

Report Date: 2/23/2018

Complete Water Analysis							
Customer:	Pine Island Chemical	Account Rep:	Chase Cornelius				
Operator:	Solaris	Sample ID:	1180219178				
Lease:	115 SWD	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, 115 SWD, Downstream

Field Da	ata		Analysis of Sample								
			Anions:	mg/L	meq/L	Cations:	mg/L	meq/L			
Initial Temperature (°F):		190	Chloride (Cl ⁻):	71400	2014.1	Sodium (Na ⁺):	42470	1848.1			
Final Temperature (°F):		80	Sulfate (SO ₄ 2-):	510	10.6	Potassium (K ⁺):	394	10.1			
Initial Pressure (psi):		1250	Borate (H ₃ BO ₃):	224	3.6	Magnesium (Mg ²⁺):	310	25.5			
Final Pressure (psi):		15	Silica (SiO ₂):	45.6	0.8	Calcium (Ca ²⁺):	1507	75.2			
						Strontium (Sr ²⁺):	394	9.0			
Sample Specifics						Barium (Ba ²⁺):	1.5	0.0			
pH:		8.0				Iron (Fe ²⁺):	10.0	0.4			
			Phosphate (PO ₄ 3-):	6.5	0.2	Manganese (Mn ²⁺):	0.7	0.0			
						Lead (Pb ²⁺):	ND				
						Zinc (Zn ²⁺):	ND				
Alkalinity by Titration:	mg/L	meq/L				Lithium (Li ⁺):	14.2	2.0			
Bicarbonate (HCO ₃ -):	781	12.8				Aluminum (Al ³⁺):	ND				
Carbonate (CO ₃ ²⁻):	0.0	0.0									
Hydroxide (OH ⁻):	ND										
aqueous CO ₂ (ppm):	80.0					Total Hardness (CaCO ₃):	5491				
aqueous H ₂ S (ppm):	6.0										
Calculated TDS (mg/L):		118054									
Calculated Density (g/cm³):		1.0742									
Resistivity (Ωcm):		N/A									
Conductivity (mS/cm):		N/A									
Turbidity (NTU):		N/A									
			Anion EPM Total:		2041	Cation EPM Total:		1968			
N/A - Not Applicable			% RPD of Cations/Anion	s:	3.6%	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	0.47	0.576	2.11	167.543	-1.07	0.000	-1.25	0.000
92°F	152 psi	0.38	0.503	2.11	162.187	-1.07	0.000	-1.20	0.000
104°F	289 psi	0.29	0.419	2.13	166.476	-1.07	0.000	-1.15	0.000
117°F	427 psi	0.20	0.322	2.15	170.392	-1.07	0.000	-1.10	0.000
129°F	564 psi	0.12	0.214	2.16	173.980	-1.07	0.000	-1.05	0.000
141°F	701 psi	0.05	0.095	2.18	177.278	-1.07	0.000	-0.99	0.000
153°F	838 psi	-0.02	0.000	2.20	180.320	-1.07	0.000	-0.93	0.000
166°F	976 psi	-0.08	0.000	2.22	183.134	-1.07	0.000	-0.87	0.000
178°F	1113 psi	-0.14	0.000	2.24	185.747	-1.07	0.000	-0.81	0.000
190°F	1250 psi	-0.19	0.000	2.26	188.182	-1.07	0.000	-0.75	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	21.235	-1.32	0.000	3.26	5.461	1.58	7.084
92°F	152 psi	0.06	19.935	-1.33	0.000	3.13	5.441	1.62	7.099
104°F	289 psi	0.05	18.410	-1.34	0.000	3.03	5.426	1.67	7.122
117°F	427 psi	0.05	16.899	-1.34	0.000	2.95	5.410	1.71	7.140
129°F	564 psi	0.04	15.605	-1.35	0.000	2.89	5.396	1.75	7.154
141°F	701 psi	0.04	14.700	-1.35	0.000	2.83	5.383	1.79	7.165
153°F	838 psi	0.04	14.321	-1.36	0.000	2.78	5.371	1.81	7.174
166°F	976 psi	0.04	14.573	-1.36	0.000	2.73	5.360	1.84	7.180
178°F	1113 psi	0.04	15.528	-1.36	0.000	2.70	5.351	1.85	7.185
190°F	1250 psi	0.05	17.226	-1.37	0.000	2.67	5.344	1.87	7.189

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.





Comments:

Sample ID: 43146 Pine Island Chemical, Solaris, 115 SWD, Downstream

