French Creek Well Log Module

in DownHole SAT®

Introducing the French Creek The Well Log™

French Creek is pleased to release the DownHole SAT Pressure Temperature Well Log this spring/summer (2015). The Well Log includes more flexible options for modeling pressure downhole. The Well Log will be available in all editions of DownHole SAT.

Why Use The Well Log

- The DownHole SAT® Well Log Creates a Profile of Scale Potential, Predicted Corrosion Rates, and Inhihitor Dosages as a brine flows from bottom hole, to the Separator, and flashes to atmospheric pressure.

- The profiles are displayed as a function of pressure, temperature and depth.

- Graphs of individual parameters versus depth, such as an index, saturation ratio, or dosage can also be prepared using the module.

A Note About Static Versus Dynamic Temperature and Pressure in DownHole SAT

DownHole SAT WHAT-IF modules utilize static or dynamic (ranges) of pressure and temperature.

Vary Temperature & Vary Pressure
Several graphs and the One-Page Summary & new Well Log Summary feature both varying pressure and temperature.

One-Page Summary
Prior to this release, the One-Page Summary used the WHAT-IF > Select Parameters > Temperature Selection Range to vary the temperature. Pressure was dependent on temperature, not increasing until after boiling was reached in the temperature column.

With this release, the One-Page Summary now uses the WHAT-IF > Select Parameters > Temperature Selection and the WHAT-IF > Select Parameters > Pressure Selection.

Water Analysis Temperature / Pressure Input
The temperature and pressure entered into the INPUT > Source Water Analysis are the temperature and pressure of the sample when the analysis was taken. If these are room temperature and atmospheric, enter them as so.

Static Temperature
The Vary Pressure Module uses Evaluation Temperature from the WHAT-IF > Select Parameters > Temperature Selection, for a static temperature for each pressure.

Static Pressure
Vary Temperature uses Evaluation Pressure from the WHAT-IF > Select Parameters > Pressure Selection, for a static pressure throughout each temperature.

To view the temperature or pressure utilized for a specific table format report, view the 2nd window that opens, "Water Chemistry Versus Temperature or Pressure." View under the section PARAMETERS.

Setup Well Log Modeling Parameters

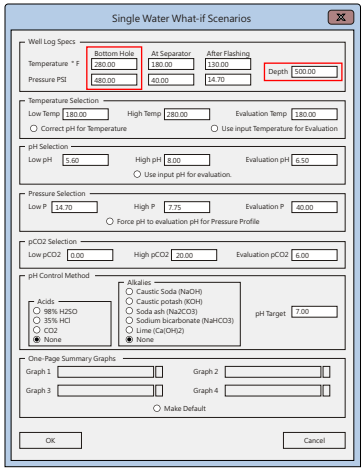
in the “What-If” Select Parameters module

You will need:

Bottom Hole Pressure, Temperature, and Depth

Pressure, Temperature at the Separator

Temperature after flashing to atmospheric pressure



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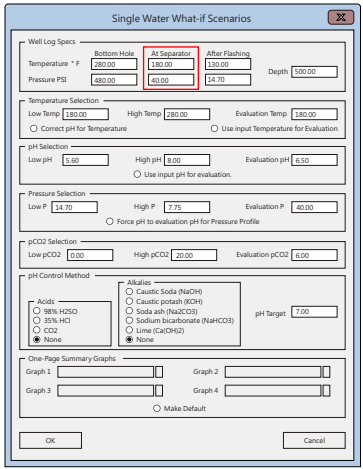

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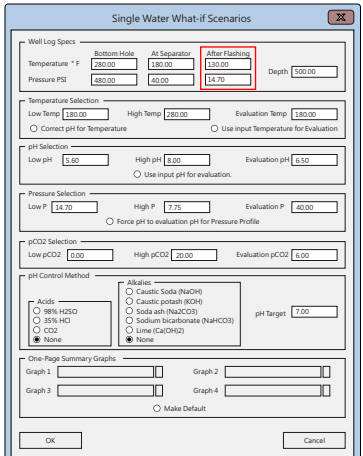
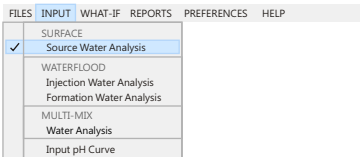
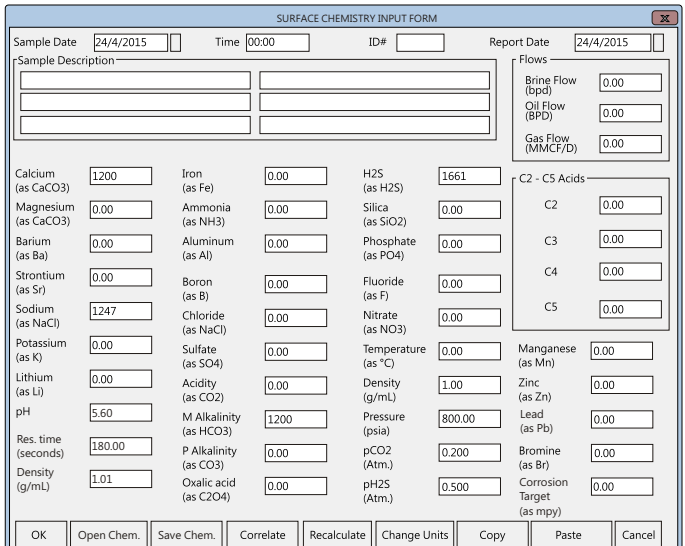


Enter the Brine Chemistry

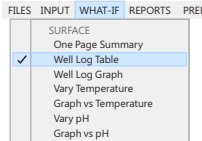
In the Input > Source Water Analysis Module

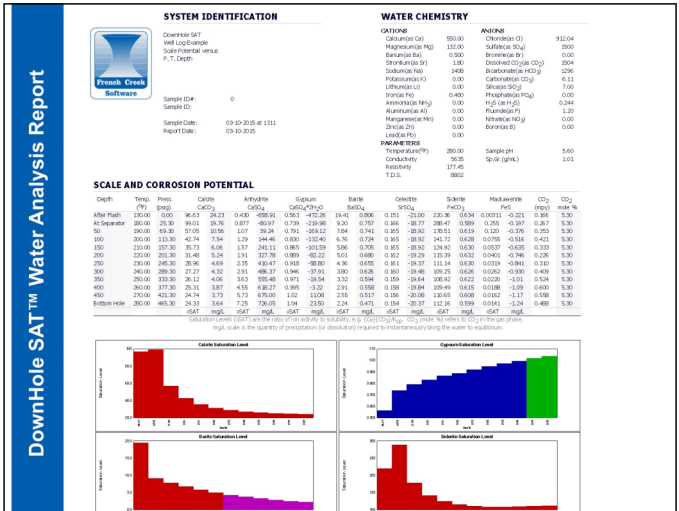




Select the Well Log Table

from the "What-If" Menu





DownHole SAT™ Water Analysis Report

French Creek Software

SYSTEM IDENTIFICATION

Downhole SAT
Well Log Example
Scale Potential versus
P, T, Depth

Sample ID#: 0
Sample ID:

Sample Date: 03-10-2015 at 1311
Report Date: 03-10-2015

WATER CHEMISTRY

CATIONS		ANIONS	
Calcium(as Ca)	550.00	Chloride(as Cl)	912.04
Magnesium(as Mg)	132.00	Sulfate(as SO_4)	1500
Barium(as Ba)	0.500	Bromine(as Br)	0.00
Strontium(as Sr)	1.80	Dissolved CO_2(as CO_2)	1504
Sodium(as Na)	1408	Bicarbonate(as HCO_3)	1296
Potassium(as K)	0.00	Carbonate(as CO_3)	6.11
Lithium(as Li)	0.00	Silica(as SiO_2)	7.00
Iron(as Fe)	0.400	Phosphate(as PO_4)	0.00
Ammonia(as NH_3)	0.00	H_2S (as H_2S)	0.244
Aluminum(as Al)	0.00	Fluoride(as F)	1.20
Manganese(as Mn)	0.00	Nitrate(as NO_3)	0.00
Zinc(as Zn)	0.00	Boron(as B)	0.00
Lead(as Pb)	0.00		

PARAMETERS			
Temperature(°F)	280.00	Sample pH	5.60
Conductivity	5635	Sp.Gr. (g/mL)	1.01
Resistivity	177.45		
T.D.S.	8802		

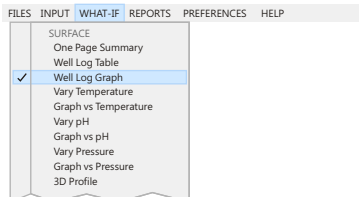
SCALE AND CORROSION POTENTIAL

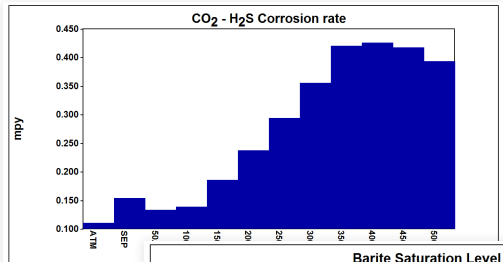
Depth	Temp. (°F)	Press. (psig)	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackawinite FeS		CO_2 (mpy)	CO_2 mole %
			SAT	mg/L	SAT	mg/L	SAT	mg/L	SAT	mg/L	SAT	mg/L	SAT	mg/L	SAT	mg/L		
After Flash	130.00	0.00	96.63	24.23	0.430	-658.91	0.563	-472.26	19.41	0.806	0.151	-21.00	220.36	0.634	0.00311	-0.221	0.166	5.30
At Separator	180.00	25.30	99.01	19.76	0.877	-80.97	0.739	-219.98	9.20	0.757	0.166	-18.77	288.47	0.589	0.255	-0.197	0.267	5.30
50	190.00	69.30	97.05	10.56	1.07	39.24	0.791	-169.12	7.84	0.741	0.165	-18.92	178.51	0.619	0.120	-0.176	0.353	5.30
100	200.00	113.30	42.74	7.54	1.29	144.46	0.830	-132.40	6.76	0.724	0.165	-18.92	141.72	0.628	0.0755	-0.516	0.421	5.30
150	210.00	157.30	35.73	6.06	1.57	241.11	0.865	-101.59	5.86	0.705	0.165	-18.92	124.92	0.630	0.0527	-0.635	0.333	5.30
200	220.00	201.30	31.48	5.24	1.91	327.78	0.899	-82.22	5.01	0.680	0.162	-19.29	115.39	0.632	0.0401	-0.746	0.236	5.30
250	230.00	245.30	28.96	4.69	2.35	410.47	0.918	-90.80	4.36	0.655	0.161	-19.37	111.14	0.630	0.0319	-0.841	0.310	5.30
300	240.00	289.30	27.27	4.32	2.91	486.37	0.946	-37.91	3.80	0.626	0.160	-19.48	109.25	0.626	0.0262	-0.930	0.409	5.30
350	250.00	333.30	26.12	4.06	3.63	555.48	0.971	-19.54	3.32	0.594	0.159	-19.64	108.92	0.622	0.0220	-1.01	0.524	5.30
400	260.00	377.30	25.31	3.87	4.55	618.27	0.995	-3.22	2.91	0.558	0.158	-19.84	109.49	0.615	0.0188	-1.09	0.600	5.30
450	270.00	421.30	24.74	3.73	5.73	675.00	1.02	11.08	2.55	0.517	0.156	-20.08	110.65	0.608	0.0162	-1.17	0.598	5.30
Bottom Hole	280.00	465.30	24.33	3.64	7.25	726.05	1.04	23.50	2.24	0.471	0.154	-20.37	112.16	0.599	0.0143	-1.24	0.488	5.30

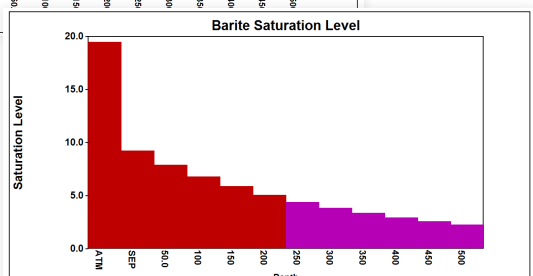
Saturation Levels (SAT) are the ratio of ion activity to solubility, e.g. $(Ca)(CO_3)/K_{SP}$. CO_2 (mpy) % refers to CO_2 in the gas phase. mg/L scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.

Create Individual 2D Graphs

from the “What-If” Menu







deus ex machina

Please note that What-if Scenarios are only as accurate as the input data and may not reflect the impact of all parameters. As outlined in the French Creek License Agreements:

> “DownHole SAT is a predictive tool which will enable Customer to obtain a more complete understanding of the chemistry of the water being analyzed. DownHole SAT should be used as a supplement to Customer’s historical experience and other testing procedures which Customer may utilize. DownHole SAT is not intended as a substitute for the exercise of judgment by Customer’s employees or consultants. “

French Creek

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