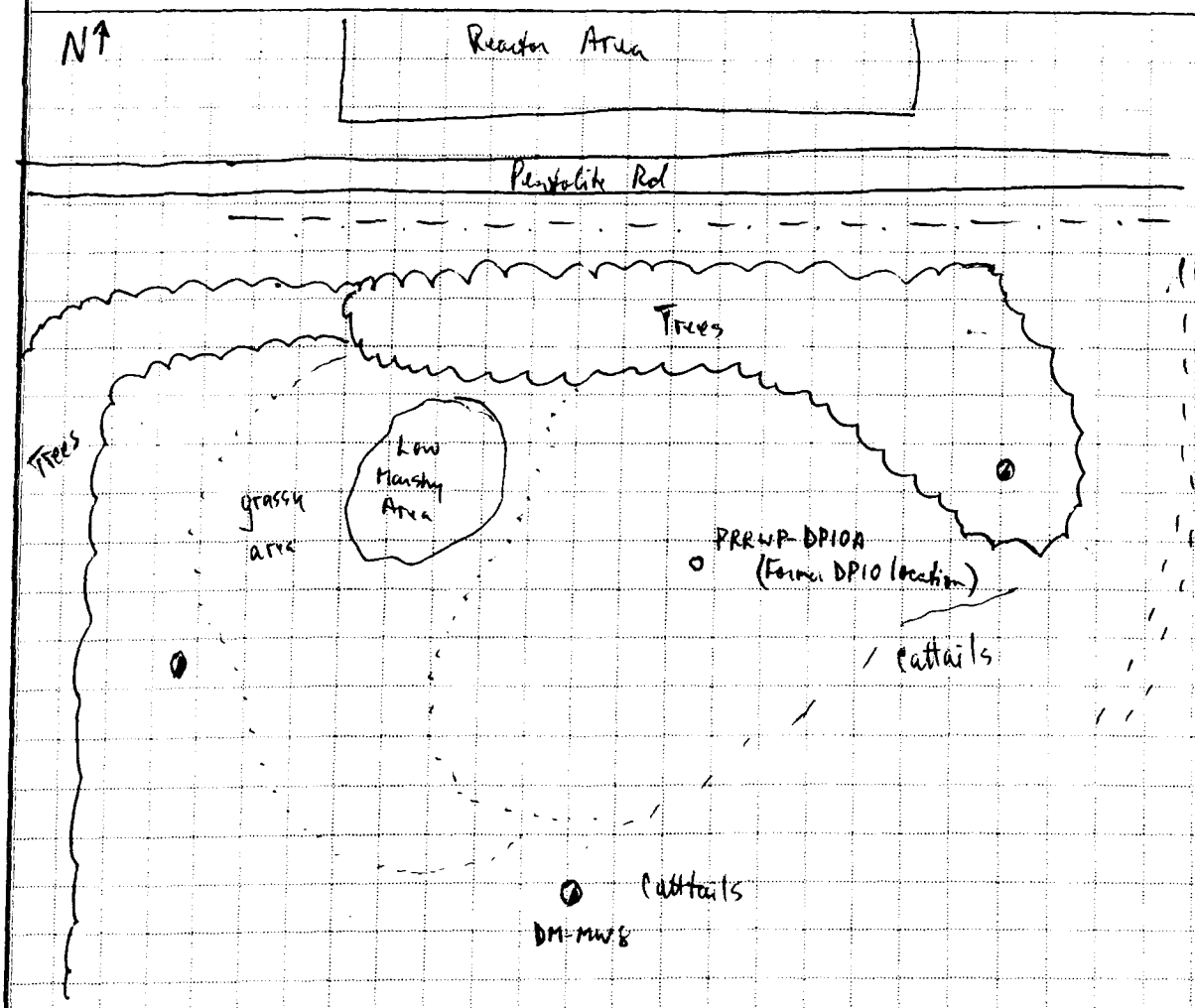
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: PRRWP-DP10A | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 3 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 1/4" ID/8" OD HSA with ~~1.4"~~ 2 1/2" ID Stain-less Steel split-spoons. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: ~~See Sketch~~ 634.90 Ft N: 625028.14 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 Kessler |

LOCATION SKETCH/COMMENTS SCALE:




| PROJECT | HOLE NO. |
|---|---|
| PBOW | PRRWP-DP10A |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PRRWP-DP10A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 3 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Weeds | | | | | | |
| | | Fill: (Loose, (10YR 3/3) dark brown, silty SAND, organic, moist) 0.4 | SM | | NA | | | Began drilling 9/26/01 1155 |
| | 1 | Fill: (Loose, 10YR ~~5/6~~ 4/6 dark yellowish brown, very fine grain. SAND, dry very well sorted.) | SP | 0.0 | | | 2.0/ 2.0 | SB-1 1155 |
| | | color grading to | | | | | | |
| | 2 | (10YR 5/8) yellowish brown, mottled (very light br/tan) | | | | | 1.6/ | SB-2 1200 |
| | 3 | As above | | 0.0 | | | 2.0 | |
| | 4 | As above | | 0.0 | | | 2.0/ | SB-3 1210 |
| | 5 | gray silty SAND spots | | | | | 2.0 | |
| | 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/ | SB-5 1220 |
| | 9 | Color changing at 8.9 ft to (2.5Y 5/3) light olive brown, mottled brownish yellow ~~gray mottles (30%)~~ wet Sand decreases w/depth | | | | | 2.0 | ▽ 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/ Uifc | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Mucheim stiff, (2.5Y 5/3) light olive br, mottled (brownish yellow), high plasticity, clayey SILT, wet | Inh | NM | ND | 10.5 | 2.0 | SB-6 1225 |
| | 11 | | | | | BD0004 MS, MSD | 2.0 | |
| | 12 | Total Depth = 12 Ft | | | | 12 | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PRRWP-DP10A

# HTRW DRILLING LOG

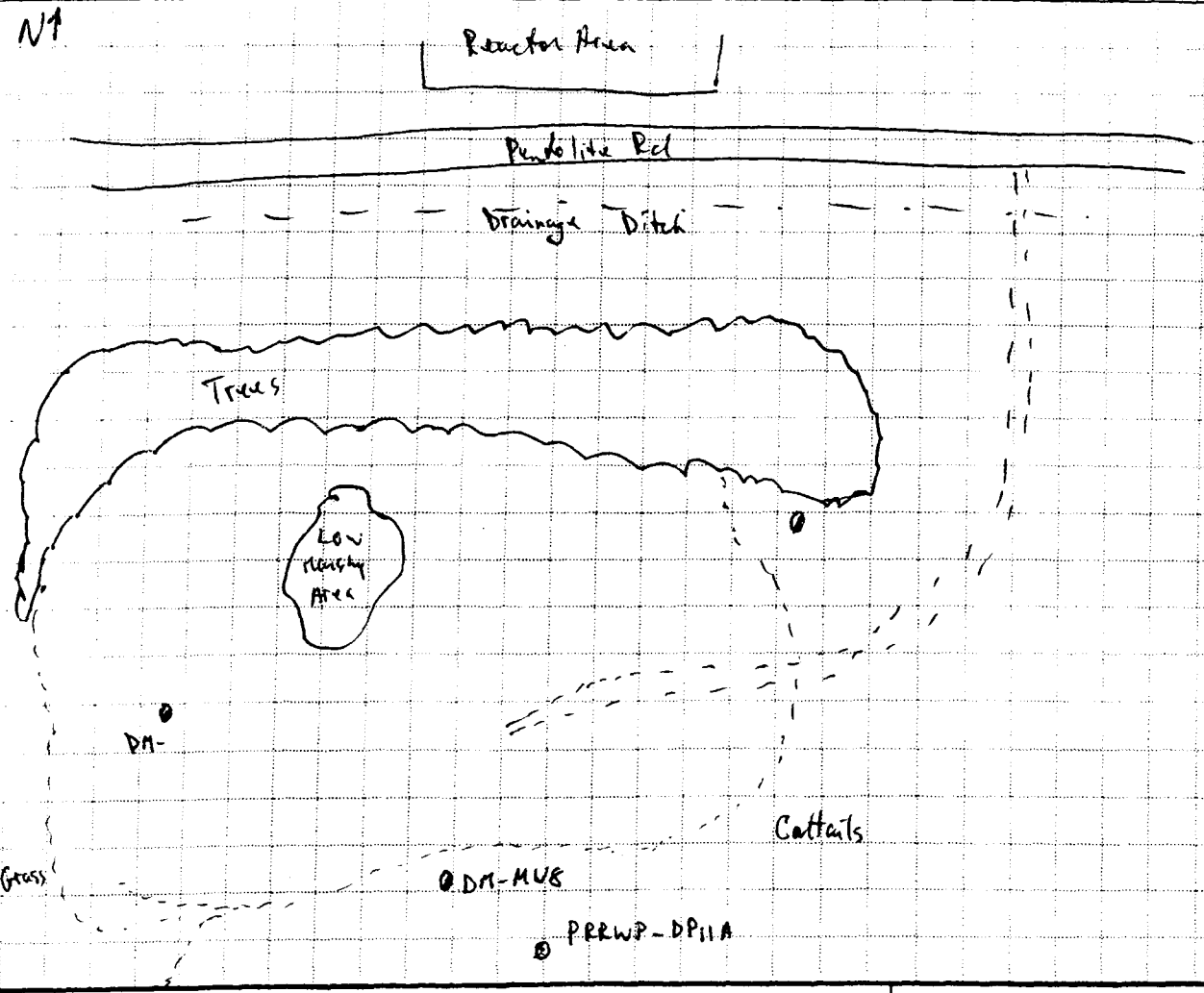
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: PRRWP-DP11A |
| 1 COMPANY NAME: IT Corporation | 2 DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 3 SHEETS |
| 3 PROJECT: PBOW | 4 LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5 NAME OF DRILLER: Paul Dickinson | 6 MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 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 Kessler |

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/ Lithe | 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 | | NA | | 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 | | | | SB-2 1535 |
| | | As above color change to (10YR 4/6) dark yellowish br, mottled (dark gray/black) | SP | | | 2.6 BD0005 3.7 | 1.1/ 2.0 | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | | very moist to wet 4.4 | | | | | 1.7/ | SB-3 1543 ▽ Encountered groundwater at 4.4 ft |
| | | Soft, (2.5Y 4/2) dark grayish brown mottled (br), high plasticity, clayey SILT, trace sand (5%), moist to wet | mh | 0.3 | | ~~PRR5.2 BD0005 5.7~~ | 2.0 | |
| | 5 | | | | | | | |
| | 6 | sand increases w/ depth | | | | | | |
| | | As above | | | | | 2.0/ | SB-4 1548 ~~▽ Encountered groundwater~~ PRR |
| | 7 | vertical fracture 7.7 to 8.0 ft, wet | | 0.0 | | | 2.0 | |
| | 8 | | mh | | | | | |
| | | Color changes to (2.5Y 3/3) dark olive br, mottled (gray/black) sand 30%, saturated | | 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/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 11 | Medium stiff, (2.5Y 3/3) dark olive br, mottled (gray/black/brown), sandy SILT, (30% very fine grain sand), high plasticity, wet | ML | | NA | 11 | 2.0/ | SB-6 1605 |
| | | | | | | BD0006 | 2.0 | |
| | 12 | Total Depth - 12.0 Ft | | | | 12 | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number:

# HTRW DRILLING LOG

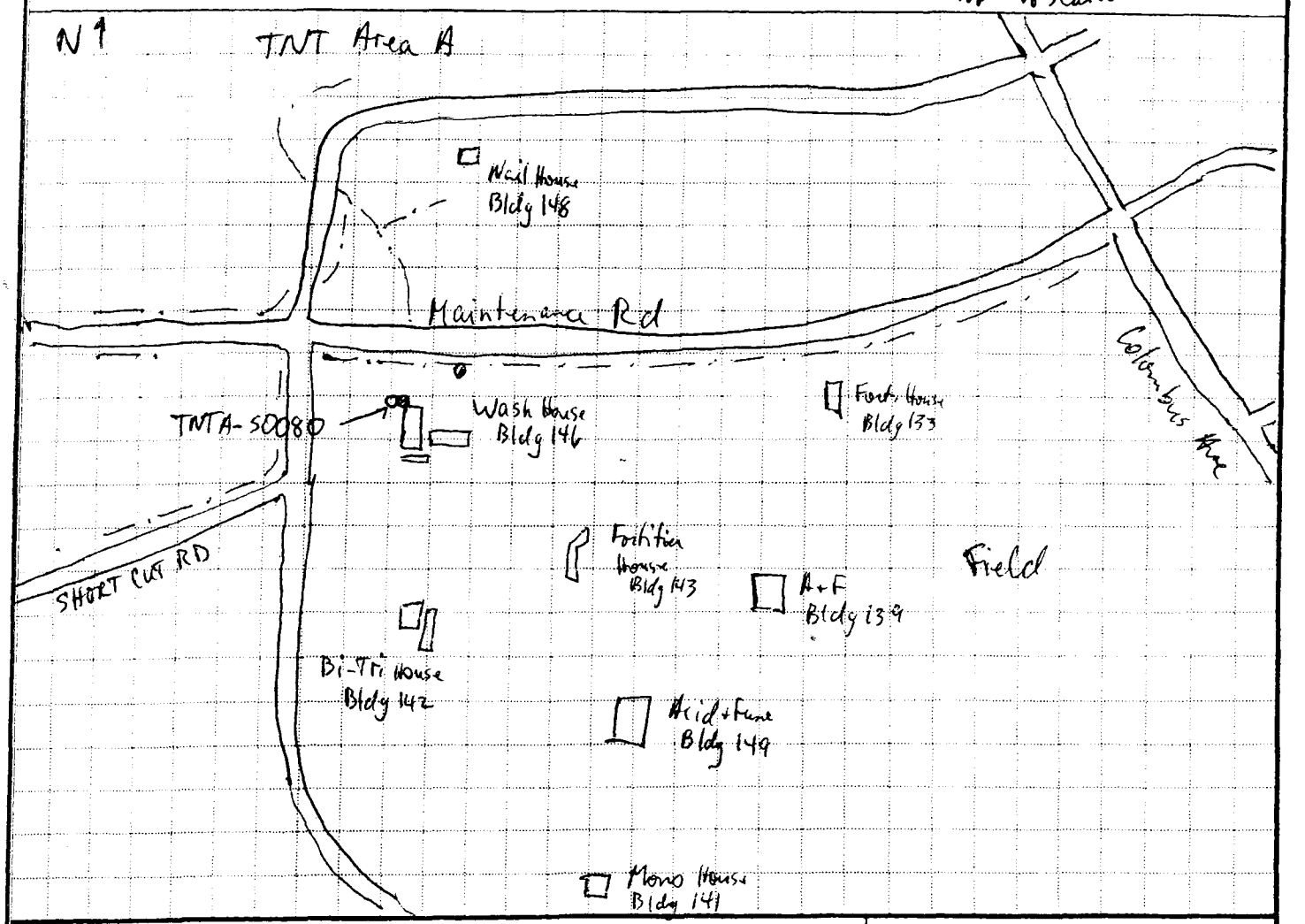
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: TNTA-S0080 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 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~~ RK 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) | 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: 10.0 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 Kreech |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTA-S0080 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-50080

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | WEEDS | | | | | | |
| | | Fill: (Very soft, (10YR 2/1) black, silty SAND, organics, moist) | SM | | NA | 0.5 | | Began drilling 9/26/01 1015 |
| | 1 | Fill: (Loose, (10YR 4/4) dark yellowish brown, mottled (light brown gray), very fine grain, SAND, little silt (15%), moist) | | 1.4 ~~0.6~~ | | BD0009 BD0010 (FD) 1.5 | 1.2/ 2.0 | SB-1 1015 collected w/3' spoon |
| | 2 | 2.3 | | | | | | |
| | | Hard, (2.5Y 5/1) gray, homogeneous, low plasticity, silty CLAY, blocky texture, trace black organics, dry trace rock fragments (1m - 1%, pebble) | | 0.5 | | | 0.5/ 2.0 | SB-2 1020 silty |
| | 4 | | | | | | | SB-3 1025 |
| | 6 | 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 | | | | | 8 | | |
| | | lime pebbles 8.3 - 8.5' | | 1.8 | | BD0011 | 1.7/ | SB-5 1045 |
| | 9 | | | | | ~~BD0012 (split) DKK~~ | 2.0 | |
| | 10 | Total Depth = 10.0 ft | | | | 10 | | |

Project: PBOW

Hole Number: TNTA-50080

# 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: 4 1/4" ID/8" OD HSA with 1.4" ID Stain-less Steel split-spoons. | 8. HOLE LOCATION: See Sketch TNTA- Bldg 195 | |
| | 9. SURFACE ELEVATION: 660.14 Ft N: 622 905.61 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 | |

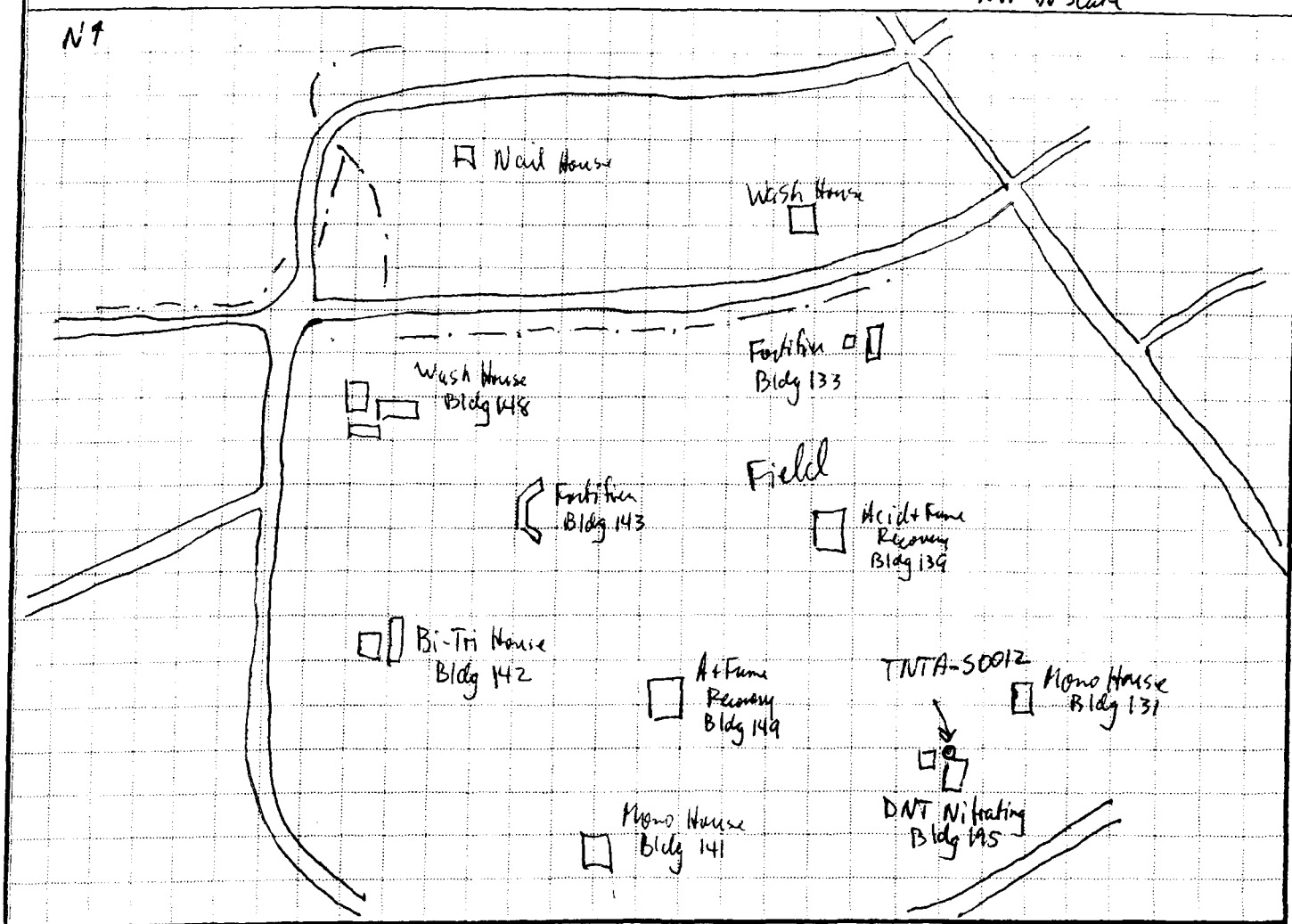
| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | NA |

| 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 Kessler |

LOCATION SKETCH/COMMENTS

SCALE: Not to scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTA-S0012 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-S0012

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | WEEDS | | | | | | |
| | | Black silty SAND 0.2 | | | NA | 0.5 | | Began drilling 9/26/01 0813 |
| | 1 | Fill: (~~Stiff~~ Loose, (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 | | BD0007 1.5 | 1.3/ 2.0 | SB-1 0826 |
| | 2 | | | | | | 1.1/ | SB-2 0822 |
| | | As above, cobbles/pebbles | | 0.0 | | | 2.0 | |
| | 3 | 3 | | | | | | |
| | 4 | | | | | 4 | | |
| | | Fill: (Medium stiff, (10YR 5/4) yellowish brown mottled (gray, orange, brown) low plasicity, 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) |
| | 6 | | | | | 6 | | |
| | | Total Depth = 6.0 Ft | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTA-S0012

# HTRW DRILLING LOG

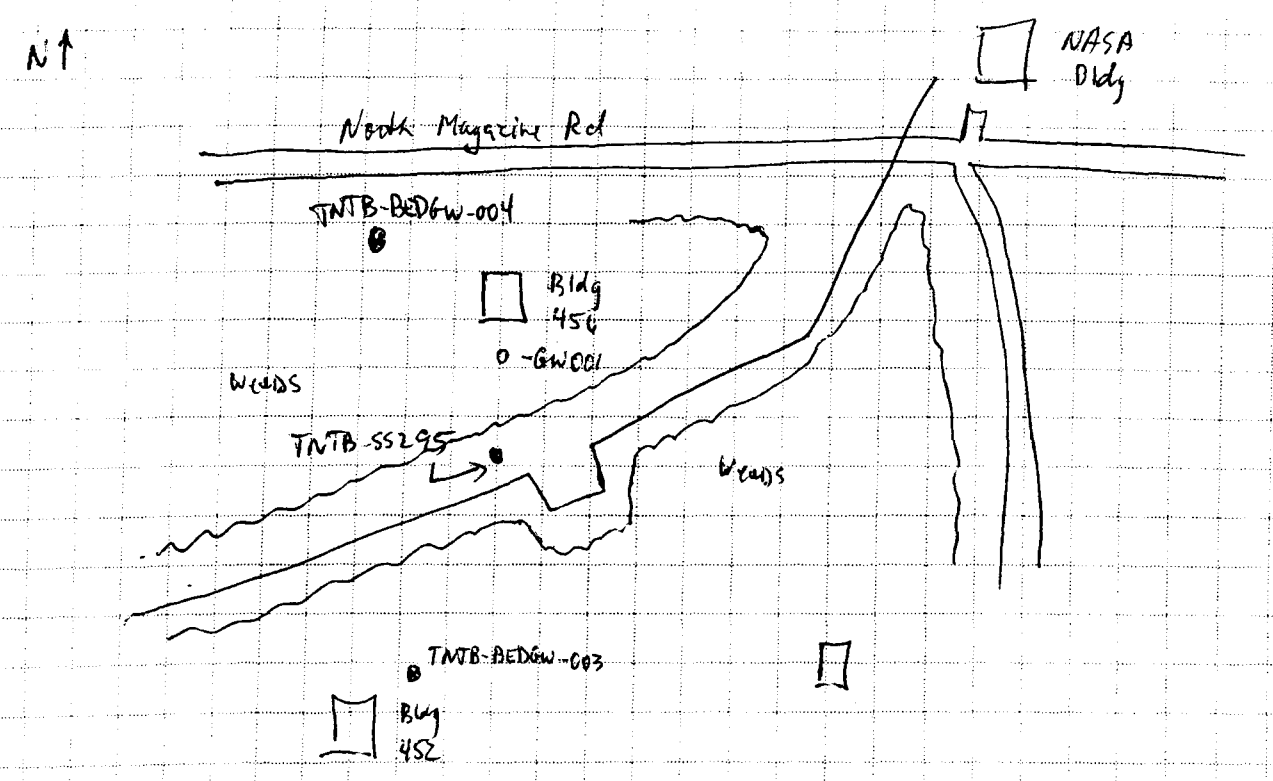
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: TNTB-SS295 | |
| 1 COMPANY NAME: IT Corporation | 2 DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 2 SHEETS |
| 3 PROJECT: PBOW | 4 LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5 NAME OF DRILLER: Paul Dickinson | 6 MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with ~~2"~~ 1" ID Stain-less Steel split-spoons. 2.5" | 8 HOLE LOCATION: See Sketch - TNTB Bldg 456, Formerly 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 Krach |

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 Use | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | 1 | Fill: (Loose, (10YR 4/4) dark yellowish brown, mottled, silty SAND, ~~mottled~~ organics, (black) slate pieces, dry) 1.0 | Sm | | NA | 0<br>BD0013<br>1 | 1.7/ | Began drilling 9/27/01<br>SB-1 1415 |
| | 2 | Fill: (~~Medium stiff~~ Hard, (10YR 3/2) very dark grayish brown, mottled (brown/black), low plasticity, silty CLAY, some sand (20%), fine to very coarse grain, dry) | | | | | 2.0 | |
| | 3 | | | | | 2.5<br>BD0014<br>BD0031 (FS)<br>3.5 | 98/<br>2.0<br>1.0/<br>2.0 | SB-2 1440 |
| | 4 | Total Depth = 4 Ft | | | | | | - Not enough recovery for sample 2-4 Ft<br>- Will push again<br>Again obtained 1 Ft recovery (sample compacted) |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTB-SS295

# HTRW DRILLING LOG

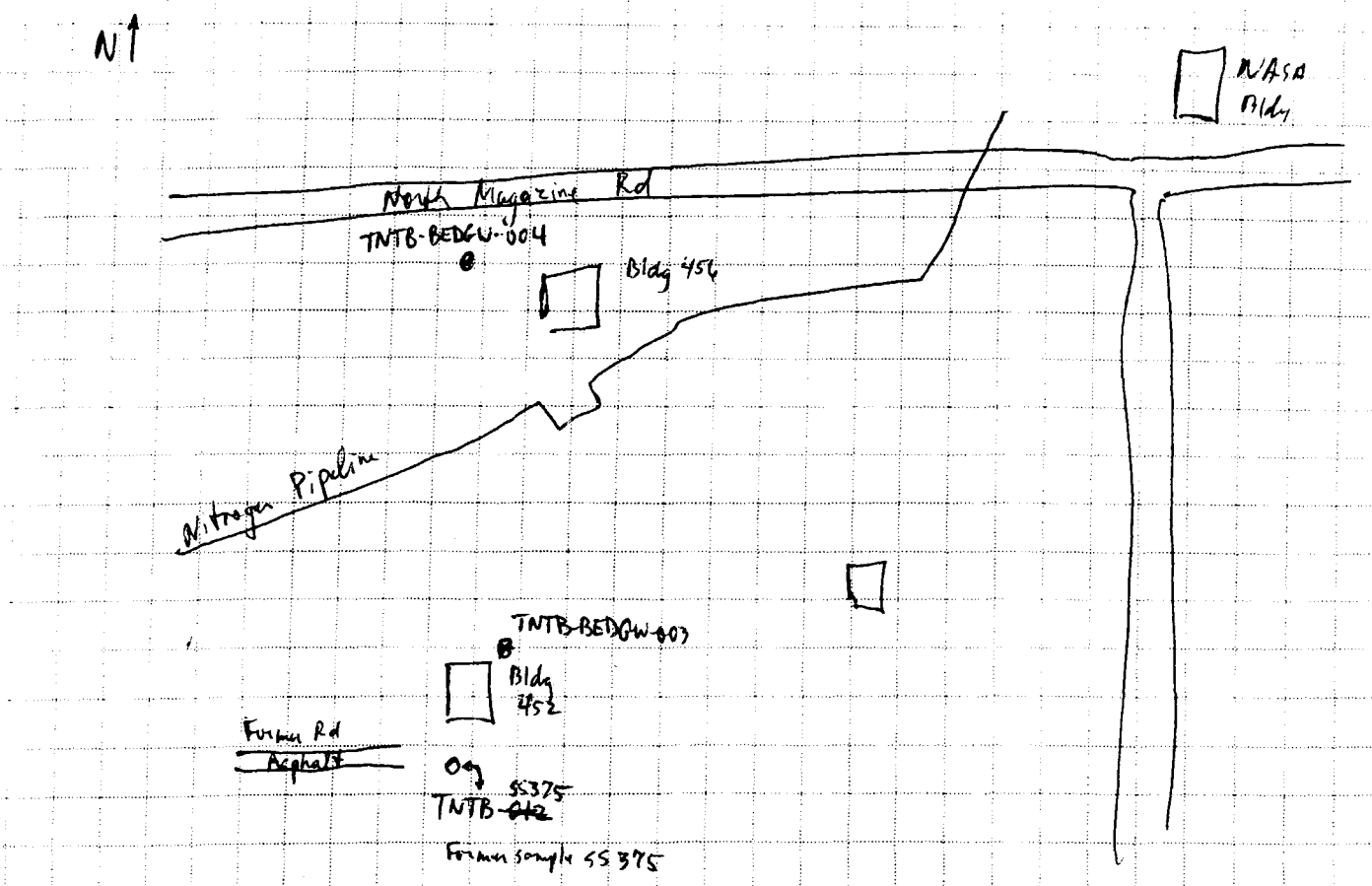
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: SS375 TNTB-~~012~~ | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 1/4" ID/8" OD HSA with 1.5" ID Stain-less Steel split-spoons. 2.5" | 8. HOLE LOCATION: See Sketch TNTB, Bldg 452, Former stacks 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 Kessler |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTB-~~012~~ SS375 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: ~~OLD~~ TNTB ~~SS3~~ SS375

Project: PBGW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | NA | | | Began drilling 9/27/01 1110 |
| | 1 | Fill: (Loose, (10YR 5/6) yellowish brown, very fine grain, very well sorted, SAND, trace silt, dry) 1.1 | SP | 0.0 | | | 1.5/ 2.0 | SB-1 |
| | | Fill: Loose, white/gray, 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 | | | | 2.0/ 2.0 | SB-2 1112 |
| | 3 | | | 0.0 | | | | |
| | 4 | | | | | 4 | | |
| | | As above | | | | BD0015 | 1.3/ 2.0 | SB-3 1115 |
| | 5 | | | 0.0 | | | | |
| | 6 | | SP | | | 6 | | |
| | | As above | | | | | 2.0/ 2.0 | SB-4 1118 |
| | 7 | | | 0.0 | | | | |
| | 8 | | | | | 8 | | |
| | | As above | | | | BD0016 MS MSD | 2.0/ 2.0 | SB-5 ~~59~~ 1120 |
| | 9 | | | 0.0 | | | | |
| | 10 | Total Depth = 10.0 Ft | | | | 10 | | |

Project: PBGW

Hole Number: ~~TNTB SS375A~~

TNTB-SS375

# HTRW DRILLING LOG

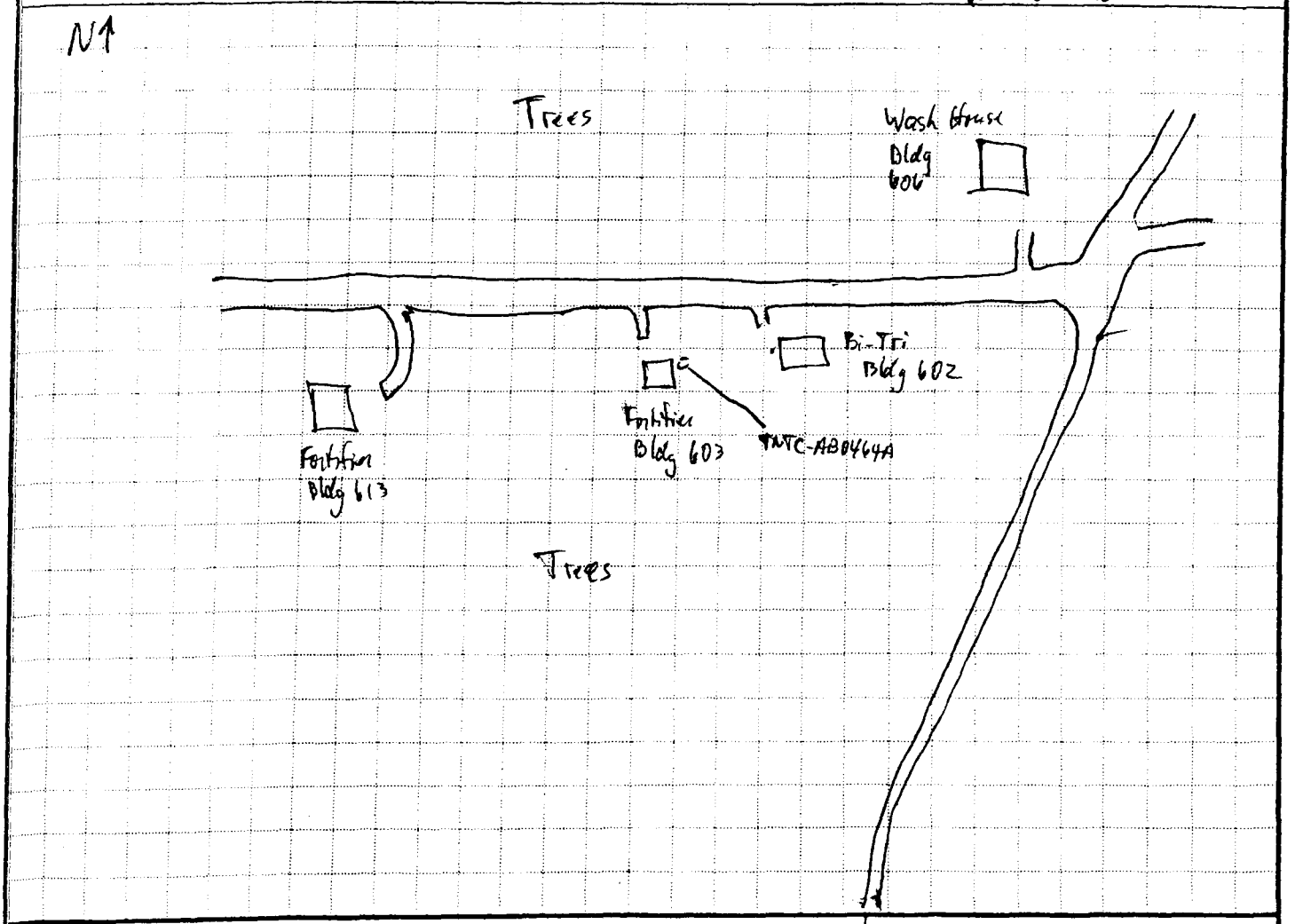
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: TNTC-AB0464A |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 2 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 2" ID Stain-less Steel split-spoons. 2.5" | 8. HOLE LOCATION: See Sketch TNTC Bldg 603 Formy 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 | 15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered | |
| 13. DEPTH DRILLED INTO ROCK: 1 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 8 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 % |

| 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.: TNTC-AB0464A

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-AB0464A

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 2 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS Use | Field Screening Results (ppm) | Geotech Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 0 | GRASS | | | NA | | | Began drilling @ 9/28/01 1620 |
| | | Fill: (Loose, (10YR 4/6) dark yellowish br. vfg. SAND, trace silt, very well sorted, dry) | SP | 0.0 | | | 1.4/ 2.0 | SB-1 1620 |
| | 1 | | | | | | | |
| | 2 | | | | | | | |
| | | 2.3 / 2.4 Crushed GRAVEL | | | | | 1.5/ 2.0 | SB-2 1621 |
| | 3 | 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 | | | | |
| | 4 | | | | | 4 | | |
| | | As above | | 0.0 | | ~~BD0021~~ BD0021R | 1.7/ 2.0 | SB-3 1626 DKK 10/2/01 1115 |
| | 5 | | | | | | | Rusty red color in streaks ~~5.5~~. 5.4-5.7' |
| | | Large LM cobble in shoe 5.7 ft | | | | 5.7 | | |
| | 6 | | | | | 6 | | |
| | | As above | | | | ~~BD0022~~ BD0022R | 2.0/ 2.0 | DKK 10/2/01 1120 SB-4 1630 |
| | 7 | | | | | 7 | | Rusty red colored SAND 6.3-6.6 ft. Contaminate? |
| | | Bedrock: Decomposed, heavily weathered, SHALE, thinnly laminated, 5% bracciopod fossils, | | 0.0 | | | | 62 blows w/300 lb hammer for last 6" |
| | 8 | Total Depth = 8.0 ft | | | | | | ~~SB-5 DKK~~ |
| | 9 | | | | | | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTC-AB0464A

# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: TNTC-AB00GGA | |
| 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: 4 1/4" ID/8" OD HSA with 1.4" ID Stain-less 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 | 15. DEPTH GROUNDWATER ENCOUNTERED: Not encountered | |
| 13. DEPTH DRILLED INTO ROCK: 0.2 Ft | 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 | |

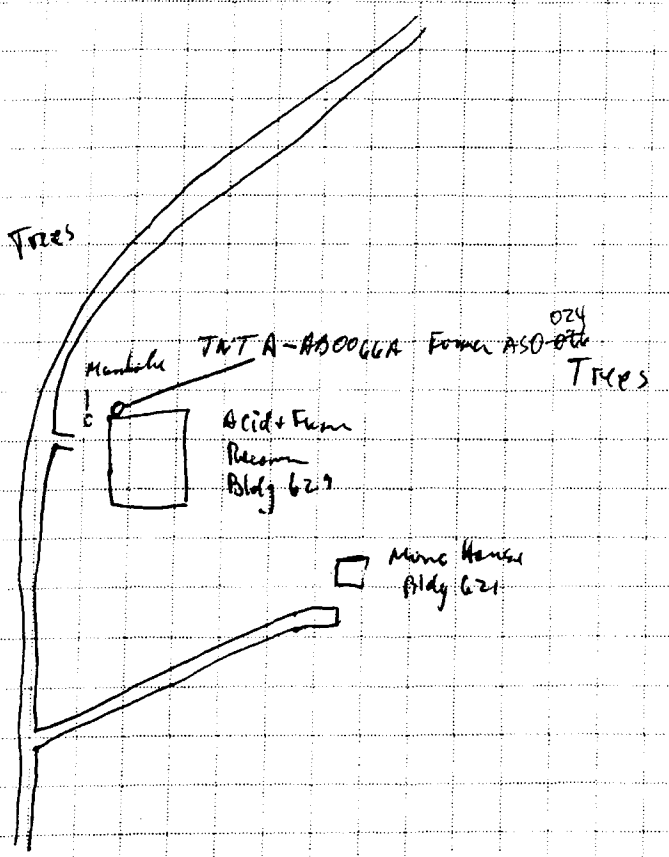
| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | NA |

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | yes - Bent. | NA | NA | David Kesch |

LOCATION SKETCH/COMMENTS — SCALE: Not To Scale

NA




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTC-AB00GGA |

# 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/ USM | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | | Fill: (Soft, (7.5YR 3/4) dark brown, low plasticity, sandy SILT, 40% sand, organics, pebbles, concrete frags, dry) black ash/cinders 0.8 | ml | | N/A | | 1.2/ 2.0 | Began drilling 9/28/01 1445 SB-1 1445 |
| 1 | | Concrete 1.3 | | 0.0 | | | | 1 |
| 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 | | | 2.5 | 1.4/ | start new borehole 6" east 2 |
| 3 | | | | 0.0 | | ~~BD0017~~ BD0017R 3.4 | DKK 10/02/01 0945 2.0 | SB-2 1500 3 |
| 4 | | | | | | | | 4 |
| 5 | | As above | | 0.0 | | | 1.1/ 2.0 | SB-3 1505 5 |
| 6 | | | | | | | | 6 |
| 7 | | Very hard, (10YR 5/1) gray, mottled (2% - yellow br), low plasticity, silty CLAY, dry | cl | 0.0 | | | 2.0/ 2.0 | SB-4 1510 7 |
| 8 | | | | | | 8 | | 8 |
| 9 | | | | 0.0 | | ~~BD0018~~ BD0018R BD0019R FD 9.3 | DKK 10/02/01 1025 1.3/ 2.0 | SB-5 1525 9 |
| 10 | | 3 9.8 ft Weathered SHALE. | | | | Rock | | 10 |

Project: PBOW Total Depth = 10.0 ft

Hole Number: TNTC-AB0066A

# APPENDIX D

# MONITORING WELL HTRW DRILL LOGS
# WELL CONSTRUCTION DIAGRAMS

# HTRW DRILLING LOG

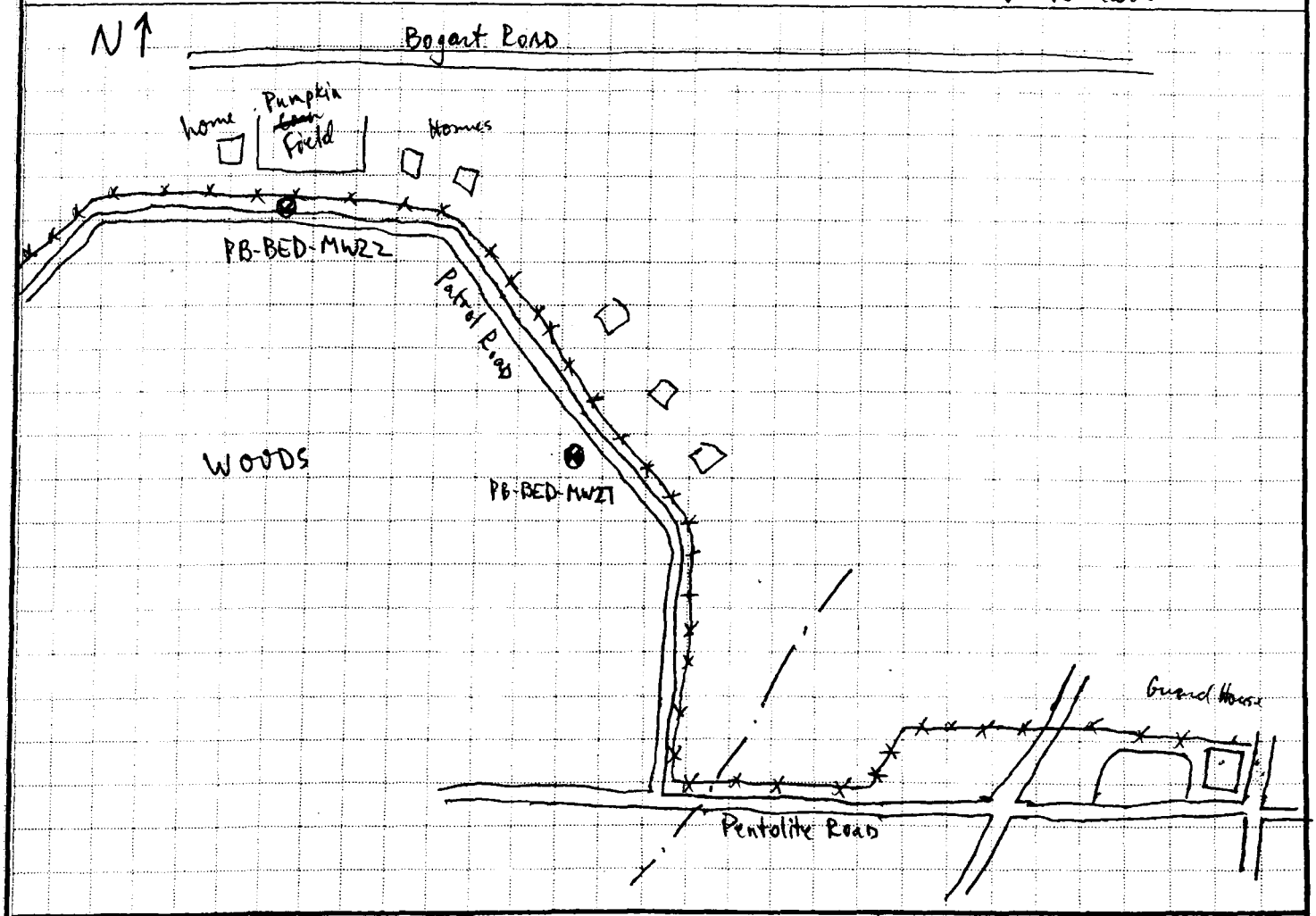
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: PB-BED-MW22 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 6 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson / Paul Schandelle | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 / Contera C2-250 | |
| 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. ~~Installed 2" PVC monitoring well BKK~~ Shot. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 627.22 Ft | |
| | 10. DATE STARTED: 8/24/01 | 11. DATE COMPLETED: 9/10/01 |
| 12. OVERBURDEN THICKNESS: 19.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 4.7 Ft (overburden), ~40 Ft Bedrock | |
| 13. DEPTH DRILLED INTO ROCK: 23.5 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 43 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 6 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler / Reed Fidoris |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO |
|---|---|
| PBOW | PB-BED-MW22 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW22

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Unit | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample ~~for~~ Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass<br>ORGANICS (grass, roots) 0.2 | | | NA | | | Began drilling 8/24/01 |
| | 1 | FILL: (Loose, Dark brown (10YR 3/3), very fine grain, SAND, trace silt (10%), very well sorted, dry) | SP | 0 | | 2/3/<br>5/8<br>1530 | 1.5/<br>2.0 | Blow Counts w/ 140 lb Hammer<br>Background/Breathing Zone<br>0.0 ppm = PID |
| | 2 | FILL: (Loose, dark yellowish brown (10YR 4/6), very fine grain, SAND, trace silt (5%), very well sorted, dry, mottled (brownish yellow, light/dark brown) (moist at 4.7 ft)) | | 0 | NA | 2/2/<br>5/9<br>1535 | 1.7/<br>2.0 | VRAE:<br>CO = 0 ppm<br>LEL: 0%<br>$H_2S$: 0 ppm<br>$O_2$: 21.0 % |
| | 4 | Medium dense, olive brown (2.5Y 4/3), homogeneous, vfg, SAND, very well sorted, wet | SP | 0 | NA | 5/7/<br>12/25<br>1538 | 1.8/<br>2.0 | ▽ Encountered (overburden) groundwater at 4.7 ft |
| | 6 | Dense, dark olive gray (5Y 3/2), homogeneous, vfg, SAND very well sorted, trace of pebbles (2%), rounded, (black/gray), wet 7.4 | | 0 | NA | 8/13/<br>20/27<br>1544 | 2.0/<br>2.0 | |
| | 8 | Stiff, dark gray (2.5Y 4/1), homogeneous, SILT, little sand (15%), high plasticity, trace pebbles (8mm), ~~wet~~, trace light pink "specks" (2) saturated | mh | 0 | NA | 8/9/<br>6/5 | 2.0/<br>2.0 | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW22

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW22

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample ~~No~~ Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Very stiff, dark gray (2.5Y 4/1), homogeneous, SILT, trace to little sand (10%), ~~little~~ high plasticity black spot (manganese?), trace light pink spots (3mm), wet trace clay (5%) | mh | 0 | NA | 5/6/ 17/22 1555 | 2.0/ 2.0 | |
| | 12 | As above, 3% black spots, ~~trace~~ few sand pockets (2) | | 0 | NA | 7/8/ 9/12 1558 | 2.0/ 2.0 | |
| | 14 | As above, 5% black spots, | | 0 | NA | 3/4/ 6/6 1603 | 2.0/ 2.0 | |
| | 16 | As above Trace rock pebbles (black, dark gray) 2-4mm, rounded, no sand, wet | | 0 | NA | 2/4/ 6/5 1613 | 2.0/ 2.0 | |
| | 18 | Hard, ~~[illegible]~~, as above, rounded pebbles increase in number 15%, moist | | 0 | NA | 5/6 50 for 6" 1621 | 1.5/ 1.5 | |
| | 19 | Spoon refusal @ 19.5 Ft | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW22

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW22

Project: PBOW

Geologist: D. Kressler/S. McLeod

Sheet 4 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | Very Hard, dark gray, LIMESTONE | NA | NA | NA | NA | NA | Began cutting with 8" rotary bit at 19.5 ft. Recirculated w/ water. Distinct $H_2S$ odor. URAE: CO = 0 ppm, LEL = 0 %, $H_2S$ = 0 ppm, $O_2$ = 20.9 % |
| | 21 | | | | | | | |
| | 22 | Soft zone 22 to 22.3 ft (22 – 22.3) | | | | | | |
| | 23 | | | | | | | |
| | 24 | | | | | Began Coring 9/10/01 | | Drilled to 24.5' w/ 8" OD roller bit. 6" ID/6 5/8" OD casing installed to 24.5' |
| | 25 | gray, hard, massive limestone, no bedding, no weathering | | | BOX 1 24.5-28.5 | HTCS | Run 1 | Depth - 24.5-31; Run - 6.5'; Rec - 4'; Start time: 10:20; End " - 10:45; PID - NA; MSA - 20.7 - $O_2$, 0 - $H_2S$, 0 - CO, 0 - LEL |
| | 26 | | | | | 26.5 | | |
| | 27 | | | | | 27.5 | | |
| | 28 | | | | | 28.5 | | |
| | 29 | | | | | | | |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW22

# HTRW DRILLING LOG

(continuation sheet)

PB-BED-MW22

Project: PBOW

Geologist: S. M. Jewell

Sheet 5 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Urbe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FIGSS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | | | | | | | |
| | 31 | gray, hard, massive ls. no bedding, no weathering | | | BOX 3 31-34 | 31.4 | Run 2 | Run 5' Rec - 5' End time: 11:27 depth - 31-36' MSA - 0 - $H_2S$ 0 - LEL 0 - CO 20.7 - $O_2$ |
| | 32 | | | | | 32.2 | | |
| | | | | | | 32.3 | | |
| | 33 | | | | | 33.3 | | |
| | 34 | | | | BOX 3 34-36 | 34.5 | | |
| | 35 | | | | | 35.5 | | |
| | 36 | | | | | 35.8 | | |
| | 37 | very hard. gray, massive. no weathering, no bedding | | | Box # 4 | 37.0 | Run 3 | Run 4' Rec - 3' Run 36-40 |
| | 38 | | | | | 38 | | |
| | 39 | | | | Box # 5 | 39 | | |
| | 40 | | | | | 40 | | Pull pump 11:40 |

Project: PBOW

Hole Number: PB-BED-MW22

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW22

Project: PBOW

Geologist: [illegible]

Sheet 6 of 6 Sheets

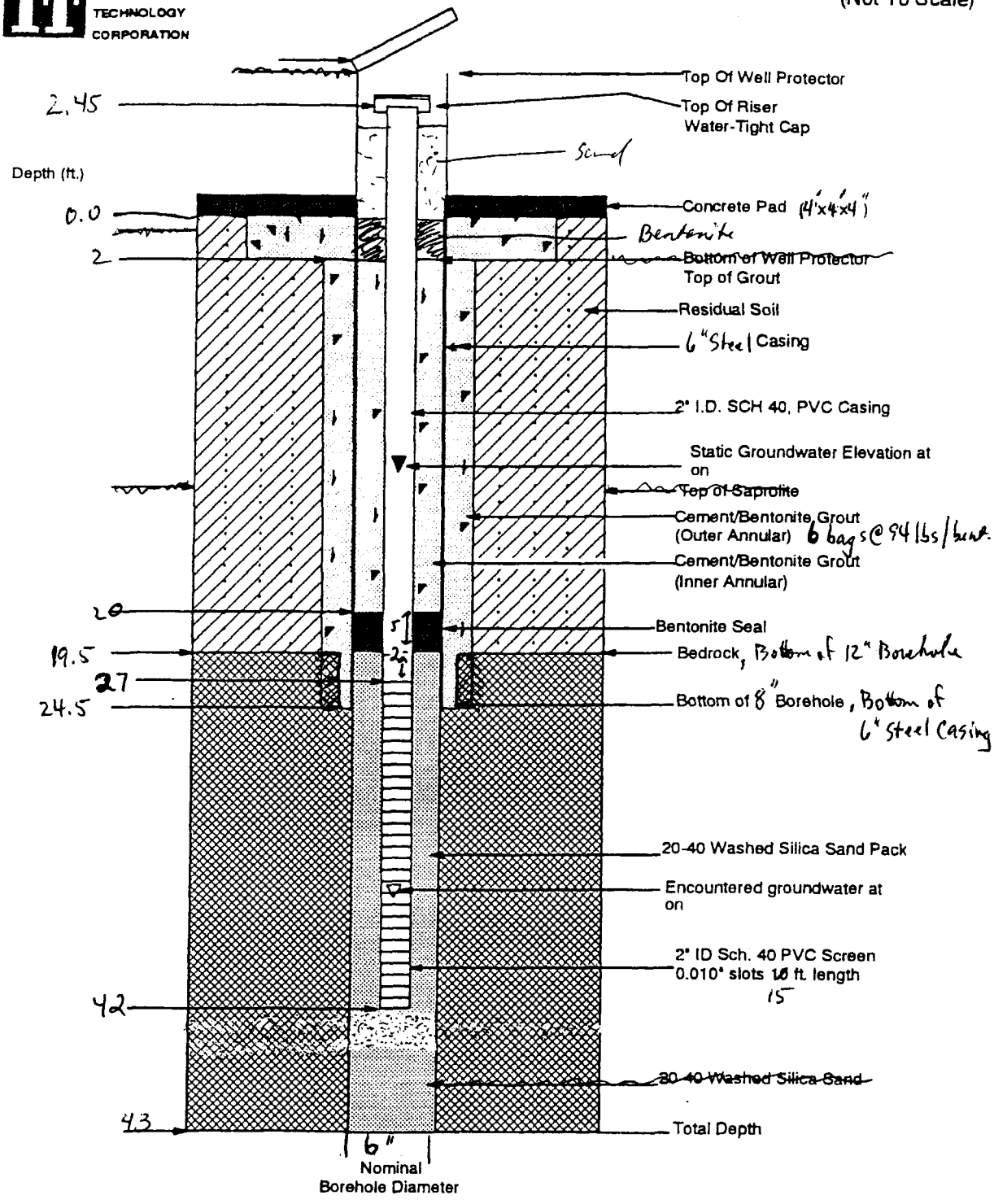
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | gray, massive, hard, limestone, w/no bedding, no weathering, hc. odor, visible | | | Box 5 | Frac5 | Run 4 | Depth - 40-43' Run - 3' Rec - 3' |
| | 41 | | | | | 40.7 | | End time 13.25 |
| | | | | | Box 6 | | | MSA 20.7% $O_2$ 0-CO 0-$H_2S$ 0-LEL |
| | 42 | | | | | 41.8 | | |
| | | | | | | 42.3 | | SET WELL MW 22 |
| | 43 | Total Depth = 43 Ft | | | | 43.0 | | |
| | 44 | | | | | | | |
| | 45 | | | | | | | |
| | 46 | | | | | | | |
| | 47 | | | | | | | |
| | 48 | | | | | | | |
| | 49 | | | | | | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW22

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW22

Date Installed: 9-10-01

Elevation Top of Casing: 629.67 Ft.

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BW\MWA23DWC.DRW/lj/5-28-93

# HTRW DRILLING LOG

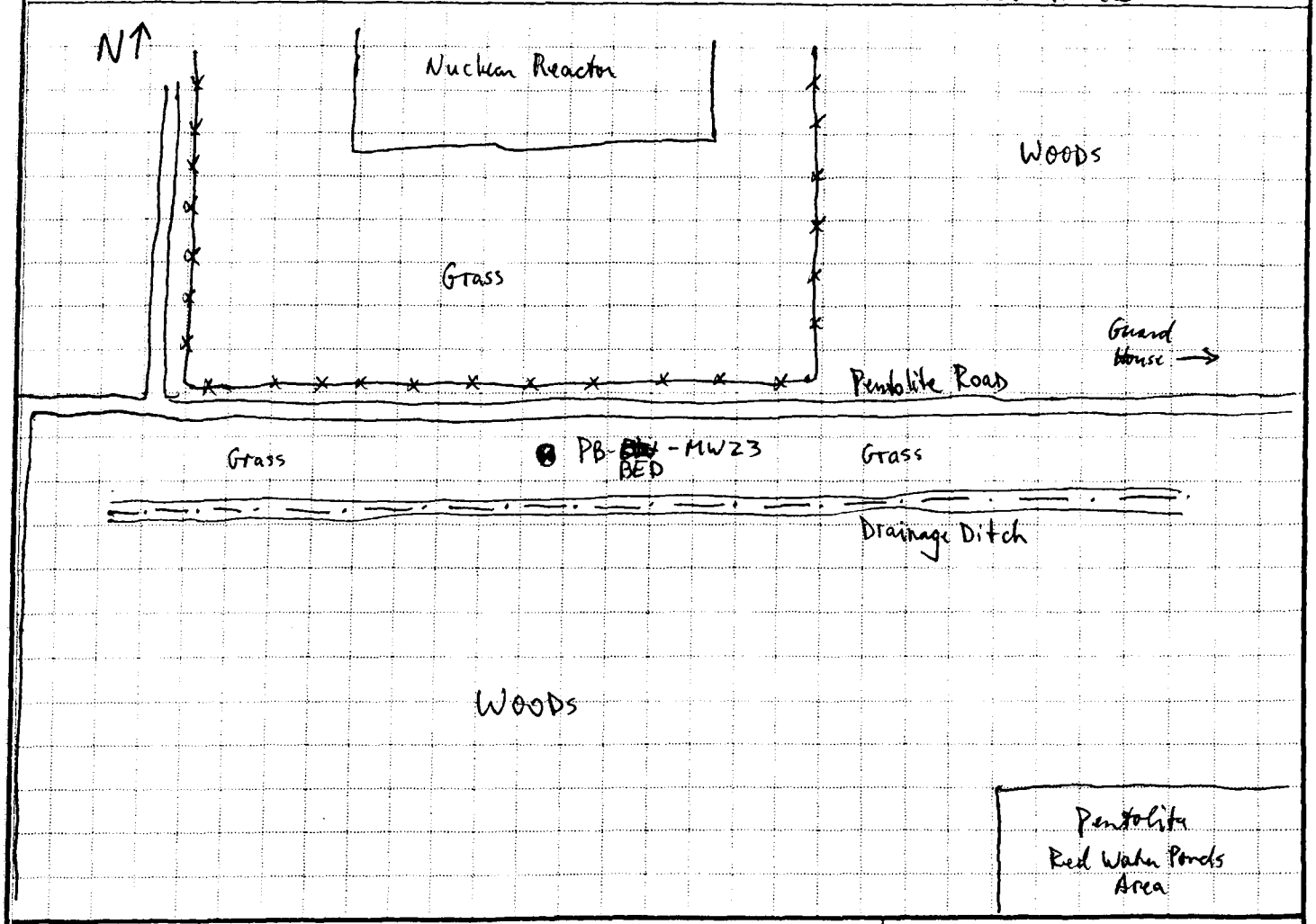
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: PB-BED-MW23 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 9 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson / Todd Schmolfeldt | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 / Cantera C2-250 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 1.4" ID Stain-less Steel split-spoons. Borehole reamed with 8¼" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6⅝" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 4" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 631.11 Ft | |
| | 10. DATE STARTED: 8/25/01 | 11. DATE COMPLETED: 9/06/01 |
| 12. OVERBURDEN THICKNESS: 26.3 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 7.1 Ft (overburden) | |
| 13. DEPTH DRILLED INTO ROCK: 47.7 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~15.0 Ft~~ 58.8 Ft 9/08/01 1430 | |
| 14. TOTAL DEPTH OF HOLE: 74 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

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

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler / [signature] |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | PB-BED-MW23 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW23

Project: PBOW

Geologist: D. Kyssler

Sheet 2 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS Unit | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | | Fill: Soft, very dark grayish brown (2.5Y 3/2), sandy SILT with organics, moist 0.3 | | | NA | 2/4 | 1.5 | Began drilling 8/25/01 1230 |
| | 1 | Fill: Loose, (10YR 4/6) dark yellowish brown, homogeneous, vfg, silty SAND, silt (40%), dry 1.2 | SM | 0 | | 6/7 | 2.0 | Backg |
| | | color change 1.0-1.2 ft; (2.5Y 3/3) dark olive brown. | | | | | | |
| | 2 | Fill: Loose, (10YR 5/6) yellowish brown, homogeneous vfg. SAND, trace silt (5%), very well sorted, dry 2.0 | SP | | | | | |
| | | | SP | | NA | 5/5 | 1.4 | |
| | 3 | Fill: Stiff, (10YR 4/6) dark yellowish brown, mottled (tan, black), sandy SILT, low plasticity, dry 2.8 | ML | 0 | | 7/8 | 2.0 | |
| | | Fill: Loose, (2.5Y 4/4) olive brown; mottled, (whitish brown) 30%, vfg, SAND, trace silt, moist 3.4 | SP | | | 1235 | | |
| | 4 | Stiff, (10YR 5/2) grayish brown, mottled (brown), silty CLAY, little sand (10%), high plasticity, moist | CH | 0 | NA | 4/5 | 2.0 | |
| | 5 | Sand content begins increasing at 5 ft | | | | 8/9 | 2.0 | |
| | | Sand layer 5.8-6.0; very fine grain (10YR 3/6) dark yellowish brown 5.8 6.0 | SP | | | 1238 | | |
| | 6 | Medium stiff (10YR 5/2) grayish brown, mottled (browns), high plasticity, silty CLAY with sand, moist. | CH | 0 | NA | 4/4 | 1.9 | |
| | 7 | Loose, (2.5Y 3/3) dark olive brown, homogeneous, vfg, SAND, trace silt (10%), very well sorted, wet | SP | | | 6/6 | 2.0 | Encountered ▽ overburden groundwater at 7.1 ft |
| | | | | | | 1242 | | |
| | 8 | 8.3 | | 0 | NA | | | |
| | 9 | Medium stiff, (2.5Y 4/1) dark gray, homogeneous, high plasticity, clayey SILT little sand (20%), vfg sand, black manganese spots (2), wet | MH | | | 2/3 | 2.0 | |
| | | | | | | 2/2 | 2.0 | |
| | 10 | | | | | 1245 | | |

Project: PBOW

Hole Number: PB-BED-MW23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW23

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Soft, (2.5Y 4/1) dark gray, homogeneous, high plasticity, clayey SILT, trace sand<5%, black manganese spots (2), pink spots (<5%), wet (5-8mm) ↳(3mm) | mh | 0 | NA | 2/2 / 2/5 / 1249 | 2.0 / 2.0 | |
| | 12 | As above | NM | NM | NA | 1/3 / 4/5 / 1251 | 2.0 / 2.0 | |
| | 14 | As above | mh | NM | NA | 1/3 / 4/3 / 1253 | 2.0 / 2.0 | |
| | 16 | As above | NM | NM | NA | 1/2 / 4/5 / 1303 | 2.0 / 2.0 | |
| | 18 | As above | NM | NM | NA | 1/2 / 3/4 / 1307 | 2.0 / 2.0 | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW23

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | Soft, (2.5 y 4/1) dark gray, homogeneous, high plasticity, clayey SILT, trace sand (10%). black manganese spots, light pink spots (3 mm) (5-8 mm) trace pebbles (5 mm), rounded | mh | NM | NA | 1/1/ 2/4 1314 | 2.0/ 2.0 | |
| | 22 | As above, stiff, pebbles and granules increase w/depth | mh | NM | NA | 3/5/ 7/9 1318 | 2.0/ 2.0 | |
| | 24 | As above, hard, pebbles and granules 30-40%, | | NM | NA | 5/7/ 27/32 1336 | 2.0/ 2.0 | Best spoon<br>Limestone pebbles in shoe 28x60mm and 22x22x22 mm |
| | 26 | As above, pebbles/granules 45% | | NM | NA | 50 for 3" 1354 | 0.3/ 0.3 | Bottom of 12" OD Borehole |
| | 27 | Spoon Refusal @ 26.3 Ft<br>LIMESTONE, dark gray, soft, fossiliferous (bracks), very slight weathering | NA | NA | NA | NA | NA | Began cutting rock w/ 8" OD tricone roller bit. Flushed with recirculated water. Competent drilling<br>VRAE:<br>CO = 0ppm<br>LEL = 0%<br>$H_2S$ = 0ppm<br>$O_2$ = 21.2 %<br>Occasional faint $H_2S$ odor.<br>8" OD Borehole to 30 ft<br>6" Casing Set at 30 ft |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW23

Project: PBOW

Contractor: R. Poderis

Sheet 5 of 9 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) | Coring Starter Remarks at 30' 9/6/01 |
|---|---|---|---|---|---|---|---|---|
| | 30 | limestone, grey, hard, massive, not weathered natural hydrocarbon odor | | | Box #1 1 | | | Depth 30-33 Start time 730 end 915 LEL 0 9/6/01 CO 0 $H_2S$ 0 $O_2$ 20.7 PID 0.0 Run 3' recovery 1' Run #1 |
| | 31 | | | | | Photo RSP 1 #1 | | |
| | 32 | | | | | | | |
| | 33 | | | | Run 2 33 | | | 33 |
| | | Same | | | | | | Depth 33-38 Start time 930 end 945 Run 5' recovery 5' Run #2 |
| | 34 | @ nat. hydrocarbon odor. nat. hc. visible throughout | | | Box # 2 | 33.5 | | |
| | 35 | | | | | 35.5 | | |
| | | | | | | 36 | | |
| | 36 | | | | Photo 2 | | | |
| | 37 | | | | | | | 945 LEL 0 CO 0 $H_2S$ 0 $O_2$ 20.7 PID 1.6 |
| | 38 | | | | Run 3 38 | | | 38 |
| | 39 | | | | Box 3 + Box 4 (Box 3 = 38-41.5) | 38.5 | | Depth 38-43 Start 945 end 1000 Run 5' recovery 5' Run #3 |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW-23

Project:

Geologist: R. Podenis

Sheet 6 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Radon | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | | | | | | | |
| | 41 | | | | Box 4 41.5 - 44.5 | | | |
| | 42 | | | | | | | |
| | 43 | | | | 43 Run #4 | | | depth 43-48 |
| | | Massive gry limestone oil seeps from core | | | | 44.2 | | run 5' |
| | 44 | | | | | 44.5 | | recovery 4' start 1000 end 1110 |
| | 45 | | | | | 46 | | |
| | | | | | | 47.2 | | |
| | 46 | | | | Box 5 44.5 - 48 | 47.8 | | |
| | 47 | | | | | | | |
| | 48 | | | | 48 Run 5 | | | 48-53 |
| | | Same | | | | 48.8 | | run 5' |
| | | | | | Box 6 | 48.9 | | recov 5' |
| | 49 | | | | 48- ~~53~~ 51 | 50.4 | | end 1130 |
| | | | | | | 50.6 | | |
| | | | | | | 51.8 | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW23

Project: PBOW

Geologist: R Podesi's

Sheet 7 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. fracture | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 50 | gray massive hard limestone nat. hc odor + oil seeps | | | | | | LEL Q<br>CO Q<br>$H_2S$ Q<br>$O_2$ 20.6<br>PID 0.0 |
| | 51 | | | | 51 | 52 | | |
| | | | | | Box 7 (51-54') | | | Box 7 51-54 |
| | 52 | | | | | | | |
| | 53 | | | | | 53 | | |
| | | | | | | Run 6 | | depth 53-58<br>run 5'<br>recovery 5'<br>end time 1200<br>start time 1130 |
| | 54 | | | | 54 | 54 | | |
| | | | | | Box 8 (54-57.5') | 55 | | Box 8 54-57.5 |
| | 55 | | | | | | | |
| | 56 | | | | | 56 | | |
| | 57 | | | | | | | |
| | 57.5 | | | | 57.5 | 57.5 | | |
| | 58 | | | | | 58 | | |
| | | | | | | Run 7 | | depth 58-63<br>run 5'<br>recov 5'<br>start 1200<br>end 1210 |
| | | | | | Box 9 (57.5-60') | | | |
| | 59 | | | | | | | |
| | 60 | | | | | | | |

Project: PBOW

Hole Number: BED MW-23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED MW23

Project: PBOW

Geologist: RPodeni

Sheet 8 of 9 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 60 | Massive grey limestone, hard | | | Box 10 (60-63') | 61.5 | | Box 9 57.5-60.0 Box 10 60-63 |
| | 63 | Same | | | 63 Run 8 63 | | | depth 63-68 run 5' recov 5' end 1230 |
| | | | | | Box 11 (63-66.5') | 64.7 | | Box 60-6 Box 11 63-66.5 |
| | | | | | 66.5 | | | |
| | | | | | Box 12 (66.5-69.5') | 67 | | depth 68-73 run 5' Box 12 66.5-69.5 recov. 5' end 1 pm |
| | | | | | 69.5 | | | |

Project: PBOW

Hole Number: MW-23

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB BED MW23

Project: PBOW

Geologist: PPaden

Sheet 9 of 9 Sheets

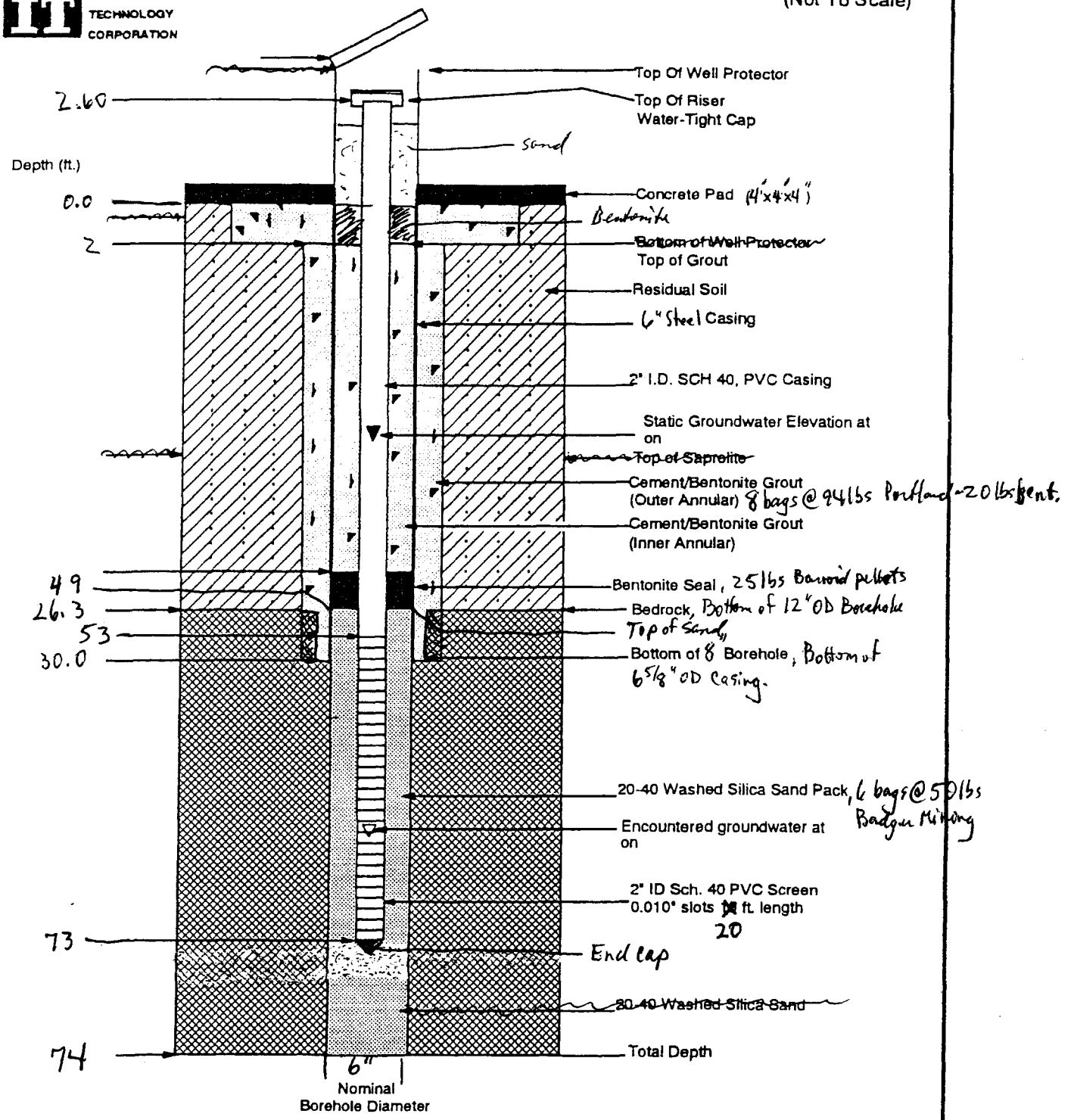
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| 70 | | grey limestone, hard, massive<br>hc odor | | | Box 13 (69.5-74') | 70.5 | | |
| | 1 | | | | | | | |
| | 2 | | | | | | | Box 13 ~~DICK~~ 69.5-74 |
| | 3 | | | | 74 | | | |
| | 4 | | | | | | | Stop and pump test 1 PM |
| | | Total Depth = 74 ft | | | | | | slowly recharging 230 pm |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| 8 | 0 | | | | | | | |

Project

Hole Number:

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW23
Date Installed: 9/8/01
Elevation Top of Casing: 633.71 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA23DWC.DRW/lj/5-28-03

# HTRW DRILLING LOG

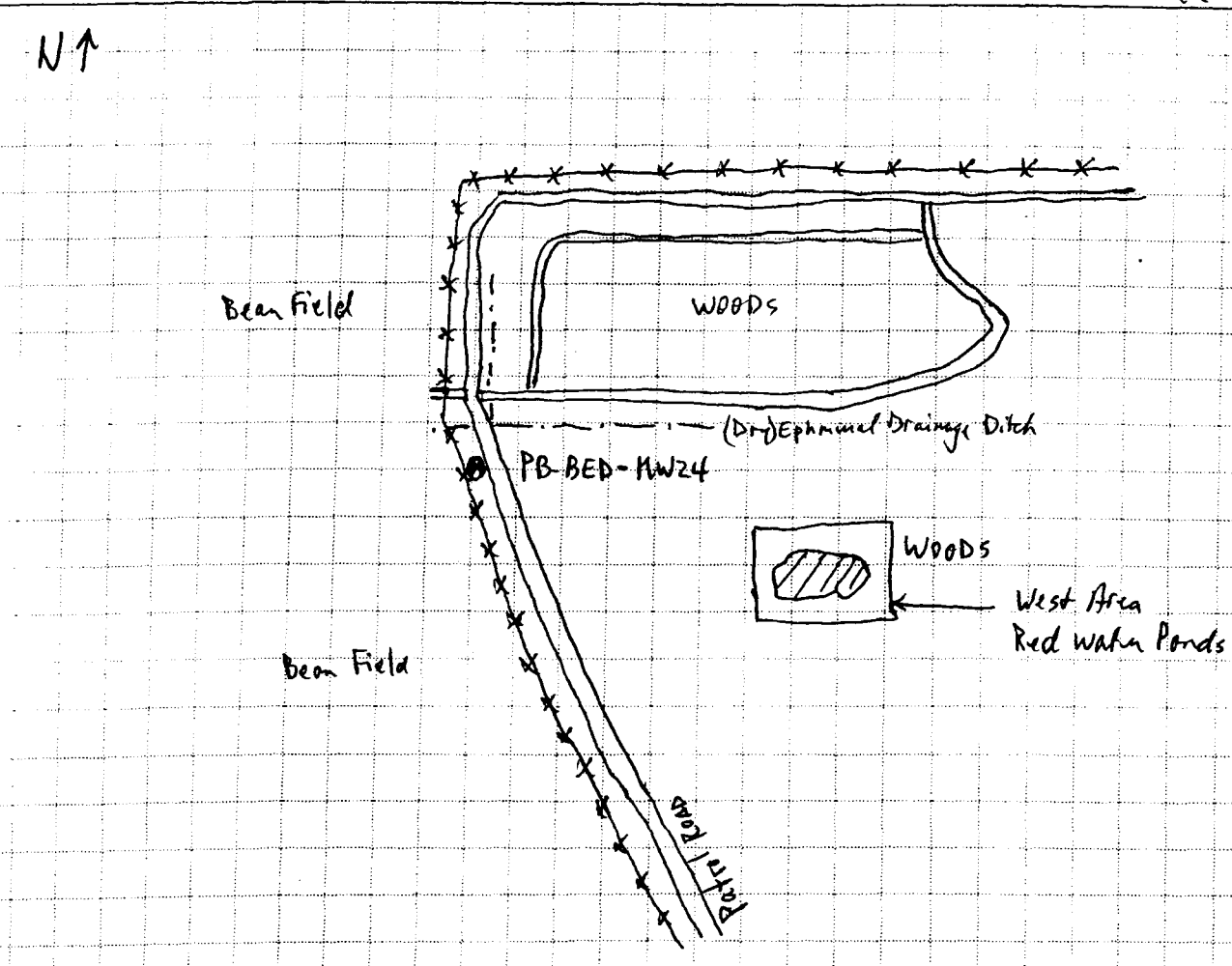
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: PB-BED-MW24 | SHEET 1 OF 6 SHEETS |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 1.4" ID Stain-less Steel split-spoons. Borehole reamed with 8¼" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6⅝" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 644.20 Ft | |
| | 10. DATE STARTED: 8/26/01 | 11. DATE COMPLETED: 9/13/01 |
| 12. OVERBURDEN THICKNESS: 17.3 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 7.0 Ft (overburden), Bedrock unknown | |
| 13. DEPTH DRILLED INTO ROCK: 24.2 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 26.5 Ft @ 1 hr | |
| 14. TOTAL DEPTH OF HOLE: 41.5 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 6 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler |

LOCATION SKETCH/COMMENTS — SCALE: Not To Scale




| PROJECT: PBOW | HOLE NO.: PB-BED-MW24 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW24

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | | Stiff, (10YR 3/2) very dark grayish br. homogeneous, sandy SILT (30% sand), organics (roots), dry 0.8 | ml | 0.0 | NA | 3/4/ 6/10 | 1.5/ 2.0 | Began drilling 8/26/01 0910 |
| | 1 | Stiff, (10YR 5/6) yellowish brown, mottled (30%-gray), vfg, sandy SILT, very well sorted, organics (roots), dry | ml | | | 0910 | | Breathing Air/ Background: PID = 0.0 ppm |
| | 2 | | | | NA | 6/8/ 10/7 | 1.4/ 2.0 | VRAE: CO = 0 ppm LEL = 0% $H_2O$ = 0 ppm $O_2$ = 20.7% |
| | 3 | As above (no organics) | | 0.0 | | | | |
| | 4 | 4.2 | | | | 0915 | | |
| | 5 | Stiff, (2.5Y 5/2) gray brown, mottled (50% - dark yellow), ~~vfg~~, high plasticity, SILT, little clay (10%), trace vfg sand, even-parallel bedding planes, moist | | 0.0 | NA | 8/7/ 8/9 | 2.0/ 2.0 | |
| | 6 | | | | | 0920 | | |
| | 7 | As above | | 0.0 | NA | 4/3/ 7/10 | 2.0/ 2.0 | ▽ Encountered lowerburden groundwater at 7.0 ft |
| | 8 | | | | | 0925 | | |
| | 9 | Very stiff, (2.5Y 5/3) light olive br, mottled (20%), SILT, trace clay, even-parallel bedding, wet | | 0.0 | NA | 5/7/ 12/14 | 2.0/ 2.0 | Mottling along vertical fractures |
| | 10 | | | | | 0927 | | |

Project: PBOW

Hole Number: PB-BED-MW24

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW24

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Stiff, (2.5Y 4/1) dark gray, homogeneous, high plasticity, SILT, trace clay, rounded pebbles (light gray), 1-5mm, wet | | ~~NM~~ NM | NA | 3/5/ 6/8 0930 | 2.0/ 2.0 | Brown staining along horizontal fractures |
| | 12 | As above, granules/pebbles increase 10%, 1-10 mm | | NM | NA | 3/4/ 5/5 0935 | 2.0/ 2.0 | |
| | 14 | As above | | NM | NA | 3/5/ 6/8 0938 | 2.0/ 2.0 | |
| | 16 | As above, granules/pebbles 30% | | NM | NA | 7/8 50 for 3" 0945 | 1.3/ 1.3 | Limestone pebble in shoe, 20x15mm Bottom of 12" OD Borehole |
| | 17.3 | Spoon refusal @ 17.3 ft LIMESTONE, gray, calcareous, fossils, fine grained, very fine grain pyrite <5%, trace calcite, clear quartz "spot" 5x5 mm. | NA | NM | NA | NA | NA | Began cutting with 8" rotary bit Faint $H_2S$ odor Breathing Air: PID = 0.0 ppm CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 20.8% |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW24

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW24

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 6 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 |
|---|---|---|---|---|---|---|---|---|
| | 20 | LIMESTONE, gray, average to hard | NA | NM | NA | NA | NA | Hardness based on cutting speed. |
| | 21 | 21.5 | | | | | | Bottom of 8" OD Borehole at 21.5 ft |
| | | LIMESTONE, gray, hard, massive bedding, slightly weathered, calcareous, slightly fractured, fossils (brachs) | | | | Fracs | | Bottom of 6 5/8" OD Steel casing at 21.5' |
| | 22 | Limey shale layer 21.9-22.0 ft soft. | | | ~~21.0~~ Limey shale | 21.9 22.0 | | Began coring 9/13/01 0925 |
| | 23 | | | | Box # 1 | | | C-1 (21.5-26.5') End: 0933 Start: 0925 |
| | | Large coral 23.6-23.9' (0.3' x 0.3') white | | | | | | 5 ft Run |
| | 24 | | | 0.4 | | | | 5 ft Recovery |
| | | | | | | 24.6 | | 0 |
| | 25 | | | | 25.2 | | | Breathing Air/Bckgrd PID: 0.0 ppm VRAE: CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 20.9% |
| | | | | | | 25.6 | | |
| | 26 | | | | Box # 2 | | | |
| | | | | | | 26.5 | | |
| | 27 | As above, massive, slightly fractured. | | | | | | C-2 (26.5-31.5') End: 0955 Start: 0944 |
| | 28 | | | | 28.5 | | | HC odor drilling |
| | | | | | Box # 3 | | | 5 ft Run |
| | 29 | | | | | 29.3 | | 5 ft Recovery |
| | | | | | | | | 0 LOSS |
| | 30 | | | | | | | HC odor |

Project: PBOW

Hole Number: PB-BED-MW24

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW24

Project: PBOW

Geologist: D. Kessler

Sheet 5 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Frac's | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | | | | | | | C-2 (cont) |
| | | | | | Box #3 | 30.8 | | |
| | 31 | | | | | | | |
| | | LIMESTONE, gray, hard to very hard, massive bedding, slight to fresh weathering, calcareous, slightly fractured, fossils (brachs/ stromalites) corals | | | | 31.5 | | |
| | 32 | | | | 32.4 | | | C-3 (31.5-36.7') |
| | 33 | | | | Box #4 | | | End: – start: – |
| | | | | | | | | 5 Ft Run |
| | 34 | | | 32.7 | | | | 5.2 Ft Recovery |
| | | | | | | | | 0.2 Ft GAIN |
| | 35 | | | | | 35.0 white shale filled | | HC staining on core Strong odor |
| | 36 | | | | 36.3 | | | Can hear water gurgling after pumping gas |
| | | | | | Box #5 | | | 36.7 |
| | 37 | As above | | | | | | C-4 (36.7-41.5') |
| | | | | | | 37.7 | | |
| | 38 | | | | | 38.2 | | End: 1052 start: 1039 |
| | | | | | | | | 5 Ft Run |
| | 39 | | | | | | | 4.8 Ft Recovery |
| | | | | | | 39.6 | | 0.2 Ft Loss |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW24

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW24

Project: PBOW

Geologist: D. Kessler

Sheet 6 of 6 Sheets

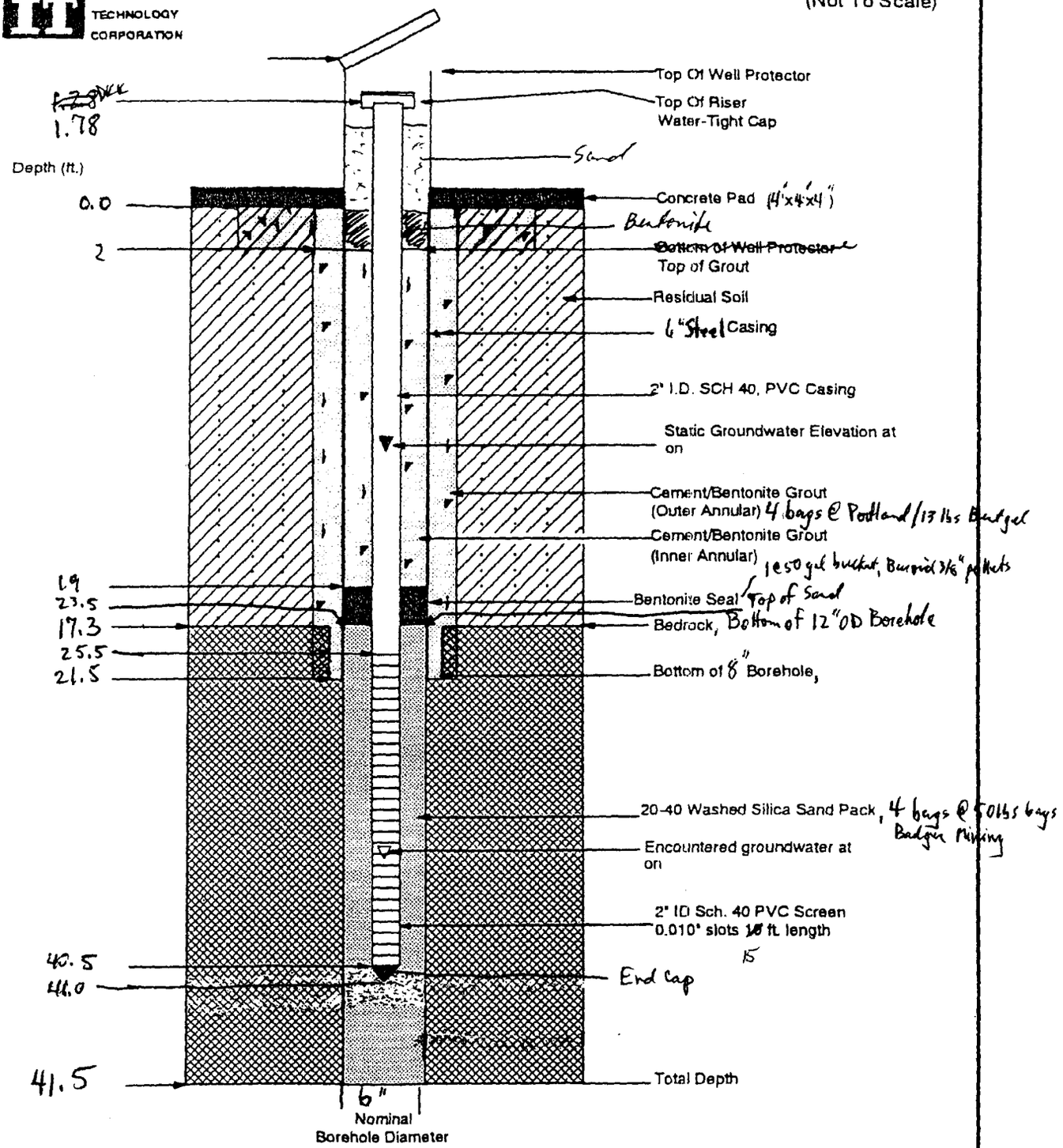
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | LIMESTONE, gray, very hard, massive, fresh weathering, calcareous, fossils (brachs/stromalites corals) | | 20.1 | 40.6 Box # 6 | Fracs | | C-4 (cont'd) ¢C staining on core. |
| | 41 | | | | | 41.5 | | |
| | | Total Depth - 41.5 ft | | | | | | pumped borehole 1107, 1110 > 3.5', 1111 > 4.5' Can hear water gurgling during recharge. |
| | 42 | | | | | | | |
| | 43 | | | | | | | |
| | 44 | | | | | | | |
| | 45 | | | | | | | |
| | 46 | | | | | | | |
| | 47 | | | | | | | |
| | 48 | | | | | | | |
| | 49 | | | | | | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW24

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW24
Date Installed: 9/13/01
Elevation Top of Casing: 645.98 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA23DWC.DRW/N/5-28-03

# HTRW DRILLING LOG

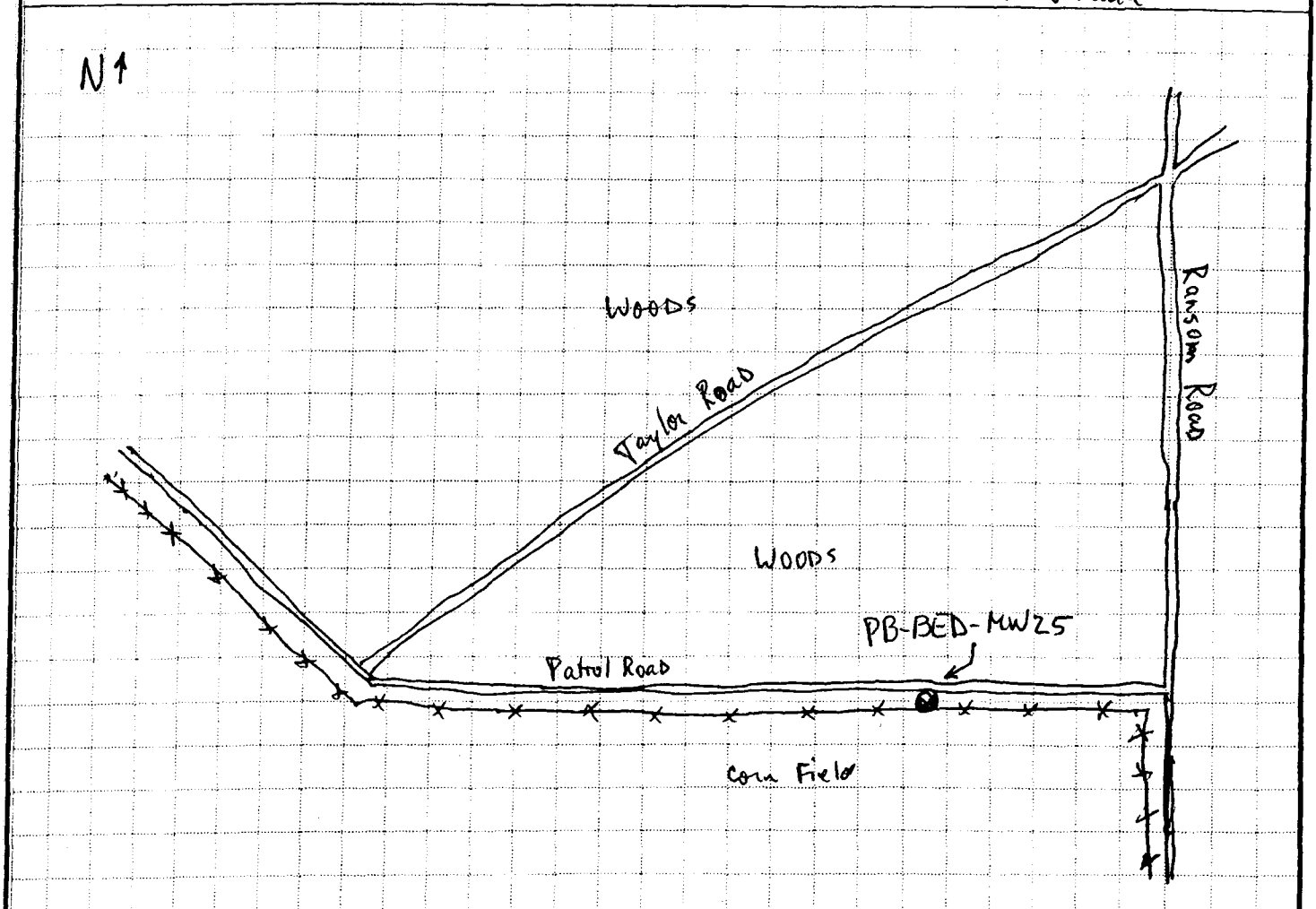
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: PB-BED-MW25 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 5 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 | |
| 7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID/8" OD HSA with 1.4" ID Stain-less Steel split-spoons. Borehole reamed with 8¼" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6⅝" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 681.99 Ft | |
| | 10. DATE STARTED: 8/26/01 | 11. DATE COMPLETED: 9/11/01 |
| 12. OVERBURDEN THICKNESS: 8.8 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 4.8 Ft (overburden) | |
| 13. DEPTH DRILLED INTO ROCK: 29.7 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 38.5 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 4 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler |

LOCATION SKETCH/COMMENTS — SCALE: Not To Scale




| PROJECT: PBOW | HOLE NO.: PB-BED-MW25 |
|---|---|

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW25

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 5 sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | ~~Analytical Sample~~ No. Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass/Weeds | | | | | | |
| | | Fill: (Very loose, (10YR 3/3) dark brown, mottled (light brown), silty SAND, organics (roots) dry) 0.6 | SM | | NA | 1/1 | 1.4/ | Began Drilling 8/26/01 1455 |
| | 1 | Fill: (Loose, (10YR 6/6) brownish yellow, homogeneous, vfg, SAND, very well sorted, dry) | SP | 0 | | 4/7 | 2.0 | With 4¼/10⅛"OD augers Borehole reamed w/ 12"OD augers to 10 Ft Background/Breathing PID = 0.0 ppm |
| | 2 | | | | | 1455 | | VRAE: |
| | | As above | | 0 | NA | 2/6/ | 1.8/ | CO = 0 ppm LEL = 0% $H_2O$ = 0.0 ppm |
| | 3 | | SP | | | 4/4 | 2.0 | $O_2$ = 20.9% (strong breeze) |
| | | | | | | 1458 | | |
| | 4 | As above, color changing to (10YR 4/4) dark yellowish brown silt content in SAND 5% at 4.8 Ft | SP | 0 | NA | 3/5/ | 2.0/ | ▽ Encountered overburden groundwater at 4.8 Ft |
| | 5 | | | | | 6/4 | 2.0 | |
| | | | | | | 1459 | | |
| | 6 | As above 4-6 Ft interval | | 0 | NA | 2/11 | 2.0/ | |
| | 7 | | | | | 1/12 | 2.0 | |
| | | 7.3 | | | | | | |
| | | Medium dense, (10YR 3/2) very dark grayish brown, homogeneous, vfg, SAND, some silt (25%), very well sorted, wet, black shale fragments 7.7-8.0 Ft (10%), trace gravel, very coarse to 8.8 | SM | | | 1504 | | |
| | 8 | | | 0 | NA | 5/7/ | 1.6/ | |
| | 9 | ~~Dry~~ weathered SHALE, dark brown, very soft, thinnly laminated | | 0 | | 8/50 for 6" | 2.0 | Black coal (ash?) laminations (2) 9.1 and 9.4 Ft |
| | 10 | spoon refusal @ 10.0 Ft | | | | 1512 | | |

Project: PBOW

Hole Number: PB-BED-MW25

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW25

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 5 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | SHALE, highly weathered, dark brown, thinnly laminated, soft | NA | 0 | NA | NA | NA | Bottom of 12"OD augers at 10 ft Description from cuttings |
| | 11 | | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | Shale from bottom of augers - dry |
| | | Dry | | | | | | 4 1/4" ID / 8" OD auger Refusal |
| | 15 | 8"OD Auger Refusal @ 15 ft | | | | | | |
| | | SHALE, soft, dark brown, | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | More competent w/ depth. |
| | 19 | | | | | | | Detected solid competent shale cuttings at ~20 ft |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW25

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW25

Project: PBOW

Geologist: D. Kesslur

Sheet 4 of 5 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ URS | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | SHALE, dark brown, average hardness | NA | NM | NA | NA | NA | |
| | 21 | 21.5 | | | | | | Began drilling 8/27/01 to 23.3 Ft w/ 8" rotary bit |
| | | LIMESTONE | | | | | | |
| | 22 | | | | | | | Drilled to 23.3 Ft w/ 8" rotary bit. 6" steel casing at 23.3 Ft |
| | 23 | | | | | | | |
| | | LIMESTONE, light gray, hard, massive bedding, slightly weathered, calcareous, moderately fractured, | | 0.0 | Box # 1 | Fracs<br>24.2<br>24.3<br>24.7 (iron stained edges) | | Began drilling 9/4/01<br>C-1 (23.3-28.3')<br>End: —<br>Start: — |
| | 24 | | | | | | | |
| | 25 | 25.1 – 25.7 Ft; many corals white nodules | | | | | | |
| | 26 | | | | | 26<br>26.3<br>26.35 | | 5 Ft Run<br>5 Ft Recovery<br>0 Locs |
| | | | | | rounded | highly weathered | | |
| | 27 | 27.3 – 28.3; pitted ~~30~~ 30%, highly weathered zone 27.3 – 27.6' | | | 27.3 | 27.3 rounded edges | | |
| | 28 | | | | Box # 2 | 28 | | |
| | | LIMESTONE, as above | | | | 28.5 | | C-2 (28.3 – 33.5') |
| | 29 | | | | | 29.3 (rounded edges) | | End: 1020<br>Start: 1000 |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW25

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW25

Project: PBOW

Geologist: D. Kressler

Sheet 5 of 5 Sheets

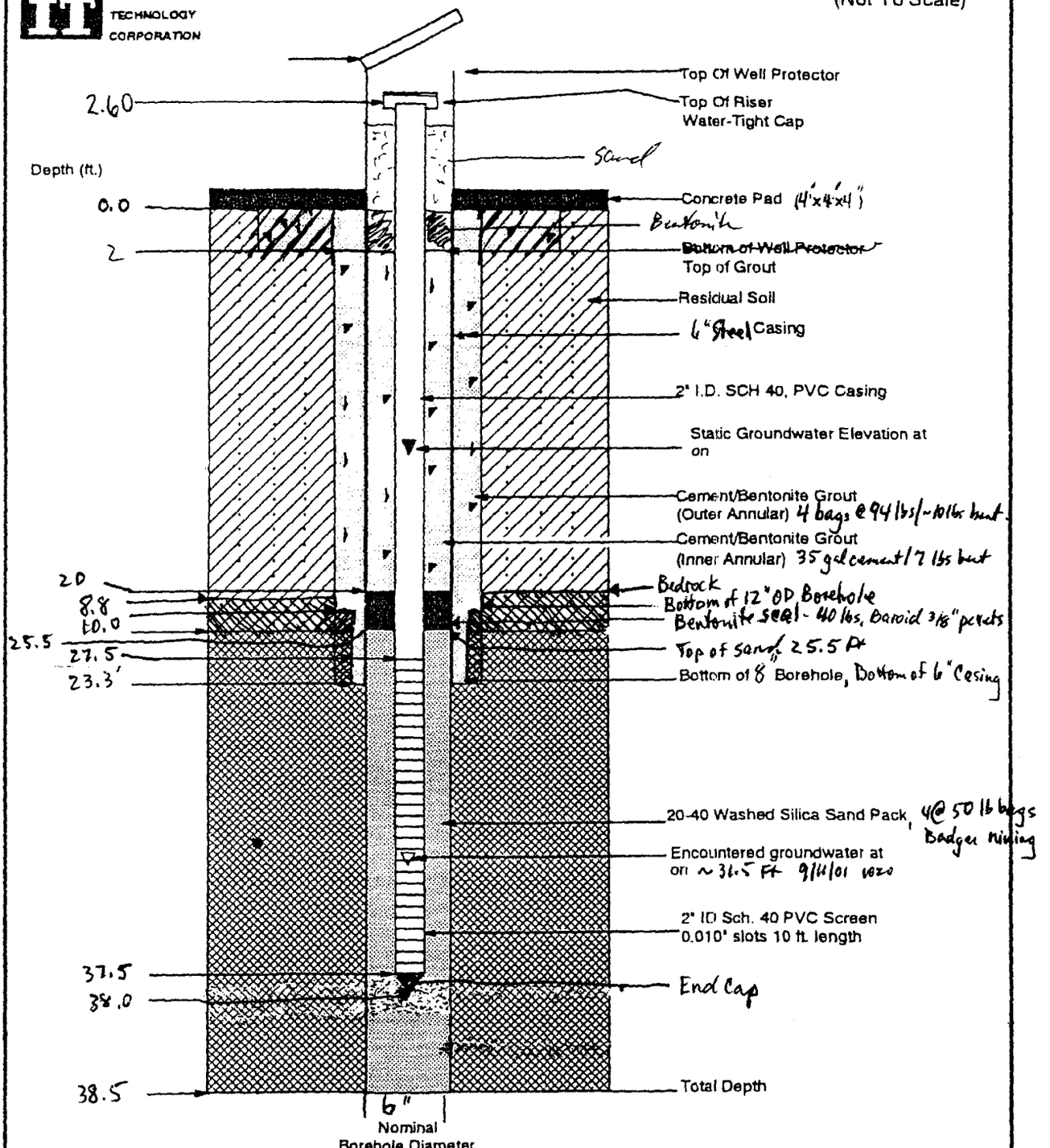
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifc | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FTCCS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | LIMESTONE, light gray, hard, massive bedding, slightly weathered, calcareous, moderately fractured, fossils | | | | 30.2 (rough) | | |
| | 31 | | | | 31 | | | 5 Ft Run<br>5.2 Ft Recovery<br>0.2 Ft Gain |
| | | 31.5 | | | Box #3 | 31.5 | | Breathing Air/Bck ground<br>PID = 0.0 ppm |
| | 32 | SHALE, very dark gray, soft, thinly bedded, highly weathered, pyrite vugs(2) 31.5-31.9; decomposed 32.4-32.5; clay/silt filled | | NM | | 32.4 | | CO = 0 ppm<br>LEL = 0 ppm<br>$H_2S$ = 0 ppm |
| | 33 | 33 | | | | 32.8 | | $O_2$ = 21.0% |
| | 34 | Limey SHALE, very dark gray, moderately hard, thinly bedded, moderately weathered, fossils (brachs/corals), calcareous, moderately to highly fractured pryite vug 35.6 Ft | | | 34.8 | | | C-3 (33.5-38.5') |
| | | | | | | 34.9 | | End: 1048<br>Start: 1035 |
| | 35 | | | | Box #4 | 35.3 | | HC odor |
| | 36 | | | | | 35.7<br>36<br>36.3<br>36.4 (clay filled, rounded edges) | | 5 Ft Run<br>5 Ft Recovery |
| | 37 | 37 | | | | 36.75 | | 0 Loss |
| | | LIMESTONE, light gray, hard, massive, slightly weathered, fossils (brachs/corals), calcareous, moderate to slightly fractured. | | | | 37.5 | | |
| | 38 | | | | | | | |
| | | Total Depth = 38.5 Ft | | | | | | |
| | 39 | | | | | | | |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW25

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW25

Date Installed: ~~9/11/01~~ DKK 9/12/01

Elevation Top of Casing: 684.59 ft.

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA23DWC.DRW/1/5-28-83

# HTRW DRILLING LOG

| | |
|---|---|
| DISTRICT | Nashville, TN |
| HOLE NUMBER | PB-BED-MW26 |
| SHEET / SHEETS | 1 OF 7 |
| 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. Installed 2" PVC monitoring well. |
| 8. HOLE LOCATION | See Sketch |
| 9. SURFACE ELEVATION | 674.61 Ft |
| 10. DATE STARTED | 8/27/01 |
| 11. DATE COMPLETED | 9/10/01 |
| 12. OVERBURDEN THICKNESS | 6.5 Ft |
| 13. DEPTH DRILLED INTO ROCK | 52.0 Ft |
| 14. TOTAL DEPTH OF HOLE | 58.5 Ft |
| 15. DEPTH GROUNDWATER ENCOUNTERED | Not encountered (overburden). Bedrock ~ ~~47.0~~ 47.0 Ft |
| 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED | NA |
| 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) | NA |

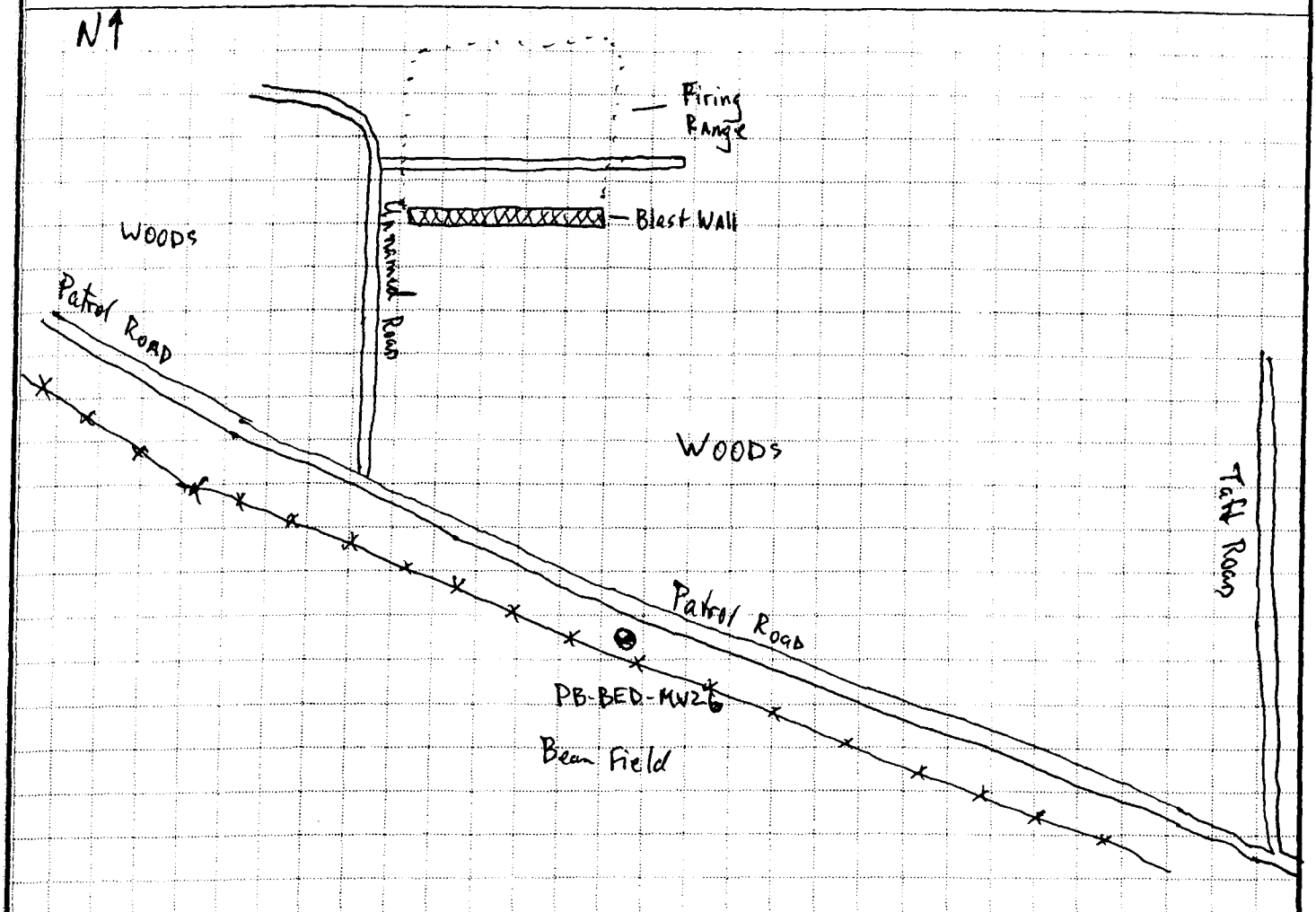
| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 9 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler |

LOCATION SKETCH/COMMENTS

SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | PB-BED-MW26 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 7 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass/Weeds | | | | | | |
| | 1 | Medium stiff, (10YR 2/1) black, homogeneous, medium plasticity, ~~SILT~~ SILT, organics (roots), vfg sand (15%), moist 0.7 | | 0.0 | NA | 3/4/ | 1.3/ | Began drilling 8/27/01 1140 |
| | | Stiff, (10YR 4/6) dark yellowish brown, mottled (50%) (light brown/gray), clayey SILT, vfg sand (20%), dry shale fragments 5% | ml | | | 5/7 | 2.0 | Breathing Air/Background PID: 0.0 ppm CO: 0 ppm LEL: 0% $H_2S$: 0 ppm $O_2$: 20.9% |
| | 2 | | | | | 1142 | | |
| | | As above 2.8 | | 0.0 | NA | 2/4/ | 1.7/ | |
| | 3 | Medium dense, (10YR 5/3) brown, mottled gray, dark brown (10%), vfg, SAND, silt (20%), dry 3.8 | sm | | | 6/7 | 2.0 | |
| | | | | | | 1146 | | |
| | 4 | Medium stiff, (10YR 5/6) yellowish br, mottled (5% gray), platy bedding, silty CLAY, shale fragments, black oxidized specks (15%), moist medium plasticity. | cl | 0.0 | NA | 2/2/ | 1.9/ | |
| | 5 | | | | | 5/7 | 2.0 | |
| | | | | | | 1148 | | |
| | 6 | As above, moist 6.5 | | 0.0 | NA | 5/7/ | 2.0/ | Bedrock |
| | 7 | SHALE, very severe (decomposed) weathering, (2 GLEY 5PB 6/1) bluish gray, relic bedding, thinnly bedded, soft, dry | NA | | | 12/48 | 2.0 | Rock crumbles in hand |
| | | | | | | 1154 | | |
| | 8 | | | NM | NA | NA | NA | Discontinued split-spoon sampling |
| | 9 | | | | | | | |
| | 10 | | | | | | | Bottom of 12" Borehole |

Project: PBOW

Hole Number: PB-BED-MW26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kressler

Sheet 3 of 7 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | SHALE, dark brown, thinnly bedded. severely (highly) weathered, dry | NA | ~~NM~~ NM | NA | NA | NA | Described from cuttings w/ 8" OD augers<br>Color change ~10 Ft |
| | 11 | | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | ▽ Water encountered ~17 Ft |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 7 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Urba | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | SHALE, dark brown | NA | NM | NA | NA | NA | |
| | 21 | | | | | | | Cuttings ~~begins~~ become dry ~~drill~~ at ~21 Ft |
| | 22 | | | | | | | |
| | 23 | | | | | | | Strange, sweet organic odor from cuttings PID = 0.0 ppm Borehole 0.0 ppm |
| | 24 | SHALE, bluish gray, hard, micro-laminated, slightly broken, fresh weathering | | | | | | Description from rock core knocked out of auger (24.3-24.5') |
| | | 8" OD Auger Refusal @ 24.5 Ft | | | | | | |
| | 26 | SHALE, hard, competent | | | | | | PID = 0.0 ppm $H_2S$ = 0.0 ppm (Still strange odor) Natural HC |
| | 28 | | | | | | | |
| | 27 | | | | | | | Drilled to 27.5 Ft w/ 8" rotary bit. Set 6 5/8" steel casing at 27.5 Ft. |
| | 28 | SHALE, very dark brown, moderately hard, thinnly laminated, slight weathering, pyrite vug at 30.1 Ft, wavy limestone layers 28.2-28.3', 29.4-29.5', 29.7-29.75', ~~29~~ 30.3-30.4', 30.65-30.75', | | 0.0 | Box # 1 photo | Fracs 28.8 29.1 29.8 | | Began coring 9/8/01 1700 C-1 (27.5-32.5) Breathing Air: PID = 0.0 ppm CO = 0 ppm $O_2$ = 21.1% LEL = 0% $H_2S$ = 0 ppm |
| | 29 | | | | | | | |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kessler

Sheet 5 of 7 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Fracs | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | SHALE, very dark brown, moderately hard, thinly laminated, slight weathering, Lm layers wavy, continuous 30.95-31', 32.35-32.45' | | | Box #1 30.8 | -30.1 (clay filled) -30.8 (clay filled) -31.4 (clay filled) -32.2 | | End: 1715 Start: 1702 5 Ft Run 5.1 Ft Recovery 0.1 Ft Gain |
| | 31 | | | | Box # 2 photo 32.6 | | | |
| | 32 | | | | | | | 32.5 32.6 |
| | 33 | As above, unbroken, pyrite in vugs, wavy Lm layer at 32.5-32.6' | | | | | | C-2 (32.6-37.5') End: 1745 Start: 1735 HC odor while drilling |
| | 34 | | | | Box # 3 photo 36.4 | 36.4 Vertical Frac (Not water bearing) | | 5 Ft Run 5 Ft Recovery 0 Loss |
| | 35 | | | | | | | |
| | 36 | | | | | | | |
| | 37 | | | | Box # 4 | 37.5 | | |
| | 38 | As above, unbroken (except from pieces of vertical frac | | | Box #4 photo 39.5 | Vertical Fracture | | C-3 (37.5-43.0') End: 1816 Start: 1804 |
| | 39 | | | | | | | |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kessler

Sheet 6 of 7 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No: Fracs | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | SHALE, very dark brown, | | NM | Box #5 photo 43.0 | 40.2 - clay filled Vertical; 40.6; 40.7 (clay filled) | | (C-3 cont) 5.5 Ft Run 5.5 Ft Recovery 0 Loss HC odor |
| | 41 | | | | | | | |
| | 41.5 | LIMESTONE, gray, hard, massive, slightly weathered, 1 vug, calcareous | | | | 42.1 - horizontal; 42.3 - vertical | | |
| | 42 | | | | | | | |
| | 42.5 | | | | | | | |
| | 43 | | | | | Frac 43.1; 43.55-43.6 | | Began drilling 9/10/01 0835 C-4 (43-48.4') 5 Ft Run 5.4 Ft Recovery 0.4 Ft Gain |
| | 44 | As above. 43.55-43.6' frac rounded edges ~~and~~ 44.0 - 45.6'; pitted LM (30%) 5% vugs 45.1-45.3 - Honeycombed 46.3-47'; pitted, vugs | | NM | Box #6 photo 46.4 | 45.3 | | |
| | 45 | | | | | | | |
| | 46 | | | | | | | |
| | 47 | SHALE, dark gray, soft, thinly laminated, highly weathered, intensely fractured (fell apart) (decomposed). | | | Box #7 photo | 47 | | ▽ Possible Bedrock water at 47' |
| | 48 | | | | | | | |
| | 48.4 | | | | | Fracs | | C-5 (48.4-53.4') |
| | 49 | As above | | | | | | |
| | 49.5 | Limy SHALE, highly weathered | | | | pyrite | | End 1103 start 1048 |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW26

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW26

Project: PBOW

Geologist: D. Kessler

Sheet 7 of 7 Sheets

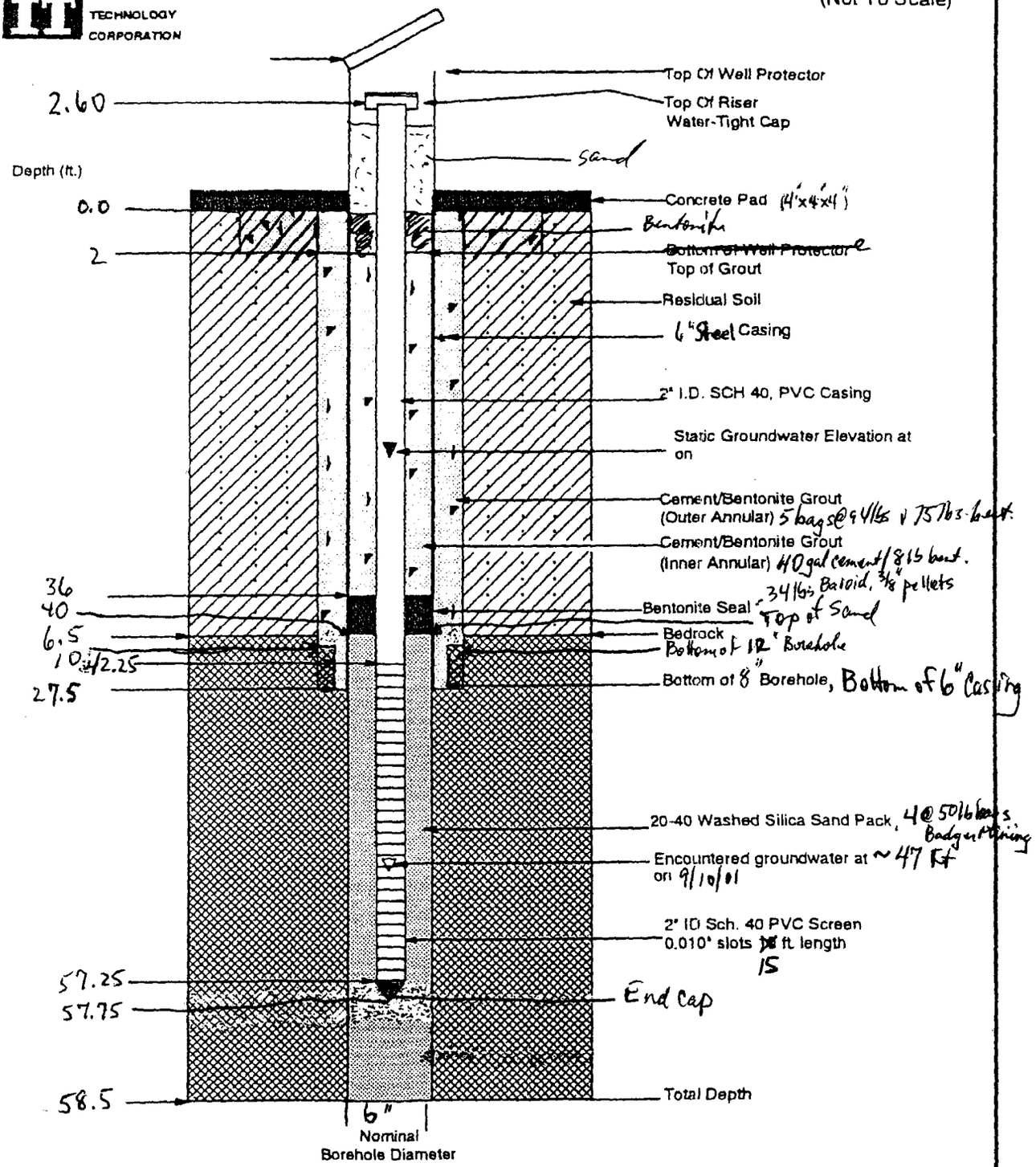
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 50 | Limey SHALE, dark gray, moderately hard, thinly bedded, moderately weathered, Fossils (brachs, corals), calcareous moderate to highly fractured (not yet broken) | | | 50.5 Box # 8 photo | FTACC | | HC odor |
| | 51 | | | NM | | 51 | | 5 Ft Run 5.2 Ft Recovery 0.2 Ft Gain |
| | 52 | | | | | | | |
| | 53 | ~~Reading to DUK~~ Limey SHALE ~~Shaly LIMESTONE~~, dark gray, soft to moderately hard, ~~thinly bedded~~ ~~massive~~ DUK, moderately weathered, fossils, (brachs, corals, crinoids), 2 pyrite filled vugs, unbroken | | | 53.6 Box # 9 photo | Pyrite | | Pumped well Recharge: 1225 @ 3 min = 0.1' 1228 @ 3 min = 0.1' 1231 @ 3 min = 0.1' 1245 @ 14 min = 0.1' 1256 @ 14 min = 0.1' 1312 @ 14 min = 0.1' |
| | 54 | | | | | 54.3 (rounded edges) | | C-6 (53.6 - 58.5) |
| | 55 | | | NM | | | | End: 1408 Start: 1355 |
| | 56 | | | | | | | 4.9 DUK ~~4~~ Ft Run 4.85 Ft Recovery 0.05 Ft Loss |
| | 57 | | | | | | | |
| | 58 | | | | | | | |
| | 59 | Total Depth = 58.5 Ft | | | | | | |
| | 60 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW26

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW2C
Date Installed: 9/10/01
Elevation Top of Casing: 677.21 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BW\MWA23DWC.DRW/1/5-28-83

# HTRW DRILLING LOG

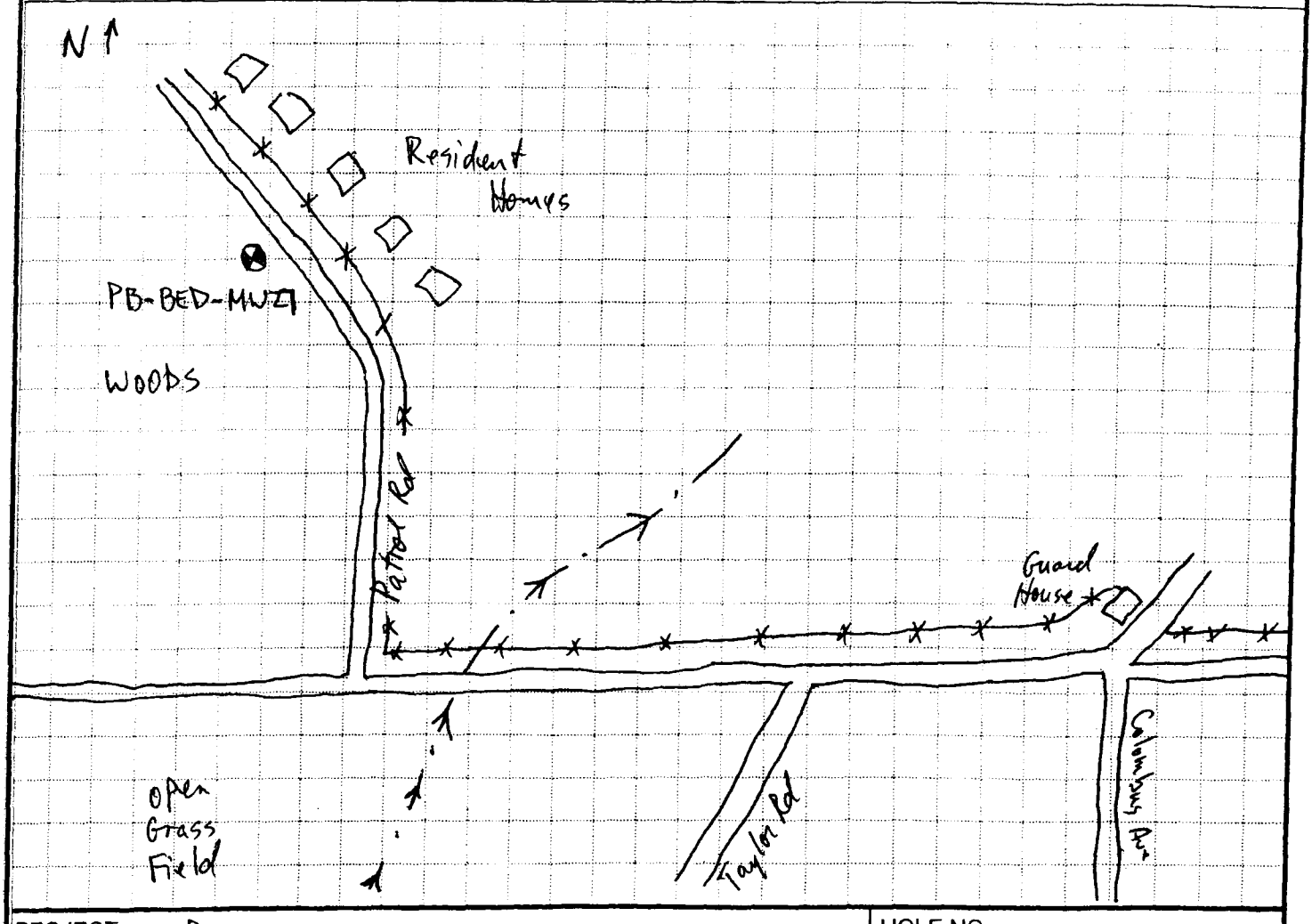
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: PB-BED-MW21 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 12 |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson / Todd Schmalfeldt | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 / Cantera CZ-250 | |
| 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. ~~Installed 2" PVC monitoring well block~~ | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: ~~627.14 ft~~ 625.24 Ft | |
| | 10. DATE STARTED: 8/23/01 | 11. DATE COMPLETED: 9/8/01 |
| 12. OVERBURDEN THICKNESS: 18.8 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 4.2 Ft (Overburden) | |
| 13. DEPTH DRILLED INTO ROCK: ~~105 feet~~ 86.2 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 104.8 ~~102.15~~ / 1hr. | |
| 14. TOTAL DEPTH OF HOLE: 105 feet | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 24 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 76 feet |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler / [illegible] |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | PB-BED-MW21 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW21

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | ~~Analysis Sample No.~~ Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass<br>SAND, very dark grayish brown, organics 0.3 | | | NA | | | Began drilling 8/23/01 1630 |
| | 1 | Fill:<br>(SAND, trace silt (5%), medium dense, yellowish brown (10YR 5/8), homogeneous till 0.9 Ft. At 0.9 Ft, becomes mottled with (10YR 7/6) yellow, vfg, very well sorted, dry) | SP | 0 | | 3/5<br>8/10 | 1.5<br>2.0 | Breathing Air:<br>CO = 0ppm<br>LEL = 0%<br>$H_2S$ = 0ppm<br>$O_2$ = 20.9% |
| | 2 | | | | | | | 2 |
| | 3 | Fill:<br>(SAND, some clay (35%), clay content increases w/ depth, dry)<br>4 | | 0 | | 3/4<br>7/10 | 2.0<br>2.0 | Water pocket at 2.5 Ft |
| | 4 | | | | | | | 4 |
| | 5 | SILT, some sand (30%), grayish brown (10YR 5/2), mottled (5%) with strong brown (7.5YR 5/8), high plasticity, sand vfg, wet<br>sand content decreases w/ depth | mh | 0 | | 2/2<br>4/7<br>1650 | 1.8<br>2.0 | Encountered groundwater ▽ 4.2 Ft |
| | 6 | | | | | | | 6 |
| | 7 | Medium stiff, SILT, same color as above, sand content 5%, wet | | 0 | | 2/3<br>4/6 | 2.0<br>2.0 | |
| | 8 | | | | | | | 8 |
| | 9 | Stiff, SILT, dark gray (10YR 4/1), homogeneous, high plasticity, wet | | 0 | | 2/3<br>6/6 | 2.0<br>2.0 | |
| | 10 | | | | | | | 10 |

Project: PBOW

Hole Number: PB-BED-MW21

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Stiff, dark gray (10YR 4/1), homogeneous, SILT, high plasticity, wet | | 0 | NA | 3/5 / 8/8 | 2.0 / 2.0 | |
| | 11 | | | | | | | |
| | 12 | | | | | 1705 | | |
| | 13 | As above | mh | 0 | | 2/3 / 6/8 | 2.0 / 2.0 | |
| | 14 | | | | | 1708 | | |
| | 15 | As above | | 0 | | 2/4 / 6/9 | 2.0 / 2.0 | |
| | 16 | | | | | 1711 | | |
| | 17 | As above | | 0 | | | 2.0 / 2.0 | |
| | 18 | | | | | 1730 | | Drilled to 18.8 Ft w/ 12" OD HSA |
| | | As above, with rounded pebbles (3 mm), broken shale fragments | | | | 2/50 for 3" | 0.8 / 0.8 | |
| | 19 | Spoon Refusal @ 18.8 Ft<br>Auger Refusal @ 18.8 Ft<br>SHALE bedrock, very dark gray / black | | | | | | Began drilling 8/24/01 0840 w/ 8" OD Tricone Roller Bit for casing. |
| | 20 | 20 Ft | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: D. Kesslen

Sheet 4 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | LIMESTONE, weathered, fractured, soft, gray | NA | NM | NA | NA | NA | Drilling w/ 8" OD Tricone Roller bit to set 6" steel casing. |
| | 21 | 21' LIMESTONE, hard, gray 21.5' | | | | | | Observing only chips of bedrock |
| | 22 | Shaley LIMESTONE, greenish gray, soft. thinnly bedded 22.5' | | | | | | Background / Breathing Air: PID: 0.0 ppm |
| | 23 | LIMESTONE, gray, hard, competent | | | | | | VMAE: CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 20.9 ppm |
| | 24 | | | | | | | |
| | 25 | | | | | | | |
| | 26 | | | | | | | Drilled to 26.5' with 8" Tricone Roller Bit. 6" OD casing set at 26.5 ft. |
| | 26.5 | | NA | | NA | NA | NA | |
| | 27 | | | | | | | |
| | 28 | | | | | | | Began casing 9/7/01 |
| | 29 | massive limestone, gray, hard, no weathering, no bedding | | | BOX 1 29-33 | | | start time - 10:30 End " - 11:00 |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED mw21

Project: PBOW

Geologist: McLeod

Sheet 5 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 31 | | | | | | | Run - 5' Rec - 5' Depth 29-34' PID - 0.0 MSA - 0 - comb 20.3 - $O_2$ 0 - $H_2S$ 0 - CO |
| | 32 | | | | | | | |
| | 33 | | | | | 33 | | |
| | 34 | | | | | 34 | Run 2 | Run 5' Rec - 5' |
| | 35 | Massive limestone gray, no weathering, no bedding, hard nat. hydrocarbs. odor | | | BOX 2 33-37 | 35 / 35.5 | | Depth 34-37 End time: 11:15 PID - 0.0 MSA - 0 - comb 20.4 - $O_2$ 0 - $H_2S$ 0 - CO |
| | 36 | | | | | | | |
| | 37 | | | | | 37.0 | | |
| | 38 | | | | | 38 | | |
| | 39 | gray massive limestone w/ fracture ~ 42'-43' | | | BOX 3 37-41 | | Run 3 | Run 5' Rec. 5' Depth - 39-44 |
| | 40 | | | | | 40 | | |

Project: PBOW

Hole Number: PB-BED mw21

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: S McLeod

Sheet 6 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 40.5 | | End time - 11:30 |
| | 41 | | | | | | | |
| | | | | | | 41.5 | | fracture |
| | 42 | | | | | | | |
| | | | | | BOX 4 41-44' | | | |
| | 43 | | | | | 43.0 | | |
| | 44 | | | | | 44 | Run 4 | Run - 5' Rec - 5' Depth - 44-49 |
| | | light-gray, massive limestone, hydrocarbon odor no bedding, no weathering | | | | | | |
| | 46 | | | | | 45 | | End time - 11:45 |
| | | | | | | | | stop - pump to check for water - none detected |
| | 48 | | | | BOX 5 44-48' | 46 | | |
| | 47 | | | | | | | PID - 0.0 |
| | | | | | | 47 | | MSA - 0 - combl 0 $H_2S$ 0 CO |
| | 48 | | | | | | | 20.7 $O_2$ |
| | | | | | | 48 | | |
| | 49 | | | | | 49 | Run 5 | |
| | | | | | | | | PID - 0.0 MSA - 0 - combl 20.6 $O_2$ 0 CO 0 $H_2S$ |
| | 50 | | | | | 50 | | |

Project: PBOW

Hole Number: PB-BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: S. McLeod

Sheet 7 of 12 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 |
|---|---|---|---|---|---|---|---|---|
| | | Same as above | | | BOX 6 48-51 | | | Run 5' Rec. 5 End time 13:18 Depth - 49-54 |
| | 51 | | | | | 51.5 | | Start - 13:00 PID - 0.0 |
| | 52 | | | | BOX 7 51-54 | | | |
| | 53 | | | | | 53.5 | | |
| | 54 | | | | | 54 | Run 6 | mech |
| | | gray, massive limestone no weath., no bedding hard | | | | | | Run - 5 Rec - 5 End: 13:30 Depth - 54-59 |
| | 55 | | | | BOX 8 54-57.5 | 55.5 | | mech |
| | 56 | | | | | | | PID - 0.0 MSA - 0 comb 20.8 $O_2$ 0 - $H_2S$ 0 CO |
| | 57 | | | | | | | |
| | | | | | | 57.5 | | |
| | 58 | | | | BOX 9 57.5-59 | | | |
| | | | | | | 58.5 | | mech |
| | 59 | gray massive limestone no weath., no bedding hard | | | | | Run 7 | Run 5' Rec 5' Depth - 59-64 End time - 13:45 |
| | 60 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: S Mozed

Sheet 8 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | BOX 10 | 6005 | | PID - 0.0 |
| | | | | | 5763 | | | MSA - 0 - comb |
| | | | | | | | | 20.8 - $O_2$ |
| | 61 | | | | | 61 | | 0 - $H_2S$ 1 |
| | | | | | | | | 0 - CO |
| | 62 | | | | | 62 | | 2 |
| | 63 | | | | | | | 3 |
| | 64 | | | | BOX 11 | | Run 8 | 4 |
| | | gray massive limestone w/ hydrocarbon odor hard | | | 63-65 | | | Run 5' Rec - 5' Depth - 64-69 |
| | 65 | | | | | | | End time - 14:00 5 |
| | | | | | | | | PID - 0.0 |
| | 66 | | | | BOX 12 | 66 | | MSA - 0 comb 6 |
| | | | | | | | | 20.8 $O_2$ |
| | | | | | 65-69 | | | 0 - $H_2S$ |
| | | | | | | | | 0 - CO |
| | 67 | | | | | 67 | | 7 |
| | | | | | | | | Stop and pump for water - the water came up very little ~0.4 |
| | 68 | | | | | | | 8 |
| | | | | | | | | 30 to 75 |
| | 69 | | | | | | Run 9 | 9 |
| | | | | | | | | Start - 15:30 End - 16:00 Run 8 Rec. 5.5 |
| | 70 | | | | | | | 10 |

Project: PBOW

Hole Number: PB-BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB BED-MW27

Project: PBOW

Geologist: S M Turd

Sheet 9 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | gray, massive, hard<br>nat. hc. odor<br>no bedding, no weathering | | | | 70.5 | | PID - 0.0<br>MSA - 0 Comb<br>0 - $H_2S$<br>0 - CO<br>20.8 - $O_2$ |
| | 71 | | | | BOX 13<br>69-72.5 | | | Depth-<br>69-75' |
| | 72 | | | | | 72.5 | | |
| | 73 | | | | | | | |
| | | | | | BOX 14<br>72.5-<br>74.5 | | | |
| | 74 | | | | | 74.5 | | |
| | 75 | massive, gray, hard<br>limestone, no weathering,<br>no bedding | | | | | run 10 | depth - 75-80<br>end time - 9:45<br>run - 5'<br>rec. 5' |
| | 76 | | | | BOX 15<br>74.5-<br>78.5 | | | |
| | 77 | | | | | 77 | | |
| | 78 | | | | | | | |
| | | | | | | 78.5 | | |
| | 79 | | | | BOX 16<br>78.5-<br>81.5 | | | |
| | 80 | | | | | 80 | | |

Project: PBOW

Hole Number: PB BED-MW27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW21

Project: PBOW

Geologist: S. McLeod

Sheet 10 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | gray, massive, hard limestone, no bed, no weath. | | | | | Run 11 | Depth. 80-85 run. 5' rec - 5' End time: 10:00 PID - 0.0 MSA 0 comb 0 - $H_2S$ 20.7 - $O_2$ 0 - CO |
| | 81 | | | | | 81.5 | | |
| | 82 | | | | BOX 17 81.5-85.5 | 82 / 82.3 | | |
| | 83 | | | | | 83.5 | | |
| | 84 | | | | | | | |
| | 85 | | | | | 85 | Run 12 | depth. 85-90 Run 5' Rec. 5' End time: 10:20 |
| | | Same as above w/ minor fracture breaks | | | | 85.5 | | |
| | 86 | | | | BOX 18 85.5-89 | | | |
| | 87 | | | | | 87 | | Photo of all three runs left to right (Run 10-12) |
| | 88 | | | | BOX 19 88-90 | 88.5 | | |
| | 89 | | | | | 89.5 | | Drillers to put together pump (10:25) |
| | 90 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW21

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW 27

Project: PBOW

Geologist: S M Gerard

Sheet 11 of 12 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | gray, massive, limestone hard, no weath. no bedding | | | | | run 13 | Depth - 90-95 |
| | | | | | BOX 20 90-92 | | | Run - 5 |
| | | | | | | | | Rec - 5' |
| | | | | | | | | End time: 13:10 |
| | | | | | | | | Start: 12:50 |
| | | | | | | | | PID - 0.0 |
| | | | | | | 91.5 | | MSA - 0% LEL |
| | | | | | | | | 0 - CO |
| | | | | | | | | 20.4 - $O_2$ |
| | | | | | | | | 0 - $H_2S$ |
| | | | | | BOX 21 92-95 | 92.5 | | |
| | | | | | | 94.5 | | |
| | | Same as above w/ hydrocarbon visibility and odor. | | | BOX 22 95-98 | | run 14 | Depth - 95-100 |
| | | | | | | | | Run - 5' |
| | | | | | | | | Rec - 5' |
| | | | | | | | | End time: 13:25 |
| | | | | | | | | 1-3' section |
| | | | | | | | | 1-2' section |
| | | | | | | | | PID - 0.0 |
| | | | | | | | | MSA - 0% LEL |
| | | | | | | | | 0 - CO |
| | | | | | | | | 20.3 - $O_2$ |
| | | | | | | 98 | | 0 - $H_2S$ |
| | | | | | BOX 23 98-100.5 | | | |
| | | | | | | 100 | | |

Project: PBOW

Hole Number: PB-BED-MW 27

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: PB-BED-MW27

Project: PBOW

Geologist: S. McLeod

Sheet 12 of 12 Sheets

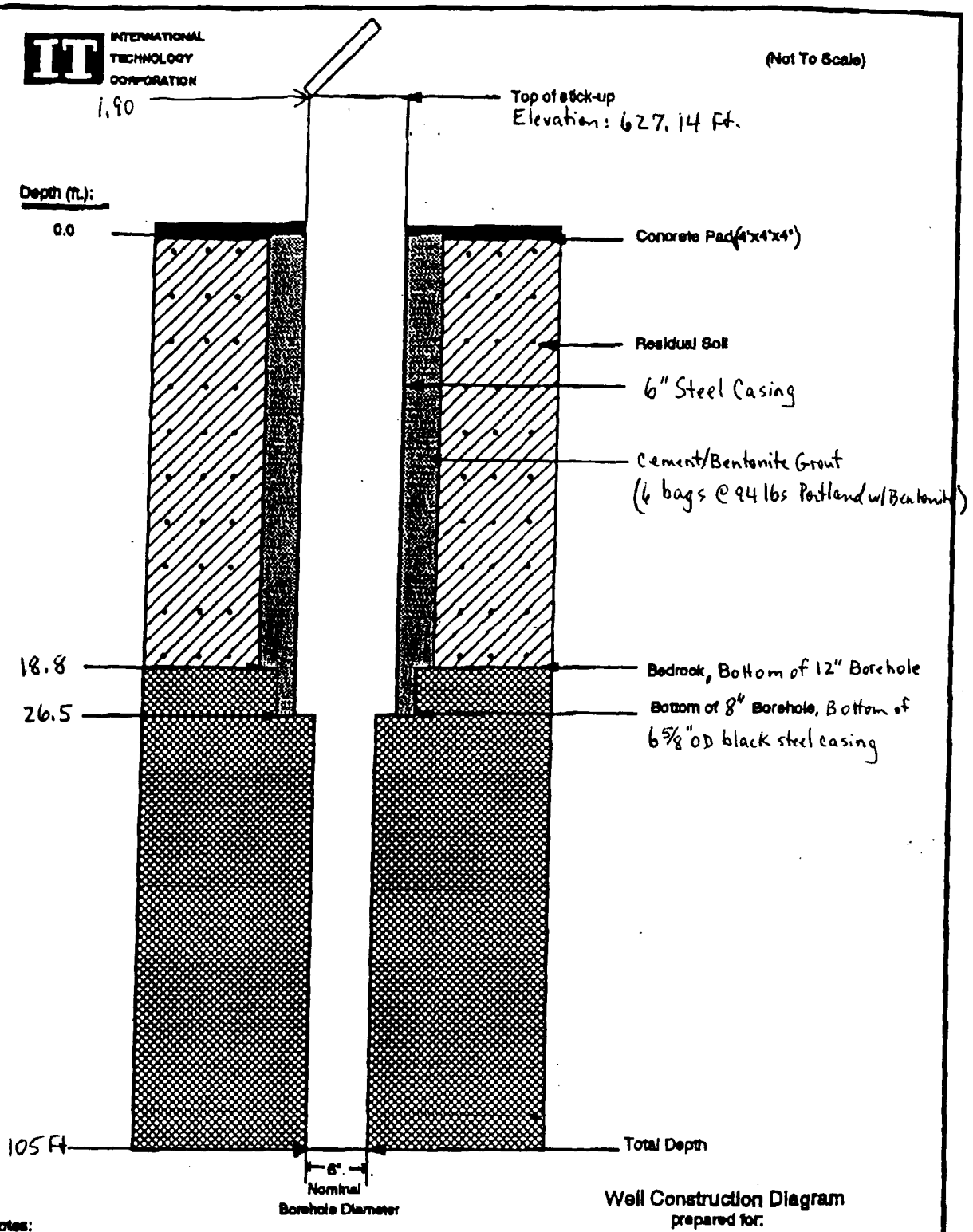
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | gray, mas. limestone w/no bedding, no weathering | | | | | Run 15 | Depth - 100-105 |
| | | | | | | | | Run - 5' |
| | | | | | | | | Rec - 5' |
| | 101 | | | | | | | End: 13:45 |
| | | | | | | 101.5 | | PID - 0.0 |
| | | | | | | | | MSA - 0 - LEL |
| | 102 | | | | | | | 0 - CO |
| | | | | | | 102 | | 20.3 - $O_2$ |
| | | | | | BOX 24 | | | 0 - $H_2S$ |
| | 103 | | | | 101.5-105 | | | 2' piece section |
| | | | | | | | | 3' piece section |
| | 104 | | | | | | | |
| | 105 | Total Depth = 105 Ft | | | | | | |
| | 106 | | | | | | | |
| | 107 | | | | | | | |
| | 108 | | | | | | | |
| | 109 | | | | | | | |
| | 110 | | | | | | | |

Project: PBOW

Hole Number: PB-BED-MW27

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: PB-BED-MW27

Date Installed: 9/8/01

Elevation Top of Casing: 627.14 Ft
(outer edge of protective casing with lid open)

**Well Construction Diagram**
prepared for:

Plum Brook Ordnance Works
Sandusky, Ohio

# HTRW DRILLING LOG

| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: TNTA-BEDGW-001 | |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 10 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson / Tod Schmalfeldt | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 / Centera C2-250 | |
| 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 636.99 Ft | |
| | 10. DATE STARTED: 9/24/01 | 11. DATE COMPLETED: 9/13/01 |
| 12. OVERBURDEN THICKNESS: 8.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Groundwater not encountered (overburden) | |
| 13. DEPTH DRILLED INTO ROCK: 77.5 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 86 ft. | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

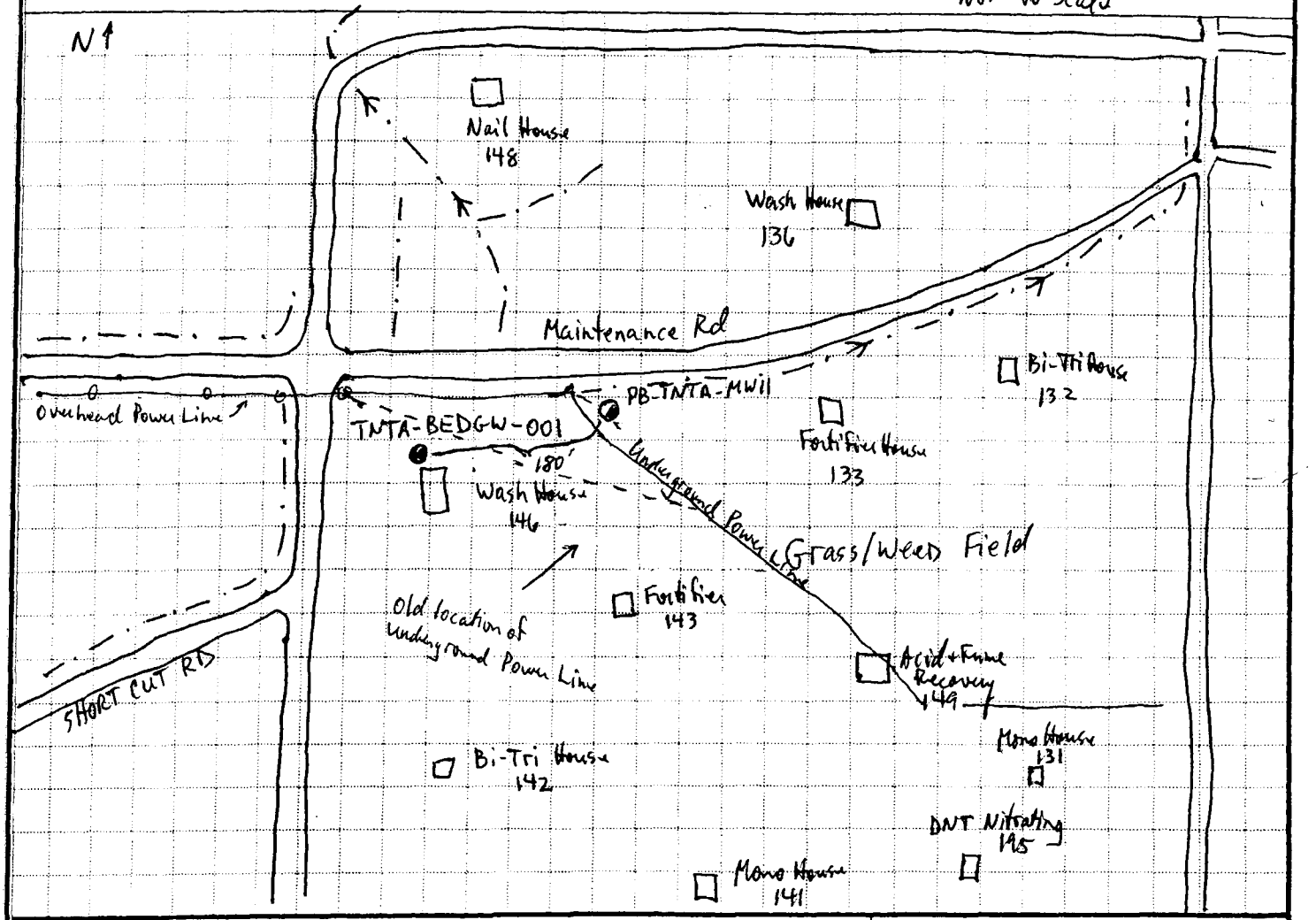
| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 9 |

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

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler / [illegible] |

LOCATION SKETCH/COMMENTS

SCALE: Not To Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTA-BEDGW-001 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Weeds | | | | | | |
| | | Loose, (10YR 3/2) very dark grayish brown, SAND, trace silt, organics weed (roots), dry 0.4 | SP | | NA | 5/5/ | 1.4/ | Began drilling 8/4/01 1429 |
| | 1 | Fill: (Loose, (10YR 5/4) yellowish brown, homogeneous, very fine grain, SAND, very well sorted, organics (roots), dry) 1.0 | | 0.0 | | 5/5 | 2.0 | |
| | | Fill: (Loose, whitish gray, sandy GRAVEL, very fine grain, 30% sand, very fine grain to 20 mm gravel pebbles, dry) | gm | | | 1630 | | Old Road bed, parking Area |
| | 2 | Fill: (Loose, (10YR 3/3) dark brown, mottled (brownish yellow, black), very fine grain, SAND, very well sorted 1", 2", 4" black ash layers, moist) | SP | 0.0 | NA | 4/4/ | 1.7/ | Background/ Breathing Air: PID = 0.0 ppm |
| | 3 | 1/4" dark gray, clay layers (wavy) in black sand 3.3 - 3.7 ft | | | | 5/5 | 2.0 | Black sand (ash) is carbon from burning |
| | 4 | 4.4 | | | | 1632 | | VRAE: |
| | | Stiff, (10YR 4/1) dark gray, homogeneous, silty CLAY, low plasticity, blocky bedding, dry | | 0.0 | NA | 1/3/ 7/12 | 1.8/ 2.0 | CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 21.3% |
| | 6 | Consistency increasing w/ depth | Cl | | NA | 1/8/ | | |
| | 7 | As above. Shale bedding (laminations) visible at 8.5 ft. | | 0.0 | | 12/20 | 2.0/ 2.0 | |
| | 8 | As above, 8.5 | | | | 1642 | | Wet pockets w/in bedding |
| | | SHALE, dark gray, soft, very thinly laminated, severely weathered, dry | NA | 0.0 | NA | 3/20/ 23/50 for 4" | 1.7/ 1.7 | Bedrock 8.5' Almost clay |
| | 9 | | | | | 1647 | | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TMTA-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | SHALE, severely weathered, very soft, very thin laminations, dry | NA | 0.0 | NA | 25/ 50 for 5" | 0.9/ 0.9 | 10 |
| | 11 | Spoon Refusal @ 10.9 | NA | NA | NA | NA | NA | 10.9 Began with 4¼" ID augers |
| | | SHALE, gray, dry | | | | | | |
| | 12 | | | | | | | |
| | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | Bottom of 12" OD Borehole at 15 Ft 15 |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: TMTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW-001

Project: PBOW

Geologist:

Sheet 4 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | SHALE, gray, dry | NA | | NA | NA | NA | |
| | 21 | | | 0.0 | | | | |
| | 22 | | | | | | | |
| | 23 | | | | | | | |
| | 24 | | | | | | | |
| | 25 | 4 1/4" ID Auger Refusal @ 25 ft | NA | | NA | NA | NA | Began drilling 9/5/01 0930 w/ 8" OD Rotary bit |
| | 26 | SHALE, gray, soft | | | | | | Breathing Air / Background: PID: 0.0 ppm VRAE: CO: 0 ppm LEL: 0% $H_2S$: 0 ppm $O_2$: 20.7% |
| | 27 | | | 1.5 | | | | |
| | 28 | | | | | | | |
| | 29 | | | | | | | |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 5 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | SHALE, gray, soft | NA | | NA | NA | NA | |
| | 31 | | | 0.6 | | | | Background/ Breathing Air: PID: 0.0 ppm |
| | 32 | | | | | | | VRAE: CO = 0 ppm LEL = 1% $H_2S$ = 0 ppm $O_2$ = 20.8 % |
| | 33 | | | | | | | |
| | 34 | | | | | | | |
| | 36 | | | | | | | Using water to circulate cuttings from borehole. No water loss. |
| | 36 | | | | | | | |
| | 37 | | | | | | | Strange, sweet organic odor 1.6 ppm |
| | 38 | | | | | | | Clay Slug attempt to wash out. (2-3 ft length) |
| | 39 | | | | | | | |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 6 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | SHALE, gray, soft | NA | | NA | NA | NA | Large 2 ft slug of silty CLAY with pebbles surges to top of ~~well~~ borehole. pebbles subrounded gray, brown |
| | 41 | | | | | | | |
| | 42 | | | | | | | |
| | 43 | | | | | | | Drill Rod begins chatter at 43.5' |
| | 44 | | | | | | | Chattering stops at 44 ft |
| | 45 | | | | | | | |
| | 46 | | | | | | | SHALE ? |
| | 47 | SHALE, gray, soft | | | | | | still no coreable bedrock. |
| | 48 | | | | | | | No rock cuttings, only silty clay nodules gathered from water. |
| | 49 | | | | | | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 7 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USRS | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 50 | SHALE, gray, soft | | NM | NA | NA | NA | |
| | 51 | shaley LIMESTONE, average hardness, dark gray, moderately weathered, pyrite, fossils | | | | | | Described from cuttings |
| | 52 | | | | | | | |
| | 53 | | | | | | | |
| | 54 | | | | | | | Bottom of 8" Borehole, Bottom of 6" Steel Casing @ 55 ft |
| | 55 | | | | | Fracs | | 9/13/01 coring |
| | | | | | | 55.8 | | Run 55-60 |
| | | | | | | | | Run 5' 60' |
| | | | | | | | | Recov 4' |
| | | | | | | | | Start 10 AM |
| | | | | | | | | End 10 40 |
| | 56 | | | | | 56.6 | | |
| | 57 | v. hard, massive, grs, limestone | | NM | Box 1 55-58 | Run 1 ~~57.8~~ 58 ~~58.6~~ | | ~~55-60~~ |
| | 58 | | | | | | | |
| | 59 | | | | | | | |
| | 60 | | | | | 60 | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA-BEDGW001

Project: PBOW

Geologist: RPodor.

Sheet 8 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USDA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Fracs | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 60 | LIMESTONE, gray, very hard, massive bedding | | | 60.3<br>60.7<br>61<br>61.3<br>61.4 | Run 2 | | Run 60-65 |
| | 61 | | | | | | | |
| | | | | | 62 | | | 62 |
| | 62 | as above | | | | Run 2 | | Run 60-65<br>Rec 5' |
| | | | | NM | 62.9<br>63.5 | Box 2<br>DKK<br>58-62 | | Rec 5'<br>PID 0.0 |
| | 63 | | | | | | | |
| | 64 | | | | 64 | | | |
| | 65 | as above | | | | Run 3 | | Run 65-70<br>Rec 5' |
| | | | | | | Box 3<br>DKK<br>65 | | |
| | 66 | | | NM | 66.2 | Box 4<br>DKK<br>69 | | Box 3<br>62-65 |
| | 67 | | | | 67.5 | | | Box 4<br>65-69 |
| | 68 | | | | 68.3 | | | |
| | 69 | | | | | | | |
| | 70 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA BCD GW 001

Project: PBOW

Geologist: R Podesta

Sheet 9 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 70 | as above | | | Run 4 | | | Run 70-75<br>Start 1145<br>Run 5'<br>Recov 5' |
| | 71 | LIMESTONE, gray, very hard, massive bedding | | | Box 5<br>69-72 | | | PID 0.0 |
| | | | | | 71.4 | | | |
| | 72 | | | | 71.9 | | | |
| | 73 | | | | ~~72.8~~<br>~~72.9~~ | | | |
| | | | | NM | | | | |
| | 74 | | | | 73.8<br>73.9<br>~~74~~ | | | |
| | 75 | | | | | | | |
| | | | | | Run 5 | | | Run 75-80<br>Start 1200<br>Run 5'<br>Recov 4.5' |
| | 76 | | | | Box 6<br>~~73-76~~ Box 6 | 76.2 | | |
| | | | NM | | Box 7<br>76-79.5 | 76.8 | | Box 6<br>72-76' |
| | 77 | | | | | 77.5 | | |
| | 78 | | | | | 78.2 | | |
| | 79 | | | | | 79 | | |
| | 80 | | | | | | | |

Project: PBOW

Hole Number: TNTA BCD GW 001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTA6CD CW001

Project: PBOW

Contractor: R Rubin's

Sheet 10 of 10 Sheets

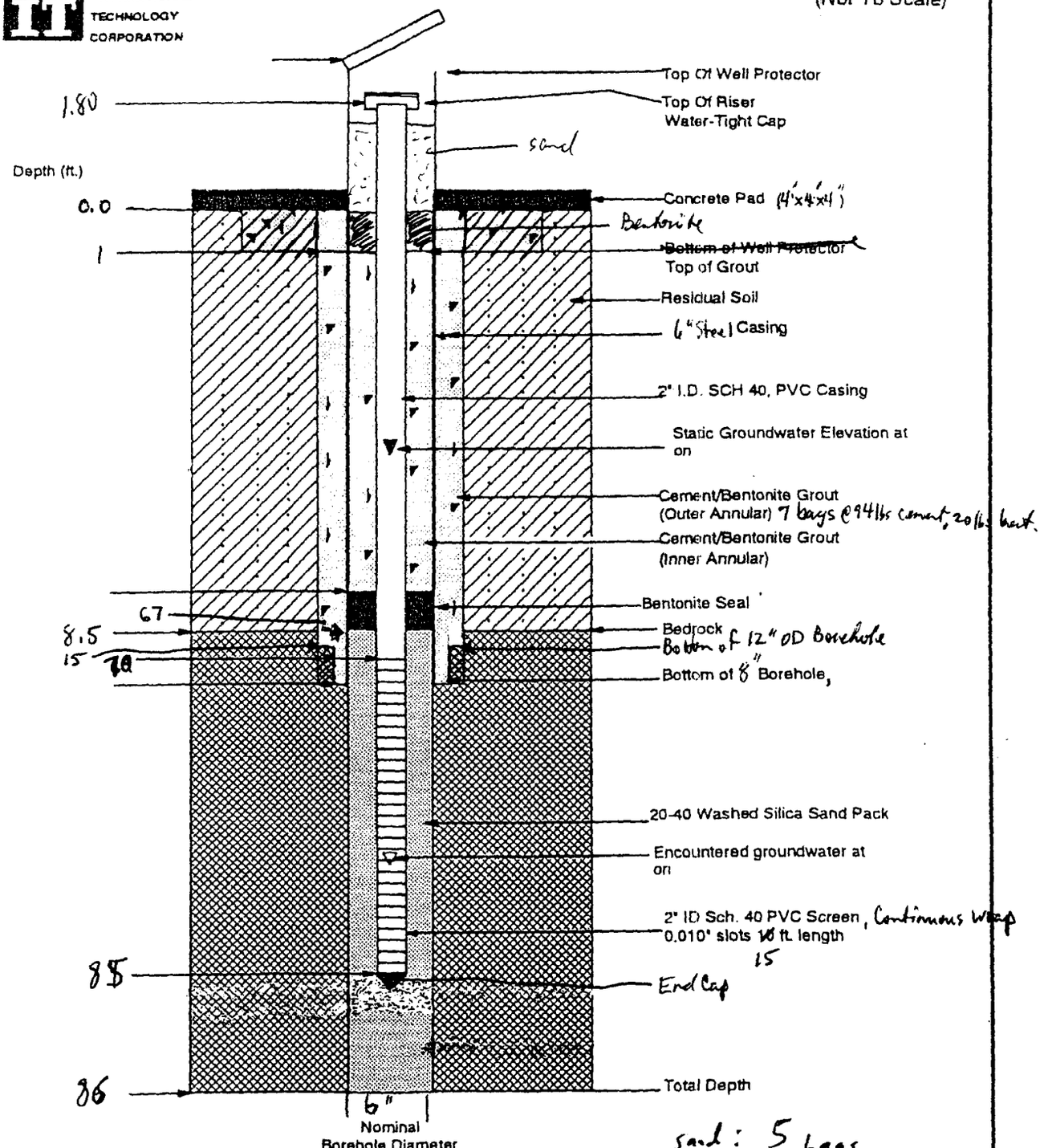
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FRACS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 80 | | | | Run 6 | | | Run 8-85<br>Run 5'<br>Recov 5' |
| | 1 | as above | | 80.8 | 80.8 | | | |
| | | LIMESTONE, gray, very hard, massive bedding | | 81.5 | 79.5 | | | Box 8<br>79.5-83 |
| | 2 | | | NM | 82.7 | | | |
| | 3 | | | | 83.1 | | | |
| | | | | | 83.6 | | | Box 9 |
| | 4 | | | | 84.1 | | | 83-85 |
| | 5 | | | | | | | 85 |
| | | | | | | | | set at 85<br>15' screen<br>~~[illegible]~~ 85-70' |
| | 6 | Total Depth = 86 ft | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 90 | | | | | | | |

Project: PBOW

Hole Number: TNTA-BCDW001

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




sand: 5 bags
pellets: 1 bucket

Notes:

Well No.: TNTA-BEDGW-001
Date Installed: 9/13/01
Elevation Top of Casing: 638.79 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA23DWC.DRW/1/5-28-93

# HTRW DRILLING LOG

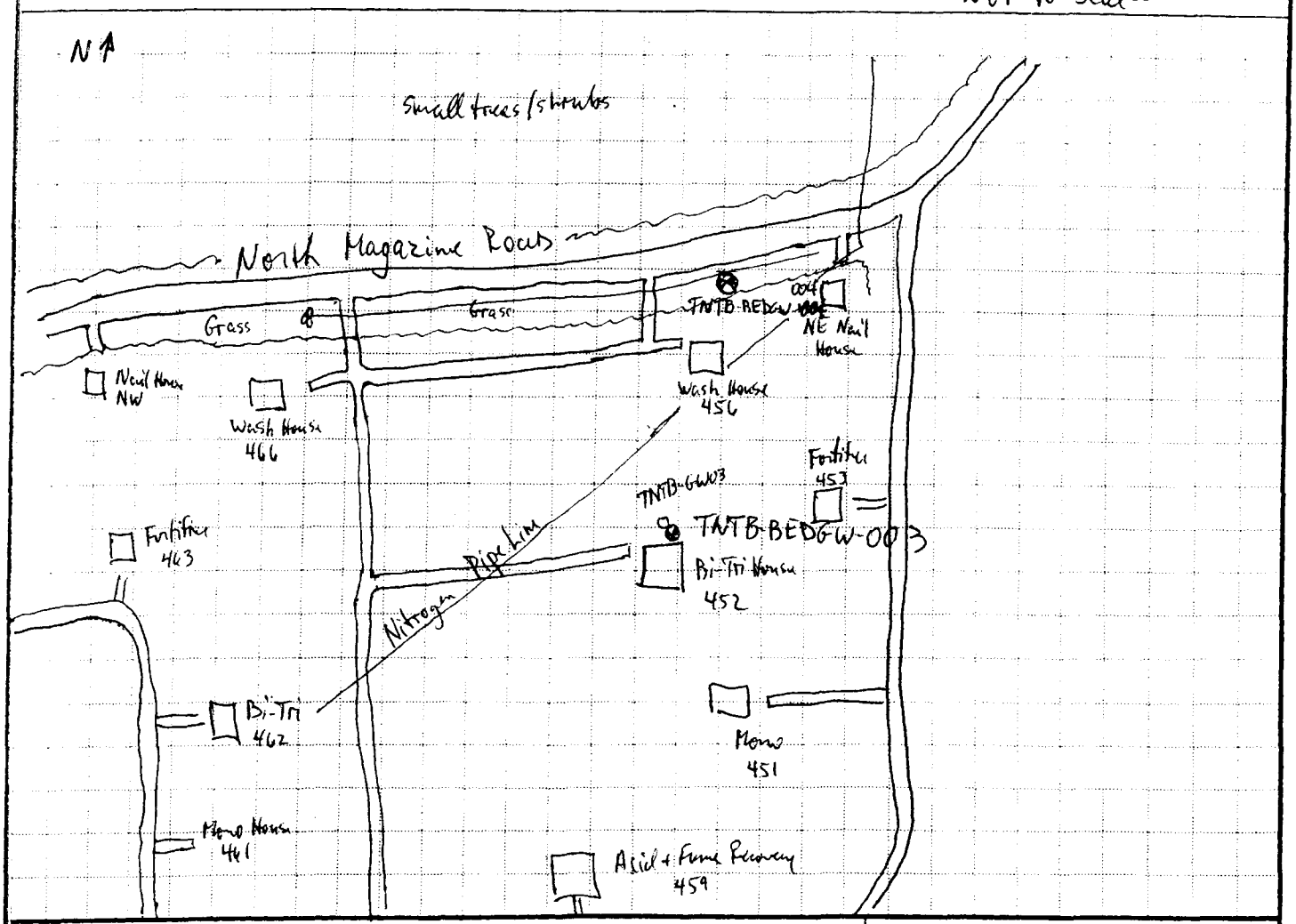
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: TNTB-BEDGW-003 | SHEET 1 OF 6 SHEETS |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole [illegible] OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 681.34 Ft | |
| | 10. DATE STARTED: 8/30/01 | 11. DATE COMPLETED: 9/8/01 |
| 12. OVERBURDEN THICKNESS: ~~14.8 Ft~~ 4.3 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 11.3 Ft (overburden), Bedrock gw suspected at 40.9 Ft | |
| 13. DEPTH DRILLED INTO ROCK: 28.5 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 43.3 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 5 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTB-BEDGW-003 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-003

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USA | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Weeds | | | | | | |
| | | Fill: Black, silty SAND, dry 0.1 | | | | | | Began drilling 8/30/01 1135 with 4¼" ID HSA |
| | 1 | Fill: (Loose, 10YR 4/6) dark yellowish brown, homogeneous, SAND, very fine grain, very well sorted, dry) | SP | 0.0 | NA | 2/2 / 3/3 / 1140 | 1.5 / 2.0 | Background/Breathing PID = 0.0 ppm CO = 0 ppm LEL = 1% $H_2S$ = 0 ppm $O_2$ = 21.0 % |
| | 2 | | | | | | | |
| | 3 | As above | SP | 0.0 | NA | 2/2 / 1/2 / 1142 | 1.0 / 2.0 | |
| | 4 | 4.3 | | | | | | |
| | 5 | Loose, (10YR 2/2) very dark brown, mottled (50% - black, yellow, rust), very fine grain, shaley SAND, little silt (20%), 30% shale, broken, thinly laminated, severely weathered, dry | SM | 0.0 | NA | start ~~2/3~~ DCK ~~3/4~~ ~~6/6~~ ~~7/5~~ 1144 | 0.5 / 2.0 | Began very weathered decomposed shale |
| | 6 | | | | | | | |
| | 7 | As above | SM | 0.0 | NA | ~~5/9~~ DCK ~~14/17~~ 6/6 / 7/5 / 1152 | 1.4 / 2.0 | |
| | 8 | | | | | | | |
| | 9 | As above<br>Moist at 9 ft | SM | 0.0 | NA | start ~~5/9~~ ~~14/17~~ ~~9/9~~ ~~7/7~~ 1155 | 2.0 / 2.0 | |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTB-BEDGW-003

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-003

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Unit | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Medium dense, (10YR 2/2) very dark brown, mottled (black, yellow, rust), 50% mottled, very fine grain, shaley SAND, 40% shale, trace sand 10%, moist 11 | Sm | 0.0 | NA | 9/4/ 7/7 | 1.5/ 2.0 | |
| | 11 | Medium dense, (10YR 3/1) very dark gray, very fine grain, SAND, trace silt (<5%) shale 40%, black shale, broken, wet | | | | 1158 | | ▽ Encountered overburden groundwater at 11.3 Ft |
| | 12 | As above, silt content increases with depth. 14 | SP | NM | NA | 5/12/ 13/17 1200 | 1.8/ 2.0 | |
| | 14 | ~~As above~~ As above, silt 20%, shale 30%, SAND 50%, wet 14.8 | Sm | NM | NA | 9/12/ 26/40 | 1.6/ 2.0 | |
| | 15 | SHALE, black, broken, thinly laminated. (5Y 5/6) olive, 1% pocket of silt, friable, wet | NA | | | 1204 | | Bedrock Bottom of 12" borehole at 15 Ft |
| | 16 | | | NM | NA | 50 for 5" 1234 | 0.4/ 0.4 | |
| | | Spoon Refusal @ 16.4 Ft | NA | NA | NA | NA | NA | |
| | 17 | SHALE | | | | | | |
| | 18 | 4¼" ID Auger Refusal @ 18 Ft | NA | NA | NA | NA | NA | |
| | | SHALE | | | | | | Fractured (Dry) at 18.5' |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: TNTB-BEDGW-003

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TMTB-BEDGW-003

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | SHALE, black/dark brown, moderately weathered, moderately hard chips, 10% stained, thinly laminated | NA | NM | NA | NA | NA | |
| | 21 | | | | | | | |
| | 22 | | | | | | | Bottom of 8" OD Borehole. Bottom of 6" Steel Casing @ 23 Ft |
| | 23 | | | | | Fracs | | C-1 (23-28') End: 1619 Start: 1548 |
| | 24 | | | | ~~Box #1~~ NK | | | |
| | 25 | | | NM | | | | 5 Ft Run 0 Ft Recovery |
| | 26 | | | | | | | Borehole open to 28 Ft. Concrete washed away. Core barrel lined w/ very dark brown, SILT |
| | 27 | | | | | | | No water lost |
| | 28 | SHALE, black/very dark brown, moderately hard, thinly bedded, slightly broken, moderately weathered, pyrite in lamination 28.2; pyrite vugs 7mm to 25mm | | 0.0 | Box #1 | 28.5<br>28.6<br>28.65<br>28.9<br>29.4<br>29.45 | | C-2 (28-33') End: 1700 Start 1645 |
| | 29 | | | | | | | 5 Ft Run 4 Ft Recovery |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: TMTB-BEDGW-003

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-003

Project: PBOW | Geologist: D. Kesslen | Sheet 5 of 6 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FRACS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | SHALE, black/very dark brown, moderately hard, thinly bedded, slightly broken, moderately weathered, pyrite in vugs | | NM | Box # 1 photo 27 | 30 / 30.7 / 30.8 | | (C-2 cont'd) 5 Ft Run 4 Ft Recovery 1 Ft Loss Obtained portion of lost broken bar |
| | 31 | | | | | | | |
| | 32 | | | | | | | |
| | 33 | SHALE, As above 33-33.9 Ft, Intensely fractured | | | Box # 2 photo 26 | 33 / Intense / 33.9 / 34.1 / vertical also / 34.8 | | C-3 (33-38') End: 1815 Start: 1759 5 Ft Run 5 Ft Recovery 0 Loss |
| | 34 | | | | | | | |
| | 35 | 35.1 LIMESTONE, gray, hard, massive, slightly weathered, fossils (brachs, corals), ~~10%~~ 5% vugs (quartz filled), unbroken | | | | 35.9 / 36 | | |
| | 36 | | | | Box # 3 | | | |
| | 37 | 37-38 Ft; pitted, highly weathered | | | photo 25 | 37.5 | | |
| | 38 | As above, ~~90%~~ intensely pitted 38-38.5'. | | | 38 Box # 4 | 38.2 / 38.6 | | Began Coring 9/8/01 0857 C-4 (38-43) End: 0911 start: 0857 |
| | 39 | 39-39.4; wavy, continuous, shale laminations | | | photo 24 | 39 / 39.4 | | |
| | 40 | | | | | | | |

Project: PBOW | Hole Number: TNTB-BEDGW-003

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TMTB-BEDGW-003

Project: PBOW

Geologist: D. Kessler

Sheet 6 of 6 Sheets

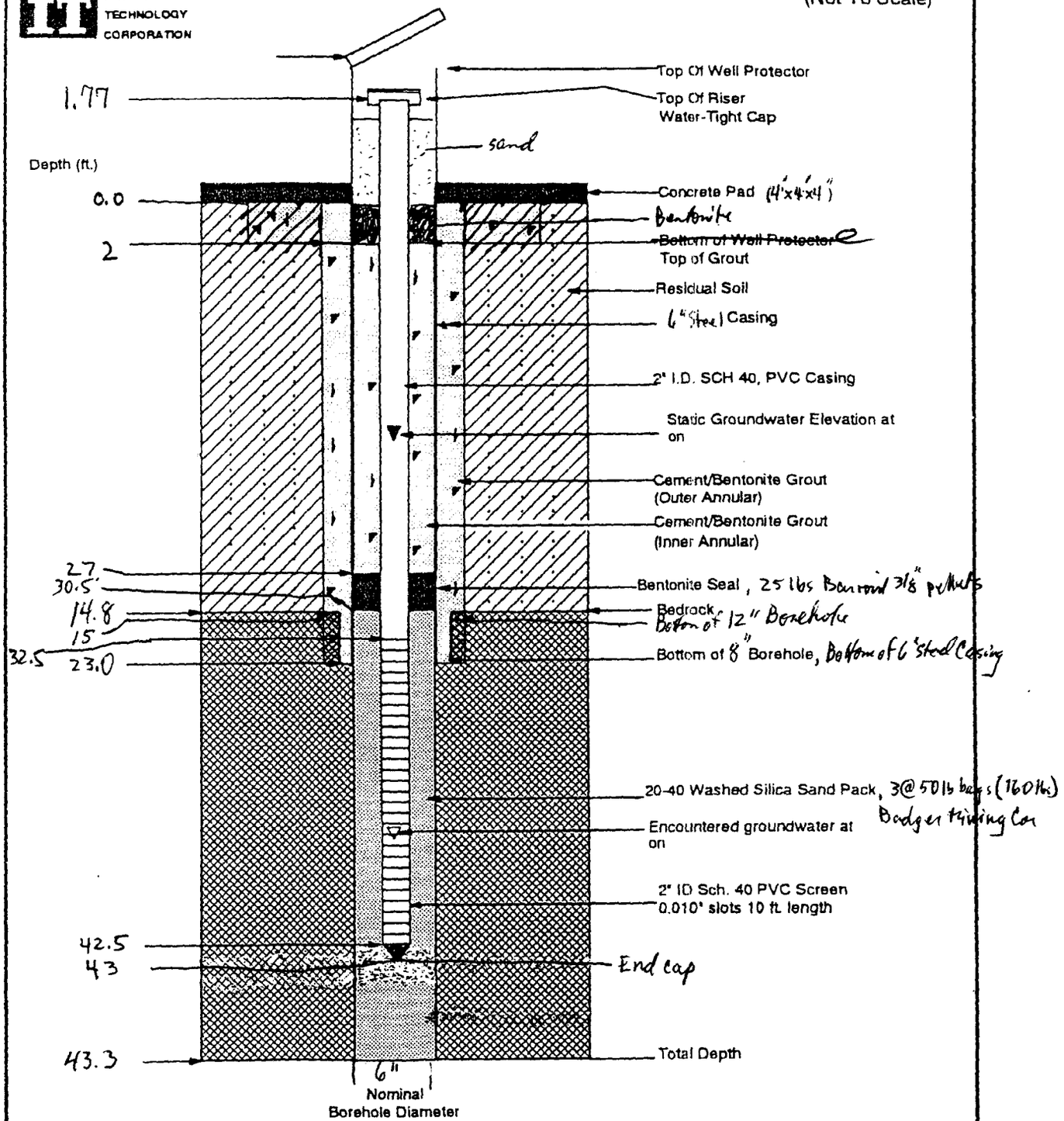
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FRACS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | LIMESTONE | | 40.1 | | 40.1 | | C-4 (cont) (38-43.3') |
| | | 40.9 | | NM | Box # 4 | 41.0, 41.3 } Intense; 41.6 | | 5.3 Ft Run |
| | 41 | SHALE, gray, highly weathered/decomposed, thinly laminated, very soft. | | | 41.8 | | | 5.3 Ft Recovery |
| | 42 | 42.5 pyrite vugs (8) | | | | 41.9, 42 } Intense | | 0 Loss |
| | | 40.9–42.7 highly weathered/decomposed | | | Box # 5 | 42.4 | | pumped borehole |
| | 43 | Moderately hard ~~clay~~ SHALE 42.6-42.9 | | | photo 23 43.3 | 42.9 } Intense; 43.3 | | |
| | | Total Depth = 43.3 Ft | | | | | | |
| | 44 | | | | | | | |
| | 45 | | | | | | | |
| | 46 | | | | | | | |
| | 47 | | | | | | | |
| | 48 | | | | | | | |
| | 49 | | | | | | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: TMTB-BEDGW-003

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: TNTB-BEDGW-003
Date Installed: 9/8/01
Elevation Top of Casing: 683.11 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA23DWC.DRW/lj/5-28-93

# HTRW DRILLING LOG

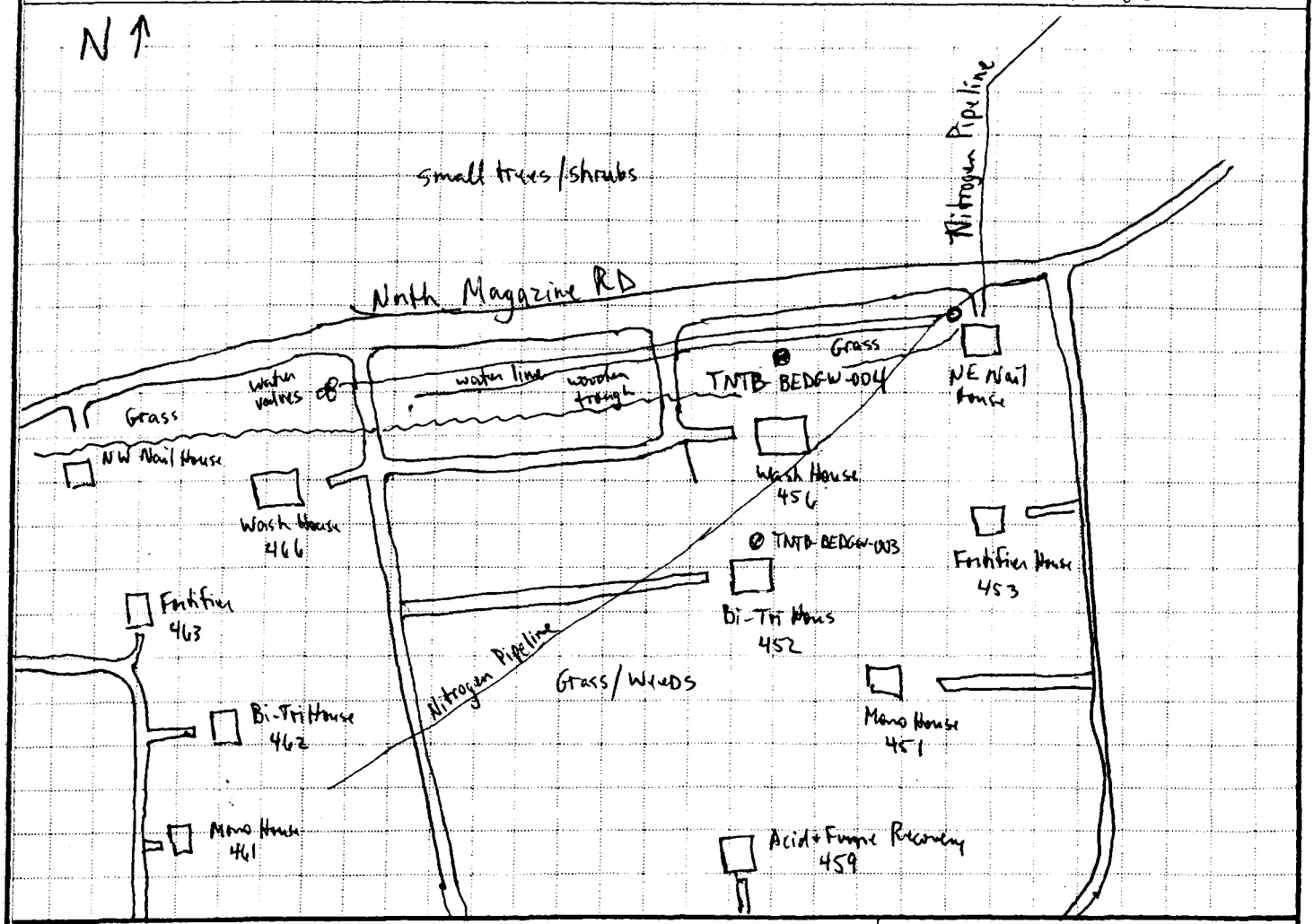
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | HOLE NUMBER: TNTB-BEDGW-004 | SHEET 1 OF 4 SHEETS |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson | 6. MANUFACTURER'S 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 4" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 666.78 Ft | |
| | 10. DATE STARTED: 8/29/01 | 11. DATE COMPLETED: 9/7/01 |
| 12. OVERBURDEN THICKNESS: 4.9 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: Overburden groundwater not encountered/Bedrock unknown | |
| 13. DEPTH DRILLED INTO ROCK: 21.2 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 4.8 Ft BGS 9/12/01 0855 | |
| 14. TOTAL DEPTH OF HOLE: 26.1 Ft | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): 9.69 btw | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 4 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kessler |

LOCATION SKETCH/COMMENTS — SCALE: Not To Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTB-BEDGW-004 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-004

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 4 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Grass | | | | | | |
| | | Fill: Stiff. (10YR 2/1) black, mottled (3%- brown), clayey SILT, some sand (20%), organics (roots) trace pebbles, dry 0.4 | ml | 0.0 | NA | 3/4/ 5/7 1746 | 1.4/ 2.0 | Began drilling 8/29/01 1745 w/ 4¼" ID augers |
| 1 | | Fill: (Stiff, (10YR 5/2) grayish brown, mottled (yellowish brown)-50%), clay SILT, some sand (20%), vfg, very well sorted, low plasticity, dry) | | | | | | |
| 2 | | As above | ml | 0.0 | NA | 4/4/ 5/7 1752 | 1.8/ 2.0 | thinly laminated, very weathered decomposed, former Shale |
| 3 | | | | | | | | |
| 4 | | | | 0.0 | NA | 8/27/ 50 for 2" 1757 | 1.2/ 1.2 | Began drilling 8/30/01 0745 Advanced 12" Borehole to 4.9 Ft |
| 5 | 4.9 | SHALE, dark gray, broken, thinly lam. dry 5.2 | | | | | | |
| | | Spoon Refusal @ 5.2 Ft | | | | | | Continued drilling with augers. |
| 6 | | SHALE | | | | | | |
| | | 4¼" ID Auger Refusal @ 6.3 Ft | | 0.0 | NA | 100 for 7" 1800 | 0.7/ 0.7 | Attempted spoon |
| | | SHALE, dark gray, broken, thin lam, dry | | | | | | |
| | | Spoon Refusal @ 6.7 Ft | | | | | | Breathing Air/ Background |
| 7 | | | | | | | | PID = 0.0ppm |
| 8 | | SHALE, very dark brown/black, slightly weathered, average hardness | | | | | | URAE: CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 20.9% |
| 9 | | | | | | | | Organic odor in borehole PID = 30.8ppm |
| 10 | | | | | | | | |

Project: PBOW

Hole Number: TNTB-BEDGW-004

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-004

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 4 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | SHALE, very dark brown/black, slight weathering, average hardness | NA | NM | NA | NA | NA | Bottom of 8" OD Borehole. Bottom of 6" steel Casing |
| | 11 | | | | | ~~Fracs~~ | | Cut w/ 6" roller bit during clean-out. |
| | 12 | SHALE, very dark brown, moderately hard, thin lamination, moderate weathering, pyrite in pits/laminations (2%), highly fractured | | | pyrite | Fracs<br>11.8<br>12.1<br>12.1<br>12.4<br>12.9<br>13.1 (1")<br>13.2 | | Began coring w/ PQ bit 9/6/97 1705<br>C-1<br>11.5-16.5'<br>End Time: 1712<br>Start Time: 1705 |
| | 13 | | | | | | | |
| | 14 | | | 0.0 | Box #1 | 13.7<br>13.9 (1/4")<br>14.3 | | 5 Ft Run<br>4.5 Ft Recovery<br>0.5 Ft Loss |
| | 15 | Large vug filled w/ pyrite 14.4-14.5 Ft | | | 15.3 | 15.3<br>15.7 vertical | | Breathing Air<br>PID: 0.0 ppm<br>CO: 0 ppm<br>LEL: 0%<br>$H_2S$: 0 ppm<br>$O_2$: 21.7% |
| | 16 | | | | Box #2<br>16.5 | 16.3 | | |
| | 16.8 | | | | | | | |
| | 17 | LIMESTONE, greenish gray, hard, massive, slightly weathered, fossils (brachs/corals) in pits/vugs (10%), moderately fractured | | | Box #2 | 16.7 (mech)<br>16.7<br>17.1 (mech)<br>17.5 (mech)<br>17.7 (mech)<br>Frac 18 | | C-2<br>16.5-21.5 Ft<br>End: 1749<br>Start: 1740 |
| | 18 | | | | | | | 5 Ft Run<br>5.3 Ft Recovery<br>0.3 Ft Gain |
| | 19 | | | | Box #3 | 19.2 (mech)<br>19.6 Frac | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: TNTB-BEDGW-004

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTB-BEDGW-004

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 4 Sheets

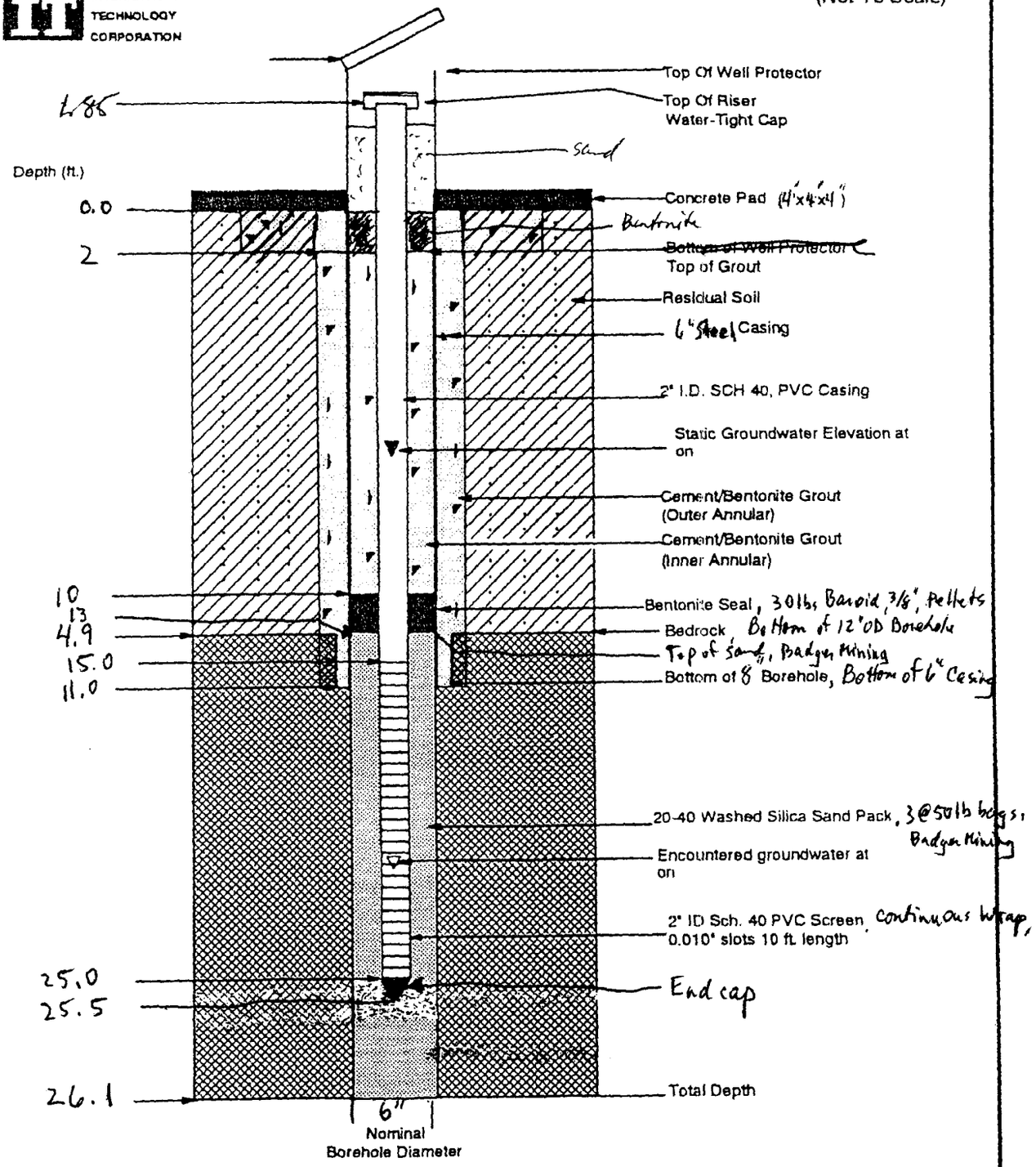
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No: Fracs | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 20 | LIMESTONE, greenish gray, hard, massive, slightly weathered, fossils (brachs, corals) in pits/vugs (10%) | | | | 20.2 | | (C-2 cont) |
| | | | | | | 20.8 filled w/shale | | |
| | 21 | | | 0.5 | Box #3 | 21.3 (Mech) | | |
| | | | | | | 21.7 | | C-3 21.5-26.1 Ft |
| | 22 | | | | | | | End 1817 Start 1808 |
| | | | | | ~~22.7~~ | 22.7 | | |
| | 23 | 23.2 | | | ~~23.2~~ | 23.2 | | |
| | | SHALE, gray, soft, very thinly laminated, highly weathered | | | | 23.6 23.6 Frac | | |
| | 24 | | | | Box # 4 | 24 (mech) | | 4.6' Run 4.6' Recovery 0 Loss |
| | 25 | | | | | 25.1 | | |
| | | | | | | 25.4 | | |
| | | 25.7 | | | | 25.7 | | |
| | | LIMESTONE, gray, hard 26 | | | | 26.0 | | |
| | 26 | SHALE | | | | | | |
| | | Total Depth: 26.1 Ft | | | | | | |
| | 27 | | | | | | | |
| | 28 | | | | | | | |
| | 29 | | | | | | | |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: TNTB-BEDGW-004

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




Notes:

Well No.: TNTB-BEPGW-004
Date Installed: 9/7/01
Elevation Top of Casing: 668.63 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

BWMWA230WC.DRW/ll/5-28-83

26.1
13
13.1

# HTRW DRILLING LOG

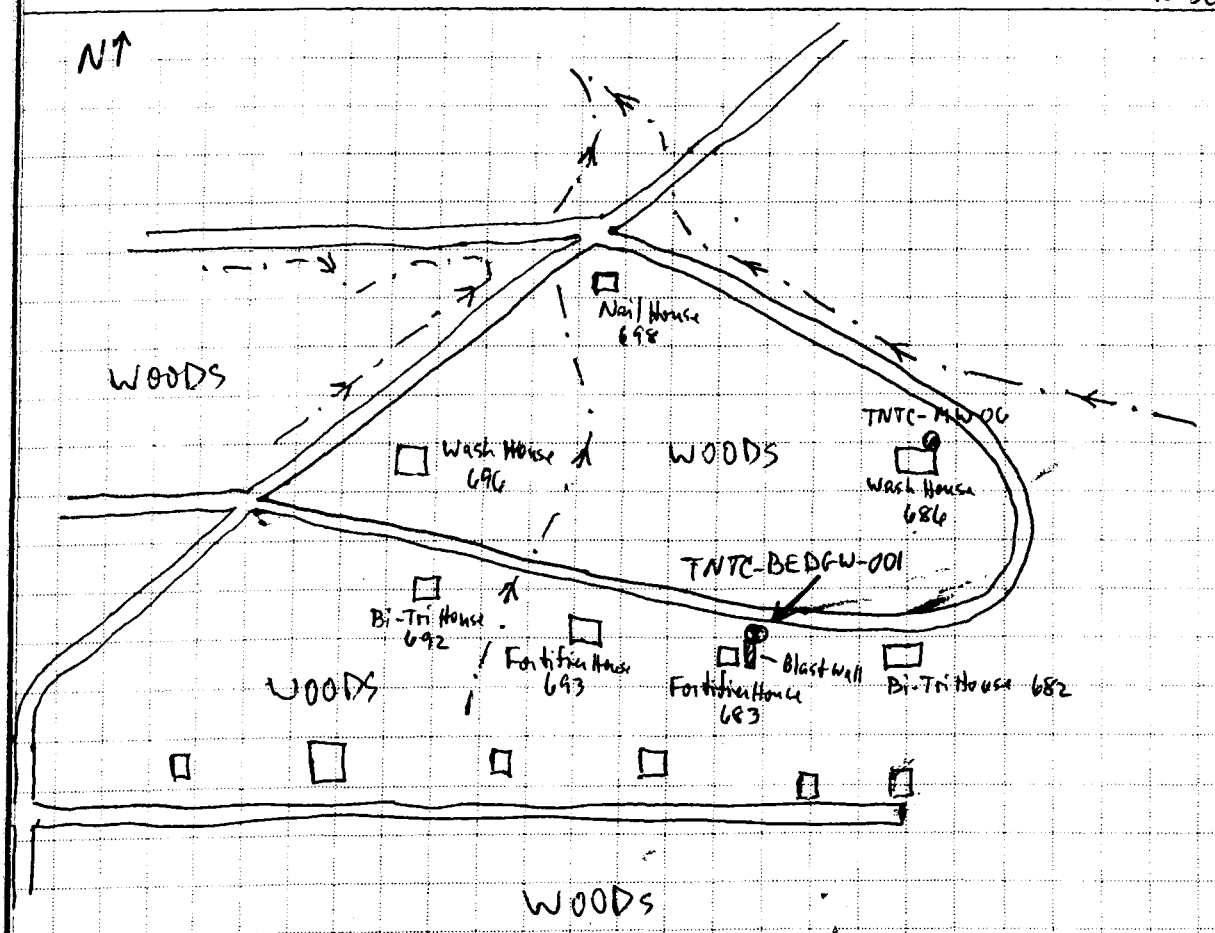
| | | |
|---|---|---|
| DISTRICT: Nashville, TN | | HOLE NUMBER: TNTC-BEDGW-001 |
| 1. COMPANY NAME: IT Corporation | 2. DRILL SUBCONTRACTOR: Boart Longyear | SHEET 1 OF 10 SHEETS |
| 3. PROJECT: PBOW | 4. LOCATION: NASA Plum Brook Station, Sandusky, OH | |
| 5. NAME OF DRILLER: Paul Dickinson / Todd Schmaltz | 6. MANUFACTURER'S DESIGNATION OF DRILL: BK81 for overburden Centera C2-250 for coring | |
| 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. Borehole reamed with 8 1/4" ID/12" OD HSA. Bedrock cut with 8" OD tricone rotary bit. Installed 6" ID/6 5/8" OD black steel casing. Bedrock cored with PQ bit. Cores 3" OD, borehole 6" OD. Installed 2" PVC monitoring well. | 8. HOLE LOCATION: See Sketch | |
| | 9. SURFACE ELEVATION: 664.04 Ft | |
| | 10. DATE STARTED: 8/28/01 | 11. DATE COMPLETED: 9/12/01 |
| 12. OVERBURDEN THICKNESS: 14.5 Ft | 15. DEPTH GROUNDWATER ENCOUNTERED: 8.8 Ft (overburden) | |
| 13. DEPTH DRILLED INTO ROCK: ~~86 Ft~~ 71.5 Ft | 16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA | |
| 14. TOTAL DEPTH OF HOLE: 86 ft. | 17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA | |

| 18. GEOTECHNICAL SAMPLES | DISTURBED | UNDISTURBED | 19. TOTAL NUMBER OF CORE BOXES |
|---|---|---|---|
| | NA | NA | 9 |

| 20. SAMPLES FOR CHEMICAL ANALYSIS | VOC | METALS | OTHER (SPECIFY) | OTHER (SPECIFY) | OTHER (SPECIFY) | 21. TOTAL CORE RECOVERY |
|---|---|---|---|---|---|---|
| | NA | NA | NA | NA | NA | 100 % |

| 22. DISPOSITION OF HOLE | BACKFILLED | MONITORING WELL | OTHER (SPECIFY) | 23. SIGNATURE OF INSPECTOR |
|---|---|---|---|---|
| | NA | X | NA | David Kesch / Reed Roberts |

LOCATION SKETCH/COMMENTS — SCALE: Not to Scale




| PROJECT | HOLE NO. |
|---|---|
| PBOW | TNTC-BEDGW-001 |

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BED6W-001

Project: PBOW

Geologist: D. Kessler

Sheet 2 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | Weeds | | | | | | |
| | 1 | Fill: Loose, (10YR 4/3) brown, homogeneous, SAND, trace silt, organics (roots), vfg, very well sorted, dry 0.5 | SP | 0.0 | NA | 2/2 / 5/4 | 1.4 / 2.0 | Began drilling 8/28/01 1640 with 4¼" ID augers. |
| | 2 | Fill: (color grading to yellowish brown (10YR 5/6)) No SILT | | | | 1640 | | Background/ Breathing Air: PID = 0.0 ppm |
| | 3 | As above | SP | 0.0 | NA | 2/4 / 5/5 | 1.6 / 2.0 | VRAE: CO = 0 ppm LEL = 0% $H_2S$ = 0 ppm $O_2$ = 21.1 % |
| | 4 | | | | | 1644 | | |
| | 5 | Fill: As above (color grading to (10YR 5/8) yellowish brown) | SP | 0.0 | NA | 3/5 / 5/5 | 2.0 / 2.0 | |
| | 6 | | | | | | | |
| | 7 | At 7.6 Ft; color changing to (10YR 4/3) brown, moist | SP | 0.0 | NA | 4/3 / 5/5 | 2.0 / 2.0 | |
| | 8 | | | | | | | |
| | 9 | At 9.5-10 Ft; color changing to (5Y 4/2) olive gray, dark red/ blackish red nodules at 9.6 Ft; trace silt begins | SP | 0.0 | NA | 5/4 / 5/5 | 2.0 / 2.0 | ▽ Encountered overburden groundwater at 8.8 Ft. PID = 0.0 ppm of nodules |
| | 10 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BED6W-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 3 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uifie | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 10 | Medium dense, (5Y 4/2) olive gray, homogeneous, SAND, trace silt, very fine grain, very well sorted, wet, 11.3 | sp | NM | NA | 5/8/ 17/29 | 2.0/ 2.0 | |
| | 11 | Medium dense, (2.5Y 4/1) dark gray homogeneous, very fine grain SAND and GRAVEL, coarse grain to 30 mm size, limestone, wet 13 | gm | NM | NA | 1658 / 8/17/ 9/32 | 2.0/ 2.0 | |
| | 12 | Very stiff, (10YR 5/1) gray, homogeneous, low plasticity, silty CLAY, coarse grain shale fragments (35%), wet 14.5 | cl | NM | NA | 1700 / 10/11/ 12/30 | 1.5/ 2.0 | Bedrock ?. Decomposed severely weathered SHALE |
| | 13 | Very stiff, (10YR 5/N) gray, homogeneous, high plasticity, silty CLAY, irregular bedding, dry | ch | NM | NA | 1707 / 8/12/ 29/32 | 2.0/ 2.0 | |
| | 14 | As above | | NM | NA | 1713 / 17/29/ 33/42 | 1.5/ 2.0 | |
| | 15 | As above | | | | 1722 | | |
| | 16 | | | | | | | |
| | 17 | | | | | | | |
| | 18 | | | | | | | |
| | 19 | | | | | | | |
| | 20 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 4 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Litho | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 21 | Very hard, (1GLEY 5/N) gray, homogeneous high plasticity, silty CLAY, occasional laminated bedding planes, dry, 20% shale fragments | ch | NM | NA | 10/16/50 for 3" 1729 | 1.3/1.3 | Decomposed shale. Very hard clay in shoe tip. |
| | 22 | Spoon Refusal @ 21.3 Ft | | NM | NA | NA | NA | Began advancing only 4¼" ID augers. |
| | 23 | | ch | | | | | |
| | 24 | | | | | | | |
| | 25 | Very hard, (1GLEY 5/N), gray, homogeneous, high plasticity, silty CLAY, ~~not~~ dry | | NM | NA | 16/50 for 3" 1745 | 0.9/0.9 | Augers turning/advancing fairly easily attempted spoon. End of day |
| | 25.8 | | | | | | | |
| | 26 | Spoon Refusal @ 25.8 Ft | | NM | NA | NA | NA | Began drilling 8/29/01 0730 with 4¼" ID augers. 8¼" ID / 12" OD augers drilled to 25 Ft |
| | 27 | Very hard, (1GLEY 5/N) gray, homogeneous, high plasticity, silty CLAY, dry | ch | | | | | Decomposed shale |
| | 28 | | | | | | | |
| | 29 | | | | | | | |
| | 30 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW

Geologist: D. Kessler

Sheet 5 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Lithe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 30 | Very hard, (1GLEY 5/N) gray, homogeneous, high plasticity, silty CLAY, thinnly laminated bedding, dry | ch | NM | NA | 100 for 0.4" | 0.8/ 0.4 | 30.4 |
| | 31 | | | | | | | Augers advancing easily. |
| | 32 | | | | | | | Decomposed, (severely weathered) shale |
| | 33 | | | | | | | |
| | 34 | | | | | | | |
| | 35 | As above | ch | NM | NA | 50 for 3" | 0.3/ 0.3 | 35 / 35.3 |
| | 36 | | | | | | | |
| | 37 | | | | | | | |
| | 38 | | | | | | | |
| | 39 | | | | | | | Sweet, organic odor 0.8 ppm = PID |
| | 40 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW

Geologist: D. Kesslin

Sheet 6 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Urbe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 40 | Very hard, (10YR 5/N) gray, homogeneous, high plasticity, silty CLAY, very thinly laminated bedding, dry, friable, 80% shale relict | ch | 0.8 | NA | 100 for 6" | 0.5/ 0.5 | 40.5 |
| | 41 | | | | | | | Could not core material with wet or dry coring method |
| | 42 | | | | | | | |
| | 43 | | | | | | | |
| | 44 | | | | | | | Augers cut easily |
| | 46 | As above | ch | 2.2 | NA | 100 for 4" 0831 | 0.3/ 0.3 | 45.3 strong organic odor |
| | 48 | | | | | | | |
| | 47 | | | | | | | |
| | 48 | | | | | | | |
| | 49 | | | | | | | |
| | 50 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW | Geologist: D. Kessler | Sheet 7 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uthe | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. / Blows | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 50 | Very hard, light gray, homogeneous, very thinly laminated bedding; SHALE, very friable, dry | NA | 1.8 | NA | 100 for 7" 0847 | 0.7/ 0.7 | 50.6 |
| | 51 | limestone pebble (20x20x30 mm) | | | | | | Augers difficulty cutting 51-51.5 ft |
| | 52 | | | | | | | |
| | 53 | | | | | | | |
| | 54 | | | | | | | |
| | 55 | As above, limestone pebble (18x20x28 mm) | | NM | NA | 100 for 7" 0910 | 0.7/ 0.7 | Layers of limestone shale. Shale layers much thicker. Will stop 4¼" ID auger drilling. Shale competent. 55.3 |
| | 56 | | | | | | | |
| | 57 | | | | | Run #1 | | Bottom of 8" OD Borehole at 57.2' Bottom of Isolation Casing at 57.2 |
| | 58 | ~~massive, very hard gray limestone~~ grey, weathered lipey shale from 57-58.0 then 93 massive very hard limestone | SH ~~LS~~ LS | | | 1 Fracs 58.5 58.8 59.3 59.6 | | Run 1 Began Coring 9/11/01 57-62 Run 5' Recov 5' |
| | 59 | | | | | | | |
| | 60 | | | | | | | |

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

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BEDGW-001

Project: PBOW

Geologist: R Podoris

Sheet 8 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ URS | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Focus | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 60 | | | | | | | Box 1 57-62 |
| | 61 | | | | | 61.0 | | Start 500 end 510 |
| | | | | | | 61 | | |
| | | | | | | 61.5 | | |
| | 62 | Massive very hard limestone | | | | Run 2 | | Run 62-67 Run 5' Rcov 5' |
| | 63 | | | | | 63 | | |
| | | | | | | 63.7 | | Box 2 62-65 |
| | 64 | | | | | 64.5 | | Box 3 65-67 |
| | | | | | | 64.8 | | |
| | 65 | | | | | | | Start 510 end 530 |
| | 66 | | | | | 66.5 | | |
| | 67 | | | | | | | 67 |
| | | | | | | Run 3 9-11-01 | | 67-72 Run 5' Rcov 5' |
| | | | | | | 67.4 | | |
| | 68 | | | | | 67.8 | | |
| | | | | | | 68.1 | | Box 4 67-69.5 |
| | 69 | | | | | 68.5 | | Box 5 69.5- |
| | | | | | | 68.6 | | Start 830 |
| | | | | | | 69.5 | | end 840 |
| | 70 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-BED GW001

Project: PBOW

Geologist: R. Podoris

Sheet 9 of 10 Sheets

| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ USM | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. Frncs | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 76 | | | | | | | |
| | 1 | | | | | 70.8 | | Box 5 69-74 |
| | 2 | | | | | | | 72 |
| | | Massive very hard gray limestone | | | Run 4 | 72.4 | | 72-77 5' recov 5' run end 905 |
| | | | | | Box 6 74-76 | 72.8 | | |
| | 3 | | | | | | | |
| | | | | | | 73.8 | | |
| | | | | | | 73.9 | | |
| | 4 | | | | | 74.5 | | Box 6 74-76 |
| | | | | | | 75 | | |
| | 5 | | | | | 75.5 | | |
| | | | | | | 76 | | |
| | 6 | | | | | | | |
| | | | | | | 76.4 | | |
| | | | | | | 76.6 | | |
| | 7 | | | | | | | 77 |
| | | | | | | | | Began Coring 9/12/01 |
| | | | | | Box 7 76-78.5 | | | Box 7 76-78.5 |
| | 8 | | | | Box 8 78.5-82 | 76 | | |
| | | | | | | 76.5 | | Box 8 78.5-82 |
| | 9 | | | | | 78 | | Run 77-82 |
| | | | | | | 78.5 | | |
| | 80 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW001

# HTRW DRILLING LOG

(continuation sheet)

Hole Number: TNTC-GW001

Project: PBOW

Geologist: RPodoris

Sheet 10 of 10 Sheets

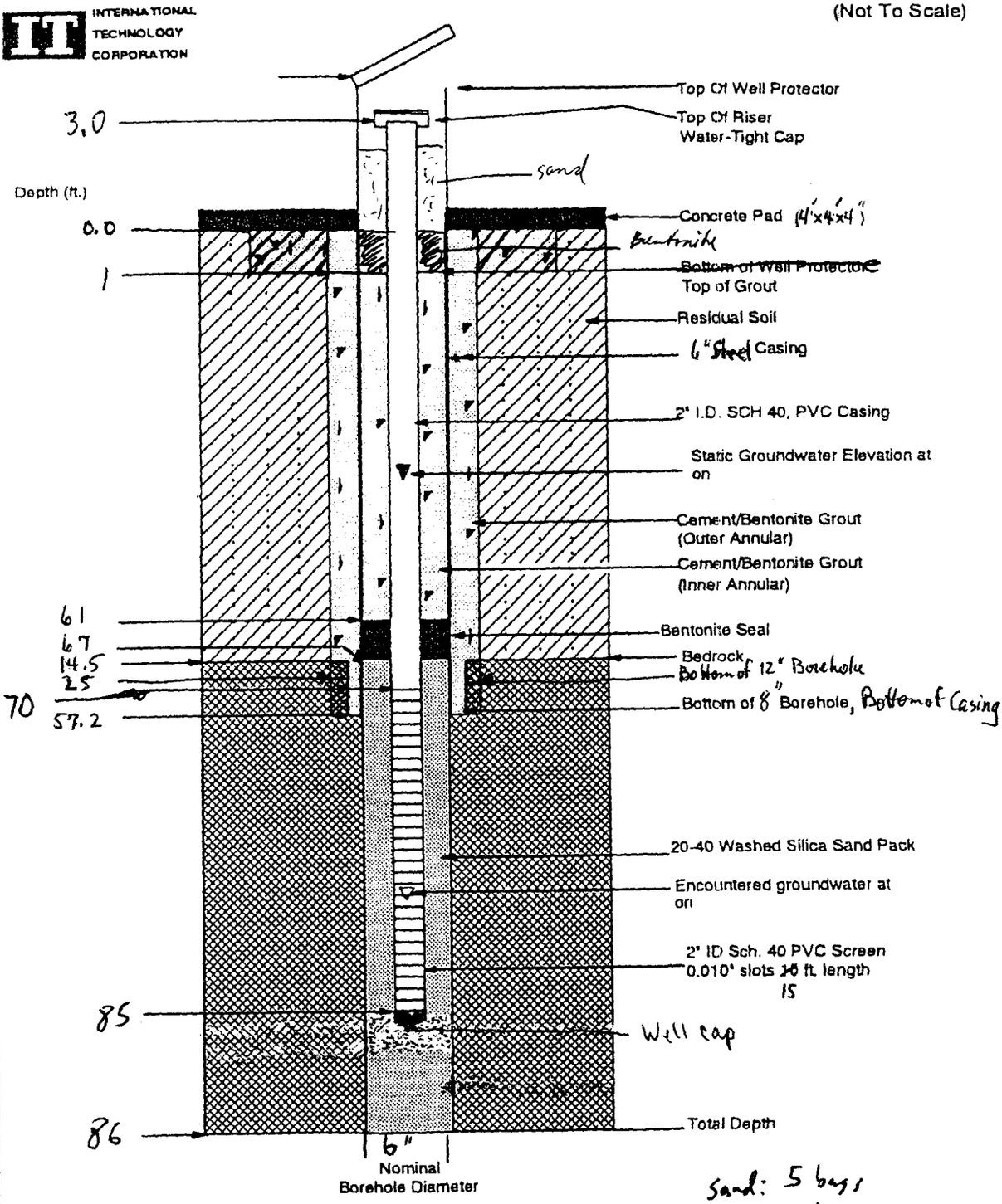
| Elev (ft) | Depth (ft) bgs | Description of Materials | USCS/ Uhs | Field Screening Results (ppm) | Geotech. Sample or Core Box No. | Analytical Sample No. FRGCS | Recovery (ft) | Remarks |
|---|---|---|---|---|---|---|---|---|
| | 80 | | | | | | | |
| | 1 | | | | | 81.5 | | |
| | 2 | | | | | | | ~~Monitoring Center~~ 82 |
| | | Massive gray limestone, very hard with vertical calcite deposits in fractures. | | | | | | 82-86 |
| | 3 | | | | | 83 | | |
| | 4 | | | | Box 9 82-86 | 84 | | vertical fracture |
| | | | | | | 84.7 | | Box 9 82-86 |
| | 5 | | | | | | | |
| | 6 | | | | | | | Clean 86 |
| | | Total Depth = 86 Ft | | | | | | Set well at 85, 1' sand |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| | 0 | | | | | | | |

Project: PBOW

Hole Number: TNTC-BEDGW-001

INTERNATIONAL TECHNOLOGY CORPORATION

(Not To Scale)




sand: 5 bags
bent: 1 bucket

Notes:

Well No.: TNTC-BEDGW-001
Date Installed: 9/12/01
Elevation Top of Casing: 667.04 ft

***Well Construction Diagram***
prepared for:
Plum Brook Ordnance Works
Sandusky, OHIO

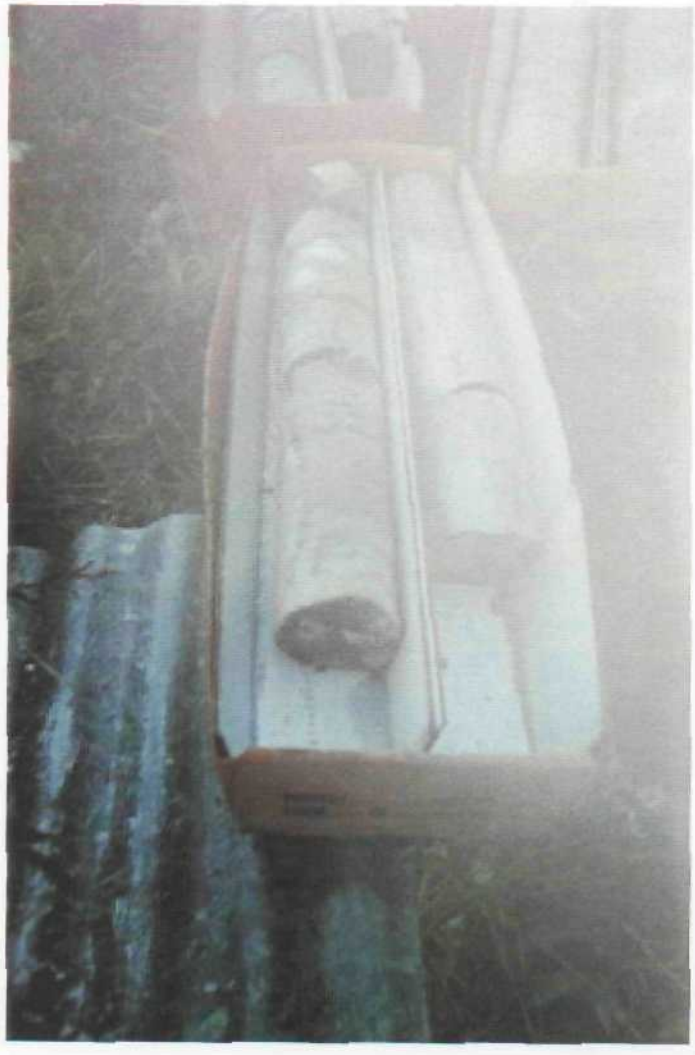
BWMWA230WC.DRW/ij/5-28-83

# APPENDIX E

# PHOTOGRAPHS

PB-BED-MW22
Box 2 of 6; 31-34 feet
9/10/01 (#1 SL27)

PB-BED-MW-22
Unknown Boxes and Depths
9/10/01 (#1 SL26)



PB-BED-MW22
Unknown Boxes and Depths
9/10/01 (#1 SL20)

PB-BED-MW22
Unknown Boxes and Depths
9/10/01 (#1 SL28)

PB-BED-MW23
Box 1 of 13; 30-31 feet
9/6/01 (#7, SL28)

PB-BED-MW23
Box 2 of 13; 33-38 feet
9/6/01 (#7, SL27)

PB-BED-MW23
Box 3 of 13; 38-41.5 feet
9/6/01 (#7, SL26)

PB-BED-MW23
Box 4 of 13; 41.5-44.5 feet
9/6/01 (#7, SL25)

PB-BED-MW23
Box 6 of 13; 48-51 feet
9/6/01 (#7, SL24)

PB-BED-MW23
Box 7 of 13; 51-54 feet
9/6/01 (#7, SL22)

PB-BED-MW23
Box 8 of 13; 54-57.5 feet
9/6/01 (#7, SL23)

PB-BED-MW23
Box 9 of 13; 57.5-60 feet
9/6/01 (#7, SL21)

PB-BED-MW23
Box 10 of 13; 60-63 feet
9/6/01 (#7, SL20)

PB-BED-MW23
Box 11 of 13; 63-66.5 feet
9/6/01 (#7, SL19)

PB-BED-MW23
Box 12 of 13; 66.5-69.5 feet
9/6/01 (#7, SL18)

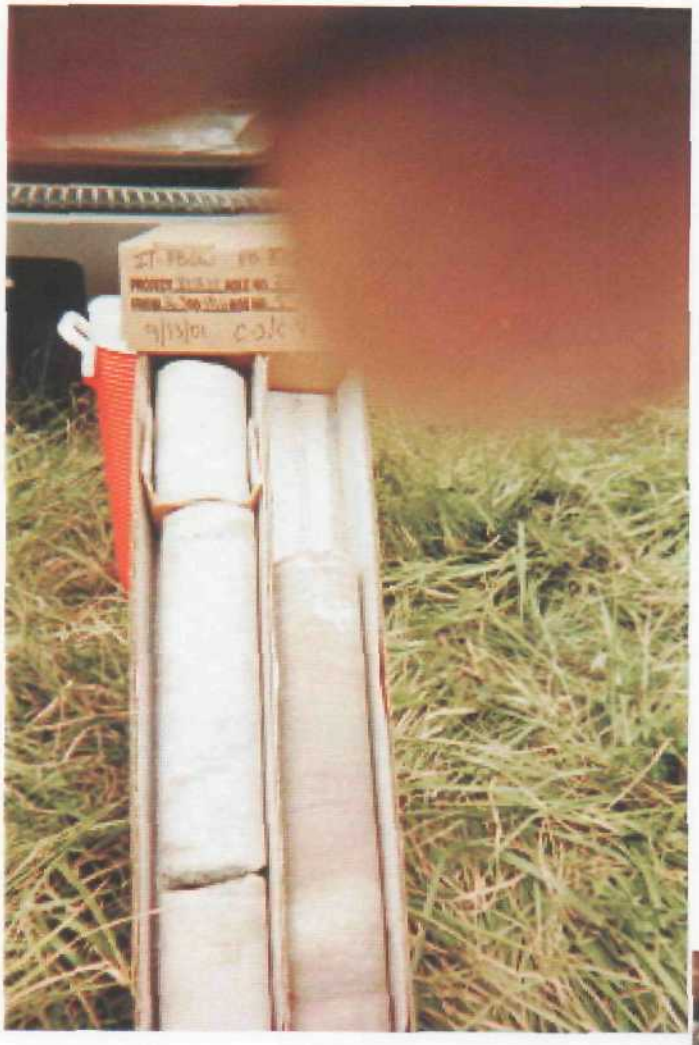
PB-BED-MW23
Box 13 of 13; 69.5-74 feet
9/6/01 (#7, SL17)

PB-BED-MW24
Box 1 of 6; 21.5-25.2 feet
9/13/01 (#2 SL9)

PB-BED-MW24
Box 2 of 6; 25.2-28.5 feet
9/13/01 (#2 SL8)

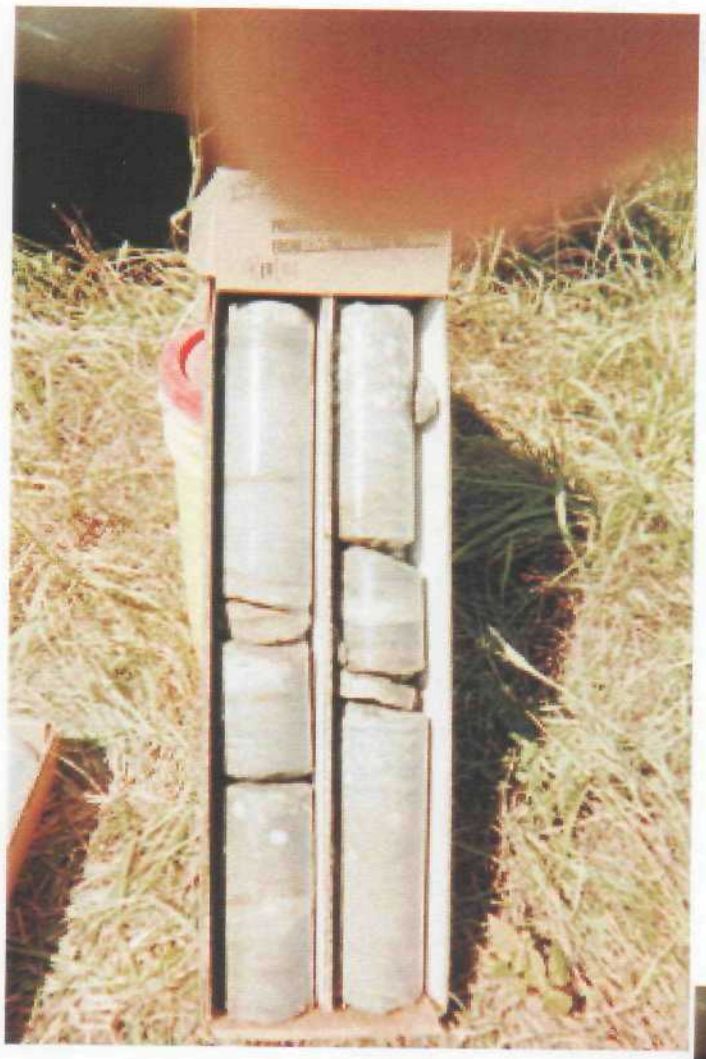
PB-BED-MW24
Box 3 of 6; 28.5-32.4 feet
9/13/01 (#2 SL4)

PB-BED-MW24
Box 4 of 6; 32.4-36.3 feet
9/13/01 (#2 SL6)

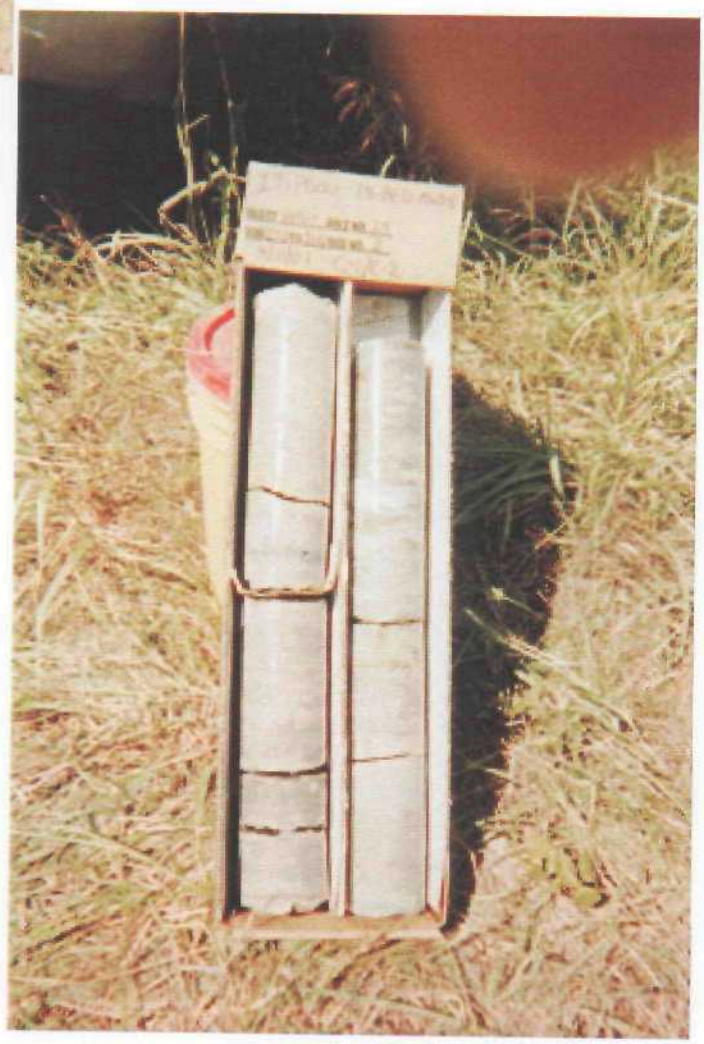


PB-BED-MW24
Box 5 of 6; 36.3-40.6 feet
9/13/01 (#2 SL7)

PB-BED-MW24
Box 6 of 6; 40.6-41.5 feet
9/13/01 (#2 SL5)



PB-BED-MW25
Box 1 of 4; 23.3-27.3 feet
9/11/01 (#2 SL13)



PB-BED-MW25
Box 2 of 4; 27.3-31.0 feet
9/11/01 (#2 SL12)

PB-BED-MW25
Box 3 of 4; 31.0-34.8 feet
9/11/01 (#2 SL10)

PB-BED-MW25
Box 4 of 4; 34.8 ft-38.5 feet
9/11/01 (#2 SL11)

PB-BED-MW26
Box 1 of 9; 27.5-30.8 feet
9/8/01 (#2 SL22)

PB-BED-MW26
Box 2 of 9; 30.8-32.6 feet
9/8/01 (#2 SL21)

PB-BED-MW26
Box 3 of 9; 32.6-36.4 feet
9/8/01 (#2 SL20)

PB-BED-MW26
Box 4 of 9; 36.4-39.5 feet
9/8/01 (#2 SL19)

PB-BED-MW26
Box 5 of 9; 39.5-43.0 feet
9/8/01 (#2 SL18)

PB-BED-MW26
Box 6 of 9; 43.0-46.4 feet
9/10/01 (#2 SL17)

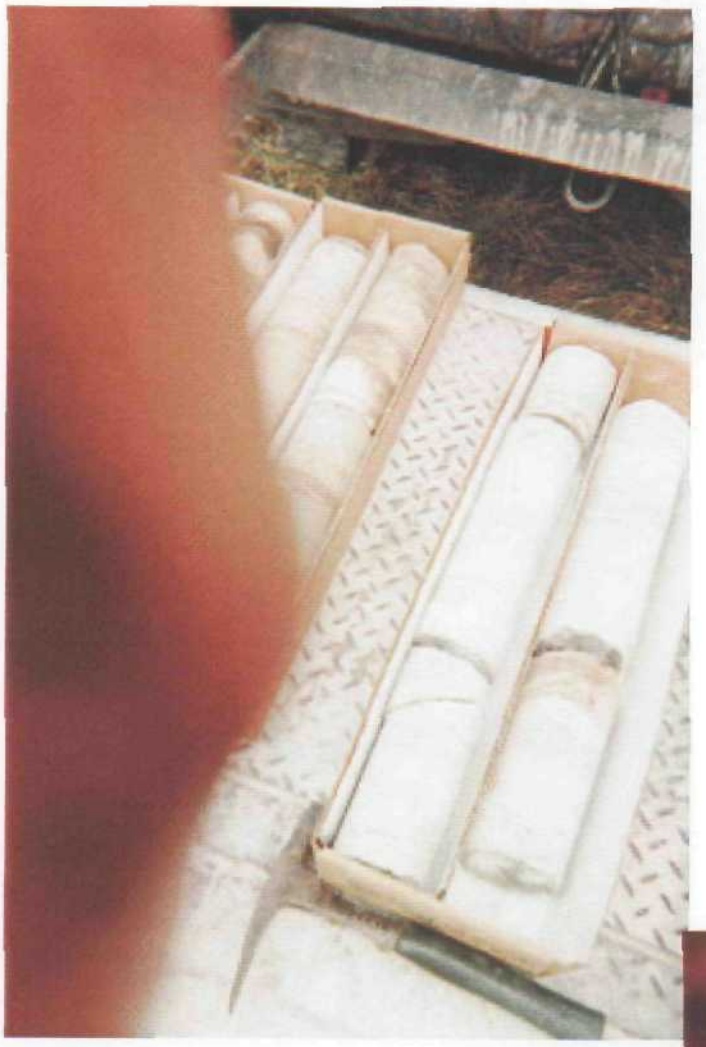
PB-BED-MW26
Box 7 of 9; 46.4-50.5 feet
9/10/01 (#2 SL16)

PB-BED-MW26
Box 8 of 9; 50.5-53.6 feet
9/10/01 (#2 SL15)

PB-BED-MW26
Box 9 of 9; 53.6-58.5 feet
9/10/01 (#2 SL14)

PB-BED-MW27
Box 1 of 24; 29-33 feet
9/7/01 (#7 SL16)

PB-BED-MW27
Box 2 of 24; 33-37 feet
9/7/01 (#7 SL15)



PB-BED-MW27
Box 3 of 24; 37-41 feet
9/7/01 (#7 SL14)

PB-BED-MW27
Box 4 of 24; 41-44 feet
9/7/01 (#7 SL13)

PB-BED-MW27
Box 5 of 24; 44-48 feet
Box 6 of 24; 48-51 feet
Box 7 of 24; 51-54 feet
9/7/01 (#7 SL12)

PB-BED-MW27
Box 6 of 24; 48-51 feet
Box 7 of 24; 51-54 feet
9/7/01 (#7 SL11)

PB-BED-MW27
Box 8 of 24; 54-57.5 feet
Box 9 of 24; 57.5-59.0 feet
9/7/01 (#7 SL9)

PB-BED-MW27
Box 7 of 24; 51-54 feet
Box 8 of 24; 54-57.5 feet
Box 9 of 24; 57.5-59.0 feet
9/7/01 (#7 SL10)

PB-BED-MW27
Box 10 of 24; 59-63 feet
Box 11 of 24; 63-65 feet
9/7/01 (#7 SL8)

PB-BED-MW27
Box 10 of 24; 59-63 feet
Box 11 of 24; 63-65 feet
Box 12 of 24; 65-69 feet
9/7/01 (#7 SL7)

PB-BED-MW27
Box 13 of 24; 69-72.5 feet
9/7/01 (#7 SL6)

PB-BED-MW27
Box 14 of 24; 72.5-74.5 feet
9/7/01 (#7 SL5)

PB-BED-MW27
Box 15 of 24; 74.5-78.5 feet
Box 16 of 24; 78.5-81.5 feet
Box 17 of 24; 81.5-85.5 feet
Box 18 of 24; 85.5-88 feet
Box 19 of 24; 88-90 feet
9/8/01 (#7 SL2)

PB-BED-MW27
Core Left; 90-95 feet
Core Center; 95-100 feet
Core Right; 100-105 feet
9/8/01 (#7 SL3)

TNTA-BEDGW-001
Box 1 of 9; 55-58 feet
9/13/01 (#1 SL19)

TNTA-BEDGW-001
Box 2 of 9; 58-62 feet
9/13/01 (#1 SL18)

TNTA-BEDGW-001
Box 3 of 9; 62-65 feet
9/13/01 (#1 SL17)

TNTA-BEDGW-001
Box 4 of 9; 65-69 feet
9/13/01 (#1 SL16)

TNTA-BEDGW-001
Box 5 of 9; 69-72 feet
9/13/01 (#1 SL15)

TNTA-BEDGW-001
Box 6 of 9; 72-76 feet
9/13/01 (#1 SL14)

TNTA-BEDGW-001
Box 7 of 9; 76-79.5 feet
9/13/01 (#1 SL13)

TNTA-BEDGW-001
Box 8 of 9; 79.5-83 feet
9/13/01 (#1 SL12)

TNTA-BEDGW-001
Box 9 of 9; 83-85 feet
9/13/01 (#1 SL12)

TNTB-BEDGW-003
Box 1 of 5; 28-32 feet
9/7/01 (#2 SL27)

TNTB-BEDGW-003
Box 2 of 5; 33-35.9 feet
9/7/01 (#2 SL26)

TNTB-BEDGW-003
Box 3 of 5; 35.9-38 feet
9/8/01 (#2 SL25)

TNTB-BEDGW-003
Box 4 of 5; 38- 41.8 ft
9/8/01 (#2 SL24)

TNTB-BEDGW-003
Box 5 of 5; 41.8-43.3 feet
9/8/01 (#2 SL23)

TNTB-BEDGW-004
Box 1 of 4; 11.5-15.3 feet
9/6/01 (#4, SL5)

TNTB-BEDGW-004
Box 2 of 4; 15.3-19 feet
9/6/01 (#4, SL4)

TNTB-BEDGW-004
Box 3 of 4; 19.0-23.6 feet
9/6/01 (#4, SL3)

TNTB-BEDGW-004
Box 4 of 4; 23.6-26.1 feet
9/6/01 (#4, SL2)

TNTC-BEDGW-001
Box 1 of 9; 57-62 feet
9/11/01 (#1 SL25)

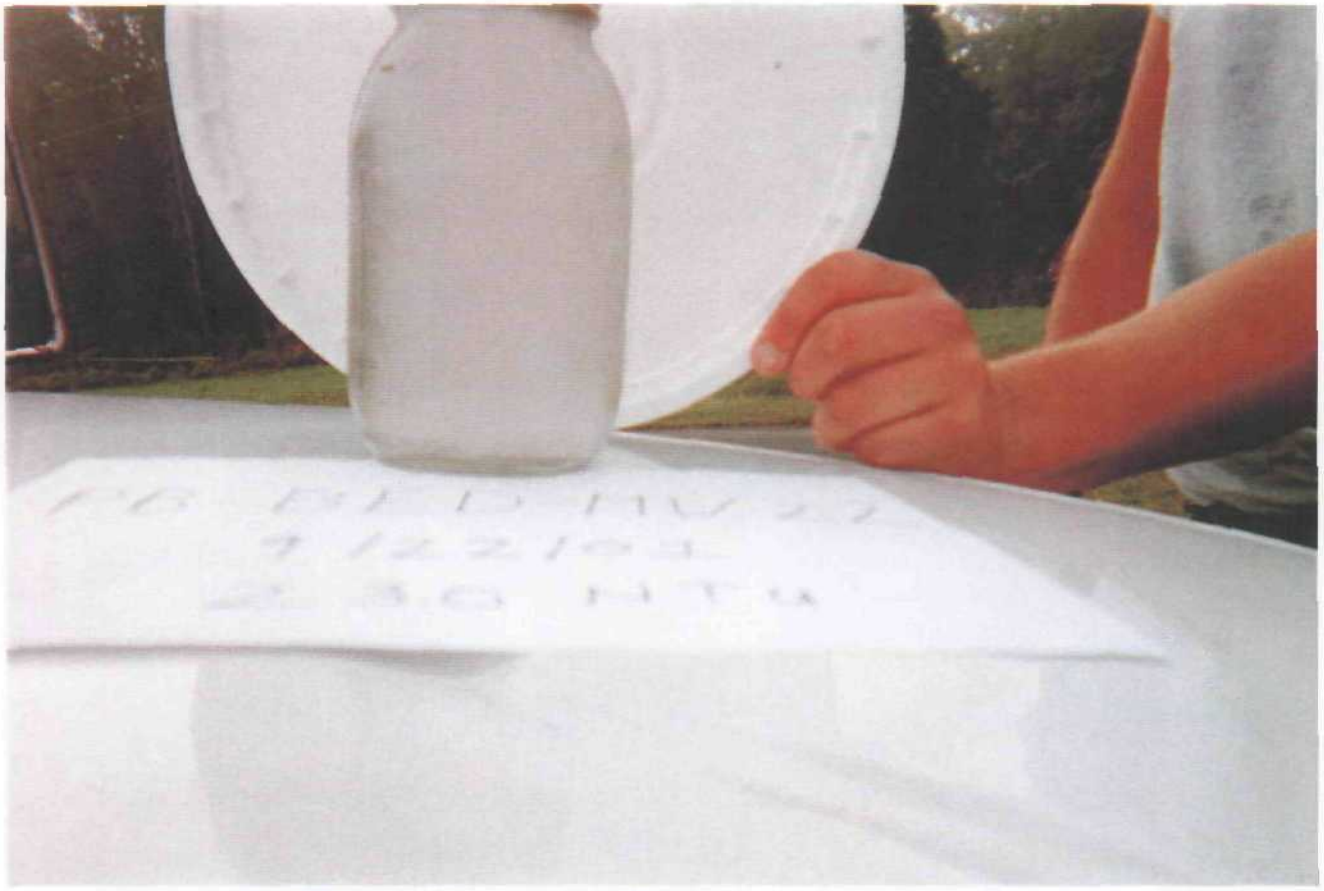
TNTC-BEDGW-001
Box 2 of 9; 62-65 feet
9/11/01 (#1 SL24)

TNTC-BEDGW-001
Box 3 of 9; 65-67 feet
9/11/01 (#1 SL23)

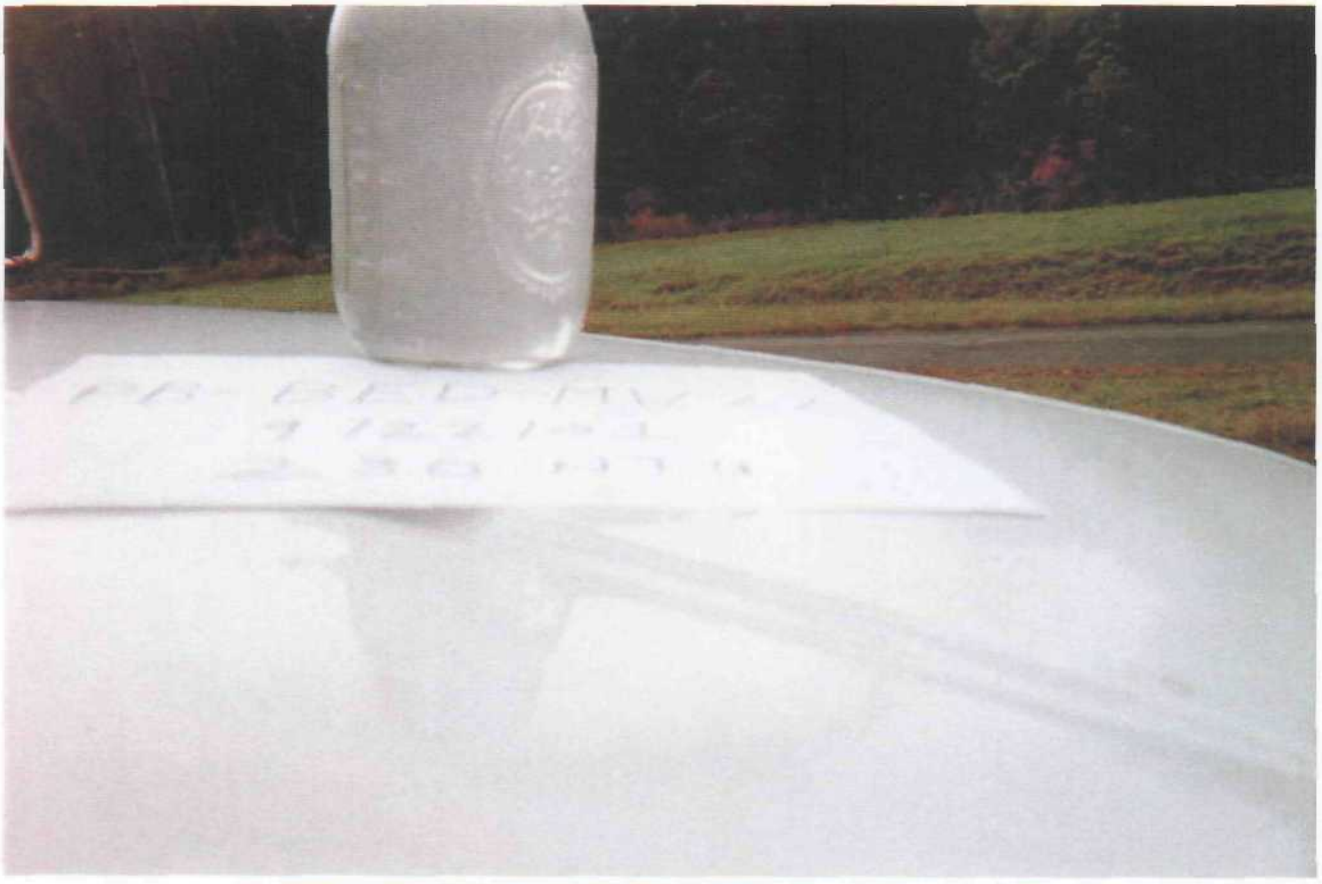
TNTC-BEDGW-001
Box 4 of 9 67-69.5 feet
9/11/01 (#1 SL22)

TNTC-BEDGW-001
Box 5 of 9; 69.5-74 feet
9/11/01 (#1 Sl21)

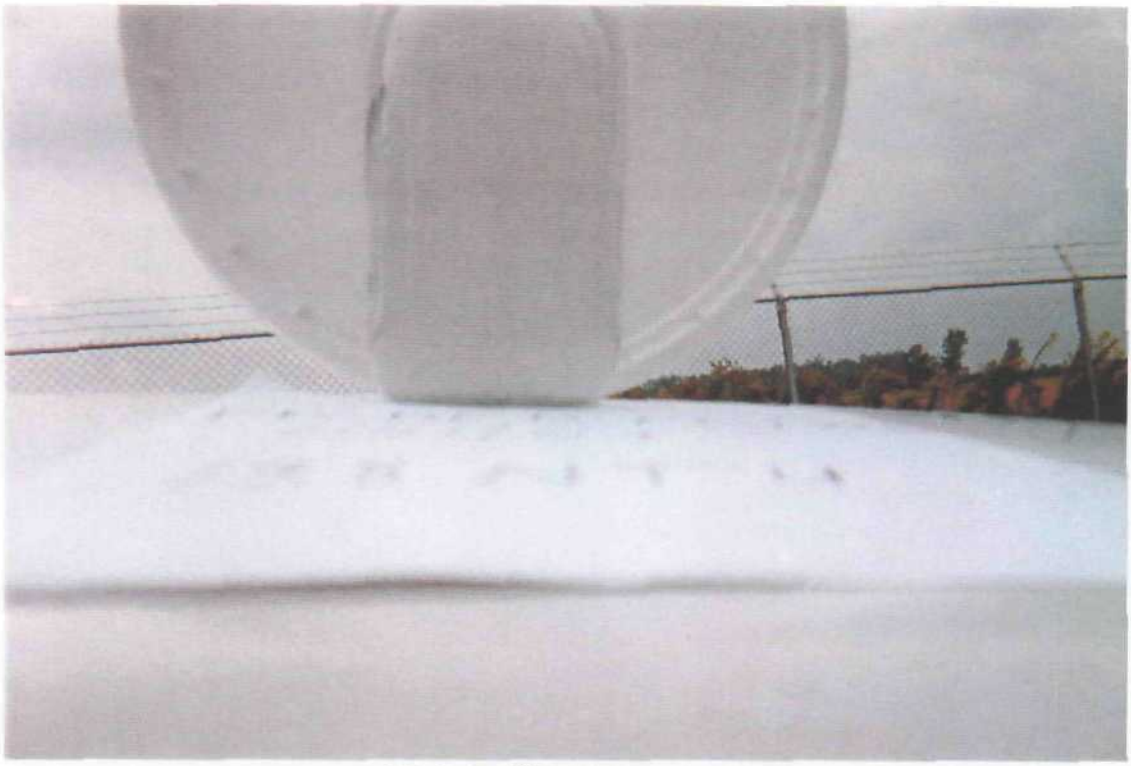
TNTC-BEDGW-001
Pictures not taken of:
Box 6 of 9; 74-76 feet
Box 7 of 9; 76-78.5 feet
Box 8 of 9; 78.5-82 feet
Box 9 of 9; 82-86 feet



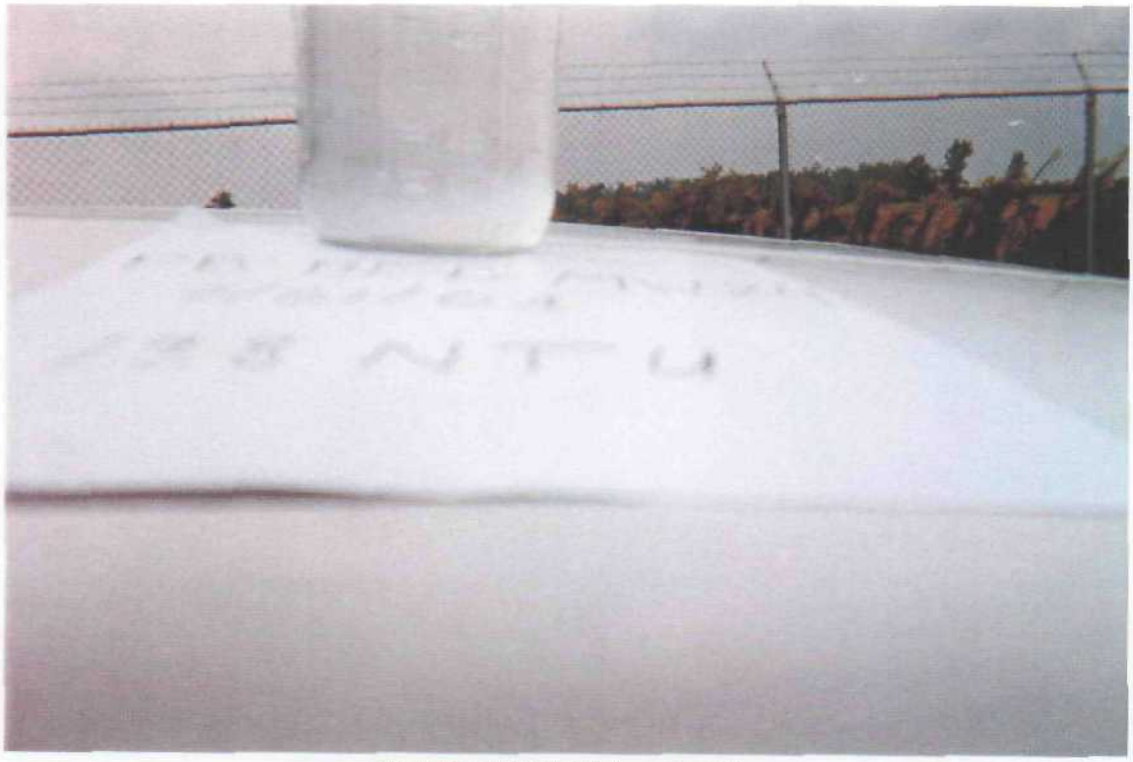
PB-BED-MW22 (Picture 1 of 2). Final Development Water; 23.0 NTU, 9/22/01 SL22



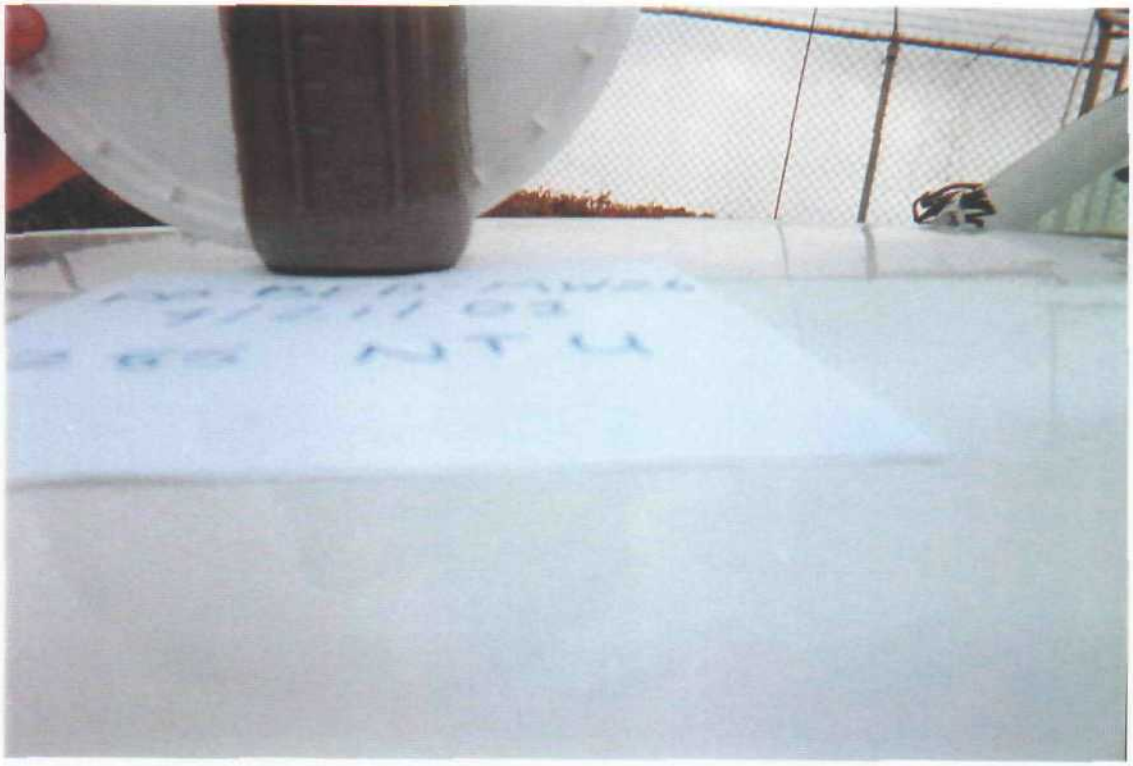
PB -BED-MW22 (Picture 2 of 2). Final Development Water; 23.0 NTU, 9/22/01 SL23



PB-BED-MW24 (Picture 1 of 2)
Final Development Water; 19.8 NTU, 9/21/01 (#3 SL5)



PB-BED-MW24 (Picture 2 of 2)
Final Development Water; 19.8 NTU, 9/21/01 (#3 SL4)

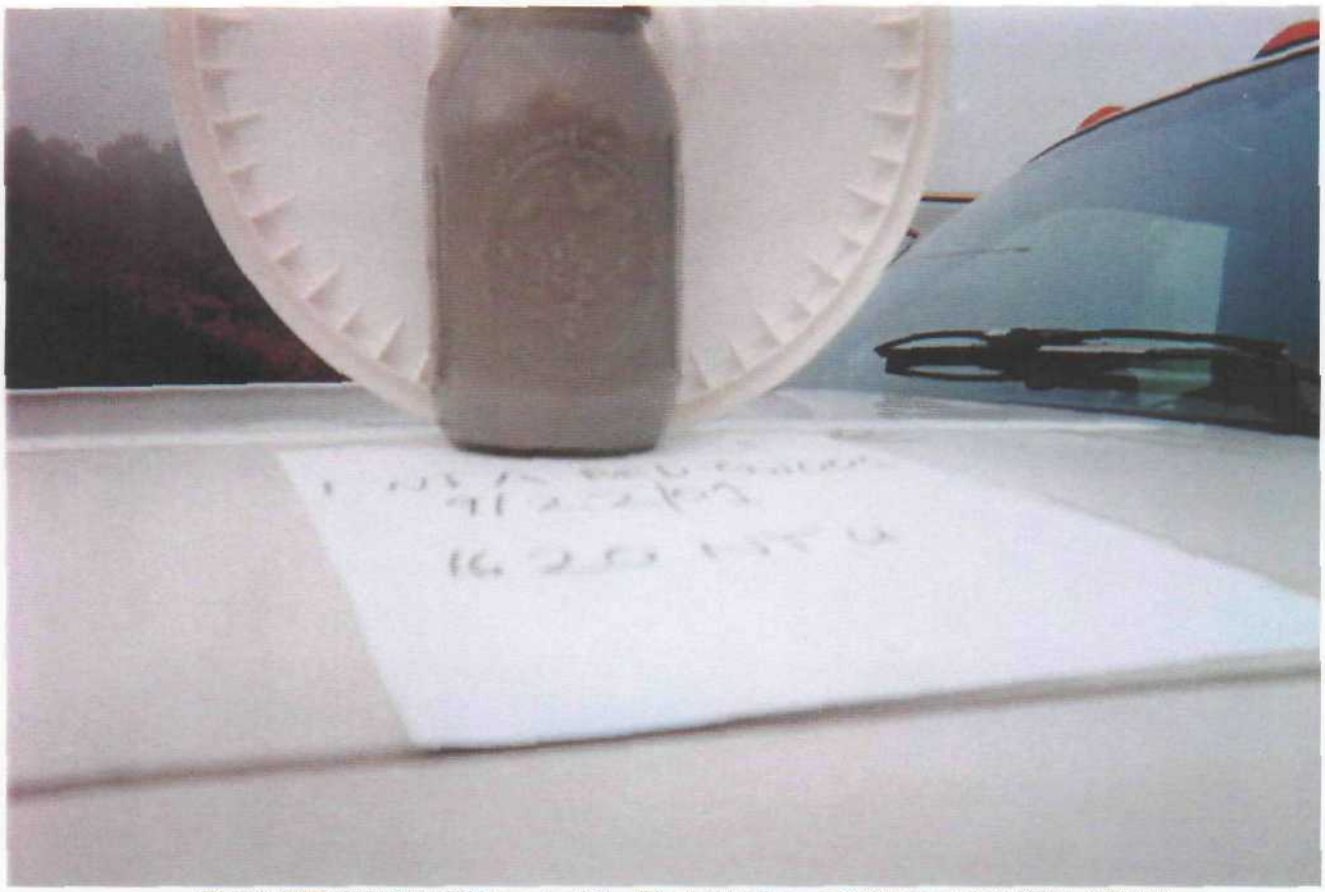


PB-BED-MW26 (Picture 1 of 2).
Final Development Water; 1054 NTU, 9/22/01 (#3 SL7)

PB-BED-MW26 (Picture 2 of 2)
Final Development Water; 1054 NTU, 9/22/01 (#3 SL6)

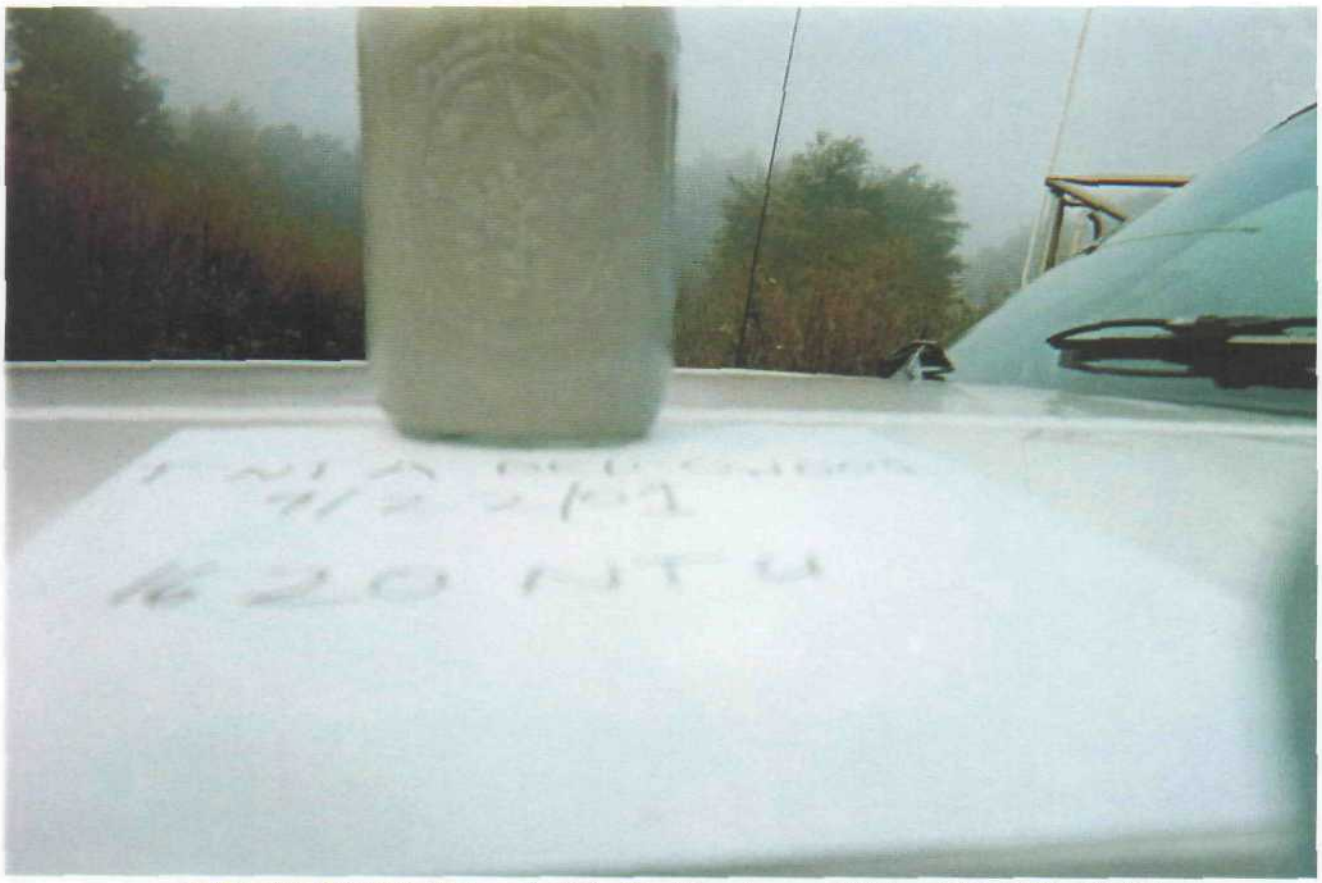
PB-BED-MW27 (Picture 1 of 2). Final Development Water; 1296 NTU, 9/22/01 SL21

PB-BED-MW27 (Picture 2 of 2). Final Development Water; 1296 NTU, 9/22/01 SL22



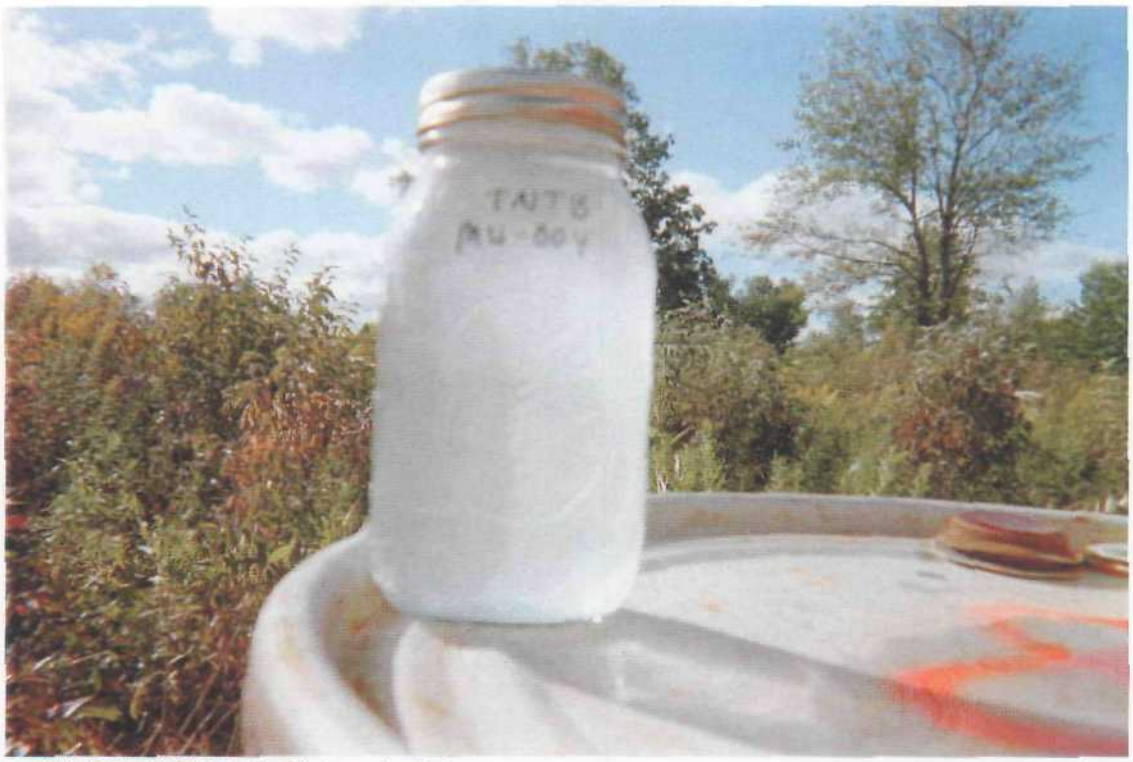
TNTA-BEDGW-001 (Picture 1 of 2). Final Development Water; 1620 NTU, 9/22/01

1/2 SL26

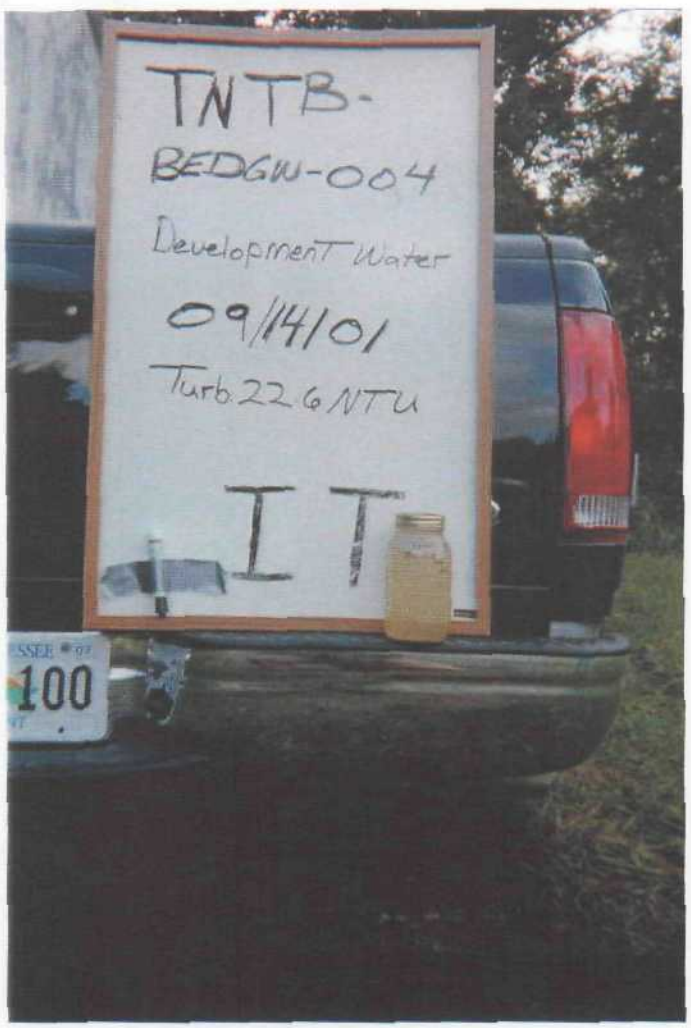


TNTA-BEDGW-001 (Picture 2 of 2). Final Development Water; 1620 NTU, 9/22/01

2/2 SL25




TNTB-BEDGW-004 (Picture 1 of 2)
Final Development Water; 22.6 NTU,
9/14/01 (#3 SL10)




TNTB-BEDGW-004 (Picture 2 of 2).
Final Development Water; 22.6 NTU,
9/14/01.

TNTC-BEDGW-001 (Picture 1 of 2).
Final Development Water; 23.5 NTU, 9/20/01 (#3 SL9)

TNTC-BEDGW-001 (Picture 2 of 2)
Final Development Water; 23.5 NTU, 9/20/01 (#3 SL8)

## No Pictures Taken for:

PB-BED-MW23. Monitoring well went dry during development. Final turbidity reading 1511.8 NTU, 9/14/01.

PB-BED-MW25. Final turbidity reading 26.3 NTU, 9/19/01.

TNTB-BEDGW-003. Monitoring well went dry during development, 9/14/01.

# APPENDIX F

# WELL DEVELOPMENT LOGS

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: BART LONGWELL

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 | 40.10 | 1615 | GRAY | 16.42 | 7.34 | 0.849 | 1.84 | | WELL DRY, |
| 1040 | 9.0 | 40.90 | 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 | 14.0 | 40.90 | 1597 | GRAY | 12.79 | 6.86 | 0.967 | 1.58 | -122 | |
| 1120 | 16.5 | 43.00 | 1158 | LIGHT GRAY WITH | 12.92 | 6.80 | 1.08 | 2.30 | -116 | |



BEGAN DEVELOPMENT

COMPLETED GOOD 9/22/01

IT CORPORATION

# Well Development Log



Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOART LONGYEAR

Site ID: PBOW
Location ID: ~~PBBED~~ 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 | ~~27.0~~ 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 | 455 | GRAY CLOUDY | 11.97 | 6.92 | 1.00 | — | -115.0 | 9/22/01 |
| 0905 | 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

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# Well Development Log



Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BOBB LONGYEAR

Site ID:
Location ID: PBBED MW 22
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) | ~~Redox~~ ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0928 | 37 | 40.05 | 113 | Light cloudy | 12.04 | 6.95 | 1.09 | — | -111 | 9/22/00 |
| 0935 | 39 | 42.30 | 23 | CLEAR | 11.95 | 6.78 | 1.11 | — | -148.8 | ↓ |
| 0945 | 42 | 42.50 | 23.0 | CLEAR | 11.91 | 6.76 | 1.19 | — | -159 | ↓ |
| 0950 | 43 | 42.85 | 23.0 | CLEAR | 11.93 | 6.76 | 1.19 | — | -161 | ↓ |
| | | | | | | | | | | |
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# Well Development Log



Project Number: 825635
Project Name: Plum Brook
Form Completed by: R Poderis
Well Developed by/firm: Boart Longyear

Site ID: Plum Brook
Location ID: PB-13GD-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~~ 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 | | |
| | | | | | | | | | | |
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COMPLETED 9/21/01

GOOD

IT CORPORATION

# Well Development Log



Project Number: 875635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BURT LONG TREAR

Site ID:
Location ID: PB BRD 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 )$^2$) = 2.30 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 2.30 gal/ft x 0.3 = ~~10.85~~ gal 5.78

**Purge Well Volume:** Purge well Volume = Filter pack volume + Well Volume = ~~10.85~~ 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) | ~~Redox~~ ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1620 | 0 | 28.03 | 1568 | DARK GRAY | 12.56 | 6.94 | 1.759 | 0.95 | -95.7 | STRONG ROTTEN EGG ODOR |
| 1645 | 5 | 41.20 | 1567 | DARK GRAY | 12.22 | 6.35 | 1.67 | 3.80 | -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 | 1029 | GRAY | 12.85 | 6.85 | 1.800 | 18.33 | | 9/20/01 PUMPING |
| 1430 | 10.3 | 29.93 | 1713 | GRAY | 12.64 | 6.75 | 1.81 | 20.33 | -234.9 | |
| 1440 | 15.3 | 29.80 | 1397 | GRAY | 13.06 | 6.77 | 1.82 | 14.30 | -231.3 | |
| 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: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: ~~BOART LONGYEAR~~

Site ID: ~~PB-BED~~ MW24
Location ID: PB-BED MW24
Date Started: 9/29/01

## 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~~ DRP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1525 | 22 | 37.89 | 402 | GRAY | 21.58 | 6.86 | 1.76 | 17.16 | -230 | 9/20/01 |
| 1537 | 24 | 35.5 | 466.2 | GRAY | 23.84 | 6.83 | 1.77 | 20.03 | -225 | ↓ |
| 1540 | 25 | 39.5 | 201 | GRAY | 18.23 | 6.73 | 1.75 | 14.16 | -234 | |
| 1550 | 27 | 40.8 | 547 | GRAY | 16.93 | 6.73 | 1.57 | 17.18 | -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 | 36 | 39.02 | 452 | GRAY | 15.76 | 6.61 | 1.80 | 21.08 | -182.5 | |
| 1620 | 44 | 39.75 | 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 | 39.98 | 19.8 | CLEAR | 16.2 | 6.55 | 1.77 | 18.01 | -200.8 | |

COMPLETED 9/19/01
GOOD

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# 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: 9/19/01

## Monitoring Well Information

Development Method: BAILER
Development Equipment: GRUNDFOS PUMP BEGAN PUMPING 0850

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

**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

PUMPING AT 1.5GPM

**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~~ 17 )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) | ~~Redox~~ ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0830 | 0 | 16.88 | 1577.5 | CLOUDY | 14.32 | 8.14 | 1.036 | 1.73 | | 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 | -126.4 | |
| 0935 | 53 | 21.83 | 169 | CLOUDY | 13.72 | 7.12 | 1.574 | 5.15 | -129 | |
| 0955 | 80 | 20.60 | 357 | CLOUDY | 13.94 | 7.14 | 1.64 | 3.34 | -136. | |
| 1005 | 98 | 20.61 | 62.5 | CLEAR | 13.89 | 7.01 | 1.64 | 3.52 | -156.6 | |
| 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 | -159.7 | |
| 1025 | 128 | 20.62 | 26.3 | | 13.98 | 6.98 | 1.643 | 3.29 | -152.9 | |

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1027 → END DEVELOPMENT

NOT ENOUGH WATER IN WELL

COMPLETED 9/21/01

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# Well Development Log



Project Number: ~~PBOW~~ 825833
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BART LONG YEAR

Site ID:
Location ID: ~~PB BED MW26~~
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 (( 6.8 )$^2$ - ( 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~~ 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 | ~~34.16~~ 18.96 | ~~51.24~~ 28.44 | ~~68.32~~ 37.92 | ~~85.4~~ 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 | — | 53.60 | — | | | | | | | |
| 1335 | 7.0 | 53.44 | 1396 | GRAY | 13.60 | 7.51 | 5.84 | 3.04 | 104 | BEGAN BAILING |
| 1545 | 8.5 | 59.00 | 1571 | GRAY | 13.28 | 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 9/21/01

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# Well Development Log



Project Number: 526625
Project Name:
Form Completed by: CHRIS GRANDE
Well Developed by/firm: ~~BOART LONGYEAR~~

Site ID:
Location ID: PB BFCD MW26
Date Started: 9/19/01

## 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

**Volume of Water in Casing:** Gallons/foot = 0.041 x $d^2$, where casing diameter in inches = (0.041 x (_____)$^2$) = _____ gal/ft. SEE PAGE 1

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) | ~~Redox~~ ORP (mV) | Comments | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1510 | 9.25 | 56.20 | 1054 | CLEAR | 1285 | 7.49 | 7.031 | 0.73 | -44 | WATERLEVEL 56.20 | 9/21/01 |
| 1518 | 9.50 | | WELL | | BAILED | | DRY | | | | |
| 1410 | | 58.61 | | | | | | | | TDW = 60.27 | 9/22/01 |
| | | | | | | | | | | | |
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NOT ENOUGH WATER IN WELL AS OF 9/22/01

IT CORPORATION

# Well Development Log



Project Number: 823635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: BART LONGYEAR

Site ID:
Location ID: PBBFD MW27
Date Started: 9/22/01

## Monitoring Well Information

Development Method: 1
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 | 6.79 | 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 | 449.9 | GRAY CLOUDY | 15.33 | 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 | | | | | | | | |
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IT CORPORATION

# Well Development Log

Page 1 of 1

Project Number: 825635
Project Name: PBOW
Form Completed by: CHRIS GRANDE
Well Developed by/firm: POWER LONGYEAR

Site ID:
Location ID: INJ PBED 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 | 83.1 | 761 | WHITE GRAY | 17.81 | 11.83 | 1.66 | 2.93 | -42.6 | |
| 1808 | 9.5 | 83.2 | | GRAY | | | | | | |
| 9/21/01 0825 | 10.5 | 83.0 | 1608 | WHITE GRAY | 14.98 | 11.41 | 2.09 | 14.52 | -195.0 | 9/21/01 |
| 0800 | 12.5 | 79.95 | 1592 | GRAY | 12.42 | 10.24 | 2.79 | 54.36 | | 9/22/01 |
| 0815 | 14.5 | 81.00 | 1620 | | | | | | | WELL BAILED DRY |
| 1340 | 14.5 | 82.69 | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

BAILING 9/22/01

82.69
86.15 TDW

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# Well Development Log



Project Number: 825635
Project Name: PBOW
Form Completed by: R. Poderis
Well Developed by/firm: ~~[illegible]~~ Boart Longyear

Site ID: Plum Brook
Location ID: INTB-BED~~[illegible]~~W-00~~[illegible]~~
Date Started: 9-14-01

## Monitoring Well Information

Development Method: submersible pump
Development Equipment:

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

14
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 ~~2.152~~ (2.63)

**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 | ~~10~~ 9 | dry | | | | | | | | removed 15 gal at beginning |
| 1115 | 9 | dry | | | | | | | | |
| | | | | | | | | | | |
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* ~~drilled back 20 gallons in hole~~ DKK

IT CORPORATION

# Well Development Log



Project Number: 825635
Project Name: PBOW
Form Completed by: Reed Podeyis
Well Developed by/firm: IT / Boart Environmental

Site ID: Plum Brook
Location ID: ~~NT~~ 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.

| 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 | | |

5
11.62
1.85
10.77

## 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 | 11.62 | 1528 | brown | 16.97 | 7.98 | .675 | 28.0 | | |
| 945 | 87 | 11.54 | 127.6 | clear | 16.13 | 7.31 | .566 | 5.87 | | |
| 1005 | 12 | 11.64 | 50.5 | clear | 16.79 | 6.80 | .566 | 5.39 | | |
| 1010 | 11 | 11.62 | 49.1 | 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 | clear | 17.06 | 7.48 | .605 | 9.15 | | |
| 145 | 80 | 14.42 | 58.1 | clear | 15.38 | 7.00 | .605 | 10.87 | | |
| 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 | | |

COMPLETED 9/20/01
GOOD

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# 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

**Monitoring Well Information**

Development Method: BAILER & 9/19/01
Development Equipment: GRUNDFOS PUMP WITH SURGING

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 (( 8 )$^2$ - ( 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 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 | 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 | 733.2 | GRAY | 15.33 | 6.71 | 2.66 | 8.16 | -245 | |

COMPLETED 9/20/01
600D

IT CORPORATION

# Well Development Log



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 ((6)$^2$ - (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~~ 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 | 22.48 | 33.72 | 44.96 | 56.2 |
| ~~15.01~~ | ~~34.02~~ | ~~51.30~~ | ~~60.04~~ | ~~85.05~~ |
| ~~17.4~~ | | | | |

6.69

75 + 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) | ~~Redox~~ ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0950 | 36.00 | ~~66~~ 84.30 | 142.2 | ~~CLOUDY~~ CLEAR | 15.26 | 6.70 | 2.60 | 10.69 | -243.3 | 0955 WELL PUMP 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 ~~COLOR~~ | 16.45 | 6.74 | 2.94 | 12.04 | -255.6 | |
| 1115 | 70.00 | ~~82.00~~ 80.0 | 120.0 | CLOUDY | 15.48 | 6.69 | 2.96 | 10.34 | -257.6 | |
| 1125 | 78.00 | 81.9 | 80.00 | 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 | 14.55 | -259.1 | |
| 1140 | 89 | 83.0 | 23.5 | 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:

$$Q = 2\pi\, KL_e \frac{y}{ln(R_e / r_w)}. \qquad 1$$

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 $\pi r_c^2$ 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 |
| $\Phi$ | 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**

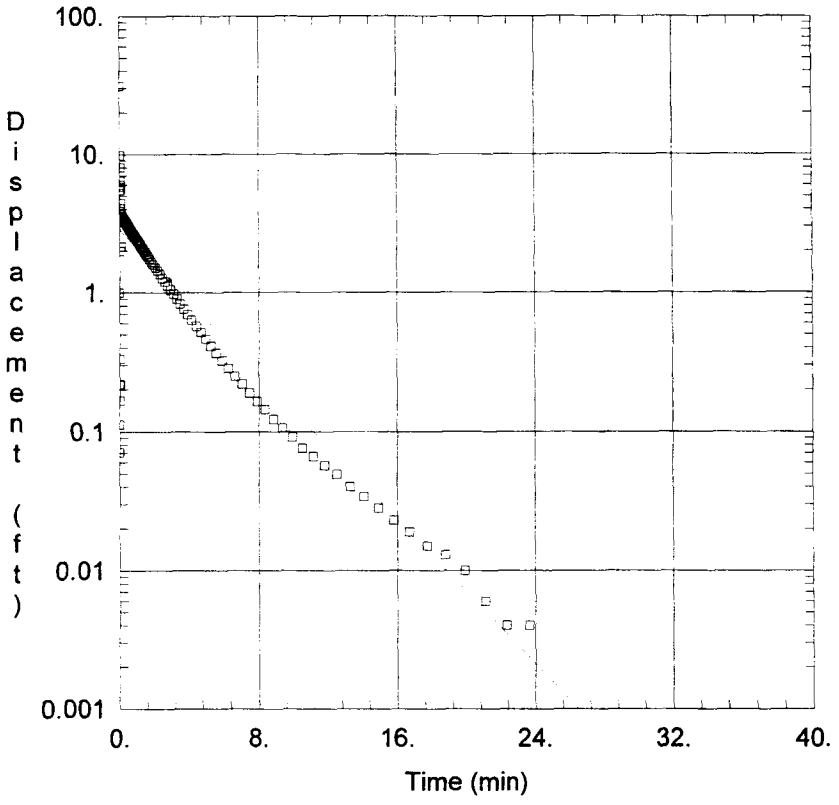
| Well No. | Water Level (TOC) (ft) | Total Depth (TOC) (ft) | H (Assumed) | $r_c$ (ft) | $r_w$ (ft) | $L_e$ (ft) | $L_w$ (ft) |
|---|---|---|---|---|---|---|---|
| PB-BED-MW22 | 30.24 | 44.45 | 14.21 | 0.08 | 0.25 | 15 | 14.21 |
| PB-BED-MW23 | 67.33 | 75.6 | 8.27 | 0.08 | 0.25 | 20 | 8.27 |
| PB-BED-MW24 | 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
$\Phi$ ---- 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*** |




## 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

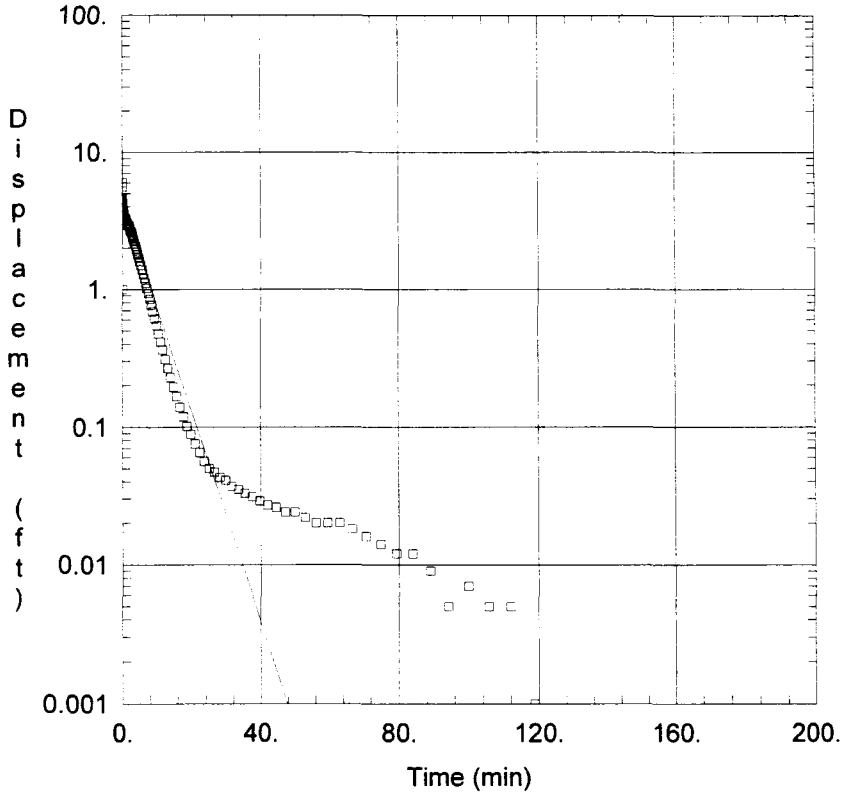
Saturated Thickness: 28.59 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\cgw1r.aqt
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

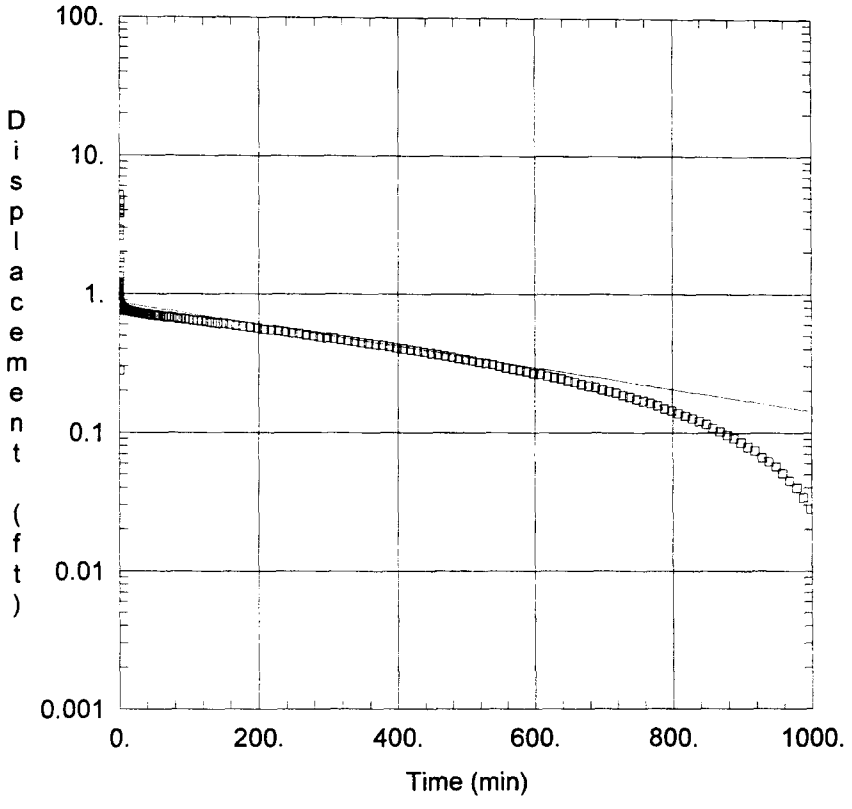
Saturated Thickness: 28.59 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\gw3r.aqt
Date: 02/21/02 Time: 14:13:53

## 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

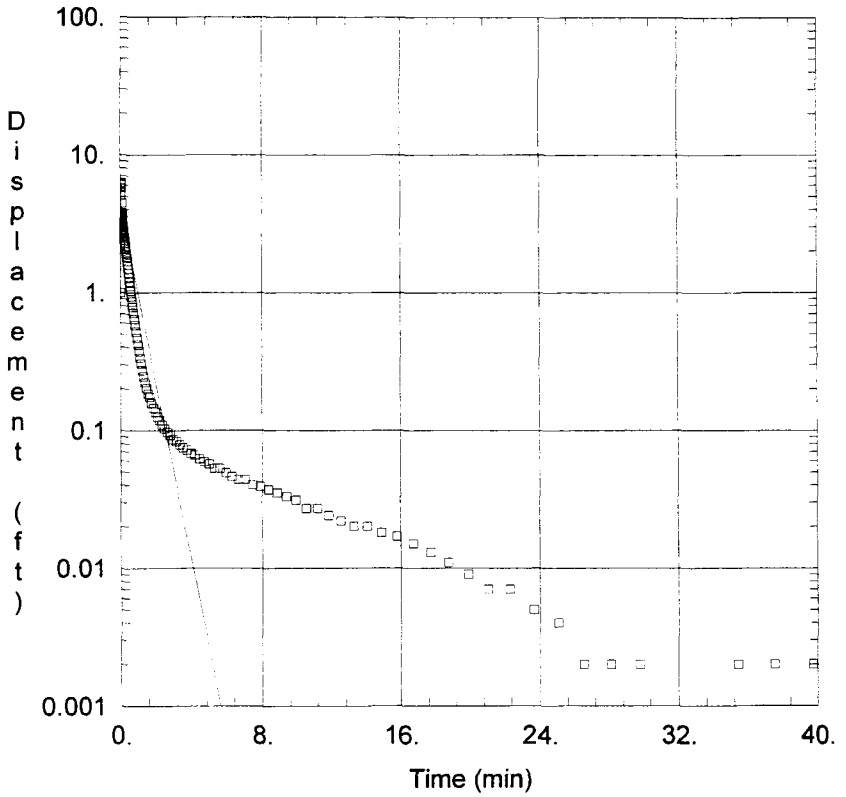
Saturated Thickness: 11.68 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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

Data Set: C:\Documents and Settings\jli\My Documents\Projects\PBOW\gw4f.aqt
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

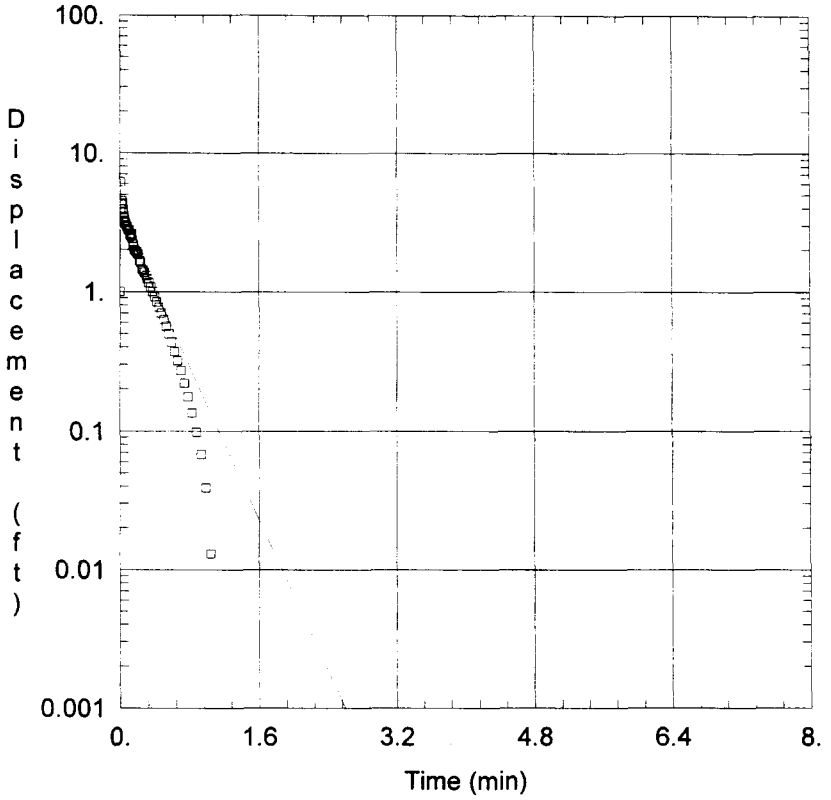
Saturated Thickness: 18.36 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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

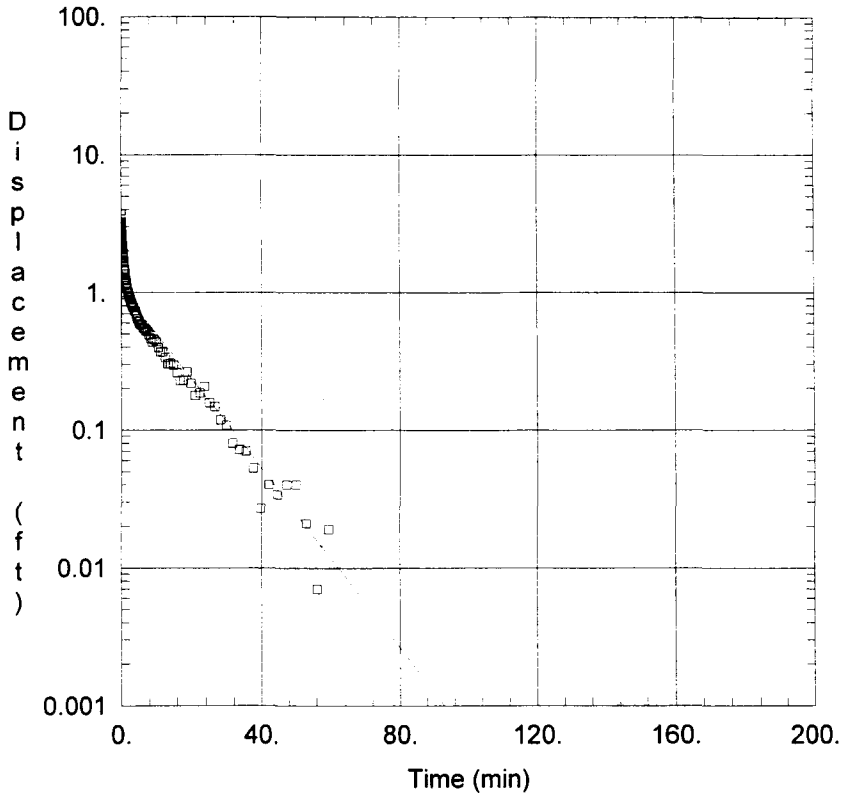
Saturated Thickness: 18.36 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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.

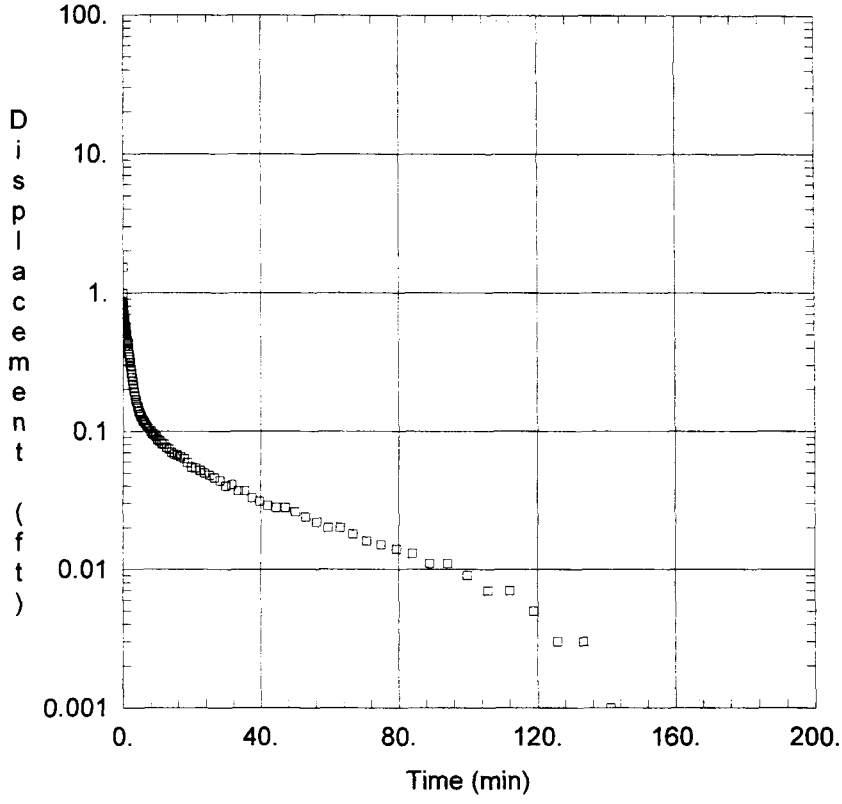
## WELL DATA (MW-22)

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

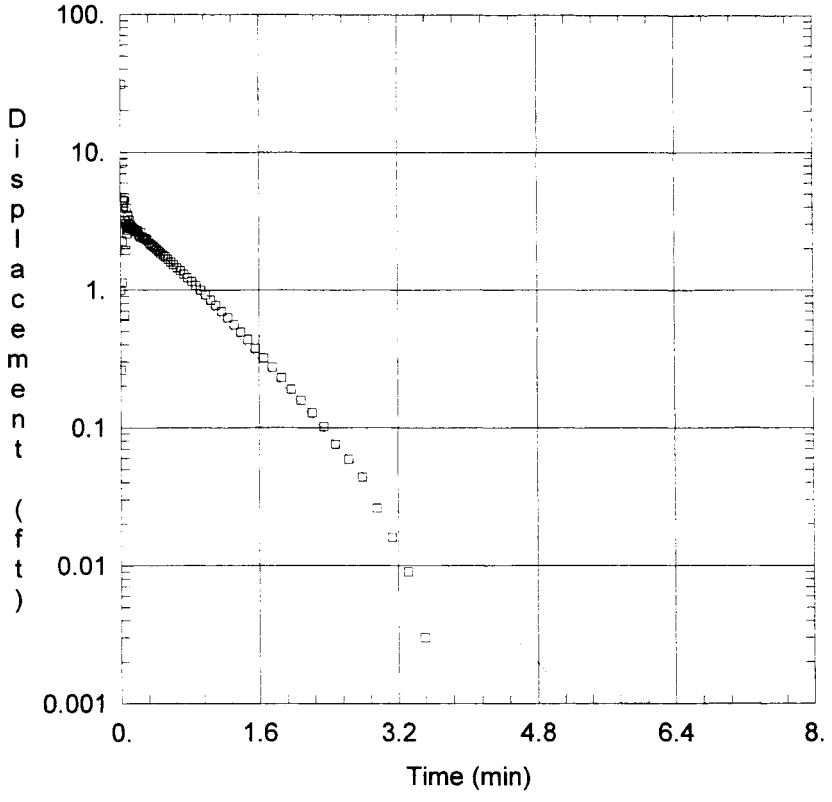
Saturated Thickness: 8.27 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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

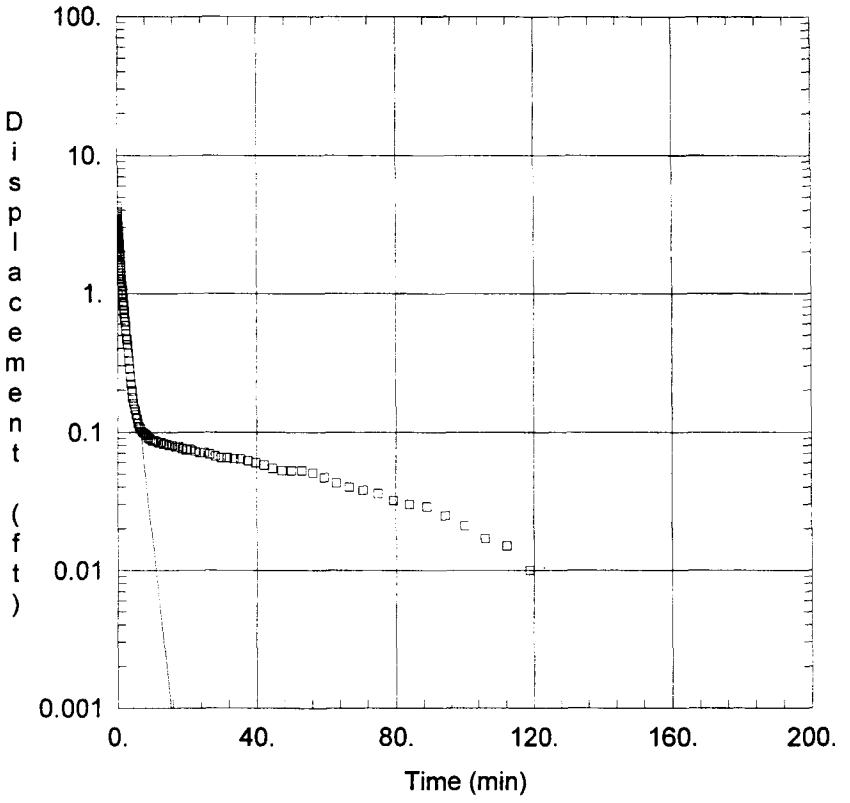
Saturated Thickness: 15.32 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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.

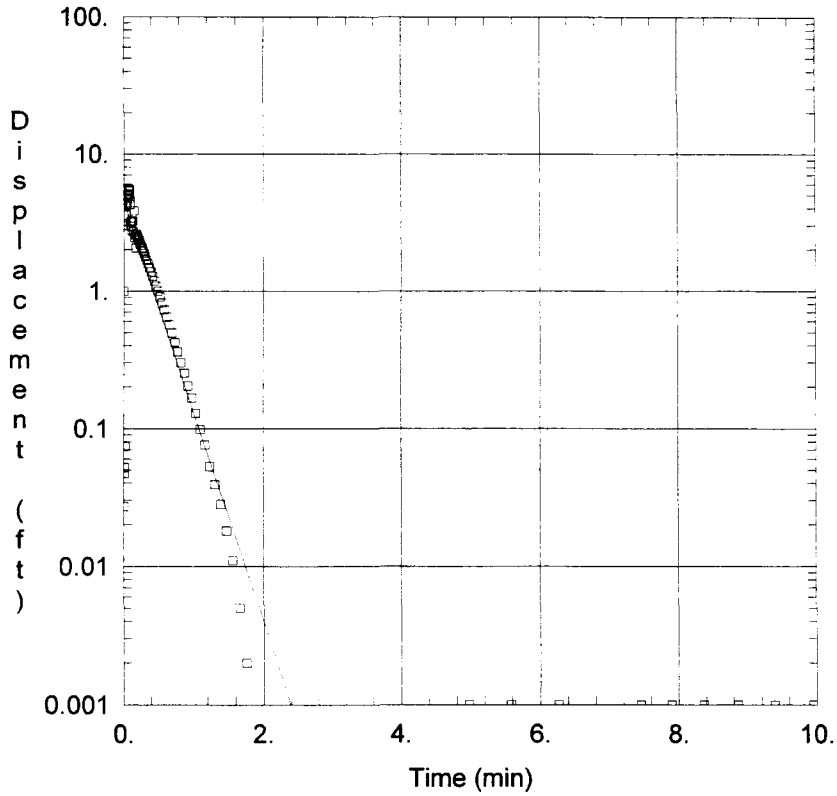
## WELL DATA (MW-23)

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.

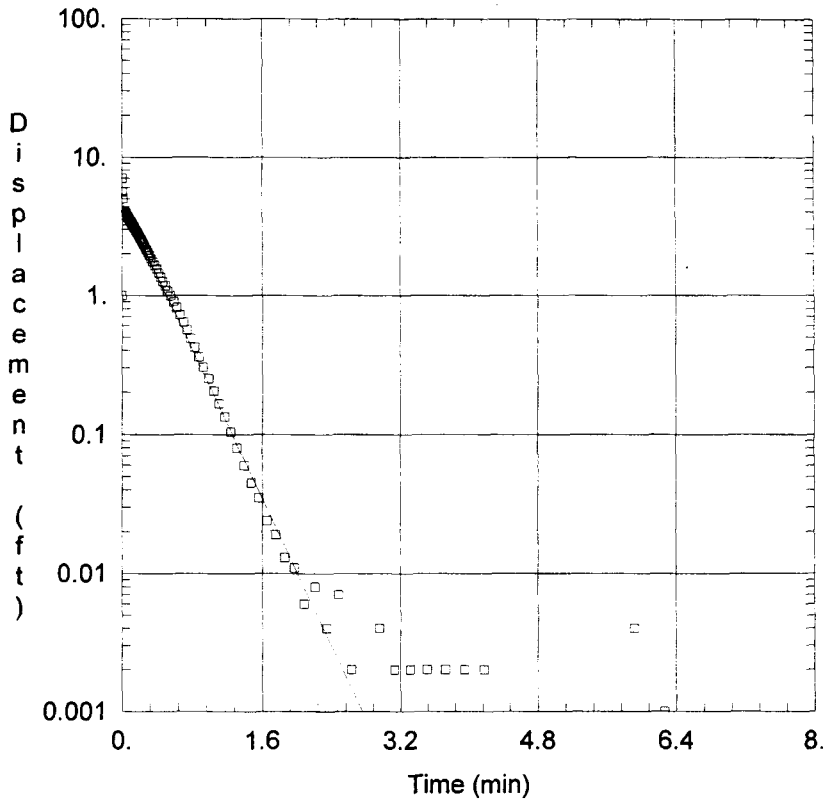
## WELL DATA (MW-25)

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

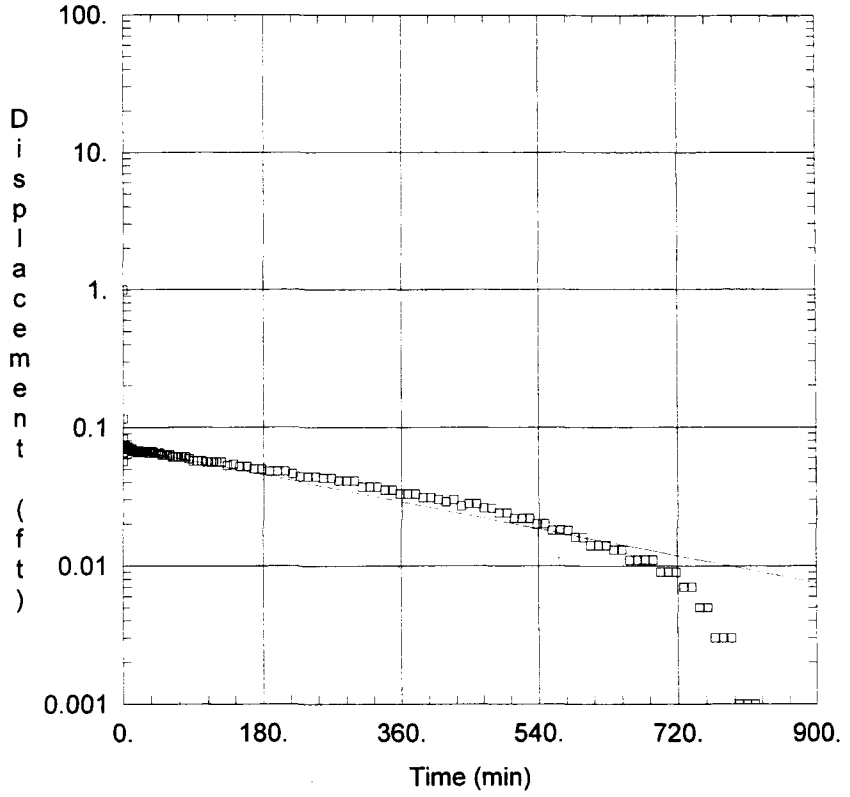
Saturated Thickness: 25.55 ft
Anisotropy Ratio (Kz/Kr): 1.

## 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 | [a]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:**

[a]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 I

# DATA VALIDATION SUMMARIES

# Data Validation Summary Report for the Site Investigation Performed for Plum Brook Ordnance Works

## 1.0 Introduction

Level III data validation was performed on environmental samples collected from Plum Brook Ordinance Works. The analytical data consisted of thirteen sample delivery groups (SDG's) 01-09-139, 01-10-024, H1I270167, H1I280106, H1J010131, H1J020107, H1H030106, H1J040177, H1J050186, H1J060123, H1J090111, H1J100121, and H1J110141 which were analyzed by Paragon Analytics and Severn Trent Laboratories. The parameters for which the data were analyzed and validated are identified below:

| Parameter (Method) |
|---|
| Volatile Organic Compounds by SW846 8260B |
| Semivolatile Organic Compounds by SW846 8270C |
| Nitroaromatics and Nitramines by SW846 8330 |
| Metals by SW846 6010B/7471A |
| Wet Chemistry |

## 2.0 Procedures

The sample data were validated following the logic identified in the *USEPA Contract Laboratory Program (CLP) National Functional Guidelines For Inorganic Data Review (February 1994)* and *USEPA Contract Laboratory Program National Functional Guidelines For Organic Review (October 1999)* for all areas except Blanks. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (April 1993)* and *Region III Modifications to National Functional Guidelines for Organic Data Review (September 1994)* were applied to the areas associated with blank contamination. Specific quality control (QC) criteria, as identified in the Quality Assurance Plan (QAP), analytical methods, and laboratory Standard

Operating Procedures (SOP's) were applied to all sample results. As the result of the use of Update III SW846 test methods for the analytical data and the application of the CLP guidelines during the validation process, there were instances where specific QC requirements for all target compounds were not defined. This primarily occurred in the organic, Gas Chromatograph (GC) and Gas Chromatograph/Mass Spectra (GC/MS) calibration areas and is due to the fact that the analytical methods are "performance-based", and allows the use of average calibration responses, in lieu of, individual responses, which are defined by CLP protocol. In light of applying CLP guidelines to SW846 methods and evaluating the usability of the data during the validation process, specific QC criteria were determined to address all target compounds and are identified in this report for each parameter, as well as, in the validation checklists, which function as worksheets. All completed validation checklists are on file in the Knoxville office. For those analytical methods not addressed by the CLP and Region III guidelines, the validation was based on the method requirements (i. e. SW846, CFR, SOP's) and technical judgement, following the logic of the CLP validation guidelines.

## 3.0 Summary of Data Validation Findings

The overall quality of the data was determined to be acceptable with minimal qualification. The only rejected data were organic volatile compounds, which experienced calibration problems, nitroaromatic compounds which experienced extremely low surrogate recoveries and samples, which were reanalyzed and have multiple results. The R qualifier was assigned to the samples with more than one set of results to indicate that a given result should not be used to characterize a particular constituent or an analysis for a given sample.

Individual validation reports have been prepared for each parameter in each SDG and the overall results of the validation findings are summarized in this report. A listing of the validation qualifiers and the reason codes, along with their definitions are also found in Attachment A. The following section highlights the key findings of the data validation for each analysis.

## 4.0 Analysis-Specific Data Validation Summaries

### 4.1 Volatile Organics by GC/MS SW846 8260B

Overall, the data are of good quality and are usable as reported by the laboratory, with the noted exceptions. Data were reviewed for the following:

***Preservation.*** Samples were properly preserved with the following exceptions:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| H1J040177 | BD3017 | All | R/J/UJ |
| H1J060123 | BD3018R | All | R/B/UJ |
| H1J100121 | BD3037 | Benzene, Toluene, Ethylbenzene | J |
| H1J110141 | BD3020 | Benzene, Toluene, Ethylbenzene | J |

- Samples BD3017 and BD3018R had all compounds qualified due to headspace.
- Samples BD3037 and BD3020 were qualified due to improper preservation.

***Holding Times.*** Technical holding time criteria were met for all samples.

***Initial and Continuing Calibration.*** All initial and continuing calibrations associated with the project samples met QC criteria, with the exceptions of the following:

- The following exhibited individual ICAL and/or CCAL RRF < 0.05:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| 01-09-139, 01-10-024 | All | Acetone | J/R/B |
| 01-10-024 | BD3047, BD3051 | Acrolein | R |
| H1I280106 | BD3005, BD3007, BD3010 | Acetone, 2-Butanone | B/R |
| H1J020107 | BD3012 | Acetone, 2-Butanone | R/B |
| H1J030106 | BD0018R | Methylene Chloride | B |
| | BD3024 | Acetone, 2-Butanone | J/R |
| H1J040177, H1J050186, H1J060123, H1J090111, H1J100121, H1J110141 | All | Acetone, 2-Butanone | J/B/R |

- The following exhibited individual ICAL %RSD > 30% and/or CCAL %D > 25%.

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| 01-09-139 | All | Naphthalene | B |
| H1I270167 | All | Bromomethane, Methylene Chloride | UJ/B |
| | BD0003, BD0004, BD0005, BD0006, BD0007, BD0008, BD0012 | Acetone | J/B |
| | BD3026 | Chloromethane | UJ |
| H1I280106 | BD0001, BD0002, BD0013, BD0014, BD0015, BD0016, BD0023, BD0024, BD0025, BD0026, BD0028 | Bromomethane, Methylene Chloride | B/UJ |
| | BD0002, BD0013, BD0014, BD0015, BD0023, BD0024, BD0028 | Acetone | J/B |
| | BD0016, BD0025, BD0026 | Chloromethane | UJ |
| | BD3005, BD3007, BD3010 | 2-Butanone, 1,1,1-Trichloroethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene, Bromoform | R/UJ |
| H1J020107 | BD3012 | 2-Butanone, 1,1,1-Trichloroethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene, Bromoform | R/UJ |
| H1J030106 | BD0017R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R | Methylene Chloride | B |
| | BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R | Chloromethane, Bromomethane | R/UJ |
| | BD3024 | 2-Butanone, 1,1,1-Trichloroethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene, Bromoform | R/UJ |
| H1J040177 | BD3035 | Acetone, 2-Butanone, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene, Bromoform | R/B/UJ |

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| | BD3034, BD3017, BD3021, BD3008 | Acetone, 2-Butanone, 1,1,1-Trichloroethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene | R/B/UJ |
| H1J050186 | All | Bromomethane, Chloroethane, 2-Butanone, Carbon Tetrachloride, cis-1,3-Dichloropropene, Dibromochloromethane, trans-1,3-Dichloropropene, Bromoform | J/R/UJ |
| H1J060123 | All | Bromomethane, Chloroethane, 2-Butanone, 1,1,1-Trichloroethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, trans-1-3-Dichlorpropene, Dibromochloromethane, Bromoform | B/R/UJ |
| H1J090111 | BD3038, BD3027 | Chloromethane, Acetone, Carbon Tetrachloride, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Dibromochloromethane, Bromoform | J/B/UJ |
| | BD3004 | Chloromethane, Bromomethane, Carbon Tetrachloride, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Dibromochloromethane, Bromoform | J/UJ |
| | BD3008 | Bromomethane | UJ |
| H1J100121 | BD3037, BD3028, BD3019 | Bromomethane, Acetone, 2-Butanone, Carbon Tetrachloride, cis-1,3-Dichloropropene, 4-Methyl-2-Pentanone, trans-1,3-Dichloropropene, 2-Hexanone, Dibromochloromethane, Bromoform | R/UJ |
| | BD3029, BD3032 | 2-Butanone, 4-Methyl-2-Pentanone, 2-Hexanone | R/UJ |
| H1J110141 | BD3020 | Acetone, 2-Butanone, 4-Methyl-2-Pentanone, 2-Hexanone | |

***Blanks.*** The 5X/10X rule for contaminants found in the associated trip and method blanks was applied to all sample results. All were found to be acceptable, with the exception of the following:

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| 01-09-139 | All | Naphthalene | Method | B |
| 01-10-024 | BD3045, BD3047, BD3049 | Acetone | Trip | B |
| | All | Methylene Chloride | Method/Trip | B |
| H1I270167 | All | Methylene Chloride | Method | B |
| | BD0003, BD0004, BD0005, BD0006, BD0007, BD0008 | Acetone | Method | B |
| H1I280106 | BD0001, BD0002, BD0013, BD0014, BD0015, BD0016, BD0023, BD0025, BD0026, BD0028, BD3005 | Methylene Chloride | Method/Trip | B |
| | BD0002, BD0013, BD0015, BD0024, BD3005 | Acetone | Method/Trip | B |
| H1J020107 | BD3012 | Acetone | Trip | B |
| H1J030106 | BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R | Methylene Chloride | Method | B |
| H1J040177 | BD3035, BD3034, BD3021 | Acetone | Method | B |
| H1J050186 | All | Acetone | Trip | B |
| | BD3043 | Methylene Chloride | Trip | B |
| H1J060123 | BD3018R, BD3052, BD3041, BD3050, BD3009R, BD3030 | Methylene Chloride | Method/Trip | B |
| | BD3018R, BD3052, BD3006R, BD3009R, BD3030 | Acetone | Trip | B |
| H1J090111 | BD3038, BD3027 | Methylene Chloride | Method/Trip | B |
| | BD3027, BD3004 | Acetone | Trip | B |

***Surrogate Recoveries.*** All surrogate recoveries were within acceptable QC limits, with the exception of the following:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0007 | Toluene | J |

***Matrix Spike/Matrix Spike Duplicate.*** MS/MSD was performed and all QC criteria were met.

***Laboratory Control Sample.*** LCS was performed for the project samples and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| 01-09-139 | All | Naphthalene | B |
| 01-10-024 | All | Methylene Chloride | B |
| H1J100121 | All | Pyrene | UJ |

***Internal Standards.*** All internal standards met QC criteria, with the exception of the following:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0006, BD0008 | Bromoform, 1,1,2,2-Tetrachloroethane | UJ |
| | BD0007 | Trans-1,3-Dichloropropene, Bromoform, 4-Methyl-2-Pentanone, 2-Hexanone, Tetrachloroethene, 1,1,2,2-Tetrachloroethene, Toluene, Chlorobenzene, Ethylbenzene, Styrene, Xylenes (total) | J/UJ |
| H1I280106 | BD0002, BD0014 | Bromoform, 1,1,2,2-Tetrachloroethane | UJ |

***Field Duplicates.*** Original and field duplicate results were reviewed to evaluate the precision and accuracy of field activities. All QC criteria were met (30% water/50% soil), with the exception of the following:

| SDG | Samples Affected | Analyte/Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0009 (original) BD0010 (FD) | Acetone | J |
| H1I280106 | BD0025 (original) BD0026 (FD) | Acetone, Toluene | J |
| H1J030106 | BD0018R (original) BD0019R (FD) | Acetone | J |
| H1J050186 | BD3025 (original) BD3046 (FD) | Methylene Chloride | J |
| | BD3042 (original) BD3048 (FD) | Methylene Chloride | J |
| H1J060123 | BD3049 (original) BD3050 (FD) | Acetone, Benzene, Toluene | J |

***Quantitation.*** Results quantified between the MDL and the RL, which the lab qualified as "J," were qualified as estimated "J" unless blank contamination was present or the results were rejected.

### *4.2 Semivolatiles by SW846 8270C*

Overall, the data are of good quality and are usable as reported by the laboratory with the noted exceptions. Data were reviewed for the following.

***Holding Times.*** Technical holding time criteria were met for all samples, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| H1J060123 | BD3041 | All | UJ |

***Initial and Continuing Calibration.*** All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following:

- The following exhibited individual ICAL %RSD > 30% and/or CCAL %D > 25%.

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD3026 | 2,4-Dinitrophenol | UJ |
| H1I280106 | All | 2,4-Dinitrophenol | UJ |
| H1J010131 | All | 2,4-Dinitrophenol | UJ |
| H1J020107 | BD3012 | 2,4-Dinitrophenol | UJ |

***Blanks.*** The 5X/10X rule for contaminants found in the associated equipment rinses, and method blanks was applied to all sample results. All were found to be acceptable.

***Surrogate Recoveries.*** All surrogate recoveries met QC criteria.

***Matrix Spike/Matrix Spike Duplicate.*** MS/MSD was performed for the project samples and all QC criteria were met

***Laboratory Control Sample/Laboratory Control Sample Duplicate.*** LCS was performed for the project samples and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-10-024 | BD3045, BD3047, BD3049 | Hexachlorocyclopentadiene, Benzidine | UJ |
| | BD3051 | Benzoic Acid, Hexachlorocyclopentadiene | UJ |
| H1J100121 | All | Pyrene | UJ |
| H1J110141 | BD3020 | Pyrene | UJ |

***Internal Standards.*** All internal standards met QC criteria.

***Field Duplicates.*** Original and field duplicate results were reviewed to evaluate the precision and accuracy of field activities and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| H1J050186 | BD3042 (original) BD3048 (FD) | Naphthalene, 2-Methylnaphthalene | J |

***Quantitation.*** Results quantified between the MDL and the RL, which the lab qualified as "J," were qualified as estimated J unless blank contamination was present or the results were rejected.

### *4.3 Nitroaromatics and Nitramines by SW846 8330*

Overall, the data are of good quality and are usable as reported by the laboratory with the noted exceptions. Data were reviewed for the following.

***Holding Times.*** Technical holding time criteria were met for all samples.

***Initial and Continuing Calibration.*** All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-10-024 | All | 2,6-Dinitrotoluene | R/UJ |

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0003, BD0004, | 2,4,6-Trinitrotoluene | UJ |
| | Leach samples BD0007, BD0008, BD0009, BD0010, BD0012 | Tetryl | UJ |
| H1I280106 | BD0023, BD0024, BD0025, BD0026 | 4-Amino-2,6-Dinitrotoluene | UJ |
| | BD0015, BD0016 | Tetryl | UJ |
| H1J030106 | BD3024 | 2,6-Dinitrotoluene | UJ |
| H1J040177 | All | 2,6-Dinitrotoluene | UJ |
| H1J050186 | All | 2,6-Dinitrotoluene | UJ |
| H1J060123 | All | 2,6-Dinitrotoluene | UJ |
| H1J100121 | BD3028, BD3019 | 2,6-Dinitrotoluene | UJ |
| H1J110141 | BD3020 | 2,6-Dinitrotoluene | UJ |

***Blanks.*** The 5X rule for contaminants found in the associated equipment rinses, and method blanks was applied to all sample results. All were found to be acceptable, with the exception of the following:

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| H1I270167 | BD0008 | 2,4-Dinitrotoluene | Method | B |
| H1I280106 | BD0023, BD0024, BD0028 | 2,4-Dinitrotoluene | Method | B |

***Surrogate Recoveries.*** All surrogate recoveries met QC criteria, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-09-139 | All Leachate Samples | All | J/UJ |
| 01-10-024 | BD3045, BD3047 | All | J/R |

***Matrix Spike/Matrix Spike Duplicate.*** MS/MSD was performed for the project samples and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-10-024 | All | Tetryl | R/UJ |

***Laboratory Control Sample.*** LCS was performed for the project samples and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-10-024 | All | Tetryl | R/UJ |

***Field Duplicates.*** Original and field duplicate results were evaluated and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0009 (original) BD0010 (FD) | 2,4,6-Trinitrotoluene | J |

***2nd Column Confirmation*** The difference between columns met all QC criteria (40%), with the exception of the following:

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-09-139 | BD0031 (Leachate) | 4-Amino-2,6-DNT, 2-Amino-4,6-DNT, 2,4-Dinitrotoluene | J |
| | BD0032 (Leachate) | RDX, 1,3-Dinitrobenzene, 2,4,6-Trinitrotoluene, 4-Amino-2,6-DNT | J |
| | BD0027, BD0032 | RDX, 1,3,5-Trinitrobenzene, 1,3-Dinitrobenzene, 4-Amino-2,6-DNT | J |
| | BD0031 | 4-Amino-2,6-DNT, 2-Amino-4,6-DNT, 2,4-Dinitrotoluene | J |
| | BD0032 | 2,4,6-Trinitrotoluene, 2,6-Dinitrotoluene | J |

***Quantitation.*** Results quantified between the MDL and the RL, which the lab qualified as "J," were qualified as estimated "J" unless blank contamination was present or the results were rejected.

### *4.4 Metals by SW846 6010B/7471A*

Overall, the data are of good quality and are usable as reported by the laboratory, with the noted exceptions. Data were reviewed for the following.

***Sample Preservation.*** All samples were properly preserved (pH<2), with the exception of the following:

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| 01-10-024 | Dissolved BD3045 | All | J/UJ |
| H1I280106 | BD3010, Dissolved BD3010 | All | J/B/UJ |
| H1J040177 | BD3035, BD3034, BD3017, Dissolved BD3017, | All | J/B/UJ |
| H1J050186 | Dissolved BD3046 | All | J/B/UJ |
| H1J100121 | BD3037, Dissolved BD3037 | All | J/B/UJ |
| H1J110141 | BD3020, Dissolved BD3020 | All | J/B/UJ |

***Holding Times.*** Technical holding time criteria were met for all samples.

***Initial and Continuing Calibrations.*** All initial and continuing calibrations associated with the project samples met QC criteria.

***Blanks.*** The 5X rule for contaminants found in the associated equipment rinse, calibration, and method blanks was applied to all sample results. All were acceptable, with the noted exceptions:

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| 01-09-139 | BD0027, BD0032 | Selenium | Method | B |
| 01-10-024 | BD3045 | Aluminum, Antimony, Chromium | Method/ICB/CCB | B |
| | BD3047 | Aluminum, Iron, Zinc | Method/ICB/CCB | B |
| | BD3049 | Aluminum, Cobalt | ICB/CCB | B |
| | BD3051 | Cobalt, Zinc | ICB/CCB | B |
| | BD3045 (Dissolved) | Chromium, Cobalt, Zinc | Method/ICB/CCB | B |
| | BD3047 (Dissolved) | Iron, Zinc | Method/ICB/CCB | B |
| | BD3049 (Dissolved) | Cobalt | ICB/CCB | B |
| | BD3051 (Dissolved) | Aluminum, Cobalt, Manganese, Zinc | ICB/CCB | B |

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| H1I270167 | BD0003, BD0004, BD0005, BD0006, BD3007, BD0008, BD0009, BD0010, BD0012 | Beryllium | ICB/CCB | B |
| | BD0003, BD0004, BD0005, BD0006, BD0008, BD0009, BD0010 | Mercury | ICB/CCB | B |
| | BD0003, BD0008 | Thallium | ICB/CCB | B |
| | BD0005, BD0006, BD0008, BD0009, BD0010, BD0012 | Cadmium | ICB/CCB | B |
| | BD3007, BD3009, BD0010 | Cobalt | ICB/CCB | B |
| | BD3009 | Copper | ICB/CCB | B |
| | BD3026 | Aluminum, Copper | ICB/CCB | B |
| H1I280106 | BD0001, BD0015 | Mercury | ICB/CCB | B |
| | BD0002, BD0023, BD0024, BD0028, BD3005 (Dissolved), | Thallium | ICB/CCB | B |
| | BD0015, BD0016, BD0023, BD0025, BD0026 | Beryllium | ICB/CCB | B |
| | BD3005, BD3007, BD3010, BD3005 (Dissolved), BD3007 (Dissolved), BD3010 (Dissolved) | Aluminum | Method/ICB/CCB | B |
| | BD3005, BD3007 | Chromium | Method/ICB/CCB | B |
| | BD3010 | Copper, Zinc | Method/ICB/CCB | B |
| H1J010131 | BD3018 | Aluminum, Thallium, Vanadium | ICB/CCB | B |
| | BD3018 (Dissolved) | Aluminum, Selenium, Thallium | ICB/CCB | B |
| H1J020107 | BD3012 | Cadmium | ICB/CCB | B |
| | BD3012 (Dissolved) | Copper | ICB/CCB | B |
| H1J030106 | BD0017R, BD0018R, BD0019R, BD0021R, BD0022R | Arsenic | ICB/CCB | B |

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| | BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R | Beryllium, Cadmium | ICB/CCB | B |
| | BD3024, BD3024 (Dissolved) | Aluminum | ICB/CCB | B |
| H1J040177 | BD3035, BD3017, BD3008, Dissolved BD3035, BD3008 | Thallium | ICB/CCB | B |
| | BD3034 | Cadmium | ICB/CCB | B |
| | BD3008 | Vanadium | ICB/CCB | B |
| | Dissolved BD3017, BD3021, BD3008 | Aluminum | ICB/CCB | B |
| H1J050186 | BD3043 | Copper, Thallium | ICB/CCB | B |
| | BD3042, BD3025, BD3046, BD3048, BD3043, BD3042 (Dissolved), BD3025 (Dissolved), BD3046 (Dissolved), BD3048 (Dissolved), | Aluminum | Method/ICB/CCB | B |
| H1J060123 | BD3052, BD3006R, BD3009R, BD3030, Dissolved BD3052, BD3030, BD3041, BD3050, BD3006R, BD3009R | Aluminum | Method/ICB/CCB | B |
| | BD3050, BD3009R | Copper | ICB/CCB | B |
| | Dissolved BD3050, BD3009R | Beryllium | ICB/CCB | B |
| H1J090111 | BD3038, Dissolved BD3004 | Beryllium | ICB/CCB | B |
| | BD3004, Dissolved BD3038 | Copper | ICB/CCB | B |
| | BD3004 | Thallium | ICB/CCB | B |
| | Dissolved BD3038, BD3027, BD3004 | Aluminum | ICB/CCB | B |
| H1J100121 | BD3037 | Beryllium | ICB/CCB | B |
| | BD3032, BD3028 | Arsenic | ICB/CCB | B |

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| | BD3019, Dissolved BD3032, BD3029, BD3028, BD3019 | Aluminum | ICB/CCB | B |
| H1J110141 | BD3020, Dissolved BD3020 | Aluminum | ICB/CCB | B |
| | Dissolved BD3020 | Magnesium, Thallium | Method/ICB/CCB | B |

***Matrix Spike/Matrix Spike Duplicate.*** MS/MSD was performed for the project samples and all QC criteria were met, with the exception of the following:

| SDG | Samples Affected | Element | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0003, BD0004, BD0005, BD0006, BD3007, BD0008, BD0009, BD0010, BD0012 | Calcium, Magnesium | J |
| H1I280106 | BD0001, BD0002, BD0013, BD0014, BD0015, BD0016, BD0023, BD0024, BD0025, BD0026, BD0028 | Manganese | J |
| H1J010131 | BD3018 (Dissolved) | Potassium | J |

***Laboratory Control Sample/Laboratory Control Sample Duplicate.*** LCS was performed for the project samples and all QC criteria were met.

***Interference Check Sample (ICS).*** All ICS % recoveries, where applicable, were acceptable.

***ICP Serial Dilutions.*** Serial dilution 10% D criteria were met, with the exception of the following:

| SDG | Samples | Elements | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0003, BD0004, BD0005, BD0006, BD3007, BD0008, BD0009, BD0010, BD0012 | Aluminum, Arsenic, Calcium, Chromium, Cobalt, Iron, Lead, Manganese, Nickel, Sodium, Vanadium, Zinc | J |
| | BD3026 | Potassium | J |
| H1J010131 | Dissolved BD3018 | Potassium | J |

| SDG | Samples | Elements | Validation Qualifier |
|---|---|---|---|
| H1J030106 | BD0017R, BD0018R, BD0019R, BD0021R, BD0022R, BD0029R, BD0030R | Aluminum, Arsenic, Barium, Calcium, Chromium, Cobalt, Iron, Lead, Magnesium, Manganese, Nickel, Vanadium, Zinc | J/B |
| H1J040177 | BD3035, BD3034, BD3017, BD3021, BD3008 | Potassium | J |
| H1J090111 | All | Potassium | J |
| H1J100121 | Dissolved BD3037, BD3032, BD3029, BD3028 | Potassium | J |

***Field Duplicates.*** Original and field duplicate results were evaluated and all QC criteria were met, with the exception of the following:

| SDG | Samples | Elements | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD0009 (original) BD0010 (FD) | Barium, Mercury | J |
| H1J030106 | BD0018R (original) BD0019R (FD) | Barium, Lead, Mercury | J |
| H1J060123 | BD3049 (original) BD3050 (FD) | Vanadium | J |

***Quantitation.*** Results quantified between the MDL and the RL (flagged by the laboratory as B) were qualified as estimated "J".

### *4.5 Wet Chemistry*

Overall, the data are of good quality and are usable as reported by the laboratory. Data were reviewed for the following.

***Sample Preservation.*** All samples were properly preserved (pH>12), with the exception of the following:

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| H1I280106 | All | Total Cyanide | UJ |
| H1J010131 | BD3009, BD3018 | Total Cyanide | UJ |
| H1J020107 | BD3012 | Total Cyanide | UJ |
| H1J030106 | BD3024 | Total Cyanide | UJ |

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| H1J040177 | BD3017, BD3021, BD3008 | Total Cyanide | UJ |
| H1J050186 | BD3025 | Total Cyanide | UJ |
| H1J100121 | BD3032, BD3029, BD3028 | Total Cyanide | UJ |
| | BD3028 | Hardness | J |

***Holding Times.*** Technical holding time criteria were met for all samples, with the exception of the following:

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| H1I270167 | BD3026 | Sulfate, Total Dissolved Solids | J/UJ |

***Initial and Continuing Calibration.*** All initial and continuing calibrations associated with the project samples met QC criteria, with the following exceptions:

| SDG | Samples | Analytes | Validation Qualifier |
|---|---|---|---|
| H1J030106 | BD3024 | Nitrate | UJ |
| H1J050186 | All | Sulfate | J |
| H1J090111 | BD3038 | Nitrate | J |

***Blanks.*** The 5X rule for contaminants found in the associated equipment rinses, and method blanks was applied to all sample results. All were found to be acceptable.

| SDG | Samples Affected | Analyte | Blank | Validation Qualifier |
|---|---|---|---|---|
| H1J020107 | BD3012 | Total Alkalinity | Method | B |
| H1J050186 | BD3042 | Total Organic Carbon | ICB/CCB | B |
| H1J060123 | BD3041, BD3030 | Total Organic Carbon | ICB/CCB | B |

***Matrix Spike/Matrix Spike Duplicate.*** MS/MSD was performed for the project samples and all QC criteria were met.

***Laboratory Control Sample.*** LCS was performed for the project samples and all QC criteria were met.

***Field Duplicates.*** Original and field duplicate results were evaluated and all QC criteria were met.

***Quantitation.*** Results quantified between the MDL and the RL, which the lab qualified as "B," were qualified as estimated "B" unless blank contamination was present or the results were rejected.

# Paragon Analytics, Inc.

## Explosives by HPLC Case Narrative

### IT Corporation

PLUMBROOK ORDINACE WORKS -- 825635

**Order Number - 0109139**

1. This report consists of 3 soil samples and 2 leachate samples. The samples were received cool and intact by Paragon on 09/28/2001.

2. These samples were extracted and analyzed according to SW-846, 3rd Edition procedures. Specifically, soil samples 1, 2, and 3 were extracted using Paragon Analytics, Inc. Standard Operating Procedure 665 Revision 2 based on Method 8330. Soil samples 2 and 3 were processed through leaching procedures following Paragon Analytics, Inc. Standard Operating Procedure 668 Revision 0 based on Method 1312. The leachates were then extracted using Paragon Analytics, Inc. Standard Operating Procedure 665 Revision 2 based on Method 8330.

3. Extracts from aqueous samples are prepared for analysis by mixing with reagent grade water (1 part water to 1 part extract). Our reporting limits for aqueous samples, as well as all results for aqueous samples are based on the final volume of the extract/reagent water mixture (typically 3mL) and not on the original volume of extract (typically 1.5mL).

   The leachate and the soil extracts were then analyzed using HPLC with a UV detector (254nm) and a $C_{18}$ column according to Paragon Analytics, Inc. Standard Operating Procedure 404 Revision 8 based on SW-846 Method 8330. All positive results were then confirmed on a cyano column. Quantitations were taken from the primary column. The results reported are based upon regression equations calculated from a six point initial calibration.

4. All initial and continuing calibration criteria were within acceptance criteria.

5. The method blanks associated with this project were below the reporting limits for all analytes.

6. All laboratory control spike and laboratory control spike duplicate recoveries and RPDs were within the acceptance criteria.

7. The leachate matrix spike and matrix spike duplicate recoveries were all outside the control limits low, except for nitrobenzene which was out high, and tetryl which was within the control limits. All leachate RPDs were within acceptance criteria.

   All soil matrix spike and matrix spike duplicate recoveries and RPDs were within acceptance criteria with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| RDX | 1MS & 1MSD | high |
| 1,3,5-trinitrobenzene | 1MS & 1MSD | high |
| 1,3-dinitrobenzene | 1MS & 1MSD | high |
| nitrobenzene | 1MS & 1MSD | high |
| 2,4-dinitrotoluene | 1MS & 1MSD | high |

   The recoveries of these compounds in the laboratory control spike and laboratory control spike duplicate were within control limits, which suggest the outliers in the matrix spikes may have been due to matrix effects. No further action was warranted. Blank spike and blank spike duplicate results have been included.

8. All samples were extracted and analyzed within the established holding times.

9. All surrogate recoveries were within acceptable limits with the following exceptions:

| Surrogate | Sample | Direction |
|---|---|---|
| 1,4-dinitrobenzene | 4, 5, 5MS, & 5MSD | low |

   Samples 4 and 5 had a similar matrix. Sample 5 was used for the matrix spike and matrix spike duplicate. The surrogate in the spikes was also outside the acceptance criteria, which suggests the outliers may have been due to matrix effects. Further re-analyses were not warranted. NCR #03623 has been included.

10. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in Paragon Analytics, Inc. Standard Operating Procedure 939 Revision 0. The chromatographic data system marks the manual integrations in the peak type field on the quantitation report with an M. Whenever manual integrations are performed before and after quantitation reports and chromatograms are included in the report.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Peter Gintautas
Organics Technical Manager

Date

Reviewer's Initials

10-18-01
Date

# *Paragon Analytics, Inc.*
# *Data Qualifier Flags*
# *Chromatography and Mass Spectrometry*

| | |
|---|---|
| U or ND: | This flag indicates that the compound was analyzed for but not detected. |
| J: | This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); and (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL. |
| B: | This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound. |
| E: | This flag identifies compounds whose concentration exceeds the upper level of the calibration range. |
| *: | This flag indicates that a spike recovery is equal to or outside the control criteria used. (This flag appears when a spike recovery is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |
| +: | This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria. (This flag appears when the RPD is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |

# Paragon Analytics, Inc.

## GC/MS Volatiles Case Narrative

### IT Corporation

PLUMBROOK ORDINACE WORKS -- 82535

**Order Number - 0109139**

1. This report consists of 3 soil samples. The samples were received cool and intact by Paragon on 09/28/01.

2. These samples were prepared and analyzed according to SW-846, 3rd Edition procedures. Specifically, the soil samples were prepared by purging the heated contents of an EnCore sampler mixed with 10 mls of reagent water. The calibration curve was also prepared using the heated purge. This procedure, including the heating step, is based on Method 5035.

3. The samples were analyzed using GC/MS with a RTX-624 capillary column according to protocols based on SW-846 Method 8260B utilizing Paragon SOP 525 Rev 4. All positive results were quantitated with the average response of the initial calibration standards using the internal standard technique. The identification of positive results was achieved by a comparison of the retention time and mass spectrum of the sample versus the daily calibration standard.

   The results reported for methylene chloride are based upon a regression equation calculated from the initial calibration using the internal standard technique.

4. All initial calibration criteria for SPCC's and CCC's were met. Method 8260B states that the average response factor may be used for quantitation for all analytes if the mean of the RSD values for all analytes is less than or equal to 15%. The initial calibrations had a mean RSD value of less than 15%.

5. All continuing calibration criteria were met.

6. Methylene chloride, acetone and 2-butanone are common laboratory contaminants. In order to minimize the levels of these compounds detected in the gc/ms analysis,

Paragon has designated its volatile laboratory as a restricted access area. In addition, the laboratory has been equipped with a dedicated, conditioned air intake and exhaust system that operates under positive pressure in order to minimize cross contamination of these compounds.

The method blank VL010928-2 had methylene chloride detected above the reporting limit. This compound was not detected in the associated samples. The method blank VL011003-2 had methylene chloride detected above the reporting limit. This compound was detected in the associated samples, so the data were flagged.

7. All laboratory control spike and laboratory control spike duplicate recoveries and RPDs were within the acceptance criteria with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| Trichlorofluoromethane | VL010928-4LCS/D | high |
| Methylene chloride | VL010928-4LCS/D, VL011003-2LCS/D | high |
| Naphthalene | VL010928-4LCS | low |
| Naphthalene | VL010928-4LCS/D | RPD high |
| 1,1,1,2-Tetrachloroethane | VL011003-2LCS | high |
| 1,2-Dibromo-3-chloropropane | VL011003-2LCS/D | RPD high |

The background levels of methylene chloride detected in this laboratory can cause inconsistent and irreproducible results for low level analyses.

With the exception of methylene chloride none of the above compounds were detected in the samples. Data were not affected, so no further action was taken.

8. A matrix spike and matrix spike duplicate were not designated for this sample delivery group. A laboratory control spike and laboratory control spike duplicate were performed instead.

9. The samples were originally analyzed within the required holding time. However, the samples were re-analyzed due to naphthalene being out low in the CCAL (VL010928-2A); The re-analyses were performed outside the holding time requirements. Results for both the original and re-analyzed samples are included. See NCR #3583, included in the Miscellaneous section of this report.

10. All surrogate recoveries were within acceptance criteria.

11. All internal standard recoveries were within acceptance criteria.

12. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in Paragon Analytics, Inc. Standard Operating Procedure 939 Revision 0. The chromatographic data system marks the manual integrations with an m on the quantitation report. Whenever manual integrations are performed, before and after chromatograms of the peak that was manually integrated are included in the report along with the reason why the re-integration was necessary.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Joel Nolte (for Tyler Knaebel) 10-12-01

Tyler Knaebel — Date

GC/MS Analyst

Reviewer's Initials — Date 10-16-01

*Paragon Analytics, Inc.*
*Data Qualifier Flags*
*Chromatography and Mass Spectrometry*

| | |
|---|---|
| U or ND: | This flag indicates that the compound was analyzed for but not detected. |
| J: | This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); and (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL. |
| B: | This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound. |
| E: | This flag identifies compounds whose concentration exceeds the upper level of the calibration range. |
| *: | This flag indicates that a spike recovery is equal to or outside the control criteria used. (This flag appears when a spike recovery is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |
| +: | This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria. (This flag appears when the RPD is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |

# Paragon Analytics, Inc.

## TOTAL METALS CASE NARRATIVE

## IT Corporation

PLUMBROOK ORDINACE WORKS -- 825635

**Order Number - 0109139**

1. This report consists of three soil samples.
2. The samples were received cool and intact on 9/28/01.
3. The samples were prepared for analysis based on SW-846, 3rd Edition procedures.

   For analysis by Trace ICP, the samples were digested following method 3050B and PAI SOP 806 Rev. 5.

   For analysis by Cold Vapor AA (CVAA), the samples were digested following method 7471A and PAI SOP 812 Rev. 7.
4. The samples were analyzed following SW-846, 3rd Edition procedures.

   Analysis by Trace ICP followed method 6010B and PAI SOP 807 Rev. 5.

   The relationship between intensity and concentration for each element is established using at least four standards, one of which is a blank solution. The equation which relates intensity to concentration is:

$$I = A_0 + (A_1 * c^n) + (A_2 * c^{2n})$$

where: $I$ = intensity

$c$ = concentration

$A_0$ = offset coefficient

$A_1$ = gain coefficient

$A_2$ = curvature coefficient

$n$ = exponent coefficient

During sample analysis concentrations are computed by the software and the results are printed in mg/L. The instrument software does not provide a printout which gives both intensity and concentration. The validity of the calibration equation is tested by analyzing the following solutions: a blank, a low level check solution with concentrations near the reporting limit, an Initial

Calibration Verification (ICV) standard from a 2nd source standard solution with concentrations near the middle of the analytical range, a Continuing Calibration Verification (CCV) standard with concentrations at two times those in the ICV, and a readback of the highest calibration standard.

These solutions provide verification that the calibration equations are functioning properly throughout the analytical range of the instrument. During sample analysis dilutions are made for analytes found at concentrations above the highest calibration standard. No results are taken from extrapolations beyond the highest standard.

Analysis by CVAA followed method 7471A and PAI SOP 812 Rev. 7.

The relationship between intensity and concentration is determined daily, prior to sample analysis. At least five standards and a blank solution are analyzed to establish the calibration curve. The instrument software performs a linear regression to fit the calibration data to a curve of the form:

$$\text{conc.} = B * I + C$$

where: conc. = concentration

B = slope coefficient

I = intensity

C = intercept coefficient

A printout summarizing the calibration data supplies the calibration curve and correlation coefficient. During sample analysis both intensity and concentration values are printed. Dilutions are made for concentrations above the highest calibration standard. No results are taken from extrapolations above the highest standard.

5. All standards and solutions are NIST traceable and were used within their recommended shelf life.
6. The samples were prepared and analyzed within the established hold times.

All in house quality control procedures were followed, as described below.

7. General quality control procedures.
   - A preparation (method) blank, laboratory control sample, and laboratory control sample duplicate were digested and analyzed with the samples in each digestion batch. There were not more than 20 samples in each digestion batch.
   - The preparation (method) blank results associated with each digestion batch were below the practical quantitation limits for the requested analytes.
   - The laboratory control samples associated with each digestion batch were within the acceptance limits. This indicates complete digestion according to the method.

- All initial and continuing calibration blanks associated with each analytical batch were below the practical quantitation limits for the requested analytes.
- All initial and continuing calibration verifications associated with each analytical batch were within the acceptance criteria for the requested analytes. This indicates a valid calibration and stable instrument conditions.
- The interference check samples and high standard readbacks associated with Method 6010B analyses were within acceptance criteria.

8. Matrix specific quality control procedures.

   Since a sample from this Order Number was not selected as a quality control (QC) sample, matrix specific QC results are not included in this report.

9. All samples required dilutions to bring iron into the analytical range of the Trace ICP. Accurate quantitation of iron is necessary to correct for spectral interferences on cadmium, lead, selenium, and thallium. The cadmium, lead, selenium, and thallium results were determined from the diluted samples.

The data contained in the following report have been reviewed and approved by the personnel listed below:

Melissa Grytdal — 10/15/01
Melissa Grytdal — Date
Data Reporting Specialist

PEM — 10/16/01
Reviewer's Initials — Date

CERTIFICATION

Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

# Paragon Analytics, Inc.

## METALS CASE NARRATIVE

## IT Corporation

PLUMBROOK ORDINACE WORKS -- 825635

**Order Number - 0110024**

1. This report consists of eight water samples for total recoverable or dissolved metals.
2. The samples were received cool and intact on 10/6/01.
3. The total recoverable samples had been preserved for the requested analyses. The dissolved samples had been filtered and preserved prior to receipt, with the exception of PAI ID 0110024-6, which was not properly preserved. This sample was preserved to a pH less than two prior to analysis.
4. The samples were prepared for analysis based on SW-846, 3rd Edition procedures.

   For analysis by Trace ICP, the samples were digested following method 3005A and PAI SOP 806 Rev. 5.

   For analysis by Cold Vapor AA (CVAA), the samples were digested following method 7470A and PAI SOP 812 Rev. 7.
5. The samples were analyzed following SW-846, 3rd Edition procedures.

   Analysis by Trace ICP followed method 6010B and PAI SOP 807 Rev. 5.

   The relationship between intensity and concentration for each element is established using at least four standards, one of which is a blank solution. The equation which relates intensity to concentration is:

$$I = A_0 + (A_1 * c^n) + (A_2 * c^{2n})$$

where: $I$ = intensity

$c$ = concentration

$A_0$ = offset coefficient

$A_1$ = gain coefficient

$A_2$ = curvature coefficient

n = exponent coefficient

During sample analysis concentrations are computed by the software and the results are printed in mg/L. The instrument software does not provide a printout which gives both intensity and concentration. The validity of the calibration equation is tested by analyzing the following solutions: a blank, a low level check solution with concentrations near the reporting limit, an Initial Calibration Verification (ICV) standard from a 2nd source standard solution with concentrations near the middle of the analytical range, a Continuing Calibration Verification (CCV) standard with concentrations at two times those in the ICV, and a readback of the highest calibration standard.

These solutions provide verification that the calibration equations are functioning properly throughout the analytical range of the instrument. During sample analysis dilutions are made for analytes found at concentrations above the highest calibration standard. No results are taken from extrapolations beyond the highest standard.

Analysis by CVAA followed method 7470A and PAI SOP 812 Rev. 7.

The relationship between intensity and concentration is determined daily, prior to sample analysis. At least five standards and a blank solution are analyzed to establish the calibration curve. The instrument software performs a linear regression to fit the calibration data to a curve of the form:

$$conc. = B * I + C$$

where: conc. = concentration

B = slope coefficient

I = intensity

C = intercept coefficient

A printout summarizing the calibration data supplies the calibration curve and correlation coefficient. During sample analysis both intensity and concentration values are printed. Dilutions are made for concentrations above the highest calibration standard. No results are taken from extrapolations above the highest standard.

6. All standards and solutions are NIST traceable and were used within their recommended shelf life.
7. The samples were prepared and analyzed within the established hold times.

All in house quality control procedures were followed, as described below.

8. General quality control procedures.
   - A preparation (method) blank, laboratory control sample, and laboratory control sample duplicate were digested and analyzed with the samples in each digestion batch. There were not more than 20 samples in each digestion batch.

- The preparation (method) blank results associated with each digestion batch were below the practical quantitation limits for the requested analytes.
- The laboratory control samples associated with each digestion batch were within the acceptance limits. This indicates complete digestion according to the method.
- All initial and continuing calibration blanks associated with each analytical batch were below the practical quantitation limits for the requested analytes.
- All initial and continuing calibration verifications associated with each analytical batch were within the acceptance criteria for the requested analytes. This indicates a valid calibration and stable instrument conditions.
- The interference check samples and high standard readbacks associated with Method 6010B analyses were within acceptance criteria.

9. Matrix specific quality control procedures.

   Since a sample from this Order Number was not selected as a quality control (QC) sample, matrix specific QC results are not included in this report.

10. Sample dilutions were not required for the requested analyses.

The data contained in the following report have been reviewed and approved by the personnel listed below:

| | |
|---|---|
| Melissa Grytdal | 10/23/01 |
| Melissa Grytdal<br>Data Reporting Specialist | Date |
| REM | 10/24/01 |
| Reviewer's Initials | Date |

CERTIFICATION

Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

# Paragon Analytics, Inc.

## GC/MS Volatiles Case Narrative

### IT Corporation

PLUMBROOK ORDINANCE -- 825635

**Order Number - 0110024**

1. This report consists of 5 water samples. The samples were received cool and intact by Paragon on 10/06/01. The vial for samples 1 and 2 contained head space prior to analysis because they were not received head space free.

2. These samples were prepared and analyzed according to SW-846, 3rd Edition procedures. Specifically,the water samples were prepared by purging 5 mls using purge and trap procedures based on Method 5030.

3. The samples were analyzed using GC/MS with a RTX-624 capillary column according to protocols based on SW-846 Method 8260B utilizing Paragon SOP 525 Rev 4. All positive results were quantitated with the average response of the initial calibration standards using the internal standard technique. The identification of positive results was achieved by a comparison of the retention time and mass spectrum of the sample versus the daily calibration standard.

   The results reported for methylene chloride are based upon a regression equation calculated from the initial calibration using the internal standard technique.

4. All initial calibration criteria for SPCC's and CCC's were met. Method 8260B states that the average response factor may be used for quantitation for all analytes if the mean of the RSD values for all analytes is less than or equal to 15%. The initial calibration had a mean RSD value of less than 15%.

5. All continuing calibration criteria were met.

6. Methylene chloride, acetone and 2-butanone are common laboratory contaminants. In order to minimize the levels of these compounds detected in the gc/ms analysis, Paragon has designated its volatile laboratory as a restricted access area. In addition, the laboratory has been equipped with a dedicated, conditioned air intake and exhaust

system that operates under positive pressure in order to minimize cross contamination of these compounds.

The method blank had methylene chloride detected above the reporting limit. This compound was detected in the samples, so the data were flagged.

7. All laboratory control spike and laboratory control spike duplicate recoveries and RPDs were within the acceptance criteria with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| Methylene chloride | LCS | low |

The background levels of methylene chloride detected in this laboratory can cause inconsistent and irreproducible results for low level analyses.

8. All matrix spike and matrix spike duplicate recoveries and RPDs were within acceptance criteria with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| Dichlorodifluoromethane | MS, MSD | low |
| Chloromethane | MS, MSD | low |
| Chloroethane | MS, RPD | high |
| 1,1,2,2-Tetrachloroethane | MSD | high |
| Naphthalene | MSD | high |

2-Chloroethyl vinyl ether was undetected in the MS and MSD. The recoveries of these compounds in the laboratory control spike and laboratory control spike duplicate were within control limits, which suggests the outliers in the matrix spikes may have been due to matrix effects, so no further action is needed. Blank spike and blank spike duplicate results are included.

9. The samples were analyzed within the established holding times.

10. All surrogate recoveries were within acceptance criteria.

11. All internal standard recoveries were within acceptance criteria.

12. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in Paragon Analytics, Inc. Standard Operating Procedure 939 Revision 0. The chromatographic data system marks the manual integrations with an m on the quantitation report. Whenever manual integrations are performed, before and after chromatograms of the peak that was manually integrated are included in the report along with the reason why the re-integration was necessary.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Joel Nolte (for Tyler Knaebel) 10-11-01

Tyler Knaebel — Date

GC/MS Analyst

10-10-01

Reviewer's Initials — Date

*Paragon Analytics, Inc.*
*Data Qualifier Flags*
*Chromatography and Mass Spectrometry*

| | |
|---|---|
| U or ND: | This flag indicates that the compound was analyzed for but not detected. |
| J: | This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); and (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL. |
| B: | This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound. |
| E: | This flag identifies compounds whose concentration exceeds the upper level of the calibration range. |
| *: | This flag indicates that a spike recovery is equal to or outside the control criteria used. (This flag appears when a spike recovery is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |
| +: | This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria. (This flag appears when the RPD is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.) |

# Paragon Analytics, Inc.

## GC/MS Semivolatiles Case Narrative

### IT Corporation

PLUMBROOK ORDINANCE -- 825635

**Order Number - 0110024**

1. This report consists of 4 water samples. These samples were received cool and intact on 10/06/01.

2. These samples were prepared and analyzed according to SW-846, 3rd Edition protocol utilizing Paragon Standard Operating Procedures. Specifically, the water samples were extracted using continuous liquid-liquid extractors, according to SW-846 Method 3520 utilizing Paragon Standard Operating Procedure 617.

3. The extracts were analyzed using GC/MS with a DB-5.625 capillary column according to Paragon Standard Operating Procedure 506 Revision 9 based on SW-846 Method 8270C. All positive results were quantitated against the initial calibration standards using the internal standard technique. The identification of positive results was achieved by a comparison of the retention time and mass spectrum of the sample versus the daily calibration standard.

4. All initial calibration criteria were met. Method 8270C states that if the average of the percent relative standard deviations (RSDs) is less than 15, the average response factors may be used for quantitation. We quantitated these compounds using the average responses.

5. There were no target compounds detected in the method blanks.

6. All laboratory control spike and laboratory control spike duplicate criteria were met with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| Hexachlorocyclopentadiene | EX011008-1LCS,<br>EX011011-3LCS,<br>EX011011-3LCSD | Low |

| | | |
|---|---|---|
| Benzidine | EX011008-1LCS, EX011011-3LCS, EX011011-3LCSD | Low |
| Benzoic acid | EX011011-3 RPD | High |

None of the above compounds were detected above the reporting limit in the samples. As the quantitation of target analytes were not compromised and reporting limits are defensible, data are submitted.

The recoveries of hexachlorocyclopentadiene are uncontrollable. This compound is subject to thermal decomposition in the inlet of the gas chromatograph, chemical reaction in acetone solution, and photochemical decomposition.

The recoveries of benzidine are uncontrollable. This compound is subject to oxidative losses during solvent concentration. The chromatographic behavior is nonreproducible and poor.

Sample was accidentally poured into EX011008-1LCSD. Only EX011008-1LCS was reported. See NCR #3627.

7. Matrix spikes and matrix spike duplicates were not designated for this sample delivery group. A laboratory control spike and laboratory control spike duplicate were performed instead.

8. The samples were extracted and analyzed within the established holding times.

9. All surrogate recoveries were within acceptance criteria.

10. All internal standard recoveries were within acceptance criteria.

11. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in Paragon Analytics, Inc. Standard Operating Procedure 939 Revision 0. The chromatographic data system marks the manual integrations with an "m" on the quantitation report. Whenever manual integrations are performed, before and after chromatograms of the peak that was manually integrated are included in the report along with the reason why the re-integration was necessary.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Cheryl Jones — 10-24-01

Cheryl Jones
Organic Chemist

Date

Reviewer's Initials — 10-23-01

Date

# *Paragon Analytics, Inc.*
# *Data Qualifier Flags*
# *Chromatography and Mass Spectrometry*

| | |
|---|---|
| **U or ND:** | **This flag indicates that the compound was analyzed for but not detected.** |
| **J:** | **This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); and (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL.** |
| **B:** | **This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound.** |
| **E:** | **This flag identifies compounds whose concentration exceeds the upper level of the calibration range.** |
| **A:** | **This flag indicates that a tentatively identified compound is a suspected aldol-condensation product.** |
| **X:** | **This flag indicates that the analyte was diluted below an accurate quantitation level.** |
| ***:** | **This flag indicates that a spike recovery is equal to or outside the control criteria used. (This flag appears when a spike recovery is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.)** |
| **+:** | **This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria. (This flag appears when the RPD is equal to, and therefore within, the control criteria due to a limitation in the current PAI LIMS system.)** |

# Paragon Analytics, Inc.

## Explosives by HPLC Case Narrative

### IT Corporation

PLUMBROOK ORDINACE WORKS -- 825635

**Order Number - 0110024**

1. This report consists of 4 water samples. These samples were received cool and intact on 10/06/2001.

2. These samples were extracted and analyzed according to SW-846, 3rd Edition procedures. Specifically, the samples were extracted using Paragon Analytics, Inc. Standard Operating Procedure 665 Revision 2 based on Method 8330.

3. Extracts from aqueous samples are prepared for analysis by mixing with reagent grade water (1 part water to 1 part extract). Our reporting limits for water samples, as well as all results for water samples are based on the final volume of the extract/reagent water mixture (typically 3mL) and not on the original volume of extract (typically 1.5mL).

   The water extracts were then analyzed using HPLC with a UV detector (254nm) and a $C_{18}$ column according to Paragon Analytics, Inc. Standard Operating Procedure 404 Revision 8 based on SW-846 Method 8330. All positive results were then confirmed on a cyano column. Quantitations were taken from the primary column. The results reported are based upon regression equations calculated from a six point initial calibration.

4. All continuing calibration criteria were met with the following exceptions:

   Continuing calibration 10/18/01 1CCV - 2,6-dinitrotoluene was out high on the cyano column.
   Continuing calibration 10/18/01 2CCV - 2,6-dinitrotoluene was out high on the cyano column.
   2,6-dinitrotoluene was not detected on the primary column, so confirmation was not necessary on the cyano column for this analyte. The quantitation of each analyte was

taken from the primary column, which met initial and continuing calibration criteria for all compounds.

5. The method blank associated with this project was below the reporting limits for all analytes.

6. All laboratory control spike and laboratory control spike duplicate criteria were met with the following exception:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| tetryl | LCS & LCSD | RPD |

Since the recoveries for tetryl in the laboratory control spike and laboratory control spike duplicate were within control limits, with only the RPD exceeding acceptance criteria, quantitations of target compounds were not compromised. No further action was taken.

7. All matrix spike and matrix spike duplicate recoveries and RPDs were within acceptance criteria with the following exceptions:

| Spiked Compound | QC Sample | Direction |
|---|---|---|
| 1,3,5-trinitrobenzene | 2MS & 2MSD | low |
| 1,3-dinitrobenzene | 2MS & 2MSD | high |
| tetryl | 2MS & 2MSD | low |
| nitrobenzene | 2MSD | high |
| 2,4,6-trinitrotoluene | 2MS | low |
| nitrobenzene | 2MS & 2MSD | RPD |

The recoveries of these compounds in the laboratory control spike and laboratory control spike duplicate were within control limits, which suggest the outliers in the matrix spikes may have been due to matrix effects. No further action was warranted. Blank spike and blank spike duplicate results have been included.

8. All samples were extracted and analyzed within the established holding times.

9. All surrogate recoveries were within acceptable limits with the following exceptions:

| Surrogate | Sample | Direction |
|---|---|---|
| 1,4-dinitrobenzene | 1, 2, 2MS, 2MSD | low |

Samples 1 and 2 had a similar matrix. Sample 2 was used for the matrix spike and matrix spike duplicate. The surrogate in the spikes was also outside the acceptance criteria, which suggests the outliers may have been due to matrix effects. Further re-analyses were not warranted. NCR #03621 has been included.

10. Manual integrations are performed when needed to provide consistent and defensible data following the guidelines in Paragon Analytics, Inc. Standard Operating Procedure 939 Revision 0. The chromatographic data system marks the manual integrations in the peak type field on the quantitation report with an M. Whenever manual integrations are performed before and after quantitation reports and chromatograms are included in the report.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Peter G. Gintautas
Peter Gintautas
Organics Technical Manager

26 Oct 01
Date

CX
Reviewer's Initials

10-26-01
Date

# *Paragon Analytics, Inc.*
# *Data Qualifier Flags*
# *Chromatography and Mass Spectrometry*

| | |
|---|---|
| **U or ND:** | **This flag indicates that the compound was analyzed for but not detected.** |
| **J:** | **This flag indicates an estimated value. This flag is used as follows : (1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the reporting limit (RL) but greater than the method detection limit (MDL); and (3) when the retention time data indicate the presence of a compound that meets the GC identification criteria, and the result is less than the RL but greater than the MDL.** |
| **B:** | **This flag is used when the analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user. This flag shall be used for a tentatively identified compound (TIC) as well as for a positively identified target compound.** |
| **E:** | **This flag identifies compounds whose concentration exceeds the upper level of the calibration range.** |
| **X:** | **This flag indicates that the analyte was diluted below an accurate quantitation level.** |
| ***:** | **This flag indicates that a spike recovery is equal to or outside the control criteria used.** |
| **+:** | **This flag indicates that the relative percent difference (RPD) equals or exceeds the control criteria.** |

SEVERN TRENT SERVICES

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# ANALYTICAL REPORT

PBOW

Lot #: H1H020118

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

August 23, 2001

# SAMPLE SUMMARY

**H1H020118**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EHCMT | 001 | BB3003 | 08/01/01 | 15:3 |
| EHDWG | 002 | BC3013 | 08/01/01 | 16:2 |
| EHDWL | 003 | BA3021 | 08/01/01 | 17:1 |
| EHDWM | 004 | TRIP BLANK | 08/01/01 | 18:0 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# ANALYTICAL METHODS SUMMARY

**H1H020118**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1H020118

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

**Sample Receipt**

One of three vials were received with headspace for sample BA3021.

**Quality Control**

All holding times and QC criteria were met.

Volatiles

The pH of sample BA3021 was greater than 2. The sample was analyzed within the normal 14 day holding time. EPA has indicated that some aromatic compounds in wastewater samples, notably benzene, toluene, and ethyl benzene, may be susceptible to biological degradation if samples are not preserved to a pH of 2.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for 1,3-Dinitrobenzene for sample BA3021. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

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# ANALYTICAL REPORT

PBOW

Lot #: H1H030124

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

August 23, 2001

# SAMPLE SUMMARY

**H1H030124**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMI TIMI |
|---|---|---|---|---|
| EHFEA | 001 | BA3014 | 08/02/01 | 10:: |
| EHFEV | 002 | TB080201 | 08/02/01 | 12:( |

**NOTE(S):**

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# ANALYTICAL METHODS SUMMARY

**H1H030124**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1H030124

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

**Sample Receipt**

There were no problems with the condition of the samples received.

**Quality Control**

All holding times and QC criteria were met.

Explosives

Sample BA3014 was reported with an elevated reporting limit for 2 –Nitrotoluene due to the diificult sample matrix.

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# ANALYTICAL REPORT

PBOW

Lot #: H1H070218

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

September 12, 2001

# SAMPLE SUMMARY

**H1H070218**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EHK2L | 001 | BC3019 | 08/06/01 | 12:10 |
| EHK2N | 002 | BB3002 | 08/06/01 | 11:45 |

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# ANALYTICAL METHODS SUMMARY

**H1H070218**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |

**References:**

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1H070218

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

**Sample Receipt**

There were no problems with the condition of the samples received.

**Quality Control**

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

The surrogate recovery for laboratory control sample EHN1P1AC was below QC limits. The samples were re-extracted 17 days outside holding time. All surrogates and associated QC samples were within QC limits in the re-extraction. Since the re-extraction was outside holding time, both sets of data were reported.

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# ANALYTICAL REPORT

**PBOW**

**Lot #: H1H070257**

**Maureen McMyler**

**IT Corporation - Knoxville**
**312 Directors Drive**
**Knoxville, TN 37923**

**SEVERN TRENT LABORATORIES, INC.**

Jamie A McKinney

**Jamie A. McKinney**
Project Manager

**August 14, 2001**

# SAMPLE SUMMARY

**H1H070257**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EHK20 | 001 | BC3019 | 08/06/01 | 12:10 |
| EHK23 | 002 | BB3002 | 08/06/01 | 11:45 |
| EHK25 | 003 | TB080601 | 08/06/01 | 11:45 |

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# ANALYTICAL METHODS SUMMARY

**H1H070257**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1H070257

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

There were no problems with the condition of the samples received.

### Quality Control

All holding times and QC criteria were met.

### Comments

The result for methylene chloride for method blank EHPLD1AA was greater than the reporting limit, but less than 5 times the reporting limit. Methylene chloride is considered a common laboratory contaminant.

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# ANALYTICAL REPORT

PBOW

Lot #: H1I170126

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

October 2, 2001

# SAMPLE SUMMARY

**H1I170126**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EKKLM | 001 | BA9001 | 09/14/01 | 18:40 |
| EKKL9 | 002 | BA5001 | 09/14/01 | 18:45 |
| EKKME | 003 | BA9002 | 09/14/01 | 18:45 |

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# ANALYTICAL METHODS SUMMARY

**H1I170126**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| pH (Electrometric) | MCAWW 150.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Pensky-Martens Method for Determining Ignitability | SW846 1010 |
| Reactive Cyanide | SW846 7.3.3 |
| Reactive Sulfide | SW846 7.3.4 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1I170126

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

There were no custody seals present upon delivery by the IT Group personnel to STL Knoxville, however, the samples were hand delivered.

The date and time of collection was not listed on the Chain of Custody.

All Metals samples were received with a pH greater than 12.

The matrix listed on the container label for sample BA9001 was soil, however, the matrix was water.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: pH (MCAAW 150.1), Reactive Cyanide (SW846 7.3.3), Reactive Sulfide (SW846 7.3.4), and Flash Point (SW846 1010).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

Internal standard recoveries for sample BA9002 was outside QC limits. However, the sample was bracketed by acceptable runs, indicating that a sample matrix effect is responsible for the internal standard criteria not being met. The same sample was reported with elevated reporting limits for all analytes due to the difficult foamy sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

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# PROJECT NARRATIVE
## H11170126

Volatiles (continued)

Sample BA9001 was reported with elevated reporting limits for all analytes. Based on screening results, a dilution was necessary prior to analysis; the reporting limits were adjusted accordingly.

Semi-Volatiles

The concentration of phenol in sample BA9002 exceeded the calibration level of the instrument. The sample was analyzed at a dilution to bring the concentration of the compound into the instrument calibration range. The results for both analyses were reported in order to provide the lowest possible reporting limits.

Explosives

Samples BA9001 and BA9002 were reported with elevated reporting limits for some analytes due to the sample matrix.

Due to sample matrix interferences, estimated results below the reporting limit were not reported for 2,4-Dintrotoluene for sample BA9002. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The serial dilution of sample BA9001 was outside control limits for barium due to physical or chemical matrix interferences.

The reporting limit for lead was elevated for sample BA9001 due to matrix effects in the original run. The sample was reanalyzed and reported on dilution for lead.

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# ANALYTICAL REPORT

PBOW

Lot #: H1I270167

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

October 31, 2001

# SAMPLE SUMMARY

**H1I270167**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EK7DP | 001 | BD0003 | 09/26/01 | 12:2( |
| EK7D9 | 002 | BD0004 | 09/26/01 | 12:2! |
| EK7EH | 003 | BD0005 | 09/26/01 | 15:3! |
| EK7EM | 004 | BD0006 | 09/26/01 | 16:0! |
| EK7EP | 005 | BD0007 | 09/26/01 | 09:2( |
| EK7ET | 006 | BD0008 | 09/26/01 | 09:3! |
| EK7EW | 007 | BD0009 | 09/26/01 | 10:1! |
| EK7E1 | 008 | BD0010 | 09/26/01 | 10:1! |
| EK7E4 | 009 | BD0012 | 09/26/01 | 10:4! |
| EK7E6 | 010 | BD3026 | 09/26/01 | 13:4( |
| EK7FP | 011 | BD3026 | 09/26/01 | 13:4( |

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# ANALYTICAL METHODS SUMMARY

**H1I270167**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Mercury in Solid Waste (Manual Cold-Vapor) | SW846 7471A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Percent Moisture | MCAWW 160.3 MOD |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**


MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1I270167

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

Samples BD0010 and BD0012 did not have tests listed on the Chain of Custody. The label listed the same tests as sample BD009.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

Internal standard recoveries for samples BD0006 and BD0008 were outside QC limits. However, the samples were bracketed by acceptable runs, indicating that a sample matrix effect is responsible for the internal standard criteria not being met.

Internal standard and surrogate recoveries for sample BD0007 were outside QC limits. However, the sample was bracketed by acceptable runs, indicating that a sample matrix effect is responsible for the internal standard criteria not being met. The surrogates outside QC limits were quantitated against the internal standards that exhibited low recoveries. The sample was not reanalyzed since the elevated surrogate recoveries were due to a matrix effect on the associated internal standards.

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# PROJECT NARRATIVE
## H1I270167

Volatiles (continued)

The concentration of acetone in samples BD0009 and BD0010 exceeded the calibration level of the instrument. The samples were analyzed at a dilution to bring the concentration of the compound into the instrument calibration range. The results for both analyses are reported in order to provide the lowest possible reporting limits.

Explosives

The matrix spike/matrix spike duplicate recoveries for sample BD0004 were acceptable for all analytes except RDX, 1,3,5-Trinitrobenzene, 1,3-Dinitrobenzene, Tetryl, Nitrobenzene, 2,4-Dintrotoluene, and 2-Nitrotoluene. The laboratory control sample/laboratory control sample duplicate showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects.

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

SPLP Explosives

The samples were tumbled for SPLP explosives, however the samples did not separate out. In order to filter enough volume of the samples to perform the extraction for explosives, the samples sat over night to allow the separation to occur.

Due to the difficult sample matrix and the high levels of target analytes in some of the samples, all of the samples for SPLP explosives were extracted using a high level preparation. The high level preparation uses 5 ml of sample instead of 500 ml, and the sample is concentrated to a 10 ml final volume instead of 5 ml. The high level prep provides a two hundred fold dilution. The dilution that appears on the sample data report will contain the two hundred fold dilution multiplied by any further dilutions that were performed on the sample.

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# PROJECT NARRATIVE
## H1I270167

Metals

The serial dilution of batch sample AC7018 was outside control limits for calcium due to physical or chemical matrix interferences.

The serial dilution of batch sample BD3026 was outside control limits for potassium due to physical or chemical matrix interferences.

A batch matrix spike/matrix spike duplicate was analyzed using a sample from this lot. Recoveries for calcium, iron, magnesium, potassium and sodium were not calculated due to high analyte concentrations in the sample relative to the spike level.

The serial dilution of sample BD0004 was outside control limits for some analytes due to physical or chemical matrix interferences.

The matrix spike/matrix spike duplicate recoveries for sample BD0004 were outside control limits for some analytes. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects. In addition, results outside of limits do not necessarily reflect poor method performance due to high analyte concentrations in the sample relative to the spike level. The affected analytes are flagged appropriately on the matrix spike/matrix spike duplicate report.

Nitrate

The sample was analyzed one day outside of the holding time due to a laboratory error.

Total Dissolved Solids

The weight of the sample was greater than 0.2 grams. The sample was prepared again outside of the holding time and with a dilution. Both sets of data were reported.

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# ANALYTICAL REPORT

PBOW

Lot #: H1I280106

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

October 31, 2001

# SAMPLE SUMMARY

**H1I280106**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EK864 | 001 | BD0001 | 09/27/01 | 09:13 |
| EK868 | 002 | BD0002 | 09/27/01 | 09:23 |
| EK87C | 003 | BD0013 | 09/27/01 | 14:15 |
| EK87D | 004 | BD0014 | 09/27/01 | 14:40 |
| EK87E | 005 | BD0015 | 09/27/01 | 11:15 |
| EK87F | 006 | BD0016 | 09/27/01 | 11:20 |
| EK87G | 007 | BD0023 | 09/27/01 | 16:28 |
| EK87H | 008 | BD0024 | 09/27/01 | 16:36 |
| EK87J | 009 | BD0025 | 09/27/01 | 15:30 |
| EK87K | 010 | BD0026 | 09/27/01 | 15:30 |
| EK87L | 011 | BD0028 | 09/27/01 | 15:45 |
| EK87M | 012 | BD3005 | 09/27/01 | 16:15 |
| EK87N | 013 | BD3007 | 09/27/01 | 12:20 |
| EK87P | 014 | BD3010 | 09/27/01 | 08:30 |
| EK87Q | 015 | BD3005 | 09/27/01 | 16:15 |
| EK87T | 016 | BD3007 | 09/27/01 | 12:20 |
| EK87V | 017 | BD3010 | 09/27/01 | 08:30 |
| EK894 | 018 | TB092701K | 09/27/01 | |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# ANALYTICAL METHODS SUMMARY

**H1I280106**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Mercury in Solid Waste (Manual Cold-Vapor) | SW846 7471A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Percent Moisture | MCAWW 160.3 MOD |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**


MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1I280106

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

Sample Trip Blank was received but was not listed on the Chain of Custody.

The cyanide portion of samples BD3005, BD3007, and BD3010 were received unpreserved. The samples were preserved to a pH greater than 12 by laboratory personnel.

The metals portion of sample BD3010 was received unpreserved. The sample was preserved to a pH less than 2 by laboratory personnel.

Two of three volatile containers for sample BD3005 were received with headspace.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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# PROJECT NARRATIVE
## H1I280106

Volatiles

The concentration of acetone in sample BD0001 exceeded the calibration level of the instrument. The sample was analyzed at a dilution to bring the concentration of the compound into the instrument calibration range. The results for both analyses are reported in order to provide the lowest possible reporting limits.

The concentration of acetone in sample TB092701K exceeded the calibration level of the instrument. A dilution could not be performed since only one vial was received; an estimated value with "E" qualifier was reported for acetone.

Sample BD3005 was reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

The internal standard recoveries for samples BD0002 and BD0014 were outside QC limits. However, the samples were bracketed by acceptable runs, indicating that a sample matrix effect is responsible for the internal standard criteria not being met.

Semi-Volatiles

Sample BD3005 was reported with elevated reporting limits for all analytes due to the difficult sample matrix. The sample had a sulfur odor, and the chromatogram had 2 large peaks indicating problems with the matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

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# PROJECT NARRATIVE
## H1I280106

Explosives (continued)

The matrix spike/matrix spike duplicate recoveries and/or RPDs for sample BD0016 were not calculated because the spikes were diluted out. The laboratory control sample showed acceptable results indicating that the analysis was in control. Results outside of limits do not necessarily reflect poor method performance due to high analyte concentrations in the sample relative to the spike level.

SPLP Explosives

The samples were tumbled for SPLP explosives, however the samples did not separate out. In order to filter enough volume of the samples to perform the extraction for explosives, the samples sat over night to allow the separation to occur.

Due to the difficult sample matrix and the high levels of target analytes in some of the samples, all of the samples for SPLP explosives were extracted using a high level preparation. The high level preparation uses 5 ml of sample instead of 500 ml, and the sample is concentrated to a 10 ml final volume instead of 5 ml. The high level prep provides a two hundred fold dilution. The dilution that appears on the sample data report will contain the two hundred fold dilution multiplied by any further dilutions that were performed on the sample.

The matrix spike/matrix spike duplicate recoveries and/or RPDs for sample BD0016 were not calculated because the spikes were diluted out. The laboratory control sample showed acceptable results indicating that the analysis was in control. Results outside of limits do not necessarily reflect poor method performance due to high analyte concentrations in the sample relative to the spike level.

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

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# PROJECT NARRATIVE
## H1I280106

Metals

The serial dilution of batch sample BD0004 was outside control limits for aluminium, arsenic, calcium, cobalt, chromium, iron, manganese, sodium, nickel, lead, vanadium and zinc.due to physical or chemical matrix interferences.

The serial dilution of batch sample AC7018 was outside control limits for calcium due to physical or chemical matrix interferences.

The serial dilution of batch sample BD3026 was outside control limits for calcium, potassium and sodium due to physical or chemical matrix interferences.

The matrix spike/matrix spike duplicate recoveries for sample BD0016 were outside control limits for some analytes. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects. In addition, results outside of limits do not necessarily reflect poor method performance due to high analyte concentrations in the sample relative to the spike level. The affected analytes are flagged

Cyanide

The standards and samples BD3005, BD3007, and BD3010 were treated with bismuth nitrate to remove sulfide prior to distillation.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J010131

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

October 31, 2001

# SAMPLE SUMMARY

**H1J010131**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELDJT | 001 | BD3009 | 09/28/01 | 16:35 |
| ELDJX | 002 | BD3006 | 09/28/01 | 09:20 |
| ELDJ1 | 003 | BD3018 | 09/28/01 | 11:40 |
| ELDJ2 | 004 | BD3018 | 09/28/01 | 11:40 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# ANALYTICAL METHODS SUMMARY

**H1J010131**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J010131

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

**Sample Receipt**

The Chain of Custody sent to STL Knoxville was not relinquished by the client.

Samples BD3009 and BD3018 for Cyanide testing were received at pH 7.

The following samples were listed on the Chain of Custody but not received: BD0017, BD0019, BD0021, BD0022, BD0029, and BD0030 for Volatiles, Explosives, and Metals testing.

Sample BD3009 was not received for Volatiles and Total and Dissolved Metals testing.

Sample BD3006 was not received for Volatiles, Total and Dissolved Metals, and Cyanide testing.

Samples BD3018 and TB092801A were not received for Volatiles testing.

Samples BD3006, BD3009, and BD30018 were received after the recommended holding time expired. The samples were cancelled per Vickie Graves of The IT Group.

**Subcontract**

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

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# PROJECT NARRATIVE
## H1J010131

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Semi-Volatiles

Sample BD3018 was reported with elevated reporting limits for all analytes due to the difficult sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Metals

The serial dilution of batch sample BD3034 was outside control limits for potassium due to physical or chemical matrix interferences.

A batch matrix spike/matrix spike duplicate was analyzed using a sample from this lot. The recoveries were outside control limits for sodium. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects. Recoveries for sodium were not calculated due to high analyte concentrations in the sample relative to the spike level.

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# PROJECT NARRATIVE
## H1J020107

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The cyanide portion of sample BD3012 was received at a pH of 5. The sample was preserved by laboratory personnel.

Sample TB100101K was received but was not listed on the Chain of Custody. The sample label did not list a date or time of collection.

The nitrate portion of sample BD3012 was received after the holding time had expired. The client was notified (V. Graves, 10/2/01) and instructed the laboratory to proceed with the anlaysis.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), Reactive Cyanide (SW846 7.3.3), Reactive Sulfide (SW846 7.3.4), FlashPoint (SW846 1010), Corrosivity (SW846 9045), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

The recovery of surrogate 1,2-dichloroethane-d4 was slightly outside the control limts for LCS EL7AR1AA. However, the data should not be affected since the recoveries of the

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# PROJECT NARRATIVE
## H1J020107

surrogates were acceptable for all samples and the recoveries of the spike compounds were acceptable.

Semi-Volatiles

All method blank, laboratory control sample (LCS), and sample surrogate criteria were met. There was one National Environmental Laboratory Accreditation Conference (NELAC) requirement that was not met, but it had no impact on the quality of the sample data. NELAC requires that if a two successive continuing calibration verification (CCV) standards fail to meet criteria, the laboratory must run two further successive CCV standards that meet calibration criteria or analyze a new initial calibration. The laboratory ran one CCV standards that met all calibration criteria. The analyte that failed in the first two CCV standards was not a TCLP target analyte, and all TCLP analytes in the LCS exhibited good recoveries. Therefore, the sample data quality is acceptable.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The serial dilution of sample BD3034 was outside control limits for potassium due to physical or chemical matrix interferences.

The serial dilution of sample BD3018 was outside control limits for potassium due to physical or chemical matrix interferences.

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SEVERN TRENT SERVICES

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# ANALYTICAL REPORT

PBOW

Lot #: H1J030106

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 7, 2001

# SAMPLE SUMMARY

**H1J030106**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELGFT | 001 | BD0017R | 10/02/01 | 09:45 |
| ELGGG | 002 | BD0018R | 10/02/01 | 10:25 |
| ELGGH | 003 | BD0019R | 10/02/01 | 10:25 |
| ELGGJ | 004 | BD0021R | 10/02/01 | 11:15 |
| ELGGK | 005 | BD0022R | 10/02/01 | 11:20 |
| ELGGM | 006 | BD0029R | 10/02/01 | 08:37 |
| ELGGN | 007 | BD0030R | 10/02/01 | 08:50 |
| ELGGQ | 008 | BD3024 | 10/02/01 | 14:35 |
| ELGGX | 009 | BD3024 | 10/02/01 | 14:35 |
| ELGG0 | 010 | TB100201A | 10/02/01 | 17:00 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# ANALYTICAL METHODS SUMMARY

**H1J030106**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Mercury in Solid Waste (Manual Cold-Vapor) | SW846 7471A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Percent Moisture | MCAWW 160.3 MOD |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J030106

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The cyanide portion of sample BD3024 was received at a pH of 7. The sample was preserved by laboratory personnel.

One of three volatile containers of sample BD3024 was received with headspace.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

Sample BD3024 was reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

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STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ, California DHS ELAP Cert. #2423, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906 (SDWA, 5/14/01-6/21/02), Hawaii DOH, Indiana DOH Cert. #C-TN-02, Kentucky DEP Lab ID #90101, Louisiana DEQ Agency Interest #83979, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #81001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, North Dakota DOHCL Cert. #R-134, Oklahoma DEQ ID #9415, South Carolina DHEC Lab ID #84001, Tennessee DOH Lab ID #02014, Utah DOH Cust. ID QUAN3, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

# PROJECT NARRATIVE
## H1J030106

SPLP Explosives

Due to the difficult sample matrix and the high levels of target analytes in some of the samples, all of the samples for SPLP explosives were extracted using a high level preparation. The high level preparation uses 5 ml of sample instead of 500 ml, and the sample is concentrated to a 10 ml final volume instead of 5 ml. The high level prep provides a two hundred fold dilution. The dilution that appears on the sample data report will contain the two hundred fold dilution multiplied by any further dilutions that were performed on the sample.

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The serial dilution of sample BD0029R was outside control limits due to physical or chemical matrix interferences.

A batch matrix spike/matrix spike duplicate was analyzed using a sample from this lot. The recoveries and/or RPDs were outside control limits for antimony, calcium, nickel and thallium. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects.

The serial dilution of batch QC samples, lab ID # ELKAL and ELDJ2 were outside control limits for potassium due to physical or chemical matrix interferences.

Cyanide

The standards and sample BD3024 were treated with bismuth nitrate to remove sulfide prior to distillation.

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# PROJECT NARRATIVE
## H1J030106

Nitrate

A CCV and the LCS were outside the control limits. Since the recoveries were high and the ion was not detected in the sample, the data should not be affected.

Total Organic Carbon

One of the CCBs was above the reporting limit. However, the next two CCBs were below the reporting limit, and all other QC was within range.

Due to due a laboratory error, sample BD3024 was analyzed outside of the holding time.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J040177

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 7, 2001

# SAMPLE SUMMARY

**H1J040177**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELKAA | 001 | BD3035 | 10/03/01 | 09:15 |
| ELKAF | 002 | BD3035 | 10/03/01 | 09:15 |
| ELKAL | 003 | BD3034 | 10/03/01 | 16:45 |
| ELKAT | 004 | BD3017 | 10/03/01 | 15:15 |
| ELKA0 | 005 | BD3017 | 10/03/01 | 15:15 |
| ELKA3 | 006 | BD3021 | 10/03/01 | 15:00 |
| ELKA5 | 007 | BD3021 | 10/03/01 | 15:00 |
| ELKA6 | 008 | BD3008 | 10/03/01 | 10:20 |
| ELKA8 | 009 | BD3008 | 10/03/01 | 10:20 |
| ELKCA | 010 | TB100301A | 10/03/01 | 18:00 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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# ANALYTICAL METHODS SUMMARY

**H1J040177**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitrate as N | MCAWW 300.0A |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J040177

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The cyanide portions of samples BD3017, BD3021, and BD3008 were received at a pH of 11. The samples were preserved by laboratory personnel.

The metals portion of samples BD3035 (unfiltered), BD3034 (unfiltered), and BD3017 (unfiltered and filtered) were received at a pH of 8. The samples were preserved by laboratory personnel.

All the volatile containers for sample BD3017 were received with headspace.

One of three volatile containers for sample BD3021 testing was received with headspace.

Sample Trip Blank did not have a collection date or time noted on the sample label.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Nitrate (MCAAW 300.0A), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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# PROJECT NARRATIVE
## H1J040177

Volatiles

Samples BD3017, BD3021 and BD3008 were reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The serial dilution of sample BD3034 was outside control limits for potassium due to physical or chemical matrix interferences.

The serial dilution of batch sample BD3027 was outside control limits for potassium due to physical or chemical matrix interferences.

A batch matrix spike/matrix spike duplicate was analyzed using a sample from this lot. The recoveries were outside control limits for aluminium and iron. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects. Recoveries for aluminium and iron were not calculated due to high analyte concentrations in the sample relative to the spike level.

Cyanide

The standards and samples BD3008, BD3017, and BD3021 were treated with bismuth nitrate to remove sulfide prior to distillation.

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# PROJECT NARRATIVE
## H1J040177

Nitrate

Due to a laboratory error, the samples were analyzed using method 300.0A. The client was notified (V. Graves, 10/1101) and instructed the laboratory to analyze the samples using method 353.2 and report both sets of data. The samples were analyzed using method 353.2 outside of the recommended holding. Both sets of data were reported.

Total Organic Carbon

One of the CCBs was above the reporting limit. However, the next two CCBs were below the reporting limit, and all other QC was within range.

Sulfate

The CCV for sample BD3008 was outside of control limits. However, since the recovery was high and the ion was not detected in the sample, the data should not be affected.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J050186

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 7, 2001

# SAMPLE SUMMARY

**H1J050186**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELMQD | 001 | BD3043 | 10/04/01 | 10:45 |
| ELMQM | 002 | BD3042 | 10/04/01 | 13:15 |
| ELMQR | 003 | BD3025 | 10/04/01 | 13:15 |
| ELMQV | 004 | BD3046 | 10/04/01 | 13:15 |
| ELMQ1 | 005 | BD3048 | 10/04/01 | 13:15 |
| ELMQ6 | 006 | TB100401A | 10/04/01 | 17:45 |
| ELMQ8 | 007 | BD3043 | 10/04/01 | 10:45 |
| ELMRA | 008 | BD3042 | 10/04/01 | 13:15 |
| ELMRD | 009 | BD3025 | 10/04/01 | 13:15 |
| ELMRG | 010 | BD3046 | 10/04/01 | 13:15 |
| ELMRH | 011 | BD3048 | 10/04/01 | 13:15 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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# ANALYTICAL METHODS SUMMARY

**H1J050186**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J050186

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

Two of three volatile containers for samples BD3048, BD3043, and BD3042 were received with headspace.

The cyanide portion of sample BD3025 was received at a pH of 7. The sample was preserved by laboratory personnel.

The metals portion of sample BD3046 was received at a pH of 10. The sample was preserved by laboratory personnel.

The chain of custody requested cyanide and wet chemistry for samples BD3046 and BD3048, however, the samples were not received. The client was notified (V. Graves, 10/5/01) and informed the laboratory that the parameters were requested by mistake.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity, (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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# PROJECT NARRATIVE
## H1J050186

Volatiles

Sample BD3043 was reported with elevated reporting limits for all analytes due to the difficult foamy sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Samples BD3042, BD3025, BD3046 and BD3048 were reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The serial dilution of batch QC samples ELR8L and ELR9M were outside control limits for potassium due to physical or chemical matrix interferences.

Cyanide

The standards and samples BD3025 and BD3042 were treated with bismuth nitrate to remove sulfide prior to distillation.

Total Organic Carbon

One of the CCBs was above the reporting limit. However, the next two CCBs were below the reporting limit, and all other QC was within range.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J060123

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 12, 2001

# SAMPLE SUMMARY

**H1J060123**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELPJM | 001 | BD3018R | 10/05/01 | 15:3 |
| ELPJP | 002 | BD3052 | 10/05/01 | 09:2 |
| ELPJW | 003 | BD3041 | 10/05/01 | 09:0 |
| ELPJ2 | 004 | BD3050 | 10/05/01 | 09:0 |
| ELPJ3 | 005 | BD3006R | 10/05/01 | 15:4 |
| ELPJ5 | 006 | BD3009R | 10/05/01 | 12:0 |
| ELPJ7 | 007 | TB100501A | 10/05/01 | 17:3 |
| ELPJ8 | 008 | BD3052 | 10/05/01 | 09:2 |
| ELPJ9 | 009 | BD3030 | 10/05/01 | 09:2 |
| ELPKA | 010 | BD3041 | 10/05/01 | 09:0 |
| ELPKC | 011 | BD3050 | 10/05/01 | 09:0 |
| ELPKD | 012 | BD3006R | 10/05/01 | 15:4 |
| ELPKE | 013 | BD3009R | 10/05/01 | 12:0 |
| ELPLR | 014 | BD3030 | 10/05/01 | 09:2 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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# ANALYTICAL METHODS SUMMARY

**H1J060123**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J060123

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

One of three volatile vials for samples BD3052 and BD3009R was received with headspace.

All of the volatile vials for sample BD03018R were received with headspace.

Samples BD3052 and BD3050 were listed on the chain of custody for cyanide but were not received.

A cyanide portion for sample BD3006R was received but was not listed on the chain of custody.

A hardness portion of sample BD3030 was received by STL Knoxville but was not listed on the STL Knoxville chain of custody. The sample was listed on the STL North Canton chain of custody but was not received at STL North Canton.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity, (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ, California DHS ELAP Cert. #2423, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906 (SDWA, 5/14/01-6/21/02), Hawaii DOH, Indiana DOH Cert. #C-TN-02, Kentucky DEP Lab ID #90101, Louisiana DEQ Agency Interest #83979, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #81001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, North Dakota DOHCL Cert. #R-134, Oklahoma DEQ ID #9415, South Carolina DHEC Lab ID #84001, Tennessee DOH Lab ID #02014, Utah DOH Cust. ID QUAN3, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

# PROJECT NARRATIVE
## H1J060123

Volatiles

Samples BD3018R, BD3041 and BD3009R were reported with elevated reporting limits for all analytes due to the difficult foamy sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Semi-Volatiles

The surrogate recoveries for sample BD3041 were outside QC limits and a re-extraction and reanalysis were performed outside of the holding time. The results for the re-extraction indicated that the original recoveries were outside limits due to laboratory error; both sets of data were reported for compliance purposes.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for Nitrobenzene for sample BD3052. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Metals

The batch serial dilution of samples ELR9M and ELR8L were outside control limits for potassim due to physical or chemical matrix interferences.

Total Organic Carbon

One of the CCBs was above the reporting limit. However, the next two CCBs were below the reporting limit, and all other QC was within range.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J090111

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 12, 2001

# SAMPLE SUMMARY

**H1J090111**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELR8A | 001 | BD3038 | 10/08/01 | 09:4( |
| ELR8L | 002 | BD3027 | 10/08/01 | 10:2( |
| ELR8W | 003 | BD3004 | 10/08/01 | 11:4! |
| ELR86 | 004 | TB100801A | 10/08/01 | 18:0( |
| ELR9J | 005 | BD3038 | 10/08/01 | 09:4( |
| ELR9M | 006 | BD3027 | 10/08/01 | 10:2( |
| ELR91 | 007 | BD3004 | 10/08/01 | 11:4! |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
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# ANALYTICAL METHODS SUMMARY

**H1J090111**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J090111

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The unfiltered metals portion of sample BD3027 MS and and the filtered metals portion of BD3027 MSD were received at a pH of 5. The samples were preserved by laboratory personnel.

The hardness portion of sample BD3027 was received unpreserved. The sample was preserved by laboratory personnel.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity, (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

Sample BD3038 was reported with elevated reporting limits for all analytes due to difficult sample matrix (sample foaming). A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Samples BD3027 and BD3004 were reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

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# PROJECT NARRATIVE
## H1J090111

Semi-Volatiles

All method blank, laboratory control sample (LCS), and sample surrogate criteria were met. There was one National Environmental Laboratory Accreditation Conference (NELAC) requirement that was not met, but it had no impact on the quality of the sample data. NELAC requires that if a two successive continuing calibration verification (CCV) standards fail to meet criteria, the laboratory must run two further successive CCV standards that meet calibration criteria or analyze a new initial calibration. The laboratory ran one CCV standard that met all calibration criteria. The two prior CCVs did not meet criteria for only one analyte, 2-nitrophenol. The batch LCS was run after this CCV. The results of this LCS demonstrated that the 2-nitrophenol was within control limits indicating that there was no impact on the quality of the data. Also, this analyte was not detected in any of the samples. Therefore, the sample data quality is acceptable.

Explosives

The matrix spike/matrix spike duplicate recoveries for sample BD0327 were acceptable for all analytes except tetryl. The laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects.

The matrix spike/matrix spike duplicate recoveries and/or RPDs for sample BD3004 were acceptable for all analytes except 2,4,6-trinitrotoluene and 2,6-dinitrotoluene. The laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects.

Due to sample matrix interferences, estimated results below the reporting limit were not reported for some analytes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

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# PROJECT NARRATIVE
## H1J090111

Metals

The serial dilution of samples BD3027 and BD3027D were outside control limits potassium due to physical or chemical matrix interferences.

The matrix spike/matrix spike duplicate recoveries for total metals for sample BD3004 were outside control limits for some aluminum and iron. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects. In addition, results outside of limits do not necessarily reflect poor method performance due to high analyte concentrations in the sample relative to the spike level. The affected analytes are flagged appropriately on the matrix spike/matrix spike duplicate report.

Cyanide

The standards and sample BD3027 were treated with bismuth nitrate to remove sulfide prior to distillation.

Nitrate

The samples analyzed within holding time, however, the CCV failed. The samples were reanalyzed outside of holding time with acceptable CCVs. Both sets of data were reported.

Total Organic Carbon

One of the CCBs was above the reporting limit. However, the next two CCBs were below the reporting limit, and all other QC was within range.

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# ANALYTICAL REPORT

**PBOW**

**Lot #: H1J100121**

**Maureen McMyler**

**IT Corporation - Knoxville**
**312 Directors Drive**
**Knoxville, TN 37923**

**SEVERN TRENT LABORATORIES, INC.**

Jamie A McKinney

**Jamie A. McKinney**
Project Manager

**November 7, 2001**

# SAMPLE SUMMARY

**H1J100121**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELV82 | 001 | BD3037 | 10/09/01 | 14:50 |
| ELV83 | 002 | BD3032 | 10/09/01 | 11:15 |
| ELV86 | 003 | BD3029 | 10/09/01 | 09:35 |
| ELV87 | 004 | BD3028 | 10/09/01 | 11:45 |
| ELV88 | 005 | BD3019 | 10/09/01 | 08:50 |
| ELV9C | 006 | TB100901A | 10/09/01 | 18:00 |
| ELV9D | 007 | BD3037 | 10/09/01 | 14:50 |
| ELV9E | 008 | BD3032 | 10/09/01 | 11:15 |
| ELV9F | 009 | BD3029 | 10/09/01 | 09:35 |
| ELV9G | 010 | BD3028 | 10/09/01 | 11:45 |
| ELV9J | 011 | BD3019 | 10/09/01 | 08:50 |
| ELV9P | 012 | BA9012 | 10/06/01 | 09:45 |
| ELV9W | 013 | BA9013 | 10/06/01 | 10:00 |
| ELV9X | 014 | BA9014 | 10/06/01 | 10:10 |
| ELV90 | 015 | BA9015 | 10/06/01 | 10:20 |
| ELV92 | 016 | BA9016 | 10/06/01 | 10:30 |
| ELV93 | 017 | BA9017 | 10/06/01 | 10:50 |
| ELV94 | 018 | BA9018 | 10/06/01 | 11:30 |
| ELV95 | 019 | BA9019 | 10/06/01 | 12:0 |
| ELV96 | 020 | BA9020 | 10/06/01 | 12:2 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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# ANALYTICAL METHODS SUMMARY

**H1J100121**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Corrosivity | SW846 9045A |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Pensky-Martens Method for Determining Ignitability | SW846 1010 |
| Percent Moisture | MCAWW 160.3 MOD |
| Reactive Cyanide | SW846 7.3.3 |
| Reactive Sulfide | SW846 7.3.4 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J100121

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

**Sample Receipt**

Two of three volatile containers for sample BD3029 were received with headspace.

The cyanide portion of samples BD3032, BD3029, and BD3028 were received at pH 11. The samples were preserved by laboratory personnel.

The unfiltered metals portion of sample BD3037 was received at a pH of 8. The sample was preserved by laboratory personnel.

The filtered metals portion of sample BD3037 was received at a pH of 8. Laboratory personnel attempted to preserve the sample but it would not remain at the correct pH.

Containers for cyanide for samples BD3029 and BD3028 were received but were not listed on the chain of custody.

The hardness portion of sample BD3038 was received unpreserved. The sample was preserved by laboratory personnel.

**Subcontract**

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

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# PROJECT NARRATIVE
## H1J100121

**Quality Control**

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

The pH of sample BD3037 was greater than 2. The sample was analyzed within the normal 14 day holding time. EPA has indicated that some aromatic compounds in wastewater samples, notably benzene, toluene, and ethyl benzene, may be susceptible to biological degradation if samples are not preserved to a pH of 2.

Samples BD3037, BD3032, BD3029, BD3028, and BD3019 were reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

The recovery of surrogate 1,2-dichloroethane-d4 was slightly outside the control limts for LCS EL7AR1AA. However, the data should not be affected since the recoveries of the surrogates were acceptable for all samples and the recoveries of the spike compounds were acceptable.

Semi-Volatiles

The recoveries for laboratory control sample EL3CD1AC and laboratory control sample duplicate EL3CD1AD were acceptable for all anlaytes except pyrene. The associated samples were reprepared outside the holding time. The recoveries laboratory control sample EMK8E1AC and laboratory control sample duplicate EMK8E1AD were acceptable for all anlaytes. Both sets of data were reported for compliance purposes.

Sample BD3037 was reported with elevated reporting limits for all analytes due to the difficult sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

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# PROJECT NARRATIVE
## H1J100121

Semi-Volatiles (continued)

The concentration of 2,4-dinitrotoluene in sample BA9013 exceeded the calibration level of the instrument. The sample was analyzed at a dilution to bring the concentration of the compound into the instrument calibration range. The results for both analyses were reported in order to provide the lowest possible reporting limits.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for several anayltes. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

Surrogate recoveries for samples BD3028 were slightly above QC limits. However, since the recoveries were high, and there were no targets detected above the reporting limits, the validity of the data is unaffected.

Metals

The serial dilution of batch sample ELN6K was outside control limits for calcium due to physical or chemical matrix interferences.

The serial dilution of sample BD3019 was outside control limits for potassium due to physical or chemical matrix interferences.

A batch matrix spike/matrix spike duplicate was analyzed using a sample from this lot. The recoveries were outside control limits for sodium. However, the laboratory control sample showed acceptable results indicating that the analysis was in control. The matrix spike/matrix spike duplicate results are, therefore, attributed to matrix effects.

Cyanide

The standards and samples BD3019, BD3029, and BD3032 were treated with bismuth nitrate to remove sulfide prior to distillation.

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# PROJECT NARRATIVE
## H1J100121

Total Suspended Solids

Due to a laboratory error, only one duplicate sample was analyzed with the batch.

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# ANALYTICAL REPORT

PBOW

Lot #: H1J110141

Maureen McMyler

IT Corporation - Knoxville
312 Directors Drive
Knoxville, TN 37923

SEVERN TRENT LABORATORIES, INC.

Jamie A. McKinney
Project Manager

November 7, 2001

# SAMPLE SUMMARY

**H1J110141**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| ELX47 | 001 | BD3020 | 10/10/01 | 11:30 |
| ELX5G | 002 | BD3020 | 10/10/01 | 11:30 |
| ELX5H | 003 | TB101001A | 10/10/01 | 18:00 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# ANALYTICAL METHODS SUMMARY

**H1J110141**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Alkalinity | MCAWW 310.1 |
| Chloride (Colorimetric, Automated Ferricyanide) | MCAWW 325.2 |
| Cyanide, Total | SW846 9012A |
| Filterable Residue (TDS) | MCAWW 160.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitrate | MCAWW 353.2 |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Non-Filterable Residue (TSS) | MCAWW 160.2 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Sulfate | MCAWW 375.4 |
| Total Hardness (Titrimetric, EDTA) | MCAWW 130.2 |
| Total Organic Carbon | SW846 9060 |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Turbidity (Nephelometric) | MCAWW 180.1 |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J110141

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The metals portion of sample BD3020 was received at pH 12. The sample was preserved by laboratory personnel.

Sample BD3020 had a collection date of 10/10/01 on the sample container label and 10/09/01 on the Chain of Custody. The client was notified (M. McMyler, 10/11/01) and instructed the laboratory to log the sample with the date on the label.

Sample Trip Blank did not have a collection date or time listed on the label.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: Hardness (MCAAW 130.2), Total Dissolved Solids (MCAAW 160.1), Total Suspended Solids (MCAAW 160.2), Turbidity (MCAAW 180.1), Alkalinity (MCAAW 310.1), Chloride (MCAAW 325.2), Nitrate (MCAAW 353.2), Sulfate (MCAAW 375.4), and Total Organic Carbon (SW846 9060).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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# PROJECT NARRATIVE
## H1J110141

Volatiles

The pH of sample BD3020 was greater than 2. The sample was analyzed within the normal 14 day holding time. EPA has indicated that some aromatic compounds in wastewater samples, notably benzene, toluene, and ethyl benzene, may be susceptible to biological degradation if samples are not preserved to a pH of 2.

Sample BD3020 was reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Semi-Volatiles

The recoveries for laboratory control sample EL3CD1AC and laboratory control sample duplicate EL3CD1AD were acceptable for all anlaytes except pyrene. The associated samples were reprepared outside the holding time. The recoveries laboratory control sample EMK8E1AC and laboratory control sample duplicate EMK8E1AD were acceptable for all anlaytes. Both sets of data were reported for compliance purposes.

Explosives

Surrogate recoveries for sample BD0320 were above QC limits due to obvious matrix interferences.

Metals

The serial dilution of batch samples ELN6K (calcium)and ELV9J(potassium) were outside control limits due to physical or chemical matrix interferences.

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# PROJECT NARRATIVE
## H1J110141

Cyanide

The standards and sample BD3020 were treated with bismuth nitrate to remove sulfide prior to distillation.

Total Dissolved Solids

Due to a laboratory error, only one duplicate sample was analyzed with the batch.

Total Suspended Solids

Due to a laboratory error, only one duplicate sample was analyzed with the batch.

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# ANALYTICAL REPORT

**PBOW**

**Lot #: H1J120174**

**Maureen McMyler**

**IT Corporation - Knoxville**
**312 Directors Drive**
**Knoxville, TN 37923**

**SEVERN TRENT LABORATORIES, INC.**

**Jamie A. McKinney**
Project Manager

**November 7, 2001**

# SAMPLE SUMMARY

**H1J120174**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EL2TA | 001 | SW8001 | 10/11/01 | 09:30 |
| EL2TH | 002 | SW8002 | 10/11/01 | 10:45 |
| EL2TJ | 003 | BA9003 | 10/11/01 | 11:05 |
| EL2V0 | 004 | BA9004 | 10/11/01 | |
| EL2V2 | 005 | TB101001A | 10/11/01 | 13:00 |

**NOTE(S):**

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# ANALYTICAL METHODS SUMMARY

**H1J120174**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| pH (Electrometric) | MCAWW 150.1 |
| Mercury in Liquid Waste (Manual Cold-Vapor) | SW846 7470A |
| Nitroaromatics and Nitramines by HPLC | SW846 8330 |
| Pensky-Martens Method for Determining Ignitability | SW846 1010 |
| Reactive Cyanide | SW846 7.3.3 |
| Reactive Sulfide | SW846 7.3.4 |
| Semivolatile Organic Compounds by GC/MS | SW846 8270C |
| Trace Inductively Coupled Plasma (ICP) Metals | SW846 6010B |
| Volatile Organics by GC/MS | SW846 8260B |

**References:**

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J120174

The results reported herein are applicable to the samples submitted for analysis only.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

The collection date and time was not listed on the sample label of sample TB101001A. The label listed the sample ID as TB101101A.

### Subcontract

The following analyses were performed by STL North Canton Laboratory, 4101 Shuffel Drive, NW, North Canton, OH 44720: pH (MCAAW 150.1): Reactive Cyanide (SW846 7.3.3), Reactive Sulfide (SW846 7.3.4), and Flash Point (SW846 1010).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

Volatiles

Sample BA9003 was reported with elevated reporting limits for all analytes. Based on screening results, a dilution was necessary prior to analysis; the reporting limits were adjusted accordingly.

Sample BA9004 was reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

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# PROJECT NARRATIVE
## H1J120174

Semi-Volatiles

The recoveries for laboratory control sample EL3CD1AC and laboratory control sample duplicate EL3CD1AD were acceptable for all anlaytes except pyrene. The associated samples were reprepared outside the holding time. The recoveries laboratory control sample EMK8E1AC and laboratory control sample duplicate EMK8E1AD were acceptable for all anlaytes. Both sets of data were reported for compliance purposes.

Sample BA9004 was reported with elevated reporting limits for all analytes due to the difficult sample matrix. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Explosives

Due to sample matrix interferences, estimated results below the reporting limit were not reported for 1,3-dinitrobenzene for sample BA9004. The result was qualified with an "I" flag to indicate the presence of matrix interferences.

The surrogate recoveries for sample BA9004 were outside QC limits. The sample was re-extracted outside of the holding time. The results of the re-extraction show that the low original recoveries were due to a laboratory error. Both sets of data were presented for compliance purposes.

Metals

The serial dilution of batch QC sample, lab ID# ELN6K was outside control limits for calcium due to physical or chemical matrix interferences.

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# ANALYTICAL REPORT

**PBOW**

**Lot #: H1J120206**

**Maureen McMyler**

**IT Corporation - Knoxville**
**312 Directors Drive**
**Knoxville, TN 37923**

**SEVERN TRENT LABORATORIES, INC.**

**Jamie A. McKinney**
**Project Manager**

**November 12, 2001**

# SAMPLE SUMMARY

**H1J120206**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| EL21J | 001 | FP7001 | 10/08/01 | 16:15 |
| EL3LF | 002 | FP7002 | 10/10/01 | 11:35 |
| EL3LK | 003 | TB101001B | 10/11/01 | 13:00 |

**NOTE(S):**

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- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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# ANALYTICAL METHODS SUMMARY

**H1J120206**

| PARAMETER | ANALYTICAL METHOD |
|---|---|
| Extractable Petroleum Hydrocarbons | SW846 8015B |
| Volatile Organics by GC/MS | SW846 8260B |
| Volatile Petroleum Hydrocarbons | SW846 8015B |

**References:**

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

# PROJECT NARRATIVE
## H1J120206

The results reported herein are applicable to the samples submitted for analysis only.

This report shall not be reproduced except in full, without the written approval of the laboratory.

**The original chain of custody documentation is included with this report.**

### Sample Receipt

Both containers for samples FP7001 and FP7002 were received with headspace.

Sample TB101001B was received labeled as TB101101B.

The chain of custody requested method 8021 for GRO analysis. Per a conversation with the client (M. McMyler, 10/12/01) the GRO analysis were logged for method 8015.

### Subcontract

The following analyses were performed by STL Austin Laboratory, 14046 Summit Dr, Austin, TX 78728: Gasoline Range Organics and Diesel Range Organics (SW846 8015B).

### Quality Control

Unless otherwise noted, all holding times and QC criteria were met. The test results shown in this report meet all applicable NELAC requirements. Any exceptions are noted below.

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# PROJECT NARRATIVE
## H1J120206

Volatiles

Sample FP7001 was reported with elevated reporting limits for all analytes due to the presence of non-target compounds. A dilution was necessary prior to analysis, and the reporting limits were adjusted accordingly.

Sample FP7002 was reported with elevated reporting limits for all analytes. Based on screening results, a dilution was necessary prior to analysis; the reporting limits were adjusted accordingly. The sample was biphasic.

The result for methylene chloride for method blank EL7P51AA was greater than the reporting limit, but less than 5 times the reporting limit. Methylene chloride is considered a common laboratory contaminant.

STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ, California DHS ELAP Cert. #2423, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906 (SDWA, 5/14/01-6/21/02), Hawaii DOH, Indiana DOH Cert. #C-TN-02, Kentucky DEP Lab ID #90101, Louisiana DEQ Cert. #03079, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #81001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, Oklahoma DEQ ID #9415, South Carolina DHEC Lab ID #84001, Tennessee DOH Lab ID #02014, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

# 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



| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 | | | | | | |

| | 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 |

| | 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 | I U | 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 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 |

| | 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 | I U | 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 | I U | U | 0.25 | U | U | 0.25 | U | U |
| RDX | mg/kg | 0.50 | U | U | 1.5 | I U | 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 | I U | 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 |

| | 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 |
| **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 |

| | 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 | | |

| | 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 |

| | 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 |
| **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 | | |

| | 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 |
| **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 |

| | 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** | | | | | | | | | | | | | |
| 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 |

| | 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 |

| | 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 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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* |
| **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 |

| | 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 |

| | 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 |

| | 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 |

**Plum Brook Ordnance Works**

**Soils**

**Data Summary**

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* |
| **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 |

**Plum Brook Ordnance Works**

**Soils**

**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** | | | | | | | | | | | | | |
| 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 |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Data Summary**



| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

Report Date: 03/04/02



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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Data Summary**



| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

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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** | | | | | | | | | | | | | | |
| 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 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 | | | |

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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** | | | | | | | | | | | | | | |
| 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 [illegible]alate | | ug/L | 10 | U | U | 10 | U | U | 10 | 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** | | | | | | | | | | | | | | |
| 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 |

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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** | | | | | | | | | | | | | | |
| 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 [illegible]halate | | ug/L | | | | 10 | U | U | 10 | U | U | 10 | U | U |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

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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** | | | | | | | | | | | | | | |
| 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 benzy[illegible]halate | | ug/L | 1.5 | J | J | 10 | U | U | 10 | U | U | 10 | U | U |

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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** | | | | | | | | | | | | | | |
| 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 |

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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** | | | | | | | | | | | |
| 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 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 ›yrene | | ug/L | 10 | U | U | 10 | U | U | 10 | 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* |
| **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 |

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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* |
| **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]vrene | | ug/L | | | | 10 | U | U | 10 | U | U | 10 | 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* |
| **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 |

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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* |
| **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 vrene | | ug/L | 10 | U | U | 10 | U | U | 10 | U | U | 10 | U | U |

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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* |
| **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 |

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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* |
| **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,[illegible]yrene | | 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 | | | |

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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* |
| **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 tetra[illegible]ide | ug/L | 5.0 | U | UJ | 200 | U | UJ | 50 | U | U | 100 | U | UJ |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 |

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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* |
| **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 |

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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* |
| **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 |

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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* |
| **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 tetra[illegible]ide | | ug/L | 5.0 | U | UJ | 2.0 | U | UJ | 100 | U | UJ |

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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* |
| **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 |

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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* |
| **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 |

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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* |
| **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 | | | |

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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* |
| **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 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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** | | | | | | | | | | | | | | |
| 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 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 . .nance 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 |

**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* |
| **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 | - | - | - | - | - | - |

**Plum Brook . ınance Works**

**Soils**

**Detected Hits**

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 | - | - | - | - | - | - | - | - | - | - | - | - |
| 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 |

**Plum Brook Ordnance Works**

**Soils**

**Detected Hits**

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 | | | - | - | - | - | - | - |
| 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 | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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 | | | | | | | | |

| | 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 | | | - | - | - | - | - | - | 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



| | 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 |
| **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 |

**Plum Brook Ordnance Works**

**Soils**

**Detected Hits**

Report Date: 03/06/02



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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* |
| **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**

Report Date: 03/06/02



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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* |
| **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 | - | - | - | - | - | - |

Report Date: 03/06/02



| | 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 |
| **METALS** | | | | | | | | | | | | | |
| Barium | mg/kg | 12.0 | B | J | 43.7 | | J | 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 | 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 | - | - | - | - | - | - | 0.044 | | | 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 | - | - | - | - | - | - | - | - | - | - | - | - |
| Sodium | mg/kg | - | - | - | 251 | B | J | - | - | - | 91.3 | B | J |
| Thallium | mg/kg | - | - | - | - | - | - | | | | | | |
| 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 | | |
| **VOLATILES** | | | | | | | | | | | | | |
| Acetone | mg/kg | .023 | | | .03 | | | .53 | B | J | | | |
| Carbon disulfide | mg/kg | - | - | - | - | - | - | - | - | - | - | - | - |
| Ethylbenzene | mg/kg | - | - | - | - | - | - | - | - | - | - | - | - |
| Toluene | mg/kg | - | - | - | .0008 | J | J | - | - | - | .00071 | J | J |

**Plum Brook Ordnance Works**

**Soils**

**Detected Hits**

Report Date: 03/06/02



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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* |
| **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 | - | - | - | - | - | - |

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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* |
| **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* | *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 | - | - | - | - | - | - | - | - | - | | | |
| **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 | | |

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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* |
| **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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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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 | | |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**



| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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 | | | |

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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 | | | - | - | - | - | - | - | 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 |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**

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* |
| **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 | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

Report Date: 03/04/02



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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** | | | | | | | | | | | | | | |
| 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 |

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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** | | | | | | | | | | | | | | |
| 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 | | | | - | - | - | - | - | - | - | - | - |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 | | |

| | | | 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 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 | | | - | - | - |

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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** | | | | | | | | | | | | | |
| 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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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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 | | | | - | - | - |

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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** | | | | | | | | | | | | | | |
| 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 | | | 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** | | | | | | | | | | | | | | |
| 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 | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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 |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**

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 |

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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* |
| **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 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *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** | | | | | | | | | | | | | |
| Methyl-2-pentanone, 4- | ug/L | - | - | - | - | - | - | | | | - | - | - |
| Methylene chloride | ug/L | 100 | J B | J | | | | | | | - | - | - |
| Toluene | ug/L | - | - | - | 11 | | | | | | - | - | - |
| Xylenes, total | ug/L | 360 | | | 28 | | | | | | - | - | - |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**

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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* |
| **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 | | | |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**

Report Date: 03/04/02



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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* |
| **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 | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *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** | | | | | | | | | | | | | |
| 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**



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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* | |
| **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 | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *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 | | |

**Plum Brook Ordnance Works**
**Monitoring Wells Groundwater**
**Detected Hits**

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* |
| **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 Ordnance 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:

$$Percent\ \mathrm{Recov}ery = \left(\frac{(x-s)}{T}\right) * 100$$

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:

$$\mathrm{Re}lative\ Percent\ Difference = \left[\frac{|D1 - D2|}{\frac{D1 + D2}{2}}\right] * 100$$

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 | Relative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION_CODE | | | | PB-BED-MW19 | | | PB-BED-MW19 | | | PB-BED-MW19 | | | Percent | Percent |
| SAMPLE_NO | | | | BD3025 | | | BD3046 | | | BD3045 | | | 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 | 0.14 | 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 | Relative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION_CODE | | | | PB-BED-MW25 | | | PB-BED-MW25 | | | PB-BED-MW25 | | | Percent | Percent |
| SAMPLE_NO | | | | BD3030 | | | BD3052 | | | BD3051 | | | Difference | Difference |
| SAMPLE_DATE | | | | 5-Oct-01 | | | 5-Oct-01 | | | 5-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 | | |
| 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 | Relative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION_CODE | | | | TNTB-BEDGW-004 | | | TNTB-BEDGW-004 | | | TNTB-BEDGW-004 | | | Percent | Percent |
| SAMPLE_NO | | | | BD3041 | | | BD3050 | | | BD3049 | | | Difference | Difference |
| SAMPLE_DATE | | | | 5-Oct-01 | | | 5-Oct-01 | | | 5-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 | | |
| 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-S0080 | | | TNTA-S0080 | | | 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-S0066 | | | TNTC-S0066 | | | 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-Trinitrololuene | 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-Trinitrololuene | 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-Trinitrololuene | 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 01-10-024 | 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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**
**and Reason Codes for Qualification**
**Plum Brook Ordnance Works**



| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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**
**and Reason Codes for Qualification**
**Plum Brook Ordnance Works**



| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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 | | |

**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 |
|---|---|---|---|---|---|---|---|---|
| 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

Other Participants — Name/Location/Representing:

CALL FROM ☐ CALL TO ☒ NAME: Martin Jones (V.P.)

Telephone Number: 419-625-8141

Company Name: Wagner Quarry

Address:

Topic BTEX in Bedrock

City Sandusky

State OH Zip Code

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 Springberg, Rick Ellis
Mike Gunderson,

PAGE ___ OF ___

548A-8-87

# APPENDIX N

# RECHARGE CALCULATIONS

# CALCULATION WORKSHEET Order No. 19116 (01-91)

| CLIENT | JOB NUMBER |
|---|---|
| NASHVILLE C.O.E. | 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 | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| LR ELLIS | Jane Li | | 1/12/99 |

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 NUMBE~~ 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 | | Approx Curve No (Rounded) | | Land Use | Hydrol Soil Group |
|---|---|---|---|---|---|---|---|
| | | Assoc | Each | Assoc | Each | | |
| Pewamo-Bennington Assoc. | Extreme Southeast & Extreme Northeast | 1/5 | | 75 | | Thinly Wooded | |
| Pewamo | | | | | 80 | | C/D |
| Bennington | | | | | 70 | | C |
| Horatio-Fries-Colwood Assoc. | Central | 1/2 | | 75 | | 1/2 Open Spaces (Good Cover) 1/2 Wooded (Good Cover) | |
| Horatio | | | | | 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 Open Spaces (Good Cover) 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 | | | |

108-10-85

| 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[3] | | | | |
| 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.

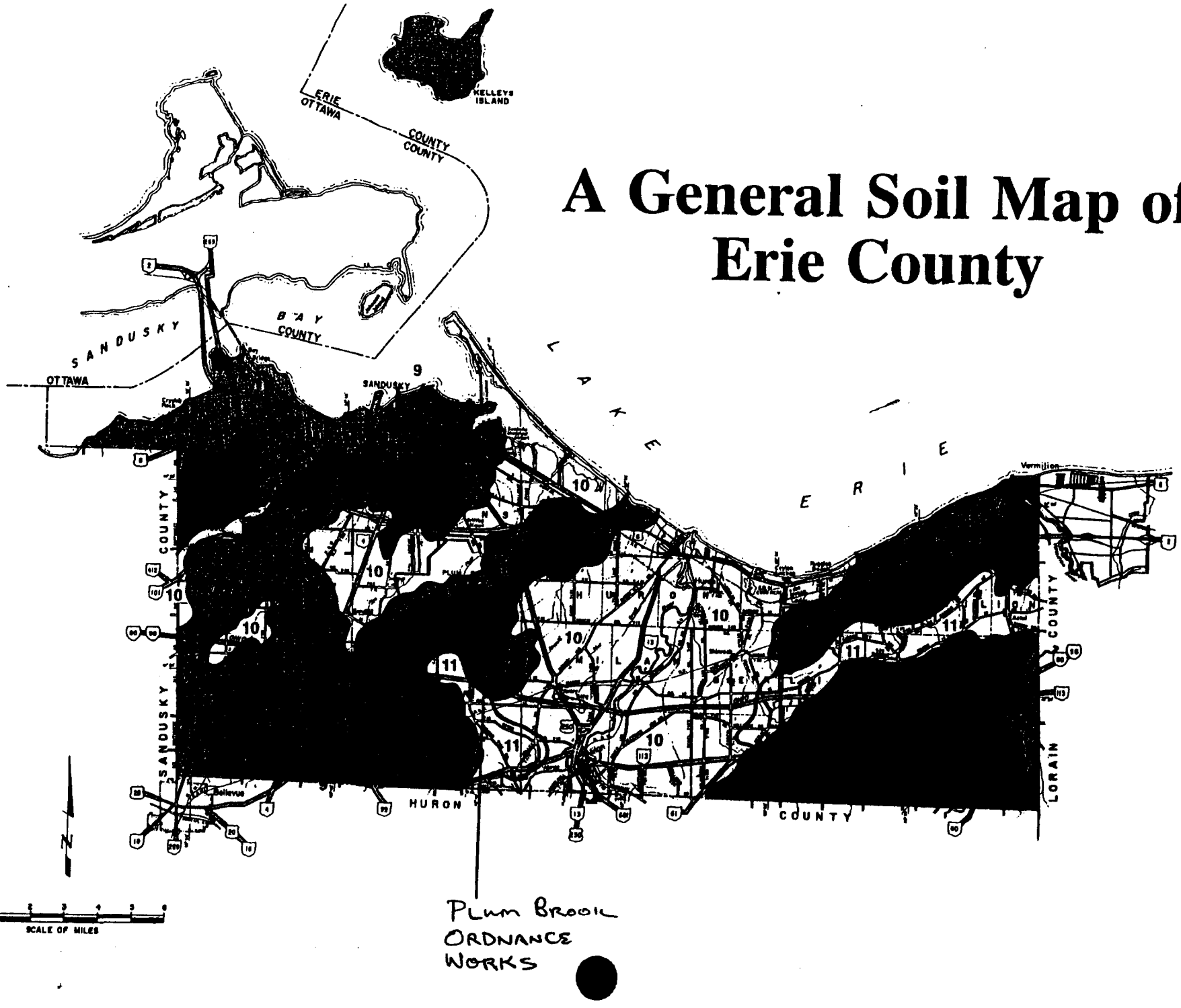
2/ Good cover is protected from grazing and litter and brush cover soil.

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



# 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.