

L Peter Galusky, Jr PE

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April 1st, 2020

Bradford Billings

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

Re: **2019 Annual Report**
Vacuum F-35 & G-35 SWDs, Sec 35, T17S, R35E
OCD Case No. AP-59

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) during 2019 as free product skim was observed. We have placed a recovery sock in the well and will attempt to sample it during 2020. Average annual groundwater chloride concentrations in the shallow down-gradient well (MW-3S) remained relatively steady at 80 mg/l in 2019 vs. 50 mg/l in 2018, and dropped in the deep down-gradient monitor well (MW-3D) averaging 86 mg/l in 2019 versus 122 mg/l in 2018.

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) dropped from 82 mg/l in 2018 to 68 mg/l in 2019. Average annual chloride concentrations in the

Rice Operating Company Vacuum F&G 35 SWD Annual Report

shallow down-gradient well (MW-3S) dropped considerably from 254 mg/l in 2018 to 126 mg/l in 2019. Average annual chloride concentrations in the deep down-gradient well (MW-3D) also dropped, measuring 248 mg/l in 2018 versus 142 mg/l in 2019. Average annual groundwater chlorides in the near-source down-gradient monitor well (MW-4) dropped from 184 mg/l in 2018 to 144 mg/l in 2019.

Average annual total BTEX concentrations in the at-source monitor well (MW-1) dropped considerably from 0.0580 mg/l in 2018 to .0095 mg/l in 2019, a tiny fraction of maximum measured value of 2.2385 mg/l measured in 2005. Average annual total BTEX concentrations in the near-source down-gradient well (MW-4) also dropped significantly, from 0.0530 mg/l in 2018 to 0.0150 mg/l, also a tiny fraction of the maximum measured value 1.0085 measured in 2012.

Groundwater chloride concentrations have dropped considerably at both locations through dilution of an apparently relatively small original mass. BTEX concentrations have clearly dropped at G-35. However, the recent emergence 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 on a semi-annual basis at both sites in 2020.

ROC is the service provider (agent) for the Vacuum Saltwater Disposal (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.

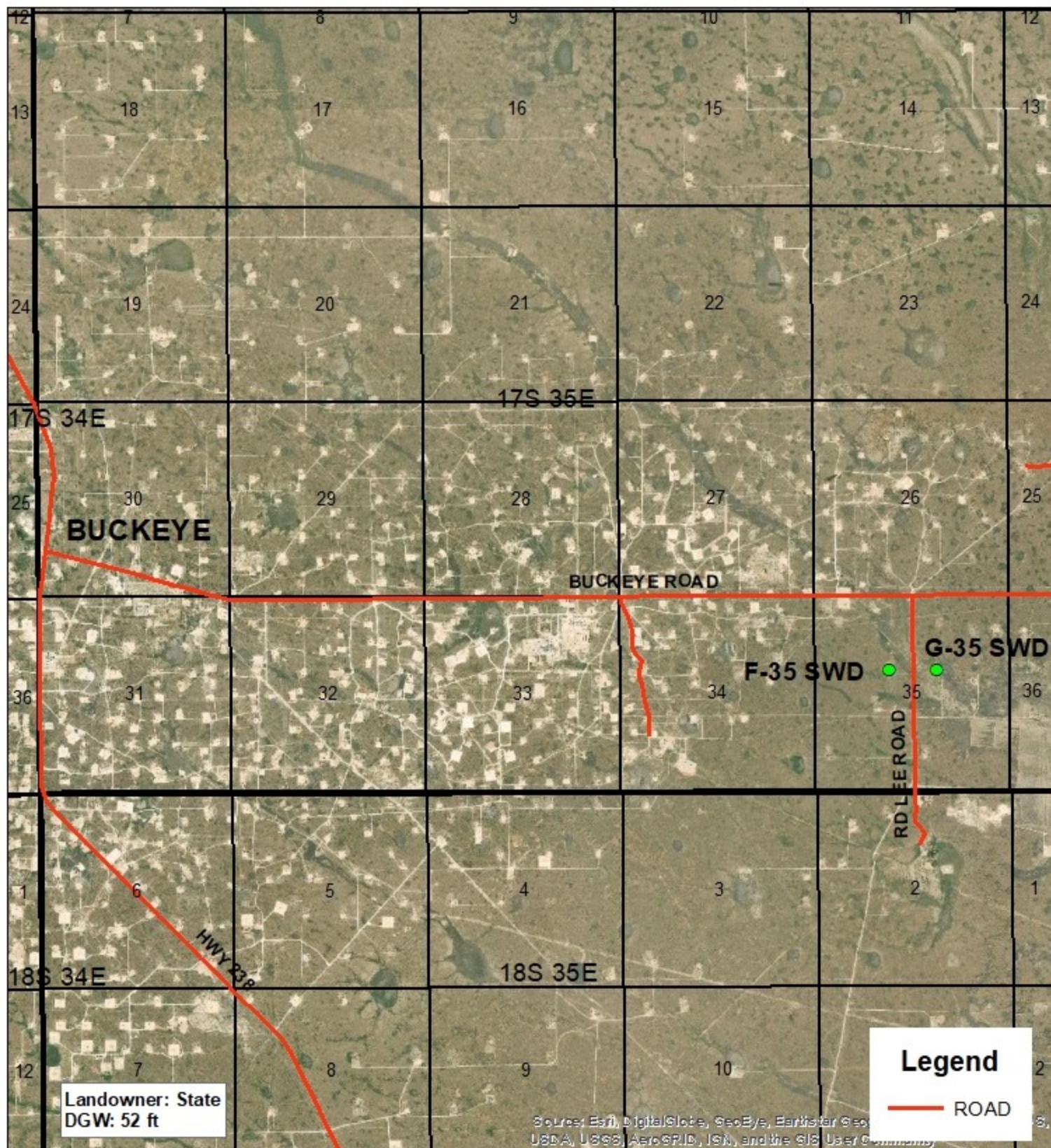
Sincerely,



L. Peter Galusky, Jr. P.E.



Copy: Rice Operating Company
Attachments: ... as noted, above.



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

AP-59

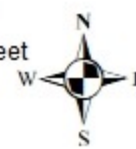
UL F & G SECTION 35
T17S, R35E
LEA COUNTY, NM

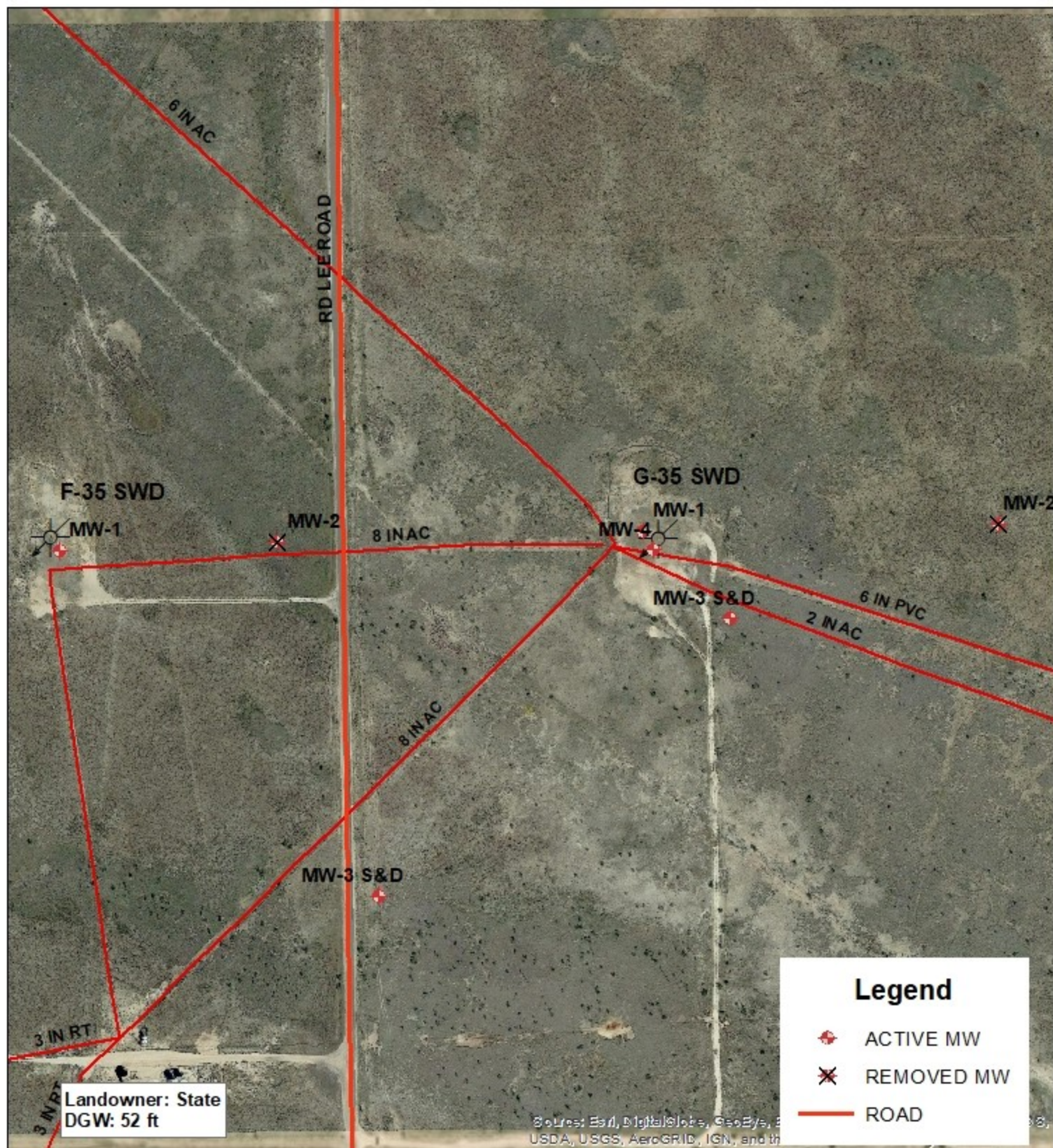
GPS: F-35 SWD 32.793056 -103.430348
G-35 SWD 32.793016 -103.426052
NAD83 STATE PLANE PROJ
NM EAST ZONE

0 2,500 5,000

Feet

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





VACUUM
F-35 & G-35
SWD

AP-59

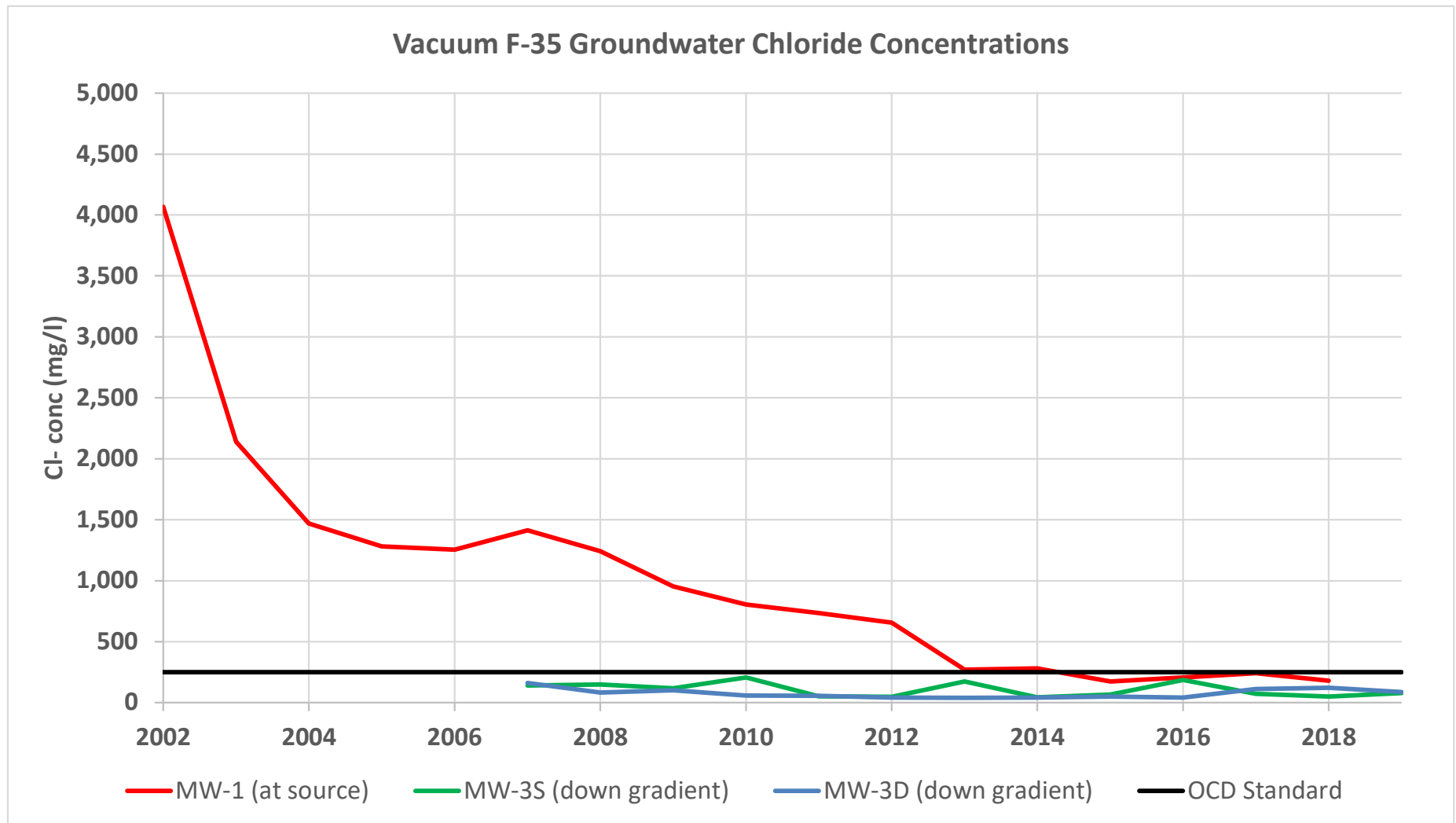
UL F & G SECTION 35
T17S, R35E
LEA COUNTY, NM

GPS: F-35 SWD 32.793056 -103.430348
G-35 SWD 32.793016 -103.426052
NAD83 STATE PLANE PROJ
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0 250 500
Feet

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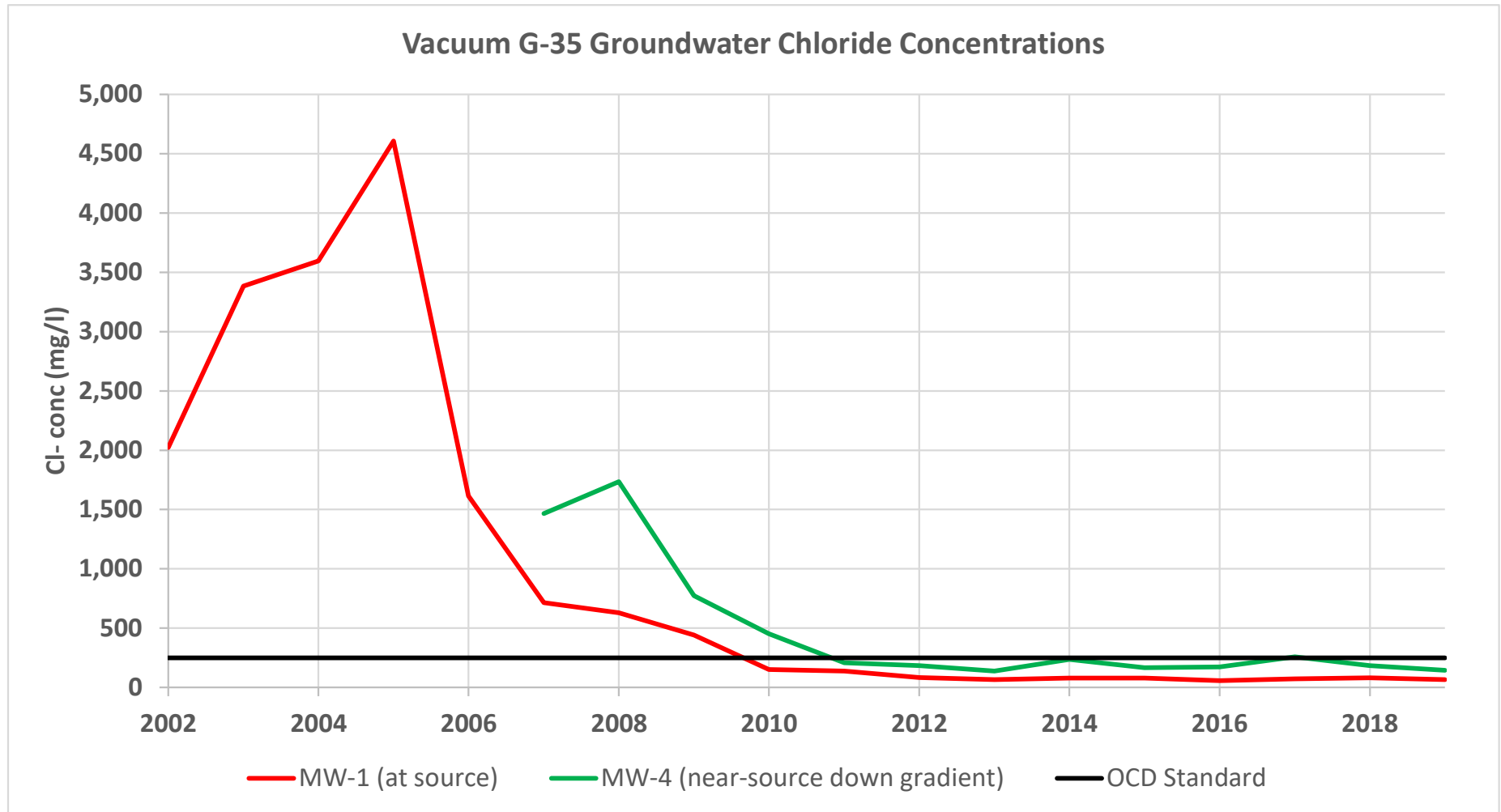


Vacuum F-35 SWD**Groundwater Data Annual Average Values**

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

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				



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

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

Vacuum G-35 SWD

Groundwater Data

Date	Chlorides (mg/l)					Total BTEX (mg/l)				
	MW-1	MW-2	MW-3S	MW-3D	MW-4 (near-source down gradient)	MW-1	MW-2	MW-3S	MW-3D	MW-4 (near-source down gradient)
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

June 20, 2019

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 06/11/19 13:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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:	06/11/2019	Sampling Date:	06/07/2019
Reported:	06/20/2019	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 (H902024-01)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	84.0	4.00	06/18/2019	ND	96.0	96.0	100	4.08		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	49.7	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	399	5.00	06/13/2019	ND	525	99.6	527	10.3		

Sample ID: F -35 SWD MONITOR WELL #3- DEEP (H902024-02)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	96.0	4.00	06/18/2019	ND	96.0	96.0	100	4.08		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	55.2	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	428	5.00	06/13/2019	ND	525	99.6	527	10.3		

Cardinal Laboratories

*=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:	06/11/2019	Sampling Date:	06/06/2019
Reported:	06/20/2019	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 (H902024-03)

BTEX 8021B		mg/L		Analyzed By: ms						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	0.004	0.001	06/17/2019	ND	0.021	107	0.0200	0.889		
Toluene*	<0.001	0.001	06/17/2019	ND	0.022	109	0.0200	0.536		
Ethylbenzene*	0.014	0.001	06/17/2019	ND	0.020	99.9	0.0200	1.37		
Total Xylenes*	0.003	0.003	06/17/2019	ND	0.061	101	0.0600	0.642		
Total BTEX	0.021	0.006	06/17/2019	ND						

Surrogate: 4-Bromofluorobenzene (PID) 105 % 81.3-128

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	64.0	4.00	06/18/2019	ND	96.0	96.0	100	4.08		

Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	36.2	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11		

TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	439	5.00	06/14/2019	ND	436	82.7	527	0.686		

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:

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

Received:	06/11/2019	Sampling Date:	06/06/2019
Reported:	06/20/2019	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 (H902024-04)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	116	4.00	06/18/2019	ND	96.0	96.0	100	4.08		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	27.1	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	806	5.00	06/14/2019	ND	436	82.7	527	0.686		

Sample ID: G-35 SWD MONITOR WELL #3- DEEP (H902024-05)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	192	4.00	06/18/2019	ND	96.0	96.0	100	4.08		
Sulfate 375.4		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Sulfate*	26.2	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	946	5.00	06/14/2019	ND	436	82.7	527	0.686		

Cardinal Laboratories

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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:	06/11/2019	Sampling Date:	06/06/2019
Reported:	06/20/2019	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 (H902024-06)

BTX 8021B		mg/L		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.009	0.001	06/18/2019	ND	0.021	107	0.0200	0.889	
Toluene*	0.004	0.001	06/18/2019	ND	0.022	109	0.0200	0.536	
Ethylbenzene*	0.004	0.001	06/18/2019	ND	0.020	99.9	0.0200	1.37	
Total Xylenes*	<0.003	0.003	06/18/2019	ND	0.061	101	0.0600	0.642	
Total BTX	0.017	0.006	06/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 81.3-128

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	06/18/2019	ND	96.0	96.0	100	4.08	

Sulfate 375.4		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	28.7	10.0	06/17/2019	ND	16.2	81.2	20.0	1.11	

TDS 160.1		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	574	5.00	06/14/2019	ND	436	82.7	527	0.686	

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

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

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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: RICE Operating Company		BILL TO Company: RICE Operating Company		PO#
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		Sampler Signature: <i>Rozanne Johnson</i> (575) 631-9310		

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # _____

ANALYSIS REQUEST

(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	(G)rab or (C)omp	# CONTAINERS	MATRIX				PRESERVATIVE METHOD					SAMPLING		MTBE 8021B/602	BTEx 8021B/602	TPH 418.1/TX1005 / TX100	PAH 8270C	Total Metals Ag As Ba Cd Cr Cu Hg Mn Ni Pb Se Tl V Zn	TCLP Metals Ag As Ba Cd Cr Cu Hg Mn Ni Pb Se Tl V Zn	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/6/8	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	Sulfates	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Relinquished by: <i>Rozanne Johnson</i>	Date: 6/11/2019	Time: 13:45	Received by: <i>Rozanne Johnson</i>	Date: 6-11-19	Time: 13:45
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)	Date:	Time:

Phone Results	Yes	No
Fax Results	Yes	No

REMARKS:

Email Results to: kjones@riceswd.com
rozanne11@windstream.net

Delivered By: (Circle One) Sampler	UPS - Bus - Other:	Sample Condition Cool <input checked="" type="checkbox"/> Intact <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	CHECKED BY: (Initials) <i>JA</i>
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December 05, 2019

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 11/21/19 12:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-19-12. 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:	11/21/2019	Sampling Date:	11/18/2019
Reported:	12/05/2019	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 (H903954-01)

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	11/22/2019	ND	104	104	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*	48.5	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	236	5.00	11/27/2019	ND	515	97.7	527	15.3		

Sample ID: F -35 SWD MONITOR WELL #3- DEEP (H903954-02)

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	11/22/2019	ND	104	104	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*	48.0	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	273	5.00	11/27/2019	ND	515	97.7	527	15.3		

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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:	11/21/2019	Sampling Date:	11/19/2019
Reported:	12/05/2019	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 (H903954-03)

BTX 8021B		mg/L		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.002	0.001	11/24/2019	ND	0.019	96.8	0.0200	0.956	
Toluene*	<0.001	0.001	11/24/2019	ND	0.019	93.7	0.0200	0.628	
Ethylbenzene*	0.005	0.001	11/24/2019	ND	0.019	95.4	0.0200	0.648	
Total Xylenes*	<0.003	0.003	11/24/2019	ND	0.058	95.9	0.0600	0.741	
Total BTX	0.007	0.006	11/24/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.4 % 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	11/22/2019	ND	104	104	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*	33.0	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5	

TDS 160.1		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	451	5.00	11/27/2019	ND	515	97.7	527	15.3	

Cardinal Laboratories

*=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:	11/21/2019	Sampling Date:	11/19/2019
Reported:	12/05/2019	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 (H903954-04)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	136	4.00	11/22/2019	ND	104	104	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*	38.8	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	471	5.00	11/27/2019	ND	515	97.7	527	15.3		

Sample ID: G-35 SWD MONITOR WELL #3- DEEP (H903954-05)

Chloride, SM4500Cl-B		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride*	168	4.00	11/22/2019	ND	104	104	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*	27.8	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5		
TDS 160.1		mg/L		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
TDS*	535	5.00	11/27/2019	ND	515	97.7	527	15.3		

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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:	11/21/2019	Sampling Date:	11/19/2019
Reported:	12/05/2019	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 (H903954-06)

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	11/24/2019	ND	0.019	96.8	0.0200	0.956	
Toluene*	0.003	0.001	11/24/2019	ND	0.019	93.7	0.0200	0.628	
Ethylbenzene*	0.003	0.001	11/24/2019	ND	0.019	95.4	0.0200	0.648	
Total Xylenes*	<0.003	0.003	11/24/2019	ND	0.058	95.9	0.0600	0.741	
Total BTX	0.013	0.006	11/24/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.3 % 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*	140	4.00	11/22/2019	ND	104	104	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*	28.2	10.0	11/27/2019	ND	18.3	91.6	20.0	18.5	

TDS 160.1		mg/L		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	552	5.00	11/27/2019	ND	515	97.7	527	15.3	

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

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

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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#: Fax#: (575) 393-9174 (575)397-1471	
Phone #: Fax #: (575) 393-9174 (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		Sampler Signature: Rozanne Johnson (575)631-9310	

ANALYSIS REQUEST

(Circle or Specify Method No.)

[illegible]