



Pacific Coast Area Laboratory
3901 Fanucchi Way E,
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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:				CATIONS:	
				mg/L	meq/L		mg/L	meq/L
Initial Temperature (°F):	160		Chloride (Cl ⁻):	29974.3		845.5	Sodium (Na ⁺):	19280.4
Final Temperature (°F):	119		Sulfate (SO ₄ ²⁻):	591.8		12.3	Potassium (K ⁺):	584.2
Initial Pressure (psi):	2840		Borate (H ₃ BO ₃):	ND			Magnesium (Mg ²⁺):	423.9
Final Pressure (psi):	11		Fluoride (F ⁻):	ND			Calcium (Ca ²⁺):	2307.3
			Bromide (Br ⁻):	ND			Strontium (Sr ²⁺):	119.8
pH:			Nitrite (NO ₂ ⁻):	ND			Barium (Ba ²⁺):	0.7
pH at time of sampling:	6.4		Nitrate (NO ₃ ⁻):	ND			Iron (Fe ²⁺):	13.0
			Phosphate (PO ₄ ³⁻):	8.7		0.3	Manganese (Mn ²⁺):	1.2
			Silica (SiO ₂):	37.0			Lead (Pb ²⁺):	ND
							Zinc (Zn ²⁺):	ND
ALKALINITY BY TITRATION:								
	mg/L	meq/L						
Bicarbonate (HCO ₃ ⁻):	2869.0	47.0					Aluminum (Al ³⁺):	ND
Carbonate (CO ₃ ²⁻):	ND						Chromium (Cr ³⁺):	ND
Hydroxide (OH ⁻):	ND						Cobalt (Co ²⁺):	ND
							Copper (Cu ²⁺):	ND
aqueous CO ₂ (ppm):	700.0		Formic Acid:	ND			Molybdenum (Mo ²⁺):	ND
aqueous H ₂ S (ppm):	4.5		Acetic Acid:	ND			Nickel (Ni ²⁺):	ND
aqueous O ₂ (ppm):	0.0		Propionic Acid:	ND			Tin (Sn ²⁺):	ND
			Butyric Acid:	ND			Titanium (Ti ²⁺):	ND
Calculated TDS (mg/L):	56203		Valeric Acid:	ND			Vanadium (V ²⁺):	ND
Density/Specific Gravity (g/cm ³):	1.0370						Zirconium (Zr ²⁺):	ND
Measured Specific Gravity	ND							
Conductivity (mmhos):	65.4						Total Hardness:	7652
Resistivity:	ND							N/A
MCF/D:	No Data							
BOPD:	No Data							
BWPD:	No Data		Anion/Cation Ratio:		0.90		ND = Not Determined	

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

Conditions		Barite (BaSO ₄)		Calcite (CaCO ₃)		Gypsum (CaSO ₄ ·2H ₂ O)		Anhydrite (CaSO ₄)	
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 ₄)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate (FeCO ₃)	
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

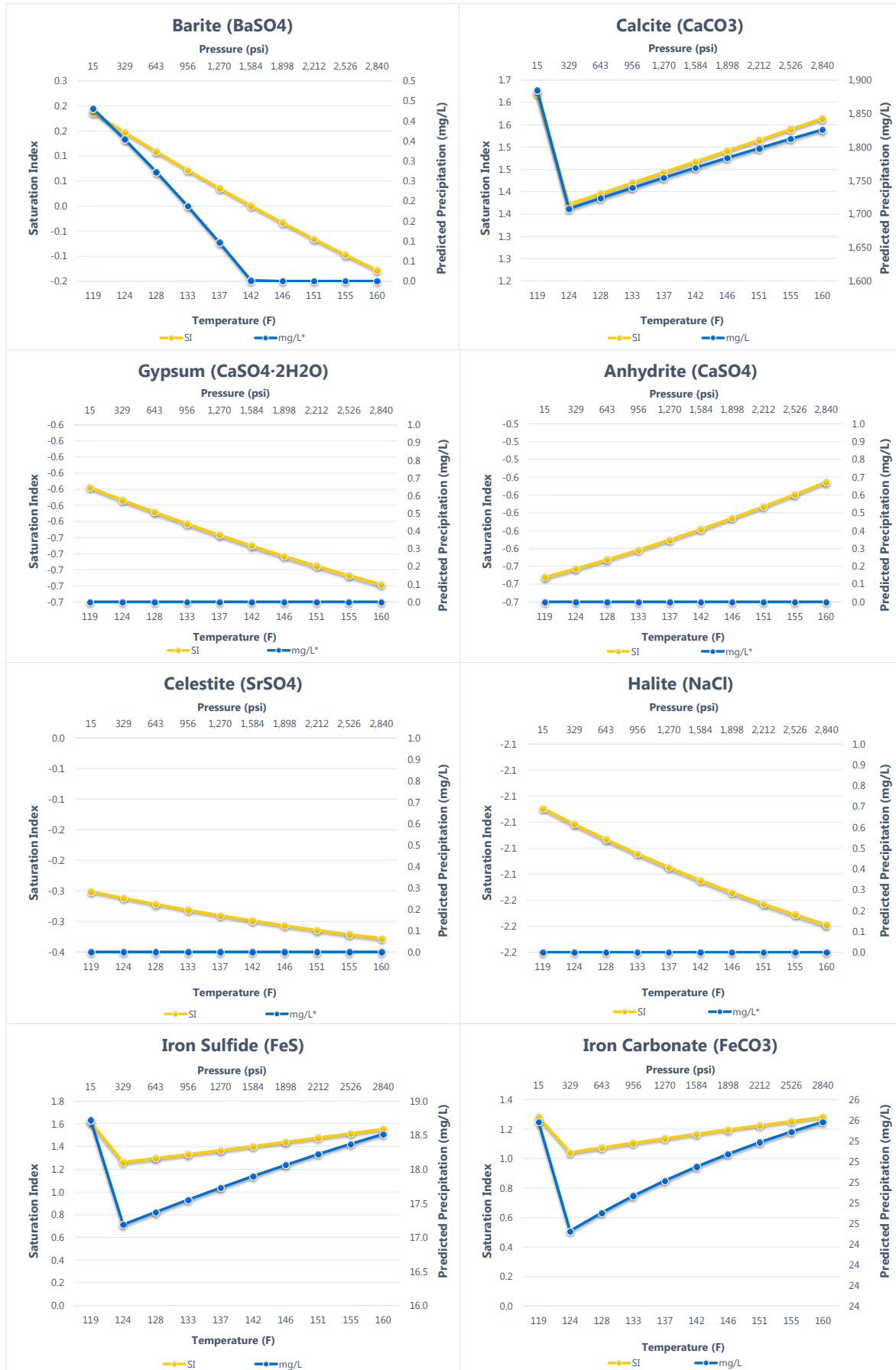
Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

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; %CO₂ is not included in the calculations.

ScaleSoft Pitzer™
SSP2010

Comments:



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