112 West Taylor • Hobbs, New Mexico 88240 Phone: (575) 393-9174 • Fax: (575) 397-1471

# **April 1, 2020**

# **Bradford Billings**

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

> RE: 2019 Annual Groundwater Report Rice Operating Company – BD SWD System BD Jct. N-20 (1R426-215): UL/N, Sec. 20, T21S, R37E

Mr. Billings:

ROC is the service provider (agent) for the BD 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.

## **Background and Previous Work**

The site is located approximately 2 miles northwest of Eunice, New Mexico at UL/N, Sec. 20, T21S, R37E as shown on the Geographical Location Map. Groundwater sampling at the site indicated the depth to groundwater is approximately 99 feet below ground surface (bgs).

An Investigation and Characterization Plan (ICP) was submitted to NMOCD on August 5, 2013 and approved on August 21, 2013. According to the ICP, the site was investigated through soil bore installation resulting in elevated chloride concentrations that decreased with depth. Based on the soil bore installation, a Corrective Action Plan (CAP) was submitted and approved by NMOCD on October 30, 2013. According to the NMOCD approved CAP, a 71x103-ft, 20-mil reinforced liner was installed and properly seated at 4.5 ft bgs. The site was backfilled and seeded with a blend of native vegetation. A CAP Report and Soil Closure Request detailing this work was submitted to the NMOCD on August 1, 2014. The report also requested a near-source monitor well (MW-1) and an up-gradient well (MW-2) to determine groundwater quality. NMOCD approved this report and granted 'Soil Closure' on September 18, 2014.

On May 14, 2015, MW-1 was installed, and lithology soil samples were collected at regular intervals. The well was developed and sampled in conjunction with the quarterly monitoring well sampling. The chloride concentrations have remained high, resulting in a chloride concentration of 2,830 mg/L in the 4<sup>th</sup> quarterly sample of 2019. The up-gradient well (MW-2) was installed November 15, 2019 and the down-gradient well (MW-3) was installed on December 20, 2019. MW-2 and MW-3 were developed and sampled, resulting in a concentration of 1,880 mg/L and 980 mg/L, respectively. The initial sample collected from the up-gradient well (MW-2) suggests a non-ROC, up-gradient source may have contributed to the degradation of groundwater quality.

Due to the current climate, and in the interest of safety, ROC is proposing to reduce groundwater monitoring from quarterly to semi-annually for the remainder of this year. This request is only temporary and regularly scheduled groundwater monitoring will commence as soon as possible.

Attached is the Appendix, which contains:

- 1. A Geographical Location Map.
- 2. A map showing well locations.
- 3. Monitoring well logs and photos of installation.
- 4. A table presenting all laboratory results and depth to groundwater for each well at the site, and a graph showing recent laboratory results.
- 5. The laboratory analytical results for 2019.

Rice Operating Company appreciates the opportunity to work with you on this project. Please contact me at (575) 393-9174 or Edward Hansen at (505) 920-4965 if you have any questions or wish to further discuss this site. Thank you for your time and consideration.

Sincerely,

Katie Davis

Environmental Manager

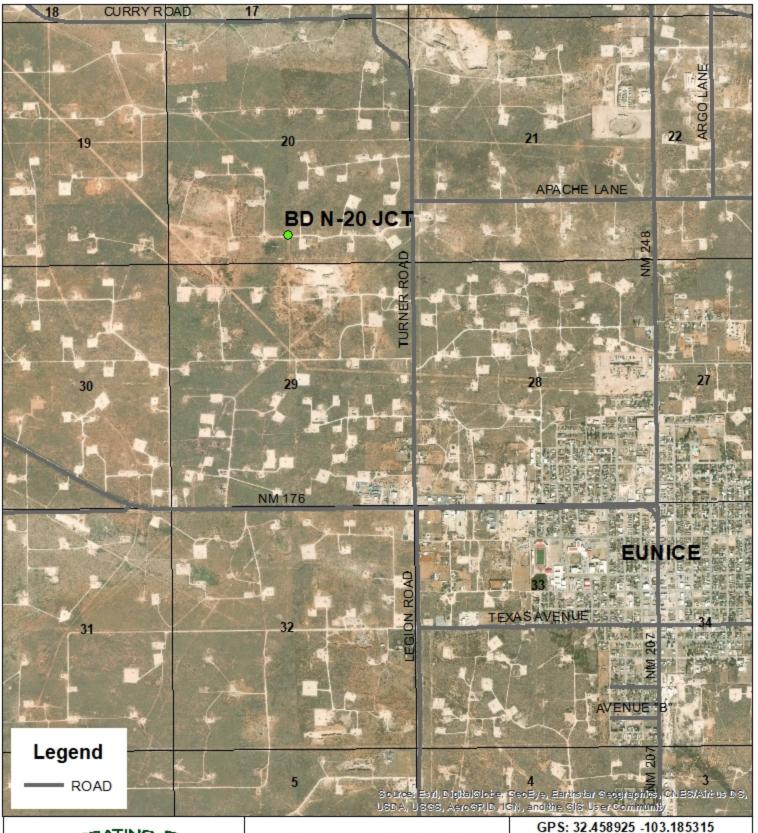
Katy Davis

RICE Operating Company (ROC)

Cc – Edward J. Hansen (ROC)

appendix

# Geographical Location Map

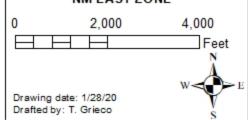




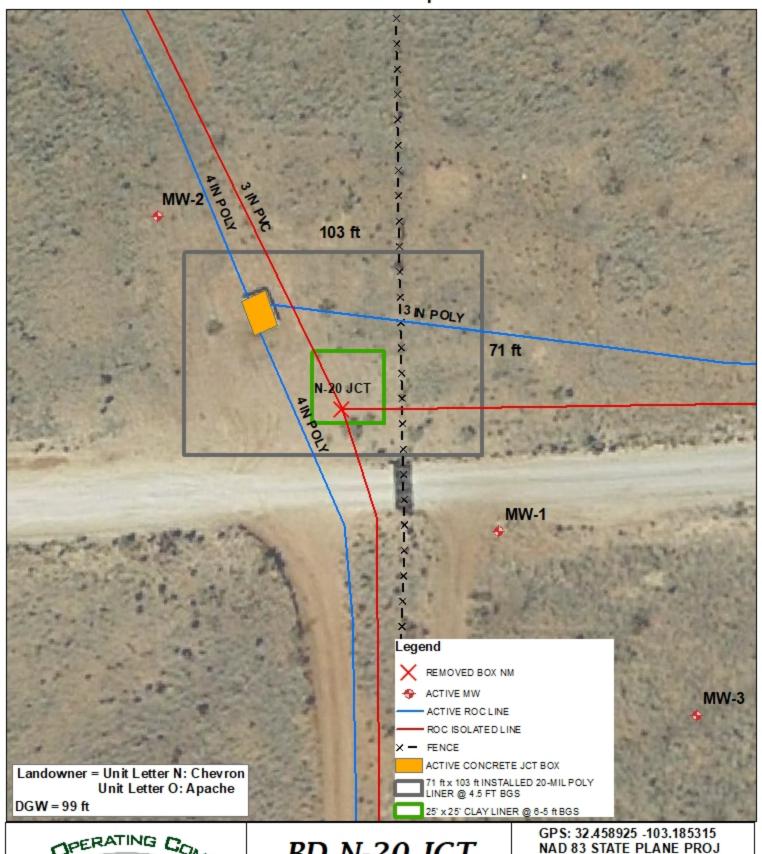
# BD N-20 JCT

1R426-215

UL N SECTION 20 T-21-S R-37-E LEA COUNTY, NM GPS: 32.458925 -103.185315 NAD 83 STATE PLANE PROJ NM EAST ZONE



# Site Map

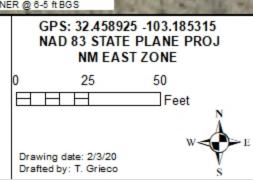




# BD N-20 JCT

1R426-215

**UL N SECTION 20** T-21-S R-37-E LEA COUNTY, NM



Logger: Chris Flores SB-1 SB-2 SB-8 Harrison & Cooper, ROC AB Driller: Source Vice Technologic Inc. SB-5 **Drilling Method:** Mud Drilling Company: **ROC** Lease R Start Date: 5/18/2015 **Project Name:** Well ID: MW-1 End Date: 5/18/2015 BD Jct. N-20 MW-1 Comments: MW-1 was installed by mud drilling. Samples were taken for Location: UL/N, Sec. 20, T21S, R37S lithology only. **DRAFTED BY: L. Weinheimer Lat**: 32.458713 County: Lea State: NM TD = 145 ftGW = 99 ftLong: -103.185052 Depth Chloride **Well Construction** LAB PID Lithology **Description** (feet) field tests SS Brown Fine Sand, Dry, No Odor Concrete 5 ft Red Clay, Dry, No Odor 10 ft 4 in. PVC Tan Sand, Dry, No Odor 15 ft 20 ft Bentonite Seal 25 ft 30 ft Ground Up Caliche, Dry, No Odor 35 ft 40 ft

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft 50 ft				Ground Up Caliche, Dry, No Odor		
55 ft						
60 ft						Bentonite
65 ft						Seal
70 ft				Caliche w/Tan Sand, Dry, No Odor		
75 ft						
80 ft						
85 ft						
90 ft						
95 ft				Cemented Sandstone, Dry, No Odor		Sand Pack
100 ft						

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
		LAB	PID	Brown Fine Sand, Wet from Mudding Up, No Odor	Lithology	Well Construction  Sand Pack
135 ft						
140 ft				(142' 145) Pod Pod Wet from Mudding		10' Sump
145 ft				(143'-145)Red Bed, Wet from Mudding Up, No Odor		

Nick Kopiasz Logger: TASMAN GEOSCIENCES Driller: **HCI** Drilling **Drilling Method:** Air/Mud Rotary MW-1 **Project Name:** Well ID: Start Date: 11/15/2019 BD Jct. N-20 MW-2 0 25 50 End Date: 11/15/2019 Project Consultant: Tasman Comments: Located approximately 100 ft northwest of the former Location: junction box. Soil samples were collected from drill cuttings at specified Unit N, Section 20, T21S, R37E intervals. **DRAFTED BY: N.Kopiasz** Lat: 32.459017 County: Lea **Long:**-103.185431 (NAD83) TD = 113 ftGW = 99 ftState: NM Depth Chloride LAB PID Lithology **Well Construction** Description (feet) field tests SP-Rust red, very fine poorly graded Concrete sand SS SP-Same As Above (SAA) 5 ft SW-reddish tan, well graded with caliche and very fine sands 10 ft PC SW-tan, well graded with caliche and .⊑ fine sands 15 ft **Bentonite** SW-SAA Seal 20 ft GW-tan, well graded gravels of caliche and fine sands 25 ft

**GW-SAA** 

SW-tan, well graded caliche and fine sands

30 ft

35 ft

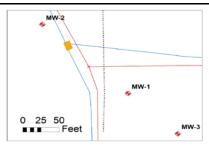
Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
40 ft				SW-well graded caliche and sandstone grains		
45 ft				SP-tan, poorly graded fine sands		
50 ft				SP-SAA		
3011				SP-SAA		
55 ft				SP-SAA		
60 ft				SP-reddish tan, very fine sands		Bentonite Seal
65 ft				SW-reddish tan, well graded with sandstone grains and very fine sand		
70 ft				GW-reddish tan, well graded sandstone gravels		
75 ft				GW-SAA		
80 ft						
85 ft				GW-SAA		

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
90 ft				SP-reddish brown, poorly graded fine sands		Bentonite Seal
95 ft				SP-SAA		
100 ft				SP-SAA		Sand
105 ft				SP-SAA		Pack
110 ft				SP-SAA		
115 ft				SP-SAA		

Logger: Nick Kopiasz Driller: **HCI** Drilling

**Drilling Method:** Air/Mud Rotary Start Date: 12/20/2019

End Date: 12/20/2019





**Project Name:** Well ID: BD Jct. N-20 MW-3

Project Consultant: Tasman

Location:

Comments: Located approximately 150 ft southeast of the former junction box. Soil samples were collected from drill cuttings at specified intervals.

**DRAFTED BY: N.Kopiasz** 

GW = 99 ftTD = 115 ft

Unit N, Section 20, T21S, R37E

Lat: 32.458541 County: Lea **Long:**-103.184832 (NAD83) State: NM

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
ss				SP-rust red, very fine poorly graded sand		Concrete
				SM-rust red, fine sand with silt, cohesive clumps of silt and sand		
5 ft				SW-tan, well graded fine sand and coarse caliche grains		
10 ft				GW-tan, well graded gravelsof caliche and fine sand		2 in. PVC
15 ft				GW-Same As Above (SAA)		Bentonite
20 ft				SP-tan, poorly graded fine sand		Seal
25 ft						
30 ft				GW-tan, well graded caliche gravels with fine sand		
35 ft				SP-orangish tan, poorly graded fine sand		

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
40 ft				SP-SAA		
45 ft				SW-tan, well graded fine sand and coarse caliche grains		
50 ft				SW-SAA		
				SP-tan, poorly graded fine sands		
55 ft 60 ft				SP-SAA		Bentonite
65 ft				GW-reddish tan, well graded gravels of sandstone and sand		Seal
				SW-reddish tan, well graded coarse sandstone and fine sand		
70 ft				SP-reddish brown,		
75 ft				SP-SAA		
80 ft						
85 ft				SW-reddish brown, well graded coarse sandstone with fine sand		

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
00.6				SP-reddish brown, poorly graded fine sand		Bentonite
90 ft 95 ft				SP-reddish brown, poorly graded fine sand with occasional chunks of sandstone		
100 ft				NR-No Recovery		
105 ft				NR		Sand Pack
110 ft				NR		
110 ft				NR		

# BD Jct. N-20 (1R426-215) Unit N, Section 20, T21S, R37E



Facing Southeast 5/18/2015



Facing North 5/18/2015

Rice Operating Company BD N-20 Jct. Drilling Monitoring Wells 11/15/2019



**MW-2 Setting Well** 



**MW-2 Completed** 

Rice Operating Company BD N-20 Jct. Drilling Monitoring Wells 12/20/2019





**Site Overview** 

Rice Operating Company BD N-20 Jct. Drilling Monitoring Wells 12/20/2019





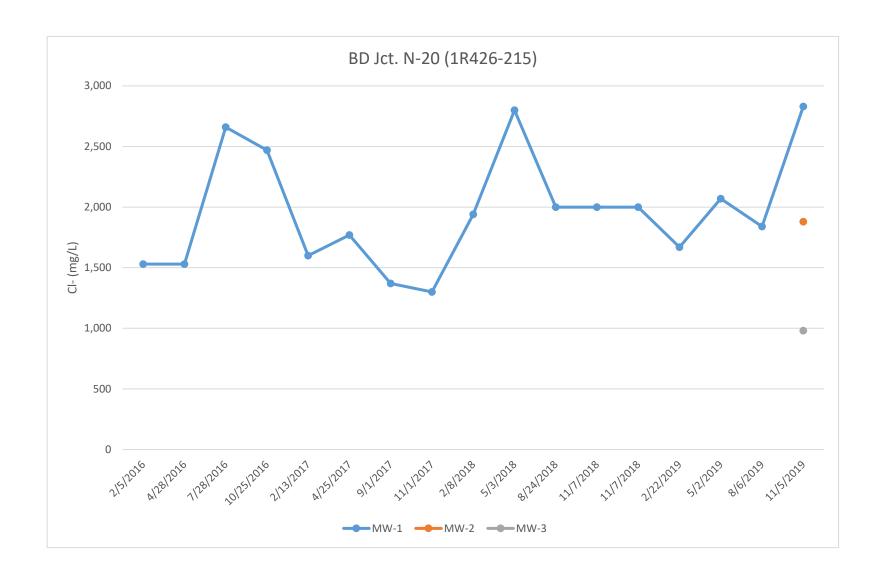
**Well Completed** 

# ROC - BD Jct. N-20 (1R426-215) Unit Letter N, Section 20, T21S, R37E

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
1	100.09	146.9	30.4	100	6/22/2015	640	2,600	<0.001	<0.001	<0.001	<0.003	240	Clear No odor
1	100.23	146.9	30.34	100	8/7/2015	1,100	2,950	<0.001	<0.001	<0.001	<0.003	112	Clear No odor
1	100.22	146.9	30.34	100	10/29/2015	1,260	3,740	<0.001	<0.001	<0.001	<0.003	94	Clear No odor
1	100.14	146.9	30.4	100	2/5/2016	1,530	2,710	<0.001	<0.001	<0.001	<0.003	85	Clear No odor
1	100.14	146.9	30.4	100	4/28/2016	1,530	3,050	<0.001	<0.001	<0.001	<0.003	240	Clear No odor
1	100.21	146.9	30	100	7/28/2016	2,660	5,220	<0.001	<0.001	<0.001	<0.003	16	Clear No odor
1	100.07	146.9	30	100	10/25/2016	2,470	6,460	<0.001	<0.001	<0.001	<0.003	18	Clear No odor
1	100.04	146.9	30.5	100	2/13/2017	1,600	2,970	<0.001	<0.001	<0.001	<0.003	38	Clear No odor
1	99.95	146.9	30.5	100	4/25/2017	1,770	3,160	<0.001	<0.001	<0.001	<0.003	67	Clear No odor
1	99.94	146.9	30.5	100	9/1/2017	1,370	3,170	<0.001	<0.001	<0.001	<0.003	198	Clear No odor
1	99.93	146.9	30.5	100	11/1/2017	1,300	2,780	<0.001	<0.001	<0.001	<0.003	272	Clear No odor
1	99.94	146.9	30.5	100	2/8/2018	1,940	3,310	<0.001	<0.001	<0.001	<0.003	119	Clear No odor
1	100.02	146.9	30.5	100	5/3/2018	2,800	4,850	<0.001	<0.001	<0.001	<0.003	110	Clear No odor
1	100.03	146.9	30.5	100	8/24/2018	2,000	5,040	<0.001	<0.001	<0.001	<0.003	107	Clear No odor
1	100.01	146.9	30.5	100	11/7/2018	2,000	3,510	<0.001	<0.001	<0.001	<0.003	110	Clear No odor
1	100.02	146.9	30.5	100	2/22/2019	1,670	2,740	<0.001	<0.001	<0.001	<0.003	140	Clear No odor
1	100.03	146.9	30.5	100			3,370			<0.001	<0.003	107	Clear No odor
1	100.01	146.9	30.5	100			4,240	<0.001	<0.001	<0.001	<0.003	111	Clear No odor
1	100.09	146.9	30	100	11/5/2019	2,830	5,240	<0.001	<0.001	<0.001	<0.003	127	Clear No odor

MW	Depth to	Total	Well	Volume	Sample	Cl	TDS	Benzene	Toluene	Ethyl	Total	Sulfate	Comments
	Water	Depth	Volume [	Purged	Date	Ci	.55	Demeerie	rorderie	Benzene	Xylenes	3411410	Comments
2	99.96	116.4	2.6	10	12/23/2019	1,880	3,420	<0.001	<0.001	<0.001	<0.003	218	Clear No odor

MW	Depth to	Total	Well	Volume	Sample	כו	TDS	Benzene	Toluene	Ethyl	Total	Sulfate	Comments
IVIVV	Water	Depth	Volume	Purged	Date	Ci	103	Delizerie	Toluelle	Benzene	Xylenes	Juliate	Comments
3	99.12	116.35	2.8	10	12/23/2019	980	1,880	<0.001	<0.001	<0.001	<0.003	152	Clear No odor





March 06, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JUNCTION N-20

Enclosed are the results of analyses for samples received by the laboratory on 02/27/19 13:41.

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 <a href="https://www.tceq.texas.gov/field/ga/lab">www.tceq.texas.gov/field/ga/lab</a> 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)

Celey D. Keine

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



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

Fax To: (575) 397-1471

Received: 02/27/2019 Sampling Date: 02/22/2019
Reported: 03/06/2019 Sampling Type: Water

Project Name: BD JUNCTION N-20 Sampling Condition: Cool & Intact
Project Number: NONE GIVEN Sample Received By: Jodi Henson

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #1 (H900742-01)

BTEX 8021B	mg/	L	Analyze	d By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	< 0.001	0.001	03/05/2019	ND	0.021	106	0.0200	0.538	
Toluene*	< 0.001	0.001	03/05/2019	ND	0.019	97.0	0.0200	0.862	
Ethylbenzene*	< 0.001	0.001	03/05/2019	ND	0.020	102	0.0200	1.06	
Total Xylenes*	< 0.003	0.003	03/05/2019	ND	0.064	106	0.0600	1.06	
Total BTEX	<0.006	0.006	03/05/2019	ND					
Surrogate: 4-Bromofluorobenzene (PID	96.9	% 81.3-12	8						
Chloride, SM4500CI-B	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	1670	4.00	02/28/2019	ND	100	100	100	3.92	
Sulfate 375.4	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	140	25.0	02/28/2019	ND	22.9	114	20.0	0.263	
TDS 160.1	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	2740	5.00	02/28/2019	ND	528	100	527	1.80	

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 whistoever 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 related only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



#### **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

Cardinal Laboratories \*=Accredited Analyte

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LAB#		(G)rab or (C)omp	# CONTAINERS WATER SOIL AIR SOIL AIR SLUDGE HCL (2 40ml VOA) HNO3 NAHSO4 H2SO4 ICE (1-1Liter HDPE) NONE DATE (2019) TIME MTBE 8021B/602 RTEX 8021B/602								B/60	Σ		B A	es s	TCLP Semi Volatiles	TCLP Pesticides		82	i.	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	S		S S		ng.						
	FIELD CODE	0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	# CONTAINE WATER SOIL AIR SLUDGE SLUDGE HCL (2 40ml VO HNO3 NAHSO4 ICE (1-1Liter HD NONE DATE (2019) TIME TIME								021	8.1/	8	stals	olati	emi	esti		No	Ser	808	les	SS,	9 0	길	S	Sis	des	ron					
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May 21, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JUNCTION N-20

Enclosed are the results of analyses for samples received by the laboratory on 05/07/19 15:40.

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 <a href="https://www.tceq.texas.gov/field/ga/lab">www.tceq.texas.gov/field/ga/lab</a> 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)

Celey D. Keine

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



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

Fax To: (575) 397-1471

Received: 05/07/2019 Sampling Date: 05/02/2019
Reported: 05/21/2019 Sampling Type: Water

Project Name: BD JUNCTION N-20 Sampling Condition: Cool & Intact
Project Number: NONE GIVEN Sample Received By: Tamara Oldaker

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #1 (H901646-01)

BTEX 8021B	mg/	L	Analyze	d By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	< 0.001	0.001	05/09/2019	ND	0.021	103	0.0200	1.25	
Toluene*	< 0.001	0.001	05/09/2019	ND	0.021	106	0.0200	2.31	
Ethylbenzene*	< 0.001	0.001	05/09/2019	ND	0.020	99.2	0.0200	0.232	
Total Xylenes*	<0.003	0.003	05/09/2019	ND	0.060	101	0.0600	0.0281	
Total BTEX	<0.006	0.006	05/09/2019	ND					
Surrogate: 4-Bromofluorobenzene (PID	108 9	% 81.3-12	8						
Chloride, SM4500CI-B	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	2070	4.00	05/09/2019	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*	107	25.0	05/14/2019	ND	21.9	109	20.0	3.77	
TDS 160.1	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier

Cardinal Laboratories \*=Accredited Analyte

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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

Cardinal Laboratories \*=Accredited Analyte

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Page 4 of 4
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		S	_	1417		/	4	_ 1	VIET	HOL		-	O/Milli	Liivo	-		5/T		Ba		es			GC/MS Vol. 8260B/624	827		Pesticides 8081A/608		Cations (Ca Mr Na K)	000	Ш	Total Dissolved Solids		~ 6
LAB#	(G)rab or (C)omp	# CONTAINERS					8				ICE (1-1Liter HDPE)				MTBE 8021B/602	302	100		g As	5	TCLP Semi Volatiles	es		260	ĕl	80	<u>₹</u>	Moiofuro Confort		94,	Ш	Sp		<u>ä</u>
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August 16, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JUNCTION N-20

Enclosed are the results of analyses for samples received by the laboratory on 08/09/19 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 <a href="https://www.tceq.texas.gov/field/ga/lab">www.tceq.texas.gov/field/ga/lab</a> 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)

Celey D. Keine

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



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

Fax To: (575) 397-1471

Received: 08/09/2019 Sampling Date: 08/05/2019
Reported: 08/16/2019 Sampling Type: Water

Project Name: BD JUNCTION N-20 Sampling Condition: Cool & Intact
Project Number: NONE GIVEN Sample Received By: Tamara Oldaker

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #1 (H902751-01)

	mg/	L	Analyze	d By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	08/15/2019	ND	0.020	101	0.0200	9.95	
Toluene*	<0.001	0.001	08/15/2019	ND	0.021	104	0.0200	8.14	
Ethylbenzene*	<0.001	0.001	08/15/2019	ND	0.020	101	0.0200	6.66	
Total Xylenes*	<0.003	0.003	08/15/2019	ND	0.063	106	0.0600	2.82	
Total BTEX	<0.006	0.006	08/15/2019	ND					
Surrogate: 4-Bromofluorobenzene (PIL	99.3	% 81.3-12	8						
Chloride, SM4500Cl-B	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	1840	4.00	08/12/2019	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
		25.0	08/13/2019	ND	19.7	98.6	20.0	7.52	
Sulfate*	111	25.0	00/13/2013						
Sulfate* TDS 160.1	111 mg/			d By: AC				_	
					BS	% Recovery	True Value QC	RPD	Qualifier

Cardinal Laboratories \*=Accredited Analyte

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#### **Notes and Definitions**

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC

batch were accepted based on percent recoveries and completeness of QC data.

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 whistoever 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 related only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celeg D. Freene

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November 13, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JUNCTION N-20

Enclosed are the results of analyses for samples received by the laboratory on 11/06/19 13:10.

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 <a href="https://www.tceq.texas.gov/field/ga/lab">www.tceq.texas.gov/field/ga/lab</a> 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.

Celey D. Keine

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



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

Fax To: (575) 397-1471

Received: 11/06/2019 Sampling Date: 11/05/2019
Reported: 11/13/2019 Sampling Type: Water

Project Name: BD JUNCTION N-20 Sampling Condition: Cool & Intact
Project Number: NONE GIVEN Sample Received By: Tamara Oldaker

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #1 (H903791-01)

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E QC RFD Qualii
0 0.551
0 0.479
0.310
0.843
e QC RPD Qualif
0.00
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Cardinal Laboratories \*=Accredited Analyte

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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

Cardinal Laboratories \*=Accredited Analyte

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( ONLY )		(G)rab or (C)omp	# CONTAINERS	WATER	SOIL	AIR		HCL (2 40ml VOA)	HNO <sub>3</sub>	NaHSO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	ICE (1-1Liter HDPE)	DATE (2019)		E E	MTBE	BTEX 8021B/602	보 구	PAH 8270C	Tal N	LP.	TCLP Semi Volatiles	TCLP Pesticides	_	GC/MS Vol. 8260B/624	SMS	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	tions	Sulfates	Total Dissolved Solids	Chlorides	m Ai
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January 02, 2020

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JUNCTION N-20

Enclosed are the results of analyses for samples received by the laboratory on 12/27/19 11:25.

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 <a href="https://www.tceq.texas.gov/field/ga/lab">www.tceq.texas.gov/field/ga/lab</a> 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)

Celey D. Keine

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



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

Fax To: (575) 397-1471

Received: 12/27/2019 Sampling Date: 12/23/2019
Reported: 01/02/2020 Sampling Type: Water

Project Name: BD JUNCTION N-20 Sampling Condition: Cool & Intact
Project Number: NONE GIVEN Sample Received By: Tamara Oldaker

A ... - L ... - - - I D. .. MC

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #2 (H904301-01)

Benzene*         <0.001	BTEX 8021B	}	mg/	L	Analyze	d By: MS					
Toluene* < 0.001 0.001 12/31/2019 ND 0.018 92.4 0.0200 1.90 Ethylbenzene* < 0.001 0.001 12/31/2019 ND 0.018 89.4 0.0200 1.53 Total Xylenes* < 0.003 0.003 12/31/2019 ND 0.053 88.6 0.0600 1.83  Total BTEX < 0.006 0.006 12/31/2019 ND  Surrogate: 4-Bromofluorobenzene (PID 89.7 % 58.2-133  Chloride, SM4500Cl-B mg/L Analyzed By: AC  Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qc  Chloride* 1880 4.00 12/27/2019 ND 104 104 100 3.77  Sulfate 375.4 mg/L Analyzed By: AC  Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qc  Sulfate 375.4 mg/L Analyzed By: AC  Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qc  Sulfate 375.4 mg/L Analyzed By: AC  True Value QC RPD Qc  Sulfate 375.4 mg/L Analyzed By: AC  Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qc  Sulfate* 218 50.0 12/30/2019 ND 20.6 103 20.0 2.49		Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Ethylbenzene*   <0.001   0.001   12/31/2019   ND   0.018   89.4   0.0200   1.53	Benzene*		<0.001	0.001	12/31/2019	ND	0.019	94.3	0.0200	0.980	
Total Xylenes*         <0.003         0.003         12/31/2019         ND         0.053         88.6         0.0600         1.83           Total BTEX         <0.006	Toluene*		< 0.001	0.001	12/31/2019	ND	0.018	92.4	0.0200	1.90	
Total BTEX         <0.006         0.006         12/31/2019         ND           Surrogate: 4-Bromofluorobenzene (PID         89.7 %         58.2-133           Chloride, SM4500Cl-B         mg/L         Analyzed By: AC           Analyte         Result Reporting Limit Reporting Limit Analyzed Method Blank BS Recovery True Value QC RPD QUE Analyzed By: AC         Question Result Reporting Limit Analyzed By: AC           Analyte         Result Reporting Limit Reporting Limit Analyzed Method Blank BS Recovery True Value QC RPD Question Reporting Limit Analyzed Method Blank BS Recovery True Value QC RPD Question Reporting Limit Analyzed By: AC           Sulfate*         218         50.0         12/30/2019 ND 20.6         103         20.0         2.49           TDS 160.1         mg/L         Analyzed By: AC	Ethylbenzen	e*	< 0.001	0.001	12/31/2019	ND	0.018	89.4	0.0200	1.53	
Surrogate: 4-Bromofluorobenzene (PID         89.7 % 58.2-133           Chloride, SM4500Cl-B         mg/L         Analyzed By: AC           Analyte         Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Questions and the proving Limit Analyzed By: AC         1880 4.00 12/27/2019 ND 104 104 104 100 3.77         100 3.77           Sulfate 375.4         mg/L         Analyzed By: AC         Analyzed By: AC         True Value QC RPD Questions and the proving Limit Analyzed Method Blank BS % Recovery True Value QC RPD Questions and the proving Limit Analyzed By: AC         Analyzed By: AC         12/30/2019 ND 20.6 103 20.0 2.49         2.49	Total Xylene	es*	<0.003	0.003	12/31/2019	ND	0.053	88.6	0.0600	1.83	
Chloride, SM4500Cl-B         mg/L         Analyzed By: AC           Analyte         Result Reporting Limit Analyzed Method Blank BS Recovery True Value QC RPD Question Chloride*         1880 4.00 12/27/2019 ND 104 104 104 100 3.77         104 104 100 3.77           Sulfate 375.4         mg/L Analyzed By: AC         Analyzed By: AC         Frue Value QC RPD Question Control Co	Total BTEX		<0.006	0.006	12/31/2019	ND					
Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Question Chloride*  1880 4.00 12/27/2019 ND 104 104 100 3.77  Sulfate 375.4 mg/L Analyzed By: AC  Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Question Company	Surrogate: 4	4-Bromofluorobenzene (PID	89.7	% 58.2-13	3						
Chloride*         1880         4.00         12/27/2019         ND         104         104         100         3.77           Sulfate 375.4         mg/L         Analyzed By: AC         BS         % Recovery         True Value QC         RPD         Quality           Sulfate*         218         50.0         12/30/2019         ND         20.6         103         20.0         2.49           TDS 160.1         mg/L         Analyzed By: AC	Chloride, SM	14500CI-B	mg/	L	Analyze	d By: AC					
Sulfate 375.4         mg/L         Analyzed By: AC           Analyte         Result         Reporting Limit         Analyzed         Method Blank         BS         % Recovery         True Value QC         RPD         Quality           Sulfate*         218         50.0         12/30/2019         ND         20.6         103         20.0         2.49           TDS 160.1         mg/L         Analyzed By: AC		Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qu  Sulfate* 218 50.0 12/30/2019 ND 20.6 103 20.0 2.49  TDS 160.1 mg/L Analyzed By: AC	Chloride*		1880	4.00	12/27/2019	ND	104	104	100	3.77	
Sulfate*         218         50.0         12/30/2019         ND         20.6         103         20.0         2.49           TDS 160.1         mg/L         Analyzed By: AC	Sulfate 375.	.4	mg/	L	Analyze	d By: AC					
TDS 160.1 mg/L Analyzed By: AC		Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
	Sulfate*		218	50.0	12/30/2019	ND	20.6	103	20.0	2.49	
Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qu	TDS 160.1		mg/	L	Analyze	d By: AC					
		Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>TDS*</b> 3420 5.00 12/30/2019 ND 534 101 527 0.611											

Cardinal Laboratories \*=Accredited Analyte

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

Fax To: (575) 397-1471

Received: 12/27/2019
Reported: 01/02/2020
Project Name: BD JUNCTION N-20
Project Number: NONE GIVEN

Sampling Date:
Sampling Type:
Sampling Condition:
Sample Received By:

12/23/2019 Water Cool & Intact

Tamara Oldaker

Project Location: T21S R37E SEC20 N-LEA CTY., NM

#### Sample ID: MONITOR WELL #3 (H904301-02)

BTEX 8021B

BIEV 9051P	ilig/	<u> </u>	Allalyze	u by: M3					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	12/31/2019	ND	0.019	94.3	0.0200	0.980	
Toluene*	< 0.001	0.001	12/31/2019	ND	0.018	92.4	0.0200	1.90	
Ethylbenzene*	< 0.001	0.001	12/31/2019	ND	0.018	89.4	0.0200	1.53	
Total Xylenes*	<0.003	0.003	12/31/2019	ND	0.053	88.6	0.0600	1.83	
Total BTEX	<0.006	0.006	12/31/2019	ND					
Surrogate: 4-Bromofluorobenzene (PID	84.3 9	% 58.2-13	3						
Chloride, SM4500CI-B	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride*	980	4.00	12/27/2019	ND	104	104	100	3.77	
Sulfate 375.4	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate*	152	50.0	12/30/2019	ND	20.6	103	20.0	2.49	
TDS 160.1	mg/	L	Analyze	d By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS*	1880	5.00	12/31/2019	ND	534	101	527	0.611	

Analyzed By: MS

Cardinal Laboratories \*=Accredited Analyte

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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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H904301	(G)rab or (C)omp	# CONTAINERS	П			T	OA)			$\neg$	ICE (1-1Liter HDPE) NONE			8021B/602	602	TPH 418.1/TX1005 / TX1005 Extended (C35)		Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Volatiles	TCLP Semi Volatiles	es		GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	80	Pesticides 8081A/608		Moisture Content	Anions (Cl, SO4, CO3, HCO3)		Total Dissolved Solids		Turn Around Time ~ 24 Hours
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