

DownHole SAT™ Water Analysis Report



SYSTEM IDENTIFICATION

Steward II
Huzenburg 3H WH

Sample ID#: 0
ID:

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

WATER CHEMISTRY

CATIONS

Calcium(as Ca) 5885
Magnesium(as Mg) 3265
Barium(as Ba) 0.00
Strontium(as Sr) 150.00
Sodium(as Na) 83149
Potassium(as K) 1390
Iron(as Fe) 0.200

ANIONS

Chloride(as Cl) 145100
Sulfate(as SO₄) 2575
Dissolved CO₂(as CO₂) 50.00
Bicarbonate(as HCO₃) 146.00
H₂S (as H₂S) 146.00

PARAMETERS

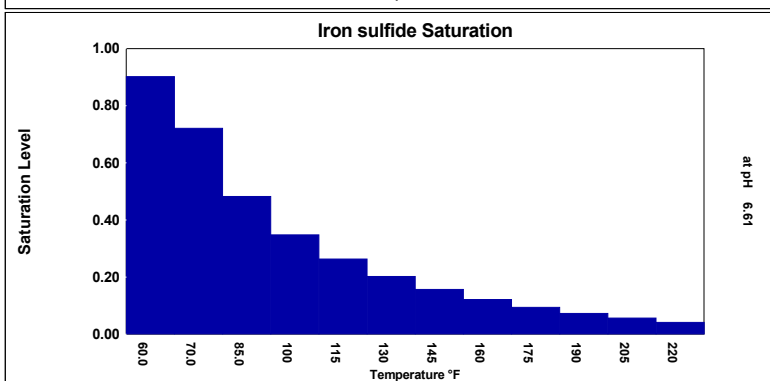
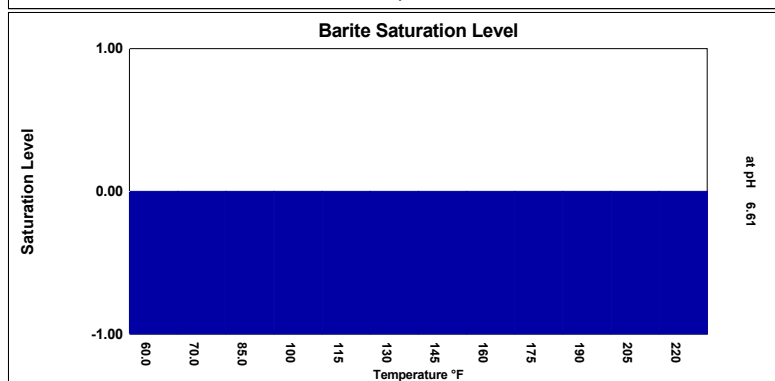
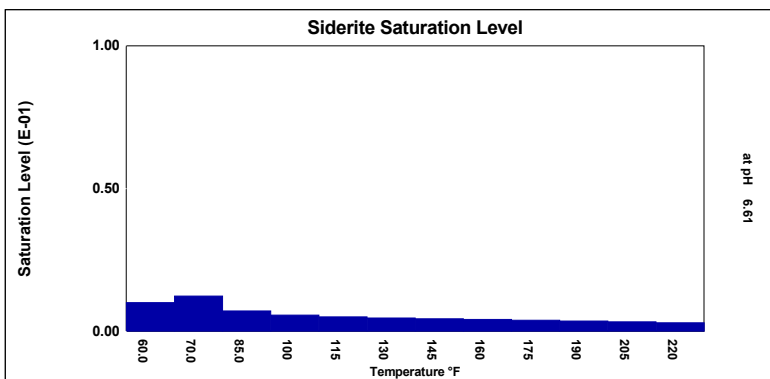
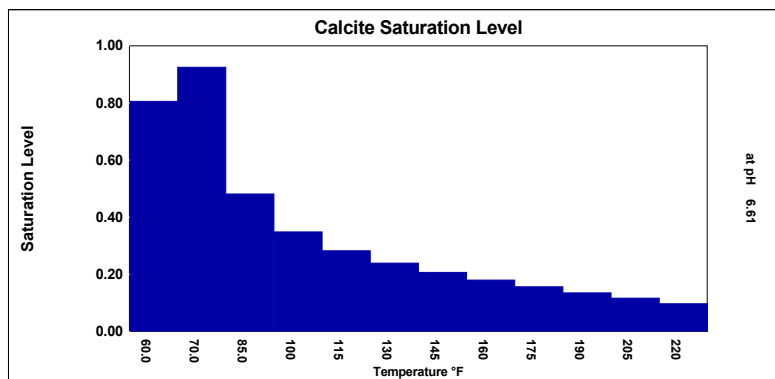
Temperature(°F) 77.00
Sample pH 6.50
Conductivity 423350
T.D.S. 228068
Resistivity 2.36
Sp.Gr.(g/mL) 1.15

Manganese(as Mn) 0.100

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	0.805	-0.00257	0.978	-6.15	1.26	63.13	0.00	-0.106	0.433	-93.19	0.0100	-0.347	0.902	-0.00175	0.0746	0.0212
70.00	-0.013	0.924	>-0.001	0.921	-21.60	1.15	37.56	0.00	-0.145	0.400	-102.78	0.0124	-0.316	0.721	-0.00616	0.0704	0.0210
85.00	1.387	0.481	-0.00573	0.877	-32.69	1.02	3.82	0.00	-0.224	0.367	-112.31	0.00714	-0.283	0.482	-0.0168	0.239	0.0503
100.00	2.787	0.348	-0.00656	0.875	-30.86	0.912	-23.63	0.00	-0.327	0.347	-117.65	0.00570	-0.253	0.348	-0.0286	0.500	0.0796
115.00	4.187	0.282	-0.00666	0.910	-19.78	0.918	-20.33	0.00	-0.462	0.330	-121.37	0.00506	-0.228	0.263	-0.0417	0.686	0.109
130.00	5.587	0.239	-0.00658	0.985	-2.93	0.946	-12.05	0.00	-0.644	0.314	-125.44	0.00468	-0.207	0.202	-0.0573	0.793	0.138
145.00	6.987	0.206	-0.00646	1.10	16.46	0.969	-6.34	0.00	-0.886	0.298	-129.94	0.00440	-0.189	0.156	-0.0762	0.885	0.168
160.00	8.387	0.179	-0.00635	1.28	36.02	0.987	-2.47	0.00	-1.21	0.282	-134.81	0.00415	-0.174	0.121	-0.0993	1.00	0.197
175.00	9.787	0.156	-0.00627	1.52	54.08	1.00	-0.0219	0.00	-1.63	0.267	-140.12	0.00390	-0.161	0.0940	-0.128	1.10	0.226
190.00	11.187	0.135	-0.00623	1.86	69.76	1.01	1.34	0.00	-2.17	0.251	-145.91	0.00363	-0.150	0.0727	-0.164	0.504	0.256
205.00	12.587	0.116	-0.00622	2.32	82.84	1.01	1.94	0.00	-2.86	0.237	-152.18	0.00336	-0.141	0.0560	-0.209	0.192	0.285
220.00	13.987	0.0967	-0.00649	2.95	95.51	1.00	0.727	0.00	-3.78	0.221	-162.11	0.00300	-0.137	0.0411	-0.274	0.00691	0.314
		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 3H WH

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

CATIONS

Calcium (as Ca)	5885
Magnesium (as Mg)	3265
Barium (as Ba)	0.00
Strontium (as Sr)	150.00
Sodium (as Na)	83149
Potassium (as K)	1390
Iron (as Fe)	0.200
Manganese (as Mn)	0.100

ANIONS

Chloride (as Cl)	145100
Sulfate (as SO ₄)	2575
Dissolved CO ₂ (as CO ₂)	50.00
Bicarbonate (as HCO ₃)	146.00
H ₂ S (as H ₂ S)	146.00

PARAMETERS

Calculated T.D.S.	228068
Molar Conductivity	423350
Resistivity	2.36
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)	0.0831
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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 3H WH

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

Calcite (CaCO ₃)	0.761
Aragonite (CaCO ₃)	0.703
Witherite (BaCO ₃)	0.00
Strontianite (SrCO ₃)	0.0139
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.528
Anhydrite (CaSO ₄)	0.895
Gypsum (CaSO ₄ *2H ₂ O)	1.08
Barite (BaSO ₄)	0.00
Celestite (SrSO ₄)	0.383
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)	0.0107
Halite (NaCl)	0.269
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.610

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.00278
Aragonite (CaCO ₃)	-0.00373
Witherite (BaCO ₃)	-28.47
Strontianite (SrCO ₃)	-0.919
Calcium oxalate (CaC ₂ O ₄)	-0.00593
Magnesite (MgCO ₃)	-0.00665
Anhydrite (CaSO ₄)	-28.25
Gypsum (CaSO ₄ *2H ₂ O)	21.29
Barite (BaSO ₄)	-0.179
Celestite (SrSO ₄)	-107.73
Fluorite (CaF ₂)	-2.48
Calcium phosphate	>-0.001
Hydroxyapatite	-254.75
Silica (SiO ₂)	-27.79
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-85.95
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.300
Halite (NaCl)	-68016
Thenardite (Na ₂ SO ₄)	-86885
Iron sulfide (FeS)	-0.0101

SIMPLE INDICES

Langelier	0.705
Ryznar	5.09
Puckorius	4.14
Larson-Skold Index	1860
Stiff Davis Index	0.625
Oddo-Tomson	-0.382

BOUND IONS

Calcium	5885
Barium	0.00
Carbonate	8.66
Phosphate	0.00
Sulfate	2575

TOTAL

FREE

5579
0.00
0.0152
0.00
509.81

OPERATING CONDITIONS

Temperature (°F)	77.00
Time(mins)	3.00