

DownHole SAT™ Water Analysis Report



SYSTEM IDENTIFICATION

Steward II
Huzenburg 7H WH

Sample ID#: 0
ID:

Sample Date: 05-02-2018 at 243
Report Date: 01-11-2018

WATER CHEMISTRY

CATIONS

Calcium(as Ca) 7534
Magnesium(as Mg) 4357
Barium(as Ba) 0.00
Strontium(as Sr) 195.00
Sodium(as Na) 80065
Potassium(as K) 1795
Iron(as Fe) 0.300

ANIONS

Chloride(as Cl) 147311
Sulfate(as SO₄) 1953
Dissolved CO₂(as CO₂) 85.00
Bicarbonate(as HCO₃) 190.00
H₂S (as H₂S) 34.00

PARAMETERS

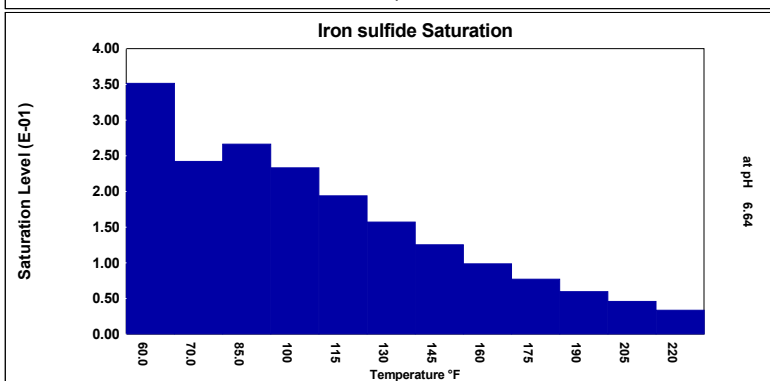
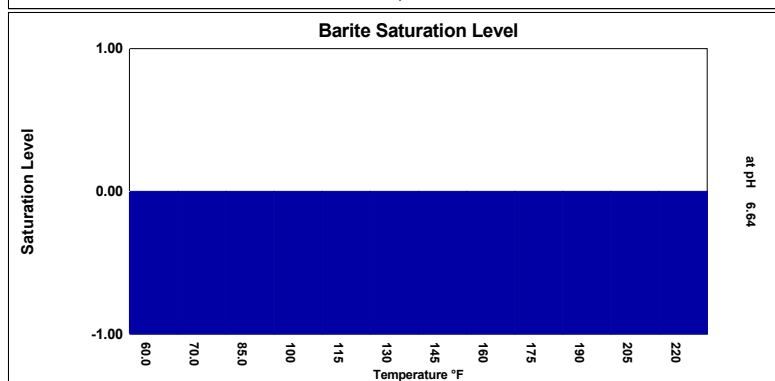
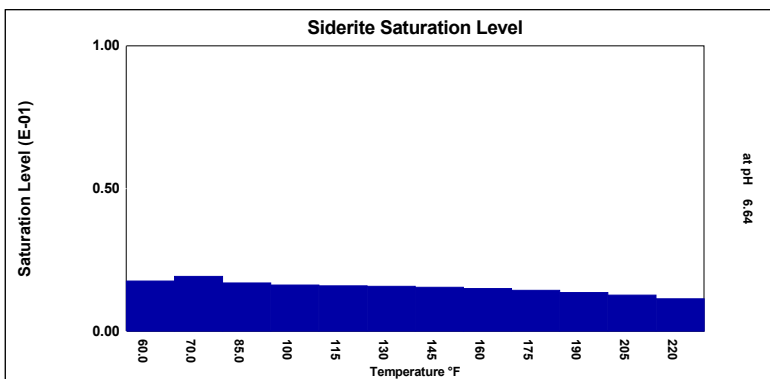
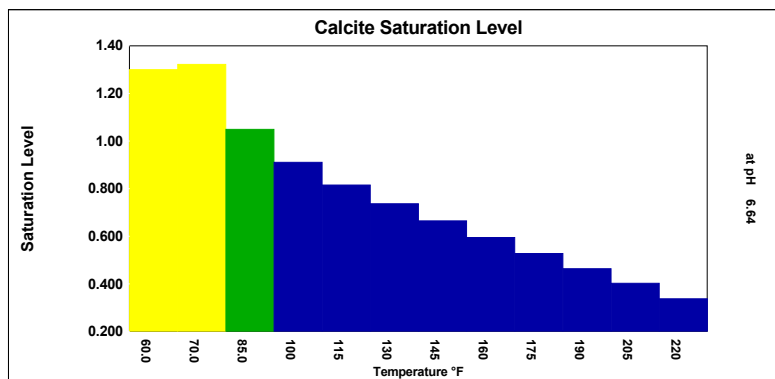
Temperature(°F) 77.00
Sample pH 6.50
Conductivity 435798
T.D.S. 229672
Resistivity 2.29
Sp.Gr.(g/mL) 1.15

Manganese(as Mn) 0.00

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (bars)	Calcite CaCO ₃		Anhydrite CaSO ₄		Gypsum CaSO ₄ *2H ₂ O		Barite BaSO ₄		Celestite SrSO ₄		Siderite FeCO ₃		Mackawenite FeS		CO ₂ (mpy)	pCO ₂ (atm)
60.00	>-0.001	1.30	0.00289	0.817	-37.60	1.05	9.68	0.00	-0.175	0.339	-128.10	0.0176	-0.318	0.351	-0.0439	0.0676	0.0276
70.00	-0.013	1.32	0.00287	0.765	-48.51	0.954	-8.66	0.00	-0.242	0.311	-137.77	0.0193	-0.289	0.242	-0.0728	0.0672	0.0272
85.00	1.387	1.05	< 0.001	0.720	-55.83	0.833	-32.76	0.00	-0.377	0.283	-146.69	0.0169	-0.255	0.266	-0.0635	0.224	0.0653
100.00	2.787	0.910	>-0.001	0.712	-53.36	0.741	-52.16	0.00	-0.556	0.265	-151.01	0.0162	-0.226	0.233	-0.0743	0.466	0.103
115.00	4.187	0.815	-0.00126	0.734	-43.92	0.740	-48.41	0.00	-0.790	0.251	-153.55	0.0159	-0.201	0.194	-0.0915	0.628	0.142
130.00	5.587	0.736	-0.00167	0.789	-30.23	0.757	-41.00	0.00	-1.11	0.237	-156.50	0.0157	-0.181	0.157	-0.115	0.706	0.180
145.00	6.987	0.664	-0.00201	0.877	-14.77	0.769	-35.66	0.00	-1.53	0.223	-159.96	0.0154	-0.164	0.125	-0.145	0.772	0.218
160.00	8.387	0.595	-0.00230	1.01	0.718	0.778	-31.80	0.00	-2.09	0.210	-163.88	0.0150	-0.150	0.0985	-0.184	0.887	0.256
175.00	9.787	0.527	-0.00258	1.19	14.94	0.783	-29.15	0.00	-2.83	0.197	-168.35	0.0144	-0.138	0.0769	-0.233	0.985	0.294
190.00	11.187	0.463	-0.00284	1.45	27.32	0.785	-27.37	0.00	-3.78	0.185	-173.36	0.0136	-0.128	0.0596	-0.295	0.433	0.332
205.00	12.587	0.402	-0.00310	1.80	37.62	0.784	-26.32	0.00	-4.98	0.173	-179.00	0.0127	-0.120	0.0458	-0.373	0.364	0.370
220.00	13.987	0.337	-0.00351	2.27	46.99	0.775	-27.38	0.00	-6.55	0.161	-189.16	0.0114	-0.116	0.0335	-0.486	0.00	0.408
		xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO₃}/K_{sp}. pCO₂ (atm) is the partial pressure of CO₂ in the gas phase.
Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.





DownHole SAT(tm)

SURFACE WATER CHEMISTRY INPUT

Steward II

Huzenburg 7H WH

Report Date: 01-11-2018 Sampled: 05-02-2018 at 2043
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CATIONS

Calcium (as Ca)	7534
Magnesium (as Mg)	4357
Barium (as Ba)	0.00
Strontium (as Sr)	195.00
Sodium (as Na)	80065
Potassium (as K)	1795
Iron (as Fe)	0.300
Manganese (as Mn)	0.00

ANIONS

Chloride (as Cl)	147311
Sulfate (as SO ₄)	1953
Dissolved CO ₂ (as CO ₂)	85.00
Bicarbonate (as HCO ₃)	190.00
H ₂ S (as H ₂ S)	34.00

PARAMETERS

Calculated T.D.S.	229672
Molar Conductivity	435798
Resistivity	2.29
Sp.Gr.(g/mL)	1.15
Pressure(bars)	1.00
Temperature (°F)	77.00
pH	6.50

CORROSION RATE PREDICTION

CO ₂ - H ₂ S Rate(mpy)	0.0916
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FRENCH CREEK SOFTWARE, INC.
1220 VALLEY FORGE ROAD, SUITE 21, VALLEY FORGE, PA 19460



DownHole SAT(tm)

SURFACE WATER DEPOSITION POTENTIAL INDICATORS

Steward II

Huzenburger 7H WH

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SATURATION LEVEL

Calcite (CaCO ₃)	1.11
Aragonite (CaCO ₃)	1.03
Witherite (BaCO ₃)	0.00
Strontianite (SrCO ₃)	0.0190
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.823
Anhydrite (CaSO ₄)	0.740
Gypsum (CaSO ₄ *2H ₂ O)	0.894
Barite (BaSO ₄)	0.00
Celestite (SrSO ₄)	0.297
Fluorite (CaF ₂)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO ₂)	0.00
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	0.00
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	0.00
Siderite (FeCO ₃)	0.0170
Halite (NaCl)	0.271
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.211

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	< 0.001
Aragonite (CaCO ₃)	< 0.001
Witherite (BaCO ₃)	-28.63
Strontianite (SrCO ₃)	-0.714
Calcium oxalate (CaC ₂ O ₄)	-0.00433
Magnesite (MgCO ₃)	-0.00171
Anhydrite (CaSO ₄)	-53.01
Gypsum (CaSO ₄ *2H ₂ O)	-20.28
Barite (BaSO ₄)	-0.299
Celestite (SrSO ₄)	-142.53
Fluorite (CaF ₂)	-2.11
Calcium phosphate	>-0.001
Hydroxyapatite	-249.39
Silica (SiO ₂)	-27.69
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-84.52
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.273
Halite (NaCl)	-66647
Thenardite (Na ₂ SO ₄)	-87173
Iron sulfide (FeS)	-0.0858

SIMPLE INDICES

Langelier	0.947
Ryznar	4.61
Puckorius	3.49
Larson-Skold Index	1461
Stiff Davis Index	0.897
Oddo-Tomson	-0.126

BOUND IONS

Calcium	7534
Barium	0.00
Carbonate	9.58
Phosphate	0.00
Sulfate	1953

TOTAL

FREE

7271
0.00
0.0162
0.00
312.28

OPERATING CONDITIONS

Temperature (°F)	77.00
Time(mins)	3.00