



DownHole SAT Rx

FORMATION WATER CHEMISTRY INPUT

Mid-Con Energy Operating
Harker Ranch #7
Wellhead

Pro-Stim Chemicals
Paul Dwyer
Prepared by SGB Solutions

Report Date: 12-30-2015
Sample #: 575

Sampled: 12-18-2015
at 1711

CATIONS

Calcium (as Ca)	2560
Magnesium (as Mg)	170.00
Barium (as Ba)	0.00
Strontium (as Sr)	0.00
Sodium (as Na)	61853
Potassium (as K)	0.00
Lithium (as Li)	0.00
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	49.50
Manganese (as Mn)	1.10
Zinc (as Zn)	0.00
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	99000
Sulfate (as SO ₄)	2600
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	10.95
Bicarbonate (as HCO ₃)	380.00
Carbonate (as CO ₃)	0.00
Oxalic acid (as C ₂ O ₄)	0.00
Silica (as SiO ₂)	0.00
Phosphate(as PO ₄)	0.00
H ₂ S (as H ₂ S)	0.00
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	0.00

PARAMETERS

Calculated T.D.S.	160921
Molar Conductivity	255844
Resistivity	3.91
Sp.Gr.(g/mL)	1.09
Pressure(psia)	14.70
pCO ₂ (psia)	0.0884
pH ₂ S(atm)	0.00
Temperature (°F)	68.00
pH	6.21

All anions & cations are in mg/l (CO₂ in MEq/L)

FRENCH CREEK SOFTWARE, INC.
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DEPOSITION POTENTIAL INDICATORS

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SATURATION LEVEL

Calcite (CaCO_3)	0.584
Aragonite (CaCO_3)	0.512
Witherite (BaCO_3)	0.00
Strontianite (SrCO_3)	0.00
Calcium oxalate (CaC_2O_4)	0.00
Magnesite (MgCO_3)	0.0388
Anhydrite (CaSO_4)	0.673
Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)	0.940
Barite (BaSO_4)	0.00
Celestite (SrSO_4)	0.00
Fluorite (CaF_2)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO_2)	0.00
Brucite ($\text{Mg}(\text{OH})_2$)	< 0.001
Magnesium silicate	0.00
Iron hydroxide ($\text{Fe}(\text{OH})_3$)	1.11
Strengite ($\text{FePO}_4 \cdot 2\text{H}_2\text{O}$)	0.00
Siderite (FeCO_3)	7.95
Halite (NaCl)	0.113
Thenardite (Na_2SO_4)	< 0.001
Iron sulfide (FeS)	0.00

FREE ION MOMENTARY EXCESS (ppm)

Calcite (CaCO_3)	-0.0547
Aragonite (CaCO_3)	-0.0732
Witherite (BaCO_3)	-72.89
Strontianite (SrCO_3)	-23.75
Calcium oxalate (CaC_2O_4)	-0.0613
Magnesite (MgCO_3)	-1.60
Anhydrite (CaSO_4)	-648.16
Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)	-103.12
Barite (BaSO_4)	-0.124
Celestite (SrSO_4)	-225.34
Fluorite (CaF_2)	-13.36
Calcium phosphate	>-0.001
Hydroxyapatite	-840.71
Silica (SiO_2)	-79.23
Brucite ($\text{Mg}(\text{OH})_2$)	< 0.001
Magnesium silicate	-261.97
Iron hydroxide ($\text{Fe}(\text{OH})_3$)	< 0.001
Strengite ($\text{FePO}_4 \cdot 2\text{H}_2\text{O}$)	>-0.001
Siderite (FeCO_3)	0.0778
Halite (NaCl)	-304375
Thenardite (Na_2SO_4)	-235020
Iron sulfide (FeS)	-0.493

SIMPLE INDICES

Langelier	0.167
Ryznar	5.88
Puckorius	4.01
Larson-Skold Index	501.16
Stiff Davis Index	-0.297
Oddo-Tomson	-0.991

BOUND IONS

	TOTAL	FREE
Calcium	2560	2313
Barium	0.00	0.00
Carbonate	5.16	0.0461
Phosphate	0.00	0.00
Sulfate	2600	1225

OPERATING CONDITIONS

Temperature ($^{\circ}\text{F}$)	68.00
Time(mins)	3.00