

1R-204

**Annual Groundwater
Monitor Report**

**DATE:
2008**

1R 204



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July 30, 2008

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

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RE: **2008 ANNUAL GROUNDWATER MONITORING REPORT
PRIDE ENERGY COMPANY
SOUTH FOUR LAKES TANK BATTERY (1RP-204)
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 2008 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 2008 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident on March 13, 2008, and site remediation activities conducted between May 6, 2008 and July 24, 2008. 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, do not hesitate to contact me at (432) 638-8740 or Mathew Pride at (918) 524-9200.

Sincerely,



Gilbert J. Van Deventer, REM, PG

cc: Mathew Pride (Pride Energy Co.)
Chris Williams (NMOCD – District 1)

1R 204

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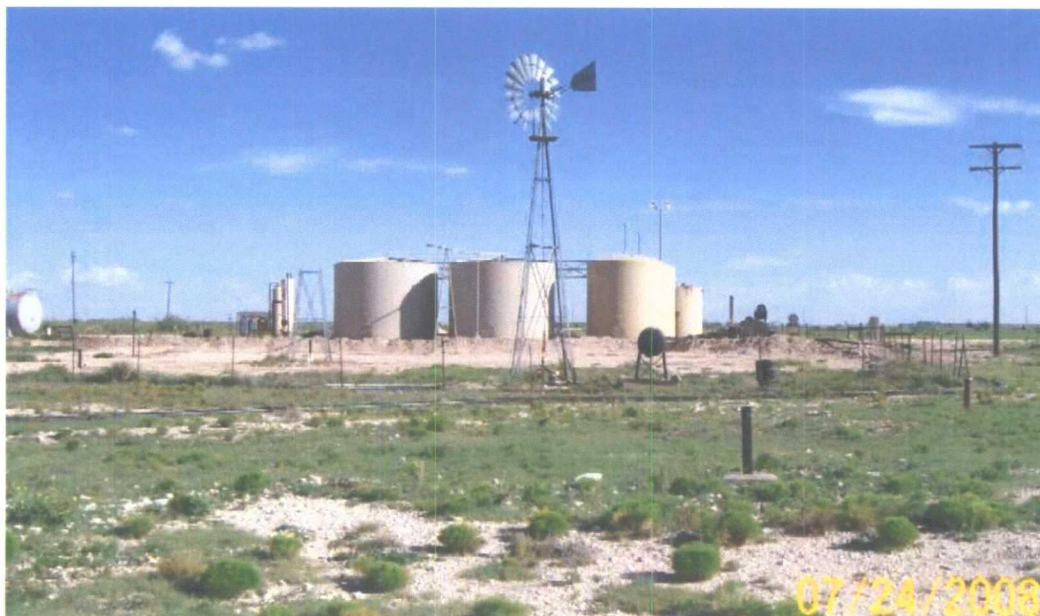
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July 30, 2008

2008 ANNUAL GROUNDWATER MONITORING REPORT

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

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



Prepared by:



P. O. Box 7624
Midland, Texas 79708

Prepared for:

Pride Energy Company

P. O. Box 701950

Tulsa, Oklahoma 74170

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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 2008 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident at the South Four Lakes Tank Battery on March 13, 2008. 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-2, MW-4, MW-5, MW-8, MW-10, MW-14, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standards for each constituent.
- The benzene (0.020 mg/L) and xylene levels (0.75 mg/L) in monitoring well MW-15 exceeded the WQCC standards of 0.010 mg/L and 0.62 mg/L, respectively. The toluene and ethylbenzene concentrations in MW-15 were below WQCC standards.
- 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 is localized between MW-7 and MW-13. During the March 13, 2008, annual monitoring event the LNAPL thicknesses were as follows: MW-1 (~1.40 ft), MW-6 (2.25 ft), MW-7 (1.62 ft), MW-9 (0.03 ft), MW-12 (1.83 ft), and MW-13 (0.75 ft).
- Trouble-shooting and repair of the windmill-driven LNAPL recovery system at RW-2s was conducted from May to July 2008 and put back into operation on July 20, 2008. In addition, passive skimmers were placed in MW-1, MW-6, MW-7, MW-12, MW-13, and RW-1s.
- Based on the historical results of the inorganic analyses, the groundwater in the site area is not adversely affected with chlorides or TDS. 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 recovery operations. Given these source control measures, contaminant loading to groundwater will decrease 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 2008.
- 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.
- After evaluation of effectiveness of windmill recovery system at RW-2s, design and install a similar system at recovery well cluster located at RW-1.
- Conduct LNAPL recovery in 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.
- Collect groundwater samples from any monitoring wells where LNAPL recovery is taking place if the LNAPL thickness is less than 0.01 feet.

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-1, 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 <i>Soil and Groundwater Assessment</i> 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 <i>Remedial Action Plan for the South Four Lakes Unit</i> to the NMOCD. The plan proposed soil and groundwater remediation and delineation of dissolved-phase hydrocarbons at the site.
August 18, 1995	The NMOCD gave Phillips conditional approval for the Remedial Action Plan.

October 9-11, 1995	SECOR conducted the installation and sampling of three monitoring wells (MW-14 through MW-16) to delineate the downgradient extent of the dissolved hydrocarbons in groundwater at the site.
November 27, 1995	Ritter Environmental & Geotechnical Services (REGS) initiated closure of the former production pit under contract with Phillips. REGS excavated the former pit to a depth of approximately 23 ft below ground surface (bgs). The excavated soils were removed for treatment by solidification in three treatment cells. The solidified material (~1,835 yd ³) was allowed two to three weeks time to cure prior to covering the excavated production pit and treatment cells. Wells MW-8 and RW-11 had to be removed as they were in the footprint of the excavated area.
January 4-5, 1996	SECOR supervised the installation of recovery wells RW-1s, RW-1d, RW-2s, and RW-2d for subsequent use to recover LNAPL.
January 15-16, 1996	BASCOR Environmental, Inc. (BEI) supervised the installation of the windmill-driven pump system for LNAPL recovery and conducted a well performance test for recovery wells RW-2s and RW-2d.
January 31, 1996	Phillips submitted the <i>Final Closure Report - Unlined Surface Impoundment Closure</i> report prepared by REGS (December 1995) to the NMOCD.
January 31, 1996	Phillips submitted the <i>Supplemental Environmental Investigation – Downgradient Assessment</i> report prepared by SECOR (November 28, 1995) to the NMOCD.
January 31, 1996	Phillips submitted the <i>Recovery Well Installation Report</i> prepared by SECOR (January 29, 1996) to the NMOCD.
January 31, 1996	Phillips submitted the <i>Free Phase Hydrocarbon Recovery System Installation Report</i> 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 <i>Quantification of Natural Attenuation of Petroleum Hydrocarbons in Groundwater</i> report prepared by SECOR (April 1997) 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 13, 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 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.

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 corner 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 NAPL 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 March 13, 2008, all on-site monitoring wells were gauged for depth to groundwater using a clean, decontaminated electronic water/product interface probe. All of the monitoring wells were sampled, with the exception of MW-1, MW-6, MW-7, MW-9, MW-12, and MW-13 due to presence of LNAPL. 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 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 dissolved iron (Fe), and manganese (Mn) to assess the efficacy of intrinsic bioremedial activity currently taking place. A third set of water samples were transferred into appropriately preserved containers for analysis of total dissolved solids (TDS), chloride, alkalinity/bicarbonate ($\text{CaCO}_3/\text{HCO}_3$), calcium, magnesium, potassium, and sodium. 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. All samples were shipped to Xenco Laboratories in Odessa, Texas 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 March 13, 2008, 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.
- Water table elevations have increased an average of 1.1 feet across the site since December 1997 (slightly above January 1995 levels).

A groundwater elevation map depicting the water table elevation and direction of groundwater flow using the gauging data obtained during the March 13, 2008 sampling event 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 March 13, 2008 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 March 13, 2008 sampling event, the distribution of dissolved-phase hydrocarbons at the South Four Lakes Tank Battery is described below.

- BTEX concentrations in monitoring wells MW-2, MW-4, MW-5, MW-10, MW-14 and MW-15 were below the WQCC standards for each constituent.
- The benzene (0.020 mg/L) and xylenes (0.752 mg/L) in MW-15 exceeded the WQCC standards of 0.010 mg/L and 0.62 mg/L, respectively. The toluene and ethylbenzene and xylene concentrations for this well were below WQCC standards. Monitoring wells MW-1, MW-6, MW-7, MW-9, MW-12 and MW-13 were not sampled due to the presence of LNAPL.
- The dissolved-phase hydrocarbons in groundwater are localized along a linear trend between MW-7 and MW-15. There are no indications that the hydrocarbon plume in the groundwater has migrated offsite.

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-10 (377 mg/L), MW-14 (361 mg/L), and MW-15 (1360 mg/L) were above the WQCC standard of 250 mg/L.
- TDS concentrations in wells MW-2 (1,020 mg/L), MW-10 (1362 mg/L), MW-14 (1170 mg/L), and MW-15 (3140 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.
- The elevated chloride and TDS levels observed in the aforementioned monitoring wells do not represent a risk to human health or the environment.

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^{+3}) are then used as an electron acceptors producing highly soluble ferrous iron (Fe^{+2}) and . The historical summary of these parameters are listed in Table 3. The electron acceptor and biodegradation by-product data collected on March 13, 2008, 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 well MW-15 is perhaps the most obvious location 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 (37.6 mg/L) exceeds the highest benzene concentration (13.0 mg/L) observed on site (MW-6 on April 16, 1996) by more than a factor of three. The biodegradation capacity of electron acceptors and metabolic byproducts far exceeds the average benzene concentration (3.93 mg/L) observed on site by a ratio of 10 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 actively reduce hydrocarbons 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 March 13, 2008 sampling event, measured LNAPL thickness varied from 0.03 feet in monitoring well MW-9 to 2.71 feet in recovery well RW-1 as listed in Table 1 and displayed in Figure 5. It is apparent that LNAPL thicknesses have declined since initial measurements obtained in 1995 and 1996, which may be attributable to the product recovery efforts to date and also as a result of horizontal migration along the water table and associated capillary fringe. It should be recognized that measured thicknesses of LNAPL in wells greatly exaggerate true thicknesses in the formation. Also, apparent thickness of LNAPL measured in wells is sensitive to water table fluctuations. The consequence of both of these factors is that LNAPL thickness in wells provides only a general indication of the amount of LNAPL present in the formation.

On May 6 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.

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.

As of July 24, 2008, approximately 20 gallons of LNAPL has been recovered since May 6, 2008 using a combination of the windmill pump system, passive bailers, and hand bailing. Product recovery and LNAPL thickness measurements are listed in Table 5. Operation and maintenance of the windmill recovery system and passive bailers 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:

- Benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations in monitoring wells MW-2, MW-4, MW-5, MW-8, MW-10, MW-14, and MW-16 were below the New Mexico Water Quality Control Commission (WQCC) standards for each constituent.
- The benzene (0.020 mg/L) and xylene levels (0.75 mg/L) in MW-15 exceeded the WQCC standards of 0.010 mg/L and 0.62 mg/L, respectively. The toluene and ethylbenzene concentrations in MW-15 were below WQCC standards for each of these wells.
- Light non-aqueous phased liquids (LNAPL) are present in the groundwater and have the characteristics of a light crude oil. The LNAPL is localized between MW-7 and MW-13. LNAPL thicknesses were as follows: MW-1 (~1.40 ft), MW-6 (2.25 ft), MW-7 (1.62 ft), MW-9 (0.03 ft), MW-12 (1.83 ft), and MW-13 (0.75 ft). 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.
- Trouble-shooting and repair of the windmill-driven LNAPL recovery system at RW-2s was conducted from May to July 2008 and back into operation on July 24, 2008. In addition, passive skimmers were placed in MW-1, MW-6, MW-7, MW-12, MW-13, and RW-1s.
- Based on the historical results of the inorganic analyses, the groundwater in the site area is not adversely affected with chlorides or TDS. Although iron and manganese concentrations exceed WQCC standards in some monitoring wells, increased levels of these constituents provide encouraging evidence that 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 recovery operations. Given these source control measures, contaminant loading to groundwater will decrease through time, and the groundwater plume will decrease in concentration and areal extent over time.
- 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.
- Given local and regional groundwater use, the groundwater plume in its current extent poses no risk to human health or the environment.

10.0 Recommendations

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

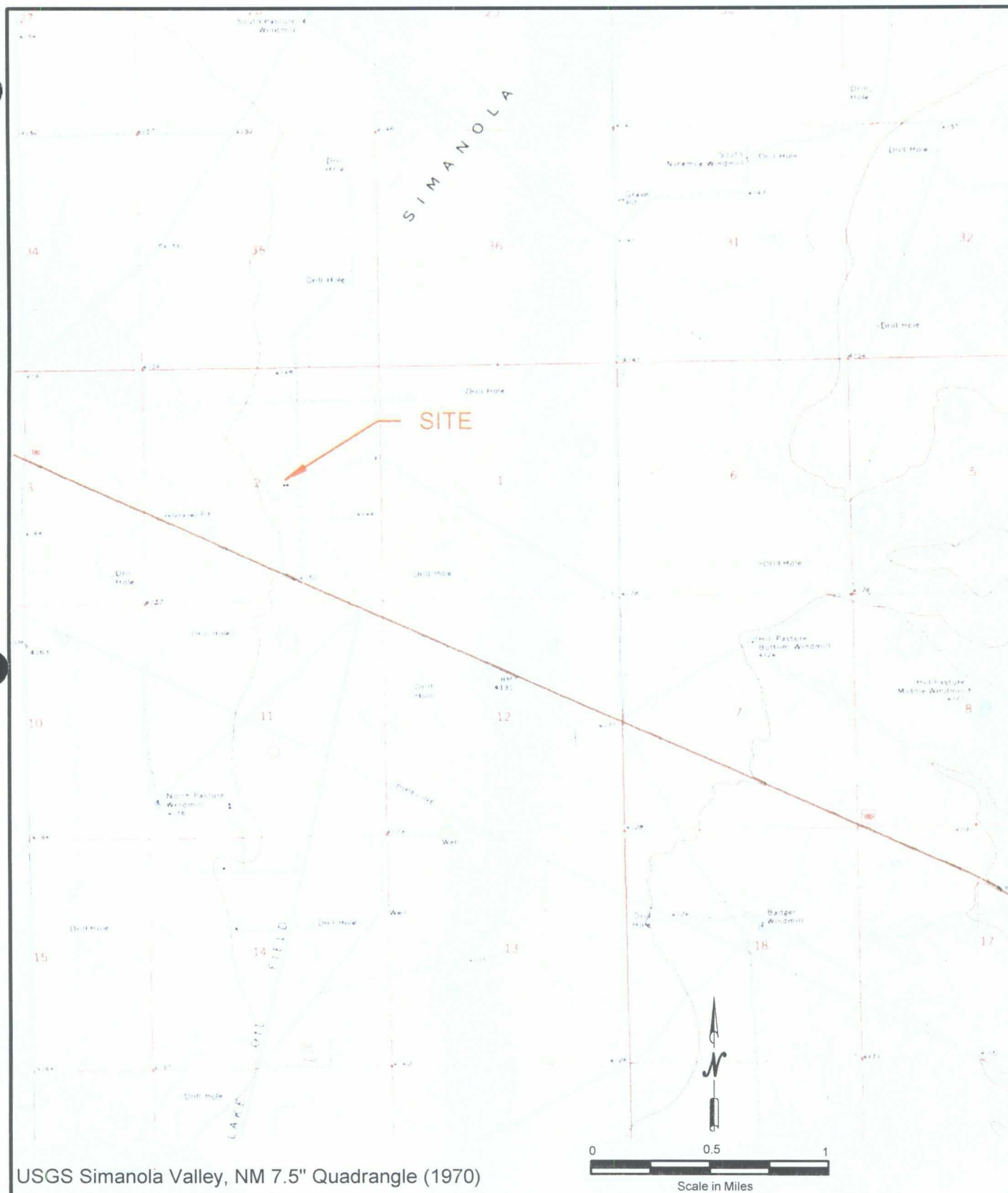
- Continue the sampling and monitoring program on an annual basis in accordance with the July 14, 1997 NMOCD approval letter. The next sampling event is scheduled during the first quarter of 2008.
- Continue total fluids (LNAPL and groundwater) removal from RW-2s using the windmill pump system with monthly inspections to ensure that the system is operational and maintained.
- After evaluation of effectiveness of windmill recovery system at RW-2s, design and install a similar system at recovery well cluster located at RW-1.
- Conduct LNAPL recovery in MW-1, MW-6, MW-7, MW-9, MW-12, and MW-13 using passive bailers with monthly inspections. Obtain groundwater samples from these wells if the LNAPL thickness is less than 0.01 feet.
- The above recommended LNAPL recovery effort will improve the effectiveness of biological attenuation of the dissolved hydrocarbon plume as observed with the continued uptake of electron acceptors, production of biological reaction by-products, and the reduction in BTEX concentrations and areal extent of the dissolved hydrocarbon plume.

11.0 Limitations

Trident has prepared this Annual Monitoring Report to the best of its ability. No other warranty, expressed or implied, is made or intended. Trident has examined and relied upon documents obtained from the OCD Online database (<http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pENV00001RP204>) as referenced in the report and may have relied on oral statements made by certain individuals. Trident has not conducted an independent examination of the facts contained in referenced materials and statements. We have presumed the genuineness of the documents and that the information provided in documents or statements is 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.

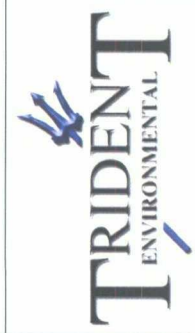
This report has been prepared for the benefit of Pride. The information contained in this report, including all exhibits and attachments, may not be used by any other party without the express consent of Trident and/or Pride.

FIGURES



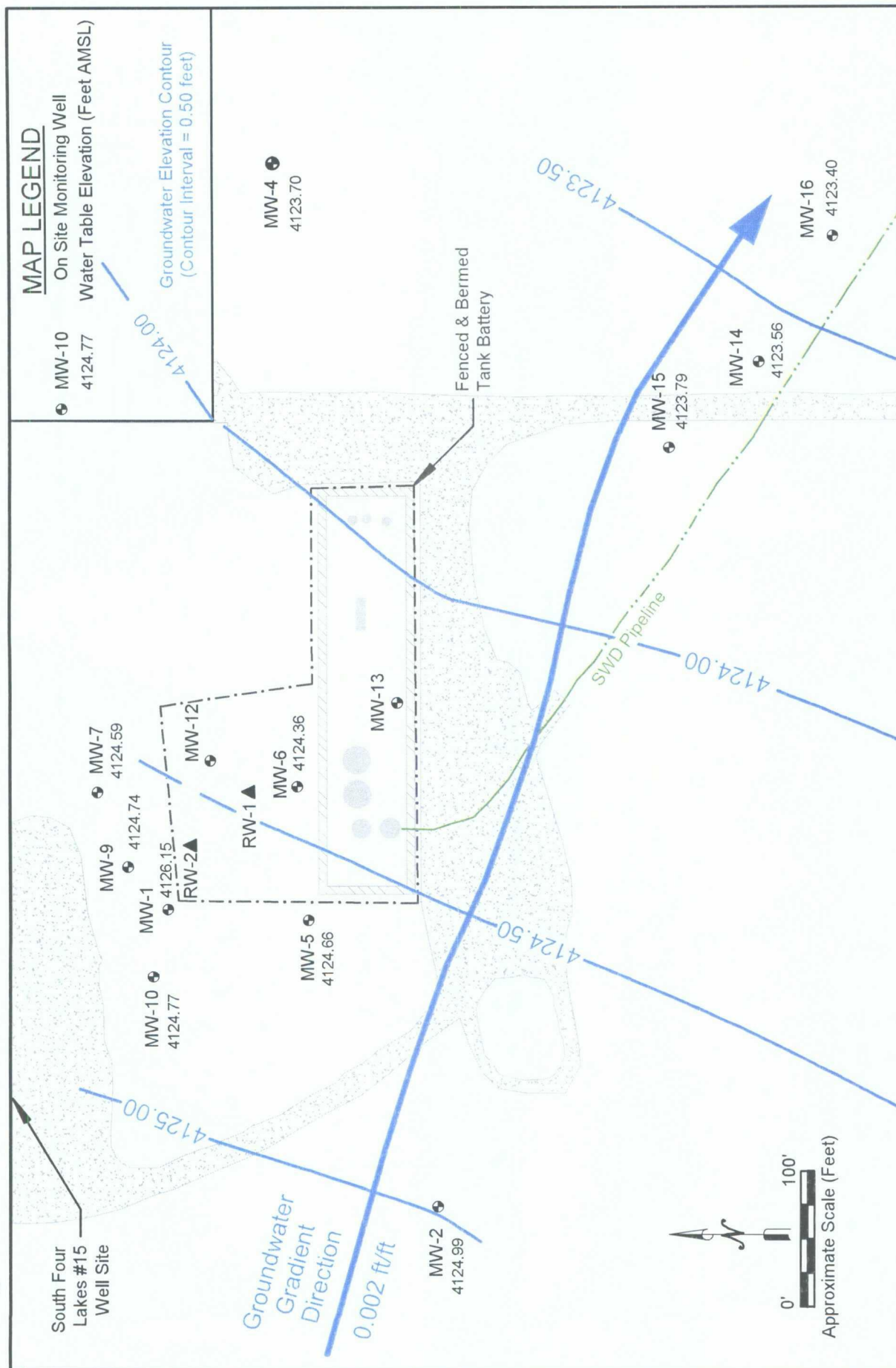
PRIDE ENERGY COMPANY
SOUTH FOUR LAKES TANK BATTERY
T12S - R34E - Section 2
Lea County, New Mexico

FIGURE 1
SITE LOCATION MAP



South Four Lakes Tank Battery
T12S - R34E - Section 2
Pride Energy Company

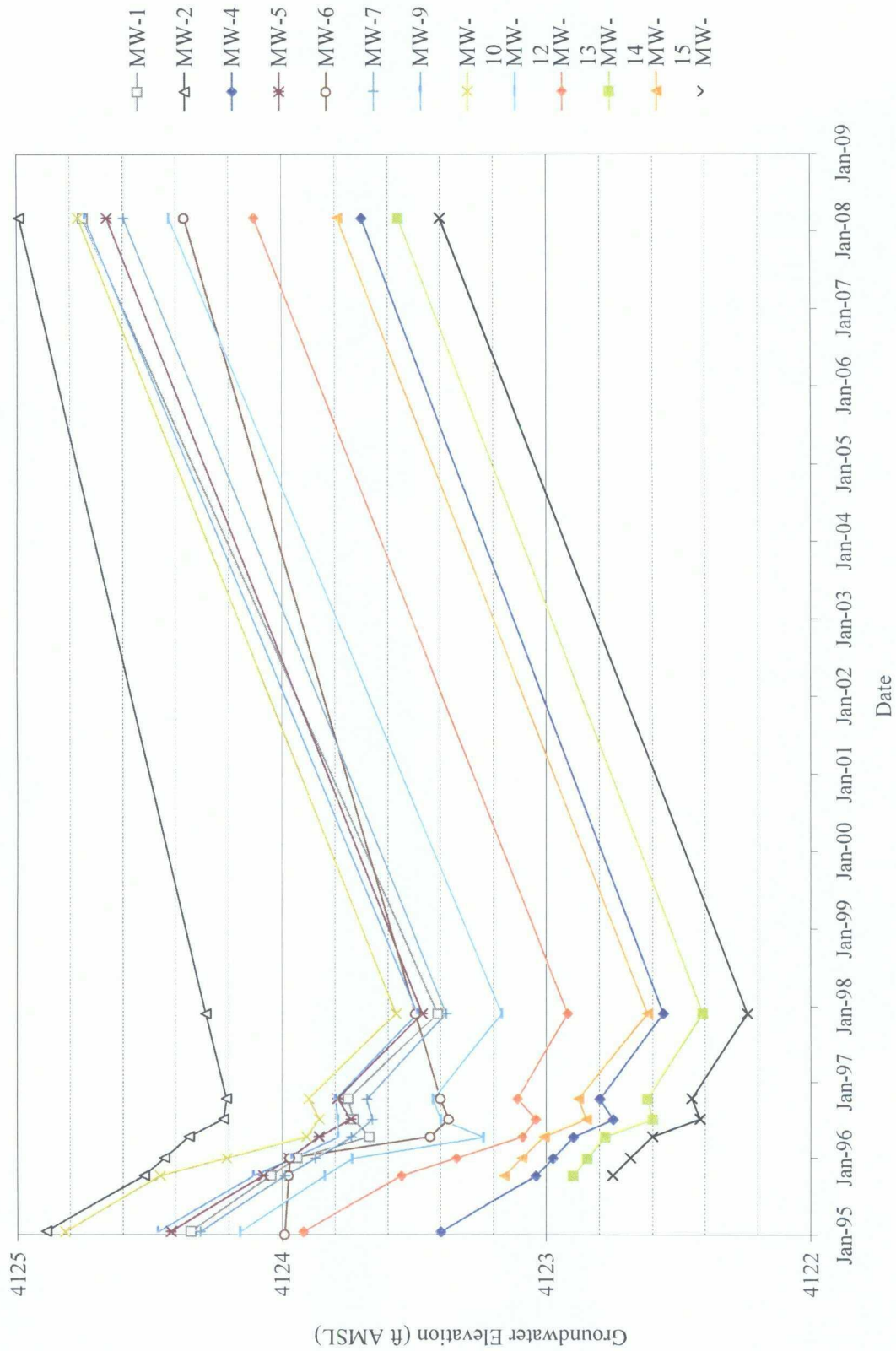
FIGURE 2
2005 AERIAL PHOTO AND
MONITORING WELL LOCATION
MAP



South Four Lakes Tank Battery
T12S - R34E - Section 2
Pride Energy Company

FIGURE 3
WATER TABLE ELEVATION MAP
March 13, 2008

FIGURE 4
Groundwater Elevation Versus Time



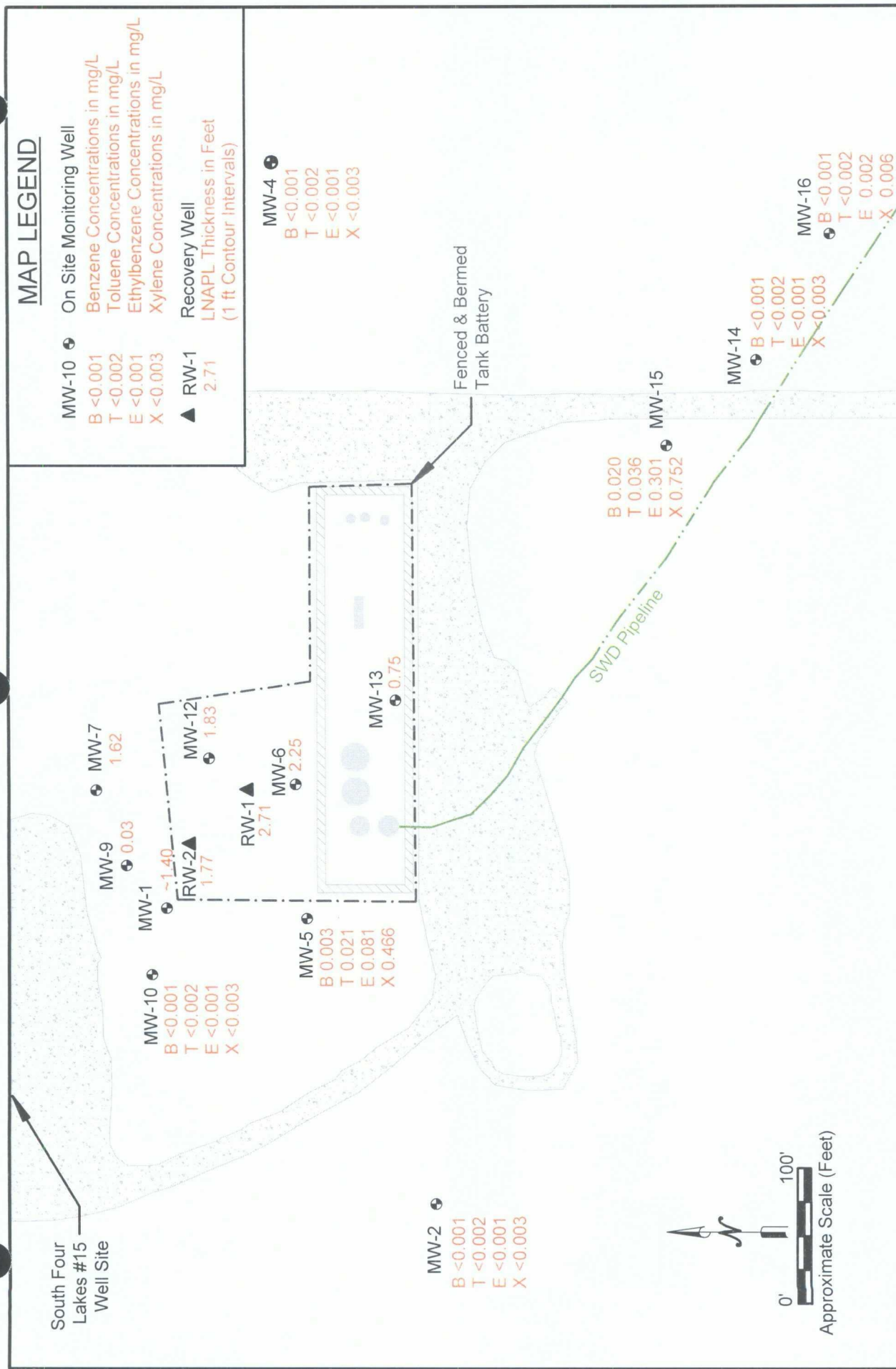


FIGURE 5

BTEX CONCENTRATION AND LNAPL THICKNESS MAP

March 13, 2008

South Four Lakes Tank Battery

T12S - R34E - Section 2

Pride Energy Company

TRIDENT
ENVIRONMENTAL

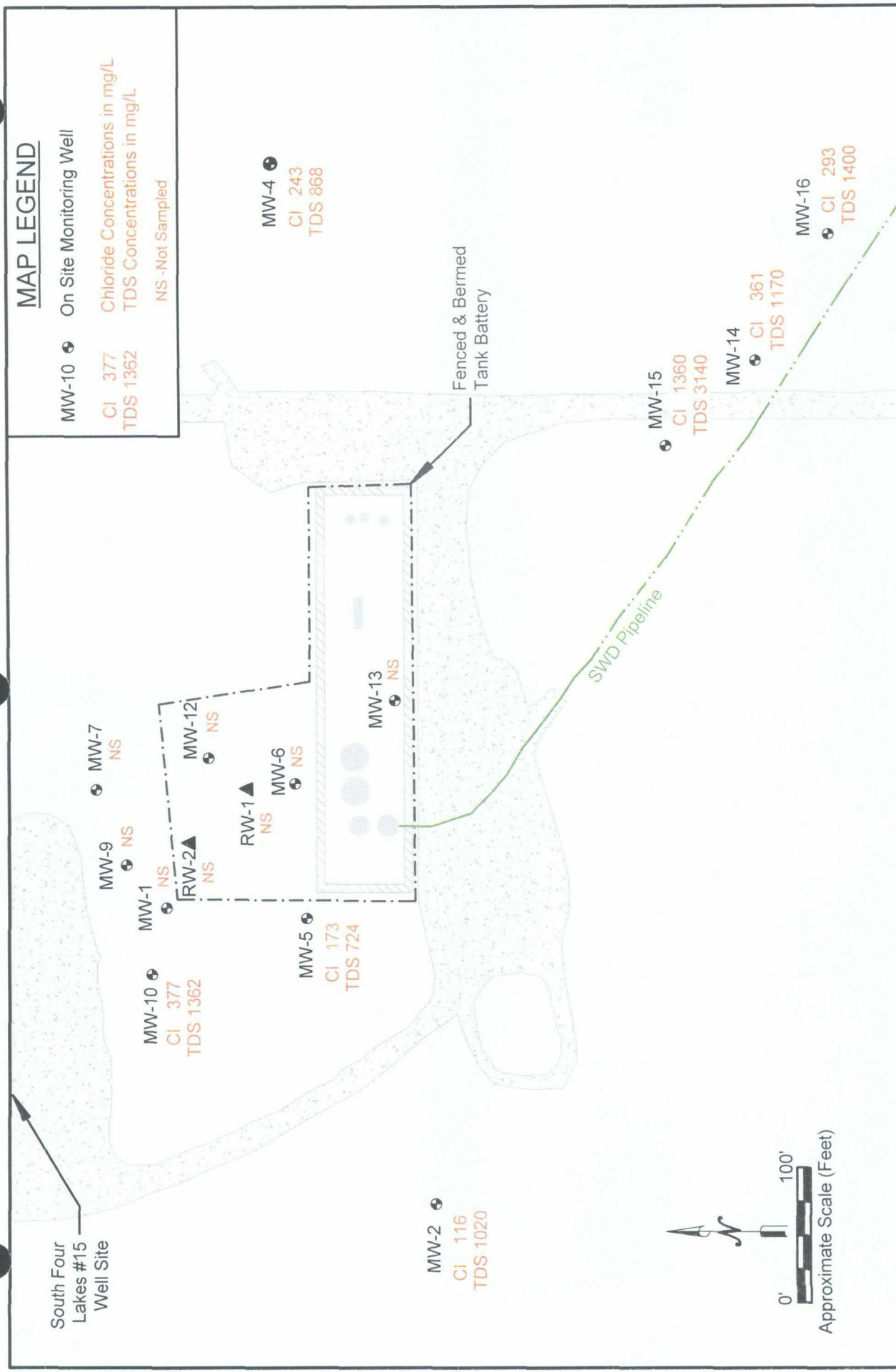


FIGURE 6

CHLORIDE AND TDS CONCENTRATION MAP

March 13, 2008

South Four Lakes Tank Battery

T12S - R34E - Section 2

Pride Energy Company

TRIDENT ENVIRONMENTAL

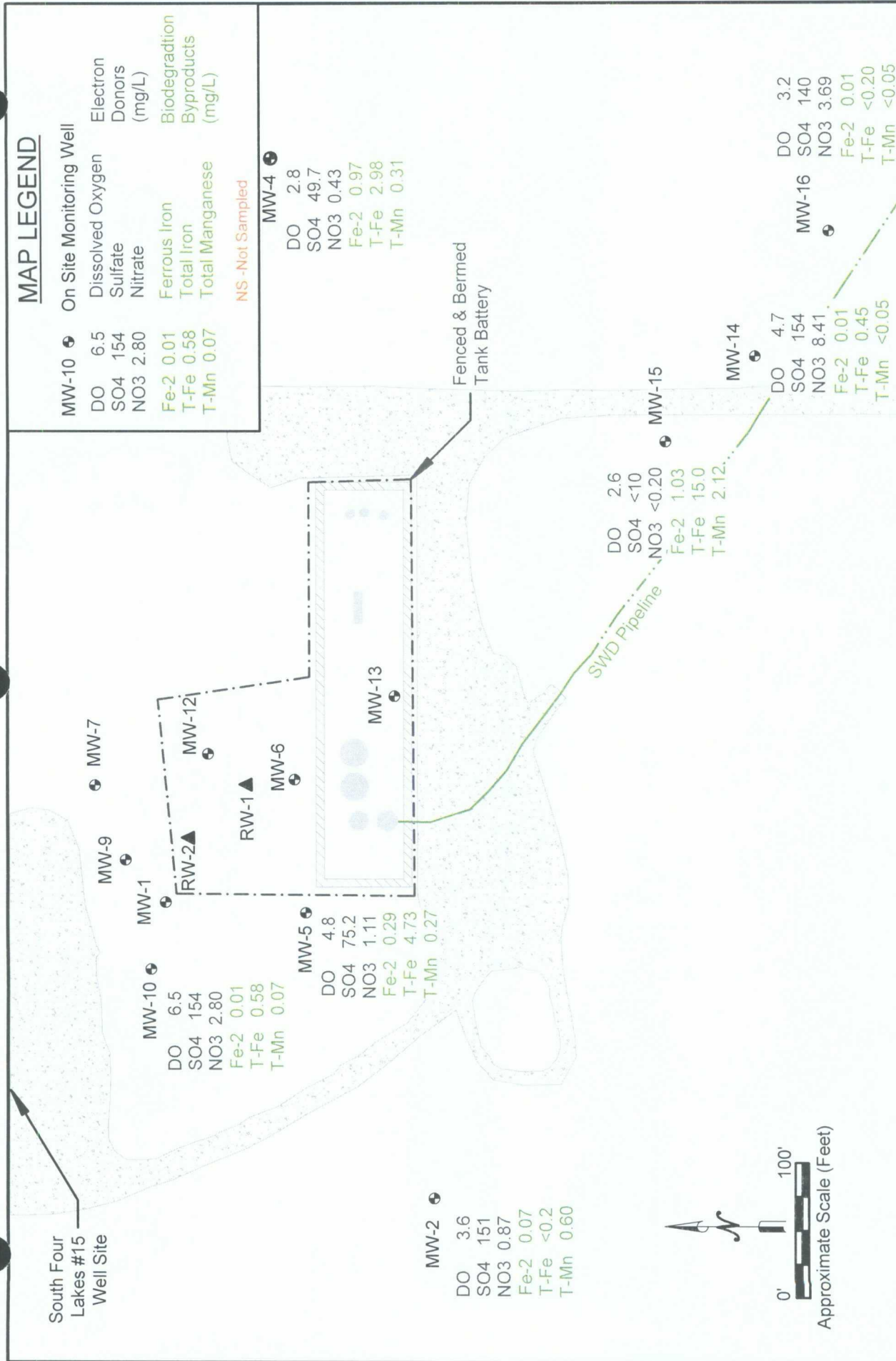
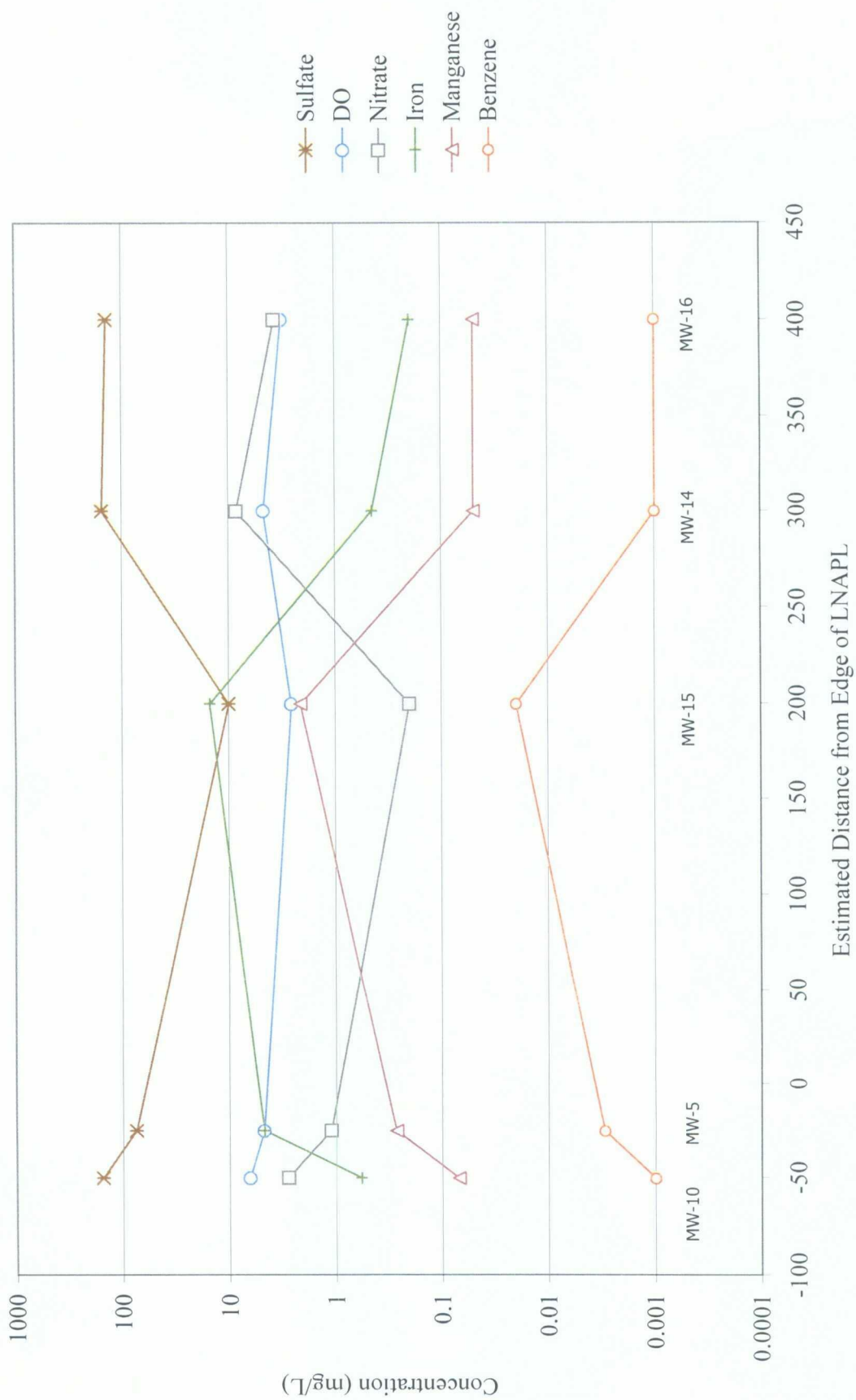


FIGURE 7
BIODEGRADATION PARAMETERS
 March 13, 2008

South Four Lakes Tank Battery
 T12S - R34E - Section 2
Pride Energy Company



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



This diagram was scanned from the Free Phase Hydrocarbon Recovery System Installation Report (January 30, 1996) prepared by Bascor Environmental Inc.

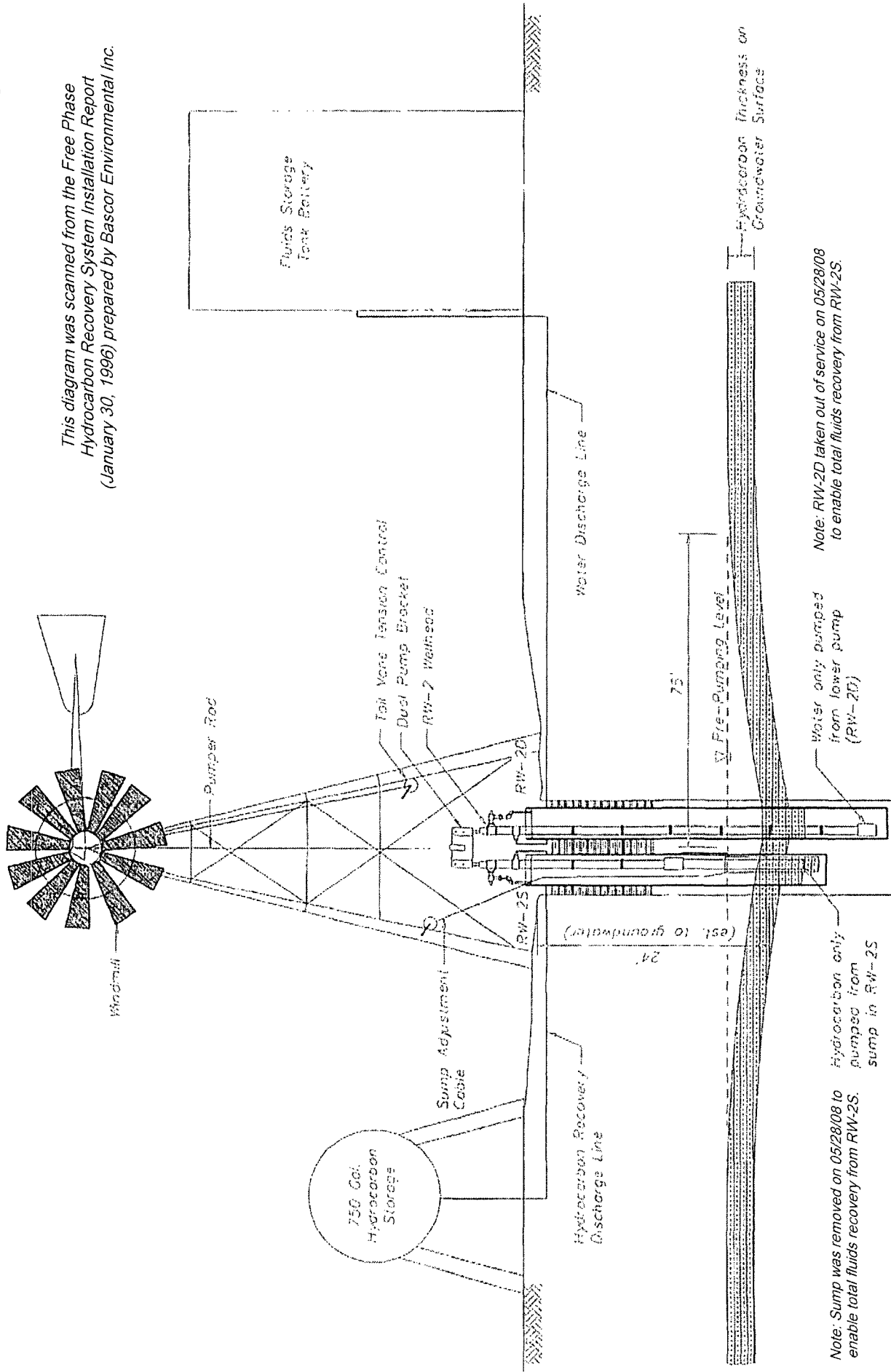


FIGURE 9
WINDMILL RECOVERY
SYSTEM DIAGRAM

South Four Lakes Tank Battery
T12S - R34E - Section 2
Pride Energy Company



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
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
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
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
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
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
MW-8	01/18/95	4148.81	24.66	0.00	4124.15
	10/10/95	4148.81	24.66	0.00	4124.15
Well removed to allow excavation and solidification of pit.					
MW-9	01/18/95	4149.63	25.16	0.00	4124.47
	10/10/95	4149.63	25.52	0.00	4124.11
	01/04/96	4149.63	NM	NM	4123.96
	04/16/96	4149.63	25.84	0.00	4123.79
	07/09/96	4149.63	25.84	0.00	4123.79
	10/15/96	4149.63	25.83	0.00	4123.80
	12/03/97	4149.63	26.14	0.00	4123.49
	03/13/08	4149.63	24.91	0.03	4124.74

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-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
RW-11	01/04/95	4149.86	28.40	3.22	4124.06
	01/17/95	4149.86	28.76	3.69	4124.08
Well removed to allow excavation and solidification of pit.					
MW-12	01/04/95	4149.15	25.30	0.35	4124.13
	01/17/95	4149.15	25.58	0.73	4124.16
	10/10/95	4149.15	NM	NM	4123.84
	01/04/96	4149.15	28.70	4.07	4123.74
	04/16/96	4149.15	29.98	5.04	4123.24
	07/09/96	4149.15	29.08	4.12	4123.40
	10/15/96	4149.15	28.94	3.99	4123.43
	12/03/97	4149.15	29.06	3.82	4123.17
MW-13	03/13/08	4149.15	26.20	1.83	4124.43
	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
MW-14	03/13/08	4150.31	26.81	0.75	4124.11
	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
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
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
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
RW-2s	01/04/96	NM	DNA	3.50	NM
	03/13/08	NM	DNA	1.77	NM

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 Petroleum 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		
	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	1300
	12/03/97	2.80	NA	NA	NA	NA	100	650
MW-2	03/13/08	1.40	NS	NS	NS	NS	NS	NS
	Oct-90	0.00	<0.001	<0.001	<0.001	<0.001		
	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
MW-4	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	1020
	Oct-90	0.00	<0.001	<0.001	<0.001	<0.001		
	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	790	1880
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	460	1300
	04/16/96	0.00	<0.001	<0.001	<0.001	0.001	450	1300
	07/09/96	0.00	<0.001	<0.001	<0.001	<0.001	460	1200
	10/15/96	0.00	<0.001	<0.001	<0.001	<0.001	460	1200
MW-5	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
	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
MW-6	03/13/08	0.00	0.003	0.021	0.081	0.466	173	724
	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	3700
	04/16/96	4.43	13.0	19.0	5.00	24.5	1200	2600
	07/09/96	4.52	NA	NA	NA	NA	1100	2500
	10/15/96	4.56	NA	NA	NA	NA	890	2500
	12/03/97	NM	NA	NA	NA	NA	720	1700
	03/13/08	2.25	NS	NS	NS	NS	NS	NS
MW-7	01/18/95	0.00	0.013	<0.001	0.026	<0.001	255	1190
	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
MW-8	01/18/95	0.00	0.740	<0.001	0.100	0.330	563	1460
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	Nov-95		Well removed to allow excavation and solidification of pit.					

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-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		
	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
MW-10	01/18/95	0.00	<0.001	<0.001	<0.001	<0.001	359	1190
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	<0.001	<0.001	<0.001	<0.001	290	1100
	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	1000
	10/15/96	DNA	<0.001	<0.001	<0.001	<0.001	260	1000
	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	1362
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	3600
	04/16/96	5.04	11.0	11.00	1.10	6.50	2100	4300
	07/09/96	4.12	NA	NA	NA	NA	1900	4200
	10/15/96	3.99	NA	NA	NA	NA	2000	4300
	12/03/97	3.82	NA	NA	NA	NA	810	1400
MW-13	03/13/08	1.83	NS	NS	NS	NS	NS	NS
	01/18/95	0.00	2.2	<0.001	0.36	1.60	647	1640
	10/10/95	0.00	NS	NS	NS	NS	NS	NS
	01/04/96	NM	2.4	0.022	0.330	1.59	560	1500
	04/16/96	0.00	2.4	0.014	0.370	1.70	540	1500
	07/09/96	0.00	2.2	0.034	0.430	1.82	560	1500
	10/15/96	0.00	2.1	0.097	0.350	1.71	530	1400
	12/03/97	0.00	0.92	0.140	0.160	0.570	560	1500
MW-14	03/13/08	0.75	NS	NS	NS	NS	NS	NS
	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	1000
	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	1170
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	1200
	04/16/96	0.00	0.052	0.550	0.690	1.92	410	1200
	07/09/96	0.00	0.035	0.610	0.850	2.15	510	1400
	10/15/96	0.00	<0.001	0.420	0.610	1.63	580	1400
	12/03/97	0.00	0.091	1.10	0.860	2.26	490	1400
	03/13/08	0.00	0.020	0.036	0.301	0.752	1360	3140
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	1400

DNA = Data Not Available, NA = Not Analyzed, NM = Not Measured, NS = Not Sampled

Total Dissolved Solids (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
MW-2	01/18/95	Downgradient	NA	145	NA	NA	2.0	0.38
	01/04/96	Downgradient	1.60	120	16.0	NA	<0.001	0.29
	04/16/96	Downgradient	3.44	120	17.0	NA	0.04	0.32
	07/09/96	Downgradient	3.44	120	17.0	NA	0.03	0.32
	10/15/96	Downgradient	1.83	130	16.0	NA	<0.001	0.28
	03/13/08	Downgradient	3.6	151	0.87	0.07	<0.20	0.60
MW-4	01/18/95	Downgradient	NA	121	NA	NA	2.20	0.09
	01/04/96	Downgradient	2.65	78	<0.05	NA	0.52	0.07
	04/16/96	Downgradient	2.00	60	<0.05	NA	1.00	0.12
	07/09/96	Downgradient	1.90	43	0.06	NA	1.60	0.16
	10/15/96	Downgradient	NA	36	0.06	NA	0.97	0.17
	03/13/08	Downgradient	2.80	49.7	0.43	0.97	2.98	0.31
MW-5	01/18/95	Downgradient	NA	109	NA	NA	13.2	0.05
	01/04/96	Downgradient	5.27	110	1.30	NA	<0.025	<0.01
	04/16/96	Downgradient	5.38	110	1.20	NA	<0.025	<0.01
	07/09/96	Downgradient	NA	100	0.91	NA	<0.025	<0.01
	10/15/96	Downgradient	6.51	110	1.10	NA	<0.025	<0.01
	12/03/97	Downgradient	NA	88	0.96	NA	0.028	<0.01
	03/13/08	Downgradient	4.8	75.2	1.11	0.29	4.73	0.27
MW-6	01/04/96	In Plume	1.98	46	<0.05	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	In Plume	2.06	170	<0.05	NA	0.67	0.10
	04/16/96	In Plume	2.82	170	<0.05	NA	0.77	0.11
	07/09/96	In Plume	3.37	170	<0.05	NA	0.46	0.08
	10/15/96	In Plume	0.76	180	<0.05	NA	0.40	0.07
	12/03/97	In Plume	2.08	140	<0.05	NA	0.34	0.08
	03/13/08	In Plume	NS	NS	NS	NS	NS	NS
MW-9	01/18/95	In Plume	NA	192.00	NA	NA	17.6	0.02
	01/04/96	In Plume	5.98	180	0.59	NA	<0.025	<0.01
	04/16/96	In Plume	7.03	190	0.56	NA	0.04	<0.01
	07/09/96	In Plume	6.30	180	0.65	NA	<0.025	<0.01
	10/15/96	In Plume	6.30	190	0.70	NA	<0.025	<0.01
	12/03/97	In Plume	NA	200	0.61	NA	<0.025	<0.01
	03/13/08	In Plume	NS	NS	NS	NS	NS	NS
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
MW-12	03/13/08	Upgradient	6.5	154	2.80	0.01	0.58	0.07
	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

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-13	01/18/95	Downgradient	NA	20.20	NA	NA	38.2	0.64
	01/04/96	Downgradient	1.66	4.50	0.07	NA	4.30	1.90
	04/16/96	Downgradient	1.19	2.30	<0.05	NA	4.00	1.90
	07/09/96	Downgradient	1.49	2.70	<0.05	NA	4.00	1.90
	10/15/96	Downgradient	0.85	2.80	<0.05	NA	4.40	2.10
	12/03/97	Downgradient	2.22	11.0	<0.05	NA	4.30	2.20
	03/13/08	Downgradient	NS	NS	NS	NS	NS	NS
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
MW-15	01/04/96	Downgradient	1.30	27	<0.05	NA	1.70	0.66
	04/16/96	Downgradient	2.17	42	<0.05	NA	1.60	0.66
	07/09/96	Downgradient	2.08	55	<0.05	NA	1.80	0.75
	10/15/96	Downgradient	1.05	46	<0.05	NA	2.40	0.98
	12/03/97	Downgradient	1.19	4.8	<0.05	NA	3.30	0.87
	03/13/08	Downgradient	2.6	<10	<0.20	1.03	15.0	2.12
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

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	0.326	6.5	2.12
Mn ²⁺	Manganese Reduction	Increases	0.14	2.12	0.30
NO ₃	Denitrification	Decreases	0.21*	2.80	0.59
Fe ²⁺	Ferric Iron Reduction	Increases	0.046	15.0	0.69
SO ₄	Sulfate Reduction	Decreases	0.22*	154	33.9
Total Biodegradation Capacity					37.6
Highest benzene concentration observed on site					13.0
Average benzene concentration observed on site					3.93

* Conservative assumption (does not take into account microbial cell mass production)

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)

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	~1.4	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

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	0.1
07/24/08	3	5	1	1	1	0.1	1	0.5
Well Totals	5	10	1	1	1	0	1	1
Total Gallons of LNAPL Recovered in all Wells Since May 6, 2008:								20.1

NM indicates not measured (not accessible due to downhole pump assembly)

LNAPL recovery methods used:

Windmill Recovery System (RW-2s)

Hand bailing (RW-1s, MW-1, MW-6, MW-7, MW-9, MW-12, and MW-13)

Passive bailer (RW-1s, MW-1, MW-6, MW-7, MW-12, and MW-13)

APPENDIX A

NMOCD Correspondence



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2045 S. PACIFIC
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.

Mr. Sam E. Christy
July 14, 1997
Page 2

- 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: "Chris Williams" <chris.williams@state.nm.us>; "Matt Pride" <mattp@pride-energy.com>
Sent: Wednesday, July 30, 2008 10:48 AM
Attach: 2008 Annual Report SFLU TB.pdf
Subject: 2008 AGWMR - South Four Lakes Tank Battery (1RP-204)

Subject: 2008 Annual Groundwater Monitoring Report

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

Site Location: T12S - R34E - Section 2, Unit Letter G

Lease Operator: Pride Energy Company

Hello Glenn:

On behalf of Pride Energy Company, Trident Environmental takes this opportunity to submit the attached 2008 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 2008 Annual Groundwater Monitoring Report documents the annual sampling event performed by Trident on March 13, 2008, and site remediation activities conducted between May 6, 2008 and July 24, 2008. 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.

One complete hard copy and one complete copy on compact disk is also being sent via USPS Certified Mail (# 7099 3400 0017 1737 1988) today. A copy will also be sent to the NMOCD District 1 office in Hobbs today.

If you have any questions, please contact me at 432-638-8740, or Matt Pride at Pride Energy Company (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

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07/30/08

APPENDIX B

Laboratory Analytical Reports

And

Chain of Custody Documentation

Analytical Report 299680

for

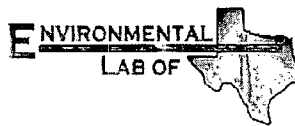
R.T. Hicks Consultants, LTD

Project Manager: Randy Hicks

Pride Energy Company

South Four Lakes Tank Battery

02-APR-08



12600 West I-20 East Odessa, Texas 79765

Texas certification numbers:

Houston, TX T104704215

Florida certification numbers:

Houston, TX E871002 - Miami, FL E86678 - Tampa, FL E86675

Norcross(Atlanta), GA E87429

South Carolina certification numbers:

Norcross(Atlanta), GA 98015

North Carolina certification numbers:

Norcross(Atlanta), GA 483

Houston - Dallas - San Antonio - Austin - Tampa - Miami - Latin America

Midland - Corpus Christi - Atlanta



02-APR-08

Project Manager: **Randy Hicks**
R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Reference: XENCO Report No: **299680**
Pride Energy Company
Project Address: T12S-R34E, Section 2

Randy Hicks:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 299680. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

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

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 299680 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Brent Barron, II

Odessa Laboratory Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - San Antonio - Austin - Tampa - Miami - Atlanta - Corpus Christi - Latin America



Sample Cross Reference 299680

R.T. Hicks Consultants, LTD, Albuquerque, NM

Pride Energy Company

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-2	W	Mar-13-08 14:25		299680-001
MW-3	W	Mar-13-08 16:30		299680-002
MW-4	W	Mar-13-08 11:00		299680-003
MW-5	W	Mar-13-08 15:00		299680-004
MW-10	W	Mar-13-08 13:32		299680-005
MW-14	W	Mar-13-08 13:25		299680-006
MW-15	W	Mar-13-08 14:09		299680-007
MW-16	W	Mar-13-08 12:25		299680-008
MW-17	W	Mar-13-08 11:48		299680-009



Certificate of Analysis Summary 299680

R.T. Hicks Consultants, LTD, Albuquerque, NM

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08


Project Location: T12S-R34E, Section 2

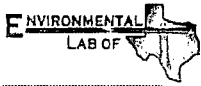
Project Manager: Brent Barron, II

<i>Analysis Requested</i>	<i>Lab Id:</i>	299680-001	299680-002	299680-003	299680-004
	<i>Field Id:</i>	MW-2	MW-3	MW-4	MW-5
	<i>Depth:</i>				
	<i>Matrix:</i>	WATER	WATER	WATER	WATER
	<i>Sampled:</i>	Mar-13-08 14:25	Mar-13-08 16:30	Mar-13-08 11:00	Mar-13-08 15:00
Nitrate by EPA 300/300.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-14-08 18:24	Mar-14-08 18:43	Mar-14-08 19:02	Mar-14-08 19:22
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Nitrate as N		0.865 0.200	0.783 0.200	0.425 0.200	1.11 0.200
Anions by EPA 300/300.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-22-08 18:32	Mar-22-08 18:55	Mar-22-08 19:19	Mar-22-08 19:44
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Chloride		116 D 25.0	2070 D 25.0	243 D 25.0	173 D 25.0
Sulfate		151 D 25.0	180 D 25.0	49.7 D 25.0	75.2 D 25.0
BTEX by EPA 8021B	<i>Extracted:</i>	Mar-17-08 17:00	Mar-17-08 17:00	Mar-17-08 17:00	Mar-18-08 10:28
	<i>Analyzed:</i>	Mar-18-08 04:04	Mar-18-08 04:22	Mar-18-08 04:40	Mar-18-08 14:41
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Benzene		ND 0.0010	ND 0.0010	ND 0.0010	0.0030 0.0010
Toluene		ND 0.0020	ND 0.0020	ND 0.0020	0.0211 0.0020
Ethylbenzene		ND 0.0010	ND 0.0010	ND 0.0010	0.0805 0.0010
m,p-Xylenes		ND 0.0020	ND 0.0020	ND 0.0020	0.3411 0.0020
o-Xylene		ND 0.0010	ND 0.0010	ND 0.0010	0.1247 0.0010
Xylenes, Total		ND	ND	ND	0.4658
Total BTEX		ND	ND	ND	0.5704
Metals per ICP by SW846 6010B	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 16:36	Mar-17-08 16:36	Mar-17-08 16:36	Mar-17-08 16:36
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Calcium		165 0.100	260 0.100	104 0.100	142 0.100
Magnesium		31.9 0.010	48.7 0.010	24.9 0.010	26.2 0.010
Potassium		2.51 0.500	18.1 0.500	6.09 0.500	2.13 0.500
Sodium		60.3 0.500	1120 0.500	155 0.500	69.6 0.500
TDS by SM2540C	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 16:00	Mar-17-08 16:00	Mar-17-08 16:00	Mar-17-08 16:00
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Total dissolved solids		1020 5.00	3850 5.00	868 5.00	724 5.00
Total Alkalinity by EPA 310.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 14:15	Mar-17-08 14:15	Mar-17-08 14:15	Mar-17-08 14:15
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Alkalinity, Total (as CaCO3)		228 4.00	570 4.00	352 4.00	550 4.00

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Brent Barron
Odessa Laboratory Director



Certificate of Analysis Summary 299680

R.T. Hicks Consultants, LTD, Albuquerque, NM

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08

Project Location: T12S-R34E, Section 2

Project Manager: Brent Barron, II

<i>Analysis Requested</i>	<i>Lab Id:</i>	299680-001	299680-002	299680-003	299680-004
	<i>Field Id:</i>	MW-2	MW-3	MW-4	MW-5
	<i>Depth:</i>				
	<i>Matrix:</i>	WATER	WATER	WATER	WATER
	<i>Sampled:</i>	Mar-13-08 14:25	Mar-13-08 16:30	Mar-13-08 11:00	Mar-13-08 15:00
Total Metals by EPA 6010B	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-19-08 14:59	Mar-19-08 14:59	Mar-19-08 14:59	Mar-19-08 14:59
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Manganese		0.602 0.050	ND 0.050	0.305 0.050	0.266 0.050
Iron		ND 0.200	ND 0.200	2.98 0.200	4.73 0.200

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Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08


Project Location: T12S-R34E, Section 2

Project Manager: Brent Barron, II

<i>Analysis Requested</i>	<i>Lab Id:</i>	299680-005	299680-006	299680-007	299680-008
	<i>Field Id:</i>	MW-10	MW-14	MW-15	MW-16
	<i>Depth:</i>				
	<i>Matrix:</i>	WATER	WATER	WATER	WATER
	<i>Sampled:</i>	Mar-13-08 13:32	Mar-13-08 13:25	Mar-13-08 14:09	Mar-13-08 12:25
Nitrate by EPA 300/300.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-14-08 19:42	Mar-14-08 20:02	Mar-14-08 20:21	Mar-14-08 20:41
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Nitrate as N		2.80 0.200	8.41 0.200	ND 0.200	3.69 0.200
Anions by EPA 300/300.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-22-08 20:08	Mar-22-08 20:32	Mar-22-08 20:56	Mar-22-08 21:44
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Chloride		377 D 25.0	361 D 25.0	1360 D 25.0	293 D 25.0
Sulfate		154 D 25.0	154 D 25.0	ND 10.0	140 D 25.0
BTEX by EPA 8021B	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 17:00	Mar-17-08 17:00	Mar-19-08 10:00	Mar-18-08 10:28
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Benzene		ND 0.0010	ND 0.0010	0.0197 0.0050	ND 0.0010
Toluene		ND 0.0020	ND 0.0020	0.0355 0.0100	ND 0.0020
Ethylbenzene		ND 0.0010	ND 0.0010	0.3006 0.0050	0.0016 0.0010
m,p-Xylenes		ND 0.0020	ND 0.0020	0.5278 0.0100	0.0044 0.0020
o-Xylene		ND 0.0010	ND 0.0010	0.2246 0.0050	0.0012 0.0010
Xylenes, Total		ND	ND	0.7524	0.0056
Total BTEX		ND	ND	1.1082	0.0072
Metals per ICP by SW846 6010B	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 16:36	Mar-17-08 16:36	Mar-17-08 16:36	Mar-17-08 16:36
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Calcium		183 0.100	195 0.100	169 0.100	196 0.100
Magnesium		26.2 0.010	37.0 0.010	38.4 0.010	31.4 0.010
Potassium		3.20 0.500	0.627 0.500	4.53 0.500	0.854 0.500
Sodium		158 0.500	115 0.500	758 0.500	106 0.500
TDS by SM2540C	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-31-08 16:00	Mar-17-08 16:00	Mar-17-08 16:00	Mar-17-08 16:00
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Total dissolved solids		1360 K 10.0	1170 5.00	3140 5.00	1400 5.00
Total Alkalinity by EPA 310.1	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-17-08 14:15	Mar-17-08 14:15	Mar-17-08 14:15	Mar-17-08 14:15
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Alkalinity, Total (as CaCO3)		420 4.00	352 4.00	650 4.00	312 4.00

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Brent Barron
Odessa Laboratory Director



Certificate of Analysis Summary 299680

R.T. Hicks Consultants, LTD, Albuquerque, NM

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08

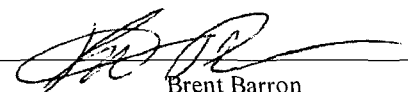
Project Location: T12S-R34E, Section 2

Project Manager: Brent Barron, II

<i>Analysis Requested</i>	<i>Lab Id:</i>	299680-005	299680-006	299680-007	299680-008
	<i>Field Id:</i>	MW-10	MW-14	MW-15	MW-16
	<i>Depth:</i>				
	<i>Matrix:</i>	WATER	WATER	WATER	WATER
	<i>Sampled:</i>	Mar-13-08 13:32	Mar-13-08 13:25	Mar-13-08 14:09	Mar-13-08 12:25
Total Metals by EPA 6010B	<i>Extracted:</i>				
	<i>Analyzed:</i>	Mar-19-08 14:59	Mar-19-08 14:59	Mar-19-08 14:59	Mar-19-08 14:59
	<i>Units/RL:</i>	mg/L RL	mg/L RL	mg/L RL	mg/L RL
Iron		0.577 0.200	0.450 0.200	15.0 0.200	ND 0.200
Manganese		0.067 0.050	ND 0.050	2.12 0.050	ND 0.050

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Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08

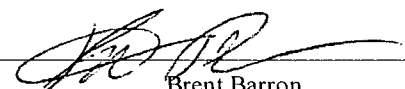
Project Location: T12S-R34E, Section 2

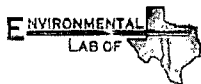
Project Manager: Brent Barron, II

Analysis Requested	Lab Id:	299680-009			
	Field Id:	MW-17			
	Depth:				
	Matrix:	WATER			
	Sampled:	Mar-13-08 11:48			
Nitrate by EPA 300/300.1	Extracted:				
	Analyzed:	Mar-14-08 21:01			
	Units/RL:	mg/L RL			
Nitrate as N		0.268 0.200			
Anions by EPA 300/300.1	Extracted:				
	Analyzed:	Mar-22-08 22:08			
	Units/RL:	mg/L RL			
Chloride		378 D 25.0			
Sulfate		71.2 D 25.0			
BTEX by EPA 8021B	Extracted:	Mar-18-08 10:28			
	Analyzed:	Mar-18-08 16:19			
	Units/RL:	mg/L RL			
Benzene		ND 0.0010			
Toluene		ND 0.0020			
Ethylbenzene		ND 0.0010			
m,p-Xylenes		ND 0.0020			
o-Xylene		ND 0.0010			
Xylenes, Total		ND			
Total BTEX		ND			
Metals per ICP by SW846 6010B	Extracted:				
	Analyzed:	Mar-17-08 16:36			
	Units/RL:	mg/L RL			
Calcium		374 0.100			
Magnesium		71.6 0.010			
Potassium		20.5 0.500			
Sodium		1130 0.500			
TDS by SM2540C	Extracted:				
	Analyzed:	Mar-17-08 16:00			
	Units/RL:	mg/L RL			
Total dissolved solids		4580 5.00			
Total Alkalinity by EPA 310.1	Extracted:				
	Analyzed:	Mar-17-08 14:15			
	Units/RL:	mg/L RL			
Alkalinity, Total (as CaCO3)		500 4.00			

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Odessa Laboratory Director



Certificate of Analysis Summary 299680

R.T. Hicks Consultants, LTD, Albuquerque, NM

Project Name: Pride Energy Company

Project Id: South Four Lakes Tank Battery

Date Received in Lab Mar-14-08 04:15 pm

Contact: Randy Hicks

Report Date: 02-APR-08


Project Location: T12S-R34E, Section 2

Project Manager: Brent Barron, II

Analysis Requested	Lab Id:	299680-009			
	Field Id:	MW-17			
	Depth:				
	Matrix:	WATER			
	Sampled:	Mar-13-08 11:48			
Total Metals by EPA 6010B	Extracted:				
	Analyzed:	Mar-19-08 14:59			
	Units/RL:	mg/L RL			
Manganese		0.772 0.050			
Iron		0.313 0.200			

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Flagging Criteria

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to effect the recovery of the spike concentration. This condition could also effect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the MQL(PQL) and above the SQL(MDL).
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.

* Outside XENCO'S scope of NELAC Accreditation

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(305) 823-8500	(305) 823-8555
(770) 449-8800	(770) 449-5477



Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717385

Sample: 299637-002 S / MS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0304	0.0300	101	80-120	
4-Bromofluorobenzene	0.0337	0.0300	112	80-120	

Lab Batch #: 717385

Sample: 299637-002 SD / MSD

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0304	0.0300	101	80-120	
4-Bromofluorobenzene	0.0343	0.0300	114	80-120	

Lab Batch #: 717385

Sample: 299680-001 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0334	0.0300	111	80-120	
4-Bromofluorobenzene	0.0336	0.0300	112	80-120	

Lab Batch #: 717385

Sample: 299680-002 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0331	0.0300	110	80-120	
4-Bromofluorobenzene	0.0337	0.0300	112	80-120	

Lab Batch #: 717385

Sample: 299680-003 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0343	0.0300	114	80-120	
4-Bromofluorobenzene	0.0348	0.0300	116	80-120	

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

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717385

Sample: 299680-005 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
1,4-Difluorobenzene	0.0331	0.0300	110	80-120	
4-Bromofluorobenzene	0.0343	0.0300	114	80-120	

Lab Batch #: 717385

Sample: 299680-006 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
1,4-Difluorobenzene	0.0330	0.0300	110	80-120	
4-Bromofluorobenzene	0.0338	0.0300	113	80-120	

Lab Batch #: 717385

Sample: 506013-1-BKS / BKS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
1,4-Difluorobenzene	0.0307	0.0300	102	80-120	
4-Bromofluorobenzene	0.0314	0.0300	105	80-120	

Lab Batch #: 717385

Sample: 506013-1-BLK / BLK

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
1,4-Difluorobenzene	0.0334	0.0300	111	80-120	
4-Bromofluorobenzene	0.0327	0.0300	109	80-120	

Lab Batch #: 717385

Sample: 506013-1-BSD / BSD

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
1,4-Difluorobenzene	0.0305	0.0300	102	80-120	
4-Bromofluorobenzene	0.0332	0.0300	111	80-120	

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

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 \times A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717545

Sample: 299680-004 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.5494	0.0300	1831	80-120	**
4-Bromofluorobenzene	0.2296	0.0300	765	80-120	**

Lab Batch #: 717545

Sample: 299680-008 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0352	0.0300	117	80-120	
4-Bromofluorobenzene	0.0417	0.0300	139	80-120	**

Lab Batch #: 717545

Sample: 299680-009 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0333	0.0300	111	80-120	
4-Bromofluorobenzene	0.0341	0.0300	114	80-120	

Lab Batch #: 717545

Sample: 299685-002 S / MS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0339	0.0300	113	80-120	
4-Bromofluorobenzene	0.0360	0.0300	120	80-120	

Lab Batch #: 717545

Sample: 299685-002 SD / MSD

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0342	0.0300	114	80-120	
4-Bromofluorobenzene	0.0356	0.0300	119	80-120	

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

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717545

Sample: 506115-1-BKS / BKS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0301	0.0300	100	80-120	
4-Bromofluorobenzene	0.0329	0.0300	110	80-120	

Lab Batch #: 717545

Sample: 506115-1-BLK / BLK

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0328	0.0300	109	80-120	
4-Bromofluorobenzene	0.0337	0.0300	112	80-120	

Lab Batch #: 717545

Sample: 506115-1-BSD / BSD

Batch: 1 Matrix: Water

Units: mg/L

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

Lab Batch #: 717610

Sample: 299447-003 S / MS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0307	0.0300	102	80-120	
4-Bromofluorobenzene	0.0320	0.0300	107	80-120	

Lab Batch #: 717610

Sample: 299447-003 SD / MSD

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0309	0.0300	103	80-120	
4-Bromofluorobenzene	0.0322	0.0300	107	80-120	

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

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717610

Sample: 299680-007 / SMP

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0344	0.0300	115	80-120	
4-Bromofluorobenzene	0.0344	0.0300	115	80-120	

Lab Batch #: 717610

Sample: 506150-1-BKS / BKS

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0336	0.0300	112	80-120	
4-Bromofluorobenzene	0.0353	0.0300	118	80-120	

Lab Batch #: 717610

Sample: 506150-1-BLK / BLK

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0327	0.0300	109	80-120	
4-Bromofluorobenzene	0.0328	0.0300	109	80-120	

Lab Batch #: 717610

Sample: 506150-1-BSD / BSD

Batch: 1 Matrix: Water

Units: mg/L

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery % R [D]	Control Limits % R	Flags
Analytes					
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0331	0.0300	110	80-120	

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

*** Poor recoveries due to dilution

Surrogate Recovery [D] = $100 * A / B$

All results are based on MDL and validated for QC purposes.



Blank Spike Recovery

Project Name: Pride Energy Company

Work Order #: 299680

Project ID: South Four Lakes Tank Battery

Lab Batch #: 717368

Sample: 717368-1-BKS

Matrix: Water

Date Analyzed: 03/17/2008

Date Prepared: 03/17/2008

Analyst: WRU

Reporting Units: mg/L

Batch #: 1

BLANK /BLANK SPIKE RECOVERY STUDY

Total Alkalinity by EPA 310.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike % R [D]	Control Limits % R	Flags
Analytes						
Alkalinity, Total (as CaCO ₃)	ND	200	172	86	80-120	

Lab Batch #: 717587

Sample: 717587-1-BKS

Matrix: Water

Date Analyzed: 03/14/2008

Date Prepared: 03/14/2008

Analyst: IRO

Reporting Units: mg/L

Batch #: 1

BLANK /BLANK SPIKE RECOVERY STUDY

Nitrate by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike % R [D]	Control Limits % R	Flags
Analytes						
Nitrate as N	ND	0.452	0.433	96	90-110	

Lab Batch #: 717875

Sample: 717875-1-BKS

Matrix: Water

Date Analyzed: 03/22/2008

Date Prepared: 03/22/2008

Analyst: MAB

Reporting Units: mg/L

Batch #: 1

BLANK /BLANK SPIKE RECOVERY STUDY

Anions by EPA 300/300.1	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike % R [D]	Control Limits % R	Flags
Analytes						
Chloride	ND	5.00	5.06	101	85-115	
Sulfate	ND	5.00	4.76	95	90-110	

Blank Spike Recovery [D] = 100*[C]/[B]

All results are based on MDL and validated for QC purposes.



BS / BSD Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Analyst: SHE

Lab Batch ID: 717385

Sample: 506013-1-BKS

Date Prepared: 03/17/2008

Batch #: 1

Project ID: South Four Lakes Tank Battery

Date Analyzed: 03/17/2008

Matrix: Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY											
Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	Benzene	ND	0.1000	0.0919	92	0.1	0.0969	97	5	70-125	25
	Toluene	ND	0.1000	0.0919	92	0.1	0.0973	97	6	70-125	25
	Ethylbenzene	ND	0.1000	0.0945	95	0.1	0.1011	101	7	71-129	25
	m,p-Xylenes	ND	0.2000	0.1862	93	0.2	0.1997	100	7	70-131	25
	o-Xylene	ND	0.1000	0.0973	97	0.1	0.1044	104	7	71-133	25

Analyst: SHE

Lab Batch ID: 717545

Sample: 506115-1-BKS

Date Prepared: 03/18/2008

Batch #: 1

Date Analyzed: 03/18/2008

Matrix: Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY													
Units: mg/L	BTEX by EPA 8021B	Analytes	Blank Sample Result	Spike Added	Blank Spike Result	Blank Spike %R	Spike Added	Blank Spike Duplicate Result	Blk. Spk Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag
			[A]	[B]	[C]	[D]	[E]	[F]	[G]				
			ND	0.1000	0.0886	89	0.1	0.0913	91	3	70-125	25	
			ND	0.1000	0.0883	88	0.1	0.0908	91	3	70-125	25	
			ND	0.1000	0.0906	91	0.1	0.0927	93	2	71-129	25	
			ND	0.2000	0.1814	91	0.2	0.1850	93	2	70-131	25	
			ND	0.1000	0.0967	97	0.1	0.0982	98	2	71-133	25	

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



BS / BSD Recoveries

Project Name: Pride Energy Company

Work Order #: 299680

Analyst: SHE

Lab Batch ID: 717610

Sample: 506150-1-BKS

Date Prepared: 03/19/2008

Batch #: 1

Project ID: South Four Lakes Tank Battery

Date Analyzed: 03/19/2008

Matrix: Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY											
BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	Benzene	ND	0.1000	0.0867	87	0.1	0.0848	85	2	70-125	25
	Toluene	ND	0.1000	0.0868	87	0.1	0.0848	85	2	70-125	25
	Ethylbenzene	ND	0.1000	0.0916	92	0.1	0.0885	89	3	71-129	25
	m,p-Xylenes	ND	0.2000	0.1841	92	0.2	0.1774	89	4	70-131	25
	o-Xylene	ND	0.1000	0.0998	100	0.1	0.0959	96	4	71-133	25

Analyst: LATCOR

Lab Batch ID: 717542

Sample: 717542-1-BKS

Date Prepared: 03/19/2008

Batch #: 1

Date Analyzed: 03/19/2008

Matrix: Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY											
Total Metals by EPA 6010B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	Iron	ND	0.200	0.203	102	0.2	0.210	105	3	80-120	20
	Manganese	ND	0.200	0.206	103	0.2	0.214	107	4	80-120	20

Relative Percent Difference RPD = $200 * [(D-F)/(D+F)]$

Blank Spike Recovery [D] = $100 * (C)/[B]$

Blank Spike Duplicate Recovery [G] = $100 * (F)/[E]$

All results are based on MDL and Validated for QC Purposes



Form 3 - MS Recoveries

Project Name: Pride Energy Company

Work Order #: 299680
Lab Batch #: 717587
Date Analyzed: 03/14/2008
QC- Sample ID: 299637-001 S
Reporting Units: mg/L

Date Prepared: 03/14/2008
Analyst: IRO
Batch #: 1
Matrix: Water
Project ID: South Four Lakes Tank Battery

MATRIX / MATRIX SPIKE RECOVERY STUDY						
Inorganic Anions by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Analytes						
Nitrate as N	4.83	4.52	4.83	107	90-110	

Lab Batch #: 717542
Date Analyzed: 03/19/2008
QC- Sample ID: 299680-001 S
Reporting Units: mg/L
Date Prepared: 03/19/2008
Analyst: LATCOR
Batch #: 1
Matrix: Water

MATRIX / MATRIX SPIKE RECOVERY STUDY						
Total Metals by EPA 6010B	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Analytes						
Iron	ND	0.200	0.358	179	80-120	X
Manganese	0.602	0.200	0.926	162	80-120	X

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



Form 3 - MSD Recoveries

Project Name: Pride Energy Company

Work Order # 299680

Lab Batch ID: 717385

Date Analyzed: 03/18/2008

Reporting Units: mg/L

Project ID: South Four Lakes Tank Battery

QC-Sample ID: 299637-002 S Batch #: 1 Matrix: Water

Date Prepared: 03/17/2008 Analyst: SHE

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY												
Reporting Units: mg/L	BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	Benzene	ND	0.1000	0.1001	100	0.1000	0.0974	97	3	70-125	25	
	Toluene	ND	0.1000	0.1019	102	0.1000	0.0990	99	3	70-125	25	
	Ethylbenzene	ND	0.1000	0.1040	104	0.1000	0.1017	102	2	71-129	25	
	m,p-Xylenes	ND	0.2000	0.2037	102	0.2000	0.1996	100	2	70-131	25	
	o-Xylene	ND	0.1000	0.1080	108	0.1000	0.1055	106	2	71-133	25	

Lab Batch ID: 717545

Date Analyzed: 03/18/2008

Reporting Units: mg/L

QC-Sample ID: 299685-002 S Batch #: 1 Matrix: Water

Date Prepared: 03/18/2008 Analyst: SHE

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY													
Reporting Units: mg/L	BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag	
	Benzene	0.0120	0.1000	0.0889	77	0.1000	0.0953	83	8	70-125	25		
	Toluene	ND	0.1000	0.0801	80	0.1000	0.0838	84	5	70-125	25		
	Ethylbenzene	ND	0.1000	0.0853	85	0.1000	0.0893	89	5	71-129	25		
	m,p-Xylenes	ND	0.2000	0.1693	85	0.2000	0.1758	88	3	70-131	25		
	o-Xylene	ND	0.1000	0.0884	88	0.1000	0.0921	92	4	71-133	25		

Matrix Spike Percent Recovery $[D] = 100 \cdot (C-A)/B$
Relative Percent Difference $RPD = 200 \cdot (D-G)/(D+G)$

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

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



Form 3 - MSD Recoveries

Project Name: Pride Energy Company

Work Order # 299680

Lab Batch ID: 717610

Date Analyzed: 03/19/2008

Reporting Units: mg/L

Project ID: South Four Lakes Tank Battery

QC- Sample ID: 299447-003 S

Batch #: 1

Matrix: Water

Date Prepared: 03/19/2008

Analyst: SHE

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										Flag
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	
BTEX by EPA 8021B											
Benzene	ND	0.1000	0.1038	104	0.1000	0.1121	112	7	70-125	25	
Toluene	ND	0.1000	0.1030	103	0.1000	0.1122	112	8	70-125	25	
Ethylbenzene	ND	0.1000	0.1055	106	0.1000	0.1161	116	9	71-129	25	
m,p-Xylenes	ND	0.2000	0.2079	104	0.2000	0.2291	115	10	70-131	25	
o-Xylene	ND	0.1000	0.1095	110	0.1000	0.1212	121	10	71-133	25	

Lab Batch ID: 717875

Date Analyzed: 03/22/2008

Reporting Units: mg/L

QC- Sample ID: 300158-005 S

Batch #: 1

Matrix: Water

Date Prepared: 03/22/2008

Analyst: MAB

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										Flag
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	
Anions by EPA 300/300.1											
Chloride	157	5.00	146	0	5.00	146	0	NC	90-110	20	X
Sulfate	245	5.00	225	0	5.00	225	0	NC	90-110	20	X

Matrix Spike Percent Recovery $[D] = 100 \times (C-A)/B$

Relative Percent Difference $RPD = 200 \times (D-G)/(D+G)$

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA =

Not ApplicableN = See Narrative, EQL = Estimated Quantitation Limit

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



Sample Duplicate Recovery

Project Name: Pride Energy Company

Work Order #: 299680

Lab Batch #: 717875

Date Analyzed: 03/22/2008

QC- Sample ID: 300158-005 D

Reporting Units: mg/L

Project ID: South Four Lakes Tank Battery

Analyst: MAB

Date Prepared: 03/22/2008

Batch #: 1

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Anions by EPA 300/300.1	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Chloride	157	157	0	20	
Sulfate	245	245	0	20	

Lab Batch #: 717329

Date Analyzed: 03/17/2008

QC- Sample ID: 299654-001 D

Reporting Units: mg/L

Date Prepared: 03/17/2008

Analyst: LATCOR

Batch #: 1

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Metals per ICP by SW846 6010B	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Calcium	45.1	45.8	2	25	
Magnesium	22.6	21.8	4	25	
Potassium	8.64	8.45	2	25	
Sodium	172	172	0	25	

Lab Batch #: 717587

Date Analyzed: 03/14/2008

QC- Sample ID: 299637-001 D

Reporting Units: mg/L

Date Prepared: 03/14/2008

Analyst: IRO

Batch #: 1

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Nitrate by EPA 300/300.1	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Nitrate as N	ND	ND	NC	20	

Lab Batch #: 717537

Date Analyzed: 03/17/2008

QC- Sample ID: 299680-001 D

Reporting Units: mg/L

Date Prepared: 03/17/2008

Analyst: RBA

Batch #: 1

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
TDS by SM2540C	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Total dissolved solids	1020	1030	1	30	

Spike Relative Difference $RPD = 200 * |(B-A)/(B+A)|$

All Results are based on MDL and validated for QC purposes.



Sample Duplicate Recovery

Project Name: Pride Energy Company

Work Order #: 299680

Lab Batch #: 718707

Date Analyzed: 03/31/2008

QC- Sample ID: 300683-001 D

Reporting Units: mg/L

Date Prepared: 03/31/2008

Batch #: 1

Project ID: South Four Lakes Tank Battery

Analyst: RBA

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
TDS by SM2540C	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Total dissolved solids	12500	12500	0	30	

Lab Batch #: 717368

Date Analyzed: 03/17/2008

QC- Sample ID: 299680-001 D

Reporting Units: mg/L

Date Prepared: 03/17/2008

Batch #: 1

Analyst: WRU

Matrix: Water

SAMPLE / SAMPLE DUPLICATE RECOVERY					
Total Alkalinity by EPA 310.1	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Analyte					
Alkalinity, Total (as CaCO ₃)	228	236	3	20	

Spike Relative Difference RPD $200 * |(B-A)/(B+A)|$

All Results are based on MDL and validated for QC purposes.

Environmental Lab of Texas
Variance/ Corrective Action Report- Sample Log-In

Client: P.T. Hicks
Date/ Time: 3-14-08 4:15
Lab ID #: 299680
Initials: AL

Sample Receipt Checklist

				Client Initials
#1	Temperature of container/ cooler?	Yes	No	-1.5 °C
#2	Shipping container in good condition?	Yes	No	
#3	Custody Seals intact on shipping container/ cooler?	Yes	No	Not Present
#4	Custody Seals intact on sample bottles/ container?	Yes	No	Not Present
#5	Chain of Custody present?	Yes	No	
#6	Sample instructions complete of Chain of Custody?	Yes	No	
#7	Chain of Custody signed when relinquished/ received?	Yes	No	
#8	Chain of Custody agrees with sample label(s)?	Yes	No	ID written on Cont./ Lid
#9	Container label(s) legible and intact?	Yes	No	Not Applicable
#10	Sample matrix/ properties agree with Chain of Custody?	Yes	No	
#11	Containers supplied by ELOT?	Yes	No	
#12	Samples in proper container/ bottle?	Yes	No	See Below
#13	Samples properly preserved?	Yes	No	See Below
#14	Sample bottles intact?	Yes	No	
#15	Preservations documented on Chain of Custody?	Yes	No	
#16	Containers documented on Chain of Custody?	Yes	No	
#17	Sufficient sample amount for indicated test(s)?	Yes	No	See Below
#18	All samples received within sufficient hold time?	Yes	No	See Below
#19	Subcontract of sample(s)?	Yes	No	Not Applicable
#20	VOC samples have zero headspace?	Yes	No	Not Applicable

Variance Documentation

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

Regarding: _____

Corrective Action Taken: _____

- Check all that Apply:
- ☐ See attached e-mail/ fax
 - ☐ Client understands and would like to proceed with analysis
 - ☐ Cooling process had begun shortly after sampling event

APPENDIX C

Well Sampling Data Forms



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW- 2
DATE: March 13, 2008
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: 35.7 Feet

DEPTH TO WATER: 27.51 Feet

HEIGHT OF WATER COLUMN: 8.19 Feet

WELL DIAMETER: 2.0 Inch

4.0 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
14:25	4	18.0	1.49	6.33	3.6		
							Fe ⁺² = 0.07 mg/L
							Samples Collected
:Total Time (hr:min)			:Total Vol (gal)			: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 Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW- 4
DATE: March 13, 2008
SAMPLER: Dale Littlejohn

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: 24.88 Feet

HEIGHT OF WATER COLUMN: 6.32 Feet

WELL DIAMETER: 2.0 Inch

3.1 Minimum gallons to purge 3 well volumes

4 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °F	COND. mS/cm	pH	DO mg/L	PHYSICAL APPEARANCE AND REMARKS
10:43	0					Start hand bailing
10:48	1.3	63.5	1.49	7.02	2.9	Clear
10:51	2.7	64.2	1.49	7.04	2.8	Clear
10:55	4.0	64.4	1.50	7.05	2.80	Slightly cloudy (white)
11:00						Samples Collected
						Fe ⁺² = 0.97 mg/L
:Total Time (hr:min)		:Total Vol (gal)		:Average Flow Rate (gal/min)		

COMMENTS: Hydac Meter used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW- 5
DATE: March 13, 2008
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: 30.9 Feet

DEPTH TO WATER: 25.74 Feet

HEIGHT OF WATER COLUMN: 5.16 Feet

WELL DIAMETER: 2.0 Inch

2.5 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
15:00	3	19.3	1.28	6.38	4.8		
							Fe ⁺² = 0.29 mg/L
							Samples Collected
:Total Time (hr:min)			:Total Vol (gal)			: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 Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW - 10
DATE: March 13, 2008
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: 32.2 Feet

DEPTH TO WATER: 25.21 Feet

HEIGHT OF WATER COLUMN: 6.99 Feet

WELL DIAMETER: 2.0 Inch

3.4 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
13:32	4	17.6	2.14	6.41	6.5		
							Fe ⁺² = 0.01 mg/L
							Samples Collected
:Total Time (hr:min)			:Total Vol (gal)			: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 Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW - 14
DATE: March 13, 2008
SAMPLER: Dale Littlejohn

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: 28.27 Feet

HEIGHT OF WATER COLUMN: 9.03 Feet

WELL DIAMETER: 2.0 Inch

4.4 Minimum gallons to purge 3 well volumes

5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °F	COND. mS/cm	pH	DO mg/L	PHYSICAL APPEARANCE AND REMARKS
12:48	0					Start hand bailing
12:52	1.7	68.6	1.62	7.18	4.7	Cloudy, white
12:56						Bailed dry without recovery
13:14						Begin bailing again
13:17	3.3	70.4	1.59	7.08	4.70	Cloudy, bails down
13:21	5	68.4	1.63	7.08	4.70	but recovers quickly
						Fe ⁺² = 0.01 mg/L
13:25						Samples Collected
:Total Time (hr:min)		:Total Vol (gal)			:Average Flow Rate (gal/min)	

COMMENTS: Hydac Meter used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.



WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company

WELL ID: MW - 15

SITE NAME: S. Four Lakes Tank Battery

DATE: March 13, 2008

SITE LOCATION: T12S-R34E-Sec 2 Unit G

SAMPLER: Dale Littlejohn

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: 26.84 Feet

HEIGHT OF WATER COLUMN: 9.96 Feet

WELL DIAMETER: 2.0 Inch

4.9 Minimum gallons to purge 3 well volumes

5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °F	COND. mS/cm	pH	DO mg/L	PHYSICAL APPEARANCE AND REMARKS
13:49	0					Start hand bailing
13:57	1.7	71.1	3.96	6.92	2.5	Cloudy, gray, with mesquite roots
14:01	3.3	67.3	3.75	6.89	2.6	Cloudy, light gray
14:06	5.0	66.7	3.81	6.90	2.6	Slightly cloudy
14:09						Samples Collected
						Fe ⁺² = 1.03 mg/L
:Total Time (hr:min)		:Total Vol (gal)			:Average Flow Rate (gal/min)	

COMMENTS: Hydac Meter used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.





WELL SAMPLING DATA FORM

CLIENT: Pride Energy Company
SITE NAME: S. Four Lakes Tank Battery
SITE LOCATION: T12S-R34E-Sec 2 Unit G

WELL ID: MW - 16
DATE: March 13, 2008
SAMPLER: Dale Littlejohn

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: 36.4 Feet

DEPTH TO WATER: 27.94 Feet

HEIGHT OF WATER COLUMN: 8.46 Feet

WELL DIAMETER: 2.0 Inch

4.1 Minimum gallons to purge 3 well volumes

5 Actual Gallons purged

TIME	VOLUME PURGED	TEMP. °F	COND. mS/cm	pH	DO mg/L	PHYSICAL APPEARANCE AND REMARKS
12:11	0					Start hand bailing
12:14	1.7	68.7	1.51	7.10	2.9	Clear to very light brown
12:18	3.3	67.4	1.46	7.10	3.5	Clear to very light brown
12:22	5.0	67.6	1.47	7.07	3.2	
12:25						Samples Collected
						Fe ⁺² = 0.01 mg/L
:Total Time (hr:min)			:Total Vol (gal)		:Average Flow Rate (gal/min)	

COMMENTS: Hydac Meter used to obtain temperature, conductivity, & pH, measurements.

Milwaukee Model SM600 used to obtain dissolved oxygen measurements.

Delivered samples to Xenco Laboratories /Environmental Lab of Texas for BTEX, Major Ions, TDS, Nitrate, Total Fe, and Total Mn analyses.