



August 18, 2020

Mr. Bradford Billings  
State of New Mexico Oil Conservation Division  
1220 South St Francis Drive  
Santa Fe, NM 87505

RE: 2-RP-4202

Mr. Billings,

In compliance with 19.15.29.15(B) NMAC and the agreement submitted by Apache Corporation on November 8, 2018, Apache Corporation is submitting information related to closure for the release occurring July 26, 2012. Apache is respectfully submitting the deferment request based on remediation and studies occurring in 2017 that demonstrate the site meeting the requirements of the agency. Unless further information is requested by NMOCD, Apache Corporation considers this release deferred.

If there are any questions, please feel free to contact me by telephone at 432-818-1000 or by e-mail at [Larry.Baker@ApacheCorp.com](mailto:Larry.Baker@ApacheCorp.com).

Sincerely,

A handwritten signature in black ink that reads "Larry Baker".

Larry Baker  
Environmental Technician Sr.  
Apache Corporation

Attachment: Deferment Report Dated August 18, 2020



303 Veterans Airpark Lane Midland, TX 79705

## **Deferment Request**

August 18, 2020

Re: Barnsdall Federal Battery  
Case # 2RP-4202

On 4/25/2017 a release occurred due to a header riser pipe failed resulting in the loss of fluid. The release (GPS: 32.811419, -104.058036) is located east of Artesia, New Mexico in unit letter A section 27 township 17S range 29E. A groundwater survey was conducted utilizing data from the NMOSE. The depth to groundwater is 76 feet below ground surface. A remediation plan was submitted and approved by OCD on 8/15/2017.

The release area was excavated to a depth of four feet in accordance with the remediation plan. On 9/11/2017 bottom and wall samples were collected and submitted to a commercial laboratory for analysis of chloride, TPH, and BTEX. Laboratory results were slightly elevated for chlorides at bottom 1, 2, east wall, and the north wall samples. The north wall samples 2 and 3 had elevated values of DRO. The east wall was further excavated and a sample was collected on 11/20/2017 and submitted to a commercial laboratory for analysis of chloride. The north wall was not further excavated due to the length of the wall and the close proximity of one foot to the lined facility. A 20 mil reinforced liner was installed at 4 feet in accordance with the approved remediation plan. All excavated material was hauled to an OCD approved facility and the excavation was backfilled with clean imported caliche to ground surface in accordance with the OCD approved remediation plan.

Apache Corporation has completed the remediation in accordance with the approved plan except for the 1 foot area along the north wall and request that area be deferred until abandonment of the facility.

Enclosed: C-141, Groundwater data, Maps, Sample Data, and Laboratory Results

Submitted by;

*Bruce Baker*

**Environmental Technician**

[larry.baker@apachecorp.com](mailto:larry.baker@apachecorp.com)

**Cell# 432-631-6982**

**Off# 432-818-1000**

## NM OIL CONSERVATION

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

ARTESIA DISTRICT

MAY 08 2017

Energy Minerals and Natural Resources

RECEIVED

State of New Mexico NM OIL CONSERVATION  
ARTESIA DISTRICT  
Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

MAY 08 2017

RECEIVED

Form C-141  
Revised August 8, 2011

Copy to appropriate District Office in  
accordance with 19.15.29 NMAC.

## Release Notification and Corrective Action

NA61713158268 OPERATOR ☒ Initial Report ☐ Final Report

Name of Company Apache Corporation <u>873</u>	Contact Bruce Baker
Address 2350 W Marland Street, Hobbs, NM 88240	Telephone No. (432) 631-6982
Facility Name Barnsdall Federal Battery	Facility Type Battery

Surface Owner Federal	Mineral Owner	API No. 30-015-42364
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## LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	27	17S	29E					Eddy

Latitude 32.811419 Longitude -104.058036

## NATURE OF RELEASE

Type of Release Oil and Produced Water	Volume of Release 4 barrels of water and 1 barrel of oil	Volume Recovered 1 barrel of oil and 3 barrels of water
Source of Release Header	Date and Hour of Occurrence 4/24/2017	Date and Hour of Discovery 4/24/2017 at 5:00 a.m.
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Shelly Tucker (BLM)	
By Whom? Bruce Baker	Date and Hour 4/25/2017 at 12:33 pm via email	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.\*

Describe Cause of Problem and Remedial Action Taken.\*

A header riser pipe failed resulting in the release of fluids. The line was isolated and vacuum trucks dispatched to pick-up standing fluid. The riser was repaired.

Describe Area Affected and Cleanup Action Taken.\*

The release affected 1400 square feet of pasture south of the battery.

New forms can be found in the  
New Mexico State Website in forms:  
[http://www.emnrd.state.nm.us/  
OCD/forms.html](http://www.emnrd.state.nm.us/OCD/forms.html)

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

Signature: <u>Bruce Baker</u>	OIL CONSERVATION DIVISION	
Printed Name: Bruce Baker	Approved by Environmental Specialist: <u>Crystal Wren</u>	
Title: Environmental Technician	Approval Date: <u>5/10/17</u>	Expiration Date: <u>N/A</u>
E-mail Address: <u>larry.baker@apachecorp.com</u>	Conditions of Approval: <u>see attached</u>	Attached <input checked="" type="checkbox"/>
Date: <u>5/5/2017</u> Phone: (432) 631-6982		

\* Attach Additional Sheets If Necessary

2RP-4202

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>76</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 type="checkbox"/> Yes <input checked="" 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 <b>not</b> 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 ½-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.

State of New Mexico  
Oil Conservation Division

Page 4

Incident ID	
District RP	
Facility ID	
Application ID	

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Printed Name: Larry Baker Title: Environmental Tech SR.  
Signature: *Larry Baker* Date: 8/18/2020  
email: larry.baker@apachecorp.com Telephone: 432-631-6982

**OCD Only**

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

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: Larry Baker Title: Environmental Tech SR.  
Signature: Larry Baker Date: 8/18/2020  
email: larry.baker@apachecorp.com Telephone: 432-631-6982

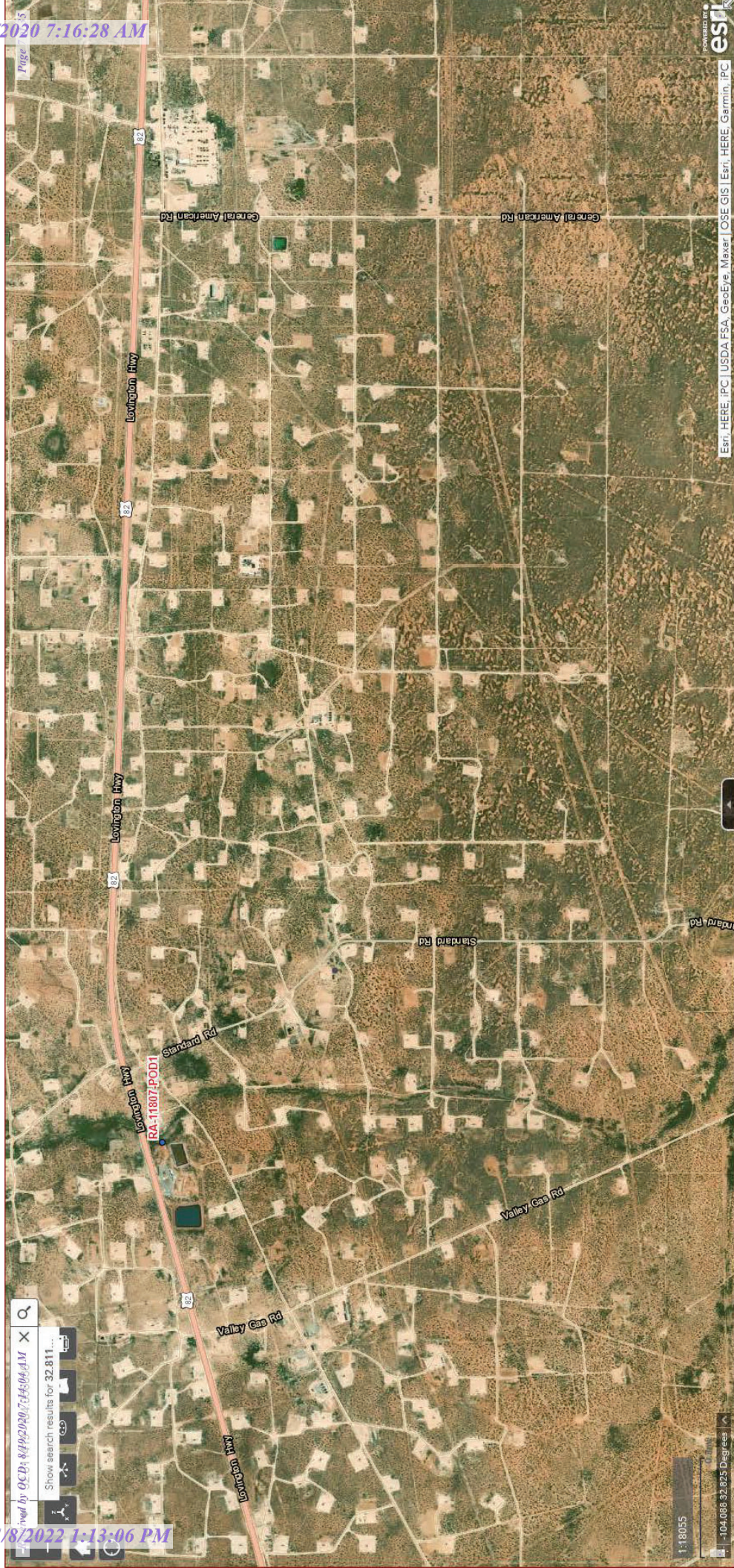
**OCD Only**

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

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☒ Deferral Approved

Signature: Brittany Hall Date: 11/8/2022










# New Mexico Office of the State Engineer

## Point of Diversion Summary

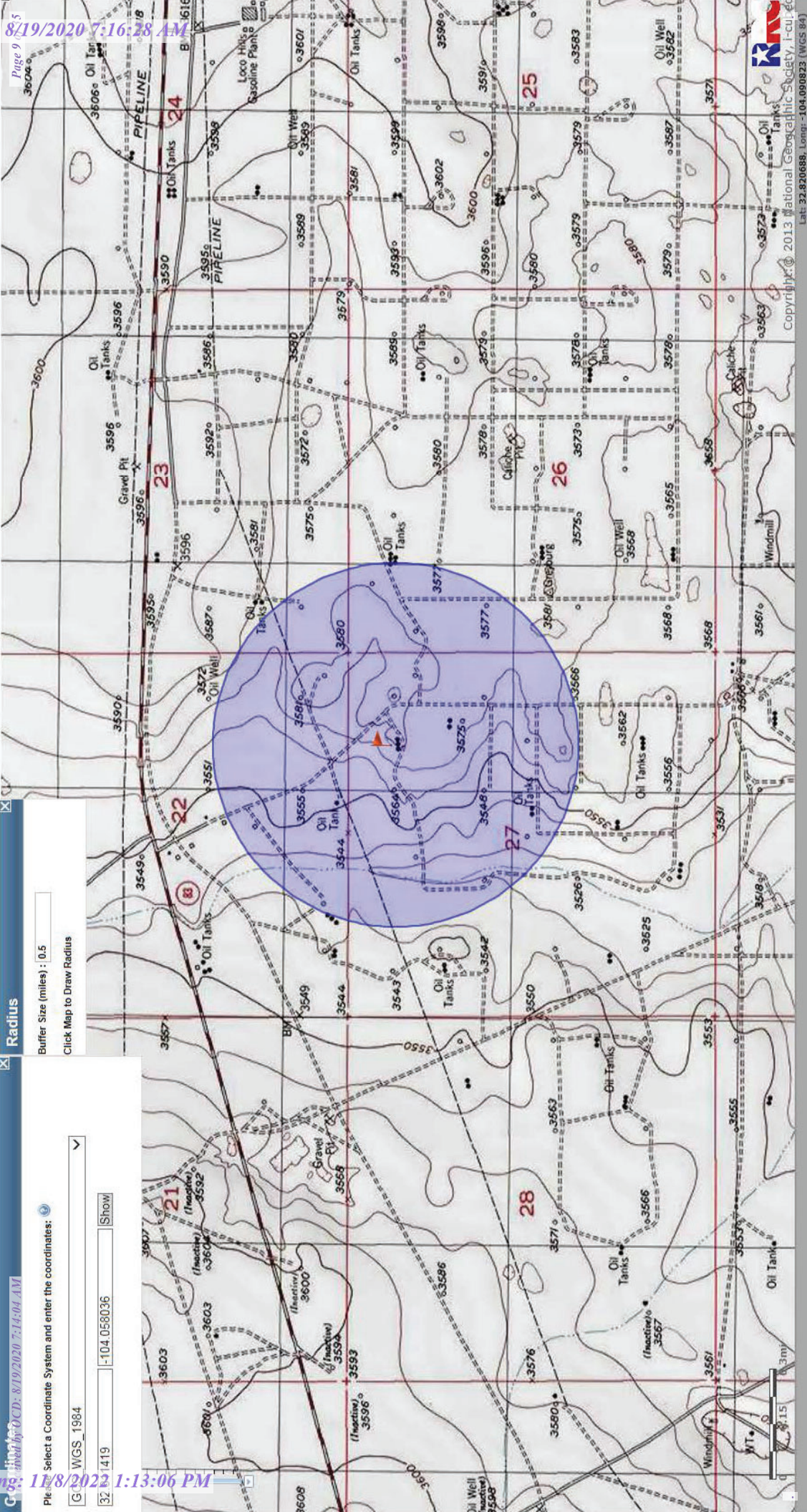
		(quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest)						(NAD83 UTM in meters)	
Well Tag	POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
	RA 11807 POD1	1	2	3	22	17S	29E	587360	3631585 
<hr/>									
Driller License:	1348	Driller Company:				TAYLOR WATER WELL SERVICE			
Driller Name:	TAYLOR, CLINTON E.								
Drill Start Date:	11/23/2012	Drill Finish Date:				11/26/2012		Plug Date:	
Log File Date:	03/26/2013	PCW Rcv Date:						Source:	Shallow
Pump Type:		Pipe Discharge Size:						Estimated Yield:	4 GPM
Casing Size:	4.50	Depth Well:				131 feet		Depth Water:	76 feet
<hr/>									
Water Bearing Stratifications:					Top	Bottom	Description		
					104	128	Other/Unknown		
<hr/>									
Casing Perforations:					Top	Bottom			
					91	131			
<hr/>									

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

8/18/20 12:07 PM

POINT OF DIVERSION SUMMARY





Page 9 of 36

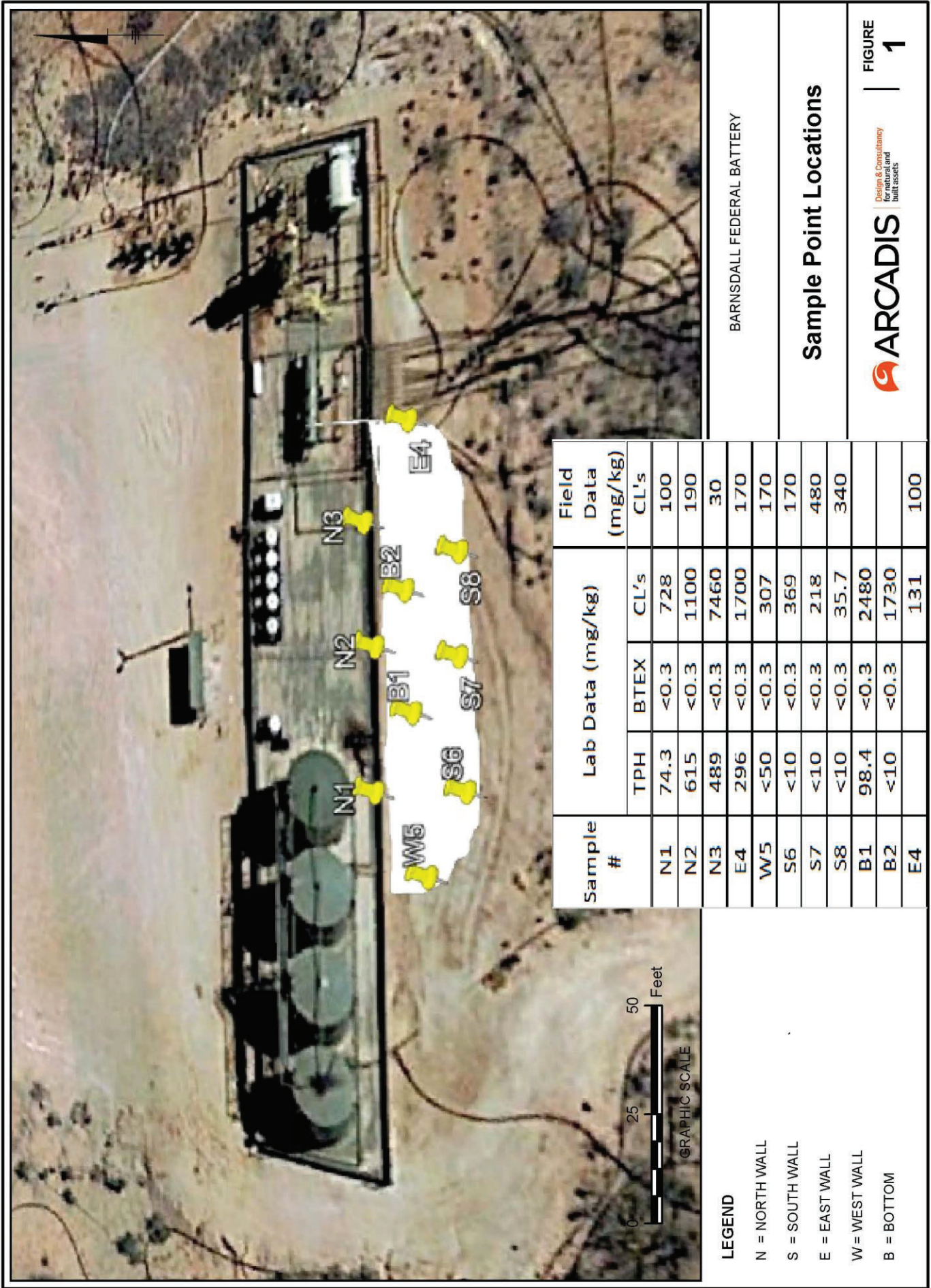
Received by OCD: 8/19/2020 7:14:04 AM

Please Select a Coordinate System and enter the coordinates:

WGS\_1984  
32 1419 -104.058036 Show







Sample Date	Sample ID	Depth	Chloride	Benzene	Toulene	Ethybenzene	Total Xylenes	Total BTEX	GRO	DRO	EXT DRO
9/11/2017	North Wall 1	2'	728	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	209	74.3
9/11/2017	North Wall 2	2'	1100	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	1990	615
9/11/2017	North Wall 3	2'	7460	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	1400	489
9/11/2017	West Wall 5	2'	307	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	92.1	<50.0
9/11/2017	East Wall 4	2'	1700	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	576	296
11/20/2017	East Wall 4	2'	131								
9/11/2017	South Wall 6	2'	369	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0
9/11/2017	South Wall 7	2'	218	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0
9/11/2017	South Wall 8	2'	35.7	<0.050	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0
9/11/2017	Bottom 1	4'	2480	<0.050	<0.050	<0.050	<0.150	<0.300	<50.0	771	98.4
9/11/2017	Bottom 2	4'	1730	<0.050	<0.050	<0.150	<0.300	<10.0	<10.0	<10.0	<10.0



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

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September 28, 2017

RYAN MULLER

ARCADIS U.S., INC.

2999 OAK ROAD, SUITE 300

WALNUT CREEK, CA 94597

RE: BARNSDALL CTB

Enclosed are the results of analyses for samples received by the laboratory on 09/11/17 15:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-9. 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	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NORTH WALL 1	H702410-01	Soil	11-Sep-17 11:30	11-Sep-17 15:05
NORTH WALL 2	H702410-02	Soil	11-Sep-17 11:32	11-Sep-17 15:05
EAST WALL 4	H702410-03	Soil	11-Sep-17 11:36	11-Sep-17 15:05
SOUTH WALL 6	H702410-04	Soil	11-Sep-17 11:40	11-Sep-17 15:05
SOUTH WALL 7	H702410-05	Soil	11-Sep-17 11:42	11-Sep-17 15:05
SOUTH WALL 8	H702410-06	Soil	11-Sep-17 11:44	11-Sep-17 15:05
BOTTOM 1	H702410-07	Soil	11-Sep-17 13:15	11-Sep-17 15:05
BOTTOM 2	H702410-08	Soil	11-Sep-17 13:17	11-Sep-17 15:05
NORTH WALL 3	H702410-09	Soil	11-Sep-17 11:34	11-Sep-17 15:05
WEST WALL 5	H702410-10	Soil	11-Sep-17 13:30	11-Sep-17 15:05

Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence or 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 damage including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**NORTH WALL 1**  
**H702410-01 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			99.5 %		72-148	7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
<b>DRO &gt;C10-C28</b>	<b>209</b>		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	QR-03
<b>EXT DRO &gt;C28-C36</b>	<b>74.3</b>		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			79.5 %		28.3-164	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			111 %		34.7-157	7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	728		20.0	mg/kg wet	20	B709128	JDA	25-Sep-17	EPA300.0	
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Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence or 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 damage including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celey D. Keene, Lab Director/Quality Manager





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

**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**NORTH WALL 2**  
**H702410-02 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			105 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	1990		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	615		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			82.6 %	28.3-164		7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			137 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	1100		50.0	mg/kg wet	50	B709128	JDA	25-Sep-17	EPA300.0	
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Cardinal Laboratories

\*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence or 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 damage including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**EAST WALL 4**  
**H702410-03 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			101 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	576		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	296		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			74.3 %	28.3-164		7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			108 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	1700		50.0	mg/kg wet	50	B709128	JDA	25-Sep-17	EPA300.0	
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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**SOUTH WALL 6**  
**H702410-04 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			106 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			84.0 %	28.3-164		7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			92.2 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	369		10.0	mg/kg wet	10	B709128	JDA	22-Sep-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager





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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**SOUTH WALL 7**  
**H702410-05 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			105 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			90.5 %	28.3-164		7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctadecane</i>			99.6 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	218		10.0	mg/kg wet	10	B709128	JDA	22-Sep-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**SOUTH WALL 8****H702410-06 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			103 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			85.2 %	28.3-164		7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctadecane</i>			91.7 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	35.7		10.0	mg/kg wet	10	B709128	JDA	22-Sep-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**BOTTOM 1**  
**H702410-07 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			102 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	771		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	98.4		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			83.3 %	28.3-164		7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			104 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	2480		100	mg/kg wet	100	B709128	JDA	25-Sep-17	EPA300.0	
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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**BOTTOM 2**  
**H702410-08 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			102 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			89.6 %	28.3-164		7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctadecane</i>			97.0 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	1730		50.0	mg/kg wet	50	B709128	JDA	25-Sep-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager





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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**NORTH WALL 3**  
**H702410-09 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091206	MS	12-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091206	MS	12-Sep-17	8021B	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			101 %	72-148		7091206	MS	12-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
<b>DRO &gt;C10-C28</b>	<b>1400</b>		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
<b>EXT DRO &gt;C28-C36</b>	<b>489</b>		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctane</i>			81.5 %	28.3-164		7091201	MS	12-Sep-17	8015B	
<i>Surrogate: 1-Chlorooctadecane</i>			116 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	7460		200	mg/kg wet	200	B709128	JDA	25-Sep-17	EPA300.0	
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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**WEST WALL 5**  
**H702410-10 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories****Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	7091301	MS	13-Sep-17	8021B	
Toluene*	<0.050		0.050	mg/kg	50	7091301	MS	13-Sep-17	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	7091301	MS	13-Sep-17	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	7091301	MS	13-Sep-17	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	7091301	MS	13-Sep-17	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			103 %	72-148		7091301	MS	13-Sep-17	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
DRO >C10-C28	92.1		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
EXT DRO >C28-C36	<50.0		50.0	mg/kg	5	7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctane			100 %	28.3-164		7091201	MS	12-Sep-17	8015B	
Surrogate: 1-Chlorooctadecane			119 %	34.7-157		7091201	MS	12-Sep-17	8015B	

**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Chloride	307		10.0	mg/kg wet	10	B709128	JDA	22-Sep-17	EPA300.0	
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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**Volatile Organic Compounds by EPA Method 8021 - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 7091206 - Volatiles****Blank (7091206-BLK1)**

Prepared &amp; Analyzed: 12-Sep-17

Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Surrogate: 4-Bromofluorobenzene (PID)	ND		mg/kg	0.0500		99.3	72-148			

**LCS (7091206-BS1)**

Prepared &amp; Analyzed: 12-Sep-17

Benzene	1.63	0.050	mg/kg	2.00		81.4	79.5-124			
Toluene	1.71	0.050	mg/kg	2.00		85.7	75.5-127			
Ethylbenzene	1.89	0.050	mg/kg	2.00		94.3	77.7-125			
Total Xylenes	5.70	0.150	mg/kg	6.00		94.9	70.9-124			
Surrogate: 4-Bromofluorobenzene (PID)	0.0489		mg/kg	0.0500		97.8	72-148			

**LCS Dup (7091206-BS1)**

Prepared &amp; Analyzed: 12-Sep-17

Benzene	1.62	0.050	mg/kg	2.00		81.2	79.5-124	0.180	6.5	
Toluene	1.75	0.050	mg/kg	2.00		87.5	75.5-127	2.03	7.02	
Ethylbenzene	1.91	0.050	mg/kg	2.00		95.5	77.7-125	1.28	7.83	
Total Xylenes	5.76	0.150	mg/kg	6.00		96.0	70.9-124	1.09	7.78	
Surrogate: 4-Bromofluorobenzene (PID)	0.0489		mg/kg	0.0500		97.8	72-148			

**Batch 7091301 - Volatiles****Blank (7091301-BLK1)**

Prepared &amp; Analyzed: 13-Sep-17

Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Surrogate: 4-Bromofluorobenzene (PID)	ND		mg/kg	0.0500		99.8	72-148			

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**Volatile Organic Compounds by EPA Method 8021 - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 7091301 - Volatiles****LCS (7091301-BS1)**

Prepared &amp; Analyzed: 13-Sep-17

Benzene	1.79	0.050	mg/kg	2.00		89.6	79.5-124			
Toluene	1.93	0.050	mg/kg	2.00		96.3	75.5-127			
Ethylbenzene	2.12	0.050	mg/kg	2.00		106	77.7-125			
Total Xylenes	6.32	0.150	mg/kg	6.00		105	70.9-124			
Surrogate: 4-Bromofluorobenzene (PID)	0.0493		mg/kg	0.0500		98.5	72-148			

**LCS Dup (7091301-BS1)**

Prepared &amp; Analyzed: 13-Sep-17

Benzene	1.82	0.050	mg/kg	2.00		91.0	79.5-124	1.54	6.5	
Toluene	1.96	0.050	mg/kg	2.00		98.2	75.5-127	1.98	7.02	
Ethylbenzene	2.15	0.050	mg/kg	2.00		108	77.7-125	1.67	7.83	
Total Xylenes	6.48	0.150	mg/kg	6.00		108	70.9-124	2.50	7.78	
Surrogate: 4-Bromofluorobenzene (PID)	0.0494		mg/kg	0.0500		98.9	72-148			

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Celey D. Keene, Lab Director/Quality Manager





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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**Petroleum Hydrocarbons by GC FID - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 7091201 - General Prep - Organics****Blank (7091201-BLK1)**

Prepared &amp; Analyzed: 12-Sep-17

GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C35	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
Total TPH C6-C28	ND	10.0	mg/kg							
Surrogate: 1-Chlorooctane	46.4		mg/kg	50.0		92.8	28.3-164			
Surrogate: 1-Chlorooctadecane	50.4		mg/kg	50.0		101	34.7-157			

**LCS (7091201-BS1)**

Prepared &amp; Analyzed: 12-Sep-17

GRO C6-C10	180	10.0	mg/kg	200		89.8	76.6-119			
DRO >C10-C28	196	10.0	mg/kg	200		98.0	81.4-124			
Total TPH C6-C28	376	10.0	mg/kg	400		93.9	79.4-121			
Surrogate: 1-Chlorooctane	50.2		mg/kg	50.0		100	28.3-164			
Surrogate: 1-Chlorooctadecane	55.3		mg/kg	50.0		111	34.7-157			

**LCS Dup (7091201-BSD1)**

Prepared &amp; Analyzed: 12-Sep-17

GRO C6-C10	178	10.0	mg/kg	200		89.0	76.6-119	0.881	7.94	
DRO >C10-C28	193	10.0	mg/kg	200		96.3	81.4-124	1.76	9.83	
Total TPH C6-C28	371	10.0	mg/kg	400		92.7	79.4-121	1.34	8.57	
Surrogate: 1-Chlorooctane	49.4		mg/kg	50.0		98.8	28.3-164			
Surrogate: 1-Chlorooctadecane	53.8		mg/kg	50.0		108	34.7-157			

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS U.S., INC.  
2999 OAK ROAD, SUITE 300  
WALNUT CREEK CA, 94597

Project: BARNSDALL CTB  
Project Number: NONE GIVEN  
Project Manager: RYAN MULLER  
Fax To: NOT GIVEN

Reported:  
28-Sep-17 11:54

**Soluble (DI Water Extraction) - Quality Control****Green Analytical Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B709128 - General Prep - Wet Chem****Blank (B709128-BLK1)**

Prepared: 18-Sep-17 Analyzed: 22-Sep-17

Chloride	ND	10.0	mg/kg wet							
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**LCS (B709128-BS1)**

Prepared: 18-Sep-17 Analyzed: 22-Sep-17

Chloride	242	10.0	mg/kg wet	250		96.8	85-115			
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**LCS Dup (B709128-BSD1)**

Prepared: 18-Sep-17 Analyzed: 22-Sep-17

Chloride	240	10.0	mg/kg wet	250		95.9	85-115	0.980	20	
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### Notes and Definitions

QR-03	The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
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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A handwritten signature in black ink, appearing to read "Celey D. Keene".

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Celey D. Keene, Lab Director/Quality Manager



ID#: **HTD2410**

# CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page \_\_\_\_ of \_\_\_\_

Lab Work Order #

<b>Send Results to:</b> Contact & Company Name: <b>Ryan Muller@Arcadis.com</b> Address: <b>1004 N. Big Spring St</b> City: <b>Midland TX</b> State: <b>TX</b> Zip: <b>79701</b> E-mail Address: <b>Ryan Muller@Arcadis.com</b> Project #: <b>7</b>		Telephone: Fax:				
Project Name/Location (City, State):		Sampler's Signature: <i>Rita Davidowski</i>				
<b>Sample ID</b>	<b>Collection Date</b>	<b>Time</b>	<b>Type (✓)</b> Comp Grab	<b>Matrix</b>	Preservation Key: A. H <sub>2</sub> SO <sub>4</sub> B. HCL C. HNO <sub>3</sub> D. NaOH E. None F. Other: _____ G. Other: _____ H. Other: _____	Keys: Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: _____ 10. Other: _____
North wall 1	9/11	1130	✓	S	TPH 8015 Extended BT-CX 8021, Chloride 80	
North wall 2	9/11	1132	✓	S		
East wall 4	9/11	1134	✓	S		
South wall 6	9/11	1140	✓	S		
South wall 7	9/11	1142	✓	S		
South wall 8	9/11	1144	✓	S		
Bottom 1	9/11	1315	✓	S		
Bottom 2	9/11	1317	✓	S		
North wall 3	9/11	1134	✓	S		
West wall 5	9/11	1330	✓	S		
Special Instructions/Comments: <i>Bill Apacere - Bruce</i>						
Special QA/QC Instructions (✓):						
<b>Laboratory Information and Receipt</b> Lab Name: <b>Cardinal Labs Hobbs</b> <input type="checkbox"/> Cooler packed with ice (✓) <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not Intact Specify Turnaround Requirements: Shipping Tracking #:		<b>Cooler Custody Seal (✓)</b> Sample Receipt: Condition/Cooler Temp: <b>1.6°C</b>		<b>Relinquished By</b> Printed Name: <i>Rita Davidowski</i> Signature: <i>[Signature]</i> Date/Time: <b>1505 9/11</b>		
<b>Received By</b> Printed Name: <i>Spodi Danner</i> Signature: <i>[Signature]</i> Date/Time: <b>9/11/17</b>		<b>Relinquished By</b> Printed Name: Signature: Date/Time:		<b>Laboratory Received By</b> Printed Name: Signature: Date/Time:		

Distribution:

WHITE - Laboratory returns with results

YELLOW - Lab copy

PINK - Retained by ARCADIS





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

November 28, 2017

RYAN MUELLER

ARCADIS - MIDLAND

1004 N BIG SPRING ST., SUITE 300

MIDLAND, TX 79701

RE: APACHE

Enclosed are the results of analyses for samples received by the laboratory on 11/20/17 13:50.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-9. 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	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Celey D. Keene

Lab Director/Quality Manager



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

**Analytical Results For:**

ARCADIS - MIDLAND  
1004 N BIG SPRING ST., SUITE 300  
MIDLAND TX, 79701

Project: APACHE  
Project Number: BARNSDALE  
Project Manager: RYAN MUELLER  
Fax To: NA

Reported:  
28-Nov-17 17:47

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EAST WALL 4	H703233-01	Soil	20-Nov-17 10:30	20-Nov-17 13:50

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A handwritten signature in black ink, appearing to read "Celey D. Keene".

Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

ARCADIS - MIDLAND  
1004 N BIG SPRING ST., SUITE 300  
MIDLAND TX, 79701

Project: APACHE  
Project Number: BARNSDALE  
Project Manager: RYAN MUELLER  
Fax To: NA

Reported:  
28-Nov-17 17:47

**EAST WALL 4****H703233-01 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Green Analytical Laboratories****Soluble (DI Water Extraction)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method
Chloride	131		10.0	mg/kg wet	10	B711202	JDA	27-Nov-17	EPA300.0

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

ARCADIS - MIDLAND  
1004 N BIG SPRING ST., SUITE 300  
MIDLAND TX, 79701

Project: APACHE  
Project Number: BARNSDALE  
Project Manager: RYAN MUELLER  
Fax To: NA

Reported:  
28-Nov-17 17:47

**Soluble (DI Water Extraction) - Quality Control****Green Analytical Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B711202 - General Prep - Wet Chem</b>									
<b>Blank (B711202-BLK1)</b>					Prepared: 22-Nov-17 Analyzed: 27-Nov-17				
Chloride	ND	10.0	mg/kg wet						
<b>LCS (B711202-BS1)</b>					Prepared: 22-Nov-17 Analyzed: 27-Nov-17				
Chloride	244	10.0	mg/kg wet	250		97.5	85-115		
<b>LCS Dup (B711202-BSD1)</b>					Prepared: 22-Nov-17 Analyzed: 27-Nov-17				
Chloride	245	10.0	mg/kg wet	250		98.0	85-115	0.458	20

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---

### Notes and Definitions

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

---

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A handwritten signature in black ink, appearing to read "Celey D. Keene".

---

Celey D. Keene, Lab Director/Quality Manager



## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name: Apachis  
Project Manager: Ryan Mueller  
Address: 1004 N Big Spring  
City: Midland State: TX Zip:   
Phone #:  Fax #:   
Project #:  Project Owner: Ryan Mueller  
Project Location: Barnsdall  
City:  State:  Zip:   
Phone #:  Fax #:

Company: Apachis  
Attn: Bruce Baker  
Address:   
City:  State:  Zip:   
Phone #:  Fax #:

FOR LAB USE ONLY

Lab I.D. H703233 Sample I.D. Eastwood  
# CONTAINERS 1  
GROUNDWATER   
WASTEWATER   
SOIL X  
OIL   
SLUDGE   
OTHER:   
ACID/BASE:   
ICE / COOL   
OTHER: Neat

DATE 11/20 TIME 1030  
Chloride 300

Relinquished By: Ryan Mueller Received By: Medi Benson  
Date: 11/20/17 Time: 1:50  
Relinquished By:  Received By:   
Date:  Time:

Delivered By: (Circle One) UPS 4.75  
Sampler - UPS - Bus - Other: 4.75  
Sample Condition: Intact  
Cool Yes Intact Yes  
No No No No

CHECKED BY:   
REMARKS:

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**District I**

1625 N. French Dr., Hobbs, NM 88240  
Phone:(575) 393-6161 Fax:(575) 393-0720

**District II**

811 S. First St., Artesia, NM 88210  
Phone:(575) 748-1283 Fax:(575) 748-9720

**District III**

1000 Rio Brazos Rd., Aztec, NM 87410  
Phone:(505) 334-6178 Fax:(505) 334-6170

**District IV**

1220 S. St Francis Dr., Santa Fe, NM 87505  
Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 9764

**CONDITIONS**

Operator: APACHE CORPORATION 303 Veterans Airpark Ln Midland, TX 79705	OGRID: 873
	Action Number: 9764
	Action Type: [C-141] Release Corrective Action (C-141)

**CONDITIONS**

Created By	Condition	Condition Date
bhall	Deferral approved. Incident status will remain "Closure Not Approved" until final remediation is completed during retrofitting or abandonment, whichever comes first.	11/8/2022