

1R - 2627

# REPORTS

DATE:

7-30-13

# Rice Environmental Consulting & Safety

---

P.O. Box 2948, Hobbs, NM 88241  
Phone 575.393.2967

RECEIVED OGD

July 30<sup>th</sup>, 2013

2013 AUG -1 P 3: 00

**Mr. Edward Hansen**

New Mexico Energy, Minerals, & Natural Resources  
Oil Conservation Division, Environmental Bureau  
1220 S. St. Francis Drive  
Santa Fe, New Mexico 87505

**RE: CAP Report for Groundwater  
Apache Corporation  
NMGSAU 1631 (1R-2627): UL/J sec. 32 T19S R37E**

Mr. Hansen:

Apache Corporation (Apache) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site.

## **Background and Previous Work**

The site is located approximately 1 mile southwest of Monument at UL/J, Sec. 32, T19S, R37E in Lea County, NM (Figure 1). A leak was discovered at the site on September 28<sup>th</sup>, 2010. An unknown amount of produced water was released from the injection line collar. According to monitor well sampling data at the site, groundwater is located at approximately 14 ft below ground surface (bgs).

Excavation of the site began on September 28<sup>th</sup>, 2010. The site was excavated to 38 ft x 96 ft x 18 ft deep to remove the saturated soils to a NMOCD approved disposal facility. The depth of saturated soils reached 14 ft 8 inches bgs at which point the capillary fringe of the aquifer was encountered. On October 7<sup>th</sup>, 2010, three (3) soil bores were drilled at the site to determine the extent of impact. RECS personnel field tested the soil for chloride and tested for hydrocarbons using a photo-ionization detector (PID). Representative samples were submitted to a commercial laboratory for chloride and TPH analyses. The site was backfilled to 4.5 ft bgs, where a 20-mil, reinforced liner was installed with 6 inches of blow sand placed below and above the liner for padding.

On October 12<sup>th</sup>, 2010, the initial C-141 was submitted to NMOCD-District 1 and was approved. Subsequently, the remaining excavation at the site was backfilled with clean, imported soil, and the site was contoured to the surrounding landscape. On October 16<sup>th</sup>, 2010, amendments were incorporated into the soil surface, and the site was seeded.

On October 25<sup>th</sup>, 2010, MW-1 was installed 45 ft southeast of the line break. On December 21<sup>st</sup>, 2010, MW-2 was installed 56 ft NNW of the line break, and on April 13<sup>th</sup>, 2011, MW-3 was installed 199 ft SE of the line break (Figure 2). The monitor wells have been sampled quarterly since their installation (Appendix A).

On October 11<sup>th</sup>, 2011, a Corrective Action Plan (CAP) was submitted to NMOCD. The CAP was approved by NMOCD on October 17<sup>th</sup>, 2011. RECS recommended that a three month groundwater source removal and test pumping program be conducted to determine if groundwater remediation could be achieved quickly. The pumping program would also assist in the evaluation of groundwater restoration methods. Water retrieved from the existing 4-inch monitoring well (MW-1) would be used for production operations. Based on the program results, a remedy for the site would be determined.

On August 14<sup>th</sup>, 2012, a Corrective Action Plan for Groundwater was submitted to NMOCD. The CAP was approved by NMOCD on August 15<sup>th</sup>, 2012. RECS detailed the groundwater and chloride extraction totals of the test pumping program. RECS recommended that, as a groundwater remedy, the test pumping program remain in use until groundwater reaches near-background levels of chloride.

Since the groundwater source removal and pumping program began on April 10<sup>th</sup>, 2012, a total of 3,965 barrels of groundwater have been removed from the site. Given the most recent laboratory chloride readings 352 mg/L in MW-1, the volume of groundwater removal indicates that 221 kg of chloride have been removed. The pumping program will remain in operation until the winter months arrived. In order to maintain integrity of the system and avoid possible utility and/or environmental damages, the pumping system at the site will be shut in throughout the winter months and will resume in the spring of 2014. As stated in the CAP for Groundwater, approved in August 2012, Apache will continue the pumping program until the chloride concentrations decrease to near-background levels.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

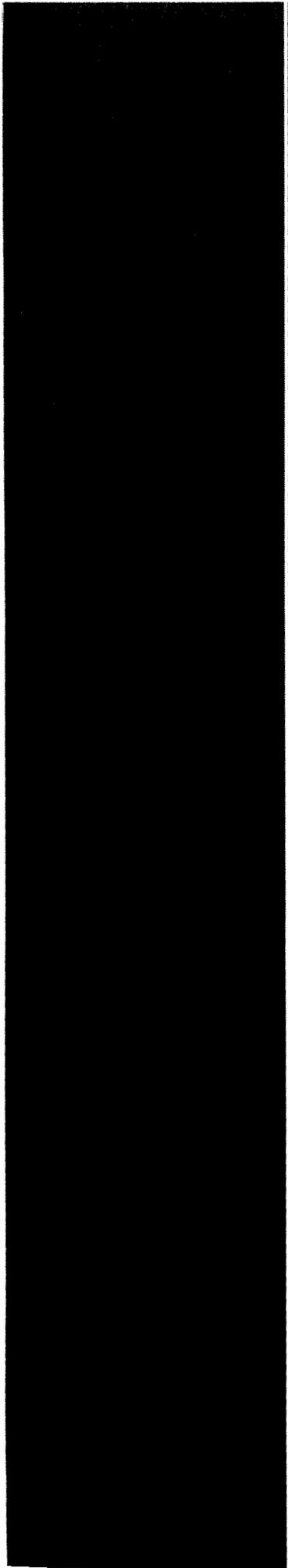
Sincerely,



Lara Weinheimer  
Project Scientist  
RECS  
(575) 441-0431

Attachments:

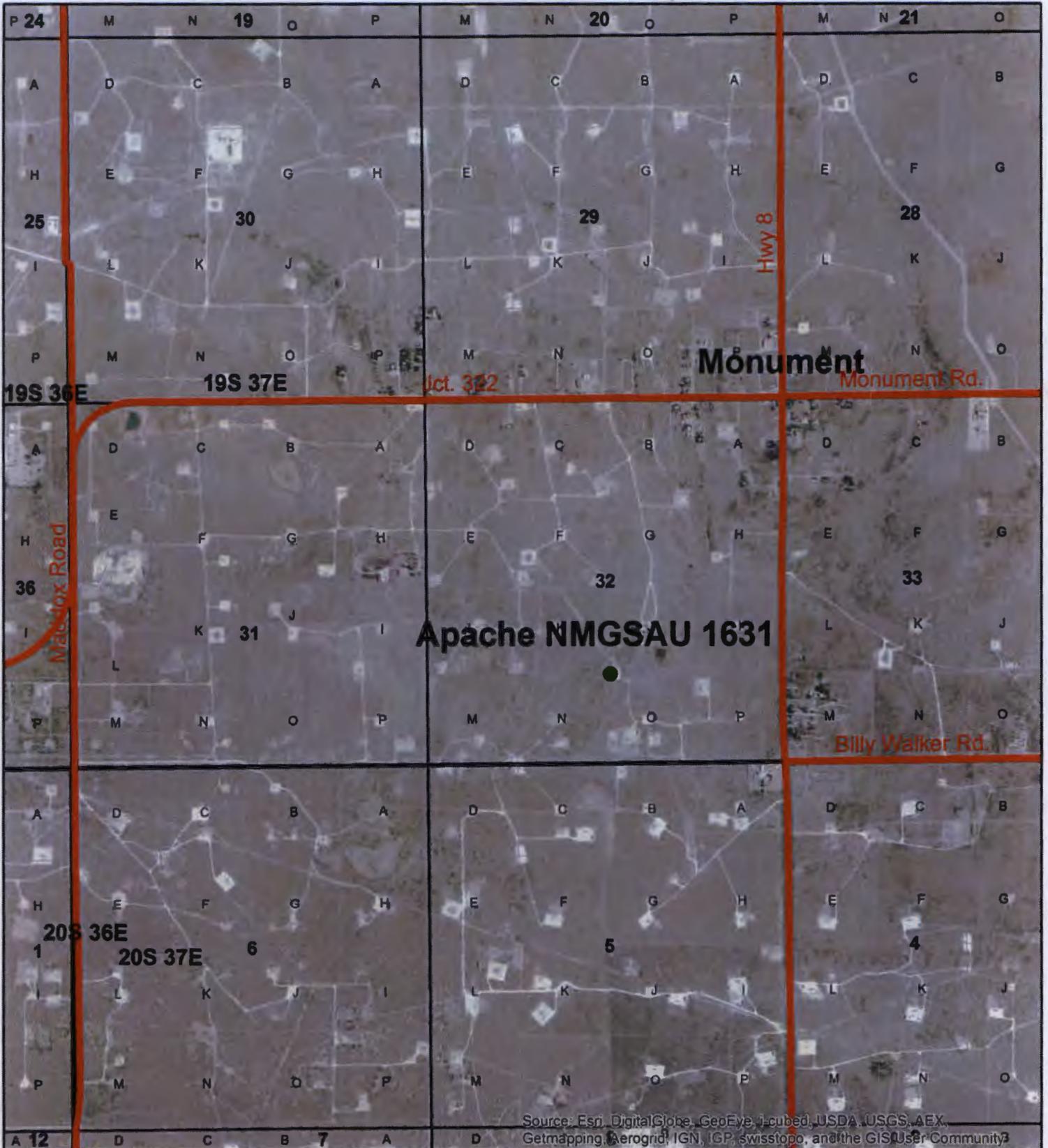
- Figure 1 – Site Map
- Figure 2 – Monitor Well Sampling Data
- Appendix A – Laboratory Analyses



# Figures

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948, Hobbs, NM 88241  
Phone 575.393.2967

# Site Location Map



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

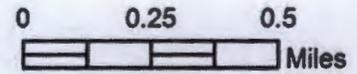


## APACHE NMGSAU 1631

LEGALS:UL/J sec. 32  
T19S R37E

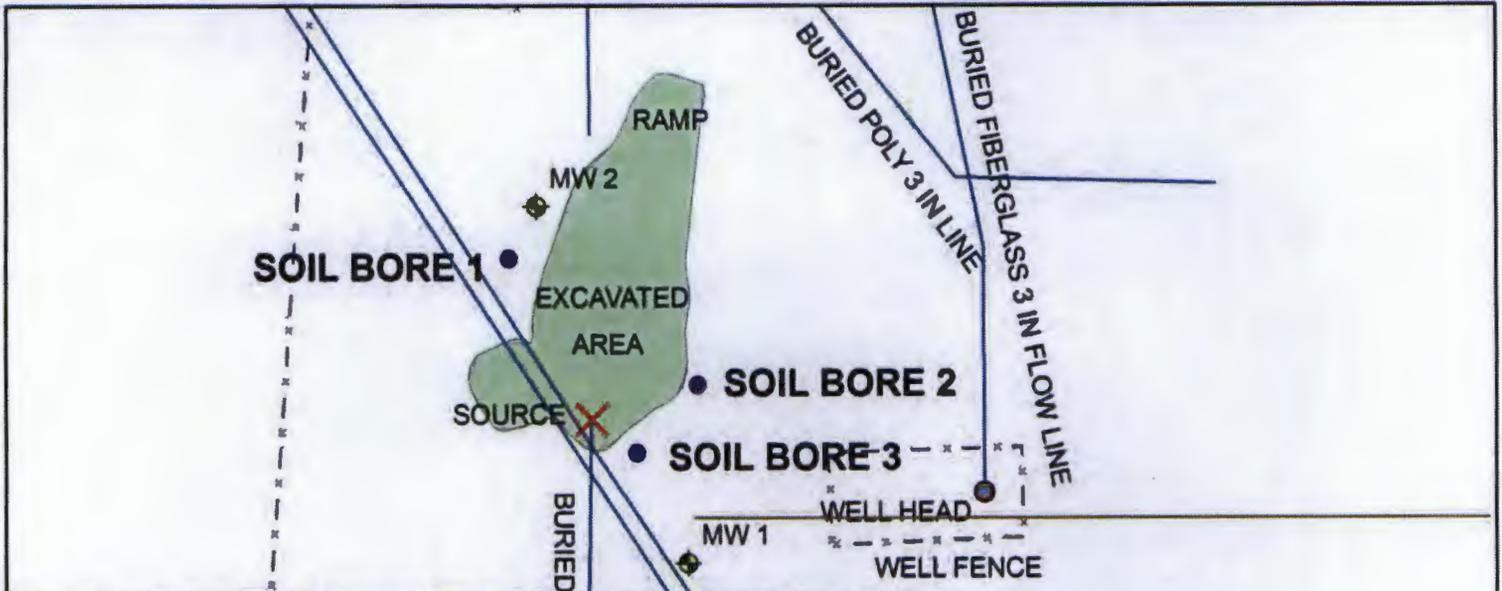
Case #: 1R-2627

Figure 1



Drawing date: 7/19/13  
Drafted by: L. Weinheimer

# Monitor Well Sampling Data



MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
1	13.84	50.35	11/3/2010	6400	12700	0.015	0.001	0.004	0.01	1120
	13.83	50.35	1/6/2011	3250	6600	0.007	<0.001	0.002	0.006	697
	13.86	50.36	5/19/2011	2420	4770	<0.001	<0.001	<0.001	<0.003	531
	13.81	50.35	9/1/2011	860	2060	<0.001	<0.001	<0.001	<0.003	232
	13.99	50.35	11/18/2011	1480	3150	<0.001	<0.001	<0.001	<0.003	344
	13.87	50.35	3/6/2012	1280	2730	<0.001	<0.001	<0.001	<0.003	363
	XXX	50.35	6/20/2012	540	1420	<0.001	<0.001	<0.001	<0.003	116
	XXX	50.35	9/25/2012	970	2190	<0.001	<0.001	<0.001	<0.003	190
	XXX	50.35	12/13/2012	1040	1970	<0.001	<0.001	<0.001	<0.003	223
	XXX	50.35	3/27/2013	480	1040	<0.001	<0.001	<0.001	<0.003	84
XXX	50.35	6/26/2013	352	1010	<0.001	<0.001	<0.001	<0.003	81	

XXX: Not gauged due to pump in well.

MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
2	13.47	61.15	1/6/2011	320	878	<0.001	<0.001	<0.001	<0.003	81.1
	13.52	61.15	5/19/2011	296	907	<0.001	<0.001	<0.001	<0.003	67.1
	13.68	61.15	9/1/2011	284	785	<0.001	<0.001	<0.001	<0.003	75.7
	13.69	61.15	11/18/2011	308	860	<0.001	<0.001	<0.001	<0.003	64.1
	13.58	61.15	3/6/2012	280	907	<0.001	<0.001	<0.001	<0.003	68.8
	13.78	61.15	6/20/2012	280	920	<0.001	<0.001	<0.001	<0.003	64
	13.81	61.15	9/25/2012	268	853	<0.001	<0.001	<0.001	<0.003	63.8
	13.64	61.15	12/13/2012	280	847	<0.001	<0.001	<0.001	<0.003	57.7
	13.72	61.15	3/27/2013	264	854	<0.001	<0.001	<0.001	<0.003	67.8
	13.88	61.15	6/26/2013	268	868	<0.001	<0.001	<0.001	<0.003	69.7

MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
3	18.69	30.05	5/19/2011	300	903	<0.001	<0.001	<0.001	<0.003	69.6
	18.7	30.05	9/1/2011	308	845	<0.001	<0.001	<0.001	<0.003	84.8
	17.93	30.05	11/18/2011	380	954	<0.001	<0.001	<0.001	<0.003	78.6
	18.06	30.05	3/6/2012	324	989	<0.001	<0.001	<0.001	<0.003	77.3
	18.43	30.05	6/20/2012	296	922	<0.001	<0.001	<0.001	<0.003	70
	18.58	30.05	9/25/2012	288	938	<0.001	<0.001	<0.001	<0.003	70.5
	18.26	30.05	12/13/2012	288	818	<0.001	<0.001	<0.001	<0.003	77
	18.26	30.05	3/27/2013	292	881	<0.001	<0.001	<0.001	<0.003	77.3
	18.57	30.05	6/26/2013	280	915	<0.001	<0.001	<0.001	<0.003	75.4

MW 3

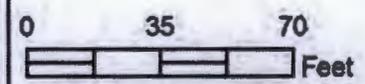


## NMGSAU 1631

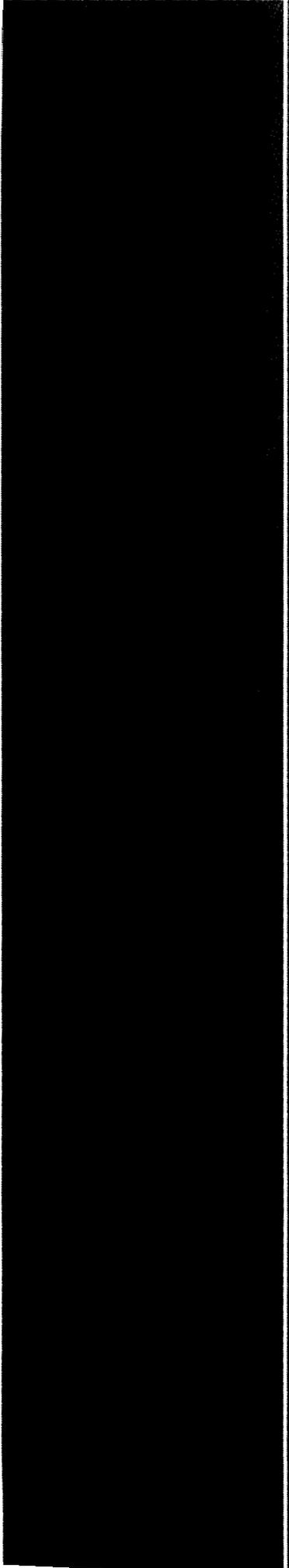
Legals: UL/J sec. 32  
T19S R37E

Case #: 1R-2627

### Figure 2



Projection: NAD 83/STATE PLANE  
Drawing date: 7/19/13  
Drafted by: L. Weinheimer



# Appendix A

Laboratory Analyses

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948 Hobbs, NM 88241  
Phone 575.393.2967

July 05, 2013

HACK CONDER  
APACHE - EUNICE  
P. O. BOX 1849  
EUNICE, NM 88231

RE: APACHE NMGSAU 1631-ACCIDENTAL DISCHARGE

Enclosed are the results of analyses for samples received by the laboratory on 06/27/13 8:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

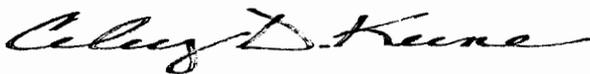
Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

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

Accreditation applies to public drinking water matrices.

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

Sincerely,



Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**

 APACHE - EUNICE  
 HACK CONDER  
 P. O. BOX 1849  
 EUNICE NM, 88231  
 Fax To: 394-2425

 Received: 06/27/2013  
 Reported: 07/05/2013  
 Project Name: APACHE NMGSAU 1631-ACCIDENTAL DI  
 Project Number: NOT GIVEN  
 Project Location: T19S-R37E-SEC32 J-LEA CTY., NM

 Sampling Date: 06/26/2013  
 Sampling Type: Water  
 Sampling Condition: Cool & Intact  
 Sample Received By: Jodi Henson

**Sample ID: MONITOR WELL #1 (H301519-01)**

BTEX 8260B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	07/03/2013	ND	0.054	108	0.0500	0.922		
Toluene*	<0.001	0.001	07/03/2013	ND	0.050	99.6	0.0500	1.95		
Ethylbenzene*	<0.001	0.001	07/03/2013	ND	0.049	98.7	0.0500	3.68		
Total Xylenes*	<0.003	0.003	07/03/2013	ND	0.153	102	0.150	1.74		

Surrogate: Dibromofluoromethane 97.7 % 59.8-161

Surrogate: Toluene-d8 97.2 % 75.2-115

Surrogate: 4-Bromofluorobenzene 106 % 53.7-120

Chloride, SM4500Cl-B		mg/L		Analyzed By: DW						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	352	4.00	06/28/2013	ND	108	108	100	0.00		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	81.0	25.0	07/05/2013	ND	21.0	105	20.0	7.55		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	1010	5.00	06/28/2013	ND	244	102	240	0.157		

Cardinal Laboratories

\*=Accredited Analyte

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



Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 APACHE - EUNICE  
 HACK CONDER  
 P. O. BOX 1849  
 EUNICE NM, 88231  
 Fax To: 394-2425

Received:	06/27/2013	Sampling Date:	06/26/2013
Reported:	07/05/2013	Sampling Type:	Water
Project Name:	APACHE NMGS AU 1631-ACCIDENTAL DI	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Jodi Henson
Project Location:	T19S-R37E-SEC32 J-LEA CTY., NM		

**Sample ID: MONITOR WELL #2 (H301519-02)**

BTEX 8260B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	07/03/2013	ND	0.054	108	0.0500	0.922		
Toluene*	<0.001	0.001	07/03/2013	ND	0.050	99.6	0.0500	1.95		
Ethylbenzene*	<0.001	0.001	07/03/2013	ND	0.049	98.7	0.0500	3.68		
Total Xylenes*	<0.003	0.003	07/03/2013	ND	0.153	102	0.150	1.74		

Surrogate: Dibromofluoromethane 95.6 % 59.8-161

Surrogate: Toluene-d8 98.1 % 75.2-115

Surrogate: 4-Bromofluorobenzene 108 % 53.7-120

Chloride, SM4500Cl-B		mg/L		Analyzed By: DW						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	268	4.00	06/28/2013	ND	108	108	100	0.00		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	69.7	10.0	07/05/2013	ND	21.0	105	20.0	7.55		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	868	5.00	07/03/2013	ND	244	102	240	0.157		

Cardinal Laboratories

\*=Accredited Analyte

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



Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 APACHE - EUNICE  
 HACK CONDER  
 P. O. BOX 1849  
 EUNICE NM, 88231  
 Fax To: 394-2425

Received:	06/27/2013	Sampling Date:	06/26/2013
Reported:	07/05/2013	Sampling Type:	Water
Project Name:	APACHE NMGSAU 1631-ACCIDENTAL DI	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Jodi Henson
Project Location:	T19S-R37E-SEC32 J-LEA CTY., NM		

**Sample ID: MONITOR WELL #3 (H301519-03)**

BTX 8260B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	07/03/2013	ND	0.054	108	0.0500	0.922		
Toluene*	<0.001	0.001	07/03/2013	ND	0.050	99.6	0.0500	1.95		
Ethylbenzene*	<0.001	0.001	07/03/2013	ND	0.049	98.7	0.0500	3.68		
Total Xylenes*	<0.003	0.003	07/03/2013	ND	0.153	102	0.150	1.74		

*Surrogate: Dibromofluoromethane* 98.6 % 59.8-161

*Surrogate: Toluene-d8* 97.0 % 75.2-115

*Surrogate: 4-Bromofluorobenzene* 108 % 53.7-120

Chloride, SM4500Cl-B		mg/L		Analyzed By: DW						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>Chloride*</b>	<b>280</b>	4.00	06/28/2013	ND	108	108	100	0.00		

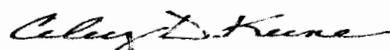
Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>Sulfate*</b>	<b>75.4</b>	10.0	07/05/2013	ND	21.0	105	20.0	7.55		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>TDS*</b>	<b>915</b>	5.00	07/03/2013	ND	244	102	240	0.157		

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

---

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

