



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 5/23/2016

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: APACHE CORPORATION
DISTRICT: NEW MEXICO
AREA/LEASE: EUNICE SOUTH
SAMPLE POINT NAME: LOU WORTHAN 20
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: WELL HEAD

ACCOUNT REP: RAEALYN FUQUA
SAMPLE ID: 201601022531
SAMPLE DATE: 5/18/2016
ANALYSIS DATE: 5/24/2016
ANALYST: HECTOR MARTINEZ

APACHE CORPORATION, EUNICE SOUTH, LOU WORTHAN 20

FIELD DATA			ANALYSIS OF SAMPLE											
			ANIONS:		mg/L		meq/L		CATIONS:		mg/L		meq/L	
Initial Temperature (°F):			250 Chloride (Cl ⁻):		92403.7		2605.6		Sodium (Na ⁺):		37191.6		1618.4	
Final Temperature (°F):			80 Sulfate (SO ₄ ²⁻):		433.4		9.0		Potassium (K ⁺):		811.2		20.7	
Initial Pressure (psi):			100 Borate (H ₃ BO ₃):		92.6		1.5		Magnesium (Mg ²⁺):		2883.0		237.3	
Final Pressure (psi):			15 Fluoride (F ⁻):		ND				Calcium (Ca ²⁺):		11102.1		554.0	
			Bromide (Br ⁻):		ND				Strontium (Sr ²⁺):		315.9		7.2	
pH:			Nitrite (NO ₂ ⁻):		ND				Barium (Ba ²⁺):		9.5		0.1	
pH at time of sampling:			6.9 Nitrate (NO ₃ ⁻):		ND				Iron (Fe ²⁺):		11.8		0.4	
			Phosphate (PO ₄ ³⁻):		ND				Manganese (Mn ²⁺):		1.8		0.1	
			Silica (SiO ₂):		ND				Lead (Pb ²⁺):		0.0		0.0	
									Zinc (Zn ²⁺):		0.0		0.0	
ALKALINITY BY TITRATION:			mg/L		meq/L									
Bicarbonate (HCO ₃ ⁻):			147.5		2.4				Aluminum (Al ³⁺):		0.0		0.0	
Carbonate (CO ₃ ²⁻):			ND						Chromium (Cr ³⁺):		ND			
Hydroxide (OH ⁻):			ND						Cobalt (Co ²⁺):		ND			
									Copper (Cu ²⁺):		0.0		0.0	
aqueous CO ₂ (ppm):			ND		Formic Acid:		ND		Molybdenum (Mo ²⁺):		0.0		0.0	
aqueous H ₂ S (ppm):			ND		Acetic Acid:		ND		Nickel (Ni ²⁺):		ND			
aqueous O ₂ (ppb):			ND		Propionic Acid:		ND		Tin (Sn ²⁺):		ND			
					Butyric Acid:		ND		Titanium (Ti ²⁺):		ND			
Calculated TDS (mg/L):			145404		Valeric Acid:		ND		Vanadium (V ²⁺):		ND			
Density/Specific Gravity (g/cm ³):			1.0948						Zirconium (Zr ²⁺):		ND			
Measured Specific Gravity			1.1067											
Conductivity (mmhos):			ND						Total Hardness:		40000		N/A	
Resistivity:			ND											
MCF/D:			No Data											
BOFD:			No Data											
BWPD:			No Data		Anion/Cation Ratio:		1.07		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)
80°F	15 psi	1.07	5.192	1.40	31.602	-0.42	0.000	-0.59	0.000
99°F	24 psi	0.95	5.027	1.45	32.199	-0.40	0.000	-0.49	0.000
118°F	34 psi	0.83	4.834	1.52	33.022	-0.39	0.000	-0.39	0.000
137°F	43 psi	0.73	4.616	1.59	33.850	-0.38	0.000	-0.29	0.000
156°F	53 psi	0.65	4.378	1.66	34.621	-0.36	0.000	-0.19	0.000
174°F	62 psi	0.57	4.126	1.73	35.321	-0.35	0.000	-0.08	0.000
193°F	72 psi	0.50	3.866	1.80	35.951	-0.34	0.000	0.04	17.322
212°F	81 psi	0.44	3.602	1.87	36.561	-0.32	0.000	0.15	62.695
231°F	91 psi	0.39	3.335	1.94	37.124	-0.31	0.000	0.27	97.764
250°F	100 psi	0.34	3.062	2.00	37.622	-0.30	0.000	0.38	124.513

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	-0.22	0.000	-1.20	0.000	-8.57	0.000	0.07	0.959
99°F	24 psi	-0.20	0.000	-1.21	0.000	-8.68	0.000	0.18	2.155
118°F	34 psi	-0.19	0.000	-1.22	0.000	-8.73	0.000	0.29	3.294
137°F	43 psi	-0.18	0.000	-1.23	0.000	-8.77	0.000	0.39	4.210
156°F	53 psi	-0.16	0.000	-1.24	0.000	-8.79	0.000	0.48	4.906
174°F	62 psi	-0.14	0.000	-1.25	0.000	-8.80	0.000	0.56	5.420
193°F	72 psi	-0.12	0.000	-1.25	0.000	-8.80	0.000	0.62	5.790
212°F	81 psi	-0.09	0.000	-1.26	0.000	-8.79	0.000	0.67	6.077
231°F	91 psi	-0.06	0.000	-1.26	0.000	-8.78	0.000	0.71	6.281
250°F	100 psi	-0.03	0.000	-1.26	0.000	-8.76	0.000	0.73	6.403

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

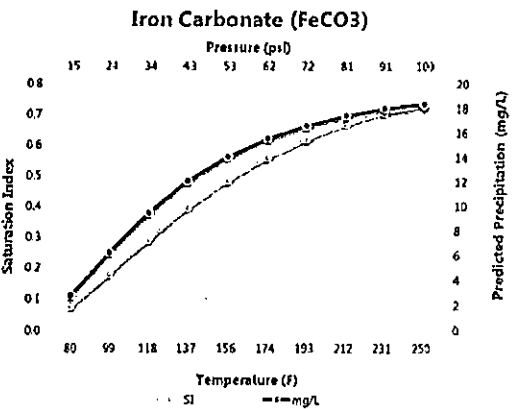
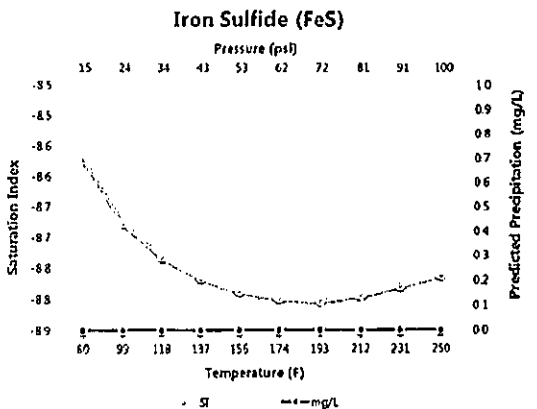
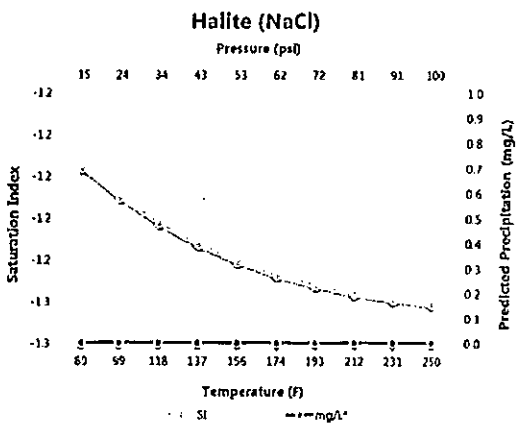
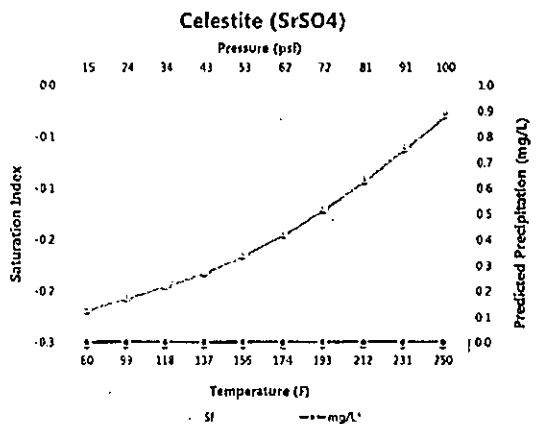
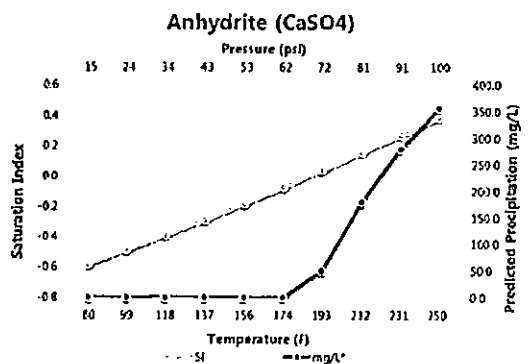
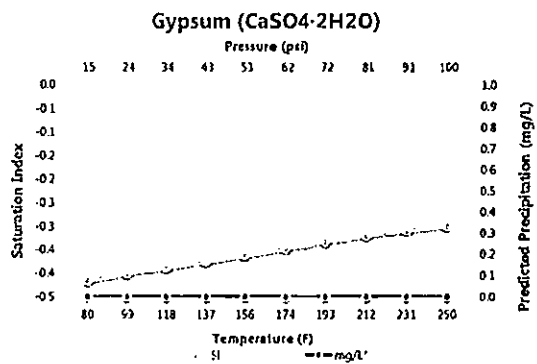
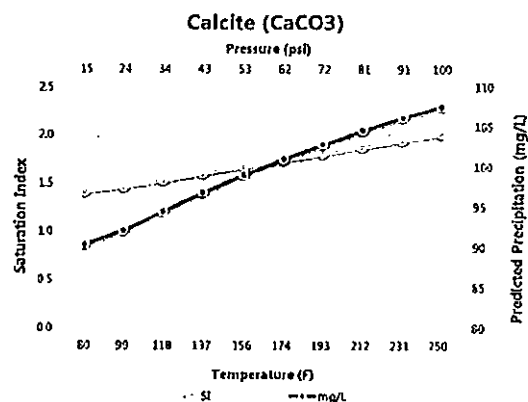
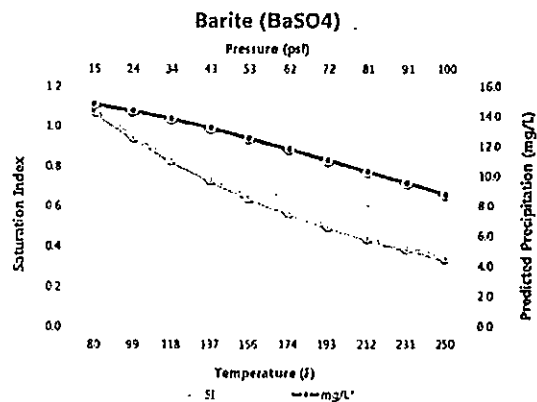
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation index predictions on this sheet use pH and alkalinity. HCO₃ is not included in the calculations.

ScaleSoft Pitzer™
SSP2010

Comments:

GRAVITE WASH ✓



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



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 4/5/2016

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: APACHE CORPORATION
DISTRICT: NEW MEXICO
AREA/LEASE: EUNICE SOUTH
SAMPLE POINT NAME: EW WALDEN3
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: WELL HEAD

PADOCK

ACCOUNT REP: RAEALYN FUQUA
SAMPLE ID: 201601013272
SAMPLE DATE: 3/9/2016
ANALYSIS DATE: 3/31/2016
ANALYST: HECTOR MARTINEZ

APACHE CORPORATION, EUNICE SOUTH, EW WALDEN3

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):		250 Chloride (Cl⁻):	86226.6	✓	2432.3 Sodium (Na⁺):	40489.8	1762.0
Final Temperature (°F):		80 Sulfate (SO₄²⁻):	1837.3	✓	38.3 Potassium (K⁺):	775.2	19.8
Initial Pressure (psi):		100 Borate (H₃BO₃):	39.8		0.6 Magnesium (Mg²⁺):	1874.1	154.2
Final Pressure (psi):		15 Fluoride (F⁻):	ND		Calcium (Ca²⁺):	7120.3	355.3
		Bromide (Br⁻):	ND		Strontium (Sr²⁺):	162.1	3.7
pH:		Nitrite (NO₂⁻):	ND		Barium (Ba²⁺):	0.0	0.0
pH at time of sampling:		6.8 Nitrate (NO₃⁻):	ND		Iron (Fe²⁺):	7.2	0.3
		Phosphate (PO₄³⁻):	ND		Manganese (Mn²⁺):	0.0	0.0
		Silica (SiO₂):	ND		Lead (Pb²⁺):	ND	
					Zinc (Zn²⁺):	0.0	0.0
ALKALINITY BY TITRATION:	mg/L						
Bicarbonate (HCO₃⁻):	146.4				Aluminum (Al³⁺):	ND	
Carbonate (CO₃²⁻):	ND				Chromium (Cr³⁺):	ND	
Hydroxide (OH⁻):	ND				Cobalt (Co²⁺):	ND	
		ORGANIC ACIDS:	mg/L	meq/L	Copper (Cu²⁺):	ND	
aqueous CO₂ (ppm):		90.0 Formic Acid:	ND		Molybdenum (Mo²⁺):	ND	
aqueous H₂S (ppm):		85.0 Acetic Acid:	ND		Nickel (Ni²⁺):	ND	
aqueous O₂ (ppb):		ND Propionic Acid:	ND		Tin (Sn²⁺):	ND	
		Butyric Acid:	ND		Titanium (Ti²⁺):	ND	
Calculated TDS (mg/L):	138679	Valeric Acid:	ND		Vanadium (V²⁺):	ND	
Density/Specific Gravity (g/cm³):	1.0888				Zirconium (Zr²⁺):	ND	
Measured Specific Gravity:	1.0965				Total Hardness:	25707	N/A
Conductivity (mmhos):	ND						
Resistivity:	ND						
MCF/D:	No Data						
BOPD:	No Data						
BWPD:	No Data						
		No Data Anion/Cation Ratio:		1.08		ND = Not Determined	

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

Conditions		Barite (BaSO₄)		Calcite (CaCO₃)		Gypsum (CaSO₄·2H₂O)		Anhydrite (CaSO₄)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi		0.000	0.39	10.370	0.06	138.209	-0.11	0.000
99°F	24 psi		0.000	0.33	8.704	0.07	164.819	-0.02	0.000
118°F	34 psi		0.000	0.28	7.429	0.08	185.162	0.07	130.848
137°F	43 psi		0.000	0.25	6.457	0.09	204.455	0.17	278.143
156°F	53 psi		0.000	0.23	5.806	0.10	224.337	0.28	404.074
174°F	62 psi		0.000	0.22	5.440	0.11	244.849	0.38	509.511
193°F	72 psi		0.000	0.23	5.358	0.12	265.206	0.49	595.893
212°F	81 psi		0.000	0.24	5.579	0.13	284.161	0.60	665.241
231°F	91 psi		0.000	0.27	6.057	0.14	300.200	0.72	719.922
250°F	100 psi		0.000	0.31	6.751	0.15	311.619	0.83	762.388

Conditions		Celestite (SrSO₄)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate (FeCO₃)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.15	33.354	-1.21	0.000	2.92	3.949	-0.97	0.000
99°F	24 psi	0.16	34.916	-1.23	0.000	2.70	3.945	-0.98	0.000
118°F	34 psi	0.17	36.370	-1.24	0.000	2.53	3.940	-0.98	0.000
137°F	43 psi	0.18	38.077	-1.25	0.000	2.41	3.935	-0.98	0.000
156°F	53 psi	0.19	40.252	-1.25	0.000	2.31	3.930	-0.99	0.000
174°F	62 psi	0.21	42.987	-1.26	0.000	2.24	3.925	-0.99	0.000
193°F	72 psi	0.23	46.268	-1.26	0.000	2.19	3.922	-1.00	0.000
212°F	81 psi	0.25	49.998	-1.27	0.000	2.16	3.919	-1.00	0.000
231°F	91 psi	0.28	54.029	-1.27	0.000	2.15	3.919	-1.01	0.000
250°F	100 psi	0.31	58.183	-1.27	0.000	2.15	3.919	-1.02	0.000

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; HCO₃ is not included in the calculations.

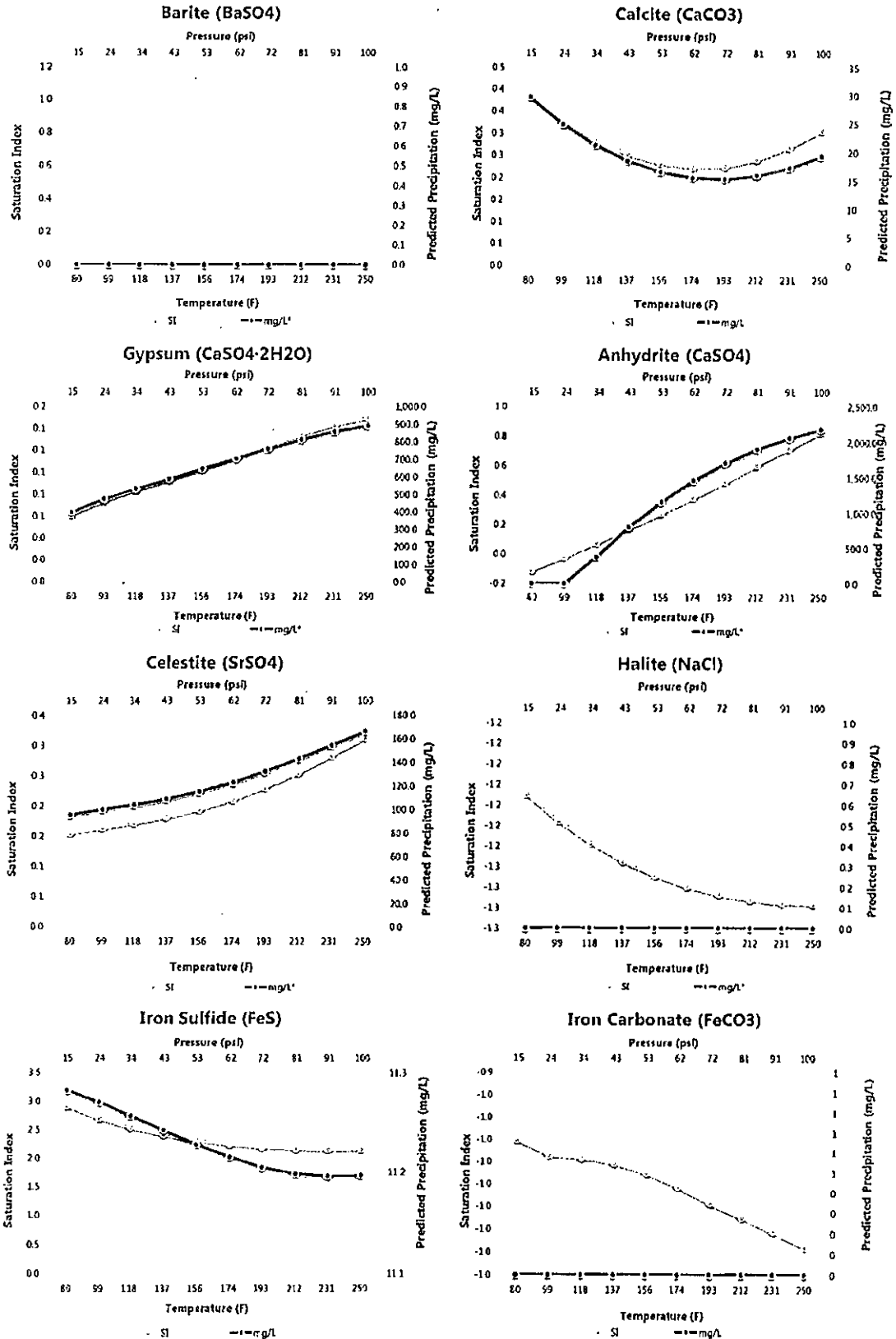
ScaleSoft Filter™
SSP2010

Comments:

PADOCK FORMATION ✓

PADOCK

SAMPLEID: 201601013722 APACHE CORPORATION, EUNICE SOUTH, EW WALDEN3



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



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 7/27/2015

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: APACHE CORPORATION ACCOUNT REP: MIKE ONEY
DISTRICT: NEW MEXICO SAMPLE ID: 201501026173
AREA/LEASE: WEST BLINEBERRY DRINKARD UNIT SAMPLE DATE: 7/14/2015
SAMPLE POINT NAME: WBDU #28 WELLHEAD DISCHARGE ANALYSIS DATE: 7/23/2015
SITE TYPE: WELL SITES ANALYST: SAMUEL NEWMAN
SAMPLE POINT DESCRIPTION: SWABBED FLUID/WORKOVER

APACHE CORPORATION, WEST BLINEBERRY DRINKARD UNIT, WBDU #28 WELLHEAD DISCHARGE

FIELD DATA			ANALYSIS OF SAMPLE							
			ANIONS:		mg/L	meq/L	CATIONS:		mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl ⁻):	31067.8	876.4	Sodium (Na ⁺):	16118.6	701.4			
Final Temperature (°F):	80	Sulfate (SO ₄ ²⁻):	2051.7	42.7	Potassium (K ⁺):	363.3	9.3			
Initial Pressure (psi):	100	Borate (H ₃ BO ₃):	80.5	1.3	Magnesium (Mg ²⁺):	776.9	63.9			
Final Pressure (psi):	15	Fluoride (F ⁻):	ND		Calcium (Ca ²⁺):	2912.8	145.3			
		Bromide (Br ⁻):	ND		Strontium (Sr ²⁺):	66.2	1.5			
pH:		Nitrite (NO ₂ ⁻):	ND		Barium (Ba ²⁺):	0.0	0.0			
pH at time of sampling:	6.9	Nitrate (NO ₃ ⁻):	ND		Iron (Fe ²⁺):	46.6	1.7			
		Phosphate (PO ₄ ³⁻):	ND		Manganese (Mn ²⁺):	10.1	0.4			
		Silica (SiO ₂):	ND		Lead (Pb ²⁺):	ND				
					Zinc (Zn ²⁺):	0.0	0.0			
ALKALINITY BY TITRATION:										
	mg/L	meq/L								
Bicarbonate (HCO ₃ ⁻):	366.0	6.0					Aluminum (Al ³⁺):	ND		
Carbonate (CO ₃ ²⁻):	ND						Chromium (Cr ⁶⁺):	ND		
Hydroxide (OH ⁻):	ND						Cobalt (Co ²⁺):	ND		
			ORGANIC ACIDS:		mg/L	meq/L	Copper (Cu ²⁺):	ND		
aqueous CO ₂ (ppm):	100.0	Formic Acid:	ND				Molybdenum (Mo ³⁺):	ND		
aqueous H ₂ S (ppm):	170.0	Acetic Acid:	ND				Nickel (Ni ²⁺):	ND		
aqueous O ₂ (ppb):	ND	Propionic Acid:	ND				Tin (Sn ⁴⁺):	ND		
		Butyric Acid:	ND				Titanium (Ti ³⁺):	ND		
Calculated TDS (mg/L):	53861	Valeric Acid:	ND				Vanadium (V ³⁺):	ND		
Density/Specific Gravity (g/cm ³):	1.0348						Zirconium (Zr ²⁺):	ND		
Measured Specific Gravity:	1.0378									
Conductivity (mmhos):	ND						Total Hardness:	10558	N/A	
Resistivity:	ND									
MCF/D:	No Data									
BOPD:	No Data									
BWPD:	No Data									
			Anion/Cation Ratio:		1.00	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)
80°F	15 psi		0.000	0.58	43.786	-0.03	0.000	-0.25	0.000
99°F	24 psi		0.000	0.55	41.550	-0.02	0.000	-0.17	0.000
118°F	34 psi		0.000	0.55	40.600	-0.01	0.000	-0.07	0.000
137°F	43 psi		0.000	0.56	40.445	0.01	21.450	0.04	65.766
156°F	53 psi		0.000	0.59	40.936	0.03	67.464	0.15	244.626
174°F	62 psi		0.000	0.63	42.006	0.05	118.676	0.27	401.774
193°F	72 psi		0.000	0.67	43.602	0.08	172.593	0.40	535.347
212°F	81 psi		0.000	0.74	45.796	0.11	226.855	0.53	645.466
231°F	91 psi		0.000	0.81	48.409	0.13	279.329	0.66	733.767
250°F	100 psi		0.000	0.89	51.365	0.16	328.146	0.79	802.864

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	0.02	2.567	-2.15	0.000	4.06	25.679	0.47	17.087
99°F	24 psi	0.03	3.252	-2.17	0.000	3.88	25.676	0.50	17.799
118°F	34 psi	0.04	4.572	-2.18	0.000	3.76	25.674	0.54	18.773
137°F	43 psi	0.06	6.524	-2.19	0.000	3.68	25.672	0.59	19.726
156°F	53 psi	0.09	9.041	-2.19	0.000	3.63	25.671	0.63	20.604
174°F	62 psi	0.13	12.008	-2.20	0.000	3.60	25.670	0.68	21.405
193°F	72 psi	0.17	15.279	-2.19	0.000	3.59	25.670	0.72	22.139
212°F	81 psi	0.22	18.698	-2.19	0.000	3.61	25.671	0.76	22.881
231°F	91 psi	0.27	22.115	-2.19	0.000	3.64	25.672	0.81	23.579
250°F	100 psi	0.33	25.403	-2.18	0.000	3.69	25.673	0.85	24.229

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

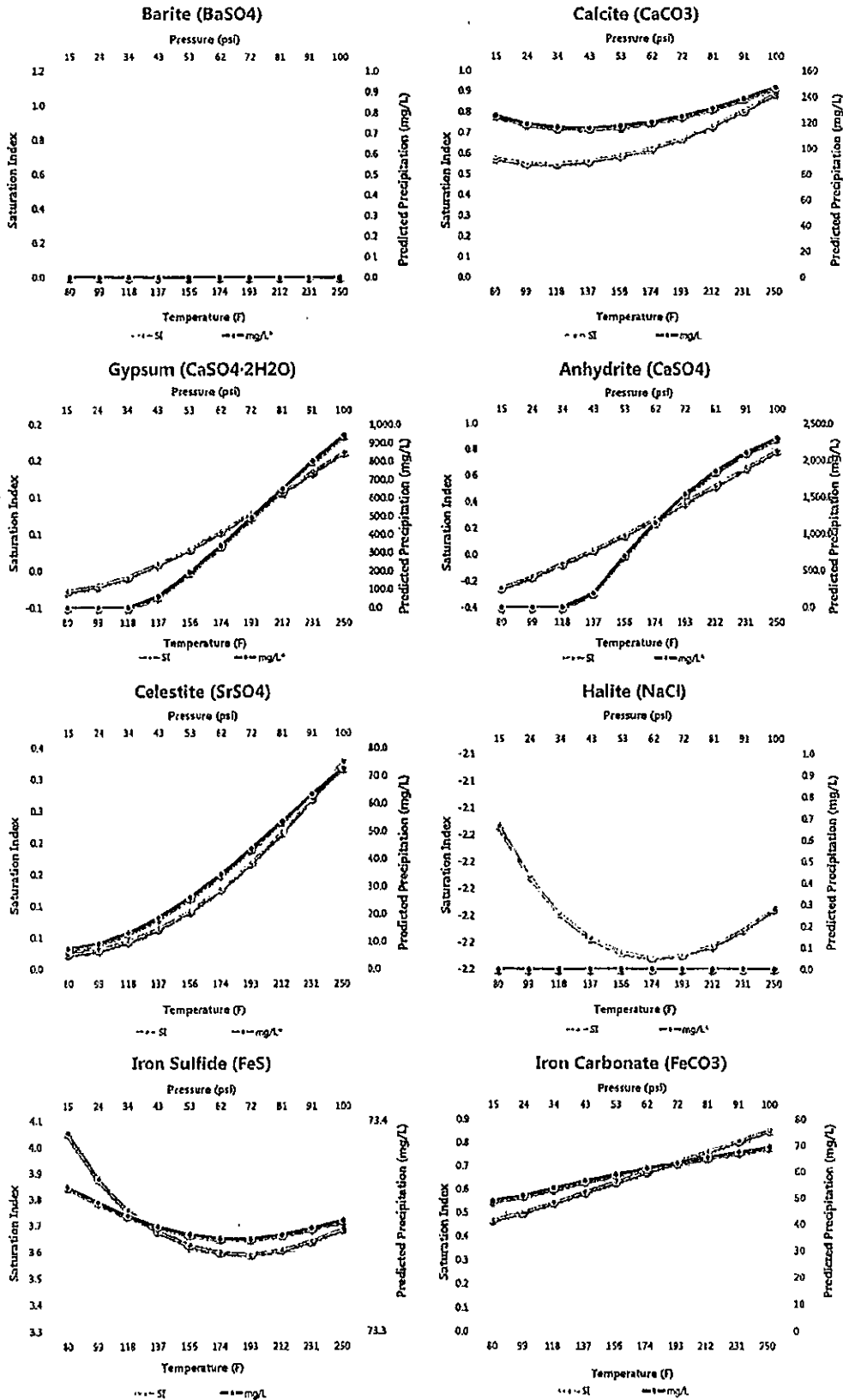
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation index predictions on this sheet use pH and alkalinity; HCO₃⁻ is not included in the calculations.

SESI
ScaleSoftPitcc™
SSP2010

Comments:

Blineberry ✓
Blineberry formation



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



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 7/14/2015

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: APACHE CORPORATION
DISTRICT: NEW MEXICO
AREA/LEASE: HAWK AS
SAMPLE POINT NAME: HAWK AS #9
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: SWABBED FLUID/WORKOVER

ACCOUNT REP: MIKE ONEY
SAMPLE ID: 201501023735
SAMPLE DATE: 6/25/2015
ANALYSIS DATE: 7/2/2015
ANALYST: SAMUEL NEWMAN

APACHE CORPORATION, HAWK AS, HAWK AS #9

FIELD DATA		ANALYSIS OF SAMPLE											
		ANIONS:		mg/L		meq/L		CATIONS:		mg/L		meq/L	
Initial Temperature (°F):		250 Chloride (Cl⁻):		43134.5		1216.8 Sodium (Na⁺):		21557.2		938.1			
Final Temperature (°F):		80 Sulfate (SO₄²⁻):		1227.7		25.6 Potassium (K⁺):		457.4		11.7			
Initial Pressure (psf):		100 Borate (H₃BO₃):		113.7		1.8 Magnesium (Mg²⁺):		1181.2		97.2			
Final Pressure (psi):		15 Fluoride (F⁻):		ND		Calcium (Ca²⁺):		3971.3		198.2			
		Bromide (Br⁻):		ND		Strontium (Sr²⁺):		88.3		2.0			
pH:		Nitrite (NO₂⁻):		ND		Barium (Ba²⁺):		0.3		0.0			
pH at time of sampling:		0.9 Nitrate (NO₃⁻):		ND		Iron (Fe³⁺):		70.3		2.5			
SI Residual:	mg/L	Phosphate (PO₄³⁻):		ND		Manganese (Mn²⁺):		2.7		0.1			
Compound:	Total PO₄	Silica (SiO₂):		ND		Lead (Pb²⁺):		ND					
Residual (ppm):						Zinc (Zn²⁺):		1.9		0.1			
ALKALINITY BY TITRATION:	mg/L												
Bicarbonate (HCO₃⁻):	144.0			2.4		Aluminum (Al³⁺):		ND					
Carbonate (CO₃²⁻):	ND					Chromium (Cr³⁺):		ND					
Hydroxide (OH⁻):	ND					Cobalt (Co²⁺):		ND					
		ORGANIC ACIDS:		mg/L		meq/L							
aqueous CO₂ (ppm):		50.0 Formic Acid:		ND				Copper (Cu²⁺):		ND			
aqueous H₂S (ppm):		51.0 Acetic Acid:		ND				Molybdenum (Mo³⁺):		ND			
aqueous O₂ (ppb):		ND Propionic Acid:		ND				Nickel (Ni²⁺):		ND			
		Butyric Acid:		ND				Tin (Sn²⁺):		ND			
								Titanium (Ti²⁺):		ND			
Calculated TDS (mg/L):		71950 Valeric Acid:		ND				Vanadium (V²⁺):		ND			
Density/Specific Gravity (g/cm³):		1.0471						Zirconium (Zr²⁺):		ND			
Measured Specific Gravity:		1.0503											
Conductivity (mmhos):		ND						Total Hardness:		14895		11/A	
Resistivity:		ND											
MCF/D:		No Data											
DOPD:		No Data											
BWPD:		No Data											
		Anion/Cation Ratio:				1.00		ND = Not Determined					

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

Conditions		Barite (BaSO₄)		Calcite (CaCO₃)		Gypsum (CaSO₄·2H₂O)		Anhydrite (CaSO₄)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.28	0.086	0.44	13.882	-0.23	0.000	-0.44	0.000
99°F	24 psi	0.14	0.043	0.42	13.311	-0.22	0.000	-0.35	0.000
118°F	34 psi	0.02	0.008	0.43	13.315	-0.20	0.000	-0.26	0.000
137°F	43 psi	-0.08	0.000	0.46	13.629	-0.19	0.000	-0.15	0.000
156°F	53 psi	-0.16	0.000	0.49	14.165	-0.17	0.000	-0.04	0.000
174°F	62 psi	-0.23	0.000	0.53	14.881	-0.15	0.000	0.08	90.459
193°F	72 psi	-0.29	0.000	0.59	15.752	-0.13	0.000	0.20	207.558
212°F	81 psi	-0.34	0.000	0.65	16.824	-0.10	0.000	0.33	301.897
231°F	91 psi	-0.37	0.000	0.72	18.016	-0.08	0.000	0.45	376.040
250°F	100 psi	-0.40	0.000	0.81	19.291	-0.06	0.000	0.58	433.113

Conditions		Celestite (SrSO₄)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate (FeCO₃)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	-0.17	0.000	-1.87	0.000	3.75	33.613	0.36	10.196
99°F	24 psi	-0.17	0.000	-1.89	0.000	3.59	33.420	0.40	11.146
118°F	34 psi	-0.16	0.000	-1.90	0.000	3.47	33.350	0.45	12.287
137°F	43 psi	-0.14	0.000	-1.91	0.000	3.40	33.337	0.51	13.358
156°F	53 psi	-0.11	0.000	-1.91	0.000	3.35	33.359	0.56	14.305
174°F	62 psi	-0.08	0.000	-1.92	0.000	3.33	33.405	0.61	15.129
193°F	72 psi	-0.05	0.000	-1.92	0.000	3.32	33.470	0.65	15.844
212°F	81 psi	-0.01	0.000	-1.91	0.000	3.33	33.574	0.70	16.337
231°F	91 psi	0.04	5.219	-1.91	0.000	3.36	33.686	0.75	17.166
250°F	100 psi	0.09	11.364	-1.90	0.000	3.40	33.827	0.79	17.721

Note 1: When assessing the severity of the scale problem, both the formation index (FI) 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: Temperature before precipitation on this sheet was pH and alkalinity (CO₃) is not included in the calculations.

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Comments:

Tubbs Formation



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 7/14/2015

COMPLETE WATER ANALYSIS REPORT

SSP v.2010

CUSTOMER: APACHE CORPORATION
DISTRICT: NEW MEXICO
AREA/LEASE: HAWK A5
SAMPLE POINT NAME: HAWK A5 #9
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: SWABBED FLUID/WORKOVER

ACCOUNT REP: MIKE ONEY
SAMPLE ID: 201501023735
SAMPLE DATE: 6/25/2015
ANALYSIS DATE: 7/2/2015
ANALYST: SAMUEL NEWMAN

APACHE CORPORATION, HAWK A5, HAWK A5 #9

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):		250 Chloride (Cl ⁻):	42232.5	1191.3	Sodium (Na ⁺):	21186.2	921.9
Final Temperature (°F):		80 Sulfate (SO ₄ ²⁻):	1057.7	22.0	Potassium (K ⁺):	447.3	11.4
Initial Pressure (psf):		100 Borate (H ₂ BO ₃):	120.1	1.9	Magnesium (Mg ²⁺):	1159.0	93.4
Final Pressure (psf):		15 Fluoride (F ⁻):	ND		Calcium (Ca ²⁺):	3796.3	189.4
pH:		Bromide (Br ⁻):	ND		Strontium (Sr ²⁺):	85.7	2.0
pH at time of sampling:		Nitrite (NO ₂ ⁻):	ND		Barium (Ba ²⁺):	0.3	0.0
SI Residual:	mg/L	6.8 Nitrate (NO ₃ ⁻):	ND		Iron (Fe ²⁺):	24.5	0.9
Compound:	Total PO ₄	Phosphate (PO ₄ ³⁻):	ND		Manganese (Mn ²⁺):	0.7	0.0
Residual (ppm):		Silica (SiO ₂):	ND		Lead (Pb ²⁺):	ND	0.0
ALKALINITY BY TITRATION:	mg/L				Zinc (Zn ²⁺):	0.0	0.0
Bicarbonate (HCO ₃ ⁻):	244.0				Aluminum (Al ³⁺):	ND	
Carbonate (CO ₃ ²⁻):	ND				Chromium (Cr ³⁺):	ND	
Hydroxide (OH ⁻):	ND				Cobalt (Co ²⁺):	ND	
		ORGANIC ACIDS:	mg/L	meq/L	Copper (Cu ²⁺):	ND	
aqueous CO ₂ (ppm):		50.0 Formic Acid:	ND		Molybdenum (Mo ⁴⁺):	ND	
aqueous H ₂ S (ppm):		50.0 Acetic Acid:	ND		Nickel (Ni ²⁺):	ND	
aqueous O ₂ (ppb):		ND Propionic Acid:	ND		Tin (Sn ²⁺):	ND	
		Butyric Acid:	ND		Titanium (Ti ²⁺):	ND	
Calculated TDS (mg/L):		70355 Valeric Acid:	ND		Vanadium (V ³⁺):	ND	
Density/Specific Gravity (g/cm ³):	1.0459				Zirconium (Zr ²⁺):	ND	
Measured Specific Gravity:	1.0494						
Conductivity (mmhos):	ND				Total Hardness:	14366	N/A
Resistivity:	ND						
MCF/Dt:	No Data						
BOPD:	No Data						
BVPD:	No Data	Anion/Cation Ratio:		1.00			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)
80°F	15 psi	0.22	0.072	0.69	34.417	-0.30	0.000	-0.51	0.000
99°F	24 psi	0.03	0.031	0.71	34.899	-0.29	0.000	-0.43	0.000
118°F	34 psi	-0.04	0.000	0.75	38.163	-0.28	0.000	-0.33	0.000
137°F	43 psi	-0.14	0.000	0.80	37.675	-0.26	0.000	-0.23	0.000
156°F	53 psi	-0.22	0.000	0.87	39.285	-0.24	0.000	-0.11	0.000
174°F	62 psi	-0.29	0.000	0.93	40.946	-0.22	0.000	0.00	3.752
193°F	72 psi	-0.35	0.000	1.01	42.643	-0.20	0.000	0.13	121.149
212°F	81 psi	-0.39	0.000	1.10	44.489	-0.18	0.000	0.25	215.883
231°F	91 psi	-0.43	0.000	1.19	46.360	-0.15	0.000	0.38	290.435
250°F	100 psi	-0.45	0.000	1.29	48.216	-0.13	0.000	0.51	347.880

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	-0.24	0.000	-1.89	0.000	3.17	13.489	0.18	4.330
99°F	24 psi	-0.24	0.000	-1.90	0.000	3.04	13.482	0.25	5.801
118°F	34 psi	-0.22	0.000	-1.92	0.000	2.97	13.478	0.34	7.379
137°F	43 psi	-0.21	0.000	-1.93	0.000	2.93	13.477	0.42	8.777
156°F	53 psi	-0.18	0.000	-1.93	0.000	2.91	13.476	0.50	9.953
174°F	62 psi	-0.15	0.000	-1.93	0.000	2.91	13.477	0.58	10.925
193°F	72 psi	-0.12	0.000	-1.93	0.000	2.93	13.479	0.65	11.722
212°F	81 psi	-0.08	0.000	-1.93	0.000	2.96	13.482	0.72	12.438
231°F	91 psi	-0.03	0.000	-1.93	0.000	3.01	13.485	0.78	13.034
250°F	100 psi	0.02	2.862	-1.92	0.000	3.05	13.489	0.84	13.518

Note 1: When assessing the severity of the scale problem, both the extension index (E) 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: Extension Index prediction on this sheet uses pH and alkalinity. %CO₂ is not included in the calculations.

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Comments:

Def. hard formation



Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 8/6/2015

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	APACHE CORPORATION	ACCOUNT REP:	MIKE ONEY
DISTRICT:	NEW MEXICO	SAMPLE ID:	201501027970
AREA/LEASE:	HAWK B1	SAMPLE DATE:	7/21/2015
SAMPLE POINT NAME:	HAWK FEDERAL B1 #69	ANALYSIS DATE:	8/4/2015
SITE TYPE:	WELL SITES	ANALYST:	SAMUEL NEWMAN
SAMPLE POINT DESCRIPTION:	WELL HEAD		

APACHE CORPORATION, HAWK B1, HAWK FEDERAL B1 #69

FIELD DATA		ANALYSIS OF SAMPLE			
		ANIONS:		CATIONS:	
		mg/L	meq/L	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl ⁻):	107364.4	3028.6 Sodium (Na ⁺):	47085.3
Final Temperature (°F):	80	Sulfate (SO ₄ ²⁻):	1088.3	22.7 Potassium (K ⁺):	933.2
Initial Pressure (psi):	100	Borate (H ₃ BO ₃):	147.7	2.4 Magnesium (Mg ²⁺):	3188.8
Final Pressure (psi):	15	Fluoride (F ⁻):	ND	Calcium (Ca ²⁺):	10522.7
		Bromide (Br ⁻):	ND	Strontium (Sr ²⁺):	264.0
pH:		Nitrite (NO ₂ ⁻):	ND	Barium (Ba ²⁺):	0.0
pH at time of sampling:	6.5	Nitrate (NO ₃ ⁻):	ND	Iron (Fe ³⁺):	12.0
		Phosphate (PO ₄ ³⁻):	ND	Manganese (Mn ²⁺):	0.0
		Silica (SiO ₂):	ND	Lead (Pb ²⁺):	ND
				Zinc (Zn ²⁺):	0.0
ALKALINITY BY TITRATION:					
		mg/L	meq/L		
Bicarbonate (HCO ₃ ⁻):	305.0		5.0	Aluminum (Al ³⁺):	ND
Carbonate (CO ₃ ²⁻):	ND			Chromium (Cr ³⁺):	ND
Hydroxide (OH ⁻):	ND			Cobalt (Co ²⁺):	ND
				Copper (Cu ²⁺):	ND
ORGANIC ACIDS:		mg/L	meq/L	Molybdenum (Mo ²⁺):	ND
				Nickel (Ni ²⁺):	ND
aqueous CO ₂ (ppm):	50.0	Formic Acid:	ND	Tin (Sn ²⁺):	ND
aqueous H ₂ S (ppm):	102.0	Acetic Acid:	ND	Titanium (Ti ²⁺):	ND
aqueous O ₂ (ppb):	ND	Propionic Acid:	ND	Vanadium (V ²⁺):	ND
		Butyric Acid:	ND	Zirconium (Zr ²⁺):	ND
Calculated TDS (mg/L):	170911	Valeric Acid:	ND		
Density/Specific Gravity (g/cm ³):	1.1100			Total Hardness:	39746
Measured Specific Gravity:	1.1235				N/A
Conductivity (mmhos):	ND				
Resistivity:	ND				
MCF/D:	No Data				
BOPD:	No Data				
BWPD:	No Data	Anion/Cation Ratio:	1.07	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)
80°F	15 psi	0.000	0.000	1.19	62.300	-0.03	0.000	-0.18	0.000
99°F	24 psi	0.000	0.000	1.16	61.138	-0.02	0.000	-0.09	0.000
118°F	34 psi	0.000	0.000	1.16	60.309	-0.01	0.000	0.00	3.925
137°F	43 psi	0.000	0.000	1.16	59.629	0.00	0.000	0.10	106.555
156°F	53 psi	0.000	0.000	1.17	59.113	0.00	3.805	0.20	193.137
174°F	62 psi	0.000	0.000	1.19	58.803	0.01	14.666	0.30	264.967
193°F	72 psi	0.000	0.000	1.21	58.733	0.02	25.111	0.41	323.445
212°F	81 psi	0.000	0.000	1.24	58.992	0.02	34.134	0.52	370.197
231°F	91 psi	0.000	0.000	1.28	59.526	0.03	40.439	0.62	406.975
250°F	100 psi	0.000	0.000	1.33	60.296	0.03	42.503	0.73	435.509

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	0.12	39.539	-0.98	0.000	3.01	6.588	-0.13	0.000
99°F	24 psi	0.13	42.201	-1.00	0.000	2.85	6.584	-0.10	0.000
118°F	34 psi	0.14	44.351	-1.01	0.000	2.74	6.581	-0.06	0.000
137°F	43 psi	0.15	46.676	-1.02	0.000	2.66	6.578	-0.02	0.000
156°F	53 psi	0.16	49.604	-1.03	0.000	2.60	6.576	0.00	0.075
174°F	62 psi	0.17	53.348	-1.03	0.000	2.56	6.574	0.03	0.410
193°F	72 psi	0.19	57.940	-1.04	0.000	2.53	6.572	0.04	0.634
212°F	81 psi	0.21	63.271	-1.05	0.000	2.52	6.572	0.05	0.830
231°F	91 psi	0.24	69.128	-1.05	0.000	2.53	6.572	0.06	0.957
250°F	100 psi	0.26	75.230	-1.05	0.000	2.54	6.573	0.07	1.001

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.

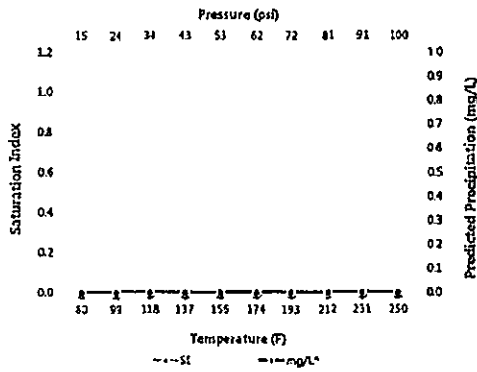
Note 3: Saturation Index predictions on this sheet use pH and alkalinity; HCO₃⁻ not included in the calculations.

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SSP2010

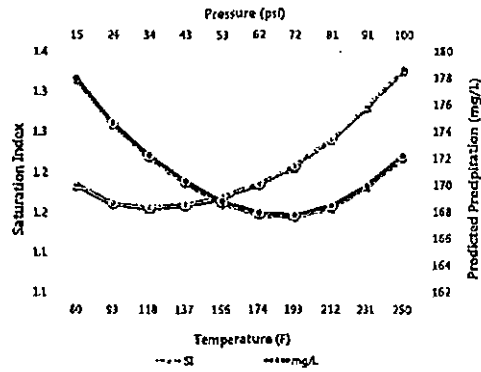
Comments:

ABO FORMATION

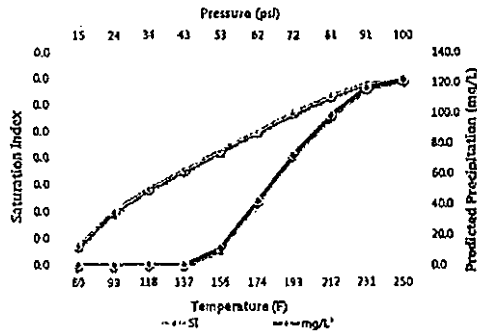
Barite (BaSO₄)



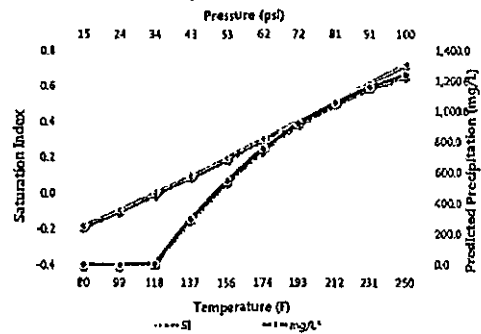
Calcite (CaCO₃)



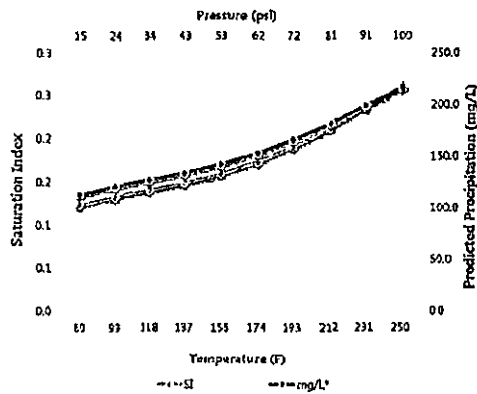
Gypsum (CaSO₄·2H₂O)



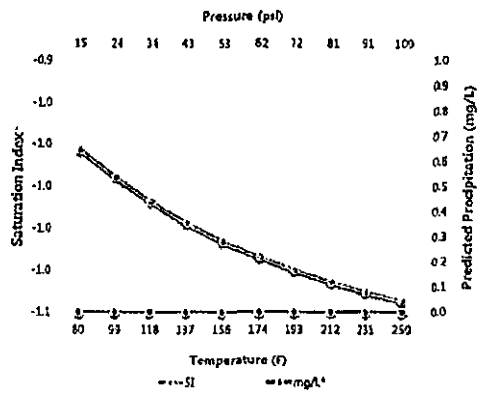
Anhydrite (CaSO₄)



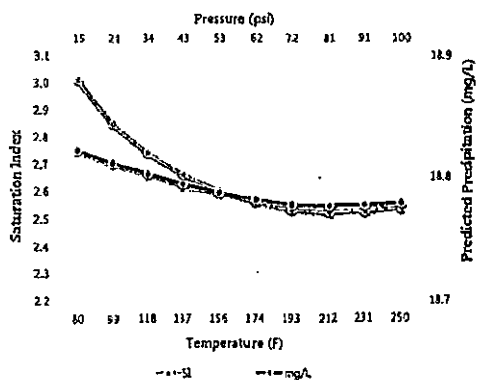
Celestite (SrSO₄)



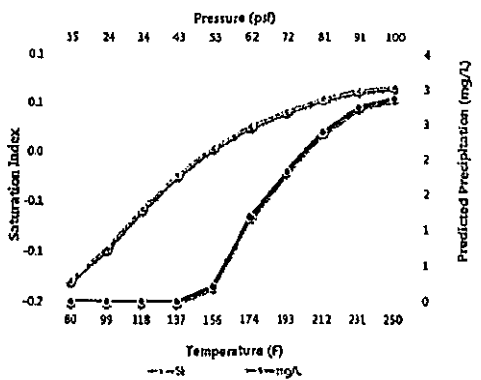
Halite (NaCl)



Iron Sulfide (FeS)



Iron Carbonate (FeCO₃)



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

Company Name	Completion Name	Reservoir Name	Measure	04/2016
APACHE CORPORATION	BAKER, A B #04 (DRI)	DRINKARD	Water Produced Estimate	48
APACHE CORPORATION	BAKER, A B #04 (TUBB)	TUBB	Water Produced Estimate	24
APACHE CORPORATION	BAKER, A B #07 GRAY	GRAYBURG	Water Produced Estimate	876
APACHE CORPORATION	BAKER, A B #07 SA	SAN ANDRES	Water Produced Estimate	432
APACHE CORPORATION	BAKER, A B #08 (GRBG)	GRAYBURG	Water Produced Estimate	104
APACHE CORPORATION	BAKER, A B #08 (SA)	SAN ANDRES	Water Produced Estimate	51
APACHE CORPORATION	BAKER, A B #11 (GRBG)	GRAYBURG	Water Produced Estimate	865
APACHE CORPORATION	BAKER, A B #11 (SA)	SAN ANDRES	Water Produced Estimate	426
APACHE CORPORATION	BUNIN #5	ABO	Water Produced Estimate	8
APACHE CORPORATION	BUNIN #6 (BLI)	DRINKARD	Water Produced Estimate	182
APACHE CORPORATION	BUNIN #6 (DRI)	DRINKARD	Water Produced Estimate	182
APACHE CORPORATION	BUNIN #6 (TUBB)	TUBB	Water Produced Estimate	128
APACHE CORPORATION	BUNIN #7 (ABO)	ABO	Water Produced Estimate	226
APACHE CORPORATION	BUNIN #7 (BLI)	BLINEBRY	Water Produced Estimate	167
APACHE CORPORATION	BUNIN #7 (TUBB)	TUBB	Water Produced Estimate	202
APACHE CORPORATION	BUNIN #9 (BLI)	BLINEBRY	Water Produced Estimate	395
APACHE CORPORATION	BUNIN #9 (TUBB)	TUBB	Water Produced Estimate	264
APACHE CORPORATION	BUTLER, EDITH B #1 (S BRUNSON D)	S. BRUNSON D	Water Produced Estimate	28
APACHE CORPORATION	BUTLER, EDITH B #1 (BLI)	BLINEBRY	Water Produced Estimate	96
APACHE CORPORATION	BUTLER, EDITH B #1 (TUBB)	TUBB	Water Produced Estimate	5
APACHE CORPORATION	BUTLER, EDITH B #2 (BLI)	BLINEBRY	Water Produced Estimate	19
APACHE CORPORATION	BUTLER, EDITH B #2 (S BRUNSON D)	S. BRUNSON D	Water Produced Estimate	4.7
APACHE CORPORATION	BUTLER, EDITH B #4	PADDOCK	Water Produced Estimate	482
APACHE CORPORATION	CORRIGAN, H #04 (BLI)	BLINEBRY	Water Produced Estimate	219
APACHE CORPORATION	CORRIGAN, H #05 (PADDO)	PADDOCK	Water Produced Estimate	956
APACHE CORPORATION	CORRIGAN, H #07 (BLI)	BLINEBRY	Water Produced Estimate	23
APACHE CORPORATION	CORRIGAN, H #10 (PADDO)	PADDOCK	Water Produced Estimate	677
APACHE CORPORATION	CORRIGAN, H #11 (PADDO)	PADDOCK	Water Produced Estimate	345
APACHE CORPORATION	CORRIGAN, H #12 (GRBG)	VARIOUS	Water Produced Estimate	109
APACHE CORPORATION	CORRIGAN, H #12 (SA)	VARIOUS	Water Produced Estimate	109
APACHE CORPORATION	CORRIGAN, H #13 (GRBG)	VARIOUS	Water Produced Estimate	1,280
APACHE CORPORATION	CORRIGAN, H #13 (SA)	VARIOUS	Water Produced Estimate	549
APACHE CORPORATION	CORRIGAN, H #14	GRAYBURG	Water Produced Estimate	568
APACHE CORPORATION	CORRIGAN, H #15 (GRBG)	GRAYBURG	Water Produced Estimate	2,330
APACHE CORPORATION	CORRIGAN, H #15 (SA)	SAN ANDRES	Water Produced Estimate	5,991
APACHE CORPORATION	CORRIGAN, H #16	GRAYBURG	Water Produced Estimate	898
APACHE CORPORATION	CORRIGAN, H #17	GRAYBURG	Water Produced Estimate	437
APACHE CORPORATION	CORRIGAN, H #18 (BLI)	BLINEBRY	Water Produced Estimate	3.0
APACHE CORPORATION	CORRIGAN, H #18 (TUBB)	TUBB	Water Produced Estimate	31
APACHE CORPORATION	CORRIGAN, H #20 (BLI)	BLINEBRY	Water Produced Estimate	3.8
APACHE CORPORATION	CORRIGAN, H #20 (DRI)	DRINKARD	Water Produced Estimate	3.8
APACHE CORPORATION	CORRIGAN, H #20 (TUBB)	TUBB	Water Produced Estimate	31
APACHE CORPORATION	CORRIGAN, H #21 (BLI)	BLINEBRY	Water Produced Estimate	131
APACHE CORPORATION	CORRIGAN, H #21 (DRI)	DRINKARD	Water Produced Estimate	190
APACHE CORPORATION	CORRIGAN, H #21 (TUBB)	TUBB	Water Produced Estimate	24
APACHE CORPORATION	CORRIGAN, H #22 (ABO)	ABO	Water Produced Estimate	63
APACHE CORPORATION	CORRIGAN, H #22 (BLI)	BLINEBRY	Water Produced Estimate	154
APACHE CORPORATION	CORRIGAN, H #22 (DRI)	DRINKARD	Water Produced Estimate	226
APACHE CORPORATION	CORRIGAN, H #22 (TUBB)	TUBB	Water Produced Estimate	39
APACHE CORPORATION	CURRY, MAE F #3 BLI	BLINEBRY	Water Produced Estimate	119
APACHE CORPORATION	CURRY, MAE F #3 PADDO	PADDOCK	Water Produced Estimate	91
APACHE CORPORATION	CURRY, MAE F #3 TUBB	TUBB-DRINKARD	Water Produced Estimate	43
APACHE CORPORATION	CURRY, MAE F #5 BLI	BLINEBRY	Water Produced Estimate	3,557
APACHE CORPORATION	CURRY, MAE F #5 TUBB	TUBB-DRINKARD	Water Produced Estimate	36
APACHE CORPORATION	ELLIOTT FED 7 #3 (ABO)	ABO	Water Produced Estimate	232
APACHE CORPORATION	ELLIOTT FED 7 #3 (BLI)	BLINEBRY	Water Produced Estimate	148
APACHE CORPORATION	ELLIOTT FED 7 #3 (TUBB)	TUBB	Water Produced Estimate	83
APACHE CORPORATION	GILL DEEP #1 (BLI)	BLINEBRY	Water Produced Estimate	252
APACHE CORPORATION	GILL DEEP #2 (BLI)	BLINEBRY	Water Produced Estimate	717
APACHE CORPORATION	GILL DEEP #3 (BLI)	BLINEBRY	Water Produced Estimate	8
APACHE CORPORATION	GILL DEEP #4 (BLI)	BLINEBRY	Water Produced Estimate	8
APACHE CORPORATION	GILL DEEP #4 (DRI)	DRINKARD	Water Produced Estimate	8
APACHE CORPORATION	GILL DEEP #6 (BLI)	BLINEBRY	Water Produced Estimate	268
APACHE CORPORATION	GILL DEEP #6 (DRI)	DRINKARD	Water Produced Estimate	87
APACHE CORPORATION	GILL DEEP #6 (TUBB)	TUBB	Water Produced Estimate	23
APACHE CORPORATION	GRIZZELL #05	BLINEBRY	Water Produced Estimate	808
APACHE CORPORATION	GRIZZELL #07 (SA)	BLINEBRY	Water Produced Estimate	10,712
APACHE CORPORATION	GRIZZELL #08 PADDO	PADDOCK	Water Produced Estimate	1,849
APACHE CORPORATION	GRIZZELL #12	PENROSE SKELLY GRAYBURG	Water Produced Estimate	4,386

APACHE CORPORATION	<u>GRIZZELL #17 (BLI)</u>	BLINEBRY	Water Produced Estimate	181
APACHE CORPORATION	<u>GRIZZELL #17 (DRI)</u>	DRINKARD	Water Produced Estimate	39
APACHE CORPORATION	<u>GRIZZELL #17 (TUBB)</u>	TUBB	Water Produced Estimate	39
APACHE CORPORATION	<u>GRIZZELL #18 (BLI)</u>	BLINEBRY	Water Produced Estimate	156
APACHE CORPORATION	<u>GRIZZELL #18 (DRI)</u>	BLINEBRY	Water Produced Estimate	40
APACHE CORPORATION	<u>GRIZZELL #18 (TUBB)</u>	BLINEBRY	Water Produced Estimate	52
APACHE CORPORATION	<u>GRIZZELL, E N #2-6 (BLI)</u>	BLINEBRY	Water Produced Estimate	3.3
APACHE CORPORATION	<u>GRIZZELL, E N #2-6 (TUBB)</u>	TUBB	Water Produced Estimate	27
APACHE CORPORATION	<u>HARE, J G #01 (TUBB)</u>	TUBB	Water Produced Estimate	26
APACHE CORPORATION	<u>HARE, J G #02 (GRBG)</u>	GRAYBURG	Water Produced Estimate	342
APACHE CORPORATION	<u>HARE, J G #04 (PADD)</u>	PADDOCK	Water Produced Estimate	53
APACHE CORPORATION	<u>HARE, J G #05 (PADD)</u>	PADDOCK	Water Produced Estimate	158
APACHE CORPORATION	<u>HARE, J G #06 (BLI) PRO GAS</u>	BLINEBRY	Water Produced Estimate	26
APACHE CORPORATION	<u>HARE, J G #07 (PADD)</u>	PADDOCK	Water Produced Estimate	105
APACHE CORPORATION	<u>HARE, J G #10 (GRBG)</u>	GRAYBURG	Water Produced Estimate	78
APACHE CORPORATION	<u>HARE, J G #10 (SA)</u>	SAN ANDRES	Water Produced Estimate	117
APACHE CORPORATION	<u>HARE, J G #12 (GRBG)</u>	GRAYBURG	Water Produced Estimate	248
APACHE CORPORATION	<u>HARE, J G #13</u>	GRAYBURG	Water Produced Estimate	78
APACHE CORPORATION	<u>HARE, J G #15 (GRBG)</u>	GRAYBURG	Water Produced Estimate	958
APACHE CORPORATION	<u>HARE, J G #16</u>	GRAYBURG-SAN ANDRES	Water Produced Estimate	59
APACHE CORPORATION	<u>HARE, J G #17 (ABO)</u>	ABO	Water Produced Estimate	407
APACHE CORPORATION	<u>HARE, J G #17 (PADD)</u>	PADDOCK ✓	Water Produced Estimate	4,270 ✓
APACHE CORPORATION	<u>HARE, J G #17 (TUBB)</u>	TUBB	Water Produced Estimate	407
APACHE CORPORATION	<u>HARE, J G #18 (BLI)</u>	BLINEBRY	Water Produced Estimate	16
APACHE CORPORATION	<u>HARE, J G #18 (TUBB)</u>	TUBB	Water Produced Estimate	2.7
APACHE CORPORATION	<u>HARE, J G #19 (ABO)</u>	ABO	Water Produced Estimate	308
APACHE CORPORATION	<u>HARE, J G #19 (BLI)</u>	BLINEBRY	Water Produced Estimate	661
APACHE CORPORATION	<u>HARE, J G #19 (PADD)</u>	PADDOCK ✓	Water Produced Estimate	3,127 ✓
APACHE CORPORATION	<u>HARE, J G #19 (TUBB)</u>	TUBB	Water Produced Estimate	308
APACHE CORPORATION	<u>LOCKHART B-11/ #01-11: ABO (CONOCO)</u>	WANTZ-ABO	Water Produced Estimate	241
APACHE CORPORATION	<u>LOCKHART B-11/ #03-11: GRBG</u>	PENROSE SKELLY GRAYBURG	Water Produced Estimate	215
APACHE CORPORATION	<u>LOCKHART B-24 #1 (BLI)</u>	BLINEBRY	Water Produced Estimate	353
APACHE CORPORATION	<u>LOCKHART B-24 #1 (TUBB)</u>	TUBB	Water Produced Estimate	159
APACHE CORPORATION	<u>LONG, THOMAS #5: BLI</u>	BLINEBRY-TUBB	Water Produced Estimate	27
APACHE CORPORATION	<u>LONG, THOMAS #5: TUBB</u>	BLINEBRY-TUBB	Water Produced Estimate	19
APACHE CORPORATION	<u>LONG, THOMAS #6 (BLI)</u>	BLINEBRY	Water Produced Estimate	60
APACHE CORPORATION	<u>LONG, THOMAS #6 (TUBB)</u>	TUBB	Water Produced Estimate	32
APACHE CORPORATION	<u>LYNCH, WALTER #10 (BLI)</u>	BLINEBRY	Water Produced Estimate	30
APACHE CORPORATION	<u>LYNCH, WALTER #10 (DRI)</u>	DRINKARD	Water Produced Estimate	39
APACHE CORPORATION	<u>LYNCH, WALTER #10 (TUBB)</u>	TUBB	Water Produced Estimate	10
APACHE CORPORATION	<u>LYNCH, WALTER #13 (ABO)</u>	ABO	Water Produced Estimate	11
APACHE CORPORATION	<u>LYNCH, WALTER #13 (BLI)</u>	BLINEBRY	Water Produced Estimate	12
APACHE CORPORATION	<u>LYNCH, WALTER #13 (TUBB)</u>	TUBB	Water Produced Estimate	3.9
APACHE CORPORATION	<u>LYNCH, WALTER #14 (BLI)</u>	BLINEBRY	Water Produced Estimate	82
APACHE CORPORATION	<u>LYNCH, WALTER #14 (TUBB)</u>	TUBB	Water Produced Estimate	23
APACHE CORPORATION	<u>LYNCH, WALTER #4 (BLI)</u>	BLINEBRY	Water Produced Estimate	13
APACHE CORPORATION	<u>LYNCH, WALTER #4 (TUBB)</u>	TUBB	Water Produced Estimate	13
APACHE CORPORATION	<u>LYNCH, WALTER #6 (BLI)</u>	BLINEBRY	Water Produced Estimate	13
APACHE CORPORATION	<u>LYNCH, WALTER #8 (S. BRUNSON D)</u>	S. BRUNSON D	Water Produced Estimate	13
APACHE CORPORATION	<u>LYNCH, WALTER #8 (BLI)</u>	BLINEBRY	Water Produced Estimate	43
APACHE CORPORATION	<u>LYNCH, WALTER #8 (DRI)</u>	DRINKARD	Water Produced Estimate	109
APACHE CORPORATION	<u>LYNCH, WALTER #8 (GRANITE WASH)</u>	GRANITE WASH	Water Produced Estimate	65
APACHE CORPORATION	<u>WANTZ, MARY E #3</u>	DRINKARD	Water Produced Estimate	24
APACHE CORPORATION	<u>MUNCY, J L #02 (BLI)</u>	BLINEBRY	Water Produced Estimate	35
APACHE CORPORATION	<u>MUNCY, J L #04 (BLI)</u>	BLINEBRY	Water Produced Estimate	9
APACHE CORPORATION	<u>MUNCY, J L #04 (S. BRUNSON D)</u>	S. BRUNSON D	Water Produced Estimate	9
APACHE CORPORATION	<u>MUNCY, J L #04 (TUBB)</u>	TUBB	Water Produced Estimate	17
APACHE CORPORATION	<u>MUNCY, J L #05 (BLI)</u>	BLINEBRY	Water Produced Estimate	22
APACHE CORPORATION	<u>MUNCY, J L #05 (GRANITE WASH)</u>	GRANITE WASH	Water Produced Estimate	13
APACHE CORPORATION	<u>MUNCY, J L #07 (GRANITE WASH)</u>	GRANITE WASH	Water Produced Estimate	24
APACHE CORPORATION	<u>MUNCY, J L #07 (TUBB)</u>	TUBB	Water Produced Estimate	11
APACHE CORPORATION	<u>MUNCY, J L #11 (BLI)</u>	BLINEBRY	Water Produced Estimate	104
APACHE CORPORATION	<u>MUNCY, J L #15 (BLI)</u>	BLINEBRY	Water Produced Estimate	67
APACHE CORPORATION	<u>MUNCY, J L #15 (DRI/ABO)</u>	DRINKARD, ABO	Water Produced Estimate	10
APACHE CORPORATION	<u>MUNCY, J L #15 (TUBB)</u>	TUBB	Water Produced Estimate	27
APACHE CORPORATION	<u>MUNCY, J L #16</u>	BLINEBRY	Water Produced Estimate	35
APACHE CORPORATION	<u>COLL, M. W. #1 (BLI)</u>	BLINEBRY	Water Produced Estimate	178
APACHE CORPORATION	<u>COLL, M. W. #1 (DRI)</u>	DRINKARD	Water Produced Estimate	248
APACHE CORPORATION	<u>COLL, M. W. #1 (TUBB)</u>	TUBB	Water Produced Estimate	113
APACHE CORPORATION	<u>COLL, M. W. #2 (BLI)</u>	BLINEBRY	Water Produced Estimate	511

APACHE CORPORATION	<u>COLL. M. W. #2 (TUBB)</u>	TUBB	Water Produced Estimate	327
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #42</u>	GRAYBURG-SAN ANDRES	Water Produced Estimate	9,465
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #43 (GRBG)</u>	GRAYBURG	Water Produced Estimate	1,562
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #43 (SA)</u>	SAN ANDRES	Water Produced Estimate	1,562
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #44 GRBG</u>	GRAYBURG	Water Produced Estimate	9,080
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #44 SA</u>	SAN ANDRES ✓	Water Produced Estimate	20,210 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #45</u>	GRAYBURG-SAN ANDRES	Water Produced Estimate	156
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #46 (GRBG)</u>	GRAYBURG	Water Produced Estimate	29
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #46 (SA)</u>	SAN ANDRES	Water Produced Estimate	7
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #47 (GRBG)</u>	GRAYBURG	Water Produced Estimate	194
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #47 (SA)</u>	SAN ANDRES	Water Produced Estimate	29
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #48 GRBG</u>	GRAYBURG	Water Produced Estimate	220
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #48 SA</u>	SAN ANDRES	Water Produced Estimate	48
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #49 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	6,633 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #49 (SA)</u>	SAN ANDRES ✓	Water Produced Estimate	6,123 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #50</u>	SAN ANDRES ✓	Water Produced Estimate	6,496 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #51 (GRBG)</u>	GRAYBURG	Water Produced Estimate	246
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #52</u>	GRAYBURG	Water Produced Estimate	89
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #53</u>	SAN ANDRES ✓	Water Produced Estimate	1,563 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #54 (SA)</u>	SAN ANDRES ✓	Water Produced Estimate	1,818 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #54 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	1,969 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #55 GRBG</u>	GRAYBURG	Water Produced Estimate	1,827 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #55 SA</u>	SAN ANDRES	Water Produced Estimate	941
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #56 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	5,358 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #56 (SA)</u>	SAN ANDRES ✓	Water Produced Estimate	16,967 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #57 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	1,079 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #57 (SA)</u>	SAN ANDRES	Water Produced Estimate	781
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #58 (GRBG)</u>	GRAYBURG	Water Produced Estimate	134
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #59 (GRBG)</u>	GRAYBURG	Water Produced Estimate	3,699 ✓
APACHE CORPORATION	<u>NEW MEXICO STATE /SI #59 (SA)</u>	SAN ANDRES	Water Produced Estimate	3,699 ✓
APACHE CORPORATION	<u>OWEN, MARK #01 (DRI)</u>	DRINKARD	Water Produced Estimate	2.2
APACHE CORPORATION	<u>OWEN, MARK #01 (TUBB)</u>	TUBB	Water Produced Estimate	9
APACHE CORPORATION	<u>OWEN, MARK #03 (BLI)</u>	BLINEBRY	Water Produced Estimate	14
APACHE CORPORATION	<u>OWEN, MARK #03 (DRI)</u>	DRINKARD	Water Produced Estimate	2.6
APACHE CORPORATION	<u>OWEN, MARK #03 (TUBB)</u>	TUBB	Water Produced Estimate	0.9
APACHE CORPORATION	<u>OWEN, MARK #04 (ABO)</u>	ABO	Water Produced Estimate	36
APACHE CORPORATION	<u>OWEN, MARK #04 (BLI)</u>	BLINEBRY	Water Produced Estimate	16
APACHE CORPORATION	<u>OWEN, MARK #05 (BLI)</u>	BLINEBRY	Water Produced Estimate	73
APACHE CORPORATION	<u>OWEN, MARK #05 (DRI)</u>	DRINKARD	Water Produced Estimate	39
APACHE CORPORATION	<u>OWEN, MARK #05 (TUBB)</u>	TUBB	Water Produced Estimate	28
APACHE CORPORATION	<u>OWEN, MARK #07 (GRBG)</u>	GRAYBURG	Water Produced Estimate	2.1
APACHE CORPORATION	<u>OWEN, MARK #08 (ABO)</u>	ABO	Water Produced Estimate	0.4
APACHE CORPORATION	<u>OWEN, MARK #08 (GRANITE WASH)</u>	GRANITE WASH	Water Produced Estimate	1.4
APACHE CORPORATION	<u>OWEN, MARK #08 (TUBB)</u>	TUBB	Water Produced Estimate	9
APACHE CORPORATION	<u>OWEN, MARK #10 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	7,457 ✓
APACHE CORPORATION	<u>OWEN, MARK #15 (GRBG)</u>	GRAYBURG	Water Produced Estimate	611
APACHE CORPORATION	<u>OWEN, MARK #15 (PADO)</u>	PADDOCK	Water Produced Estimate	301
APACHE CORPORATION	<u>OWEN, MARK #16 (GRBG)</u>	GRAYBURG ✓	Water Produced Estimate	6,299 ✓
APACHE CORPORATION	<u>OWEN, MARK #17 (GRBG)</u>	GRAYBURG	Water Produced Estimate	461
APACHE CORPORATION	<u>OWEN, MARK #18 (GRBG)</u>	GRAYBURG	Water Produced Estimate	271
APACHE CORPORATION	<u>OWEN, MARK #20 (GRBG)</u>	GRAYBURG	Water Produced Estimate	81
APACHE CORPORATION	<u>OWEN, MARK #28 (BLI)</u>	BLINEBRY	Water Produced Estimate	138
APACHE CORPORATION	<u>OWEN, MARK #28 (DRI)</u>	DRINKARD	Water Produced Estimate	76
APACHE CORPORATION	<u>OWEN, MARK #28 (TUBB)</u>	TUBB	Water Produced Estimate	57
APACHE CORPORATION	<u>OWEN, MARK #29 (BLI)</u>	BLINEBRY	Water Produced Estimate	28
APACHE CORPORATION	<u>OWEN, MARK #29 (DRI)</u>	DRINKARD	Water Produced Estimate	15
APACHE CORPORATION	<u>OWEN, MARK #29 (TUBB)</u>	TUBB	Water Produced Estimate	11
APACHE CORPORATION	<u>PLUMLEE #1</u>	ABO	Water Produced Estimate	152
APACHE CORPORATION	<u>RINEWALT #01 (SA)</u>	SAN ANDRES	Water Produced Estimate	325
APACHE CORPORATION	<u>RINEWALT #05 (PENROSE SKELLY)</u>	PENROSE SKELLY GRAYBURG	Water Produced Estimate	161
APACHE CORPORATION	<u>RINEWALT #06</u>	GRAYBURG	Water Produced Estimate	754
APACHE CORPORATION	<u>RINEWALT #07</u>	GRAYBURG ✓	Water Produced Estimate	3,359 ✓
APACHE CORPORATION	<u>RINEWALT #08 (BLI)</u>	BLINEBRY	Water Produced Estimate	165
APACHE CORPORATION	<u>RINEWALT #08 (TUBB)</u>	TUBB	Water Produced Estimate	294
APACHE CORPORATION	<u>STATE /QI #3 (BLI)</u>	BLINEBRY	Water Produced Estimate	49
APACHE CORPORATION	<u>STATE /QI #3 (TUBB)</u>	TUBB	Water Produced Estimate	25
APACHE CORPORATION	<u>STATE C TR 13 #14 (BLI)</u>	BLINEBRY	Water Produced Estimate	74
APACHE CORPORATION	<u>STATE C TR 13 #14 (DRI)</u>	DRINKARD	Water Produced Estimate	65
APACHE CORPORATION	<u>STATE C TR 13 #14 (TUBB)</u>	TUBB	Water Produced Estimate	25
APACHE CORPORATION	<u>STATE SEC 2 #03</u>	BLINEBRY	Water Produced Estimate	2.1

APACHE CORPORATION STATE SEC 2 #08
 APACHE CORPORATION STATE SEC 2 #14 (ABO)
 APACHE CORPORATION STATE SEC 2 #07
 APACHE CORPORATION STEVENS 18/ #18-07
 APACHE CORPORATION TURNER 29 #10 (BLI)
 APACHE CORPORATION TURNER 29 #10 (TUBB)
 APACHE CORPORATION TURNER 29 #5
 APACHE CORPORATION TURNER 29 #6
 APACHE CORPORATION TURNER 29 #7 (BLI)
 APACHE CORPORATION TURNER 29 #7 (TUBB)
 APACHE CORPORATION WORTHAN, LOU #03 (ABO)
 APACHE CORPORATION WORTHAN, LOU #03 (BLI)
 APACHE CORPORATION WORTHAN, LOU #03 (DRI)
 APACHE CORPORATION WORTHAN, LOU #03 (TUBB)
 APACHE CORPORATION WORTHAN, LOU #04 (BLI)
 APACHE CORPORATION WORTHAN, LOU #11 GAS (DRI)
 APACHE CORPORATION WORTHAN, LOU #11 GAS (TUBB)
 APACHE CORPORATION WORTHAN, LOU #11 OIL (BLI)
 APACHE CORPORATION WORTHAN, LOU #12 GAS (BLI)
 APACHE CORPORATION WORTHAN, LOU #15 (TUBB)
 APACHE CORPORATION WORTHAN, LOU #16 (TUBB)
 APACHE CORPORATION WORTHAN, LOU #17 (ABO)
 APACHE CORPORATION WORTHAN, LOU #17 (DRI)
 APACHE CORPORATION WORTHAN, LOU #19 (BLI)
 APACHE CORPORATION WORTHAN, LOU #20 (ABO)
 APACHE CORPORATION WORTHAN, LOU #20 (GRANITE WASH)
 APACHE CORPORATION WORTHAN, LOU #21 (BLI)
 APACHE CORPORATION WORTHAN, LOU #30 (ABO)
 APACHE CORPORATION WORTHAN, LOU #30 (BLI)
 APACHE CORPORATION WORTHAN, LOU #30 (DRI)
 APACHE CORPORATION WORTHAN, LOU #30 (TUBB)

Macasland Management Inc. Elliott #001

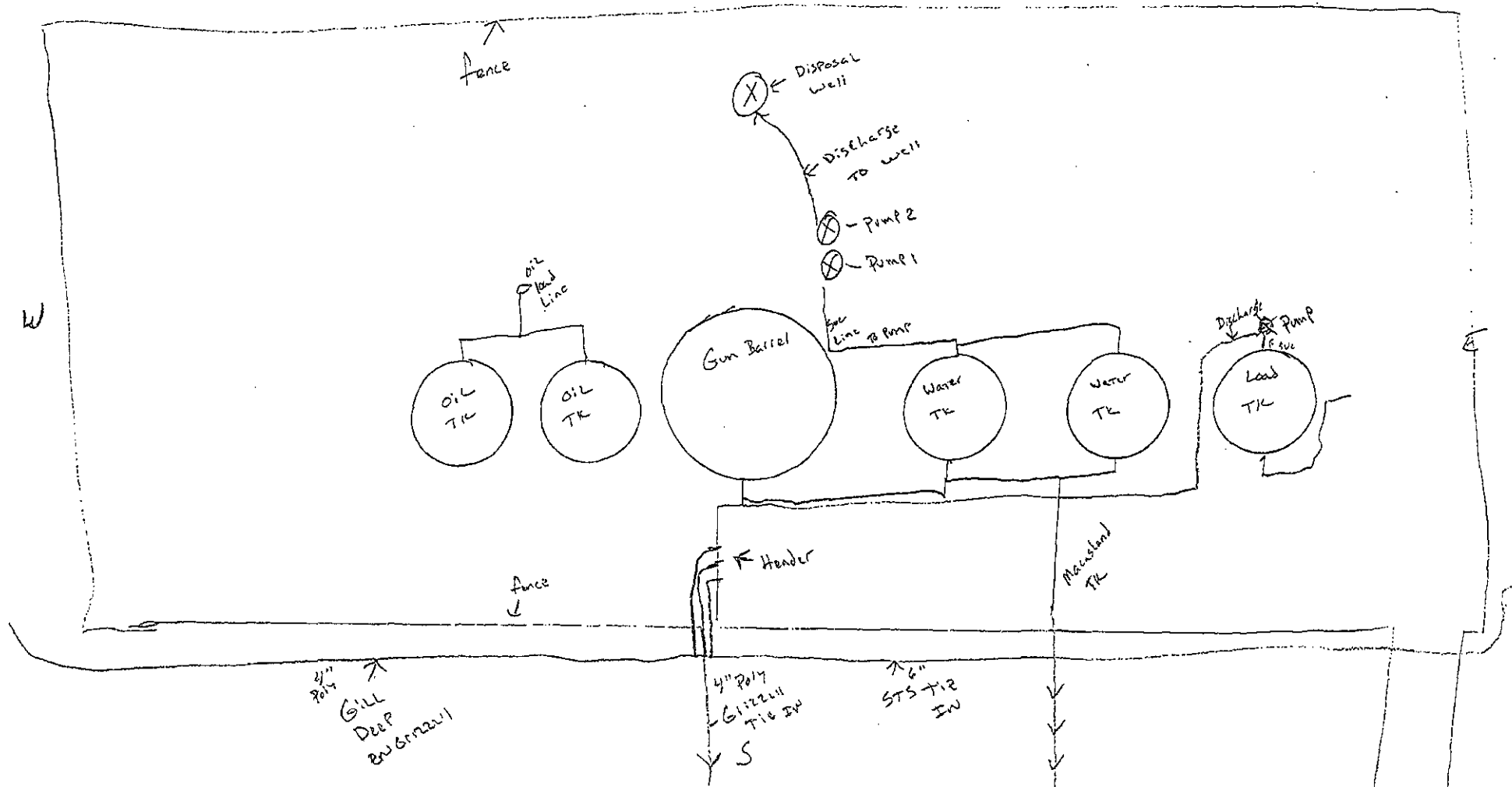
Macasland Management Inc. Elliott #002

BLINEBRY	Water Produced Estimate	15
ABO	Water Produced Estimate	15
ABO	Water Produced Estimate	15
YATES-SEVEN RIVERS QN	Water Produced Estimate	247
BLINEBRY	Water Produced Estimate	593
TUBB	Water Produced Estimate	113
GRAYBURG	Water Produced Estimate	622
SAN ANDRES	Water Produced Estimate	1,820
BLINEBRY	Water Produced Estimate	231
TUBB	Water Produced Estimate	41
ABO	Water Produced Estimate	2.1
BLINEBRY	Water Produced Estimate	2.6
DRINKARD	Water Produced Estimate	1.6
TUBB	Water Produced Estimate	0.5
BLINEBRY	Water Produced Estimate	64
DRINKARD	Water Produced Estimate	8
TUBB	Water Produced Estimate	13
BLINEBRY	Water Produced Estimate	13
BLINEBRY	Water Produced Estimate	34
TUBB	Water Produced Estimate	34
TUBB	Water Produced Estimate	34
ABO	Water Produced Estimate	23
DRINKARD	Water Produced Estimate	11
BLINEBRY	Water Produced Estimate	34
ABO	Water Produced Estimate	22
GRANITE WASH	Water Produced Estimate	45
BLINEBRY	Water Produced Estimate	34
ABO	Water Produced Estimate	3.1
BLINEBRY	Water Produced Estimate	3.9
DRINKARD	Water Produced Estimate	2.3
TUBB	Water Produced Estimate	0.8
Eumont; YATES-SEVEN RIVERS QN	Water Produced Estimate	26.0 Based on 2/2016
Eumont; YATES-SEVEN RIVERS QN	Water Produced Estimate	16.8 Based on 2/2016

Property Name	Completion Name	Reservoir Name	Measure	04/2016
BAKER, A B	BAKER, A B #04 (DRI)	DRINKARD	Water Produced Estimate	62
BAKER, A B	BAKER, A B #04 (TUBB)	TUBB	Water Produced Estimate	30
BAKER, A B	BAKER, A B #07 GRAY	GRAYBURG	Water Produced Estimate	1,188
BAKER, A B	BAKER, A B #07 SA	SAN ANDRES	Water Produced Estimate	585
BAKER, A B	BAKER, A B #08 (GRBG)	GRAYBURG	Water Produced Estimate	126
BAKER, A B	BAKER, A B #08 (SA)	SAN ANDRES	Water Produced Estimate	62
BAKER, A B	BAKER, A B #11 (GRBG)	GRAYBURG	Water Produced Estimate	1,069
BAKER, A B	BAKER, A B #11 (SA)	SAN ANDRES	Water Produced Estimate	526
WALDEN, E W	WALDEN, E W #10 (BLI)	BLINEBRY	Water Produced Estimate	278
WALDEN, E W	WALDEN, E W #10 (DRI)	DRINKARD	Water Produced Estimate	18
WALDEN, E W	WALDEN, E W #16 (ABO)	ABO	Water Produced Estimate	65
WALDEN, E W	WALDEN, E W #16 (BLI)	BLINEBRY	Water Produced Estimate	203
WALDEN, E W	WALDEN, E W #16 (DRI)	TUBB	Water Produced Estimate	76
WALDEN, E W	WALDEN, E W #16 (TUBB)	TUBB	Water Produced Estimate	18
WALDEN, E W	WALDEN, E W #17 (ABO)	ABO	Water Produced Estimate	23
WALDEN, E W	WALDEN, E W #17 (BLI)	BLINEBRY	Water Produced Estimate	83
WALDEN, E W	WALDEN, E W #17 (DRI)	DRINKARD	Water Produced Estimate	31
WALDEN, E W	WALDEN, E W #17 (TUBB)	TUBB	Water Produced Estimate	9
WALDEN, E W	WALDEN, E W #3 (PADD)	PADDOCK	Water Produced Estimate	3,201
WALDEN, E W	WALDEN, E W #4 (BLI)	BLINEBRY	Water Produced Estimate	7
WALDEN, E W	WALDEN, E W #5 (TUBB)	TUBB	Water Produced Estimate	4.8
WALDEN, E W	WALDEN, E W #6 (BLI)	BLINEBRY	Water Produced Estimate	166
WALDEN, E W	WALDEN, E W #7 (BLI)	BLINEBRY	Water Produced Estimate	15
WALDEN, E W	WALDEN, E W #9 (BLI)	BLINEBRY	Water Produced Estimate	70
WALDEN, E W	WALDEN, E W #9 (DRI)	DRINKARD	Water Produced Estimate	45
WALDEN, E W	WALDEN, E W #9 (TUBB)	TUBB	Water Produced Estimate	51
WOOD, EUGENE	WOOD, EUGENE #11 (BLI)	BLINEBRY	Water Produced Estimate	156
WOOD, EUGENE	WOOD, EUGENE #11 (DRI)	DRINKARD	Water Produced Estimate	73
WOOD, EUGENE	WOOD, EUGENE #11 (TUBB)	TUBB	Water Produced Estimate	23
WOOD, EUGENE	WOOD, EUGENE #12 (BLI)	BLINEBRY	Water Produced Estimate	163
WOOD, EUGENE	WOOD, EUGENE #12 (DRI)	DRINKARD	Water Produced Estimate	107
WOOD, EUGENE	WOOD, EUGENE #12 (TUBB)	TUBB	Water Produced Estimate	11
WOOD, EUGENE	WOOD, EUGENE #13 (GRBG)	GRAYBURG	Water Produced Estimate	1,021
WOOD, EUGENE	WOOD, EUGENE #14 (ABO)	ABO	Water Produced Estimate	33
WOOD, EUGENE	WOOD, EUGENE #14 (BLI)	BLINEBRY	Water Produced Estimate	58
WOOD, EUGENE	WOOD, EUGENE #14 (DRI)	DRINKARD	Water Produced Estimate	28
WOOD, EUGENE	WOOD, EUGENE #14 (TUBB)	TUBB	Water Produced Estimate	9
WOOD, EUGENE	WOOD, EUGENE #15 (GRBG)	GRAYBURG	Water Produced Estimate	6,809
WOOD, EUGENE	WOOD, EUGENE #16 (GRBG)	GRAYBURG	Water Produced Estimate	2,120
WOOD, EUGENE	WOOD, EUGENE #20 (ABO)	ABO	Water Produced Estimate	146
WOOD, EUGENE	WOOD, EUGENE #20 (BLI)	BLINEBRY	Water Produced Estimate	279
WOOD, EUGENE	WOOD, EUGENE #20 (DRI)	DRINKARD	Water Produced Estimate	146
WOOD, EUGENE	WOOD, EUGENE #20 (PADD)	PADDOCK	Water Produced Estimate	595
WOOD, EUGENE	WOOD, EUGENE #20 (TUBB)	TUBB	Water Produced Estimate	49
WOOD, EUGENE	WOOD, EUGENE #5 (BLI)	BLINEBRY	Water Produced Estimate	3.3
WOOD, EUGENE	WOOD, EUGENE #6 (ELB)	ELLENBURGER	Water Produced Estimate	64
WOOD, EUGENE	WOOD, EUGENE #7 (BLI)	BLINEBRY	Water Produced Estimate	65
WOOD, EUGENE	WOOD, EUGENE #9 (BLI)	BLINEBRY	Water Produced Estimate	65

N

Elliott B-9 Disposal





NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON

Governor

Joanna Prukop

Cabinet Secretary

Mark E. Fesmire, P.E.

Director

Oil Conservation Division

ADMINISTRATIVE ORDER SWD-960

APPLICATION OF APACHE CORPORATION FOR PRODUCED WATER DISPOSAL, LEA COUNTY, NEW MEXICO.

ADMINISTRATIVE ORDER OF THE OIL CONSERVATION DIVISION

Under the provisions of Rule 701(B), Apache Corporation made application to the New Mexico Oil Conservation Division on November 15, 2004, for permission to utilize for produced water disposal its proposed Elliot B Well No. 9 (API No. 30-025-37042) to be located 330 feet from the South line and 330 feet from the East line of Section 6, Township 22 South, Range 37 East, NMPM, Lea County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

- (1) The application has been duly filed under the provisions of Rule 701(B) of the Division Rules and Regulations;
- (2) Satisfactory information has been provided that all offset operators and surface owners have been duly notified;
- (3) The applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 will be met; and
- (4) No objections have been received within the waiting period prescribed by said rule.

IT IS THEREFORE ORDERED THAT:

The applicant is hereby authorized to utilize its Elliot B Well No. 9 (API No. 30-025-37042) to be located 330 feet from the South line and 330 feet from the East line of Section 6, Township 22 South, Range 37 East, NMPM, Lea County, New Mexico, in such manner as to permit the injection of produced water for disposal purposes into the lower San Andres formation through an open hole interval from approximately 4,400 feet to 5,050 feet and through plastic-lined tubing set with a packer located within 100 feet of the top of the injection interval.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

The operator shall estimate the initial reservoir pressure of the injection interval, i.e. from stable fluid levels, and submit this in writing to the Division (referencing SWD-960).

After installing injection tubing, the casing shall be pressure tested from the surface to the packer setting depth to assure casing integrity.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge or an approved leak detection device in order to determine leakage in the casing, tubing, or packer.

The wellhead injection pressure on the well shall be limited to no more than 880 psi. In addition, the injection well or system shall be equipped with a pressure limiting device in workable condition which shall, at all times, limit surface injection pressure to the maximum allowable pressure for this well.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the injection formation. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of disposal equipment and of any mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Hobbs district office of the Division of the failure of the tubing, casing, or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The operator shall provide written notice of the date of commencement of injection to the Hobbs district office of the Division.

The operator shall submit monthly reports of the disposal operations on Division Form C-115, in accordance with Rule Nos. 706 and 1120 of the Division Rules and Regulations.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

Approved at Santa Fe, New Mexico, on this 18th day of January 2005.



MARK E. FESMIRE, P.E.
Director

MEF/wvj

cc: Oil Conservation Division – Hobbs
Bureau of Land Management – Carlsbad

Goetze, Phillip, EMNRD

From: Goetze, Phillip, EMNRD
Sent: Thursday, July 07, 2016 9:46 AM
To: 'Fisher, Reesa'
Cc: Brown, Maxey G, EMNRD; Jones, William V, EMNRD; McMillan, Michael, EMNRD; Lowe, Leonard, EMNRD
Subject: RE: APACHE ELLIOTT B #9 SWD-960 AMENDMENT

RE: Elliott B No. 9 (API 30-025-37042); Administrative Order SWD-960; Addition of Produced Water Sources

Reesa:

Engineers do tend to become "antsy", and for good cause. Apparently the submittal by Apache got lost in transmittal and I have no record of Apache's letter (either e-mail copy or a paper copy in the "in basket" stack).

Your request for additional sources is being made to amend the original disposal profile provided in the application and resulting order, SWD-960. You have stated that the all produced waters continue to be from Apache's operations and that the addition of the new sources does not require any revision of the current injection pressure. The submitted analyses does suggest an increase scaling rate potential (along with increased mineralization in the injection interval); however, the summary of disposal shows that the Grayburg and San Andres sources continue to be the dominate overall injection volume which would result in a dilution of the higher TDS sources. Therefore, OCD has no objection to the addition of the new produced water sources for disposal in the Elliott B No. 9. A copy of this e-mail and Apache's correspondence will be placed in the well file and administrative order file on OCD's Online Imaging.

Please contact me with any questions regarding this matter. PRG

Phillip R. Goetze, PG
Engineering Bureau
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505
Direct: 505.476.3466
E-mail: phillip.goetze@state.nm.us



From: Fisher, Reesa [mailto:Reesa.Fisher@apachecorp.com]
Sent: Thursday, July 07, 2016 8:05 AM
To: Goetze, Phillip, EMNRD <Phillip.Goetze@state.nm.us>
Subject: APACHE ELLIOTT B #9 SWD-960 AMENDMENT

Good morning, Mr. Phillip! My engineer is getting antsy waiting on this one, so thought I'd check and see if we're in the pile. This is one of those where it's an SWD, but on Federal land, so we're wanting to get square with you before we "notify" the BLM.

Hope you had a Happy 4th! – R ☺

REESA FISHER

SR STAFF REGULATORY ANALYST

New Mexico Assets

direct 432-818-1062 | 6325C

APACHE CORP.

303 Veterans Airpark Lane, Suite 1000

Midland, Texas 79705

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