AP-77 Pride Energy #14 - South Fork Lakes Unit

Sept 2004 - well spudded
Oct 2004 - well completed
Aug 2007 - Closure form C-144 submitted
Jan 2008 - Form C-141 submitted
Feb 2008 - Abatement Plan required
Sept 2008 - Stage 2 Abatement Plan submitted

chronology in Stage 2 Plan refers to pollution coming from a Humble Oil legacy pit from 1961 using 1964 aerial photo of site. apparently Pride Energy constructed their drilling pit for Well #14 at the same location as the 1961 pit. Claim that "evidence collected to date permits a conclusion that the documented impairment of groundwater (2500 mg/l Cl) is wholly or primarily due to seepage associated with the 1961 drilling pit."

Mar 1961 Humble Oil submits Notice of Intent to Drill unit #1
July 1961 well is completed
July 1967 Humble submits plugging and abandonment form C-103

Pride Energy abatement plan is "pump and use"

depth to groundwater estimated with info from surrounding wells at 24 to 38 ft bgs
later determined to be 23 ft bgs

"brine from the pit probably migrated through the vadose zone to groundwater via saturated flow during operation of the drilling pit or sometime during the drying process"

MW1 located at SE corner of former drilling pit footprint
concentration in groundwater 3 ft below water table: 1100 mg/l Cl and 2200 mg/l TDS
concentration in groundwater 17-20 ft below water table: 3100 mg/l Cl and 5400 mg/l TDS
concentration after purging: 4700 mg/l Cl and 8100 mg/l TDS

estimate downgradient migration at 150 feet

the following data dated Jan 2008
soil concentrations at 8 ft: 1300 to 14,000 mg/kg
soil concentrations at 12 ft: 1500 to 12,000 mg/kg
soil concentrations at 16 ft: 900 to 9200 mg/kg
highest concentrations in center of pit and SE corner

used trench burial system for closure

6C

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R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

September 15, 2008

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Pride Energy South Four Lakes #14
NMOCD #AP-077

Dear Wayne:

Please accept this Stage 2 Abatement Plan for the above-referenced site as fulfillment of Pride Energy's mandate to submit a Stage 2 Abatement Plan. We installed two borings down gradient of the former drilling pit. The magnitude and extent of brine impact is consistent with a release from the legacy pit drilled by Humble Oil in 1961. The extent of chloride impairment of ground water (i.e. concentrations in excess of 250 mg/L) appears restricted to the area occupied by the production pad. Regulated hydrocarbons are not present in ground water or the vadose zone.

Three additional wells are proposed to refine our estimate of the vertical and horizontal extent of ground water impairment at the site. MW-1 medium and deep are, 2-inch monitoring wells located near the center of mass of ground water chloride and are screened below a low-permeability quartzite horizon. MW-2 and MW-3 are 2-inch monitoring well clusters located about 200 feet down gradient from the former drilling pits.

The proposed ground water remedy is natural restoration with an on-demand pump-and-use contingency plan that recovers brackish ground water for drilling oil and gas wells in the area.

The proposed drilling pit excavation closure is construction of an infiltration barrier to minimize the transport of salt from the vadose zone to ground water. Because the open excavation allows infiltration of precipitation through the impacted vadose zone and may represent an ongoing safety threat to stock, we ask NMOCD to review the vadose zone remedy as soon as possible. We are prepared to meet with you to resolve any outstanding issues associated with this vadose zone remedy - as it is the same design for other Pride sites. We will prepare a Public Notice for your review upon your request.

Sincerely,
R.T. Hicks Consultants, Ltd.

Randall T. Hicks
Principal

Copy: Pride Energy
NMOCD District II
New Mexico State Land Office

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List of Plates

List of Appendices

1 Summary

1. Humble Oil and Refining (Humble) drilled South Four Lakes Unit #1 at this location in 1961. The cover of this plan shows a 1964 air photo of the area and the site is located in the upper right corner of the photograph.
2. In 2004, Pride Energy constructed a drilling pit for South Four Lakes #14 at the same location as the 1961 drilling pit
3. Evidence collected to date permits a conclusion that the horizontal extent of ground water impairment (chloride concentrations greater than 250 mg/L) is restricted to the area of the production pad.
4. Evidence collected to date permit a conclusion that the vertical extent of ground water impairment (chloride concentrations greater than 250 mg/L) is restricted to the ground water zone above a well-cemented quartzite horizon that exists at a depth of 52 feet below grade.
5. At MW-1, which is drilled through the legacy Humble drilling pit and is about 10-feet down gradient from the Pride drilling pit, chloride in ground water exceeds 2,500 mg/L.
6. Evidence collected to date permits a conclusion that the documented impairment of ground water is wholly or primarily due to seepage associated with the 1961 drilling pit.
7. Construction of a deep monitoring well using the mud-rotary method is proposed to test the hypothesis that the vertical extent of ground water impairment is restricted to the the aquifer that lies above the local quartzite horizon.
8. Construction of two down gradient monitoring wells is proposed to refine our estimate of the horizontal extent of ground water impairment
9. The proposed ground water remedy program is natural restoration and monitoring with a contingency plan to implement an on-demand pump-and-use program to remove impaired ground water for use in oil and gas well drilling.
10. Six months after NMOCD approval of this plan Pride will provide a report to NMOCD that presents
    a. The borehole data from the proposed monitoring wells,
    b. the ground water monitoring and sampling data,
    c. our analysis of contaminant fate and transport and
    d. a recommendation to continue with the proposed remedy of natural restoration or to implement an on-demand pump-and-use ground water restoration program as a contingency.

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2.4 Site History – Table 1 and Plate 2

Our examination of historic aerial photographs show that the drilling pit used by Pride Energy was located at the same location as the drilling pit used for the drilling of the Humble Oil and Refining Company well South Four Lakes Unit #1 originally drilled in 1961. Plate 2 is a 1966 aerial photo that shows the scar from the 1961 drilling event with the configuration of the Pride Energy activities superimposed. Prior to the mid 1960s, the State of New Mexico did not require lining of drilling pits, therefore it is probable that the 1961 unlined drilling pit released brine to the subsurface. Table 1 presents the Site History.

Table 1: Site History

Date	Description
March 3, 1961	Humble Oil and Refining Company submits Notice of Intent to Drill South Four Lakes Unit #1 (API – 30-025-01828) well at this location to a depth of 10,600 feet
July 16, 1961	Humble completes well
July 18, 1967	Humble submits plugging and abandonment Form C-103 to NMOCD
August 30, 2004	Pride submits APD (C-101) for South Four Lakes Unit #14
September 8, 2004	Well spudded
October 25, 2004	Well drilled to total depth
March 10, 2005	Set pump in well
August 21, 2007	C-144 Pit Closure Form submitted to NMOCD
December 10, 2007	Revised C-144 submitted by Elke Environmental to NMOCD
January 30, 2008	C-141 submitted by Elke Environmental to NMOCD
February 12, 2008	NMOCD requires submission of Abatement Plan
April 14, 2008	Stage 1 Abatement Plan submitted by R.T. Hicks Consultants to NMOCD
May 13, 2008	Soil boring program to define vertical and horizontal extent of any impairment to ground water
June 19, 2008	Sampling and monitoring event
September, 2008	Stage 2 Abatement Plan submitted by R.T. Hicks Consultants to NMOCD

3 May 2008 Deep Sampling Program – Field Protocols and Modification of the Stage 1 Abatement Plan

On May 13, 2008, Hicks Consultants mobilized to the site to perform soil boring activities. Hicks Consultants selected Atkins Engineering (Atkins), from Roswell, NM, as the drilling contractor. Using a Foremost Mobile 58 drilling rig and a 7 ¼- inch O.D. hollow stem auger, we installed two soil borings at the site (see Plate 1).

After examination of historic air photos and a close examination of the site, we modified the location of the soil borings shown in Plate 6 of the Stage 1 Abatement Plan. The first boring was drilled adjacent to MW-1 (see Plate 1), and is basically the same location as the proposed boring SB-1 shown on Plate 6 of the Stage 1 Abatement Plan. We drilled the second boring midway between the

proposed borings SB-2 and SB-3 shown on Plate 6 of the Stage 1 Abatement Plan. The relatively low chloride concentrations in this boring obviated the need for additional borings.

Because each boring encountered a hard quartzite horizon at 52-feet below grade, we ceased drilling to avoid creating a vertical pathway between the documented impaired ground water and potentially unimpaired ground water beneath the quartzite. Furthermore, we observed flowing sands under lithostatic or hydrostatic pressure during soil boring activities at another Pride Energy site, State X #1. With the knowledge that flowing sands exist in the area, penetration of the quartzite layer without a mud column in the hole could allow flowing sand to rise in the auger hole, causing the loss of the hole and creation of a permanent conduit through the quartzite.

At each boring location, we

1. Created a borehole log.
2. Measured specific conductance (SC) of ground water collected through the auger using a trip bailer. SC was measured using a Hanna Combo pH & EC meter (Model No. HI 98130). We used the SC measurements to a.) determine the vertical and horizontal extent of any ground water impairment and b.) determine the location of additional boreholes.
3. Complete soil boring as a monitoring well if drilled outside of the deadman (well anchor) zone. The Association of Energy Service Companies (AESC) recommended safe procedures and guidelines for oil and gas well servicing[2] states "During operations, all wireline units, other vehicles, or portable houses and equipment should be placed outside the guylines of the well service unit and outside the fall zone (lane) of the derrick". The standpipe for a monitoring well would create a hazard during well servicing if placed within the deadman zone.
4. When borehole conditions allowed, we obtained ground water samples for laboratory analysis for SC, chloride, and total dissolved solids (TDS) to correlated field measurements with laboratory measurements. We submitted the ground water samples to Hall Environmental Laboratories in Albuquerque, NM. Laboratory Certificates of Analysis are in Appendix A.

Because ground water analysis of samples from MW-1 did not detect regulated hydrocarbons and deep soil samples from within the former pit did not detect volatile hydrocarbon vapors above 20 ppm using a PID, we did not collect samples from the auger borings for analysis of regulated hydrocarbons.

4 Results of Deep Sampling Program

4.1 Soil Boring SB-01 – Plate 3

SB-01 is located approximately 70-feet east of the southeast corner of the former drilling pit. The borehole log is shown on Plate 3.

[2] Association of Energy Service Companies (AESC) Recommended Safe Procedures and Guidelines for Oil and Gas Well Servicing. Available: http://www.aesc.net/Safety/index.cfm?action=view&pdfid=27 and http://www.aesc.net/Safety/index.cfm. Accessed July 3, 2008.

Total depth of this borehole is 53.2-feet. The upper 15-feet consist of caliche. Fifteen to 52-feet below ground surface (bgs) is composed of fine sand with interbedded quartzite between 15 and 23-feet bgs. Quartzite (well indurated fine sandstone) exists from 52 to total depth.

Ground water was encountered at 27-feet bgs. We were unable to obtain field measurements at 38 and 43-feet bgs due to fine sands clogging the trip bailer. However, we obtained a ground water sample at total depth. Field measurements indicate SC is 7.33 mS/cm. We were unable to obtain sufficient sample volume for laboratory analysis.

4.2 Soil Boring SB-02 – Plate 4

SB-02 is located down-gradient approximately 65-feet southeast of the southeast corner of the former drilling pit. The borehole log is shown on Plate 4.

Total depth of this borehole is 52-feet. The upper 18-feet consist of caliche. Eighteen to 51-feet below ground surface (bgs) is composed of fine sand. Quartzite exists from 51 to total depth. We ceased drilling at 52-feet to avoid creating a vertical pathway for any impaired ground water.

Ground water was encountered at 23-feet bgs. Field measurements indicate the SC of ground water remained relatively consistent. We obtained sufficient sample volume for laboratory analysis of ground water at 28.3 and 38.2-feet bgs.

4.3 Analysis of Ground Water from Borings – Table 2 and Plate 5

Field and laboratory analysis of ground water samples are shown in Table 2.

Table 2: Analysis of ground water samples

Boring ID	Depth (ft bgs)	Field Measured Values	Lab Analyzed Values		
		SC (mS/cm)	SC (mS/cm)	Chloride (mg/L)	TDS (mg/L)
SB-01	52.2	7.33	---	---	---
SB-02	28.3	1.66	1.60	280	1,100
SB-02	38.2	1.55	1.50	270	1,400
SB-02	48.2	1.65	---	---	---

--- indicates insufficient sample volume for lab analysis

SB-01 shows the highest SC measurement; 7.33 mS/cm at 53.2 feet bgs. SC measurements at SB-02 remained relatively consistent with increasing depth ranging from 1.55 to 1.65 mS/cm (see Plate 5 and Table 2).

Plate 5 shows the soil boring data spatially. Included on Plate 5 is laboratory and field data. Field TDS values were calculated from field SC measurements by correlating the ratio between lab measured conductivity and lab analyzed TDS concentrations (a 0.72 factor, see Table3). Maximum

calculated field TDS is 5,058 mg/L which occurred at SB-01, exceeding New Mexico Quality Control Commission's (WQCC) standards of 1,000 mg/L for domestic water supplies.

Calculated and actual TDS measurements at SB-02 range from 1,100 to 1,447 mg/L TDS. Actual chloride concentrations ranged from 270 to 280 mg/L; which only slightly exceeds the WQCC standard of 250 mg/L.

4.4 Ground Water Monitoring Well Sampling – Table 3 and Appendix A

Table 4, below, summarizes recent and historic ground water chemistry and ground water elevation measurements at MW-01. The Certificate of Analysis for the June 19th sampling event is in Appendix A.

June 2008 ground water monitoring data indicates chloride and TDS concentrations (2,600 and 5,700 mg/L, respectively) are above the WQCC standard at MW-01.

Table 4: Summary of ground water chemistry at MW-01

Sample Date	GW Elevation (ft)	DTW (ft)	Cl (mg/L)	TDS (mg/L)	Specific Conductance (mS/cm) (field measured)
1/24/2008	4123.70	25.10	1910	NA	6.32
3/13/2008	4123.58	25.22	1700	4260	6.74
6/19/2008	4123.45	25.35	2600	5700	6.89

NA indicates not analyzed for this constituent

Although MW-01 is the only monitoring well at the site, data from nearby monitoring wells and data from USGS allow a reasonable assessment of the water table elevation in the area. Plate 6 shows ground water gauging data collected at four nearby Pride Energy sites and a water table elevation map. Ground water flows east-southeast at a gradient of approximately 0.002. Depth to water at the site is approximately 25-feet bgs. Plate 6 agrees with regional data[1] from USGS gauging stations for 1996.

5 Discussion and Conclusions

All of the conclusions listed below will be proved or disproved by the data collection program proposed in the Stage 2 Abatement Plan described in this submission.

5.1 Ground Water Flow is East-Southeast

Regional ground water data suggest a southeast ground water flow direction in much of the South Four Lakes area. Data from the gauging of the newly-installed monitor wells at the various sites in the area now suggest an east-southeast direction of ground water flow at the South Four Lakes #14 site (Plate 6).

5.2 The Extent of Brine Impact is Consistent with a 1962 Release

The lithologic data presented in Plates 4 and 5 show that the upper portion of the aquifer above the quartzite is composed of fine sand. The hydraulic conductivity of fine sand could be as low as 0.1 ft/day or as high as 10 ft/day. Plate 6 shows that the hydraulic gradient in the area of the site is 0.0015. Assuming a porosity of 25% for fine sand, a hydraulic conductivity of 1 ft/day, and use of Darcy's equation, the average linear velocity of ground water at the site is 2 feet/year. In the absence of site-specific hydraulic testing, this calculation must be considered an estimate.

Plate 7 shows our estimate of the extent of chloride impact from the release(s) from the drilling pit area. The distance from the edge of the 1962 reserve pit to the down gradient 250 mg/L chloride isoconcentration line is about 95 feet. We believe that the maximum extent of chloride impact (where chloride concentration exceeds background) could be 200 feet down gradient from the edge of the 1962 pit. The distance from the edge of the 2004-05 Pride Energy drilling pit to the down gradient of chloride impact is about 245 feet.

With a measured hydraulic gradient of 0.0015 and an assumed porosity of 25% for the fine sand, the hydraulic conductivity value required for the average linear velocity to equal 245 feet/4 years (61.25 feet/year) is 28 ft/day. We believe it possible but not probable that chloride molecules from the Pride drilling pit materially contributed to the impact observed as SB-1 and MW-1.

5.3 The Vertical Extent of Brine Impact is Limited by the Quartzite at 52 Feet below Grade

Soil borings SB-01 and SB-02 partially penetrated a very hard quartzite layer at 52-feet bgs. We believe this well-cemented horizon creates a permeability barrier between the uppermost portion of the Ogallala Aquifer and the lower section of the aquifer, which is typically screened for water supply wells.

5.4 The Magnitude of Ground Water Impairment is 5700 mg/L TDS

MW-1 was drilled through the area of the 1962 Humble drilling pit and is 10-feet down gradient of the 2004-05 Pride drilling pit. We conclude that MW-1 lies within the center of mass of the brine release at the site. The TDS of the most recent ground water sample at MW-1 is 5700 mg/L and the chloride concentration is 2600 mg/L.

5.5 Natural Dilution and Dispersion Will Effectively Abate the Ground Water Impairment

At this site, we believe the ground water flux is relatively small due to the low hydraulic gradient and fine-grained sediments that comprise the uppermost ground water zone. While this condition will minimize migration of the documented ground water impairment, natural restoration of ground water due to dilution and dispersion will require decades. Due to the location of the site, we believe it highly unlikely that the area of the production pad will be a site of ground water use in the foreseeable future. Therefore, rapid restoration of ground water quality is not warranted.

6 Stage 2 Abatement Plan

Data collected to date indicates a highly localized area of impaired ground water beneath the site. Data from the Elke Environmental report shows that chloride above 1,000 mg/kg exists in the vadose zone below the former drilling pit (1961 and 2004). The source of the chloride in the vadose zone at the Elke Environmental boring TP-5 is probably leakage from the Pride drilling pit. The other borings conducted by Elke Environmental are 10 times lower in chloride concentration and have relatively low moisture content; the source of this chloride is probably the Humble drilling pit (1961). The source of the chloride detected in SB-2 is probably leakage from the Humble drilling pit. Because MW-1 is located within the footprint of the 1962 drilling pit, the source of chloride in ground water at this location is probably the Humble pit.

6.1 Ground Water Remedy

Although the impairment of ground water was probably caused by the legacy drilling pit originally operated by Humble Oil and Refining, Pride Energy is considered a "responsible party" with Humble. Pride Energy proposes to

1. Conduct three additional quarterly ground water sampling events and several slug (recovery) tests to provide data that will assist in creating a better estimate the rate of natural ground water restoration and the rate of contaminant migration
2. Compare the results of the slug testing to the results from an aquifer pumping test at a nearby site then create an estimate of the fate and transport of impaired ground water at this site.
3. After NMOCD approval of the Stage 1 and 2 Abatement Plan:
   a. use mud rotary drilling and install MW-1 Middle and Deep (Plate 8 and Plate 9) to define the vertical extent of ground water impairment,
   b. use mud rotary drilling and install MW-2 Shallow, Middle and Deep and MW-3 Shallow, Middle and Deep (Plates 8 and Plate 10) to further define the horizontal and vertical extent of ground water impairment.
4. Six months after NMOCD approval of this plan, Pride will provide a report to NMOCD that presents
   a. The borehole data from the proposed monitoring wells,
   b. the ground water monitoring and sampling data,
   c. our analysis of contaminant fate and transport and
   d. our recommendation to continue with the proposed remedy of natural restoration or to implement an on-demand pump-and-use ground water restoration program as a contingency.

6.2 Vadose Zone Remedy

1. Expand the existing pit excavation as necessary to create a 3-foot wide area where subsurface impact of pit leakage does not exist (Plate 11, step 1).

2. Use the material from the pit expansion or deepen the excavation as necessary to create a sloping surface on the bottom of the excavation as suggested in Plate 11, step 2.
3. Over the sloping surface, place "shingles" of recycled or new 20-mil, reinforced liner material with a permeability of less than 10^{-9} cm/sec. The shingles are laid to shed any infiltrated water from the pit area to native soil and to prevent any upward migration of chloride into the root zone.
4. Backfill the excavation with clean material, beginning with caliche and/or sand and finishing the top of the backfill with about 6-inches of soil that is capable of supporting native vegetation.
5. The new grade is a 3-5% slope that drains to a "ponding area". The final grade of the surface over the former pit should blend with the surroundings as much as possible. Plate 11, step 3, which shows a 5% slope that resembles a large "pitchers mound", is one example of a final surface that allows for drainage of stormwater away from the former drilling pit.
6. Seed the reclaimed pit with a mixture acceptable to the State Land Office.

6.3 Schedule of Activities

We will perform two additional ground water monitoring and sampling events at MW-1 to complete a full year of quarterly monitoring at the site. We will analyze the ground water for the following:

- Chloride
- TDS
- BTEX

Upon OCD approval of the Abatement Plan, Pride will commence the proposed work elements.

PLATES

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APPENDIX A

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APPENDIX A

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Wednesday, May 28, 2008

Andrew Parker
R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104

TEL: (505) 266-5004
FAX (505) 266-0745

RE: Pride Energy-S4L #14

Order No.: 0805247

Dear Andrew Parker:

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 5/16/2008 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425
AZ license # AZ0682
ORELAP Lab # NM100001

Hall Environmental Analysis Laboratory, Inc.

Date: *28-May-08*

CLIENT:	R.T. Hicks Consultants, LTD	**Client Sample ID:**	SB-02@38.2 fbgs
Lab Order:	0805247	**Collection Date:**	5/13/2008 12:45:00 PM
Project:	Pride Energy-S4L #14	**Date Received:**	5/16/2008
Lab ID:	0805247-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SLB**
Chloride	270	1.0		mg/L	10	5/20/2008 4:32:09 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **TAF**
Specific Conductance	1500	0.010		µmhos/cm	1	5/20/2008
SM 2540C TOTAL DISSOLVED SOLIDS						Analyst: **KMS**
Total Dissolved Solids	1400	400		mg/L	1	5/19/2008

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *28-May-08*

CLIENT:	R.T. Hicks Consultants, LTD	**Client Sample ID:**	SB-02@28.3 fbgs
Lab Order:	0805247	**Collection Date:**	5/13/2008 12:38:00 PM
Project:	Pride Energy-S4L #14	**Date Received:**	5/16/2008
Lab ID:	0805247-02	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SLB**
Chloride	280	1.0		mg/L	10	5/20/2008 5:06:59 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **TAF**
Specific Conductance	1600	0.010		µmhos/cm	1	5/20/2008
SM 2540C TOTAL DISSOLVED SOLIDS						Analyst: **KMS**
Total Dissolved Solids	1100	100		mg/L	1	5/19/2008

Qualifiers:

*	Value exceeds Maximum Contaminant Level
E	Value above quantitation range
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike recovery outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
MCL	Maximum Contaminant Level
RL	Reporting Limit

QA/QC SUMMARY REPORT

Client: R.T. Hicks Consultants, LTD
Project: Pride Energy-S4L #14 **Work Order:** 0805247

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions									
Sample ID: MB		*MBLK*			Batch ID:	**R28613**	Analysis Date:	5/20/2008 11:36:14 AM	
Chloride	ND	mg/L	0.10						
Sample ID: LCS		*LCS*			Batch ID:	**R28613**	Analysis Date:	5/20/2008 11:53:38 AM	
Chloride	4.853	mg/L	0.10	97.1	90	110			
Method: SM 2540C Total Dissolved Solids									
Sample ID: MB-15979		*MBLK*			Batch ID:	**15979**	Analysis Date:	5/19/2008	
Total Dissolved Solids	ND	mg/L	20						
Sample ID: LCS-15979		*LCS*			Batch ID:	**15979**	Analysis Date:	5/19/2008	
Total Dissolved Solids	1012	mg/L	20	99.7	80	120			

Qualifiers:

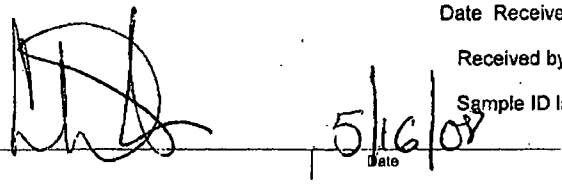
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name RT HICKS Date Received: 5/16/2008

Work Order Number 0805247 Received by: AMF

Checklist completed by:  5/16/08 Sample ID labels checked by: AS

Signature Date Initials

Matrix: Carrier name Client drop-off

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☑		Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	
Container/Temp Blank temperature?	**16°**	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

1

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

Client: RT HICKS CONSULTANTS

Address: ON FILE

Phone #: 505-266-5004

Fax #:

Project Name: PRIDE ENERGY - SAL #14

Project #:

Project Manager: ANDREW PARKER

Sampler: A. PARKER

Sample Temperature: 16°

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No. 0805247	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)	TDS	SPECIFIC CONDUCTANCE	CHLORIDES		Air Bubbles or Headspace (Y or N)
5/13	12:45	Aq	SB-02 @ 38.2 fbgs	625 mL			1													X	X	X		
5/13	12:38	Aq	SB-02 @ 28.3 fbgs	625 mL			2													X	X	X		

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	
5/16/08	11:35			5/16/08 11:35
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

Remarks:

Analytical Report 299691

for

R.T. Hicks Consultants, LTD

Project Manager: Randy Hicks

Pride Energy Company

South Four Lakes #14

20-MAR-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

20-MAR-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: **299691**
Pride Energy Company
Project Address: T11S-R34E, Section 35, Unit Letter I

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 299691. 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. 299691 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

Sample Cross Reference 299691

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

Pride Energy Company

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1	W	Mar-13-08 10:10		299691-001

Certificate of Analysis Summary 299691
R.T. Hicks Consultants, LTD, Albuquerque, NM

Project Name: Pride Energy Company

Project Id: South Four Lakes #14 | **Date Received in Lab:** Mar-14-08 05:16 pm
Contact: Randy Hicks | **Report Date:** 20-MAR-08
Project Location: T11S-R34E, Section 35, Unit Letter I | **Project Manager:** Brent Barron, II

Analysis Requested					
	Lab Id:	299691-001			
	Field Id:	MW-1			
	Depth:				
	Matrix:	WATER			
	Sampled:	Mar-13-08 10:10			
Anions by EPA 300/300.1	*Extracted:*				
	Analyzed:	Mar-15-08 10:29			
	Units/RL:	mg/L	RL		
Chloride		1710	25.0		
Sulfate		390	25.0		
BTEX by EPA 8021B	*Extracted:*	Mar-19-08 10:00			
	Analyzed:	Mar-19-08 17:44			
	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		585	0.100		
Magnesium		112	0.010		
Potassium		5.05	0.500		
Sodium		511	0.500		
TDS by SM2540C	*Extracted:*				
	Analyzed:	Mar-17-08 16:00			
	Units/RL:	mg/L	RL		
Total dissolved solids		4260	5.00		
Total Alkalinity by EPA 310.1	*Extracted:*				
	Analyzed:	Mar-17-08 14:15			
	Units/RL:	mg/L	RL		
Alkalinity, Total (as CaCO3)		230	4.00		

Brent Barron
Odessa Laboratory Director

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

Form 2 - Surrogate Recoveries

Project Name: Pride Energy Company

Work Order #: 299691 **Project ID:** South Four Lakes #14

Lab Batch #: 717610 **Sample:** 299447-003 S / MS **Batch:** 1 **Matrix:** Water

Units: mg/L

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

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

Lab Batch #: 717610 **Sample:** 299691-001 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0325	0.0300	108	80-120	
4-Bromofluorobenzene	0.0329	0.0300	110	80-120	

Lab Batch #: 717610 **Sample:** 506150-1-BKS / BKS **Batch:** 1 **Matrix:** Water

Units: mg/L

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

BTEX by EPA 8021B	SURROGATE RECOVERY STUDY				
Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0327	0.0300	109	80-120	
4-Bromofluorobenzene	0.0328	0.0300	109	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 #: 299691 **Project ID:** South Four Lakes #14

Lab Batch #: 717610 **Sample:** 506150-1-BSD / BSD **Batch:** 1 **Matrix:** Water

Units: mg/L

BTEX by EPA 8021B Analytes	SURROGATE RECOVERY STUDY Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0331	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 #: 299691 **Project ID:** South Four Lakes #14

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

Total Alkalinity by EPA 310.1 Analytes	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
	BLANK /BLANK SPIKE RECOVERY STUDY					
Alkalinity, Total (as CaCO3)	ND	200	172	86	80-120	

Lab Batch #: 717419 **Sample:** 717419-1-BKS **Matrix:** Water

Date Analyzed: 03/15/2008 **Date Prepared:** 03/15/2008 **Analyst:** LATCOR

Reporting Units: mg/L **Batch #:** 1

Anions by EPA 300/300.1 Analytes	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
	BLANK /BLANK SPIKE RECOVERY STUDY					
Chloride	ND	10.0	9.45	95	85-115	
Sulfate	ND	10.0	8.71	87	90-110	L

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 #: 299691 **Project ID:** South Four Lakes #14

Analyst: SHE **Date Prepared:** 03/19/2008 **Date Analyzed:** 03/19/2008

Lab Batch ID: 717610 **Sample:** 506150-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	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	

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 #: 299691
Lab Batch #: 717419
Date Analyzed: 03/15/2008
QC- Sample ID: 299690-001 S
Reporting Units: mg/L

Date Prepared: 03/15/2008
Batch #: 1

Project ID: South Four Lakes #14
Analyst: LATCOR
Matrix: Water

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	4150	1000	5250	110	85-115	
Sulfate	415	1000	1400	99	90-110	

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

ENVIRONMENTAL LAB OF

Form 3 - MS / MSD Recoveries

Project Name: Pride Energy Company

Work Order #: 299691 **Project ID:** South Four Lakes #14

Lab Batch ID: 717610 ***QC- Sample ID:*** 299447-003 S ***Batch #:*** 1 ***Matrix:*** Water

Date Analyzed: 03/19/2008 **Date Prepared:** 03/19/2008 **Analyst:** SHE

Reporting Units: mg/L

BTEX by EPA 8021B Analytes	MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY										
	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	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	

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

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

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

Sample Duplicate Recovery

Project Name: Pride Energy Company

Work Order #: 299691

Lab Batch #: 717419 **Project ID:** South Four Lakes #14
Date Analyzed: 03/15/2008 **Date Prepared:** 03/15/2008 **Analyst:** LATCOR
QC- Sample ID: 299690-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Anions by EPA 300/300.1	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	4150	4140	0	20	
Sulfate	415	406	2	20	

Lab Batch #: 717329
Date Analyzed: 03/17/2008 **Date Prepared:** 03/17/2008 **Analyst:** LATCOR
QC- Sample ID: 299654-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Metals per ICP by SW846 6010B	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
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 #: 717538
Date Analyzed: 03/17/2008 **Date Prepared:** 03/17/2008 **Analyst:** RBA
QC- Sample ID: 299683-002 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

TDS by SM2540C	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	978	972	1	30	

Lab Batch #: 717368
Date Analyzed: 03/17/2008 **Date Prepared:** 03/17/2008 **Analyst:** WRU
QC- Sample ID: 299680-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Total Alkalinity by EPA 310.1	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Alkalinity, Total (as CaCO3)	228	236	3	20	
Alkalinity, Carbonate (as CaCO3)	ND	ND	NC	20	
Alkalinity, Bicarbonate (as CaCO3)	ND	ND	NC	20	

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

XENCO Laboratories / Environmental Lab of Texas

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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Randy Hicks

Company Name: R. T. Hicks Consultants, Ltd.

Company Address: 901 Rio Grandé Blvd NW

City, State, Zip Code: Albuquerque NM 87104

Telephone No: 505-266-5004 Fax No: 505-266-0745

Sampler: Gil Van Deventer (Printed) Signature

Project Name: Pride Energy Company

Project #: South Four Lakes #14

Project Location: T11S-R34E, Section 35, Unit Letter I

COC #: S4L 14-0308

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO$_3$	HCl (BTEX only)	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For (TCLP / TOTAL): TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K, F)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030 or BTEX 8260	RCI	N.O.R.M.	Total Dissolved Solids (160.1)	SPLP 1312	Nitrate (N-NO^3)	Total Fe and Mn	RUSH TAT (Pre-Schedule)	Standard TAT
299641	MW-1	3/13/08	1010	3	X		X					X					X	X					X			X					X

Special Instructions: Email results to: r@rthicksconsult.com and gilbertvandeventer@suddenlink.net

Sample Containers Intact? (Y) N
Temperature Upon Receipt: 1.5
Laboratory Comments: W/ labels & seals on cooler

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	3/14/08	4:15pm			
Relinquished by:	Date	Time	Received by ELOT: Andrea [signature]	3/14/08	4:15

Environmental Lab of Texas

Variance/ Corrective Action Report- Sample Log-In

Client: R.T. Hicks

Date/ Time: 3.14.08 4:15

Lab ID #: 279691

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

Analytical Report 306329

for

R.T. Hicks Consultants, LTD

Project Manager: Andrew Parker

Pride Energy Company

South Four Lakes # 14

27-JUN-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

27-JUN-08

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

Reference: XENCO Report No: **306329**
Pride Energy Company
Project Address: T11S-R34E, Section 35, Unit Letter I

Andrew Parker:

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 306329. 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. 306329 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

Sample Cross Reference 306329

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

Pride Energy Company

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1	W	Jun-20-08 08:55		306329-001

ENVIRONMENTAL LAB OF

Certificate of Analysis Summary 306329

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

Project Name: Pride Energy Company

Project Id: South Four Lakes # 14 **Date Received in Lab:** Jun-20-08 05:00 pm

Contact: Andrew Parker **Report Date:** 27-JUN-08

Project Location: T11S-R34E, Section 35, Unit Letter I **Project Manager:** Brent Barron, II

Analysis Requested					
	Lab Id:	306329-001			
	Field Id:	MW-1			
	Depth:				
	Matrix:	WATER			
	Sampled:	Jun-20-08 08:55			
Alkalinity by SM2320B	*Extracted:*				
	Analyzed:	Jun-26-08 10:45			
	Units/RL:	mg/L	RL		
Alkalinity, Total (as CaCO3)		190	4.00		
Alkalinity, Bicarbonate (as CaCO3)		190	4.00		
Alkalinity, Carbonate (as CaCO3)		ND	4.00		
Inorganic Anions by EPA 300	*Extracted:*				
	Analyzed:	Jun-23-08 08:50			
	Units/RL:	mg/L	RL		
Chloride		2600	25.0		
Sulfate		477	25.0		
Metals per ICP by SW846 6010B	*Extracted:*				
	Analyzed:	Jun-23-08 11:59			
	Units/RL:	mg/L	RL		
Calcium		ND			
Magnesium		120	0.010		
Potassium		4.41	0.500		
Sodium		564	0.500		
TDS by SM2540C	*Extracted:*				
	Analyzed:	Jun-23-08 16:30			
	Units/RL:	mg/L	RL		
Total dissolved solids		5700	5.00		

Brent Barron
Odessa Laboratory Director

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

Blank Spike Recovery

Project Name: Pride Energy Company

Work Order #: 306329 **Project ID:** South Four Lakes # 14

Lab Batch #: 726566 **Sample:** 726566-1-BKS **Matrix:** Water
Date Analyzed: 06/26/2008 **Date Prepared:** 06/26/2008 **Analyst:** WRU
Reporting Units: mg/L **Batch #:** 1

Alkalinity by SM2320B Analytes	Blank Result [A]	BLANK /BLANK SPIKE RECOVERY STUDY Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Alkalinity, Bicarbonate (as CaCO3)	ND	200	176	88	80-120	

Lab Batch #: 726337 **Sample:** 726337-1-BKS **Matrix:** Water
Date Analyzed: 06/23/2008 **Date Prepared:** 06/23/2008 **Analyst:** LATCOR
Reporting Units: mg/L **Batch #:** 1

Inorganic Anions by EPA 300 Analytes	Blank Result [A]	BLANK /BLANK SPIKE RECOVERY STUDY Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Chloride	ND	10.0	11.6	116	80-120	
Sulfate	ND	10.0	12.0	120	80-120	

Blank Spike Recovery [D] = 100*[C]/[B]
All results are based on MDL and validated for QC purposes.

Form 3 - MS Recoveries

Project Name: Pride Energy Company

Work Order #: 306329
Lab Batch #: 726337
Date Analyzed: 06/23/2008
QC- Sample ID: 306329-001 S
Reporting Units: mg/L

Date Prepared: 06/23/2008
Batch #: 1

Project ID: South Four Lakes # 14
Analyst: LATCOR
Matrix: Water

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	2600	500	3270	134	80-120	X
Sulfate	477	500	1080	121	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

Sample Duplicate Recovery

Project Name: Pride Energy Company

Work Order #: 306329

Lab Batch #: 726566 **Project ID:** South Four Lakes # 14
Date Analyzed: 06/26/2008 **Date Prepared:** 06/26/2008 **Analyst:** WRU
QC- Sample ID: 306329-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Alkalinity by SM2320B	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Alkalinity, Total (as CaCO3)	190	180	20	20	
Alkalinity, Bicarbonate (as CaCO3)	190	180	20	20	
Alkalinity, Carbonate (as CaCO3)	ND	ND	20	20	

Lab Batch #: 726337
Date Analyzed: 06/23/2008 **Date Prepared:** 06/23/2008 **Analyst:** LATCOR
QC- Sample ID: 306329-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Inorganic Anions by EPA 300	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	2600	2590	20	20	
Sulfate	477	463	20	20	

Lab Batch #: 726094
Date Analyzed: 06/23/2008 **Date Prepared:** 06/23/2008 **Analyst:** LATCOR
QC- Sample ID: 306329-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

Metals per ICP by SW846 6010B	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Calcium	ND	603	NC	25	
Magnesium	120	116	3	25	
Potassium	4.41	4.85	10	25	
Sodium	564	575	2	25	

Lab Batch #: 726342
Date Analyzed: 06/23/2008 **Date Prepared:** 06/23/2008 **Analyst:** WRU
QC- Sample ID: 306329-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

TDS by SM2540C	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	5700	5580	2	30	

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

XENCO Laboratories / Environmental Lab of Texas

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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Company Name:	R. T. Hicks Consultants	Company Name:	R. T. Hicks Consultants	Project Name:	Pride Energy Company
Direct Invoice To:	Andrew Parker	Project Manager:	Andrew Parker	Project #:	South Four Lakes #14
Billing Address:	901 Rio Grande Blvd NW Suite F-142	Address:	901 Rio Grande Blvd NW Suite F-142	Project Location:	T11S-R34E, Section 35, Unit Letter I
City, State, Zip Code:	Albuquerque, NM 87104	City, State, Zip Code:	Albuquerque, NM 87104	COC #:	
Telephone No:	505-366-5004	Telephone No:	505-366-5004		
Fax No:		Fax No:			
Email Report to:	andrew@rthicksconsult.com	Email Report to:	andrew@rthicksconsult.com		

Sampler: Rozanne Johnson (575) 631-9310 rozanne@valornet.com
Printed — Signature

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	Preservative: HNO_3	Preservative: HCl BTEX only	Preservative: NaOH	Preservative: H_2SO_4	Preservative: None	Preservative: Other (Specify)	Matrix: Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify)	Analyze For: TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K, Fi	Anions (Cl, SO4, CO3 HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B	PCI	N O R M	Total Dissolved Solids (SM2540C	SPLP 1312	Chloride	Total Fe and Mn	RUSH TAT (Pre-Schedule)	Standard TAT
306329-01	MW-1	06/20/08	8:55	1	X							X					X	X									X				X
																															X

Special Instructions: Email results to: andrew@rthicksconsult.com and rozanne@valornet.com

Relinquished by:	Date	Time	Received by:	Date	Time
Rozanne Johnson	6/20/08	17.00			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
			Andrea Pam	6-20-08	17.00

Sample Containers Intact? Y N
Temperature Upon Receipt: 1.4°C
Laboratory Comments: 5.0 w/labels & seals

Environmental Lab of Texas

Variance/ Corrective Action Report- Sample Log-In

Client: R. T. Hicks

Date/ Time: 6 20 08 1700

Lab ID # : 306329

Initials: AL

Sample Receipt Checklist

					Client Initials
#1	Temperature of container/ cooler?	Yes	No	5.3 °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