



# Linn Energy JL Keel B #007

## REMEDIATION WORK PLAN

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API No. 30-015-05108

Release Date: Unknown date reported 3/6/2014

Unit Letter C, Section 08, Township 17 South, Range 31 East

RP# 2RP-2209

September 4, 2014

**Prepared by:**

Environmental Department  
Diversified Field Service, Inc.  
206 W. Snyder  
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 #007 – Remediation Work Plan**  
UL/C, Section 08, T17S, R31E  
API No. 30-015-05108

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 never determined. Fluids were released to surface due to an unknown source. A C-141 was submitted to the NMOCD on March 6, 2014 (2RP-2209).

### **Site Assessment and Delineation**

On April 2, 2014 DFSI ordered an Arch Survey from Boone Arch Surveys. At that time the site was found to be negative of any artifacts. On June 26, 2014 DFSI employees delineated the site, which eight samples points were taken. All of the sample points were confirmed below the reportable levels.

Field samples were taken on eight sample points, 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:

SP1: 3' - 192 mg/kg chlorides, <0.300 mg/kg BTEX and <10 mg/kg TPH  
SP2: 3' - 128 mg/kg chlorides, <0.300 mg/kg BTEX and <10 mg/kg TPH  
SP3: 9' - <16 mg/kg chlorides, <0.300 mg/kg BTEX and <10 mg/kg TPH  
SP4: 3' - <16 mg/kg chlorides, <0.300 mg/kg BTEX and <10 mg/kg TPH  
SP5: 3' - <16 mg/kg chlorides, <0.300 mg/kg BTEX and 39.6 DRO>C10-C-28  
SP6: 3' - 64 mg/kg chlorides, <0.300 BTEX and <10 mg/kg TPH  
SP7: 3' - 48 mg/kg chlorides, <0.300 BTEX and <10 mg/kg TPH  
SP8: 3' - 128 mg/kg chlorides, <0.300 BTEX and <10 mg/kg TPH

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 227 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

Till the entire 5,741 sq. ft. area of compacted soil and excavate SP3 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.

Surface samples will be taken before remediation of the site begins and taken to the Cardinal Labs for confirmation as requested by the BLM. 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 Option 1 and after the remediation has taken place, DFSI will submit all proper closure documentation to the NMOCD 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,



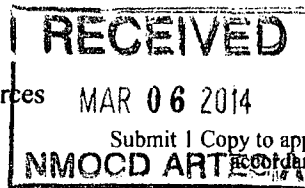
Natalie Gladden  
Environmental Consultant  
Diversified Field Service, Inc.  
206 W. Snyder  
Hobbs, NM 88240  
Office: (575)964-8394  
Mobile: (575)602-1786  
Fax: (575)964-8396  
Email: ngladden@diversifiedfsi.com

cc Jeff Robertson  
NM Bureau of Land Management

Attachments: Cover Letter  
Initial Form C-141  
Site/Sample Map  
Sample Data  
Lab Analytical Data  
Arch Survey

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



Form C-141  
Revised August 8, 2011

**Release Notification and Corrective Action**

nHMP1407240205  
Name of Company Linn Operating, Inc. 269324  
Address 2130 W. Bender Hobbs, NM 88240  
Facility Name JL Keel B 007  
Facility Type Injection  
Surface Owner Federal  
Mineral Owner Federal  
API No. 30-015-05108

**LOCATION OF RELEASE**

Unit Letter C	Section 8	Township 17S	Range 31E	Feet from the 660	North/South Line NL	Feet from the 1980	East/West Line WL	County Eddy
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Latitude 32.86647 Longitude 103.8571

**NATURE OF RELEASE**

Type of Release Crude oil and produced water	Volume of Release Unknown	Volume Recovered 0
Source of Release Unknown	Date and Hour of Occurrence Unknown	Date and Hour of Discovery
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? BLM	
By Whom?	Date and Hour Unknown	
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.* NA		
Describe Cause of Problem and Remedial Action Taken.* Unknown cause		
Describe Area Affected and Cleanup Action Taken.* Fluids were released to surface due to unknown source. Impacted area is visible on location pad, lease road and pasture area. DFSI will remediate. Impacted soils will be removed to an NMOC D approved facility. Lab confirmations submitted to commercial lab. Pasture area will be restored to natural state. Closure will be filed according to NMOC D and BLM guidelines.		

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOC D 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 NMOC D 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, NMOC D 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 Environmental Specialist:	
Title: Construction Foreman II		Approval Date: 3-13-14	Expiration Date: NA
E-mail Address: bwall@linnenergy.com		Conditions of Approval:	Attached <input type="checkbox"/>
Date: 3/6/14	Phone: 806-367-0645	Remediation per OGD Rule & Guidelines, & like approval by BLM. SUBMIT REMEDIATION PROPOSAL NO LATER THAN: 4-13-14	

\* Attach Additional Sheets If Necessary

2RP 2209



# Site Diagram











**Linn, JL Keel B #007**  
**UL/C, Sec. 8 T17S R31E**  
**Eddy County, NM**  
**Drafted By: Lance Crenshaw, 3-27-14**

0 0.00375 0.0075 0.015 Miles

## Legend



### Misc\_points

#### Types


-  Electrical Box
-  Power Pole
-  Headers
-  Injection
-  Pumpjacks
-  Tanks
-  Valves
-  Other
-  sample\_pts
-  Source

### Pipeline





#### Type

-  Above Ground Line
-  Buried Line

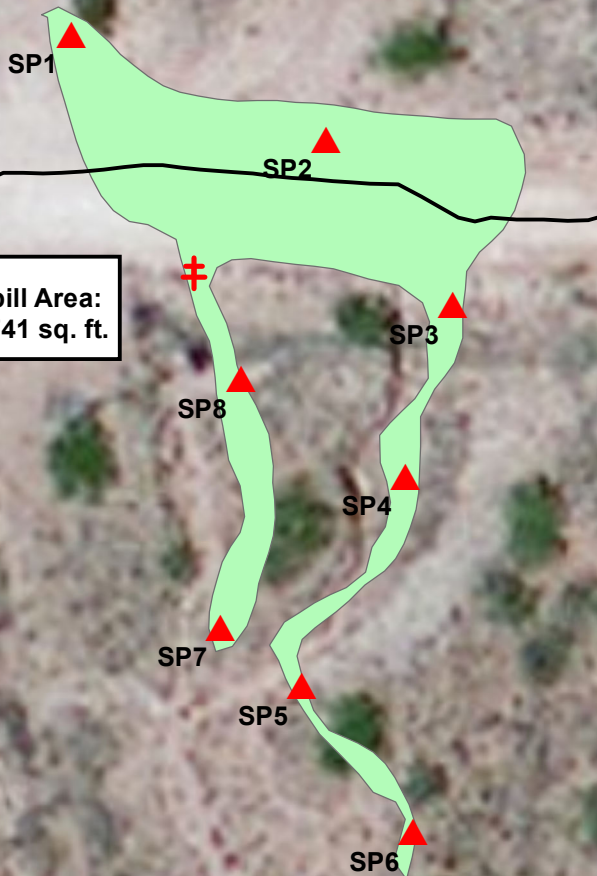
### Spill

-  <all other values>

### Spill\_Media

-  Oil and Produced H2O
-  Oil
-  Other
-  Produced Water

**Spill Area:**  
**5,741 sq. ft.**



**Lance Crenshaw**  
 GIS Technician

Soil Remediation and Ground Water Remediation  
 Environmental Assessments  
 Regulatory Compliance



**Environmental**

**DFS**

**Services**

Office: 575-964-8394

Fax: 575-964-8396

Cell: 575-441-2359

Email: lcrenshaw@diversifiedfsi.com

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

## Diversified Environmental Services

Company Name:	linn energy
Location Name:	jl keel b 007

SP Date: 6/26/14  
Rel Date: Unknown filed w/NMOCD 03-06-14

[illegible]

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples

## Diversified Environmental Services

[illegible]

	Lab Confirmation Sample
	Field Sampling
	Needs Delineation and confirmation samples



July 08, 2014

BRIAN WALL

LINN OPERATING-HOBBS

2130 W. BENDER

HOBBS, NM 88240

RE: J. L. KEEL B #007

Enclosed are the results of analyses for samples received by the laboratory on 07/01/14 14:50.

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,



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:	07/01/2014	Sampling Date:	06/26/2014
Reported:	07/08/2014	Sampling Type:	Soil
Project Name:	J. L. KEEL B #007	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Kathy Perez
Project Location:	NOT GIVEN		

**Sample ID: SP. 1 @ 3' (H402000-01)**

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	07/04/2014	ND	1.83	91.3	2.00	23.7	
Toluene*	<0.050	0.050	07/04/2014	ND	1.60	79.9	2.00	24.4	
Ethylbenzene*	<0.050	0.050	07/04/2014	ND	1.50	74.9	2.00	23.3	
Total Xylenes*	<0.150	0.150	07/04/2014	ND	4.68	78.0	6.00	25.1	
Total BTEX	<0.300	0.300	07/04/2014	ND					

Surrogate: Dibromofluoromethane 96.1 % 61.3-142

Surrogate: Toluene-d8 108 % 71.3-129

Surrogate: 4-Bromofluorobenzene 96.0 % 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	07/07/2014	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	07/04/2014	ND	180	90.2	200	1.72	
DRO >C10-C28	<10.0	10.0	07/04/2014	ND	193	96.4	200	0.0794	

Surrogate: 1-Chlorooctane 116 % 65.2-140

Surrogate: 1-Chlorooctadecane 127 % 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: 07/01/2014  
Reported: 07/08/2014  
Project Name: J. L. KEEL B #007  
Project Number: NONE GIVEN  
Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Kathy Perez

**Sample ID: SP. 2 @ 3' (H402000-02)**

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	07/06/2014	ND	2.18	109	2.00	9.71	
Toluene*	<0.050	0.050	07/06/2014	ND	1.84	92.2	2.00	9.99	
Ethylbenzene*	<0.050	0.050	07/06/2014	ND	1.75	87.3	2.00	10.4	
Total Xylenes*	<0.150	0.150	07/06/2014	ND	5.43	90.6	6.00	11.5	
Total BTEx	<0.300	0.300	07/06/2014	ND					

Surrogate: Dibromofluoromethane 96.9 % 61.3-142

Surrogate: Toluene-d8 100 % 71.3-129

Surrogate: 4-Bromofluorobenzene 95.8 % 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	128	16.0	07/07/2014	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	07/04/2014	ND	180	90.2	200	1.72	
DRO >C10-C28	<10.0	10.0	07/04/2014	ND	193	96.4	200	0.0794	

Surrogate: 1-Chlorooctane 108 % 65.2-140

Surrogate: 1-Chlorooctadecane 119 % 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: 07/01/2014  
Reported: 07/08/2014  
Project Name: J. L. KEEL B #007  
Project Number: NONE GIVEN  
Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Kathy Perez

**Sample ID: SP. 3 @ 9' (H402000-03)**

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	07/06/2014	ND	2.18	109	2.00	9.71	
Toluene*	<0.050	0.050	07/06/2014	ND	1.84	92.2	2.00	9.99	
Ethylbenzene*	<0.050	0.050	07/06/2014	ND	1.75	87.3	2.00	10.4	
Total Xylenes*	<0.150	0.150	07/06/2014	ND	5.43	90.6	6.00	11.5	
Total BTX	<0.300	0.300	07/06/2014	ND					

Surrogate: Dibromofluoromethane 100 % 61.3-142

Surrogate: Toluene-d8 102 % 71.3-129

Surrogate: 4-Bromofluorobenzene 92.5 % 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	<16.0	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	11.1	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 106 % 65.2-140

Surrogate: 1-Chlorooctadecane 114 % 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: 07/01/2014  
Reported: 07/08/2014  
Project Name: J. L. KEEL B #007  
Project Number: NONE GIVEN  
Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Kathy Perez

**Sample ID: SP. 4 @ 3' (H402000-04)**

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	07/06/2014	ND	2.18	109	2.00	9.71	
Toluene*	<0.050	0.050	07/06/2014	ND	1.84	92.2	2.00	9.99	
Ethylbenzene*	<0.050	0.050	07/06/2014	ND	1.75	87.3	2.00	10.4	
Total Xylenes*	<0.150	0.150	07/06/2014	ND	5.43	90.6	6.00	11.5	
Total BTX	<0.300	0.300	07/06/2014	ND					

Surrogate: Dibromofluoromethane 101 % 61.3-142

Surrogate: Toluene-d8 106 % 71.3-129

Surrogate: 4-Bromofluorobenzene 93.1 % 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	<16.0	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	<10.0	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 101 % 65.2-140

Surrogate: 1-Chlorooctadecane 108 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager



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 BRIAN WALL  
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 HOBBS NM, 88240  
 Fax To: (575) 738-1740

Received: 07/01/2014  
 Reported: 07/08/2014  
 Project Name: J. L. KEEL B #007  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Kathy Perez

**Sample ID: SP. 5 @ 3' (H402000-05)**

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	07/06/2014	ND	2.18	109	2.00	9.71	
Toluene*	<0.050	0.050	07/06/2014	ND	1.84	92.2	2.00	9.99	
Ethylbenzene*	<0.050	0.050	07/06/2014	ND	1.75	87.3	2.00	10.4	
Total Xylenes*	<0.150	0.150	07/06/2014	ND	5.43	90.6	6.00	11.5	
Total BTEX	<0.300	0.300	07/06/2014	ND					

Surrogate: Dibromofluoromethane 102 % 61.3-142  
 Surrogate: Toluene-d8 107 % 71.3-129  
 Surrogate: 4-Bromofluorobenzene 93.5 % 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	<16.0	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	39.6	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 108 % 65.2-140  
 Surrogate: 1-Chlorooctadecane 120 % 63.6-154

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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: 07/01/2014  
 Reported: 07/08/2014  
 Project Name: J. L. KEEL B #007  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
 Sampling Type: Soil  
 Sampling Condition: Cool & Intact  
 Sample Received By: Kathy Perez

**Sample ID: SP. 6 @ 3' (H402000-06)**

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	07/06/2014	ND	2.18	109	2.00	9.71	
Toluene*	<0.050	0.050	07/06/2014	ND	1.84	92.2	2.00	9.99	
Ethylbenzene*	<0.050	0.050	07/06/2014	ND	1.75	87.3	2.00	10.4	
Total Xylenes*	<0.150	0.150	07/06/2014	ND	5.43	90.6	6.00	11.5	
Total BTEx	<0.300	0.300	07/06/2014	ND					

Surrogate: Dibromofluoromethane 104 % 61.3-142  
 Surrogate: Toluene-d8 104 % 71.3-129  
 Surrogate: 4-Bromofluorobenzene 93.5 % 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	64.0	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	<10.0	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 119 % 65.2-140  
 Surrogate: 1-Chlorooctadecane 122 % 63.6-154

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\*=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: 07/01/2014  
Reported: 07/08/2014  
Project Name: J. L. KEEL B #007  
Project Number: NONE GIVEN  
Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Kathy Perez

**Sample ID: SP. 7 @ 3' (H402000-07)**

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	07/07/2014	ND	2.18	109	2.00	9.71		
Toluene*	<0.050	0.050	07/07/2014	ND	1.84	92.2	2.00	9.99		
Ethylbenzene*	<0.050	0.050	07/07/2014	ND	1.75	87.3	2.00	10.4		
Total Xylenes*	<0.150	0.150	07/07/2014	ND	5.43	90.6	6.00	11.5		
Total BTEX	<0.300	0.300	07/07/2014	ND						

Surrogate: Dibromofluoromethane 99.2 % 61.3-142

Surrogate: Toluene-d8 107 % 71.3-129

Surrogate: 4-Bromofluorobenzene 93.1 % 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	48.0	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	<10.0	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 112 % 65.2-140

Surrogate: 1-Chlorooctadecane 117 % 63.6-154

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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: 07/01/2014  
Reported: 07/08/2014  
Project Name: J. L. KEEL B #007  
Project Number: NONE GIVEN  
Project Location: NOT GIVEN

Sampling Date: 06/26/2014  
Sampling Type: Soil  
Sampling Condition: Cool & Intact  
Sample Received By: Kathy Perez

**Sample ID: SP. 8 @ 3' (H402000-08)**

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	07/07/2014	ND	2.18	109	2.00	9.71		
Toluene*	<0.050	0.050	07/07/2014	ND	1.84	92.2	2.00	9.99		
Ethylbenzene*	<0.050	0.050	07/07/2014	ND	1.75	87.3	2.00	10.4		
Total Xylenes*	<0.150	0.150	07/07/2014	ND	5.43	90.6	6.00	11.5		
Total BTEx	<0.300	0.300	07/07/2014	ND						

Surrogate: Dibromofluoromethane 105 % 61.3-142

Surrogate: Toluene-d8 107 % 71.3-129

Surrogate: 4-Bromofluorobenzene 88.4 % 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	128	16.0	07/07/2014	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	07/03/2014	ND	184	91.8	200	0.423	
DRO >C10-C28	<10.0	10.0	07/03/2014	ND	195	97.5	200	0.786	

Surrogate: 1-Chlorooctane 109 % 65.2-140

Surrogate: 1-Chlorooctadecane 115 % 63.6-154

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

QR-02	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
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


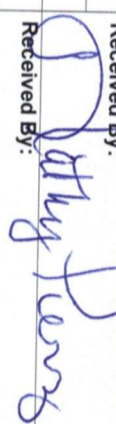



101 East Marland, Hobbs, NM 88240  
(575) 393-2326 FAX (575) 393-2476

### CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

<b>Company Name:</b> Linn Energy <b>Project Manager:</b> Brian Wall <b>Address:</b> <b>City:</b> <b>State:</b> <b>Zip:</b> <b>Phone #:</b> <b>Fax #:</b> <b>Project #:</b> <b>Project Owner:</b> <b>Project Name:</b> <b>Project Location:</b> IL Well B 007 <b>Sampler Name:</b> Michael Alvarado <b>FOR LAB USE ONLY</b>				<b>BILL TO</b> <b>P.O. #:</b> <b>Company:</b> Linn Energy <b>Attn:</b> Brian Wall <b>Address:</b> <b>City:</b> <b>State:</b> <b>Zip:</b> <b>Phone #:</b> <b>Fax #:</b>				<b>ANALYSIS REQUEST</b>															
<b>Lab I.D.</b> H402000 <b>Sample I.D.</b>				<b>(G)RAB OR (C)OMP.</b> <b># CONTAINERS</b>		<b>MATRIX</b> <input type="checkbox"/> GROUNDWATER <input type="checkbox"/> WASTEWATER <input type="checkbox"/> SOIL <input type="checkbox"/> OIL <input type="checkbox"/> SLUDGE <b>OTHER:</b>				<b>PRESERV.</b> <b>ACID/BASE:</b> <b>ICE / COOL</b> <b>OTHER:</b>		<b>SAMPLING</b> <b>DATE</b> <b>TIME</b>		<b>CL</b> <b>TPH</b> <b>BTX</b>									
1 sp. 1 @ 3'				01		X				6/26/14 9:46		X											
2 sp. 2 @ 3'				01		X				6/26/14 9:57		X											
3 sp. 3 @ 3'				01		X				6/26/14 10:05		X											
4 sp. 4 @ 3'				01		X				6/26/14 10:30		X											
5 sp. 5 @ 3'				01		X				6/26/14 11:35		X											
6 sp. 6 @ 3'				01		X				6/26/14 11:45		X											
7 sp. 7 @ 3'				01		X				6/26/14 11:40		X											
8 sp. 8 @ 3'				01		X				6/26/14 11:30		X											

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<b>Relinquished By:</b> 		<b>Date:</b> 6/26/14 <b>Time:</b> 8:50		<b>Received By:</b> 		<b>Date:</b> <b>Time:</b>	
<b>Delivered By: (Circle One)</b> Sampler - UPS - Bus - Other: 3, 2 @ # 54		<b>Sample Condition</b> <input checked="" type="checkbox"/> Cool <input type="checkbox"/> Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		<b>CHECKED BY:</b> (Initials) 		<b>REMARKS:</b> E-mail Results To: Ngladden@diversifiedfsi.com Rpons@diversifiedfsi.com Tjennings@diversifiedfsi.com	

NMCRIS No.: 130195

## NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

<b>1. NMCRIS Activity No.:</b>  130195	<b>2a. Lead Agency:</b> US Bureau of Land Management Carlsbad Field Office	<b>2b. Other Agency(ies):</b>	<b>3. Lead Agency Report No.:</b>
--	---	-------------------------------	-----------------------------------

<b>4. Title of Report:</b> A Class III Archaeological Survey for Diversified Field Services, Inc.'s J.L. Keel B #007 Spill Clean-Up  <b>Author(s)</b> Hill, Rebecca L. and Joshua W. Broxson	<b>5. Type of Report</b> <input checked="" type="checkbox"/> Negative <input type="checkbox"/> Positive
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**6. Investigation Type**

☐ Research Design   ☒ Archaeological Survey/Inventory   ☐ Architectural Survey/Inventory   ☐ Test Excavation   ☐ Excavation  
☐ Collections/Non-Field Study   ☐ Compliance Decision Based on Previous Inventory   ☐ Overview/Lit Review   ☐ Monitoring  
☐ Ethnographic Study   ☐ Site/Property Specific Visit   ☐ Historic Structures Report   ☐ Other

**7. Description of Undertaking (what does the project entail?):**

A pedestrian cultural resources survey was conducted on 31 March 2014 for Diversified Field Services, Inc.'s J.L. Keel B #007 Spill Clean-Up. The spill lies in Eddy County, NM, on federal lands managed by the Bureau of Land Management/Carlsbad Field Office (BLM/CFO) in Section 8 (NE¼NW¼) of T17S R31E. The spill area measures 3,919.86 sq. ft. or 0.09 acres and lies adjacent to the J.L. Keel B #007 well pad and runs south downhill into a drainage. The survey was conducted using 15 m (50 ft.) parallel transects across the spill area and 100 ft. beyond creating a 100 ft. cultural buffer around and including the spill area. The survey area measures 108,013.93 sq. ft. or 2.48 acres. No cultural resources were recorded or updated during the survey.

[   ] Continuation

<b>8. Dates of Investigation:</b> from: 31-Mar-2014   to: 31-Mar-2014	<b>9. Report Date:</b> 01-Apr-2014
---	------------------------------------

**10. Performing Agency/Consultant:** Boone Arch Services of NM, LLC

**Principal Investigator:** Rebecca L. Hill

**Field Supervisor:** Rebecca L. Hill

**Field Personnel Names:** Rebecca L. Hill

**Historian / Other:**

**11. Performing Agency/Consultant Report No.:**  
BASNM 03-14-58

**12. Applicable Cultural Resource Permit No(s):**  
BLM Permit No.: 190-2920-12-S

NMCRIS No.: 130195

**13. Client/Customer (project proponent):**

Diversified Field Services, Inc.

**Contact:** Natalie Gladden

**Address:** 3412 N. Dal Paso, Hobbs, NM 88240

**Phone:** 575-602-1786

**14. Client/Customer Project No.:**

**15. Land Ownership Status (must be indicated on project map):**

**Land Owner (By Agency)**

**Acres Surveyed**

**Acres in APE**

US Bureau of Land Management Carlsbad Field Office	2.48	0.09
<b>TOTALS</b>	2.48	0.09

**16. Records Search(es):**

Date(s) of HPD/ARMS File Review: 21 Mar 2014	Name of Reviewer(s): M. Jones	
Date(s) of Other Agency File Review: 21 Mar 2014	Name of Reviewer(s): M. Jones	Agency: BLM/CFO

**17. Survey Data:**

a. Source Graphics [ ] NAD 27 [ x ] NAD 83 Note: NAD 83 is the NMCRIS standard.

☒ USGS 7.5' (1:24,000) topo map ☐ Other topo map, Scale:

☒ GPS Unit Accuracy ☒ <1.0m ☐ 1-10m ☐ 10-100m ☐ >100m

☐ Aerial Photo(s)

Other Source Graphic(s):

b. USGS 7.5' Topographic Map Name

USGS Quad Code

Loco Hills, NM	32103-G8
----------------	----------

c. County(ies): EDDY

d. Nearest City or Town: Loco Hills, NM

**e. Legal Description:**

Township (N/S)

Range (E/W)

Section

17S	31E	8
-----	-----	---

Projected legal description? [ ] Yes [ x ] No [ ] Unplatted

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.):

[ ] Continuation

**18. Survey Field Methods:**

Intensity:

☒ 100% coverage

☐ <100% coverage

NMCRIS No.: 130195

Configuration: ☒ block survey units ☐ linear survey units (l x w):

☐ other survey units (specify):

Scope: ☒ non-selective (all sites/properties recorded) ☐ selective/thematic (selected sites/properties recorded)

Coverage Method: ☒ systematic pedestrian coverage

☐ other method (describe):

Survey Interval (m): 15 Crew Size: 1 Fieldwork Dates: from: 31-Mar-2014 to: 31-Mar-2014

Survey Person Hours: 1.00 Recording Person Hours: 0.00 Total Hours: 1.00

**Additional Narrative:**

The spill area lies within ¼ mile of four previously recorded archaeological sites: LAs 51084, 51085, 108038, and 108660. The spill is at a distance sufficient to avoid impacting these sites. For a detailed description of these sites, see Table 1 on page 5.

[ ] Continuation

**19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.):**

According to the Natural Resources Conservation Service' online database, the spill area soils consist of Largo loam, 0 to 5 percent slopes. Largo soils are designated as "loamy" and typically support black and blue grama and tobosa grasslands with an even yet sparse distribution of shrubs such as yucca, mesquite, American tarbush, cholla, and creosote. The current vegetative community consists of mesquite, shinnery oak, soapweed yucca, winterfat, and desert grasses. The spill extends southt from the east side of the J.L. Keel B #007 well pad across a lease road and buried pipeline downhill in a small drainage. The spill is situated approximately 5.15 miles southwest of Mescalero Ridge and 3.6 miles northwest of Taylor Draw. The Pecos River lies approximately 25 miles to the west. The elevation ranges from 3,770 ft. to 3,780 ft. above mean sea level.

[ ] Continuation

**20.a. Percent Ground Visibility: 80% b. Condition of Survey Area (grazed, bladed, undistributed, etc.):**

The survey area includes the J.L. Keel B. #007 well pad, an existing lease road, an existing buried pipeline, and several existing buried pipelines.

[ ] Continuation

**21. CULTURAL RESOURCE FINDINGS** ☐ Yes, see next report section ☒ No, discuss why:

No cultural resources were recorded or updated during the survey. It is uncertain why aboriginal peoples did not inhabit the area.

[ ] Continuation

**22. Attachments (check all appropriate boxes):**

- ☒ USGS 7.5 Topographic Map with sites, isolates, and survey area clearly drawn (required)
- ☒ Copy of NMCRIS Map Check (required)
- ☐ LA Site Forms - new sites (with sketch map & topographic map) if applicable
- ☐ LA Site Forms (update) - previously recorded & un-relocated sites (first 2 pages minimum)
- ☐ Historic Cultural Property Inventory Forms, if applicable
- ☐ List and Description of Isolates, if applicable
- ☐ List and Description of Collections, if applicable

**23. Other Attachments:**


☐ Photographs and Log

☒ Other Attachments  
(Describe): BLM Map

NMCRIS No.: 130195

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Qualified Supervisor: Printed Name: Rebecca L. Hill

Signature:  Date: 2 Apr 2014 Title: Principal Investigator

25. Reviewing Agency

Reviewer's Name/Date:

Accepted [ ]

Rejected [ ]

26. SHPO

Reviewer's Name/Date:

HPD Log #:

Date sent to ARMS:

### CULTURAL RESOURCE FINDINGS

*[fill in appropriate section(s)]*

#### SURVEY RESULTS:

Archaeological Sites discovered and registered: 0

Archaeological Sites discovered and NOT registered: 0

Previously recorded archaeological sites revisited (site update form required): 0

Previously recorded archaeological sites not relocated (site update form required): 0

TOTAL ARCHAEOLOGICAL SITES (visited & recorded): 0

Total isolates recorded: 0

☒ Non-selective isolate recording?

HCPI properties discovered and registered: 0

HCPI properties discovered and NOT registered: 0

Previously recorded HCPI properties revisited: 0

Previously recorded HCPI properties not relocated: 0

TOTAL HCPI PROPERTIES (visited & recorded, including acequias): 0

#### MANAGEMENT SUMMARY:

No cultural resources were recorded or updated during the survey. The spill clean-up is recommended for approval. If cultural materials are encountered during the clean-up process, work should be halted and archaeologists with BLM/CFO should be notified immediately.

[ ] Continuation

IF REPORT IS NEGATIVE, YOU ARE DONE AT THIS POINT.

#### SURVEY LA/HCPI NUMBER LOG

Sites/Properties Discovered:

LA/HCPI No. Field/Agency No.

Eligible? (Y/N/U, applicable criteria)



NMCRIS No.: 130195

Previously recorded revisited sites/HCPI properties:

LA/HCPI No.      Field/Agency No.

Eligible? (Y/N/U, applicable criteria)

---

**MONITORING LA NUMBER LOG (site form required)**

Sites Discovered (site form required):

Previously recorded sites (site update form required):

LA No.              Field/Agency No.

LA No.              Field/Agency No.

Areas outside known nearby site boundaries monitored?      [      ] Yes

[      ] No, Explain  
why

---

**TESTING & EXCAVATION LA NUMBER LOG (site form required)**

Tested LA number(s)

Excavated LA number(s)

---

**Table 1. Previously Recorded Archaeological Sites within ¼ Mile.**

LA No.	Cultural/Temporal Affiliation	Eligibility
51084	Jornada Mogollon/Early Pueblo to Late Pueblo (1100 AD – 1400 AD)	Eligible, D
51085	Jornada Mogollon/Late Pithouse to Early Pueblo (750 AD – 1200 AD)	Undetermined
108038	Jornada Mogollon/ Late Pithouse to Late Pueblo (750 AD – 1400 AD)	Undetermined
108660	Jornada Mogollon/ Late Pithouse to Late Pueblo (750 AD – 1400 AD)	Eligible, D



Diversified Field Services, Inc  
J.L. Keel B #007 Spill Clean-Up

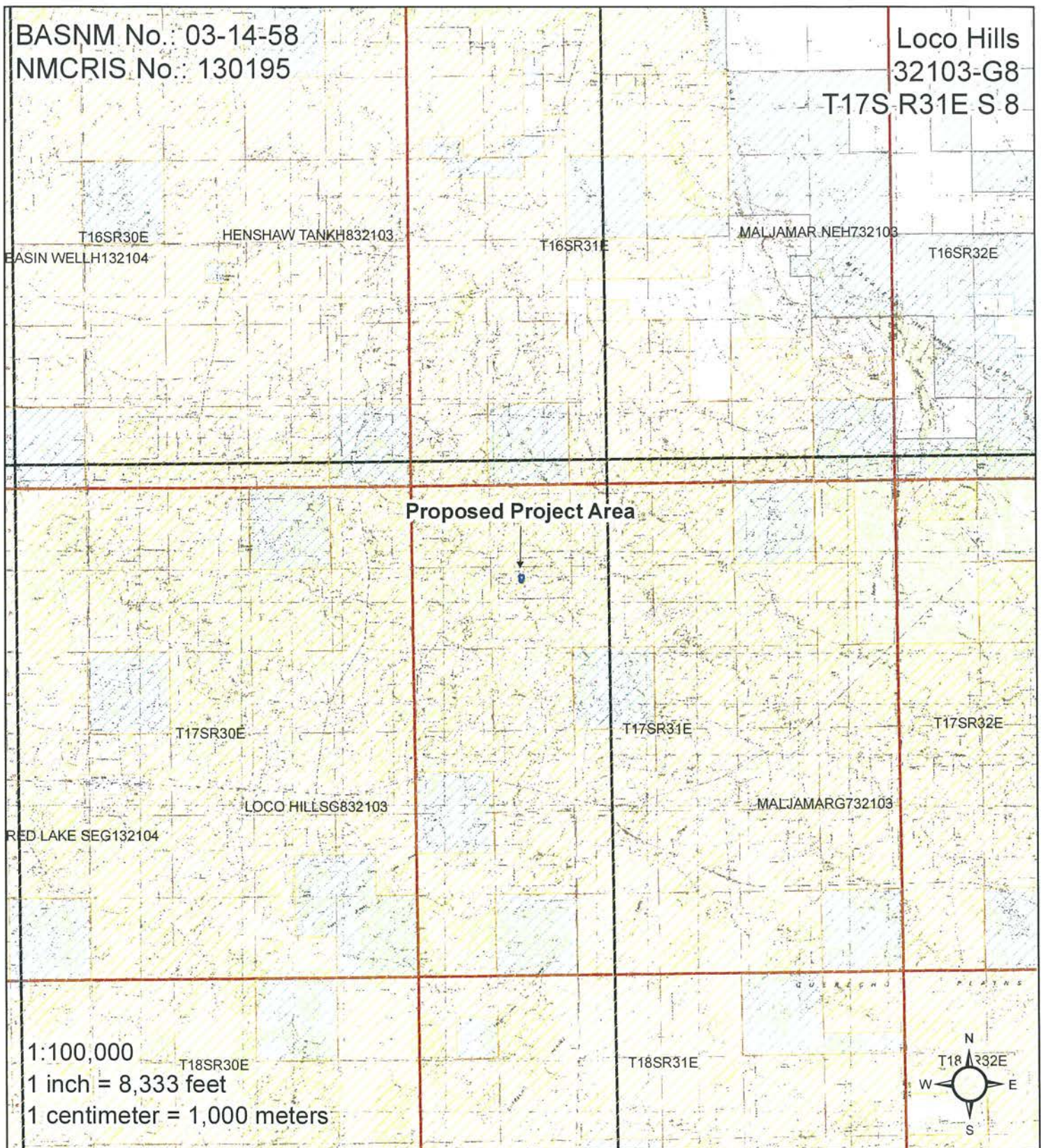


**Legend**

- |                         |                  |       |                       |                 |                          |
|-------------------------|------------------|-------|-----------------------|-----------------|--------------------------|
| ■ Proposed Project Area | ■ BLM            | ■ DOE | ■ BOI                 | ■ Private       | ■ NM State Game and Fish |
| ■ BOR                   | ■ Forest Service | ■ NPS | ■ NM State Trust Land | ■ NM State Park |                          |



Diversified Field Services, Inc  
J.L. Keel B #007 Spill Clean-Up



## Legend

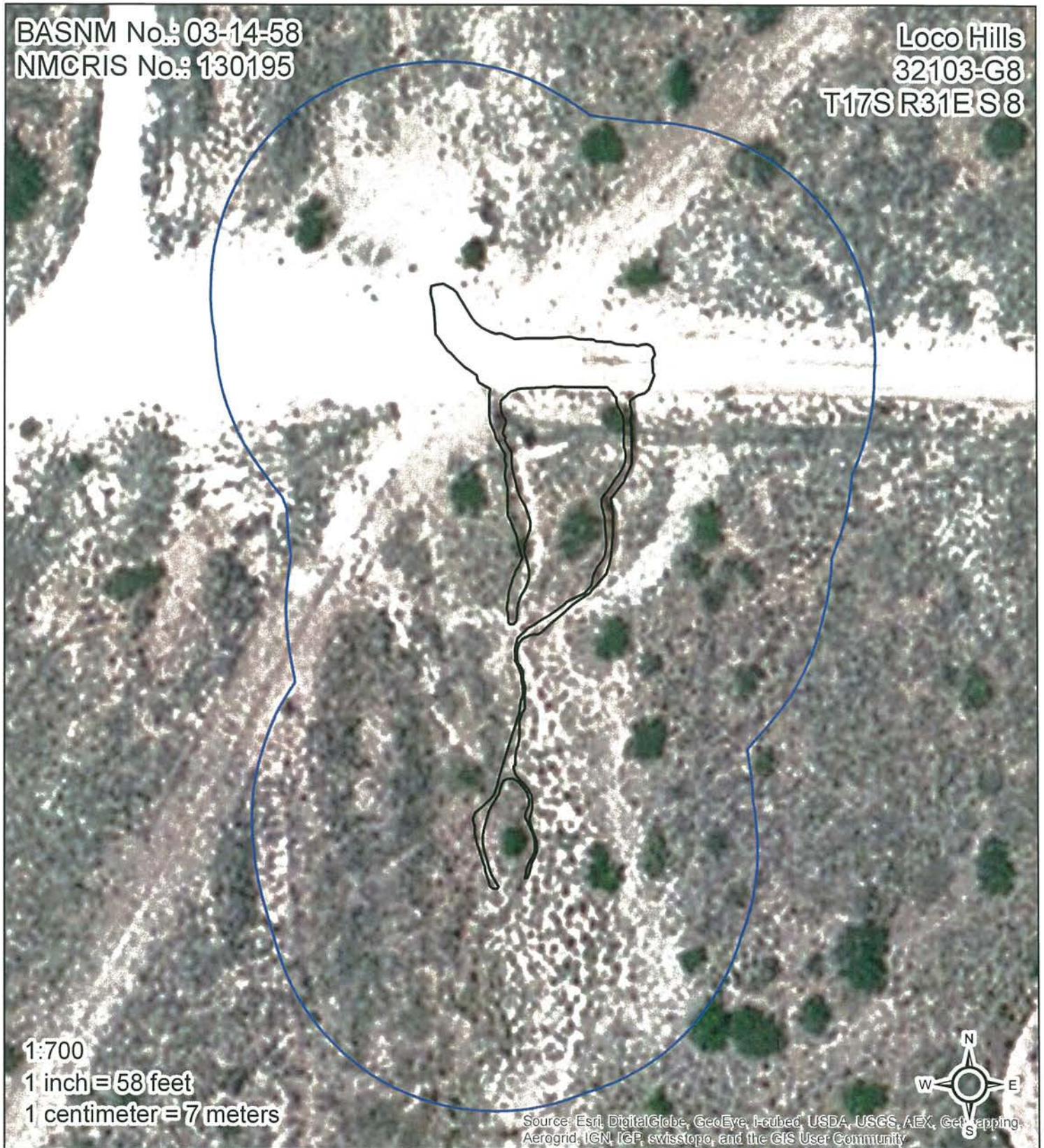
- |                         |                  |       |                       |                 |                          |
|-------------------------|------------------|-------|-----------------------|-----------------|--------------------------|
| ■ Proposed Project Area | ■ BLM            | ■ DOE | ■ BOI                 | ■ Private       | ■ NM State Game and Fish |
| ■ BOR                   | ■ Forest Service | ■ NPS | ■ NM State Trust Land | ■ NM State Park |                          |



Diversified Field Services, Inc  
J.L. Keel B #007 Spill Clean-Up

BASNM No.: 03-14-58  
NMCRIS No.: 130195

Loco Hills  
32103-G8  
T17S R31E S 8



### Legend

■ Survey Area ■ Spill ■ Archaeological Site