

## L Peter Galusky, Jr PE

5935 Exeter Cir Norcross, GA 30071 | 470 955-5335 | [peter@bluerock.pro](mailto:peter@bluerock.pro)

April 1, 2021

**APPROVED**

### Bradford Billings

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

Re: **2020 Annual Report**  
**Vacuum F-35 & G-35 SWDs, Sec 35, T17S, R35E**  
**OCD Case No. AP-59**

Review of 2020 Annual Report: **Content satisfactory**

1. Further evaluation of free product sheen in the source monitor well (MW-1) at F-35 is clearly warranted. ROC will continue to monitor groundwater concentrations at both sites in 2021.
2. Submit summarized activities completed and their results in a 2021 Annual Report. Submittal to OCD expected no later than March 31, 2022.

Sent via E-mail

**Mr. Billings:**

This letter summarizes the results of groundwater monitoring over the past year pursuant to the NMOCD approved Abatement Plan for Rice Operating Company (ROC)'s Vacuum F&G-35 project. Site and monitor well locations are given in Figures 1 & 2, respectively.

### Vacuum F-35 SWD

Data for Vacuum F-35 SWD are summarized in Figure 3 and Table 1a. The full dataset is given in Table 1b.

Groundwater was not sampled in the at-source monitor well (MW-1) since 2018, as free product was observed. We have placed a recovery sock in the well and will attempt to sample it during 2021. Average annual groundwater chloride concentrations in the shallow down-gradient well (MW-3S) were essentially unchanged at 82 mg/l in 2020 vs 80 mg/l in 2019 but dropped slightly in the deep down-gradient monitor well (MW-3D) at 78 mg/l in 2020 versus 86 mg/l in 2019. Groundwater chlorides have remained below the OCD standard of 250 mg/l.

## **Rice Operating Company Vacuum F&G 35 SWD Annual Report**

### **Vacuum G-35 SWD**

Data for Vacuum G-35 SWD are summarized in Figure 4 and Table 2a. The full dataset is given in Table 2b.

Average annual groundwater chloride concentrations in the at-source monitor well (MW-1) remained low at 68 mg/l in 2019 and 76 mg/l in 2020. Average annual chloride concentrations in the shallow down-gradient well (MW-3S) were low at 126 mg/l in 2019 to 148 mg/l in 2020. Average annual chloride concentrations in the deep down-gradient well (MW-3D) remained low at 142 mg/l in 2019 and 168 mg/l in 2020. Average annual groundwater chlorides in the near-source down-gradient monitor well (MW-4) dropped slightly but remained low at 144 mg/l in 2019 to 116 mg /l in 2020. Groundwater chlorides in all of these wells test considerably below the OCD standard of 250 mg/l.

Average annual total BTEX concentrations in the at-source monitor well (MW-1) dropped considerably from 0.0095 mg/l in 2019 to 0.0055 mg/l in 2020, a tiny fraction of the maximum average value of 2.2385 mg/l measured in in 2005. Average annual total BTEX concentrations in the near-source down-gradient well (MW-4) dropped significantly, from 0.0150 mg/l in 2019 to 0.0060 mg/l in 2020, also a tiny fraction of the maximum average value 1.0085 mg/l measured in 2012. These data suggest that BTEX is a diminishing concern at the G-35 SWD location.

Groundwater chloride concentrations have dropped considerably at both locations through dilution of an apparently relatively small original mass. BTEX concentrations have also clearly dropped at G-35. However, the recent emergence (since 2019) of free product sheen in the at-source monitor well (MW-1) at F-35 clearly warrants further evaluation. ROC will continue to monitor groundwater concentrations at both sites in 2021.

ROC is the service provider (agent) for the Vacuum SWD System and has no ownership of any portion of the pipeline, well, or facility. The system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. The Vacuum system is now abandoned. We thus submit this report for your review and consideration. Please call Rice Operating Company or me if you have any questions or need additional information. Thank you.

## Rice Operating Company Vacuum F&G 35 SWD Annual Report

Sincerely,



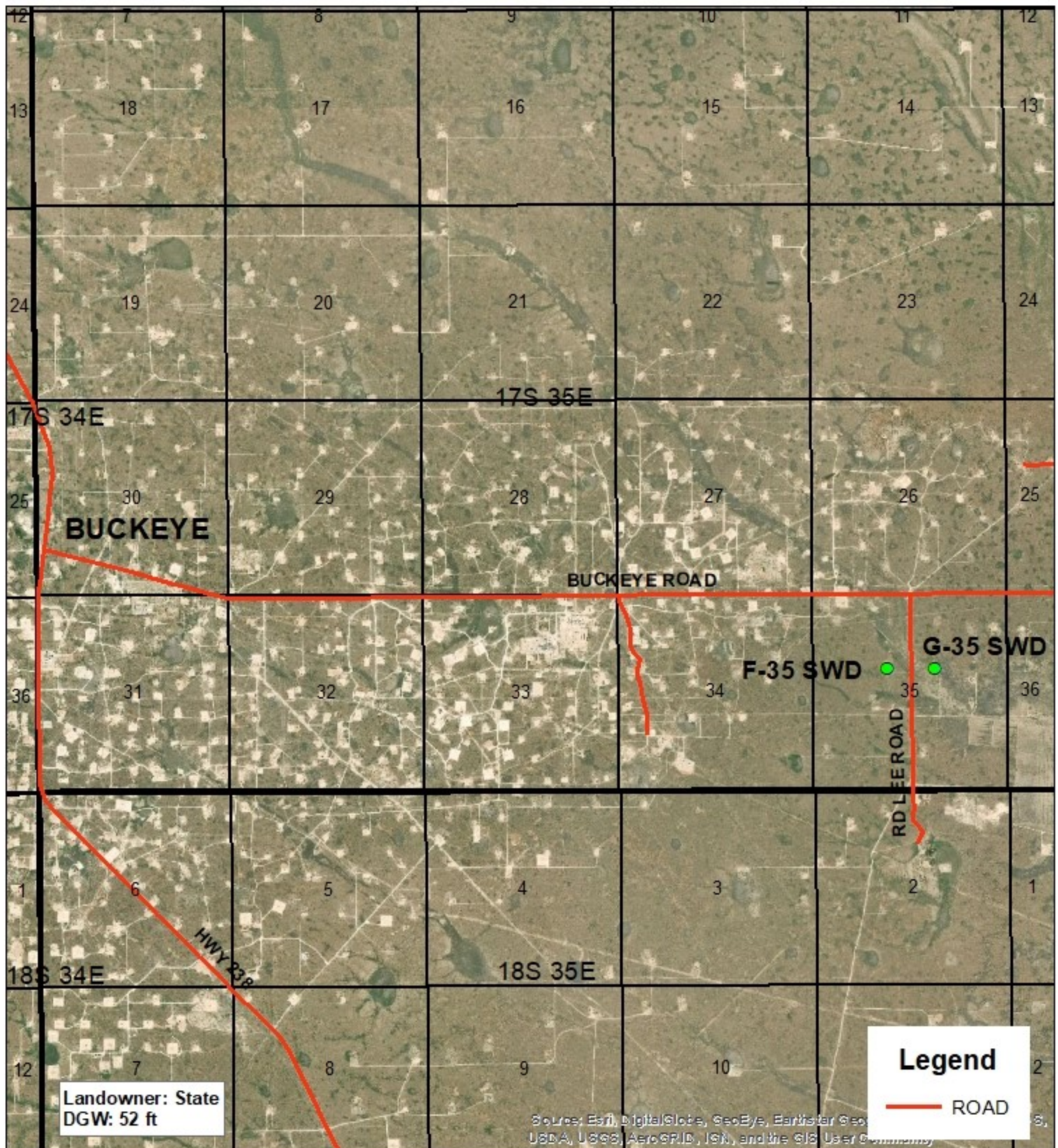
L. Peter Galusky, Jr. P.E.



Copy: Rice Operating Company

Attachments: ... as noted, above.





**VACUUM**  
**F-35 & G-35**  
**SWD**  
 AP-59

UL F & G SECTION 35  
 T17S, R35E  
 LEA COUNTY, NM

GPS: F-35 SWD 32.793056 -103.430348  
 G-35 SWD 32.793016 -103.426052  
 NAD83 STATE PLANE PROJ  
 NM EAST ZONE

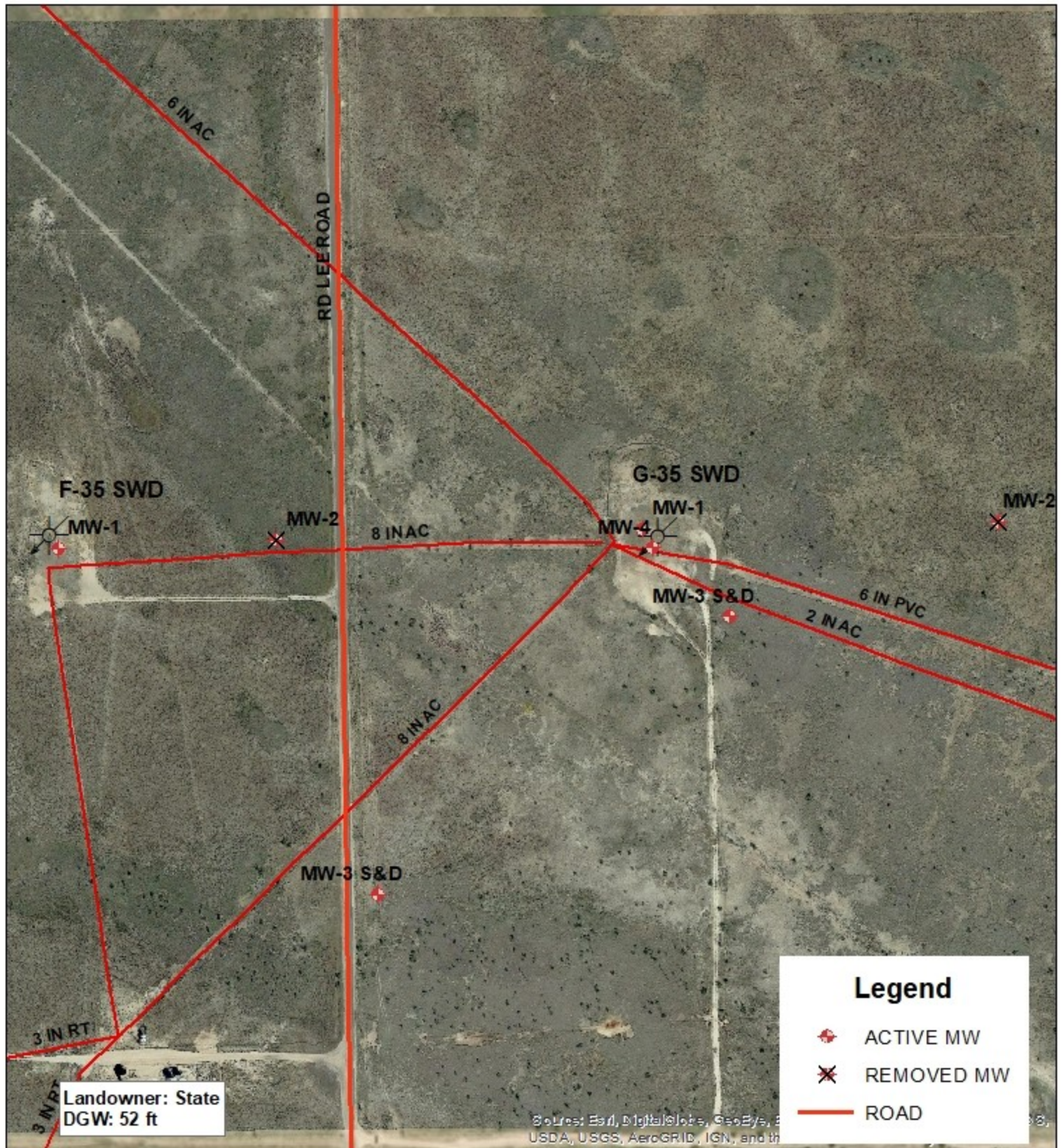
0 2,500 5,000

Feet

Drawing date: 2/4/20  
 Drafted by: T. Grieco







# VACUUM F-35 & G-35 SWD

AP-59

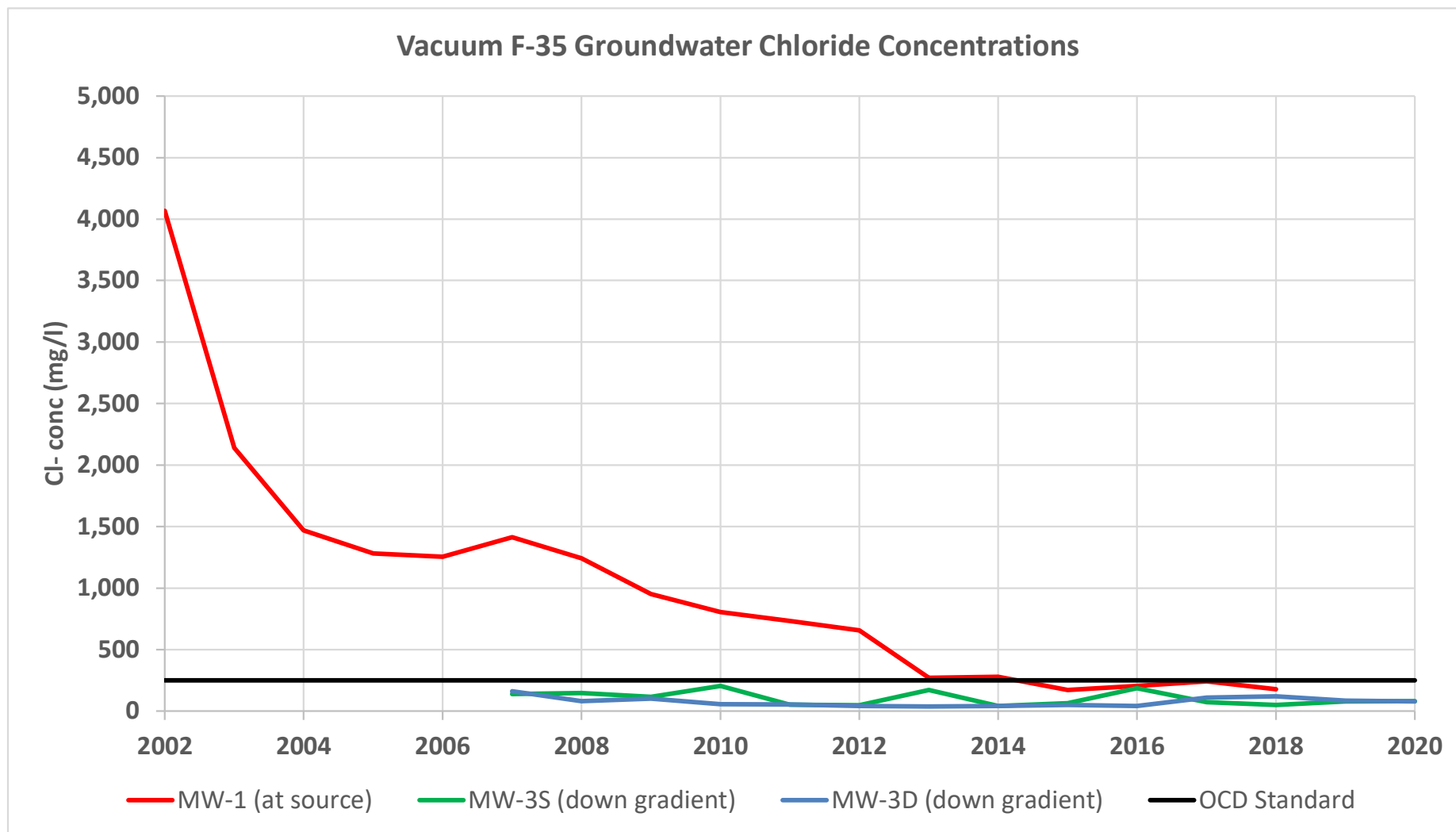
UL F & G SECTION 35  
T17S, R35E  
LEA COUNTY, NM

GPS: F-35 SWD 32.793056 -103.430348  
G-35 SWD 32.793016 -103.426052  
NAD83 STATE PLANE PROJ  
NM EAST ZONE

0 250 500



Drawing date: 2/4/20  
Drafted by: T. Grieco



**Vacuum F-35 SWD****Groundwater Data Annual Average Values**

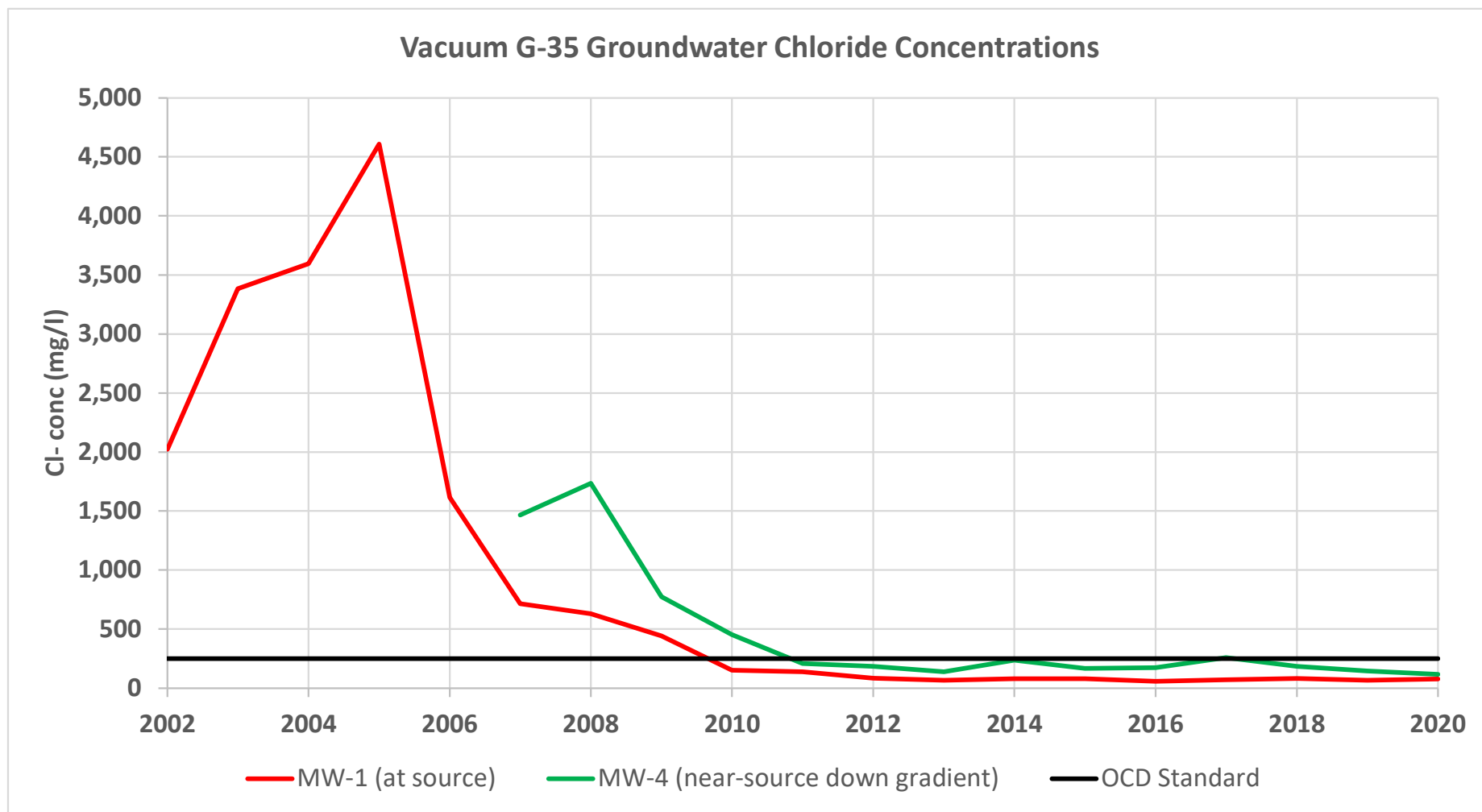
year	Chlorides (mg/l)				Total BTEX (mg/l)				OCD Standard
	MW-1 (at source)	MW-2 (east of source)	MW-3S (down gradient)	MW-3D (down gradient)	MW-1 (at source)	MW-2 (east of source)	MW-3S (down gradient)	MW-3D (down gradient)	
2002	4,068				1.4743				250
2003	2,140				1.5173				250
2004	1,470				0.9398				250
2005	1,283				3.3751				250
2006	1,255	89			1.2779				250
2007	1,413	96	139	161	2.2188	0.0000	0.0000	0.0000	250
2008	1,243	98	149	81	0.6153	0.0000	0.0000	0.0000	250
2009	953	80	116	102	0.6970				250
2010	805	128	206	56	0.4458				250
2011	735		52	54	0.4920				250
2012	655		48	42	0.2040				250
2013	270		172	38	0.2745				250
2014	280		42	40	0.1405				250
2015	172		66	50	0.2670				250
2016	206		186	40	0.1435				250
2017	242		72	110	0.1210				250
2018	180		50	122	0.1250				250
2019			80	86					250
2020			82	78					250



**Vacuum F-35 SWD****Groundwater Data**

Date	Chlorides (mg/l)				Total BTEX (mg/l)			
	MW-1 (at source)	MW-2 (east of source)	MW-3S (down gradient)	MW-3D (down gradient)	MW-1 (at source)	MW-2	MW-3S (down gradient)	MW-3D (down gradient)
1/10/2002	5,200				0.243			
5/15/2002	3,720				1.770			
8/19/2002	3,630				1.065			
11/11/2002	3,720				2.819			
2/28/2003	2,200				2.194			
6/5/2003	2,300				0.894			
8/21/2003	2,060				1.371			
11/19/2003	2,000				1.610			
2/18/2004	1,819				0.535			
5/27/2004	1,759				1.385			
9/7/2004	1,040				1.018			
11/24/2004	1,260				0.822			
3/21/2005	1,220				5.941			
5/11/2005	1,490							
8/15/2005	1,340				2.462			
10/25/2005	1,080				1.722			
1/23/2006	886				1.250			
4/25/2006	1,420				0.658			
10/24/2006	1,460	89.1			1.926			
1/9/2007	1,510	101	144	133	1.581	0.000	0.000	0.000
5/23/2007	1,500	88.3	117	92	1.948	0.000	0.000	0.000
9/19/2007	1,380	100	192	204	3.330	0.000	0.000	0.000
11/19/2007	1,260	96	104	216	2.016	0.000	0.000	0.000
2/15/2008	1,240	100	212	52	1.185	0.000	0.000	0.000
6/3/2008	1,460	96	116	104	0.000	0.000	0.000	0.000
7/28/2008	1,120	96	164	96	0.312	0.000	0.000	0.000
10/23/2008	1,150	100	104	72	0.964	0.000	0.000	0.000
1/28/2009	1,150	96	100	84	1.169			
4/28/2009	980	100	128	60	0.814			
8/5/2009	740	104	128	56	0.439			
10/26/2009	940	20	108	208	0.366			
3/3/2010	970	124	108	56	0.337			
5/12/2010	880	128	80	64	0.145			
8/4/2010	630	132	64	52	0.215			
11/1/2010	740		570	52	1.086			
6/2/2011	900		52	68	0.533			
11/30/2011	570		52	40	0.451			
5/25/2012	580		52	44	0.240			
11/13/2012	730		44	40	0.168			
6/6/2013	280		292	32	0.367			
11/18/2013	260		52	44	0.182			
6/26/2014	296		56	52	0.102			
12/10/2014	264		28	28	0.179			
6/24/2015	172		52	56	0.116			
11/11/2015	172		80	44	0.418			
5/23/2016	196		300	40	0.131			
11/15/2016	216		72	40	0.156			
5/31/2017	232		84	168	0.162			
12/5/2017	252		60	52	0.080			
5/23/2018	192		36	164	0.175			
11/27/2018	168		64	80	0.075			
6/7/2019			84	96				
11/18/2019			76	76				
6/11/2020			72	80				
11/12/2020			92	76				





**Vacuum G-35 SWD****Groundwater Data Annual Average Values**

Chlorides (mg/l)						Total BTEX (mg/l)					OCD Standard
year	MW-1 (at source)	MW-2 (east of source)	MW-3S (down gradient)	MW-3D (down gradient)	MW-4 (near- source down gradient)	MW-1 (at source)	MW-2 (east of source)	MW-3S (down gradient)	MW-3D (down gradient)	MW-4 (near- source down gradient)	
2002	2,025					0.9595					250
2003	3,383					0.6598					250
2004	3,595					1.3313					250
2005	4,608					2.2385					250
2006	1,617	13				0.5540	0.0000				250
2007	717	16	547	525	1,467	0.2076	0.0000	0.0048	0.0034	0.1738	250
2008	630	16	661	858	1,735	0.8547	0.0000	0.0000	0.0000	0.6803	250
2009	442	41	663	1,113	775	0.5543	0.0000			0.2408	250
2010	152	17	508	828	455	0.0580	0.0000			0.0658	250
2011	138		775	750	208	0.1260				0.0130	250
2012	84		715	990	186	0.1165				1.0085	250
2013	68		545	985	138	0.0570				0.3595	250
2014	78		330	675	238	0.0080				0.4935	250
2015	80		332	519	166	0.0405				0.1850	250
2016	58		296	298	174	0.0035				0.0630	250
2017	72		272	308	258	0.0015				0.0930	250
2018	82		254	248	184	0.0580				0.0530	250
2019	68		126	142	144	0.0095				0.0150	250
2020	76		148	168	116	0.0055				0.0060	250

## Vacuum G-35 SWD

## Groundwater Data

Date	Chlorides (mg/l)				MW-4 (near-source down gradient)	Total BTEX (mg/l)				MW-4 (near-source down gradient)
	MW-1	MW-2	MW-3S	MW-3D		MW-1	MW-2	MW-3S	MW-3D	
1/10/2002	568					0.1220				
5/15/2002	1,950					0.6670				
8/19/2002	1,950					1.7650				
11/11/2002	3,630					1.2840				
2/28/2003	2,730					0.7680				
5/22/2003	3,860					0.7320				
8/21/2003	5,010					1.0320				
11/19/2003	1,930					0.1070				
2/18/2004	2,579					0.4160				
5/27/2004	1,899					2.1540				
9/7/2004	4,700					1.6467				
11/24/2004	5,200					1.1083				
3/21/2005	5,750					3.6922				
5/11/2005	5,890									
8/15/2005	4,430					1.9337				
10/25/2005	2,360					1.0896				
1/23/2006	1,960					0.2419				
4/25/2006	1,540					0.8845				
10/25/2006	1,350	13				0.5356	0.0000			
1/9/2007	873	14	311	313		0.2839	0.0000	0.0191	0.0136	
5/24/2007	873	17	599	648	1,200	0.2395	0.0000	0.0000	0.0000	0.1555
9/20/2007	800	16	500	570	1,600	0.3040	0.0000	0.0000	0.0000	0.2690
11/20/2007	320	16	776	570	1,600	0.0030	0.0000	0.0000	0.0000	0.0970
2/4/2008	540	16	670	820	2,680	0.3650	0.0000	0.0000	0.0000	0.7360
4/29/2008	440	16	750	930	1,800	0.2410	0.0000	0.0000	0.0000	1.0770
7/29/2008	860	16	760	1,010	1,420		0.0000	0.0000	0.0000	0.3950
10/23/2008	680	16	464	670	1,040	1.9580	0.0000	0.0000	0.0000	0.5130
1/26/2009	500	16	710	1,560	730	1.2090	0.0000			0.4630
4/27/2009	550	16	630	1,080	940	0.5420	0.0000			0.1990
8/6/2009	384	16	710	1,090	770	0.3020	0.0000			0.2490
10/23/2009	332	116	600	720	660	0.1640	0.0000			0.0520
3/3/2010	232	16	740	810	670	0.1330	0.0000			0.2020
5/13/2010	152	16	660	760	500	0.0210	0.0000			0.0140
8/3/2010	124	20	580	790	396	0.0330	0.0000			0.0270
11/1/2010	100		52	950	252	0.0450				0.0200
6/2/2011	156		770	570	328	0.1190				0.0090
11/30/2011	120		780	930	88	0.1330				0.0170
5/25/2012	100		830	940	280	0.1460				1.1370
11/13/2012	68		600	1,040	92	0.0870				0.8800
6/6/2013	72		630	1,040	96	0.0030				0.3130
11/18/2013	64		460	930	180	0.1110				0.4060
6/26/2014	68		428	940	144	0.0030				0.5580
12/9/2014	88		232	410	332	0.0130				0.4290
6/23/2015	84		348	328	180	0.0770				0.2220
11/12/2015	76		316	710	152	0.0040				0.1480
5/24/2016	56		300	304	204	0.0020				0.1230
11/14/2016	60		292	292	144	0.0050				0.0030
5/30/2017	52		296	392	312	0.0000				0.1440
12/4/2017	92		248	224	204	0.0030				0.0420
5/22/2018	88		232	260	208	0.0120				0.0510
11/26/2018	76		276	236	160	0.1040				0.0550
6/6/2019	64		116	116	148	0.0120				0.0170
11/19/2019	72		136	168	140	0.0070				0.0130
6/12/2020	72		148	160	112	0.0110				0.0120
11/13/2020	80		148	176	120	0.0000				0.0000





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

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June 23, 2020

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: VACUUM F-35 SWD AND G-35 SWD

Enclosed are the results of analyses for samples received by the laboratory on 06/16/20 15:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-20-13. 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



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

**Analytical Results For:**

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

Received:	06/16/2020	Sampling Date:	06/11/2020
Reported:	06/23/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Kelly Jacobson
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: F -35 SWD MONITOR WELL #3- SHALLOW (H001596-01)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	72.0	4.00	06/18/2020	ND	100	100	100	3.92		
Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	54.7	10.0	06/17/2020	ND	20.3	102	20.0	9.52		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	369	5.00	06/19/2020	ND	523	105	500	0.415		

**Sample ID: F -35 SWD MONITOR WELL #3- DEEP (H001596-02)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	80.0	4.00	06/18/2020	ND	100	100	100	3.92		
Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	86.0	25.0	06/17/2020	ND	20.3	102	20.0	9.52		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	407	5.00	06/19/2020	ND	523	105	500	0.415		

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

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

Received:	06/16/2020	Sampling Date:	06/12/2020
Reported:	06/23/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Kelly Jacobson
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #1 (H001596-03)**

BTX 8021B		mg/L		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.011	0.001	06/23/2020	ND	0.020	101	0.0200	0.174	
Toluene*	<0.001	0.001	06/23/2020	ND	0.020	98.7	0.0200	0.122	
Ethylbenzene*	<0.001	0.001	06/23/2020	ND	0.020	101	0.0200	0.188	
Total Xylenes*	<0.003	0.003	06/23/2020	ND	0.059	99.1	0.0600	0.411	
Total BTX	0.011	0.006	06/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID) 96.9 % 58.2-133

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	72.0	4.00	06/18/2020	ND	100	100	100	3.92	

Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	38.9	10.0	06/17/2020	ND	20.3	102	20.0	9.52		

TDS 160.1		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	461	5.00	06/19/2020	ND	523	105	500	0.415	

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





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Project Number:	NOT GIVEN	Sample Received By:	Kelly Jacobson
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #3 - SHALLOW (H001596-04)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	148	4.00	06/18/2020	ND	100	100	100	3.92		
Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	33.3	10.0	06/17/2020	ND	20.3	102	20.0	9.52		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	661	5.00	06/19/2020	ND	523	105	500	0.415		

**Sample ID: G-35 SWD MONITOR WELL #3 - DEEP (H001596-05)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	160	4.00	06/18/2020	ND	100	100	100	3.92		
Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	36.0	10.0	06/17/2020	ND	20.3	102	20.0	9.52		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	669	5.00	06/19/2020	ND	523	105	500	0.415		

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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

**Analytical Results For:**

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

Received:	06/16/2020	Sampling Date:	06/12/2020
Reported:	06/23/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Kelly Jacobson
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #4 (H001596-06)**

BTX 8021B		mg/L		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.007	0.001	06/23/2020	ND	0.020	101	0.0200	0.174	
Toluene*	0.003	0.001	06/23/2020	ND	0.020	98.7	0.0200	0.122	
Ethylbenzene*	0.002	0.001	06/23/2020	ND	0.020	101	0.0200	0.188	
Total Xylenes*	<0.003	0.003	06/23/2020	ND	0.059	99.1	0.0600	0.411	
Total BTX	0.012	0.006	06/23/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.0 % 58.2-133

Chloride, SM4500CI-B		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	112	4.00	06/18/2020	ND	100	100	100	3.92	

Sulfate 375.4		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	30.2	10.0	06/17/2020	ND	20.3	102	20.0	9.52		

TDS 160.1		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	513	5.00	06/19/2020	ND	523	105	500	0.415	

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Celey D. Keene, Lab Director/Quality Manager



---

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---

### Notes and Definitions

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

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A handwritten signature in black ink, appearing to read "C. D. Keene", written over a horizontal line.

---

Celey D. Keene, Lab Director/Quality Manager



# Cardinal Laboratories, Inc.

### CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # \_\_\_\_\_

Company Name: RICE Operating Company		BILL TO Company: PO# RICE Operating Company	
Project Manager: Katie Jones		Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240	
Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240		Phone#: (575) 393-9174	Fax#: (575) 397-1471
Phone #: (575) 393-9174		Fax #: (575) 397-1471	

Project #:	Project Name:
	Vacuum F-35 SWD and G-35 SWD


Project Location: T17S-R35E-Sec35 F and G ~ Lea County - New Mexico

## ANALYSIS REQUEST

(Circle or Specify Method No.)

[illegible]

Relinquished by: Rozanne Johnson Date: 10/16/2020 Time: 15:45

Received by: 	Date: 6-16-20	Time: 1545
Received By: (Laboratory Staff)	Date:	Time:

Phone Results	Yes	No
Fax Results	Yes	No      Additional Fax Number:

REMARKS:

Email Results to: [kjones@riceswd.com](mailto:kjones@riceswd.com)  
[rozanne11@windstream.net](mailto:rozanne11@windstream.net)

Delivered By: (Circle One)

Sample Condition
------------------

CHECKED BY:

Sampler - UPS - Bus - Other:

	Cool	Intact
Yes		
No		

(Initials)

Released to Imaging: 1/25/2022 4:12:16 PM



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---

November 30, 2020

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: VACUUM F-35 SWD AND G-35 SWD

Enclosed are the results of analyses for samples received by the laboratory on 11/17/20 14:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-20-13. 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



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

**Analytical Results For:**

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

Received:	11/17/2020	Sampling Date:	11/12/2020
Reported:	11/30/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: F -35 SWD MONITOR WELL #3- SHALLOW (H003046-01)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	92.0	4.00	11/18/2020	ND	100	100	100	0.00		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	54.0	10.0	11/19/2020	ND	23.9	119	20.0	17.7		
TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	387	5.00	11/20/2020	ND	490	98.0	500	2.24		

**Sample ID: F -35 SWD MONITOR WELL #3- DEEP (H003046-02)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	76.0	4.00	11/18/2020	ND	100	100	100	0.00		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	54.6	10.0	11/19/2020	ND	23.9	119	20.0	17.7		
TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	386	5.00	11/20/2020	ND	490	98.0	500	2.24		

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

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

Received:	11/17/2020	Sampling Date:	11/13/2020
Reported:	11/30/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #1 (H003046-03)**

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	11/21/2020	ND	0.021	103	0.0200	1.30	
Toluene*	<0.001	0.001	11/21/2020	ND	0.019	95.4	0.0200	1.40	
Ethylbenzene*	<0.001	0.001	11/21/2020	ND	0.020	101	0.0200	1.32	
Total Xylenes*	<0.003	0.003	11/21/2020	ND	0.061	101	0.0600	1.30	
Total BTEX	<0.006	0.006	11/21/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID) 105 % 58.2-133

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	80.0	4.00	11/18/2020	ND	100	100	100	0.00		

Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	36.5	10.0	11/19/2020	ND	23.9	119	20.0	17.7		

TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	373	5.00	11/20/2020	ND	490	98.0	500	2.24		

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

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

Received:	11/17/2020	Sampling Date:	11/13/2020
Reported:	11/30/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #3 - SHALLOW (H003046-04)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	124	4.00	11/18/2020	ND	100	100	100	0.00		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	32.8	10.0	11/19/2020	ND	23.9	119	20.0	17.7		
TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	522	5.00	11/20/2020	ND	490	98.0	500	2.24		

**Sample ID: G-35 SWD MONITOR WELL #3 - DEEP (H003046-05)**

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	176	4.00	11/18/2020	ND	100	100	100	0.00		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	32.5	10.0	11/19/2020	ND	23.9	119	20.0	17.7		
TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	715	5.00	11/20/2020	ND	490	98.0	500	2.24		

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Celey D. Keene, Lab Director/Quality Manager





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**Analytical Results For:**

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

Received:	11/17/2020	Sampling Date:	11/13/2020
Reported:	11/30/2020	Sampling Type:	Water
Project Name:	VACUUM F-35 SWD AND G-35 SWD	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 F&G-LEA CTY., NM		

**Sample ID: G-35 SWD MONITOR WELL #4 (H003046-06)**

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	11/21/2020	ND	0.021	103	0.0200	1.30	
Toluene*	<0.001	0.001	11/21/2020	ND	0.019	95.4	0.0200	1.40	
Ethylbenzene*	<0.001	0.001	11/21/2020	ND	0.020	101	0.0200	1.32	
Total Xylenes*	<0.003	0.003	11/21/2020	ND	0.061	101	0.0600	1.30	
Total BTEX	<0.006	0.006	11/21/2020	ND					

Surrogate: 4-Bromofluorobenzene (PID) 104 % 58.2-133

Chloride, SM4500CI-B		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	120	4.00	11/18/2020	ND	100	100	100	0.00	

Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	30.4	10.0	11/19/2020	ND	23.9	119	20.0	17.7		

TDS 160.1		mg/L		Analyzed By: GM						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	509	5.00	11/20/2020	ND	490	98.0	500	2.24		

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Celey D. Keene, Lab Director/Quality Manager



---

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### Notes and Definitions

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

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

---

Celey D. Keene, Lab Director/Quality Manager

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

# Cardinal Laboratories, Inc.

Company Name: <b>RICE Operating Company</b>		BILL TO Company: <b>RICE Operating Company</b>		PO#
Project Manager: <b>Katie Jones</b>		Address: (Street, City, Zip) <b>122 W Taylor Street ~ Hobbs, New Mexico 88240</b>		
Address: (Street, City, Zip) <b>122 W Taylor Street ~ Hobbs, New Mexico 88240</b>		Phone#: <b>(575) 393-9174</b>		Fax#: <b>(575) 397-1471</b>
Phone #: <b>(575) 393-9174</b>		Fax #: <b>(575) 397-1471</b>		
Project #:		Project Name: <b>Vacuum F-35 SWD and G-35 SWD</b>		
Project Location: <b>T17S-R35E-Sec35 F and G ~ Lea County - New Mexico</b>		Sampler Signature: <i>Rozanne Johnson</i> (575) 631-9310		

17-S-R35E-Sec35 F and G - Lea County - New Mexico															
H003046 LAB #  ( LAB USE ONLY )	FIELD CODE	(G)rab or (C)omp	# CONTAINERS	MATRIX				PRESERVATIVE METHOD					SAMPLING		
				WATER	SOIL	AIR	SLUDGE	HCL (4 40ml VOA)	HNO <sub>3</sub>	NaHSO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	ICE (1-1Liter HDPE)	NONE	DATE (2020)	TIME
1	F-35 SWD Monitor Well #3-Shallow	G	1	X								1		11/12	11:05
2	F-35 SWD Monitor Well #3-Deep	G	1	X								1		11/12	11:20
3	G-35 SWD Monitor Well #1	G	5	X					4			1		11/13	10:10
4	G-35 SWD Monitor Well #3-Shallow	G	1	X								1		11/13	15:00
5	G-35 SWD Monitor Well #3-Deep	G	1	X								1		11/13	15:10
6	G-35 SWD Monitor Well #4	G	5	X					4			1		11/13	12:00

Relinquished by: <i>Rozanne Johnson</i>	Date: <b>11/17/20</b>	Time: <b>14:55</b>	Received by: <i>Rozanne Johnson</i>	Date: <b>11-17-20</b>	Time: <b>1455</b>
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)	Date:	Time:

Delivered By: (Circle One) <b>Sampler</b> - UPS - Bus - Other:	Sample Condition Cool <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Intact <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	CHECKED BY: <i>R.J.</i> (Initials)
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## CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # \_\_\_\_\_

### ANALYSIS REQUEST

(Circle or Specify Method No.)

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Phone Results	Yes	No
Fax Results	Yes	No
Additional Fax Number:		

## REMARKS:

Email Results to: [kjones@riceswd.com](mailto:kjones@riceswd.com)  
[rozanne@sdacres.com](mailto:rozanne@sdacres.com)

**District I**

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811 S. First St., Artesia, NM 88210  
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1000 Rio Brazos Rd., Aztec, NM 87410  
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**District IV**

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

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

CONDITIONS

Action 24242

**CONDITIONS**

Operator: RICE OPERATING COMPANY 122 W Taylor Hobbs, NM 88240	OGRID: 19174
	Action Number: 24242
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

**CONDITIONS**

Created By	Condition	Condition Date
nvelez	Review of 2020 Annual Report: Content satisfactory 1. Further evaluation of free product sheen in the source monitor well (MW-1) at F-35 is clearly warranted. ROC will continue to monitor groundwater concentrations at both sites in 2021. 2. Submit summarized activities completed and their results in a 2021 Annual Report. Submittal to OCD expected no later than March 31,2022.	1/25/2022