

Imagine the result

**Apache Corporation**

**State SWD Flowline  
Remediation  
Completion**

Eddy County, New Mexico

April 3, 2017

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Jennifer Van Curen  
Environmental Project Scientist

## STATE SWD FLOWLINE

Remediation  
Completion

Prepared for:  
Apache  
Corporation  
Eddy County, New Mexico

Prepared by:  
ARCADIS U.S., Inc.  
1004 North Big Spring Street  
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Our Ref.:  
MT001200.0000.0000

Date:  
April 3, 2017

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**Remediation  
Completion**

Apache  
Corporation  
Eddy County, New Mexico

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Final C-141  
Remediated Area  
Laboratory Analyticals

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**Tables**

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Initial Soil Analyticals  
Final Soil Analyticals

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**Appendix C  
Photlog**

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## 1. INTRODUCTION

The subject site is a Rights-of-Way (ROW) and State Pit located west of Loco Hills, New Mexico with gps coordinates of 32.816536 and -103.916730. The site is operated by Apache Corporation.

## 2. SUMMARY OF INITIAL SITE INVESTIGATION ACTIVITIES

New Mexico Oil Conservation Division (NMOCD) was notified of the 7-bbl. release at the site via form C-141, submitted on October 7, 2015 by Bruce Baker with Apache Corporation.

The release was reported to have had a 3-inch metal transition in the flowline developed a hole resulting in the release. The flow line was isolated and repaired. The release affected a total of 695 square feet with 100 square feet in pasture and 595 square feet on lease road and NM state pit 337. The release site was mapped and initial field sampling was conducted. The state land office was notified due to the contamination inside caliche pit.

Initial release site investigation activities were conducted in May of 2016 with follow-up sampling completed in June of 2016. Soil sampling activities included soil sampling of five verticals to a varied depth to reach the NMOCD delineation guidelines for chlorides utilizing a hand auger.

Five vertical samples were taken within the release area at the subject site. Elevated chloride concentrations were detected in soil samples collected from verticals. Elevated chlorides were detected down gradient from release point with the stained area encompassing 695 square feet.

A table was prepared for all depths of the soil sampling activities and includes both field and lab results.

## 3. ENVIRONMENTAL ASSESSMENT

### 3.1 Surface and Mineral Ownership

The 100-square foot area at the source falls inside BLM managed lands and on an existing ROW and lease road. The 595 square feet area where fluid ran down slope into the caliche pit is state managed lands. Apache received approvals from the BLM,

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OCD, and SLO to remediate the area around the ROW, access road, and the state caliche pit.

**3.2 Arch and Paleo**

This release site falls within a previously arched area of a ROW and inside a state caliche pit. No areas outside these two areas will be disturbed. This release site falls into PFYC 2, which means that there is little chance of paleontology to be discovered.

**3.3 Hydrology**

Water depths were not located in the area. There are storm water drainages and collection areas within a quarter mile, but will not be affected by this release site. There are no bodies of water, lakes, or streams near this release site. Karst

The area surrounding this release site has a low karst potential. There are no known karst features in this area.

**3.4 Range**

The range allotment is in the Cedar Lake, 77008 and cattle are sometimes in the area. All open trenches or excavations will be fenced to prevent injury to cattle if left unattended. All equipment left overnight will be positioned to prevent injury to cattle.

**3.5 Soils, Geology, and Vegetation**

KM – Kermit-Berino fine sands, 0-3 percent slopes. The natural drainage is excessively drained to well-drained. Water movement is very high to moderately high. Shrink – swell potential is low to medium. The soils in the area is sandy to loamy sand soils with caliche found in some areas from very shallow to deeper zones. The underlying geology is eolian deposits with piedmont alluvial deposits. The vegetation in the area consist of mesquite, sage, four-wing saltbush, cacti, yucca, and grasses found in sandy soils. All areas on the ROW will be seeded with the BLM LPC seed mix.

**3.6 Wildlife and Special Status Species**

This area falls inside the BLM mapped Lesser Prairie Chicken area, but will not be affected as the timing stipulation ended on June 15<sup>th</sup>, and Apache is a CCA participator. No wildlife will be affected by the remediation activity at the release site.

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**4. REMEDIATION**

Remedial activities were completed on Friday, March 17, 2017. Remediation activities are summarized below.

**4.1 Soil Remediation Plan**

Apache, Arcadis, and EPI met on location to review plan, complete JSA, and clear any buried lines in the areas of excavation. An area was cleared and leveled for plastic liner to be positioned for stockpiling of the excavated soils. Two liners were laid for impacted soils and clean soils removed to reach impacted soils. Soils were analyzed with a Hanna GroLine Direct Soil EC Tester - Electrical Conductivity (EC) meter to ensure that soils were kept separately as soils were excavated.

Excavation began in the state pit area of the furthest south cell. As EPI was excavating, we encountered several buried tires and other buried items that gave notice that this cell had previously been excavated and backfilled. Arcadis had EPI dig a vertical to find caliche. None was found. Jennifer with Arcadis contacted Amber with the State Land Office (SLO) and Mike Bratcher with the Oil Conservation Division (OCD). Both were notified of the caliche not present in the area of the release. Jennifer received approval to remove four foot of the impacted area and line with a 20-mil liner. It was also agreed that the cell would be backfilled, contoured, and seeded. Side wall samples were taken for lab confirmation for horizontal delineation prior to lining and backfilling. All work as planned was completed.

EPI brought an auger (50 ft total depth capabilities) for delineation of the Rights-of-Way (ROW) area on Bureau of Land Management (BLM) surface. The delineation started at two feet below ground surface (bgs), repeated in two foot intervals to six feet bgs and then to four feet intervals starting at last interval in previous vertical until impacts were no longer encountered at 34 feet bgs. All soil samples collected (including the representative sample for hydrocarbon constituents) were sent to Cardinal Laboratories for analyzing. Once results were received, Jennifer made contact with Mike Bratcher with the OCD, Amber with the SLO, and Randy Pair with the BLM. It was approved to line at four feet and backfill with clean soil. A hydrovac was brought in to remove impacted soils to four feet due to multiple poly lines in the exact area of excavation. The lines were supported with pipe and excavation began. Some rock was encountered at three feet, so hydrovac worked around these areas. The excavation continued until sidewalls showed to be clean utilizing the Hanna GroLine Direct Soil EC Tester. All four walls were collected for lab confirmation. After area was excavated,

**Remediation  
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sand was placed in the bottom to protect the integrity of the liner. The liner was installed and area backfilled with clean soil.

**4.2 Conditions of Approval**

- OCD will be notified once remedial activities have been scheduled – Complete.
- A representative sample will need to be obtained and tested for hydrocarbon constituents - Completed.
- The target goal for chloride delineation is 250 mg/kg or background levels at SP1 – Completed.
- Sidewall samples will be required in excavations where lateral extent of impact has not been previously defined. – Completed.
- BLM and OCD must be contacted prior to liner placement or backfilling – Completed.
- SLO will be contacted with locations utilizing caliche with less than 1000 mg/kg from this release site prior to moving to locations – This action was not needed as there was no caliche located in south cell of state pit.

**4.3 Seeding Plan**

All areas, state and federal, were seeded with BIM seed mixture.

**5. FOLLOW-UP SCHEDULE**

Apache is requesting closure of this release.



## **Appendix A**

Attachments

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

Form C-141  
Revised August 8, 2011

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

Submit 1 Copy to appropriate District Office in  
accordance with 19.15.29 NMAC.

**Release Notification and Corrective Action**

**OPERATOR**

Initial Report  Final Report

Name of Company Apache Corporation	Contact Bruce Baker
Address 2350 W Marland Street, Hobbs, NM 88240	Telephone No. (432) 631-6982
Facility Name Apache State SWD # 3	Facility Type SWD

Surface Owner State	Mineral Owner	API No. 30-015-38978
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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
L	19	17S	31E					Eddy

**Latitude** 32.816536 **Longitude** -103.916730

**NATURE OF RELEASE**

Type of Release Produced water	Volume of Release 7 barrels of produce water	Volume Recovered 0 bbls
Source of Release flow line	Date and Hour of Occurrence 10/2/2015	Date and Hour of Discovery 10/2/2015
Was Immediate Notice Given? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
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 3 inch metal transition developed a hole resulting in the release. The flow line was isolated and repaired

Describe Area Affected and Cleanup Action Taken.\*

The release affected total of 695 square feet with 100 square feet of pasture and 595 square feet on lease road and NM state pit 337. The area was mapped and initial field sampling was conducted. The state land office was notified due to contamination in pit 337. Impacted areas were excavated to 4 feet bgs, lined, and backfilled with clean soils. The state pit was remediated by contouring to surrounding environment and seeding.

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

Signature: 	<b><u>OIL CONSERVATION DIVISION</u></b>	
Printed Name: Bruce Baker	Approved by Environmental Specialist:	
Title: Environmental Technician	Approval Date:	Expiration Date:
E-mail Address: larry.baker@apachecorp.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: 4/3/17	Phone: (432) 631-6982	

\* Attach Additional Sheets If Necessary



State SWD #3

**Legend**

- SWD spill path
- State SWD

PT.1

PT.4

PT.2

PT.5

PT.3

>5% slope

State SWD





May 13, 2016

BRUCE BAKER

APACHE CORP - HOBBS

2350 W. MARLAND BLVD.

HOBBS, NM 88240

RE: SWD #3 FLOWLINE

Enclosed are the results of analyses for samples received by the laboratory on 05/11/16 15:15.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-15-7. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

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

Received:	05/11/2016	Sampling Date:	05/11/2016
Reported:	05/13/2016	Sampling Type:	Soil
Project Name:	SWD #3 FLOWLINE	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SAMPLE PT. 5 @ 4' (H601037-01)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2560	16.0	05/12/2016	ND	416	104	400	3.77	

**Sample ID: SAMPLE PT. 5 @ 5' (H601037-02)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	240	16.0	05/12/2016	ND	416	104	400	3.77	

**Sample ID: SAMPLE PT. 5 @ 6' (H601037-03)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	448	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 7' (H601037-04)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	512	16.0	05/13/2016	ND	416	104	400	0.00	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

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

Received:	05/11/2016	Sampling Date:	05/11/2016
Reported:	05/13/2016	Sampling Type:	Soil
Project Name:	SWD #3 FLOWLINE	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SAMPLE PT. 5 @ 8' (H601037-05)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	384	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 9' (H601037-06)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	480	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 10' (H601037-07)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	432	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 11' (H601037-08)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	608	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 12' (H601037-09)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	720	16.0	05/13/2016	ND	416	104	400	0.00	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

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

Received:	05/11/2016	Sampling Date:	05/11/2016
Reported:	05/13/2016	Sampling Type:	Soil
Project Name:	SWD #3 FLOWLINE	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SAMPLE PT. 5 @ 13' (H601037-10)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	464	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 14' (H601037-11)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	304	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 5 @ 15' (H601037-12)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	640	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 3 @ SURFACE (H601037-13)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 3 @ 1' (H601037-14)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	05/13/2016	ND	416	104	400	0.00	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

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 BRUCE BAKER  
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 HOBBS NM, 88240  
 Fax To: (575) 393-2432

Received:	05/11/2016	Sampling Date:	05/11/2016
Reported:	05/13/2016	Sampling Type:	Soil
Project Name:	SWD #3 FLOWLINE	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SAMPLE PT. 3 @ 2' (H601037-15)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	05/13/2016	ND	416	104	400	0.00	

**Sample ID: SAMPLE PT. 3 @ 3' (H601037-16)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>32.0</b>	16.0	05/13/2016	ND	416	104	400	0.00	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

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



---

Celey D. Keene, Lab Director/Quality Manager







June 21, 2016

BRUCE BAKER

APACHE CORP - HOBBS

2350 W. MARLAND BLVD.

HOBBS, NM 88240

RE: SWD #3 FLOWLINE

Enclosed are the results of analyses for samples received by the laboratory on 06/15/16 16:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-15-7. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager

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

Received:	06/15/2016	Sampling Date:	06/15/2016
Reported:	06/21/2016	Sampling Type:	Soil
Project Name:	SWD #3 FLOWLINE	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SAMPLE PT. 5 @ 16' (H601326-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>288</b>	16.0	06/20/2016	ND	416	104	400	3.77	

**Sample ID: SAMPLE PT. 5 @ 17' (H601326-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>320</b>	16.0	06/20/2016	ND	416	104	400	3.77	

**Sample ID: SAMPLE PT. 5 @ 18' (H601326-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>1010</b>	16.0	06/20/2016	ND	416	104	400	3.77	

Cardinal Laboratories

\*=Accredited Analyte

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



Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

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



---

Celey D. Keene, Lab Director/Quality Manager

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

**BILL TO**

**ANALYSIS REQUEST**

Company Name: APACHE  
 Project Manager: Bruce Baker  
 Address: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 City: \_\_\_\_\_  
 Phone #: \_\_\_\_\_ Fax #: \_\_\_\_\_  
 Project #: \_\_\_\_\_ Project Owner: \_\_\_\_\_  
 Project Name: APACHE  
 Project Location: State SUD #3 Flowline  
 Sampler Name: Chris Flores  
 FOR LAB USE ONLY

P.O. #: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Attn: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone #: \_\_\_\_\_  
 Fax #: \_\_\_\_\_

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX						DATE	TIME	ANALYSIS	
				GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :				
<u>HW01330</u>	<u>-1 Sample Point 5 @ 16'</u>	<u>G</u>	<u>1</u>	<u>✓</u>						<u>6/15/2016 10:00am</u>	<u>11:30am</u>	<u>X</u>	<u>Chloride</u>
	<u>-2 Sample Point 5 @ 17'</u>	<u>G</u>	<u>1</u>	<u>✓</u>							<u>2:40pm</u>	<u>X</u>	
	<u>-3 Sample Point 5 @ 18'</u>	<u>G</u>	<u>1</u>	<u>✓</u>								<u>X</u>	

Relinquished By: \_\_\_\_\_ Date: 6/15/2016  
 Received By: Angela Alvarez  
 Time: \_\_\_\_\_

Sample Condition:  
 Cool  Intact   
 Yes  No

Checked By: \_\_\_\_\_ (Initials)  
16.20

REMARKS:  
 Email to: Flores@diversifiedfsi.com  
to: Flores@diversifiedfsi.com  
motives  
suburban  
in person  
Larry Baker @ apache corp.com

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



February 24, 2017

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

RE: APACHE STATE 3 SWD

Enclosed are the results of analyses for samples received by the laboratory on 02/23/17 16:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

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

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

Received:	02/23/2017	Sampling Date:	02/23/2017
Reported:	02/24/2017	Sampling Type:	Soil
Project Name:	APACHE STATE 3 SWD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: PILE 1 (H700464-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 2 (H700464-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 3 (H700464-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 4 (H700464-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

 Received: 02/23/2017  
 Reported: 02/24/2017  
 Project Name: APACHE STATE 3 SWD  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

 Sampling Date: 02/23/2017  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Jodi Henson

**Sample ID: PILE 5 (H700464-05)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 6 (H700464-06)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

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- RPD Relative Percent Difference
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- \*\*\* Insufficient time to reach temperature.
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Samples reported on an as received basis (wet) unless otherwise noted on report

---

Cardinal Laboratories

\*=Accredited Analyte

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---

Celey D. Keene, Lab Director/Quality Manager





February 28, 2017

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

RE: APACHE STATE 3 SWD

Enclosed are the results of analyses for samples received by the laboratory on 02/23/17 16:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

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

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

Received:	02/23/2017	Sampling Date:	02/23/2017
Reported:	02/28/2017	Sampling Type:	Soil
Project Name:	APACHE STATE 3 SWD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: WALL S (H700465-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: WALL N (H700465-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: WALL E (H700465-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: WALL W (H700465-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	48.0	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

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



---

Celey D. Keene, Lab Director/Quality Manager



# CARDINAL Laboratories

## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name: <i>Acidus Semtex Landcare</i>		P.O. #:		<b>BILL TO</b>		ANALYSIS REQUEST											
Project Manager: <i>Semtex Landcare</i>		Company: <i>Apache</i>															
Address:		Attn:															
City:		Address:															
State:		City:															
Zip:		State:															
Phone #:		Phone #:															
Fax #:		Fax #:															
Project #:		Project Owner:															
Project Name: <i>Apache State 3 SURD</i>		Project Location:															
Project Location: <i>Apache State 3 SURD</i>		Sampler Name: <i>James Landcare</i>															
FOR LAB USE ONLY		Matrix		PRESERV		SAMPLING											
Lab I.D.		Sample I.D.															
<i>H-100465</i>		<i>1 Well S</i>		<input checked="" type="checkbox"/> (G)RAB OR (C)OMP.				DATE		TIME							
<i>2 Well N</i>		<i>2 Well N</i>		<input checked="" type="checkbox"/> # CONTAINERS				<i>11/17</i>		<i>0900</i>		<i>Chlorides</i>					
<i>3 Well E</i>		<i>3 Well E</i>		<input checked="" type="checkbox"/> GROUNDWATER													
<i>4 Well W</i>		<i>4 Well W</i>		<input checked="" type="checkbox"/> WASTEWATER													
				<input checked="" type="checkbox"/> SOIL													
				<input checked="" type="checkbox"/> OIL													
				<input checked="" type="checkbox"/> SLUDGE													
				OTHER:													
				ACID/BASE:													
				ICE / COOL													
				OTHER:													

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 the client for the 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 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 services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: *James Landcare*

Date: *11/17*

Received By: *James Landcare*

Checked By: *James Landcare*

Phone Result:  Yes  No

Add'l Phone #: *70 #15*

Add'l Fax #: *70 #15*

REMARKS:

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



February 24, 2017

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

RE: APACHE STATE 3 SWD

Enclosed are the results of analyses for samples received by the laboratory on 02/23/17 16:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

Received:	02/23/2017	Sampling Date:	02/23/2017
Reported:	02/24/2017	Sampling Type:	Soil
Project Name:	APACHE STATE 3 SWD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: PILE 1 (H700464-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 2 (H700464-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 3 (H700464-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 4 (H700464-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

 Received: 02/23/2017  
 Reported: 02/24/2017  
 Project Name: APACHE STATE 3 SWD  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

 Sampling Date: 02/23/2017  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Jodi Henson

**Sample ID: PILE 5 (H700464-05)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: PILE 6 (H700464-06)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

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Celey D. Keene, Lab Director/Quality Manager

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- \*\*\* Insufficient time to reach temperature.
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Samples reported on an as received basis (wet) unless otherwise noted on report

---

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

---

March 01, 2017

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

RE: APACHE STATE 3 SWD

Enclosed are the results of analyses for samples received by the laboratory on 02/23/17 16:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. 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).

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

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Sincerely,

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

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

Received:	02/23/2017	Sampling Date:	02/23/2017
Reported:	03/01/2017	Sampling Type:	Soil
Project Name:	APACHE STATE 3 SWD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

**Sample ID: SP1 2' (H700466-01)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	02/25/2017	ND	1.89	94.4	2.00	1.81	
Toluene*	<0.050	0.050	02/25/2017	ND	1.76	88.2	2.00	2.17	
Ethylbenzene*	<0.050	0.050	02/25/2017	ND	1.75	87.3	2.00	2.30	
Total Xylenes*	<0.150	0.150	02/25/2017	ND	4.96	82.7	6.00	2.29	
Total BTEX	<0.300	0.300	02/25/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.3 % 73.6-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>368</b>	16.0	02/24/2017	ND	448	112	400	3.64	

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	03/01/2017	ND	195	97.3	200	2.86	
<b>DRO &gt;C10-C28</b>	<b>23.2</b>	10.0	03/01/2017	ND	205	103	200	4.62	

Surrogate: 1-Chlorooctane 104 % 25.1-158

Surrogate: 1-Chlorooctadecane 101 % 26.8-170

**Sample ID: SP1 4' (H700466-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>4800</b>	16.0	02/24/2017	ND	448	112	400	3.64	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

 Received: 02/23/2017  
 Reported: 03/01/2017  
 Project Name: APACHE STATE 3 SWD  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

 Sampling Date: 02/23/2017  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Jodi Henson

**Sample ID: SP1 6' (H700466-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	8260	16.0	02/24/2017	ND	448	112	400	3.64	

**Sample ID: SP1 18' (H700466-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1550	16.0	02/27/2017	ND	448	112	400	3.64	

**Sample ID: SP1 22' (H700466-05)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	304	16.0	02/27/2017	ND	448	112	400	3.64	

**Sample ID: SP1 26' (H700466-06)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	02/27/2017	ND	448	112	400	3.64	

**Sample ID: SP1 30' (H700466-07)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	02/27/2017	ND	432	108	400	3.77	

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

 Received: 02/23/2017  
 Reported: 03/01/2017  
 Project Name: APACHE STATE 3 SWD  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

 Sampling Date: 02/23/2017  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Jodi Henson

**Sample ID: SP1 34' (H700466-08)**
**Chloride, SM4500Cl-B**
**mg/kg**
**Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>32.0</b>	16.0	02/27/2017	ND	448	112	400	3.64	

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- 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







March 29, 2017

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

RE: APACHE STATE 3 SWD

Enclosed are the results of analyses for samples received by the laboratory on 03/28/17 12:56.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 ARCADIS U.S., INC.  
 JENNIFER VAN CUREN  
 2999 OAK ROAD, SUITE 300  
 WALNUT CREEK CA, 94597  
 Fax To: NOT GIVEN

 Received: 03/28/2017  
 Reported: 03/29/2017  
 Project Name: APACHE STATE 3 SWD  
 Project Number: NONE GIVEN  
 Project Location: NOT GIVEN

 Sampling Date: 03/13/2017  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Celey D. Keene

**Sample ID: ROW NORTH WALL (H700807-01)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	03/29/2017	ND	448	112	400	3.51	

**Sample ID: ROW SOUTH WALL (H700807-02)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	03/29/2017	ND	448	112	400	3.51	

**Sample ID: ROW EAST WALL (H700807-03)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	03/29/2017	ND	448	112	400	3.51	

**Sample ID: ROW WEST WALL (H700807-04)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	03/29/2017	ND	448	112	400	3.51	

Cardinal Laboratories

\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

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



---

Celey D. Keene, Lab Director/Quality Manager





## **Appendix B**

Tables

## STATE SWD FLOWLINE

Date	Sample #	Depth (feet)	Lab Data			Field Data for CL's
			BTEX	TPH	CL's	
4/5/2016	PT.1	0				116
		1				218
		2				1646
		3				2899
		4				12960
		5				7309
		6				9993
		7				13694
		8				11921
		9				12670
		10				12481
		11				9095
		12				8301
		13				6517
		14				8380
		15				9108
		16				9468
		17				11306
4/5/2016	PT.2	0				112
		1				789
		2				4235
		3				11623
		4				8427
		5				9032
		6				8893
		7			7400	7008
		8				3776
		9				4161
		10				1163
		11				1658
		12				347
		13			43	161
		14			330	454
6/15/2016	PT.3	0			64	116
		1			ND	139
		2			ND	149
		3			32	111

## STATE SWD FLOWLINE

Date	Sample #	Depth (feet)	Lab Data			Field Data for CL's
			BTEX	TPH	CL's	
4/5/2016	PT.4	0				111
		1				112
		2				624
		3				684
		4				1762
5/11/2016	PT. 5	0				168
		1				1278
		2				194
		3				1146
		4			2560	
		5			240	
		6			448	
		7			512	
		8			384	
		9			480	
		10			432	
		11			608	
		12			720	
		13			464	
		14			304	
		15			640	
		16			288	
		17			320	
		18			1010	

## STATE SWD FLOWLINE

Date	Sample #	Depth (feet)	Lab Data			Field Data for CL's
			BTEX	TPH	CL's	
2/23/2017	BLM ROW					
	SP1	2	<0.300	23.2	368	426
	SP1	4			4,800	>4,000
	SP1	6			8,260	>4,000
	SP1	18			1,550	1,680
	SP1	22			304	480
	SP1	26			64	220
	SP1	30			32	280
	SP1	34			32	64

State Pit Excavation					
South Wall	4			32	220
North Wall	4			32	96
East Wall	4			16	320
West Wall	4			48	78

Stockpiled Topsoil from Excavation used in backfil					
Pile 1				80	120
Pile 2				16	82
Pile 3				32	102
Pile 4				192	220
Pile 5				32	48
Pile 6				16	62



## **Appendix C**

Photolog

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 1**

**Description:**  
Overview

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 2**

**Description:**  
Overview

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 3**

**Description:**

Overview

**Location:**

Apache State SWD #3

**Photograph taken by:**

Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 4**

**Description:**

Overview

**Location:**

Apache State SWD #3

**Photograph taken by:**

Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 5**

**Description:**  
Overview

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 6**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 7**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 8**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 9**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 10**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 11**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 12**

**Description:**  
Excavating  
No caliche in cell

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 13**

**Description:**  
Excavating  
No caliche in cell

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 14**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 15**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 16**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 17**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 18**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 19**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 20**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 21**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 22**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 23**

**Description:**  
Excavating

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 24**

**Description:**  
Lining

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 25**

**Description:**  
Lining

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 26**

**Description:**  
Lining

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 27**

**Description:**  
Backfilling

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 28**

**Description:**  
Backfilling

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 29**

**Description:**  
Contouring

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 30**

**Description:**  
Contouring

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 31**

**Description:**  
ROW excavation with  
Hydrovac

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 32**

**Description:**  
Padding with sand

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017

## PHOTOGRAPH LOG

Apache Corporation  
MT001204.0001  
Eddy County, NM



**Photograph: 33**

**Description:**  
Lining

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017



**Photograph: 34**

**Description:**  
Backfilling

**Location:**  
Apache State SWD #3

**Photograph taken by:**  
Jennifer Van Curen

**Date:** 4/4/2017