



Oilfield Labs of America  
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Midland, Texas 79706  
1-855-OIL-LAB1

Report Date: 2/23/2018

### Complete Water Analysis

Customer:	Pine Island Chemical	Account Rep:	Chase Cornelius
Operator:	Solaris	Sample ID:	1180219181
Lease:	MF King	Sample Date:	2/15/2018
Sample Point:	Downstream	Received Date:	2/19/2018
Region:	Permian	Log Out Date:	2/23/2018

### Pine Island Chemical, Solaris, MF King, Downstream

Field Data		Analysis of Sample					
		Anions:		mg/L		meq/L	
Initial Temperature (°F):	190	Chloride (Cl <sup>-</sup> ):	64800	1827.9	Sodium (Na <sup>+</sup> ):	37274	1622.0
Final Temperature (°F):	80	Sulfate (SO <sub>4</sub> <sup>2-</sup> ):	410	8.5	Potassium (K <sup>+</sup> ):	495	12.7
Initial Pressure (psi):	1250	Borate (H <sub>3</sub> BO <sub>3</sub> ):	290	4.7	Magnesium (Mg <sup>2+</sup> ):	425	35.0
Final Pressure (psi):	15	Silica (SiO <sub>2</sub> ):	54.4	0.9	Calcium (Ca <sup>2+</sup> ):	2977	148.5
Sample Specifics							
pH:	7.0						
		Phosphate (PO <sub>4</sub> <sup>3-</sup> ):	6.7	0.2	Strontium (Sr <sup>2+</sup> ):	424	9.7
						Barium (Ba <sup>2+</sup> ):	1.3
						Iron (Fe <sup>2+</sup> ):	46.2
						Manganese (Mn <sup>2+</sup> ):	1.2
						Lead (Pb <sup>2+</sup> ):	ND
						Zinc (Zn <sup>2+</sup> ):	0.1
						Lithium (Li <sup>+</sup> ):	17.9
						Aluminum (Al <sup>3+</sup> ):	ND
						Total Hardness (CaCO <sub>3</sub> ):	9675
Alkalinity by Titration:							
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> ):	232						
Carbonate (CO <sub>3</sub> <sup>2-</sup> ):	0.0						
Hydroxide (OH <sup>-</sup> ):	ND						
aqueous CO <sub>2</sub> (ppm):	440						
aqueous H <sub>2</sub> S (ppm):	1.0						
Calculated TDS (mg/L):	107437						
Calculated Density (g/cm <sup>3</sup> ):	1.0686						
Resistivity (Ωcm):	N/A						
Conductivity (mS/cm):	N/A						
Turbidity (NTU):	N/A						
		Anion EPM Total:		1845		Cation EPM Total:	
						1830	
N/A - Not Applicable		% RPD of Cations/Anions:		0.8%		ND = Not Detected	

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)
80°F	15 psi	0.35	0.440	0.93	36.755	-0.88	0.000	-1.07	0.000
92°F	152 psi	0.25	0.352	0.86	33.991	-0.87	0.000	-1.02	0.000
104°F	289 psi	0.17	0.252	0.93	36.339	-0.87	0.000	-0.97	0.000
117°F	427 psi	0.08	0.138	0.99	38.479	-0.87	0.000	-0.91	0.000
129°F	564 psi	0.01	0.012	1.06	40.435	-0.87	0.000	-0.86	0.000
141°F	701 psi	-0.06	0.000	1.11	42.227	-0.87	0.000	-0.80	0.000
153°F	838 psi	-0.13	0.000	1.17	43.874	-0.87	0.000	-0.74	0.000
166°F	976 psi	-0.19	0.000	1.23	45.392	-0.87	0.000	-0.67	0.000
178°F	1113 psi	-0.24	0.000	1.28	46.795	-0.86	0.000	-0.61	0.000
190°F	1250 psi	-0.29	0.000	1.33	48.094	-0.86	0.000	-0.54	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)
80°F	15 psi	-0.01	0.000	-1.43	0.000	2.03	1.331	0.77	19.947
92°F	152 psi	-0.01	0.000	-1.44	0.000	1.83	1.322	0.73	19.005
104°F	289 psi	-0.01	0.000	-1.45	0.000	1.82	1.322	0.83	21.019
117°F	427 psi	-0.02	0.000	-1.45	0.000	1.82	1.322	0.93	22.710
129°F	564 psi	-0.02	0.000	-1.46	0.000	1.82	1.322	1.01	24.121
141°F	701 psi	-0.02	0.000	-1.47	0.000	1.82	1.323	1.09	25.293
153°F	838 psi	-0.01	0.000	-1.47	0.000	1.83	1.323	1.15	26.264
166°F	976 psi	-0.01	0.000	-1.47	0.000	1.84	1.324	1.21	27.067
178°F	1113 psi	0.00	0.000	-1.48	0.000	1.85	1.324	1.27	27.729
190°F	1250 psi	0.00	1.508	-1.48	0.000	1.86	1.325	1.31	28.273

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.



Comments: \_\_\_\_\_

