



Linn Energy JL Keel B #30

REMEDIATION WORK PLAN

API No. 30-015-28098

Release Date: 03/26/2014

Unit Letter O, Section 6 , Township 17 South, Range 31E East

RP#2RP-2234

June 6, 2014

Prepared by:

Environmental Department
Diversified Field Service, Inc.
3412 N. Dal Paso
Hobbs, NM 88240
Phone: (575)964-8394
Fax: (575)393-8396

Mike Bratcher
Environmental Specialist
NM Oil Conservation District – Division 2
811 S. First St.
Artesia, NM 88210

RE: Linn Energy JL Keel B #30 – Remediation Work Plan
UL/O, Section 06, T17S, R31E
API No. 30-015-21460

Mr. Bratcher,

Linn Energy (Linn) has retained Diversified Field Service, Inc. (DFSI) to address environmental issues for the site detailed herein.

The site is located south west of Maljamar NM, in Eddy County. The leak site resulted from a hydrocarbon and produced water leak. The source of the leak was due to corrosion on a nipple located on the wellhead. A C-141 was submitted to the NMOCD on March 27, 2014 (2RP-2234).

Site Assessment and Delineation

On April 11, 2014 DFSI personnel obtained surface and delineation samples of the leak area, which included SP1-SP12. All but SP7 cleaned up below the required levels, SP1-SP6 and SP8-12 were sampled to 16' and found that contamination was still present. Then on 04/21/14 SP13-SP16 were sampled whereby indicating that contamination was present and we received augur refusal. At this time John Scarborough Drilling, Inc., was contracted to drill four bore holes at the JL Keel B #30 site. On May 23, 2014 the boreholes were drilled and was successful with finding the bottom of contamination.

Field samples were taken on sixteen sample points, along with four boreholes, each sample was tested for chlorides levels as well as TPH. The TPH samples were performed using a Mini Rae Photoionization Detector (PID). All clean field samples found under the BLM/NMOCD standards, were taken to Cardinal Lab of Hobbs to obtain confirmation samples. And the results confirmed that bottom samples of each sample point were as follows:

SP7: 9'bgs – 608 mg/kg chlorides, <30 mg/kg BTEX and <10 mg/kg GRO/DRO
SB1: 35'bgs – 352 mg/kg chlorides, <30 mg/kg BTEX and <10 mg/kg GRO/DRO
SB2: 35'bgs – 96 mg/kg chlorides, <30 mg/kg BTEX and <10 mg/kg GRO/DRO
SB3: 50'bgs – 368 mg/kg chlorides, <30 mg/kg BTEX and <10 mg/kg GRO/DRO
SB4: 60'bgs – 160 mg/kg chlorides, <30 mg/kg BTEX and <10 mg/kg GRO/DRO

DFSI has conducted a groundwater study of the area and has determined that according to the New Mexico Office of the State Engineer the average depth to groundwater for this area is 236 foot below ground surface. Therefore, no eminent danger of groundwater impact or threat to life is anticipated.

Conclusion

After careful review DFSI on behalf of Linn Energy would like to propose the following:

Option 1

Excavate the entire 11,905 sq. ft. area of compacted soil to 4'bgs, haul the contaminated soil to an approved disposal site, line with a 20 mil liner and backfill with fresh imported topsoil. Then reseed the entire area with a native vegetation mixture as per the BLM's guidelines for returning the site to its natural state.

Option 2

Excavate the entire 11,905 sq. ft. area of compacted soil to 4'bgs. Excavate an 85' x 85' x 8' deep hole, line the bottom and sides with a 20 mil liner, bury the contaminated soil, install a cap at 4' by using a 20 mil liner and backfill with the clean excavated soil and reseed area. The contaminated area will also be lined at 4' with a 20mil liner and the remainder of the soil that was excavated for the deep bury area will be used as well as pushing in the native sand for surface reseeding procedures to return this site to its natural state. Some imported topsoil maybe needed to finalize this procedure to ensure proper growth. This option illuminates having to haul the contaminated soil to an approved facility and the disposal costs.

Side wall samples will be taking during the excavation procedure to ensure that all contaminants have been remediated. These samples will also be taken to an approved lab for confirmation before backfilling will take place.

Following the approval of one of the above plans, either Option 1 or Option 2 above and after the remediation has taken place, DFSI will submit all proper closure documentation to the NMOC and BLM in accordance to the State and Federal Guidelines set forth.

Please feel free to contact me with any questions concerning this remediation plan request.

Sincerely,

Natalie Gladden
Environmental Consultant
Diversified Field Service, Inc.
315 S. Leech
Hobbs, NM 88240
Office: (575)964-8394
Mobile: (575)602-1786
Fax: (575)964-8396
Email: ngladden@diversifiedfsi.com

cc Jennifer Van Curen
NM Bureau of Land Management

Attachments: Initial Form C-141
Linn Spill/Release Report
Site/Sample Map
Sample Data
Lab Analytical Data
Drilling Bore Logs

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

RECEIVED
MAR 27 2014
NMOCD ARTESIA

Form C-141
Revised October 10, 2003
Appropriate District Office in
conformance with 19.15.29 NMAC

Release Notification and Corrective Action

OPERATOR

Initial Report Final Report

| | |
|---|-----------------------------|
| Name of Company: Linn Operating 269324 | Contact: Brian Wall |
| Address: 2130 W. Bender Hobbs, NM 88240 | Telephone No.: 575-738-1739 |
| Facility Name: Keel J L B #30 | Facility Type: Injection |
| Surface Owner: Federal | Mineral Owner: |
| API No.: 30-015-21460 | |

LOCATION OF RELEASE

| Unit Letter | Section | Township | Range | Feet from the | North/South Line | Feet from the | East/West Line | County |
|-------------|---------|----------|-------|---------------|------------------|---------------|----------------|--------|
| O | 06 | 17S | 31E | 430 | South | 2250 | East | Eddy |

Latitude: 32.85744 Longitude: -103.90692

nHMP1409029298

NATURE OF RELEASE

| | | |
|--|---|--|
| Type of Release: Produced Water | Volume of Release: 88 bbls | Volume Recovered: 60 bbls |
| Source of Release: Steel Pipeline | Date and Hour of Occurrence: 03/26/2014 | Date and Hour of Discovery: 03/26/2014 10:30am |
| 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 03/27/2014 0650 | |
| 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.*: Drove up to keel west water station started getting gauges on control panel noticed that injection pressure was at 1875 # when usually runs 1940-1950# turn pump off went up to header and spotted line #3 dropping down quick s/l master valve turn pump back on pressure went back to normal on header and control panel went out to inj wells to look for leak found leak North side of Keel A #23 location 150'.

Describe Area Affected and Cleanup Action Taken.*: Leak ran west average 10' wide X 450' long end of leak puddle 40' X 50' called vac truck and recover 60 BBLS of P/W from ground hauled to CRI dug out leak found a steel plug at the end of tee with a hole in it, had rain showers early this morning floor was wet was able to recover fluid. Site will be delineated by Diversified and the a CAP will be turned in. I will have estimate and PLA at that time.

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: | OIL CONSERVATION DIVISION | |
| Printed Name: Brian Wall | Approved by District Supervisor: | |
| Title: Construction Foreman II | Approval Date: 3-31-14 | Expiration Date: NA |
| E-mail Address: bwall@linenergy.com | Conditions of Approval: | Attached <input type="checkbox"/> |
| Date: 03/27/2014 | Remediation per OCD Rule 8 | |
| Phone: 806-367-0645 | Guidelines. SUBMIT REMEDIATION PROPOSAL NO LATER THAN: | |

5-1-14

2RP-2234

Spill / Release Report



Incident Date: 3/26/2014 Incident Time: 10:30 AM

Location Information

EH&S Rep: Only By An EH&S Rep.
Date: _____

Completion
or Unit
Lease Code:

| | |
|------------------------------------|--|
| Division: <u>Houston Corporate</u> | State: <u>New Mexico</u> |
| Department: <u>Production</u> | Lease Name & No: <u>Keel B #30</u> |
| Area: <u>Grayburg</u> | Legal: <u>SEC. 6, T17S, R31E LC-029435-B</u> |
| Rig Name: _____ | County: <u>EDDY</u> |

Type and Location

| | |
|---------------------------------|---|
| Spill/Release Type: <u>Land</u> | Inside Dike Area: <u>No</u> |
| Latitude: <u>0' " N</u> | Longitude: <u>0' " W</u> |
| Facility: <u>Water Flood</u> | Were There Any Injuries? <u>No</u> <small>(If yes, must also fill out Injury Report)</small> |

| |
|---|
| Nearest City: <u>Loco Hills</u> |
| Directions to Site: <u>From loco hills go E to CR 221 go N for 1.4 miles go N/E 0.5 go E 0.1 than N 0.5 to location Keel A # 23</u> |
| Source Type: _____ |
| Body of Water Impacted: <u>No</u> Name Body Of Water: _____ |

Description of Incident and Cause Analysis

Drove up to keel west water station started getting gauges on control panel noticed that injection pressure was at 1875 # when usually runs 1940-1950# turn pump off went up to header and spotted line #3 dropping down quick s/l master valve turn pump back on pressure went back to normal on header and control panel went out to inj wells to look for leak found leak North side of Keel A #23 location 150'. leak ran west average 10' wide X 450' long end of leak puddle 40' X 50' called vac truck and recover 60 BBLs of P/W from ground hauled to CRI dug out leak found a steel plug at the end of tee with a hole in it, had rain showers early this morning floor was wet was able to recover fluid

| |
|--|
| Company Name: if caused by contractor - contractor information _____ |
| Address: _____ City, State, Zip: _____ |
| Phone: _____ Contact Person: _____ |

Personnel Information

| | |
|--|----------------------------|
| Lease Operator: <u>Mario Hernandez</u> | Phone: <u>575-602-8598</u> |
| Remarks: _____ | |
| Supervisor: <u>Joe Hernandez</u> | Phone: <u>575-942-9492</u> |
| Remarks: _____ | |

Containment/Clean Up

| | | |
|---|------------------------------|--------------------|
| Cleaned Date: _____ | Time: _____ | By: LaminaTrucking |
| Containment/Cleanup Description: picked up fluid off ground, Lamina trucking hauled to CR1 | | |
| Waste Handling Description: Site will be delineated by Diversified and the a CAP will be turned In. I will have estimate and PLA at that time. | | |
| Containment/Cleanup Costs: <u>\$80,000.00</u> | Oil Loss Cost: <u>\$0.00</u> | |

Weather

| | | |
|---------------------------------|-----------------------|------------------------|
| Wind Direction: <u>S/W</u> | Wind Speed: <u>15</u> | Wind Speed UOM: _____ |
| Temperature: <u>75</u> | Fahrenheit | Temperature UOM: _____ |
| Weather Conditions: <u>Rain</u> | | |

Substance

| | |
|---|--|
| Number Substances Were Released? <u>1</u> | |
| SUBSTANCE 1 | |
| Substance Released: <u>Produced Water</u> | Volume Released: <u>88</u> Volume Recovered: <u>60</u> |
| Volume Type: <u>Barrels</u> | Amount Lost: <u>28</u> |
| SUBSTANCE 2 | |
| Substance Released: <u>Select One</u> | Volume Released: <u>0</u> Volume Recovered: <u>0</u> |
| Volume Type: <u>Select One</u> | Amount Lost: <u>0</u> |
| SUBSTANCE 3 | |
| Substance Released: <u>Select One</u> | Volume Released: <u>0</u> Volume Recovered: <u>0</u> |
| Volume Type: <u>Select One</u> | Amount Lost: <u>0</u> |

| | |
|--------------------------|--|
| Slick Present: <u>No</u> | Was a CERCLA Hazardous substance Released? <u>No</u> |
|--------------------------|--|

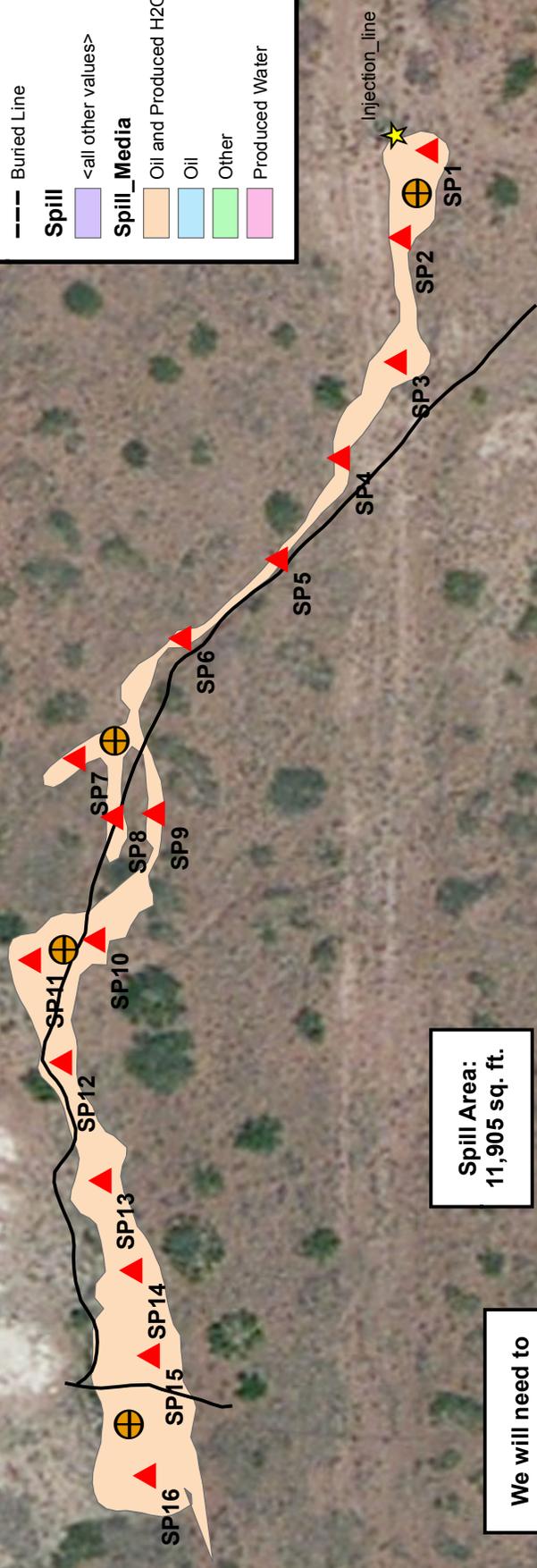
| External Agency Name | Reported to | Reported By | Verbal / Written | Date / Time |
|----------------------|---------------|-------------|------------------|--------------|
| 1 BLM | Mike Burton | Brian Wall | Verbal/Written | 3-27-14 0650 |
| 2 OCD | Mike Bratcher | Brian Wall | Verbal/Written | 3-27-14 0700 |
| 3 | | | | |

| | |
|---|--|
| Equipment Type: <u>Pipeline-Steel</u> | Specific Cause: <u>Normal Degradation</u> |
| If not listed enter on line below: <u>4" bull plug at end of fiber glass injection line</u> | If not listed enter on line below: _____ |

| <u>For EH&S Department Only</u> | | | |
|-------------------------------------|------------|---------------------|------------|
| Contributing Factors | | | |
| Contributing Factors: | SELECT ONE | Weather Conditions: | SELECT ONE |

Site Diagram

Linn, JL Keel B 30
 UL/O, Sec. 6 T17S R31E
 Eddy County, NM
 Drafted By: Lance Crenshaw, 4-1-14



Spill Area:
 11,905 sq. ft.

We will need to
 prepare a road
 for the drilling rig
 for each of the
 four soil bores.

Legend

- Soil Bores (Yellow circle with cross)
- sample_pts (Red triangle)
- Source (Yellow star)

Pipeline

- Above Ground Line (Solid black line)
- Buried Line (Dashed black line)

Spill

- <all other values> (Light purple)

Spill_Media

- Oil and Produced H2O (Light orange)
- Oil (Light blue)
- Other (Light green)
- Produced Water (Light pink)

Lance Crenshaw
 GIS Technician

Soil Remediation and Ground Water Remediation
 Environmental Assessments
 Regulatory Compliance

DFS

Environmental Services

Office: 575-964-8394
 Fax: 575-964-8396
 Cell: 575-441-2359
 Email: lcrenshaw@diversifiedfsi.com

Source: Esri, DigitalGlobe, GeoEye, IGN, Aeri, GeoEye, and the GIS User Community

Diversified Environmental Services

| SP16 | CHL | TPH | Bore 1 | CHL | TPH | Bore 2 | CHL | TPH | Bore 3 | CHL | TPH | Bore 4 | CHL | TPH |
|---------|-------|-----|--------|------|-----|--------|------|-----|--------|------|-----|--------|------|-----|
| Surface | 16969 | 4.8 | 20' | 1524 | 0 | 20' | 1774 | 0 | 20' | 4948 | 0 | 20' | 7472 | 0.1 |
| 2' | 6872 | 3 | 25' | 1874 | 0 | 25' | 1049 | 0 | 25' | 4224 | 0 | 25' | 4523 | 0 |
| 4' | 6972 | 2.8 | 30' | 774 | 0 | 30' | 324 | 0 | 30' | 2299 | 0 | 30' | 4198 | 0 |
| 6' | 4723 | 0.8 | 35' | 624 | 0 | 35' | 374 | 0 | 35' | 4198 | 0 | 35' | 5623 | 0 |
| 8' | 4723 | 0.2 | 35' | 352 | <10 | 35' | 96 | <10 | 40' | 1274 | 0 | 40' | 2924 | 0 |
| 10' | 4623 | 0.3 | | | | | | | 45' | 524 | 0 | 45' | 974 | 0 |
| 12' | 4198 | 0.2 | | | | | | | 50' | 599 | 0 | 50' | 1024 | 0 |
| 14' | 4798 | 0.3 | | | | | | | 50' | 368 | <10 | 55' | 649 | 0 |
| 16' | 4698 | 2 | | | | | | | | | | 60' | 524 | 0 |
| | | | | | | | | | | | | 60' | 160 | <10 |
| | | | | | | | | | | | | | | |
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| | |
|--|--|
| | Lab Confirmation Sample |
| | Field Sampling |
| | Needs Delineation and confirmation samples |



April 28, 2014

BRIAN WALL

LINN OPERATING-HOBBS

2130 W. BENDER

HOBBS, NM 88240

RE: J. L. KEEL B #30

Enclosed are the results of analyses for samples received by the laboratory on 04/22/14 15:55.

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.

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 cursive script that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

 LINN OPERATING-HOBBS
 BRIAN WALL
 2130 W. BENDER
 HOBBS NM, 88240
 Fax To: (575) 738-1740

| | | | |
|-------------------|------------------|---------------------|---------------|
| Received: | 04/22/2014 | Sampling Date: | 04/22/2014 |
| Reported: | 04/28/2014 | Sampling Type: | Soil |
| Project Name: | J. L. KEEL B #30 | Sampling Condition: | Cool & Intact |
| Project Number: | NONE GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | NOT GIVEN | | |

Sample ID: SP 7 @ 9' (H401210-01)

| 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 | 1.89 | 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 BTEX | <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 | 608 | 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 104 % 65.2-140
Surrogate: 1-Chlorooctadecane 97.4 % 63.6-154

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



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



Celey D. Keene, Lab Director/Quality Manager



May 30, 2014

BRIAN WALL

LINN OPERATING-HOBBS

2130 W. BENDER

HOBBS, NM 88240

RE: J. L. KEEL B #30

Enclosed are the results of analyses for samples received by the laboratory on 05/23/14 14:55.

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.

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 cursive script that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

 LINN OPERATING-HOBBS
 BRIAN WALL
 2130 W. BENDER
 HOBBS NM, 88240
 Fax To: (575) 738-1740

| | | | |
|-------------------|------------------|---------------------|---------------|
| Received: | 05/23/2014 | Sampling Date: | 05/23/2014 |
| Reported: | 05/30/2014 | Sampling Type: | Soil |
| Project Name: | J. L. KEEL B #30 | Sampling Condition: | Cool & Intact |
| Project Number: | NONE GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | NOT GIVEN | | |

Sample ID: SB 1 @ 35' (H401591-01)

| BTEX 8021B | | mg/kg | | Analyzed By: MS | | | | | |
|----------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Benzene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.07 | 103 | 2.00 | 3.77 | |
| Toluene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.05 | 102 | 2.00 | 3.01 | |
| Ethylbenzene* | <0.050 | 0.050 | 05/29/2014 | ND | 1.96 | 98.2 | 2.00 | 3.78 | |
| Total Xylenes* | <0.150 | 0.150 | 05/29/2014 | ND | 6.15 | 102 | 6.00 | 3.77 | |
| Total BTEX | <0.300 | 0.300 | 05/29/2014 | ND | | | | | |

Surrogate: 4-Bromofluorobenzene (PID) 107 % 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 | 352 | 16.0 | 05/29/2014 | ND | 432 | 108 | 400 | 3.77 | |

| 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 | 05/27/2014 | ND | 212 | 106 | 200 | 16.2 | |
| DRO >C10-C28 | <10.0 | 10.0 | 05/27/2014 | ND | 228 | 114 | 200 | 20.7 | |

Surrogate: 1-Chlorooctane 112 % 65.2-140

Surrogate: 1-Chlorooctadecane 111 % 63.6-154

Cardinal Laboratories

* = Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 LINN OPERATING-HOBBS
 BRIAN WALL
 2130 W. BENDER
 HOBBS NM, 88240
 Fax To: (575) 738-1740

| | | | |
|-------------------|------------------|---------------------|---------------|
| Received: | 05/23/2014 | Sampling Date: | 05/23/2014 |
| Reported: | 05/30/2014 | Sampling Type: | Soil |
| Project Name: | J. L. KEEL B #30 | Sampling Condition: | Cool & Intact |
| Project Number: | NONE GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | NOT GIVEN | | |

Sample ID: SB 2 @ 35' (H401591-02)

| BTEX 8021B | | mg/kg | | Analyzed By: MS | | | | | | |
|----------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|--|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier | |
| Benzene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.07 | 103 | 2.00 | 3.77 | | |
| Toluene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.05 | 102 | 2.00 | 3.01 | | |
| Ethylbenzene* | <0.050 | 0.050 | 05/29/2014 | ND | 1.96 | 98.2 | 2.00 | 3.78 | | |
| Total Xylenes* | <0.150 | 0.150 | 05/29/2014 | ND | 6.15 | 102 | 6.00 | 3.77 | | |
| Total BTEX | <0.300 | 0.300 | 05/29/2014 | ND | | | | | | |

Surrogate: 4-Bromofluorobenzene (PID) 106 % 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 | 96.0 | 16.0 | 05/29/2014 | ND | 432 | 108 | 400 | 3.77 | | |

| 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 | 05/27/2014 | ND | 212 | 106 | 200 | 16.2 | | |
| DRO >C10-C28 | <10.0 | 10.0 | 05/27/2014 | ND | 228 | 114 | 200 | 20.7 | | |

Surrogate: 1-Chlorooctane 111 % 65.2-140

Surrogate: 1-Chlorooctadecane 111 % 63.6-154

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 LINN OPERATING-HOBBS
 BRIAN WALL
 2130 W. BENDER
 HOBBS NM, 88240
 Fax To: (575) 738-1740

| | | | |
|-------------------|------------------|---------------------|---------------|
| Received: | 05/23/2014 | Sampling Date: | 05/23/2014 |
| Reported: | 05/30/2014 | Sampling Type: | Soil |
| Project Name: | J. L. KEEL B #30 | Sampling Condition: | Cool & Intact |
| Project Number: | NONE GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | NOT GIVEN | | |

Sample ID: SB 3 @ 50' (H401591-03)

| BTEX 8021B | | mg/kg | | Analyzed By: MS | | | | | | |
|----------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|--|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier | |
| Benzene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.07 | 103 | 2.00 | 3.77 | | |
| Toluene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.05 | 102 | 2.00 | 3.01 | | |
| Ethylbenzene* | <0.050 | 0.050 | 05/29/2014 | ND | 1.96 | 98.2 | 2.00 | 3.78 | | |
| Total Xylenes* | <0.150 | 0.150 | 05/29/2014 | ND | 6.15 | 102 | 6.00 | 3.77 | | |
| Total BTEX | <0.300 | 0.300 | 05/29/2014 | ND | | | | | | |

Surrogate: 4-Bromofluorobenzene (PID) 107 % 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 | 368 | 16.0 | 05/29/2014 | ND | 432 | 108 | 400 | 3.77 | | |

| 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 | 05/28/2014 | ND | 212 | 106 | 200 | 16.2 | | |
| DRO >C10-C28 | <10.0 | 10.0 | 05/28/2014 | ND | 228 | 114 | 200 | 20.7 | | |

Surrogate: 1-Chlorooctane 119 % 65.2-140

Surrogate: 1-Chlorooctadecane 117 % 63.6-154

Cardinal Laboratories

* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 LINN OPERATING-HOBBS
 BRIAN WALL
 2130 W. BENDER
 HOBBS NM, 88240
 Fax To: (575) 738-1740

| | | | |
|-------------------|------------------|---------------------|---------------|
| Received: | 05/23/2014 | Sampling Date: | 05/22/2014 |
| Reported: | 05/30/2014 | Sampling Type: | Soil |
| Project Name: | J. L. KEEL B #30 | Sampling Condition: | Cool & Intact |
| Project Number: | NONE GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | NOT GIVEN | | |

Sample ID: SB 4 @ 60' (H401591-04)

| BTEX 8021B | | mg/kg | | Analyzed By: MS | | | | | | |
|----------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|--|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier | |
| Benzene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.30 | 115 | 2.00 | 1.75 | | |
| Toluene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.33 | 116 | 2.00 | 2.64 | | |
| Ethylbenzene* | <0.050 | 0.050 | 05/29/2014 | ND | 2.23 | 111 | 2.00 | 2.07 | | |
| Total Xylenes* | <0.150 | 0.150 | 05/29/2014 | ND | 6.96 | 116 | 6.00 | 2.23 | | |
| Total BTEX | <0.300 | 0.300 | 05/29/2014 | ND | | | | | | |

Surrogate: 4-Bromofluorobenzene (PID) 106 % 89.4-126

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | | |
|----------------------|--------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|--|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier | |
| Chloride | 160 | 16.0 | 05/29/2014 | ND | 432 | 108 | 400 | 3.77 | | |

| 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 | 05/28/2014 | ND | 212 | 106 | 200 | 16.2 | | |
| DRO >C10-C28 | <10.0 | 10.0 | 05/28/2014 | ND | 228 | 114 | 200 | 20.7 | | |

Surrogate: 1-Chlorooctane 114 % 65.2-140

Surrogate: 1-Chlorooctadecane 108 % 63.6-154

Cardinal Laboratories

* = Accredited Analyte

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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



Celey D. Keene, Lab Director/Quality Manager

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

BILL TO

ANALYSIS REQUEST

| Company Name: <u>Lin Energy</u> | | P.O. #: | | | | | | | | | | | | | | | |
|-------------------------------------|----------------|----------------------------|--------------|-------------|------------|----------|-----|--------|---------|------------|------------|---------|----------------|--------------|----------|----------|----------|
| Project Manager: <u>Brian Wall</u> | | Company: <u>Lin Energy</u> | | | | | | | | | | | | | | | |
| Address: | | Attn: <u>Brian Wall</u> | | | | | | | | | | | | | | | |
| City: | State: | Address: | | | | | | | | | | | | | | | |
| Phone #: | Fax #: | City: | | | | | | | | | | | | | | | |
| Project #: | Project Owner: | State: | | | | | | | | | | | | | | | |
| Project Name: | | Zip: | | | | | | | | | | | | | | | |
| Project Location: <u>Steel B 30</u> | <u>Eddy NM</u> | Phone #: | | | | | | | | | | | | | | | |
| Sampler Name: <u>Myrd Alor</u> | | Fax #: | | | | | | | | | | | | | | | |
| FOR LAB USE ONLY | | | | | | | | | | | | | | | | | |
| 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 | CC | TH | DTX |
| <u>HDD1591</u> | | | | | | | | | | | | | | | | | |
| | <u>1</u> | <u>561035'</u> | <u>1</u> | | | <u>X</u> | | | | | | | <u>5/23/14</u> | <u>11:30</u> | <u>X</u> | <u>X</u> | <u>X</u> |
| | <u>2</u> | <u>562035'</u> | <u>1</u> | | | <u>X</u> | | | | | | | <u>5/23/14</u> | <u>12:00</u> | <u>X</u> | <u>X</u> | <u>X</u> |
| | <u>3</u> | <u>563050'</u> | <u>1</u> | | | <u>X</u> | | | | | | | <u>5/23/14</u> | <u>10:40</u> | <u>X</u> | <u>X</u> | <u>X</u> |
| | <u>4</u> | <u>564060'</u> | <u>1</u> | | | <u>X</u> | | | | | | | <u>5/23/14</u> | <u>9:00</u> | <u>X</u> | <u>X</u> | <u>X</u> |

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Relinquished By: [Signature] Date: 5/23/14 Time: 8:55
 Received By: [Signature] Date: 5/23/14 Time: 9:00

Delivered By: (Circle One) UPS 60
 Sampler - UPS - Bus - Other: 60
 Sample Condition: Cool Intact
 Checked By: [Signature]
 E-mail Results To: Ngladden@diversifiedfsi.com
Rpons@diversifiedfsi.com
Tjennings@diversifiedfsi.com

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

JOHN SCARBOROUGH DRILLING, INC.

2001 S. Hwy 87
P.O. Box 305
Lamesa, Texas 79331

Linn Energy:

5-23-2014

J.L. Keel B # 30

SB1:

| | |
|-------|---------------|
| 0-11 | Top soil |
| 11-22 | Caliche |
| 22-35 | Sand & gravel |
| 35-60 | Red clay |

SB2:

| | |
|-------|---------------|
| 0-12 | Top soil |
| 12-25 | Caliche |
| 25-40 | Sand & gravel |
| 40-55 | Red Clay |

SB3:

| | |
|-------|---------------|
| 0-10 | Top soil |
| 10-20 | Caliche |
| 20-30 | Sand & gravel |
| 30-35 | Red clay |

SB4:

| | |
|-------|---------------|
| 0-11 | Top soil |
| 11-22 | Caliche |
| 22-29 | Sand & gravel |
| 29-35 | Red clay |