

Jones, William V., EMNRD

From: Cindy Cottrell [ccottrell@jdmii.com]
Sent: Thursday, July 19, 2012 12:55 PM
To: Jones, William V., EMNRD
Cc: Steve Morris; Joel Stockford; Mike Daugherty
Subject: Ringer Fed Com #6 (30-015-33187)
Attachments: H201467 MURCHISON.pdf

Mr. Jones,

The fresh water analysis requested in your 6/12/12 email is attached. Please let us know if you need any additional information.

Best regards,

Cindy Cottrell

From: Greg Boans
Sent: Thursday, July 19, 2012 1:43 PM
To: Cindy Cottrell
Subject: FW: WATER SAMPLES

Attached is your fresh water sample from Fred Beards water well and a produced water sample on the Ogden 5 A well for you file

Thanks Greg Boans

From: Celey Keene [<mailto:celey.keene@cardinallabsnm.com>]
Sent: Thursday, July 19, 2012 11:08 AM
To: Greg Boans
Subject: WATER SAMPLES

THANK YOU,

Celey Keene
Lab Director
Cardinal Laboratories
101 East Marland
Hobbs, NM 88240
T: (575) 393-2326
F: (575) 393-2476



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

July 19, 2012

GREG BOANS

MURCHISON OIL & GAS, INC.

110 W. SHAW

CARLSBAD, NM 88220

RE: WATER SAMPLES

Enclosed are the results of analyses for samples received by the laboratory on 06/29/12 12:15.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. 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 on accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

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

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

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:MURCHISON OIL & GAS, INC.
110 W. SHAW
CARLSBAD NM, 88220Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: GREG BOANS
Fax To: (575) 887-7793Reported:
19-Jul-12 10:54

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FRED BEARD FRESH WATER	H201467-01	Water	28-Jun-12 09:00	29-Jun-12 12:15
OGDEN 5-A WELL	H201467-02	Water	28-Jun-12 09:00	29-Jun-12 12:15

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

FRED BEARD FRESH WATER
H201467-01 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories
Dissolved Metals

Calcium	512	10.0	mg/L	10	2071814	JM	11-Jul-12	200.7	GAL
Magnesium	88.0	10.0	mg/L	10	2071814	JM	11-Jul-12	200.7	GAL
Potassium	15.1	10.0	mg/L	10	2071814	JM	11-Jul-12	200.7	GAL
Sodium	22.0	10.0	mg/L	10	2071814	JM	11-Jul-12	200.7	GAL

Inorganic Compounds

Alkalinity, Bicarbonate	161	5.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	
Alkalinity, Carbonate	ND	0.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	
Chloride*	12.0	4.00	mg/L	1	2070514	HM	05-Jul-12	4500-Cl-B	
Conductivity*	2150	1.00	uS/cm	1	2071704	HM	06-Jul-12	120.1	
pH*	7.25	0.100	pH Units	1	2071702	HM	03-Jul-12	150.1	
Sulfate*	1370	10.0	mg/L	1	2071209	HM	12-Jul-12	375.4	
TDS*	2080	5.00	mg/L	1	2062814	AP	05-Jul-12	160.1	
Alkalinity, Total*	132	4.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	

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* = Accredited Analyte

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 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

OGDEN 5-A WELL
H201467-02 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories
Dissolved Metals

Barium	ND	0.500	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL
Calcium	4550	50.0	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL
Iron	ND	2.50	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL
Magnesium	1670	50.0	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL
Potassium	442	50.0	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL
Sodium	36900	50.0	mg/L	50	2071814	JM	11-Jul-12	200.7	GAL

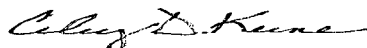
Inorganic Compounds

Alkalinity, Bicarbonate	360	5.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	
Alkalinity, Carbonate	320	0.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	
Chloride*	71000	4.00	mg/L	1	2070514	HM	05-Jul-12	4500-Cl-B	
Conductivity*	231000	1.00	uS/cm	1	2071704	HM	06-Jul-12	120.1	
pH*	7.76	0.100	pH Units	1	2071702	HM	03-Jul-12	150.1	
Resistivity	0.0433		Ohms/m	1	2071704	HM	06-Jul-12	120.1	
Specific Gravity @ 60° F	1.075	0.000	[blank]	1	2071304	HM	11-Jul-12	SM 2710F	
Sulfate*	2820	10.0	mg/L	1	2071209	HM	12-Jul-12	375.4	
TDS*	119000	5.00	mg/L	1	2062814	AP	05-Jul-12	160.1	
Alkalinity, Total*	680	4.00	mg/L	1	2061106	HM	06-Jul-12	310.1M	
Sulfide, total	652	0.0100	mg/L	1	2070312	HM	03-Jul-12	376.2	

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Analytical Results For:

 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

Dissolved Metals - 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 2071814 - Dissolved/Potentially Dissolved Metals
Blank (2071814-BLK1)

Prepared & Analyzed: 11-Jul-12

Magnesium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
Barium	ND	0.010	mg/L							
Potassium	ND	1.00	mg/L							
Iron	ND	0.050	mg/L							
Calcium	ND	1.00	mg/L							

LCS (2071814-BS1)

Prepared & Analyzed: 11-Jul-12

Calcium	5.68		mg/L	5.00		114	85-115			
Magnesium	28.5		mg/L	25.0		114	85-115			
Potassium	11.3		mg/L	10.0		113	85-115			
Barium	2.71		mg/L	2.50		108	85-115			
Sodium	9.17		mg/L	8.10		113	85-115			
Iron	5.51		mg/L	5.00		110	85-115			

LCS Dup (2071814-BSD1)

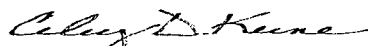
Prepared & Analyzed: 11-Jul-12

Calcium	5.73		mg/L	5.00		115	85-115	0.876	20	
Potassium	11.5		mg/L	10.0		115	85-115	1.75	20	
Sodium	9.20		mg/L	8.10		114	85-115	0.327	20	
Barium	2.74		mg/L	2.50		110	85-115	1.10	20	
Magnesium	28.8		mg/L	25.0		115	85-115	1.05	20	
Iron	5.56		mg/L	5.00		111	85-115	0.903	20	

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

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 2061106 - General Prep - Wet Chem
Blank (2061106-BLK1)

Prepared & Analyzed: 11-Jun-12

Alkalinity, Carbonate	ND	0.00	mg/L							
Alkalinity, Bicarbonate	ND	5.00	mg/L							
Alkalinity, Total	ND	4.00	mg/L							

LCS (2061106-BS1)

Prepared & Analyzed: 11-Jun-12

Alkalinity, Carbonate	ND	0.00	mg/L				80-120			
Alkalinity, Bicarbonate	137	5.00	mg/L				80-120			
Alkalinity, Total	112	4.00	mg/L	100		112	80-120			

LCS Dup (2061106-BSD1)

Prepared & Analyzed: 11-Jun-12

Alkalinity, Carbonate	ND	0.00	mg/L				80-120		20	
Alkalinity, Bicarbonate	132	5.00	mg/L				80-120	3.72	20	
Alkalinity, Total	108	4.00	mg/L	100		108	80-120	3.64	20	

Duplicate (2061106-DUP1)

Source: H201253-01

Prepared & Analyzed: 11-Jun-12

Alkalinity, Carbonate	ND	0.00	mg/L		0.00				20	
Alkalinity, Bicarbonate	229	5.00	mg/L		239			4.27	20	
Alkalinity, Total	188	4.00	mg/L		196			4.17	20	

Batch 2062814 - Filtration
Blank (2062814-BLK1)

Prepared & Analyzed: 28-Jun-12

TDS	ND	5.00	mg/L							
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LCS (2062814-BS1)

Prepared & Analyzed: 28-Jun-12

TDS	235	5.00	mg/L	240		97.9	80-120			
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

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 2062814 - Filtration
Duplicate (2062814-DUP1)

Source: H201441-03

Prepared & Analyzed: 28-Jun-12

TDS	358	5.00	mg/L		365			1.94	20	
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Batch 2070312 - General Prep - Wet Chem
Blank (2070312-BLK1)

Prepared & Analyzed: 03-Jul-12

Sulfide, total	ND	0.0100	mg/L							
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Duplicate (2070312-DUP1)

Source: H201467-02

Prepared & Analyzed: 03-Jul-12

Sulfide, total	628	0.0100	mg/L		652			3.75	20	
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Batch 2070514 - General Prep - Wet Chem
Blank (2070514-BLK1)

Prepared & Analyzed: 05-Jul-12

Chloride	ND	4.00	mg/L							
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LCS (2070514-BS1)

Prepared & Analyzed: 05-Jul-12

Chloride	104	4.00	mg/L	100	104	80-120				
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LCS Dup (2070514-BSD1)

Prepared & Analyzed: 05-Jul-12

Chloride	100	4.00	mg/L	100	100	80-120	3.92	20		
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Duplicate (2070514-DUP1)

Source: H201491-01

Prepared & Analyzed: 05-Jul-12

Chloride	1830	4.00	mg/L		1930			5.32	20	
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Batch 2071209 - General Prep - Wet Chem
Blank (2071209-BLK1)

Prepared & Analyzed: 12-Jul-12

Sulfate	ND	10.0	mg/L							
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 MURCHISON OIL & GAS, INC.
 110 W. SHAW
 CARLSBAD NM, 88220

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: GREG BOANS
 Fax To: (575) 887-7793

 Reported:
 19-Jul-12 10:54

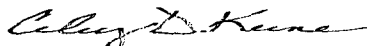
Inorganic Compounds - Quality Control
Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2071209 - General Prep - Wet Chem										
LCS (2071209-BS1)				Prepared & Analyzed: 12-Jul-12						
Sulfate	19.1	10.0	mg/L	20.0		95.5	80-120			
LCS Dup (2071209-BSD1)				Prepared & Analyzed: 12-Jul-12						
Sulfate	18.9	10.0	mg/L	20.0		94.5	80-120	1.05	20	
Duplicate (2071209-DUP1)				Source: H201554-01		Prepared & Analyzed: 12-Jul-12				
Sulfate	146	10.0	mg/L		144			1.38	20	
Batch 2071304 - General Prep - Wet Chem										
Duplicate (2071304-DUP1)				Source: H201467-02		Prepared & Analyzed: 11-Jul-12				
Specific Gravity @ 60° F	1.076	0.000	[blank]		1.075			0.0437	200	
Batch 2071702 - General Prep - Wet Chem										
LCS (2071702-BS1)				Prepared & Analyzed: 06-Jul-12						
pH	7.06		pH Units	7.00		101	90-110			
Duplicate (2071702-DUP1)				Source: H201467-01		Prepared: 03-Jul-12 Analyzed: 06-Jul-12				
pH	7.26	0.100	pH Units		7.25			0.138	20	
Batch 2071704 - General Prep - Wet Chem										
LCS (2071704-BS1)				Prepared & Analyzed: 06-Jul-12						
Conductivity	1410		uS/cm	1410		100	80-120			

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Celey D. Keene, Lab Director/Quality Manager



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

Analytical Results For:

MURCHISON OIL & GAS, INC.
110 W. SHAW
CARLSBAD NM, 88220

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: GREG BOANS
Fax To: (575) 887-7793

Reported:
19-Jul-12 10:54

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 2071704 - General Prep - Wet Chem

Duplicate (2071704-DUP1)

Source: H201467-01

Prepared & Analyzed: 06-Jul-12

Conductivity	2160	1.00	uS/cm	2150	0.464	20
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Celey D. Keene, Lab Director/Quality Manager

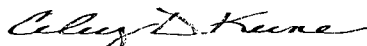
Notes and Definitions

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

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Celey D. Keene, Lab Director/Quality Manager



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name: <u>Murchison Oil & Gas, Inc.</u>		BILL TO		ANALYSIS REQUEST																						
Project Manager: <u>Greg Boans</u>		P.O. #:		<div style="display: flex; flex-direction: column; align-items: center; justify-content: center;"><div style="writing-mode: vertical-rl; transform: rotate(180deg);">Cation / Anion</div><div style="writing-mode: vertical-rl; transform: rotate(180deg);">Seals Sulfide</div></div>																						
Address: <u>110 W. Shaw</u>		Company:																								
City: <u>Carlsbad</u> State: <u>NM</u> Zip: <u>88220</u>		Attn:																								
Phone #: <u>628-3932</u> Fax #: <u>897-7793</u>		Address:																								
Project #:		City:																								
Project Name:		State: Zip:																								
Project Location:		Phone #:																								
Sampler Name: <u>Greg Boans</u>		Fax #:																								
FOR LAB USE ONLY				MATRIX		PRESERV		SAMPLING																		
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER	ACID/BASE	ICE / COOL	OTHER	DATE	TIME												
<u>H201467</u>	<u>1 Fresh water</u>												<u>6/28/12</u>	<u>9:00</u>												
	<u>2 Ogden 5-A well</u>												<u>6/28/12</u>	<u>9:00</u>												

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 the client for the 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 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 services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: <u>[Signature]</u>	Date: <u>6/29/12</u> Time: <u>12:15</u>	Received By: <u>[Signature]</u>	Phone Result: <input type="checkbox"/> Yes <input type="checkbox"/> No	Add'l Phone #:
Relinquished By:	Date:	Received By:	Fax Result: <input type="checkbox"/> Yes <input type="checkbox"/> No	Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other: <u>230</u>			REMARKS: <u>gb oans @jdmii.com</u>	
Sample Condition Cool Intact <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			CHECKED BY: (Initials) <u>[Initials]</u>	

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

MURCHINSON OIL & GAS, INC.
SCALE INDEX WATER ANALYSIS REPORT

Company : MURCHINSON OIL & GAS, INC.	Date Sampled : 6/28/2012
Lease Name : NOT GIVEN	Company Rep. : GREG BOANS
Well Number : OGDEN 5-A WELL	
Location : NOT GIVEN	

ANALYSIS

- | | | |
|---|--------|------------------------------------|
| 1. pH | 7.76 | |
| 2. Specific Gravity @ 60/60 F. | 1.0750 | |
| 3. CaCO ₃ Saturation Index @ 80 F. | +0.867 | 'Calcium Carbonate Scale Possible' |
| @ 140 F. | +1.777 | 'Calcium Carbonate Scale Possible' |

Dissolved Gasses

- | | | |
|---------------------|----------------|-----|
| 4. Hydrogen Sulfide | 652 | PPM |
| 5. Carbon Dioxide | Not Determined | PPM |
| 6. Dissolved Oxygen | Not Determined | |

Cations

- | | mg/L | / | Eq. Wt. | = | MEQ/L |
|---------------------|----------|---|---------|---|----------|
| 7. Calcium (Ca++) | 4,550.00 | / | 20.1 | = | 226.37 |
| 8. Magnesium (Mg++) | 1,670.00 | / | 12.2 | = | 136.89 |
| 9. Sodium (Na+) | 36,900 | / | 23.0 | = | 1,711.09 |
| 10. Barium (Ba++) | 0.000 | / | 68.7 | = | 0.00 |

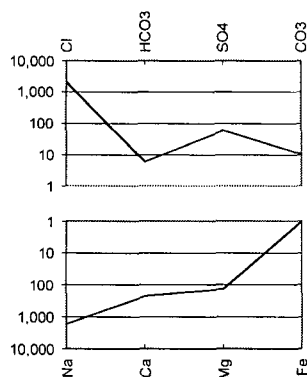
Anions

- | | | | | | |
|--------------------------------------|--------|---|------|---|----------|
| 11. Hydroxyl (OH-) | 0 | / | 17.0 | = | 0.00 |
| 12. Carbonate (CO ₃ =) | 320 | / | 30.0 | = | 10.67 |
| 13. Bicarbonate (HCO ₃ -) | 360 | / | 61.1 | = | 5.89 |
| 14. Sulfate (SO ₄ =) | 2,820 | / | 48.8 | = | 57.79 |
| 15. Chloride (Cl-) | 71,000 | / | 35.5 | = | 2,000.00 |

Other

- | | | | | | |
|---|----------|---|------|---|----------------------------------|
| 16. Soluble Iron (Fe) | 0.000 | / | 18.2 | = | 0.00 |
| 17. Total Dissolved Solids | 119,000 | | | | |
| 18. Total Hardness As CaCO ₃ | 18,238.0 | | | | |
| 19. Calcium Sulfate Solubility @ 90 F. | 3,562 | | | | 'Calcium Sulfate Scale Possible' |
| 20. Resistivity (Measured) | 0.043 | | | | Ohm/Meters @ 77 Degrees (F) |

Logarithmic Water Pattern



PROBABLE MINERAL COMPOSITION

COMPOUND	Eq. Wt.	X	MEQ/L	=	mg/L
Ca(HCO ₃) ₂	81.04	X	5.89	=	477
CaSO ₄	68.07	X	57.79	=	3,934
CaCl ₂	55.50	X	162.69	=	9,029
Mg(HCO ₃) ₂	73.17	X	0.00	=	0
MgSO ₄	60.19	X	0.00	=	0
MgCl ₂	47.62	X	136.89	=	6,518
NaHCO ₃	84.00	X	0.00	=	0
NaSO ₄	71.03	X	0.00	=	0
NaCl	58.46	X	1,711.09	=	100,030