

L. Peter Galusky, Jr. P.E.

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March 29th, 2016

Dr. Tomas Oberding
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

RE: **2015 Annual Report: OCD Case Number: 1R427-87**
Rice Operating Company – EME SWD System
H-20 SWD (UL H, Sec 20, T20S, R37E)

Sent by E-mail

Dr. Oberding:

This letter summarizes progress made over the past year pursuant to the NMOCD approved Corrective Action Plan for this site. The site is an active SWD produced water disposal facility operated by Rice Operating Company (ROC) in the EME field, located approximately 4 miles south of Monument, New Mexico (Appendix, Figure 1).

Over the course of 2015 we continued to monitor up and down-gradient monitor wells (Appendix, Figure 2) for chlorides and petroleum hydrocarbons (BTEX). In brief:

1. Groundwater chloride concentrations (Appendix Figure 3, Table 1) in the up-gradient monitor well (MW-2) increased from the previous year, rising to an average of 932 mg/l in 2015 from 780 mg/l in 2014. Year average groundwater chloride concentrations in the at-source monitor well (MW-1) dropped from 1,135 mg/l in 2014 to 1,090 mg/l in 2015. Groundwater chlorides in the down-gradient monitor well (MW-3) increased from an average of 1,230 mg/l in 2014 to 1,490 mg/l in 2015.
2. Groundwater benzene concentrations (Appendix Figure 4, Table 2) in the at-source monitor well (MW-1) began at 0.029 mg/l in February 2015 and have remained below detectable limit for three consecutive quarters. Benzene and total BTEX concentrations continued to measure below detectable limits in the other monitoring wells through 2015, excepting for the down-gradient monitor well (MW-4) which measured 0.001 mg/l on August 11th, 2015 (which is the limit of laboratory detection) during one sampling event (Appendix Figure 4, Table 2).

During the course of 2016, we plan to continue the operation of the solar-powered bio-sparge system and to continue the quarterly monitoring of groundwater for chlorides and BTEX.

Rice Operating Company: EME H-20 SWD Annual Report

ROC is the service provider (agent) for the EME Salt Water Disposal System and has no ownership of any portion of pipeline, well or facility. The EME SWD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Please do not hesitate to contact either Rice Operating Company or myself if you have any questions or need additional information.

Sincerely,

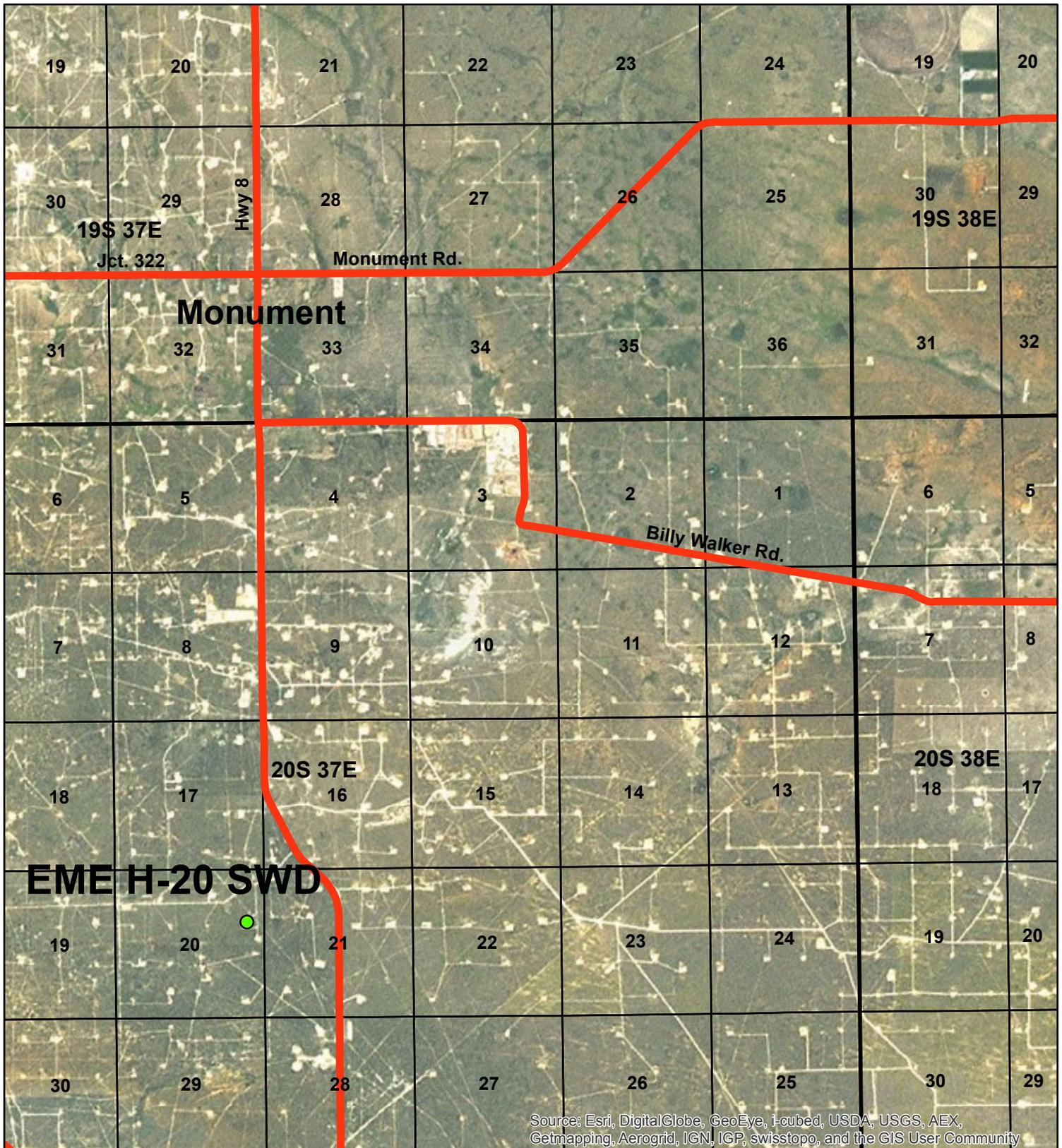
A handwritten signature in black ink, appearing to be 'L. Peter Galusky, Jr.', written over a light gray rectangular background.

L. Peter Galusky, Jr. P.E.
NM Prof. Engineer No. 22561

Copy: Rice Operating Company

Attachment: Appendix

Site Location



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



EME H-20 SWD

LEGALS: UL/H sec. 20
T-20-S R-37-E

NMOCD Case #: 1R427-87

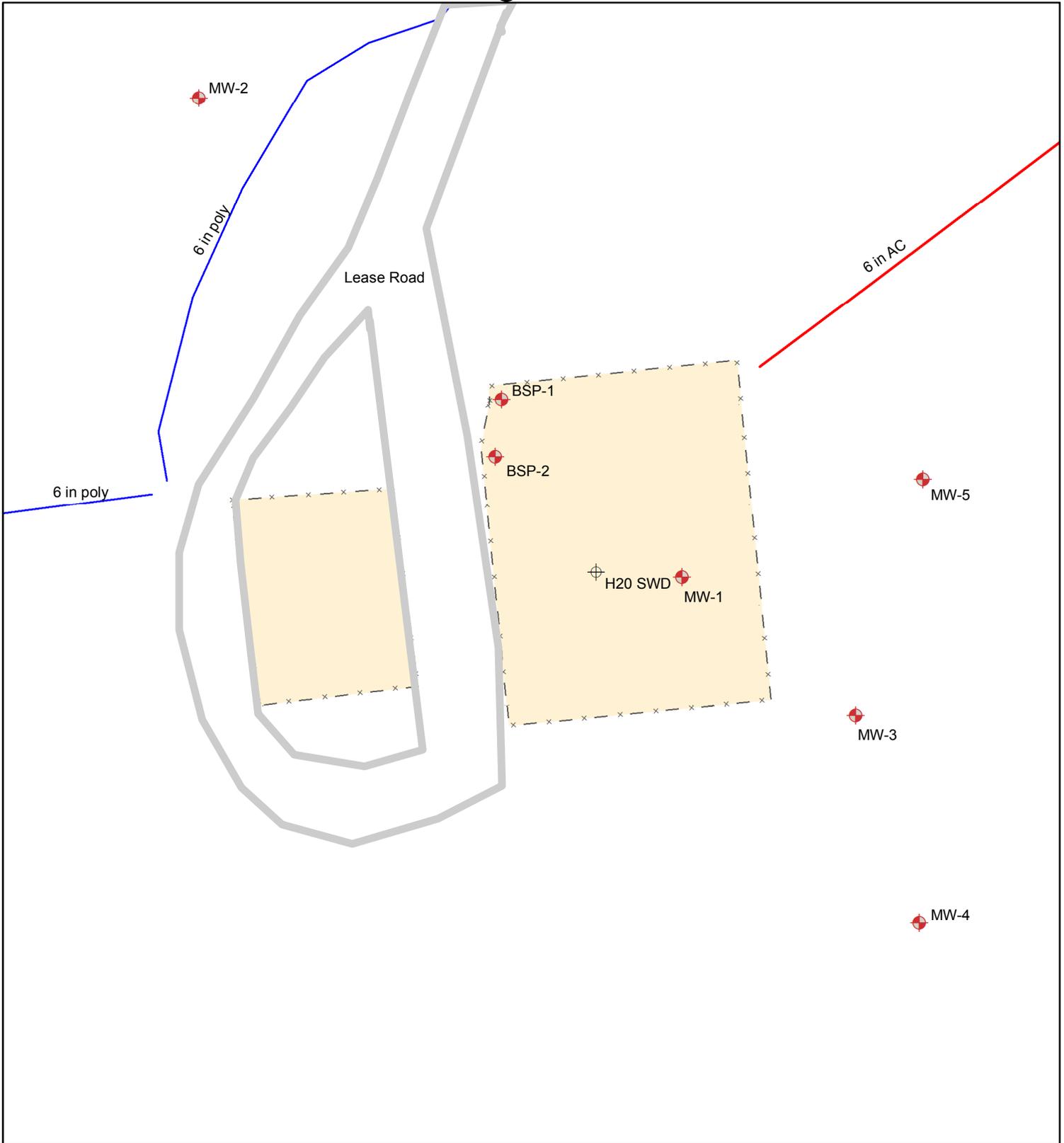
Figure 1



0 0.2750.55 1.1
Miles

Drawing date: 3/18/14
Drafted by: L. Flores

Monitoring Well Locations

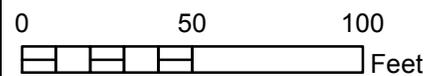


EME H-20 SWD

LEGALS: UL/H sec.20
T-20-S R-37-E

NMOCD Case #: 1R427-87

Figure 2



Drawing date: 3/18/14
Drafted by: L. Flores

Figure 3

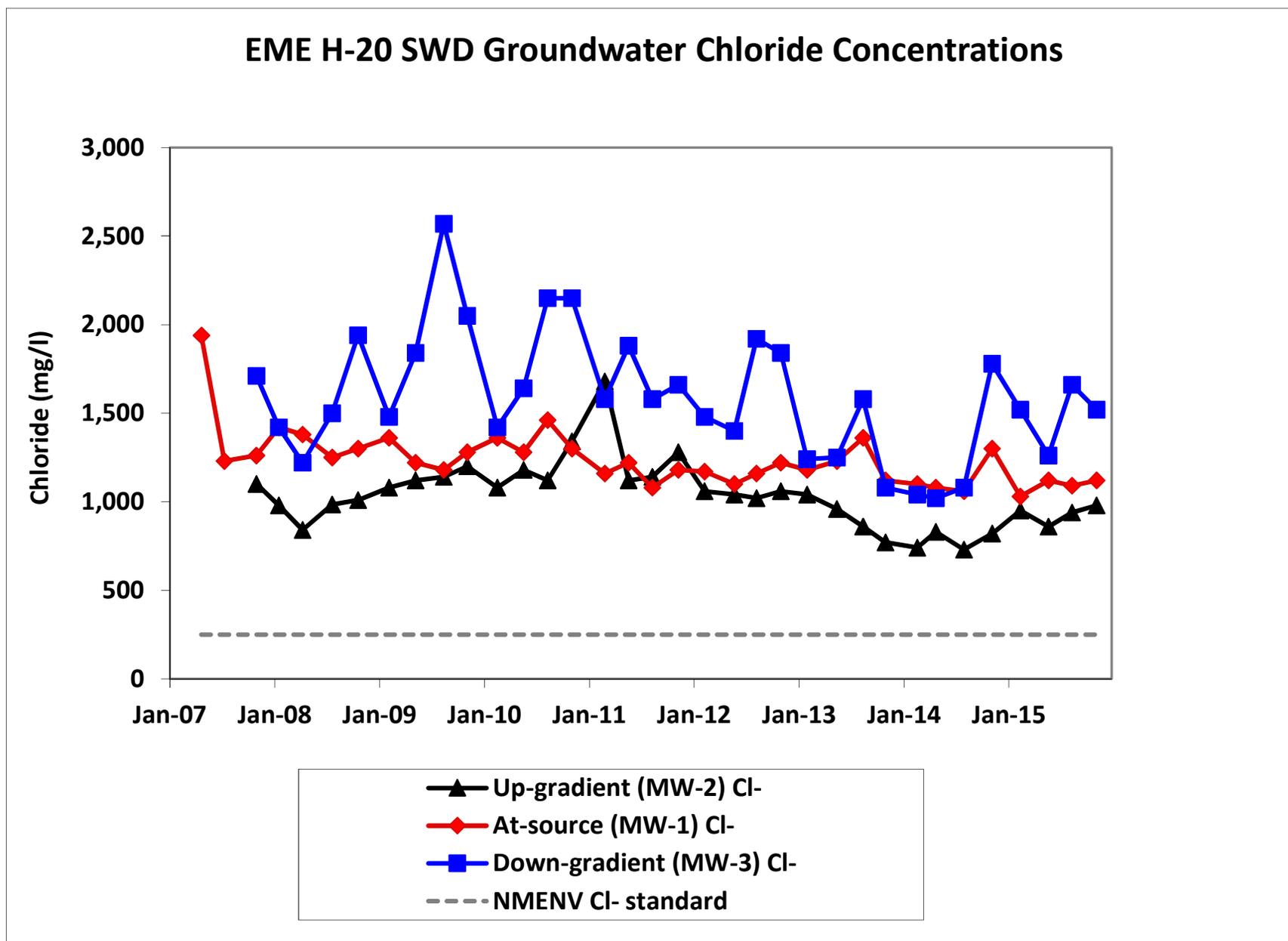


Table 1**EME H-20 SWD****Groundwater Chloride Concentrations**

	at-source	up-gradient	down- gradient	down- gradient	down- gradient	NMENV Standard
<u>Date</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>MW-5</u>	
4/23/07	1,939					250
7/12/07	1,230					250
11/1/07	1,260	1,100	1,710			250
1/18/08	1,420	980	1,420			250
4/9/08	1,380	840	1,220			250
7/21/08	1,250	984	1,500	1,060	1,120	250
10/20/08	1,300	1,010	1,940	1,120	1,220	250
2/5/09	1,360	1,080	1,480	1,200	1,180	250
5/8/09	1,220	1,120	1,840	1,340	1,320	250
8/14/09	1,180	1,140	2,570	1,240	1,240	250
11/4/09	1,280	1,200	2,050	1,200	1,260	250
2/17/10	1,360	1,080	1,420	1,380	1,260	250
5/19/10	1,280	1,180	1,640	1,340	1,340	250
8/11/10	1,460	1,120	2,150	1,380	1,400	250
11/4/10	1,300	1,340	2,150	1,280	1,560	250
2/26/11	1,160	1,680	1,580	1,440	1,600	250
5/20/11	1,220	1,120	1,880	1,500	1,680	250
8/11/11	1,080	1,140	1,580	1,400	1,600	250
11/9/11	1,180	1,280	1,660	1,480	1,600	250
2/8/2012	1,170	1,060	1,480	1,500	1,560	250
5/22/2012	1,100	1,040	1,400	1,360	1,480	250
8/7/2012	1,160	1,020	1,920	1,360	1,320	250
10/31/12	1,220	1,060	1,840	1,400	1,240	250
1/30/13	1,180	1,040	1,240	1,220	1,140	250
5/14/13	1,230	960	1,250	1,340	1,200	250
8/14/13	1,360	860	1,580	1,400	1,070	250
10/31/13	1,120	770	1,080	1,180	1,000	250
2/18/14	1,100	740	1,040	1,200	1,000	250
4/24/14	1,080	830	1,020	1,240	1,060	250
7/31/14	1,060	730	1,080	1,220	1,040	250
11/6/14	1,300	820	1,780	920	1,100	250
2/12/15	1,030	950	1,520	1,080	1,040	250
5/21/15	1,120	860	1,260	1,040	1,200	250
8/11/15	1,090	939	1,660	1,120	1,220	250
11/5/15	1,120	980	1,520	1,140	1,360	250
2011 avg	1,160	1,305	1,675	1,455	1,620	250
2012 avg	1,163	1,045	1,660	1,405	1,400	250
2013 avg	1,223	908	1,288	1,285	1,103	250
2014 avg	1,135	780	1,230	1,145	1,050	250
2015 avg	1,090	932	1,490	1,095	1,205	250

Figure 4

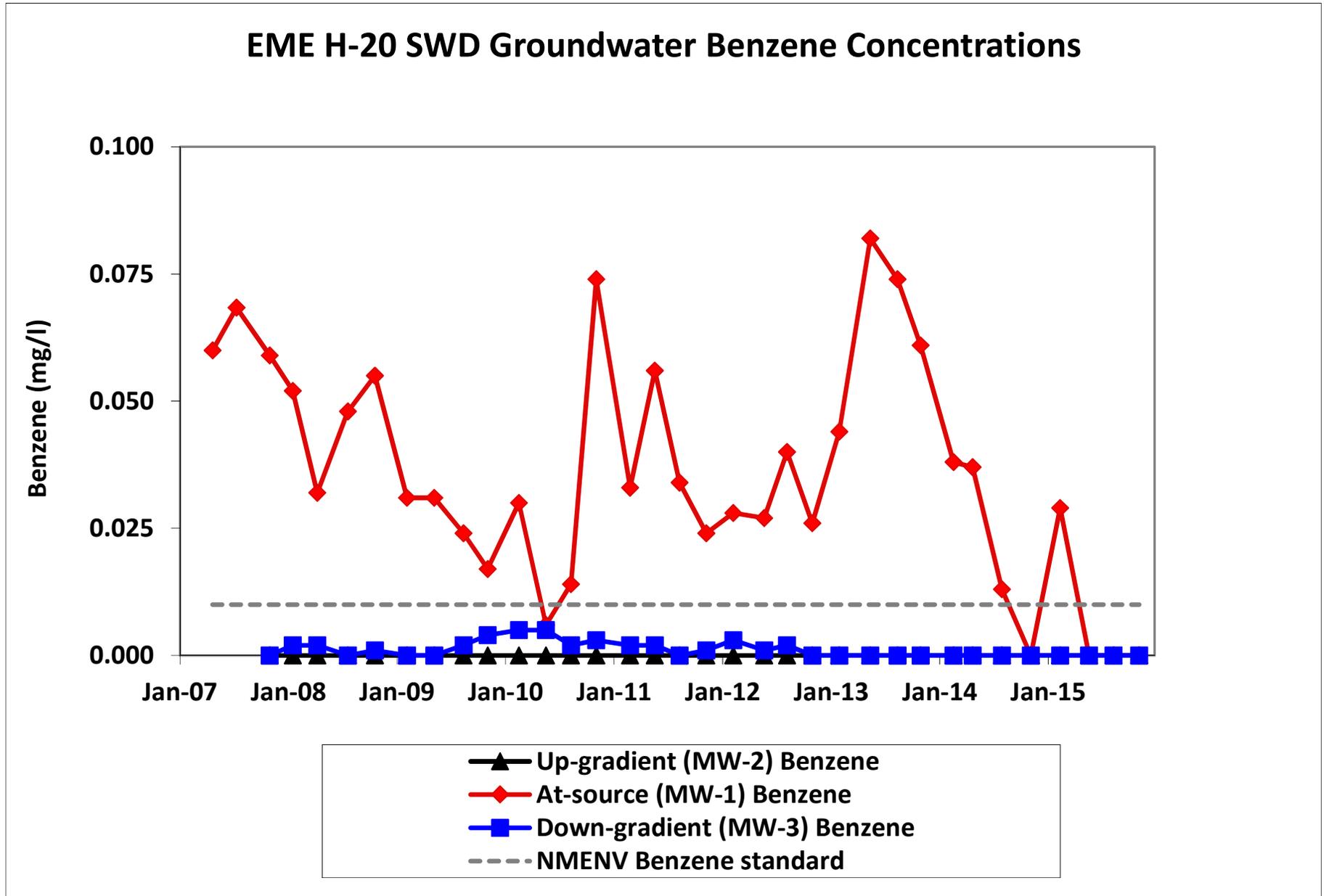


Table 2**EME H-20 SWD****Groundwater Benzene Concentrations**

	at-source	up- gradient	down- gradient	down- gradient	down- gradient	NMENV Benzene Standard
<u>Date</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>MW-5</u>	
4/23/07	0.060					0.01
7/12/07	0.068					0.01
11/1/07	0.059	<0.002	<0.002			0.01
1/18/08	0.052	<0.001	0.002			0.01
4/9/08	0.032	<0.001	0.002			0.01
7/21/08	0.048	<0.002	<0.002	<0.002	<0.002	0.01
10/20/08	0.055	<0.001	0.001	<0.001	<0.001	0.01
2/5/09	0.031	<0.001	<0.001	<0.001	<0.001	0.01
5/8/09	0.031	<0.001	<0.001	<0.001	<0.001	0.01
8/14/09	0.024	<0.001	0.002	<0.001	<0.001	0.01
11/4/09	0.017	<0.001	0.004	0.001	<0.001	0.01
2/17/10	0.030	<0.001	0.005	<0.001	<0.001	0.01
5/19/10	0.006	<0.001	0.005	<0.001	<0.001	0.01
8/11/10	0.014	<0.001	0.002	<0.001	<0.001	0.01
11/4/10	0.074	<0.001	0.003	0.001	0.082	0.01
2/26/11	0.033	<0.001	0.002	<0.001	<0.001	0.01
5/20/11	0.056	<0.001	0.002	<0.001	<0.001	0.01
8/11/11	0.034	<0.001	<0.001	0.004	<0.001	0.01
11/9/11	0.024	<0.001	0.001	0.002	<0.001	0.01
2/8/2012	0.028	<0.001	0.003	0.002	<0.001	0.01
5/22/2012	0.027	<0.001	0.001	<0.001	<0.001	0.01
8/7/2012	0.040	<0.001	0.002	0.001	<0.001	0.01
10/31/12	0.026	<0.001	<0.001	<0.001	<0.001	0.01
1/30/13	0.044	<0.001	<0.001	<0.001	<0.001	0.01
5/14/13	0.082	<0.001	<0.001	<0.001	<0.001	0.01
8/14/13	0.074	<0.001	<0.001	<0.001	<0.001	0.01
10/31/13	0.061	<0.001	<0.001	<0.001	<0.001	0.01
2/18/14	0.038	<0.001	<0.001	<0.001	<0.001	0.01
4/24/14	0.037	<0.001	<0.001	<0.001	<0.001	0.01
7/31/14	0.013	<0.001	<0.001	<0.001	<0.001	0.01
11/6/14	<0.001	<0.001	<0.001	<0.001	<0.001	0.01
2/12/15	0.029	<0.001	<0.001	<0.001	<0.001	0.01
5/21/15	<0.001	<0.001	<0.001	<0.001	<0.001	0.01
8/11/15	<0.001	<0.001	<0.001	0.001	<0.001	0.01
11/5/15	<0.001	<0.001	<0.001	<0.001	<0.001	0.01
2011 avg	0.037	0.000	0.002	0.003	0.000	0.01
2012 avg	0.030	0.000	0.002	0.002	0.000	0.01
2013 avg	0.063	0.000	0.000	0.000	0.000	0.01
2014 avg	0.029	0.000	0.000	0.000	0.000	0.01
2015 avg	0.029	0.000	0.000	0.001	0.000	0.01

November 13, 2015

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME JUNCTION H-20

Enclosed are the results of analyses for samples received by the laboratory on 11/09/15 15:23.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

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:

 Rice Operating Company
 KATIE JONES
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

Received:	11/09/2015	Sampling Date:	11/05/2015
Reported:	11/13/2015	Sampling Type:	Water
Project Name:	EME JUNCTION H-20	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T20S-R37E-SEC20 H-LEA CTY, NM		

Sample ID: MONITOR WELL #1 (H502964-01)

BTEX 8021B		mg/L		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	11/10/2015	ND	0.020	100	0.0200	0.235	
Toluene*	<0.001	0.001	11/10/2015	ND	0.021	106	0.0200	0.0235	
Ethylbenzene*	<0.001	0.001	11/10/2015	ND	0.019	97.3	0.0200	0.681	
Total Xylenes*	<0.003	0.003	11/10/2015	ND	0.062	104	0.0600	0.587	
Total BTEX	<0.006	0.006	11/10/2015	ND					

Surrogate: 4-Bromofluorobenzene (PID) 95.8 % 73.7-146

Chloride, SM4500Cl-B		mg/L		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	1120	4.00	11/12/2015	ND	100	100	100	3.92	

Sulfate 375.4		mg/L		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	728	250	11/13/2015	ND	21.2	106	20.0	4.06	

TDS 160.1		mg/L		Analyzed By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	3790	5.00	11/12/2015	ND	556	106	527	6.47	

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KATIE JONES
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

Received:	11/09/2015	Sampling Date:	11/05/2015
Reported:	11/13/2015	Sampling Type:	Water
Project Name:	EME JUNCTION H-20	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T20S-R37E-SEC20 H-LEA CTY, NM		

Sample ID: MONITOR WELL #2 (H502964-02)

BTEX 8021B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	11/10/2015	ND	0.020	100	0.0200	0.235		
Toluene*	<0.001	0.001	11/10/2015	ND	0.021	106	0.0200	0.0235		
Ethylbenzene*	<0.001	0.001	11/10/2015	ND	0.019	97.3	0.0200	0.681		
Total Xylenes*	<0.003	0.003	11/10/2015	ND	0.062	104	0.0600	0.587		
Total BTEX	<0.006	0.006	11/10/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 96.1 % 73.7-146

Chloride, SM4500Cl-B		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	980	4.00	11/12/2015	ND	100	100	100	3.92		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	691	125	11/13/2015	ND	21.2	106	20.0	4.06		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	3490	5.00	11/12/2015	ND	556	106	527	6.47		

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KATIE JONES
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

Received:	11/09/2015	Sampling Date:	11/05/2015
Reported:	11/13/2015	Sampling Type:	Water
Project Name:	EME JUNCTION H-20	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T20S-R37E-SEC20 H-LEA CTY, NM		

Sample ID: MONITOR WELL #3 (H502964-03)

BTEX 8021B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	11/10/2015	ND	0.020	100	0.0200	0.235		
Toluene*	<0.001	0.001	11/10/2015	ND	0.021	106	0.0200	0.0235		
Ethylbenzene*	<0.001	0.001	11/10/2015	ND	0.019	97.3	0.0200	0.681		
Total Xylenes*	<0.003	0.003	11/10/2015	ND	0.062	104	0.0600	0.587		
Total BTEX	<0.006	0.006	11/10/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 97.1 % 73.7-146

Chloride, SM4500Cl-B		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	1520	4.00	11/12/2015	ND	100	100	100	3.92		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	915	250	11/13/2015	ND	21.2	106	20.0	4.06		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	5110	5.00	11/12/2015	ND	504	95.6	527	3.30		

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KATIE JONES
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

Received:	11/09/2015	Sampling Date:	11/05/2015
Reported:	11/13/2015	Sampling Type:	Water
Project Name:	EME JUNCTION H-20	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T20S-R37E-SEC20 H-LEA CTY, NM		

Sample ID: MONITOR WELL #4 (H502964-04)

BTEX 8021B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	11/10/2015	ND	0.020	100	0.0200	0.235		
Toluene*	<0.001	0.001	11/10/2015	ND	0.021	106	0.0200	0.0235		
Ethylbenzene*	<0.001	0.001	11/10/2015	ND	0.019	97.3	0.0200	0.681		
Total Xylenes*	<0.003	0.003	11/10/2015	ND	0.062	104	0.0600	0.587		
Total BTEX	<0.006	0.006	11/10/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 96.5 % 73.7-146

Chloride, SM4500Cl-B		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	1140	4.00	11/12/2015	ND	100	100	100	3.92		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	782	125	11/13/2015	ND	21.2	106	20.0	4.06		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	3640	5.00	11/12/2015	ND	504	95.6	527	3.30		

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KATIE JONES
 112 W. Taylor
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Received:	11/09/2015	Sampling Date:	11/05/2015
Reported:	11/13/2015	Sampling Type:	Water
Project Name:	EME JUNCTION H-20	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T20S-R37E-SEC20 H-LEA CTY, NM		

Sample ID: MONITOR WELL #5 (H502964-05)

BTEX 8021B		mg/L		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.001	0.001	11/10/2015	ND	0.020	100	0.0200	0.235		
Toluene*	<0.001	0.001	11/10/2015	ND	0.021	106	0.0200	0.0235		
Ethylbenzene*	<0.001	0.001	11/10/2015	ND	0.019	97.3	0.0200	0.681		
Total Xylenes*	<0.003	0.003	11/10/2015	ND	0.062	104	0.0600	0.587		
Total BTEX	<0.006	0.006	11/10/2015	ND						

Surrogate: 4-Bromofluorobenzene (PID) 98.8 % 73.7-146

Chloride, SM4500Cl-B		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	1360	4.00	11/12/2015	ND	100	100	100	3.92		

Sulfate 375.4		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	353	125	11/13/2015	ND	21.2	106	20.0	4.06		

TDS 160.1		mg/L		Analyzed By: AP						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	4060	5.00	11/12/2015	ND	504	95.6	527	3.30		

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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

