1R-204

Annual Groundwater Monitor Report

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July 1, 2009

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: **2009 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:

On behalf of Pride Energy Company, Trident Environmental takes this opportunity to submit the attached 2009 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 2009 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident on May 18-19, 2009, and site remediation activities conducted between May 6, 2008 and June 17, 2009. 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 consideration 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

cc: Matt Pride (Pride Energy Co.)
Larry Hill (NMOCD – District 1)

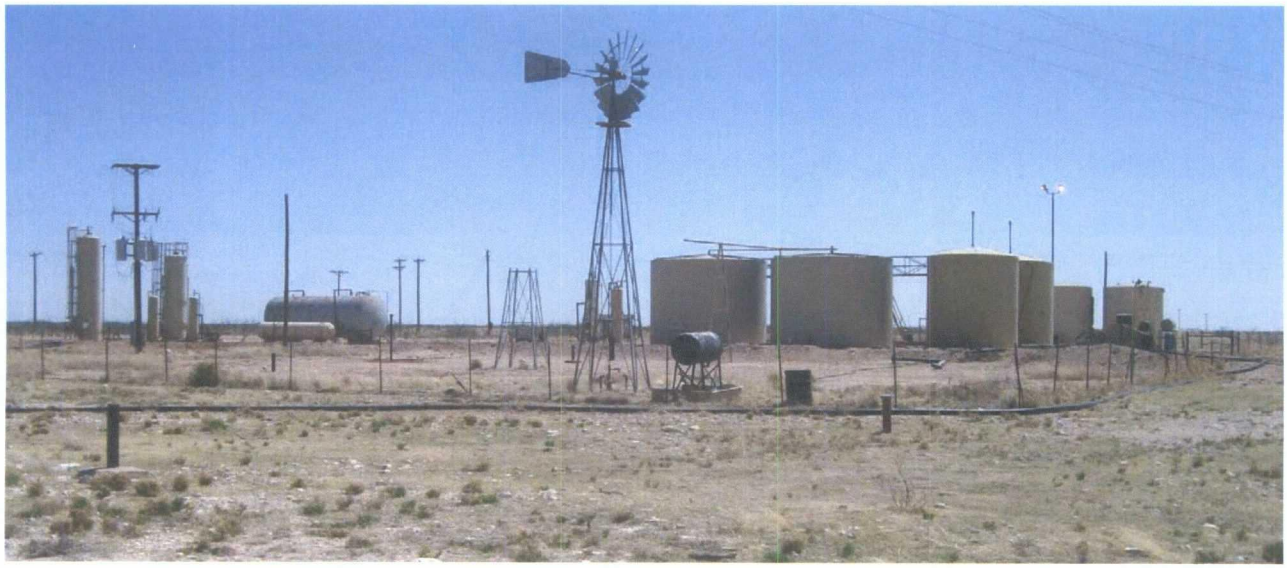
July 1, 2009

2009 Annual Groundwater Monitoring Report

South Four Lakes Tank Battery Site (1RP-204)

T12S, R34E, Section 2, Unit Letter G

Lea County, New Mexico



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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 2009 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident at the South Four Lakes Tank Battery on May 18-19, 2009. 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, toluene, ethylbenzene, and xylene (BTEX) concentrations in monitoring wells MW-5, MW-7, MW-9, MW-10, MW-14, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standards for each constituent.
- The benzene levels in monitoring wells MW-1 (0.01 mg/L), MW-13 (1.0 mg/L), and MW-15 (0.019 mg/L) exceeded the WQCC standards of 0.010 mg/L. The toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards with the exception of xylenes in MW-15 (1.60 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 year due to operation of the windmill recovery system and passive recovery activities in affected wells. LNAPL is localized between RW-1, MW-6, and MW-12. As of May 18, 2009, the LNAPL thicknesses were measured as follows: MW-6 (1.17 ft), MW-12 (0.012 ft), and RW-1s (0.24 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 4,200 barrels (bbl) of hydrocarbon-impacted groundwater has been removed.
- Approximately 44.7 gal of LNAPL has been removed from MW-1, MW-6, MW-7, MW-9, MW12, MW-13, and RW-1s since May 2008 by use of passive bailers and oil absorbent socks.
- Chlorides and TDS concentrations in monitoring wells MW-5, MW-7, MW-10, MW-13, MW-14, MW-15, and MW-16 exceed WQCC standards.
- 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.

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 2010.

- 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, 1995The 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 hydrophobic bailers and socks. Gauged wells 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.

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 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-1
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-1 indicated that the oils were essentially the same. One minor but expected difference between the produced crude oils and the LNAPL from MW-1 is that the MW-1 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 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 [~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.

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.

4.0 Procedures

During the annual sampling event conducted by Trident on May 18, 2009, all on-site monitoring wells were gauged for depth to groundwater using a clean, decontaminated electronic water/product interface probe. Monitoring wells MW-1, MW-5, MW-7, MW-9, MW-10, MW-13, MW-14, MW-15, and MW-16 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 during and after 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}) was also measured in the field using a Hach DR2010 spectrophotometer (Hach Method 8146).

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 appropriately preserved containers for analysis of nitrate (NO_3), 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 Cardinal Laboratories in Hobbs, New Mexico, on May 19, 2009, 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 18, 2009, the groundwater conditions at the South Four Lakes Tank Battery are characterized below.

- The depth to the water table is approximately 23 to 25 feet below ground surface.
- The hydraulic gradient is approximately 0.002 feet/foot.
- Direction of groundwater flow is to the southeast (39° south of due east).
- Water table elevations have decreased an average of 0.68 feet across the site over the last year.

A groundwater elevation map depicting the water table elevation and direction of groundwater flow using the gauging data obtained on May 18, 2009 is presented in Figure 2. Historical groundwater elevations and depth to water measurements are summarized on Table 1, and depicted graphically in Figure 3.

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 18-19, 2009 sampling event is presented in Figure 4. The laboratory reports and COC documentation are included in Appendix B.

Based on the analytical results obtained from the May 18-19, 2009 sampling event, the distribution of dissolved-phase hydrocarbons at the South Four Lakes Tank Battery is described below.

- BTEX concentrations in monitoring wells MW-5, MW-7, MW-9, MW-10, MW-14, and MW-16 were below the WQCC standards for each constituent.
- The benzene levels in monitoring wells MW-1 (0.01 mg/L), MW-13 (1.0 mg/L), and MW-15 (0.019 mg/L) exceeded the WQCC standards of 0.010 mg/L. The toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards, with the exception of xylenes in MW-15 (1.60 mg/L).
- The dissolved-phase hydrocarbons in groundwater are localized along a linear trend between MW-1 and MW-15. 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. The laboratory reports and COC documentation are included in Appendix B.

- Chloride concentrations in wells MW-5 (364 mg/L), MW-7 (332 mg/L), MW-10 (320 mg/L), MW-13 (1,600 mg/L), MW-14 (304 mg/L), MW-15 (960 mg/L), and MW-16 (336 mg/L) were above the WQCC standard of 250 mg/L.
- TDS concentrations in wells MW-5 (1,100 mg/L), MW-7 (1,330 mg/L), MW-10 (1,100 mg/L), MW-13 (3,860 mg/L), MW-14 (1,250 mg/L), MW-15 (2,250 mg/L), and MW-16 (1,270 mg/L) were above the WQCC standard of 1,000 mg/L.
- Chloride and TDS concentrations in the remaining sampled monitoring wells 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 18-19, 2009, 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. 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 cross-gradient of 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 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-13 and MW-15 are perhaps the most obvious locations displaying the above relationships when compared to upgradient monitoring well MW-10 and other wells outside the dissolved hydrocarbon plume.

The above trends are also 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 extending from upgradient monitoring well MW-10 to downgradient monitoring well MW-16.

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 (18.9 mg/L) exceeds the highest benzene concentration (1.0 mg/L) currently observed on site by a factor of nineteen. The biodegradation capacity of electron acceptors and metabolic byproducts far exceeds the average benzene concentration (0.19 mg/L) observed on site by a ratio of 100 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. This is clear evidence 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 18, 2009 sampling event, measured LNAPL thickness varied from 0.01 feet in monitoring well MW-12 to 1.17 feet in monitoring well MW-6 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, 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 99,903 gallons of total fluids from RW-2s since July 24, 2008, at an average rate of 0.21 gal/min over the period of record.

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-7, and MW-13, were 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, and MW-13 such that they could be included in the groundwater sampling program. On June 17, 2009, the oil absorbent socks were removed from MW-1, MW-7, MW-9, and MW-13, since LNAPL has not been present in these wells for several months or more. LNAPL thickness and recovery rates in MW-6, MW-12, and RW-1s have also declined considerably and have stabilized.

A minimum of 44.7 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. Product recovery and LNAPL thickness measurements are listed in Table 5. Operation and maintenance of the windmill recovery system, passive bailers, and oil absorbent socks will continue 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:

- BTEX concentrations in monitoring wells MW-5, MW-7, MW-9, MW-10, MW-14, and MW-16 were below the WQCC standards for each constituent.
- The benzene levels in monitoring wells MW-1, MW-13, and MW-15 exceeded the WQCC standards of 0.010 mg/L. The toluene, ethylbenzene, and xylene concentrations in all sampled wells were below the WQCC standards with the exception of xylenes in MW-15.
- LNAPL is present in the groundwater and has the characteristics of a light crude oil or natural gas liquid (condensate). The LNAPL thicknesses have been reduced significantly over the last year due to operation of the windmill recovery system and passive recovery activities in affected wells. LNAPL is localized between RW-1, MW-6, and MW-12.
- 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 4,200 barrels (bbl) of hydrocarbon-impacted groundwater has been removed.
- Approximately 44.1 gal of LNAPL has been removed from MW-1, MW-6, MW-7, MW-9, MW12, MW-13, and RW-1s since May 2008 by use of passive bailers and oil absorbent socks.
- Chlorides and TDS concentrations in monitoring wells MW-5, MW-7, MW-10, MW-13, MW-14, MW-15, and MW-16 exceed WQCC standards.
- Although iron and manganese concentrations exceed WQCC standards in some monitoring wells, increased levels of these constituents indicate intrinsic bioremediation processes are active; therefore they are useful indicators for evaluating the efficacy of the natural attenuation taking place.
- 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 2010.

- 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.

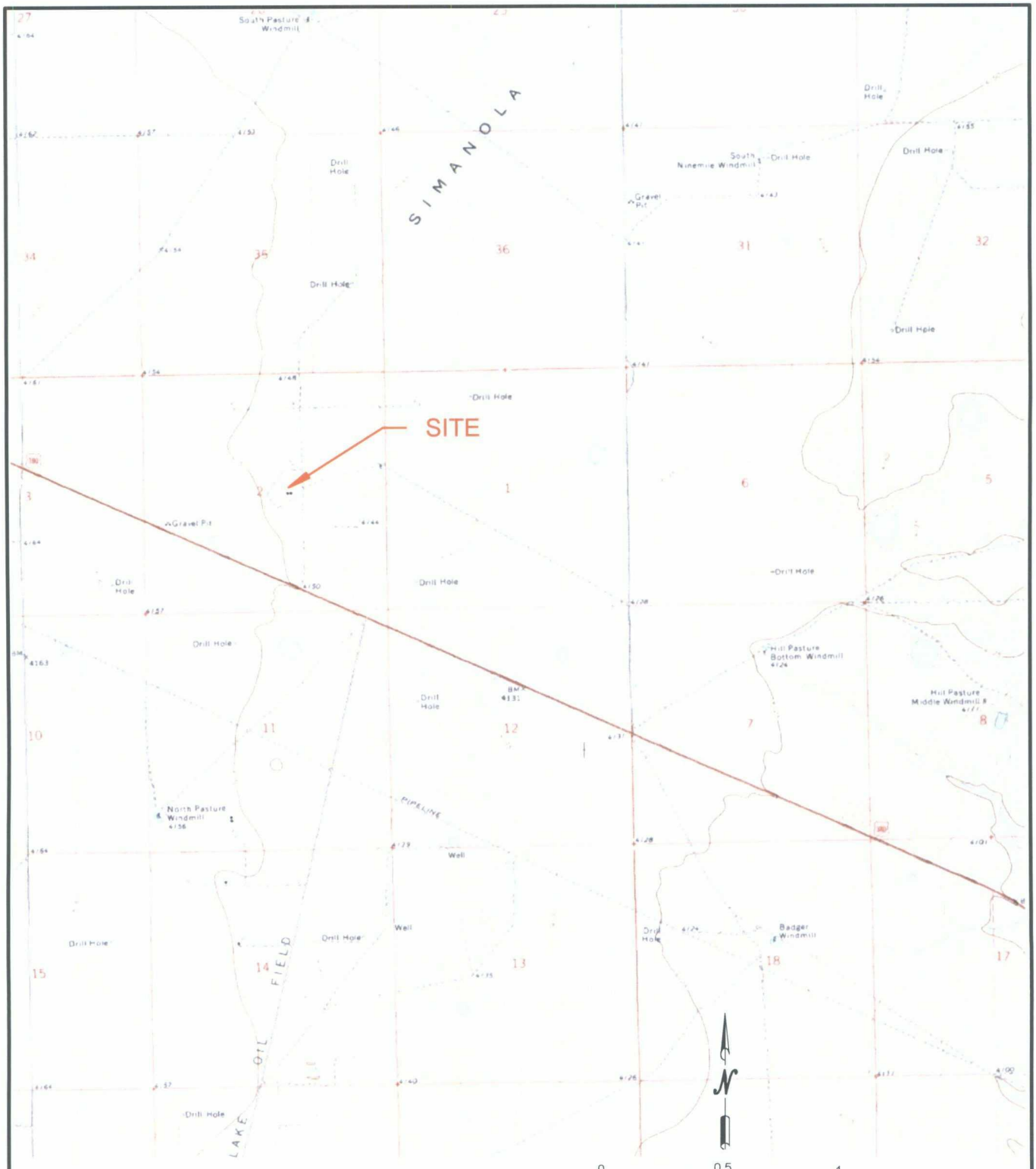
- Continue LNAPL recovery, if present, in RW-1s, MW-1, MW-6, MW-7, MW-9, MW-12, and MW-1, using passive bailers or absorbent socks with monthly inspections. Obtain groundwater samples from these wells if the LNAPL thickness is less than 0.01 feet.

- 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=pENV0000 1RP204) 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.

FIGURES



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

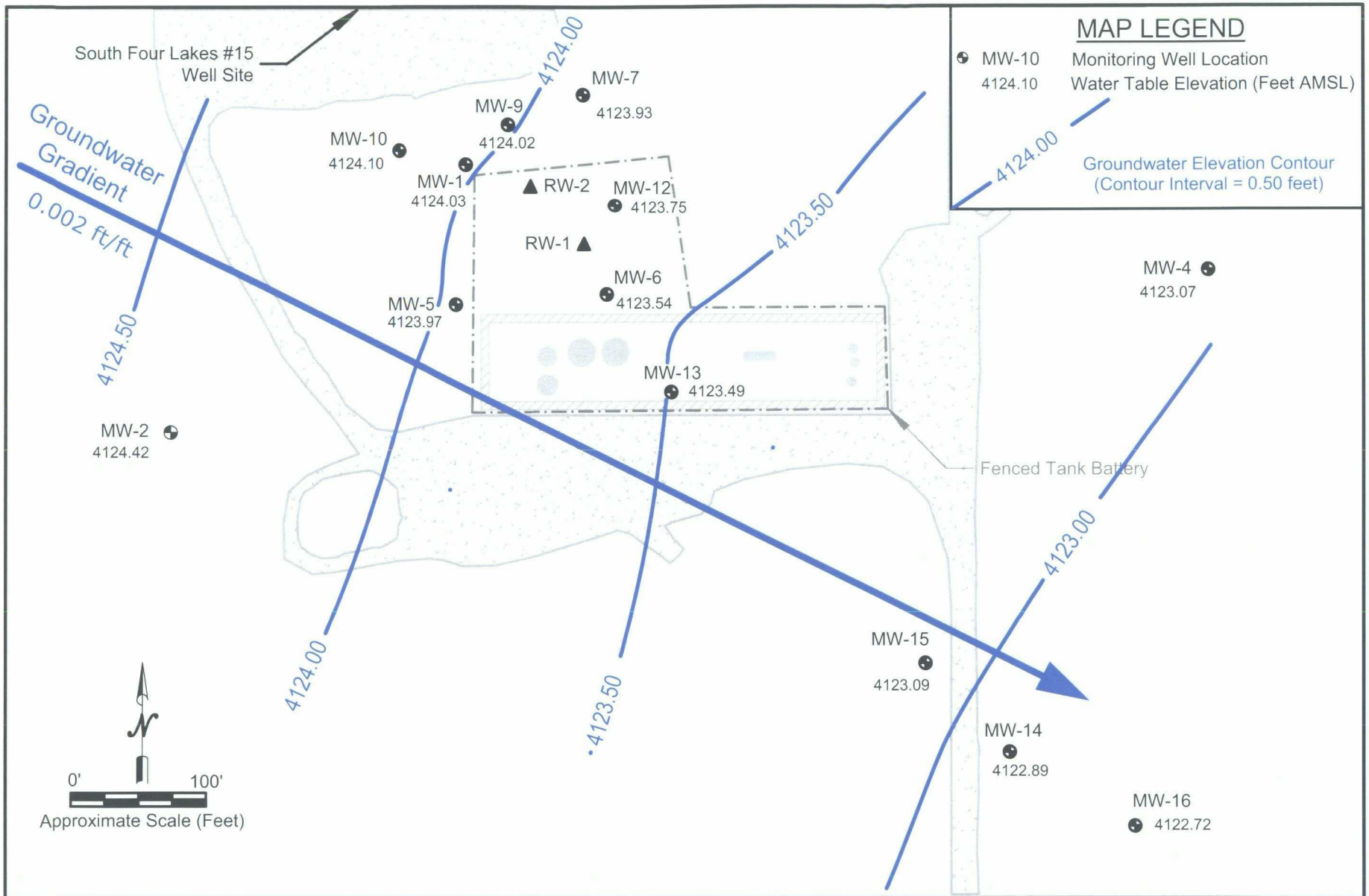
TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery

T12S - R34E - Section 2

Pride Energy Company

FIGURE 2
2005 AERIAL PHOTO AND
MONITORING WELL LOCATION
MAP



TRIDENT ENVIRONMENTAL

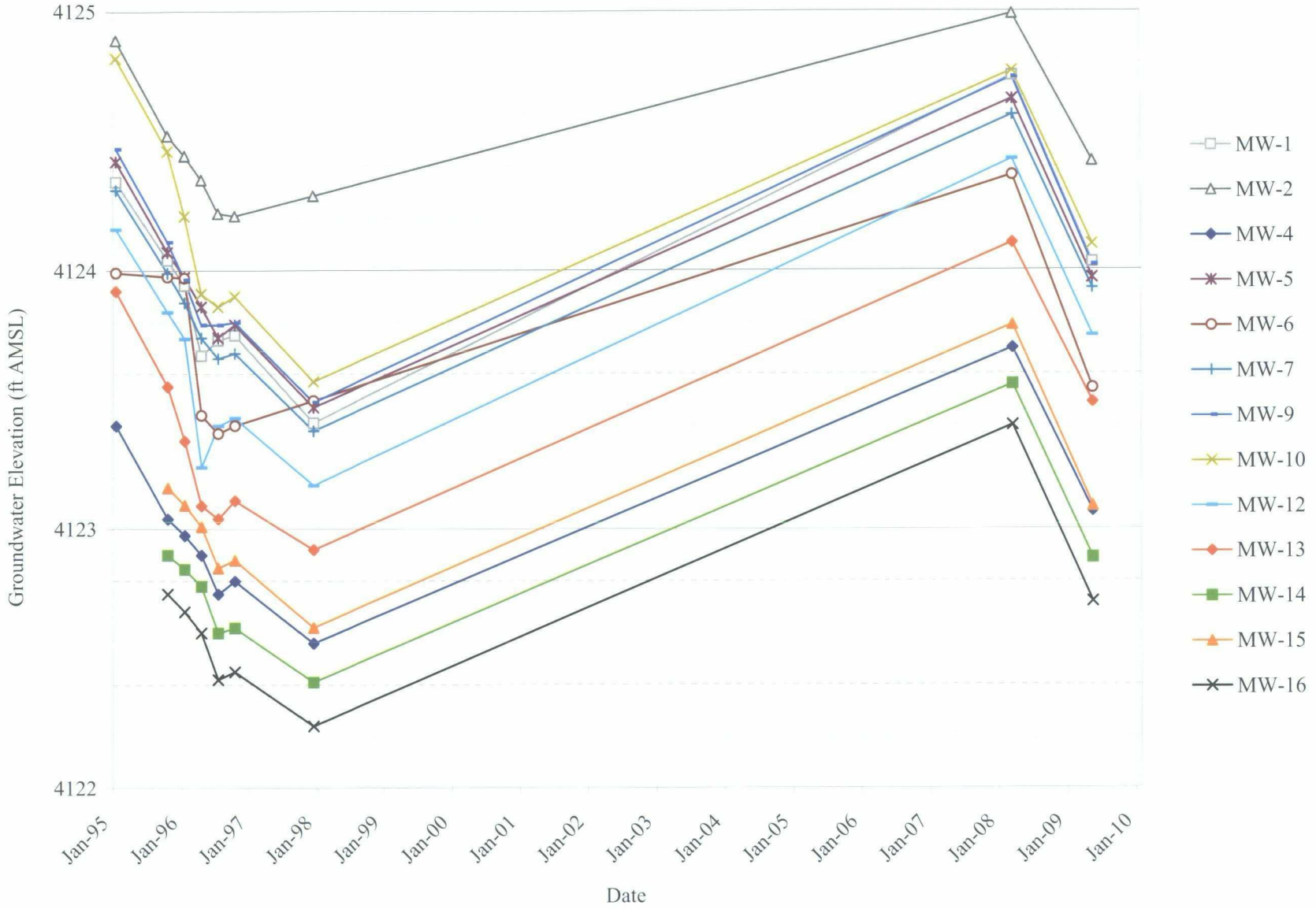
South Four Lakes Tank Battery (1R0204)

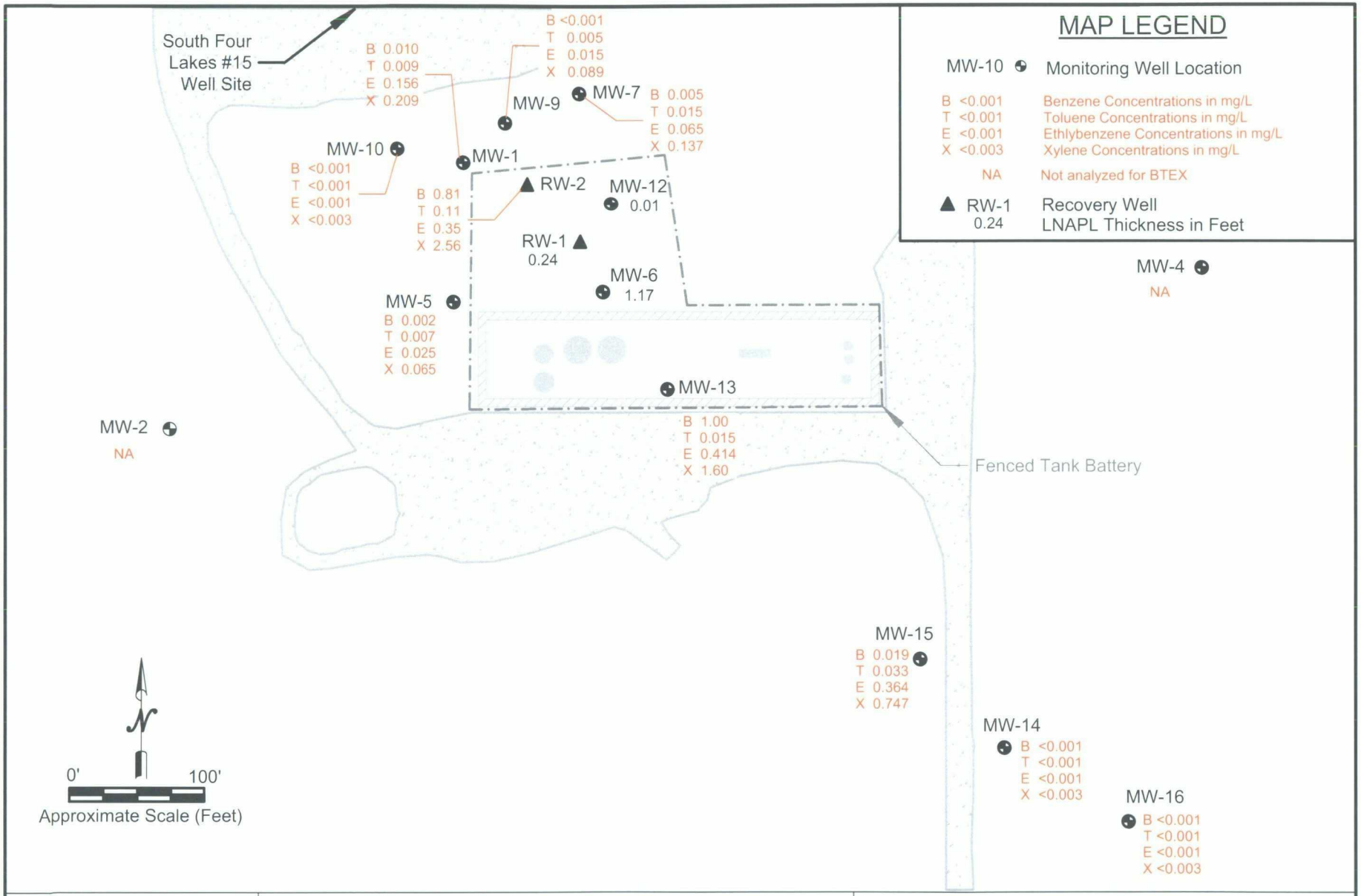
T12S - R34E - Section 2 (Lea County, NM)

Pride Energy Company

FIGURE 3
WATER TABLE ELEVATION MAP
May 18, 2009

FIGURE 4
Groundwater Elevation Versus Time





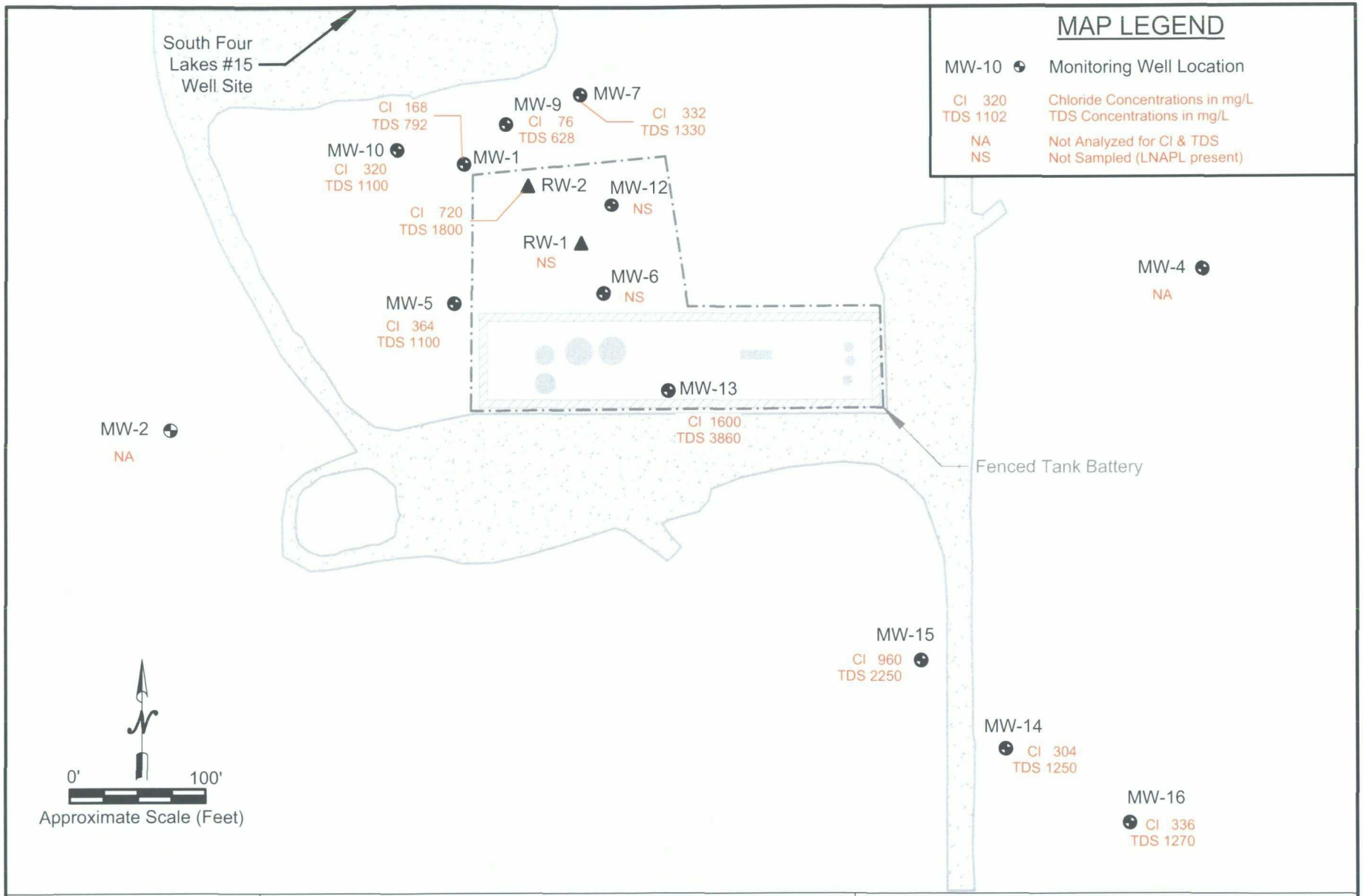
TRIDENT ENVIRONMENTAL

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 18-19, 2009



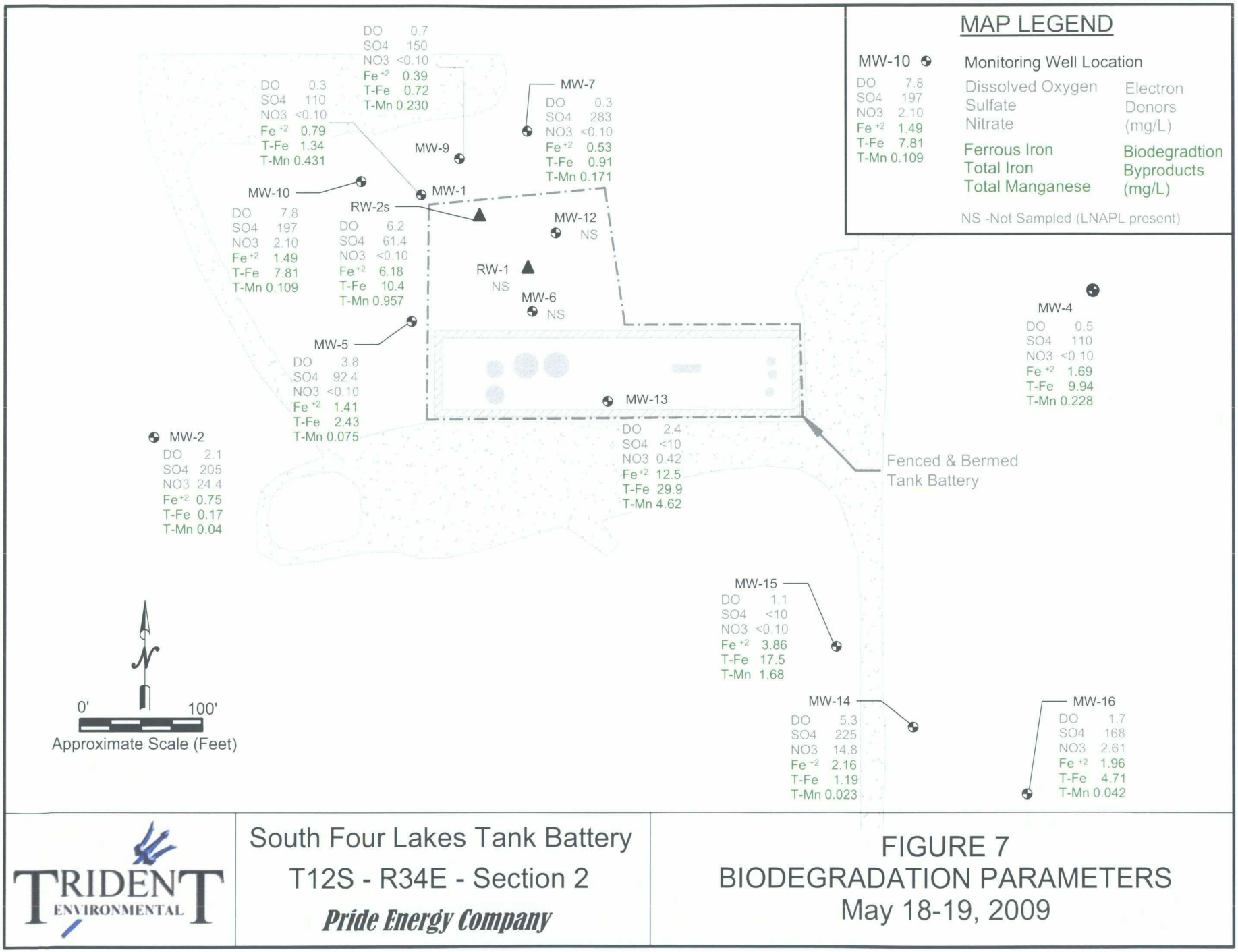
TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery (1R0204)

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

Pride Energy Company

FIGURE 6
CHLORIDE AND TDS
CONCENTRATION MAP
May 18-19, 2009



TRIDENT ENVIRONMENTAL

South Four Lakes Tank Battery

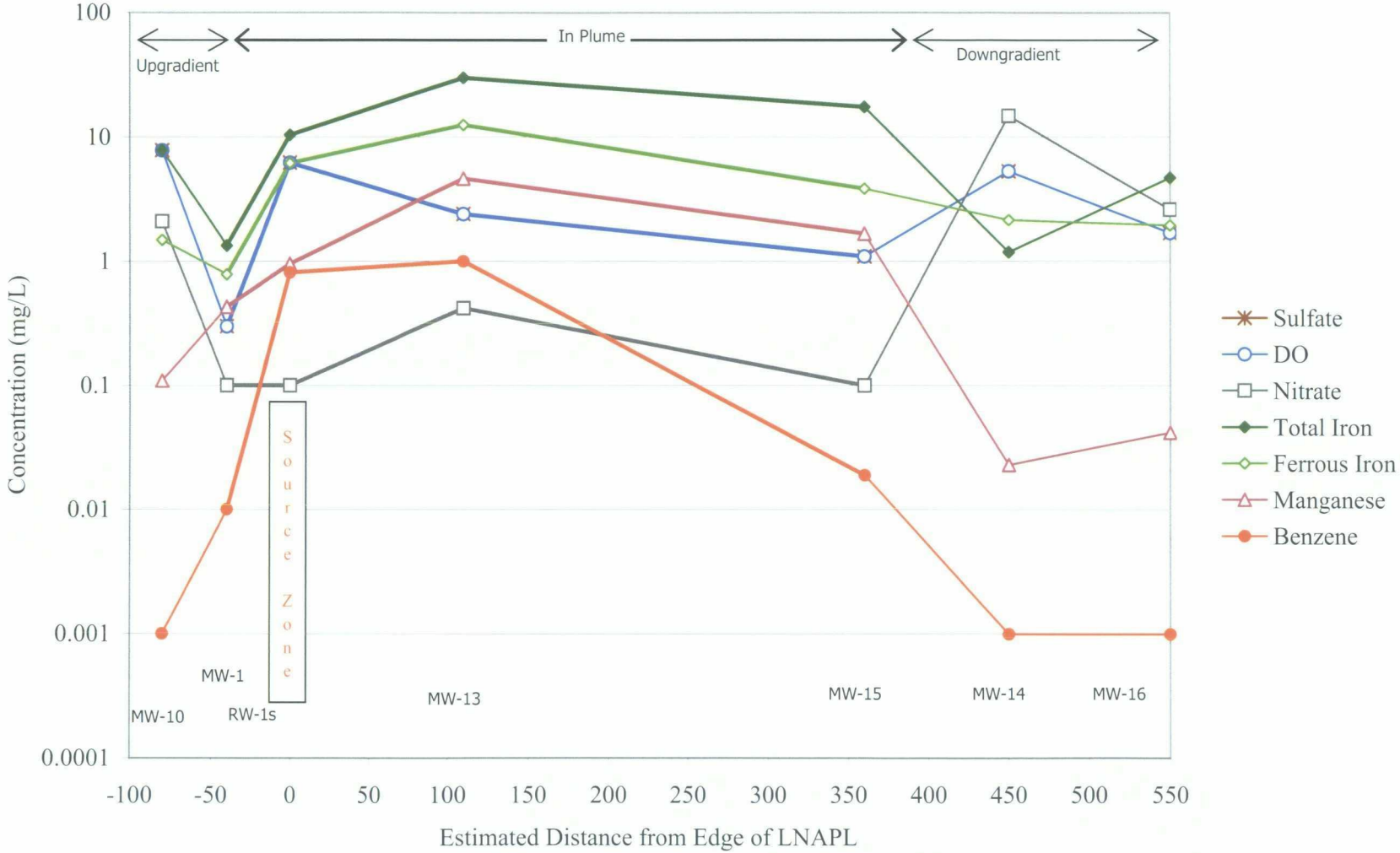
T12S - R34E - Section 2

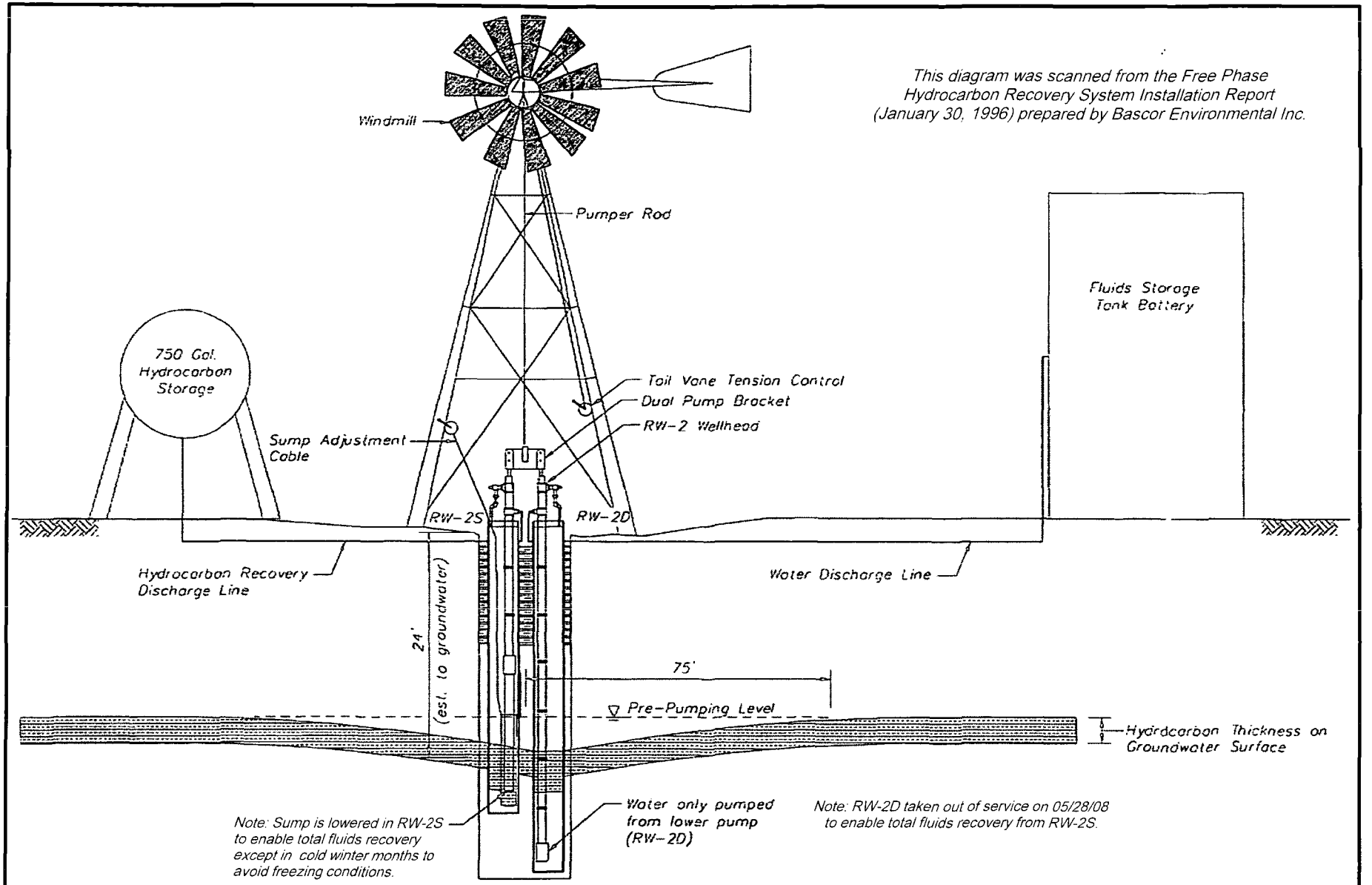
Pride Energy Company

FIGURE 7
BIODEGRADATION PARAMETERS
May 18-19, 2009

FIGURE 8

Benzene and Biological Parameters Concentrations Versus Distance from Source Area





TRIDENT ENVIRONMENTAL

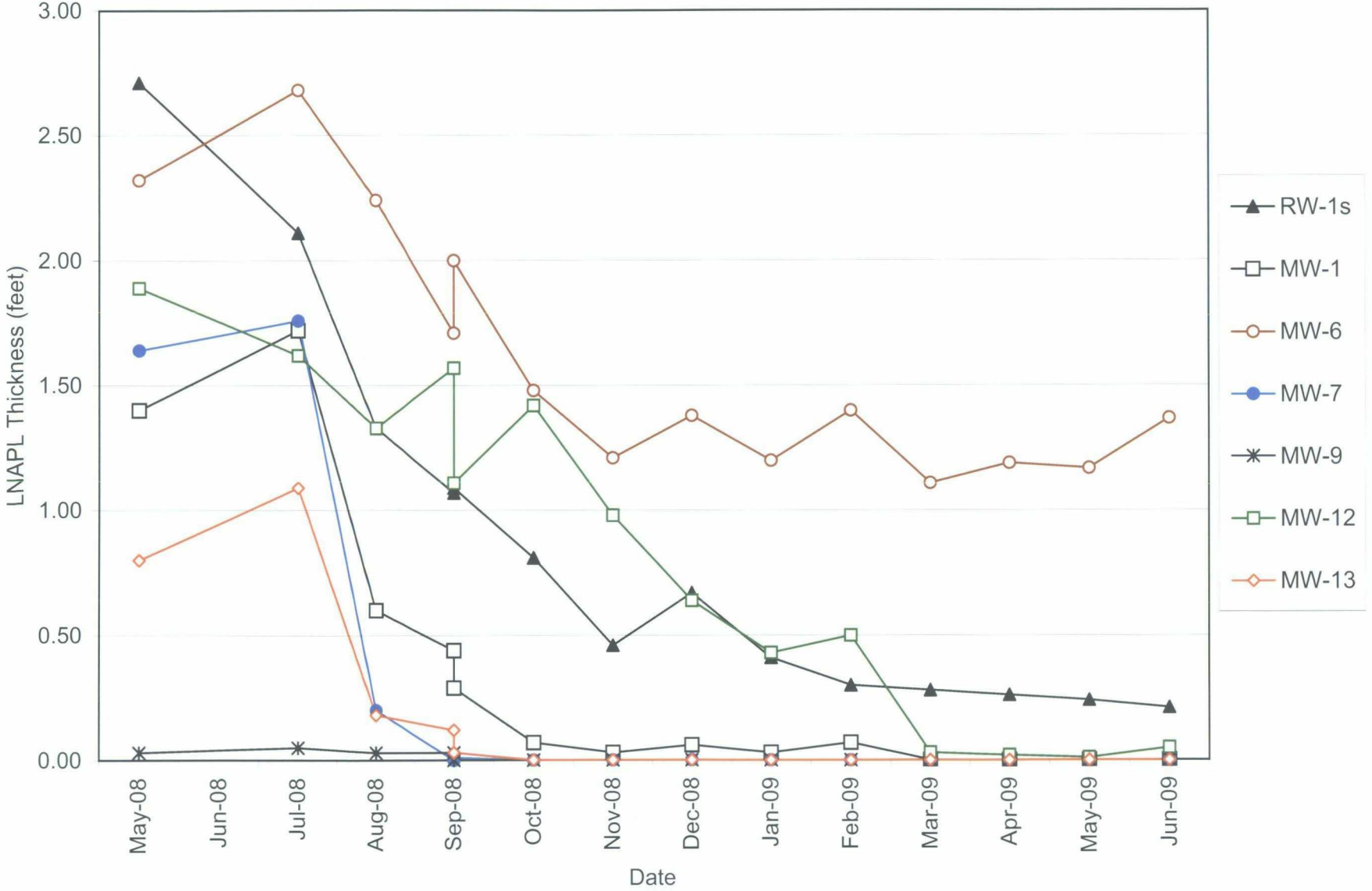
South Four Lakes Tank Battery (1R0204)

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

Pride Energy Company

FIGURE 9
WINDMILL RECOVERY SYSTEM DIAGRAM

Figure 10
LNAPL Thickness Vs Time Graph



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
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
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
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
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

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
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
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
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
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

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-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
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
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
RW-1s	01/04/96	NM	DNA	0.15	NM
	04/16/96	NM	DNA	3.58	NM
	07/09/96	NM	DNA	4.72	NM
	10/15/96	NM	DNA	4.67	NM
	12/03/97	NM	DNA	4.26	NM
	03/13/08	NM	DNA	2.71	NM
	05/18/09	NM	DNA	0.24	NM
RW-2s	01/04/96	NM	DNA	3.50	NM
	03/13/08	NM	DNA	1.77	NM
	05/18/09	NM	NM	0.00	DNA

NM = Not Measured; DNA - Data Not Available
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.
Elevation data for 10/15/96 gauging event estimated by interpolating values from graph in April 1997.

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	Chloride (mg/L)	TDS (mg/L)
MW-1	Oct-90	0.00	<0.010	0.039	0.100	0.390	NA	NA
	01/04/95	1.55	NS	NS	NS	NS	NS	NS
	01/17/95	1.96	NS	NS	NS	NS	NS	NS
	10/10/95	NM	NS	NS	NS	NS	NS	NS
	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
	03/13/08	1.40	NS	NS	NS	NS	NS	NS
	05/19/09	0.00	**0.01**	0.009	0.156	0.209	168	792
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**
	05/18/09	0.00	NS	NS	NS	NS	NS	NS
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
	05/18/09	0.00	NS	NS	NS	NS	NS	NS
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**
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**	**1400**	**3,700**
	04/16/96	4.43	**13.0**	**19.0**	**5.00**	**24.5**	**1200**	**2,600**
	07/09/96	4.52	NA	NA	NA	NA	**1100**	**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

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (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**
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
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**
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**	**1700**	**3,600**
	04/16/96	5.04	**11.0**	**11.00**	**1.10**	**6.50**	**2100**	**4,300**
	07/09/96	4.12	NA	NA	NA	NA	**1900**	**4,200**
	10/15/96	3.99	NA	NA	NA	NA	**2000**	**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

Table 2
Summary of Regulated Constituent Concentrations

Monitoring Well	Sample Date	LNAPL Thickness (feet)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (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**
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	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**
	03/13/08	0.75	NS	NS	NS	NS	NS	NS
	05/19/09	0.00	**1.00**	0.015	0.414	**1.60**	**1,600**	**3,860**
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**
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**	**1360**	**3,140**
	05/18/09	0.00	**0.019**	0.033	0.364	0.747	**960**	**2,250**
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**
RW-2s	05/18/09	0.00	0.81	0.11	0.35	2.56	**720**	**1,800**
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	0.4
	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	<0.10	0.79	1.34	0.431
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	<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	<0.10	1.41	**2.43**	0.075
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	<0.10	0.53	0.91	0.171
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	<0.10	0.39	0.72	0.230

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	0.109
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**
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	0.42	12.5	29.9	4.62
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	14.80	2.16	1.19	0.023
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 / In Plume	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	<0.10	3.86	**17.5**	**1.68**
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
RW-2s	05/18/09	In Plume	6.2	61.4	<0.10	6.18	10.4	0.957

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 2100 Spectrophotometer (Method 8146) used for field measurement of ferrous iron (Fe^{++}).

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	Concentrations of Electron Acceptors/ Byproducts (mg/L)	Biodegradation Capacity of Electron Acceptors/Byproducts (mg/L)
DO	Aerobic Respiration	Decreases	0.325	2.53	0.82
Mn^{2+}	Manganese Reduction	Increases	0.14	0.74	0.10
NO_3	Denitrification	Decreases	0.21*	4.24	0.89
Fe^{3+}/Fe^{+2}	Ferric Iron Reduction	Increases	0.046	7.59	0.35
SO_4	Sulfate Reduction	Decreases	0.22*	77.0	16.7
				Total Biodegradation Capacity	18.9
				Highest benzene concentration observed on site	13.0
				Average benzene concentration observed on site	0.19

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).

Concentrations of electron acceptors/byproducts are averages of current values, with the exception of sulfate which is based on difference between background (218 mg/L) and average value on site (141 mg/L).

Redox *	Respiration	e⁻ Acceptor	By-Products
+ 200 mv	Aerobic	O_2	CO_2
	Denitrification	NO_3^{2-}	NO_2^-, N_2, NH_3
	Manganese Reduction	Mn^{4+}	Mn^{2+}
	Iron Reduction	Fe^{3+}	Fe^{2+}
	Sulfanogenesis	SO_4^{2-}	H_2S
- 400 mv	Methanogenesis	CO_2	CH_4

* The redox values are for guideline purposes only. These values can vary by 2 to 3 times based on other factors.

Table 5

LNAPL Thickness and Recovery Volumes

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

NM indicates not measured (not accessable due to pump components downhole in well)

Date	LNAPL Recovered (gallons)							
	RW-1s	RW-2s	MW-1	MW-6	MW-7	MW-9	MW-12	MW-13
05/07/08	1.3	5	0	0	0	0	0.03	0
07/23/08	1.0	0	0	0	0	0	0	0.10
07/24/08	3.0	5	1	1	1	0.10	1	0.50
08/12/08	0.8	*13780**	0.50	0.50	0.50	0	0.30	0.03
08/13/08	0.1	*14212**	0.01	0.01	0.02	0.01	0	0.03
09/09/08	0.9	*29543**	0.40	0.30	0.15	0.00	0.50	0.05
09/17/08	0.1	*32192**	0.14	0.38	0.01	0.02	0.34	0.05
10/08/08	1.0	*43045**	0.15	0.90	0.05	0.00	0.64	0.05
11/20/08	1.0	*79497**	0.27	0.85	0.01	0.01	1.04	0.02
12/23/08	0.8	1.69	0.08	1.10	0.00	0.00	0.42	0.00
01/15/09	0.3	2.00	0.02	0.47	0.00	0.00	0.40	0.00
02/27/09	0.5	0.50	0.10	0.46	0.00	0.00	0.41	0.00
03/26/09	0.2	*90888**	0.06	0.44	0.00	0.00	0.39	0.00
04/28/09	0.2	*91716**	0.06	0.39	0.00	0.00	0.25	0.00
05/18/09	0.2	*96403**	0.00	0.38	0.00	0.00	0.05	0.00
06/17/09	0.2	*103262**	0.00	0.36	0.00	0.00	0.05	0.00
Well Totals	11.6	14.2	2.79	7.54	1.74	0.14	5.83	0.83
Total Gallons of LNAPL Recovered in all Wells Since May 6, 2008:								44.7
Total Gallons of Fluids Recovered in RW-2s Since July 24, 2008:								*99903*

* 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.

LNAPL recovery methods currently in use:
Windmill Recovery System (RW-2s)
Passive bailer (RW-1s, MW-6, and MW-12)
Hydrophobic (oil adsorbent) socks (MW-1, MW-7, MW-9, and MW-13)

Table 6

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

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.

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

Gil Van Deventer

From: "Gil Van Deventer" <gilbertvandeventer@suddenlink.net>
"Glenn Von Gonten" <glenn.vongonten@state.nm.us>
Cc: "Geoffrey Leking" <GeoffreyR.Leking@state.nm.us>; "Johnson, Larry, EMNRD" <larry.johnson@state.nm.us>; "Buddy Hill" <larry.hill@state.nm.us>; "Matt Pride" <mattp@pride-energy.com>
Sent: Wednesday, July 01, 2009 3:24 PM
Attach: S4LTB_2009_AGWMR.pdf
Subject: South Four Lakes Tank Battery Site (1RP-204) - 2009 Annual Groundwater Monitoring Report

Hello Glenn:

As agent for Pride Energy Company, Trident Environmental is submitting the attached *2009 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. The report documents the annual sampling event performed by Trident on May 18-19, 2009, and site remediation activities conducted between May 6, 2008 and June 17, 2009. The monitoring program is being conducted in accordance with the monitoring plan specified by Mr. William C. Olson of the NMOCD in his letter dated July 14, 1997.

A complete hard copy and one on compact disk is also being sent via USPS Certified Mail (7099 3400 0017 1737 1919). A copy will also be sent to the NMOCD District 1 Office in Hobbs, NM.

If you have any questions, please feel free to contact me, or Matt Pride with Pride Energy Co. at 918-524-9200.

Thanks - Gil

(Gilbert J. Van Deventer, PG, REM
Trident Environmental
P. O. Box 7624, Midland TX 79708
Work/Mobile 432-638-8740
Fax: 413-403-9968
Home 432-682-0727

APPENDIX B

Laboratory Analytical Reports

And

Chain of Custody Documentation

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79708-7624
FAX TO: (413) 403-9668

Receiving Date: 05/19/09
Reporting Date: 05/22/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES TANK BATTERY (1R0204)
Project Location: T21S-R34E, SECTION 2, UNIT LETTER G

Sampling Date: 05/18/09
Sample Type: WATER
Sample Condition: COOL & INTACT @ 0°C
Sample Received By: ML
Analyzed By: ZL

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		05/22/09	05/22/09	05/22/09	05/22/09
H17451-3	MW-5	0.002	0.007	0.025	0.065
H17451-4	MW-10	<0.001	<0.001	<0.001	<0.003
H17451-5	MW-14	<0.001	<0.001	<0.001	<0.003
H17451-6	MW-15	0.019	0.033	0.364	0.747
H17451-7	MW-16	<0.001	<0.001	<0.001	<0.003
H17451-8	MW-2S	0.814	0.107	0.345	2.56
Quality Control		0.060	0.051	0.045	0.133
True Value QC		0.050	0.050	0.050	0.150
% Recovery		120	102	90.0	88.7
Relative Percent Difference		<1.0	9.5	2.2	3.0

METHOD: EPA SW-846 8021 B

TEXAS NELAP ACCREDITATION T104704398-08-TX FOR BENZENE, TOLUENE, ETHYL BENZENE, AND TOTAL XYLENES.

Chemist

Date

H17451 WB TRIDENT

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79707-7624
FAX TO: (413) 403-9966

Receiving Date: 05/19/09
Reporting Date: 05/27/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES
TANK BATTERY (1R0204)
Project Location: T12S-R34E, SECTION 2,
UNIT LETTER G

Sampling Date: 05/18/09
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
@ 0°C
Sample Received By: ML
Analyzed By: HM

LAB NUMBER	SAMPLE ID	Fe (mg/L)	Mn (mg/L)
ANALYSIS DATE:		05/27/09	05/27/09
H17451-1	MW-2	0.17	0.040
H17451-2	MW-4	9.94	0.228
H17451-3	MW-5	2.43	0.075
H17451-4	MW-10	7.81	0.109
H17451-5	MW-14	1.19	0.023
H17451-6	MW-15	17.5	1.680
H17451-7	MW-16	4.71	0.042
H17451-8	RW-2S	10.4	0.957
Quality Control		5.10	2.650
True Value QC		5.00	2.500
% Recovery		102	106
Relative Percent Difference		0.9	0.2
METHODS: EPA 600/4-79-020		200.7	200.7

Chemist

Date

CARDINAL LABORATORIES

PHONE: (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79707-7624
FAX TO: (413) 403-9968

Receiving Date: 05/19/09
Reporting Date: 05/28/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES TANK BATTERY (1RC204)
Project Location: T12S-R34E, SECTION 2, UNIT LETTER G

Sampling Date: 05/18/09
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT @ 0°C
Sample Received By: ML
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	TDS (mg/L)	NO_3 (mg/L)
Analysis Date:		05/19/09	05/21/09	05/19/09	05/20/09
H17451-1	MW-2	-	205	-	24.4
H17451-2	MW-4	-	110	-	< 0.10
H17451-3	MW-5	364	92.4	1,100	< 0.10
H17451-4	MW-10	320	197	1,100	2.10
H17451-5	MW-14	304	225	1,250	14.8
H17451-6	MW15	960	< 10.0	2,250	< 0.10
H17451-7	MW16	336	168	1,270	2.61
H17451-8	RW-2S	720	61.4	1,800	< 0.10
Quality Control		490	42.3	NR	4.65
True Value QC		500	40.0	NR	5.00
% Recovery		98.0	106	NR	93.0
Relative Percent Difference		2.0	0.5	2.5	7.3
METHOD: Standard Methods, EPA		4500-Cl B	375.4	160.1	353.3

Chemist

Date

H17451 Trident Environmental

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES
101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Trident Environmental	**BILL TO**	
Project Manager:	Gil Van Deventer	P.O. #:	
Address:	P. O. Box 7624	Company:	Pride Energy Co.
City:	Midland State: TX Zip: 79707-7624	Attn:	Matt Pride
Phone #:	(432) 638-8740 Fax #: (413) 403-9968	Address:	P. O. Box 701950
Project #:	V-126 Project Owner: Gil Van Deventer	City:	Tulsa
Project Name:	South Four Lakes Tank Battery (1R0204)	State: OK Zip:	74170-1950
Project Location:	T12S-R34E, Section 2, Unit Letter G	Phone #:	918-524-9200
Sampler Name:	Gil Van Deventer	Fax #:	918-524-9292

FOR LAB USE ONLY				MATRIX						PRESERV			SAMPLING		ANALYSIS REQUEST															
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ICE / COOL	HCl (BTEX only)	H_2SO_4 (Nitrate only)	DATE	TIME	BTEX (8021B)	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							TAT: RUSH (Pre-Schedule)	Standard TAT
H17451-1	MW-2	G	1	✓						✓			5-18-09	1126			✓	✓		✓								✓
-2	MW-4	G	1	✓						✓			5-18-09	1212			✓	✓		✓								✓
-3	MW-5	G	5	✓						✓	✓		5-18-09	1610	✓	✓	✓	✓	✓	✓								✓
-4	MW-10	G	4	✓						✓	✓		5-18-09	1520	✓	✓	✓	✓	✓	✓								✓
-5	MW-14	G	4	✓						✓	✓		5-18-09	1340	✓	✓	✓	✓	✓	✓								✓
-6	MW-15	G	4	✓						✓	✓		5-18-09	1420	✓	✓	✓	✓	✓	✓								✓
-7	MW-16	G	4	✓						✓	✓		5-18-09	1250	✓	✓	✓	✓	✓	✓								✓
-8	RW-2	G	5	✓						✓	✓		5-18-09	1750	✓	✓	✓	✓	✓	✓								✓

Relinquished By:	Date: 5-19-09	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time: 8:45		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date:	Received By:	Email results to: gil@trident-environmental.com and mattp@pride-energy.com
	Time:		REMARKS:

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition		CHECKED BY: (Initials)
Cool	Intact	
☑ Yes ☐ No	☑ Yes ☐ No	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

0°C #26

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79707-7624
FAX TO: (413) 403-9968

Receiving Date: 05/19/09
Reporting Date: 05/27/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES
TANK BATTERY (1R0204)
Project Location: T12S-R34E-SECTION 2,
UNIT LETTER G

Sampling Date: 05/19/09
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT @ 3.5°C
Sample Received By: ML
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	TDS (mg/L)	NO_3 (mg/L)
Analysis Date		05/20/09	05/20/09	05/20/09	05/20/09
H17454-1	MW-1	168	110	792	< 0.10
H17454-2	MW-7	332	283	1,330	< 0.10
H17454-3	MW-9	76	150	628	< 0.10
H17454-4	MW-13	1,600	< 10.0	3,860	0.42
Quality Control		490	42.1	NR	4.65
True Value QC		500	40.0	NR	5.00
% Recovery		98.0	105	NR	93.0
Relative Percent Difference		2.0	0.2	2.5	7.3
METHOD: Standard Methods, EPA		4500-Cl B	375.4	160.1	353.3

Chemist

Date

H17454 Trident Environmental

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79708-7624
FAX TO: (413) 403-9968

Receiving Date: 05/19/09
Reporting Date: 05/22/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES TANK BATTERY (1R0204)
Project Location: T21S-R34E, SECTION 2, UNIT LETTER G

Sampling Date: 05/19/09
Sample Type: WATER
Sample Condition: COOL & INTACT @ 3.5°C
Sample Received By: ML
Analyzed By: ZL

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		05/21/09	05/21/09	05/21/09	05/21/09
H17454-1	MW-1	0.010	0.009	0.156	0.209
H17454-2	MW-7	0.005	0.015	0.065	0.137
H17454-3	MW-9	<0.001	0.005	0.015	0.089
H17454-4	MW-13	1.00	0.015	0.414	1.60
Quality Control		0.060	0.051	0.045	0.133
True Value QC		0.050	0.050	0.050	0.150
% Recovery		120	102	90.0	88.7
Relative Percent Difference		2.2	1.9	2.2	1.5

METHOD: EPA SW-846 8021 B

TEXAS NELAP ACCREDITATION T104704398-08-TX FOR BENZENE, TOLUENE, ETHYL BENZENE, AND TOTAL XYLENES.

Chemist

Date

H17454WB TRIDENT

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TRIDENT ENVIRONMENTAL
ATTN: GIL VAN DEVENTER
P.O. BOX 7624
MIDLAND, TX 79707-7624
FAX TO: (413) 403-9966

Receiving Date: 05/19/09
Reporting Date: 05/27/09
Project Number: V-126
Project Name: SOUTH FOUR LAKES
TANK BATTERY (1R0204)
Project Location: T12S-R34E-SECTION 2,
UNIT LETTER G

Sampling Date: 05/19/09
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT @ 3.5°C
Sample Received By: ML
Analyzed By: HM

LAB NUMBER	SAMPLE ID	Fe (mg/L)	Mn (mg/L)
ANALYSIS DATE:		05/27/09	05/27/09
H17454-1	MW-1	1.34	0.431
H17454-2	MW-7	0.91	0.171
H17454-3	MW-9	0.72	0.230
H17454-4	MW-13	29.89	4.619
Quality Control		5.10	2.650
True Value QC		5.00	2.500
% Recovery		102	106
Relative Percent Difference		0.9	0.2
METHODS: EPA 600/4-79-020		200.7	200.7

Chemist

Date

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name:	Trident Environmental	**BILL TO**	
Project Manager:	Gil Van Deventer	P.O. #:	
Address:	P. O. Box 7624	Company:	Pride Energy Co.
City:	Midland State: TX Zip: 79707-7624	Attn:	Matt Pride
Phone #:	(432) 638-8740 Fax #: (413) 403-9968	Address:	P. O. Box 701950
Project #:	V-126 Project Owner: Gil Van Deventer	City:	Tulsa
Project Name:	South Four Lakes Tank Battery (1R0204)	State: OK Zip:	74170-1950
Project Location:	T12S-R34E, Section 2, Unit Letter G	Phone #:	918-524-9200
Sampler Name:	Gil Van Deventer	Fax #:	918-524-9292

FOR LAB USE ONLY				MATRIX						PRESERV			SAMPLING		ANALYSIS REQUEST													
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ICE / COOL	HCl (BTEX only)	H_2SO_4 (Nitrate only)	DATE	TIME	BTEX (8021B)	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	Cations / Anions					TAT: RUSH (Pre-Schedule)	Standard TAT
H17454-1	MW-1	G	4	✓						✓	✓		5-19-09	1335	✓	✓	✓	✓	✓	✓	✓						✓
-2	MW-7	G	4	✓						✓	✓		5-19-09	1050	✓	✓	✓	✓	✓	✓							✓
-3	MW-9	G	4	✓						✓	✓		5-19-09	1130	✓	✓	✓	✓	✓	✓							✓
-4	MW-13	G	4	✓						✓	✓		5-19-09	1220	✓	✓	✓	✓	✓	✓	✓						✓

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 5-19-09	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Time: 4:00 PM	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #:
	Date:		Email results to: gil@trident-environmental.com and mattp@pride-energy.com
	Time:		REMARKS: Request for detection limits! NO_3 0.1 mg/L

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials) MCAB

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

3.5°C

APPENDIX C

Well Sampling Data Forms

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 1
SITE NAME: S. Four Lakes Tank Battery
DATE: May 19, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ er: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 31.0 Feet
DEPTH TO WATER: 25.10 Feet
HEIGHT OF WATER COLUMN: 5.90 Feet
WELL DIAMETER: 2.0 Inch

2.9 Minimum gallons to purge 3 well volumes
3 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
13:24	0						Start hand bailing
13:27	1	21.7	1.34	7.04	0.2		Light gray with some black flecks
13:30	2	20.7	1.34	7.01	0.4		Light gray with some black flecks
13:35	3.0	20.9	1.33	7.04	0.3		Light gray with some black flecks
13:35							Samples Collected
							Fe^{+2} = 0.15 mg/L (pillow reagent)
							Recalculate and estimate due to suspected bad pillow
							Fe^{+2} = Lab Total Fe (1.34) / 1.7 = 0.79 mg/L
0:11	:Total Time (hr:min)		3	:Total Vol (gal)		0.27	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 2
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ er: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 35.7 Feet
DEPTH TO WATER: 27.08 Feet
HEIGHT OF WATER COLUMN: 8.62 Feet
WELL DIAMETER: 2.0 Inch

4.2 Minimum gallons to purge 3 well volumes
6 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
11:05	0	20.0	1.18	6.64	1.5		Clear
11:10	2	18.3	1.32	6.78	1.6		Clear
11:19	4	16.3	1.32	6.94	1.9		Clear
11:26	6	17.8	1.29	7.03	2.1		Samples Collected
							Fe^{+2} = 0.75 mg/L
0:21 :Total Time (hr:min)			6 :Total Vol (gal)			0.29	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 4
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type:

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other:

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other:

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 31.2 Feet
DEPTH TO WATER: 25.51 Feet
HEIGHT OF WATER COLUMN: 5.69 Feet
WELL DIAMETER: 2.0 Inch

2.8 Minimum gallons to purge 3 well volumes
4 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
11:51	0						
11:58	1.3	19.9	1.25	7.11	0.3		Grayish
12:05	2.7	19.0	1.26	7.06	0.3		Light Gray
12:12	4.0	19.0	1.26	7.08	0.5		Clearing but still light gray
12:12							Samples Collected
							Fe^{+2} = 1.69 mg/L
0:21	:Total Time (hr:min)		4	:Total Vol (gal)		0.19	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 5
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ er: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 30.9 Feet
DEPTH TO WATER: 26.43 Feet
HEIGHT OF WATER COLUMN: 4.47 Feet
WELL DIAMETER: 2.0 Inch

2.2 Minimum gallons to purge 3 well volumes
3 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
15:55	0						
16:00	1	22.4	1.28	7.15	2.3		Dark gray
16:04	2	21.6	1.44	7.20	3.5		Dark gray
16:10	3	21.6	1.46	7.25	3.80		Dark gray
16:10							Samples Collected
							Fe^{+2} = 1.41 mg/L
0:15	:Total Time (hr:min)		3	:Total Vol (gal)		0.20	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 7
SITE NAME: S. Four Lakes Tank Battery
DATE: May 19, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 34.0 Feet
DEPTH TO WATER: 25.23 Feet
HEIGHT OF WATER COLUMN: 8.77 Feet
WELL DIAMETER: 2.0 Inch

4.3 Minimum gallons to purge 3 well volumes
6 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
10:33	0						
10:39	2	18.6	1.91	6.86	0.4		Grayish
10:44	4	19.3	1.92	7.05	0.2		Grayish
10:50	6	18.4	1.91	7.00	0.3		Samples Collected
							Fe^{+2} = 0.53 mg/L
0:17	:Total Time (hr:min)	6	:Total Vol (gal)	0.35	:Average Flow Rate (gal/min)		

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 9
SITE NAME: S. Four Lakes Tank Battery
DATE: May 19, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 30.0 Feet
DEPTH TO WATER: 25.61 Feet
HEIGHT OF WATER COLUMN: 4.39 Feet
WELL DIAMETER: 2.0 Inch

2.1 Minimum gallons to purge 3 well volumes
3 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
11:20	0						
11:23	1	19.8	0.87	7.40	0.6		Light Gray
11:26	2	19.7	0.86	7.41	0.8		Light Gray
11:30	3	18.9	0.88	7.40	0.7		Clearer
11:30							Samples Collected
							Fe^{+2} = 0.39 mg/L
0:10 :Total Time (hr:min)			3 :Total Vol (gal)			0.30	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW - 10
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ er: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 32.2 Feet
DEPTH TO WATER: 25.88 Feet
HEIGHT OF WATER COLUMN: 6.32 Feet
WELL DIAMETER: 2.0 Inch

3.1 Minimum gallons to purge 3 well volumes
5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
15:05	0						
15:10	1.7	18.8	1.58	7.09	7.7		Light tan
15:15	3.4	18.5	1.59	7.11	7.8		Light tan
15:20	5.0	18.2	1.62	7.17	7.80		Samples Collected
							Fe^{+2} = 1.49 mg/L
0:15 :Total Time (hr:min)			5 :Total Vol (gal)			0.33	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW- 13
SITE NAME: S. Four Lakes Tank Battery
DATE: May 19, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 34.0 Feet
DEPTH TO WATER: 26.82 Feet
HEIGHT OF WATER COLUMN: 7.18 Feet
WELL DIAMETER: 2.0 Inch

3.5 Minimum gallons to purge 3 well volumes
4.5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
12:03	0						
12:09	1.5						Med. Gray
12:15	3.0						Light gray
12:20	4.5	21.3	5.39	6.83	2.40		Clearer
12:20							Samples Collected
							Fe^{+2} = 12.5 mg/L (8 x 1.56)
0:17 :Total Time (hr:min)			4.5 :Total Vol (gal)			0.26	:Average Flow Rate (gal/min)

COMMENTS: *Hanna* Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW - 14
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 37.3 Feet
DEPTH TO WATER: 28.94 Feet
HEIGHT OF WATER COLUMN: 8.36 Feet
WELL DIAMETER: 2.0 Inch

4.1 Minimum gallons to purge 3 well volumes
3 Actual Gallons purged (bailed dry)

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
13:25	0						
13:30	1	18.9	1.88	6.92	2.4		Cloudy white
13:35	2	18.4	1.87	7.07	4.3		Well bailing dry
13:40	3	18.4	1.90	7.11	5.3		Bailed dry
13:40							Samples Collected
							Fe^{+2} = 2.16 mg/L
0:15	:Total Time (hr:min)		3	:Total Vol (gal)		0.20	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW - 15
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 36.8 Feet
DEPTH TO WATER: 27.54 Feet
HEIGHT OF WATER COLUMN: 9.26 Feet
WELL DIAMETER: 2.0 Inch

4.5 Minimum gallons to purge 3 well volumes
5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
14:06	0						*Start hand bailing*
14:11	1.7	18.9	3.95	7.06	0.9		Cloudy, light gray
14:14	3.3	18.3	3.90	7.07	0.8		Cloudy, light gray
14:20	5.0	18.1	3.90	7.12	1.1.		Cloudy, light gray
14:20							*Samples Collected*
							Fe^{+2} = 3.86 mg/L (1.93 x 2)
0:14	:Total Time (hr:min)		5	:Total Vol (gal)		0.36	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: MW - 16
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☑ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ er: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 36.4 Feet
DEPTH TO WATER: 28.62 Feet
HEIGHT OF WATER COLUMN: 7.78 Feet
WELL DIAMETER: 2.0 Inch

3.8 Minimum gallons to purge 3 well volumes
5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
12:39	0						Start hand bailing
12:43	1.7	19.0	1.68	6.98	1.0		Clear to very light brown
12:47	3.3	18.5	1.69	7.00	1.4		Clear to very light brown
12:50	5.0	18.3	1.69	7.06	1.7		Clear to very light brown
12:50							Samples Collected
							Fe^{+2} = 1.96 mg/L
0:11	:Total Time (hr:min)		5	:Total Vol (gal)		0.45	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.

TRIDENT ENVIRONMENTAL

WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
WELL ID: RW-2s
SITE NAME: S. Four Lakes Tank Battery
DATE: May 18, 2009
SITE LOCATION: T12S-R34E-Sec 2 Unit G
SAMPLER: Gil Van Deventer

PURGING METHOD: ☐ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☑ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☑ Gloves ☑ Alconox ☑ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☑ Drums ☑ SWD Disposal Facility

TOTAL DEPTH OF WELL: 39.5 Feet
DEPTH TO WATER: NM Feet
HEIGHT OF WATER COLUMN: NM Feet
WELL DIAMETER: 4.0 Inch

~30 Minimum gallons to purge 3 well volumes
140 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L		PHYSICAL APPEARANCE AND REMARKS
17:50	140	21.9	2.94	7.12	6.2		Collected from running windmill pump
							Fe^{+2} = 6.18 mg/L (3.09 x 2)
11:00	96263						Totalizer reading
18:00	96403						Totalizer reading
11:00	:Total Time (hr:min)		96263	:Total Vol (gal)		0.00	:Average Flow Rate (gal/min)

COMMENTS: Hanna Model HI98130 used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Cardinal Laboratories (Hobbs NM) for BTEX, chloride, sulfate, TDS, Nitrate, Total Fe, and Total Mn analyses.