



April 14, 2016 

**Mr. Phillip Goetze
New Mexico Oil Conservation Division
Engineering Bureau
1220 South St Francis Drive
Santa Fe, New Mexico 87505**

**RE: Administrative Order SWD-1503
AAO Federal SWD No. 1
API: 30-015-42549
Unit G, Section 1, T18S, R27E
Eddy County, New Mexico**

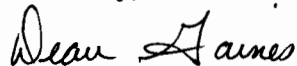
Dear Mr. Goetze:

Please find attached a copy of the subject Order issued by the OCD on October 8, 2014. Though this Order does not restrict our source water, Apache would like to notify the OCD of our intention to dispose of water from not only the Glorieta/Yeso as noted in the application submitted on June 6, 2014, but also water from the San Andres, Queen, and Grayburg. Water Analysis for the Washington 33 State 15 – 30.015.22822 are included for the additional formations to satisfy any compatibility concerns.

This SWD well is used only for Apache non-commercial produced water. Scaling issues are not anticipated to be a problem and Apache will continue to monitor injection pressure to ensure compliance.

If additional information is required or you have any questions, please contact me at 432-818-1803 or email Dean.Gaines@apachecorp.com

Sincerely,



**Dean Gaines
UIC Coordinator**

2016 APR 19 P 2:41
RECEIVED OCD



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

Upstream Chemicals

REPORT DATE: 10/15/2015

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER: APACHE CORPORATION
DISTRICT: NEW MEXICO
AREA/LEASE: WASHINGTON 33 STATE
SAMPLE POINT NAME: WASHINGTON 33 STATE #15
SITE TYPE: WELL SITES
SAMPLE POINT DESCRIPTION: WELL HEAD

ACCOUNT REP: BOBBY D VAUGHN
SAMPLE ID: 201501038231
SAMPLE DATE: 9/29/2015
ANALYSIS DATE: 10/14/2015
ANALYST: FRANCISCO RAMIREZ

APACHE CORPORATION, WASHINGTON 33 STATE, WASHINGTON 33 STATE #15

FIELD DATA			ANALYSIS OF SAMPLE							
			ANIONS:		mg/L	meq/L	CATIONS:		mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl):	63252.9		1784.3	Sodium (Na ⁺):	37234.8	1620.3		
Final Temperature (°F):	80	Sulfate (SO ₄ ²⁻):	4327.4		90.1	Potassium (K ⁺):	323.1	8.3		
Initial Pressure (psi):	100	Borate (H ₃ BO ₃):	34.2		0.6	Magnesium (Mg ²⁺):	372.9	30.7		
Final Pressure (psi):	15	Fluoride (F):	ND			Calcium (Ca ²⁺):	2087.4	104.2		
			Bromide (Br):	ND		Strontium (Sr ²⁺):	37.1	0.8		
pH:			Nitrite (NO ₂):	ND		Barium (Ba ²⁺):	0.0	0.0		
pH at time of sampling:			5.9	Nitrate (NO ₃):	ND	Iron (Fe ²⁺):	1.6	0.1		
				Phosphate (PO ₄ ³⁻):	ND	Manganese (Mn ²⁺):	0.0	0.0		
				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):	622.2	10.2						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):	310.0	Formic Acid:	ND			Molybdenum (Mo ²⁺):	ND			
aqueous H ₂ S (ppm):	204.0	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):	108293	Valeric Acid:	ND			Vanadium (V ²⁺):	ND			
Density/Specific Gravity (g/cm ³):	1.0684						Zirconium (Zr ²⁺):	ND		
Measured Specific Gravity	1.0762									
Conductivity (mmhos):	ND						Total Hardness:	6797	N/A	
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; 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)
80°F	15 psi		0.000	0.06	11.551	0.00	0.000	-0.19	0.000
99°F	24 psi		0.000	0.09	16.226	0.01	34.618	-0.10	0.000
118°F	34 psi		0.000	0.14	25.084	0.02	63.480	-0.01	0.000
137°F	43 psi		0.000	0.20	34.479	0.03	92.338	0.09	219.442
156°F	53 psi		0.000	0.27	43.607	0.04	123.287	0.19	451.577
174°F	62 psi		0.000	0.33	52.464	0.05	156.503	0.30	665.510
193°F	72 psi		0.000	0.41	61.977	0.06	191.051	0.41	860.003
212°F	81 psi		0.000	0.49	70.993	0.07	225.292	0.52	1034.471
231°F	91 psi		0.000	0.57	79.675	0.08	257.105	0.63	1188.991
250°F	100 psi		0.000	0.66	88.101	0.09	284.023	0.75	1324.205

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	-0.05	0.000	-1.45	0.000	1.29	0.828	-1.40	0.000
99°F	24 psi	-0.04	0.000	-1.46	0.000	1.19	0.817	-1.32	0.000
118°F	34 psi	-0.03	0.000	-1.47	0.000	1.16	0.813	-1.23	0.000
137°F	43 psi	-0.02	0.000	-1.48	0.000	1.16	0.813	-1.15	0.000
156°F	53 psi	-0.01	0.000	-1.48	0.000	1.17	0.814	-1.07	0.000
174°F	62 psi	0.00	0.280	-1.49	0.000	1.19	0.817	-1.00	0.000
193°F	72 psi	0.03	1.574	-1.49	0.000	1.23	0.822	-0.94	0.000
212°F	81 psi	0.05	3.069	-1.49	0.000	1.28	0.828	-0.88	0.000
231°F	91 psi	0.08	4.707	-1.48	0.000	1.33	0.833	-0.83	0.000
250°F	100 psi	0.12	6.417	-1.48	0.000	1.39	0.838	-0.79	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.

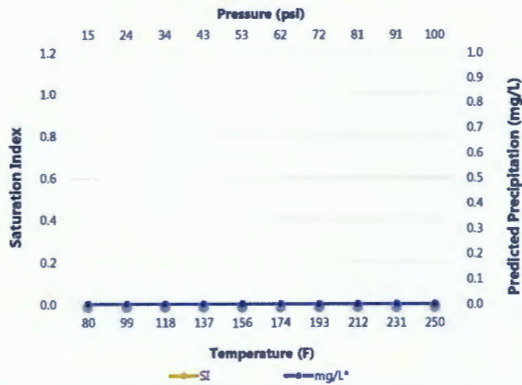
Note 3: Saturation Index predictions on this sheet use pH and alkalinity; %CO₂ is not included in the calculations.

ScaleSoft Pitzer™
SSP2010

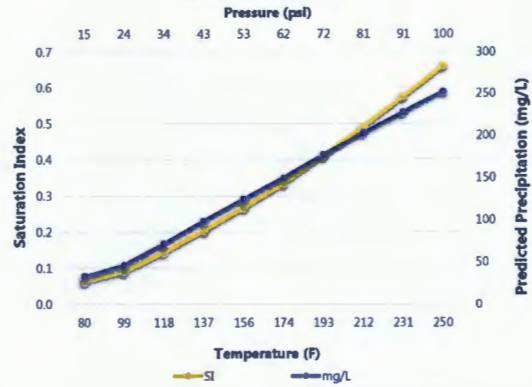
Comments:

SA-Q-GR
30-015-22822

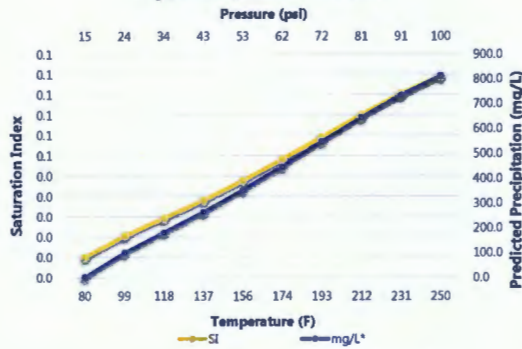
Barite (BaSO4)



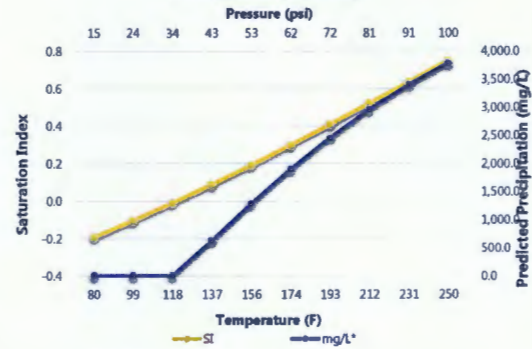
Calcite (CaCO3)



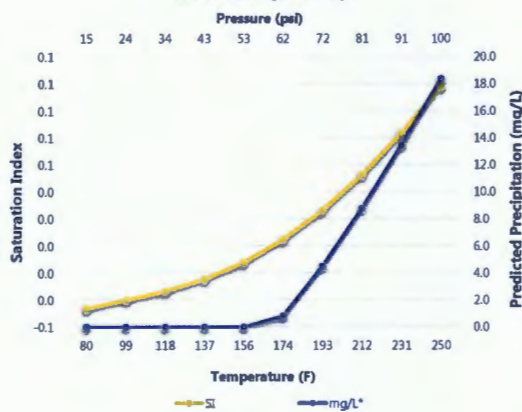
Gypsum (CaSO4-2H2O)



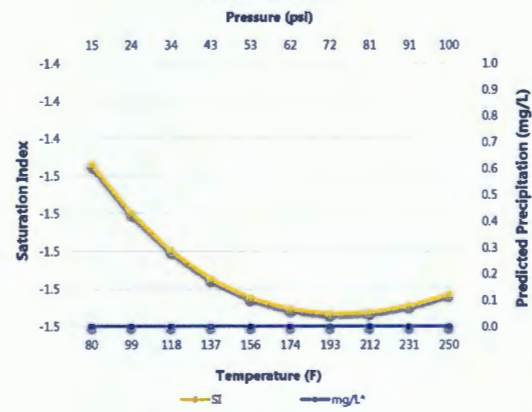
Anhydrite (CaSO4)



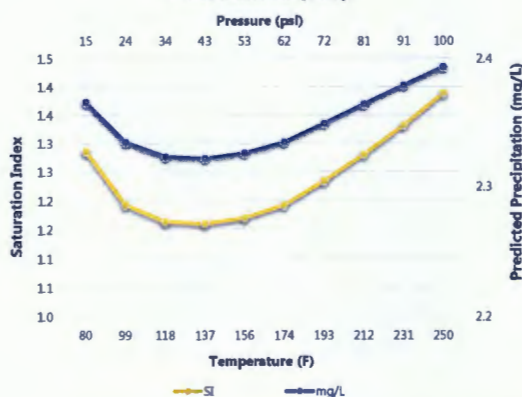
Celestite (SrSO4)



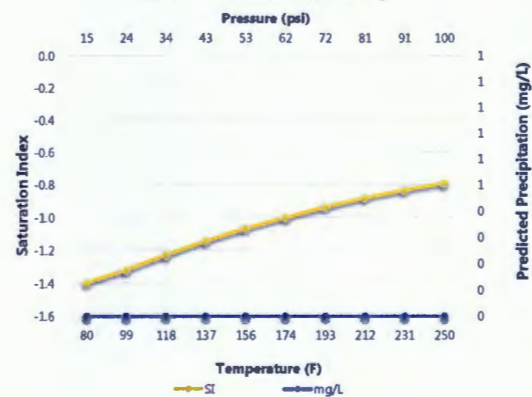
Halite (NaCl)



Iron Sulfide (FeS)



Iron Carbonate (FeCO3)



Goetze, Phillip, EMNRD

From: Goetze, Phillip, EMNRD
Sent: Wednesday, April 20, 2016 8:34 AM
To: Gaines, Dean (Dean.Gaines@apachecorp.com)
Cc: Jones, William V, EMNRD; Inge, Richard, EMNRD; 'Fernandez, Edward' (efernand@blm.gov) (efernand@blm.gov)
Subject: Corrected Sources - SWD-1503 and SWD-1378-B - Additional Disposal Sources

RE: AAO Federal SWD No. 1 (30-015-42549; SWD-1503) and Geronimo 28 State SWD No. 2 (30-015-40876; SWD-1378-B)

Mr. Gaines:

On behalf of Apache, you have submitted water analysis for additional sources for disposal in the two referenced SWD wells. These sources were not included in the original application for the wells and are from producing wells operated by Apache. The wells with the proposed new sources include the following (corrected):

Geronimo 28 State SWD No. 2

C-108 application sources: Glorieta and Yeso formations

Requested additional sources: San Andres – Queen – Grayburg formations, Abo formation, and Bone Spring formation

AAO Federal SWD No. 1

C-108 application sources: Glorieta and Yeso formations

Requested additional sources: San Andres – Queen – Grayburg formations

Division has reviewed the water analysis for each source and has no objections to the injection of the new sources into the respective well. Copies of the water analysis and Apache's correspondence will be placed in each of the respective administrative order file and well file. Please contact with any additional questions regarding this matter. PRG

Phillip R. Goetze, PG

Engineering and Geological Services Bureau

Oil Conservation Division

New Mexico Energy, Minerals and Natural Resources Department

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Santa Fe, NM 87505

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