



## **LINN ENERGY**

2130 W. Bender Blvd.  
Hobbs, NM 88241  
Phone 575.738.1739

### **J.L. Keel A #11**

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# **Corrective Action Plan**

API No. 30-015-05099

Release Date: April 14<sup>th</sup>, 2014

Unit Letter H, Section 7, Township 17S, Range 31E

**May 29<sup>th</sup>, 2014**

**Mike Bratcher**

New Mexico Energy, Minerals, & Natural Resources  
Oil Conservation Division, Environmental Bureau – District 2  
811 S. First St.  
Artesia, NM 88210

**RE: Corrective Action Plan  
Linn Energy – J.L. Keel A #11  
UL/H sec. 7 T17S R31E  
API No. 30-015-05099**

Mr. Bratcher:

Linn Energy (Linn) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site.

**Background and Previous Work**

The site is located approximately 5 miles northeast of Loco Hills, New Mexico at UL/H sec. 7 T17S R31E. This site is in an area of no known groundwater.

On April 14<sup>th</sup>, 2014, Linn discovered that the header pressure at the injection station was low. A pump truck pressured up the lines with fresh water and then opened up the lateral lines one by one until the release was discovered. A 2 inch fiberglass line had cracked releasing 5 barrels of produced water and 10 barrels of fresh water. The release affected 1,420 square feet of pasture land. NMOCD and BLM were notified of the release on April 15<sup>th</sup>, 2014 and an initial C-141 was sent to NMOCD for their approval (Appendix A).

RECS personnel were on site beginning on April 22<sup>nd</sup>, 2014 to assess the release. Six points within the release area were sampled and surface and with depth (Figure 1). The samples were field tested for chlorides and organic vapors, and representative samples were taken to a commercial laboratory for analysis (Appendix B). The surface samples from Point 1 and Point 2 returned elevated laboratory chloride readings, Gasoline Range Organics (GRO) readings of non-detect, elevated Diesel Range Organics (DRO) readings and BTEX readings of non-detect at Point 1 and near non-detect at Point 2. Point 3 through Point 5 returned laboratory chloride readings at the surface below 1,000 mg/kg, GRO readings of non-detect, elevated DRO readings and BTEX readings of non-detect. Verticals were then installed at all points to determine the depth of contamination. Point 1 was installed to a depth of 9 ft bgs and returned a laboratory chloride reading of 144 mg/kg. Point 2 was installed to a depth of 9 ft bgs and returned a laboratory chloride reading of 640 mg/kg. Point 3 was installed to a depth of 1 ft bgs and returned a laboratory chloride reading of 192 mg/kg. Point 4 was installed to a depth of 2 ft bgs and returned a laboratory chloride reading of 784 mg/kg. Point 5 was installed to a depth of 2 ft

bgs and returned a laboratory chloride reading of 368 mg/kg. Point 6 was installed to a depth of 2 ft bgs and returned a laboratory chloride reading of 400 mg/kg. All of these samples returned GRO, DRO and BTEX results of non-detect.

Photo documentation of these activities can be found in Appendix C.

### **Corrective Action Plan**

Based on the laboratory analyses, the area around Point 1 and Point 2 will be excavated to a depth of 4 ft bgs. Due to safety concerns, the excavation around Point 2 will maintain a judicious distance from the buried pipeline. Once the two excavations are completed, wall samples will be taken from each to verify that all constituents are below regulatory standards. At the base of each excavation, a 20-mil reinforced poly liner will be installed and properly seated.

The areas around Point 3 through Point 6 will be scraped down to 1 ft bgs. All excavated soils from the excavations and scrapes will be evaluated for use as backfill and any soils that do not meet regulatory standards will be disposed of at a NMOCD approved facility. The remaining soils will be blended on site to use as backfill. Clean soil will be imported to the site to replace any soils taken for disposal. A sample of the blended backfill will be taken to a commercial laboratory to confirm that the backfill has constituents below regulatory standards. The two excavations and the scrapes will then be backfilled with the blended soil.

Soil amendments will be added to all disturbed areas as needed and these areas will be seeded with a blend of native vegetation. Vegetation will provide an infiltration barrier for the site, since plants capture water through their roots thereby reducing the amount of water traveling through the vadose zone.

Once these activities are completed, a report will be submitted to NMOCD and BLM detailing these actions and asking for 'remediation termination' and site closure.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

A handwritten signature in cursive script, appearing to read 'L. Weinheimer', followed by a long horizontal flourish.

Lara Weinheimer  
Project Scientist  
RECS  
(575) 441-0431

Attachments:

Figure 1 – Initial Sampling Data

Figure 2 – Proposed Corrective Actions

Appendix A – Initial C-141

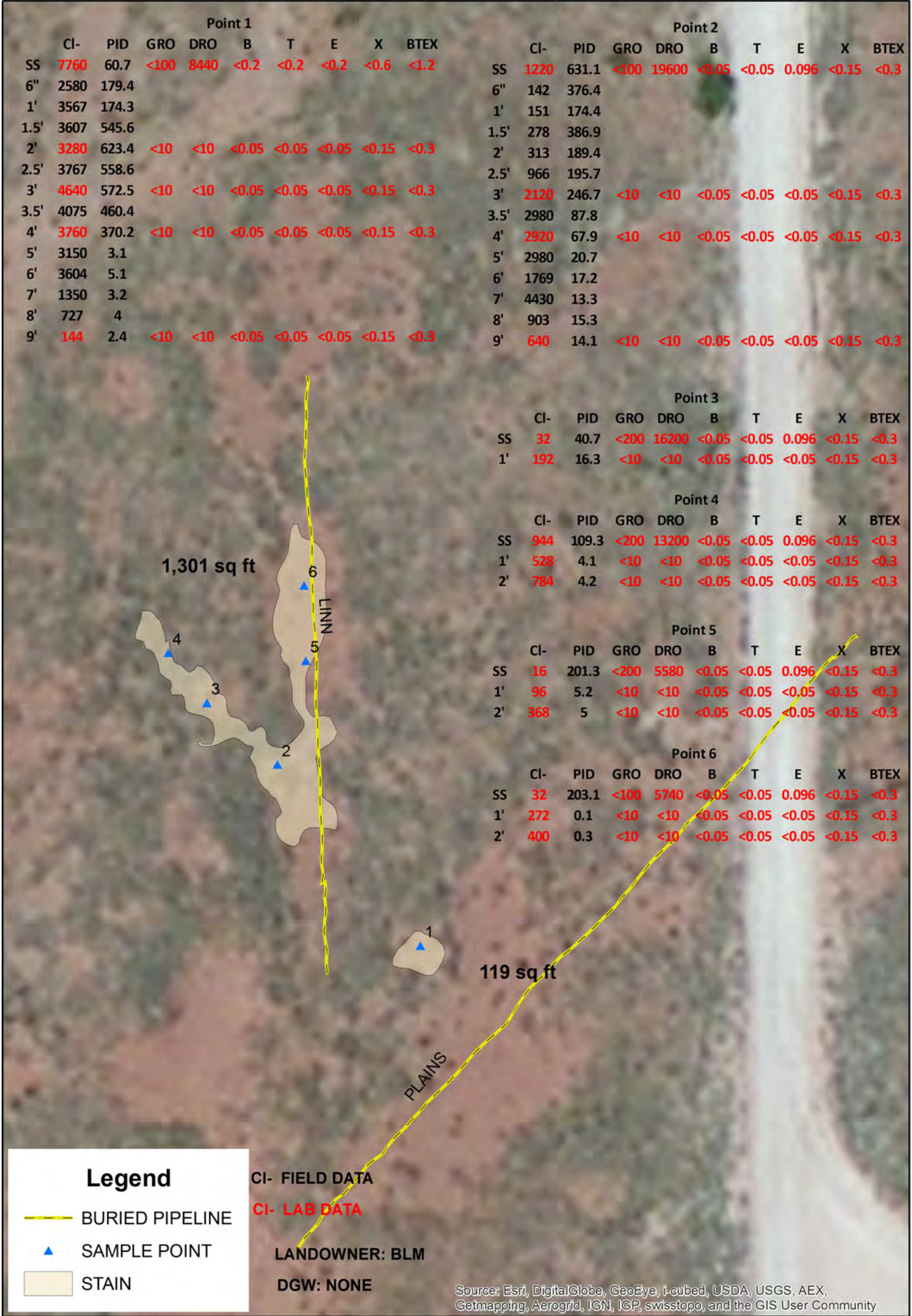
Appendix B – Initial Laboratory Labs

Appendix C – Photo Documentation

# Figures

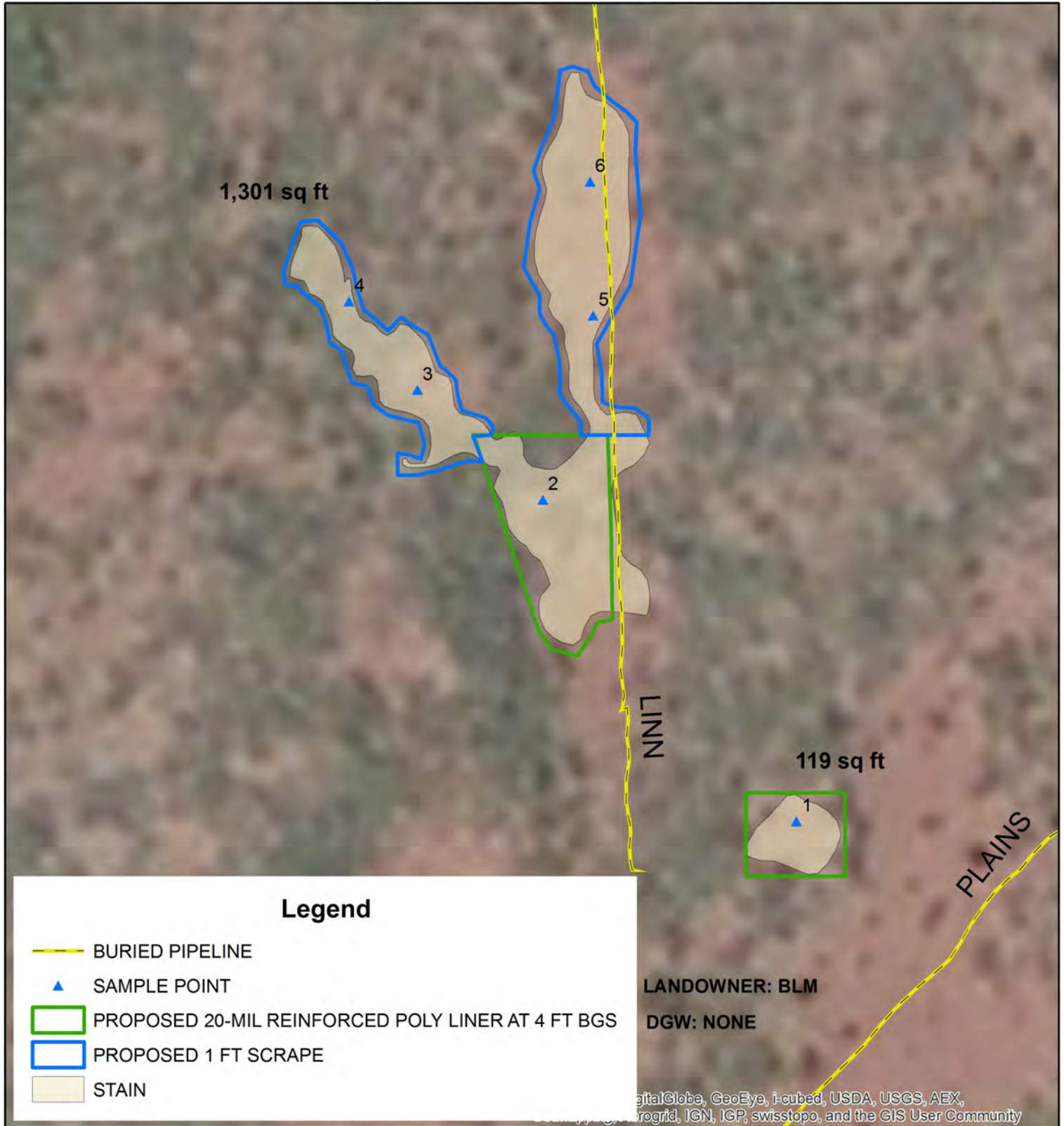


Initial Sampling Data





# Proposed Corrective Actions



**LINN**  
**J. L. KEEL A #11**

UL H&I SECTION 7  
T-17-S R-31-E  
EDDY COUNTY, NM

Figure 2



0 10 20  
Feet

GPS date: 4/22/14 JB  
Drawing date: 5/22/14  
Drafted by: L. Weinheimer

# Appendix A

Initial C-141



District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Avenue, 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

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

Form C-141  
Revised October 10, 2003

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: Linn Operating	Contact: Brian Wall	
Address: 2130 W. Bender Hobbs, NM 88240	Telephone No.: 575-738-1739	
Facility Name: JL Keel A # 11	Facility Type: Injection	
Surface Owner: Federal	Mineral Owner:	API No.: 30-015-05099

### LOCATION OF RELEASE

Unit Letter H	Section 07	Township 17S	Range 31E	Feet from the 1980	North/South Line North	Feet from the 660	East/West Line West	County Eddy
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Latitude: 32.85081 Longitude: -103.90279

### NATURE OF RELEASE


Type of Release: Produced Water / Fresh Water	Volume of Release: 5 bbls / 10 bbls	Volume Recovered: 0 / 0
Source of Release: Fiber glass line	Date and Hour of Occurrence: 04/14/2014	Date and Hour of Discovery: 04/14/2014 0800
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Mike Burton- BLM Mike Bratcher- NM OCD	
By Whom? Brian Wall	Date and Hour 04/15/2014 0715	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.\*:

Describe Cause of Problem and Remedial Action Taken.\*: Was notified of possible injection leak, header pressure at the injection station was low. He ordered a pump truck to pressure up lines with fresh water. After pumping water into trunk line and pressuring up lateral lines were opened one by one to find leak. the 2 inch fiberglass line feeding the #11 did not hold pressure. walked line out and found the leak on a buried fiberglass line approx.

Describe Area Affected and Cleanup Action Taken.\*: 15 barrels of produced water and fresh water were lost to an affected area about 20'W x50'L

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: 	<b>OIL CONSERVATION DIVISION</b>	
Printed Name: Brian Wall	Approved by District Supervisor:	
Title: Construction Foreman II	Approval Date:	Expiration Date:
E-mail Address: bwall@linenergy.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: 04/16/2014 Phone: 806-367-0645		

\* Attach Additional Sheets If Necessary

# Appendix B

## Initial Sampling Labs

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948 Hobbs, NM 88241  
Phone 575.393.2967



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

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April 28, 2014

JACOB KAMPLAIN

RICE ENVIRONMENTAL CONSULTING & SAFETY LLC

419 W. CAIN

HOBBS, NM 88240

RE: J. L. KEEL A #11

Enclosed are the results of analyses for samples received by the laboratory on 04/22/14 16:35.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive style with a large, stylized 'C' and 'K'.

Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 04/22/2014  
Reported: 04/28/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 04/22/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 1 SURFACE (H401216-01)**

BTX 8021B		mg/kg	Analyzed By: CK						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.200	0.200	04/25/2014	ND	1.89	94.5	2.00	8.49	
Toluene*	<0.200	0.200	04/25/2014	ND	1.88	94.2	2.00	8.41	
Ethylbenzene*	<0.200	0.200	04/25/2014	ND	1.88	94.0	2.00	8.50	
Total Xylenes*	<0.600	0.600	04/25/2014	ND	5.61	93.4	6.00	8.54	
Total BTX	<1.20	1.20	04/25/2014	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 89.4-126

Chloride, SM4500Cl-B		mg/kg	Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7760	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg	Analyzed By: CK							S-06
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<100	100	04/24/2014	ND	193	96.7	200	6.41		
DRO >C10-C28	8440	100	04/24/2014	ND	215	107	200	1.79		

Surrogate: 1-Chlorooctane 121 % 65.2-140

Surrogate: 1-Chlorooctadecane 338 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 RICE ENVIRONMENTAL CONSULTING & SAFETY  
 JACOB KAMPLAIN  
 419 W. CAIN  
 HOBBS NM, 88240  
 Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 1 VERTICAL 2' (H401216-02)**

BTX 8021B		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/25/2014	ND	1.89	94.5	2.00	8.49	
Toluene*	<0.050	0.050	04/25/2014	ND	1.88	94.2	2.00	8.41	
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.88	94.0	2.00	8.50	
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.61	93.4	6.00	8.54	
Total BTX	<0.300	0.300	04/25/2014	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3280	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	<10.0	10.0	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 99.5 % 65.2-140

Surrogate: 1-Chlorooctadecane 104 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 1 VERTICAL 3' (H401216-03)**

BTX 8021B		mg/kg		Analyzed By: CK						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	04/25/2014	ND	1.89	94.5	2.00	8.49		
Toluene*	<0.050	0.050	04/25/2014	ND	1.88	94.2	2.00	8.41		
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.88	94.0	2.00	8.50		
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.61	93.4	6.00	8.54		
Total BTX	<0.300	0.300	04/25/2014	ND						

Surrogate: 4-Bromofluorobenzene (PID) 101 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4640	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	<10.0	10.0	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 103 % 65.2-140

Surrogate: 1-Chlorooctadecane 106 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Analytical Results For:

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

### Sample ID: PT. 1 VERTICAL 4' (H401216-04)

BTX 8021B		mg/kg		Analyzed By: CK						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05		
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87		
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27		
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26		
Total BTX	<0.300	0.300	04/25/2014	ND						

Surrogate: 4-Bromofluorobenzene (PID) 102 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3760	16.0	04/24/2014	ND	400	100	400	0.00		

TPH 8015M		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	<10.0	10.0	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 105 % 65.2-140

Surrogate: 1-Chlorooctadecane 109 % 63.6-154

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\*=Accredited Analyte

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HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 2 SURFACE (H401216-05)**

BTX 8021B		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05	
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87	
Ethylbenzene*	0.096	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27	
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26	
Total BTX	<0.300	0.300	04/25/2014	ND					

Surrogate: 4-Bromofluorobenzene (PID) 122 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1220	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK				S-06	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<100	100	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	19600	100	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 97.9 % 65.2-140

Surrogate: 1-Chlorooctadecane 729 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 04/22/2014  
Reported: 04/28/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 04/22/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 3 SURFACE (H401216-06)**

BTX 8021B		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05	
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87	
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27	
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26	
Total BTX	<0.300	0.300	04/25/2014	ND					

Surrogate: 4-Bromofluorobenzene (PID) 100 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK				S-06	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<200	200	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	16200	200	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 89.3 % 65.2-140

Surrogate: 1-Chlorooctadecane 695 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 4 SURFACE (H401216-07)**

BTX 8021B		mg/kg		Analyzed By: CK						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05		
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87		
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27		
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26		
Total BTX	<0.300	0.300	04/25/2014	ND						

Surrogate: 4-Bromofluorobenzene (PID) 98.0 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	944	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK				S-06	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<200	200	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	13200	200	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 77.7 % 65.2-140

Surrogate: 1-Chlorooctadecane 526 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 04/22/2014  
Reported: 04/28/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 04/22/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 5 SURFACE (H401216-08)**

BTX 8021B		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05	
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87	
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27	
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26	
Total BTX	<0.300	0.300	04/25/2014	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.4 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK				S-06	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<200	200	04/24/2014	ND	193	96.7	200	6.41	
DRO >C10-C28	5580	200	04/24/2014	ND	215	107	200	1.79	

Surrogate: 1-Chlorooctane 77.0 % 65.2-140

Surrogate: 1-Chlorooctadecane 259 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
JACOB KAMPLAIN  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	04/22/2014	Sampling Date:	04/22/2014
Reported:	04/28/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 6 SURFACE (H401216-09)**

BTEx 8021B		mg/kg		Analyzed By: CK						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	3.05		
Toluene*	<0.050	0.050	04/25/2014	ND	1.86	92.9	2.00	2.87		
Ethylbenzene*	<0.050	0.050	04/25/2014	ND	1.87	93.4	2.00	2.27		
Total Xylenes*	<0.150	0.150	04/25/2014	ND	5.67	94.4	6.00	1.26		
Total BTEx	<0.300	0.300	04/25/2014	ND						

Surrogate: 4-Bromofluorobenzene (PID) 99.8 % 89.4-126

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	04/24/2014	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK				S-06	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<100	100	04/24/2014	ND	181	90.4	200	1.53	
DRO >C10-C28	5740	100	04/24/2014	ND	193	96.3	200	0.969	

Surrogate: 1-Chlorooctane 117 % 65.2-140

Surrogate: 1-Chlorooctadecane 253 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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Cardinal Laboratories

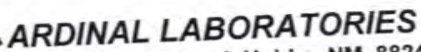
\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

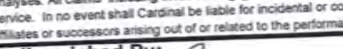



**RDINAL LABORATORIES**  
101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603  
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325) 673-7020

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Relinquished By: 	Date: 4/22/14	Received By: Jodi Benson	Phone Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Phone #:
Relinquished By:	Time: 4:35	Received By:	Fax Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Fax #:
Delivered By: (Circle One)	Time:	Sample Condition	REMARKS:	
Sampler - UPS - Bus - Other:		Cool <input checked="" type="checkbox"/> Intact <input checked="" type="checkbox"/> <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No	email results Knorman@rice-ecs.com jbalcom@rice-ecs.com Kjones@riceswd.com; jkamplain@rice-ecs.com hconder@rice-ecs.com; Lweinheimer@rice-ecs.com	

Checked By: (Initials) 

Call us at 505.393.2876

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

#54



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

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May 15, 2014

LAURA FLORES

RICE ENVIRONMENTAL CONSULTING & SAFETY LLC

419 W. CAIN

HOBBS, NM 88240

RE: J. L. KEEL A #11

Enclosed are the results of analyses for samples received by the laboratory on 05/14/14 16:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive style with a large, stylized 'C' and 'K'.

Celey D. Keene

Lab Director/Quality Manager



**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	05/14/2014	Sampling Date:	05/14/2014
Reported:	05/15/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 1 @ 9' (H401471-01)**

BTEX 8260B			mg/kg		Analyzed By: ms				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	1.85	92.4	2.00	5.18	
Toluene*	<0.050	0.050	05/15/2014	ND	1.73	86.5	2.00	7.75	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	1.61	80.7	2.00	8.03	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	4.93	82.2	6.00	6.38	
Total BTEX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 93.9 % 61.3-142

Surrogate: Toluene-d8 99.2 % 71.3-129

Surrogate: 4-Bromofluorobenzene 102 % 65.7-141

Chloride, SM4500Cl-B			mg/kg		Analyzed By: AP				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	144	16.0	05/15/2014	ND	416	104	400	3.92	

TPH 8015M			mg/kg		Analyzed By: MS				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/15/2014	ND	167	83.6	200	14.7	
DRO >C10-C28	<10.0	10.0	05/15/2014	ND	169	84.6	200	16.3	

Surrogate: 1-Chlorooctane 98.3 % 65.2-140

Surrogate: 1-Chlorooctadecane 106 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/14/2014  
Reported: 05/15/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/14/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 2 @ 9' (H401471-02)**

BTX 8260B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	05/15/2014	ND	1.85	92.4	2.00	5.18		
Toluene*	<0.050	0.050	05/15/2014	ND	1.73	86.5	2.00	7.75		
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	1.61	80.7	2.00	8.03		
Total Xylenes*	<0.150	0.150	05/15/2014	ND	4.93	82.2	6.00	6.38		
Total BTX	<0.300	0.300	05/15/2014	ND						

Surrogate: Dibromofluoromethane 97.6 % 61.3-142  
Surrogate: Toluene-d8 99.7 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	640	16.0	05/15/2014	ND	416	104	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/15/2014	ND	167	83.6	200	14.7	
DRO >C10-C28	<10.0	10.0	05/15/2014	ND	169	84.6	200	16.3	

Surrogate: 1-Chlorooctane 105 % 65.2-140  
Surrogate: 1-Chlorooctadecane 105 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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Celey D. Keene, Lab Director/Quality Manager



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RUSH!!

## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: <b>RECS</b>				<b>BILL TO</b>				<b>ANALYSIS REQUEST</b>																			
Project Manager: <b>Laura Flores, Jacob Kamplain</b>				P.O. #:				<div style="display: flex; flex-direction: column; align-items: center;"> <div>Chlorides</div> <div>TPH 8015 M</div> <div>BTEX</div> <div>Texas TPH</div> <div>Complete Cations/Anions</div> <div>TDS</div> </div>																			
Address:				Company:																							
City: <b>Hobbs</b> State: <b>NM</b> Zip: <b>88240</b>				Attn:																							
Phone #: Fax #:				Address:																							
Project #: Project Owner:				City:																							
Project Name:				State: Zip:																							
Project Location: <b>J.L. Keel A #11 (2)</b>				Phone #: Fax #:																							
Sampler Name: <b>Kyle Schnaidt</b>																											
FOR LAB USE ONLY						MATRIX		PRESERV.		SAMPLING																	
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME													
<b>H401471</b>																											
	<b>1 Point 1 @ 9'</b>	<b>G</b>	<b>1</b>			<b>X</b>				<b>X</b>			<b>5-14-14</b>	<b>2:00</b>	<b>X</b>	<b>X</b>	<b>X</b>										
	<b>2 Point 2 @ 9'</b>	<b>G</b>	<b>1</b>			<b>X</b>				<b>X</b>			<b>5-14-14</b>	<b>2:05</b>	<b>X</b>	<b>X</b>	<b>X</b>										

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Relinquished By: <b>Kyle Schnaidt</b>	Date: <b>5-14-14</b> Time: <b>4:25</b>	Received By: <b>Jodi Henson</b>	Phone Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Phone #:
Relinquished By:	Date:	Received By:	Fax Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Fax #:
			REMARKS:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:			email: hconder@riceswd.com; lflores@rice-ecs.com; lweinheimer@rice-ecs.com; knorman@rice-ecs.com; jkamplain@rice-ecs.com; sedwards@rice-ecs.com; cursanic@rice-ecs.com Environmental Tech: <b>KSchnaidt</b> @rice-ecs.com	
Sample Condition Cool <input checked="" type="checkbox"/> Intact <input checked="" type="checkbox"/> <input type="checkbox"/> Yes <input type="checkbox"/> No		CHECKED BY: (Initials) <b>KS</b>		

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

#54



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

---

May 16, 2014

LAURA FLORES

RICE ENVIRONMENTAL CONSULTING & SAFETY LLC

419 W. CAIN

HOBBS, NM 88240

RE: J. L. KEEL A #11

Enclosed are the results of analyses for samples received by the laboratory on 05/09/14 16:00.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene

Lab Director/Quality Manager



**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 2 VERTICAL 3' (H401423-01)**

BTEX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTEX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 97.2 % 61.3-142

Surrogate: Toluene-d8 98.8 % 71.3-129

Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2120	16.0	05/14/2014	ND	400	100	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 131 % 65.2-140

Surrogate: 1-Chlorooctadecane 135 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 2 VERTICAL 4' (H401423-02)**

BTX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 94.9 % 61.3-142  
Surrogate: Toluene-d8 101 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	2920	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 125 % 65.2-140  
Surrogate: 1-Chlorooctadecane 131 % 63.6-154

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 3 VERTICAL 1' (H401423-03)**

BTEX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTEX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 96.9 % 61.3-142  
Surrogate: Toluene-d8 99.8 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 105 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	192	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 135 % 65.2-140  
Surrogate: 1-Chlorooctadecane 138 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received:	05/09/2014	Sampling Date:	05/09/2014
Reported:	05/16/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL A #11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	LINN ENERGY		

**Sample ID: PT. 4 VERTICAL 1' (H401423-04)**

BTX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 92.9 % 61.3-142

Surrogate: Toluene-d8 101 % 71.3-129

Surrogate: 4-Bromofluorobenzene 103 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	528	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 133 % 65.2-140

Surrogate: 1-Chlorooctadecane 135 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 4 VERTICAL 2' (H401423-05)**

BTX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 99.3 % 61.3-142  
Surrogate: Toluene-d8 100 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 102 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	784	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 134 % 65.2-140  
Surrogate: 1-Chlorooctadecane 135 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 5 VERTICAL 1' (H401423-06)**

BTX 8260B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769		
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923		
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259		
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427		
Total BTX	<0.300	0.300	05/15/2014	ND						

Surrogate: Dibromofluoromethane 93.5 % 61.3-142  
Surrogate: Toluene-d8 101 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	96.0	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS				S-04	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 160 % 65.2-140  
Surrogate: 1-Chlorooctadecane 158 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 5 VERTICAL 2' (H401423-07)**

BTX 8260B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769		
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923		
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259		
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427		
Total BTX	<0.300	0.300	05/15/2014	ND						

Surrogate: Dibromofluoromethane 97.9 % 61.3-142  
Surrogate: Toluene-d8 98.2 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 102 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	368	16.0	05/14/2014	ND	400	100	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	194	97.2	200	2.25	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	211	105	200	2.97	

Surrogate: 1-Chlorooctane 130 % 65.2-140  
Surrogate: 1-Chlorooctadecane 130 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 6 VERTICAL 1' (H401423-08)**

BTX 8260B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769		
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923		
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259		
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427		
Total BTX	<0.300	0.300	05/15/2014	ND						

Surrogate: Dibromofluoromethane 96.5 % 61.3-142  
Surrogate: Toluene-d8 103 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	272	16.0	05/14/2014	ND	400	100	400	7.69	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	203	102	200	0.0683	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	229	114	200	0.184	

Surrogate: 1-Chlorooctane 137 % 65.2-140  
Surrogate: 1-Chlorooctadecane 137 % 63.6-154

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

RICE ENVIRONMENTAL CONSULTING & SAFETY  
LAURA FLORES  
419 W. CAIN  
HOBBS NM, 88240  
Fax To: (575) 397-1471

Received: 05/09/2014  
Reported: 05/16/2014  
Project Name: J. L. KEEL A #11  
Project Number: NONE GIVEN  
Project Location: LINN ENERGY

Sampling Date: 05/09/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: PT. 6 VERTICAL 2' (H401423-09)**

BTX 8260B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	05/15/2014	ND	2.32	116	2.00	0.769	
Toluene*	<0.050	0.050	05/15/2014	ND	2.20	110	2.00	0.0923	
Ethylbenzene*	<0.050	0.050	05/15/2014	ND	2.05	103	2.00	0.259	
Total Xylenes*	<0.150	0.150	05/15/2014	ND	6.27	105	6.00	0.427	
Total BTX	<0.300	0.300	05/15/2014	ND					

Surrogate: Dibromofluoromethane 96.7 % 61.3-142  
Surrogate: Toluene-d8 100 % 71.3-129  
Surrogate: 4-Bromofluorobenzene 104 % 65.7-141

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	400	16.0	05/14/2014	ND	400	100	400	7.69		

TPH 8015M		mg/kg		Analyzed By: MS				S-04	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	05/14/2014	ND	203	102	200	0.0683	
DRO >C10-C28	<10.0	10.0	05/14/2014	ND	229	114	200	0.184	

Surrogate: 1-Chlorooctane 149 % 65.2-140  
Surrogate: 1-Chlorooctadecane 149 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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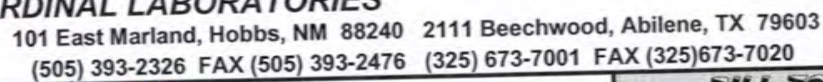
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† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#54

# Appendix C

Photo Documentation

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948 Hobbs, NM 88241  
Phone 575.393.2967



# Linn J.L. Keel A #11

Unit Letter H, Section 7, T17S, R31E



Initial release area, facing north

4/22/14



Initial release area, facing southeast

4/22/14



Initial release area, facing northwest

4/22/14



Line spot with hydrovac, facing west

5/13/14



Installing verticals, facing northwest

5/14/14