1R - 204

AGWMR

12/09/2011

1R-204

TRIDENT ENVIRONMENTAL

RECEIVED OCD
2011 DEC 13 A 8:24

USPS Priority Mail
9101 0105 2129 7005 0335 79

December 9, 2011

Mr. Glenn von Gonten
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

RE: **2011 ANNUAL GROUNDWATER MONITORING REPORT**
PRIDE ENERGY COMPANY
SOUTH FOUR LAKES TANK BATTERY (1RP-0204)
T12S, R34E, SECTION 2, UNIT LETTER G
LEA COUNTY, NEW MEXICO

Mr. von Gonten:

As agent for Pride Energy Company, Trident Environmental submits the attached *2011 Annual Groundwater Monitoring Report* for the South Four Lakes Tank Battery Site (1RP-204) located approximately 10 miles west of Tatum in Lea County, New Mexico. This *2010 Annual Groundwater Monitoring Report* documents the annual sampling event performed by Trident on May 17-18, 2011, and site remediation activities conducted between May 6, 2008 and October 25, 2011. This report also contains historical groundwater elevation and analytical data for the onsite monitoring wells that was obtained from the OCD Online database. The monitoring and sampling program was conducted in accordance with the monitoring plan specified by Mr. William C. Olson of the New Mexico Oil Conservation Division (NMOCD) in his letter dated July 14, 1997.

Thank you for your attention concerning this annual summary of groundwater monitoring activities. If you have any questions, please contact me at (432) 638-8740 or Matt Pride at (918) 524-9200.

Sincerely,

Gilbert J. Van Deventer, REM, PG
Trident Environmental – Project Manager

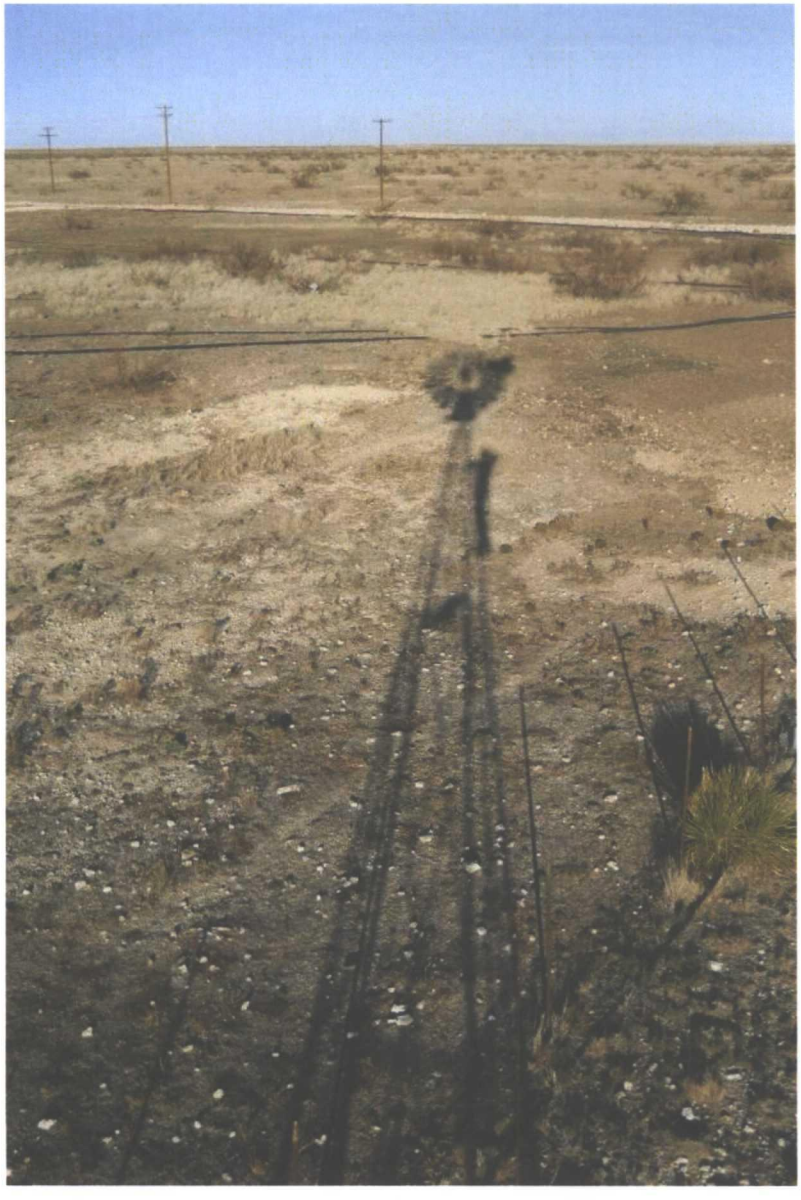
cc: Matt Pride (Pride Energy Co.)
Geoffrey Leking (NMOCD – District 1)

December 9, 2011

2011 ANNUAL GROUNDWATER MONITORING REPORT

SOUTH FOUR LAKES TANK BATTERY SITE (1RP-204)

T12S, R34E, SECTION 2, UNIT LETTER G
LEA COUNTY, NEW MEXICO



Prepared for:

Pride Energy Company

P. O. Box 701950

Tulsa, Oklahoma 74170

Prepared by:

TRIDENT ENVIRONMENTAL

P. O. Box 12177

Odessa, Texas 79768

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 Executive Summary

Trident Environmental (Trident) was retained by Pride Energy Company (Pride) to perform the annual groundwater monitoring at the South Four Lakes Tank Battery which is located approximately 10 miles west of Tatum, New Mexico. The legal description of the site is described as being in township 12 south, range 34 east, section 2, unit letter G, in Lea County, New Mexico. This 2011 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident at the South Four Lakes Tank Battery on May 17-18, 2011. This report also contains historical groundwater elevation and analytical data for all monitoring wells on site. The monitoring and sampling program was conducted in accordance with the monitoring plan specified by Mr. William C. Olson of the New Mexico Oil Conservation Division (NMOCD) in his letter dated July 14, 1997 (Appendix A).

Based on the sampling and monitoring data to date, the following conclusions relevant to groundwater conditions at the South Four Lakes Tank Battery are evident:

- Benzene concentrations in monitoring wells MW-1, MW-5, MW-7, MW-9, MW-10, MW-14, MW-15, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standard of 0.010 mg/L.

- The benzene levels in monitoring wells MW-13 (0.133 mg/L), RW-1d (3.09 mg/L), and RW-2s (1.22 mg/L) exceeded the WQCC standard. Toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards with the exception of the 0.75 mg/L standard for xylenes in MW-15 (0.757 mg/L) and RW-2s (3.05 mg/L).

- Light non-aqueous phased liquids (LNAPL) are present in the groundwater and have the characteristics of a light crude oil or natural gas liquid (condensate). The LNAPL thicknesses have been reduced significantly over the last 3 years due to operation of the windmill recovery system and passive recovery activities in affected wells. LNAPL is localized between RW-2s and MW-6. As of October 25, 2011, measurable LNAPL was only present in: MW-6 (0.18 ft) and MW-12 (0.12 ft).

- The windmill-driven LNAPL recovery system at RW-2s has been performing well since it was put back into operation on July 20, 2008. The system operates in total fluids mode so it is not known how much LNAPL has been removed; however, approximately 419,257 gallons (9,982 barrels) of hydrocarbon-impacted groundwater has been removed, since July 2008.

- Approximately 69.0 gal of LNAPL has been removed from MW-1, MW-6, MW-7, MW-9, MW12, MW-13, RW-1s, and RW-2s since May 2008 by use of passive bailers, oil absorbent socks, hand bailing, and windmill recovery.

- Chloride and TDS concentrations in MW-1, MW-5, MW-10, MW-13, MW-14, MW-15, MW-16, RW-1d, and RW-2s exceed the WQCC standards of 250 mg/L and 1,000 mg/L, respectively.

- Although iron and manganese concentrations exceed WQCC standards in some monitoring wells, increased levels of these constituents indicate intrinsic bioremediation processes are active.

- Source control has been implemented with the removal of contaminated soils beneath the closed EXXON production pit (December 1995) and the ongoing LNAPL and groundwater recovery operations. Given these source control measures, contaminant loading to groundwater has diminished through time, and the groundwater plume will decrease in concentration and areal extent over time.

- There are no indications that the hydrocarbon plume in the groundwater has migrated beyond the boundaries of the facility and there are no potential receptors (water wells) within a half-mile of the site. Given local and regional groundwater use, the groundwater plume in its current extent poses no risk to human health or the environment.

Recommendations for the South Four Lakes Tank Battery are as follows:

- Continue the sampling and monitoring program on an annual basis in accordance with the July 14, 1997 NMOCD approval letter. Continued annual sampling is necessary to monitor plume stability and to evaluate the effectiveness of natural attenuation in limiting the downgradient migration of the plume. The next sampling event is scheduled during the first quarter of 2011.

- Continue total fluids (LNAPL and groundwater) removal from RW-2s using the windmill pump system with monthly inspections to ensure that the system is operational and maintained.

- Conduct LNAPL recovery, if present, in RW-1s, MW-1, MW-6, MW-7, MW-9, MW-12, and MW-13 using passive bailers or absorbent socks with monthly inspections. Obtain groundwater samples from these wells if the LNAPL thickness is less than 0.01 feet.

- The above recommended LNAPL recovery effort will improve the effectiveness of biological attenuation of the dissolved hydrocarbon plume as observed with the continued uptake of electron acceptors, production of biological reaction by-products, and the reduction in BTEX concentrations and areal extent of the dissolved hydrocarbon plume.

2.0 Chronology of Events

November 13, 1987	EXXON Company U. S. A. (Exxon) reported a crude oil spill to the NMOCD which resulted in a loss of 600 barrels from a ruptured line at the South Four Lakes Tank Battery. No record of corrective actions appear to be on file however, Exxon stated that the tank battery would be redesigned and that old buried piping would be replaced with new above-ground piping.
November 1990	Phillips Petroleum Company (Phillips) acquired the South Four Lakes Unit from Exxon. As part of Phillips' due diligence effort during the acquisition, a Phase I and II environmental assessment was completed on the lease and associated facilities by Law Environmental, Inc. This assessment included the installation of four monitoring wells (MW-1 through MW-4).
September 1994	As part of a second environmental due diligence effort for the sale of the Unit, monitoring wells MW-1 through MW-4 were sampled again by SECOR International Incorporated (SECOR). Upon detection of LNAPL in MW-I, Phillips initiated a source identification effort which included evaluation of production storage tank integrity, excavation of an adjacent Amoco crude oil pipeline, a comparative analysis (fingerprinting) of crude oil produced from the unit with the LNAPL discovered within MW-1, and a focused soil and groundwater assessment in the area of the closed EXXON production pit.
December 13-16, 1994	SECOR supervised the installation of nine monitoring wells (MW-5 through MW-13).
January 17-18, 1995	SECOR performed groundwater sampling of all wells at the site with the exception of MW-1, MW-6, RW-11, and MW-12 in which LNAPL was observed.
March 13, 1995	SECOR submitted a *Soil and Groundwater Assessment* report in which they concluded that two historic hydrocarbon release mechanisms existed at the tank battery. The first and primary mechanism was a subsurface release to soil and ground-water from the closed production pit located north of the tank battery. The second mechanism was a relatively shallow subsurface release to soil from historic surface spills of crude oil and produced water.
May 15, 1995	NMOCD requested submission of a soil and groundwater remediation work plan and additional delineation of the dissolved-phase hydrocarbons in groundwater at the site.
July 27, 1995	Phillips submitted a *Remedial Action Plan for the South Four Lakes Unit* to the NMOCD. The plan proposed soil and groundwater remediation and delineation of dissolved-phase hydrocarbons at the site.
August 18, 1995	The NMOCD gave Phillips conditional approval for the Remedial Action Plan.

October 9-11, 1995	SECOR conducted the installation and sampling of three monitoring wells (MW-14 through MW-16) to delineate the downgradient extent of the dissolved hydrocarbons in groundwater at the site.
November 27, 1995	Ritter Environmental & Geotechnical Services (REGS) initiated closure of the former production pit under contract with Phillips. REGS excavated the former pit to a depth of approximately 23 ft below ground surface (bgs). The excavated soils were removed for treatment by solidification in three treatment cells. The solidified material (~1,835 yd^3) was allowed two to three weeks time to cure prior to covering the excavated production pit and treatment cells. Wells MW-8 and RW-11 had to be removed as they were in the footprint of the excavated area.
January 4-5, 1996	SECOR supervised the installation of recovery wells RW-1s, RW-1d, RW-2s, and RW-2d for subsequent use to recover LNAPL.
January 15-16, 1996	BASCOR Environmental, Inc. (BEI) supervised the installation of the windmill-driven pump system for LNAPL recovery and conducted a well performance test for recovery wells RW-2s and RW-2d.
January 31, 1996	Phillips submitted the *Final Closure Report - Unlined Surface Impoundment Closure* report prepared by REGS (December 1995) to the NMOCD.
January 31, 1996	Phillips submitted the *Supplemental Environmental Investigation – Downgradient Assessment* report prepared by SECOR (November 28, 1995) to the NMOCD.
January 31, 1996	Phillips submitted the *Recovery Well Installation Report* prepared by SECOR (January 29, 1996) to the NMOCD.
January 31, 1996	Phillips submitted the *Free Phase Hydrocarbon Recovery System Installation Report* prepared by BEI (January 30, 1996) to the NMOCD.
March 22, 1996	NMOCD approved Phillips' actions to date and added conditions for a long-term groundwater monitoring plan.
May 6, 1997	Phillips submitted the *Quantification of Natural Attenuation of Petroleum Hydrocarbons in Groundwater* report prepared by SECOR (April1997) to the NMOCD with a request that MW-2, MW-3, MW-4, and metals analysis for all monitoring wells be eliminated from future monitoring events. In addition, Phillips requested that groundwater monitoring for the on site wells be reduced to an annual frequency.
July 14, 1997	NMOCD conditionally approved Phillips' May 6, 1997 request.
December 3-5, 1997	CH2M Hill conducted the 1997 groundwater sampling event at the South Four Lakes Unit.

October 1998	Phillips sold South Four Lakes Unit to Pride Energy Company.
December 1, 1998	After the sale of the South Four Lakes Unit to Pride, Phillips sent a disclosure letter that included reports of previous investigations at the site. In the letter Phillips stated they would finalize the 1998 annual monitoring report for submission to the NMOCD.
February 15, 2000	NMOCD requested Phillips to submit required annual reports by March 17, 2000.
March 15, 2000	Phillips submitted the 1997 annual monitoring report and requested NMOCD to acknowledge the submission as its final action for the site.
May 26, 2000	NMOCD denied Phillips request for final action. Although Pride contractually accepted responsibility for site remediation, the NMOCD stated that contractual arrangement between Phillips and Pride does not relieve Phillips of liability or responsibility for remediation.
March 13, 2008	Trident Environmental conducted the 2008 groundwater monitoring event at the South Four Lakes tank battery site on behalf of Pride. Trident also acquired site documentation from various reports available from the OCD Online database to incorporate into the forthcoming annual monitoring report.
May 6, 2008	Trident supervised the inspection and trouble-shooting of the windmill-driven LNAPL recovery system at RW-2 which included removal of worn components. Passive bailers were installed in MW-6 and RW-1s to augment LNAPL recovery efforts.
May 28, 2008	Trident supervised the repair of the windmill-driven LNAPL recovery system at RW-2 which included repair and replacement of downhole components.
June 30, 2008	The discharge line was installed to direct LNAPL recovery from the windmill at RW-2s to the South Four Lakes tank battery.
July 24, 2008	The pump rod on the windmill at RW-2s was repaired and the system put back into operating status for total fluids recovery. Also, hydrophobic bailers were placed in monitoring wells MW-1, MW-7, MW-12 and MW-13, for passive recovery of LNAPL.
August 12, 2009	Hydrophobic bailer was installed in monitoring well MW-6. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
September 17, 2009	Oil absorbent sock was placed in monitoring well MW-9. The hydrophobic bailer in MW-7 was replaced with a hydrophobic sock, due to reduced LNAPL.
October 8, 2009	The hydrophobic bailer in MW-13 was replaced with an oil absorbent sock, due to reduced LNAPL.

November 20, 2009	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
December 23, 2009	Lewis Windmill on site to re-install new sump in RW-2s; windmill set in product-only mode for winter operation. Emptied hydrophobic bailers/socks, hand bailed, and gauged wells with LNAPL.
January 15, 2009	Adjusted sump; windmill set in product-only mode for winter operation. Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
February 27, 2009	Lowered sump in windmill to pump total fluids. The hydrophobic bailer in MW-1 was replaced with an oil absorbent sock, due to reduced LNAPL. Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
March 26, 2009	Windmill performing well in total fluids mode (product pumped off - only pumping water). Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
April 28, 2009	Re-attached loose bracket on windmill which was loose from pump on arrival (probably caused by high winds). Totalizer indicates windmill pumped at 1.7 gpm (average) over past month which is much higher than normal. Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
May 18-19, 2009	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Conducted annual groundwater monitoring event. Added monitoring wells MW-1, MW-7, MW-9, and MW-13 to sampled well list due to lack of LNAPL.
June 17, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
July 16, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
August 26, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
September 15, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
October 15 & 19, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL. Piñon Well Service on site to repair windmill (replaced leather cups, new coupling, and stabilizer tower) and put back in service.

October 21, 2009	Emptied and replaced hydrophobic bailers and socks. Replaced passive bailer in RW-1s with oil absorbent sock due to reduced LNAPL thickness.
November 12, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
December 10, 2009	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL. Turned windmill off to avoid winter freeze up problems.
January 13, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
February 25, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL. Re-activated windmill
March 23, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
April 1, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL. Windmill not operational (tophead plunge rod threads stripped)
April 28, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL. Repaired windmill (replaced tophead plunger rod) and installed new totalizer meter.
May 25, 2010	Gauged on site monitoring wells and began annual groundwater sampling activities.
May 25-26, 2010	Completed annual groundwater sampling activities. Emptied and replaced hydrophobic bailers and socks.
June 16, 2010	Emptied and replaced hydrophobic bailers and socks. Gauged wells with LNAPL.
July 14, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Replaced passive bailer in MW-12 with oil absorbent sock due to reduced LNAPL thickness.
August 24, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
September 22, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
October 6, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
November 30, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
December 13, 2010	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
January 19, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.

February 24, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Windmill out of service (stuffing box rod broken at threads).
March 17, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Windmill operational after replacing stuffing box rod.
April 26, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
May 17, 2011	Gauged on site monitoring wells and began annual groundwater sampling activities.
May 17-18, 2011	Completed annual groundwater sampling activities. Emptied and replaced hydrophobic bailers and socks.
June 29, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
July 14, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
August 23, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.
September 28, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL. Installed new totalizer meter.
October 25, 2011	Emptied hydrophobic bailers and socks. Gauged wells with LNAPL.

3.0 Site Description and Background Information

Pride Energy Company (Pride) owns and operates the South Four Lakes Unit located in Lea County, New Mexico, just north of U.S. Highway 380, approximately 10 miles northwest of the town of Tatum (Figure 1). The Unit is an oil and gas lease on State land containing several active producing wells, one saltwater disposal well, and associated production tank battery. The tank battery is situated on approximately 5 acres and is surrounded by relatively flat grazing lands. Regionally, topography gently slopes to the east-southeast and is sparsely vegetated. The nearest water well (L-3005) is located approximately 0.35 miles north and is currently out of service but used periodically as a water supply for oil well drilling. An active windmill (L-0656) used for livestock watering is located approximately 0.4 miles east-northeast of the site. Figure 2 presents the facility layout, as well as the location of all site monitoring wells.

Pride acquired the Unit from Phillips Petroleum Company (Phillips) in October 1998. Phillips acquired the Unit from EXXON Company, U.S.A. in November 1990. EXXON (formerly Humble Oil Co.) had operated the unit since the 1950's. As part of Phillips' due diligence effort during the acquisition, Phase I and Phase II environmental assessments were completed on the lease and associated facilities. Eight soil borings were drilled for the purposes of soil screening and sampling. Four monitoring wells (MW-1 through MW-4) were installed in four of the eight soil borings. The four monitoring wells were sampled for benzene, toluene, ethylbenzene, and total xylenes (BTEX) in mid-October 1990. Low levels of dissolved toluene, ethylbenzene, and xylene were detected in the groundwater sample collected from MW-1, located adjacent to the northwest comer of an abandoned EXXON production pit. No other monitoring well contained detectable levels of BTEX or light non-aqueous phase liquids (LNAPL). Upon acquiring the lease from EXXON, Phillips dismantled the old EXXON tank battery and constructed a new tank battery in its place. As part of a second environmental due diligence effort for the sale of the Unit, the four monitoring wells were sampled again in September 1994. During this sampling event, approximately 2.5 feet of LNAPL was present in MW-1. No other monitoring well contained detectable levels of dissolved BTEX or measurable LNAPL. Upon detection of the LNAPL in MW-1, Phillips initiated a source identification effort that included four tasks:

1. A production storage tank integrity evaluation
2. Excavation of an adjacent Amoco crude oil pipeline
3. A comparative analysis (fingerprinting) of crude oil produced from the Unit with the LNAPL discovered in MW-l
4. A focused soil and groundwater assessment in the area of the abandoned EXXON production pit

Internal inspection of the two crude storage tanks indicated that the tanks had not leaked. Furthermore, excavation of the Amoco crude oil pipeline indicated that the Amoco pipeline had not leaked. The comparative analysis of the crude oil samples produced from the Unit with the LNAPL encountered at MW-l indicated that the oils were essentially the same. One minor but expected difference between the produced crude oils and the LNAPL from MW-l is that the MW-l oil has experienced minor evaporation, water washing, and/or biodegradation as suggested by the loss of light-end petroleum hydrocarbons (C4-C8).

Based on the results of second due diligence effort, it was determined that LNAPLs in soils beneath the abandoned EXXON production pit were the source of the dissolved BTEX in groundwater and the LNAPL at MW-1.

SECOR performed soil and groundwater assessment activities in December 1994 which included the installation of nine monitoring wells (MW-5 through MW-13) as documented in the report titled "*Soil And Groundwater Assessment*", dated March 13, 1995. In October 1995, SECOR conducted the installation and sampling of three additional monitoring wells (MW-14 through MW-16) to delineate the downgradient extent of the dissolved hydrocarbons in groundwater at the site.

Soils beneath the abandoned EXXON production pit were excavated and solidified onsite by Ritter Environmental on behalf of Phillips in December 1995. Wells MW-8 and RW-11 had to be removed as they were in the footprint of the excavated area.

In January 1996, SECOR supervised the installation of two 4-inch diameter recovery well clusters, RW-1 and RW-2, in areas with thickest accumulations of LNAPL.

Construction of a total fluids removal system consisting of dual pumps installed in recovery well cluster RW-2s (shallow) and RW-2d (deep) was completed by Bascor Environmental in January 1996. A conventional 8-foot diameter windmill placed on a 27-foot high tower provided the energy necessary to operate the dual pump system. According to the *1997 Natural Attenuation of Petroleum Hydrocarbons Monitoring Report* (December 1997), the windmill "recovery system recovered 2,700 gallons [~64 barrels] of natural gas condensate and 190,000 to 200,000 gallons [~4600 barrels] of water" during 1997. In the 1997 report, Phillips demonstrated that biological attenuation of petroleum hydrocarbons is actively occurring, that the dissolved hydrocarbon plume has only migrated a few hundred feet beyond the LNAPL release, and the extent of the plume appears to be stable.

Figure 2 depicts the locations of the on site monitoring wells and recovery wells over a 2005 aerial photograph of the facility.

Pride resumed monitoring activities and authorized Trident Environmental to conduct the annual groundwater monitoring and sampling event on March 13, 2008. Between May 6, 2008 and July 24, 2008 the windmill fluids recovery system at RW-2s was repaired and put back into service, and passive bailers were placed in monitoring wells with LNAPL present. Passive bailers were eventually replaced with oil absorbent socks due to significantly reduced thicknesses of LNAPL. Operation and maintenance of the groundwater recovery system has continued on a monthly basis with annual groundwater sampling events as updated herein.

4.0 Procedures

During the annual sampling event conducted by Trident on May 17-18, 2011, all on-site monitoring wells were gauged for depth to groundwater using a clean, decontaminated electronic water/oil interface probe. Monitoring wells MW-1, MW-5, MW-7, MW-9, MW-10, MW-13, MW-14, MW-15, MW-16, RW-1d, and RW-2s were sampled. A minimum of three volumes was purged from the wells by hand-bailing using a new, clean, disposable bailer prior to collecting groundwater samples. Groundwater parameters, including pH, conductivity, temperature, and dissolved oxygen (DO) were measured at the completion of purging using a Milwaukee Model SM600 DO meter, and a Hanna Model 98130 pH, conductivity, and temperature meter. At the end of purging, ferrous iron (Fe^{+2}) and nitrate (NO_3) were also measured in the field using a Hach DR890 spectrophotometer (Hach Methods 8146 and 8171, respectively).

The first set of water samples were transferred into air-tight, septum-sealed, 40-ml glass VOA sample vials with zero head space for BTEX analysis using EPA Method 8021B. The next set of water samples were transferred into unpreserved plastic containers for analysis of sulfate (SO_4), total iron (Fe), and total manganese (Mn) to assess the efficacy of intrinsic bioremedial activity currently taking place. Water samples were also collected for analysis of chloride and total dissolved solids (TDS). Chain-of-custody (COC) forms documenting sample identification numbers, collection times, and delivery times to the laboratories were completed for each set of samples. The water samples were placed in an ice-filled cooler immediately after collection and delivered to Xenco Laboratories in Odessa TX, on May 19, 2011, for analysis using EPA standard methods.

5.0 Groundwater Elevations, Hydraulic Gradient and Flow Direction

Based on the most recent gauging data collected by Trident on May 17, 2011, the groundwater conditions at the South Four Lakes Tank Battery are characterized below.

- The depth to the water table varies from approximately 23 to 27 feet below ground surface across the site.
- The hydraulic gradient is approximately 0.002 feet/foot.
- Direction of groundwater flow is to the southeast (39° south of due east).
- The direction of groundwater flow and hydraulic gradient are consistent with previous gauging events and the prevailing regional gradient.
- Water table elevations have declined approximately 1.3-feet across the site at a consistent rate over the last three years and are at their lowest levels since monitoring began in 1995.

A groundwater elevation map depicting the water table elevation and direction of groundwater flow using the gauging data obtained on May 17, 2011, is presented in Figure 3. Historical groundwater elevations and depth to water measurements are summarized on Table 1, and depicted graphically in Figure 4.

6.0 Groundwater Quality Conditions

6.1 Distribution of Dissolved-phase Hydrocarbons in Groundwater

A historical listing of BTEX concentrations obtained from the on site monitoring wells is summarized in Table 2. Hydrocarbon concentration maps depicting the BTEX concentrations for the May 17-18, 2011 sampling event is presented in Figure 5. The laboratory reports and COC documentation are included in Appendix B.

Based on the analytical results obtained from the May 17-18, 2011 sampling event, the distribution of dissolved-phase hydrocarbons at the South Four Lakes Tank Battery is described below.

- Benzene concentrations in monitoring wells MW-1, MW-5, MW-7, MW-9, MW-10, MW-14, MW-15, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standard of 0.010 mg/L.
- The benzene levels in monitoring wells MW-13 (0.133 mg/L), RW-1d (3.09 mg/L), and RW-2s (1.22 mg/L) exceeded the WQCC standard.
- Toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards with the exception of the 0.75 mg/L standard for xylenes in MW-15 (0.757 mg/L) and RW-2s (3.05 mg/L).
- The dissolved-phase hydrocarbons in groundwater are localized within the boundaries of the facility. The dissolved hydrocarbon plume in the groundwater has remained stable and shows no indications of further downgradient migration.

6.2 Distribution of Chloride and TDS in Groundwater

Historical chloride and TDS concentrations in groundwater are also listed in Table 2. Constituents with concentrations above the WQCC standards are highlighted in boldface type. Figure 6 is a map depicting the chloride and TDS concentration for the May 17-18, 2011 sampling event. The laboratory reports and COC documentation are included in Appendix B.

- Chloride concentrations in MW-1 (316 mg/L), MW-5 (547 mg/L), MW-10 (471 mg/L), MW-13 (1,710 mg/L), MW-14 (299 mg/L), MW-15 (1,010 mg/L), MW-16 (410 mg/L), RW-1d (2,010 mg/L), and RW-2s (452 mg/L) exceed the WQCC standard of 250 mg/L.
- TDS concentrations in MW-1 (1,000 mg/L), MW-5 (1,170 mg/L), MW-10 (1,510 mg/L), MW-13 (3,120 mg/L), MW-14 (1,420 mg/L), MW-15 (1,840 mg/L), MW-16 (1,350 mg/L), RW-1d (3,240 mg/L), and RW-2s (2,510 mg/L) exceed the WQCC standard of 1,000 mg/L.
- Chloride and TDS concentrations in monitoring wells MW-7 and MW-9 were below the WQCC standards.

7.0 Monitoring Natural Attenuation

The following biological parameters are being monitored to assess the efficacy of the biodegradation of the dissolved hydrocarbon (BTEX) plume:

- Electron Acceptors: dissolved oxygen (DO), nitrate (NO_3), sulfate (SO_4), and
- Biodegradation by-products: ferrous iron (Fe^{+2}), total iron (Fe), and total manganese (Mn).

Decreased levels of electron acceptors indicate uptake of these constituents in which biological processes are actively degrading dissolved hydrocarbons in groundwater. Thus, oxygen is consumed during aerobic respiration, nitrate is transformed to nitrite through denitrification, and sulfate decreases from the sulfate reduction process.

Increased levels of biodegradation byproducts (ferrous iron, total iron, and total manganese) are also indicators of naturally occurring biodegradation of the dissolved hydrocarbons. The uptake of hydronium ions associated with specific biodegradation processes mentioned above and/or the dissolution of soil minerals (iron and manganese) results from reaction with acids generated in hydrocarbon degradation. Insoluble forms of iron (Fe^{+3}) and manganese (Mn^{+4}) are then used as an electron acceptors producing highly soluble ferrous iron (Fe^{+2}) and manganese (Mn^{+2}). The historical summary of these parameters are listed in Table 3. The electron acceptor and biodegradation by-product data collected on May 17-18, 2011, are presented graphically in Figure 7.

One approach to analyzing the efficacy of biodegradation of dissolved hydrocarbons in groundwater is to compare the concentrations of various biological parameters based on their upgradient and downgradient location, to evaluate if any trends are evident. These trends are depicted graphically in Figure 8 in which the concentrations of benzene, electron acceptors, and biodegradation byproducts are plotted versus the distance from the source of hydrocarbons along the axis of the plume and extending from upgradient monitoring well MW-10 to downgradient monitoring well MW-16. With this analysis the following relationships in the electron acceptor and biodegradation by-product data are observed at the South Four Lakes Tank Battery Site:

- Generally, DO values are lower downgradient and within the plume indicating that oxygen is being utilized as an electron acceptor (aerobic respiration).
- Nitrate and sulfate concentrations also exhibit decreasing tendencies in the downgradient direction (within the plume) as they are being utilized as electron acceptors indicating denitrification and sulfate reduction processes are occurring.
- Dissolved iron concentrations increase within the BTEX plume and downgradient indicating the insoluble ferric iron (Fe^{+3}) is being used as an electron acceptor producing highly soluble ferrous iron (Fe^{+2}).
- Manganese concentrations are higher within the plume indicating that manganese in solute form is a metabolic byproduct resulting from anaerobic biodegradation processes.
- Downgradient wells MW-14 and MW-16, which are outside the dissolved hydrocarbon plume, are perhaps the most obvious locations displaying the above relationships when compared to upgradient monitoring wells RW-2s, RW-1d, MW-13, and MW-15 within the dissolved hydrocarbon plume.

In another approach, using stoichiometric derivations, the mass of benzene degraded per unit mass of electron acceptor utilized and metabolic byproduct produced was calculated to determine the biodegradation capacity of these constituents relative to the highest and average benzene concentration observed on site. This comparison is summarized in Table 4.

The calculated biodegradation capacity of electron acceptors and metabolic byproducts (28.6 mg/L) exceeds the highest benzene concentration (3.09 mg/L) currently observed on site by a factor of 9.3. The biodegradation capacity of electron acceptors and metabolic byproducts far exceeds the average benzene concentration (0.56 mg/L) currently observed within the plume by a ratio of 51 to 1. This indicates that the necessary nutrients and by-products are present for the continued biodegradation of dissolved hydrocarbons.

The geochemical data for the site provides clear evidence of uptake of electron acceptors and production of biological reaction by-products, such that dissolved petroleum hydrocarbon biodegradation is occurring. Based on the analysis of electron acceptors and biodegradation by-products, it is concluded that biological processes continue to stabilize the hydrocarbon plume by actively reducing the BTEX constituents in both the downgradient dissolved plume and in the areas where LNAPL is present.

8.0 Free Product Recovery and LNAPL Thickness

Construction of a total fluids removal system consisting of dual pumps installed in recovery well cluster RW-2s (shallow) and RW-2d (deep) was completed by Bascor Environmental in January 1996. A conventional 8-foot diameter windmill placed on a 27-foot high tower provides the energy necessary to operate the dual pump system. According to the *1997 Natural Attenuation of Petroleum Hydrocarbons Monitoring Report* (December 1997), the windmill "recovery system recovered 2,700 gallons [~64 barrels] of natural gas condensate and 190,000 to 200,000 gallons [~4,600 barrels] of water" during 1997. A diagram of the windmill recovery system scanned from the *Free Phase Hydrocarbon Recovery System Installation Report* (January 30, 1996) prepared by BEI is shown in Figure 9. The system is also pictured on the cover of this report.

During the May 17-18, 2011 sampling event, monitoring well MW-6 (0.21 ft) and MW-12 (0.67 ft) had the only measurable LNAPL thickness on site as listed in Table 1 and displayed in Figure 5. The steady declining trend in LNAPL thickness across the site, which is attributable to the product recovery efforts to date, is displayed in Figure 10. It should be recognized that measured thicknesses of LNAPL in wells exaggerates true thicknesses in the formation.

On May 6, 2008, and May 28, 2008, Trident supervised the inspection and trouble-shooting of the windmill-driven LNAPL recovery system at RW-2 which included removal of worn components. In late June 2008, the discharge line was installed to direct total fluids (LNAPL and recovered groundwater) from the windmill at RW-2s to the South Four Lakes tank battery. On July 24, 2008, the pump rod and wellhead seal on the windmill at RW-2s was repaired and the system put back into operating status. A totalizing meter records the cumulative volume of total fluids recovered by the windmill. With a 5 to 10 mile per hour wind the windmill pumps approximately 0.5 gallons per minute. According to the totalizer readings, the windmill has pumped approximately 419,257 gallons (9,932 barrels) of total fluids from RW-2s since July 24, 2008, at an average rate of 0.25 gal/min over the period of record. A higher volume of total fluids have been recovered compared to what has been recorded due to periods when the totalizer meter was not operational or intermittently clogged. A new totalizer meter was installed on September 28, 2011.

Passive bailers with hydrophobic filters were installed in MW-12 and RW-1s on May 6, 2008, to augment LNAPL recovery efforts. Initial attempts to install a passive bailer in MW-1, MW-7, MW-12, and MW-13 were unsuccessful due to slight curvature or obstruction in these monitoring wells. On July 24, 2008, custom-made passive bailers were placed in monitoring wells MW-1, MW-6, MW-7, MW-12 and MW-13. An oil-absorbent sock was installed in MW-9 due to minimal presence of LNAPL. Due to significant declines in LNAPL thickness, the passive bailers in MW-1, MW-6, MW-7, MW-12, MW-13 and RW-1s, have since been replaced with oil-absorbent socks. Continued LNAPL recovery from these wells was successful in reducing LNAPL thickness to 0.00 ft in MW-1, MW-7, MW-9, MW-13, and RW-1s such that they could be included in the groundwater sampling program. As of October 25, 2011, measurable LNAPL was only present in MW-6 (0.18 ft) and MW-12 (0.12). Because of the minimized LNAPL thicknesses across the site, recoverable LNAPL has also declined considerably as depicted in Figure 11.

A minimum of 69.0 gallons of LNAPL has been recovered since May 6, 2008 using a combination of the windmill pump system, passive bailers, oil absorbent socks, and hand bailing. The LNAPL from RW-2s is not separated from the total fluids; therefore LNAPL recovery in RW-2s cannot be measured and total LNAPL recovery volumes are underestimated. LNAPL thickness and product recovery volumes measurements are listed in Table 5 and Table 6, respectively. Operation and maintenance of the windmill recovery system, passive bailers, and oil absorbent socks continues on a monthly basis.

9.0 Conclusions

Based on the sampling and monitoring data to date, the following conclusions relevant to groundwater conditions at the South Four Lakes Tank Battery are evident:

- Benzene concentrations in monitoring wells MW-1, MW-5, MW-7, MW-9, MW-10, MW-14, MW-15, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standard of 0.010 mg/L.

- The benzene levels in monitoring wells MW-13 (0.133 mg/L), RW-1d (3.09 mg/L), and RW-2s (1.22 mg/L) exceeded the WQCC standard. Toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards with the exception of the 0.75 mg/L standard for xylenes in MW-15 (0.757 mg/L) and RW-2s (3.05 mg/L).

- Light non-aqueous phased liquids (LNAPL) are present in the groundwater and have the characteristics of a light crude oil or natural gas liquid (condensate). The LNAPL thicknesses have been reduced significantly over the last 3 years due to operation of the windmill recovery system and passive recovery activities in affected wells. LNAPL is localized between RW-2s and MW-6. As of October 25, 2011, measurable LNAPL was only present in: MW-6 (0.18 ft) and MW-12 (0.12 ft).

- The windmill-driven LNAPL recovery system at RW-2s has been performing well since it was put back into operation on July 20, 2008. The system operates in total fluids mode so it is not known how much LNAPL has been removed; however, approximately 419,257 gallons (9,982 barrels) of hydrocarbon-impacted groundwater has been removed, since July 2008.

- Approximately 69.0 gal of LNAPL has been removed from MW-1, MW-6, MW-7, MW-9, MW12, MW-13, RW-1s, and RW-2s since May 2008 by use of passive bailers, oil absorbent socks, hand bailing, and windmill recovery.

- Chloride and TDS concentrations in MW-1, MW-5, MW-10, MW-13, MW-14, MW-15, MW-16, RW-1d, and RW-2s exceed the WQCC standards of 250 mg/L and 1,000 mg/L, respectively.

- Although iron and manganese concentrations exceed WQCC standards in some monitoring wells, increased levels of these constituents indicate intrinsic bioremediation processes are active.

- Source control has been implemented with the removal of contaminated soils beneath the closed EXXON production pit (December 1995) and the ongoing LNAPL and groundwater recovery operations. Given these source control measures, contaminant loading to groundwater has decreased through time, and the groundwater plume will decrease in concentration and areal extent over time.

- There are no indications that the hydrocarbon plume in the groundwater has migrated beyond the boundaries of the facility and there are no potential receptors (water wells) within a half-mile of the site. Given local and regional groundwater use, the groundwater plume in its current extent poses no risk to human health or the environment.

- Continued annual sampling is necessary to monitor plume stability and to evaluate the effectiveness of natural attenuation in limiting the downgradient migration of the plume.

10.0 Recommendations

The following corrective actions are recommended for South Four Lakes Tank Battery.

- Continue the sampling and monitoring program on an annual basis in accordance with the July 14, 1997 NMOCD approval letter. Continued annual sampling is necessary to monitor plume stability and to evaluate the effectiveness of natural attenuation in limiting the downgradient migration of the plume. The next sampling event is scheduled during the first quarter of 2011.

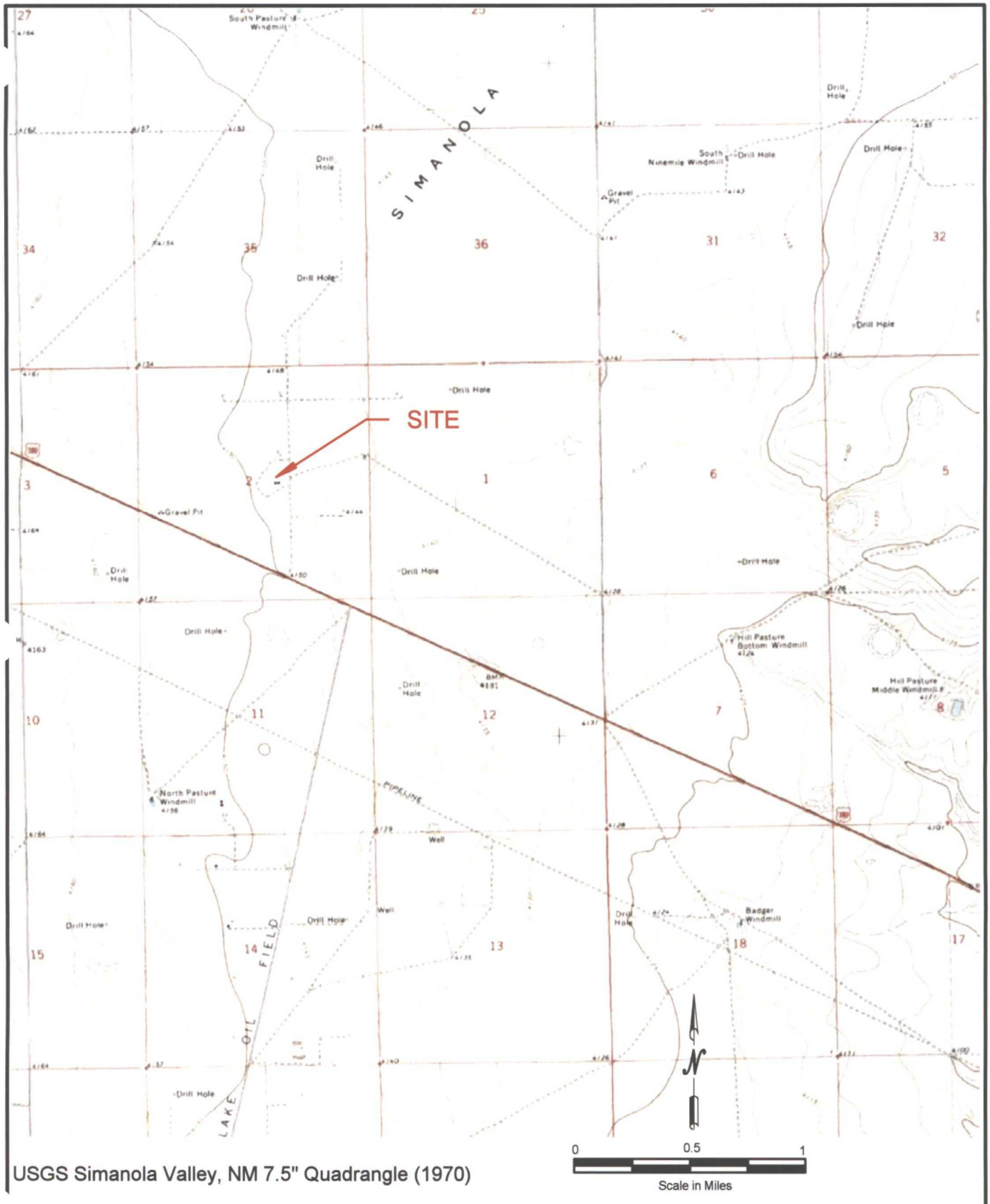
- Continue total fluids (LNAPL and groundwater) removal from RW-2s using the windmill pump system with monthly inspections to ensure that the system is operational and maintained.

- Continue LNAPL recovery, if present, in RW-1s, MW-1, MW-6, MW-7, MW-9, MW-12, and MW-13, using passive bailers or absorbent socks with monthly inspections. Obtain groundwater samples from these wells if the LNAPL thickness is less than 0.01 feet.

- The above recommended LNAPL recovery effort will improve the effectiveness of biological attenuation of the dissolved hydrocarbon plume as observed with the continued uptake of electron acceptors, production of biological reaction by-products, and the reduction in BTEX concentrations and areal extent of the dissolved hydrocarbon plume.

11.0 Limitations

Trident has prepared this Annual Monitoring Report to the best of its ability. No other warranty, expressed or implied, is made or intended. Trident has examined and relied upon documents obtained from the OCD Online database (http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pENV00001RP204) as referenced in the report and may have relied on oral statements made by certain individuals. Trident has not conducted an independent examination of the facts contained in referenced materials and statements. We have presumed the genuineness of the documents and that the information provided in documents or statements are true and accurate. Trident has prepared this report, in a professional manner, using the degree of skill and care expected of environmental consultants. Trident also notes that the facts and conditions referenced in this report may change over time and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report.



USGS Simanola Valley, NM 7.5" Quadrangle (1970)

TRIDENT ENVIRONMENTAL

PRIDE ENERGY COMPANY
SOUTH FOUR LAKES TANK BATTERY
T12S - R34E - Section 2
Lea County, New Mexico

FIGURE 1
SITE LOCATION MAP

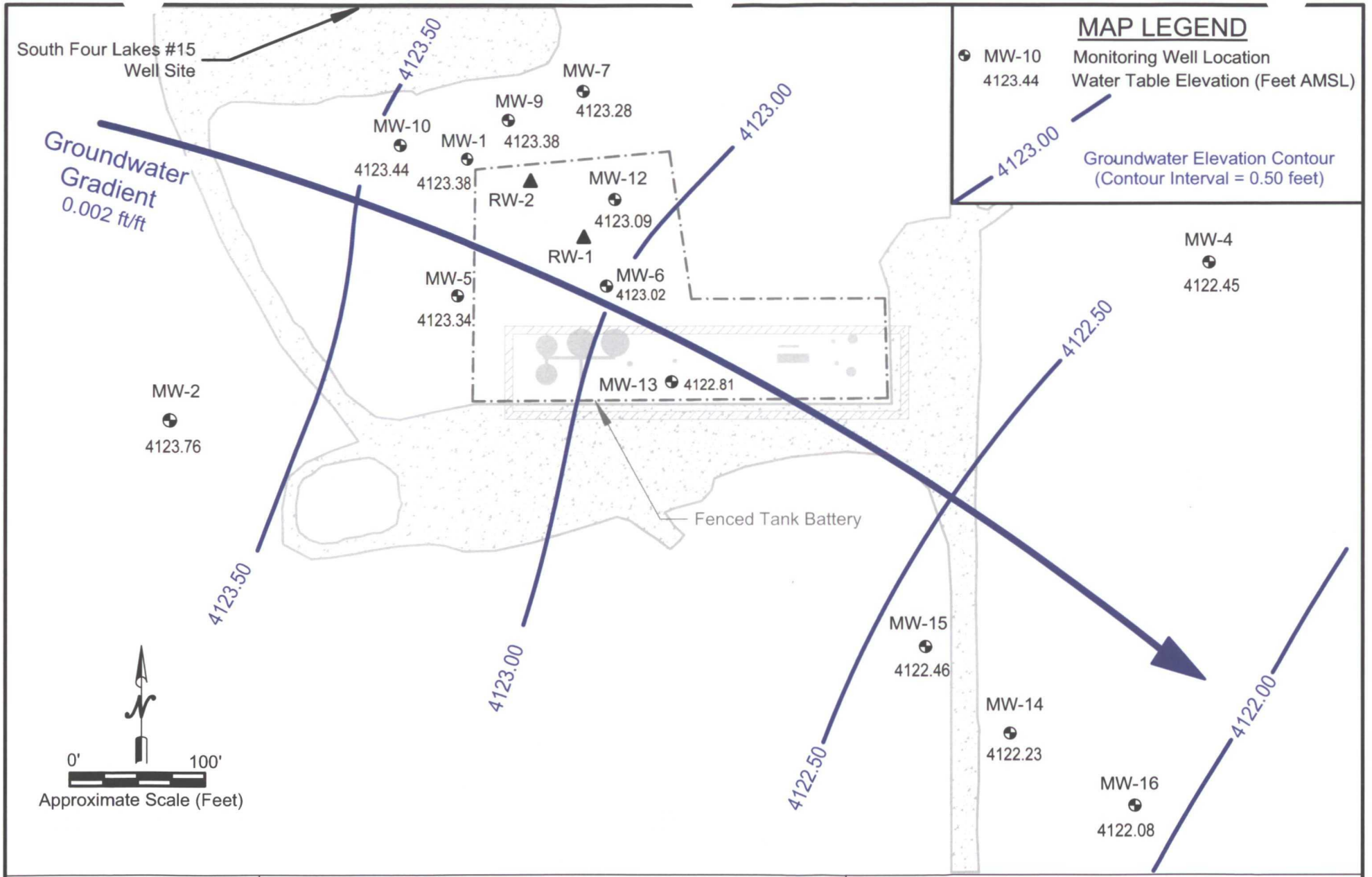
TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery

T12S - R34E - Section 2

Pride Energy Company

FIGURE 2
2005 AERIAL PHOTO AND MONITORING WELL LOCATION MAP



TRIDENT ENVIRONMENTAL

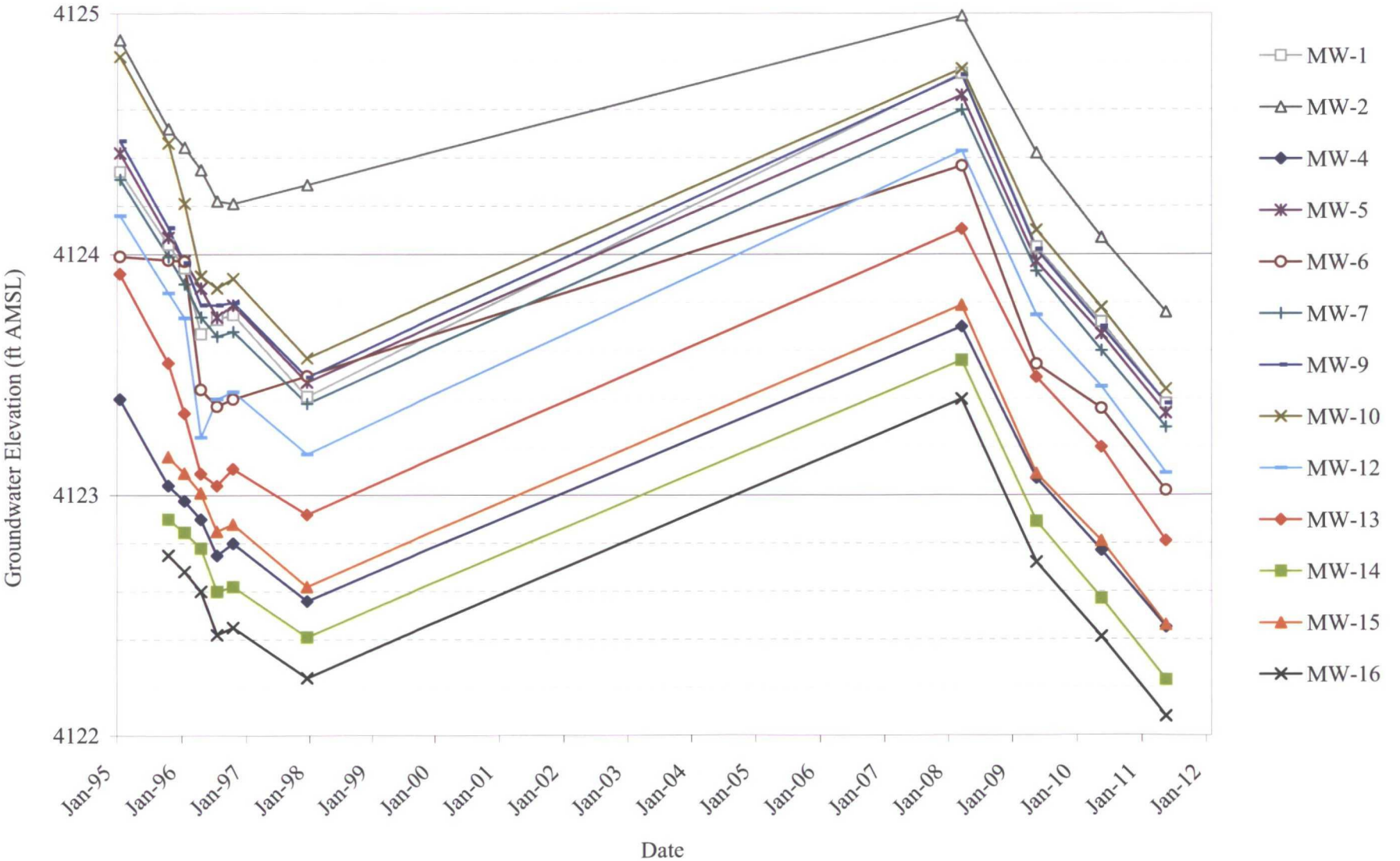
South Four Lakes Tank Battery (1R0204)

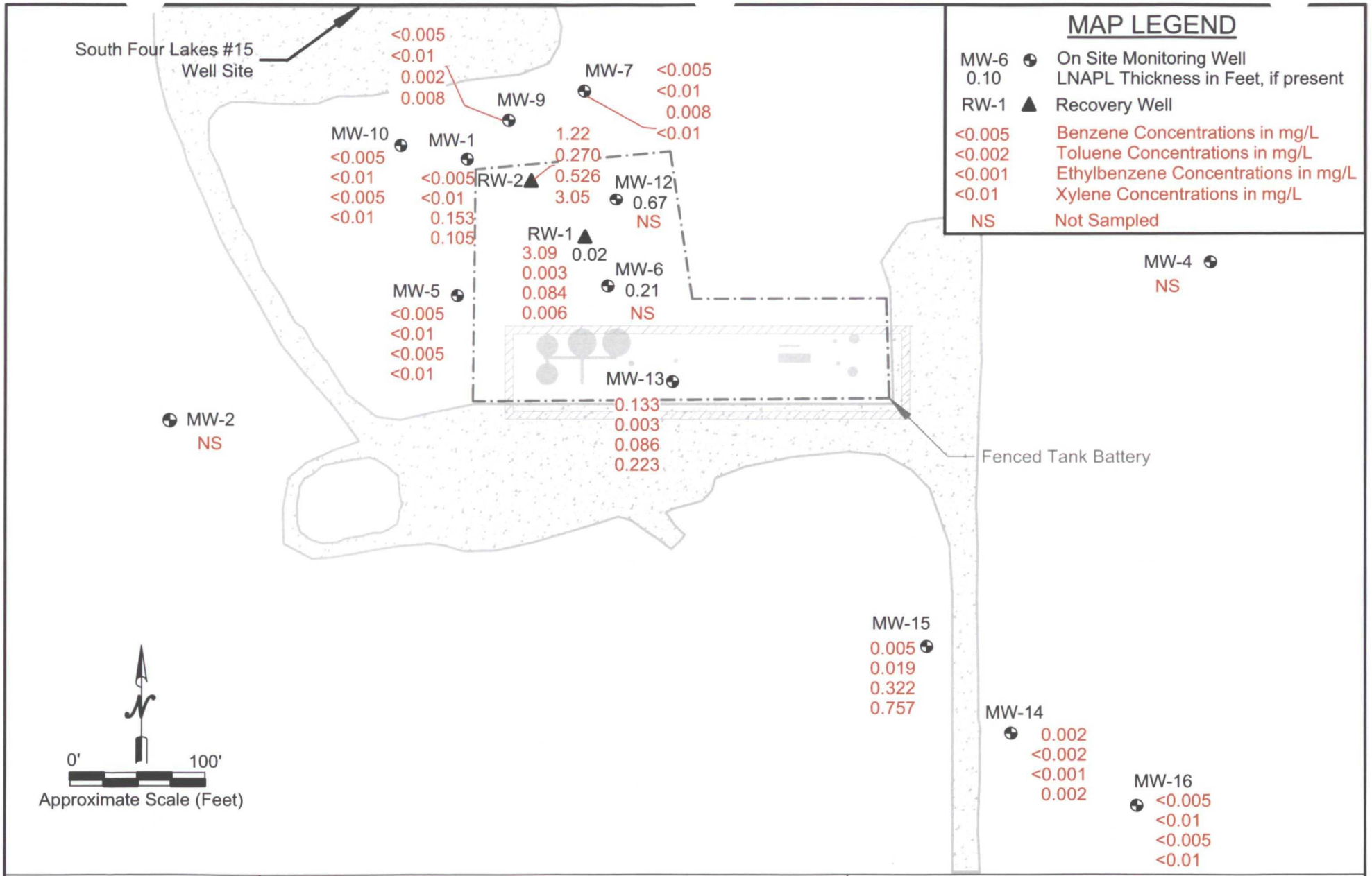
T12S - R34E - Section 2 (Lea County, NM)

Pride Energy Company

FIGURE 3
WATER TABLE ELEVATION MAP
May 17, 2011

FIGURE 4
Groundwater Elevation Versus Time





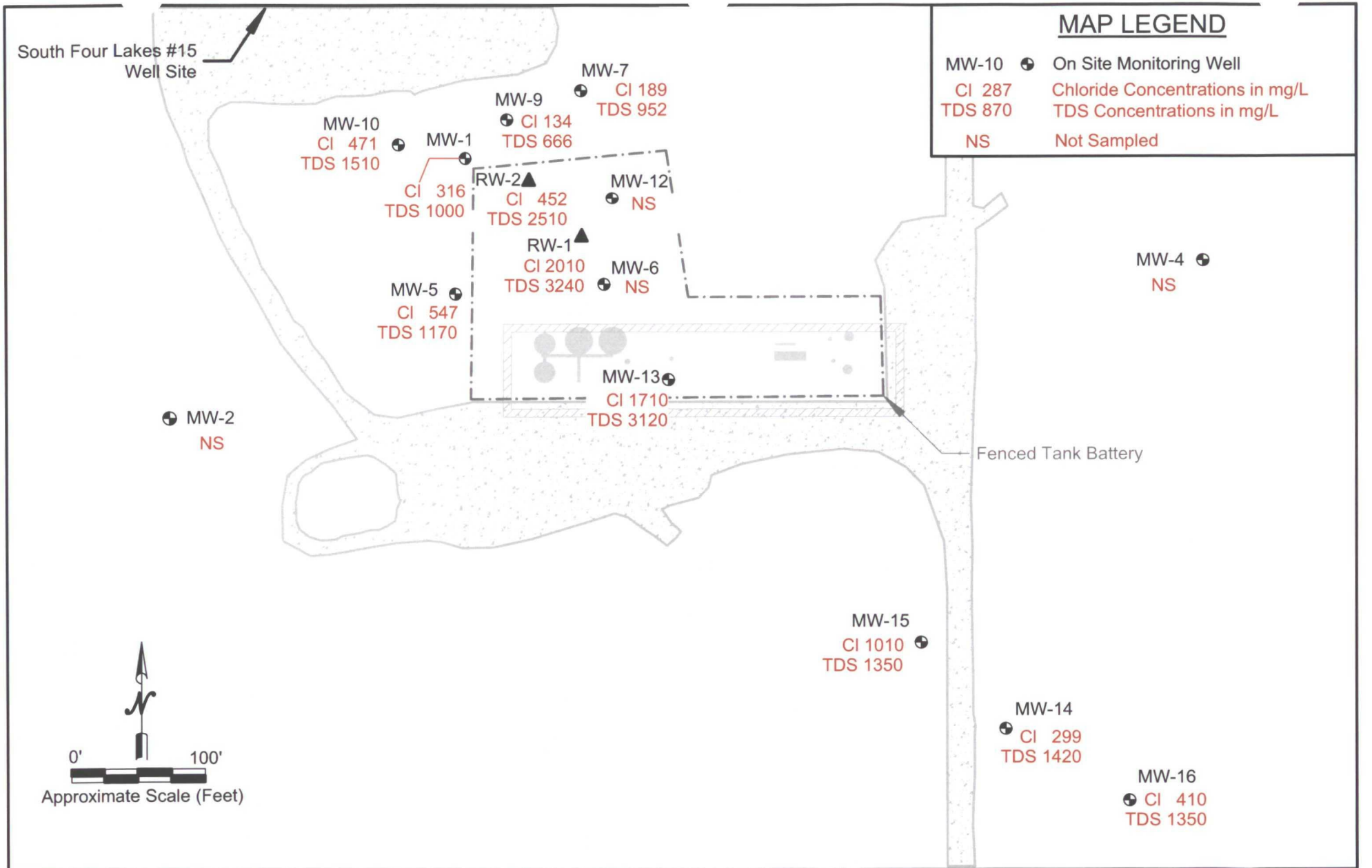
TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery (1R0204)

T12S - R34E - Section 2 (Lea County, NM)

Pride Energy Company

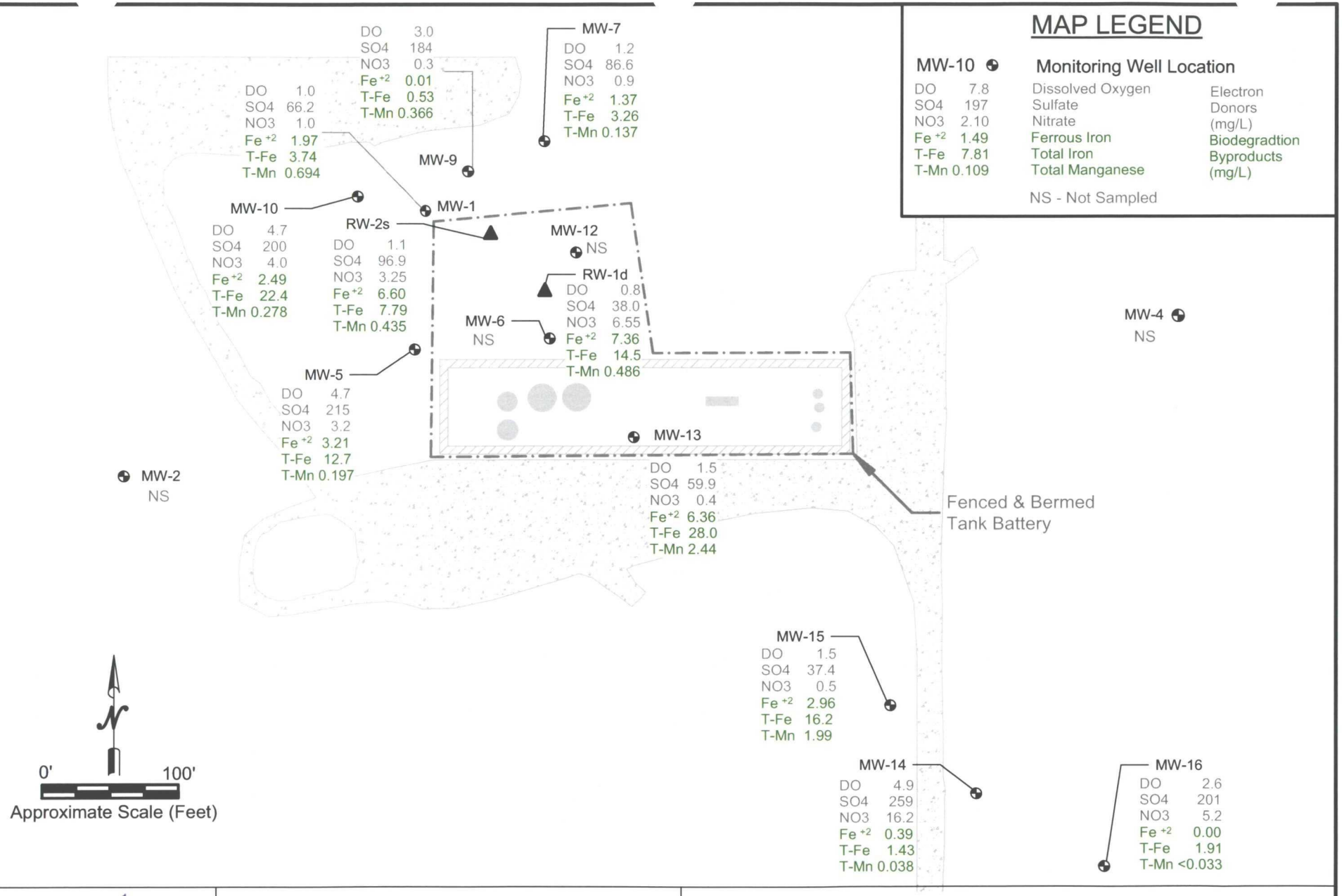
FIGURE 5
BTEX CONCENTRATION AND LNAPL THICKNESS MAP
May 17-18, 2011



TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery (1R0204)
T12S - R34E - Section 2 (Lea County, NM)
Pride Energy Company

FIGURE 6
CHLORIDE AND TDS
CONCENTRATION MAP
May 17-18, 2011



TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery

T12S - R34E - Section 2

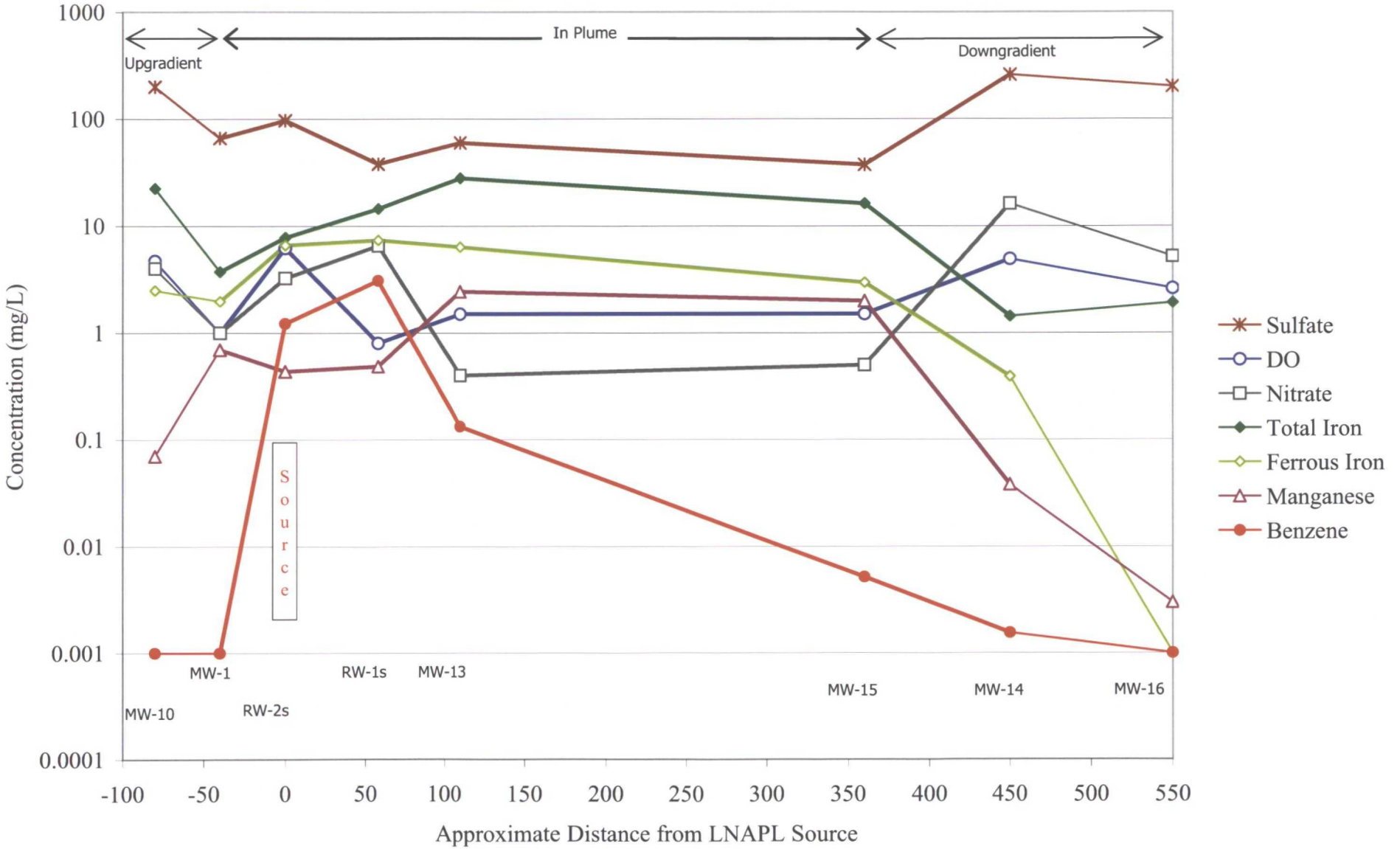
Pride Energy Company

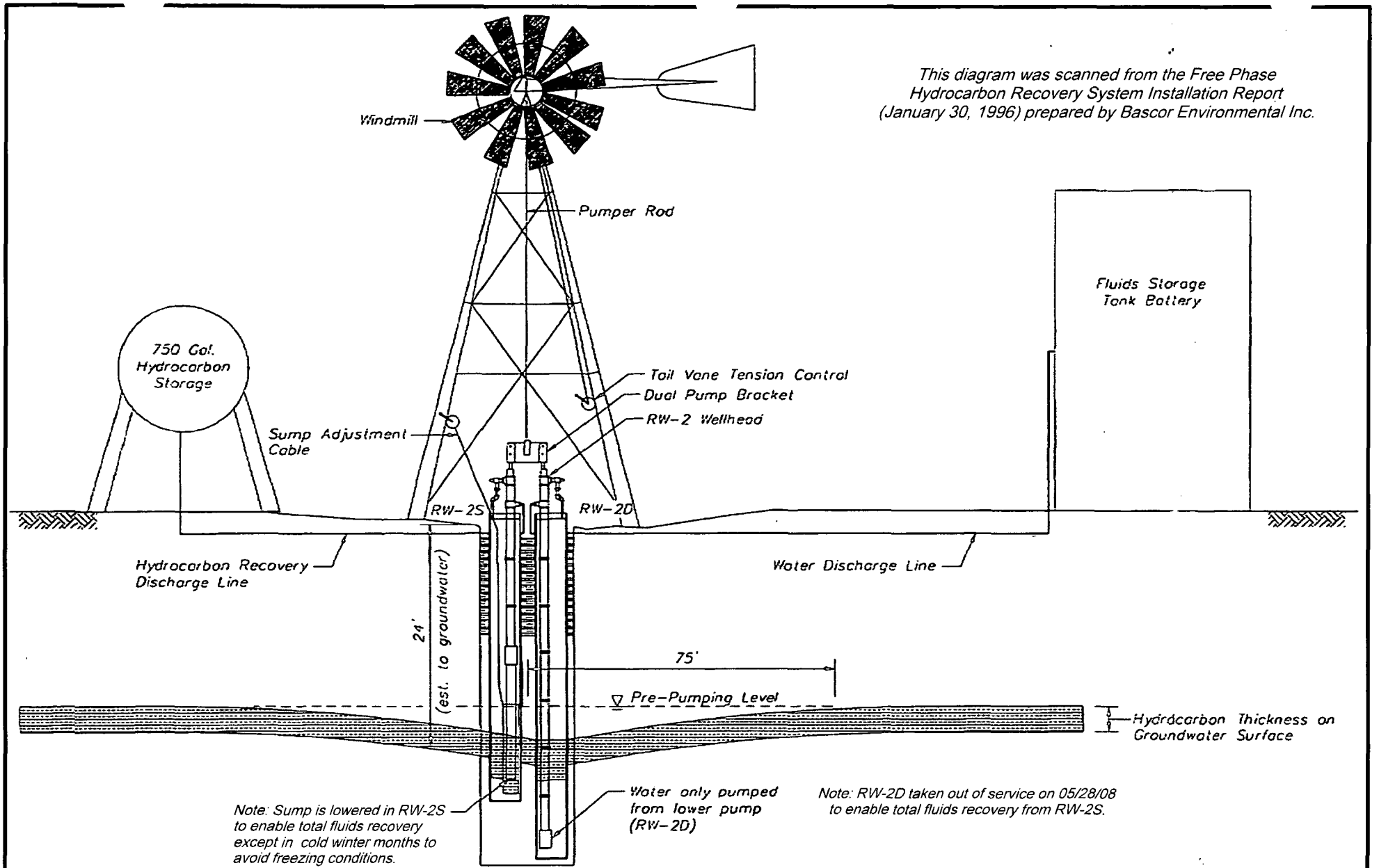
FIGURE 7

BIODEGRADATION PARAMETERS

May 17-18, 2011

FIGURE 8
Benzene and Biological Parameters Concentrations Versus Distance from Source Area





TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery (1R0204)

T12S - R34E - Section 2 (Lea County, NM)

Pride Energy Company

FIGURE 9
WINDMILL RECOVERY SYSTEM DIAGRAM

Figure 10
LNAPL Thickness Vs Time Graph

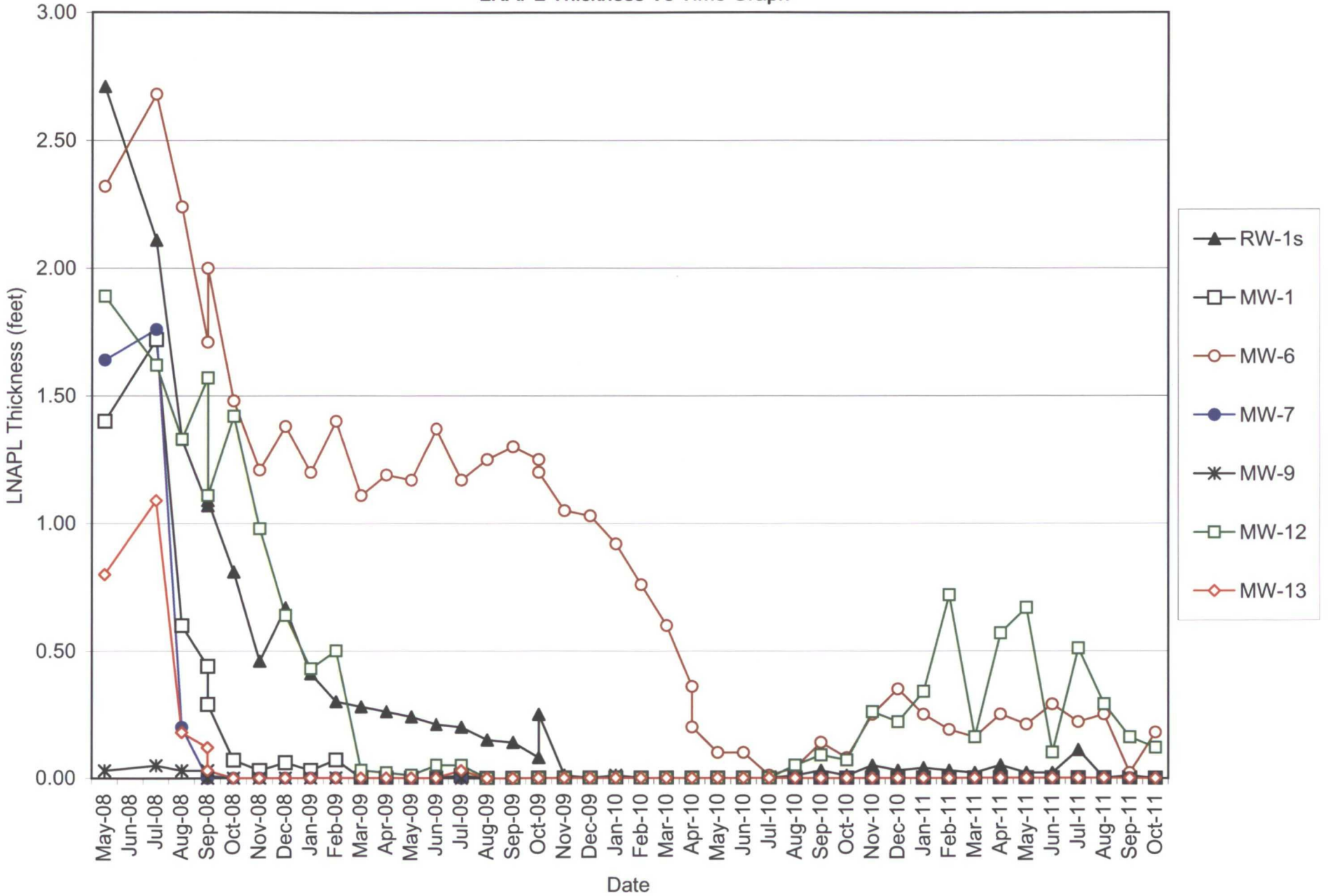
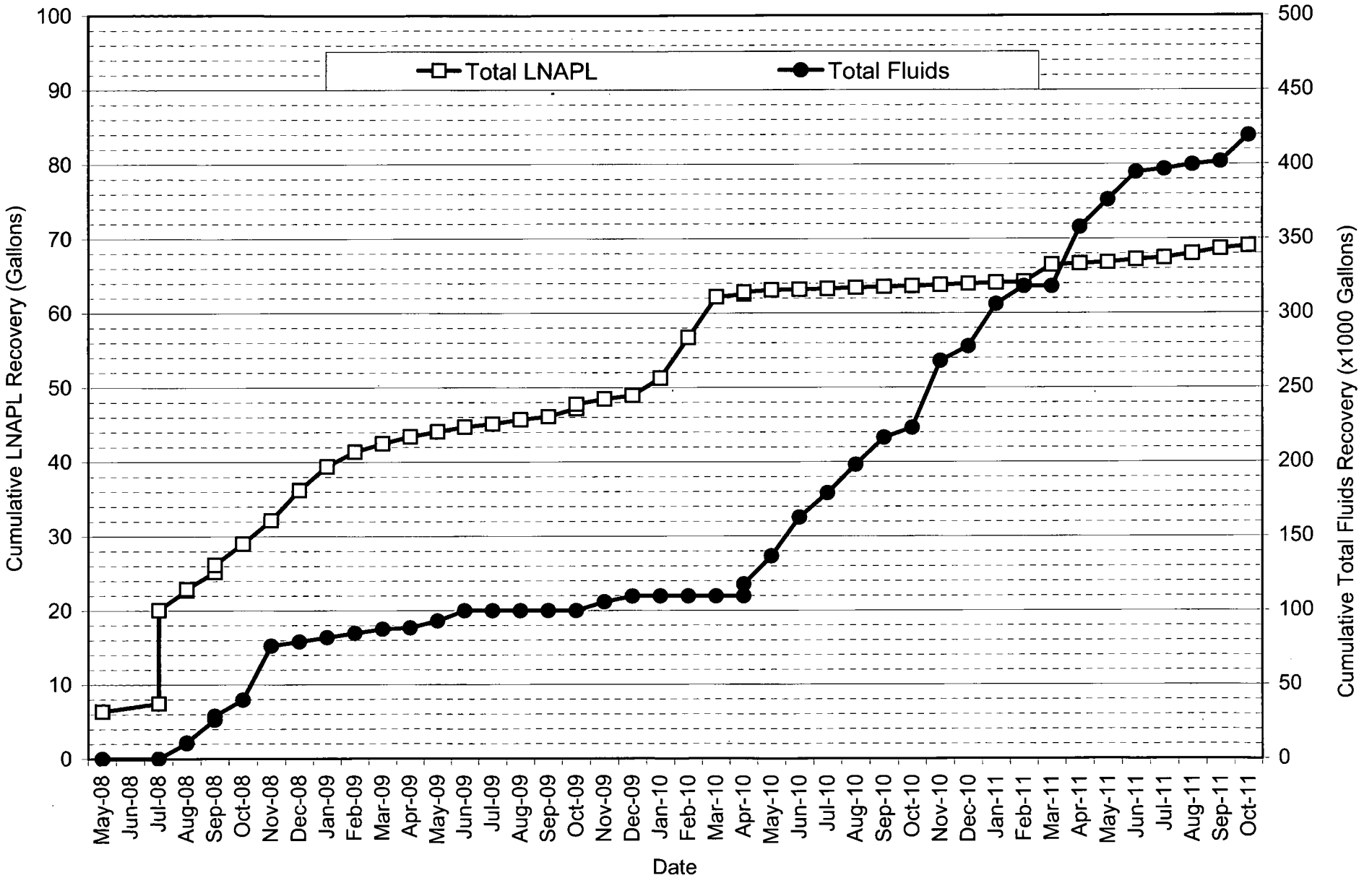


Figure 11
Cumulative LNAPL and Total Fluids Recovery Vs Time Graph



TABLES

Table 1
Summary of Groundwater Elevations

Monitoring Well	Sample Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet BTOC)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet AMSL)
MW-1	01/17/95	4149.13	26.37	1.96	4124.34
	10/10/95	4149.13	NM	NM	4124.04
	01/04/96	4149.13	27.40	2.74	4123.94
	04/16/96	4149.13	28.02	3.17	4123.67
	07/09/96	4149.13	27.96	3.17	4123.73
	10/15/96	4149.13	27.97	3.21	4123.75
	12/03/97	4149.13	27.98	2.80	4123.41
	03/13/08	4149.13	25.51	1.40	4124.75
	05/18/09	4149.13	25.10	0.00	4124.03
	05/26/10	4149.13	25.41	0.00	4123.72
	05/17/11	4149.13	25.75	0.00	4123.38
MW-2	01/18/95	4151.50	26.61	0.00	4124.89
	10/10/95	4151.50	26.98	0.00	4124.52
	01/04/96	4151.50	NM	NM	4124.44
	04/16/96	4151.50	27.15	0.00	4124.35
	07/09/96	4151.50	27.28	0.00	4124.22
	10/15/96	4151.50	27.29	0.00	4124.21
	12/03/97	4151.50	NM	NM	4124.29
	03/13/08	4151.50	26.51	0.00	4124.99
	05/18/09	4151.50	27.08	0.00	4124.42
	05/26/10	4151.50	27.43	0.00	4124.07
	05/17/11	4151.50	27.74	0.00	4123.76
MW-4	01/18/95	4148.58	25.18	0.00	4123.40
	10/10/95	4148.58	25.54	0.00	4123.04
	01/04/96	4148.58	NM	NM	4122.98
	04/16/96	4148.58	25.68	0.00	4122.90
	07/09/96	4148.58	25.83	0.00	4122.75
	10/15/96	4148.58	25.78	0.00	4122.80
	12/03/97	4148.58	26.02	0.00	4122.56
	03/13/08	4148.58	24.88	0.00	4123.70
	05/18/09	4148.58	25.51	0.00	4123.07
	05/26/10	4148.58	25.81	0.00	4122.77
	05/17/11	4148.58	26.13	0.00	4122.45
MW-5	01/18/95	4150.40	25.98	0.00	4124.42
	10/10/95	4150.40	26.33	0.00	4124.07
	01/04/96	4150.40	NM	NM	4123.97
	04/16/96	4150.40	26.54	0.00	4123.86
	07/09/96	4150.40	26.66	0.00	4123.74
	10/15/96	4150.40	26.61	0.00	4123.79
	12/03/97	4150.40	26.93	0.00	4123.47
	03/13/08	4150.40	25.74	0.00	4124.66
	05/18/09	4150.40	26.43	0.00	4123.97
	05/26/10	4150.40	26.73	0.00	4123.67
	05/17/11	4150.40	27.06	0.00	4123.34
MW-6	01/04/95	4149.90	28.88	3.68	4123.99
	10/10/95	4149.90	NM	NM	4123.98
	01/04/96	4149.90	29.53	4.46	4123.97
	04/16/96	4149.90	30.04	4.43	4123.44
	07/09/96	4149.90	30.04	4.52	4123.37
	10/15/96	4149.90	30.18	4.56	4123.40
	12/03/97	4149.90	NM	NM	4123.50
	03/13/08	4149.90	27.35	2.25	4124.37
	05/18/09	4149.90	27.30	1.17	4123.54
	05/26/10	4149.90	26.62	0.10	4123.36
	05/17/11	4149.90	27.05	0.21	4123.02

Table 1
Summary of Groundwater Elevations

Monitoring Well	Sample Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet BTOC)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet AMSL)
MW-7	01/18/95	4149.16	24.85	0.00	4124.31
	10/10/95	4149.16	25.17	0.00	4123.99
	01/04/96	4149.16	NM	NM	4123.88
	04/16/96	4149.16	25.42	0.00	4123.74
	07/09/96	4149.16	25.50	0.00	4123.66
	10/15/96	4149.16	25.48	0.00	4123.68
	12/03/97	4149.16	25.78	0.00	4123.38
	03/13/08	4149.16	25.87	1.62	4124.60
	05/18/09	4149.16	25.23	0.00	4123.93
	05/26/10	4149.16	25.56	0.00	4123.60
	05/17/11	4149.16	25.88	0.00	4123.28
MW-8	01/18/95	4148.81	24.66	0.00	4124.15
	10/10/95	4148.81	24.66	0.00	4124.15
	Well removed to allow excavation and solidification of pit.				
MW-9	01/18/95	4149.63	25.16	0.00	4124.47
	10/10/95	4149.63	25.52	0.00	4124.11
	01/04/96	4149.63	NM	NM	4123.96
	04/16/96	4149.63	25.84	0.00	4123.79
	07/09/96	4149.63	25.84	0.00	4123.79
	10/15/96	4149.63	25.83	0.00	4123.80
	12/03/97	4149.63	26.14	0.00	4123.49
	03/13/08	4149.63	24.91	0.03	4124.74
	05/18/09	4149.63	25.61	0.00	4124.02
	05/26/10	4149.63	25.93	0.00	4123.70
	05/17/11	4149.63	26.25	0.00	4123.38
MW-10	01/18/95	4149.98	25.16	0.00	4124.82
	10/10/95	4149.98	25.52	0.00	4124.46
	01/04/96	4149.98	NM	NM	4124.21
	04/16/96	4149.98	26.07	0.00	4123.91
	07/09/96	4149.98	26.12	0.00	4123.86
	10/15/96	4149.98	26.08	0.00	4123.90
	12/03/97	4149.98	26.41	0.00	4123.57
	03/13/08	4149.98	25.21	0.00	4124.77
	05/18/09	4149.98	25.88	0.00	4124.10
	05/26/10	4149.98	26.20	0.00	4123.78
	05/17/11	4149.98	26.54	0.00	4123.44
RW-11	01/04/95	4149.86	28.40	3.22	4124.06
	01/17/95	4149.86	28.76	3.69	4124.08
	Well removed to allow excavation and solidification of pit.				
MW-12	01/04/95	4149.15	25.30	0.35	4124.13
	01/17/95	4149.15	25.58	0.73	4124.16
	10/10/95	4149.15	NM	NM	4123.84
	01/04/96	4149.15	28.70	4.07	4123.74
	04/16/96	4149.15	29.98	5.04	4123.24
	07/09/96	4149.15	29.08	4.12	4123.40
	10/15/96	4149.15	28.94	3.99	4123.43
	12/03/97	4149.15	29.06	3.82	4123.17
	03/13/08	4149.15	26.20	1.83	4124.43
	05/18/09	4149.15	25.41	0.01	4123.75
	05/26/10	4149.15	25.70	0.00	4123.45
	05/17/11	4149.15	26.60	0.67	4123.09

Table 1
Summary of Groundwater Elevations

Monitoring Well	Sample Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet BTOC)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet AMSL)
MW-13	01/18/95	4150.31	26.39	0.00	4123.92
	10/10/95	4150.31	26.76	0.00	4123.55
	01/04/96	4150.31	NM	NM	4123.34
	04/16/96	4150.31	27.22	0.00	4123.09
	07/09/96	4150.31	27.27	0.00	4123.04
	10/15/96	4150.31	27.20	0.00	4123.11
	12/03/97	4150.31	27.39	0.00	4122.92
	03/13/08	4150.31	26.81	0.75	4124.11
	05/18/09	4150.31	26.82	0.00	4123.49
	05/26/10	4150.31	27.11	0.00	4123.20
	05/17/11	4150.31	27.50	0.00	4122.81
MW-14	10/11/95	4151.83	28.93	0.00	4122.90
	01/04/96	4151.83	NM	NM	4122.85
	04/16/96	4151.83	29.05	0.00	4122.78
	07/09/96	4151.83	29.23	0.00	4122.60
	10/15/96	4151.83	29.21	0.00	4122.62
	12/03/97	4151.83	29.42	0.00	4122.41
	03/13/08	4151.83	28.27	0.00	4123.56
	05/18/09	4151.83	28.94	0.00	4122.89
	05/26/10	4151.83	29.26	0.00	4122.57
	05/17/11	4151.83	29.60	0.00	4122.23
MW-15	10/11/95	4150.63	27.47	0.00	4123.16
	01/04/96	4150.63	NM	NM	4123.09
	04/16/96	4150.63	27.62	0.00	4123.01
	07/09/96	4150.63	27.78	0.00	4122.85
	10/15/96	4150.63	27.75	0.00	4122.88
	12/03/97	4150.63	28.01	0.00	4122.62
	03/13/08	4150.63	26.84	0.00	4123.79
	05/18/09	4150.63	27.54	0.00	4123.09
	05/26/10	4150.63	27.82	0.00	4122.81
	05/17/11	4150.63	28.17	0.00	4122.46
MW-16	10/11/95	4151.34	28.59	0.00	4122.75
	01/04/96	4151.34	NM	NM	4122.68
	04/16/96	4151.34	28.74	0.00	4122.60
	07/09/96	4151.34	28.92	0.00	4122.42
	10/15/96	4151.34	28.89	0.00	4122.45
	12/03/97	4151.34	29.10	0.00	4122.24
	03/13/08	4151.34	27.94	0.00	4123.40
	05/18/09	4151.34	28.62	0.00	4122.72
	05/26/10	4151.34	28.93	0.00	4122.41
	05/17/11	4151.34	29.26	0.00	4122.08
RW-1s	01/04/96	NM	DNA	0.15	DNA
	04/16/96	NM	DNA	3.58	DNA
	07/09/96	NM	DNA	4.72	DNA
	10/15/96	NM	DNA	4.67	DNA
	12/03/97	NM	DNA	4.26	DNA
	03/13/08	NM	DNA	2.71	DNA
	05/18/09	NM	DNA	0.24	DNA
	05/26/10	NM	24.99	0.00	DNA
	05/17/11	NM	25.37	0.02	DNA
RW-2s	01/04/96	NM	DNA	3.50	DNA
	03/13/08	NM	NM	1.77	DNA
	05/18/09	NM	24.97	0.24	DNA
	05/26/10	NM	25.15	0.00	DNA
	05/17/11	NM	NM	NM	DNA

NM = Not Measured; DNA - Data Not Available
Total Dissolved Soilds (TDS), chloride, sulfate, and BTEX concentrations listed in milligrams per liter (mg/L)
AMSL - Above Mean Sea Level; BTOC - Below Top of Casing, LNAPL - Light Non-Aqueous Phased Liquids
Gauging data, laboratory results, and elevations for MW-1 through MW-16 obtained from previously published reports submitted by Phillips Petrleum Co.
Elevations for MW-14 through MW-17 based on laser survey conducted by Trident Environmental on 03-14-08.

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)	TDS (mg/L)
MW-1	Oct-90	0.00	<0.010	0.039	0.100	0.390	NA	NA
	01/04/96	2.74	**0.260**	0.730	0.450	**2.72**	120	680
	04/16/96	3.17	**0.051**	0.270	0.340	**2.19**	150	750
	07/09/96	3.17	NA	NA	NA	NA	160	800
	10/15/96	3.21	NA	NA	NA	NA	170	**1,300**
	12/03/97	2.80	NA	NA	NA	NA	100	650
	05/19/09	0.00	**0.01**	0.009	0.156	0.209	168	792
	05/26/10	0.00	0.002	0.004	0.036	0.045	144	594
	05/17/11	0.00	<0.005	<0.01	0.153	0.105	**316**	**1,000**
MW-2	Oct-90	0.00	<0.001	<0.001	<0.001	<0.001	NA	NA
	01/04/95	0.00	NS	NS	NS	NS	NS	NS
	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	109	760
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	80	680
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	80	700
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	84	680
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	79	680
	12/03/97	NM	NMOCD approved request to discontinue annual sampling.					
	03/13/08	0.00	<0.001	<0.002	<0.001	<0.003	116	**1,020**
MW-4	Oct-90	0.00	<0.001	<0.001	<0.001	<0.001	NA	NA
	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	**790**	**1,880**
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	**460**	**1,300**
	04/16/96	0.00	<0.001	<0.001	<0.001	0.001	**450**	**1,300**
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	**460**	**1,200**
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	**460**	**1,200**
	12/03/97	0.00	NMOCD approved request to discontinue annual sampling.					
	03/13/08	0.00	<0.001	<0.002	<0.001	<0.003	243	868
MW-5	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	49	497
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	41	500
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	40	490
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	38	470
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	36	500
	12/03/97	0.00	<0.001	<0.001	<0.001	<0.001	37	450
	03/13/08	0.00	0.003	0.021	0.081	0.466	173	724
	05/18/09	0.00	0.002	0.007	0.025	0.065	**364**	**1,100**
	05/25/10	0.00	**0.448**	<0.04	0.121	**0.776**	**372**	**1,180**
	05/17/11	0.00	<0.005	<0.01	<0.005	<0.01	**547**	**1,170**
MW-6	01/04/95	3.68	NS	NS	NS	NS	NS	NS
	10/10/95	NM	NS	NS	NS	NS	NS	NS
	01/04/96	4.08	**9.10**	**11.0**	**0.93**	**5.30**	**1,400**	**3,700**
	04/16/96	4.43	**13.0**	**19.0**	**5.00**	**24.5**	**1,200**	**2,600**
	07/09/96	4.52	NA	NA	NA	NA	**1,100**	**2,500**
	10/15/96	4.56	NA	NA	NA	NA	**890**	**2,500**
	12/03/97	NM	NA	NA	NA	NA	**720**	**1,700**
	03/13/08	2.25	NS	NS	NS	NS	NS	NS
	05/18/09	1.17	NS	NS	NS	NS	NS	NS
	05/25/10	0.10	NS	NS	NS	NS	NS	NS
	05/17/11	0.21	NS	NS	NS	NS	NS	NS

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)	TDS (mg/L)
MW-7	01/18/95	0.00	**0.013**	<0.001	0.026	<0.001	**255**	**1,190**
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	0.006	<0.001	0.013	<0.001	210	900
	04/16/96	0.00	0.004	<0.001	0.011	<0.001	180	920
	07/09/96	0.00	0.003	<0.001	0.010	<0.001	110	730
	10/15/96	0.00	0.005	<0.001	0.015	<0.001	120	720
	12/03/97	0.00	0.002	<0.001	<0.001	<0.001	69	620
	03/13/08	1.62	NS	NS	NS	NS	NS	NS
	05/19/09	0.00	0.005	0.015	0.065	0.137	**332**	**1,330**
	05/25/10	0.00	**0.022**	0.112	0.050	0.083	**362**	**1,240**
	05/17/11	0.00	<0.005	<0.01	0.008	<0.01	189	952
MW-8	01/18/95	0.00	**0.740**	<0.001	0.100	0.330	**563**	**1,460**
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	Nov-95	Well removed to allow excavation and solidification of pit.						
MW-9	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	58	636
	10/10/95	0.00	<0.001	<0.001	<0.001	<0.001	NA	NA
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	54	620
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	58	630
	07/09/96	DNA	<0.001	<0.001	<0.001	<0.001	57	640
	10/15/96	DNA	<0.001	<0.001	<0.001	<0.001	58	620
	12/03/97	0.00	<0.001	<0.001	<0.001	<0.001	54	630
	03/13/08	0.03	NS	NS	NS	NS	NS	NS
	05/19/09	0.00	<0.001	0.005	0.015	0.089	76	628
	05/25/10	0.00	<0.001	<0.002	0.005	0.014	149	630
	05/17/11	0.00	<0.005	<0.01	0.002	0.008	134	666
MW-10	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	**359**	**1,190**
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	**290**	**1,100**
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	**260**	970
	07/09/96	DNA	<0.001	<0.001	<0.001	<0.001	**260**	**1,000**
	10/15/96	DNA	<0.001	<0.001	<0.001	<0.001	**260**	**1,000**
	12/03/97	0.00	<0.001	<0.001	<0.001	<0.001	140	720
	03/13/08	0.00	<0.001	<0.002	<0.001	<0.003	**377**	**1,362**
	05/18/09	0.00	<0.001	<0.001	<0.001	<0.003	**320**	**1,100**
	05/25/10	0.00	<0.001	<0.002	<0.001	<0.002	**287**	870
	05/17/11	0.00	<0.005	<0.01	<0.005	<0.01	**471**	**1,510**
RW-11	01/04/95	3.22	NS	NS	NS	NS	NS	NS
	01/17/95	3.69	NS	NS	NS	NS	NS	NS
	Nov-95	Well removed to allow excavation and solidification of pit.						
MW-12	01/04/95	0.35	NS	NS	NS	NS	NS	NS
	01/17/95	0.73	NS	NS	NS	NS	NS	NS
	10/10/95	NM	NS	NS	NS	NS	NS	NS
	01/04/96	4.07	**7.20**	**6.10**	**1.50**	**7.40**	**1,700**	**3,600**
	04/16/96	5.04	**11.0**	**11.00**	**1.10**	**6.50**	**2,100**	**4,300**
	07/09/96	4.12	NA	NA	NA	NA	**1,900**	**4,200**
	10/15/96	3.99	NA	NA	NA	NA	**2,000**	**4,300**
	12/03/97	3.82	NA	NA	NA	NA	**810**	**1,400**
	03/13/08	1.83	NS	NS	NS	NS	NS	NS
	05/18/09	0.01	NS	NS	NS	NS	NS	NS
	05/26/10	0.00	**1.10**	<0.04	0.257	0.349	**394**	**1,120**
	05/17/11	0.67	NS	NS	NS	NS	NS	NS

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)	TDS (mg/L)
MW-13	01/18/95	0.00	**2.2**	<0.001	0.36	**1.60**	**647**	**1,640**
	01/04/96	NM	**2.4**	0.022	0.330	**1.59**	**560**	**1,500**
	04/16/96	0.00	**2.4**	0.014	0.370	**1.70**	**540**	**1,500**
	07/09/96	0.00	**2.2**	0.034	0.430	**1.82**	**560**	**1,500**
	10/15/96	0.00	**2.1**	0.097	0.350	**1.71**	**530**	**1,400**
	12/03/97	0.00	**0.92**	0.140	0.160	0.570	**560**	**1,500**
	05/19/09	0.00	**1.00**	0.015	0.414	**1.60**	**1,600**	**3,860**
	05/26/10	0.00	**0.247**	<0.01	0.125	0.400	**1,329**	**2,720**
	05/18/11	0.00	**0.133**	0.003	0.086	0.223	**1,710**	**3,120**
MW-14	10/11/95	0.00	<0.005	<0.005	<0.005	<0.005	NA	NA
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	87	900
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	100	920
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	110	**1,000**
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	120	930
	12/03/97	0.00	<0.001	<0.001	<0.001	<0.001	130	900
	03/13/08	0.00	<0.001	<0.002	<0.001	<0.003	**361**	**1,170**
	05/18/09	0.00	<0.001	<0.001	<0.001	<0.003	**304**	**1,250**
	05/25/10	0.00	0.002	0.002	0.001	0.003	**319**	**1,280**
	05/17/11	0.00	0.002	<0.002	<0.001	0.002	**299**	**1,420**
MW-15	10/11/95	0.00	**0.087**	**1.10**	**0.770**	**2.07**	NA	NA
	01/04/96	NM	**0.096**	**0.870**	**0.880**	**2.40**	**430**	**1,200**
	04/16/96	0.00	**0.052**	0.550	0.690	**1.92**	**410**	**1,200**
	07/09/96	0.00	**0.035**	0.610	**0.850**	**2.15**	**510**	**1,400**
	10/15/96	0.00	<0.001	0.420	0.610	**1.63**	**580**	**1,400**
	12/03/97	0.00	**0.091**	**1.10**	**0.860**	**2.26**	**490**	**1,400**
	03/13/08	0.00	**0.020**	0.036	0.301	**0.752**	**1,360**	**3,140**
	05/18/09	0.00	**0.019**	0.033	0.364	0.747	**960**	**2,250**
	05/25/10	0.00	0.008	0.044	0.406	**0.993**	**1,064**	**2,090**
	05/17/11	0.00	0.005	0.019	0.322	**0.757**	**1,010**	**1,840**
MW-16	10/11/95	0.00	<0.005	<0.005	<0.005	<0.005	NA	NA
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	66	900
	04/16/96	0.00	<0.001	<0.001	<0.001	<0.001	68	910
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	93	910
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	73	870
	12/03/97	0.00	<0.001	<0.001	<0.001	<0.001	66	850
	03/13/08	0.00	<0.001	<0.002	0.002	0.006	**293**	**1,400**
	05/18/09	0.00	<0.001	<0.001	<0.001	<0.003	**336**	**1,270**
	05/25/10	0.00	<0.001	<0.002	<0.001	0.003	**404**	**1,290**
	05/17/11	0.00	<0.005	<0.01	<0.005	<0.01	**410**	**1,350**
RW-1s	05/26/10	0.00	<0.001	<0.002	<0.001	<0.002	**1,436**	**2,760**
RW-1d	05/18/11	0.00	**3.09**	0.003	0.084	0.006	**2,010**	**3,240**
RW-2s	05/18/09	0.00	0.814	0.107	0.345	2.56	**720**	**1,800**
	05/26/10	NM	**1.03**	<1.00	**1.32**	**5.74**	**718**	**1,470**
	05/18/11	NM	**1.22**	0.270	0.526	**3.05**	**452**	**2,510**
WQCC Standards			0.01	0.62	0.62	0.75	250	1,000

DNA = Data Not Available, NA = Not Analyzed, NM = Not Measured, NS = Not Sampled
Total Dissolved Soilds (TDS), chloride, sulfate, and BTEX concentrations listed in milligrams per liter (mg/L)
Values in boldface type indicate concentrations exceed New Mexico Water Quality Commission (WQCC) standards.
Samples analyzed by Xenco Laboratories (Odessa TX) using EPA methods as described in lab reports.

Table 3

Summary of Monitoring Natural Attenuation Parameters

Monitoring Well	Sample Date	Well Position	Electron Acceptors			Biodegradation Byproducts		
			Dissolved Oxygen (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Ferrous Iron (mg/L)	Total Iron (mg/L)	Total Manganese (mg/L)
MW-1	01/04/96	In Plume	1.50	120	1.00	NA	0.14	0.40
	04/16/96	In Plume	2.50	160	1.60	NA	0.08	0.32
	07/09/96	In Plume	1.19	160	1.60	NA	0.07	0.36
	10/15/96	In Plume	<0.10	130	1.00	NA	0.06	0.35
	12/03/97	In Plume	NA	120	0.67	NA	0.10	0.49
	05/19/09	In Plume	0.3	110	<0.1	0.79	1.34	0.43
	05/26/10	In Plume	1.5	97.7	0.9	0.16	4.04	0.68
	05/17/11	In Plume	1.0	66.2	1.0	1.97	3.74	0.694
MW-2	01/18/95	Crossgradient	NA	145	NA	NA	2.0	0.38
	01/04/96	Crossgradient	1.60	120	16.0	NA	<0.001	0.29
	04/16/96	Crossgradient	3.44	120	17.0	NA	0.04	0.32
	07/09/96	Crossgradient	3.44	120	17.0	NA	0.03	0.32
	10/15/96	Crossgradient	1.83	130	16.0	NA	<0.001	0.28
	03/13/08	Crossgradient	3.6	151	0.87	0.07	<0.20	0.60
	05/18/09	Crossgradient	2.1	205	24.4	0.75	0.17	0.040
MW-4	01/18/95	Crossgradient	NA	121	NA	NA	2.20	0.09
	01/04/96	Crossgradient	2.65	78	<0.05	NA	0.52	0.07
	04/16/96	Crossgradient	2.00	60	<0.05	NA	1.00	0.12
	07/09/96	Crossgradient	1.90	43	0.06	NA	1.60	0.16
	10/15/96	Crossgradient	NA	36	0.06	NA	0.97	0.17
	03/13/08	Crossgradient	2.80	49.7	0.43	0.97	2.98	0.31
	05/18/09	Crossgradient	0.50	110	<0.10	1.69	9.94	0.228
MW-5	01/18/95	Crossgradient	NA	109	NA	NA	13.2	0.05
	01/04/96	Crossgradient	5.27	110	1.30	NA	<0.025	<0.01
	04/16/96	Crossgradient	5.38	110	1.20	NA	<0.025	<0.01
	07/09/96	Crossgradient	NA	100	0.91	NA	<0.025	<0.01
	10/15/96	Crossgradient	6.51	110	1.10	NA	<0.025	<0.01
	12/03/97	Crossgradient	NA	88	0.96	NA	0.028	<0.01
	03/13/08	Crossgradient	4.8	75.2	1.11	0.29	4.73	0.27
	05/18/09	Crossgradient	3.8	92.4	<0.1	1.41	2.43	0.075
	05/25/10	Crossgradient	5.3	211	1.3	1.73	8.35	0.220
	05/17/11	Crossgradient	4.7	215	3.2	3.21	12.7	0.197
MW-6	01/04/96	In Plume	1.98	46	NA	NA	3.20	1.10
	04/16/96	In Plume	<0.10	56	0.73	NA	2.20	1.00
	07/09/96	In Plume	1.67	40	0.48	NA	1.90	0.85
	10/15/96	In Plume	<0.10	43	0.29	NA	1.40	0.72
	12/03/97	In Plume	NA	21	<0.05	NA	<0.025	0.79
MW-7	01/18/95	In Plume	NA	222	NA	NA	15.6	0.18
	01/04/96	Upgradient	2.06	170	<0.05	NA	0.67	0.10
	04/16/96	Upgradient	2.82	170	<0.05	NA	0.77	0.11
	07/09/96	Upgradient	3.37	170	<0.05	NA	0.46	0.08
	10/15/96	Upgradient	0.76	180	<0.05	NA	0.40	0.07
	12/03/97	Upgradient	2.08	140	<0.05	NA	0.34	0.08
	03/13/08	In Plume	NS	NS	NS	NS	NS	NS
	05/19/09	Upgradient	0.3	283	<0.1	0.53	0.91	0.17
	05/25/10	In Plume	2.7	185	<0.1	2.50	14.0	0.53
	05/17/11	Upgradient	1.2	86.6	0.9	1.37	3.26	0.137
MW-9	01/18/95	Upgradient	NA	192	NA	NA	17.6	0.02
	01/04/96	Upgradient	5.98	180	0.59	NA	<0.025	<0.01
	04/16/96	Upgradient	7.03	190	0.56	NA	0.04	<0.01
	07/09/96	Upgradient	6.30	180	0.65	NA	<0.025	<0.01
	10/15/96	Upgradient	6.30	190	0.70	NA	<0.025	<0.01
	12/03/97	Upgradient	NA	200	0.61	NA	<0.025	<0.01
	03/13/08	In Plume	NS	NS	NS	NS	NS	NS
	05/19/09	Upgradient	0.7	150	<0.1	0.39	0.72	0.23
	05/25/10	Upgradient	2.3	165	<0.1	0.81	0.80	0.60
	05/17/11	Upgradient	3.0	184	0.3	0.01	0.53	0.366

Table 3

Summary of Monitoring Natural Attenuation Parameters

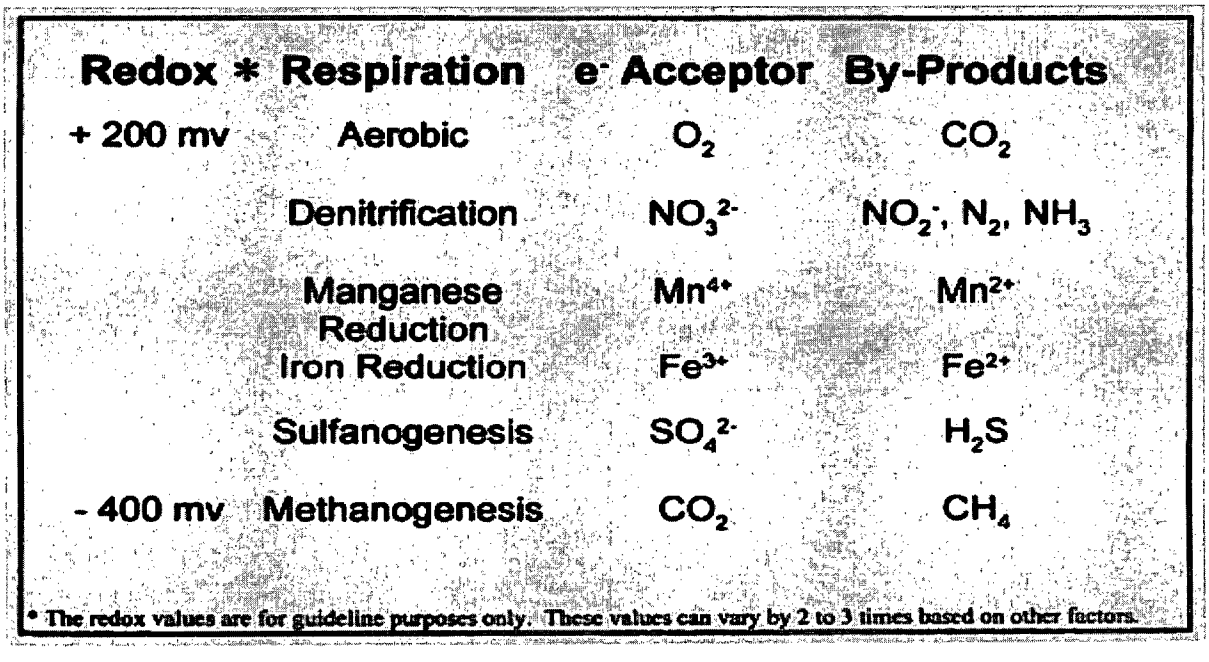
Monitoring Well	Sample Date	Well Position	Electron Acceptors			Biodegradation Byproducts		
			Dissolved Oxygen (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Ferrous Iron (mg/L)	Total Iron (mg/L)	Total Manganese (mg/L)
MW-10	01/18/95	Upgradient	NA	176	NA	NA	19.9	0.09
	01/04/96	Upgradient	4.80	160	4.80	NA	<0.025	<0.01
	04/16/96	Upgradient	4.57	160	4.10	NA	<0.025	<0.01
	07/09/96	Upgradient	4.58	170	3.70	NA	<0.025	<0.01
	10/15/96	Upgradient	4.10	180	3.90	NA	<0.025	0.02
	12/03/97	Upgradient	3.83	150	2.00	NA	<0.025	<0.01
	03/13/08	Upgradient	6.5	154	2.80	0.01	0.58	0.07
	05/18/09	Upgradient	7.8	197	2.10	1.49	7.81	0.11
	05/25/10	Upgradient	7.2	138	0.7	0.15	0.70	<0.1
	05/17/11	Upgradient	4.7	200	4.0	2.49	22.4	0.278
MW-12	01/04/96	In Plume	0.81	0.86	<0.05	NA	2.80	0.85
	04/16/96	In Plume	1.32	<0.025	<0.05	NA	5.60	1.60
	07/09/96	In Plume	1.35	<0.025	<0.05	NA	5.20	1.30
	10/15/96	In Plume	<0.10	0.37	<0.05	NA	0.04	1.30
	12/03/97	In Plume	NA	4.30	<0.05	NA	0.27	0.62
	05/25/10	In Plume	1.4	64.1	1.90	2.02	6.64	0.85
MW-13	01/18/95	Downgradient / In Plume	NA	20.20	NA	NA	38.2	0.64
	01/04/96	Downgradient / In Plume	1.66	4.50	0.07	NA	4.30	1.90
	04/16/96	Downgradient / In Plume	1.19	2.30	<0.05	NA	4.00	1.90
	07/09/96	Downgradient / In Plume	1.49	2.70	<0.05	NA	4.00	1.90
	10/15/96	Downgradient / In Plume	0.85	2.80	<0.05	NA	4.40	2.10
	12/03/97	Downgradient / In Plume	2.22	11.0	<0.05	NA	4.30	2.20
	03/13/08	Downgradient / In Plume	NS	NS	NS	NS	NS	NS
	05/19/09	Downgradient / In Plume	2.4	<10	0.42	12.5	29.9	4.62
	05/26/10	Downgradient / In Plume	1.7	<25	<0.1	8.8	26.6	30.5
	05/17/11	Downgradient / In Plume	1.5	59.9	0.4	6.36	28.0	2.44
MW-14	01/04/96	Downgradient	5.7	230	0.38	NA	0.03	0.01
	04/16/96	Downgradient	NA	230	0.47	NA	0.05	0.01
	07/09/96	Downgradient	3.68	220	0.37	NA	0.03	0.01
	10/15/96	Downgradient	2.96	250	0.60	NA	<0.025	<0.01
	12/03/97	Downgradient	NA	170	0.79	NA	<0.025	<0.01
	03/13/08	Downgradient	4.7	154	8.41	0.01	0.45	<0.05
	05/18/09	Downgradient	5.3	225	14.8	2.16	1.19	0.023
	05/25/10	Downgradient	4.4	28.2	5.5	2.99	<0.3	<0.1
	05/17/11	Downgradient	4.9	259	16.2	0.39	1.43	0.038
MW-15	01/04/96	Downgradient / In Plume	1.30	27	<0.05	NA	1.70	0.66
	04/16/96	Downgradient / In Plume	2.17	42	<0.05	NA	1.60	0.66
	07/09/96	Downgradient / In Plume	2.08	55	<0.05	NA	1.80	0.75
	10/15/96	Downgradient	1.05	46	<0.05	NA	2.40	0.98
	12/03/97	Downgradient / In Plume	1.19	4.8	<0.05	NA	3.30	0.87
	03/13/08	Downgradient / In Plume	2.6	<10	<0.20	1.03	15.0	2.12
	05/18/09	Downgradient / In Plume	1.1	<10	<0.1	3.86	17.5	1.68
	05/25/10	Downgradient / In Plume	2.0	36.8	<0.1	3.50	16.5	2.38
	05/17/11	Downgradient / In Plume	1.5	37.4	0.5	2.96	16.2	1.99
MW-16	01/04/96	Downgradient	4.90	280	1.00	NA	<0.025	<0.01
	04/16/96	Downgradient	4.75	260	0.92	NA	0.03	<0.01
	07/09/96	Downgradient	3.03	230	0.86	NA	0.04	<0.01
	10/15/96	Downgradient	3.56	260	0.81	NA	<0.025	<0.01
	12/03/97	Downgradient	2.83	190	0.66	NA	<0.025	<0.01
	03/13/08	Downgradient	3.2	140	3.69	0.01	<0.20	<0.05
	05/18/09	Downgradient	1.7	168	2.61	1.96	4.71	0.042
	05/25/10	Downgradient	1.7	172	3.2	3.06	<0.3	<0.1
	05/17/11	Downgradient	2.6	201	5.2	0.00	1.91	<0.033
RW-1s	05/26/10	In Plume	1.2	<25	<0.1	3.04	26.0	0.66
RW-1d	05/17/11	In Plume	0.8	38.0	6.55	7.36	14.5	0.486
RW-2s	05/18/09	In Plume	6.2	61.4	<0.1	6.18	10.4	0.957
	05/26/10	In Plume	6.2	55.2	2.4	4.94	13.5	0.780
	05/17/11	In Plume	1.1	96.9	3.25	6.60	7.79	0.435
			WQCC Standards:	600	10	---	1.0	0.2

NA - Not Analyzed.
Hanna Model 98130 instrument used in field to obtain pH, conductivity, and temperature measurements.
Milwaukee Model SM300 used in field for dissolved oxygen readings
Hach Model DR 890 Spectrophotometer used for field measurement of ferrous iron (Method 8146) and nitrate (Method 8171).

Table 4
Expressed Assimilative Capacity

Electron Acceptor/ Byproduct	Terminal Electron Accepting Process (in order of preferred utilization)	Trend in Analyte Concentration During Biodegradation	Mass of benzene Degraded per unit mass of Electron Acceptor Utilized/Produced	Average Concentrations of Electron Acceptors/ Byproducts (mg/L)	Biodegradation Capacity of Electron Acceptors/Byproducts (mg/L)
O_2/CO_2	Aerobic Respiration	Decreases	0.325	2.90	0.94
Mn^{4+}/Mn^{2+}	Manganese Reduction	Increases	0.14	0.77	0.11
$NO_3/NO_2,N_2,NH_3$	Denitrification	Decreases	0.21	4.6	0.97
Fe^{3+}/Fe^{+2}	Iron Reduction	Increases	0.046	12.0	0.55
SO_4/H_2S	Sulfanogenesis	Decreases	0.22	120	26.0
				Total Biodegradation Capacity	28.6
				Highest benzene concentration currently observed within plume	3.09
				Average benzene concentration currently observed within plume	0.56

Degradation capacity based on values provided by "*Technical Protocol for Implementing Intrinsic Remediation With Long-Term Monitoring of Natural Attenuation of Fuel-Contamination Dissolved in Groundwater* " (Weidemeier et. al. 1995)
The stoichiometry presented above does not take into account microbial cell mass production (Conservative assumption).



As displayed in Table 4 above, the calculated biodegradation capacity of electron acceptors and metabolic byproducts (28.6 mg/L) exceeds the *highest* benzene concentration (3.09 mg/L) currently observed on site by a factor of 9.3. The biodegradation capacity of electron acceptors and metabolic byproducts further exceeds the *average* benzene concentration (0.56 mg/L) currently observed within the plume by a ratio of 51 to 1. This indicates that the necessary nutrients and by-products are present for the continued biodegradation of dissolved hydrocarbons.

Table 5

LNAPL Thickness

Date	LNAPL Thickness (feet)							
	RW-1s	RW-2s	MW-1	MW-6	MW-7	MW-9	MW-12	MW-13
05/07/08	2.71	1.77	1.40	2.32	1.64	0.03	1.89	0.80
07/23/08	2.11	NM	1.72	2.68	1.76	0.05	1.62	1.09
07/24/08	1.35	NM	0.27	0.39	0.45	0.00	0.54	0.03
08/12/08	1.33	NM	0.60	2.24	0.20	0.03	1.33	0.18
08/13/08	1.32	NM	0.54	1.65	0.17	0.00	1.37	0.18
09/09/08	1.07	NM	0.44	1.71	0.00	0.03	1.57	0.12
09/17/08	1.09	NM	0.29	2.00	0.01	0.00	1.11	0.03
10/08/08	0.81	NM	0.07	1.48	0.00	0.00	1.42	0.00
11/20/08	0.46	0.00	0.03	1.21	0.00	0.00	0.98	0.00
12/23/08	0.67	1.47	0.06	1.38	0.00	0.00	0.64	0.00
12/23/08	0.35	1.47	0.06	0.14	0.00	0.00	0.64	0.00
01/15/09	0.41	NM	0.03	1.20	0.00	0.00	0.43	0.00
02/27/09	0.30	NM	0.07	1.40	0.00	0.00	0.50	0.00
03/26/09	0.28	NM	0.00	1.11	0.00	0.00	0.03	0.00
04/28/09	0.26	NM	0.00	1.19	0.00	0.00	0.02	0.00
05/18/09	0.24	NM	0.00	1.17	0.00	0.00	0.01	0.00
06/17/09	0.21	NM	0.00	1.37	0.00	0.00	0.05	0.00
07/16/09	0.20	NM	0.01	1.17	0.00	0.00	0.05	0.03
08/26/09	0.15	NM	0.00	1.25	0.00	0.00	0.00	0.00
09/15/09	0.14	NM	0.00	1.30	0.00	0.00	0.00	0.00
10/15/09	0.08	1.44	0.00	1.25	0.00	0.00	0.00	0.00
10/21/09	0.25	NM	0.00	1.20	0.00	0.00	0.00	0.00
11/12/09	0.01	NM	0.00	1.05	0.00	0.00	0.00	0.00
12/10/09	0.00	NM	0.00	1.03	0.00	0.00	0.00	0.00
01/13/10	0.00	NM	0.00	0.92	0.00	0.01	0.00	0.00
02/25/10	0.00	NM	0.00	0.76	0.00	0.00	0.00	0.00
03/23/10	0.00	NM	0.00	0.60	0.00	0.00	0.00	0.00
04/01/10	0.00	NM	0.00	0.36	0.00	0.00	0.00	0.00
04/28/10	0.00	NM	0.00	0.20	0.00	0.00	0.00	0.00
05/25/10	0.00	NM	0.00	0.10	0.00	0.00	0.00	0.00
06/16/10	0.00	NM	0.00	0.10	0.00	0.00	0.00	0.00
07/14/10	0.00	NM	0.00	0.01	0.00	0.00	0.00	0.00
08/24/10	0.01	NM	0.00	0.04	0.00	0.00	0.05	0.00
09/22/10	0.03	NM	0.00	0.14	0.00	0.00	0.09	0.00
10/06/10	0.01	NM	0.00	0.08	0.00	0.00	0.07	0.00
11/30/10	0.05	NM	0.00	0.25	0.00	0.00	0.26	0.00
12/13/10	0.03	NM	0.00	0.35	0.00	0.00	0.22	0.00
01/19/11	0.04	NM	0.00	0.25	0.00	0.00	0.34	0.00
02/24/11	0.03	NM	0.00	0.19	0.00	0.00	0.72	0.00
03/17/11	0.02	NM	0.00	0.16	0.00	0.00	0.16	0.00
04/26/11	0.05	NM	0.00	0.25	0.00	0.00	0.57	0.00
05/17/11	0.02	NM	0.00	0.21	0.00	0.00	0.67	0.00
06/29/11	0.02	NM	0.00	0.29	0.00	0.00	0.10	0.00
07/14/11	0.11	NM	0.00	0.22	0.00	0.00	0.51	0.00
08/23/11	0.00	NM	0.00	0.25	0.00	0.00	0.29	0.00
09/28/11	0.01	NM	0.00	0.02	0.00	0.00	0.16	0.00
10/25/11	0.00	NM	0.00	0.18	0.00	0.00	0.12	0.00

Table 6
LNAPL Recovery Volumes

Date	LNAPL Recovered (gallons)							
	RW-1s	RW-2s	MW-1	MW-6	MW-7	MW-9	MW-12	MW-13
05/07/08	1.34	5	0	0	0	0	0.03	0
07/23/08	1.00	0	0	0	0	0	0	0.10
07/24/08	3.00	5	1	1	1	0.10	1	0.50
08/12/08	0.80	*13780**	0.50	0.50	0.50	0	0.30	0.03
08/13/08	0.10	*14212**	0.01	0.01	0.02	0.01	0.00	0.03
09/09/08	0.90	*29543**	0.40	0.30	0.15	0.00	0.50	0.05
09/17/08	0.05	*32192**	0.14	0.38	0.01	0.02	0.34	0.05
10/08/08	1.04	*43045**	0.15	0.90	0.05	0.00	0.64	0.05
11/20/08	0.95	*79497**	0.27	0.85	0.01	0.01	1.04	0.02
12/23/08	0.78	1.69	0.08	1.10	0.00	0.00	0.42	0.00
01/15/09	0.30	2.00	0.02	0.47	0.00	0.00	0.40	0.00
02/27/09	0.48	0.50	0.10	0.46	0.00	0.00	0.41	0.00
03/26/09	0.23	*90888**	0.06	0.44	0.00	0.00	0.39	0.00
04/28/09	0.23	*91716**	0.06	0.39	0.00	0.00	0.25	0.00
05/18/09	0.23	*96403**	0.00	0.38	0.00	0.00	0.05	0.00
06/17/09	0.17	*103262**	0.00	0.36	0.00	0.00	0.05	0.00
07/16/09	0.12	*103262**	0.00	0.25	0.00	0.00	0.05	0.00
08/26/09	0.20	*103262**	0.01	0.34	0.00	0.00	0.04	0.00
09/15/09	0.12	*103262**	0.00	0.24	0.00	0.00	0.02	0.00
10/15/09	0.12	0.5	0.01	0.50	0.00	0.00	0.01	0.00
10/21/09	0.20	*103363**	0.00	0.38	0.00	0.00	0.00	0.00
11/12/09	0.21	*109166**	0.02	0.44	0.00	0.00	0.02	0.00
12/10/09	0.01	*113040**	0.01	0.44	0.00	0.00	0.01	0.00
01/13/10	0.01	2.0	0.01	0.31	0.00	0.00	0.01	0.00
02/25/10	0.03	5.0	0.01	0.37	0.00	0.00	0.04	0.00
03/23/10	0.06	5.0	0.01	0.33	0.00	0.00	0.03	0.00
04/01/10	0.03	*113040**	0.00	0.29	0.00	0.00	0.04	0.00
04/28/10	0.02	*113040**	0.00	0.27	0.00	0.00	0.02	0.00
05/25/10	0.01	*34850**	0.00	0.25	0.00	0.00	0.01	0.00
06/16/10	0.01	*52910**	0.00	0.06	0.00	0.00	0.01	0.00
07/14/10	0.01	*69360**	0.00	0.07	0.00	0.00	0.02	0.00
08/24/10	0.03	*88340**	0.00	0.10	0.00	0.00	0.02	0.00
09/22/10	0.04	*106670**	0.00	0.04	0.00	0.00	0.03	0.00
10/06/10	0.03	*113270**	0.00	0.04	0.00	0.00	0.02	0.00
11/30/10	0.05	*158198**	0.01	0.04	0.00	0.00	0.05	0.00
12/13/10	0.04	*167888**	0.00	0.06	0.00	0.00	0.06	0.00
01/19/11	0.02	*196370**	0.01	0.05	0.00	0.00	0.05	0.00
02/24/11	0.04	*208270**	0.00	0.06	0.00	0.00	0.01	0.00
03/17/11	0.04	2.0	0.00	0.06	0.00	0.00	0.21	0.00
04/26/11	0.03	*248070**	0.00	0.06	0.00	0.00	0.07	0.00
05/17/11	0.02	*266380**	0.00	0.06	0.00	0.00	0.07	0.00
06/29/11	0.06	*284910**	0.00	0.08	0.00	0.00	0.25	0.00
07/14/11	0.11	*286970**	0.00	0.07	0.00	0.00	0.06	0.00
08/23/11	0.13	*290010**	0.00	0.07	0.00	0.00	0.36	0.00
09/28/11	0.05	*292068**	0.00	0.24	0.00	0.00	0.35	0.00
10/25/11	0.07	*17486**	0.00	0.03	0.00	0.00	0.29	0.00
Well Totals	13.5	28.7	2.90	13.2	1.74	0.14	8.04	0.84
Total Gallons of LNAPL Recovered in all Wells Since May 6, 2008:								**69.0**
Total Gallons of Fluids Recovered in RW-2s Since July 24, 2008:								***419257***

* Volumes in blue text reflect gallons of total fluids (mostly water with some LNAPL) recovered from RW-2s. LNAPL is not separated from total fluids, therefore LNAPL recovery in RW-2s cannot be measured.

APPENDIX A

NMOCD Correspondence

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

July 14, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-410-431-193

Mr. Sam E. Christy
Phillips Petroleum Company
4001 Penbrook
Odessa, Texas 79762

RE: GROUND WATER REMEDIATION AND MONITORING
SOUTH FOUR LAKES UNIT

Dear Mr. Christy:

The New Mexico Oil Conservation Division has reviewed Phillips Petroleum Company's (Phillips) May 6, 1997 "SOUTH FOUR LAKES UNIT QUANTIFICATION OF NATURAL ATTENUATION & FUTURE GROUNDWATER MONITORING PROGRAM". This document contains the results of Phillips's recent ground water remediation and monitoring activities. The document also contains recommendations to plug and abandon 3 site monitoring wells and modify the long term ground water monitoring plan.

Phillips's proposals as contained in the above referenced document are approved with the following conditions:

1. In addition to the proposed sampling parameters, Phillips will continue to sample and analyze ground water from all monitor wells for concentrations of iron and manganese using EPA approved methods and quality assurance/quality control (QA/QC).

2. Annual remediation and monitoring reports will be submitted to the OCD by July 1 of each year. The annual reports will contain:

   a. A description of the monitoring and remediation activities which occurred during the year including conclusions and recommendations.

   b. Summary tables listing past and present laboratory analytic results of all water quality sampling for each monitoring point and plots of concentration vs. time for contaminants of concern from each monitoring point. Copies of the most recent years laboratory, data sheets and associated QA/QC data will also be submitted.

c. A water table elevation map using the water table elevation of the ground water in all monitor wells.

d. Plots of water table elevation vs. time for each ground water monitoring point.

e. A product thickness map based on the thickness of free phase product on ground water in all refinery monitor wells.

f. The volume of product and water recovered in the remediation system during each year and the total recovered to date.

3. All wastes generated will be disposed of at an OCD approved facility or in an OCD approved manner.

4. Phillips will notify the OCD at least one week in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples.

5. All documents will be submitted to the OCD Santa Fe Office with copies provided to the OCD Hobbs District Office.

Please be advised that OCD approval does not relieve Phillips of liability should the remediation and monitoring program fail to adequately monitor or remediate contamination related to Phillips's operations. In addition, OCD approval does not relieve Phillips of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Supervisor
Wayne Price, OCD Hobbs Office
David Deardorff, New Mexico State Land Office

APPENDIX B

Laboratory Analytical Reports

And

Chain of Custody Documentation

Analytical Report 417112

for

Trident Environmental

Project Manager: Gil Van Deventer

Pride Energy Company

South Four Lakes Tank Battery

26-MAY-11

Celebrating 20 Years of commitment to excellence in Environmental Testing Services

12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0738), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Utah (AALI1), West Virginia (362), Kentucky (85)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Miami (EPA Lab code: FL01152): Florida (E86678), Maryland (330)
Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco-Corpus Christi (EPA Lab code: TX02613): Texas (T104704370)
Xenco-Boca Raton (EPA Lab Code: FL01273):
Florida(E86240),South Carolina(96031001), Louisiana(04154), Georgia(917)
North Carolina(444), Texas(T104704468-TX), Illinois(002295), Florida(E86349)

Xenco Phoenix (EPA Lab Code: AZ00901):
Arizona(AZ0757), Texas(104704435-10-2), Nevada(NAC-445A), DoD(65816)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

26-MAY-11

Project Manager: **Gil Van Deventer**
Trident Environmental
P.O. Box 7624
Midland, TX 79708

Reference: XENCO Report No: **417112**
Pride Energy Company
Project Address: T12S-R-34E, Section 2, Unit Letter G

Gil Van Deventer:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 417112. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 417112 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

Sample Cross Reference 417112

Trident Environmental, Midland, TX

Pride Energy Company

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1	W	May-17-11 13:30		417112-001
MW-5	W	May-17-11 15:30		417112-002
MW-7	W	May-17-11 14:00		417112-003
MW-9	W	May-17-11 13:00		417112-004
MW-10	W	May-17-11 12:30		417112-005
MW-13	W	May-18-11 13:30		417112-006
MW-14	W	May-17-11 11:00		417112-007
MW-15	W	May-17-11 11:30		417112-008
MW-16	W	May-17-11 10:20		417112-009
RW-1D	W	May-18-11 15:00		417112-010
RW-2S	W	May-18-11 14:30		417112-011

CASE NARRATIVE

Client Name: Trident Environmental
Project Name: Pride Energy Company

Project ID:	*South Four Lakes Tank Ba*	*Report Date:*	*26-MAY-11*
Work Order Number:	*417112*	*Date Received:*	*05/19/2011*

Sample receipt non conformances and Comments:

None

Sample receipt Non Conformances and Comments per Sample:

None

Analytical Non Conformances and Comments:

Batch: LBA-856835 Inorganic Anions by EPA 300/300.1
E300

Batch 856835, Chloride, Sulfate recovered above QC limits in the Matrix Spike.
Samples affected are: 417112-002, -003, -010, -004, -009, -001, -007, -011, -006, -008, -005.
The Laboratory Control Sample for Chloride , Sulfate is within laboratory Control Limits

Batch: LBA-857074 BTEX by EPA 8021B
SW8021BM

Batch 857074, 1,4-Difluorobenzene recovered below QC limits . Matrix interferences is suspected; data not confirmed by re-analysis
Samples affected are: 417112-006. 1,4-Difluorobenzene recovered above QC limits . Matrix interferences is suspected; data not confirmed by re-analysis Samples affected are: 417112-010.

Batch: LBA-857415 Metals per ICP by SW846 6010B

Batch: LBA-857602 BTEX by EPA 8021B

Certificate of Analysis Summary 417112

Trident Environmental, Midland, TX

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery
Contact: Gil Van Deventer
Project Location: T12S-R-34E, Section 2, Unit Letter G

Date Received in Lab: Thu May-19-11 07:50 am
Report Date: 26-MAY-11
Project Manager: Brent Barron, II

Analysis Requested													
	Lab Id:	417112-001		417112-002		417112-003		417112-004		417112-005		417112-006	
	Field Id:	MW-1		MW-5		MW-7		MW-9		MW-10		MW-13	
	Depth:												
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	Sampled:	May-17-11 13:30		May-17-11 15:30		May-17-11 14:00		May-17-11 13:00		May-17-11 12:30		May-18-11 13:30	
BTEX by EPA 8021B	***Extracted:***	May-20-11 11:15		May-20-11 11:15		May-20-11 11:15		May-20-11 11:15		May-20-11 11:15		May-20-11 11:15	
	Analyzed:	May-21-11 02:19		May-21-11 02:42		May-21-11 03:04		May-21-11 04:12		May-20-11 22:11		May-20-11 22:33	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Benzene		ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0010	ND	0.0010	0.133	0.0010
Toluene		ND	0.0100	ND	0.0100	ND	0.0100	ND	0.0020	ND	0.0020	0.00331	0.0020
Ethylbenzene		0.153	0.0050	ND	0.0050	0.00810	0.0050	0.00244	0.0010	ND	0.0010	0.0862	0.0010
m_p-Xylenes		0.105	0.0100	ND	0.0100	ND	0.0100	0.00378	0.0020	ND	0.0020	0.219	0.0020
o-Xylene		ND	0.0050	ND	0.0050	ND	0.0050	0.00374	0.0010	ND	0.0010	0.00354	0.0010
Total Xylenes		0.105	0.0050	ND	0.0050	ND	0.0050	0.00752	0.0010	ND	0.0010	0.223	0.0010
Total BTEX		0.258	0.0050	ND	0.0050	0.00810	0.0050	0.00996	0.0010	ND	0.0010	0.445	0.0010
Inorganic Anions by EPA 300/300.1	***Extracted:***												
	Analyzed:	May-19-11 11:02		May-19-11 11:02		May-19-11 11:02		May-19-11 11:02		May-19-11 11:02		May-19-11 11:02	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Chloride		316	4.00	547	5.00	189	2.00	134	2.00	471	4.00	1710	10.0
Sulfate		66.2	4.00	215	5.00	86.6	2.00	184	2.00	200	4.00	59.9	10.0
Metals per ICP by SW846 6010B SUB: T104704295-TX	***Extracted:***	May-24-11 08:00		May-24-11 08:00		May-24-11 08:00		May-24-11 08:00		May-24-11 08:00		May-24-11 08:00	
	Analyzed:	May-25-11 10:00		May-25-11 10:08		May-25-11 10:10		May-25-11 10:12		May-25-11 10:14		May-25-11 10:21	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Iron		3.74	0.300	12.7	0.300	3.26	0.300	0.530	0.300	22.4	0.300	28.0	0.300
Manganese		0.694	0.0330	0.197	0.0330	0.137	0.0330	0.366	0.0330	0.278	0.0330	2.44	0.0330
TDS by SM2540C	***Extracted:***												
	Analyzed:	May-19-11 16:35		May-19-11 16:35		May-19-11 16:35		May-19-11 16:35		May-19-11 16:35		May-19-11 16:35	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Total dissolved solids		1000	5.00	1170	5.00	952	5.00	666	5.00	1510	5.00	3120	5.00

Brent Barron, II
Odessa Laboratory Manager

Certificate of Analysis Summary 417112

Trident Environmental, Midland, TX

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery
Contact: Gil Van Deventer
Project Location: T12S-R-34E, Section 2, Unit Letter G

Date Received in Lab: Thu May-19-11 07:50 am
Report Date: 26-MAY-11
Project Manager: Brent Barron, II

Analysis Requested	*Lab Id:*	417112-007		417112-008		417112-009		417112-010		417112-011	
	Field Id:	MW-14		MW-15		MW-16		RW-1D		RW-2S	
	Depth:										
	Matrix:	WATER		WATER		WATER		WATER		WATER	
	Sampled:	May-17-11 11:00		May-17-11 11:30		May-17-11 10:20		May-18-11 15:00		May-18-11 14:30	
Anions by E300	*Extracted:*										
	Analyzed:							May-19-11 11:02		May-19-11 11:02	
	Units/RL:							mg/L	RL	mg/L	RL
Chloride								2010	25.0	452	12.5
Sulfate								38.0	25.0	96.9	12.5
Nitrate as N								6.55	2.50	3.25	1.25
BTEX by EPA 8021B	*Extracted:*	May-20-11 11:15		May-20-11 11:15		May-20-11 11:15		May-20-11 11:15		May-20-11 11:15	
	Analyzed:	May-20-11 22:56		May-20-11 23:19		May-21-11 01:11		May-21-11 04:34		May-21-11 03:27	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Benzene		0.00155	0.0010	0.00520	0.0010	ND	0.0010	3.09 D	0.0010	1.22	0.100
Toluene		ND	0.0020	0.0187	0.0020	ND	0.0020	0.00261	0.0020	0.270	0.200
Ethylbenzene		ND	0.0010	0.322	0.0010	ND	0.0010	0.0844	0.0010	0.526	0.100
m_p-Xylenes		0.00203	0.0020	0.683	0.0020	ND	0.0020	0.00300	0.0020	2.30	0.200
o-Xylene		ND	0.0010	0.0744	0.0010	ND	0.0010	0.00310	0.0010	0.749	0.100
Total Xylenes		0.00203	0.0010	0.757	0.0010	ND	0.0010	0.00610	0.0010	3.05	0.100
Total BTEX		0.00358	0.0010	1.10	0.0010	ND	0.0010	3.18	0.0010	5.07	0.100
Inorganic Anions by EPA 300/300.1	*Extracted:*										
	Analyzed:	May-19-11 11:02		May-19-11 11:02		May-19-11 11:02					
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL				
Chloride		299	4.00	1010	10.0	410	4.00				
Sulfate		259	4.00	37.4	10.0	201	4.00				
Metals per ICP by SW846 6010B SUB: T104704295-TX	*Extracted:*	May-24-11 08:00		May-24-11 08:00		May-24-11 08:00		May-24-11 08:00		May-24-11 08:00	
	Analyzed:	May-25-11 10:23		May-25-11 10:25		May-25-11 10:27		May-25-11 10:29		May-25-11 10:31	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Iron		1.43	0.300	16.2	0.300	1.91	0.300	14.5	0.300	7.79	0.300
Manganese		0.0380	0.0330	1.99	0.0330	ND	0.0330	0.486	0.0330	0.435	0.0330

Brent Barron, II
Odessa Laboratory Manager

Certificate of Analysi ummary 417112

Trident Environmen Midland, TX

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery
Contact: Gil Van Deventer
Project Location: T12S-R-34E, Section 2, Unit Letter G

Date Received in Lab: Thu May-19-11 07:50 am
Report Date: 26-MAY-11
Project Manager: Brent Barron, II

Analysis Requested	*Lab Id:*	417112-007		417112-008		417112-009		417112-010		417112-011	
	Field Id:	MW-14		MW-15		MW-16		RW-1D		RW-2S	
	Depth:										
	Matrix:	WATER		WATER		WATER		WATER		WATER	
	Sampled:	May-17-11 11:00		May-17-11 11:30		May-17-11 10:20		May-18-11 15:00		May-18-11 14:30	
TDS by SM2540C	*Extracted:*										
	Analyzed:	May-19-11 16:35		May-19-11 16:35		May-19-11 16:35		May-19-11 16:35		May-19-11 16:35	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Total dissolved solids		1420	5.00	1840	5.00	1350	5.00	3240	5.00	2510	5.00

Brent Barron, II
Odessa Laboratory Manager

XENCO Laboratories

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the MQL and above the SQL.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit

PQL Practical Quantitation Limit

LOD Limit of Detection

LOQ Limit of Quantitation

DL Method Detection Limit

*** Outside XENCO's scope of NELAC Accreditation.**

XENCO Laboratories

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Orders : 417112,

Project ID: South Four Lakes Tank Battery

Lab Batch #: 857074 **Sample:** 603361-1-BKS / BKS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 18:03

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0300	0.0300	100	80-120	
4-Bromofluorobenzene	0.0307	0.0300	102	80-120	

Lab Batch #: 857074 **Sample:** 603361-1-BSD / BSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 18:26

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0326	0.0300	109	80-120	
4-Bromofluorobenzene	0.0312	0.0300	104	80-120	

Lab Batch #: 857074 **Sample:** 603361-1-BLK / BLK **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 19:33

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0279	0.0300	93	80-120	
4-Bromofluorobenzene	0.0267	0.0300	89	80-120	

Lab Batch #: 857074 **Sample:** 417112-005 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 22:11

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0278	0.0300	93	80-120	
4-Bromofluorobenzene	0.0283	0.0300	94	80-120	

Lab Batch #: 857074 **Sample:** 417112-006 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 22:33

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0230	0.0300	77	80-120	*
4-Bromofluorobenzene	0.0242	0.0300	81	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

gate Recovery [D] = 100 * A / B

esults are based on MDL and validated for QC purposes.

Final 1.000

XENCO Laboratories

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

k Orders : 417112,

Project ID: South Four Lakes Tank Battery

.o Batch #: 857074 **Sample:** 417112-007 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 22:56

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0272	0.0300	91	80-120	
4-Bromofluorobenzene	0.0299	0.0300	100	80-120	

Lab Batch #: 857074 **Sample:** 417112-008 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 23:19

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0247	0.0300	82	80-120	
4-Bromofluorobenzene	0.0319	0.0300	106	80-120	

Lab Batch #: 857074 **Sample:** 417060-001 S / MS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/20/11 23:41

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
,4-Difluorobenzene	0.0304	0.0300	101	80-120	
4-Bromofluorobenzene	0.0301	0.0300	100	80-120	

Lab Batch #: 857074 **Sample:** 417060-001 SD / MSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 00:04

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0295	0.0300	98	80-120	
4-Bromofluorobenzene	0.0316	0.0300	105	80-120	

Lab Batch #: 857074 **Sample:** 417112-009 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 01:11

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0288	0.0300	96	80-120	
4-Bromofluorobenzene	0.0283	0.0300	94	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

igate Recovery [D] = 100 * A / B

esults are based on MDL and validated for QC purposes.

Final 1.000

XENCO Laboratories

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

'k Orders : 417112,

Project ID: South Four Lakes Tank Battery

Lab Batch #: 857074 **Sample:** 417112-001 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 02:19

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0270	0.0300	90	80-120	
4-Bromofluorobenzene	0.0296	0.0300	99	80-120	

Lab Batch #: 857074 **Sample:** 417112-002 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 02:42

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0276	0.0300	92	80-120	
4-Bromofluorobenzene	0.0303	0.0300	101	80-120	

Lab Batch #: 857074 **Sample:** 417112-003 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 03:04

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
ı-Difluorobenzene	0.0284	0.0300	95	80-120	
4-Bromofluorobenzene	0.0318	0.0300	106	80-120	

Lab Batch #: 857074 **Sample:** 417112-011 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 03:27

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0280	0.0300	93	80-120	
4-Bromofluorobenzene	0.0345	0.0300	115	80-120	

Lab Batch #: 857074 **Sample:** 417112-004 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 04:12

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0275	0.0300	92	80-120	
4-Bromofluorobenzene	0.0317	0.0300	106	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

gate Recovery [D] = 100 * A / B

esults are based on MDL and validated for QC purposes.

XENCO Laboratories

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

k Orders : 417112,

Project ID: South Four Lakes Tank Battery

o Batch #: 857074 **Sample:** 417112-010 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/21/11 04:34

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0558	0.0300	186	80-120	*
4-Bromofluorobenzene	0.0318	0.0300	106	80-120	

Lab Batch #: 857602 **Sample:** 603703-1-BKS / BKS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/25/11 11:59

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0300	0.0300	100	80-120	
4-Bromofluorobenzene	0.0298	0.0300	99	80-120	

Lab Batch #: 857602 **Sample:** 603703-1-BSD / BSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/25/11 12:21

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
4-Difluorobenzene	0.0278	0.0300	93	80-120	
4-Bromofluorobenzene	0.0272	0.0300	91	80-120	

Lab Batch #: 857602 **Sample:** 603703-1-BLK / BLK **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/25/11 13:28

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0254	0.0300	85	80-120	
4-Bromofluorobenzene	0.0242	0.0300	81	80-120	

Lab Batch #: 857602 **Sample:** 417298-001 S / MS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/25/11 18:53

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0297	0.0300	99	80-120	
4-Bromofluorobenzene	0.0318	0.0300	106	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

gate Recovery [D] = 100 * A / B

.esults are based on MDL and validated for QC purposes.

XENCO Laboratories

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

'k Orders : 417112,

Project ID: South Four Lakes Tank Battery

Lab Batch #: 857602 **Sample:** 417298-001 SD / MSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/25/11 19:16

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0280	0.0300	93	80-120	
4-Bromofluorobenzene	0.0295	0.0300	98	80-120	

Lab Batch #: 857602 **Sample:** 417112-010 / DL **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 05/26/11 10:19

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0250	0.0300	83	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

'gate Recovery [D] = 100 * A / B

.esults are based on MDL and validated for QC purposes.

Final 1.000

BS / BSD Recoveries

Project Name: Pride Energy Company

Work Order #: 417112 **Project ID:** South Four Lakes Tank Battery

Analyst: ASA **Date Prepared:** 05/20/2011 **Date Analyzed:** 05/20/2011

Lab Batch ID: 857074 **Sample:** 603361-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00100	0.100	0.0973	97	0.100	0.102	102	5	70-125	25	
Toluene	<0.00200	0.100	0.0972	97	0.100	0.104	104	7	70-125	25	
Ethylbenzene	<0.00100	0.100	0.0924	92	0.100	0.0977	98	6	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.187	94	0.200	0.198	99	6	70-131	25	
o-Xylene	<0.00100	0.100	0.0971	97	0.100	0.101	101	4	71-133	25	

Analyst: ASA **Date Prepared:** 05/24/2011 **Date Analyzed:** 05/25/2011

Lab Batch ID: 857602 **Sample:** 603703-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00100	0.100	0.0995	100	0.100	0.0888	89	11	70-125	25	
Toluene	<0.00200	0.100	0.0967	97	0.100	0.0878	88	10	70-125	25	
Ethylbenzene	<0.00100	0.100	0.101	101	0.100	0.0916	92	10	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.210	105	0.200	0.190	95	10	70-131	25	
o-Xylene	<0.00100	0.100	0.103	103	0.100	0.0957	96	7	71-133	25	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

XENCO Laboratories

BS / BSD Recoveries

Project Name: Pride Energy Company

Work Order #: 417112 **Project ID:** South Four Lakes Tank Battery

Analyst: LATCOR **Date Prepared:** 05/19/2011 **Date Analyzed:** 05/19/2011

Lab Batch ID: 856835 **Sample:** 856835-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

Inorganic Anions by EPA 300/300.1	BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY										
Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<0.200	10.0	10.7	107	10.0	11.0	110	3	80-120	20	
Nitrate as N	<0.0700	2.26	2.21	98	2.26	2.29	101	4	90-110	10	
Sulfate	<0.200	10.0	11.0	110	10.0	10.3	103	7	80-120	20	

Analyst: DAT **Date Prepared:** 05/24/2011 **Date Analyzed:** 05/25/2011

Lab Batch ID: 857415 **Sample:** 603441-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

Metals per ICP by SW846 6010B	BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY										
Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Iron	<0.0300	1.00	1.07	107	1.00	1.08	108	1	85-115	20	
Manganese	<0.0100	1.00	1.03	103	1.00	1.05	105	2	85-115	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

BS / BSD coveries

Project Name: Pride Energy Company

Work Order #: 417112
Analyst: WRU
Lab Batch ID: 856830
Sample: 856830-1-BKS
Units: mg/L

Date Prepared: 05/19/2011
Batch #: 1

Project ID: South Four Lakes Tank Battery
Date Analyzed: 05/19/2011
Matrix: Water

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TDS by SM2540C Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Total dissolved solids	<5.00	1000	976	98	1000	1010	101	3	80-120	30	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

XENCO Laboratories

Form 3 - MS Recoveries

Project Name: Pride Energy Company

Work Order #: 417112

b Batch #: 856835

Project ID: South Four Lakes Tank Battery

Date Analyzed: 05/19/2011

Date Prepared: 05/19/2011

Analyst: LATCOR

QC- Sample ID: 417112-011 S

Batch #: 1

Matrix: Water

Reporting Units: mg/L

	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Inorganic Anions by EPA 300 **Analytes**	**Parent Sample Result [A]**	**Spike Added [B]**	**Spiked Sample Result [C]**	**%R [D]**	**Control Limits %R**	**Flag**
Chloride	452	250	827	150	80-120	X
Nitrate-N	<5.00	56.5	65.8	116	80-120	
Sulfate	96.9	250	427	132	80-120	X

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

Final 1.000

Form 3 - MS / MSD Recoveries

Project Name: Pride Energy Company

Work Order # : 417112 **Project ID:** South Four Lakes Tank Battery

Lab Batch ID: 857074 **QC- Sample ID:** 417060-001 S **Batch #:** 1 **Matrix:** Water

Date Analyzed: 05/20/2011 **Date Prepared:** 05/20/2011 **Analyst:** ASA

Reporting Units: mg/L

BTEX by EPA 8021B Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	0.00753	0.100	0.119	111	0.100	0.101	93	16	70-125	25	
Toluene	<0.00200	0.100	0.0825	83	0.100	0.0930	93	12	70-125	25	
Ethylbenzene	0.00110	0.100	0.0814	80	0.100	0.0899	89	10	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.161	81	0.200	0.181	91	12	70-131	25	
o-Xylene	<0.00100	0.100	0.0849	85	0.100	0.0953	95	12	71-133	25	

Lab Batch ID: 857602 **QC- Sample ID:** 417298-001 S **Batch #:** 1 **Matrix:** Water

Date Analyzed: 05/25/2011 **Date Prepared:** 05/24/2011 **Analyst:** ASA

Reporting Units: mg/L

BTEX by EPA 8021B Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00100	0.100	0.0972	97	0.100	0.0954	95	2	70-125	25	
Toluene	<0.00200	0.100	0.0983	98	0.100	0.0950	95	3	70-125	25	
Ethylbenzene	<0.00100	0.100	0.102	102	0.100	0.100	100	2	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.218	109	0.200	0.212	106	3	70-131	25	
o-Xylene	<0.00100	0.100	0.105	105	0.100	0.105	105	0	71-133	25	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not ApplicableN = See Narrative, EQL = Estimated Quantitation Limit

Form 3 - MS / MSD Recoveries

Project Name: Pride Energy Company

Work Order # : 417112 **Project ID:** South Four Lakes Tank Battery

Lab Batch ID: 857415 **QC- Sample ID:** 417469-001 S **Batch #:** 1 **Matrix:** Water

Date Analyzed: 05/25/2011 **Date Prepared:** 05/24/2011 **Analyst:** DAT

Reporting Units: mg/L

Metals per ICP by SW846 6010B Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Iron	0.379	1.00	1.49	111	1.00	1.51	113	1	75-125	20	
Manganese	0.0171	1.00	1.05	103	1.00	1.05	103	0	75-125	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not ApplicableN = See Narrative, EQL = Estimated Quantitation Limit

Final 1.000

Sample Duplicate Recovery

Project Name: Pride Energy Company

Work Order #: 417112

Lab Batch #: 856835 **Project ID:** South Four Lakes Tank Battery

Date Analyzed: 05/19/2011 11:02 **Date Prepared:** 05/19/2011 **Analyst:** LATCOR

QC- Sample ID: 417112-011 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

Inorganic Anions by EPA 300/300.1	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	452	446	1	20	
Nitrate-N	<5.00	<5.00	0	20	
Sulfate	96.9	96.4	1	20	

Lab Batch #: 856830

Date Analyzed: 05/19/2011 16:35 **Date Prepared:** 05/19/2011 **Analyst:** WRU

QC- Sample ID: 417114-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

TDS by SM2540C	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	1880	1760	7	30	

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.
BRL - Below Reporting Limit

XENCO Laboratories

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQU...

Company Name:	Pride Energy Company	**Company Name:**	Trident Environmental	**Project Name:**	Pride Energy Company
Direct Invoice To:	Matt Pride	**Project Manager:**	Gil Van Deventer	**Project #:**	South Four Lakes Tank Battery
Billing Address:	P. O. Box 701950	**Address:**	PO Box 12177	**Project Location:**	T12S-R34E, Section 2, Unit Letter G
City, State, Zip Code:	Tulsa, OK 74170-1950	**City, State, Zip Code:**	Odessa TX 79768-2177	**COC #:**	0511-1
Telephone No:	918-524-9200	**Telephone No:**	432-638-8740		
Fax No:	918-524-9292	**Fax No:**	413-403-9968		
Email Report to:	mattp@pride-energy.com	**Email Report to:**	gil@trident-environmental.com		
Sampler:	Gil Van Deventer (Printed)		(Signature)		

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO_3 250ml HDPE	HCl BTEX only) 40mL glass	NaOH	H_2SO_4 (Nitrate only)	None (Cl, SO_4, & TDS only 500ml HDPE	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify):	Analyze For: TCLP: TPH: 418.1 8015M 1005 1006	TOTAL: BTEX 8021B	Volatiles	Semivolatiles	Metals: As Ag Ba Cd Cr Pb Hg Se	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	Chloride (325.3 / SM4500B)	Sulfate - SO_4 (EPA 375.1 / SM4500)	Nitrate - NO_3 (EPA WW 352.1)	TDS (160.1 / SM2540C)	Total Fe and Mn	SPLP 1312	TAT: RUSH (Pre-Schedule)	Standard TAT
417112																														
01	MW - 1	05/17/11	1330	5	X	1	3			1		X					3						1	1		1	1			X
02	MW - 5	05/17/11	1530	5	X	1	3			1		X					3						1	1		1	1			X
03	MW - 7	05/17/11	1400	5	X	1	3			1		X					3						1	1		1	1			X
04	MW - 9	05/17/11	1300	5	X	1	3			1		X					3						1	1		1	1			X
05	MW - 10	05/17/11	1230	5	X	1	3			1		X					3						1	1		1	1			X
06	MW - 13	05/18/11	1330	5	X	1	3			1		X					3						1	1		1	1			X
07	MW - 14	05/17/11	1100	4	X	1	2			1		X					2						1	1		1	1			X
08	MW - 15	05/17/11	1130	4	X	1	2			1		X					2						1	1		1	1			X
09	MW - 16	05/17/11	1020	4	X	1	2			1		X					2						1	1		1	1			X
10	RW - 1D	05/18/11	1500	5	X	1	3			1		X					3						1	1	1	1	1			X
11	RW - 2S	05/18/11	1430	5	X	1	3			1		X					3						1	1	1	1	1			X

Special Instructions:
Email results to: gil@trident-environmental.com and mattp@pride-energy.com

Sample Containers Intact? (Y) N
Samples Cool? (Y) N
Laboratory Comments:
Total: 52 containers 1.6 °C
Labels
Labels as seals on VOA's

Relinquished by:	Date	Time	Received by:	Date	Time
	5/19/11	07:50			
Relinquished by:	**Date**	**Time**	**Received by Xenco:**	**Date**	**Time**
			Jeanne Fitch	05-19-11	0750

XENCO Laboratories

XENCO Laboratories
Atlanta, Boca Raton, Corpus Christi, Dallas
Houston, Miami, Odessa, Philadelphia
Phoenix, San Antonio, Tampa

Document Title: Sample Receipt Checklist
Document No.: SYS-SRC
Revision/Date: No. 01, 5/27/2010
Effective Date: 6/1/2010 Page 1 of 1

Prelogin / Nonconformance Report - Sample Log-In

Client: Pride / Trident
Date/Time: 05-19-11 @ 0150
Lab ID #: 417112
Initials: JMF

Sample Receipt Checklist

1. Samples on ice?	Blue	(Water)	No	
2. Shipping container in good condition?	(Yes)	No	None	
3. Custody seals intact on shipping container (N/A cooler) and bottles? (VOA's sis labels)	Yes	No	N/A	
4. Chain of Custody present?	(Yes)	No		
5. Sample instructions complete on chain of custody?	(Yes)	No		
6. Any missing / extra samples?	Yes	(No)		
7. Chain of custody signed when relinquished / received?	(Yes)	No		
8. Chain of custody agrees with sample label(s)?	(Yes)	No		
9. Container labels legible and intact?	(Yes)	No		
10. Sample matrix / properties agree with chain of custody?	(Yes)	No		
11. Samples in proper container / bottle?	(Yes)	No		
12. Samples properly preserved?	(Yes)	No	N/A	
13. Sample container intact?	(Yes)	No		
14. Sufficient sample amount for indicated test(s)?	(Yes)	No		
15. All samples received within sufficient hold time?	(Yes)	No		
16. Subcontract of sample(s)?	Yes	No	N/A	Xenco - Metals
17. VOC sample have zero head space?	(Yes)	No	N/A	

18. Cooler 1 No.		Cooler 2 No.		Cooler 3 No.		Cooler 4 No.		Cooler 5 No.	
lbs	1.6 °C	lbs	°C	lbs	°C	lbs	°C	lbs	°C

Nonconformance Documentation

Contact:_____ Contacted by:_____ Date/Time:_____

Regarding: _____

Corrective Action Taken: _____

Check all that apply:
- ☐ Cooling process has begun shortly after sampling event and out of temperature condition acceptable by NELAC 5.5.8.3.1.a.1.
- ☐ Initial and Backup Temperature confirm out of temperature conditions
- ☐ Client understands and would like to proceed with analysis

APPENDIX C

Well Sample Data Form

And

Operation & Maintenance Log

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: South Four Lakes Tank Battery
SITE LOCATION: T12S - R34E - Sec 2, Lea County, NM
SAMPLER: Gil Van Deventer

TRIDENT ENVIRONMENTAL

PURGING METHOD: ☑ Hand Bailed ☐ Pump, Type: _____
SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____
DISPOSAL METHOD OF PURGE WATER: ☐ On-site Drum ☐ Drums ☑ SWD Disposal Facility
DECONTAMINATION METHODS: Nitile gloves, Alconox, and Distilled Water Rinse.

Date	Time	Monitoring Well No.	Depth to Water (ft btoc)	Total Depth (ft)	Water Column Height (ft)	Well Factor 2"=.16 4"=.65	Volume Purged (gal)	No. of Well Volumes Purged	Field Measurements						Comments
									Temp. °C	Cond. (mS/cm)	pH	DO (mg/L)	Fe^{+2} (mg/L)	NO_3 (mg/L)	
05/17/11	13:30	MW-1	25.75	31.0	5.3	0.16	3	3.6	19.7	1.05	7.02	1.0	1.97	1.0	Light gray with black flecks
05/17/11	15:30	MW-5	27.06	30.9	3.8	0.16	3	4.9	21.0	2.21	7.18	4.7	3.21	3.2	Dark gray
05/17/11	14:00	MW-7	25.88	34.0	8.1	0.16	6	4.6	20.7	1.82	7.02	1.2	1.98	0.9	Grayish
05/17/11	13:00	MW-9	26.25	30.0	3.8	0.16	3	5.0	19.5	1.04	7.29	3.0	0.01	0.3	Light gray with black flecks
05/17/11	12:30	MW-10	26.54	32.2	5.7	0.16	5	5.5	20.3	1.97	7.17	4.7	2.49	4.0	Light tan
05/18/11	13:30	MW-13	27.50	34.0	6.5	0.16	5	4.8	22.3	4.62	6.56	1.5	6.36	0.4	Light gray; clearing
05/17/11	11:00	MW-14	29.60	37.3	7.7	0.16	4	3.2	18.1	2.09	6.98	4.9	0.39	16.2	Cloudy white; clearing
05/17/11	11:30	MW-15	28.17	36.8	8.6	0.16	5	3.6	19.6	3.46	6.95	1.5	2.96	0.5	Cloudy, light gray
05/17/11	10:20	MW-16	29.26	36.4	7.1	0.16	5	4.4	20.2	2.10	7.07	2.6	0.00	5.2	Clear to very light brown
05/18/11	15:00	RW-1d	NM	39.5	15	0.65	30	3.1	21.6	5.93	6.88	0.80	7.36	6.5	Light gray
05/18/11	14:30	RW-2s	NM	39.5	15	0.65	50	5.1	25.4	2.11	6.45	1.10	6.60	3.3	Nitrate = 2.4 mg/L (Xenco Lab)

COMMENTS: Hanna Model 98130 meter used to obtain pH, conductivity, and temperature readings. Milwaukee Model SM600 used for DO readings.

Hach Model DR-890 used to measure nitrate (NO_3 - N) using Hach Method 8171 and ferrous iron (Fe^{+2}) using Hach Method 8146.

Hand delivered samples to Xenco Laboratories for BTEX, sulfate, iron, manganese, chloride and TDS analysis (and NO_3 for MW-12 & RW-2s).

Operation & Maintenance Log of Activities for LNAPL and Groundwater Recovery System

Date	Description of Activities Performed
05/07/08	Rod broken on RW-2d side. Lewis Pump service on site to inspect and remove worn components. Installed passive bailers in RW-1s and MW-6 for passive recovery of LNAPL.
05/23/08	Lewis Windmill on site to replace worn components. Ready to be operational after Shane (pumper) installs discharge line.
06/30/08	Discharge line was installed to direct LNAPL recovery from the windmill at RW-2s to the tank battery.
07/23-24/08	Put windmill back into operating status for total fluids recovery by reconnecting loose pump rod and installing clamp around wellhead. Also, hydrophobic bailers were placed in monitoring wells MW-1, MW-7, MW-12, and MW-13 for passive recovery of LNAPL.
08/12-13/08	Installed hydrophobic bailer in monitoring well MW-6. Emptied hydrophobic bailers in other wells. Installed locks for MWs 1,7,9,10,14, &15.
09/09/08	Emptied hydrophobic bailers and gauged wells with LNAPL.
09/17/08	Installed hydrophobic sock in monitoring wells MW-7 & MW-9. Emptied hydrophobic bailers and gauged wells with LNAPL.
10/08/08	Replaced hydrophobic bailer with hydrophobic sock in MW-13. Emptied hydrophobic bailers, hand bailed, and gauged wells with LNAPL.
11/20/08	Emptied hydrophobic bailers/socks, hand bailed, and gauged wells with LNAPL.
12/23/08	Lewis Windmill on site to re-install new sump in RW-2s; windmill operational. Emptied hydrophobic bailers, hand bailed, and gauged wells with LNAPL.
01/15/09	Lowered sump ~1 ft in RW-2s; pumped ~2 gal LNAPL; then raised sump until (water) flow stopped. Emptied passive bailers/socks; gauged MWs with LNAPL.
02/27/09	Totalizer meter stuck but windmill is pumping fluid. Lowered sump to pump total fluids. Totalizer needs replacement. Emptied passive bailers/socks; gauged MWs with LNAPL. Replaced passive bailer in MW-1 with sock.
03/26/09	Windmill performing well in total fluids mode (product pumped off - only pumping water). Raised sump ~ 0.5 ft but still in total fluids mode. Totalizer working without replacement. Emptied passive bailers/socks (1.12 gal LNAPL); gauged MWs with LNAPL. Replaced passive bailer (loose patch) in MW-6 with another bailer. Installed new socks in MW-1, MW-7, MW-9, and MW-13.
04/28/09	Re-attached loose bracket on windmill which was loose from pump on arrival (probably caused by high winds). Totalizer indicates windmill pumped at 1.7 gpm (avg) over past month which is much higher than normal. Emptied passive bailers/socks (0.93 gal LNAPL); gauged MWs with LNAPL. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
05/18/09	Windmill pumping at ~ 0.33 gpm upon arrival. Totalizer indicates windmill pumped ~ 0.16 gpm over past month. Emptied passive bailers/socks (0.66 gal LNAPL); gauged MWs with LNAPL. Wells showing steady decline in LNAPL thicknesses due to recovery system in operation.
06/17/09	Windmill pumped 6859 gallons of total fluids at an average rate of 0.16 gpm since last month. Emptied passive bailers/socks (0.58 gal LNAPL); gauged MWs with LNAPL. Removed oil absorbent socks from MW-1, MW-7, MW-9, and MW-13, since LNAPL has not been present in these wells for several months or more.
07/16/09	Windmill does not appear to be pumping (meter same as last reading). Emptied passive bailers/socks (0.58 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent socks in MW-1 and MW-13 due to return of small amounts of LNAPL.
08/26/09	Emptied passive bailers/socks (0.42 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent socks in MW-1, MW-7, MW-12, and MW-13 due to return of small amounts of LNAPL. Windmill not pumping (meter same as last reading).
09/15/09	Emptied passive bailers/socks (0.38 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent sock in MW-12. Windmill not pumping (meter same as last reading). Ray Hardy (Pinon Well Service) on site to diagnose windmill pump and ordered new parts.

Operation & Maintenance Log of Activities for LNAPL and Groundwater Recovery System

Date	Description of Activities Performed
10/15/09	Emptied passive bailers/socks (0.61 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent socks in MW-1 & MW-9. Passive bailer in RW-1s cracked (will replace with sock later). Windmill not pumping (meter same as last reading). Ray Hardy (Piñon Well Service) on site to repair windmill pump and install new parts (leather cups and 1 1/4" x 1 1/2" coupling. Needs a stablizer rig in tower for proper balance before windmill can be put back in service.
10/19/09	Ray Hardy (Piñon Well Service) on site to install a stablizer rig in tower for proper balance. Windmill back in service.
10/21/09	Inspected windmill system which is running fine (adjusted sump); recovered LNAPL (0.58 gal) and gauged RW-1s and MW-6; installed new oil absorbent sock in RW-1s.
11/12/09	Inspected windmill system which is running fine (adjusted sump); emptied passive bailers/socks (0.69 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent socks in MW-1, MW-12, & RW-1s.
12/10/09	Meter reading at windmill hasn't changed (meter needs cleaning or replacement); applied brake to windmill to avoid winter freezing problems; emptied passive bailers/socks (0.48 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent socks in MW-1, MW-7, MW-12, MW-13, & RW-1s.
01/13/10	Windmill at RW-2s still not in service to avoid winter freezing problems; recovered 2.0 gal of LNAPL at RW-2s by running windmill for ~20 min; emptied passive bailers/socks (0.35 gal LNAPL); gauged MWs with LNAPL. Installed new oil absorbent sock in MW-9 and reinstalled socks in MW-1, MW-7, MW-12, & MW-13.
02/25/10	Re-activated windmill; recovered 5.0 gal of LNAPL at RW-2s by running windmill for ~20 min; emptied passive bailer/socks (0.45 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, & MW-12.
03/23/10	Windmill running but totalizer meter is stuck; recovered 5.0 gal of LNAPL at RW-2s by running windmill for ~20 min; emptied passive bailer/socks (0.43 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, and MW-6.
04/01/10	Windmill not operational (tophead plunge rod threads stripped); emptied passive bailer/socks (0.36 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW1s & MW-6.
04/28/10	Returned windmill to operational service (installed new tophead plunger rod and totalizer meter); emptied passive bailer/socks (0.31 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-12, & MW-13.
05/25/10	Windmill system operating normally; emptied passive bailer/socks (0.26 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-7, MW-9, & MW-12.
06/16/10	Windmill system operating normally; emptied passive bailer/socks (0.09 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1 & MW-12.
07/14/10	Windmill system operating normally; emptied passive bailer/socks (0.10 gal LNAPL); gauged MWs for LNAPL. Replaced passive bailer in MW-6 with an oil absorbant sock; installed new oil absorbent socks in RW-1s, MW-1, & MW-12.
08/24/10	Windmill system operating normally; emptied passive bailer/socks (0.14 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-7, MW-9, & MW-13.
09/22/10	Windmill system operating normally; emptied passive bailer/socks (0.12 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-6, & MW-12.
10/06/10	Windmill system operating normally (lowered sump ~6-in to increase recovery); emptied passive bailer/socks (0.09 gal LNAPL); gauged MWs; installed new oil absorbent socks in RW-1s, MWs 1,6, & 12.

Operation & Maintenance Log of Activities for LNAPL and Groundwater Recovery System

Date	Description of Activities Performed
11/30/10	Windmill system operating normally; emptied passive bailer/socks (0.15 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, & MW-12.
12/13/10	Windmill system operating normally; emptied passive bailer/socks (0.15 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-6, & MW-12.
01/19/11	Windmill system operating normally; emptied passive bailer/socks (0.13 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-6, & MW-12. Installed new totalizer meter.
02/24/11	Windmill system out of service (pump rod broken at upper threads); emptied passive bailer/socks (0.11 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-7, MW-9, MW-12, MW-13. Will order/replace pump rod for next site visit.
03/17/11	Windmill system repaired (replaced threaded *SS* stuffing box rod with new unit); adjusted sump & pumped 2 gal LNAPL from windmill until only water recovered; emptied passive bailer/socks (0.10 gal LNAPL); handbailed MW-12 (0.21 gal); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-6, & MW-12.
04/26/11	Windmill system operating normally; emptied passive bailer/socks (0.17 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-12, & MW-13.
05/17/11	Windmill system operating normally; emptied passive bailer/socks (0.15 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-7, MW-12, & MW-13.
06/29/11	Windmill system operating normally; hand bailed and emptied passive bailer/socks (0.39 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-9, MW-12, & MW-13.
07/14/11	Windmill system operating normally; emptied passive bailer/socks (0.24 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s, MW-1, MW-6, MW-7, & MW-13. Replaced oil absorbant sock in MW-12 with passive bailer.
08/23/11	Windmill system operating normally; emptied passive bailer/socks (0.57 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s (3), MW-1, MW-7, MW-9, & MW-13. Replaced oil absorbant sock in MW-6 with passive bailer.
09/28/11	Windmill system operating normally; emptied passive bailer/socks (0.64 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s (3), MW-1, MW-7, MW-9, & MW-13.
10/25/11	Windmill system operating normally; emptied passive bailer/socks (0.39 gal LNAPL); gauged MWs for LNAPL. Installed new oil absorbent socks in RW-1s (3), MW-1, MW-6, MW-7, MW-9, & MW-13. Replaced passive bailer in MW-6 with sock.