

HALLIBURTON

Rockies, Grand Junction

Lab Results-PE

Job Information

Request ID	2013649/1	Rig Name		Date	12/MAR/2015
Submitted By	Zachary Green	Job Type	Acid/Scale	Well	Rulison CE&P WMF COGCC #149006
Customer	WPX Energy, Inc.	Location			

Well Information

Formation	Unknown	Depth MD		BHST	
Pressure		Depth TVD		Cool Down Temperature	

Fluid Results Request ID 2013649/ 1

Water Analysis, Request Test ID:30067800

Tank Number/Source	Specific Gravity	pH	Chlorides (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Dissolved Iron (mg/L)	Potassium (mg/L)
Wo64	1.0125	7.84	8446	880	180	5.2	64

Bicarbonates (mg/L)	Carbonates (mg/L)	Hydroxides (mg/L)	Sulfates (mg/L)	TDS (mg/L)	Rw Resistivity (Ohms-Meter)	Temperature (°F)
745	70	0	0	14500	0.420	68

Job Information

Request ID	2006511	Rig Name		Date	12/JUN/2014
Submitted By	Nathan Barnum	Job Type	Fracturing/Stimulation	Well	Rulison
Customer	WPX Energy, Inc.	Location			

Well Information

Formation	Unknown	Depth MD		BHST	
Pressure		Depth TVD		Cool Down Temperature	

Results For Request ID 2006511

Water Analysis

Tank Number/Source	Specific Gravity	pH	Chlorides (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Dissolved Iron (mg/L)	Potassium (mg/L)
W259	1.0315	8.04	9297	920	140	3.1	120

Bicarbonates (mg/L)	Carbonates (mg/L)	Hydroxides (mg/L)	Sulfates (mg/L)	Sodium (mg/L)	TDS (mg/L)	Rw Resistivity (Ohms-Meter)	Temperature (°F)
600	20	0	0	4874	12300	0.452	66

Conductivity - 21.4 mS

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Rockies Lab Water Analysis Report
District: Grand Junction

Tested By Jason Martinez
Reported By Jason Martinez

Customer and Well Information

Company	<u>WPX</u>	Well/Sample Name	<u>RU Injection Field W358</u>
Report To	<u>Mark Mayo</u>	Date Received	<u>12/22/2013</u>
		Date Tested	<u>12/22/2013</u>

Sample Physical Characteristics

Sample 1	<u>W358</u>			
Temperature	<u>68.1</u>	°F	Resistivity	<u>0.5</u> Ω·m
Specific Gravity	<u>1.015</u>		Conductivity	<u>29.7</u> mS/cm
pH	<u>7.6</u>		TDS	<u>17000.0</u> mg/L
Turbidity	<u>361.0</u>	FNU	Color (observation)	<u>Light Yellow</u>

Sample Chemical Characteristics

Anions		Cations	
Chloride	<u>10962</u> mg/L	Total Iron	<u>2.13</u> mg/L
Sulfate	<u>7</u> mg/L	Ferrous Iron	<u>0</u> mg/L
Carbonate	<u>0</u> mg/L	Potassium	<u>400</u> mg/L
Bicarbonate	<u>590</u> mg/L	Calcium	<u>910</u> mg/L
Hydroxide	<u>0</u> mg/L	Magnesium	<u>250</u> mg/L
		Sodium (calculated)	<u>5581</u> mg/L

General Comments

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Rockies Lab Water Analysis Report
District: Grand Junction

Tested By Jason Martinez
Reported By Nathan Barnum

Customer and Well Information

Company	<u>WPX</u>	Well/Sample Name	<u>Rullison</u>
Report To	<u>Mark Mayo</u>	Date Received	<u>9/16/2013</u>
		Date Tested	<u>9/17/2013</u>

Sample Physical Characteristics

Sample 1	<u>W232</u>			
Temperature	<u>67.0</u>	°F	Resistivity	<u>0.6</u> Ω·m
Specific Gravity	<u>1.017</u>		Conductivity	<u>46.0</u> mS/cm
pH	<u>7.3</u>		TDS	<u>18345.0</u> mg/L
Turbidity	<u>243.0</u>	FNU	Color (observation)	<u>Yellow</u>

Sample Chemical Characteristics

Anions

Chloride	<u>11181</u>
Sulfate	<u>0</u>
Carbonate	<u>0</u>
Bicarbonate	<u>640</u>
Hydroxide	<u>0</u>

Cations

Total Iron	<u>3.7</u>	mg/L
Ferrous Iron	<u>1.1</u>	mg/L
Potassium	<u>104</u>	mg/L
Calcium	<u>1030</u>	mg/L
Magnesium	<u>280</u>	mg/L
Sodium (calculated)	<u>5717</u>	mg/L

General Comments

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Rockies Lab Water Analysis Report
District: Grand Junction

Tested By Nathan Barnum
Reported By Nathan Barnum

Customer and Well Information

Company	<u>WPX</u>	Well/Sample Name	<u>Rulison Injection Water</u>
Report To	<u>Mark Mayo</u>	Date Received	<u>6/12/2013</u>
		Date Tested	<u>6/13/2013</u>

Sample Physical Characteristics

Sample 1	<u>W143</u>				
Temperature	<u>64.0</u>	°F	Resistivity	<u>0.4</u>	Ω·m
Specific Gravity	<u>1.016</u>		Conductivity	<u>35.1</u>	mS/cm
pH	<u>8.3</u>		TDS	<u>18583.0</u>	mg/L
Turbidity		FNU	Color (observation)	<u>Slightly Yellow</u>	

Sample Chemical Characteristics

Anions

Chloride	<u>10923</u>	mg/L
Sulfate	<u>0</u>	mg/L
Carbonate	<u>80</u>	mg/L
Bicarbonate	<u>700</u>	mg/L
Hydroxide	<u>0</u>	mg/L

Cations

Total Iron	<u>34</u>	mg/L
Ferrous Iron	<u>0.2</u>	mg/L
Potassium	<u>110</u>	mg/L
Calcium	<u>1260</u>	mg/L
Magnesium	<u>120</u>	mg/L
Sodium (calculated)	<u>5630</u>	mg/L

General Comments

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Rockies Lab Water Analysis Report
 District: Grand Junction

Tested By Jason
 Reported By Jason

Customer and Well Information

Company	<u>WPX</u>	Well/Sample Name	<u>Rulison</u>
Report To	<u>Mark Mayo</u>	Date Received	<u>3/28/2013</u>
		Date Tested	<u>3/28/2013</u>

Sample Physical Characteristics

Sample 1	<u>W073</u>		
Temperature	<u>66.0</u>	°F Resistivity	<u>0.4</u> Ω·m
Specific Gravity	<u>1.014</u>	Conductivity	<u>31.4</u> mS/cm
pH	<u>7.9</u>	TDS	<u>17800.0</u> mg/L
Turbidity	<u>43.3</u>	FNU Color (observation)	<u>Clear</u>

Sample Chemical Characteristics

Anions		Cations	
Chloride	<u>10923</u>	mg/L Total Iron	<u>1.8</u> mg/L
Sulfate	<u>0</u>	mg/L Ferrous Iron	<u>0.3</u> mg/L
Carbonate	<u>40</u>	mg/L Potassium	<u>28</u> mg/L
Bicarbonate	<u>670</u>	mg/L Calcium	<u>1070</u> mg/L
Hydroxide	<u>0</u>	mg/L Magnesium	<u>155</u> mg/L
		Sodium (calculated)	<u>5828</u> mg/L

Bacteria Serial Dilution

Bacteria Serial Dilution				Correlation of "Positive" Vials to Estimated Concentration of Bacteria		
Baseline				Number of "Positive" Vials	Estimated Bacteria/cc of Original Sample	
24	48	72	hours			
Aerobic	/	/	bacteria count	0	0	
Anaerobic	/	/	bacteria count	1	1-10	or 10 ¹
				2	10-100	or 10 ²
				3	100-1,000	or 10 ³
				4	1,000-10,000	or 10 ⁴
				5	10,000-100,000	or 10 ⁵
				6	100,000-1,000,000	or 10 ⁶
				7	1,000,000-10,000,000	or 10 ⁷
				8	10,000,000-100,000,000	or 10 ⁸

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