



Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

REPORT DATE: 6/25/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: FOUNDATION ENERGY
DISTRICT: KANSAS
AREA/LEASE: ALLISON
SAMPLE POINT NAME: ALLISON SWD
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: WELL HEAD

ACCOUNT REP: NEIL J HUTTON
SAMPLE ID: 201810007274
SAMPLE DATE: 6/6/2018
ANALYSIS DATE: 6/22/2018
ANALYST: BS

FOUNDATION ENERGY, ALLISON, ALLISON SWD

FIELD DATA			ANALYSIS OF SAMPLE					
			ANIONS:		mg/L		meq/L	
Initial Temperature (°F):	300	Chloride (Cl ⁻):	10810.0	304.9	Sodium (Na ⁺):	7234.3	314.8	
Final Temperature (°F):	76	Sulfate (SO ₄ ²⁻):	7.3	0.2	Potassium (K ⁺):	28.9	0.7	
Initial Pressure (psi):	150	Borate (H ₃ BO ₃):	75.8	1.2	Magnesium (Mg ²⁺):	45.0	3.7	
Final Pressure (psi):	15	Fluoride (F ⁻):	ND		Calcium (Ca ²⁺):	58.5	2.9	
		Bromide (Br ⁻):	ND		Strontium (Sr ²⁺):	16.1	0.4	
pH:		Nitrite (NO ₂ ⁻):	ND		Barium (Ba ²⁺):	16.6	0.2	
pH at time of sampling:	7.9	Nitrate (NO ₃ ⁻):	ND		Iron (Fe ²⁺):	9.6	0.3	
SI Residual:	mg/L	Phosphate (PO ₄ ³⁻):	13.0	0.4	Manganese (Mn ²⁺):	0.2	0.0	
Compound:	SCW-2600	Silica (SiO ₂):	ND		Lead (Pb ²⁺):	ND		
Residual (ppm):	63.8				Zinc (Zn ²⁺):	0.0	0.0	
ALKALINITY BY TITRATION:	mg/L							
	meq/L							
Bicarbonate (HCO ₃ ⁻):	1634.8				Aluminum (Al ³⁺):	ND		
Carbonate (CO ₃ ²⁻):	ND				Chromium (Cr ³⁺):	ND		
Hydroxide (OH ⁻):	ND				Cobalt (Co ²⁺):	ND		
					Copper (Cu ²⁺):	ND		
					Molybdenum (Mo ²⁺):	ND		
aqueous CO ₂ (ppm):	19.8	ORGANIC ACIDS:	mg/L	meq/L	Nickel (Ni ²⁺):	ND		
aqueous H ₂ S (ppm):	0.5	Formic Acid:	ND		Tin (Sn ²⁺):	ND		
aqueous O ₂ (ppb):	ND	Acetic Acid:	ND		Titanium (Ti ²⁺):	ND		
		Propionic Acid:	ND		Vanadium (V ²⁺):	ND		
		Butyric Acid:	ND		Zirconium (Zr ²⁺):	ND		
Calculated TDS (mg/L):	19861	Valeric Acid:	ND		Lithium (Li):	ND		
Density/Specific Gravity (g/cm ³):	1.0109							
Measured Specific Gravity	ND							
Conductivity (mmhos):	ND							
Resistivity:	ND							
MCF/D:	No Data				Total Hardness:	362	N/A	
BOPD:	No Data							
BWPD:	No Data							
		Anion/Cation Ratio:		1.03				

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER 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)
76°F	15 psi	0.50	3.236	0.95	40.260	-3.66	0.000	-3.92	0.000
101°F	30 psi	0.29	2.117	1.02	41.868	-3.67	0.000	-3.82	0.000
126°F	45 psi	0.13	1.022	1.14	44.054	-3.66	0.000	-3.70	0.000
151°F	60 psi	0.00	0.039	1.28	45.958	-3.63	0.000	-3.55	0.000
176°F	75 psi	-0.08	0.000	1.42	47.503	-3.60	0.000	-3.39	0.000
200°F	90 psi	-0.14	0.000	1.58	48.672	-3.56	0.000	-3.22	0.000
225°F	105 psi	-0.18	0.000	1.75	49.486	-3.51	0.000	-3.04	0.000
250°F	120 psi	-0.20	0.000	1.92	50.043	-3.46	0.000	-2.85	0.000
275°F	135 psi	-0.20	0.000	2.09	50.417	-3.41	0.000	-2.66	0.000
300°F	150 psi	-0.20	0.000	2.27	50.665	-3.36	0.000	-2.46	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)
76°F	15 psi	-2.56	0.000	-2.90	0.000	2.28	0.505	1.98	6.863
101°F	30 psi	-2.56	0.000	-2.93	0.000	2.13	0.503	2.14	6.888
126°F	45 psi	-2.55	0.000	-2.94	0.000	2.07	0.503	2.32	6.907
151°F	60 psi	-2.51	0.000	-2.95	0.000	2.06	0.503	2.50	6.920
176°F	75 psi	-2.46	0.000	-2.95	0.000	2.09	0.503	2.67	6.928
200°F	90 psi	-2.39	0.000	-2.95	0.000	2.15	0.504	2.83	6.933
225°F	105 psi	-2.30	0.000	-2.93	0.000	2.24	0.504	2.98	6.936
250°F	120 psi	-2.20	0.000	-2.92	0.000	2.34	0.505	3.11	6.938
275°F	135 psi	-2.09	0.000	-2.90	0.000	2.45	0.506	3.23	6.940
300°F	150 psi	-1.97	0.000	-2.87	0.000	2.58	0.506	3.33	6.941

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.

Comments:

