



# DownHole SAT Rx

## FORMATION WATER CHEMISTRY INPUT

HRM  
Lowe A #1  
Wellhead

Pro-Stim Chemicals  
Paul Dwyer  
Prepared by SGB Solutions

Report Date: 04-15-2016 Sampled: 03-31-2016  
Sample #: 898 at 0823

### CATIONS

Calcium (as Ca)	3000
Magnesium (as Mg)	316.00
Barium (as Ba)	0.00
Strontium (as Sr)	0.00
Sodium (as Na)	29712
Potassium (as K)	0.00
Lithium (as Li)	0.00
Ammonia (as NH <sub>3</sub> )	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	11.00
Manganese (as Mn)	0.420
Zinc (as Zn)	0.00
Lead (as Pb)	0.00

### ANIONS

Chloride (as Cl)	53000
Sulfate (as SO <sub>4</sub> )	1750
Bromine (as Br)	0.00
Dissolved CO <sub>2</sub> (as CO <sub>2</sub> )	145 ppm 11.71
Bicarbonate (as HCO <sub>3</sub> )	500.00
Carbonate (as CO <sub>3</sub> )	0.00
Oxalic acid (as C <sub>2</sub> O <sub>4</sub> )	0.00
Silica (as SiO <sub>2</sub> )	0.00
Phosphate(as PO <sub>4</sub> )	0.00
H <sub>2</sub> S (as H <sub>2</sub> S)	0.00
Fluoride (as F)	0.00
Nitrate (as NO <sub>3</sub> )	0.00
Boron (as B)	0.00

### PARAMETERS

Calculated T.D.S.	87036
Molar Conductivity	119630
Resistivity	8.36
Sp.Gr.(g/mL)	1.05
Pressure(psia)	14.70
pCO <sub>2</sub> (psia)	0.0878
pH <sub>2</sub> S(atm)	0.00
Temperature (°F)	70.00
pH	6.43

All anions & cations are in mg/l (CO<sub>2</sub> in MEq/L)

FRENCH CREEK SOFTWARE, INC.  
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## FORMATION WATER DEPOSITION POTENTIAL INDICATORS

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### SATURATION LEVEL

Calcite (CaCO <sub>3</sub> )	1.51
Aragonite (CaCO <sub>3</sub> )	1.32
Witherite (BaCO <sub>3</sub> )	0.00
Strontianite (SrCO <sub>3</sub> )	0.00
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	0.00
Magnesite (MgCO <sub>3</sub> )	0.143
Anhydrite (CaSO <sub>4</sub> )	0.539
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	0.832
Barite (BaSO <sub>4</sub> )	0.00
Celestite (SrSO <sub>4</sub> )	0.00
Fluorite (CaF <sub>2</sub> )	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO <sub>2</sub> )	0.00
Brucite (Mg(OH) <sub>2</sub> )	< 0.001
Magnesium silicate	0.00
Iron hydroxide (Fe(OH) <sub>3</sub> )	7.16
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	0.00
Siderite (FeCO <sub>3</sub> )	6.33
Halite (NaCl)	0.0235
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	< 0.001
Iron sulfide (FeS)	0.00

### FREE ION MOMENTARY EXCESS (ppm)

Calcite (CaCO <sub>3</sub> )	0.0732
Aragonite (CaCO <sub>3</sub> )	0.0529
Witherite (BaCO <sub>3</sub> )	-64.30
Strontianite (SrCO <sub>3</sub> )	-20.92
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	-0.0680
Magnesite (MgCO <sub>3</sub> )	-1.09
Anhydrite (CaSO <sub>4</sub> )	-912.59
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	-258.41
Barite (BaSO <sub>4</sub> )	-0.114
Celestite (SrSO <sub>4</sub> )	-196.65
Fluorite (CaF <sub>2</sub> )	-14.58
Calcium phosphate	> -0.001
Hydroxyapatite	-974.11
Silica (SiO <sub>2</sub> )	-95.18
Brucite (Mg(OH) <sub>2</sub> )	0.00181
Magnesium silicate	-290.31
Iron hydroxide (Fe(OH) <sub>3</sub> )	< 0.001
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	> -0.001
Siderite (FeCO <sub>3</sub> )	0.210
Halite (NaCl)	-441222
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	-217576
Iron sulfide (FeS)	-0.843

### SIMPLE INDICES

Langelier	0.432
Ryznar	5.57
Puckorius	3.70
Larson-Skold Index	197.42
Stiff Davis Index	-0.300
Oddo-Tomson	-0.574

### BOUND IONS

	TOTAL	FREE
Calcium	3000	2773
Barium	0.00	0.00
Carbonate	2.72	0.130
Phosphate	0.00	0.00
Sulfate	1750	930.11

### OPERATING CONDITIONS

Temperature (°F)	70.00
Time(mins)	3.00