

# RXSOIL

October 15, 2019

NMOCD District 2  
811 S. First St  
Artesia, NM 88210

Re: Remediation Plan  
Apache Corporation – Empire Abo Unit K-14

LYCB0-191203-C-1410

To Robert Hamlet and Victoria Venegas

RXSoil, Inc. is pleased to submit the remediation plan for the on-site remediation of impacted soil for the above release in Eddy County, New Mexico.

Sincerely,



Jace Caraway  
Chief Operating Officer  
RXSoil, Inc.  
(940) 210-2051



Zach Robbins  
Technical and Engineering Analyst  
RXSoil, Inc.  
(210) 400-7645

**Table of Contents**

I.	Introduction.....	3
II.	Site Assessment/Characterization.....	3
III.	Remediation .....	3
IV.	Restoration, Reclamation and Re-vegetation .....	4

**Figures**

1.	Vicinity Map.....	5
2.	Site Overview.....	6
3.	Hydrology Map.....	7

**Appendix**

A.	C-141 .....	8
B.	Nearest Water Well Data .....	12
C.	Delineation Summary Table .....	15
D.	Laboratory Reports.....	17

## I. Introduction

On behalf of Apache Corporation, RXSoil, Inc. ("RXSoil") has prepared this work plan that describes remediation of the release of produced water and crude oil.

The release occurred on 5/31/2019 in Unit Letter K, Section 02, Township 18S, Range 27E (see *Figure 1* for Vicinity Map) at approximate coordinates 32.77505, -104.25316. It was reported that six (6) barrels of crude oil and 11 barrels of produced water were released, and two (2) barrels of crude oil and three (3) barrels of produced water were recovered during the initial response.

## II. Site Assessment/Characterization

1. **Site Map** – See *Figure 2*
2. **Depth to ground water** – USGS 324603104155001 is the nearest water well (listed in *Appendix B*) and has a reported depth to water of 32', recorded in January of 1999. This well is approximately 0.79 miles from the spill area. Remediation standards will follow the strictest thresholds stated in Table I, ≤50 feet.
3. **Wellhead protection area** – There are no known water sources within a half mile of the release (see *Figure 3*).
4. **Distance to nearest significant watercourse** – The nearest water way per the New Mexico OCD Oil and Gas Map GIS Service, Scoggin Draw, is approximately 530' away from the release area at its closest point (see *Figure 3*). This is a draw connecting to the Pecos River approximately 28,000' downstream.
5. **Soil/waste characteristics** – An initial delineation was completed on July 29 and August 8, 2019. Sample points are shown in *Figure 2* with results summarized in *Appendix C*. Lab data is displayed in *Appendix D*. Horizontal excavation will consist of sampling sidewalls (composites representing <200 square feet) to verify each wall is below thresholds listed in NMAC 19.15.29.13.D.1 (600 mg/kg chloride) and Table I (100 mg/kg TPH, 50 mg/kg BTEX, 10 mg/kg benzene). Vertical delineation will continue throughout the spill area to clean material per Table I. Excavation will be guided by field data.

## III. Remediation Plan

The delineation points can be seen in *Figure 2* with results in *Appendix C*. As stated in Section II, further delineation will be conducted throughout excavation.

RXSoil's core process of on-site remediation will be used to address the contamination. RXSoil will supervise all excavation with approval from area utilities owners via NM 811.

RXSoil will construct an above-ground treatment cell adjacent to the contaminated area (see *Figure 2* for projected placement). Berms will be placed around the perimeter of the cell area. A 20-mil reinforced poly liner will be placed on the surface and up the sides of the berms to contain treatment. A proprietary drainage and collection system will be installed prior to filling the cells with the estimated 2,500 cubic yards of contaminated soils.

Once all contaminated material is in the treatment cell, chemical and biological treatment will begin. To confirm successful treatment, a grid of confirmation samples will be gathered at depth 36"-48" with one sample representing no more than 100 cubic yards. All samples will be field screened using Quantab Chloride Test Strips and a RAE Systems MiniRAE 3000 PID Monitor. If a sample tests above threshold, treatment will continue in that area until the soil tests clean, per strictest Table I guidelines for impacted soils. At least 50% of total samples will be transferred on ice to a third-party lab for confirmation testing using NMOCD approved testing methods. The 50% chosen will contain an approximately even distribution of the lowest, middle and highest contaminated samples based on field testing data.

Sidewall and bottom samples will be taken using a stainless-steel hand shovel while remediation samples will be taken using a stainless-steel bucket auger. All tools are to be decontaminated before each sample, as specified in *Field Equipment Cleaning and Decontamination* (EPA, 2015). This includes wiping the equipment clean, water-rinsing the equipment, washing the equipment in detergent and water, and rinsing the equipment in water.

Samples will temporarily be transferred to a new plastic bag in the field. Once in a location safer for handling glass, the samples will be transferred to glass jars, supplied by an approved laboratory. The threads on all jars will be wiped clean to allow an air-tight seal. Samples will be transferred on ice to a third-party laboratory to ensure tests are completed within 14 days (as recommended for EPA methods 8021B and 8015M).

Remediation efforts will commence following the approval of this remediation plan and are estimated to take approximately 30 days.

#### **IV. Restoration, Reclamation and Re-Vegetation**

Following remediation, RXSoil will drill in seed at the discretion of the appropriate surface owner (SLO). RXSoil will continue to monitor this area to ensure growth.







**APPENDIX A**

**C-141**

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

Form C-141  
Revised August 24, 2018  
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

## Release Notification

### Responsible Party

Responsible Party: Apache Corporation	OGRID 873
Contact Name: Bruce Baker	Contact Telephone: (432) 631-6982
Contact email: Larry.Baker@apachecorp.com	Incident # (assigned by OCD)
Contact Mailing Address: 2350 W. Marland Blvd, Hobbs, NM 88240	

### Location of Release Source

Latitude: W 32.77505 Longitude: N -104.25316

(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Empire Abo Unit K-14	Site Type: Well
Date Release Discovered: May 31, 2019	API# (if applicable)

Unit Letter	Section	Township	Range	County
K	02	18S	27E	Eddy

Surface Owner:  State  Federal  Tribal  Private (Name: *Not Applicable*)

### Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input checked="" type="checkbox"/> Crude Oil	Volume Released (6 bbls)	Volume Recovered (2bbls)
<input checked="" type="checkbox"/> Produced Water	Volume Released (11 bbls)	Volume Recovered (3 bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

Corrosion on flow line.

Form C-141

State of New Mexico  
Oil Conservation Division

Page 2

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC?  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release?  If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Via email given to NM OCD by Bruce Baker, Senior Environmental Technician, Apache Corporation
---	---

### Initial Response

*The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury*

<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why:  Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.
Printed Name: <u>Bruce Baker</u> Title: <u>Senior Environmental Technician</u> Signature: <u></u> Date: <u>12/03/2019</u> Email: <u>Larry.Baker@apachecorp.com</u> Telephone: <u>(432) 631-6982</u>
<b><u>OCD Only</u></b>  Received by: _____ Date: _____

Form C-141  
Page 3

State of New Mexico  
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

### Site Assessment/Characterization

*This information must be provided to the appropriate district office no later than 90 days after the release discovery date*

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>32</u> (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

**Characterization Report Checklist:** *Each of the following items must be included in the report.*

- Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- Field data
- Data table of soil contaminant concentration data
- Depth to water determination
- Determination of water sources and significant watercourses within 1/2-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- Topographic/Aerial maps
- Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141

State of New Mexico  
Oil Conservation Division

Page 4

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: Bruce Baker Title: Environmental Tech SR.  
 Signature: Bruce Baker Date: 10-15-19  
 email: larry.baker@apachecorp.com Telephone: 432-631-6982

OCD Only

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

Form C-141

State of New Mexico  
Oil Conservation Division

Page 5

Incident ID	
District RP	
Facility ID	
Application ID	

## Remediation Plan

**Remediation Plan Checklist:** *Each of the following items must be included in the plan.*

- Detailed description of proposed remediation technique
- Scaled sitemap with GPS coordinates showing delineation points
- Estimated volume of material to be remediated
- Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

**Deferral Requests Only:** *Each of the following items must be confirmed as part of any request for deferral of remediation.*

- Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- Extents of contamination must be fully delineated.
- Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: Bruce Baker Title: Environmental Tech SR.  
 Signature: Bruce Baker Date: 10-15-19  
 email: larry.baker@apechecorp.com Telephone: 482-631-6982

**OCD Only**

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

- Approved     
  Approved with Attached Conditions of Approval     
  Denied     
  Deferral Approved

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**APPENDIX B**  
**NEAREST WATER WELL DATA**

10/14/2019

USGS Groundwater for USA: Water Levels -- 1 sites



USGS Home  
Contact USGS  
Search USGS

National Water Information System: Web Interface

USGS Water Resources

Data Category: **Groundwater** Geographic Area: **United States** **GO**

Click to hide News Bulletins

- [Introducing The Next Generation of USGS Water Data for the Nation](#)
- [Full News](#)

Groundwater levels for the Nation

Search Results -- 1 sites found

Agency code = usgs  
site\_no list =  
• 324603104155001

Minimum number of levels = 1

[Save file of selected sites](#) to local disk for future upload

**USGS 324603104155001 18S.27E.10.213223**

Eddy County, New Mexico  
Latitude 32°46'03", Longitude 104°15'50" NAD27  
Land-surface elevation 3,479 feet above NAVD88  
The depth of the well is 130 feet below land surface.  
This well is completed in the Artesia Group (313ART5) local aquifer.

Output formats

<a href="#">Table of data</a>
<a href="#">Tab-separated data</a>
<a href="#">Graph of data</a>
<a href="#">Reselect period</a>

Date	Time	Water-level date-time accuracy	Water level, feet below land surface	Water level, feet above specific vertical datum	Referenced vertical datum	Water-level accuracy	Status	Method of measurement	Measuring agency	Source of measureme
1999-01-19		D	31.73				2		S	USGS
1994-02-24		D	32.67				2		S	
1989-02-02		D	19.41				2		U	
1984-03-01		D	21.36				2		U	
1984-02-09		D	22.16				2		U	
1966-01-24		D	41.29				2		U	
1964-01-09		D	46.92				2		U	
1963-11-22		D	46.16				2		U	
1963-10-01		D	45.73				2		U	
1963-09-04		D	45.59				2		U	
1963-08-30		D	48.28				2		U	
1963-07-23		D	48.21				2		U	
1963-01-07		D	48.75				2		U	
1962-01-04		D	47.31				2		U	
1961-12-28		D	47.28				2		U	

Explanation

Section	Code	Description
Water level date time accuracy	D	Date is accurate to the Day

10/14/2019

USGS Groundwater for USA: Water Levels -- 1 sites

Section	Code	Description
Water-level accuracy	2	Water level accuracy to nearest hundredth of a foot
Status		The reported water-level measurement represents a static level
Method of measurement	S	Steel-tape measurement.
Method of measurement	U	Unknown method.
Measuring agency		Not determined
Measuring agency	USGS	U.S. Geological Survey
Source of measurement	S	Measured by personnel of reporting agency.
Source of measurement	U	Source is unknown.
Water-level approval status	A	Approved for publication -- Processing and review completed.

[Questions about sites/data?](#)

[Feedback on this web site](#)

[Automated retrievals](#)

[Help](#)

[Data Tips](#)

[Explanation of terms](#)

[Subscribe for system changes](#)

[News](#)

[Accessibility](#) [Plug-Ins](#) [FOIA](#) [Privacy](#) [Policies and Notices](#)

U.S. Department of the Interior | U.S. Geological Survey  
 Title: Groundwater for USA: Water Levels  
 URL: <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>



Page Contact Information: [USGS Water Data Support Team](#)  
 Page Last Modified: 2019-10-14 17:52:10 EDT  
 0.48 0.42 nadwv02

**APPENDIX C**  
**DELINEATION SUMMARY TABLE**

--	--	--	--	--

Appendix C. Delineation Data													
Borehole	Depth (ft)	Sample Date	Analyzed Date (Latest)	Chloride (4500)	BTEX (8021B)					TPH (8015M)			
					Benzene	Toluene	o-Xylene	Total Xylenes	Total BTEX	GRD	DRO	EXT DRO	C6-C15
1	5	7/29/2019	8/1/2019	16,000	0.785	10.4	21.5	28.8	61.5	762	12,200	2,580	15,842
1	4	7/29/2019	8/1/2019	19,600	<0.500	2.05	5.74	19.2	27.0	270	1,670	224	2,164
1	6	7/29/2019	8/2/2019	240	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	<10.0
2	1	7/29/2019	8/1/2019	5,440	<1.00	37.4	66.7	194	299	4,870	27,900	4,530	37,300
2	3	7/29/2019	8/1/2019	1,230	2.28	58.6	79.4	223	364	5,030	25,900	4,300	35,230
2	4	7/29/2019	8/1/2019	208	<1.00	11.1	21.8	63.5	96.5	1,650	9,260	1,310	12,220
2	5	8/8/2019	8/14/2019	-	<0.500	1.62	6.13	21.0	28.8	568	4,920	723	6,211
2	6	8/8/2019	8/14/2019	-	<0.200	0.685	2.94	9.8	13.4	301	2,840	375	3,516
2	7	8/8/2019	8/14/2019	-	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	30.0	<10.0	30.0
3	5	7/29/2019	8/1/2019	1,980	0.155	5.77	10.5	30.2	46.7	1,140	47,400	10,600	59,140
3	2	7/29/2019	8/1/2019	192	<0.050	<0.050	0.094	0.300	0.394	<10.0	<10.0	<10.0	<10.0
3	4	7/29/2019	8/1/2019	400	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	<10.0
4	5	7/29/2019	8/2/2019	7,330	5.40	63.3	58.8	155	283	2,870	8,090	1,120	12,060
4	6	7/29/2019	8/2/2019	208	0.053	0.648	1.78	4.55	7.04	91.7	916	169	1,177
4	7	8/8/2019	8/14/2019	-	0.205	3.18	5.05	13.8	22.2	195	1,940	243	2,378
4	8	8/8/2019	8/14/2019	-	<0.050	<0.050	0.086	0.306	0.392	<10.0	153	14.9	168
4	9	8/8/2019	8/14/2019	-	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	<10.0
<b>NMOC Thresholds</b>				<b>600</b>	<b>10</b>				<b>50</b>				<b>100</b>

BOLD results indicate results above RRAL

- indicates tests were not ran

All units in mg/kg unless otherwise noted

**APPENDIX D**  
**LABORATORY REPORTS**

**RXSoil, Inc.**  
**201 Main St. Ste. 1360, Fort Worth, TX 76102**



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

August 05, 2019

BRUCE BAKER  
APACHE CORP - HOBBS  
2350 W. MARLAND BLVD.  
HOBBS, NM 88240

RE: EMPIRE ABO UNIT K-14

Enclosed are the results of analyses for samples received by the laboratory on 07/29/19 16:16.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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



PHONE (575) 393-2326 • 181 E. MARLAND • HOBBS, NM 88240

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K 14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 1 @ SURFACE (H902590-01)

BTEX 80218		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	0.785	0.500	08/01/2019	ND	1.94	97.0	2.00	0.844		
Toluene*	10.4	0.500	08/01/2019	ND	2.04	102	2.00	2.80		
Ethylbenzene*	21.5	0.500	08/01/2019	ND	1.97	98.4	2.00	1.37		
Total Xylenes*	28.8	1.50	08/01/2019	ND	5.95	99.2	6.00	2.11		
Total BTEX	61.5	3.00	08/01/2019	ND						

Surrogate 4-Bromofluorobenzene (PIE Chloride, SM4500C1-B)		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Surrogate 4-Bromofluorobenzene (PIE Chloride)	113%	73.3-129	07/30/2019	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*	762	50.0	08/01/2019	ND	201	100	200	0.472		
DRO >C10-C28*	12200	50.0	08/01/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	2580	50.0	08/01/2019	ND						

Surrogate 1-Chlorooctane 129% 41-142  
 Surrogate 1-Chlorooctadecane 455% 376-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal Laboratories does not accept liability for any claim, injury, whether based in contract or tort, that is brought to the amount paid by them for analysis. All claims, including those for negligence and any other cause whatsoever that be directed against errors 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 suffered by client, or subcontractors, affiliates or successors arising out of or related to the performance of the services furnished by Cardinal, regardless of whether such claim is based upon any of the above stated theories or otherwise. Reports relate only to the samples identified herein. This report shall not be reproduced or copied in full without approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2328 • 301 E. MARLAND • HOBBS, NH 88240

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 1 @ 4' (H902590-02)

BTEX 80218		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.500	0.500	08/01/2019	ND	1.94	97.0	2.00	0.844		
Toluene*	2.05	0.500	08/01/2019	ND	2.04	102	2.00	2.80		
Ethylbenzene*	5.74	0.500	08/01/2019	ND	1.97	98.4	2.00	1.37		
Total Xylenes*	19.2	1.50	08/01/2019	ND	5.95	99.2	6.00	2.11		
Total BTEX	27.0	3.00	08/01/2019	ND						

Surrogate 4-Bromofluorobenzene (PIE Chloride, SM4580CI-B)		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	13600	16.0	07/30/2019	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*	270	10.0	07/31/2019	ND	201	100	200	0.472		
DRO >C10-C28*	1670	10.0	07/31/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	224	10.0	07/31/2019	ND						

Surrogate 1-Chlorooctane 110 % 41-142  
 Surrogate 1-Chlorooctadecane 129 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Utility and Surrogate Certified Analyte and other's analysis results are not shown unless they are shown on contract or test, that be added to the contract paid by them for analysis. 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 furnished by Cardinal regardless of whether such claim is based upon any of the other trade names or otherwise. Results relate only to the samples described above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 2 @ 1' (H902590-03)

BTEX 80218		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<1.00	1.00	08/01/2019	ND	1.94	97.0	2.00	0.844		
Toluene*	37.4	1.00	08/01/2019	ND	2.04	102	2.00	2.80		
Ethylbenzene*	66.7	1.00	08/01/2019	ND	1.97	98.4	2.00	1.37		
Total Xylenes*	194	3.00	08/01/2019	ND	5.95	99.2	6.00	2.11		
Total BTEX	299	6.00	08/01/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC) 118 % 73.3 129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	5440	16.0	07/30/2019	ND	432	108	400	3.77		

TPH 8015M		mg/kg		Analyzed By: MS							S-D6
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier		
GRO C6-C10*	4870	50.0	08/01/2019	ND	201	100	200	0.472			
DRO >C10-C28*	27900	50.0	08/01/2019	ND	201	100	200	3.79			
EXT DRO >C28-C36	4530	50.0	08/01/2019	ND							

Surrogate 1-Chlorooctane 1090 % 41-142

Surrogate 1-Chlorooctadecane 741 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Dispute: Cardinal's liability and direct liability remains for any data arising whether based in contract or tort, shall be limited to the amount paid by client for analysis. All costs, including those for reanalysis and any other basic reanalysis shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the analysis service. In no event shall Cardinal be liable for indirect or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or employees arising out of or related to the performance of the services provided by Cardinal, regardless of whether such claim is based upon any of the above stated theories of recovery. Please refer only to the primary contract above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 2 @ 3' (H902590-04)**

BTEX 00218		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	2.28	1.00	08/01/2019	ND	1.94	97.0	2.00	0.844	
Toluene*	58.6	1.00	08/01/2019	ND	2.04	102	2.00	2.80	
Ethylbenzene*	79.4	1.00	08/01/2019	ND	1.97	98.4	2.00	1.37	
Total Xylenes*	223	3.00	08/01/2019	ND	5.95	99.2	6.00	2.11	
Total BTEX	364	6.00	08/01/2019	ND					

Surrogate 4-Bromofluorobenzene (PIL) 117% 733-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1230	16.0	07/30/2019	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*	5030	50.0	08/01/2019	ND	201	100	200	0.472	
DRO >C10-C28*	25900	50.0	08/01/2019	ND	201	100	200	3.79	
EXT DRO >C28-C36	4300	50.0	08/01/2019	ND					

Surrogate 1-Chlorooctane 1260% 41-142

Surrogate 1-Chlorooctadecane 691% 376-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages: Cardinal's liability and damages exclusive remedy for any data errors, 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 furnished by Cardinal, regardless of whether such claim is based upon any of the above stated remedies or otherwise. Results relate only to the samples identified above. This report shall not be reproduced or kept in file with neither approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 2 @ 4' (H902590-05)**

BTEX #0218		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<1.00	1.00	08/01/2019	ND	1.94	97.0	2.00	0.844	
Toluene*	11.1	1.00	08/01/2019	ND	2.04	102	2.00	2.80	
Ethylbenzene*	21.8	1.00	08/01/2019	ND	1.97	98.4	2.00	1.37	
Total Xylenes*	63.5	3.00	08/01/2019	ND	5.95	99.2	6.00	2.11	
Total BTEX	96.5	6.00	08/01/2019	ND					

Surrogate 4-Bromofluorobenzene (P/E) 113 % 73.3-129

Chloride, SMAS00CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	208	16.0	07/30/2019	ND	432	108	400	3.77	

TPH #015H		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	1650	10.0	07/31/2019	ND	201	100	200	0.472	
DRO >C10-C28*	9260	10.0	07/31/2019	ND	201	100	200	3.79	
EXT DRO >C28-C36	1310	10.0	07/31/2019	ND					

Surrogate 1-Chlorooctane 438 % 41-142

Surrogate 1-Chlorooctadecane 320 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Disputes: Cardinal's liability and clients' remedies are limited to the amount paid by client for analyses. All claims, including claims 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. It is agreed that Cardinal is not to be responsible or compensated in any way for any loss, damage, injury, or loss of profits sustained by client, its subsidiaries, affiliates or customers arising out of or in relation to the performance of the services furnished 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 in any form without approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 3 @ SURFACE (H902590-06)**

BTEX 80218		mg/kg		Analyzed By: ms				S-04	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.155	0.050	08/01/2019	ND	1.94	97.0	2.00	0.844	
Toluene*	5.77	0.050	08/01/2019	ND	2.04	102	2.00	2.80	
Ethylbenzene*	10.5	0.050	08/01/2019	ND	1.97	98.4	2.00	1.37	
Total Xylenes*	30.2	0.150	08/01/2019	ND	5.95	99.2	6.00	2.11	
Total BTEX	46.7	0.300	08/01/2019	ND					

Surrogate 4-Bromofluorobenzene (PIC) 130 % 73 3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1980	16.0	07/30/2019	ND	432	108	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS						S-06
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10*	1140	50.0	08/01/2019	ND	201	100	200	0.472		
DRO >C10-C28*	47400	50.0	08/01/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	10600	50.0	08/01/2019	ND						

Surrogate 1-Chlorooctane 515 % 41-142

Surrogate 1-Chlorooctadecane 1700 % 37 6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Disputes: Cardinal's liability and clients' liability hereby are by their agreement, which is based on contract or tort, shall be limited to the amount paid by client for analysis. 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 held responsible for consequential damages resulting without reasonable business expectation, loss of time, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services performed by Cardinal, regardless of whether such claim is based upon any of the above stated theories or otherwise. Results reflect only the laboratory described above. This report shall not be reproduced except in full without written consent of Cardinal Laboratories.

*Coley D. Keene*

Coley D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 \* 101 E. MARLAND \* HOBBS, NH 88240

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 3 @ 2' (H902590-07)**

BTEX 80218		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	08/01/2019	ND	1.94	97.0	2.00	0.844		
Toluene*	<0.050	0.050	08/01/2019	ND	2.04	102	2.00	2.60		
Ethylbenzene*	0.094	0.050	08/01/2019	ND	1.97	98.4	2.00	1.37		
Total Xylenes*	0.300	0.150	08/01/2019	ND	5.95	99.2	6.00	2.61		
<b>Total BTEX</b>	<b>0.394</b>	<b>0.300</b>	<b>08/01/2019</b>	<b>NO</b>						

Surrogate 4-Bromofluorobenzene (PIC) 101 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	192	16.0	07/30/2019	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	08/01/2019	ND	201	100	200	0.472		
DRO >C10-C28*	<10.0	10.0	08/01/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	<10.0	10.0	08/01/2019	ND						

Surrogate 1-Chlorooctane 90.7 % 41-142

Surrogate 1-Chlorooctadecane 93.0 % 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Damages: Cardinal's liability and damages are limited to the amount paid by client for analysis. 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. It is agreed that Cardinal is not liable for material or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or customers arising out of or relating to the performance of the services rendered by Cardinal, regardless of whether such claim is based upon any of the above stated releases or otherwise. Results apply only to the samples identified above. This report shall not be reproduced or used in any way without approval of Cardinal Laboratories.

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/29/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 3 @ 4' (H902590-08)**

BTEX 88218		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	08/01/2019	ND	1.94	97.0	2.00	0.844	
Toluene*	<0.050	0.050	08/01/2019	ND	2.04	102	2.00	2.80	
Ethylbenzene*	<0.050	0.050	08/01/2019	ND	1.97	98.4	2.00	1.37	
Total Xylenes*	<0.150	0.150	08/01/2019	ND	5.95	99.2	6.00	2.11	
Total BTEX	<0.300	0.300	08/01/2019	ND					

Surrogate 4-Bromofluorobenzene (PIC) 101 % 33.129

Chloride, SM4300Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	400	16.0	07/30/2019	ND	432	108	400	3.77	

TPH 8815M		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	08/01/2019	ND	201	100	200	0.472	
DRO >C10-C28*	<10.0	10.0	08/01/2019	ND	201	100	200	3.79	
EXT DRO >C28-C36	<10.0	10.0	08/01/2019	ND					

Surrogate 1-Chlorooctane 97.4 % 41.142

Surrogate 1-Chlorooctadecane 102 % 37.614

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Damages: Cardinal's liability and client's insurance policy for any data errors, whether based on contract or tort, shall be limited to the amount paid by client for analysis. All clients, including those for regulatory and any other state or federal purposes shall be deemed to have agreed in writing and accepted by Cardinal within thirty (30) days after completion of the analytical services. In no event shall Cardinal be liable for damages or consequential damages, including actual, incidental, business interruption, loss of use, or loss of profits incurred by client, or subsidiaries, affiliates or successors arising out of or related to the performance of the services rendered by Cardinal, regardless of whether such claim is based upon any of the above stated or otherwise. Results given only to the parties specified above. This report shall not be reproduced or used in any way without express written permission of Cardinal Laboratories.

*Deley D. Keene*  
 Deley D. Keene, Lab Director/Quality Manager



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

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 SM4500C B does not require samples be received at or below 5°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Coverage: Cardinal's liability and coverage extends to any data errors, whether based in method or fact, that do not exceed the amount paid by client for analysis. All clients, including those for negligence and any other third parties that do not exceed amount 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 retention or non-retention of samples, including without limitation, business interruptions, loss of data or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services furnished by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the methods identified above. This report shall not be reproduced or used in full without written approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager





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

August 05, 2019

BRUCE BAKER  
APACHE CORP - HOBBS  
2350 W. MARLAND BLVD.  
HOBBS, NM 88240

RE: EMPIRE ABO UNIT K-14

Enclosed are the results of analyses for samples received by the laboratory on 07/30/19 16:27.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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,

Celest D. Keene  
Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/30/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 1 @ 6' (H902599-01)**

BTEX 80218		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	08/02/2019	ND	1.95	97.5	2.00	2.95		
Toluene*	<0.050	0.050	08/02/2019	ND	2.07	103	2.00	2.48		
Ethylbenzene*	<0.050	0.050	08/02/2019	ND	2.01	100	2.00	2.59		
Total Xylenes*	<0.150	0.150	08/02/2019	ND	6.03	100	6.00	2.35		
Total BTEX	<0.300	0.300	08/02/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC) 97.8% 73.3-129

Chloride, SM4S00CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	240	16.0	07/31/2019	ND	400	100	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	08/01/2019	ND	201	100	200	0.472		
DRO >C10-C28*	<10.0	10.0	08/01/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	<10.0	10.0	08/01/2019	ND						

Surrogate 1-Chlorooctane 92.5% 41-142

Surrogate 1-Chlorooctadecane 98.0% 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Disclaimers. Cardinal Laboratories and client's respective liability for any data errors, whether based in reliance or not, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other claims whatsoever that are deemed covered herein, shall be barred unless 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 data, or loss of profits sustained by client, its subsidiaries, affiliates or customers arising out of or related to the performance of the services provided by Cardinal, regardless of whether such claims are based upon any of the above stated services or otherwise. Results shall only be reported if stated on the separate analytical report. This report or any part in reproduction may not be used without approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/30/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 4 @ 5' (H902599-02)**

BTEX 8021B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	5.40	1.00	08/02/2019	ND	1.95	97.5	2.00	2.95		
Toluene*	63.3	1.00	08/02/2019	ND	2.07	103	2.00	2.48		
Ethylbenzene*	58.8	1.00	08/02/2019	ND	2.01	100	2.00	2.59		
Total Xylenes*	155	3.00	08/02/2019	ND	6.03	100	6.00	2.35		
Total BTEX	283	6.00	08/02/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC Chloride, SM4580Cl-B)		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	7330	16.0	07/31/2019	ND	400	100	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*	2870	50.0	08/01/2019	ND	201	100	200	0.472		
DRO >C10-C28*	8090	50.0	08/01/2019	ND	201	100	200	3.79		
EXT DRO >C28-C36	1120	50.0	08/01/2019	ND						

Surrogate: 1-Chlorooctane 384 % 41-142  
 Surrogate: 1-Chlorooctadecane 280 % 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Coverage: Cardinal's liability and cover is limited to the amount paid for analysis. All claims, including those for negligence and any other legal 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 negligent or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or customers arising out of or related to the performance of the services rendered by Cardinal, regardless of whether such claim is based upon any of the above stated releases or otherwise. Results will only be the sampling described above. This report shall not be a reproduction of a report in full with certain portions of Cardinal Laboratories.

*Cooley D. Keene*

Cooley D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 • 201 E. MARLAND • HOBBS, NM 88240

**Analytical Results For:**

APACHE CORP - HOBBS  
 BRUCE BAKER  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	07/30/2019	Sampling Date:	07/29/2019
Reported:	08/05/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 4 @ 6' (H902599-03)

BTEX #021B		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	0.053	0.050	08/02/2019	ND	1.95	97.5	2.00	2.95		
Toluene*	0.648	0.050	08/02/2019	ND	2.07	103	2.00	2.48		
Ethylbenzene*	1.78	0.050	08/02/2019	ND	2.01	100	2.00	2.59		
Total Xylenes*	4.55	0.150	08/02/2019	ND	6.03	100	6.00	2.35		
Total BTEX	7.04	0.300	08/02/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC)		121 %		73 J-129						
Chloride, SM4580C1-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	208	16.0	07/31/2019	ND	400	100	400	3.92		

TPH #015H		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRD C6-C10*	91.7	10.0	08/01/2019	ND	194	97.1	200	3.56		
DRO >C10-C28*	916	10.0	08/01/2019	ND	185	92.4	200	6.64		
EXT DRO >C28-C36	169	10.0	08/01/2019	ND						

Surrogate 1-Chlorooctane 103 % 41-142  
 Surrogate 1-Chlorodecane 109 % J7 6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Coverage: Cardinal's liability and coverage is limited to the amount paid by client for analysis. 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 held liable for negligence or consequential damages, including without limitation, business interruption, 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 provided by Cardinal, regardless of whether such claim is based upon any of the above stated causes or otherwise. Results relate only to the samples identified above. This report shall not be reproduced in any form without approval of Cardinal Laboratories.

*Colley D. Keene*

Colley D. Keene, Lab Director/Quality Manager



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

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 SM4500C-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

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE Liability and Damages: Cardinal's liability and damage recovery remains for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analysis. At all times, including those for reanalysis and any other data whatsoever and its deemed correct unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be held for penalties or consequential damages, including, without limitation, business interruption, 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 furnished by Cardinal regardless of whether such claim is based upon any of the above stated methods or otherwise. Results shall only be the business operated above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

*Celey D. Keene*  
Celey D. Keene, Lab Director/Quality Manager





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

August 15, 2019

JEFFREY BROOM  
APACHE CORP - HOBBS  
2350 W. MARLAND BLVD.  
HOBBS, NM 88240

RE: EMPIRE ABO UNIT K-14

Enclosed are the results of analyses for samples received by the laboratory on 08/08/19 15:35.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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 cursive script that reads "Celey D. Keene".

Celey D. Keene  
Lab Director/Quality Manager



PHONE (575) 393-2325 • 101 E. MARLAND • HOBBS, NM 88240

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 4 @ 7' (H902737-01)

BTEX 80218		mg/kg		Analyzed By: ms				S-04		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	0.205	0.100	08/14/2019	ND	1.99	99.6	2.00	3.60		
Toluene*	3.18	0.100	08/14/2019	ND	2.13	106	2.00	1.02		
Ethylbenzene*	5.05	0.100	08/14/2019	ND	2.09	104	2.00	2.93		
Total Xylenes*	13.8	0.300	08/14/2019	ND	6.25	104	6.00	2.25		
Total BTEX	22.2	0.600	08/14/2019	ND						

Surrogate 4-Bromofluorobenzene (PIE) 148 % 73.3-129

TPH 8015H		mg/kg		Analyzed By: MS				S-06		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10*	195	50.0	08/10/2019	ND	189	94.3	200	2.56		
DRO >C10-C28*	1940	50.0	08/10/2019	ND	194	97.0	200	0.546		
EXT DRO >C28-C36	243	50.0	08/10/2019	ND						

Surrogate 1-Chlorooctane 122 % 41-142

Surrogate 1-Chlorooctadecane 169 % 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Damages: Cardinal's liability and client's recovery remain for any claim arising, whether stated or not, that is based on the amount paid by client to analysts of data, including those for negligence and any other cause whatsoever that is derived from or based on any and all data received by Cardinal within thirty (30) days after completion of the applicable services. 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 furnished by Cardinal, regardless of whether such claim is based upon any of the above stated results or otherwise. Results relate only to the samples identified above. This report shall not be reproduced or used in any way without approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 4 @ 8' (H902737-02)

BTEX 80218		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	08/14/2019	ND	1.99	99.6	2.00	3.60	
Toluene*	<0.050	0.050	08/14/2019	ND	2.13	106	2.00	1.02	
Ethylbenzene*	0.086	0.050	08/14/2019	ND	2.09	104	2.00	2.93	
Total Xylenes*	0.306	0.150	08/14/2019	ND	6.25	104	6.00	2.25	
Total BTEX	0.392	0.300	08/14/2019	ND					

Surrogate 4-Bromofluorobenzene (PIC) 100% 73.3-129

TPH 8015H		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	08/10/2019	ND	189	94.3	200	2.56	
DRO >C10-C28*	153	10.0	08/10/2019	ND	194	97.0	200	0.546	
EXT DRO >C28-C36	14.9	10.0	08/10/2019	ND					

Surrogate 1-Chlorooctane 93.6% 41-142

Surrogate 1-Chlorooctadecane 97.3% 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any direct or indirect, special, incidental or consequential damages, including those for negligence and any other cause whatsoever shall be limited to the amount of any fee paid to 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 rendered by Cardinal, regardless of whether such claim is based upon any of the above stated theories or otherwise. Results noted only on the samples described above. This report shall not be reproduced or copy in full without written approval of Cardinal Laboratories.

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oskaker
Project Location:	NOT GIVEN		

Sample ID: SP 4 @ 9' (H902737-03)

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	08/14/2019	ND	1.99	99.6	2.00	3.60		
Toluene*	<0.050	0.050	08/14/2019	ND	2.13	106	2.00	1.02		
Ethylbenzene*	<0.050	0.050	08/14/2019	ND	2.09	104	2.00	2.93		
Total Xylenes*	<0.150	0.150	08/14/2019	ND	6.25	104	6.00	2.25		
Total BTEX	<0.300	0.300	08/14/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC) 98.0 % 71.3-129

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	08/10/2019	ND	189	94.3	200	2.56		
DRO >C10-C28*	<10.0	10.0	08/10/2019	ND	194	97.0	200	0.546		
EXT DRO >C28-C36	<10.0	10.0	08/10/2019	ND						

Surrogate 1-Chlorooctane 101 % 41-142

Surrogate 1-Chlorooctadecane 98.3 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and charges exclude remedy for any claims arising, whether stated or not, and be limited to the amount paid by client for analysis. All clients, including those for regulatory and any other state obligations shall be deemed advised unless made in writing and retained 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 interruption, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or in relation to the performance of the services rendered by Cardinal, regardless of whether such claim is based upon any of the various stated causes or otherwise. Results stated only as they appear on this report. This report shall not be reliable if a print or full web version approved of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 2 @ 5' (H902737-04)

BTEX 80218		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.500	0.500	08/14/2019	ND	1.99	99.6	2.00	3.60		
Toluene*	1.62	0.500	08/14/2019	ND	2.13	106	2.00	1.02		
Ethylbenzene*	6.13	0.500	08/14/2019	ND	2.09	104	2.00	2.93		
Total Xylenes*	21.0	1.50	08/14/2019	ND	6.25	104	6.00	2.25		
Total BTEX	28.8	3.00	08/14/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC) 109% 71 J-129

TPH 8015M		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRD C6-C10*	568	50.0	08/10/2019	ND	200	100	200	0.237		
DRO >C10-C28*	4920	50.0	08/10/2019	ND	199	99.6	200	1.09		
EXT DRO >C28-C36	723	50.0	08/10/2019	ND						

Surrogate 1-Chlorooctane 160% 41-142

Surrogate 1-Chlorooctadecane 252% 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's relative remedy for any error arising, whether based in contract or tort, shall be limited to the amount paid by client for analysis. 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 damages or consequential damages, including, without limitation, business interruption, 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 performed by Cardinal, regardless of whether such claim is based upon any of the above stated causes of otherwise. Analyte refers only to the samples identified above. This report shall not be reproduced or used in full without written approval of Cardinal Laboratories.

*Cefey D. Keene*

Cefey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

**Sample ID: SP 2 @ 6' (H902737-05)**

BTEX 80218		mg/kg		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.200	0.200	08/15/2019	ND	1.99	99.6	2.00	3.60		
Toluene*	0.685	0.200	08/15/2019	ND	2.13	106	2.00	1.02		
Ethylbenzene*	2.94	0.200	08/15/2019	ND	2.09	104	2.00	2.93		
Total Xylenes*	9.79	0.600	08/15/2019	ND	6.25	104	6.00	2.25		
Total BTEX	13.4	1.20	08/15/2019	ND						

Surrogate 4-Bromofluorobenzene (PIL) 111 % 73.3-129

TPH 8015H		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10*	301	50.0	08/10/2019	ND	200	100	200	0.237		
DRO >C10-C28*	2840	50.0	08/10/2019	ND	199	99.6	200	1.09		
EXT DRO >C28-C36	375	50.0	08/10/2019	ND						

Surrogate 1-Chlorooctane 167 % 41-142

Surrogate 1-Chlorodecane 193 % 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Damages: Cardinal's liability and thereby evidence reports for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client to analyze. All clients, ordering these for negligence and any other cause whatsoever shall be deemed to have agreed 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 data, or loss of profits caused by client, its subsidiaries, affiliates or licensors using 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 no warranty. Results relate only to the samples identified above. This report shall not be reproduced or used in full without approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

APACHE CORP - HOBBS  
 JEFFREY BROOM  
 2350 W. MARLAND BLVD.  
 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	08/08/2019	Sampling Date:	08/08/2019
Reported:	08/15/2019	Sampling Type:	Soil
Project Name:	EMPIRE ABO UNIT K-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP 2 @ 7' (H902737-06)

BTEX 80218		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	08/15/2019	ND	1.99	99.6	2.00	3.60		
Toluene*	<0.050	0.050	08/15/2019	ND	2.13	106	2.00	1.02		
Ethylbenzene*	<0.050	0.050	08/15/2019	ND	2.09	104	2.00	2.93		
Total Xylenes*	<0.150	0.150	08/15/2019	ND	6.25	104	6.00	2.25		
Total BTEX	<0.300	0.300	08/15/2019	ND						

Surrogate 4-Bromofluorobenzene (PIC) 96.4 % 73.3-129

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	08/10/2019	ND	200	100	200	0.237		
DRO >C10-C28*	30.0	10.0	08/10/2019	ND	199	99.6	200	1.09		
EXT DRO >C28-C36	<10.0	10.0	08/10/2019	ND						

Surrogate 1-Chlorooctane 101 % 41-142

Surrogate 1-Chlorooctadecane 99.3 % 37.6-147

Cardinal Laboratories

\* = Accredited Analyte

PLEASE NOTE: Liability and Disputes: Cardinal Laboratory and its client's exclusive liability for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analysis. 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 reports or otherwise. Results are only to the extent identified above. This report shall not be reproduced or used in any form without written approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 • 101 E. MARLAND • HOBBBS, NM 88340

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 SM4500C-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

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal holds and shall continue to hold for all claims arising, whether based in contract or tort, and be limited to the amount due by them for analysis. 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 arising, without limitation, from negligence, 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 rendered by Cardinal, regardless of whether such claim is based upon any of the above stated causes or otherwise. If such claim only to the extent described above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



**END OF REPORT**