

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

OCD Hobbs

FORM APPROVED  
OMB NO. 1004-0135  
Expires: July 31, 2010**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*5. Lease Serial No.  
NMLC029509A

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

**SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

1. Type of Well

☐ Oil Well ☐ Gas Well ☒ Other: injection UNKNOWN OTH8. Well Name and No.  
MALJAMAR AGI 2 ☒

2. Name of Operator

FRONTIER FIELD SERVICES LLC ☒

Contact: MICHAEL W SELKE

E-Mail: mselke@geolex.com

9. API Well No.  
30-025-42628 ☒

3a. Address

MALJAMAR, NM 88260

3b. Phone No. (include area code)

Ph: 505-842-8000

10. Field and Pool, or Exploratory  
AGI

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 21 T17S R32E Mer NMP SWSE 400FSL 2100FEL ☒  
32.813967 N Lat, 103.769748 W Lon

11. County or Parish, and State

LEA COUNTY, NM

## 12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

## TYPE OF SUBMISSION

## TYPE OF ACTION

☐ Notice of Intent☒ Subsequent Report☐ Final Abandonment Notice☐ Acidize☐ Alter Casing☐ Casing Repair☐ Change Plans☐ Convert to Injection☐ Deepen☐ Fracture Treat☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☐ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☒ Other

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

This submittal is a follow-up subsequent report to the Demonstration of No Recoverable Hydrocarbons Sundry (EC Transaction No. 334553) submitted on March 23, 2016 and approved on March 25, 2016. That sundry indicated that consistent with the COAs an attempt would be made to swab and recover a fluid sample from the injection zone following perforation and prior to any treatment or testing.

On April 7, 2016 the lowermost zone in the well (Zone 4) was perforated from 10,750 to 10,900 feet (9,977 to 10,100 TVD) with 6 SPF and 60 degree phasing with 0.38-inch holes. A temporary packer was set at 10,715 feet. On April 8, 2016, test tubing was installed and 60 bbls of fresh water was circulated prior to setting down on the packer. An additional 10 bbls of fresh water was pumped into the perforations at 1.8 bbls per minute and 2,200 psi surface pressure.

On April 9, 2016 the well was allowed to flow into tanks while the surrounding area was monitored

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #337478 verified by the BLM Well Information System  
For FRONTIER FIELD SERVICES LLC, sent to the Hobbs  
Committed to AFMSS for processing by KENNETH RENNICK on 04/27/2016 ()

Name (Printed/Typed) MICHAEL W SELKE

Title CONSULTANT TO FRONTIER

Signature (Electronic Submission)

Date 04/26/2016

## THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Accepted for Record:

Approved By

Kenneth Rennick

Title

Retadeva Engineer

Date

4/27/2016

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Carlsbad field office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**\*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\***

MAY 06 2016



## **Additional data for EC transaction #337478 that would not fit on the form**

### **32. Additional remarks, continued**

for potential H<sub>2</sub>S. A water sample was recovered after 70 bbls of flow-back. At approximately 93 bbls flow-back H<sub>2</sub>S alarms sounded and a laboratory sample was recovered under SCBA. No hydrocarbons or any sheens were visible in either sample and, as expected, the sample recovered at 93 bbls flow-back was discolored with H<sub>2</sub>S (see photograph in Attachment A) and H<sub>2</sub>S concentrations of 1900ppm were measured in the frac tank. This demonstrates the direct communication between the injection zone in this well and the Maljamar AGI#1 which is what was planned and anticipated.

The sample was weighed (8.87 lbs per gallon) and preserved in ice until submitted to Cardinal Laboratory on April 12, 2016 for analysis of cations, anions, total dissolved solids, pH, conductivity, and petroleum hydrocarbons.

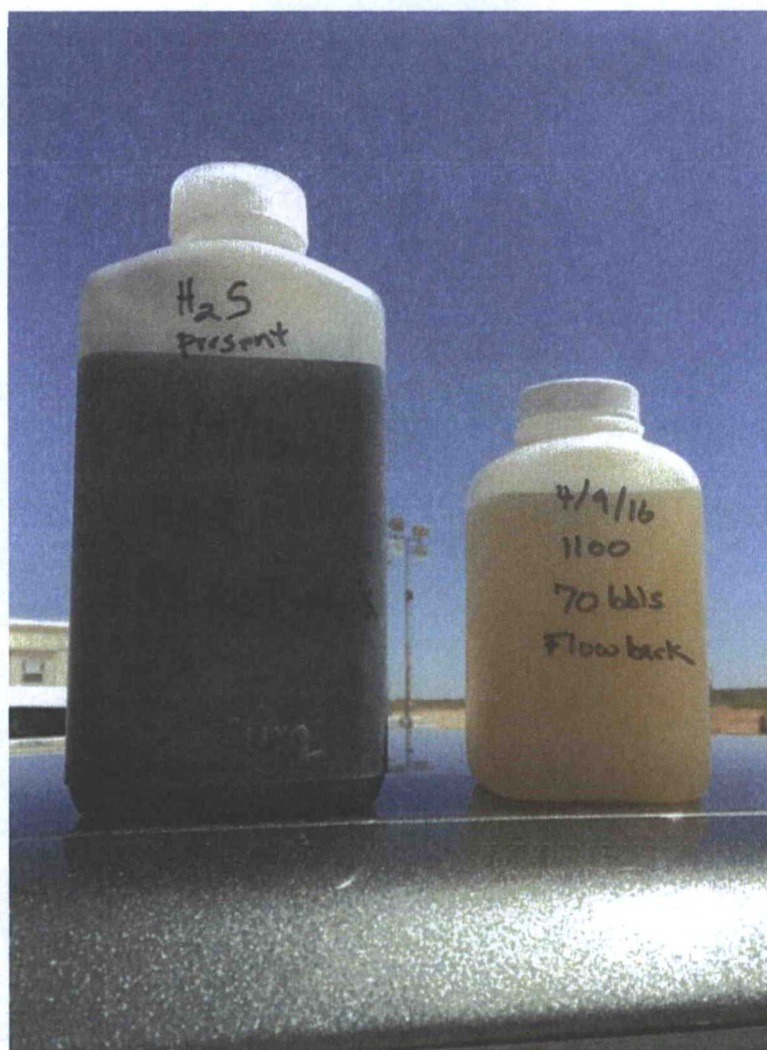
The laboratory results are provided in Attachment B and they are consistent with formation water. The only detected hydrocarbon was 1.72 mg/L (ppm) gasoline range organics (GRO), the source of which is not crude oil, but most likely from impurities within the injection stream of the Maljamar AGI No. 1 well. This information, in support of the data analysis submitted in EC Transaction No. 334553, clearly confirms that no recoverable hydrocarbons are present in the injection zone.

The flow-back operation was terminated due to safety issues associated with H<sub>2</sub>S (1900 ppm). Zone 4 was acidized using a rock salt blocker so that further flow-back was not required. On April 14, 2016 a Step-Rate Test was conducted in Zone 4, the results of which were provided in EC Transaction No. 337235. Zones 1, 2, and 3 were perforated on April 20, 2016 from 10,268 to 10,678 feet (9,609 to 9,920 TVD). Due to the known presence of H<sub>2</sub>S in the injection zone as demonstrated by the flowback sample from Zone 4, and the fact that we already obtained a valid formation fluid sample from the injection zone, flow-back from these zones was not allowed. In summary, it is clear the injection zone does not contain recoverable hydrocarbons.

## ATTACHMENT A

### Maljamar AGI #2

Photograph of Zone 4 Flow-Back Samples Indicating  
No Visible Hydrocarbons Present



## **ATTACHMENT B**

**Maljamar AGI #2**  
Zone 4 Formation Water Sample  
Laboratory Results



April 21, 2016

DALE LITTLEJOHN

GEOLEX INC.

500 MARQUETTE AVE, STE. 1350

ALBUQUERQUE, NM 87102

RE: MALJAMAR AGI #2

Enclosed are the results of analyses for samples received by the laboratory on 04/12/16 8:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-15-7. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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:**

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FORMATION WATER ZONE 4	H600789-01	Wastewater	09-Apr-16 11:42	12-Apr-16 08:30

Cardinal Laboratories

\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



### Analytical Results For:

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

### FORMATION WATER ZONE 4

#### H600789-01 (Wastewater)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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#### Cardinal Laboratories

##### Inorganic Compounds

Alkalinity, Bicarbonate	2020		5.00	mg/L	1	6041808	AP	18-Apr-16	310.1	
Alkalinity, Carbonate	<1.00		1.00	mg/L	1	6041808	AP	18-Apr-16	310.1	
Chloride*	43000		4.00	mg/L	1	6041301	AP	13-Apr-16	4500-Cl-B	
Conductivity*	136000		1.00	uS/cm	1	6041305	AP	13-Apr-16	120.1	
pH*	6.53		0.100	pH Units	1	6041407	AP	14-Apr-16	150.1	
Sulfate*	4000		1250	mg/L	125	6041402	AP	14-Apr-16	375.4	
TDS*	80500		5.00	mg/L	1	6040508	AP	18-Apr-16	160.1	
Alkalinity, Total*	1660		4.00	mg/L	1	6041808	AP	18-Apr-16	310.1	

##### Petroleum Hydrocarbons by GC FID

A-01

GRO C6-C10	1.72		1.00	mg/L	0.1	6041901	MS	19-Apr-16	8015B	
DRO >C10-C28	<1.00		1.00	mg/L	0.1	6041901	MS	19-Apr-16	8015B	
EXT DRO >C28-C35	<1.00		1.00	mg/L	0.1	6041901	MS	19-Apr-16	8015B	
Surrogate: 1-Chlorooctane			93.6 %	34.8-131		6041901	MS	19-Apr-16	8015B	
Surrogate: 1-Chlorooctadecane			118 %	30.4-167		6041901	MS	19-Apr-16	8015B	

#### Green Analytical Laboratories

##### Total Recoverable Metals by ICP (E200.7)

Calcium*	2730		1.00	mg/L	50	B604152	JLM	15-Apr-16	EPA200.7	
Magnesium*	1730		5.00	mg/L	50	B604152	JLM	15-Apr-16	EPA200.7	
Potassium*	3210		50.0	mg/L	50	B604152	JLM	15-Apr-16	EPA200.7	
Sodium*	23300		500	mg/L	500	B604152	JLM	18-Apr-16	EPA200.7	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Analytical Results For:

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

### Inorganic Compounds - Quality Control

#### Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6040508 - Filtration</b>										
<b>Blank (6040508-BLK1)</b>				Prepared: 07-Apr-16 Analyzed: 08-Apr-16						
TDS	ND	5.00	mg/L							
<b>LCS (6040508-BS1)</b>				Prepared: 07-Apr-16 Analyzed: 08-Apr-16						
TDS	536	5.00	mg/L	527		102	80-120			
<b>Duplicate (6040508-DUP1)</b>				Source: H600702-01		Prepared: 07-Apr-16 Analyzed: 08-Apr-16				
TDS	608	5.00	mg/L		652			6.98	20	
<b>Batch 6041301 - General Prep - Wet Chem</b>										
<b>Blank (6041301-BLK1)</b>				Prepared & Analyzed: 13-Apr-16						
Chloride	ND	4.00	mg/L							
<b>LCS (6041301-BS1)</b>				Prepared & Analyzed: 13-Apr-16						
Chloride	100	4.00	mg/L	100		100	80-120			
<b>LCS Dup (6041301-BSD1)</b>				Prepared & Analyzed: 13-Apr-16						
Chloride	104	4.00	mg/L	100		104	80-120	3.92	20	
<b>Batch 6041305 - General Prep - Wet Chem</b>										
<b>LCS (6041305-BS1)</b>				Prepared & Analyzed: 13-Apr-16						
Conductivity	489		uS/cm	500		97.8	80-120			
<b>Duplicate (6041305-DUP1)</b>				Source: H600740-02		Prepared & Analyzed: 13-Apr-16				
Conductivity	14000	1.00	uS/cm		13900			0.429	20	

Cardinal Laboratories

\*=Accredited Analyte

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*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



### Analytical Results For:

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

### Inorganic Compounds - Quality Control

#### Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 6041402 - General Prep - Wet Chem

<b>Blank (6041402-BLK1)</b>				Prepared & Analyzed: 14-Apr-16					
Sulfate	ND	10.0	mg/L						
<b>LCS (6041402-BS1)</b>				Prepared & Analyzed: 14-Apr-16					
Sulfate	18.2	10.0	mg/L	20.0		90.8	80-120		
<b>LCS Dup (6041402-BSD1)</b>				Prepared & Analyzed: 14-Apr-16					
Sulfate	19.8	10.0	mg/L	20.0		99.0	80-120	8.75	20

#### Batch 6041407 - General Prep - Wet Chem

<b>LCS (6041407-BS1)</b>				Prepared & Analyzed: 14-Apr-16					
pH	7.11		pH Units	7.00		102	90-110		
<b>Duplicate (6041407-DUP1)</b>				Source: H600789-01 Prepared & Analyzed: 14-Apr-16					
pH	6.53	0.100	pH Units		6.53			0.00	20

#### Batch 6041808 - General Prep - Wet Chem

<b>Blank (6041808-BLK1)</b>				Prepared & Analyzed: 18-Apr-16					
Alkalinity, Carbonate	ND	0.00	mg/L						
Alkalinity, Bicarbonate	ND	5.00	mg/L						
Alkalinity, Total	ND	4.00	mg/L						
<b>LCS (6041808-BS1)</b>				Prepared & Analyzed: 18-Apr-16					
Alkalinity, Carbonate	ND	0.00	mg/L				80-120		
Alkalinity, Bicarbonate	126	5.00	mg/L				80-120		
Alkalinity, Total	104	4.00	mg/L	100		104	80-120		

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:Reported:  
21-Apr-16 08:28**Inorganic Compounds - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 6041808 - General Prep - Wet Chem****LCS Dup (6041808-BSD1)**


Prepared &amp; Analyzed: 18-Apr-16

Alkalinity, Carbonate	ND	0.00	mg/L				80-120		20	
Alkalinity, Bicarbonate	126	5.00	mg/L				80-120	0.00	20	
Alkalinity, Total	104	4.00	mg/L	100		104	80-120	0.00	20	

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Celey D. Keene, Lab Director/Quality Manager



### Analytical Results For:

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

### Petroleum Hydrocarbons by GC FID - Quality Control

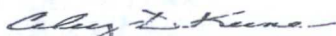
#### Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6041901 - General Prep - Organics</b>										
<b>Blank (6041901-BLK1)</b>				Prepared & Analyzed: 19-Apr-16						
GRO C6-C10	ND	1.00	mg/L							
DRO >C10-C28	ND	1.00	mg/L							
EXT DRO >C28-C35	ND	1.00	mg/L							
Surrogate: 1-Chlorooctane	3.66		mg/L	5.00		73.2	34.8-131			
Surrogate: 1-Chlorooctadecane	5.30		mg/L	5.00		106	30.4-167			
<b>LCS (6041901-BS1)</b>				Prepared & Analyzed: 19-Apr-16						
GRO C6-C10	44.5	1.00	mg/L	50.0		89.0	77.1-111			
DRO >C10-C28	50.0	1.00	mg/L	50.0		100	84.8-116			
EXT DRO >C28-C35	ND	1.00	mg/L	0.00			0-0			
Surrogate: 1-Chlorooctane	4.65		mg/L	5.00		93.0	34.8-131			
Surrogate: 1-Chlorooctadecane	5.21		mg/L	5.00		104	30.4-167			
<b>LCS Dup (6041901-BSD1)</b>				Prepared & Analyzed: 19-Apr-16						
GRO C6-C10	43.2	1.00	mg/L	50.0		86.4	77.1-111	2.98	8.98	
DRO >C10-C28	47.1	1.00	mg/L	50.0		94.2	84.8-116	6.00	9.66	
EXT DRO >C28-C35	ND	1.00	mg/L	0.00			0-0		20	
Surrogate: 1-Chlorooctane	4.53		mg/L	5.00		90.6	34.8-131			
Surrogate: 1-Chlorooctadecane	5.16		mg/L	5.00		103	30.4-167			

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

### Analytical Results For:

GEOLEX INC.  
500 MARQUETTE AVE, STE. 1350  
ALBUQUERQUE NM, 87102

Project: MALJAMAR AGI #2  
Project Number: 15-022  
Project Manager: DALE LITTLEJOHN  
Fax To:

Reported:  
21-Apr-16 08:28

### Total Recoverable Metals by ICP (E200.7) - Quality Control

#### Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B604152 - EPA 200.2 Total Rec.</b>										
<b>Blank (B604152-BLK1)</b>				Prepared & Analyzed: 15-Apr-16						
Calcium	0.022	0.020	mg/L							B1
Magnesium	ND	0.100	mg/L							
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
<b>LCS (B604152-BS1)</b>				Prepared & Analyzed: 15-Apr-16						
Potassium	8.21	1.00	mg/L	8.00		103	85-115			
Magnesium	20.4	0.100	mg/L	20.0		102	85-115			
Sodium	6.65	1.00	mg/L	6.48		103	85-115			
Calcium	4.13	0.020	mg/L	4.00		103	85-115			
<b>LCS Dup (B604152-BSD1)</b>				Prepared & Analyzed: 15-Apr-16						
Magnesium	20.5	0.100	mg/L	20.0		102	85-115	0.623	20	
Calcium	4.14	0.020	mg/L	4.00		103	85-115	0.105	20	
Potassium	8.31	1.00	mg/L	8.00		104	85-115	1.21	20	
Sodium	6.67	1.00	mg/L	6.48		103	85-115	0.357	20	

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



### Notes and Definitions

- B1 Target analyte detected in method blank at or above method reporting limit. Sample concentration found to be 10 times above the concentration found in the method blank or less than the reporting limit.
- A-01 Sample collected in plastic container with headspace. Results could be biased low.
- 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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\*=Accredited Analyte

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