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via e-mail May 23, 2005

Ms. Amy Williams
Remedial Project Manager
U.S. Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303-3104

Subject: Transmittal of Surficial Aquifer DNAPL Removal Interim Measures/Remedy Pilot Test Report (Gainesville, FL)

Dear Ms. Williams:

On behalf of Beazer East Inc. (Beazer), attached is the Surficial Aquifer DNAPL Removal Interim Measures/Remedy Pilot Test Report for your review. Please feel free to contact me at (703) 444-7000, if you have any comments or questions.

Sincerely,

James W. Mercer

James W. Mercer, Ph.D., P.G.
Executive Vice President
Principal Hydrogeologist
Professional Geologist FL #275

Enclosures

cc: Kelsey Helton, FDEP
John Mousa, ACEPD
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Mike Slenska, BEI
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# Surficial Aquifer DNAPL Removal
# Interim Measures/Remedy
# Pilot Test Report

## Cabot Carbon/Koppers Superfund Site
## Gainesville, Florida

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## May 23, 2005

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# List of Abbreviations and Acronyms

| | |
|---|---|
| Beazer | Beazer East, Inc. |
| bgs | below ground surface |
| DNAPL | dense non-aqueous phase liquid |
| ft/d | feet per day |
| GAC | granular activated carbon |
| GeoTrans | GeoTrans, Inc. |
| gpd/ft | gallons per day per foot |
| gpm | gallons per minute |
| GRU | Gainesville Regional Utilities |
| HDPE | high-density polyethylene |
| KEY | KEY Environmental, Inc. |
| µg/L | micrograms per liter |
| POTW | Publicly Owned Treatment Works |
| program | interim measures/remedy pilot test program |
| RETEC | The RETEC Group, Inc. |
| Site | Cabot Carbon/Koppers Superfund Site |
| SVOCs | semi-volatile organic compounds |
| VOCs | volatile organic compounds |

# 1 Introduction

GeoTrans, Inc. ("GeoTrans"), The RETEC Group, Inc. ("RETEC"), and KEY Environmental, Inc. ("KEY"), on behalf of Beazer East, Inc. ("Beazer"), prepared this report on the interim measures/remedy pilot test program ("pilot test") for hydraulic gradient-enhanced dense non-aqueous phase liquid (DNAPL) recovery in the Surficial Aquifer at the Koppers portion of the Cabot Carbon/Koppers Superfund Site (Site) in Gainesville, Florida. This pilot test was implemented in response to discussions that occurred in the July 21, 2004 stakeholders meeting held at the United States Environmental Protection Agency's ("USEPA") Region IV Atlanta offices. The pilot test was initially described in a follow-up letter to Ms. Amy Williams (USEPA) from Mr. Michael Slenska (Beazer) dated August 4, 2004. Details for the pilot were described in a Work Plan dated October 21, 2004 (RETEC and GeoTrans, 2004), which was submitted to USEPA on October 25, 2004 [letter to Ms. Amy Williams (USEPA) from Dr. James Mercer (GeoTrans)]. As specified in the Work Plan (RETEC and GeoTrans, 2004), the objectives of this pilot test were:

- To evaluate the effectiveness of increased hydraulic gradient on DNAPL recovery within the Surficial Aquifer (i.e., attempt to mobilize creosote believed to be at residual saturation under ambient conditions); and

- To collect the data needed to determine if it is feasible to expand the hydraulic gradient-enhanced DNAPL recovery effort to other source areas at the Site.

Because quick action was emphasized at the July 21, 2004 stakeholders meeting, this pilot test took advantage of existing wells so that the pilot test could be implemented promptly. The pilot test consisted of pumping groundwater from the Shallow Aquifer well (PW-1) in order to increase the hydraulic gradient within the aquifer and draw DNAPL into the well where it could be recovered. PW-1 is an existing 6-inch diameter well, located in the Process Area where creosote releases were suspected, in which measurable DNAPL accumulated during a previous pumping test (McLaren/Hart, 1993). In addition, enough existing monitoring/observation wells are located near PW-1 that sufficient data on the influence of pumping on the hydraulic gradient could be determined.

Pursuant to the Work Plan, pumping at PW-1 began on November 9, 2004 at an initial rate of 1.0 gallon per minute (gpm). Although the Work Plan (RETEC and GeoTrans, 2004) proposed a minimum of four weeks of pumping and monitoring, the pilot test was extended until April 21, 2005 in order to assess hydraulic gradient-enhanced DNAPL recovery at a variety of pumping rates. This report provides a summary and discussion of the results of the PW-1 pilot test. Section 1 provides background information concerning prior activities at PW-1, the objectives of the pilot study, and the rationale for the DNAPL recovery approach. A description of the DNAPL recovery pilot configuration, operation, and monitoring is discussed in Section 2. Section 3 discusses the monitoring data, interpretation, and recommendations.

## 1.1 PW-1 Background Information

McLaren/Hart completed installation of well PW-1 on October 22, 1992 (McLaren/Hart, 1993). PW-1 was installed at the down-gradient limit of the former cooling pond for the purpose of performing a pumping test to provide data for the evaluation of aquifer characteristics and finalization of the conceptual design of the initial phase groundwater extraction system. The PW-1 boring was terminated approximately 2 feet into the Hawthorn Group and was completed as a stainless steel, 6-inch well with a screen between depths of 4.3 to 24.3 feet below ground surface (bgs). The well was developed over a 12-hour period, via surging and purging—removing 1,500 gallons of water.

In November 1992, McLaren/Hart conducted both variable-rate (i.e., step test) and constant-rate pumping tests at PW-1. For the step test, the well was pumped at 1.0 gpm, 2.0 gpm, 3.25 gpm and 4.25 gpm. Based on the results of the step test, McLaren/Hart selected a flow rate of 2.5 gpm for the 56-hour pumping test. Analysis of the pumping test data indicated that the Surficial Aquifer is moderately permeable with a hydraulic conductivity on the order of 5-15 feet/day (ft/d). This pumping test value is within the range of 16-29 ft/d calculated from pumping tests by TRC (1999) and near the value of 21 ft/d that GeoTrans determined to be the Site-wide value for hydraulic conductivity by using the model MODFLOWT (GeoTrans, 2004b). McLaren/Hart estimated the radius of influence at the 2.5 gpm flow rate to be approximately 70 feet. Pumping rates used by McLaren/Hart were utilized to guide the pumping rates considered in this pilot test.

During the PW-1 pumping test, McLaren/Hart detected the presence of DNAPL, which had not previously been observed in this well. By the end of the test, approximately 2 feet of DNAPL had accumulated in the well, and naphthalene concentrations in extracted groundwater sampled during the test varied from 84,000 micrograms per liter (µg/L) at the beginning of the test to 102,500 µg/L at the intermediate point, to 33,000 µg/L near the end of the test.

In February 1994 standing DNAPL in PW-1 was pumped out until no measurable DNAPL was observed in the well. Quarterly monitoring since 1994 indicated that no DNAPL has returned. However, there have been no hydraulic stresses (i.e., pumping) since then to mobilize DNAPL into the well.

## 1.2 Rationale for the DNAPL Recovery Pilot Test

Creosote in the subsurface is acted upon by three forces: (1) gravitational forces (pressure due to gravity), (2) capillary forces (capillary pressure) and (3) hydraulic force (also known as viscous force or hydrodynamic pressure). In general, capillary forces tend to trap creosote while gravitational and hydraulic forces tend to mobilize creosote. Creosote at residual saturation below the water table is immobile at ambient conditions (including small seasonal water table fluctuations). By sufficiently increasing the hydraulic gradient near a well, the change in hydraulic forces can mobilize DNAPL that was immobile under ambient conditions. Accordingly, by pumping the Surficial Aquifer, the hydraulic gradients in the vicinity of PW-1 are increased thereby drawing DNAPL into PW-1, as was demonstrated during the 1992 pumping test. Therefore, DNAPL collection rates at PW-1 at variable groundwater pumping

rates can be used to establish critical thresholds for the mobilization of DNAPL in the vicinity of PW-1. The data gained from pumping PW-1, monitoring adjacent monitoring/observation wells, and monitoring DNAPL recovery rates potentially can be used to expand hydraulic gradient-enhanced DNAPL recovery efforts to other locations on Site.

# 2 DNAPL Recovery Pilot Test

This section provides a detailed description of the pilot test configuration, operation and maintenance, as well as a description of the effectiveness monitoring conducted during the pilot test.

## 2.1 Pilot Test Configuration, Operation, and Maintenance

Groundwater was pumped from PW-1 to a groundwater treatment system including a trailer-mounted oil/water separator, an equalization tank, and three granular activated carbon (GAC) drums (375 pounds each) piped in series (**Figure 2-1**). The groundwater treatment system was staged adjacent to the well, and the treated groundwater was discharged (through approximately 200 linear feet of 1-inch high-density polyethylene [HDPE] tubing) to the Gainesville Regional Utilities (GRU) Publicly Owned Treatment Works (POTW).

The pilot test was conducted using a pneumatic diaphragm pump and a 2-inch diameter, screened drop tube to monitor groundwater and DNAPL levels (**Figure 2-2**). The diaphragm pump was selected over an electrical submersible pump to minimize the potential emulsification and/or mixing of the DNAPL with co-produced groundwater and to facilitate separation of the DNAPL within the oil-water separator. The diaphragm pump intake was set at an elevation suitable to sustain the desired pumping rate and sustainable hydraulic gradient. The pump was lowered on two occasions as the pumping rate was increased. The final pump intake depth was 24 feet below the top of casing. As DNAPL accumulated in PW-1, it was removed using an electrical submersible pump, gauged, and stored in 55-gallon drums for off-site disposal.

As requested by the GRU, the Site operator collected and analyzed effluent samples for arsenic, chromium, copper, semi-volatile organic compounds (SVOCs) including acid extractable compounds and base neutral compounds, and volatile organic compounds (VOCs) using the analytical methods required in the existing discharge permit (Permit #04-007). Beazer provided a copy of all analytical results to the GRU. One effluent sample collected on November 24, 2004 had no concentrations exceeding the permit criteria. A second effluent sample collected February 15, 2005 had a copper concentration that exceeded the permitted limit. A resample was collected on February 25, 2005 and copper did not exceed the permitted limit during this event. A summary of samples collected and significant results are provided in **Table 2-1**.

The site operator, on a weekly basis, collected a treated water sample from between each carbon vessel and monitored for breakthrough using total phenol and arsenic test kits. When breakthrough was detected downstream of the number one carbon vessel, this vessel was removed, the number two and three vessels were each advanced one position, and a new carbon vessel was placed in the number three position. By rotating the carbon drums in this manner, Beazer optimized the use of the carbon in each drum, while insuring permit compliance. A summary of the breakthrough testing dates and replacement schedule for the carbon filters is provided in **Table 2-1**.

**Table 2-1** also summarizes issues related to the operation and maintenance of the PW-1 pumping system that resulted in equipment replacement and/or temporary shut-down of the pumping system. In addition, the following issues with the pumping system were encountered:

- At the 2.5 gpm pumping rate, continuous operation of the pump could not be maintained even after lowering the pump intake to 24 feet below the top of well casing, which was likely the limit of the pump's ability to maintain a continuous suction lift. The pump stopped cycling on and off once the pumping rate was reduced to approximately 1.75 gpm.

- The total flow volume recorded by the totalizing flow meter was not consistent with the total volume estimated based on the instantaneous flow rates recorded daily. In general, the flow meter was recording lower extracted groundwater volumes than would be estimated by extrapolating the measured instantaneous flow rates over the course of a day. Furthermore, the flow meter does not work at rates less than 1.0 gpm, so no volume data was recorded when the pump was set to 0.5 gpm. Therefore, all total groundwater volumes are estimated based on the measured instantaneous flow rates, and no data from the totalizing flow meter was used.

## 2.2 Effectiveness Monitoring

To determine if hydraulic gradient-enhanced DNAPL recovery is effective and to assist in determining the feasibility for use in a full-scale design, the following pilot test data were collected and regularly reviewed:

- Water table elevations,
- DNAPL thickness and extracted volumes,
- Groundwater extraction rates, and
- Extracted DNAPL/Water Ratios for various pumping rates.

These data were collected as follows:

- The depth to groundwater and depth to DNAPL, if any, were measured and recorded in monitoring wells M-28R (located 485 ft southwest of PW-1), M-29 (located 245 feet southwest of PW-1), M-30A and M-30B (located approximately 130 ft south of PW-1), M-24A and M-24B (located approximately 125 ft northwest of PW-1), M-31 (located approximately 210 ft southeast of PW-1), and observation wells OW-1 and OW-2 (located 13 and 33 ft due east of PW-1), to better define hydraulic conductivity of the Surficial Aquifer in the vicinity of PW-1. These measurements were collected prior to the start of the pilot test and approximately daily after the start of the pilot test until mid-December 2004. Only a few measurements were collected after this date.

- Well PW-1 was gauged at least daily for the presence of DNAPL. If a sufficient quantity of DNAPL was detected (usually greater than 1 ft), the site operator removed the DNAPL from the well using an in-line submersible pump.

- Twice daily, and after any system configuration changes, the site operator also recorded the following information:

  – The depth to groundwater and DNAPL in PW-1,

  – The instantaneous pumping rate from the PW-1 flow meter,

  – The total volume of groundwater pumped from PW-1 (see Section 2.1 for a discussion of mechanical issues with the totalizing flow meter),

  – The volume of DNAPL recovered from PW-1, and

  – The date and time that the data was collected.

# 3 Monitoring Results and Interpretation

This section summarizes the results of the effectiveness monitoring and provides a discussion of the potential of hydraulic gradient-enhanced DNAPL recovery to effectively remove residual creosote in the Surficial Aquifer at PW-1 and Site-wide. A summary of all effectiveness monitoring measurements is provided in **Table 3-1**.

## 3.1 Aquifer Characteristics

**Figure 3-1** shows the groundwater elevation and pumping rates at PW-1 over the course of the pilot test. The plot shows that there is a strong correlation between changes in pumping rates and increases or decreases in the groundwater elevation at PW-1. In general as the pumping rate was increased, the water table elevation decreased.

A summary of groundwater elevations measured at M-24A, M-24B, M-28R, M-29, M-30A, M-30B, M-31, OW-1, and OW-2, are provided in **Table 3-2**. Hydrographs for all of these wells are provided as **Figure 3-2**. The measured water level elevations at all wells generally decrease from November 2004 through January 2005 then increase during March and April 2005. This is likely not due to pumping, as discussed below, but instead is due to a decrease in the amount of rainfall during this period. **Figure 3-3** shows daily rainfall amounts measured at the Gainesville Municipal Airport (NWS, 2005). Rainfall totals in November 2004 were slightly below the National Climatic Data Center (NCDC) 30-year normal value for this gauging station, and December 2004 through February 2005 were 40 to 50% below normal (NCDC, 2005). This period of below normal rainfall corresponds to the same period during which water table elevations decreased by approximately 2 feet at all the monitoring wells. Rainfall in March 2005 was slightly above normal, and the hydrographs show a slight increase in the water table elevation. A slight increase in the groundwater elevation also occurred at the end of November 2004. Just prior to this increase there was 1.78 inches of precipitation over a four-day period. This response demonstrates that changes in water table elevation are strongly correlated with precipitation totals.

Water-table contours for three different dates are displayed on **Figures 3-4** to **3-6**. Note that OW-2 groundwater elevations were anomalously lower than adjacent wells, even under non-pumping conditions. Therefore data from this well was not used to construct the water-table contour maps. **Figure 3-4** shows conditions before pumping commenced, **Figure 3-5** shows the conditions 1.15 days after the start of the pilot test at 1.0 gpm, and **Figure 3-6** shows the conditions 82 days after pumping began. Before pumping began (**Figure 3-4**) the groundwater flow direction was to the north and northeast, similar to historic groundwater flow patterns (McLaren/Hart, 1993; GeoTrans, 2004b). After pumping began (**Figure 3-5**) a slight cone-of-depression formed around PW-1, which became more pronounced as pumping continued (**Figure 3-6**). However, the cone-of-depression does not extend very far from the vicinity of PW-1. Outside of the cone-of-depression, the groundwater contours are similar to the pre-pumping conditions.

**Table 3-3** summarizes calculated drawdown at each well. The data indicate that drawdown is increasing at all monitoring wells over time. The previous pumping tests (McLaren/Hart, 1993)

demonstrated that the radius of influence for a rate of 2.5 gpm was 70 feet. All monitoring wells except for OW-1 and OW-2 are further from PW-1 than 70 feet. Therefore, the increased drawdown over time at all the monitoring wells is likely due to natural variability, specifically the below normal rainfall, as discussed above. Adjusted drawdown values for OW-1 corrected for this natural variability were calculated by taking the average drawdown of all the monitoring wells outside of the radius of influence and subtracting from the OW-1 drawdown (**Table 3-3**). **Figure 3-7** shows a plot of the approximate pumping rate at PW-1 versus adjusted drawdown at OW-1. The plot shows a general increase in the drawdown with increasing pumping rate, but appears to stabilize at around 1 foot of drawdown.

The adjusted drawdown data calculated for observation well OW-1 was plotted on a time-drawdown plot and the transmissivity and storativity was calculated using the Cooper-Jacob method for unconfined aquifers (Cooper and Jacob, 1946) using the AQTESOLV software package (**Figure 3-8**). The estimated transmissivity is 341.8 $ft^2/d$ (2,557 gallons per day per foot [gpd/ft]) which is comparable to the transmissivity of 2,420 gpd/ft calculated by McLaren/Hart for OW-1 during the previous pumping test (McLaren/Hart, 1993). Assuming an aquifer thickness of approximately 20 feet, the hydraulic conductivity is 17 ft/day. This hydraulic conductivity is near the range of 5-15 feet/day and within the range of 16-29 ft/d calculated during previous pumping tests (McLaren/Hart, 1993; TRC, 1999) and similar to the Site-wide value of 21 ft/d estimated in the flow and transport model (GeoTrans, 2004b).

Using the method described in Driscoll (1986), the slope of the time-drawdown curve and observed drawdown measurements at observation well OW-1 were used to estimate the radius-of-influence for all pumping rates. The radius-of-influence for the combined pumping rates was estimated to be between 15 and 40 feet[1]. For comparison, the source area dewatering modeling used a spacing of 60 feet (TRC, 2005).

## 3.2 DNAPL Recovery

**Figure 3-9** shows the DNAPL elevation and pumping rate at PW-1 over the course of the pilot test. In general there is a correlation between DNAPL elevation and pumping rate with higher DNAPL elevations associated with higher pumping rates. An exception is during pumping at 2.5 gpm when lower DNAPL elevations were recorded than at the 1.75 and 2.0 gpm rates. This is likely due to the non-continuous pumping that occurred while pumping at this rate. **Figure 3-10** is a plot of DNAPL thickness and amount recovered over time. The plot shows that with a larger thickness of DNAPL more is able to be recovered. The plot also shows that at the lower pumping rates which occurred from the end of January to mid-March the DNAPL thickness did not increase as quickly as at other times, limiting the amount that could be recovered.

**Table 3-4** summarizes the volume of groundwater pumped and the volume of DNAPL recovered at various pumping rates. After 158 days of pumping a total of 335,169 gallons of groundwater was extracted at PW-1 and 89.95 gallons of DNAPL was recovered. The ratio of DNAPL

[1] The 70-ft radius-of-influence determined by McLaren/Hart was based on data from OW-2, which is now thought to be anomalous and was not used in the radius-of-influence determination above.

recovered to groundwater extracted is 0.000268 or approximately 0.03%. **Figure 3-11** is a plot of the volume of DNAPL recovered during each recovery event versus the volume of water extracted during that event. This plot shows that the best recovery of DNAPL occurs at pumping rates of approximately 1.5 to 2.0 gpm. At pumping rates below 1.5 gpm and above 2.0 gpm a greater volume of groundwater needs to be extracted to recover DNAPL than at the 1.5 to 2.0 gpm rates. At lower rates, the hydraulic gradient is less steep decreasing the mobility of DNAPL. At higher rates turbulent flow may inhibit migration of DNAPL into the pumping well. Also a continuous pumping rate could not be maintained at the higher pumping rates which may also create a less favorable hydraulic gradient or otherwise disrupt the flow of DNAPL into the well.

**Figure 3-12** is a plot of the cumulative DNAPL recovered over the course of the pilot test. The slope of this line decreases during the 0.5, 1.0, and 2.5 gpm pumping periods, which corresponds to periods when less DNAPL volume was able to be recovered.

Following shut-down of the pumping system on April 21, 2005, PW-1 was periodically monitored for the presence of DNAPL. For the first three days after the pump was turned off, no recoverable DNAPL was measured in PW-1. One week after the pump was turned off, 0.6 gallons of DNAPL was recovered from the well, but one week after that (May 2-3, 2005), no measurable DNAPL was present.

## 3.3 Conclusions and Recommendations

Residual DNAPL can be mobilized by manipulating the hydraulic gradient using groundwater extraction (pumping). By varying the pumping rate and monitoring the volume of DNAPL and groundwater extracted, it was determined that the pumping rate with the highest DNAPL yield was between 1.5 and 2.0 gpm. At lower pumping rates, the hydraulic gradient is not steep enough to efficiently mobilize DNAPL in the direction of the pumping well. At higher pumping rates, a continuous pumping rate could not be maintained, thereby decreasing the efficiency of DNAPL extraction.

Two weeks after the pilot test was halted and the remaining recoverable DNAPL was removed from PW-1, no measurable DNAPL accumulated in the well, indicating that DNAPL is not mobile under non-pumping conditions. The radius-of-influence for the combined pumping rates was estimated to be between 15 and 40 feet. Consequently, if this removal technology were to be expanded to source areas in the Surficial Aquifer, the required well spacing would be on the order of 30 to 80 feet.

Over a period of 158 days, an estimated 335,169 gallons of groundwater were extracted and 89.95 gallons of DNAPL were recovered (**Table 3-4**). The groundwater to DNAPL extracted ratio for PW-1 is 0.000268 (0.03%). That is, for every 1 gallon of DNAPL recovered, approximately 3,726 gallons of groundwater needed to be extracted and treated. This DNAPL recovery rate is relatively low as compared to other DNAPL recovery programs conducted by Beazer, but is consistent with local hydrogeological and residual DNAPL conditions in the

Surficial Aquifer. Typically, more effective and efficient DNAPL recovery programs operate at approximately 1 to 3% DNAPL recovery.

Consequently, increasing the hydraulic gradient by pumping groundwater only mobilizes a small percentage of the residual DNAPL near PW-1. In addition, the DNAPL recovery rate is anticipated to decrease with time due to heterogeneities, fluid flow mechanics, and because easily accessible DNAPL is recovered first leaving behind less accessible DNAPL. The low DNAPL extraction ratio is consistent with previous observations that the creosote in the Surficial Aquifer is at residual saturation and will not flow to a well under ambient conditions (GeoTrans, 2004a).

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# Tables

# TABLE 2-1
## Summary of Operation and Maintenance Activities and Performance Monitoring

***Sample phenol and arsenic between carbon filters***

| Date sampled | Carbon Filter position 1 | Carbon Filter position 2 | Carbon Filter position 3 | Removed carbon filters |
|---|---|---|---|---|
| 11/10/2004 | C1 | C2 | C3 | |
| 11/17/2004 | C2 | C3 | C4 | C1 |
| 11/24/2004 | C3 | C4 | C5 | C2 |
| 12/9/2004 | C4 | C5 | C6 | C3 |
| 12/22/2004 | C6 | C7 | C8 | C4, C5 |
| 12/30/2004 | C6 | C7 | C8 | |
| 2/16/2005 | C8 | C9 | C10 | C6, C7 |
| 2/23/2005 | C10 | C11 | C12 | C8, C9 |
| 3/2/2005 | C12 | C13 | C14 | C10, C11 |
| 3/8/2005 | C14 | C15 | C16 | C12, C13 |

***Sample effluent for Gainesville Regional Utility***

| Date | Sample ID | Compounds that exceed permit limits | Comments |
|---|---|---|---|
| 11/24/2004 | PW-01-02 | None | Effluent |
| 2/15/2005 | PW-1I | N/A | Influent |
| 2/15/2005 | PW-1E | Copper | Effluent |
| 2/25/2005 | PW-1E | None | Effluent |

***Operation & Maintenance***

| Date | Issue | Result | System Down-Time |
|---|---|---|---|
| 11/9/2004 | Effluent tank leaking | Repaired | 87 minutes |
| 11/24/2005 | Install dense-pack in oil/water seperator | Installed | 0 minutes |
| 11/30/2004 | Clean totalizer flow meter | Cleaned, and reinstalled | 30 minutes |
| 12/2/2004 | Pump not working, change pump | Repaired | 36 minutes |
| 1/13/2005 | Clean totalizer flow meter; not working properly | Removed from service | 1 hour |
| 2/28/2005 | System down, will not operate in automatic | Repaired, system restarted | 18 hours |

# Table 3-1
# Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 10/31/04 | NR | 6.28 | 180.56 | ----- | 0 | ----- | 0 | 0 |
| 11/8/04 | 16:33 | 6.69 | 180.15 | ----- | 0 | ----- | 0 | 0 |
| 11/9/04 | 7:46 | 6.7 | 180.14 | ----- | 0 | ----- | 1.15 | 0 |
| 11/9/04 | 7:54 | 9.75 | 177.09 | ----- | 0 | ----- | 1 | 0 |
| 11/9/04 | 8:31 | 10.45 | 176.39 | ----- | 0 | ----- | 1 | 0 |
| 11/9/04 | 10:00 | 11.06 | 175.78 | ----- | 0 | ----- | 1.07 | 0 |
| 11/9/04 | 11:31 | 10.89 | 175.95 | ----- | 0 | ----- | 0.96 | 0 |
| 11/9/04 | 12:13 | 11.1 | 175.74 | ----- | 0 | ----- | 0.94 | 0 |
| 11/9/04 | 13:30 | 6.8 | 180.04 | ----- | 0 | ----- | 1 | 0 |
| 11/9/04 | 15:10 | 10.75 | 176.09 | ----- | 0 | ----- | 1.09 | 0 |
| 11/9/04 | 17:40 | 11.86 | 174.98 | ----- | 0 | ----- | 0.98 | 0 |
| 11/10/04 | 7:24 | 12.14 | 174.7 | ----- | 0 | ----- | 1.09 | 0 |
| 11/10/04 | 11:28 | 10.75 | 176.09 | ----- | 0 | ----- | 1.09 | 0 |
| 11/11/04 | 7:03 | 11.23 | 175.61 | ----- | 0 | ----- | 1.15 | 0 |
| 11/12/04 | 5:10 | 14.8 | 172.04 | ----- | 0 | ----- | 2.03 | 0 |
| 11/12/04 | 8:00 | 13.52 | 173.32 | 26.65 | 0 | 160.19 | 1.61 | 0 |
| 11/12/04 | 9:30 | 15.12 | 171.72 | ----- | 0 | ----- | 1.88 | 0 |
| 11/12/04 | 10:30 | 14.6 | 172.24 | ----- | 0 | ----- | 1.8 | 0 |
| 11/12/04 | 11:30 | 14.85 | 171.99 | ----- | 0 | ----- | 1.95 | 0 |
| 11/12/04 | 13:30 | 14.9 | 171.94 | 26.5 | 0.15 | 160.34 | 1.85 | 0 |
| 11/13/04 | 7:40 | 15.76 | 171.08 | 25.94 | 0.71 | 160.9 | 2.1 | 0 |
| 11/14/04 | 7:30 | 16.28 | 170.56 | 25.51 | 1.14 | 161.33 | 2 | 0 |
| 11/15/04 | 7:15 | 16.3 | 170.54 | 25.26 | 1.39 | 161.58 | 1.98 | 1.7 |
| 11/15/04 | 14:23 | 16.8 | 170.04 | 26.65 | 0 | 160.19 | 2.02 | 0 |
| 11/16/04 | 9:25 | 16.48 | 170.36 | 26 | 0.65 | 160.84 | 2.01 | 0 |
| 11/16/04 | 15:30 | 16.53 | 170.31 | 25.9 | 0.75 | 160.94 | 1.96 | 0 |
| 11/17/04 | 7:56 | 17.42 | 169.42 | 25.6 | 1.05 | 161.24 | 2.1 | 0 |
| 11/17/04 | 14:00 | 16.29 | 170.55 | 25.45 | 1.2 | 161.39 | 1.88 | 1.5 |
| 11/18/04 | 9:05 | 16.82 | 170.02 | 25.95 | 0.7 | 160.89 | 1.92 | 0 |
| 11/18/04 | 13:53 | 16.86 | 169.98 | 25.86 | 0.79 | 160.98 | 1.9 | 0 |
| 11/19/04 | 6:32 | 18.25 | 168.59 | 25.55 | 1.1 | 161.29 | 2.17 | 0 |
| 11/19/04 | 14:23 | 16.88 | 169.96 | 25.4 | 1.25 | 161.44 | 1.87 | 1.5 |
| 11/20/04 | 7:06 | 18.16 | 168.68 | 25.98 | 0.67 | 160.86 | 2.09 | 0 |
| 11/21/04 | 7:17 | 18.45 | 168.39 | 25.5 | 1.15 | 161.34 | 1.97 | 1.4 |
| 11/22/04 | 7:40 | 18.52 | 168.32 | 25.63 | 1.02 | 161.21 | 1.94 | 1.2 |
| 11/22/04 | 12:15 | 17.83 | 169.01 | 26.03 | 0.62 | 160.81 | 1.99 | 0 |
| 11/23/04 | 9:42 | 18.15 | 168.69 | 25.62 | 1.03 | 161.22 | 1.82 | 1.5 |
| 11/23/04 | 14:17 | 17.77 | 169.07 | 26.09 | 0.56 | 160.75 | 2.02 | 0 |
| 11/24/04 | 8:20 | 19.06 | 167.78 | 25.71 | 0.94 | 161.13 | 2 | 0 |
| 11/24/04 | 14:35 | 17.7 | 169.14 | 25.65 | 1 | 161.19 | 1.83 | 1.4 |
| 11/25/04 | 7:27 | 18.94 | 167.9 | 25.85 | 0.8 | 160.99 | 2.04 | 0.9 |
| 11/26/04 | 5:47 | 19.18 | 167.66 | 25.75 | 0.9 | 161.09 | 1.75 | 1 |
| 11/27/04 | 7:10 | 18.74 | 168.1 | 25.37 | 1.28 | 161.47 | 1.91 | 1.6 |
| 11/28/04 | 6:27 | 19.4 | 167.44 | 25.77 | 0.88 | 161.07 | 1.95 | 1 |
| 11/29/04 | 9:11 | 19.53 | 167.31 | 25.36 | 1.29 | 161.48 | 1.92 | 1.6 |
| 11/29/04 | 13:07 | 19.39 | 167.45 | 26.11 | 0.54 | 160.73 | 1.87 | 0 |
| 11/30/04 | 7:50 | 8.72 | 178.12 | 26.05 | 0.6 | 160.79 | 0 | 0 |
| 11/30/04 | 8:10 | 15.16 | 171.68 | NR | NR | NR | 2.42 | 0 |

# Table 3-1
# Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 11/30/04 | 8:16 | 17.45 | 169.39 | NR | NR | NR | 2.53 | 0 |
| 11/30/04 | 8:21 | 18.8 | 168.04 | NR | NR | NR | 2.54 | 0 |
| 11/30/04 | 8:25 | 20.05 | 166.79 | NR | NR | NR | 2.52 | 0 |
| 11/30/04 | 8:30 | 21.11 | 165.73 | NR | NR | NR | 2.5 | 0 |
| 11/30/04 | 9:33 | 19.15 | 167.69 | 26.08 | 0.57 | 160.76 | 2.43 | 0 |
| 11/30/04 | 10:10 | 22.35 | 164.49 | 26.03 | 0.62 | 160.81 | 2.61 | 0 |
| 11/30/04 | 15:50 | 22.85 | 163.99 | 26 | 0.65 | 160.84 | 2.57 | 0 |
| 12/1/04 | 7:54 | 10.3 | 176.54 | 25.97 | 0.68 | 160.87 | 2.56 | 0.7 |
| 12/1/04 | 15:33 | 19.15 | 167.69 | NR | NR | NR | 2.49 | 0 |
| 12/2/04 | 7:15 | 12.31 | 174.53 | NR | NR | NR | NR | 0 |
| 12/2/04 | 7:51 | 13.96 | 172.88 | 26.16 | 0.49 | 160.68 | 2.53 | 0 |
| 12/2/04 | 8:17 | 20.44 | 166.4 | NR | NR | NR | 2.46 | 0 |
| 12/2/04 | 8:25 | 21.27 | 165.57 | 26.17 | 0.48 | 160.67 | 2.6 | 0 |
| 12/2/04 | 9:00 | 23.32 | 163.52 | 26.15 | 0.5 | 160.69 | 2.53 | 0 |
| 12/2/04 | 10:53 | 23.1 | 163.74 | 26.12 | 0.53 | 160.72 | 2.44 | 0 |
| 12/2/04 | 15:50 | 23.36 | 163.48 | 26.1 | 0.55 | 160.74 | 2.54 | 0 |
| 12/3/04 | 6:35 | 19.63 | 167.21 | 26.05 | 0.6 | 160.79 | 2.51 | 0.6 |
| 12/3/04 | 9:00 | 23.8 | 163.04 | 26.65 | 0 | 160.19 | 2.46 | 0 |
| 12/3/04 | 14:55 | 23.06 | 163.78 | 26.5 | 0.15 | 160.34 | 2.51 | 0 |
| 12/4/04 | 7:59 | 23.9 | 162.94 | 26.01 | 0.64 | 160.83 | 2.34 | 0 |
| 12/5/04 | 7:29 | 23.7 | 163.14 | 25.75 | 0.9 | 161.09 | 2.45 | 1 |
| 12/6/04 | 9:00 | 23.46 | 163.38 | 26.02 | 0.63 | 160.82 | 2.56 | 0 |
| 12/6/04 | 15:35 | 23.8 | 163.04 | 25.9 | 0.75 | 160.94 | 2.48 | 0.8 |
| 12/7/04 | 13:50 | 23 | 163.84 | 26 | 0.65 | 160.84 | 2.42 | 0 |
| 12/8/04 | 7:30 | 23.26 | 163.58 | 25.8 | 0.85 | 161.04 | 2.49 | 0.9 |
| 12/8/04 | 11:54 | 22.9 | 163.94 | 26.12 | 0.53 | 160.72 | 2.54 | 0 |
| 12/9/04 | 6:40 | 23.75 | 163.09 | 25.9 | 0.75 | 160.94 | 2.52 | 0 |
| 12/9/04 | 13:35 | 23.7 | 163.14 | 25.85 | 0.8 | 160.99 | 2.59 | 0.9 |
| 12/10/04 | 11:36 | 12.95 | 173.89 | 25.95 | 0.7 | 160.89 | 2.26 | 0 |
| 12/10/04 | 12:32 | 23.95 | 162.89 | NR | NR | NR | 2.24 | 0 |
| 12/11/04 | 8:15 | 22.2 | 164.64 | 25.65 | 1 | 161.19 | 1.64 | 1.2 |
| 12/12/04 | 7:25 | 23.35 | 163.49 | 25.9 | 0.75 | 160.94 | 2.2 | 0 |
| 12/13/04 | 5:50 | 23.21 | 163.63 | 25.68 | 0.97 | 161.16 | 1.92 | 1.1 |
| 12/14/04 | 10:51 | 23.3 | 163.54 | 25.37 | 1.28 | 161.47 | 2.05 | 1.6 |
| 12/14/04 | 13:59 | 23.12 | 163.72 | 26.22 | 0.43 | 160.62 | 2.08 | 0 |
| 12/15/04 | 13:28 | 23.72 | 163.12 | 25.95 | 0.7 | 160.89 | 1.98 | 0 |
| 12/16/04 | 10:01 | 22.75 | 164.09 | 25.7 | 0.95 | 161.14 | 1.75 | 1.1 |
| 12/16/04 | 13:26 | 19.8 | 167.04 | 26.12 | 0.53 | 160.72 | 1.72 | 0 |
| 12/17/04 | 8:05 | 20.75 | 166.09 | 25.91 | 0.74 | 160.93 | 1.8 | 0 |
| 12/17/04 | 9:50 | 20.44 | 166.4 | 25.9 | 0.75 | 160.94 | 1.71 | 0 |
| 12/18/04 | 7:23 | 20.51 | 166.33 | 25.6 | 1.05 | 161.24 | 1.66 | 1.2 |
| 12/19/04 | 7:25 | 20.61 | 166.23 | 25.8 | 0.85 | 161.04 | 1.7 | 0 |
| 12/20/04 | 9:22 | 20.51 | 166.33 | 25.49 | 1.16 | 161.35 | 1.62 | 1.4 |
| 12/22/04 | 7:37 | 20.91 | 165.93 | 25.45 | 1.2 | 161.39 | 1.64 | 1.4 |
| 12/23/04 | 13:07 | 20.96 | 165.88 | 25.65 | 1 | 161.19 | 1.71 | 1.2 |
| 12/24/04 | 7:05 | 21.55 | 165.29 | 25.8 | 0.85 | 161.04 | 1.75 | 0 |
| 12/26/04 | 8:27 | 20.55 | 166.29 | 25.23 | 1.42 | 161.61 | 1.65 | 1.8 |
| 12/27/04 | 8:03 | 21.05 | 165.79 | 25.7 | 0.95 | 161.14 | 1.56 | 0 |

# Table 3-1
# Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 12/28/04 | 7:49 | 20.4 | 166.44 | 25.44 | 1.21 | 161.4 | 1.67 | 1.5 |
| 12/29/04 | 7:45 | 20.51 | 166.33 | 25.81 | 0.84 | 161.03 | 1.67 | 0 |
| 12/30/04 | 7:42 | 20.78 | 166.06 | 24.91 | 1.74 | 161.93 | 1.65 | 2.25 |
| 12/31/04 | 7:58 | 21.18 | 165.66 | 25.75 | 0.9 | 161.09 | 1.63 | 0 |
| 1/1/05 | 8:09 | 20.99 | 165.85 | 25.48 | 1.17 | 161.36 | 1.67 | 1.4 |
| 1/2/05 | 7:42 | 20.65 | 166.19 | 25.75 | 0.9 | 161.09 | 1.52 | 1 |
| 1/3/05 | 9:24 | 22.59 | 164.25 | 25.7 | 0.95 | 161.14 | 1.44 | 1.1 |
| 1/3/05 | 13:03 | 22.64 | 164.2 | 26 | 0.65 | 160.84 | 1.52 | 0 |
| 1/4/05 | 11:53 | 21.51 | 165.33 | 25.77 | 0.88 | 161.07 | 1.64 | 1 |
| 1/4/05 | 13:53 | 22.43 | 164.41 | 26.11 | 0.54 | 160.73 | 1.52 | 0 |
| 1/5/05 | 6:25 | 22.63 | 164.21 | 25.91 | 0.74 | 160.93 | 1.61 | 0 |
| 1/5/05 | 13:10 | 21.81 | 165.03 | 25.87 | 0.78 | 160.97 | 1.61 | 0 |
| 1/6/05 | 7:03 | 22.88 | 163.96 | 25.65 | 1 | 161.19 | 1.67 | 1 |
| 1/6/05 | 9:48 | 21.57 | 165.27 | 25.84 | 0.81 | 161 | 1.5 | 0 |
| 1/7/05 | 6:45 | 23.8 | 163.04 | 25.8 | 0.85 | 161.04 | 1.69 | 0 |
| 1/7/05 | 13:17 | 23.08 | 163.76 | 25.79 | 0.86 | 161.05 | 1.61 | 1 |
| 1/8/05 | 7:05 | 23.82 | 163.02 | 25.85 | 0.8 | 160.99 | 1.58 | 0 |
| 1/9/05 | 7:37 | 20.21 | 166.63 | 25.7 | 0.95 | 161.14 | 1.44 | 0 |
| 1/10/05 | 8:50 | 20.21 | 166.63 | 25.46 | 1.19 | 161.38 | 1.56 | 1.4 |
| 1/10/05 | 15:30 | 19.85 | 166.99 | 26.05 | 0.6 | 160.79 | 1.5 | 0 |
| 1/11/05 | 7:22 | 19.87 | 166.97 | 25.82 | 0.83 | 161.02 | 1.46 | 0 |
| 1/11/05 | 12:52 | 19.57 | 167.27 | 25.75 | 0.9 | 161.09 | 1.4 | 0 |
| 1/12/05 | 7:40 | 19.97 | 166.87 | 25.54 | 1.11 | 161.3 | 1.36 | 1.3 |
| 1/12/05 | 14:00 | 20.01 | 166.83 | 26.65 | 0 | 160.19 | 1.41 | 0 |
| 1/13/05 | 7:45 | 20.4 | 166.44 | 25.78 | 0.87 | 161.06 | 1.42 | 1 |
| 1/13/05 | 14:00 | 9.36 | 177.48 | 26.05 | 0.6 | 160.79 | 0 | 0 |
| 1/14/05 | 8:34 | 17.9 | 168.94 | 25.9 | 0.75 | 160.94 | 1.59 | 0 |
| 1/14/05 | 12:47 | 19.5 | 167.34 | 25.85 | 0.8 | 160.99 | 1.5 | 0 |
| 1/15/05 | 9:19 | 20.79 | 166.05 | 25.62 | 1.03 | 161.22 | 1.58 | 1.2 |
| 1/16/05 | 10:45 | 20.26 | 166.58 | 25.8 | 0.85 | 161.04 | 1.46 | 0.9 |
| 1/17/05 | 13:17 | 20.15 | 166.69 | 25.72 | 0.93 | 161.12 | 1.5 | 1 |
| 1/18/05 | 10:10 | 20.82 | 166.02 | 25.8 | 0.85 | 161.04 | 1.5 | 1 |
| 1/18/05 | 14:20 | 21.04 | 165.8 | 26.05 | 0.6 | 160.79 | 1.58 | 0 |
| 1/19/05 | 7:30 | 21.38 | 165.46 | 25.85 | 0.8 | 160.99 | 1.57 | 0 |
| 1/20/05 | 9:00 | 20.68 | 166.16 | 25.6 | 1.05 | 161.24 | 1.56 | 1.2 |
| 1/20/05 | 14:38 | 20.21 | 166.63 | 25.99 | 0.66 | 160.85 | 1.46 | 0 |
| 1/21/05 | 13:53 | 20.14 | 166.7 | 25.75 | 0.9 | 161.09 | 1.53 | 1.2 |
| 1/22/05 | 6:45 | 21.17 | 165.67 | 25.98 | 0.67 | 160.86 | 1.56 | 0 |
| 1/23/05 | 7:15 | 21.28 | 165.56 | 25.55 | 1.1 | 161.29 | 1.53 | 1.3 |
| 1/24/05 | 15:05 | 21.35 | 165.49 | 25.72 | 0.93 | 161.12 | 1.4 | 1.1 |
| 1/25/05 | 6:32 | 20.85 | 165.99 | 25.95 | 0.7 | 160.89 | 1.56 | 0 |
| 1/26/05 | 7:40 | 23.17 | 163.67 | 25.66 | 0.99 | 161.18 | 1.54 | 1.2 |
| 1/27/05 | 10:11 | 22.25 | 164.59 | 25.9 | 0.75 | 160.94 | 1.41 | 0.8 |
| 1/28/05 | 7:40 | 22.65 | 164.19 | 25.95 | 0.7 | 160.89 | 1.58 | 0 |
| 1/29/05 | 10:59 | 24 | 162.84 | 25.95 | 0.7 | 160.89 | 1.71 | 1.1 |
| 1/30/05 | 11:01 | 23.02 | 163.82 | 26.21 | 0.44 | 160.63 | 1.54 | 0 |
| 1/31/05 | 6:20 | 23.82 | 163.02 | 25.7 | 0.95 | 161.14 | 1.6 | 1.1 |
| 2/4/05 | 8:03 | 14.02 | 172.82 | 26.11 | 0.54 | 160.73 | 0.88 | 0 |

# Table 3-1
# Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 2/5/05 | 8:40 | 11.95 | 174.89 | 26.09 | 0.56 | 160.75 | 0.42 | 0 |
| 2/6/05 | 9:45 | 12.42 | 174.42 | 26.06 | 0.59 | 160.78 | 0.52 | 0 |
| 2/7/05 | 7:06 | 12.06 | 174.78 | 26.04 | 0.61 | 160.8 | 0.51 | 0 |
| 2/7/05 | 14:57 | 12.05 | 174.79 | 26.04 | 0.61 | 160.8 | 0.41 | 0 |
| 2/8/05 | 9:42 | 12.04 | 174.8 | 26.03 | 0.62 | 160.81 | 0.47 | 0 |
| 2/8/05 | 12:51 | 12.1 | 174.74 | 26.03 | 0.62 | 160.81 | 0.46 | 0 |
| 2/9/05 | 9:18 | 12 | 174.84 | 26 | 0.65 | 160.84 | 0.53 | 0 |
| 2/9/05 | 14:12 | 12.3 | 174.54 | 25.99 | 0.66 | 160.85 | 0.52 | 0 |
| 2/10/05 | 8:18 | 12.39 | 174.45 | 25.98 | 0.67 | 160.86 | 0.51 | 0.7 |
| 2/10/05 | 13:52 | 12.38 | 174.46 | 26.04 | 0.61 | 160.8 | 0.52 | 0 |
| 2/11/05 | 9:49 | 12.47 | 174.37 | 26 | 0.65 | 160.84 | 0.48 | 0 |
| 2/11/05 | 12:00 | 12.51 | 174.33 | 25.99 | 0.66 | 160.85 | 0.49 | 0 |
| 2/12/05 | 14:54 | 12.52 | 174.32 | 25.95 | 0.7 | 160.89 | 0.56 | 0 |
| 2/13/05 | 13:24 | 12.49 | 174.35 | 25.93 | 0.72 | 160.91 | 0.54 | 0 |
| 2/14/05 | 10:20 | 12.6 | 174.24 | 25.9 | 0.75 | 160.94 | 0.5 | 0 |
| 2/14/05 | 13:32 | 12.5 | 174.34 | 25.9 | 0.75 | 160.94 | 0.51 | 0.8 |
| 2/15/05 | 10:03 | 12.6 | 174.24 | 26.11 | 0.54 | 160.73 | 0.53 | 0 |
| 2/15/05 | 14:52 | 15.09 | 171.75 | 26 | 0.65 | 160.84 | 0.96 | 0 |
| 2/16/05 | 6:25 | 15.46 | 171.38 | 26 | 0.65 | 160.84 | 0.97 | 0 |
| 2/16/05 | 15:13 | 15.43 | 171.41 | 25.94 | 0.71 | 160.9 | 1.03 | 0 |
| 2/17/05 | 13:09 | 15.48 | 171.36 | 25.86 | 0.79 | 160.98 | 0.96 | 0 |
| 2/18/05 | 6:57 | 15.37 | 171.47 | 25.78 | 0.87 | 161.06 | 0.99 | 0 |
| 2/18/05 | 12:45 | 15.34 | 171.5 | 25.75 | 0.9 | 161.09 | 0.97 | 1 |
| 2/20/05 | 7:37 | 15.41 | 171.43 | 25.91 | 0.74 | 160.93 | 0.99 | 0 |
| 2/21/05 | 7:19 | 15.35 | 171.49 | 25.8 | 0.85 | 161.04 | 0.95 | 0.9 |
| 2/21/05 | 12:02 | 15.09 | 171.75 | 26.05 | 0.6 | 160.79 | 0.95 | 0 |
| 2/22/05 | 7:13 | 15.77 | 171.07 | 25.99 | 0.66 | 160.85 | 1.02 | 0 |
| 2/22/05 | 12:40 | 15.65 | 171.19 | 25.96 | 0.69 | 160.88 | 0.98 | 0 |
| 2/23/05 | 7:28 | 16.1 | 170.74 | 25.8 | 0.85 | 161.04 | 1 | 0 |
| 2/23/05 | 11:45 | 15.75 | 171.09 | 25.75 | 0.9 | 161.09 | 0.98 | 0 |
| 2/24/05 | 5:45 | 15.16 | 171.68 | 25.7 | 0.95 | 161.14 | 1.06 | 1.1 |
| 2/24/05 | 12:02 | 15.42 | 171.42 | 26.1 | 0.55 | 160.74 | 1.01 | 0 |
| 2/25/05 | 7:05 | 16.15 | 170.69 | 25.97 | 0.68 | 160.87 | 1.01 | 0 |
| 2/25/05 | 11:30 | 16.05 | 170.79 | 26 | 0.65 | 160.84 | 0.98 | 0 |
| 3/1/05 | 8:49 | 14.69 | 172.15 | 25.63 | 1.02 | 161.21 | 0.98 | 1.2 |
| 3/1/05 | 14:03 | 15.14 | 171.7 | 26.21 | 0.44 | 160.63 | 1.03 | 0 |
| 3/2/05 | 7:24 | 15.31 | 171.53 | 26.17 | 0.48 | 160.67 | 0.98 | 0 |
| 3/2/05 | 14:20 | 15.52 | 171.32 | 26.05 | 0.6 | 160.79 | 1.03 | 0 |
| 3/3/05 | 8:12 | 15.31 | 171.53 | 26 | 0.65 | 160.84 | 0.99 | 0 |
| 3/3/05 | 12:52 | 15.2 | 171.64 | 25.98 | 0.67 | 160.86 | 0.97 | 0 |
| 3/4/05 | 7:27 | 15.83 | 171.01 | 25.9 | 0.75 | 160.94 | 1.01 | 0 |
| 3/4/05 | 14:00 | 15.75 | 171.09 | 25.88 | 0.77 | 160.96 | 0.99 | 0 |
| 3/5/05 | 6:30 | 15.74 | 171.1 | 25.75 | 0.9 | 161.09 | 1.04 | 0 |
| 3/6/05 | 7:15 | 15.65 | 171.19 | 25.64 | 1.01 | 161.2 | 0.98 | 0 |
| 3/7/05 | 7:05 | 15.32 | 171.52 | 25.51 | 1.14 | 161.33 | 1 | 1.4 |
| 3/7/05 | 15:32 | 15.29 | 171.55 | 26.1 | 0.55 | 160.74 | 1.04 | 0 |
| 3/8/05 | 7:10 | 15.21 | 171.63 | 26.03 | 0.62 | 160.81 | 0.96 | 0 |
| 3/8/05 | 14:15 | 15.32 | 171.52 | 26 | 0.65 | 160.84 | 1 | 0 |

# Table 3-1
# Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 3/9/05 | 5:59 | 15.82 | 171.02 | 25.9 | 0.75 | 160.94 | 1.06 | 0 |
| 3/9/05 | 12:35 | 15.69 | 171.15 | 25.88 | 0.77 | 160.96 | 1.04 | 0 |
| 3/10/05 | 6:39 | 15.71 | 171.13 | 25.79 | 0.86 | 161.05 | 0.99 | 0 |
| 3/10/05 | 13:13 | 15.52 | 171.32 | 25.68 | 0.97 | 161.16 | 0.99 | 1.1 |
| 3/11/05 | 5:54 | 15.81 | 171.03 | 26.65 | 0 | 160.19 | 0.97 | 0 |
| 3/11/05 | 12:00 | 15.42 | 171.42 | 26.65 | 0 | 160.19 | 1.01 | 0 |
| 3/12/05 | 9:33 | 15.46 | 171.38 | 26.25 | 0.4 | 160.59 | 1.01 | 0 |
| 3/13/05 | 7:03 | 15.62 | 171.22 | 25.95 | 0.7 | 160.89 | 1.04 | 0 |
| 3/14/05 | 7:30 | 15.47 | 171.37 | 25.85 | 0.8 | 160.99 | 1.02 | 0 |
| 3/14/05 | 13:34 | 15.26 | 171.58 | 25.77 | 0.88 | 161.07 | 1.04 | 1 |
| 3/15/05 | 6:31 | 15.59 | 171.25 | 26.35 | 0.3 | 160.49 | 1.03 | 0 |
| 3/15/05 | 13:20 | 15.49 | 171.35 | 26.29 | 0.36 | 160.55 | 1.02 | 0 |
| 3/16/05 | 6:38 | 15.48 | 171.36 | 26.65 | 0 | 160.19 | 0.97 | 0 |
| 3/16/05 | 13:52 | 15.37 | 171.47 | 26.11 | 0.54 | 160.73 | 1.03 | 0 |
| 3/17/05 | 6:26 | 15.27 | 171.57 | 25.95 | 0.7 | 160.89 | 1 | 0 |
| 3/17/05 | 13:33 | 15.42 | 171.42 | 25.91 | 0.74 | 160.93 | 1.04 | 0 |
| 3/18/05 | 7:00 | 15.44 | 171.4 | 25.65 | 1 | 161.19 | 1 | 1.2 |
| 3/18/05 | 14:51 | 15.36 | 171.48 | 26.31 | 0.34 | 160.53 | 1.02 | 0 |
| 3/19/05 | 6:36 | 15.4 | 171.44 | 26.03 | 0.62 | 160.81 | 0.91 | 0 |
| 3/20/05 | 6:48 | 15.23 | 171.61 | 26.03 | 0.62 | 160.81 | 0.96 | 0 |
| 3/21/05 | 6:56 | 15.05 | 171.79 | 25.82 | 0.83 | 161.02 | 1 | 0 |
| 3/21/05 | 13:38 | 14.85 | 171.99 | 25.8 | 0.85 | 161.04 | 1.01 | 0 |
| 3/21/05 | 15:48 | 19.48 | 167.36 | 25.75 | 0.9 | 161.09 | 1.5 | 0 |
| 3/22/05 | 7:16 | 21.74 | 165.1 | 25.55 | 1.1 | 161.29 | 1.54 | 1.3 |
| 3/22/05 | 13:00 | 19.84 | 167 | 26.09 | 0.56 | 160.75 | 1.48 | 0 |
| 3/23/05 | 7:08 | 21.21 | 165.63 | 25.85 | 0.8 | 160.99 | 1.59 | 0 |
| 3/23/05 | 13:42 | 20.9 | 165.94 | 25.78 | 0.87 | 161.06 | 1.57 | 0 |
| 3/24/05 | 7:30 | 20.89 | 165.95 | 25.55 | 1.1 | 161.29 | 1.53 | 1.3 |
| 3/24/05 | 13:38 | 20.88 | 165.96 | 26.08 | 0.57 | 160.76 | 1.59 | 0 |
| 3/25/05 | 6:38 | 21.56 | 165.28 | 25.83 | 0.82 | 161.01 | 1.56 | 0 |
| 3/25/05 | 11:55 | 21.53 | 165.31 | 25.78 | 0.87 | 161.06 | 1.56 | 0 |
| 3/26/05 | 6:58 | 21.62 | 165.22 | 25.57 | 1.08 | 161.27 | 1.53 | 1.3 |
| 3/27/05 | 8:09 | 20.77 | 166.07 | 25.85 | 0.8 | 160.99 | 1.55 | 0 |
| 3/28/05 | 6:25 | 20.74 | 166.1 | 25.56 | 1.09 | 161.28 | 1.57 | 1.3 |
| 3/29/05 | 6:36 | 18.66 | 168.18 | 25.85 | 0.8 | 160.99 | 1.51 | 0 |
| 3/29/05 | 12:35 | 18.85 | 167.99 | 25.69 | 0.96 | 161.15 | 1.57 | 1.1 |
| 3/30/05 | 7:33 | 17.22 | 169.62 | 25.95 | 0.7 | 160.89 | 1.51 | 0 |
| 3/30/05 | 14:30 | 17.05 | 169.79 | 25.89 | 0.76 | 160.95 | 1.49 | 0 |
| 3/31/05 | 7:00 | 16.82 | 170.02 | 25.75 | 0.9 | 161.09 | 1.49 | 1 |
| 3/31/05 | 14:19 | 16.95 | 169.89 | 26.05 | 0.6 | 160.79 | 1.52 | 0 |
| 4/1/05 | 7:15 | 16.9 | 169.94 | 25.95 | 0.7 | 160.89 | 1.55 | 0 |
| 4/2/05 | 7:04 | 17.06 | 169.78 | 25.75 | 0.9 | 161.09 | 1.49 | 0 |
| 4/3/05 | 7:55 | 21.62 | 165.22 | 25.6 | 1.05 | 161.24 | 1.81 | 1.2 |
| 4/4/05 | 6:15 | 17.09 | 169.75 | 25.94 | 0.71 | 160.9 | 1.53 | 0 |
| 4/5/05 | 7:30 | 17.79 | 169.05 | 25.76 | 0.89 | 161.08 | 1.54 | 1 |
| 4/6/05 | 7:17 | 17.77 | 169.07 | 26.03 | 0.62 | 160.81 | 1.52 | 0 |
| 4/7/2005 | 10:38 | 17.48 | 169.36 | 25.99 | 0.66 | 160.85 | 1.51 | 0 |
| 4/8/2005 | 7:12 | 17.45 | 169.39 | 25.46 | 1.19 | 161.38 | 1.56 | 1.4 |

## Table 3-1
## Summary of Effectiveness Monitoring Measurements at PW-1

| Date | Time | Depth to Groundwater (feet) | Water Level Elevation (feet) | Depth to DNAPL (feet) | DNAPL Thickness (feet) | DNAPL Elevation (feet) | Pumping Rate (gpm) | DNAPL Recovered (gallons) |
|---|---|---|---|---|---|---|---|---|
| 4/9/2005 | 14:49 | 16.44 | 170.4 | 25.79 | 0.86 | 161.05 | 1.56 | 0.9 |
| 4/10/2005 | 7:37 | 16.63 | 170.21 | 25.99 | 0.66 | 160.85 | 1.58 | 0 |
| 4/11/2005 | 5:55 | 16.7 | 170.14 | 25.74 | 0.91 | 161.1 | 1.57 | 1 |
| 4/11/2005 | 13:25 | 16.6 | 170.24 | 26.11 | 0.54 | 160.73 | 1.54 | 0 |
| 4/12/2005 | 5:46 | 16.38 | 170.46 | 25.95 | 0.7 | 160.89 | 1.57 | 0 |
| 4/12/2005 | 14:30 | 16.51 | 170.33 | 25.8 | 0.85 | 161.04 | 1.55 | 0 |
| 4/13/2005 | 6:45 | 16.76 | 170.08 | 25.63 | 1.02 | 161.21 | 1.52 | 1.2 |
| 4/13/2005 | 13:50 | 16.8 | 170.04 | 26.05 | 0.6 | 160.79 | 1.54 | 0 |
| 4/14/2005 | 7:48 | 16.89 | 169.95 | 25.88 | 0.77 | 160.96 | 1.54 | 0 |
| 4/14/2005 | 13:37 | 16.77 | 170.07 | 25.8 | 0.85 | 161.04 | 1.56 | 0 |
| 4/15/2005 | 7:33 | 17.17 | 169.67 | 25.63 | 1.02 | 161.21 | 1.59 | 1.2 |
| 4/15/2005 | 14:00 | 16.68 | 170.16 | 25.96 | 0.69 | 160.88 | 1.46 | 0 |
| 4/16/2005 | 7:26 | 16.8 | 170.04 | 25.9 | 0.75 | 160.94 | 1.56 | 0 |
| 4/17/2005 | 7:05 | 17.21 | 169.63 | 25.58 | 1.07 | 161.26 | 1.55 | 1.3 |
| 4/18/2005 | 7:32 | 17.38 | 169.46 | 25.89 | 0.76 | 160.95 | 1.56 | 0 |
| 4/18/2005 | 13:22 | 17.05 | 169.79 | 25.8 | 0.85 | 161.04 | 1.52 | 0.9 |
| 4/19/2005 | 9:18 | 17.45 | 169.39 | 25.91 | 0.74 | 160.93 | 1.51 | 0 |
| 4/19/2005 | 13:48 | 17.09 | 169.75 | 25.88 | 0.77 | 160.96 | 1.51 | 0 |
| 4/20/2005 | 8:26 | 16.93 | 169.91 | 25.68 | 0.97 | 161.16 | 1.54 | 1.1 |
| 4/21/2005 | 7:09 | 16.53 | 170.31 | 25.89 | 0.76 | 160.95 | 1.58 | 0.8 |
| 4/22/2005 | 7:50 | 7.36 | 179.48 | ----- | 0 | ----- | 0 | 0 |
| 4/23/2005 | 6:55 | 7.39 | 179.45 | ----- | 0 | ----- | 0 | 0 |
| 4/24/2005 | 7:23 | 7.41 | 179.43 | ----- | 0 | ----- | 0 | 0 |
| 4/27/2005 | 9:54 | 7.89 | 178.95 | 26.05 | 0.6 | 160.79 | 0 | 0.6 |
| 5/2/2005 | 12:35 | 7.58 | 179.26 | ----- | 0 | ----- | 0 | 0 |
| 5/3/2005 | 10:17 | 7.6 | 179.24 | ----- | 0 | ----- | 0 | 0 |

NR: Data not recorded. -----: No DNAPL present.

# Table 3-2
# Measured Groundwater Elevations at Monitoring/Observation Wells

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| M-24A | 10/31/2004 | 187.15 | 6.62 | 180.53 |
| M-24A | 11/7/04 15:40 | 187.15 | 7.06 | 180.09 |
| M-24A | 11/8/04 17:00 | 187.15 | 7 | 180.15 |
| M-24A | 11/9/04 8:36 | 187.15 | 7.04 | 180.11 |
| M-24A | 11/9/04 10:11 | 187.15 | 7.05 | 180.1 |
| M-24A | 11/9/04 11:34 | 187.15 | 7.05 | 180.1 |
| M-24A | 11/9/04 15:40 | 187.15 | 7.06 | 180.09 |
| M-24A | 11/9/04 17:47 | 187.15 | 7.06 | 180.09 |
| M-24A | 11/10/04 11:31 | 187.15 | 7.11 | 180.04 |
| M-24A | 11/12/04 13:52 | 187.15 | 7.2 | 179.95 |
| M-24A | 11/15/04 14:11 | 187.15 | 7.4 | 179.75 |
| M-24A | 11/16/04 9:47 | 187.15 | 7.46 | 179.69 |
| M-24A | 11/17/04 8:37 | 187.15 | 7.5 | 179.65 |
| M-24A | 11/18/04 14:09 | 187.15 | 7.51 | 179.64 |
| M-24A | 11/19/04 14:49 | 187.15 | 7.57 | 179.58 |
| M-24A | 11/22/04 8:04 | 187.15 | 7.74 | 179.41 |
| M-24A | 11/23/04 14:12 | 187.15 | 7.75 | 179.4 |
| M-24A | 11/24/04 8:38 | 187.15 | 7.81 | 179.34 |
| M-24A | 11/29/04 13:24 | 187.15 | 7.69 | 179.46 |
| M-24A | 11/30/04 16:09 | 187.15 | 7.64 | 179.51 |
| M-24A | 12/1/04 15:48 | 187.15 | 7.63 | 179.52 |
| M-24A | 12/2/04 8:09 | 187.15 | 7.65 | 179.5 |
| M-24A | 12/3/04 14:49 | 187.15 | 7.75 | 179.4 |
| M-24A | 12/6/04 15:53 | 187.15 | 7.89 | 179.26 |
| M-24A | 12/8/04 8:03 | 187.15 | 7.98 | 179.17 |
| M-24A | 12/9/04 13:54 | 187.15 | 7.96 | 179.19 |
| M-24A | 12/14/04 14:13 | 187.15 | 8.08 | 179.07 |
| M-24A | 12/16/04 13:44 | 187.15 | 8.11 | 179.04 |
| M-24A | 12/17/04 9:44 | 187.15 | 8.17 | 178.98 |
| M-24A | 1/30/05 10:30 | 187.15 | 8.72 | 178.43 |
| M-24A | 3/21/05 13:57 | 187.15 | 8.64 | 178.51 |
| M-24A | 4/6/2005 8:24 | 187.15 | 7.62 | 179.53 |
| M-24B | 10/31/2004 | 187.19 | 6.68 | 180.51 |
| M-24B | 11/7/04 15:41 | 187.19 | 7.11 | 180.08 |
| M-24B | 11/8/04 17:01 | 187.19 | 7.05 | 180.14 |
| M-24B | 11/9/04 8:37 | 187.19 | 7.1 | 180.09 |
| M-24B | 11/9/04 10:12 | 187.19 | 7.11 | 180.08 |
| M-24B | 11/9/04 11:35 | 187.19 | 7.11 | 180.08 |
| M-24B | 11/9/04 15:41 | 187.19 | 7.11 | 180.08 |
| M-24B | 11/9/04 17:48 | 187.19 | 7.12 | 180.07 |
| M-24B | 11/10/04 11:31 | 187.19 | 7.18 | 180.01 |
| M-24B | 11/12/04 13:53 | 187.19 | 7.26 | 179.93 |
| M-24B | 11/15/04 14:10 | 187.19 | 7.46 | 179.73 |
| M-24B | 11/16/04 9:48 | 187.19 | 7.52 | 179.67 |
| M-24B | 11/17/04 8:35 | 187.19 | 7.54 | 179.65 |
| M-24B | 11/18/04 14:08 | 187.19 | 7.57 | 179.62 |
| M-24B | 11/19/04 14:50 | 187.19 | 7.65 | 179.54 |
| M-24B | 11/22/04 8:05 | 187.19 | 7.81 | 179.38 |

## Table 3-2
## Measured Groundwater Elevations at Monitoring/Observation Wells

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| M-24B | 11/23/04 14:11 | 187.19 | 7.81 | 179.38 |
| M-24B | 11/24/04 8:37 | 187.19 | 7.87 | 179.32 |
| M-24B | 11/29/04 13:25 | 187.19 | 7.74 | 179.45 |
| M-24B | 11/30/04 16:10 | 187.19 | 7.69 | 179.5 |
| M-24B | 12/1/04 15:47 | 187.19 | 7.69 | 179.5 |
| M-24B | 12/2/04 8:08 | 187.19 | 7.72 | 179.47 |
| M-24B | 12/3/04 14:48 | 187.19 | 7.8 | 179.39 |
| M-24B | 12/6/04 15:52 | 187.19 | 7.94 | 179.25 |
| M-24B | 12/8/04 8:02 | 187.19 | 8.04 | 179.15 |
| M-24B | 12/9/04 13:53 | 187.19 | 8.03 | 179.16 |
| M-24B | 12/14/04 14:12 | 187.19 | 8.15 | 179.04 |
| M-24B | 12/16/04 13:43 | 187.19 | 8.27 | 178.92 |
| M-24B | 12/17/04 9:43 | 187.19 | 8.21 | 178.98 |
| M-24B | 1/30/05 10:31 | 187.19 | 8.78 | 178.41 |
| M-24B | 3/21/05 13:56 | 187.19 | 8.7 | 178.49 |
| M-24B | 4/6/2005 8:23 | 187.19 | 7.69 | 179.5 |
| M-28R | 10/31/2004 | 186.62 | 6.1 | 180.52 |
| M-28R | 11/7/04 15:43 | 186.62 | 6.48 | 180.14 |
| M-28R | 11/8/04 17:05 | 186.62 | 6.43 | 180.19 |
| M-28R | 11/9/04 8:41 | 186.62 | 6.46 | 180.16 |
| M-28R | 11/9/04 10:14 | 186.62 | 6.46 | 180.16 |
| M-28R | 11/9/04 11:37 | 186.62 | 6.48 | 180.14 |
| M-28R | 11/9/04 15:43 | 186.62 | 6.48 | 180.14 |
| M-28R | 11/9/04 17:50 | 186.62 | 6.48 | 180.14 |
| M-28R | 11/10/04 11:33 | 186.62 | 6.49 | 180.13 |
| M-28R | 11/12/04 13:57 | 186.62 | 6.55 | 180.07 |
| M-28R | 11/15/04 14:07 | 186.62 | 6.65 | 179.97 |
| M-28R | 11/16/04 9:44 | 186.62 | 6.68 | 179.94 |
| M-28R | 11/17/04 8:32 | 186.62 | 6.7 | 179.92 |
| M-28R | 11/18/04 14:05 | 186.62 | 6.73 | 179.89 |
| M-28R | 11/19/04 14:45 | 186.62 | 6.77 | 179.85 |
| M-28R | 11/22/04 7:59 | 186.62 | 6.85 | 179.77 |
| M-28R | 11/23/04 14:09 | 186.62 | 6.88 | 179.74 |
| M-28R | 11/24/04 8:34 | 186.62 | 6.92 | 179.7 |
| M-28R | 11/29/04 13:22 | 186.62 | 6.46 | 180.16 |
| M-28R | 11/30/04 16:06 | 186.62 | 6.49 | 180.13 |
| M-28R | 12/1/04 15:44 | 186.62 | 6.54 | 180.08 |
| M-28R | 12/2/04 8:06 | 186.62 | 6.58 | 180.04 |
| M-28R | 12/3/04 14:46 | 186.62 | 6.66 | 179.96 |
| M-28R | 12/6/04 15:49 | 186.62 | 6.83 | 179.79 |
| M-28R | 12/8/04 8:00 | 186.62 | 6.9 | 179.72 |
| M-28R | 12/9/04 13:51 | 186.62 | 6.92 | 179.7 |
| M-28R | 12/14/04 14:08 | 186.62 | 6.97 | 179.65 |
| M-28R | 12/16/04 13:41 | 186.62 | 7.01 | 179.61 |
| M-28R | 12/17/04 9:40 | 186.62 | 7.04 | 179.58 |
| M-28R | 1/30/05 8:15 | 186.62 | 7.49 | 179.13 |
| M-28R | 3/21/05 13:52 | 186.62 | 7.03 | 179.59 |
| M-28R | 4/6/2005 8:20 | 186.62 | 6.22 | 180.4 |

## Table 3-2
## Measured Groundwater Elevations at Monitoring/Observation Wells

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| M-29 | 10/31/2004 | 186.67 | 5.84 | 180.83 |
| M-29 | 11/7/04 15:45 | 186.67 | 6.25 | 180.42 |
| M-29 | 11/8/04 17:07 | 186.67 | 6.21 | 180.46 |
| M-29 | 11/9/04 8:44 | 186.67 | 6.24 | 180.43 |
| M-29 | 11/9/04 10:16 | 186.67 | 6.25 | 180.42 |
| M-29 | 11/9/04 11:38 | 186.67 | 6.25 | 180.42 |
| M-29 | 11/9/04 15:45 | 186.67 | 6.25 | 180.42 |
| M-29 | 11/9/04 17:51 | 186.67 | 6.26 | 180.41 |
| M-29 | 11/10/04 11:35 | 186.67 | 6.29 | 180.38 |
| M-29 | 11/12/04 14:00 | 186.67 | 6.37 | 180.3 |
| M-29 | 11/15/04 14:05 | 186.67 | 6.52 | 180.15 |
| M-29 | 11/16/04 9:42 | 186.67 | 6.55 | 180.12 |
| M-29 | 11/17/04 8:30 | 186.67 | 6.78 | 179.89 |
| M-29 | 11/18/04 14:03 | 186.67 | 6.63 | 180.04 |
| M-29 | 11/19/04 14:43 | 186.67 | 6.67 | 180 |
| M-29 | 11/22/04 7:57 | 186.67 | 6.78 | 179.89 |
| M-29 | 11/23/04 14:07 | 186.67 | 6.82 | 179.85 |
| M-29 | 11/24/04 8:32 | 186.67 | 6.85 | 179.82 |
| M-29 | 11/29/04 13:19 | 186.67 | 6.54 | 180.13 |
| M-29 | 11/30/04 16:05 | 186.67 | 6.55 | 180.12 |
| M-29 | 12/1/04 15:43 | 186.67 | 6.57 | 180.1 |
| M-29 | 12/2/04 8:04 | 186.67 | 6.59 | 180.08 |
| M-29 | 12/3/04 14:44 | 186.67 | 6.68 | 179.99 |
| M-29 | 12/6/04 15:48 | 186.67 | 6.87 | 179.8 |
| M-29 | 12/8/04 7:57 | 186.67 | 6.92 | 179.75 |
| M-29 | 12/9/04 13:49 | 186.67 | 6.95 | 179.72 |
| M-29 | 12/14/04 14:07 | 186.67 | 7.02 | 179.65 |
| M-29 | 12/16/04 13:39 | 186.67 | 7.07 | 179.6 |
| M-29 | 12/17/04 9:38 | 186.67 | 7.09 | 179.58 |
| M-29 | 1/30/05 8:14 | 186.67 | 7.66 | 179.01 |
| M-29 | 3/21/05 13:50 | 186.67 | 7.4 | 179.27 |
| M-29 | 4/6/2005 8:15 | 186.67 | 6.37 | 180.3 |
| M-30A | 10/31/2004 | 187.24 | 6.41 | 180.83 |
| M-30A | 11/7/04 15:46 | 187.24 | 6.88 | 180.36 |
| M-30A | 11/8/04 17:09 | 187.24 | 6.82 | 180.42 |
| M-30A | 11/9/04 8:46 | 187.24 | 6.86 | 180.38 |
| M-30A | 11/9/04 10:17 | 187.24 | 6.87 | 180.37 |
| M-30A | 11/9/04 11:39 | 187.24 | 6.86 | 180.38 |
| M-30A | 11/9/04 15:46 | 187.24 | 6.88 | 180.36 |
| M-30A | 11/9/04 17:52 | 187.24 | 6.9 | 180.34 |
| M-30A | 11/10/04 11:36 | 187.24 | 6.92 | 180.32 |
| M-30A | 11/12/04 14:03 | 187.24 | 7.04 | 180.2 |
| M-30A | 11/15/04 14:04 | 187.24 | 7.18 | 180.06 |
| M-30A | 11/16/04 9:40 | 187.24 | 7.22 | 180.02 |
| M-30A | 11/17/04 8:28 | 187.24 | 7.25 | 179.99 |
| M-30A | 11/18/04 14:02 | 187.24 | 7.3 | 179.94 |
| M-30A | 11/19/04 14:42 | 187.24 | 7.35 | 179.89 |
| M-30A | 11/22/04 7:56 | 187.24 | 7.48 | 179.76 |

## Table 3-2
## Measured Groundwater Elevations at Monitoring/Observation Wells

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| M-30A | 11/23/04 14:06 | 187.24 | 7.53 | 179.71 |
| M-30A | 11/24/04 8:30 | 187.24 | 7.56 | 179.68 |
| M-30A | 11/29/04 13:18 | 187.24 | 7.4 | 179.84 |
| M-30A | 11/30/04 16:03 | 187.24 | 7.35 | 179.89 |
| M-30A | 12/1/04 15:41 | 187.24 | 7.36 | 179.88 |
| M-30A | 12/2/04 8:02 | 187.24 | 7.38 | 179.86 |
| M-30A | 12/3/04 14:43 | 187.24 | 7.47 | 179.77 |
| M-30A | 12/6/04 15:46 | 187.24 | 7.63 | 179.61 |
| M-30A | 12/8/04 7:56 | 187.24 | 7.69 | 179.55 |
| M-30A | 12/9/04 13:47 | 187.24 | 7.72 | 179.52 |
| M-30A | 12/14/04 14:05 | 187.24 | 7.81 | 179.43 |
| M-30A | 12/16/04 13:37 | 187.24 | 7.87 | 179.37 |
| M-30A | 12/17/04 9:37 | 187.24 | 7.9 | 179.34 |
| M-30A | 1/30/05 8:12 | 187.24 | 8.53 | 178.71 |
| M-30A | 3/21/05 13:48 | 187.24 | 8.35 | 178.89 |
| M-30A | 4/6/2005 8:13 | 187.24 | 7.22 | 180.02 |
| M-30B | 10/31/2004 | 187.31 | 6.49 | 180.82 |
| M-30B | 11/7/04 15:47 | 187.31 | 6.96 | 180.35 |
| M-30B | 11/8/04 17:10 | 187.31 | 6.91 | 180.4 |
| M-30B | 11/9/04 8:47 | 187.31 | 6.94 | 180.37 |
| M-30B | 11/9/04 10:18 | 187.31 | 6.95 | 180.36 |
| M-30B | 11/9/04 11:40 | 187.31 | 6.85 | 180.46 |
| M-30B | 11/9/04 15:47 | 187.31 | 6.96 | 180.35 |
| M-30B | 11/9/04 17:53 | 187.31 | 6.96 | 180.35 |
| M-30B | 11/10/04 11:37 | 187.31 | 7 | 180.31 |
| M-30B | 11/12/04 14:04 | 187.31 | 7.09 | 180.22 |
| M-30B | 11/15/04 14:03 | 187.31 | 7.27 | 180.04 |
| M-30B | 11/16/04 9:38 | 187.31 | 7.31 | 180 |
| M-30B | 11/17/04 8:27 | 187.31 | 7.32 | 179.99 |
| M-30B | 11/18/04 14:01 | 187.31 | 7.38 | 179.93 |
| M-30B | 11/19/04 14:41 | 187.31 | 7.43 | 179.88 |
| M-30B | 11/22/04 7:55 | 187.31 | 7.58 | 179.73 |
| M-30B | 11/23/04 14:04 | 187.31 | 7.62 | 179.69 |
| M-30B | 11/24/04 8:29 | 187.31 | 7.65 | 179.66 |
| M-30B | 11/29/04 13:16 | 187.31 | 7.45 | 179.86 |
| M-30B | 11/30/04 16:02 | 187.31 | 7.42 | 179.89 |
| M-30B | 12/1/04 15:40 | 187.31 | 7.44 | 179.87 |
| M-30B | 12/2/04 8:01 | 187.31 | 7.46 | 179.85 |
| M-30B | 12/3/04 14:42 | 187.31 | 7.55 | 179.76 |
| M-30B | 12/6/04 15:45 | 187.31 | 7.72 | 179.59 |
| M-30B | 12/8/04 7:54 | 187.31 | 7.75 | 179.56 |
| M-30B | 12/9/04 13:46 | 187.31 | 7.8 | 179.51 |
| M-30B | 12/14/04 14:04 | 187.31 | 7.91 | 179.4 |
| M-30B | 12/16/04 13:36 | 187.31 | 7.96 | 179.35 |
| M-30B | 12/17/04 9:36 | 187.31 | 7.98 | 179.33 |
| M-30B | 1/30/05 8:11 | 187.31 | 8.62 | 178.69 |
| M-30B | 3/21/05 13:47 | 187.31 | 8.43 | 178.88 |
| M-30B | 4/6/2005 8:12 | 187.31 | 7.32 | 179.99 |

**Table 3-2**
**Measured Groundwater Elevations at Monitoring/Observation Wells**

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| M-31 | 10/31/2004 | 187.5 | 7.24 | 180.26 |
| M-31 | 11/7/04 15:49 | 187.5 | 7.75 | 179.75 |
| M-31 | 11/8/04 17:12 | 187.5 | 7.69 | 179.81 |
| M-31 | 11/9/04 8:51 | 187.5 | 7.75 | 179.75 |
| M-31 | 11/9/04 10:20 | 187.5 | 7.73 | 179.77 |
| M-31 | 11/9/04 11:43 | 187.5 | 7.74 | 179.76 |
| M-31 | 11/9/04 15:49 | 187.5 | 7.75 | 179.75 |
| M-31 | 11/9/04 17:55 | 187.5 | 7.75 | 179.75 |
| M-31 | 11/10/04 11:38 | 187.5 | 7.8 | 179.7 |
| M-31 | 11/12/04 14:10 | 187.5 | 7.89 | 179.61 |
| M-31 | 11/15/04 14:00 | 187.5 | 8.07 | 179.43 |
| M-31 | 11/16/04 9:35 | 187.5 | 8.11 | 179.39 |
| M-31 | 11/17/04 8:24 | 187.5 | 8.14 | 179.36 |
| M-31 | 11/18/04 13:59 | 187.5 | 8.19 | 179.31 |
| M-31 | 11/19/04 14:38 | 187.5 | 8.25 | 179.25 |
| M-31 | 11/22/04 7:52 | 187.5 | 8.39 | 179.11 |
| M-31 | 11/23/04 14:01 | 187.5 | 8.45 | 179.05 |
| M-31 | 11/24/04 8:27 | 187.5 | 8.48 | 179.02 |
| M-31 | 11/29/04 13:14 | 187.5 | 8.39 | 179.11 |
| M-31 | 11/30/04 16:00 | 187.5 | 8.4 | 179.1 |
| M-31 | 12/1/04 15:38 | 187.5 | 8.42 | 179.08 |
| M-31 | 12/2/04 7:58 | 187.5 | 8.45 | 179.05 |
| M-31 | 12/3/04 14:40 | 187.5 | 8.52 | 178.98 |
| M-31 | 12/6/04 15:42 | 187.5 | 8.64 | 178.86 |
| M-31 | 12/8/04 7:52 | 187.5 | 8.41 | 179.09 |
| M-31 | 12/9/04 13:43 | 187.5 | 8.74 | 178.76 |
| M-31 | 12/14/04 14:02 | 187.5 | 8.86 | 178.64 |
| M-31 | 12/16/04 13:33 | 187.5 | 8.93 | 178.57 |
| M-31 | 12/17/04 9:46 | 187.5 | 8.96 | 178.54 |
| M-31 | 1/30/05 8:10 | 187.5 | 9.7 | 177.8 |
| M-31 | 3/21/05 13:44 | 187.5 | 10.65 | 176.85 |
| M-31 | 4/6/2005 8:10 | 187.5 | 8.43 | 179.07 |
| OW-1 | 10/31/2004 | 187.35 | 6.82 | 180.53 |
| OW-1 | 11/7/04 15:38 | 187.35 | 7.63 | 179.72 |
| OW-1 | 11/8/04 16:36 | 187.35 | 7.29 | 180.06 |
| OW-1 | 11/9/04 8:32 | 187.35 | 7.51 | 179.84 |
| OW-1 | 11/9/04 10:09 | 187.35 | 7.6 | 179.75 |
| OW-1 | 11/9/04 11:32 | 187.35 | 7.6 | 179.75 |
| OW-1 | 11/9/04 15:38 | 187.35 | 7.63 | 179.72 |
| OW-1 | 11/9/04 17:42 | 187.35 | 7.71 | 179.64 |
| OW-1 | 11/10/04 11:29 | 187.35 | 7.75 | 179.6 |
| OW-1 | 11/12/04 13:40 | 187.35 | 8.12 | 179.23 |
| OW-1 | 11/15/04 14:19 | 187.35 | 8.43 | 178.92 |
| OW-1 | 11/16/04 9:51 | 187.35 | 8.48 | 178.87 |
| OW-1 | 11/17/04 8:41 | 187.35 | 8.51 | 178.84 |
| OW-1 | 11/18/04 14:13 | 187.35 | 8.58 | 178.77 |
| OW-1 | 11/19/04 14:53 | 187.35 | 8.67 | 178.68 |
| OW-1 | 11/22/04 8:10 | 187.35 | 8.83 | 178.52 |

**Table 3-2**
**Measured Groundwater Elevations at Monitoring/Observation Wells**

| Well ID | Date/Time | Top of Casing Elevation (feet) | Depth to Water Table (feet) | Groundwater Elevation (feet) |
|---|---|---|---|---|
| OW-1 | 11/23/04 14:15 | 187.35 | 8.83 | 178.52 |
| OW-1 | 11/24/04 8:41 | 187.35 | 8.79 | 178.56 |
| OW-1 | 11/29/04 13:28 | 187.35 | 8.81 | 178.54 |
| OW-1 | 11/30/04 16:15 | 187.35 | 8.79 | 178.56 |
| OW-1 | 12/1/04 15:51 | 187.35 | 8.65 | 178.7 |
| OW-1 | 12/2/04 8:13 | 187.35 | 8.53 | 178.82 |
| OW-1 | 12/3/04 14:52 | 187.35 | 8.96 | 178.39 |
| OW-1 | 12/6/04 15:56 | 187.35 | 9.06 | 178.29 |
| OW-1 | 12/8/04 8:06 | 187.35 | 9.12 | 178.23 |
| OW-1 | 12/9/04 13:57 | 187.35 | 9.11 | 178.24 |
| OW-1 | 12/14/04 14:15 | 187.35 | 9.22 | 178.13 |
| OW-1 | 12/16/04 13:47 | 187.35 | 9.22 | 178.13 |
| OW-1 | 12/17/04 9:49 | 187.35 | 9.27 | 178.08 |
| OW-1 | 1/30/05 11:00 | 187.35 | 9.85 | 177.5 |
| OW-1 | 3/21/05 14:00 | 187.35 | 9.8 | 177.55 |
| OW-1 | 4/6/2005 8:05 | 187.35 | 8.71 | 178.64 |
| OW-2 | 10/31/2004 | 187.4 | 7.54 | 179.86 |
| OW-2 | 11/7/04 15:37 | 187.4 | 8.11 | 179.29 |
| OW-2 | 11/8/04 16:53 | 187.4 | 7.98 | 179.42 |
| OW-2 | 11/9/04 8:33 | 187.4 | 8.01 | 179.39 |
| OW-2 | 11/9/04 10:10 | 187.4 | 8.07 | 179.33 |
| OW-2 | 11/9/04 11:32 | 187.4 | 8.1 | 179.3 |
| OW-2 | 11/9/04 15:39 | 187.4 | 8.11 | 179.29 |
| OW-2 | 11/9/04 17:44 | 187.4 | 8.14 | 179.26 |
| OW-2 | 11/10/04 11:29 | 187.4 | 8.25 | 179.15 |
| OW-2 | 11/12/04 13:44 | 187.4 | 8.42 | 178.98 |
| OW-2 | 11/15/04 14:13 | 187.4 | 8.69 | 178.71 |
| OW-2 | 11/16/04 9:50 | 187.4 | 8.75 | 178.65 |
| OW-2 | 11/17/04 8:40 | 187.4 | 8.77 | 178.63 |
| OW-2 | 11/18/04 14:11 | 187.4 | 8.82 | 178.58 |
| OW-2 | 11/19/04 14:51 | 187.4 | 8.88 | 178.52 |
| OW-2 | 11/22/04 8:08 | 187.4 | 9.06 | 178.34 |
| OW-2 | 11/23/04 14:14 | 187.4 | 9.08 | 178.32 |
| OW-2 | 11/24/04 8:40 | 187.4 | 9.12 | 178.28 |
| OW-2 | 11/29/04 13:27 | 187.4 | 9.07 | 178.33 |
| OW-2 | 11/30/04 16:14 | 187.4 | 9.03 | 178.37 |
| OW-2 | 12/1/04 15:49 | 187.4 | 8.9 | 178.5 |
| OW-2 | 12/2/04 8:11 | 187.4 | 8.85 | 178.55 |
| OW-2 | 12/3/04 14:51 | 187.4 | 9.16 | 178.24 |
| OW-2 | 12/6/04 15:55 | 187.4 | 9.28 | 178.12 |
| OW-2 | 12/8/04 8:05 | 187.4 | 9.36 | 178.04 |
| OW-2 | 12/9/04 13:56 | 187.4 | 9.36 | 178.04 |
| OW-2 | 12/14/04 14:14 | 187.4 | 9.48 | 177.92 |
| OW-2 | 12/16/04 13:46 | 187.4 | 9.52 | 177.88 |
| OW-2 | 12/17/04 9:48 | 187.4 | 9.55 | 177.85 |
| OW-2 | 1/30/05 10:59 | 187.4 | 10.2 | 177.2 |
| OW-2 | 3/21/05 14:02 | 187.4 | 10.09 | 177.31 |
| OW-2 | 4/6/2005 8:07 | 187.4 | 9.03 | 178.37 |

**Table 3-3**
**Measured and Corrected Drawdown at Observation Well OW-1**

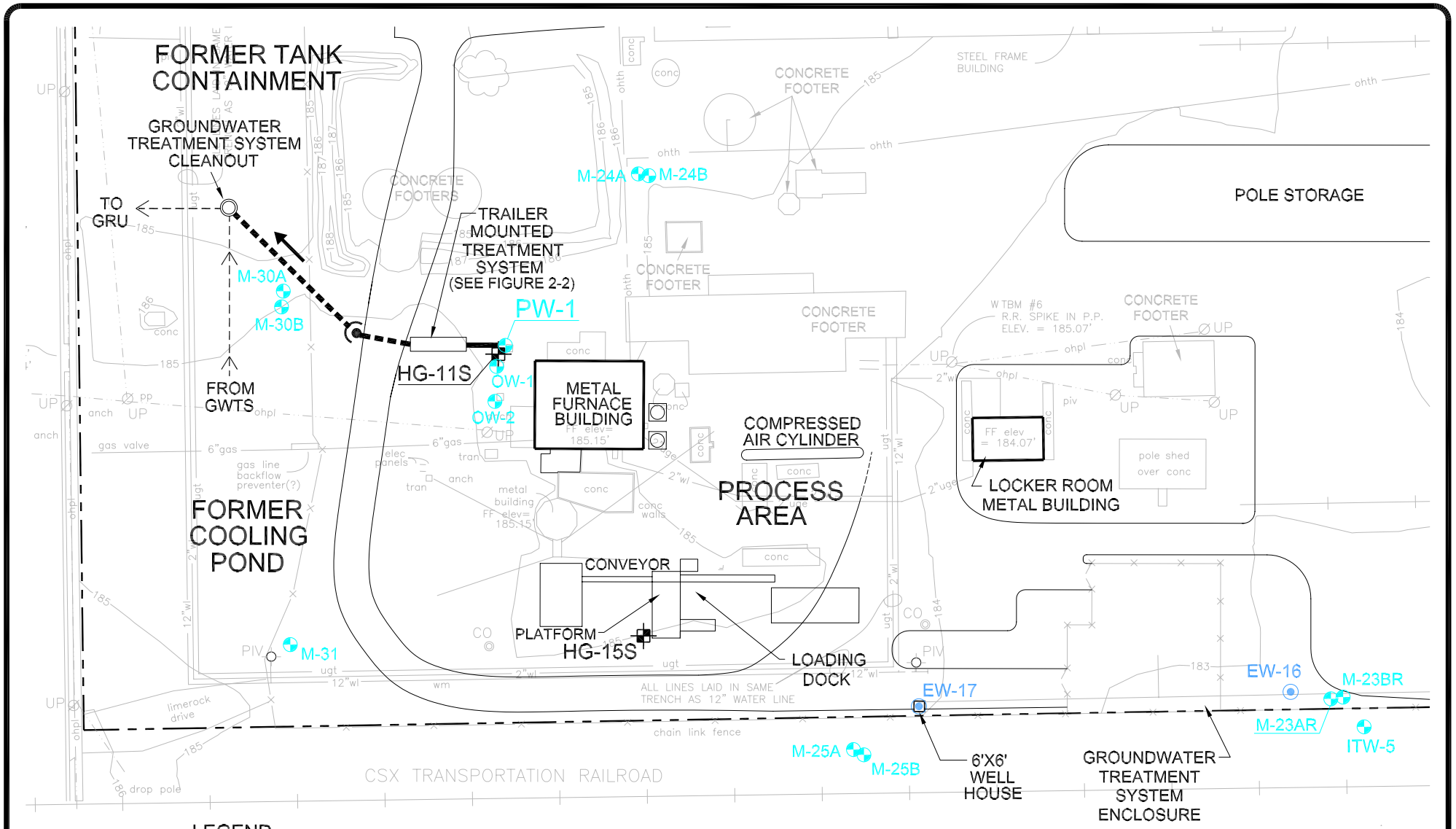
| Date | Pumping Rate (gpm) | Calculated Drawdown at OW-1 (feet) | Correction factor | Corrected Drawdown at OW-1 (feet) |
|---|---|---|---|---|
| 11/8/04 | 0 | 0 | 0 | 0.0 |
| 11/9/04 | 1 | 0.22 | 0.04 | 0.2 |
| 11/9/04 | | 0.31 | 0.04 | 0.3 |
| 11/9/04 | | 0.31 | 0.03 | 0.3 |
| 11/9/04 | | 0.34 | 0.05 | 0.3 |
| 11/9/04 | | 0.42 | 0.06 | 0.4 |
| 11/10/04 | | 0.46 | 0.10 | 0.4 |
| 11/12/04 | 2 | 0.83 | 0.18 | 0.6 |
| 11/15/04 | | 1.14 | 0.35 | 0.8 |
| 11/16/04 | | 1.19 | 0.39 | 0.8 |
| 11/17/04 | | 1.22 | 0.45 | 0.8 |
| 11/18/04 | | 1.29 | 0.46 | 0.8 |
| 11/19/04 | | 1.38 | 0.51 | 0.9 |
| 11/22/04 | | 1.54 | 0.65 | 0.9 |
| 11/23/04 | | 1.54 | 0.68 | 0.9 |
| 11/24/04 | | 1.5 | 0.72 | 0.8 |
| 11/29/04 | | 1.52 | 0.51 | 1.0 |
| 11/30/04 | | 1.5 | 0.49 | 1.0 |
| 12/1/04 | 2.5 | 1.36 | 0.51 | 0.9 |
| 12/2/04 | | 1.24 | 0.53 | 0.7 |
| 12/3/04 | | 1.67 | 0.62 | 1.1 |
| 12/6/04 | | 1.77 | 0.77 | 1.0 |
| 12/8/04 | | 1.83 | 0.80 | 1.0 |
| 12/9/04 | | 1.82 | 0.86 | 1.0 |
| 12/14/04 | 1.75 | 1.93 | 0.96 | 1.0 |
| 12/16/04 | | 1.93 | 1.02 | 0.9 |
| 12/17/04 | | 1.98 | 1.03 | 0.9 |
| 1/30/05 | 1.5 | 2.56 | 1.63 | 0.9 |
| 3/21/05 | 1 | 2.51 | 1.58 | 0.9 |
| 4/6/05 | 1.5 | 1.42 | 0.39 | 1.0 |

**Table 3-4**
**Summary of Groundwater and DNAPL Volumes Extracted from PW-1**

| Date/Time Start | Total pumping period (days) | Approximate average pumping rate (gpm) | Total groundwater volume pumped (gallons) | Total DNAPL recovered (gallons) | Ratio DNAPL recovered/groundwater pumped | Comments |
|---|---|---|---|---|---|---|
| 11/9/2004 7:46 | 2.9 | 1.0 | 4344 | 0 | 0 | |
| 11/12/2004 5:10 | 18.1 | 2.0 | 50636 | 16.3 | 0.000321905 | |
| 11/30/2004 8:10 | 11.0 | 2.5 | 39422 | 6.1 | 0.000154736 | Pump cycling on and off |
| 12/11/2004 8:15 | 22.0 | 1.75 | 55630 | 16.95 | 0.000304692 | |
| 1/2/2005 7:45 | 29.0 | 1.5 | 62239 | 20.9 | 0.000335802 | System off 4 days |
| 2/4/2005 8:03 | 11.3 | 0.5 | 8493 | 1.5 | 0.000176616 | |
| 2/15/2005 14:52 | 33.3 | 1.0 | 46250 | 10.2 | 0.000220541 | System off for >18 hours |
| 3/21/2005 15:48 | 30.6 | 1.5 | 68155 | 18.0 | 0.000264104 | |
| Total | 158.3 | | 335169 | 89.95 | 0.000268372 | |

Note: Pumping system halted at 4/21/05 7:18.

# Figures




LEGEND

UNDERGROUND DISCHARGE LINE

ABOVEGROUND DISCHARGE LINE

0 80 160

SCALE IN FEET

N

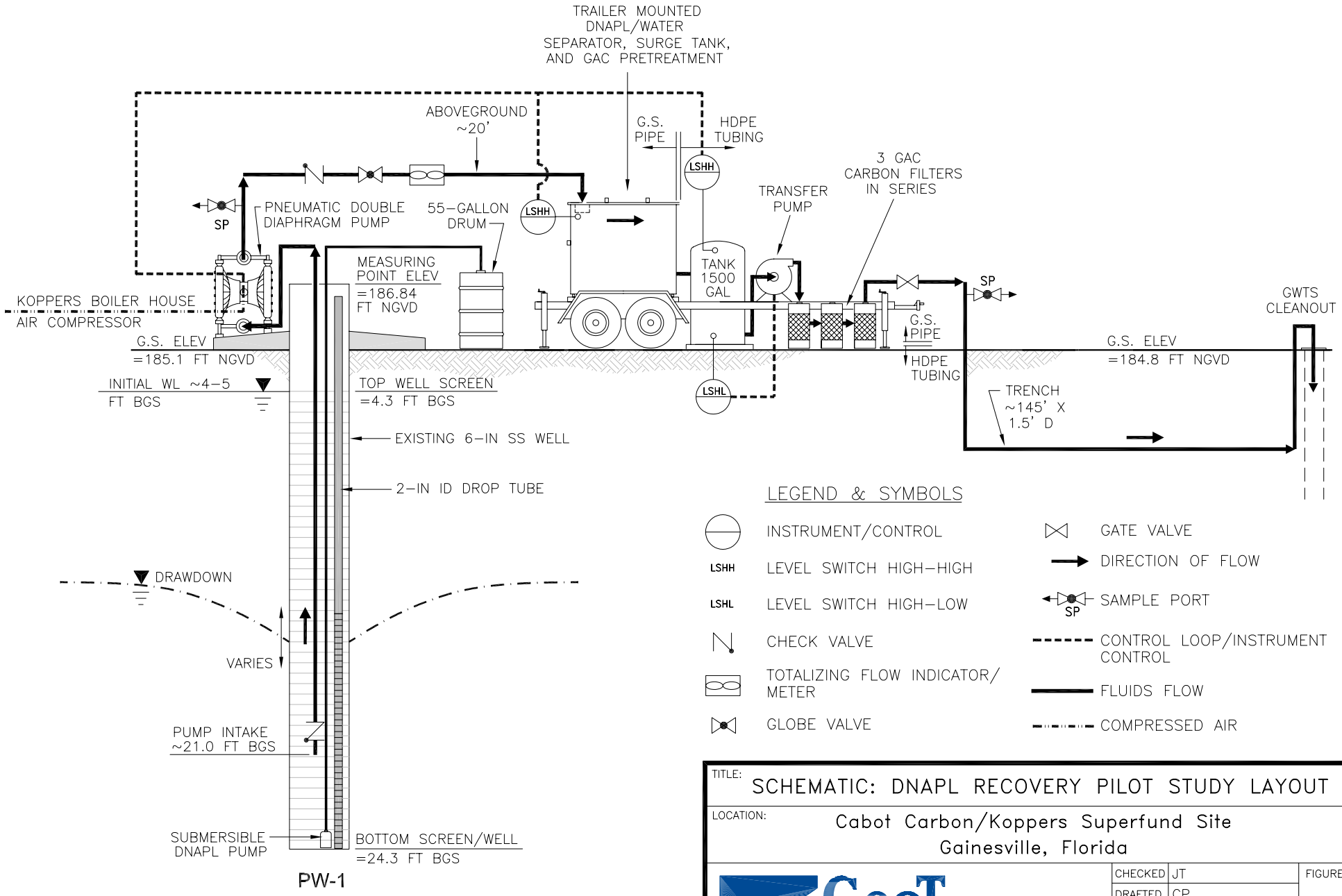
TITLE: DNAPL RECOVERY PILOT STUDY PLAN PIPING SCHEMATIC

LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

| | |
|---|---|
| CHECKED | JT |
| DRAFTED | CP |
| FILE | 2201040043A.DWG |
| DATE | 4/26/05 |

FIGURE: 2-1




TITLE: SCHEMATIC: DNAPL RECOVERY PILOT STUDY LAYOUT

LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

| | |
|---|---|
| CHECKED | JT |
| DRAFTED | CP |
| FILE | 2201040064A.DWG |
| DATE | 4-25-05 |

FIGURE: 2-2

## Figure 3-1. Groundwater Elevation and Pumping Rate at PW-1

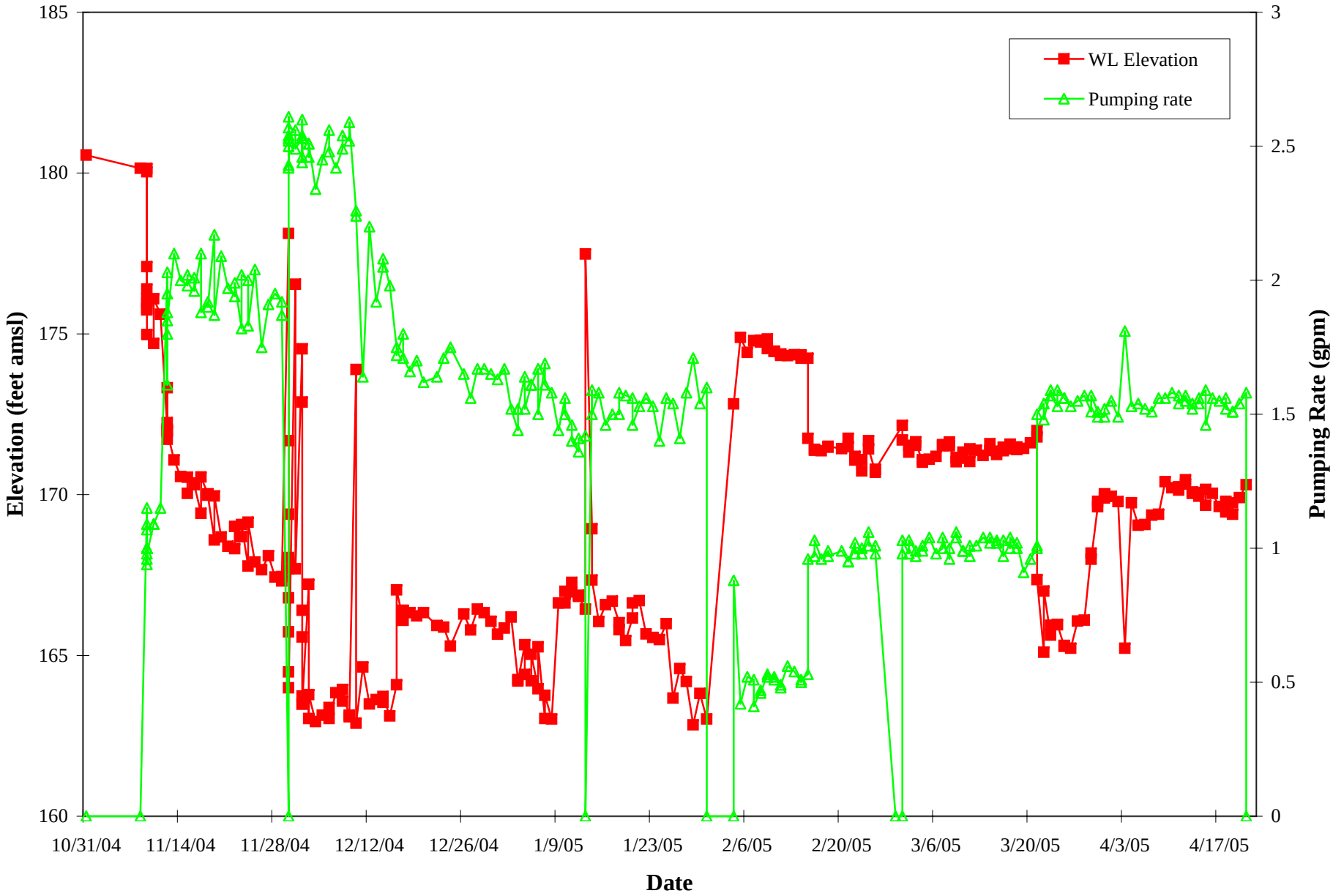
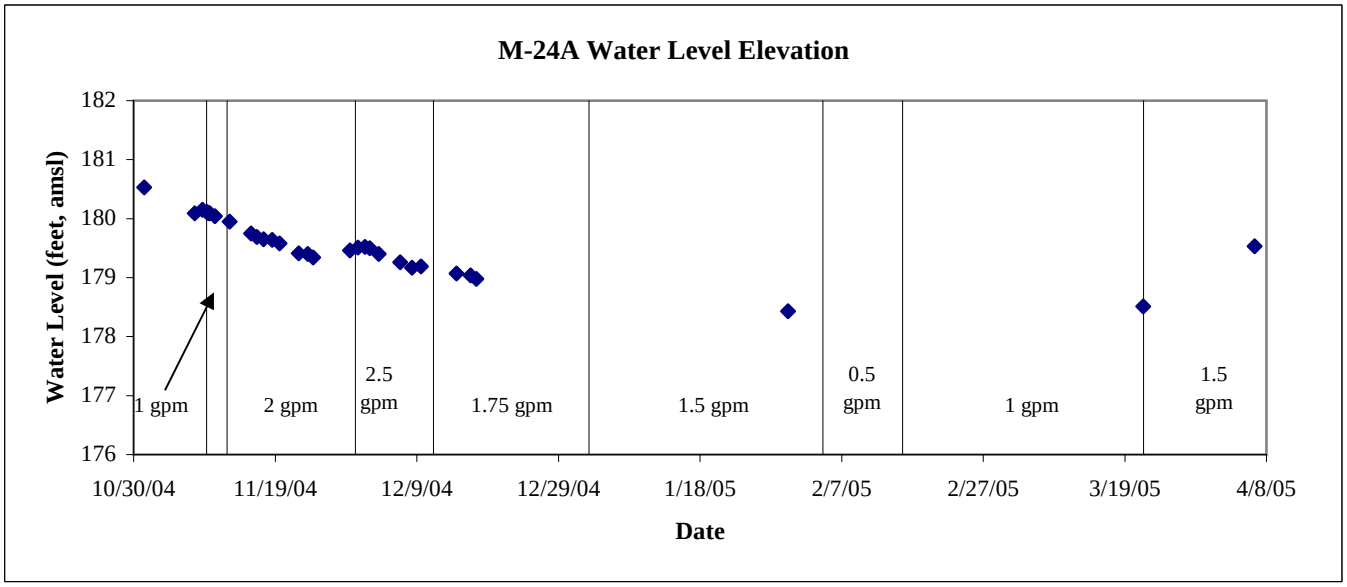
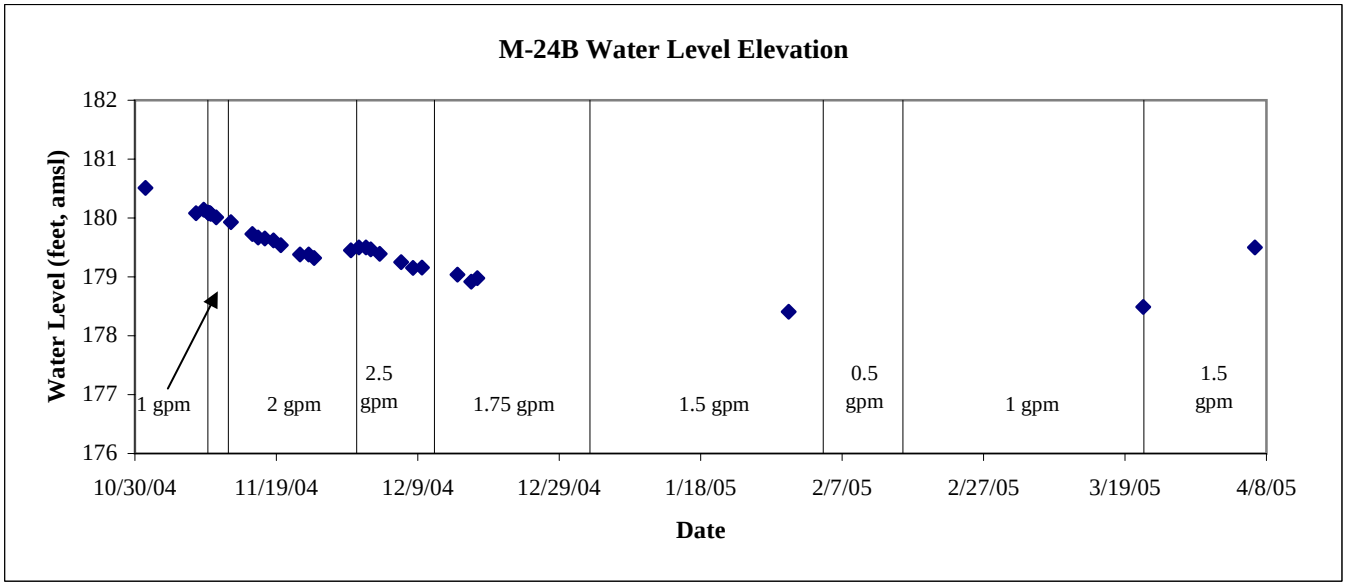


**Figure 3-2**
**Monitoring/Observation Well Hydrographs**



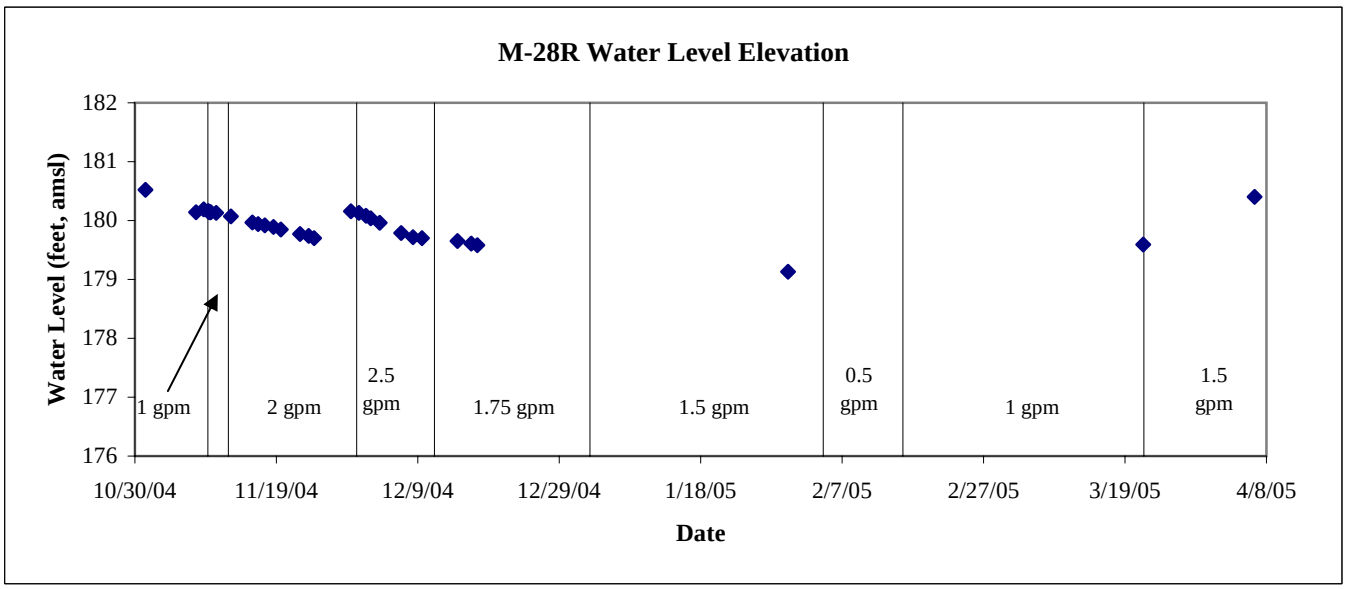
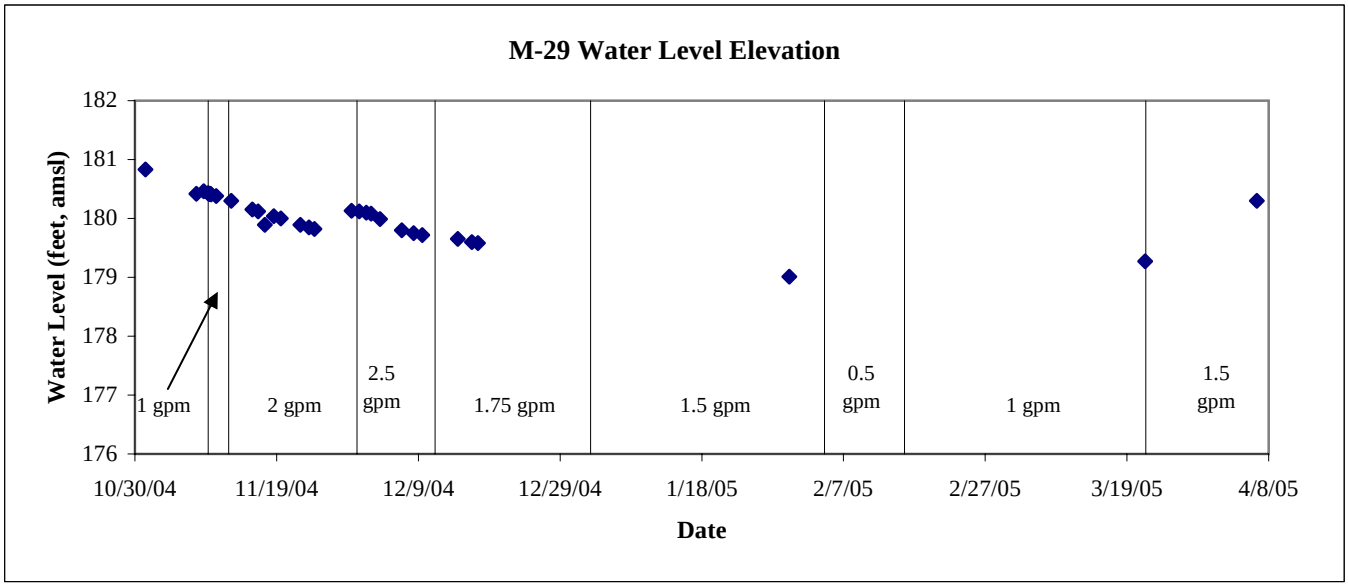
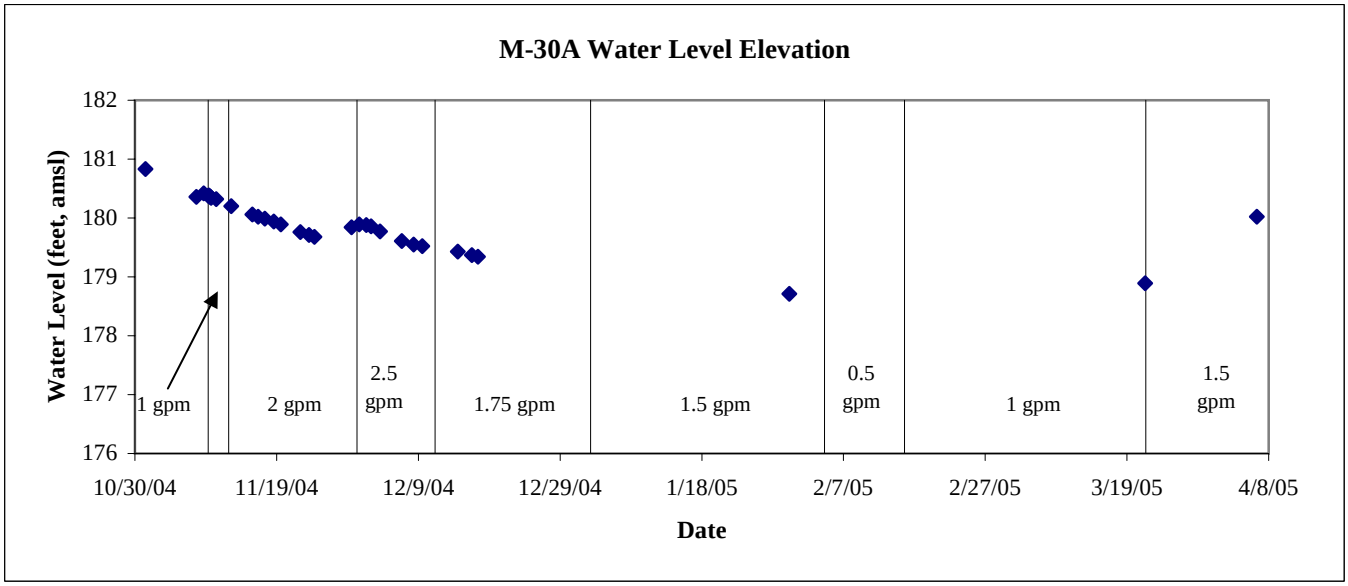



**Figure 3-2**
**Monitoring/Observation Well Hydrographs**



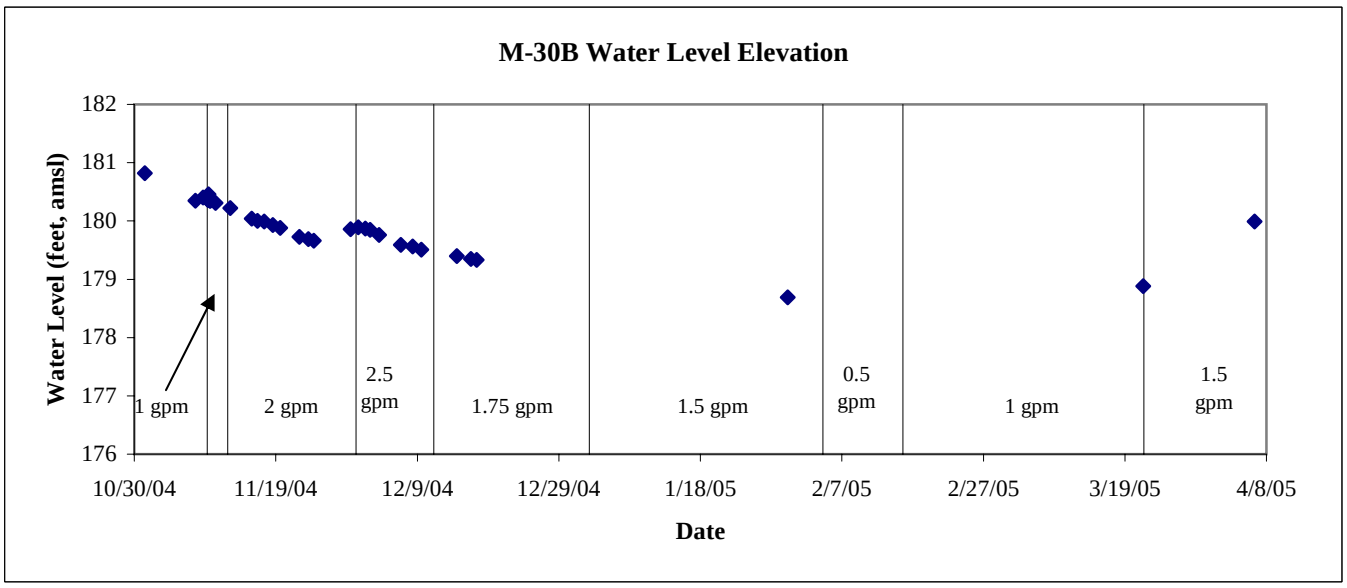
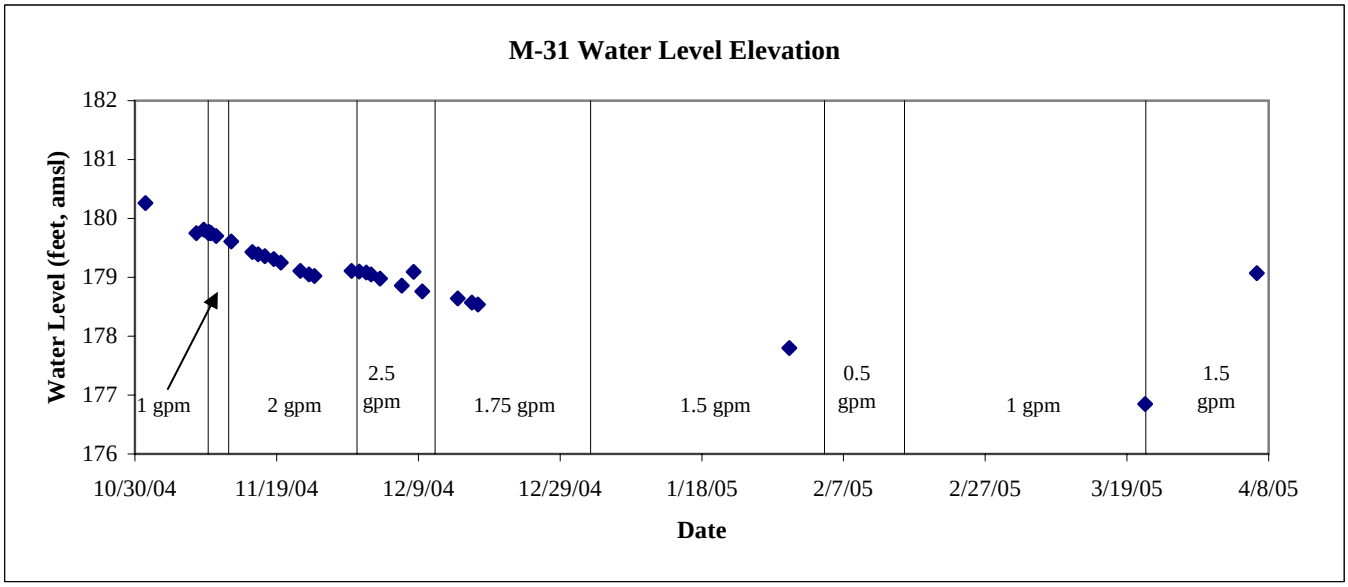
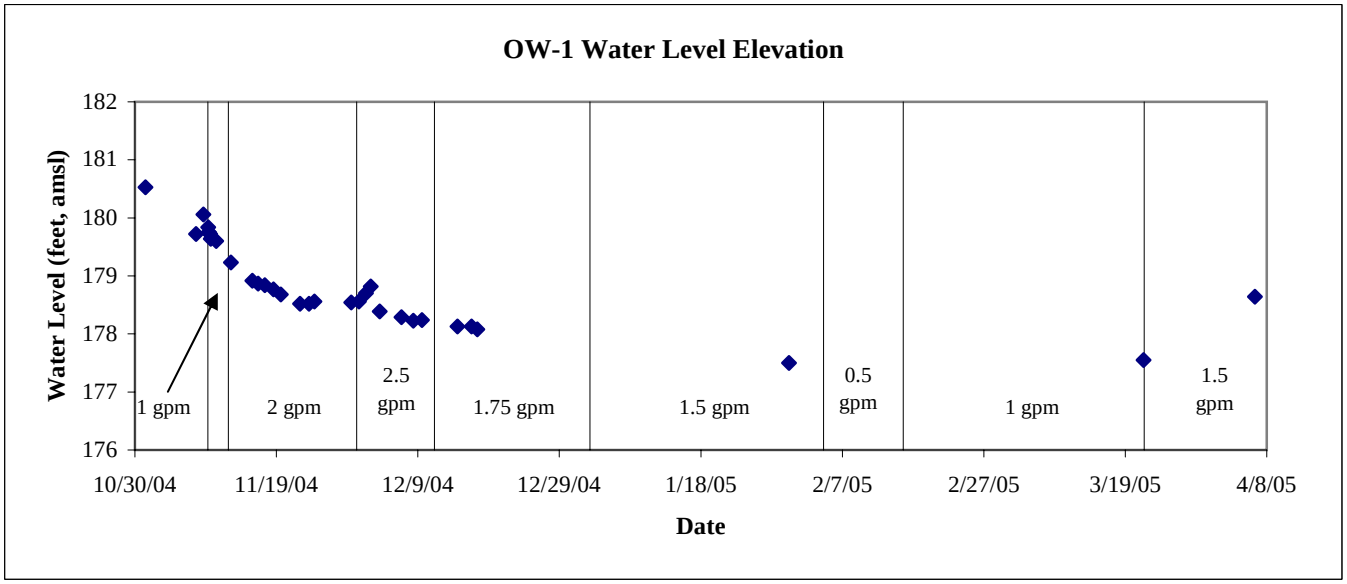



**Figure 3-2**
**Monitoring/Observation Well Hydrographs**



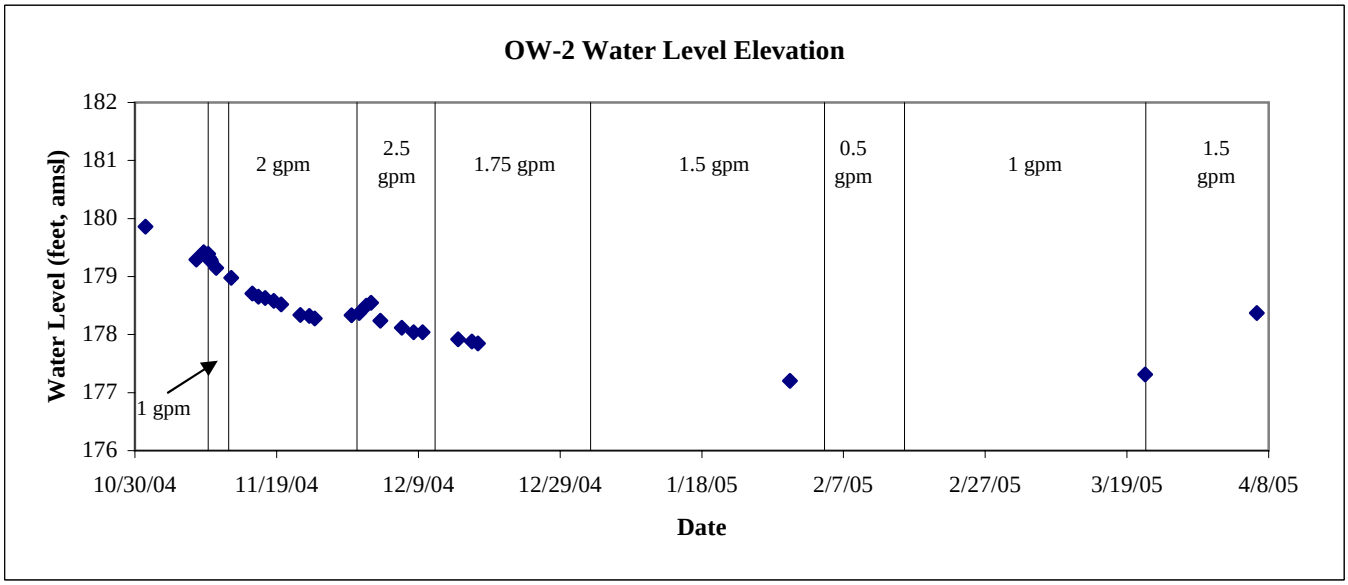
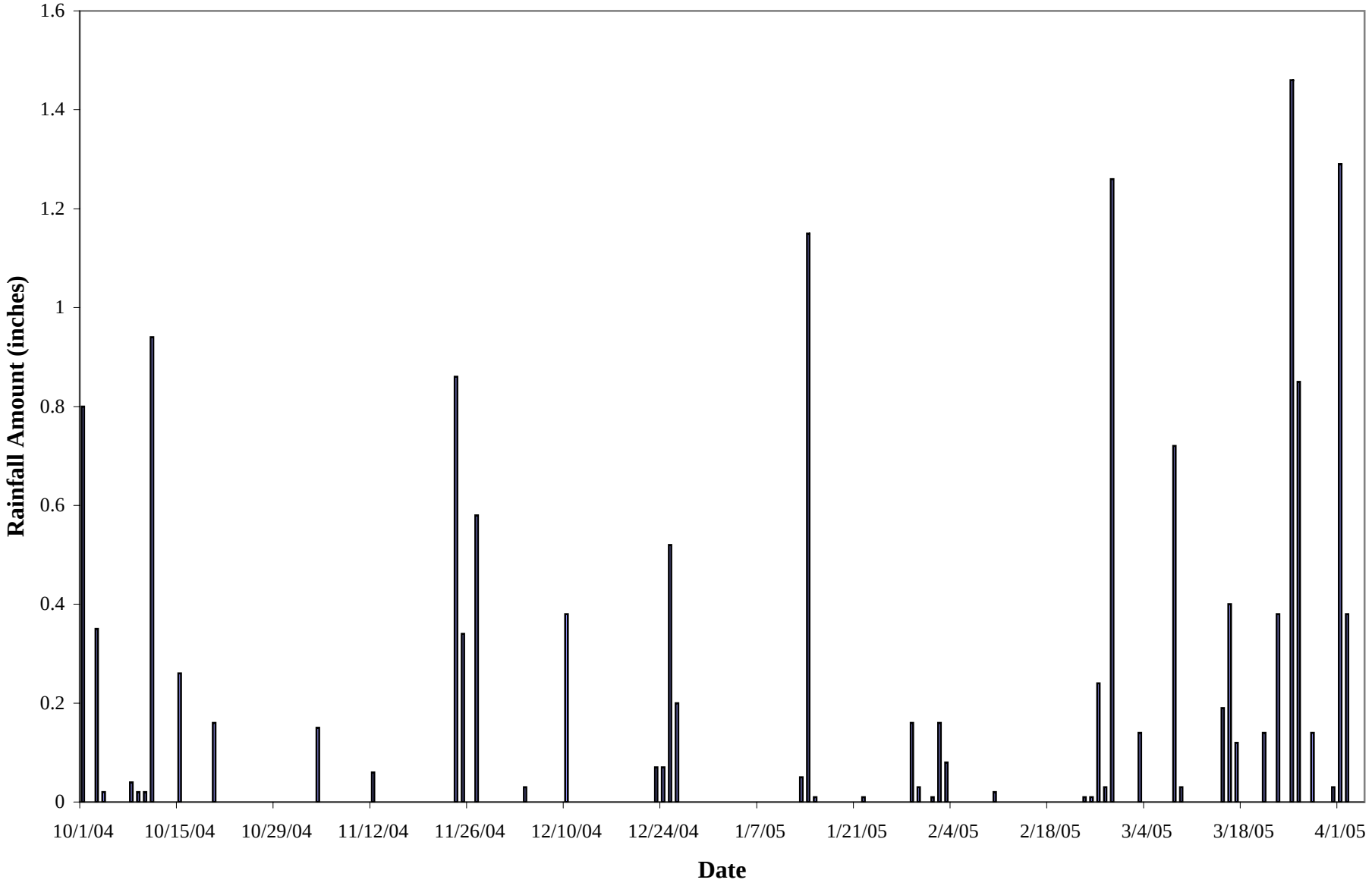
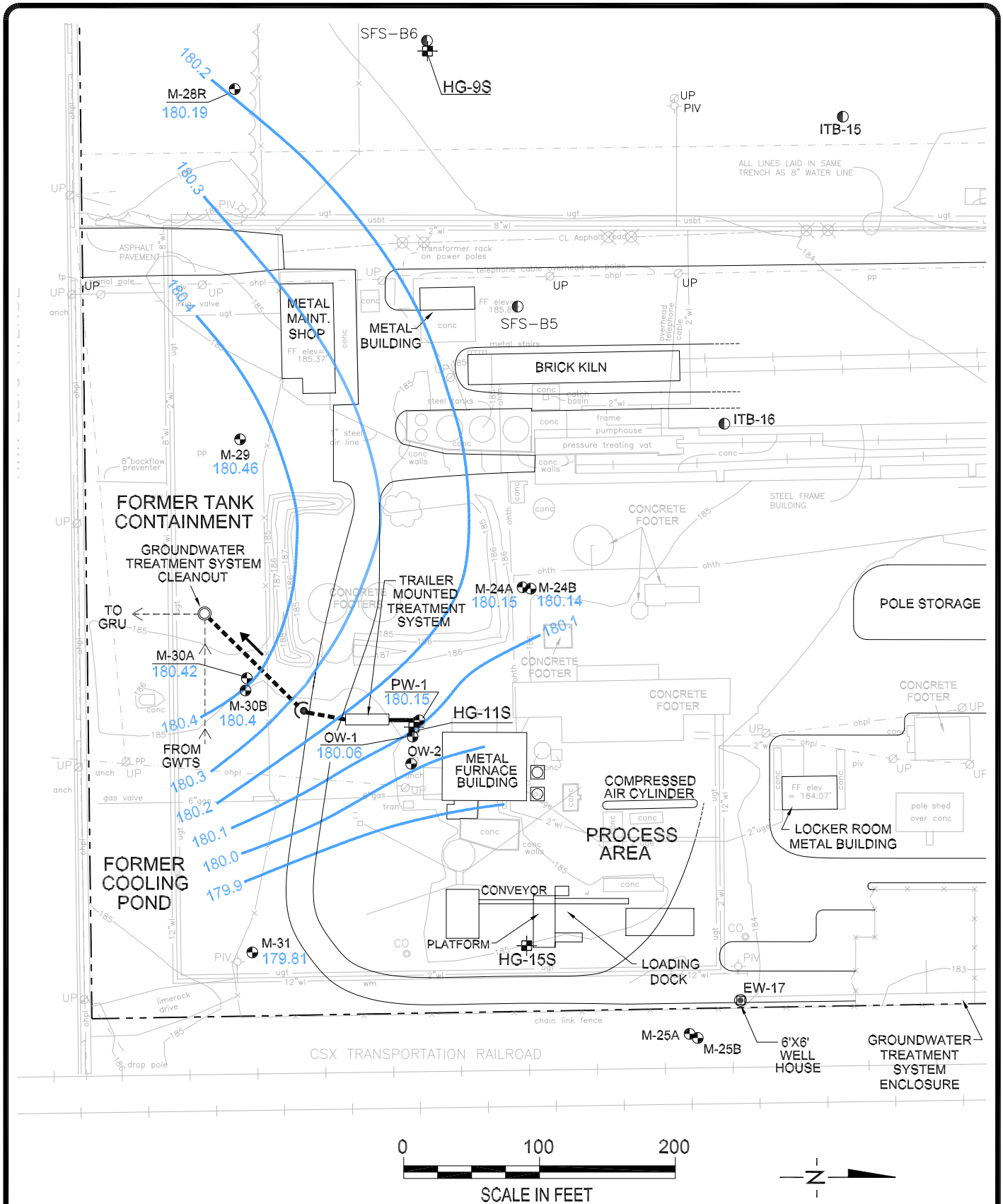



**Figure 3-3**
**Daily Precipitation**
**Gainesville Regional Airport (COOP ID #083326)**




4/13/2005



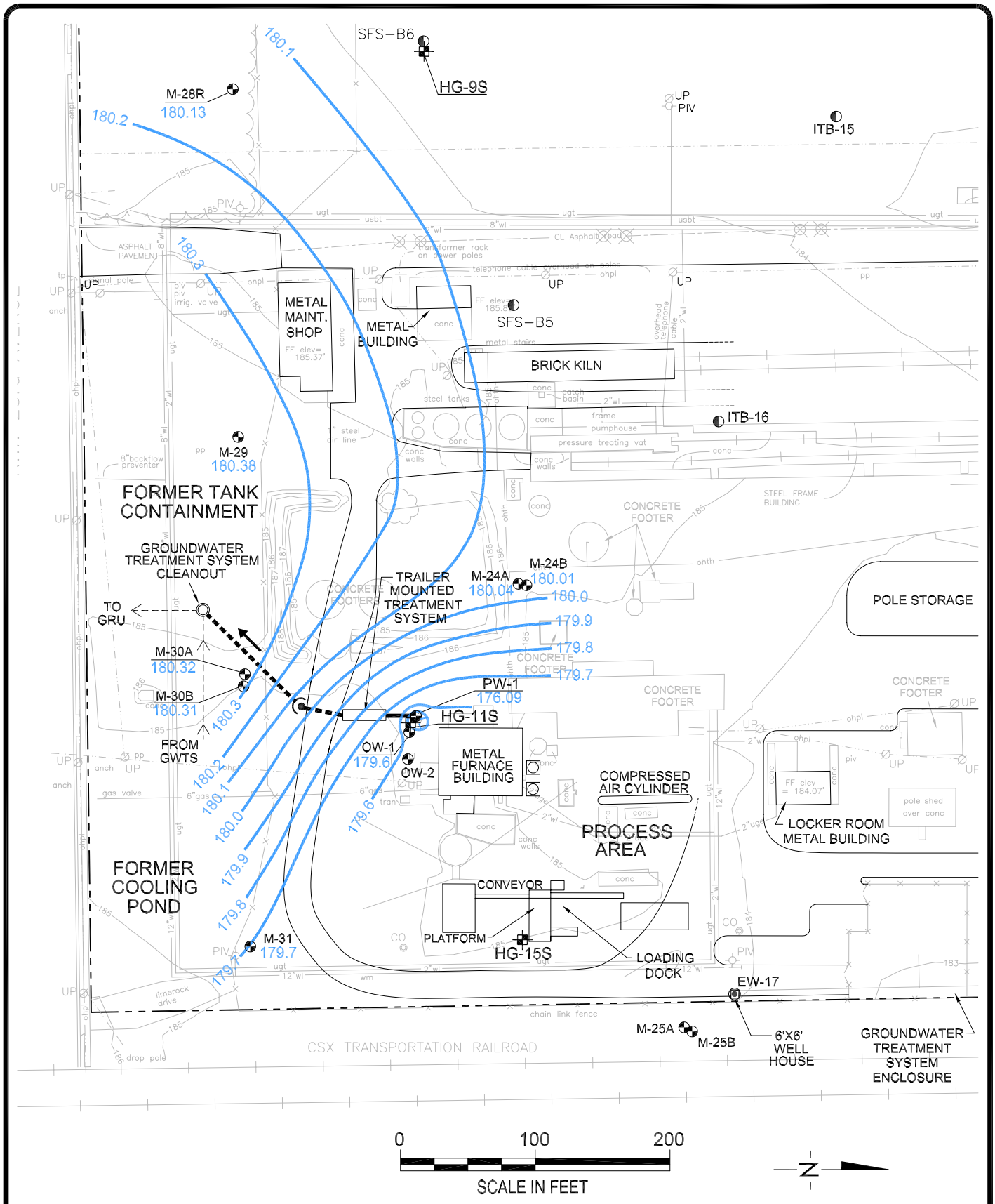

TITLE: WATER TABLE CONTOURS ON NOVEMBER 8, 2004 PRIOR TO START OF PILOT TEST

LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

| | |
|---|---|
| CHECKED | CF |
| DRAFTED | CP |
| FILE | 2201040061A.DWG |
| DATE | 4-25-05 |

FIGURE: 3-4



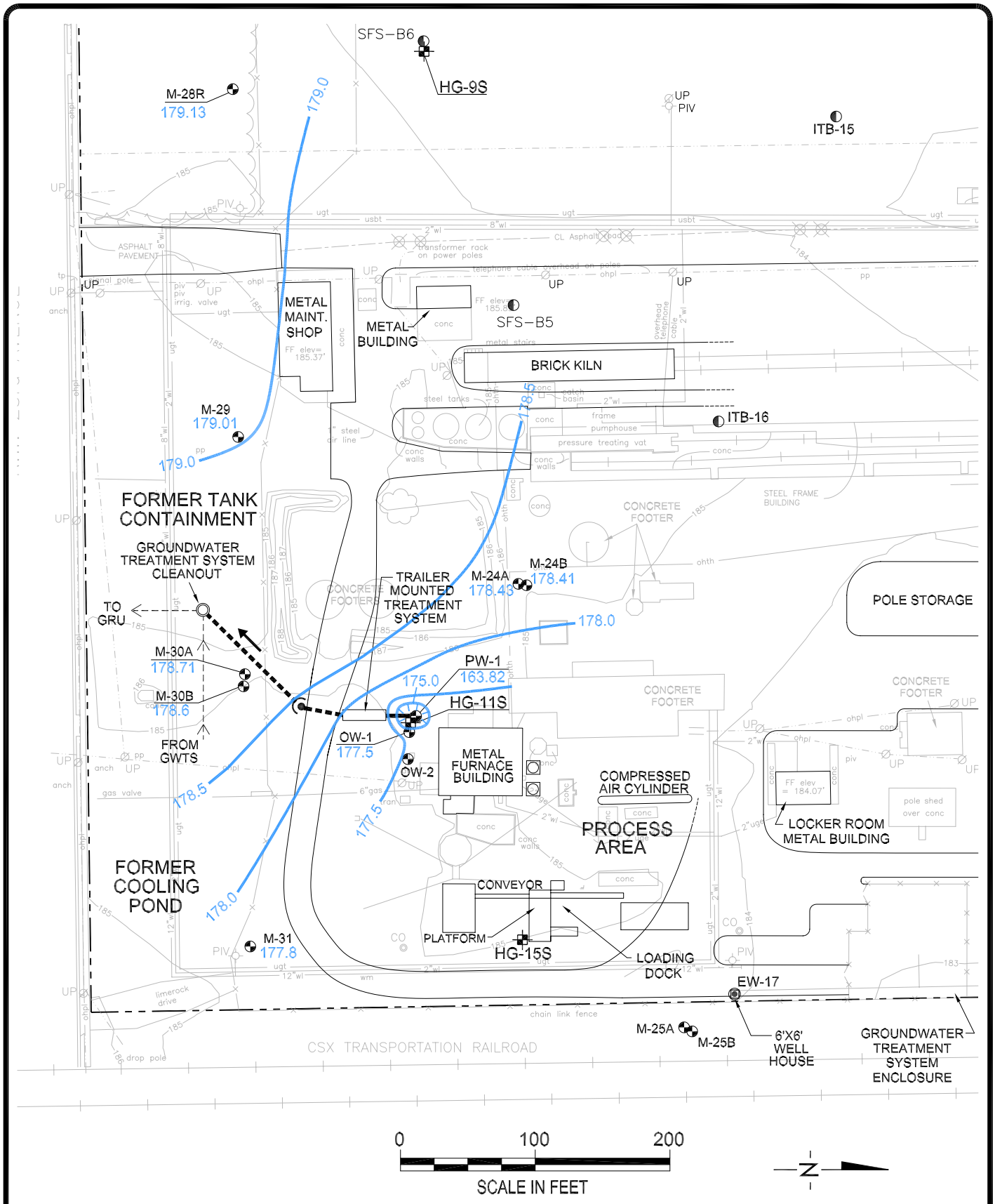

TITLE: WATER TABLE CONTOURS ON NOVEMBER 10, 2004
PUMPING AT 1 GPM FOR 1.15 DAYS

LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

| | |
|---|---|
| CHECKED | CF |
| DRAFTED | CP |
| FILE | 2201040062A.DWG |
| DATE | 4-25-05 |

FIGURE: 3-5




TITLE: WATER TABLE CONTOURS ON JANUARY 30, 2005, PUMPING AT 1.5 GPM, 82 DAYS AFTER START OF PILOT TEST

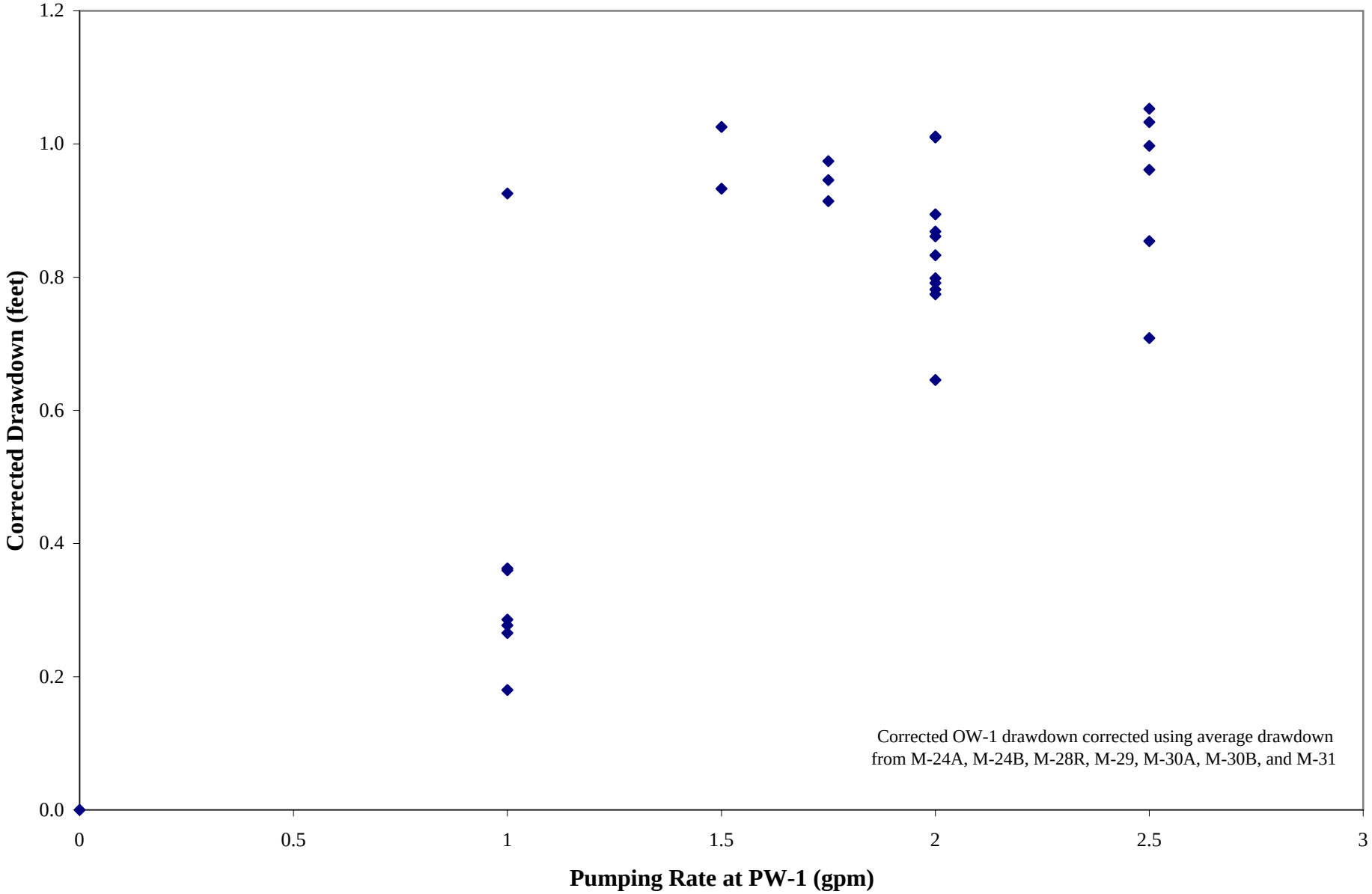
LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

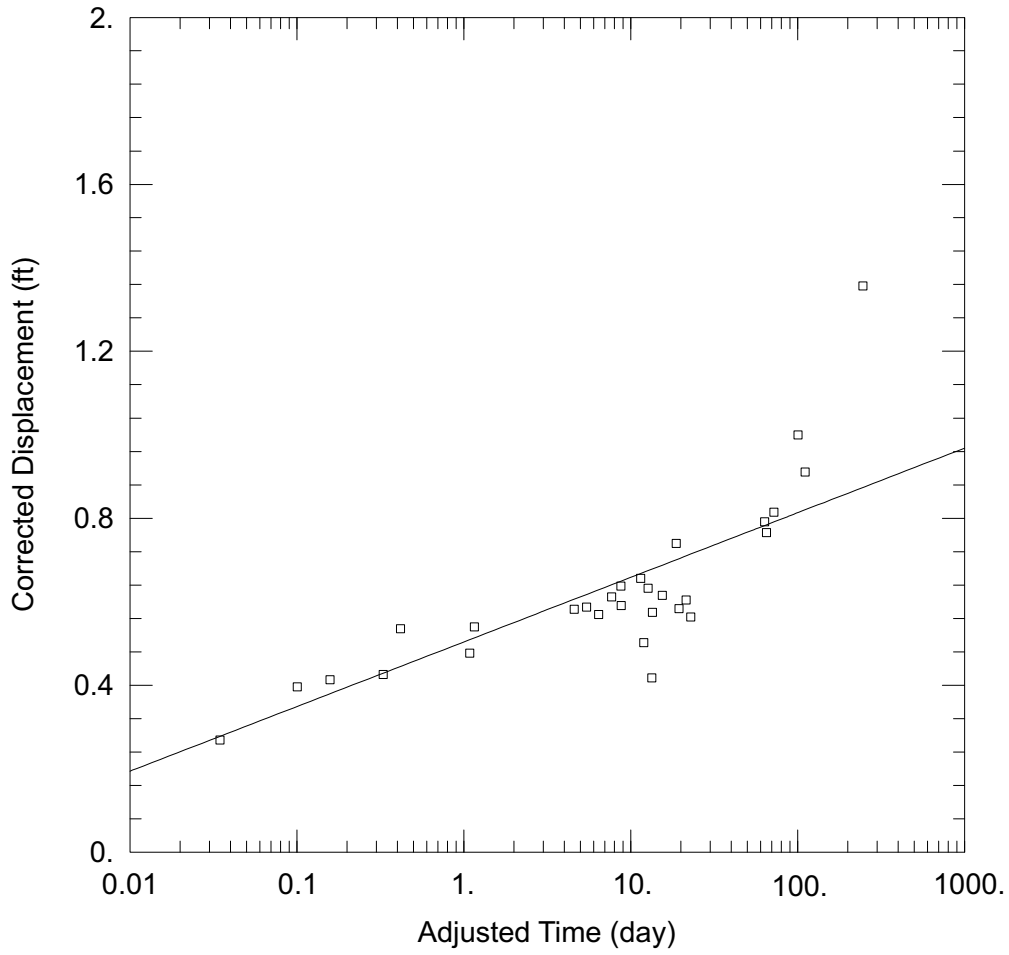
| | |
|---|---|
| CHECKED | CF |
| DRAFTED | CP |
| FILE | 2201040063A.DWG |
| DATE | 4-25-05 |

FIGURE: 3-6

## Figure 3-7. Corrected Drawdown at OW-1 versus PW-1 Pumping Rate




5/23/2005




WELL TEST ANALYSIS

Data Set: H:\Sterling Projects\Jim Mercer projects\Gainesville\OW-1-all.aqt

Date: 4/13/05 Time: 10:29:02

AQUIFER DATA

Saturated Thickness: 25. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| PW-1 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| ▫ OW 1 | -5 | -12 |

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 341.8 $ft^2$/day S = 0.002537

TITLE: CALCULATION OF TRANSMISSIVITY USING COOPER-JACOB METHOD

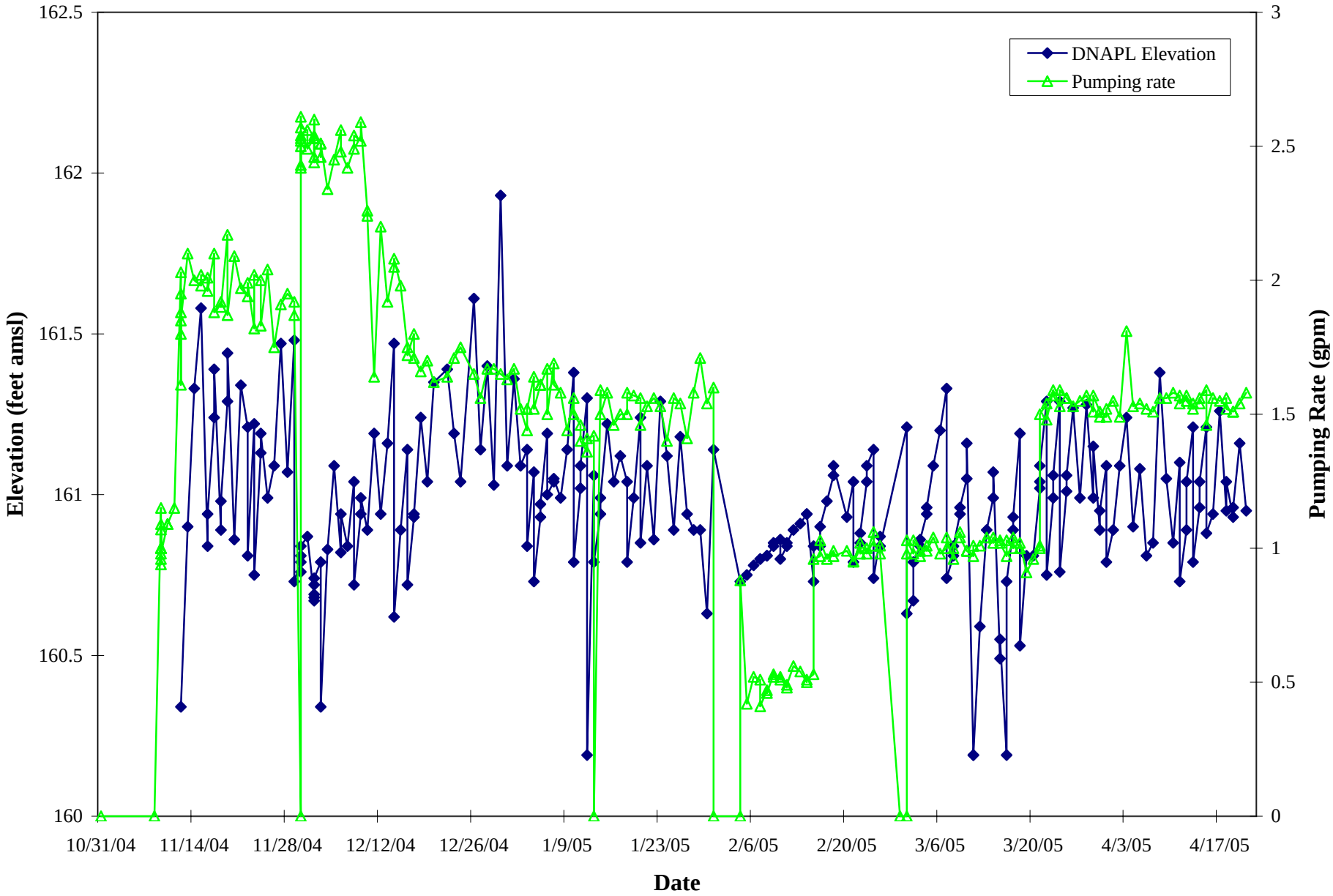
LOCATION: Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

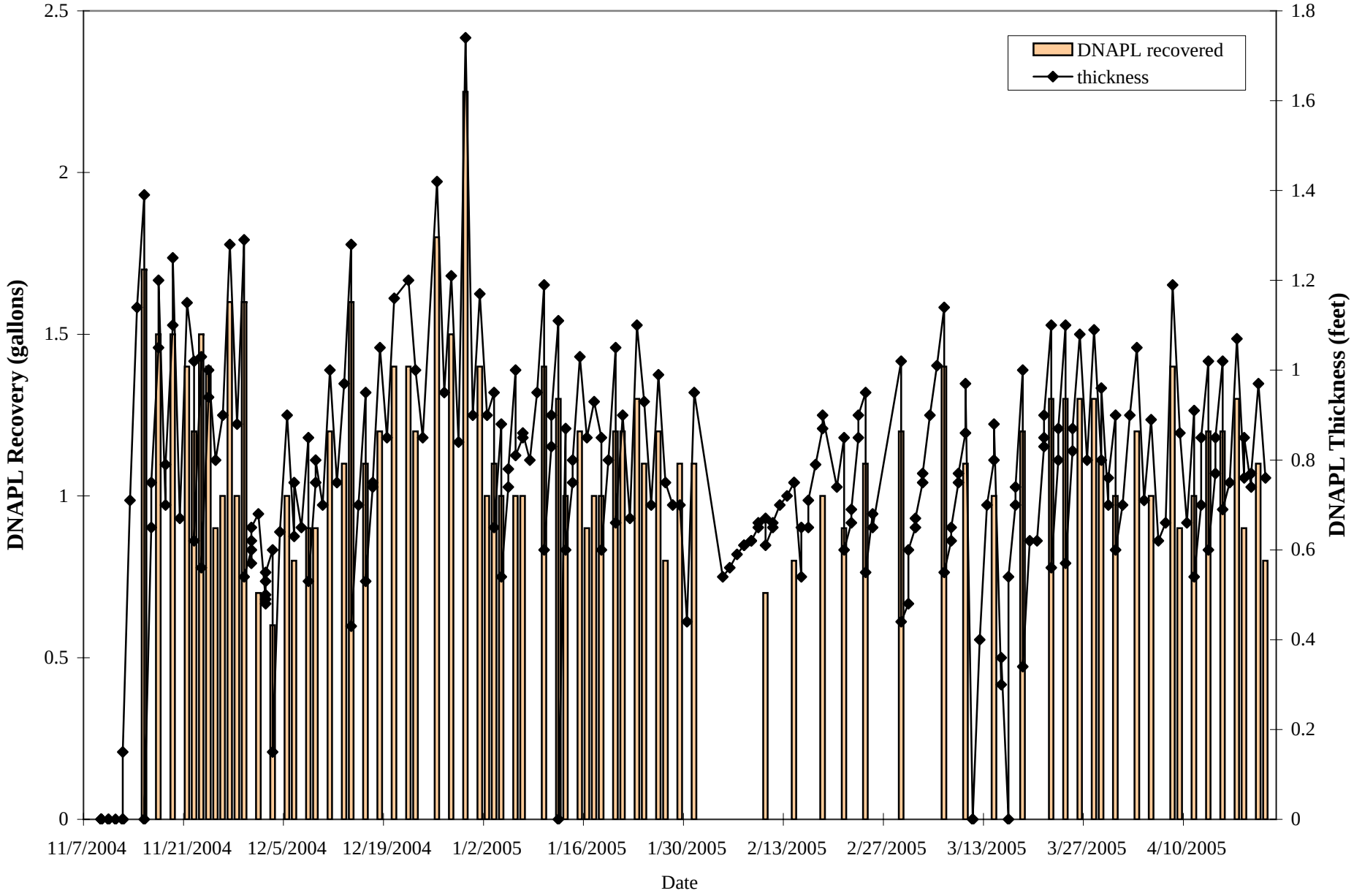
| | |
|---|---|
| CHECKED | CF |
| DRAFTED | CP |
| FILE | 2201040006A.CDR |
| DATE | 4-13-05 |

FIGURE: 3-8

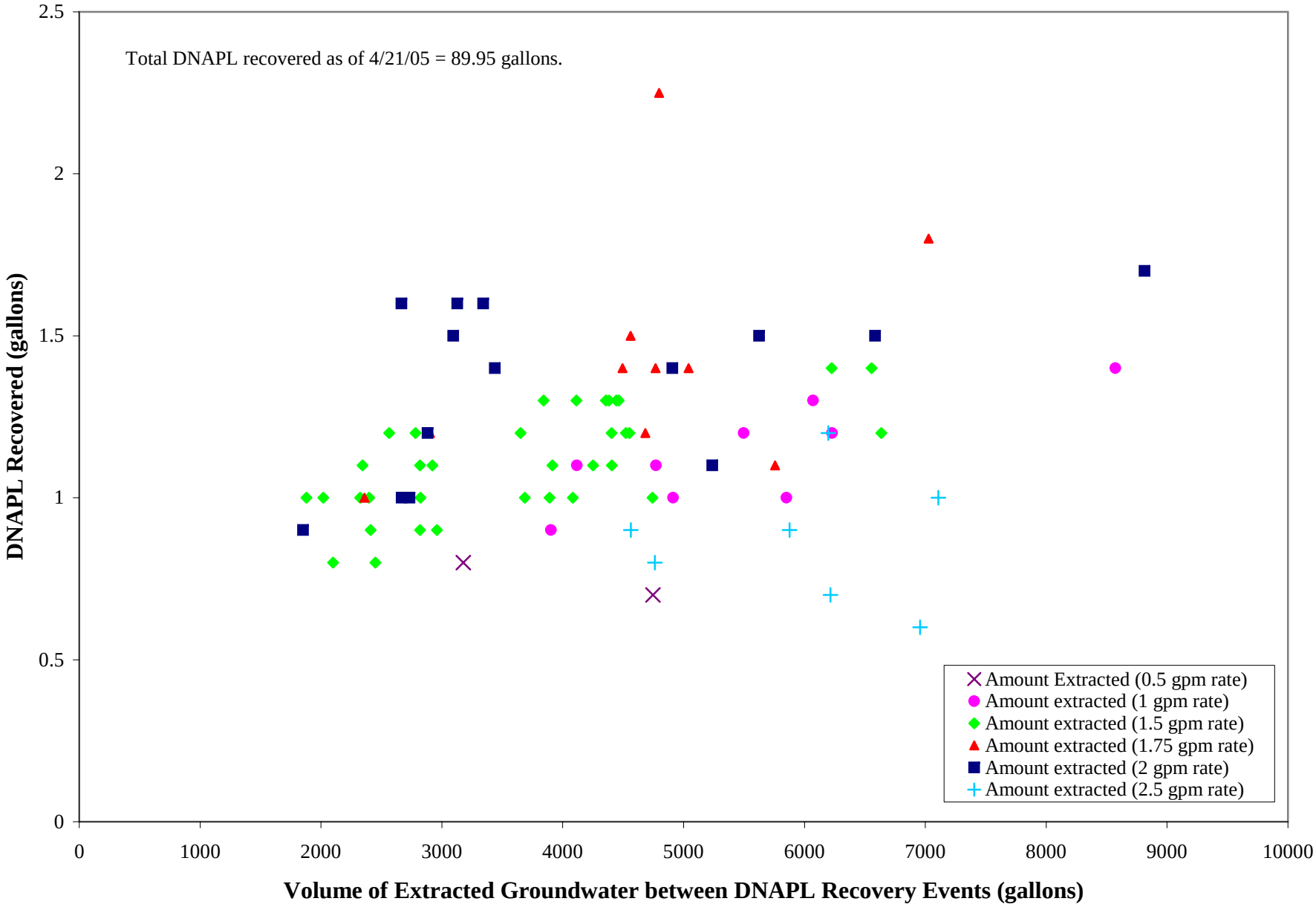
## Figure 3-9. PW-1 Pilot Test DNAPL Level versus PW-1 Pumping Rate



## Figure 3-10. PW-1 Pilot Test DNAPL Recovery



## Figure 3-11. PW-1 Pilot Test DNAPL/Water Recovery



## Figure 3-12. PW-1 Pilot Test Cumulative DNAPL Recovered