



Pacific Coast Area Laboratory  
3901 Fanucchi Way E,  
Shafter, California 93263

Upstream Chemicals

REPORT DATE: 1/5/2017

## COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: CHEVRON  
DISTRICT: WESTERN DIVIDE  
AREA/LEASE: RANGELY  
SAMPLE POINT NAME: FACILITY WATER PLANT - WEST SKIM TANK 2 INLET  
SITE TYPE:  
SAMPLE POINT DESCRIPTION:

ACCOUNT REP: PRESTON M. STEWART  
SAMPLE ID: 201606049028  
SAMPLE DATE: 12/14/2016  
ANALYSIS DATE: 1/5/2017  
ANALYST: ER/IL

### CHEVRON, RANGELY, FACILITY WATER PLANT - WEST SKIM TANK 2 INLET

FIELD DATA			ANALYSIS OF SAMPLE					
			ANIONS:		mg/L		meq/L	
							CATIONS:	
							mg/L	
							meq/L	
Initial Temperature (°F):	160		Chloride (Cl <sup>-</sup> ):	29974.3	845.5	Sodium (Na <sup>+</sup> ):	19280.4	839.0
Final Temperature (°F):	119		Sulfate (SO <sub>4</sub> <sup>2-</sup> ):	591.8	12.3	Potassium (K <sup>+</sup> ):	584.2	14.9
Initial Pressure (psi):	2840		Borate (H <sub>3</sub> BO <sub>3</sub> ):	ND		Magnesium (Mg <sup>2+</sup> ):	423.9	34.9
Final Pressure (psi):	11		Fluoride (F <sup>-</sup> ):	ND		Calcium (Ca <sup>2+</sup> ):	2307.3	115.1
pH:			Bromide (Br <sup>-</sup> ):	ND		Strontium (Sr <sup>2+</sup> ):	119.8	2.7
pH at time of sampling:	6.4		Nitrite (NO <sub>2</sub> <sup>-</sup> ):	ND		Barium (Ba <sup>2+</sup> ):	0.7	0.0
			Nitrate (NO <sub>3</sub> <sup>-</sup> ):	ND		Iron (Fe <sup>2+</sup> ):	13.0	0.5
			Phosphate (PO <sub>4</sub> <sup>3-</sup> ):	8.7	0.3	Manganese (Mn <sup>2+</sup> ):	1.2	0.0
			Silica (SiO <sub>2</sub> ):	37.0		Lead (Pb <sup>2+</sup> ):	ND	
						Zinc (Zn <sup>2+</sup> ):	ND	
ALKALINITY BY TITRATION:								
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> ):	2869.0	47.0						
Carbonate (CO <sub>3</sub> <sup>2-</sup> ):	ND							
Hydroxide (OH <sup>-</sup> ):	ND							
aqueous CO <sub>2</sub> (ppm):	700.0		Formic Acid:	ND		Aluminum (Al <sup>3+</sup> ):	ND	
aqueous H <sub>2</sub> S (ppm):	4.5		Acetic Acid:	ND		Chromium (Cr <sup>3+</sup> ):	ND	
aqueous O <sub>2</sub> (ppm):	0.0		Propionic Acid:	ND		Cobalt (Co <sup>2+</sup> ):	ND	
			Butyric Acid:	ND		Copper (Cu <sup>2+</sup> ):	ND	
			Valeric Acid:	ND		Molybdenum (Mo <sup>2+</sup> ):	ND	
Calculated TDS (mg/L):	56203					Nickel (Ni <sup>2+</sup> ):	ND	
Density/Specific Gravity (g/cm <sup>3</sup> ):	1.0370					Tin (Sn <sup>2+</sup> ):	ND	
Measured Specific Gravity	ND					Titanium (Ti <sup>2+</sup> ):	ND	
Conductivity (mmhos):	65.4					Vanadium (V <sup>2+</sup> ):	ND	
Resistivity:	ND					Zirconium (Zr <sup>2+</sup> ):	ND	
MCF/D:	No Data					Total Hardness:	7652	N/A
BOPD:	No Data							
BWPD:	No Data		Anion/Cation Ratio:		0.90			

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		Barite (BaSO <sub>4</sub> )		Calcite (CaCO <sub>3</sub> )		Gypsum (CaSO <sub>4</sub> ·2H <sub>2</sub> O)		Anhydrite (CaSO <sub>4</sub> )	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
119°F	15 psi	0.19	0.151	1.62	659.739	-0.62	0.000	-0.67	0.000
124°F	329 psi	0.15	0.124	1.37	597.772	-0.63	0.000	-0.66	0.000
128°F	643 psi	0.11	0.095	1.40	603.272	-0.63	0.000	-0.65	0.000
133°F	956 psi	0.07	0.065	1.42	608.681	-0.64	0.000	-0.64	0.000
137°F	1270 psi	0.04	0.034	1.44	613.995	-0.65	0.000	-0.63	0.000
142°F	1584 psi	0.00	0.001	1.47	619.211	-0.66	0.000	-0.62	0.000
146°F	1898 psi	-0.03	0.000	1.49	624.327	-0.66	0.000	-0.61	0.000
151°F	2212 psi	-0.07	0.000	1.52	629.341	-0.67	0.000	-0.59	0.000
155°F	2526 psi	-0.10	0.000	1.54	634.252	-0.67	0.000	-0.58	0.000
160°F	2840 psi	-0.13	0.000	1.56	639.060	-0.68	0.000	-0.57	0.000

Conditions		Celestite (SrSO <sub>4</sub> )		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate (FeCO <sub>3</sub> )	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
119°F	15 psi	-0.25	0.000	-2.11	0.000	1.61	6.553	1.28	8.956
124°F	329 psi	-0.26	0.000	-2.12	0.000	1.26	6.015	1.04	8.585
128°F	643 psi	-0.27	0.000	-2.13	0.000	1.30	6.080	1.08	8.647
133°F	956 psi	-0.28	0.000	-2.13	0.000	1.33	6.143	1.11	8.704
137°F	1270 psi	-0.29	0.000	-2.14	0.000	1.37	6.205	1.14	8.755
142°F	1584 psi	-0.30	0.000	-2.14	0.000	1.40	6.264	1.17	8.803
146°F	1898 psi	-0.31	0.000	-2.15	0.000	1.44	6.322	1.20	8.846
151°F	2212 psi	-0.31	0.000	-2.15	0.000	1.48	6.378	1.23	8.885
155°F	2526 psi	-0.32	0.000	-2.16	0.000	1.52	6.430	1.25	8.922
160°F	2840 psi	-0.33	0.000	-2.16	0.000	1.55	6.481	1.28	8.955

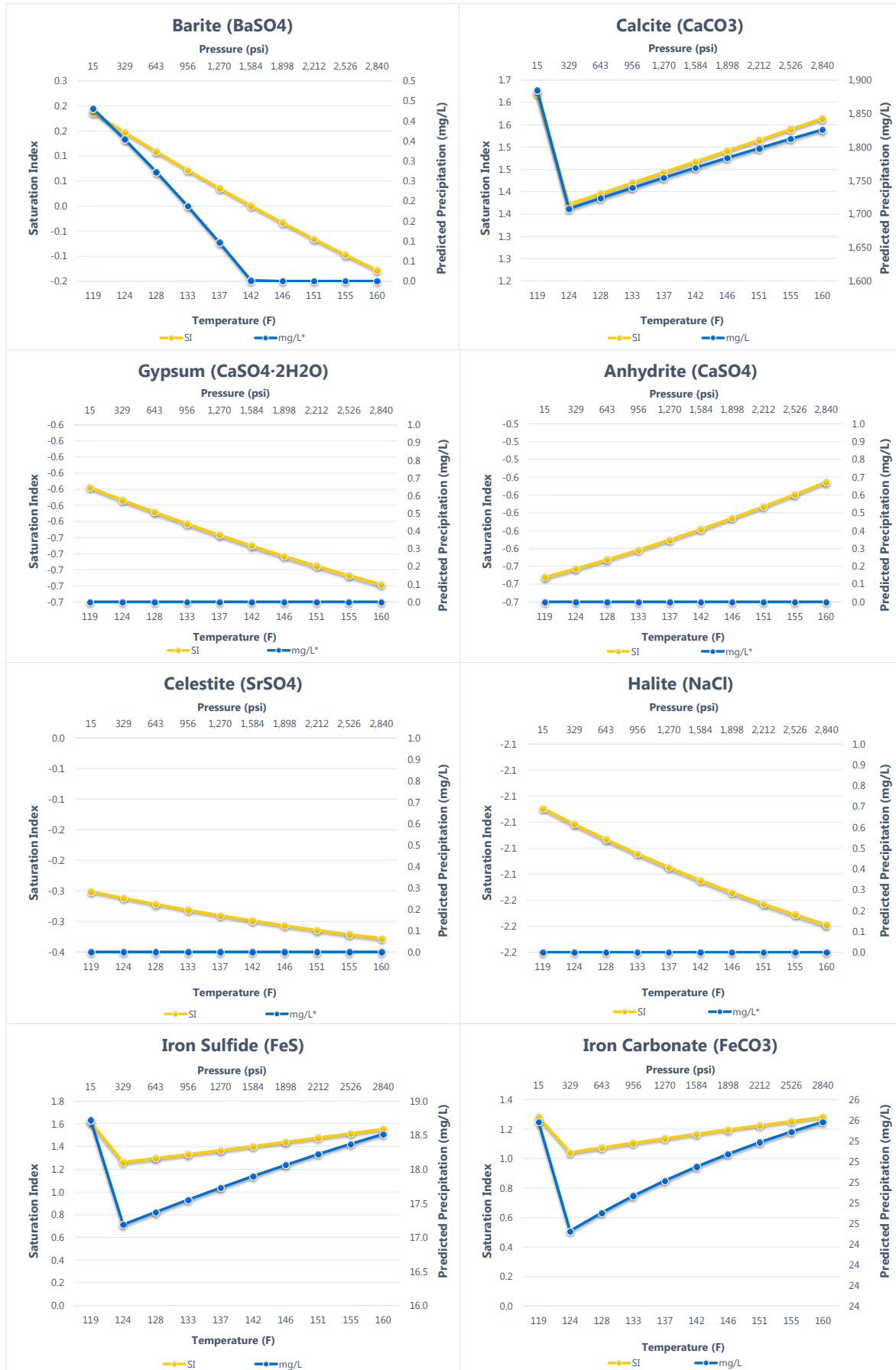
Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; %CO<sub>2</sub> is not included in the calculations.

ScaleSoft Pitzer™  
SSP2010

Comments:



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