L Peter Galusky, Jr PE

5935 Exeter Circle Norcross, GA 30071 | 470 955-5335 | peter@bluerock.pro

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** Rice Operating Company Vacuum K-35-1 Boot, UL K, Sec 35, T17S, R35E **OCD Case Number 1R425-03**

Sent by E-mail

Mr. Billings:

This letter summarizes remediation history and progress made for this project over the past calendar year. Location and site schematic maps are given in the Appendix (Figures 1 and 2, respectively).

OCD granted termination of soil remediation requirements (soil closure) on October 13th, 2011, allowing for the cessation of groundwater withdrawals and stipulating that groundwater monitoring must continue semi-annually at wells MW-2, MW-3 and MW-4.

A Groundwater Recovery Notification was submitted to the NMOCD on September 4th, 2013 and NMOCD approved the notification on September 5th, 2013. Groundwater recovery began from RW-1 on September 13th, 2013. According to the NMOCD approved Groundwater Recovery Notification, ROC began sampling all the wells (MW-1, MW-2, MW-3, MW-4, and RW-1) on a semi-annual (twice a year) basis in 2013, and a quarterly basis in 2014.

Brief Summary of Groundwater Monitoring and Present Status

- Approximately 32,110 barrels of chloride-affected groundwater have been withdrawn from a near-source recovery well (RW-1) over the period June 2008 through October 2019 resulting in the removal of an estimated 2,359 kg of chlorides (Appendix Figure 3). The removed groundwater was hauled to an off-site location and utilized for a beneficial use.
- The average annual groundwater chloride concentration in the near/at-source monitor well, MW-4, decreased substantially from 365 mg/l in 2018 to 137 mg/l in 2019 (Appendix Figure 3, Table 1).

Rice Operating Company Vacuum K-35-1 Boot Annual Report

- The average annual groundwater chloride concentration in the down-gradient monitor well, MW-2, was little changed rising from 39 mg/l in 2018 to 50 mg/l in (Appendix Table 1).
- The average annual groundwater chloride concentration in the down-gradient recovery well, RW-1, dropped substantially from 523 mg/l in 2018 to 269 mg/l in 2019 (Appendix Figure 3, Table 1).
- The average annual groundwater chloride concentration in the up-gradient monitor well (MW-3) rose slightly from 274 mg/l in 2018 to 307 mg/l in (Appendix Figure 3, Table 1). The more or less general rise in average annual groundwater chloride concentrations from a low value of 77 mg/l in 2009 suggests that chloride impacted groundwater water from up-gradient source(s) may increase groundwater chloride concentrations beneath the subject site within the coming years.

Due to the current climate, and in the interest of safety, ROC proposes to reduce groundwater monitoring from quarterly to semi-annually for the remainder of this year. In addition, ROC proposes to suspend groundwater recovery for this year. These proposals are only temporary, and regularly scheduled groundwater monitoring and recovery will commence as soon as possible.

ROC is the service provider (agent) for the Vacuum Saltwater Disposal (SWD) System and has no ownership of any portion of pipeline, well or facility. The Vacuum 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 myself or Rice Operating Company if you have any questions or need additional information.

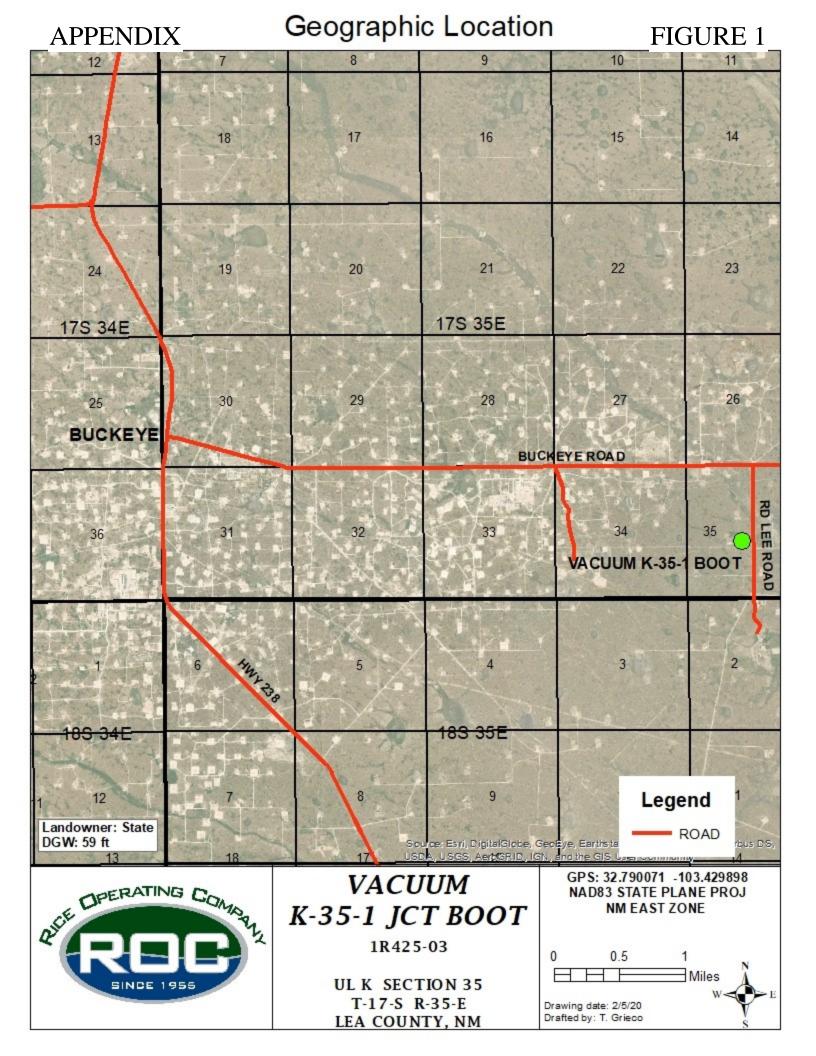
Sincerely,

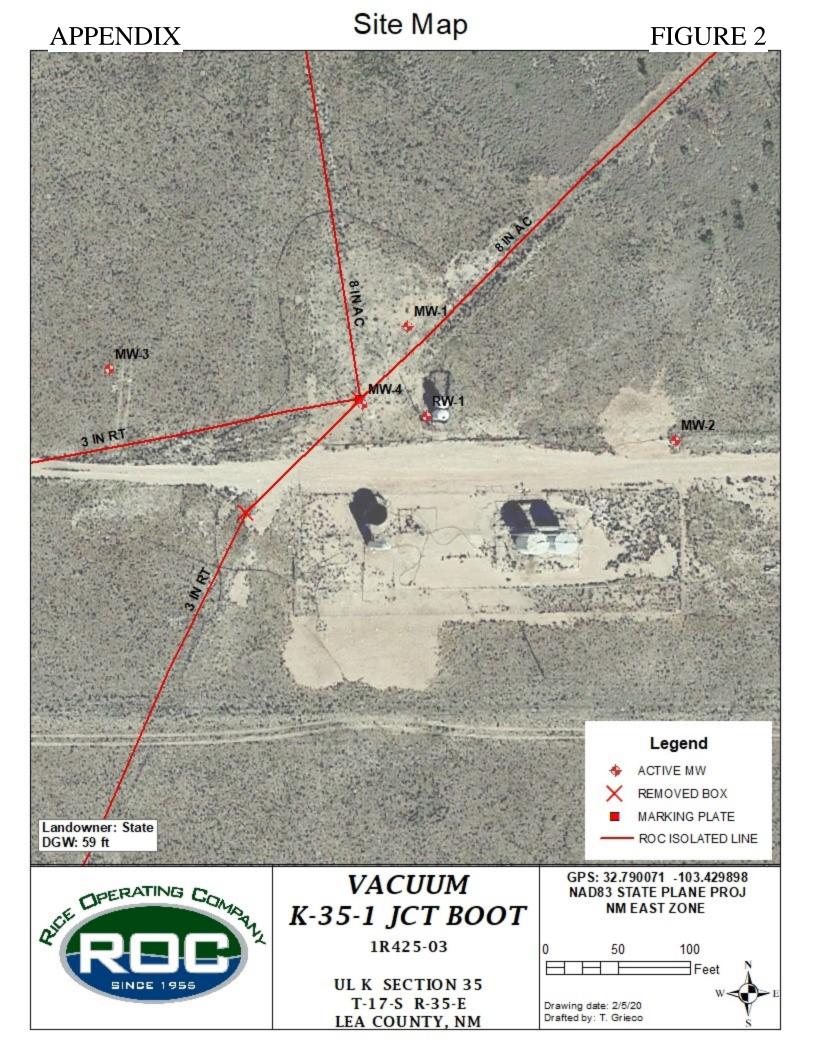
L. Peter Galusky, Jr. P.E. NM Prof. Engineer No. 22561

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

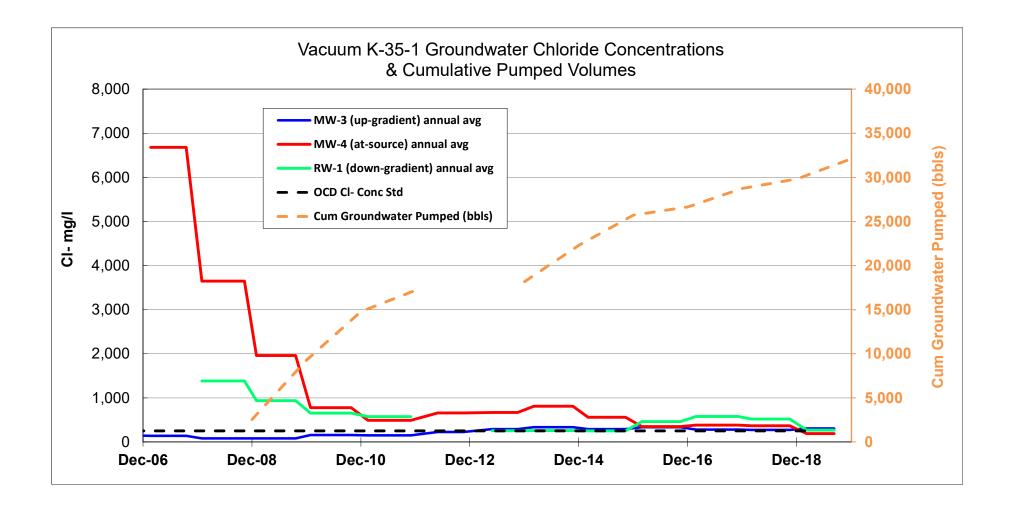


L Peter Galusky, Jr PE





APPENDIX



APPENDIX

				Groundwate	r Chloride Co	nc (mg/l)				
								MW-4 (at-		RW- (dowr
	MW-1		W-2 (down∙			MW-3 (up-		source)		gradien
	(downgradient	MW-1 annual	gradient	MW-2	MW-3 (up-		MW-4 (at-		RW-1 (down-	annu
Date	well)	avg	well)	annual avg	gradient)	annual avg	source)	avg	gradient)	av
6/28/06	508	684	32	29	140	153				
10/19/06	859	684	26	29	165	153				
2/21/07	1,080	1,138	29	27	178	138	6,770	6,680		
5/22/07	923	1,138	25	27	128	138	6,770	6,680		
8/7/07	1,150	1,138	27	27	134	138	6,390	6,680		
10/16/07	1,400	1,138	28	27	112	138	6,790	6,680		
1/30/08	1,300	1,330	80	43	88	81	4,000	3,645		1,38
4/30/08	1,440	1,330	32	43	84	81	4,550	3,645	1,880	1,38
7/30/08	1,360	1,330	32	43	76	81	3,450	3,645	1,070	1,38
11/10/08	1,220	1,330	28	43	76	81	2,580	3,645	1,200	1,38
1/30/09	1,280	1,210	28	28	76	83	1,960	1,960	1,680	93
5/1/09	1,420	1,210	28	28	84	83	2,080	1,960	750	93
8/4/09	940	1,210	28	28	72	83	2,300	1,960	580	93
10/20/09	1,200	1,210	28	28	100	83	1,500	1,960	730	93
1/27/10	1,180	795	32	32	152	157	1,200	778	490	65
4/28/10	460	795	32	32	128	157	460	778	1,220	65
7/29/10	980	795	32	32	184	157	800	778	570	65
10/26/10	560	795	32	32	164	157	650	778	332	65
2/16/11	800	662	32	34	128	152	520	490	750	57
6/1/11	396	662	32	34	148	152	680	490	476	57
8/30/11	352	662	32	34	156	152	380	490	490	57
12/1/11	1,100	662	40	34	176	152	380	490		57
5/29/12	1,100	002	36	36	204	228	700	655		0.
11/15/12			36	36	252	228	610	655		
5/28/13			36	36	280	294	690	670	212	25
11/15/13	1.040	1.040	36	36	308	294	650	670	300	25
3/4/14	920	733	32	36	312	333	720	808	364	26
6/3/14	800	733	36	36	356	333	870	808	300	26
8/28/14	750	733	44	36	328	333	810	808	292	26
11/21/14	460	733	32	36	336	333	830	808	84	26
3/3/15	400	423	40	44	304	288	640	560	252	25
6/3/15	499	423	40 60	44	244	288	750	560	232	25
8/22/15	292	423	36	44	284	288	510	560	292	25
11/8/15	432	423	30 40	44	320	288	340	560	292	25
2/26/16	432 830	630	40	44	430	200	340	350	220 570	46
5/21/16	740	630	40 32	40	430 284	337	440		620	46
	520	630	32 36	40		337	280	350 350	368	46
9/10/16	520 430	630	30 68	40 46	332 300	337	280		292	46
11/10/16								350		
2/22/17	850	968	40	54	280	279	430	385	690	57
5/25/17	960	968	84	54	296	279	256	385	810	57
9/16/17	1,040	968	60	54	320	279	392	385	156	57
12/2/17	1,020	968	32	54	220	279	460	385	652	57
2/28/18	1,300	1,305	44	39	328	274	300	365	680	52
5/15/18	1,300	1,305	36	39	180	274	320	365	820	52
9/8/18	1,120	1,305	36	39	288	274	228	365	112	52
11/13/18	1,500	1,305	40	39	300	274	610	365	480	52
3/6/19	870	748	44	50	324	307	344	188	820	26
5/29/19	900	748	32	50	312	307	128	188	108	26
9/6/19	640	748	48	50	320	307	132	188	108	26
11/16/19	580	748	76	50	272	307	148	188	40	26



March 18, 2019

KATIE JONES Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: VACUUM JUNCTION K-35-1

Enclosed are the results of analyses for samples received by the laboratory on 03/11/19 13:25.

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/ga/lab_accred_certif.html.

Cardinal Laboratories is accreditated 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. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	03/11/2019	Sampling Date:	03/06/2019
Reported:	03/18/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #1 (H900962-01)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	870	4.00	03/18/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	72.3	10.0	03/14/2019	ND	21.3	106	20.0	6.80	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	1840	5.00	03/14/2019	ND	542	103	527	7.32	

Sample ID: MONITOR WELL #2 (H900962-02)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	44.0	4.00	03/18/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	62.6	10.0	03/14/2019	ND	21.3	106	20.0	6.80	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	436	5.00	03/14/2019 ND		542	103	527	7.32	

Cardinal Laboratories

*=Accredited Analyte

Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	03/11/2019	Sampling Date:	03/06/2019
Reported:	03/18/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #3 (H900962-03)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Analyzed Method Blank		% Recovery	True Value QC	RPD	Qualifier
Chloride*	324	4.00	03/18/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	115	25.0	03/14/2019	ND	21.3	106	20.0	6.80	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	906	5.00	03/14/2019 ND		542	103	527	7.32	

Sample ID: MONITOR WELL #4 (H900962-04)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	128	4.00	03/18/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	74.8	10.0	03/14/2019	ND	21.3	106	20.0	6.80	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	496	5.00	03/14/2019 ND		542	103	527	7.32	

Cardinal Laboratories

*=Accredited Analyte

Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	03/11/2019	Sampling Date:	03/06/2019
Reported:	03/18/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: RECOVERY WELL #1 (H900962-05)

Chloride, SM4500Cl-B	mg	/L	Analyze	d By: AC									
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier				
Chloride*	820	4.00	03/18/2019	ND	100	100	100	0.00					
Sulfate 375.4	mg,	/L	Analyze	d By: JH									
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier				
Sulfate*	73.4	10.0	03/14/2019	ND	21.3	106	20.0	6.80					
TDS 160.1	mg,	/L	Analyzed By: AC		Analyzed By: AC		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier				
TDS*	1840	5.00	03/14/2019 ND		542	103	527	7.32					

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PLEASE NOTE: Liability and Damages. Cardinal's liability and clent'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, whother bits ubsidiaries, affiliates or successor 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.

Celeg D. Keine



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 sample identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celeg D. Keine

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ONLY H900962	(G)rab or (C)omp	00	WATER	SOIL	AIR	SLUDGE	HCL (2 40ml VOA)	HNO ₃	NaHSO ₄	H ₂ SO ₄	ICE (1-1Liter HDPE)	INCINE	DATE (2019)	TIME	MTBE 8021B/602	BTEX 8021B/602 TPH 418 1/TX100	PAH 8270C	otal	CLP	TCLP Semi Vol	TCLP Pesticides	RCI	CIM	C/M	PCB's 8082/608	estici	BOD, TSS, pH	otion	Anions (CI, SO4,	Sulfates	otal I	Cniorides
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June 06, 2019

KATIE JONES Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: VACUUM JUNCTION K-35-1

Enclosed are the results of analyses for samples received by the laboratory on 06/03/19 10:12.

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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. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	06/03/2019	Sampling Date:	05/29/2019
Reported:	06/06/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #1 (H901928-01)

Chloride, SM4500Cl-B	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	900	4.00	06/04/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	69.0	10.0	06/04/2019	ND	21.1	105	20.0	4.96	
TDS 160.1	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	2270	5.00	06/06/2019	ND	520	98.7	527	2.05	

Sample ID: MONITOR WELL #2 (H901928-02)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	32.0	4.00	06/04/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	63.5	10.0	06/04/2019	ND	21.1	105	20.0	4.96	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	453	5.00	06/06/2019	ND	520	98.7	527	2.05	

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*=Accredited Analyte

Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	06/03/2019	Sampling Date:	05/29/2019
Reported:	06/06/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #3 (H901928-03)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	312	4.00	06/04/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	114	100	06/04/2019	ND	21.1	105	20.0	4.96	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	889	5.00	06/06/2019	ND	520	98.7	527	2.05	

Sample ID: MONITOR WELL #4 (H901928-04)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	132	4.00	06/04/2019	ND	100	100	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	72.4	10.0	06/04/2019	ND	21.1	105	20.0	4.96	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	599	5.00	06/06/2019	ND	520	98.7	527	2.05	

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	06/03/2019	Sampling Date:	05/29/2019
Reported:	06/06/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: RECOVERY WELL #1 (H901928-05)

Chloride, SM4500Cl-B	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	108	4.00	06/04/2019	/04/2019 ND		100	100	0.00	
Sulfate 375.4	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	56.4	10.0	06/04/2019	ND	21.1	105	20.0	4.96	
TDS 160.1	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	465	5.00	06/06/2019	ND	520	98.7	527	2.05	

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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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	Street, City, Zip)		1070		Phon							Fax#:							2															
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1000000				T	MA	TRI		F		SER			SA	MPLING			TPH 418.1/TX1005 / TX1005 Extended (C35)		Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	33 Cd				24	GC/MS Semi. Vol. 8270C/625		8			Cations (Ca, Mg, Na, K)	10,00	sp		Turn Around Time ~ 24 Hours
H901928		ę	RS					2			-		1		2	N	005 /		As B	I CLP Metals Ag As Ba TCL D Vicipitales	TCLP Semi Volatiles			GC/MS Vol. 8260B/624	ol. 8;		Pesticides 8081A/608		ŧ	Z C	2	Total Dissolved Solids		ne ~
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		Ū.	# CONTAINERS	WATER	SOIL	AIR	וק	HCL (2 40ml VOA)	HNO ₃	NaHSO4	H ₂ SO ₄	ICE (1-1Liter HDPE) NONE	DATE (2019)	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH	PAH 8270C	Tota	TCLP Metals A	102	TCLP Pesticides	RCI	GCI	GCM	PCB's 8082/608	Pest	BOD, TSS, pH	Moisture Content	Catio	Sulfates	Tota	Chlorides	Lurn
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3	Monitor Well #3	G	1	X								1	5/2	29 10:40							Τ	Γ	Γ								X	x	X	
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	and the second se		N	Cool	-	Intact	-																											
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September 17, 2019

KATIE JONES Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: VACUUM JUNCTION K-35-1

Enclosed are the results of analyses for samples received by the laboratory on 09/11/19 15:50.

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/ga/lab_accred_certif.html.

Cardinal Laboratories is accreditated 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. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	09/11/2019	Sampling Date:	09/06/2019
Reported:	09/17/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #1 (H903143-01)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	640	4.00	09/13/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	73.5	25.0	09/13/2019	ND	21.2	106	20.0	0.950	
TDS 160.1	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	1660	5.00	09/13/2019	ND	539	102	527	9.17	

Sample ID: MONITOR WELL #2 (H903143-02)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	48.0	4.00	09/13/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	53.1	10.0	09/13/2019	ND	21.2	106	20.0	0.950	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	504	5.00	09/13/2019	ND	539	102	527	9.17	

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	09/11/2019	Sampling Date:	09/06/2019
Reported:	09/17/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #3 (H903143-03)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	320	4.00	09/13/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	93.4	25.0	09/13/2019	ND	21.2	106	20.0	0.950	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	942	5.00	09/13/2019	ND	539	102	527	9.17	

Sample ID: MONITOR WELL #4 (H903143-04)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	148	4.00	09/13/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	68.3	10.0	09/13/2019	ND	21.2	106	20.0	0.950	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	572	5.00	09/13/2019	ND	539	102	527	9.17	

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	09/11/2019	Sampling Date:	09/06/2019
Reported:	09/17/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: RECOVERY WELL #1 (H903143-05)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	108	4.00	09/13/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	53.2	10.0	09/13/2019	ND	21.2	106	20.0	0.950	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	490	5.00	09/13/2019	ND	539	102	527	9.17	

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Celez D. Keine



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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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager

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Project Manager:	23		Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240						1	1	1	1	T	Ť	1	Ê 1	. 1	1	1	T	1	1	Т	T	T	Ē.	1	1							
Katie Jones			122 W	Tayle	-		Hobbs	s, Nev	w Me	xico		_																							
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T17S-R35E	-Sec35 K ~ Lea County New Me	exico					0	t	3	4	- 0	N						005		Cr Pb	5					162!					C C	5			noF
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H903143	FIELD CODE	(C)omp	# CONTAINERS				ш	Dml VOA)	Final Andrews			(ter HDPE)	1000	(119)		21B/602	21B/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	S	Total Metals Ag As Ba Cd Cr Pb Se Hg Tr'i D Metals An As Ba Cd Cr Ph Se Hn	atiles	TCLP Semi Volatiles	sticides		GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	82/608	Pesticides 8081A/608	S, pH	Content	Cations (Ca, Mg, Na, K) Anions (CI, SO4, CO3, HCO3)		Total Dissolved Solids		Turn Around Time ~ 24 Hours
(LAB USE ONLY)		(G)rab or (C)omp	# CONT	WATER	SOIL	AIR	SLUDGE	HCL (2 40ml VOA)	HNO ₃	NaHSO ₄	H₂SO₄	ICE (1-1Liter HDPE)		DATE (2019)	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418	PAH 8270C	Total Met	TCLP Volatiles	TCLP Ser	TCLP Pesticides	RCI	GC/MS V	GC/MS S	PCB's 8082/608	Pesticides	BOD, TSS, pH	Moisture Content	Cations (Sulfates	Total Dis	Chlorides	Turn Aro
1	Monitor Well #1	G	1	X				Γ	Τ			1	9	0/6	13:30															Т	T	X	X	X	
2	Monitor Well #2	G	1	X					Τ		Π	1	9	9/6	9:45						Τ								Т	Т	T	X	X	X	
3	Monitor Well #3	G	1	x								1	9	9/6	11:00														\square	\uparrow	T	X	X	X	
Y	Monitor Well #4	G	1	x							П	1	9		12:15												1		\neg	+	\top	x	-	-	
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December 02, 2019

KATIE JONES Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: VACUUM JUNCTION K-35-1

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/ga/lab_accred_certif.html.

Cardinal Laboratories is accreditated 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. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	11/21/2019	Sampling Date:	11/16/2019
Reported:	12/02/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #1 (H903952-01)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	580	4.00	11/22/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	65.8	25.0	11/27/2019	ND	18.3	91.6	20.0	18.5	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	1230	5.00	11/26/2019	ND	523	99.2	527	2.39	

Sample ID: MONITOR WELL #2 (H903952-02)

Chloride, SM4500Cl-B	mg	/L	Analyze	d 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	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	70.6	25.0	11/27/2019	ND	18.3	91.6	20.0	18.5	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	485	5.00	11/26/2019	ND	523	99.2	527	2.39	

Cardinal Laboratories

*=Accredited Analyte

Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	11/21/2019	Sampling Date:	11/16/2019
Reported:	12/02/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: MONITOR WELL #3 (H903952-03)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	272	4.00	11/22/2019	ND	104	104	100	0.00	
Sulfate 375.4	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	162	25.0	11/27/2019	ND	18.3	91.6	20.0	18.5	
TDS 160.1	mg,	/L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	833	5.00	11/26/2019	ND	523	99.2	527	2.39	

Sample ID: MONITOR WELL #4 (H903952-04)

Chloride, SM4500Cl-B	mg,	/L	Analyze	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	Analyze	d By: AC								
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier			
Sulfate*	73.5	25.0	11/27/2019	ND	18.3	91.6	20.0	18.5				
TDS 160.1	mg,	/L	Analyze	d By: AC								
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier			
TDS*	564	5.00	11/26/2019	ND	523	99.2	527	2.39				

Cardinal Laboratories

*=Accredited Analyte

Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	11/21/2019	Sampling Date:	11/16/2019
Reported:	12/02/2019	Sampling Type:	Water
Project Name:	VACUUM JUNCTION K-35-1	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	T17S-R35E-SEC35 K LEA COUNTY, NM		

Sample ID: RECOVERY WELL #1 (H903952-05)

Chloride, SM4500Cl-B	mg,	/L	Analyze	d By: AC							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier		
Chloride*	40.0	4.00	11/22/2019	ND	104	104	100	0.00			
Sulfate 375.4	mg,	/L	Analyze	d By: AC							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier		
Sulfate*	155	25.0	11/27/2019	ND	18.3	91.6	20.0	18.5			
TDS 160.1	mg,	/L	Analyze	d By: AC							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier		
TDS*	428	5.00	11/26/2019	ND	523	99.2	527	2.39			

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PLEASE NOTE: Liability and Damages. Cardinal's liability and clent'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, whother bits ubsidiaries, affiliates or successor 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.

Celeg D. Keine



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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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager

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101 East Marland - Hobbs, NM 88240												CHAIN-OF-CUSTODY AND ANALYSIS REQUEST																							
Tel (575) 393-2326 Cardinal Laboratories, IIIC. Fax (575) 393-2476 Cardinal Laboratories, IIIC.													LAB Order ID #																						
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(LAB USE ONLY)		(G)rab or (C)omp	# CONTAINERS	WATER	SOIL	AIR	SLUDGE	HCI (2 40ml VOA)	HNO ₃	NaHSO ₄	H ₂ SO ₄	ICE (1-1Liter HDPE)	NONE	DATE (2019)	TIME	MTBE 80	BTEX 8021B/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/B/2007 TCI P Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	Cations (Ca, Mg, Na, K)	Anions (C	Sultates Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
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U															Email Results: kjones@riceswd.com																				
Delivered By: (Circle One) Samp				e Condition CHECKED BY:									rozanne11@windstream.net																						
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