

Report Date: 2/23/2018

Complete Water Analysis							
Customer:	Pine Island Chemical	Account Rep:	Chase Cornelius				
Operator:	Solaris	Sample ID:	1180219179				
Lease:	Brown	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, Brown ,Downstream

Field D	ata		Analysis of Sample							
			Anions:	mg/L	meq/L	Cations:	mg/L	meq/L		
Initial Temperature (°F):		190	Chloride (Cl ⁻):	54000	1523.3	Sodium (Na ⁺):	30656	1334.0		
Final Temperature (°F):		80	Sulfate (SO ₄ 2-):	320	6.7	Potassium (K ⁺):	382	9.8		
Initial Pressure (psi):		1250	Borate (H ₃ BO ₃):	333	5.4	Magnesium (Mg ²⁺):	358	29.5		
Final Pressure (psi):		15	Silica (SiO ₂):	53.2	0.9	Calcium (Ca ²⁺):	2144	107.0		
						Strontium (Sr ²⁺):	561	12.8		
Sample Specifics						Barium (Ba ²⁺):	2.2	0.0		
pH: 7.0					Iron (Fe ²⁺):	8.8	0.3			
			Phosphate (PO ₄ 3-):	1.3	0.0	Manganese (Mn ²⁺):	0.5	0.0		
						Lead (Pb ²⁺):	ND			
						Zinc (Zn ²⁺):	ND			
Alkalinity by Titration:	mg/L	meq/L				Lithium (Li ⁺):	19.4	2.8		
Bicarbonate (HCO ₃ -):	415	6.8				Aluminum (Al ³⁺):	ND			
Carbonate (CO ₃ ²⁻):	0.0	0.0								
Hydroxide (OH ⁻):	ND									
aqueous CO ₂ (ppm):	180					Total Hardness (CaCO₃):	7473			
aqueous H ₂ S (ppm):	2.0									
Calculated TDS (mg/L):		89235								
Calculated Density (g/cm ³):		1.0568								
Resistivity (Ωcm):		N/A								
Conductivity (mS/cm):		N/A								
Turbidity (NTU):		N/A								
			Anion EPM Total:		1542	Cation EPM Total:		1493		
N/A - Not Ap	plicable		% RPD of Cations/Anions: 3.2			ND = Not Detected				

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)
80°F	15 psi	0.54	0.939	1.02	68.988	-1.06	0.000	-1.27	0.000
92°F	152 psi	0.44	0.842	0.93	64.124	-1.06	0.000	-1.22	0.000
104°F	289 psi	0.35	0.731	1.01	68.207	-1.06	0.000	-1.17	0.000
117°F	427 psi	0.27	0.606	1.08	71.954	-1.06	0.000	-1.11	0.000
129°F	564 psi	0.19	0.470	1.15	75.401	-1.06	0.000	-1.06	0.000
141°F	701 psi	0.12	0.322	1.21	78.576	-1.06	0.000	-1.00	0.000
153°F	838 psi	0.06	0.165	1.28	81.506	-1.06	0.000	-0.93	0.000
166°F	976 psi	0.00	0.003	1.34	84.215	-1.05	0.000	-0.87	0.000
178°F	1113 psi	-0.05	0.000	1.41	86.725	-1.05	0.000	-0.80	0.000
190°F	1250 psi	-0.10	0.000	1.47	89.054	-1.04	0.000	-0.73	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)
80°F	15 psi	0.06	18.739	-1.61	0.000	1.62	2.593	0.29	2.929
92°F	152 psi	0.06	17.630	-1.62	0.000	1.40	2.503	0.25	2.575
104°F	289 psi	0.05	16.707	-1.63	0.000	1.41	2.507	0.36	3.356
117°F	427 psi	0.05	16.123	-1.64	0.000	1.41	2.512	0.45	3.947
129°F	564 psi	0.05	16.009	-1.65	0.000	1.42	2.518	0.55	4.396
141°F	701 psi	0.05	16.465	-1.65	0.000	1.44	2.525	0.63	4.739
153°F	838 psi	0.06	17.564	-1.66	0.000	1.45	2.533	0.71	5.004
166°F	976 psi	0.06	19.353	-1.66	0.000	1.47	2.543	0.77	5.209
178°F	1113 psi	0.07	21.849	-1.66	0.000	1.49	2.553	0.84	5.370
190°F	1250 psi	0.08	25.047	-1.66	0.000	1.52	2.563	0.89	5.497

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.



Sample ID: 43146 Pine Island Chemical, Solaris, Brown ,Downstream

