HALLIBURTON

Rockies, Grand Junction

Lab Results-PE

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 | Tested By: Jason Martinez
District: Grand Junction | Reported By: Jason Martinez

Customer and Well Information

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

Sample Physical Characteristics

Sample 1 W358

Temperature	68.1	°F	Resistivity	0.5	Ω·m
Specific Gravity	1.015		Conductivity	29.7	mS/cm
pH	7.6		TDS	17000.0	mg/L
Turbity	361.0	FNU	Color (observation)	Light Yellow	

Sample Chemical Characteristics

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

General Comments

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HALLIBURTON

Rockies Lab Water Analysis Report | Tested By: Jason Martinez
District: Grand Junction | Reported By: Nathan Barnum

Customer and Well Information

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

Sample Physical Characteristics

Sample 1 W232

Temperature	67.0	°F	Resistivity	0.6	Ω·m
Specific Gravity	1.017		Conductivity	46.0	mS/cm
pH	7.3		TDS	18345.0	mg/L
Turbity	243.0	FNU	Color (observation)	Yellow	

Sample Chemical Characteristics

Anions			Cations		
Chloride	11181	mg/L	Total Iron	3.7	mg/L
Sulfate	0	mg/L	Ferrous Iron	1.1	mg/L
Carbonate	0	mg/L	Potassium	104	mg/L
Bicarbonate	640	mg/L	Calcium	1030	mg/L
Hydroxide	0	mg/L	Magnesium	280	mg/L
			Sodium (calculated)	5717	mg/L

General Comments

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HALLIBURTON

Rockies Lab Water Analysis Report | Tested By: Nathan Barnum
District: Grand Junction | Reported By: Nathan Barnum

Customer and Well Information

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

Sample Physical Characteristics

Sample 1 W143

Temperature	64.0	°F	Resistivity	0.4	Ω·m
Specific Gravity	1.016		Conductivity	35.1	mS/cm
pH	8.3		TDS	18583.0	mg/L
Turbity		FNU	Color (observation)	Slightly Yellow	

Sample Chemical Characteristics

Anions			Cations		
Chloride	10923	mg/L	Total Iron	34	mg/L
Sulfate	0	mg/L	Ferrous Iron	0.2	mg/L
Carbonate	80	mg/L	Potassium	110	mg/L
Bicarbonate	700	mg/L	Calcium	1260	mg/L
Hydroxide	0	mg/L	Magnesium	120	mg/L
			Sodium (calculated)	5630	mg/L

General Comments

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HALLIBURTON

Rockies Lab Water Analysis Report | Tested By: Jason
District: Grand Junction | Reported By: Jason

Customer and Well Information

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

Sample Physical Characteristics

Sample 1 W073

Temperature	66.0	°F	Resistivity	0.4	Ω·m
Specific Gravity	1.014		Conductivity	31.4	mS/cm
pH	7.9		TDS	17800.0	mg/L
Turbity	43.3	FNU	Color (observation)	Clear	

Sample Chemical Characteristics

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

Bacteria Serial Dilution

Bacteria Serial Dilution

Baseline

24 / 48 / 72 hours

Aerobic	/ /	bacteria count
Anaerobic	/ /	bacteria count
	w /	
Aerobic	/ /	bacteria count
Anaerobic	/ /	bacteria count

Correlation of "Positive" Vials to Estimated Concentration of Bacteria

Number of "Positive" Vials	Estimated Bacteria/cc of Original Sample	
0	0	
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

General Comments

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