

**From:** Andrew Parker  
**To:** [Yu, Olivia, EMNRD](mailto:Yu,Olivia,EMNRD)  
**Cc:** [Billings, Bradford, EMNRD](mailto:Billings,Bradford,EMNRD); [mnanranjo@slo.state.nm.us](mailto:mnanranjo@slo.state.nm.us); [mattp@pride-energy.com](mailto:mattp@pride-energy.com); [taylorp@pride-energy.com](mailto:taylorp@pride-energy.com)  
**Subject:** RE: Pride Energy NM 87 State 001 (Tank Battery) 1RP-4625  
**Date:** Wednesday, March 28, 2018 3:49:02 PM

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Ms. Yu:

Sorry for the confusion. Below is a revised noticed.

... We plan to arrive at the Purvis Antelope #1 location late morning on Monday April 2, 2018. Then proceed to the **Pride Energy NM 87 State 001 (Tank Battery) location late morning/early afternoon.**

Andrew Parker  
R.T. Hicks Consultants  
Durango Field Office  
970-570-9535

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**From:** Andrew Parker [<mailto:andrew@rthicksconsult.com>]  
**Sent:** Wednesday, March 28, 2018 3:35 PM  
**To:** [Olivia.yu@state.nm.us](mailto:Olivia.yu@state.nm.us)  
**Cc:** [bradford.billings@state.nm.us](mailto:bradford.billings@state.nm.us); [mnanranjo@slo.state.nm.us](mailto:mnanranjo@slo.state.nm.us); [mattp@pride-energy.com](mailto:mattp@pride-energy.com); [taylorp@pride-energy.com](mailto:taylorp@pride-energy.com)  
**Subject:** RE: Pride Energy NM 87 State 001 (Tank Battery) 1RP-4625

Ms. Yu:

Please consider this the 48-hour advanced notice to perform characterization as outlined in our March 28, 2018 report submitted to Pride Operating with a copy to NMOCD. We plan to arrive at the Antelope #1 location late morning on Monday April 2, 2018. We welcome NMOCD to observe the characterization and we are prepared to answer any questions NMOCD may have. Any person on-site will be required to have steel toe boots, ear protection, and hardhat as PPE.

Andrew Parker  
R.T. Hicks Consultants  
Durango Field Office  
970-570-9535

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**From:** Andrew Parker [<mailto:andrew@rthicksconsult.com>]  
**Sent:** Wednesday, March 28, 2018 3:29 PM  
**To:** [mattp@pride-energy.com](mailto:mattp@pride-energy.com); [taylorp@pride-energy.com](mailto:taylorp@pride-energy.com)  
**Cc:** [bradford.billings@state.nm.us](mailto:bradford.billings@state.nm.us); [mnanranjo@slo.state.nm.us](mailto:mnanranjo@slo.state.nm.us); [Olivia.yu@state.nm.us](mailto:Olivia.yu@state.nm.us)  
**Subject:** Pride Energy NM 87 State 001 (Tank Battery) 1RP-4625

Mr. Pride:

Attached are the results of the first characterization plan and the proposed activities for the second

characterization. Please note that NMAC 19.15.29 does not require NMOCD approval of characterization plans. After reviewing second characterization results, we will determine the best approach on whether to

1. Perform corrective actions under the current regulation, or
2. Ask for a variance using the proposed cleanup criteria levels as a guidance as discussed in the attached plan.

We plan on performing the second characterization on the afternoon of April 2, 2018. A notice to NMOCD will follow this email.

Per NMAC 19.15.29, the next formal submission to NMOCD is either a remediation (correction action) or closure plan – at which time NMOCD can either deny or approval the plan. The type of submission and path forward will be based on data collected during the characterization using standards and regulations in-place at the time. A formal variance may be requested at the time of formal submission to NMOCD.

Andrew Parker  
R.T. Hicks Consultants  
Durango Field Office  
970-570-9535

# R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996  
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

March 28, 2018

Matt Pride  
Pride Energy Company  
4641 E 91<sup>st</sup> Street  
Tulsa, OK 74137

RE: Operator: Pride Energy Company  
NM 87 State #001 (Tank Battery)  
API#: 30-025-23655  
Section 33-14S-34E: Unit K  
Lea County, New Mexico  
January 11, 2017 Battery Release, Horizontal and Vertical Characterization Plan  
1RP-4625

Mr. Pride:

R.T. Hicks Consultants (Hicks Consultants) is pleased to submit this characterization plan to Pride Energy Company. This characterization plan addresses 1RP-4625 that occurred on January 13, 2017. The C-141 is reproduced in Appendix A. The January 2018 characterization was conducted under our Horizontal and Vertical Characterization Plan submitted to NMOCD on December 27, 2017.

As we understand the closure criteria suggested by NMOCD's application to repeal and replace Rule 19.15.29 NMAC (R&R Part 29; Appendix B) will establish delineation and closure criteria limits. Based upon R&R Part 29 Table 1, chloride closure criteria at this location is:

Depth (below ground surface)	Depth to Water (bottom of release)	Chloride (mg/kg)	TPH (GRO+DRO+MRO) (mg/kg)	TPH (GRO+DRO) (mg/kg)	BTEX (mg/kg)	Benzene (mg/kg)
0-4 feet		600	100		50	10
>4 feet	>50 feet	10,000	2,500	1,000	50	10

**Exhibit 1: Closure Criteria from R&R Part 29 Table 1**

Per 19.15.29.11 of the R&R Part 29 (Site Assessment/Characterization), NMOCD approval is not required. This letter is copied to the OCD and the SLO as courtesy.

Plates 1-9 show that this site meets the criteria established by R&R Part 29 Section 19.15.29.12.B.3 and B.4.

Please refer to Appendix C that discusses our January 2018 sampling program.

### ***Sampling and Analytical Results***

Table 1 presents the result of all sampling conducted at the site. Plate 10 shows the locations of the trench and soil boring locations. Plate 11 presents chloride concentration at depths between zero and 5 feet at each location during the January 8, 2018 sampling event. Limited samples were collect at 4 feet below ground surface (bgs); thus, for locations where soil samples exceed the closure criteria (Exhibit 1, above) for the uppermost 4-feet, additional sampling is proposed.

Below is a summary of observations during the limited characterization. Please refer to Table 1 and Appendix E for summary of analytical and trench/auger logs, respectively.

- 2017 East
  - Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 0.5 feet bgs. No further characterization is necessary.
- 2017 West
  - Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 0.5 feet bgs. No further characterization is necessary.
- 2017 Northeast (NE)
  - Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 0.5 feet bgs. No further characterization is necessary.
- 2017 Northwest (NW Berm)
  - The trench sample was located within the berm area of an active tank battery. In the upper 4 feet:
    - Chloride (4,600 mg/kg) is above cleanup criteria of 600 mg/kg.
    - Benzene and BTEX are below cleanup criteria.
    - DRO+MRO (21,100 mg/kg) comprises 99% of TPH (GRO+DRO+MRO; 21,250 mg/kg). GRO (150 mg/kg) comprises 1% of TPH (GRO+DRO+MRO). It is highly unlikely that BTEX, which is within the GRO hydrocarbon range, will exceed groundwater standards as defined in NMAC 20.6.2.3103.
  - Greater than 4 ft (sampled at 12 feet bgs):
    - Chloride is 2,900 mg/kg; below the 10,000 mg/kg cleanup criteria.
    - Benzene and BTEX are below cleanup criteria.
    - DRO+MRO (10,800 mg/kg) comprises 96% of TPH (GRO+DRO+MRO; 11,220 mg/kg). GRO (420 mg/kg) comprises 4% TPH (GRO+DRO+MRO). It is highly unlikely that BTEX will exceed groundwater standards as defined in NMAC 20.6.2.3103
- Historic North
  - Chloride, Benzene, and BTEX concentrations are below cleanup criteria levels at 0.5 feet bgs. TPH (GRO+DRO+MRO) concentration is 122 mg/kg; above the cleanup criteria of 100 mg/kg for the upper 4 feet.
- Historic Northeast
  - Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 0.5 feet bgs. No further characterization is necessary.
- Historic Southwest

In the upper 4 feet:

- Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 2.0 feet bgs.

Greater than 4 ft (sampled at 8 feet bgs):

- Chloride is 45 mg/kg; below the 10,000 mg/kg cleanup criteria.
- Benzene, BTEX, and TPH was not analyzed and were below cleanup criteria in the upper 4 feet.

- Historic Southeast

Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria levels at 0.5 feet bgs. No further characterization is necessary.

- SB-01

In the upper 4 feet:

- Chloride, Benzene, and BTEX concentrations are below cleanup criteria levels at the surface.
- TPH (GRO+DRO+MRO; 374.7 mg/kg) exceeds cleanup criteria at the surface

Greater than 4 ft (sampled at 8 feet bgs):

- Chloride is below cleanup criteria levels.

- SB-02

At the surface:

- Chloride is 4,200 mg/kg.
- BTEX, Benzene, and TPH is below cleanup criteria levels.

At 4 feet and greater:

- Chloride is below cleanup criteria levels.
- Benzene, BTEX, and TPH was not analyzed and were below cleanup criteria for the upper 4 feet.

- SB-03 Playa (within the natural depression)

At the surface:

- Chloride is below cleanup criteria levels.
- Benzene, BTEX, and TPH was not analyzed

Greater than 4 feet:

- Chloride, Benzene, BTEX, and TPH concentrations are below cleanup criteria level.
- Chloride at 5 feet was 660 mg/kg with a maximum concentration of 672 mg/kg at 9 feet.

## ***Proposed Actions***

### *1. Additional Sampling*

While the concentrations below 4-feet meet the closure criteria, with the exception of the sample location northwest of the tank battery and within the tank batter berm, we propose additional sampling at 4-feet below grade at the following locations to characterize the uppermost 4-feet. The sample at 6 feet bgs is for confirmation that the upper four feet meet cleanup criteria levels.

- Historic North – collect a sample for analysis of TPH using EPA Method 8015M at 2, 4, and 6 feet bgs.
- SB-01 - collect a sample for analysis of TPH using EPA Method 8015M at 2, 4, and 6 feet bgs.
- SB-03 – collect a sample for analysis of Chloride at 2, 4, and 6 feet bgs.

Vertical delineation will cease at 6 feet if:

- PID readings for VOCs are below 100 ppm (using the heated headspace method of field testing), and
- Chloride titrations are below 600 mg/kg (using field titration methods).

Otherwise, we will continue to delineate vertically until the forth mentioned conditions are met with a total depth not to exceed 15-feet. One soil sample with be collected at total depth and analyzed for the constituents of concern.

Protocols for chloride field titrations and VOC screening with a photoionization detector (PID) are in Appendix F.

## *2. Surface restoration*

To restore surface soils near SB-02 Historic, where chloride is greater than 600 mg/kg, the proposed surface restoration is in-situ remediation:

- Rip and mulch affected area to increase soil infiltration rates. Contour to capture surface water run-on to increase infiltration rates.
- Allow natural flushing to occur (via precipitation).
- Within a year, contour to blend with surrounding topography and reseed with an approved seed mixture

## *3. Tank Battery Mitigation (2017 Northwest – within berm)*

Pride Energy will evaluate placing a liner around the active tank battery, within the berm area, to reduce future impairment to the environment from accidental releases.

Furthermore, the liner will prevent surface water infiltration – reducing the vertical migration of constituents of concern. The impaired area will be remediated during the closure of the tank battery complying with the standards-in-place at time of closure.

The above outlined characterization will be followed by a report presenting corrective actions based upon the closure criteria concentrations proposed in R&R Part 29.

March 28, 2018  
Page 5

Please contact me at 970-570-9535 with any questions or comments.

Sincerely,  
R.T. Hicks Consultants, Ltd.

A handwritten signature in black ink that reads "Andrew Parker". The signature is written in a cursive style with a large initial 'A'.

Andrew Parker  
Project Scientist

Copy: Hobbs NMOCD office – Oliva Yu (Olivia.Yu@state.nm.us)  
NMOCD – Brad Billings (bradford.billings@state.nm.us)  
NM SLO - Mark Naranjo (mnanranjo@slo.state.nm.us)

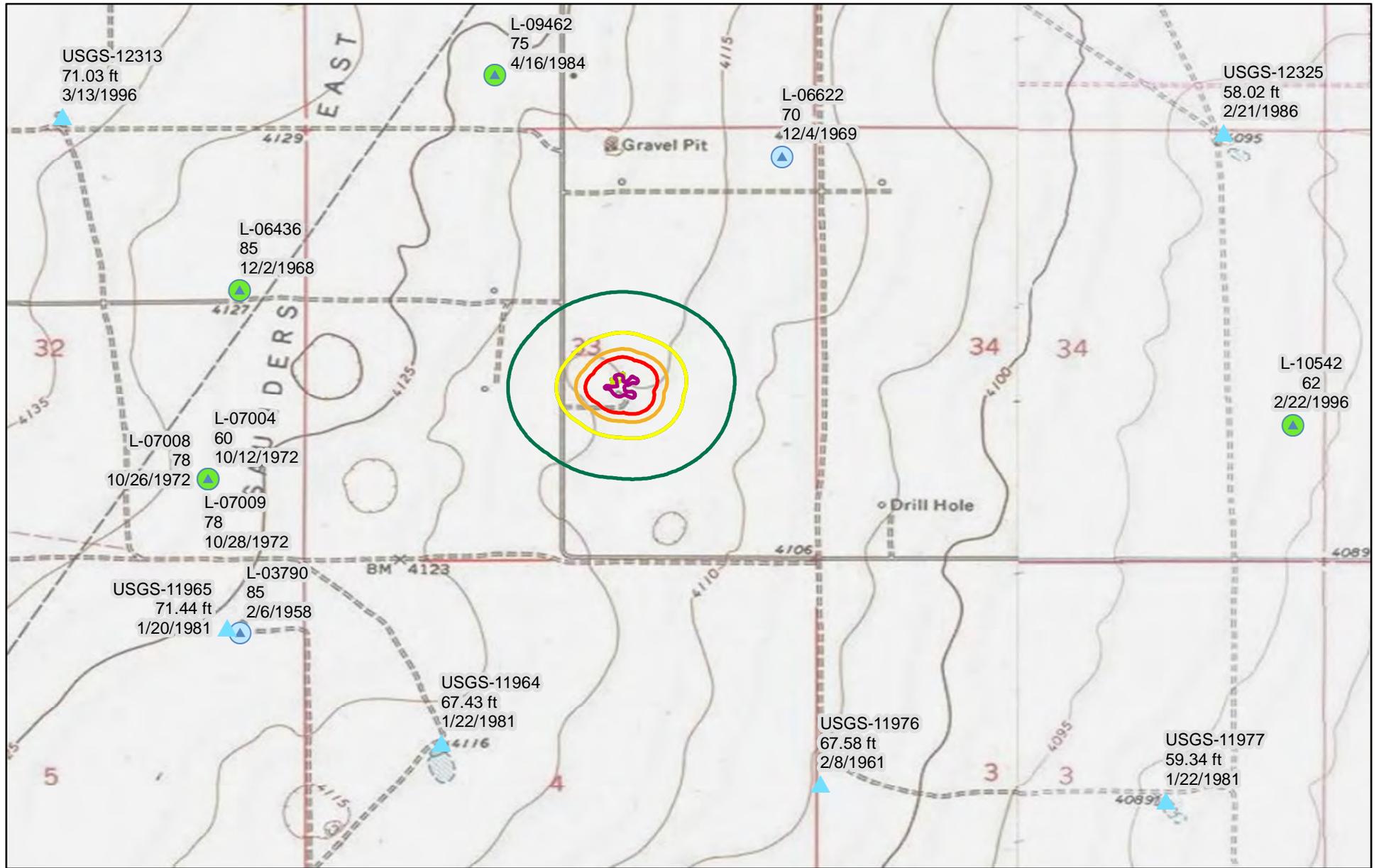
## ***TABLES***

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Sample Name	Date	Cl mg/kg	Cl mg/kg	BTEX mg/kg	Benzene mg/kg	TPH (GRO+DRO) mg/kg	TPH (GRO+DRO+MRO) mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg	GRO mg/kg	DRO mg/kg	MRO mg/kg
Table 1 (19.15.29 NMAC)		Field	Lab										
Ground water < 50 ft (Soil ≤ 4 ft)			600	50	10		100						
Ground water 50 to 100 ft (Soil > 4 ft)			10,000	50	10	1,000	2,500						
2017 East @ 0.5 ft	1/8/2018		<30	<0.221	<0.025	<14.5	<62.5	<0.049	<0.049	<0.098	<4.9	<9.6	<48
2017 West @ 0.5 ft	1/8/2018		<30	<0.225	<0.025	<15	<66	<0.050	<0.050	<0.10	<5.0	<10	<51
2017 NE @ 0.5 ft	1/8/2018		<30	<0.213	<0.024	<14.4	<62.4	<0.047	<0.047	<0.095	<4.7	<9.7	<48
2017 NW Berm @ 2 ft	1/8/2018		4,600	2.358	0.27	12,150	21,250	<0.098	0.69	1.3	150	12,000	9,100
2017 NW Berm @ 12 ft	1/8/2018		2,900	35.25	<0.25	8,320	11,220	<0.50	7.5	27	420	7,900	2,900
Historic North @ 0.5 ft	1/8/2018		<30	0.34	<0.024	60.8	122.8	<0.048	<0.048	0.22	<4.8	56	62
Historic Northeast @ 0.5 ft	1/8/2018		260	<0.222	<0.025	<14.2	<61.2	<0.049	<0.049	<0.099	<4.9	<9.3	<47
Historic Southwest @ 2 ft	1/8/2018		500	<0.22	<0.024	<14.8	<63.8	<0.049	<0.049	<0.098	<4.9	<9.9	<49
Historic Southwest @ 8 ft	1/8/2018		45										
Historic Southeast @ 0.5 ft	1/8/2018		<30	<0.217	<0.024	<14.5	<63.5	<0.048	<0.048	<0.097	<4.8	<9.7	<49
SB-01 2017 @ 0 ft	1/8/2018	65	93	<0.21	<0.023	144.7	374.7	<0.047	<0.047	<0.093	<4.7	140	230
SB-01 2017 @ 5 ft	1/8/2018	73											
SB-01 2017 @ 10 ft	1/8/2018	21											
SB-01 2017 @ 15 ft	1/8/2018	99	40										
SB-02 Historic @ 0 ft	1/8/2018	2968	4,200	<0.208	<0.023	<14.4	<63.4	<0.046	<0.046	<0.093	<4.6	<9.8	<49
SB-02 Historic @ 4 ft	1/8/2018	404											
SB-02 Historic @ 9 ft	1/8/2018	157	<30										
SB-02 Historic @ 15 ft	1/8/2018	45	<30										
SB-02 Historic @ 21 ft	1/8/2018	57											
SB-03 Playa @ 0 ft	1/8/2018	108											
SB-03 Playa @ 5 ft	1/8/2018	632	660	<0.215	<0.024	<14.3	<61.3	<0.048	<0.048	<0.095	<4.8	<9.5	<47
SB-03 Playa @ 9 ft	1/8/2018	672											
SB-03 Playa @ 15 ft	1/8/2018	341											
SB-03 Playa @ 21 ft	1/8/2018	207	220										
SB-03 Playa @ 25 ft	1/8/2018	168											
SB-03 Playa @ 31 ft	1/8/2018	129	200										
TT-1 @ 0 ft	7/7/2017		4,830		<0.00109	401.2	498	<0.00217	<0.00109	<0.00217	<27.2	374	124
TT-1 @ 4 ft	7/7/2017		8,670		<0.00112	<28.1	<28.1	<0.00225	<0.00112	<0.00225	<28.1	<28.1	<28.1
TT-1 @ 8 ft	7/7/2017		705		<0.00123	<30.9	<30.9	<0.00247	<0.00123	<0.00247	<30.9	<30.9	<30.9
TT-1 @ 12 ft	7/7/2017		2,630		<0.00109	<21.7	<21.7	<0.00217	<0.00109	<0.00217	<27.2	<27.2	<27.2

***PLATES***

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0 1,000 2,000  
Feet

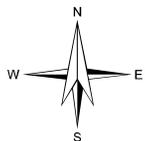
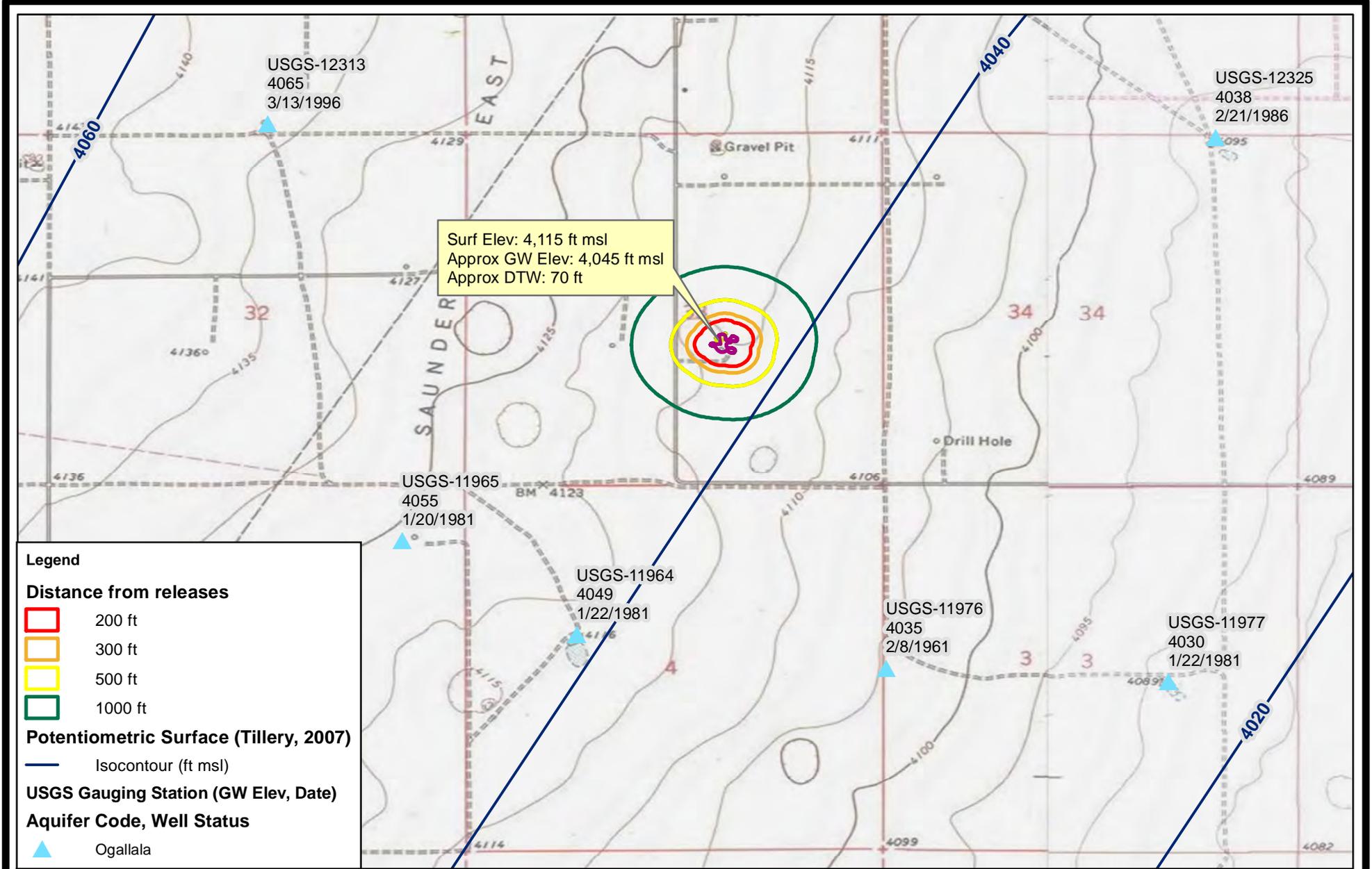
R.T. Hicks Consultants, Ltd  
901 Rio Grande Blvd NW Suite F-142  
Albuquerque, NM 87104  
Ph: 505.266.5004

Depth To Water  
Pride Energy Company  
NM 87 State #001 (Tank Battery)

Plate 1  
February 2018

Legend	
<b>Distance from releases</b>	<b>USGS Gauging Station (DTW, Date)</b>
 200 ft	<b>Aquifer Code, Well Status</b>
 300 ft	 Ogallala
 500 ft	<b>OSE Water Wells (DTW, Date)</b>
 1000 ft	<b>Well Depth (ft)</b>
	 <= 150
	 151 - 350

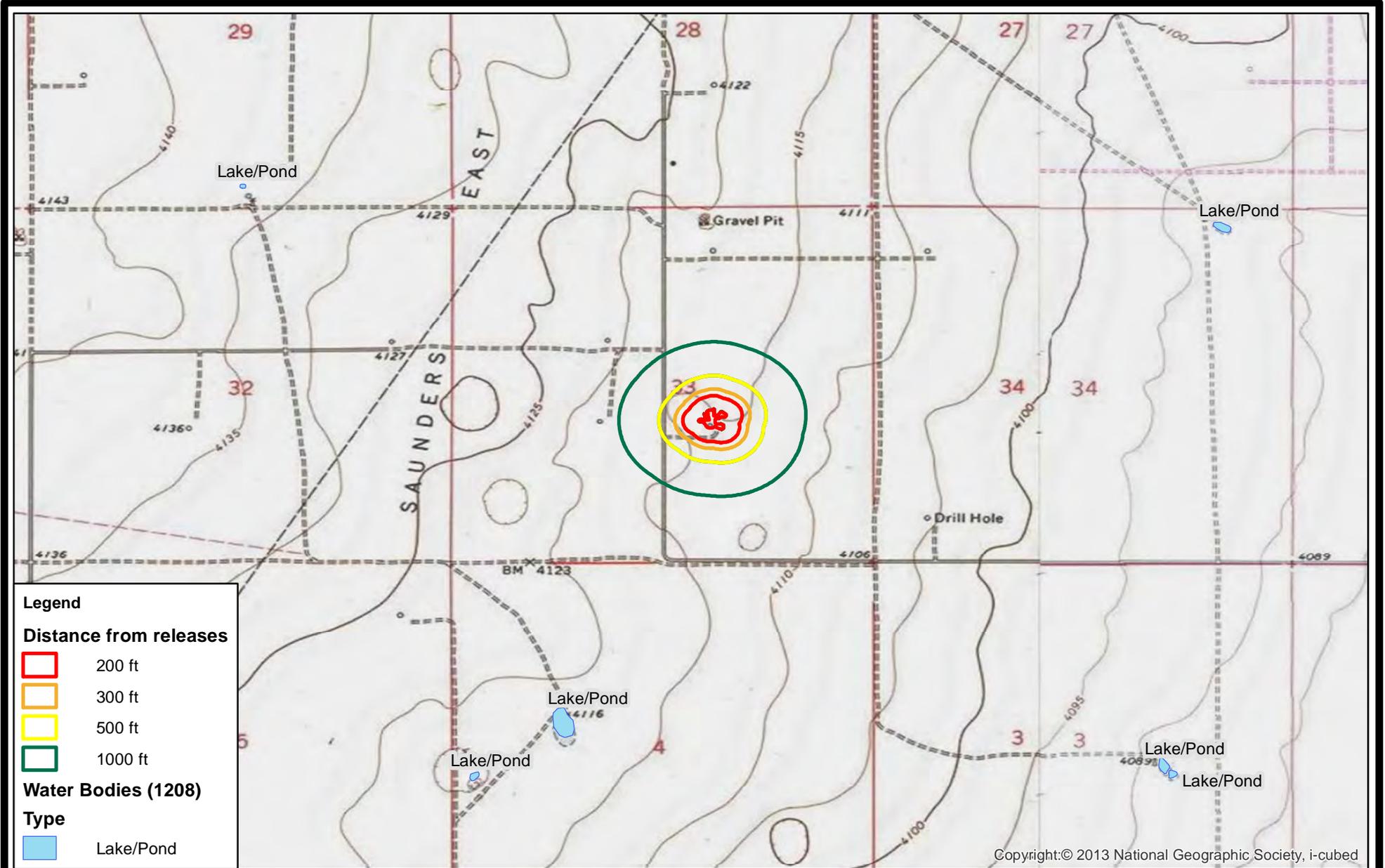
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth To Water	Plate 1 Legend
	Pride Energy Company NM 87 State #001 (Tank Battery)	February 2018



R.T. Hicks Consultants, Ltd  
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 Albuquerque, NM 87104  
 Ph: 505.266.5004

Potentiometric Surface and Groundwater Elevation  
 Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 2  
 February 2018



**Legend**

**Distance from releases**

- 200 ft
- 300 ft
- 500 ft
- 1000 ft

**Water Bodies (1208)**

**Type**

- Lake/Pond

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 Ph: 505.266.5004

Surface Water and Topography

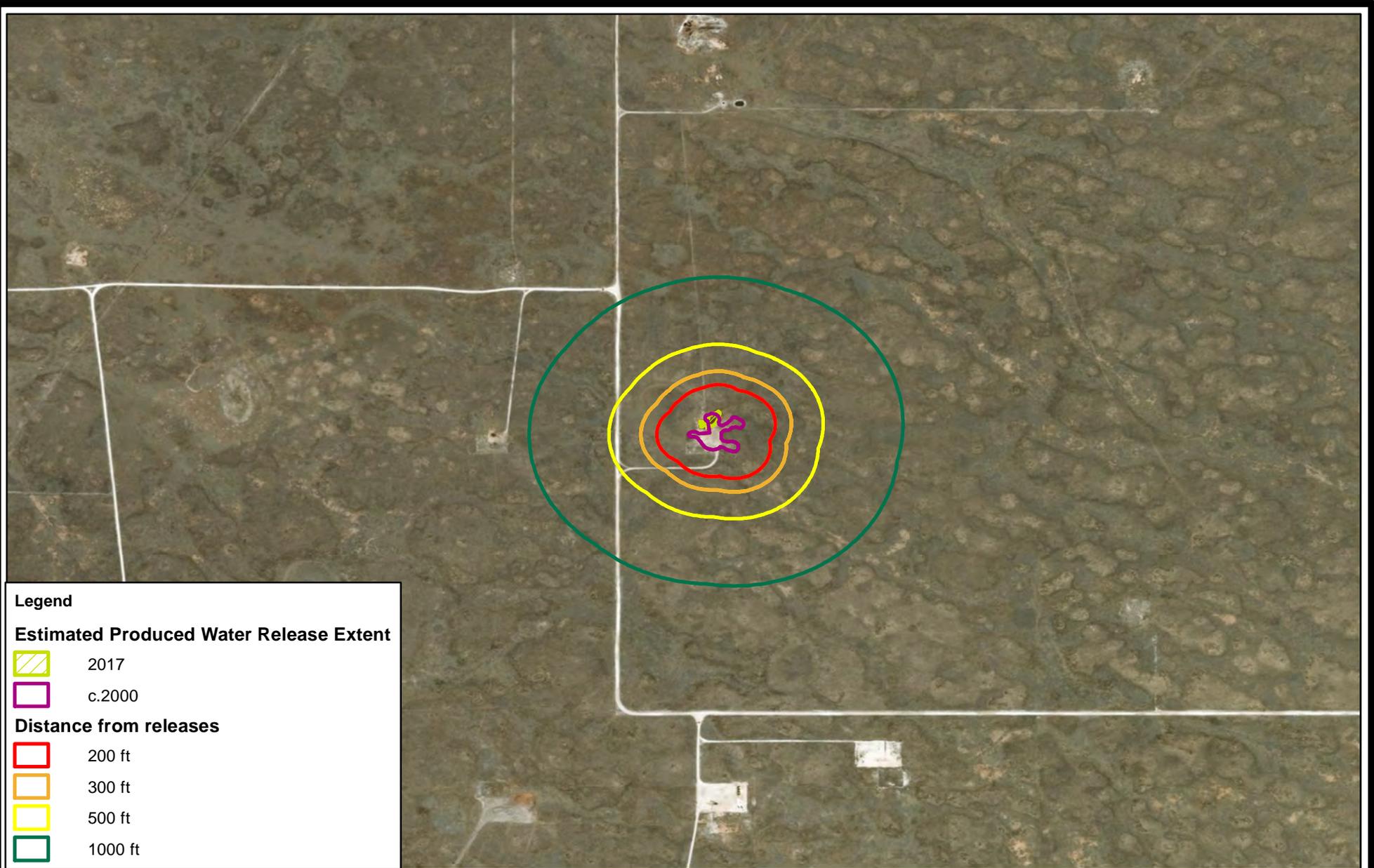
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Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 3

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February 2018



**Legend**

**Estimated Produced Water Release Extent**

-  2017
-  c.2000

**Distance from releases**

-  200 ft
-  300 ft
-  500 ft
-  1000 ft



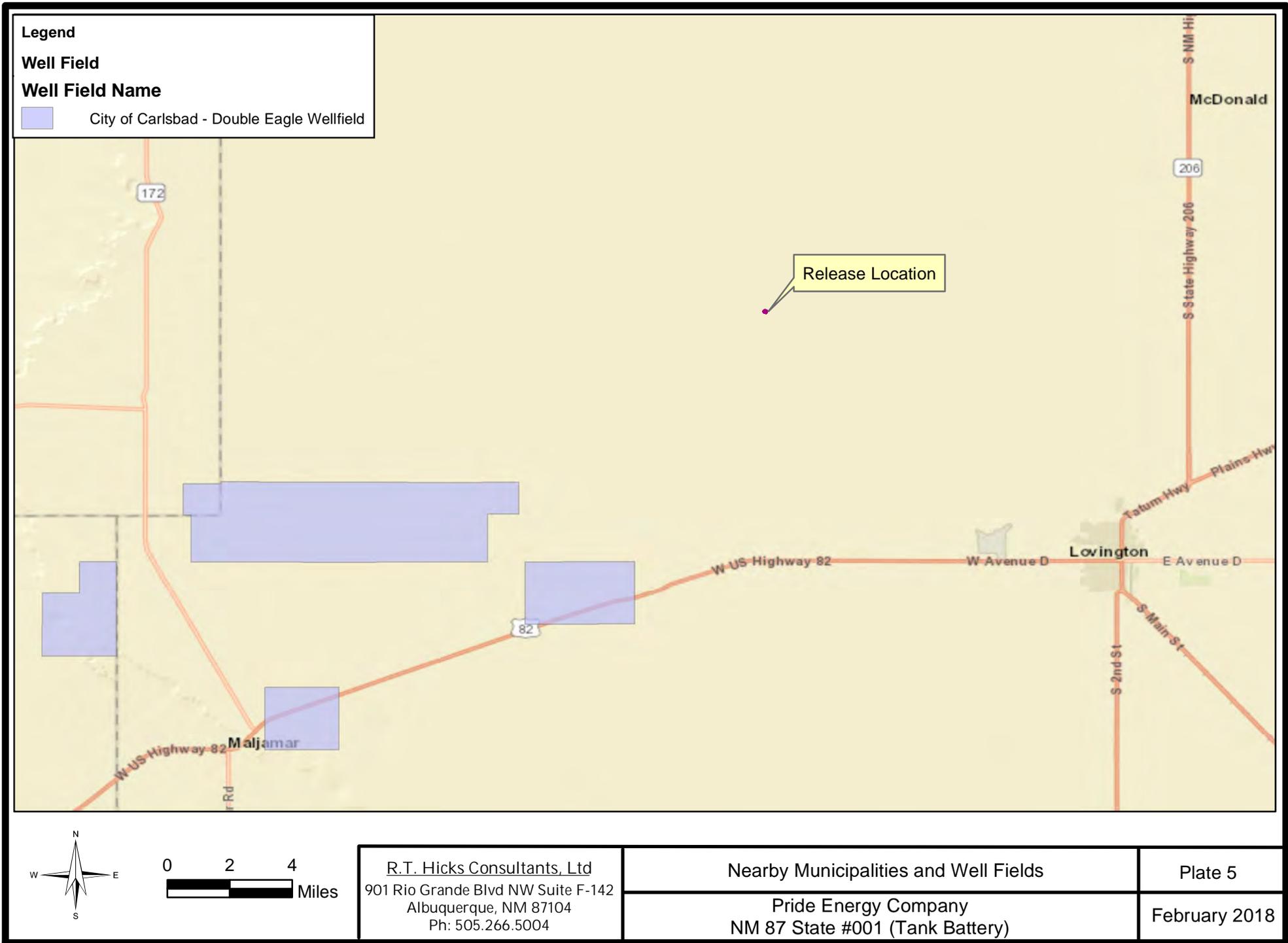
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 Albuquerque, NM 87104  
 Ph: 505.266.5004

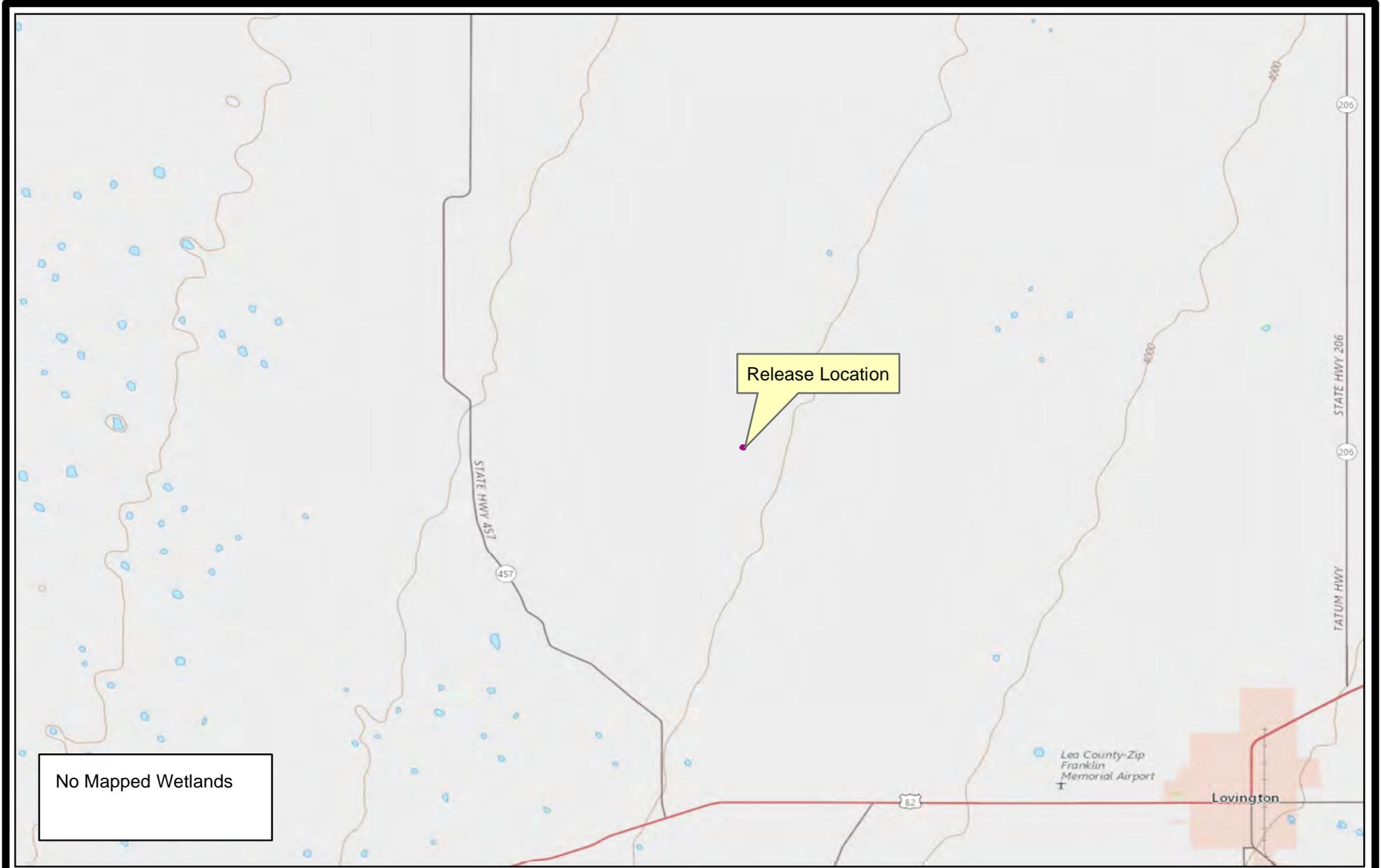
Nearby Structures

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

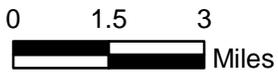
Plate 4

February 2018





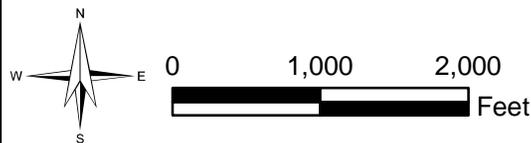
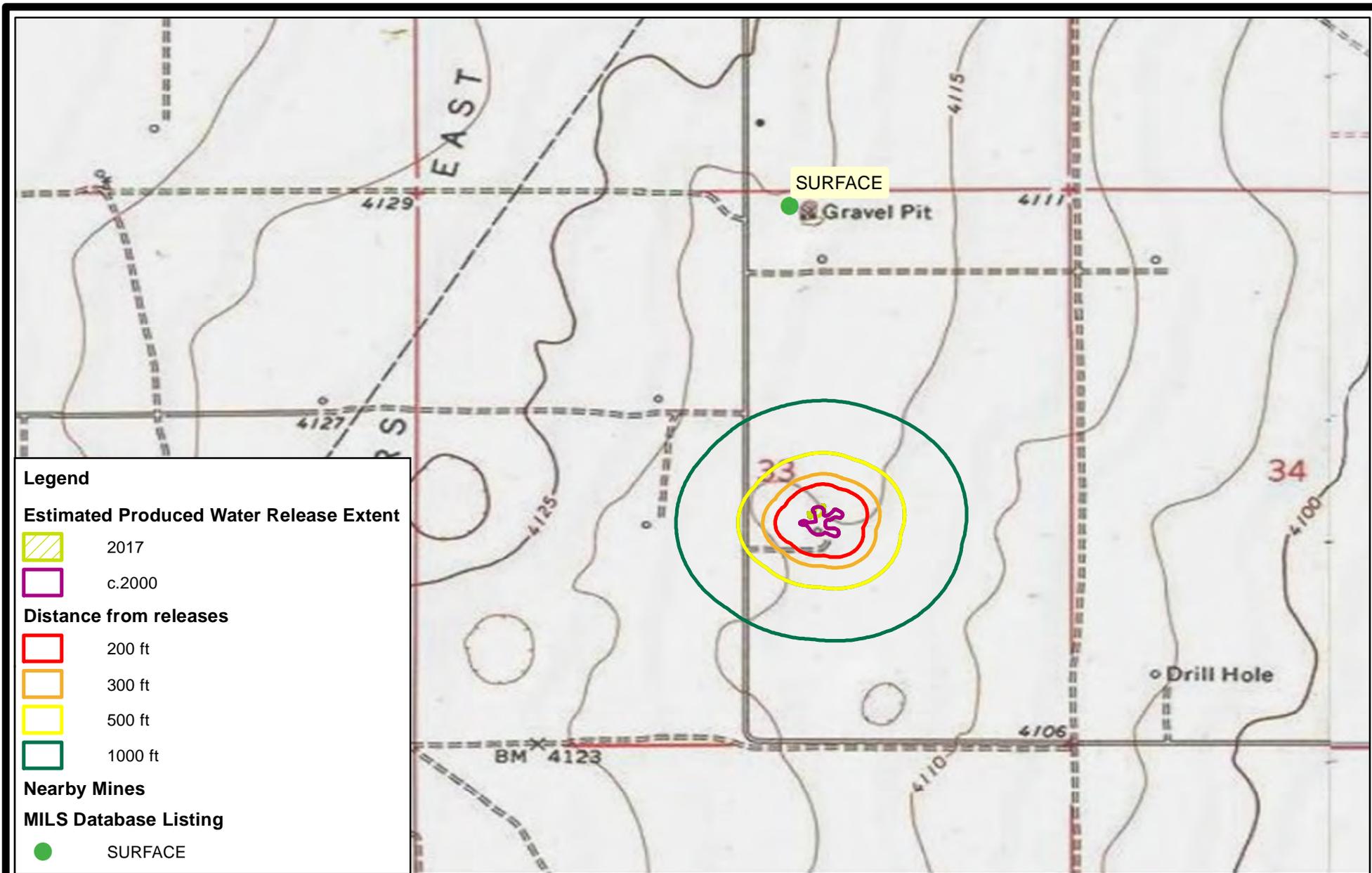
No Mapped Wetlands



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Nearby Wetlands  
 Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 6  
 February 2018



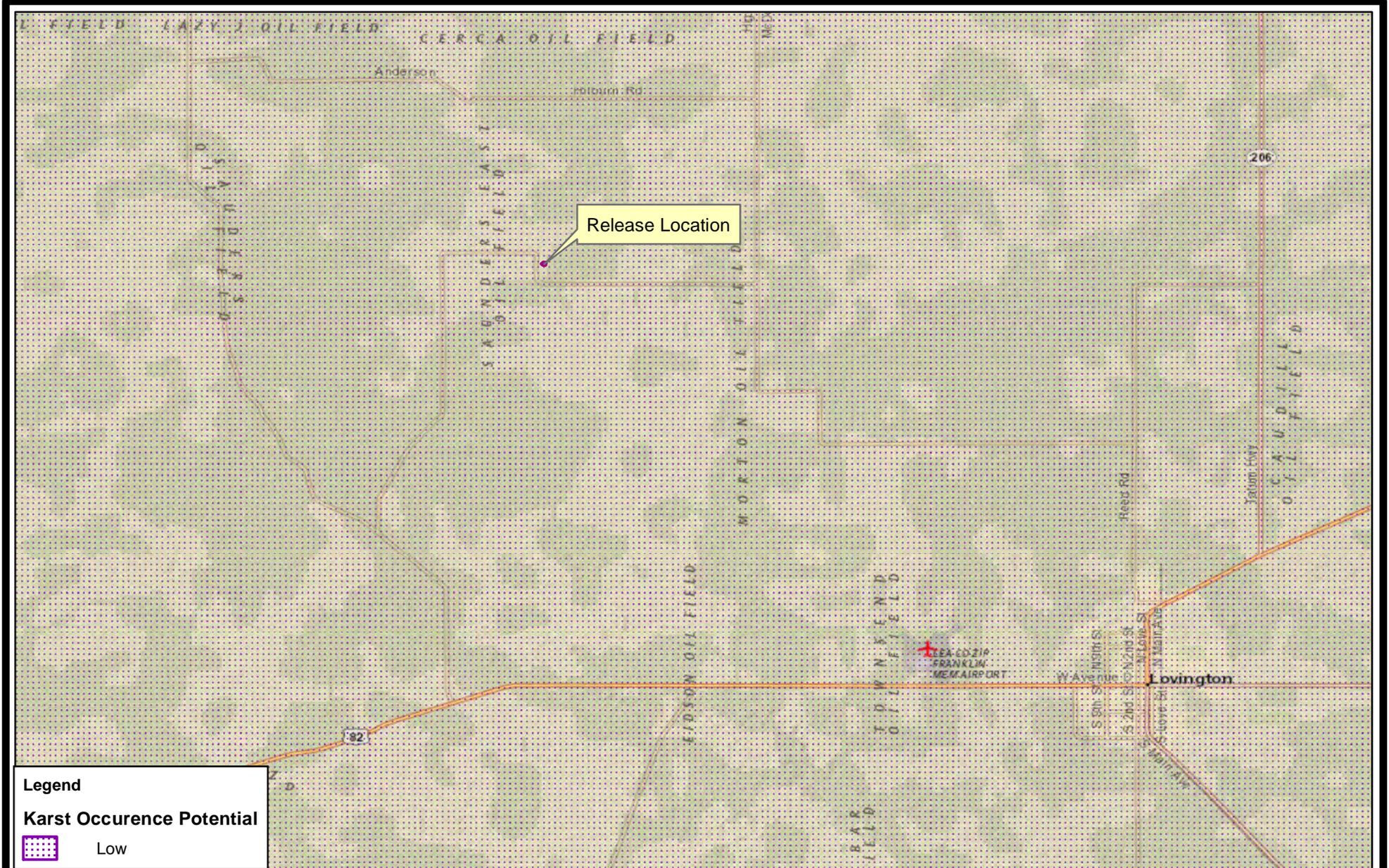
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Nearby Mines and Minerals

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 7

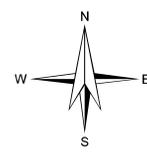
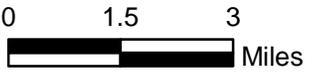
February 2018



**Legend**

**Karst Occurrence Potential**

 Low

0 1.5 3 Miles

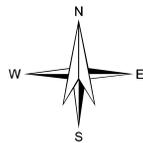
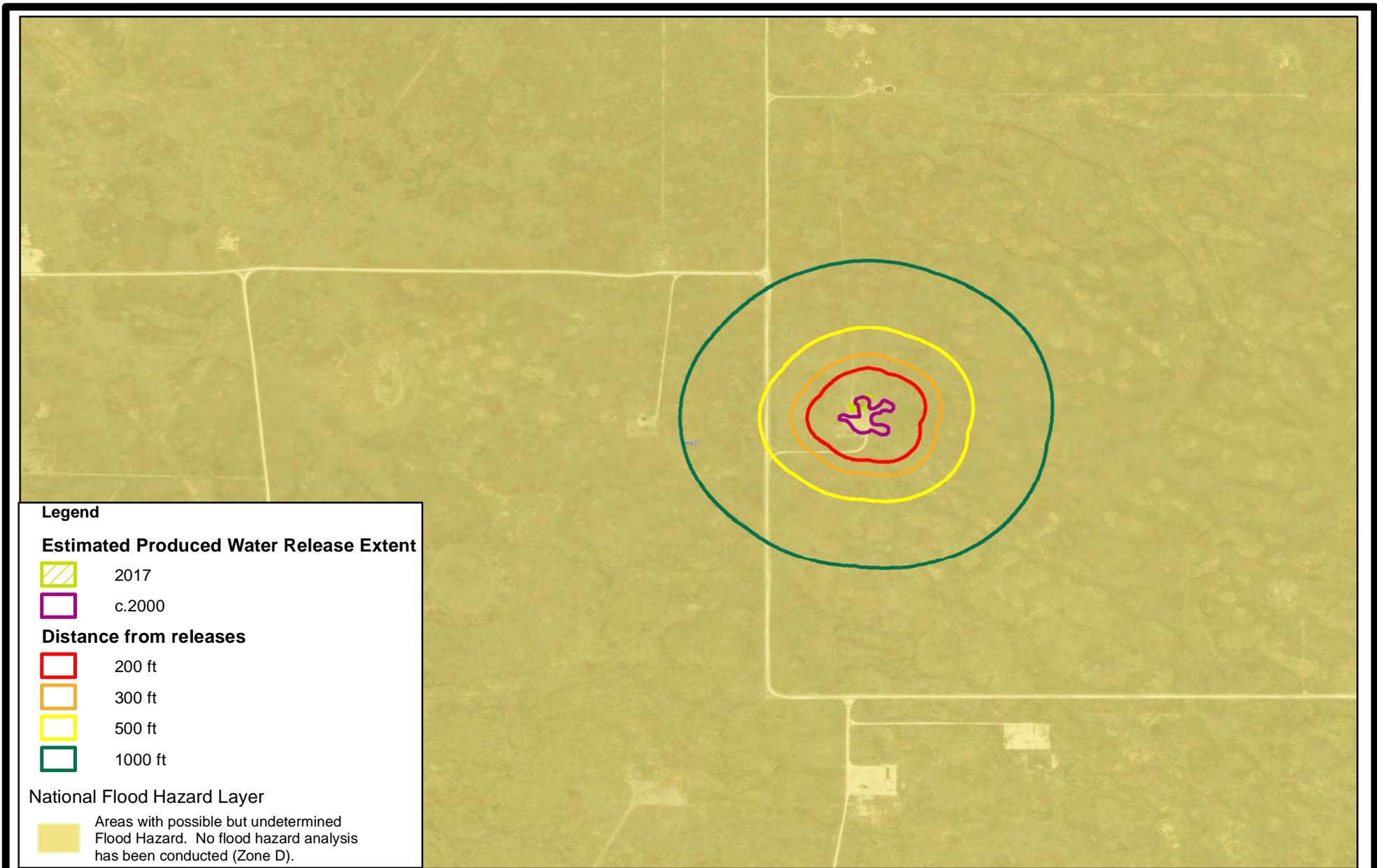
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 Albuquerque, NM 87104  
 Ph: 505.266.5004

Karst Potential

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 8

February 2018



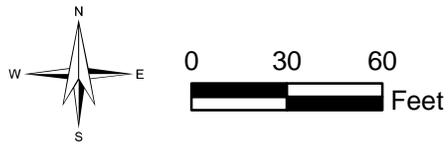
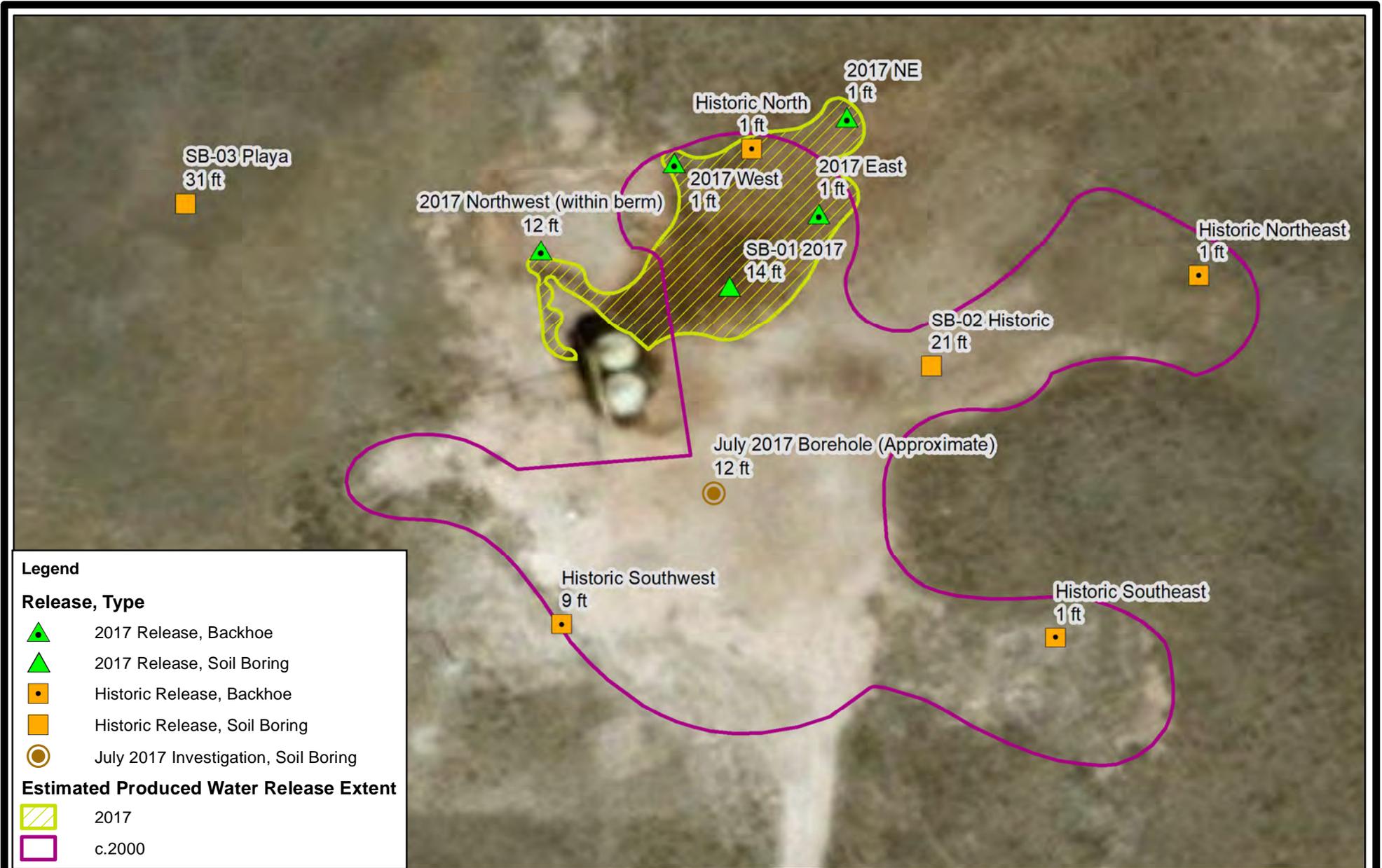
R.T. Hicks Consultants, Ltd  
 901 Rio Grande Blvd NW Suite F-142  
 Albuquerque, NM 87104  
 Ph: 505.266.5004

FEMA Flood Map

Plate 9

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

February 2018

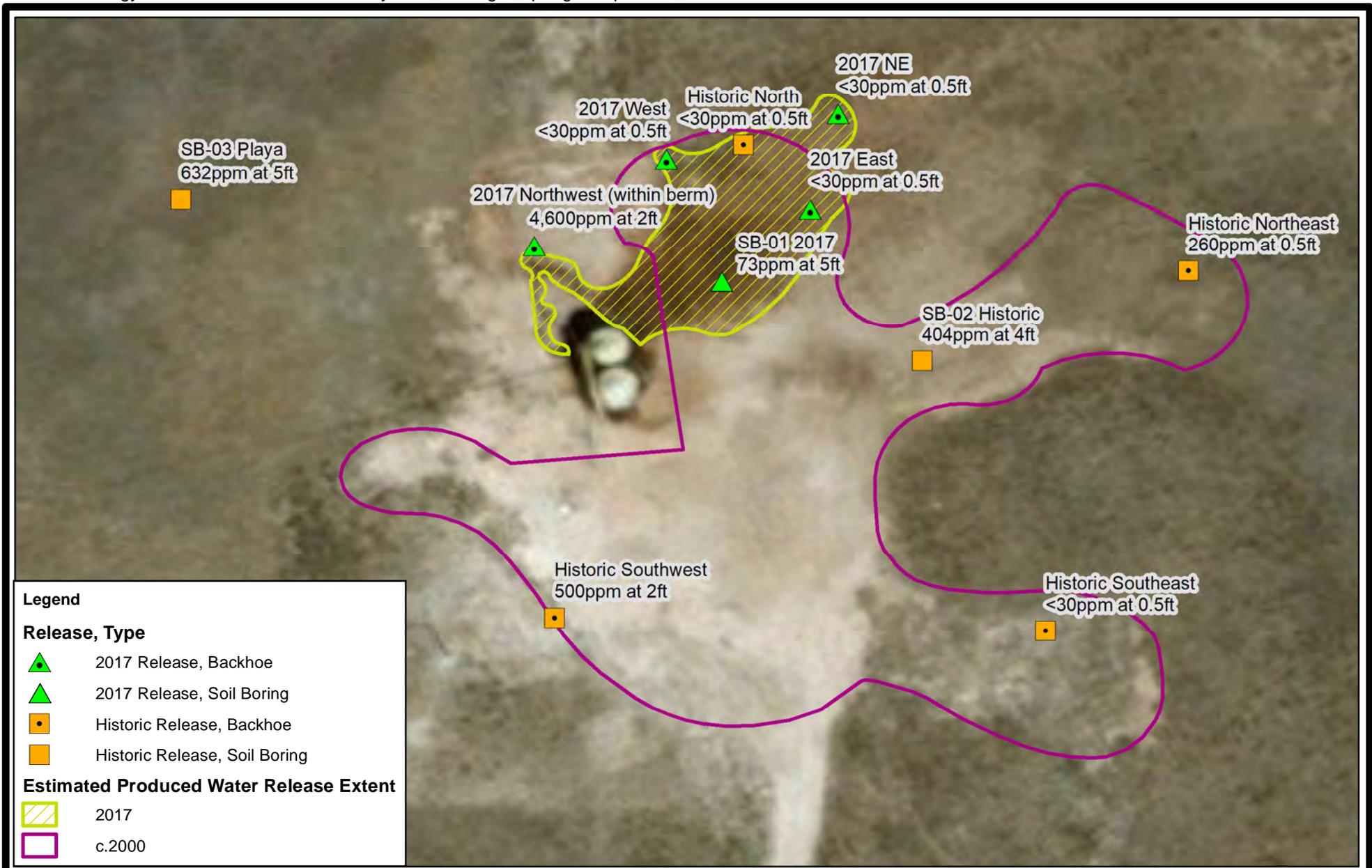


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Sample Locations with Total Depth (ft)  
 (Jan. 2018)

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 10  
 February 2018



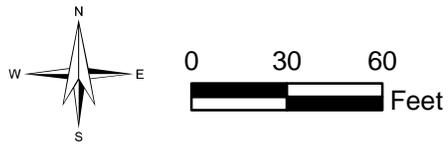
**Legend**

**Release, Type**

- 2017 Release, Backhoe
- 2017 Release, Soil Boring
- Historic Release, Backhoe
- Historic Release, Soil Boring

**Estimated Produced Water Release Extent**

- 2017
- c.2000



R.T. Hicks Consultants, Ltd  
 901 Rio Grande Blvd NW Suite F-142  
 Albuquerque, NM 87104  
 Ph: 505.266.5004

Chloride Concentrations < 5 ft  
 (Jan. 2018)

Pride Energy Company  
 NM 87 State #001 (Tank Battery)

Plate 11  
 February 2018

# ***APPENDIX A***

---

# PRIDE ENERGY COMPANY

---

(918) 524-9200 ♦ Fax (918) 524-9292 ♦ www.pride-energy.com

Physical Address: 4641 E. 91<sup>st</sup> Street  
Tulsa, OK 74137

Mailing Address: P.O. Box 701950  
Tulsa, OK 74170-1950  
Email Address: mattp@pride-energy.com

January 16, 2017

New Mexico Oil Conservation  
1625 N. French Drive  
Hobbs, NM 88240

Via Certified Mail  
Return Receipt #

91 7199 9991 7034 2014 0874

RE: New Mexico 87 State #001  
API # 30-025-23655  
Section 33-14S-34E: 2086' FSL and 1,874' FWL (Unit Letter K)  
Lea County, New Mexico

Dear Maxey,

In reference to the above well, please find enclosed a completed Form C-141 (Initial Report).

Thank you and if there are any questions, please feel free to contact me at 918-524-9200.

Sincerely,

*Matthew L. Pride*

Matthew L. Pride  
Pride Energy Company

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural Resources

Form C-141  
Revised August 8, 2011

Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Submit 1 Copy to appropriate District Office in  
accordance with 19.15.29 NMAC.

**Release Notification and Corrective Action**

**OPERATOR**

Initial Report  Final Report

Name of Company	Pride Energy Company	Contact	Matthew Pride
Address	P.O. Box 701950, Tulsa, OK 74170	Telephone No.	918-524-9200
Facility Name	New Mexico 87 State #1	Facility Type	Oil Well
Surface Owner	State of New Mexico	Mineral Owner	State
		API No.	30-025-23655

**LOCATION OF RELEASE**

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	33	14S	34E	2086	South	1874	West	Lea

Latitude **33.059717** Longitude **-103.514153**

**NATURE OF RELEASE**

Type of Release	Oil and Water	Volume of Release	95 bbls.	Volume Recovered	95 bbls.
Source of Release	Tank Battery	Date and Hour of Occurrence	Unknown	Date and Hour of Discovery	1:55 PM, 1/13/17
Was Immediate Notice Given?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom?	Maxey Brown		
By Whom?	Willie Dean (contract pumper)	Date and Hour	5:10 PM, 1/13/17		
Was a Watercourse Reached?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.			

**RECEIVED**  
By Olivia Yu at 9:49 am, Mar 01, 2017

If a Watercourse was Impacted, Describe Fully.\*

Describe Cause of Problem and Remedial Action Taken.\*  
It appears that the surface owner's cattle may have rubbed up against the mechanism that turned the pumping unit on and caused the tank to run over. When the spill was found, the pumping unit was immediately turned off and a vac truck, backhoe and roustabout crew were called to the location to clean up the spill.

Describe Area Affected and Cleanup Action Taken.\*  
The area that was affected was the soil around the tank battery. The vac truck has picked up all free standing oil, and the roustabout crew (with backhoe) has scraped up the oily soil which will be properly disposed of. (most of the free standing oil ran into a hole that is within 10 feet of the tank that had been dug in the past.) A fence around the tank battery and pumping unit will also be constructed to keep livestock (cattle) away from the surface equipment pertaining to the oil well. The dike (firewall) will be reconstructed around the tank battery in order to contain any spilled fluid from the tanks that may occur in the future.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: <i>Matthew L. Pride</i>	<b>OIL CONSERVATION DIVISION</b>	
Printed Name: Matthew L. Pride	<i>JY</i>	
Title: President of Pride Production Co., Inc. General Partner of Pride Energy Company	Approved by Environmental Specialist:	Approval Date: <b>3/1/2017</b> Expiration Date:
E-mail Address: mattp@pride-energy.com	Conditions of Approval:	Attached <input checked="" type="checkbox"/>
Date: 1/16/17 Phone: 918-524-9200	<b>see attached directive</b>	

\* Attach Additional Sheets If Necessary

**pOY1706037126** **1RP-4625** **fOY1706036376** **nOY1706036769**

Operator/Responsible Party,

The OCD has received the form C-141 you provided on 1/31/2017 regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number 1R-4625 has been assigned. **Please refer to this case number in all future correspondence.**

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

*The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC. [emphasis added]*

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District 1 office in Hobbs on or before 4/1/2017. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

- Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C<sub>6</sub> thru C<sub>36</sub>), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.
- Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C<sub>6</sub> thru C<sub>36</sub>), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.
- Nominal detection limits for field and laboratory analyses must be provided.
- Composite sampling is not generally allowed.
- Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

- Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

- If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

- Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

**Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.**

**Jim Griswold**

OCD Environmental Bureau Chief  
1220 South St. Francis Drive  
Santa Fe, New Mexico 87505  
505-476-3465  
jim.griswold@state.nm.us

## ***APPENDIX B***

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STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

RECEIVED OGD

2018 JAN -3 P 4:51 CASE NO. 15959

IN THE MATTER OF THE:

**APPLICATION OF THE NEW MEXICO OIL CONSERVATION DIVISION TO REPEAL  
AND REPLACE RULE 19.15.29 NMAC; STATEWIDE.**

APPLICATION

The New Mexico Oil Conservation Division hereby applies to the Oil Conservation Commission to rename and repeal and replace 19.15.29 NMAC. The proposed name change from "Release Notification" to "Releases" and the purpose of the repealed and replaced rule is to refine existing terms, define new terms, and clarify the process for responding to releases of oil, gases, produced water, condensate, or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixtures of those chemicals or contaminants that occur during drilling, producing, storing, disposing, injecting, transporting, servicing, or processing and to establish reporting, site assessment, remediation, closure, variance, and enforcement procedures.

A draft of the proposed amendments to 19.15.29 NMAC is attached hereto as *Exhibit A*. A proposed legal notice for publication is attached hereto as *Exhibit B*. A copy of the New Mexico Commission of Public Records approval of the name change is attached hereto as *Exhibit C*.

Respectfully submitted,



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Keith Herrmann  
Assistant General Counsel  
New Mexico Energy Minerals and Natural  
Resources Department  
1220 S. St. Francis Drive  
Santa Fe, NM 87505  
(505) 476-3463  
Keith.Herrmann@state.nm.us

*Exhibit A – Proposed Rule 19.15.29 NMAC:*

DRAFT

**TITLE 19 NATURAL RESOURCES AND WILDLIFE  
CHAPTER 15 OIL AND GAS  
PART 29 RELEASES**

**19.15.29.1 ISSUING AGENCY:** Oil Conservation Commission.  
[19.15.29.1 NMAC – Rp, 19.15.29.1 NMAC, XX/XX/201?]

**19.15.29.2 SCOPE:** 19.15.29 NMAC applies to persons engaged in oil and gas development and production within New Mexico.  
[19.15.29.2 NMAC – Rp, 19.15.29.2 NMAC, XX/XX/201?]

**19.15.29.3 STATUTORY AUTHORITY:** 19.15.29 NMAC is adopted pursuant to the Oil and Gas Act, Section 70-2-11 NMSA 1978 (1977) and Section 70-2-12 NMSA 1978 (2004).  
[19.15.29.3 NMAC – Rp, 19.15.29.3 NMAC, XX/XX/201?]

**19.15.29.4 DURATION:** Permanent.  
[19.15.29.4 NMAC - Rp, 19.15.29.4 NMAC, XX/XX/201?]

**19.15.29.5 EFFECTIVE DATE:** \_\_\_\_\_, unless a later date is cited at the end of a section.  
[19.15.29.5 NMAC – Rp, 19.15.29.5 NMAC, XX/XX/201?]

**19.15.29.6 OBJECTIVE:** To require persons who operate or control the release or the location of the release to report the unauthorized release of oil, gases, produced water, condensate or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixtures of those chemicals or contaminants that occur during drilling, producing, storing, disposing, injecting, transporting, servicing or processing and to establish reporting, site assessment, remediation, closure, variance and enforcement procedures.  
[19.15.29.6 NMAC – Rp, 19.15.29.6 NMAC, XX/XX/201?]

**19.15.29.7 DEFINITIONS:**

- A. "Major release" means:**
- (1) an unauthorized release of a volume, excluding gases, of 25 barrels or more;
  - (2) an unauthorized release of a volume that:
    - (a) results in a fire or a fire causes;
    - (b) may with reasonable probability reach a watercourse;
    - (c) may with reasonable probability endanger public health; or
    - (d) substantially damages property or the environment;
  - (3) an unauthorized release of gases exceeding 500 MCF; or
  - (4) a release of a volume that may with reasonable probability be detrimental to fresh water.
- B. "Minor release" means** an unauthorized release, which is not a major release and is a volume greater than five barrels but less than 25 barrels; or for gases, greater than 50 MCF but less than 500 MCF.
- C. "Responsible Party" means** the operator, as defined in 19.15.2 NMAC. Notwithstanding the foregoing, the division, in its sole discretion, may also consider a person causing the release, or controlling the location of the release as the responsible party.  
[19.15.29.7 NMAC – Rp, 19.15.29.7 NMAC, XX/XX/201?]

**19.15.29.8 RELEASE NOTIFICATION:**

- A.** The responsible party must notify the division on form C-141 of a major or minor release occurring during the drilling, producing, storing, disposing, injecting, transporting, servicing or processing of oil, gases, produced water, condensate or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixture of the chemicals or contaminants, in accordance with the requirements of 19.15.29 NMAC.
- B.** If state, federal or tribal lands are involved, the responsible party must send a copy of the form C-141 to the appropriate land managing agency including the State Land Office, the Bureau of Land Management or tribal authority, as applicable.  
[19.15.29.8 NMAC – Rp, 19.15.29.8 NMAC, XX/XX/201?]

**19.15.29.9 RELEASE NOTIFICATION REPORTING REQUIREMENTS:** The responsible party must notify the division of releases in 19.15.29.8 NMAC as follows.

**A. Reporting a Major Release.**

(1) The responsible party must notify the division's environmental bureau chief and the appropriate division district office verbally or by e-mail within 24 hours of discovery of the release. The notification must provide the information required on form C-141.

(2) The responsible party must also notify the appropriate division district office in writing within 15 days of discovering the release by completing and filing form C-141. The written notification must verify the prior verbal or e-mail notification and include additions or corrections to the information contained in the prior verbal or e-mail notification.

**B. Reporting a Minor Release.** The responsible party must notify the appropriate division district office in writing within 15 days of discovery of the release by completing and filing form C-141.

[19.15.29.9 NMAC – Rp, 19.15.29.9 NMAC, XX/XX/201?]

**19.15.29.10 INITIAL RESPONSE:** The responsible party must take the following immediate actions unless the actions could create a safety hazard that would result in injury.

**A. Source Elimination and Site Security.** The responsible party must take appropriate measures to stop the source of the release and limit access to the site as necessary to protect human health and the environment.

**B. Containment.** Once the site is secure, the responsible party must contain the materials released by construction of berms or dikes, the use of absorbent pads or other containment actions to limit the area affected by the release and prevent potential fresh water contaminants from migrating to watercourses or areas which could pose a threat to public health and environment. The responsible party must monitor the containment to ensure that it is effectively containing the material and not being degraded by weather or onsite activity.

**C. Site Stabilization.** After containment, the responsible party must recover any free liquids and recoverable product that can be physically removed from the surface within the containment area. The responsible party must deliver material removed from the site to a division-approved facility.

[19.15.29.10 NMAC – Rp, 19.15.29.10 NMAC, XX/XX/201?]

**19.15.29.11 SITE ASSESSMENT/CHARACTERIZATION:** After the responsible party has removed all free liquids and recoverable products, the responsible party must assess soils both vertically and horizontally for potential environmental impacts from the release.

**A. Characterization Requirements:** The responsible party must submit information characterizing the release to the appropriate division district office within 90 days of discovery of the release or characterize the site by submitting a final closure report within 90 days of discovery of the release in accordance with 19.15.29 NMAC. The responsible party may seek an extension of time to submit characterization information for good cause as determined by the division. The responsible party must submit the following information to the division.

(1) **Site Map.** The responsible party must provide a scaled diagram that shows the potentially impacted area, significant surface features including roads and site infrastructure, location of borings, sample points, monitoring wells and subsurface features such as known pipelines to the extent known at the time of submittal including the source of information regarding subsurface features.

(2) **Depth to Ground Water.** The responsible party must determine the depth to ground water where the release occurred. If the exact depth to ground water is unknown, the responsible party must provide a reasonable determination of probable ground water depth using data generated by numeric models, cathodic well lithology, water well data, published information or other tools as approved by the appropriate division district office. If the responsible party uses water well data, the responsible party must provide all pertinent well information.

(3) **Wellhead Protection Area.** The responsible party must determine the horizontal distance from all known water sources within a half mile of the release including private and domestic water sources. Water sources are wells, springs or other sources of fresh water extraction. Private and domestic water sources are those water sources used by less than five households for domestic or stock purposes.

(4) **Distance to Nearest Significant Watercourse.** The responsible party must determine the horizontal distance to the nearest significant watercourse as defined in Subsection P of 19.15.17.7 NMAC.

(5) **Soil/Waste Characteristics.** The responsible party must determine the lateral and vertical extents of soil contamination, as follows.

(a) If the release occurred within a lined containment area, the responsible party must demonstrate liner integrity after affected material is removed and the affected area of the liner is exposed and provide:

(i) certification on form C-141 that the responsible party has visually inspected the liner where the release occurred and the liner remains intact and had the ability to contain the leak in question; and

(ii) at least two business days' notice to the appropriate division district office before conducting the liner inspection.

(b) If the responsible party is unable to demonstrate liner integrity or the release occurred outside of a lined containment area, the responsible party must delineate the release horizontally and vertically using Table I constituents or other constituents as appropriate for the type of the release. The operator may use the following soil sampling methods for characterization.

- (i) NRCS Field Guide;
- (ii) EPA SW-846;
- (iii) ASTM Method 4547;
- (iv) EPA 600; or
- (v) or other division-approved methods.

(c) In addition to Subparagraph (b) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC, if the release occurred outside of a lined containment area and is in an area where depth to ground water is greater than 50 feet and less than or equal to 100 feet, the responsible party must delineate the vertical extent of the release to the greater of 600 mg/kg chloride or background chloride level, if:

(i) the release contains produced water that exceeds 10,000 mg/l of chloride (if the responsible party contends the fluid is less than 10,000 mg/l, the responsible party must provide current sample results to the division); and

(ii) the release is of an unknown quantity or results in greater than 200 barrels of unrecovered produced water.

(d) If the conditions are met in Subparagraph (c) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC, the responsible party must submit at least two soil samples for laboratory analysis from each borehole or sample point (highest observed contamination and deepest depth investigated). Field screening and assessment techniques are acceptable (headspace, titration, electrical conductivity [include algorithm for validation purposes], electromagnetics, etc.), but the sampling procedures must be clearly defined. The responsible party must submit copies of field notes attributable to field sampling and provide copies of the actual laboratory results including chain of custody documentation.

**B.** Unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.

**C.** If the division determines that more information is needed to understand the character of the release and its potential impact on fresh water, public health and the environment, the division may request the responsible party submit additional information. Should the division request additional information, it must do so in writing to the responsible party within 30 days from receipt of the characterization report or remediation plan with what specific information the division is requesting and reasons why the additional information is needed. The responsible party has 14 days to respond to a written request for additional information. If the responsible party disagrees with the request for additional information, it may consult with the division, or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the issuance of the conditions.

#### **19.15.29.12 REMEDIATION AND CLOSURE:**

**A.** The responsible party must remediate all releases regardless of volume.

**B.** The responsible party must complete division-approved remediation for releases that endanger public health or the environment within 90 days of division approval of a remediation plan or with an abatement plan the responsible party submitted to the division in accordance with 19.15.30 NMAC. The responsible party may request an extension of time to remediate upon a showing of good cause as determined by the division. If the director determines that the release has caused water pollution in excess of the standards and requirements of 19.15.30 NMAC, the director may notify the responsible party that an abatement plan may be required pursuant to 19.15.30 NMAC.

(1) **Remediation Plan Requirements.** The responsible party must submit a detailed description of proposed remediation measures in accordance with the findings of the site assessment/characterization plan that includes:

- (a) delineation results, including laboratory analysis;
- (b) a scaled sitemap showing release area with horizontal and vertical delineation points;
- (c) estimated volume of impacted material to be remediated;
- (d) proposed remediation technique; and
- (e) proposed timeline for remediation activities.

(2) The responsible party shall restore the impacted surface area of a release occurring on a lined, bermed or otherwise contained exploration, development, production or storage site to the condition that existed prior to the release. Restoration of the site must include, but is not limited to, removal of materials the release contaminated and replacement with clean, uncontaminated materials. The responsible party must place the replacement materials to the near original relative positions and contour the replacement materials so as to achieve erosion control, long-term stability and preservation of surface water.

(3) The responsible party shall remediate the impacted surface area of a release not occurring on a lined, bermed or otherwise contained exploration, development, production or storage site to meet the standards of Table I of 19.15.29.12 NMAC and contain a minimum of four feet of non-waste material containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0. The soil cover must include a top layer which is either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

(4) If a release occurs within the following areas, the responsible party must treat the release as if it occurred less than 50 feet to ground water in Table I of 19.15.29.12 NMAC:

- (a) within
  - (i) 300 feet of any continuously flowing watercourse or any other significant watercourse, or
  - (ii) 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);
- (b) within 300 feet from an occupied permanent residence, school, hospital, institution or church;
- (c) within
  - (i) 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or
  - (ii) 1000 feet of any fresh water well or spring;
- (d) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves;
- (e) within 100 feet of a wetland;
- (f) within the area overlying a subsurface mine;
- (g) within an unstable area; or
- (h) within a 100-year floodplain.

B. The division has 30 days from receipt of the proposed remediation plan to review and approve, approve with conditions, or deny the remediation plan. If 30 days have lapsed without response from the division, then the plan is deemed denied and the responsible party may file an application for a hearing pursuant to 19.15.4 NMAC within 30 days. If the responsible party disagrees with any conditions of approval or denial of the plan, it may consult with the division or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the denial or issuance of the conditions.

**C. Closure Requirements.**

(1) The responsible party must test the remediated areas for contamination with representative five-point composite samples and individual grab samples from any wet or discolored areas. The samples must be analyzed for the constituents listed in Table I of 19.15.29.12 NMAC.

(a) The responsible party must verbally notify the appropriate division district office two business days prior to conducting final sampling. If the division district office does not respond to the notice within the two business days, the responsible party may proceed with final sampling. The responsible party may request a variance from this requirement upon a showing of good cause as determined by the division.

(b) There must be separate representative wall and base 5-point composite samples to show horizontal and vertical remediation. Each composite sample must not be representative of more than 200 ft<sup>2</sup>. The division may add additional sampling requirements dependent on the material released and any risks to human health or the environment.

(c) The responsible party may submit an alternative sampling plan for the division's review and approval. If a division inspector is witnessing the samples, the division inspector is authorized to verbally approve an alternative sampling plan based on site observations.

(2) If all composite and grab sample concentrations are less than or equal to the parameters listed in Table I or any conditions of approval, then the responsible party may proceed to backfill any excavated areas.

**D. Closure Reporting.**

(1) The responsible party must submit to the division a closure report on form C-141, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The responsible party must certify that all information in the closure report and attachments is correct and that the responsible party has complied with all applicable closure requirements and conditions specified in division rules or directives. The responsible party must submit closure report along with form C-141 to the division within 90 days of the remediation plan approval. The responsible party may apply for additional time to submit the final closure report upon a showing of good cause as determined by the division. The final report must include:

- (a) a scaled site and sampling diagram;
- (b) photographs of the remediated site prior to backfill;
- (c) laboratory analyses of final sampling; and
- (d) a description of all remedial activities.

(2) The division district office has 60 days to review and approve or deny the closure report. If the responsible party disagrees with denial of the closure report, it may consult with the division or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the denial.

Table I Closure Criteria for Soils Impacted by a Release			
Depth below bottom of release to ground water less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤ 50 feet	Chloride***	EPA 300.0	600 mg/kg
	TPH	EPA SW-846 Method 8015M	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
51 feet-100 feet	Chloride***	EPA 300.0	10,000 mg/kg
	TPH	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
> 100 feet	Chloride***	EPA 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg

	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

\*Or other test methods approved by the division.

\*\*Numerical limits or natural background level, whichever is greater.

\*\*\*This applies to releases of produced water or other fluids which may contain chloride.

[19.15.29.12 NMAC – N, XX/XX/201?]

**19.15.29.13 RESTORATION, RECLAMATION AND RE-VEGETATION:**

A. The responsible party must substantially restore the impacted surface areas to the condition that existed prior to the release. Restoration of the site must include the replacement of removed material and must be replaced to the near original relative positions and contoured to achieve erosion control, long-term stability and preservation of surface water flow patterns.

B. Areas reasonably needed for production operations or for subsequent drilling operations must be compacted, covered, paved or otherwise stabilized and maintained in such a way as to minimize dust and erosion to the extent practical.

C. The responsible party must construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

D. **Reclamation of Areas No Longer in Use.** The responsible party shall reclaim all areas disturbed by the remediation and closure, except areas reasonably needed for production operations or for subsequent drilling operations, as early and as nearly as practical to their original condition or their final land use and maintain those areas to control dust and minimize erosion to the extent practical.

(1) The responsible party must reseed disturbed area in the first favorable growing season following closure of the site.

(2) The division will consider reclamation of all disturbed areas complete when uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent of pre-disturbance levels and a total percent plant cover of at least seventy percent of pre-disturbance levels, excluding noxious weeds.

(3) The responsible party must notify the division when reclamation and re-vegetation are complete.

E. The surface restoration, reclamation and re-vegetation obligations imposed by federal, state agencies or tribes on lands managed or owned by those agencies supersede these provisions and govern the obligations of any responsible party subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

[19.15.29.13 NMAC – N, XX/XX/201?]

**19.15.29.14 VARIANCES:**

A. A responsible party may file a written request for a variance from any requirement of 19.15.29 NMAC with the appropriate division district office. The variance request must include:

(1) a detailed statement explaining the need for a variance; and

(2) a detailed written demonstration that the variance will provide equal or better protection of fresh water, public health and the environment.

B. The division district office must approve or deny the variance in writing within 60 days of receipt. If the division district office denies the variance, it must provide the responsible party with the reasons for denial.

C. If the division district office does not approve or deny a request for variance from the requirements of this rule within 60 days of the date of the request for variance is received by the division district office, then the plan is deemed denied and the responsible party may file an application for a hearing pursuant to 19.15.4 NMAC within 30 days of the denial.

D. If the responsible party requests a hearing pursuant to 19.15.4 NMAC within 30 days after receipt of notice, the division must set the matter for hearing with notice to the responsible and appropriate division district office.

E. In addition to the notice provisions in 19.15.4 NMAC, the responsible party must provide notice of the hearing on the request for variance to the surface owner of the site by certified mail, return receipt requested, at least 20 days prior to the date of the hearing.

F. Variances must receive division approval prior to implementation.

[19.15.29.14 NMAC – N, XX/XX/201?]

**19.15.29.15 ENFORCEMENT:**

A. The responsible party must comply with all the requirements of 19.15.29 NMAC. The division may take enforcement action against any responsible party who does not comply with 19.15.29 NMAC.

B. A responsible party may enter an agreed compliance order with the division for any violation of 19.15.29 NMAC, except for 19.15.29.9 NMAC. An agreed compliance order may be entered prior to or after the filing of an application by the division or any other party for an administrative compliance proceeding. Any administrative compliance order will have the same force and effect as a compliance order issued after an adjudicatory hearing.

C. The director or the director's designee may deny a permit to drill, deepen or plug back any application if the responsible party is not in compliance with a court order, agreed compliance order or administrative compliance order arising from 19.15.29 NMAC.

D. If the division or other party files an administrative enforcement application, the provisions of 19.15.4 NMAC apply to the enforcement proceeding, unless altered or amended by 19.15.5.10 NMAC or 19.15.29 NMAC.

[19.15.29.15 NMAC – N, XX/XX/201?]

**19.15.29.16 TRANSITIONAL PROVISIONS:**

A. Responsible parties with current ongoing corrective actions/remediation with approved plans and timelines as of \_\_\_\_\_ (effective date of rule) do not have to submit revised plans.

B. Responsible parties with ongoing corrective actions/remediation without approved timelines or plans as of \_\_\_\_\_ (effective date of rule) must submit a characterization plan or corrective action/remediation plan with proposed timeframes within 90 days of \_\_\_\_ (effective date of rule).

[19.15.29.16 NMAC – N, XX/XX/201?]

## ***APPENDIX C***

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### **January 2018 Sample Locations**

On January 08, 2018 Andrew Parker and Kristin Pope of Hicks Consultants mobilized to the Pride Energy State New Mexico 87 State 001 (Tank Battery) location to conduct a limited characterization of an accidental release in January 2017. The release was predominantly crude oil and occurred at the tank battery, which is located at the production pad for the plugged NM 83 State #1 SWD well (Latitude: 33.05973, Longitude: -103.514153; 33-14S-34E Unit Letter J), about 1325 feet east of the NM 87 State #001 producing well.

Gandy Backhoe Services provided backhoe trenching services. Adkins Engineering provided drilling rig services.

We excavated eight (8) backhoe trenches and drilled three (3) soil borings to characterize the 2017 and historic releases. Excavation depth was determined by the extent of the backhoe reach or bucket refusal caused by the underlying caliche. Borehole depth was determined by chloride field titrations. Vertical delineation was determined complete when chloride titrations showed less than 250 mg/kg for ten vertical feet.

Soil samples were collected for the analysis of chloride, BTEX, and GRO/DRO/MRO. Soil samples were submitted to Hall Environmental Laboratory in Albuquerque, NM; on-ice and under strict chain-of-custody. Appendix D contains the laboratory Certificate of Analysis.

Plate 10 shows the location of the sample locations. Exhibit A, below, shows the latitude, longitude, depth, and sampling type. Table 1 is a summary of the laboratory analysis. Appendix E contains the lithologic logs for the sample locations.

Sample Location	Date	Release	Type	Total Depth (feet)	Latitude WGS84	Longitude (WGS84)
2017 NE	1/8/2018	2017 Release	Backhoe	1	33.06003943	-103.5138131
2017 West	1/8/2018	2017 Release	Backhoe	1	33.05998348	-103.5140252
2017 East	1/8/2018	2017 Release	Backhoe	1	33.05992135	-103.5138477
2017 Northwest (within berm)	1/8/2018	2017 Release	Backhoe	12	33.059876	-103.514189
SB-01 2017	1/8/2018	2017 Release	Soil Boring	14	33.05983205	-103.513957
Historic Southeast	1/8/2018	Historic Release	Backhoe	1	33.059401	-103.513557
Historic Northeast	1/8/2018	Historic Release	Backhoe	1	33.05984562	-103.5133808
Historic North	1/8/2018	Historic Release	Backhoe	1	33.06000135	-103.5139305
Historic Southwest	1/8/2018	Historic Release	Backhoe	9	33.05941708	-103.5141641
SB-02 Historic	1/8/2018	Historic Release	Soil Boring	21	33.0597343	-103.5137094
SB-03 Playa	1/8/2018	Historic Release	Soil Boring	31	33.059934	-103.514626

**Exhibit A: Sample location and type.**



**Exhibit B: Trench sample at Historic Southeast. Hard caliche encountered at 1-foot below ground surface. Land surface is undergoing natural restoration/re-vegetation. Drilling of SB-02 is visible in upper right of photo.**



**Exhibit C: Drilling of SB-03, within the natural depression (“playa”) west-northwest of the tank battery. Tank battery is visible in photo center.**

# ***APPENDIX D***

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Hall Environmental Analysis Laboratory  
4901 Hawkins NE  
Albuquerque, NM 87109  
TEL: 505-345-3975 FAX: 505-345-4107  
Website: [www.hallenvironmental.com](http://www.hallenvironmental.com)

February 01, 2018

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: NM 87 State 001 Tank Battery

OrderNo.: 1801659

Dear Andrew Parker:

Hall Environmental Analysis Laboratory received 18 sample(s) on 1/11/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to [www.hallenvironmental.com](http://www.hallenvironmental.com) or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

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

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a white background.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-001

**Matrix:** SOIL

**Client Sample ID:** 2017 East @ 0.5 ft  
**Collection Date:** 1/8/2018 8:45:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	ND	30		mg/Kg	20	1/17/2018 2:33:10 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	1/16/2018 10:32:53 AM	36022
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	1/16/2018 10:32:53 AM	36022
Surr: DNOP	101	70-130		%Rec	1	1/16/2018 10:32:53 AM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	1/15/2018 10:21:21 AM	36006
Surr: BFB	87.1	15-316		%Rec	1	1/15/2018 10:21:21 AM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.025		mg/Kg	1	1/15/2018 11:15:19 AM	36006
Toluene	ND	0.049		mg/Kg	1	1/15/2018 11:15:19 AM	36006
Ethylbenzene	ND	0.049		mg/Kg	1	1/15/2018 11:15:19 AM	36006
Xylenes, Total	ND	0.098		mg/Kg	1	1/15/2018 11:15:19 AM	36006
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	1/15/2018 11:15:19 AM	36006
Surr: Toluene-d8	92.3	70-130		%Rec	1	1/15/2018 11:15:19 AM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-002

**Matrix:** SOIL

**Client Sample ID:** 2017 West @ 0.5 ft  
**Collection Date:** 1/8/2018 9:00:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	ND	30		mg/Kg	20	1/17/2018 2:45:35 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	1/16/2018 5:57:24 PM	36022
Motor Oil Range Organics (MRO)	ND	51		mg/Kg	1	1/16/2018 5:57:24 PM	36022
Surr: DNOP	77.7	70-130		%Rec	1	1/16/2018 5:57:24 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	1/15/2018 10:45:09 AM	36006
Surr: BFB	91.3	15-316		%Rec	1	1/15/2018 10:45:09 AM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.025		mg/Kg	1	1/15/2018 12:24:01 PM	36006
Toluene	ND	0.050		mg/Kg	1	1/15/2018 12:24:01 PM	36006
Ethylbenzene	ND	0.050		mg/Kg	1	1/15/2018 12:24:01 PM	36006
Xylenes, Total	ND	0.10		mg/Kg	1	1/15/2018 12:24:01 PM	36006
Surr: 4-Bromofluorobenzene	110	70-130		%Rec	1	1/15/2018 12:24:01 PM	36006
Surr: Toluene-d8	94.2	70-130		%Rec	1	1/15/2018 12:24:01 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-003

**Matrix:** SOIL

**Client Sample ID:** 2017 NW @ 0.5 ft  
**Collection Date:** 1/8/2018 9:15:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	ND	30		mg/Kg	20	1/17/2018 2:57:59 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	1/16/2018 12:38:08 PM	36022
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	1/16/2018 12:38:08 PM	36022
Surr: DNOP	85.3	70-130		%Rec	1	1/16/2018 12:38:08 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	1/15/2018 5:53:49 PM	36006
Surr: BFB	91.7	15-316		%Rec	1	1/15/2018 5:53:49 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.024		mg/Kg	1	1/15/2018 12:46:56 PM	36006
Toluene	ND	0.047		mg/Kg	1	1/15/2018 12:46:56 PM	36006
Ethylbenzene	ND	0.047		mg/Kg	1	1/15/2018 12:46:56 PM	36006
Xylenes, Total	ND	0.095		mg/Kg	1	1/15/2018 12:46:56 PM	36006
Surr: 4-Bromofluorobenzene	112	70-130		%Rec	1	1/15/2018 12:46:56 PM	36006
Surr: Toluene-d8	94.6	70-130		%Rec	1	1/15/2018 12:46:56 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:		
*	Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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	P Sample pH Not In Range
PQL	Practical Quantitative Limit	RL Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-004

**Matrix:** SOIL

**Client Sample ID:** 2017 NW Berm @ 2 ft  
**Collection Date:** 1/8/2018 9:30:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	4600	150		mg/Kg	100	1/19/2018 12:33:57 AM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	12000	1000		mg/Kg	100	1/16/2018 5:33:18 PM	36022
Motor Oil Range Organics (MRO)	9100	5000		mg/Kg	100	1/16/2018 5:33:18 PM	36022
Surr: DNOP	0	70-130	S	%Rec	100	1/16/2018 5:33:18 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	150	24		mg/Kg	5	1/15/2018 9:33:37 AM	36006
Surr: BFB	193	15-316		%Rec	5	1/15/2018 9:33:37 AM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	0.27	0.049		mg/Kg	2	1/15/2018 1:09:56 PM	36006
Toluene	ND	0.098		mg/Kg	2	1/15/2018 1:09:56 PM	36006
Ethylbenzene	0.69	0.098		mg/Kg	2	1/15/2018 1:09:56 PM	36006
Xylenes, Total	1.3	0.20		mg/Kg	2	1/15/2018 1:09:56 PM	36006
Surr: 4-Bromofluorobenzene	123	70-130		%Rec	2	1/15/2018 1:09:56 PM	36006
Surr: Toluene-d8	94.7	70-130		%Rec	2	1/15/2018 1:09:56 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:		
*	Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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	P Sample pH Not In Range
PQL	Practical Quantitative Limit	RL Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-005

**Matrix:** SOIL

**Client Sample ID:** 2017 NW Berm @ 12 ft  
**Collection Date:** 1/8/2018 9:32:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	2900	150		mg/Kg	100	1/19/2018 12:46:22 AM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	7900	98		mg/Kg	10	1/16/2018 1:28:43 PM	36022
Motor Oil Range Organics (MRO)	2900	490		mg/Kg	10	1/16/2018 1:28:43 PM	36022
Surr: DNOP	0	70-130	S	%Rec	10	1/16/2018 1:28:43 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	420	50		mg/Kg	10	1/15/2018 9:57:38 AM	36006
Surr: BFB	298	15-316		%Rec	10	1/15/2018 9:57:38 AM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.25		mg/Kg	10	1/15/2018 1:32:54 PM	36006
Toluene	ND	0.50		mg/Kg	10	1/15/2018 1:32:54 PM	36006
Ethylbenzene	7.5	0.50		mg/Kg	10	1/15/2018 1:32:54 PM	36006
Xylenes, Total	27	1.0		mg/Kg	10	1/15/2018 1:32:54 PM	36006
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	10	1/15/2018 1:32:54 PM	36006
Surr: Toluene-d8	102	70-130		%Rec	10	1/15/2018 1:32:54 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-006

**Matrix:** SOIL

**Client Sample ID:** 2000 North @ 0.5 ft  
**Collection Date:** 1/8/2018 10:45:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	ND	30		mg/Kg	20	1/17/2018 4:24:50 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	56	9.7		mg/Kg	1	1/16/2018 2:17:42 PM	36022
Motor Oil Range Organics (MRO)	62	48		mg/Kg	1	1/16/2018 2:17:42 PM	36022
Surr: DNOP	97.2	70-130		%Rec	1	1/16/2018 2:17:42 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	1/15/2018 6:17:41 PM	36006
Surr: BFB	98.0	15-316		%Rec	1	1/15/2018 6:17:41 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.024		mg/Kg	1	1/15/2018 1:55:54 PM	36006
Toluene	ND	0.048		mg/Kg	1	1/15/2018 1:55:54 PM	36006
Ethylbenzene	ND	0.048		mg/Kg	1	1/15/2018 1:55:54 PM	36006
Xylenes, Total	0.22	0.095		mg/Kg	1	1/15/2018 1:55:54 PM	36006
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	1/15/2018 1:55:54 PM	36006
Surr: Toluene-d8	92.6	70-130		%Rec	1	1/15/2018 1:55:54 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-007

**Matrix:** SOIL

**Client Sample ID:** 2000 NE @ 0.5 ft  
**Collection Date:** 1/8/2018 11:00:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	260	30		mg/Kg	20	1/17/2018 4:37:15 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	1/16/2018 2:42:17 PM	36022
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	1/16/2018 2:42:17 PM	36022
Surr: DNOP	98.6	70-130		%Rec	1	1/16/2018 2:42:17 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	1/15/2018 6:41:29 PM	36006
Surr: BFB	93.0	15-316		%Rec	1	1/15/2018 6:41:29 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.025		mg/Kg	1	1/15/2018 2:18:49 PM	36006
Toluene	ND	0.049		mg/Kg	1	1/15/2018 2:18:49 PM	36006
Ethylbenzene	ND	0.049		mg/Kg	1	1/15/2018 2:18:49 PM	36006
Xylenes, Total	ND	0.099		mg/Kg	1	1/15/2018 2:18:49 PM	36006
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/15/2018 2:18:49 PM	36006
Surr: Toluene-d8	93.1	70-130		%Rec	1	1/15/2018 2:18:49 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** 2000 SW @ 2 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 11:15:00 AM

**Lab ID:** 1801659-008

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	500	30		mg/Kg	20	1/17/2018 4:49:40 PM	36067
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	1/16/2018 3:06:55 PM	36022
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	1/16/2018 3:06:55 PM	36022
Surr: DNOP	87.9	70-130		%Rec	1	1/16/2018 3:06:55 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	1/15/2018 7:05:19 PM	36006
Surr: BFB	91.8	15-316		%Rec	1	1/15/2018 7:05:19 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.024		mg/Kg	1	1/15/2018 2:41:47 PM	36006
Toluene	ND	0.049		mg/Kg	1	1/15/2018 2:41:47 PM	36006
Ethylbenzene	ND	0.049		mg/Kg	1	1/15/2018 2:41:47 PM	36006
Xylenes, Total	ND	0.098		mg/Kg	1	1/15/2018 2:41:47 PM	36006
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/15/2018 2:41:47 PM	36006
Surr: Toluene-d8	96.9	70-130		%Rec	1	1/15/2018 2:41:47 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1801659**

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** 2000 SW @ 8 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 11:20:00 AM

**Lab ID:** 1801659-009

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	45	30		mg/Kg	20	1/18/2018 11:19:42 AM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-010

**Matrix:** SOIL

**Client Sample ID:** 2000 SE @ 0.5 ft  
**Collection Date:** 1/8/2018 12:45:00 PM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	ND	30		mg/Kg	20	1/18/2018 12:34:08 PM	36090
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	1/16/2018 3:56:02 PM	36022
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	1/16/2018 3:56:02 PM	36022
Surr: DNOP	78.5	70-130		%Rec	1	1/16/2018 3:56:02 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	1/15/2018 7:29:02 PM	36006
Surr: BFB	90.8	15-316		%Rec	1	1/15/2018 7:29:02 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.024		mg/Kg	1	1/15/2018 3:04:47 PM	36006
Toluene	ND	0.048		mg/Kg	1	1/15/2018 3:04:47 PM	36006
Ethylbenzene	ND	0.048		mg/Kg	1	1/15/2018 3:04:47 PM	36006
Xylenes, Total	ND	0.097		mg/Kg	1	1/15/2018 3:04:47 PM	36006
Surr: 4-Bromofluorobenzene	110	70-130		%Rec	1	1/15/2018 3:04:47 PM	36006
Surr: Toluene-d8	94.2	70-130		%Rec	1	1/15/2018 3:04:47 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:		
*	Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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	P Sample pH Not In Range
PQL	Practical Quantitative Limit	RL Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery  
**Lab ID:** 1801659-011

**Matrix:** SOIL

**Client Sample ID:** SB 1 @ 0 ft  
**Collection Date:** 1/8/2018 9:30:00 AM  
**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	93	30		mg/Kg	20	1/18/2018 12:46:32 PM	36090
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	140	9.5		mg/Kg	1	1/16/2018 4:20:18 PM	36022
Motor Oil Range Organics (MRO)	230	48		mg/Kg	1	1/16/2018 4:20:18 PM	36022
Surr: DNOP	95.1	70-130		%Rec	1	1/16/2018 4:20:18 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	1/15/2018 7:52:47 PM	36006
Surr: BFB	88.6	15-316		%Rec	1	1/15/2018 7:52:47 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.023		mg/Kg	1	1/15/2018 3:27:36 PM	36006
Toluene	ND	0.047		mg/Kg	1	1/15/2018 3:27:36 PM	36006
Ethylbenzene	ND	0.047		mg/Kg	1	1/15/2018 3:27:36 PM	36006
Xylenes, Total	ND	0.093		mg/Kg	1	1/15/2018 3:27:36 PM	36006
Surr: 4-Bromofluorobenzene	111	70-130		%Rec	1	1/15/2018 3:27:36 PM	36006
Surr: Toluene-d8	95.1	70-130		%Rec	1	1/15/2018 3:27:36 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1801659**

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 1 @ 15 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018

**Lab ID:** 1801659-012

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	40	30		mg/Kg	20	1/18/2018 12:58:57 PM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 2 @ 0 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 11:38:00 AM

**Lab ID:** 1801659-013

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>MRA</b>
Chloride	4200	150		mg/Kg	100	1/19/2018 10:35:22 PM	36090
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	1/16/2018 4:44:54 PM	36022
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	1/16/2018 4:44:54 PM	36022
Surr: DNOP	81.3	70-130		%Rec	1	1/16/2018 4:44:54 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	1/15/2018 8:16:29 PM	36006
Surr: BFB	89.2	15-316		%Rec	1	1/15/2018 8:16:29 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.023		mg/Kg	1	1/15/2018 3:50:36 PM	36006
Toluene	ND	0.046		mg/Kg	1	1/15/2018 3:50:36 PM	36006
Ethylbenzene	ND	0.046		mg/Kg	1	1/15/2018 3:50:36 PM	36006
Xylenes, Total	ND	0.093		mg/Kg	1	1/15/2018 3:50:36 PM	36006
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/15/2018 3:50:36 PM	36006
Surr: Toluene-d8	95.6	70-130		%Rec	1	1/15/2018 3:50:36 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1801659**

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 2 @ 9 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 10:53:00 AM

**Lab ID:** 1801659-014

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	ND	30		mg/Kg	20	1/18/2018 1:23:46 PM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1801659**

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 2 @ 15 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 12:30:00 PM

**Lab ID:** 1801659-015

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	ND	30		mg/Kg	20	1/18/2018 1:36:11 PM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1801659

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 3 @ 5 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 1:58:00 PM

**Lab ID:** 1801659-016

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	660	30		mg/Kg	20	1/18/2018 1:48:36 PM	36090
<b>EPA METHOD 8015M/D: DIESEL RANGE ORGANICS</b>							Analyst: <b>TOM</b>
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	1/16/2018 5:09:04 PM	36022
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	1/16/2018 5:09:04 PM	36022
Surr: DNOP	85.0	70-130		%Rec	1	1/16/2018 5:09:04 PM	36022
<b>EPA METHOD 8015D: GASOLINE RANGE</b>							Analyst: <b>NSB</b>
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	1/15/2018 8:40:13 PM	36006
Surr: BFB	87.6	15-316		%Rec	1	1/15/2018 8:40:13 PM	36006
<b>EPA METHOD 8260B: VOLATILES SHORT LIST</b>							Analyst: <b>AG</b>
Benzene	ND	0.024		mg/Kg	1	1/15/2018 4:13:32 PM	36006
Toluene	ND	0.048		mg/Kg	1	1/15/2018 4:13:32 PM	36006
Ethylbenzene	ND	0.048		mg/Kg	1	1/15/2018 4:13:32 PM	36006
Xylenes, Total	ND	0.095		mg/Kg	1	1/15/2018 4:13:32 PM	36006
Surr: 4-Bromofluorobenzene	109	70-130		%Rec	1	1/15/2018 4:13:32 PM	36006
Surr: Toluene-d8	92.7	70-130		%Rec	1	1/15/2018 4:13:32 PM	36006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	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	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD

Client Sample ID: SB 3 @ 21 ft

Project: NM 87 State 001 Tank Battery

Collection Date: 1/8/2018 1:48:00 PM

Lab ID: 1801659-017

Matrix: SOIL

Received Date: 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	220	30		mg/Kg	20	1/18/2018 2:25:50 PM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:			
*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1801659**

Date Reported: 2/1/2018

**CLIENT:** R.T. Hicks Consultants, LTD

**Client Sample ID:** SB 3 @ 31 ft

**Project:** NM 87 State 001 Tank Battery

**Collection Date:** 1/8/2018 3:33:00 PM

**Lab ID:** 1801659-018

**Matrix:** SOIL

**Received Date:** 1/11/2018 2:15:00 PM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
<b>EPA METHOD 300.0: ANIONS</b>							Analyst: <b>CJS</b>
Chloride	200	30		mg/Kg	20	1/18/2018 2:38:15 PM	36090

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	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	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1801659

01-Feb-18

**Client:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery

Sample ID	<b>MB-36067</b>	SampType:	<b>mblk</b>	TestCode:	<b>EPA Method 300.0: Anions</b>					
Client ID:	<b>PBS</b>	Batch ID:	<b>36067</b>	RunNo:	<b>48508</b>					
Prep Date:	<b>1/17/2018</b>	Analysis Date:	<b>1/17/2018</b>	SeqNo:	<b>1560534</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	<b>LCS-36067</b>	SampType:	<b>ics</b>	TestCode:	<b>EPA Method 300.0: Anions</b>					
Client ID:	<b>LCSS</b>	Batch ID:	<b>36067</b>	RunNo:	<b>48508</b>					
Prep Date:	<b>1/17/2018</b>	Analysis Date:	<b>1/17/2018</b>	SeqNo:	<b>1560535</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	98.2	90	110			

Sample ID	<b>MB-36090</b>	SampType:	<b>mblk</b>	TestCode:	<b>EPA Method 300.0: Anions</b>					
Client ID:	<b>PBS</b>	Batch ID:	<b>36090</b>	RunNo:	<b>48535</b>					
Prep Date:	<b>1/18/2018</b>	Analysis Date:	<b>1/18/2018</b>	SeqNo:	<b>1561668</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	<b>LCS-36090</b>	SampType:	<b>ics</b>	TestCode:	<b>EPA Method 300.0: Anions</b>					
Client ID:	<b>LCSS</b>	Batch ID:	<b>36090</b>	RunNo:	<b>48535</b>					
Prep Date:	<b>1/18/2018</b>	Analysis Date:	<b>1/18/2018</b>	SeqNo:	<b>1561669</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	97.9	90	110			

**Qualifiers:**

- |   |   |
|---|---|
| * Value exceeds Maximum Contaminant Level.              | B Analyte detected in the associated Method Blank           |
| D Sample Diluted Due to Matrix                          | 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                  | P Sample pH Not In Range                                    |
| PQL Practical Quantitative Limit                        | RL Reporting Detection Limit                                |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1801659

01-Feb-18

**Client:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery

Sample ID	<b>LCS-36022</b>	SampType:	<b>LCS</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>LCSS</b>	Batch ID:	<b>36022</b>	RunNo:	<b>48464</b>					
Prep Date:	<b>1/15/2018</b>	Analysis Date:	<b>1/16/2018</b>	SeqNo:	<b>1557778</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	10	50.00	0	90.4	70	130			
Surr: DNOP	4.4		5.000		88.3	70	130			

Sample ID	<b>MB-36022</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>PBS</b>	Batch ID:	<b>36022</b>	RunNo:	<b>48464</b>					
Prep Date:	<b>1/15/2018</b>	Analysis Date:	<b>1/16/2018</b>	SeqNo:	<b>1557779</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.4		10.00		93.6	70	130			

Sample ID	<b>1801659-001AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>2017 East @ 0.5 ft</b>	Batch ID:	<b>36022</b>	RunNo:	<b>48464</b>					
Prep Date:	<b>1/15/2018</b>	Analysis Date:	<b>1/16/2018</b>	SeqNo:	<b>1558759</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	9.4	46.90	5.011	82.4	55.8	125			
Surr: DNOP	4.2		4.690		90.6	70	130			

Sample ID	<b>1801659-001AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>EPA Method 8015M/D: Diesel Range Organics</b>					
Client ID:	<b>2017 East @ 0.5 ft</b>	Batch ID:	<b>36022</b>	RunNo:	<b>48464</b>					
Prep Date:	<b>1/15/2018</b>	Analysis Date:	<b>1/16/2018</b>	SeqNo:	<b>1558761</b>	Units:	<b>mg/Kg</b>			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	44	9.5	47.35	5.011	83.4	55.8	125	1.82	20	
Surr: DNOP	4.4		4.735		91.9	70	130	0	0	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1801659

01-Feb-18

**Client:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery

Sample ID <b>MB-36006</b>	SampType: <b>MBLK</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>PBS</b>	Batch ID: <b>36006</b>		RunNo: <b>48452</b>							
Prep Date: <b>1/12/2018</b>	Analysis Date: <b>1/15/2018</b>		SeqNo: <b>1557550</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	930		1000		93.2	15	316			

Sample ID <b>LCS-36006</b>	SampType: <b>LCS</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>LCSS</b>	Batch ID: <b>36006</b>		RunNo: <b>48452</b>							
Prep Date: <b>1/12/2018</b>	Analysis Date: <b>1/15/2018</b>		SeqNo: <b>1557551</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	94.0	75.9	131			
Surr: BFB	1000		1000		101	15	316			

Sample ID <b>1801659-002AMS</b>	SampType: <b>MS</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>2017 West @ 0.5 ft</b>	Batch ID: <b>36006</b>		RunNo: <b>48452</b>							
Prep Date: <b>1/12/2018</b>	Analysis Date: <b>1/15/2018</b>		SeqNo: <b>1557554</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	4.8	24.13	0	85.4	77.8	128			
Surr: BFB	950		965.3		98.9	15	316			

Sample ID <b>1801659-002AMSD</b>	SampType: <b>MSD</b>		TestCode: <b>EPA Method 8015D: Gasoline Range</b>							
Client ID: <b>2017 West @ 0.5 ft</b>	Batch ID: <b>36006</b>		RunNo: <b>48452</b>							
Prep Date: <b>1/12/2018</b>	Analysis Date: <b>1/15/2018</b>		SeqNo: <b>1557555</b>		Units: <b>mg/Kg</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	4.8	23.85	0	92.6	77.8	128	6.94	20	
Surr: BFB	920		954.2		96.2	15	316	0	0	

**Qualifiers:**

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- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1801659

01-Feb-18

**Client:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery

Sample ID	<b>Ics-36006</b>		SampType:	<b>LCS4</b>		TestCode:	<b>EPA Method 8260B: Volatiles Short List</b>				
Client ID:	<b>BatchQC</b>		Batch ID:	<b>36006</b>		RunNo:	<b>48454</b>				
Prep Date:	<b>1/12/2018</b>		Analysis Date:	<b>1/15/2018</b>		SeqNo:	<b>1557603</b>		Units: <b>mg/Kg</b>		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	0.83	0.025	1.000	0	82.8	80	120				
Toluene	0.89	0.050	1.000	0	88.7	80	120				
Ethylbenzene	0.90	0.050	1.000	0	90.2	80	120				
Xylenes, Total	2.6	0.10	3.000	0	87.1	80	120				
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.5	70	130				
Surr: Toluene-d8	0.48		0.5000		95.9	70	130				

Sample ID	<b>MB-36006</b>		SampType:	<b>MBLK</b>		TestCode:	<b>EPA Method 8260B: Volatiles Short List</b>				
Client ID:	<b>PBS</b>		Batch ID:	<b>36006</b>		RunNo:	<b>48454</b>				
Prep Date:	<b>1/12/2018</b>		Analysis Date:	<b>1/15/2018</b>		SeqNo:	<b>1557604</b>		Units: <b>mg/Kg</b>		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	ND	0.025									
Toluene	ND	0.050									
Ethylbenzene	ND	0.050									
Xylenes, Total	ND	0.10									
Surr: 4-Bromofluorobenzene	0.55		0.5000		110	70	130				
Surr: Toluene-d8	0.47		0.5000		93.4	70	130				

Sample ID	<b>1801659-001ams</b>		SampType:	<b>MS4</b>		TestCode:	<b>EPA Method 8260B: Volatiles Short List</b>				
Client ID:	<b>2017 East @ 0.5 ft</b>		Batch ID:	<b>36006</b>		RunNo:	<b>48454</b>				
Prep Date:	<b>1/12/2018</b>		Analysis Date:	<b>1/15/2018</b>		SeqNo:	<b>1557606</b>		Units: <b>mg/Kg</b>		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	0.84	0.024	0.9597	0	87.3	80	120				
Toluene	0.87	0.048	0.9597	0	91.1	80	120				
Ethylbenzene	ND	0.048	0.9597	0.01008	-1.05	80	120			S	
Xylenes, Total	ND	0.096	2.879	0.02842	-0.0721	80	120			S	
Surr: 4-Bromofluorobenzene	0.53		0.4798		110	70	130				
Surr: Toluene-d8	0.45		0.4798		94.8	70	130				

Sample ID	<b>1801659-001amsd</b>		SampType:	<b>MSD4</b>		TestCode:	<b>EPA Method 8260B: Volatiles Short List</b>				
Client ID:	<b>2017 East @ 0.5 ft</b>		Batch ID:	<b>36006</b>		RunNo:	<b>48454</b>				
Prep Date:	<b>1/12/2018</b>		Analysis Date:	<b>1/15/2018</b>		SeqNo:	<b>1557607</b>		Units: <b>mg/Kg</b>		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	0.83	0.023	0.9234	0	89.9	80	120	0.927	0		
Toluene	0.89	0.046	0.9234	0	95.9	80	120	1.25	0		
Ethylbenzene	ND	0.046	0.9234	0.01008	-0.129	80	120	0	0	S	
Xylenes, Total	ND	0.092	2.770	0.02842	-0.167	80	120	0	0	S	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1801659

01-Feb-18

**Client:** R.T. Hicks Consultants, LTD  
**Project:** NM 87 State 001 Tank Battery

Sample ID	1801659-001amsd	SampType:	MSD4	TestCode:	EPA Method 8260B: Volatiles Short List					
Client ID:	2017 East @ 0.5 ft	Batch ID:	36006	RunNo:	48454					
Prep Date:	1/12/2018	Analysis Date:	1/15/2018	SeqNo:	1557607	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.51		0.4617		111	70	130	0	0	
Surr: Toluene-d8	0.46		0.4617		98.6	70	130	0	0	

**Qualifiers:**

- |   |   |
|---|---|
| * Value exceeds Maximum Contaminant Level.              | B Analyte detected in the associated Method Blank           |
| D Sample Diluted Due to Matrix                          | 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                  | P Sample pH Not In Range                                    |
| PQL Practical Quantitative Limit                        | RL Reporting Detection Limit                                |
| S % Recovery outside of range due to dilution or matrix | W Sample container temperature is out of limit as specified |



# Sample Log-In Check List

Client Name: RT HICKS

Work Order Number: 1801659

RcptNo: 1

Received By: Dennis Suazo

1/11/2018 2:15:00 PM

*Dennis Suazo*

Completed By: Dennis Suazo

1/12/2018 9:12:36 AM

*Dennis Suazo*

Reviewed By:

*MS/DDS*

*01/12/18*

**Chain of Custody**

1. Is Chain of Custody complete? Yes  No  Not Present
2. How was the sample delivered? Client

**Log In**

3. Was an attempt made to cool the samples? Yes  No  NA
4. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA
5. Sample(s) in proper container(s)? Yes  No
6. Sufficient sample volume for indicated test(s)? Yes  No
7. Are samples (except VOA and ONG) properly preserved? Yes  No
8. Was preservative added to bottles? Yes  No  NA
9. VOA vials have zero headspace? Yes  No  No VOA Vials
10. Were any sample containers received broken? Yes  No
11. Does paperwork match bottle labels?  
(Note discrepancies on chain of custody) Yes  No
12. Are matrices correctly identified on Chain of Custody? Yes  No
13. Is it clear what analyses were requested? Yes  No
14. Were all holding times able to be met?  
(If no, notify customer for authorization.) Yes  No

# of preserved bottles checked for pH: \_\_\_\_\_  
 (<2 or >12 unless noted)  
 Adjusted? \_\_\_\_\_  
 Checked by: \_\_\_\_\_

**Special Handling (if applicable)**

15. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified: \_\_\_\_\_ Date: \_\_\_\_\_  
 By Whom: \_\_\_\_\_ Via:  eMail  Phone  Fax  In Person  
 Regarding: \_\_\_\_\_  
 Client Instructions: \_\_\_\_\_

16. Additional remarks:

**17. Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.7	Good	Not Present			

# Chain-of-Custody Record

Client: RT Hicks Consultants

Mailing Address: 04 file

Phone #: 970-570-9535

email or Fax#: andrew@rthicksresult.com

QA/QC Package

Standard  Level 4 (Full Validation)

Accreditation

NELAP  Other

EDD (Type) \_\_\_\_\_

Turn-Around Time:

Standard  Rush

Project Name: NM 87 State 001 Tank Battery

Project #: \_\_\_\_\_

Project Manager: Andrew Parker

Sampler: Andrew Parker

On/Off:  Yes  No

Sample Temperature: 5.1 - 0.4 (CF) = 4.7

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
1/8/18	08:45	Soil	2017 East @ 0.5 ft	4oz Jar - 7	7 ICE	1801659
	09:00		2017 West @ 0.5 ft			002
	09:15		2017 NW @ 0.5 ft			003
	09:30		2017 SW Berm @ 2 ft			004
	09:32		2017 NW Berm @ 12 ft			005
	10:45		2000 North @ 0.5 ft			006
	11:00		2000 NE @ 0.5 ft			007
	11:15		2000 SW @ 2 ft			008
	11:20		2000 SW @ 8 ft			009
	12:45		2000 SE @ 0.5 ft			010
	09:30		SB 1 @ 1 ft			011
			SB 1 @ 15 ft			012

Date: 1/18/18 Time: 14:15

Date: 1/11 Time: \_\_\_\_\_

Relinquished by: Andrew Parker

Relinquished by: \_\_\_\_\_

Received by: [Signature] Date: 1/11/18 Time: 14:15

Received by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

# HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com  
 4901 Hawkins NE - Albuquerque, NM 87109  
 Tel. 505-345-3975 Fax 505-345-4107

## Analysis Request

<input type="checkbox"/>	BTEX + MTBE + TMBs (8021)	<input type="checkbox"/>
<input type="checkbox"/>	BTEX + MTBE + TPH (Gas only)	<input type="checkbox"/>
<input type="checkbox"/>	TPH 8015B (GRO / DRO / MRO)	<input type="checkbox"/>
<input type="checkbox"/>	TPH (Method 418.1)	<input type="checkbox"/>
<input type="checkbox"/>	EDB (Method 504.1)	<input type="checkbox"/>
<input type="checkbox"/>	PAHs (8310 or 8270 SIMS)	<input type="checkbox"/>
<input type="checkbox"/>	RCRA 8 Metals	<input type="checkbox"/>
<input type="checkbox"/>	Anions (F, Cl, NO <sub>3</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> )	<input type="checkbox"/>
<input type="checkbox"/>	8081 Pesticides / 8092 PCB's	<input type="checkbox"/>
<input type="checkbox"/>	8260B (VOA) BTEX only	<input type="checkbox"/>
<input type="checkbox"/>	8270 (Semi-VOA)	<input type="checkbox"/>
<input type="checkbox"/>	Chloride	<input type="checkbox"/>
<input type="checkbox"/>	Air Bubbles (Y or N)	<input type="checkbox"/>

Remarks: 1 of 2

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

**Chain-of-Custody Record**

Client: R.T. Hicks Consultants  
 Mailing Address: on file  
 Phone #: 970-570-9535

email or Fax#: andrew@rthicksconsult.com  
 Q/COC Package:  
 Standard  Level 4 (Full Validation)  
 Accreditation:  
 NELAP  Other  
 EDD (Type) \_\_\_\_\_



**HALL ENVIRONMENTAL ANALYSIS LABORATORY**  
 www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109  
 Tel. 505-345-3975 Fax 505-345-4107

**Analysis Request**

BTEX + MTBE + TPH (Gas only)	X
BTEX + MTBE + TPH (Gas/Diesel)	X
TPH (Method 418.1)	
EDB (Method 504.1)	
8310 (PNA or PAH)	
RCRA 8 Metals	
Anions (F, Cl, NO <sub>3</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> )	
8081 Pesticides / 8082 PCB's	
8260B (NOA) BTEX ONLY	X
8270 (Semi-VOA)	X
Chloride	X

Project Manager: Andrew Parker  
 Sampler: Andrew Parker  
 On Ice:  Yes  No  
 Sample Temperature: 5.1-0.4(C/F) = 4.7  
 Container Type and #: 402-81  
 Preservative Type: ICE  
 HEAL No. 1801659  
013  
014  
015  
016  
017  
018

Project Name: NM 87 State 001 Tank Bottom  
 Project #: \_\_\_\_\_

Remarks: 2 of 2

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
1/8/13	11:58	Soil	SB 2 @ <del>15</del> 9 ft	402-81	ICE	1801659
	10:53		SB 2 @ 9 ft			
	12:30		SB 2 @ 15 ft			
			SB 2 @ 9 ft			
	13:58	Soil	SB 3 @ 5 ft			
			SB 3 @ 15 ft			
	13:40		SB 3 @ 21 ft			
	15:33		SB 3 @ 31 ft			

Received by: Ring Date: 1/11/13 Time: 14:15  
 Relinquished by: Andrew Parker Date: \_\_\_\_\_ Time: \_\_\_\_\_

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

**PERMIAN BASIN  
ENVIRONMENTAL LAB, LP  
1400 Rankin Hwy  
Midland, TX 79701**



# Analytical Report

**Prepared for:**

Bob Allen  
Safety & Environmental Solutions, Inc.  
703 E Clinton  
Hobbs, New Mexico, TX 88240

Project: Pride NM 83 SWD State #1  
Project Number: PRI-17-001  
Location: Lea County  
Lab Order Number: 7G07005



**NELAP/TCEQ # T104704516-16-7**

Report Date: 07/13/17

Safety & Environmental Solutions, Inc.  
703 E Clinton  
Hobbs, New Mexico TX, 88240

Project: Pride NM 83 SWD State #1  
Project Number: PRI-17-001  
Project Manager: Bob Allen

Fax: (575) 393-4388

**ANALYTICAL REPORT FOR SAMPLES**

<b>Sample ID</b>	<b>Laboratory ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
TT-1 Surface	7G07005-01	Soil	07/05/17 09:00	07-06-2017 17:00
TT-1 4'	7G07005-02	Soil	07/05/17 10:00	07-06-2017 17:00
TT-1 8'	7G07005-03	Soil	07/05/17 10:20	07-06-2017 17:00
TT-1 12'	7G07005-04	Soil	07/05/17 10:35	07-06-2017 17:00

**TT-1 Surface**  
**7G07005-01 (Soil)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**Permian Basin Environmental Lab, L.P.**

**Organics by GC**

Benzene	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Toluene	ND	0.00217	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Ethylbenzene	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (p/m)	ND	0.00217	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (o)	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	75-125		P7G1103	07/07/17	07/07/17	EPA 8021B	
<i>Surrogate: 1,4-Difluorobenzene</i>		97.2 %	75-125		P7G1103	07/07/17	07/07/17	EPA 8021B	

**General Chemistry Parameters by EPA / Standard Methods**

<b>Chloride</b>	<b>4830</b>	27.2	mg/kg dry	25	P7G1110	07/11/17	07/12/17	EPA 300.0	
<b>% Moisture</b>	<b>8.0</b>	0.1	%	1	P7G1004	07/10/17	07/10/17	ASTM D2216	

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M**

C6-C12	ND	27.2	mg/kg dry	1	P7G1106	07/07/17	07/08/17	TPH 8015M	
>C12-C28	<b>374</b>	27.2	mg/kg dry	1	P7G1106	07/07/17	07/08/17	TPH 8015M	
>C28-C35	<b>124</b>	27.2	mg/kg dry	1	P7G1106	07/07/17	07/08/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		98.7 %	70-130		P7G1106	07/07/17	07/08/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		112 %	70-130		P7G1106	07/07/17	07/08/17	TPH 8015M	
<b>Total Petroleum Hydrocarbon C6-C35</b>	<b>498</b>	27.2	mg/kg dry	1	[CALC]	07/07/17	07/08/17	calc	

Safety & Environmental Solutions, Inc.  
 703 E Clinton  
 Hobbs, New Mexico TX, 88240

Project: Pride NM 83 SWD State #1  
 Project Number: PRI-17-001  
 Project Manager: Bob Allen

Fax: (575) 393-4388

**TT-1 4'**  
**7G07005-02 (Soil)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**Permian Basin Environmental Lab, L.P.**

**Organics by GC**

Benzene	ND	0.00112	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Toluene	ND	0.00225	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Ethylbenzene	ND	0.00112	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (p/m)	ND	0.00225	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (o)	ND	0.00112	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.3 %		75-125	P7G1103	07/07/17	07/07/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		95.6 %		75-125	P7G1103	07/07/17	07/07/17	EPA 8021B	

**General Chemistry Parameters by EPA / Standard Methods**

Chloride	8670	28.1	mg/kg dry	25	P7G1110	07/11/17	07/12/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7G1004	07/10/17	07/10/17	ASTM D2216	

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M**

C6-C12	ND	28.1	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C12-C28	ND	28.1	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C28-C35	ND	28.1	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
Surrogate: 1-Chlorooctane		92.8 %		70-130	P7G1109	07/07/17	07/07/17	TPH 8015M	
Surrogate: o-Terphenyl		96.5 %		70-130	P7G1109	07/07/17	07/07/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.1	mg/kg dry	1	[CALC]	07/07/17	07/07/17	calc	

Safety & Environmental Solutions, Inc.  
 703 E Clinton  
 Hobbs, New Mexico TX, 88240

Project: Pride NM 83 SWD State #1  
 Project Number: PRI-17-001  
 Project Manager: Bob Allen

Fax: (575) 393-4388

**TT-1 8'**  
**7G07005-03 (Soil)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**Permian Basin Environmental Lab, L.P.**

**Organics by GC**

Benzene	ND	0.00123	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Toluene	ND	0.00247	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Ethylbenzene	ND	0.00123	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (p/m)	ND	0.00247	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (o)	ND	0.00123	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
<i>Surrogate: 4-Bromofluorobenzene</i>		91.8 %	75-125		P7G1103	07/07/17	07/07/17	EPA 8021B	
<i>Surrogate: 1,4-Difluorobenzene</i>		87.0 %	75-125		P7G1103	07/07/17	07/07/17	EPA 8021B	

**General Chemistry Parameters by EPA / Standard Methods**

<b>Chloride</b>	<b>705</b>	1.23	mg/kg dry	1	P7G1110	07/11/17	07/12/17	EPA 300.0	
<b>% Moisture</b>	<b>19.0</b>	0.1	%	1	P7G1004	07/10/17	07/10/17	ASTM D2216	

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M**

C6-C12	ND	30.9	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C12-C28	ND	30.9	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C28-C35	ND	30.9	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		94.7 %	70-130		P7G1109	07/07/17	07/07/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		97.8 %	70-130		P7G1109	07/07/17	07/07/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	30.9	mg/kg dry	1	[CALC]	07/07/17	07/07/17	calc	

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703 E Clinton  
Hobbs, New Mexico TX, 88240

Project: Pride NM 83 SWD State #1  
Project Number: PRI-17-001  
Project Manager: Bob Allen

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**TT-1 12'**  
**7G07005-04 (Soil)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**Permian Basin Environmental Lab, L.P.**

**Organics by GC**

Benzene	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Toluene	ND	0.00217	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Ethylbenzene	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (p/m)	ND	0.00217	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Xylene (o)	ND	0.00109	mg/kg dry	1	P7G1103	07/07/17	07/07/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		88.1 %		75-125	P7G1103	07/07/17	07/07/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		95.1 %		75-125	P7G1103	07/07/17	07/07/17	EPA 8021B	

**General Chemistry Parameters by EPA / Standard Methods**

Chloride	2630	10.9	mg/kg dry	10	P7G1110	07/11/17	07/12/17	EPA 300.0	
% Moisture	8.0	0.1	%	1	P7G1004	07/10/17	07/10/17	ASTM D2216	

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M**

C6-C12	ND	27.2	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C12-C28	ND	27.2	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
>C28-C35	ND	27.2	mg/kg dry	1	P7G1109	07/07/17	07/07/17	TPH 8015M	
Surrogate: 1-Chlorooctane		94.4 %		70-130	P7G1109	07/07/17	07/07/17	TPH 8015M	
Surrogate: o-Terphenyl		97.6 %		70-130	P7G1109	07/07/17	07/07/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	27.2	mg/kg dry	1	[CALC]	07/07/17	07/07/17	calc	

**Organics by GC - Quality Control**  
**Permian Basin Environmental Lab, L.P.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch P7G1103 - General Preparation (GC)**

**Blank (P7G1103-BLK1)**

Prepared & Analyzed: 07/07/17

Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 1,4-Difluorobenzene	0.0521		"	0.0600		86.8	75-125			
Surrogate: 4-Bromofluorobenzene	0.0524		"	0.0600		87.4	75-125			

**LCS (P7G1103-BS1)**

Prepared & Analyzed: 07/07/17

Benzene	0.106	0.00100	mg/kg wet	0.100		106	70-130			
Toluene	0.104	0.00200	"	0.100		104	70-130			
Ethylbenzene	0.104	0.00100	"	0.100		104	70-130			
Xylene (p/m)	0.187	0.00200	"				70-130			
Xylene (o)	0.0900	0.00100	"				70-130			
Surrogate: 1,4-Difluorobenzene	0.0616		"	0.0600		103	75-125			
Surrogate: 4-Bromofluorobenzene	0.0534		"	0.0600		89.0	75-125			

**LCS Dup (P7G1103-BSD1)**

Prepared & Analyzed: 07/07/17

Benzene	0.115	0.00100	mg/kg wet	0.100		115	70-130	7.80	20	
Toluene	0.112	0.00200	"	0.100		112	70-130	7.13	20	
Ethylbenzene	0.112	0.00100	"	0.100		112	70-130	7.62	20	
Xylene (p/m)	0.200	0.00200	"				70-130		20	
Xylene (o)	0.0985	0.00100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	0.0603		"	0.0600		101	75-125			
Surrogate: 1,4-Difluorobenzene	0.0652		"	0.0600		109	75-125			

**Matrix Spike (P7G1103-MS1)**

Source: 7G07005-03

Prepared & Analyzed: 07/07/17

Benzene	0.119	0.00123	mg/kg dry	0.123	ND	96.5	80-120			
Toluene	0.112	0.00247	"	0.123	ND	90.4	80-120			
Ethylbenzene	0.113	0.00123	"	0.123	ND	91.7	80-120			
Xylene (p/m)	0.200	0.00247	"		ND		80-120			
Xylene (o)	0.0991	0.00123	"		ND		80-120			
Surrogate: 4-Bromofluorobenzene	0.0782		"	0.0741		106	75-125			
Surrogate: 1,4-Difluorobenzene	0.0819		"	0.0741		111	75-125			

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**Organics by GC - Quality Control**  
**Permian Basin Environmental Lab, L.P.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch P7G1103 - General Preparation (GC)**

**Matrix Spike Dup (P7G1103-MSD1)**

Source: 7G07005-03

Prepared & Analyzed: 07/07/17

Benzene	0.116	0.00123	mg/kg dry	0.123	ND	94.1	80-120	2.48	20	
Toluene	0.110	0.00247	"	0.123	ND	89.1	80-120	1.35	20	
Ethylbenzene	0.109	0.00123	"	0.123	ND	88.7	80-120	3.36	20	
Xylene (p/m)	0.209	0.00247	"		ND		80-120		20	
Xylene (o)	0.0994	0.00123	"		ND		80-120		20	
Surrogate: 4-Bromofluorobenzene	0.0751		"	0.0741		101	75-125			
Surrogate: 1,4-Difluorobenzene	0.0794		"	0.0741		107	75-125			

**General Chemistry Parameters by EPA / Standard Methods - Quality Control**  
**Permian Basin Environmental Lab, L.P.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P7G1004 - *** DEFAULT PREP ***</b>										
<b>Blank (P7G1004-BLK1)</b> Prepared & Analyzed: 07/10/17										
% Moisture	ND	0.1	%							
<b>Duplicate (P7G1004-DUP1)</b> Source: 7G07004-04 Prepared & Analyzed: 07/10/17										
% Moisture	2.0	0.1	%		1.0			66.7	20	
<b>Duplicate (P7G1004-DUP2)</b> Source: 7G07022-02 Prepared & Analyzed: 07/10/17										
% Moisture	11.0	0.1	%		11.0			0.00	20	
<b>Batch P7G1110 - *** DEFAULT PREP ***</b>										
<b>Blank (P7G1110-BLK1)</b> Prepared & Analyzed: 07/11/17										
Chloride	ND	1.00	mg/kg wet							
<b>LCS (P7G1110-BS1)</b> Prepared & Analyzed: 07/11/17										
Chloride	419	1.00	mg/kg wet	400		105	80-120			
<b>LCS Dup (P7G1110-BSD1)</b> Prepared & Analyzed: 07/11/17										
Chloride	410	1.00	mg/kg wet	400		102	80-120	2.29	20	
<b>Duplicate (P7G1110-DUP1)</b> Source: 7G10001-58 Prepared & Analyzed: 07/11/17										
Chloride	3.28	1.04	mg/kg dry		4.07			21.5	20	R3
<b>Duplicate (P7G1110-DUP2)</b> Source: 7G07005-03 Prepared: 07/11/17 Analyzed: 07/12/17										
Chloride	715	1.23	mg/kg dry		705			1.45	20	
<b>Matrix Spike (P7G1110-MS1)</b> Source: 7G10001-58 Prepared & Analyzed: 07/11/17										
Chloride	1080	1.04	mg/kg dry	1040	4.07	103	80-120			

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control**  
**Permian Basin Environmental Lab, L.P.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P7G1106 - TX 1005</b>										
<b>Blank (P7G1106-BLK1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	92.9		"	100		92.9	70-130			
Surrogate: o-Terphenyl	51.2		"	50.0		102	70-130			
<b>LCS (P7G1106-BS1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	1140	25.0	mg/kg wet	1000		114	75-125			
>C12-C28	1060	25.0	"	1000		106	75-125			
Surrogate: 1-Chlorooctane	108		"	100		108	70-130			
Surrogate: o-Terphenyl	59.0		"	50.0		118	70-130			
<b>LCS Dup (P7G1106-BSD1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	1030	25.0	mg/kg wet	1000		103	75-125	9.86	20	
>C12-C28	1040	25.0	"	1000		104	75-125	2.03	20	
Surrogate: 1-Chlorooctane	122		"	100		122	70-130			
Surrogate: o-Terphenyl	55.8		"	50.0		112	70-130			
<b>Matrix Spike (P7G1106-MS1)</b> Source: 7G07005-01 Prepared: 07/07/17 Analyzed: 07/08/17										
C6-C12	1280	27.2	mg/kg dry	1090	ND	118	75-125			
>C12-C28	1350	27.2	"	1090	374	89.6	75-125			
Surrogate: 1-Chlorooctane	139		"	109		128	70-130			
Surrogate: o-Terphenyl	64.6		"	54.3		119	70-130			
<b>Matrix Spike Dup (P7G1106-MSD1)</b> Source: 7G07005-01 Prepared: 07/07/17 Analyzed: 07/08/17										
C6-C12	1170	27.2	mg/kg dry	1090	ND	108	75-125	8.88	20	
>C12-C28	1240	27.2	"	1090	374	79.3	75-125	12.2	20	
Surrogate: 1-Chlorooctane	140		"	109		129	70-130			
Surrogate: o-Terphenyl	58.5		"	54.3		108	70-130			

**Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control**  
**Permian Basin Environmental Lab, L.P.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P7G1109 - TX 1005</b>										
<b>Blank (P7G1109-BLK1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	95.0		"	100		95.0	70-130			
Surrogate: o-Terphenyl	49.6		"	50.0		99.2	70-130			
<b>LCS (P7G1109-BS1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	966	25.0	mg/kg wet	1000		96.6	75-125			
>C12-C28	959	25.0	"	1000		95.9	75-125			
Surrogate: 1-Chlorooctane	103		"	100		103	70-130			
Surrogate: o-Terphenyl	57.1		"	50.0		114	70-130			
<b>LCS Dup (P7G1109-BSD1)</b> Prepared & Analyzed: 07/07/17										
C6-C12	956	25.0	mg/kg wet	1000		95.6	75-125	1.01	20	
>C12-C28	961	25.0	"	1000		96.1	75-125	0.244	20	
Surrogate: 1-Chlorooctane	99.9		"	100		99.9	70-130			
Surrogate: o-Terphenyl	47.5		"	50.0		95.0	70-130			
<b>Matrix Spike (P7G1109-MS1)</b> Source: 7G07005-03 Prepared: 07/07/17 Analyzed: 07/08/17										
C6-C12	1240	30.9	mg/kg dry	1230	ND	100	75-125			
>C12-C28	1200	30.9	"	1230	17.6	96.1	75-125			
Surrogate: 1-Chlorooctane	129		"	123		105	70-130			
Surrogate: o-Terphenyl	60.2		"	61.7		97.6	70-130			
<b>Matrix Spike Dup (P7G1109-MSD1)</b> Source: 7G07005-03 Prepared: 07/07/17 Analyzed: 07/08/17										
C6-C12	1260	30.9	mg/kg dry	1230	ND	102	75-125	2.05	20	
>C12-C28	1270	30.9	"	1230	17.6	102	75-125	5.60	20	
Surrogate: 1-Chlorooctane	134		"	123		108	70-130			
Surrogate: o-Terphenyl	63.3		"	61.7		102	70-130			

### Notes and Definitions

R3	The RPD exceeded the acceptance limit due to sample matrix effects.
BULK	Samples received in Bulk soil containers
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: \_\_\_\_\_



Date: 7/13/2017

Brent Barron, Laboratory Director/Technical Director

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-686-7235.



# ***APPENDIX E***

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<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  2017 East
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.059944, -103.513758		

Depth (feet)	Description	Lithology	Comments	Chloride (LAB)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Fine sand, silt; brown At 1 foot caliche; tan			<30 (0.5 ft)		0.0
1.0			Very hard caliche			1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
14.0						14.0
15.0						15.0
16.0						16.0
17.0						17.0
18.0						18.0
19.0						19.0
20.0						20.0
21.0						21.0
22.0						22.0
23.0						23.0
24.0						24.0
25.0						25.0
26.0						26.0
27.0						27.0
28.0						28.0
29.0						29.0
30.0						30.0
31.0						31.0
32.0						32.0
33.0						33.0
34.0						34.0
35.0						35.0
36.0						36.0
37.0						37.0
38.0						38.0
39.0						39.0
40.0						40.0
41.0						41.0
42.0						42.0
43.0						43.0
44.0						44.0
45.0						45.0
46.0						46.0
47.0						47.0
48.0						48.0
49.0						49.0
50.0						50.0
51.0						51.0
52.0						52.0
53.0						53.0
54.0						54.0
55.0						55.0

<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  2017 West
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.060345, -103.513492		

Depth (feet)	Description	Lithology	Comments	Chloride (LAB)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Fine sand, silt; brown At 1 foot caliche; tan			< 30 @ 0.5 ft		0.0
1.0			Very hard caliche			1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
14.0						14.0
15.0						15.0
16.0						16.0
17.0						17.0
18.0						18.0
19.0						19.0
20.0						20.0
21.0						21.0
22.0						22.0
23.0						23.0
24.0						24.0
25.0						25.0
26.0						26.0
27.0						27.0
28.0						28.0
29.0						29.0
30.0						30.0
31.0						31.0
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46.0						46.0
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48.0						48.0
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51.0						51.0
52.0						52.0
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  2017 Northeast
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.060264, -103.513115		

Depth (feet)	Description	Lithology	Comments	Chloride (LAB)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Fine sand, silt; brown At 1 foot caliche; tan			<30 at 0.5 ft		0.0
1.0			Very hard caliche			1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
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18.0						18.0
19.0						19.0
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42.0						42.0
43.0						43.0
44.0						44.0
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  2017 Northwest (within tank battery berm)
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>	33.059876, -103.514189	

Depth (feet)	Description	Lithology	Comments	Chloride Lab (mg/kg)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Fine sand, silt; medium brown		Pockets of impacted soil from 1 to 2 feet			0.0
1.0				1.0		
2.0				2.0		
3.0	2 - 12 ft Fine sand, silt, interbedded caliche; light grey, hydrocarbon odor		Hydrocarbon impacted soil			3.0
4.0				4.0		
5.0				5.0		
6.0				6.0		
7.0				7.0		
8.0				8.0		
9.0				9.0		
10.0				10.0		
11.0				11.0		
12.0				12.0		
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13.0					13.0	
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  Historic Release North
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.060086, -103.513542		

Depth (feet)	Description	Lithology	Comments	Chloride Lab (mg/kg)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Silt; brown At 1 foot caliche; tan			<30 @ 0.5 ft		0.0
1.0			Very hard caliche			1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  Historic Release Northeast
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.059774, -103.513591		

Depth (feet)	Description	Lithology	Comments	Chloride Lab (mg/kg)	Trench Completion	Depth (feet)
0.0	0 - 1 ft Silt; brown At 1 foot caliche; tan			260 at 0.5 ft		0.0
1.0			Very hard caliche			1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
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29.0						29.0
30.0						30.0
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32.0						32.0
33.0						33.0
34.0						34.0
35.0						35.0
36.0						36.0
37.0						37.0
38.0						38.0
39.0						39.0
40.0						40.0
41.0						41.0
42.0						42.0
43.0						43.0
44.0						44.0
45.0						45.0
46.0						46.0
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54.0						54.0
55.0						55.0

<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  Historic Release Southwest
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.059409, -103.514169		

Depth (feet)	Description	Lithology	Comments	Chloride (LAB)	Trench Completion	Depth (feet)
0.0	0 - 0.5 ft Caliche, silt; dark brown				Backfill with excavated material	0.0
1.0	0.5 - 2 ft					1.0
2.0	Silt; brown			500		2.0
3.0	2 - 4 ft Caliche, tan					3.0
4.0						4.0
5.0	4 - 8 ft					5.0
6.0	Caliche, light pink					6.0
7.0						7.0
8.0				45	8.0	
9.0	8 - 9 ft Caliche, tan		Very hard at 8 feet			9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
14.0						14.0
15.0						15.0
16.0						16.0
17.0						17.0
18.0						18.0
19.0						19.0
20.0						20.0
21.0						21.0
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38.0						38.0
39.0						39.0
40.0						40.0
41.0						41.0
42.0						42.0
43.0						43.0
44.0						44.0
45.0						45.0
46.0						46.0
47.0						47.0
48.0						48.0
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Andrew Parker	<b>Client:</b>	Pride Energy	<b>Trench ID:</b>  Historic Release Southeast
<b>Driller:</b>	Gandy Backhoe			
<b>Drilling Method:</b>	Backhoe	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b> 33.059401, -103.513557		

Depth (feet)	Description	Lithology	Comments	Chloride (LAB)	Trench Completion	Depth (feet)
0.0	0 - 0.5 ft Silt, caliche clasts (6 inches), tan					0.0
1.0	0.5 - 1 ft Caliche, tan		Very hard	<30 @ 0.5 ft		1.0
2.0						2.0
3.0						3.0
4.0						4.0
5.0						5.0
6.0						6.0
7.0						7.0
8.0						8.0
9.0						9.0
10.0						10.0
11.0						11.0
12.0						12.0
13.0						13.0
14.0						14.0
15.0						15.0
16.0						16.0
17.0						17.0
18.0						18.0
19.0						19.0
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Trench Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Kristin Pope	<b>Client:</b>	Pride Energy	<b>Boring ID:</b>  SB-01 2017
<b>Driller:</b>	Atkins Environmental			
<b>Drilling Method:</b>	Hollow Stem Auger	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.059926, -103.513917 (WGS84/NAD83)		

Depth (feet)	Description	Lithology	Comments	Chloride Titrant/Lab	Borehole Completion	Boring Diameter 3.5 inches	Depth (feet)
0.0	0 - 0.5 ft Silty Sand; caliche rocks; light brown			65/93 mg/kg		0 - 10 ft Bentonite Plug	0.0
1.0							1.0
2.0	0.5 - 3.5 ft Caliche; white		Hard				2.0
3.0							3.0
4.0	3.5 - 10 ft Caliche; light pink			73/-- mg/kg			4.0
5.0							6.0
6.0							7.0
7.0							8.0
8.0							9.0
9.0							10.0
10.0				21/-- mg/kg		11.0	
11.0	10 - 12.5 ft Medium sand; light pink		Interbedded caliche cobbles			10 to 14 ft Backfill	11.0
12.0							12.0
13.0	12.5 - 14 ft Sandstone; tan; dry		Hard (blowcount = 50/3 inches)	99/40 mg/kg			13.0
14.0						14.0	
15.0						15.0	
16.0						16.0	
17.0						17.0	
18.0						18.0	
19.0						19.0	
20.0						20.0	
21.0						21.0	
22.0						22.0	
23.0						23.0	
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Borehole Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Kristin Pope	<b>Client:</b>	Pride Energy	<b>Boring ID:</b>  SB-02 Historic
<b>Driller:</b>	Atkins Environmental	Pride Energy		
<b>Drilling Method:</b>	Hollow Stem Auger	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b>		
		33.059743, -103.513652 (WGS84/NAD83)		

Depth (feet)	Description	Lithology	Comments	Chloride Titrant/Lab	Borehole Completion	Boring Diameter 3.5 Inches	Depth (feet)
0.0	0 - 0.25 ft Silty sand; dark brown		No vegetation	2968/4200 mg/kg		0 - 21 feet Bentonite Plug	0.0
1.0	0.25 - 5 ft Caliche; light pink, dry		Hard	404/-- mg/kg			1.0
2.0							2.0
3.0							3.0
4.0							4.0
5.0							5.0
6.0	5 - 9 ft Medium sand; tan, pink; dry			157/<30 mg/kg			6.0
7.0							7.0
8.0							8.0
9.0	9 - 16 ft Caliche; white; interbedded sand (15%)		Hard	45/<30 mg/kg			9.0
10.0							10.0
11.0							11.0
12.0							12.0
13.0							13.0
14.0							14.0
15.0							15.0
16.0	16 - 21 ft Caliche, sand (10%); light pink; dry		Hard Blowcounts = 50/6 inches	57/-- mg/kg			16.0
17.0							17.0
18.0							18.0
19.0							19.0
20.0	20.0						
21.0	21.0						
22.0					22.0		
23.0					23.0		
24.0					24.0		
25.0					25.0		
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<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Borehole Sampling Log</b>	<b>January 2018</b>

<b>Logger:</b>	Kristin Pope	<b>Client:</b>	Pride Energy	<b>Boring ID:</b>  SB-03 Playa
<b>Driller:</b>	Atkins Environmental	Pride Energy		
<b>Drilling Method:</b>	Hollow Stem Auger	<b>Project Name:</b>		
<b>Start Date:</b>	1/8/2018	1RP-4625 (NM 87 State 001 Tank Battery)		
<b>End Date:</b>	1/8/2018	<b>Location:</b> 33.059934, -103.514626 (WGS84/NAD83)		

Depth (feet)	Description	Lithology	Comments	Chloride Titrate/Lab	Borehole Completion	Boring Diameter 3.5 Inches	Depth (feet)
0.0	0 - 4 ft Silty sand; dark brown			108/-- mg/kg			0.0
1.0							1.0
2.0							2.0
3.0							3.0
4.0							4.0
5.0	6 - 16 ft Silt; light grey			632/660 mg/kg		Bentonite Plug	5.0
6.0							6.0
7.0							7.0
8.0							8.0
9.0							9.0
10.0							10.0
11.0							11.0
12.0							12.0
13.0							13.0
14.0							14.0
15.0	16 - 31 ft Medium sand, well sorted, round; light tan			672/-- mg/kg			15.0
16.0							16.0
17.0							17.0
18.0							18.0
19.0							19.0
20.0							20.0
21.0							21.0
22.0							22.0
23.0							23.0
24.0							24.0
25.0							25.0
26.0							26.0
27.0							27.0
28.0							28.0
29.0							29.0
30.0							30.0
31.0	Located in lowest point of playa			341/-- mg/kg			16.0
17.0							17.0
18.0							18.0
19.0							19.0
20.0							20.0
21.0							21.0
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35.0							35.0
36.0							36.0
37.0							37.0
38.0							38.0
39.0							39.0
40.0		40.0					
41.0		41.0					
42.0		42.0					
43.0		43.0					
44.0		44.0					
45.0		45.0					
46.0		46.0					
47.0		47.0					
48.0		48.0					
49.0		49.0					
50.0		50.0					
51.0		51.0					
52.0		52.0					
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55.0		55.0					

<b>R.T. Hicks Consultants, Ltd</b> 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	<b>Pride Energy</b>	<b>Appendix E</b>
	<b>Borehole Sampling Log</b>	<b>January 2018</b>

# ***APPENDIX F***

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FIELD PROCEDURE  
Chloride Titration Using  
0.282 Normal Silver Nitrate Solution

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**1.0 Purpose**

This procedure is to be used to determine the concentration of chloride in soil and other solids (e.g. drilling waste).

**2.0 Scope**

This procedure is to be used as the standard field measurement for soil chloride concentrations.

**3.0 Sample Collection and Preparation**

- 3.1 Collect at least 80 grams of soil from the sample collection point. Take care to ensure that the sample is representative of the general area of concern to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample for soils obtained at several points in the sample area.
- 3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.
- 3.3 The sealed sample bag should be massaged to break up any clods.

**4.0 Sample Preparation**

- 4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.
- 4.2 Add at least 10 grams of reverse osmosis water or distilled water to the soil sample and shake or agitate for 20 seconds.
- 4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.
- 4.4 Carefully pour the free liquid extract from the sample, through a paper filter if necessary, into a clean plastic cup.

**5.0 Titration Procedure**

- 5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.

- 5.2 Add 2-3 drops potassium chromate ( $K_2CrO_4$ ) to mixture.
- 5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide ( $H_2O_2$ ) to mixture.
- 5.4 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.
- 5.5 Record the ml of silver nitrate used.

### 6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{.282 \times 35,450 \times \text{ml AgNO}_3}{\text{ml water extract}} \quad \times \quad \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on a field form.

## Additional Notes

- 1) Make sure the scale is weighing in grams.
- 2) “Zero” the scale with clean, empty 40 ml container (including the cap) sitting on the scale.
- 3) Add 10 to 20 grams of sample soil to the container. Record the weight.
- 4) “Re-zero” the scale.
- 5) Add distilled water to almost fill the container. Record the weight.
- 6) Screw the cap on, and shake the container to thoroughly mix the sample with the distilled water. Set aside to allow settling of the sample. This will take only a few minutes for coarse grained material and up to 20 minutes for very fine grained sediments. The solution does not need to be perfectly clear to continue the procedure.
- 7) Add 3 drops of Potassium Chromate to a small, clean, plastic cup.
- 8) Extract 10 ml (using a large pipette – at least 10 ml) of solution from the sample container and put it into the plastic cup. Record ml of solution placed in the cup.
  - a. This can be kept track of by careful recording of “before” and “after” fluid levels in the pipette.
  - b. Or: Place the plastic cup on the scale with the potassium chromate and “zero” the scale. Add solution to the cup until 10 grams is indicated on the scale.
- 9) Swirl the solution and the potassium chromate to mix them.
- 10) Using a 1 ml pipette, add silver nitrate to the mixed solution drop by drop while swirling. The entire solution will change from a pale lemon yellow color to a brick red color when sufficient silver nitrate has been added. STOP when it all turns brick red. It does not need to be a deep brick red color. This will result in an overly high result. Record ml of silver nitrate used.
- 11) The chloride concentration of the sample is given by:

$$C_{\text{sam}} = (35,450 * 0.282) * \frac{(\text{grams of water})}{(\text{grams of soil})} * \frac{(\text{ml of silver nitrate})}{(\text{ml of solution})}$$

or:

$$C_{\text{sam}} = (9997) * \frac{(\text{grams of water (Step 5)})}{(\text{grams of soil (Step 3)})} * \frac{(\text{ml of silver nitrate (Step 10)})}{(\text{ml of solution (Step 8)})}$$

Units are: mg(of chloride)/kg(of soil)

**Equipment List:**

Scale

10 ml pipettes

1 ml pipettes

Controllers for pipettes (small and large),  
press pipette into open end (carefully)

40 ml sample containers

Small plastic cups

Silver Nitrate

Potassium Chromate

Distilled water

Waste container for final solution. A robust plastic jug with lid will do for field use.

DO NOT pour this down a drain. Dispose of with a chemical lab.

Waste bags for used plastic cups (rinse and pour rinsing fluid into robust jug)

Calculator

Nitrile gloves

Safety glasses

Paper towels

Safety Data

[http://ptcl.chem.ox.ac.uk/~hmc/hsci/chemicals/silver\\_nitrate.html](http://ptcl.chem.ox.ac.uk/~hmc/hsci/chemicals/silver_nitrate.html)

[http://ptcl.chem.ox.ac.uk/~hmc/hsci/chemicals/potassium\\_chromate.html](http://ptcl.chem.ox.ac.uk/~hmc/hsci/chemicals/potassium_chromate.html)

## Photo-Ionization Detector (PID) Standard Operating Procedures

Headspace analysis procedures should be conducted according to NMOCD approved industry standards or other NMOCD-approved procedures. Accepted NMOCD procedures are as follows:

- a) Fill a 0.5 liter or larger jar half full of sample and seal the top tightly with aluminum foil or fill a one quart zip-lock bag one-half full of sample and seal the top of the bag leaving the remainder of the bag filled with air.
- b) Ensure that the sample temperature is between 15 to 25 degrees Celsius (59-77 degrees Fahrenheit).
- c) Allow aromatic hydrocarbon vapors to develop within the headspace of the sample jar or bag for 5 to 10 minutes. During this period, the sample jar should be shaken vigorously for 1 minute or the contents of the bag should be gently massaged to break up soil clods.
- d) If using a jar, pierce the aluminum foil seal with the probe of either a PID or FID organic vapor meter (OVM), and then record the highest (peak) measurement. If using a bag, carefully open one end of the bag and insert the probe of the OVM into the bag and re-seal the bag around the probe as much as possible to prevent vapors from escaping. Record the peak measurement. The OVM must be calibrated to assume a benzene response factor.