CONCHO

RECEIVED

JUN 07 2018

EOG RESOURCES, INC.
MIDLAND DIVISION

June 4, 2018

EOG Resources, Inc.
509 Champions Drive
Midland, TX 79706

RE: Application For Authorization To Inject
Valor 35 Fee SWD #1
1500' FNL, 580' FEL
Unit H, Section 35, Township 25 South, Range 33 East, N.M.P.M.
Lea County, New Mexico

To Whom It May Concern:

Enclosed for your review is a copy of COG Operating LLC's C-108 Application to Inject for the above referenced well. We plan to drill this well for SWD service if our C-108 is approved. As a requirement of the New Mexico Oil Conservation Division, we are notifying you because you have been identified as the surface owner or an affected person within a half mile radius area of review. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within fifteen (15) days of receipt of this letter.

Please do not hesitate to contact us at 575-748-6940 should you have any questions.

Sincerely,

Brian Collins
Facilities Engineering Advisor

BC/mv
Enclosures

CORPORATE ADDRESS
ONE CONCHO CENTER | 600 WEST ILLINOIS AVENUE | MIDLAND, TEXAS 79701
P 432.683.7443 | F 432.683.7441

ARTESIA WEST OFFICE
2208 MAIN STREET | ARTESIA, NEW MEXICO 88210
P 575.748.6940 | F 575.746.2096

RECEIVED:	REVIEWER:	TYPE:	APP NO:
6/1/2018		SWD	pMAM1815754142

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

Suspended 06/06/2018 (Steve Hall)

:O OIL CONSERVATION DIVISION
cal & Engineering Bureau –
rancis Drive, Santa Fe, NM 87505

'RATIVE APPLICATION CHECKLIST

ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

OGRID Number: 229137
API: NIA
Pool Code:

INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW SWD-

ɔse which apply for [A]
A. Location – Spacing ... multaneous Dedication
☐NSL ☐NSP(PROJECT AREA) ☐ NSP(PRORATION UNIT) ☐SD

JUN 05 2018 PM 02:48

B. Check one only for [I] or [II]
[I] Commingling – Storage – Measurement
☐DHC ☐CTB ☐PLC ☐PC ☐OLS ☐OLM
[II] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery
☐ WFX ☐PMX ☒SWD ☐IPI ☐EOR ☐PPR

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☒ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☒ Application requires published notice
D. ☐ Notification and/or concurrent approval by SLO
E. ☐ Notification and/or concurrent approval by BLM
F. ☒ Surface owner
G. ☒ For all of the above, proof of notification or publication is attached, and/or,
H. ☐ No notice required

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

4 June 2018
Date

Brian Collins
Print or Type Name

575-748-6940
Phone Number

Signature

bcollins@concho.com
e-mail Address

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance _____X____Disposal _____Storage
Application qualifies for administrative approval? ____X_____Yes _____No

II. OPERATOR: COG Operating, LLC

ADDRESS: One Concho Center, 600 W. Illinois Ave., Midland, TX 79701

CONTACT PARTY: Brian Collins PHONE: 575-748-6940

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____Yes _____X_____No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: _Brian Collins TITLE: Facilities Engineering Advisor

SIGNATURE:  DATE: 4 June 2018

E-MAIL ADDRESS: _bcollins@concho.com

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

C-108 Application for Authorization to Inject
Valor 35 Fee SWD 1
1500' FNL, 580' FEL
Unit H, Section 35, T25S, R33E
Lea County, NM

COG Operating, LLC, proposes to drill the captioned well to 19,450' for salt water disposal service into the Devonian/Silurian from approximately 17,450' to 19,450'. A drilling permit will be submitted upon approval of this C-108.

Should this well undergo a mechanical integrity issue while in service in the future, it will be taken out of service immediately per UIC rules and repaired as quickly as possible. The water going to this well will be diverted to other SWD wells via pipeline if applicable; otherwise it will be trucked to other SWD wells. If necessary, producing wells serviced by this SWD well will be curtailed and/or shut-in until this well is repaired.

V. Map is attached.

VI. No wells within the ½ mile radius area of review penetrate the proposed injection zone.

VII. 1. Proposed average daily injection rate = 25,000 BWPD
Proposed maximum daily injection rate = 40,000 BWPD

2. Closed system

3. Proposed maximum injection pressure = 3490 psi
(0.2 psi/ft. x 17,450' ft.)

4. Source of injected water will be Delaware, Bone Spring and Wolfcamp produced water. No compatibility problems are expected. Analyses of Delaware, Bone Spring and Wolfcamp waters from analogous source wells are attached. An appropriate chemical treatment program will be put in place should scale formation become apparent.

VIII. The injection zone is the Devonian/Silurian, a mixture of non-hydrocarbon bearing limestone and dolomite from 17,450' to 19,450'. Any underground water sources will be shallower than 1078', the estimated top of the Rustler Anhydrite. The estimated top of the Devonian is 17,658' and the Fusselman is 18,498'. The proposed permitted injection interval has been expanded approximately 200' upwards and downwards to account for geologic uncertainty.

IX. The Devonian/Silurian injection interval will be acidized with approximately 40,000 gals of 20 % HCl acid.

X. Well logs will be filed with the Division. A section of open hole log across the Devonian/Silurian from the Mesquite SWD Vaca Draw Federal SWD 1 located about 2.5 miles northwest in Unit P, Section 21, T25S, R33E is attached.

XI. There is one fresh water well within a mile of the proposed SWD well. Water analysis is attached for well C 02313 located NE/4 SE/4 SE/4 Section 26, T25S, R33E.

XII. After examining the available geologic and engineering data, no evidence was found of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water. There is no evidence of faulting or structural traps in this area in the Devonian/Silurian.

XIII. Proof of Notice is attached.

III.

WELL DATA

INJECTION WELL DATA SHEET

Operator: COG Operating, LLC
Well Name & Number: Valor 35 Fee SWD 1
Well Location: 1500' FNL, 580' FEL, Unit H, Section 35, T25S, R33E

Wellbore Schematic: See attached schematic

Surface Casing:

Hole Size: 26"
Casing Size: 20" @ 1100'
Cemented with: 3300 cubic feet
Top of Cement: Surface by design

Intermediate Casing:

Hole Size: 18-1/2"
Casing Size: 16" @ 5100'
Cemented with: 4800 cubic feet
Top of Cement: Surface by design

Intermediate Casing:

Hole Size: 14-3/4"
Casing Size: 10-3/4" @ 12400'
Cemented with: 10400 cubic feet
Top of Cement: Surface by design

Production Casing:

Hole Size: 9-1/2"
Casing Size: 7-5/8" liner @ 12200-17450'
Cemented with: 1200 cubic feet
Top of Cement: Liner top by design

Injection Interval:

17450' to 19450' (6-1/2" open hole)

Injection Tubing/Packer:

Tubing Size: 5-1/2" x 5"
Lining Material: Internally plastic coated or internally fiberglass lined
Type of Packer: Nickel plated 10K double grip retrievable or permanent packer
Packer Setting Depth: 17400'
Other Type of Tubing/Casing Seal: Not Applicable

Additional Data:

1. Is this a new well drilled for injection? Yes
   If no, for what purpose was well originally drilled? N/A

2. Name of Injection Formation: Devonian/Silurian

3. Name of Field or Pool (if applicable): SWD: Devonian

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. No

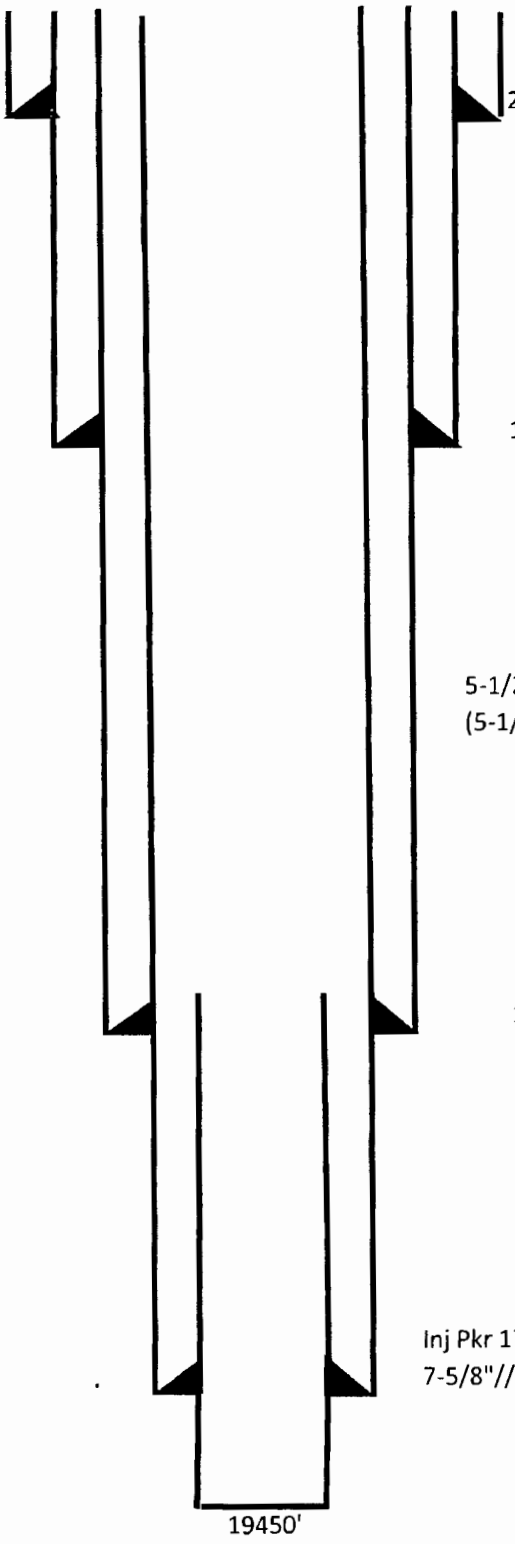
5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area:

   Overlying: Possible Delaware 5100-9200', Bone Spring 9200-12300', Wolfcamp 12300-14000', possible Strawn 14400'+, possible Atoka 14650'+, possible Morrow 15175'+

   Underlying: None

Valor 35 Fee SWD #1
1500' FNL, 580' FEL
H-35-25s-33e
Lea, NM
30-025-xxxxx

Zero:
KB elev:
GL elev:



26"

20"/// @ 1100'

3300 CF Cmt (circ to surf)
Set in Rustler

18.5"

16"/// @ 5100'

4800 CF Cmt (circ to surf)
Set in top Delaware Sd

14.75"

5-1/2" x 5" Inj Tbg 0-17400'
(5-1/2" in 10-3/4", 5" in 7-5/8")

10-3/4"/// @ 12400'

10400 CF Cmt (circ to surf)
Set in upper Wolfcamp

9.5"

Inj Pkr 17400'
7-5/8"/// liner 12200-17450'

1200 CF Cmt (circ to liner top)
Set in top Devonian

6.5"

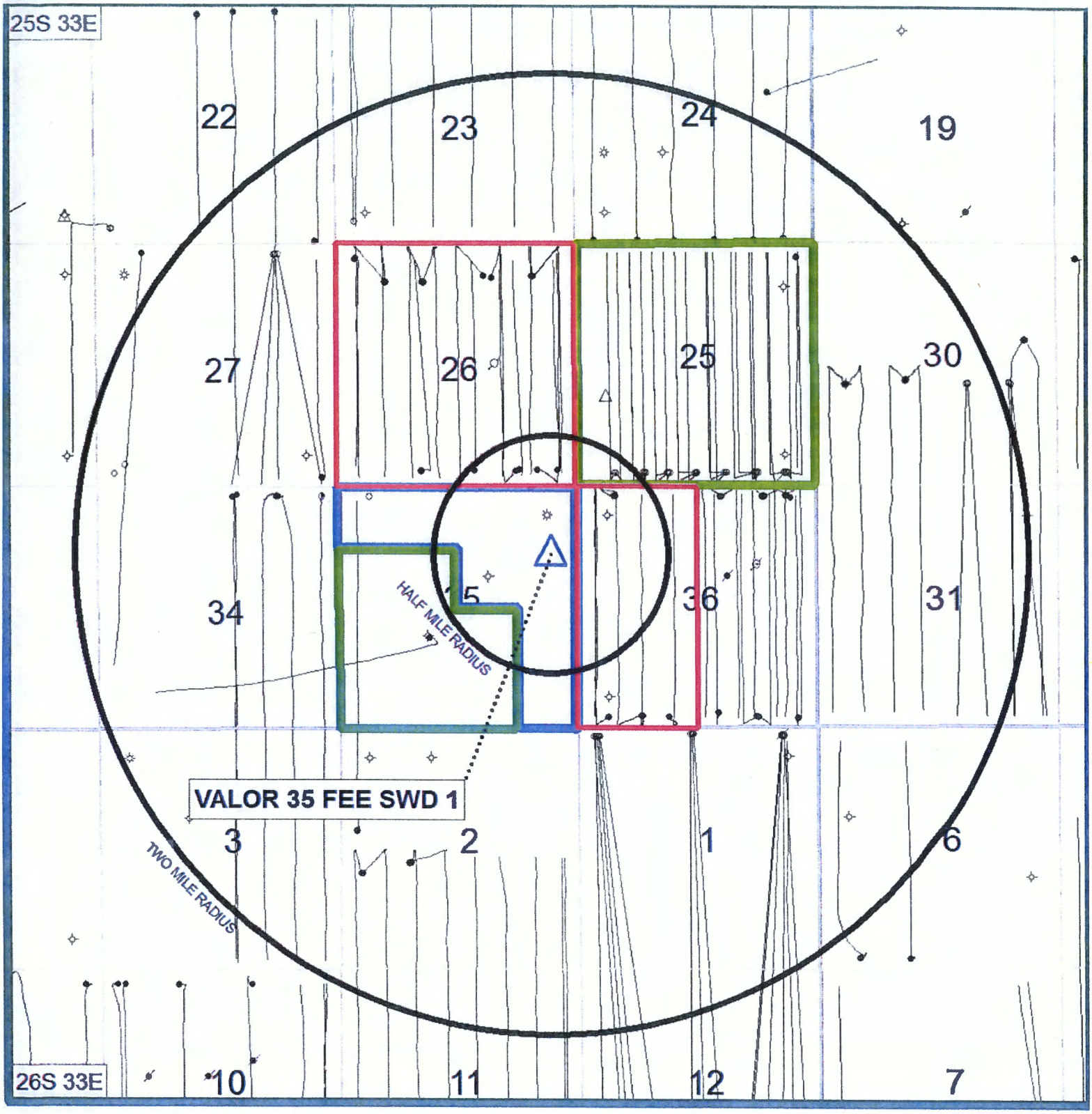
Devonian/Silurian OH

19450'

kbcollins 15-May-18

V.

MAP



EOG Resources, Inc.

COG Operating, LLC

COG Operating, LLC &
Loving County Minerals, LP

Surface: Loving County Minerals, LP

CONCHO

VALOR 35 FEE SWD #1

1500 FNL 580 FEL
Unit H, Sec. 35, T25S, R33E
Lea Co., New Mexico

Author		Date:
T RODRIQUEZ		30 May, 2018

File Path: CGX06:Northern_Delaware_Basin:TGK NDB ACE TGR VALOR SWD RADIUS MAP.gmp

C-108 Application for Authorization to Inject
Valor 35 Fee SWD 1
1500' FNL, 580' FEL
Unit H, Section 35, T25S, R33E
Lea County, NM

List of Affected Persons Within ½ Mile Radius Area of Review

Surface Owner:

Loving County Minerals, L.P.
111 West 75th Street
Kansas City, MO 64114

Affected Persons:

Loving County Minerals, L.P.
111 West 75th Street
Kansas City, MO 64114

EOG Resources, Inc.
509 Champions Drive
Midland, TX 79706

COG Operating, LLC
One Concho Center
600 W Illinois Ave.
Midland, TX 79701

VI.

No Wells Penetrate Proposed Disposal Interval Within Half Mile Area of Review

VII.

Water Analysis Produced and Receiving Formation Water

Delaware Sand

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland Texas 79703

Upstream Chemicals

REPORT DATE: 5/11/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	**ACCOUNT REP:**	KENNETH MORGAN
DISTRICT:	NEW MEXICO	**SAMPLE ID:**	201701012804
AREA/LEASE:	KING TUT	**SAMPLE DATE:**	3/21/2017
SAMPLE POINT NAME	KING TUT FED 3H BTRY	**ANALYSIS DATE:**	3/24/2017
SITE TYPE:	FACILITY	**ANALYST:**	SVP
SAMPLE POINT DESCRIPTION:	TRANSFER PUMP		

COG OPERATING LLC, KING TUT, KING TUT FED 3H BTRY

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl⁻):	152606.2	4304.8	Sodium (Na^+):	74498.5	3241.9
Final Temperature (°F):	80	Sulfate (SO_4^{2-}):	461.4	9.6	Potassium (K^+):	1381.8	35.3
Initial Pressure (psi):	100	Borate (H_3BO_3):	170.9	2.8	Magnesium (Mg^{2+}):	2495.8	205.4
Final Pressure (psi):	15	Fluoride (F⁻):	ND		Calcium (Ca^{2+}):	15329.6	765.0
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	724.2	16.5
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	1.8	0.0
pH at time of sampling:	6.8	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	43.2	1.5
		Phosphate (PO_4^{3-}):	ND		Manganese (Mn^{2+}):	2.6	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^-):	36.6	0.6			Aluminum (Al^{3+}):	0.0	0.0
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+}):	0.0	0.0
aqueous CO_2 (ppm):	1050.0	Formic Acid:	ND			Molybdenum (Mo^{2+}):	0.0	0.0
aqueous H_2S (ppm):	0.0	Acetic Acid:	ND			Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND	Propionic Acid:	ND			Tin (Sn^{2+}):	ND	
		Butyric Acid:	ND			Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	247582	Valeric Acid:	ND			Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	1.1573					Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	1.1683					Lithium (Li):	ND	
Conductivity (mmhos):	ND							
Resistivity:	ND					Total Hardness:	49434	N/A
MCF/D:	No Data							
BOPD:	No Data							
BWPD:	No Data	Anion/Cation Ratio:		1.01		ND = Not Determined		

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA, FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PRED CT ON RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.40	0.646	1.16	7.579	-0.15	0.000	-0.23	0.000
99°F	24 psi	0.28	0.509	1.18	7.675	-0.14	0.000	-0.14	0.000
118°F	34 psi	0.16	0.334	1.20	7.774	-0.14	0.000	-0.06	0.000
137°F	43 psi	0.05	0.115	1.22	7.857	-0.15	0.000	0.03	13.651
156°F	53 psi	-0.06	0.000	1.23	7.925	-0.15	0.000	0.11	51.143
174°F	62 psi	-0.16	0.000	1.24	7.980	-0.16	0.000	0.20	82.865
193°F	72 psi	-0.25	0.000	1.25	8.022	-0.17	0.000	0.28	109.409
212°F	81 psi	-0.34	0.000	1.25	8.058	-0.19	0.000	0.37	131.297
231°F	91 psi	-0.42	0.000	1.25	8.083	-0.20	0.000	0.46	149.069
250°F	100 psi	-0.50	0.000	1.26	8.095	-0.22	0.000	0.55	163.281

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	0.34	123.094	-0.45	0.000	-7.90	0.000	0.19	1.935
99°F	24 psi	0.34	125.716	-0.46	0.000	-8.04	0.000	0.27	2.698
118°F	34 psi	0.35	126.379	-0.48	0.000	-8.15	0.000	0.34	3.330
137°F	43 psi	0.35	126.223	-0.49	0.000	-8.24	0.000	0.39	3.801
156°F	53 psi	0.35	126.022	-0.50	0.000	-8.32	0.000	0.43	4.122
174°F	62 psi	0.35	126.264	-0.51	0.000	-8.38	0.000	0.45	4.307
193°F	72 psi	0.35	127.203	-0.53	0.000	-8.43	0.000	0.45	4.367
212°F	81 psi	0.36	128.885	-0.54	0.000	-8.47	0.000	0.44	4.316
231°F	91 psi	0.36	131.186	-0.55	0.000	-8.51	0.000	0.42	4.148
250°F	100 psi	0.37	133.845	-0.56	0.000	-8.54	0.000	0.38	3.848

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 (HCO_3) is not included in the calculations

ScaleSoftPitzer™
SSP2010

Comments:

Bone Spring

BAKER HUGHES

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

Upstream Chemicals

REPORT DATE: 5/16/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	**ACCOUNT REP:**	KENNETH MORGAN
DISTRICT:	NEW MEXICO	**SAMPLE ID:**	201501048297
AREA/LEASE:	WINDWARD	**SAMPLE DATE:**	12/11/2015
SAMPLE POINT NAME	WINDWARD FED 2H	**ANALYSIS DATE:**	12/16/2015
SITE TYPE:	WELL SITES	**ANALYST:**	SAMUEL NEWMAN
SAMPLE POINT DESCRIPTION:	WELL HEAD		

COG OPERATING LLC, WINDWARD, WINDWARD FED 2H

FIELD DATA		ANALYSIS OF WATER					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	89914.5	2536.4	Sodium (Na^+):	46148.7	2008.2
Final Temperature (°F):	82	Sulfate (SO_4^{2-}):	1031.7	21.5	Potassium (K^+):	902.9	23.1
Initial Pressure (psi):	100	Borate (H_3BO_3):	187.2	3.0	Magnesium (Mg^{2+}):	855.0	70.4
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	6890.6	343.8
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	278.9	6.4
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	0.0	0.0
pH at time of sampling:	7.1	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	89.1	3.2
		Phosphate (PO_4^{3-}):	ND		Manganese (Mn^{2+}):	1.8	0.1
		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^-):	170.0	2.8			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):	240.0	Formic Acid:	ND		Molybdenum (Mo^{2+}):	ND	
aqueous H_2S (ppm):	0.0	Acetic Acid:	ND		Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND	Propionic Acid:	ND		Tin (Sn^{2+}):	ND	
		Butyric Acid:	ND		Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	146283	Valeric Acid:	ND		Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	1.0934				Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	1.1045				Lithium (Li^+):	ND	
Conductivity (mmhos):	ND						
Resistivity:	ND				Total Hardness:	21067	N/A
MCF/D:	No Data						
BOPD:	No Data						
BWPD:	No Data	Anion/Cation Ratio:		1.04	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 ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
82°F	15 psi		0.000	1.43	35.518	-0.18	0.000	-0.34	0.000
101°F	24 psi		0.000	1.48	36.271	-0.17	0.000	-0.25	0.000
119°F	34 psi		0.000	1.54	37.269	-0.16	0.000	-0.16	0.000
138°F	43 psi		0.000	1.60	38.261	-0.15	0.000	-0.06	0.000
157°F	53 psi		0.000	1.66	39.182	-0.15	0.000	0.04	39.216
175°F	62 psi		0.000	1.72	40.019	-0.14	0.000	0.14	133.848
194°F	72 psi		0.000	1.78	40.776	-0.13	0.000	0.24	211.707
213°F	81 psi		0.000	1.84	41.510	-0.13	0.000	0.35	274.678
231°F	91 psi		0.000	1.90	42.195	-0.13	0.000	0.45	324.816
250°F	100 psi		0.000	1.96	42.808	-0.12	0.000	0.56	364.191

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)
82°F	15 psi	0.16	51.545	-1.13	0.000	-7.50	0.000	1.18	30.476
101°F	24 psi	0.17	54.187	-1.14	0.000	-7.61	0.000	1.28	32.451
119°F	34 psi	0.18	56.250	-1.15	0.000	-7.69	0.000	1.38	34.487
138°F	43 psi	0.18	58.374	-1.16	0.000	-7.75	0.000	1.47	36.277
157°F	53 psi	0.19	60.980	-1.17	0.000	-7.79	0.000	1.55	37.770
175°F	62 psi	0.21	64.301	-1.17	0.000	-7.81	0.000	1.61	38.985
194°F	72 psi	0.22	68.407	-1.18	0.000	-7.83	0.000	1.66	39.950
213°F	81 psi	0.24	73.238	-1.18	0.000	-7.84	0.000	1.70	40.777
231°F	91 psi	0.26	78.634	-1.18	0.000	-7.83	0.000	1.73	41.446
250°F	100 psi	0.29	84.362	-1.18	0.000	-7.82	0.000	1.75	41.931

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. $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™
SSP2010

Comments:

Wolfcamp

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland Texas 79703

Upstream Chemicals

REPORT DATE: 5/11/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	ACCOUNT REP:	LARRY G HINES
DISTRICT:	WATER MANAGEMENT - PERMIAN	SAMPLE ID:	201801021234
AREA/LEASE:	VIKING HELMET STATE	SAMPLE DATE:	4/11/2018
SAMPLE POINT NAME	VIKING HELMET STATE COM 24H	ANALYSIS DATE:	4/16/2018
SITE TYPE:	WELL SITES	ANALYST:	SP
SAMPLE POINT DESCRIPTION:	WELL HEAD		

COG OPERATING LLC, VIKING HELMET STATE, VIKING HELMET STATE COM 24H

FIELD DATA

Initial Temperature (°F):	250
Final Temperature (°F):	88
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	6.8

ANALYSIS OF SAMPLE

ANIONS:	mg/L	meq/L
Chloride (Cl^-):	80548.2	2272.2
Sulfate (SO_4^{2-}):	1551.7	32.3
Borate (H_3BO_3):	170.8	2.8
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	ND	
Silica (SiO_2):	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	46716.0	2032.9
Potassium (K^+):	887.5	22.7
Magnesium (Mg^{2+}):	684.8	56.4
Calcium (Ca^{2+}):	5224.8	260.7
Strontium (Sr^{2+}):	209.4	4.8
Barium (Ba^{2+}):	0.0	0.0
Iron (Fe^{2+}):	126.5	4.5
Manganese (Mn^{2+}):	3.4	0.1
Lead (Pb^{2+}):	0.0	0.0
Zinc (Zn^{2+}):	0.0	0.0

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	342.0	5.6
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

ORGANIC ACIDS:	mg/L	meq/L
Formic Acid:	ND	
Acetic Acid:	ND	
Propionic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

Aluminum (Al^{3+}):	0.0	0.0
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	0.0	0.0
Molybdenum (Mo^{2-}):	0.0	0.0
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Lithium (Li^+):	ND	

aqueous CO_2 (ppm):	220.0
aqueous H_2S (ppm):	0.0
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	136294
Density/Specific Gravity (g/cm³):	1.0879
Measured Specific Gravity	1.0961
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

Total Hardness:	16122	N/A	
Anion/Cation Ratio:	0.97	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 ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
88°F	15 psi		0.000	1.26	69.277	-0.13	0.000	-0.27	0.000
106°F	24 psi		0.000	1.31	70.705	-0.12	0.000	-0.18	0.000
124°F	34 psi		0.000	1.38	72.857	-0.11	0.000	-0.09	0.000
142°F	43 psi		0.000	1.46	75.061	-0.10	0.000	0.00	4.176
160°F	53 psi		0.000	1.54	77.135	-0.10	0.000	0.10	142.433
178°F	62 psi		0.000	1.62	79.035	-0.09	0.000	0.20	260.388
196°F	72 psi		0.000	1.70	80.758	-0.08	0.000	0.30	359.322
214°F	81 psi		0.000	1.78	82.441	-0.08	0.000	0.40	440.907
232°F	91 psi		0.000	1.87	84.028	-0.07	0.000	0.50	507.127
250°F	100 psi		0.000	1.95	85.448	-0.07	0.000	0.61	560.114

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)
88°F	15 psi	0.19	50.203	-1.20	0.000	-7.79	0.000	1.31	61.325
106°F	24 psi	0.20	52.071	-1.21	0.000	-7.88	0.000	1.40	64.099
124°F	34 psi	0.21	53.663	-1.22	0.000	-7.92	0.000	1.51	67.134
142°F	43 psi	0.22	55.383	-1.22	0.000	-7.94	0.000	1.61	69.838
160°F	53 psi	0.23	57.491	-1.23	0.000	-7.95	0.000	1.71	72.110
178°F	62 psi	0.24	60.125	-1.23	0.000	-7.94	0.000	1.79	73.969
196°F	72 psi	0.26	63.318	-1.24	0.000	-7.93	0.000	1.85	75.466
214°F	81 psi	0.28	67.017	-1.24	0.000	-7.91	0.000	1.91	76.785
232°F	91 psi	0.30	71.103	-1.24	0.000	-7.88	0.000	1.97	77.898
250°F	100 psi	0.33	75.415	-1.24	0.000	-7.84	0.000	2.01	78.761

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 (5) scales
Note 3: Saturation Index predictions on this sheet use pH and alkalinity. $\%CO_2$ is not included in the calculations

ScaleSoftPitzer™ SSP2010

Comments:

Devonian (Receiving Formation)

8.0 RESERVOIR CHARACTERISTICS

8.1 FORMATION FLUID CHEMISTRY

Following the drilling of the 6-inch open-hole section the injection zone was swabbed and 10 samples were sent to Cardinal Laboratories in Hobbs, NM. The laboratory report and analysis, along with a summary table of the results that depict the concentrations of all analytes is included in Appendix D. The average concentrations for major constituents within the formation water in the entire injection interval are as follows:

Chloride: 23,700 mg/L
TDS: 42,750 mg/L
Diesel Range Organics: 5.7 mg/L
Extended Range Organics: 2.7 mg/L
pH: 6.5
Total Alkalinity: 613 mg/L

The maximum concentrations for major constituents within the formation water in the entire injection interval are as follows:

Chloride: 27,000 mg/L
TDS: 44,700 mg/L
Diesel Range Organics: 20.5 mg/L
Extended Range Organics: 5.6 mg/L
pH: 6.7
Total Alkalinity: 670 mg/L

The results of the formation water analysis support and confirm the conclusions presented from the geophysical logs, mud log, and sidewall cores that the injection zone clearly does not contain recoverable hydrocarbons. Included in Appendix D is Geolex's No Recoverable Hydrocarbon Summary report, which was required by the BLMs COA, and submitted to the BLM and NMOCD.

X.

Log Section Across Proposed Devonian Injection Interval

Weatherford®

COMPOSITE LOG
SPECTRAL GAMMA RAY

COMPANY	MESQUITE SWD, INC.
WELL	VACA DRAW FEDERAL SWD #1
FIELD	SWD DEVONIAN
PROVINCE/COUNTY	LEA COUNTY
COUNTRY/STATE	U.S.A./ NEW MEXICO
LOCATION	658' FSL & 662' FEL
PERMIT NUMBER	SEC 21, T-25S RGE 33E

HOBBS OCD
MAR 13 2017
RECEIVED

SEC 21	TWP 25S	RGE 33E	Other Services
Latitude		32.110473	NEUTRON
Longitude		-103.570458	FOCUSSED ELECTRIC
API Number		30-025-23895	MICRO-LOG

PHOTO-DENSITY
ARRAY INDUCTION
MICRO-IMAGER

		feet
Permanent Datum GL, Elevation 3350 feet	Elevations: KB	3375
Log Measured From KB	DF	3374
Drilling Measured From KB (25')	GL	3350

Date	28-JAN-2017					
Run Number	ONE					
Service Order	4362-172728084					
Depth Driller	19035.00	feet				
Depth Logger	19041.00	feet				
First Reading	19039.00	feet				
Last Reading	17491.00	feet				
Casing Driller	17490.00	feet				
Casing Logger	17491.00	feet				
Bit Size	6.500	inches				
Hole Fluid Type	WBM					
Density / Viscosity	8.40	lb/USg	28.00	CP		
PH / Fluid Loss	8.00		---			
Sample Source	ACTIVE TANK					
Rm @ Measured Temp	0.81 @ 65.9	ohm-m				
Rmf @ Measured Temp	0.61 @ 65.9	ohm-m				
Rmc @ Measured Temp	1.01 @ 65.9	ohm-m				
Source Rmf / Rmc	0.8019	CALC				
Rm @ BHT	0.208 @270.0	ohm-m				
Time Since Circulation	4 HOURS					
Max Recorded Temp	270.00	deg F				
Equipment / Base	13242	4352				
Recorded By	MICHAEL RATHS		RUSHAT SHANGAREEV			
Witnessed By	---					

BOREHOLE RECORD

Last Edited: 29-JAN-2017 22:20

Bit Size inches	Depth From feet	Depth To feet
8.750	0.00	17491.00
6.500	17491.00	19042.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	7.625	0.00	17491.00	39.00

REMARKS

1) ALL WEATHERFORD DEPTH CONTROL PROCEDURES WERE FOLLOWED.

2) TOOLS RAN: MAI-MFE-MIE-MIM-SKJ-MPD-MVC-MDN-MML-SGS-MCG-SHA-CBH

3) HARDWARE : CENTRALIZER MANDREL ON BOTTOM OF MAI
OVERBODY CENTRALIZERS ON MIM AND MIE

4) 2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.

5) SPECTRAL GAMMA AND NEUTRON LOGGED TO SURFACE. ALL OTHER TOOLS LOGGED TO CASING SHOE

AS PER CLIENT'S REQUEST.

6) BOREHOLE SIZE AND RUGOSITY AFFECTING LOG QUALITY.

7) LCM WILL AFFECT TOOL READINGS.

8) TWO RUNS WERE NEEDED TO BECAUSE OF CMI TOOL FAILURE

8) ANNULAR HOLE VOLUME CALCULATED WITH A 5.5 IN. FUTURE CASING DIAMETER FROM TD TO CASING SHOE
ANNULAR HOLE VOLUME: 71 CU. FT.
HOLE VOLUME: 325 CU. FT

9) SERVICE ORDER # 4362-172728084

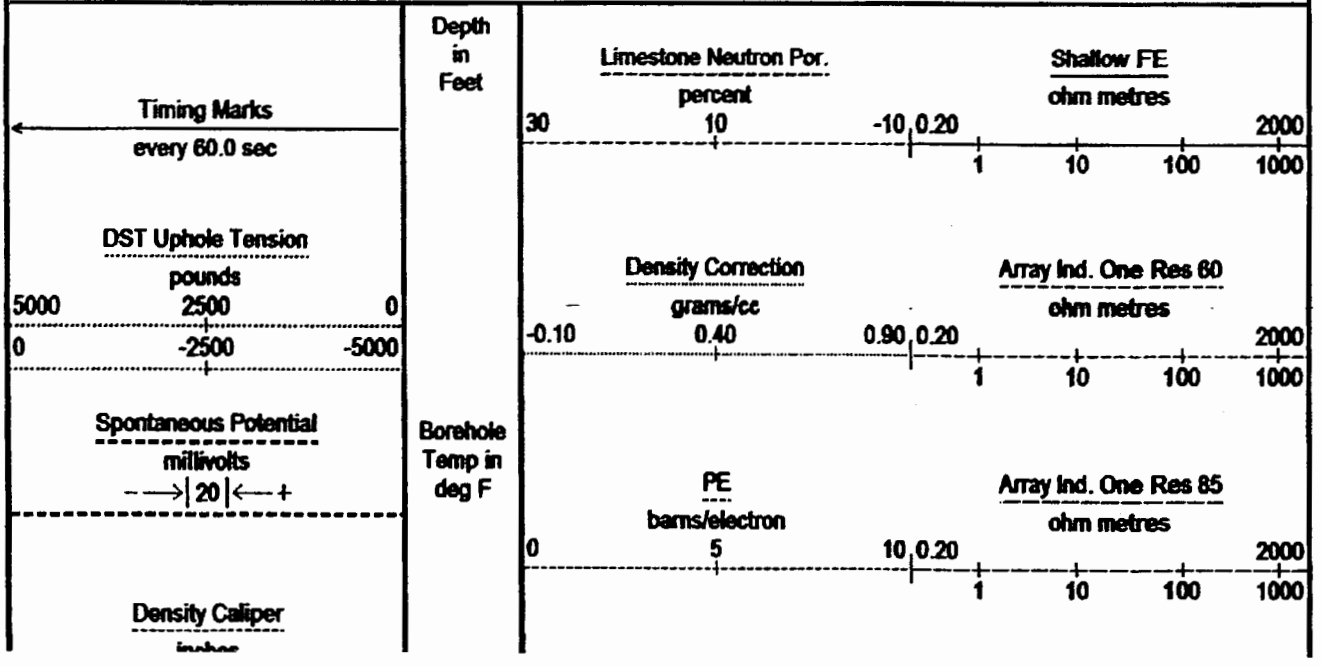
10) RIG: PRECISION #590

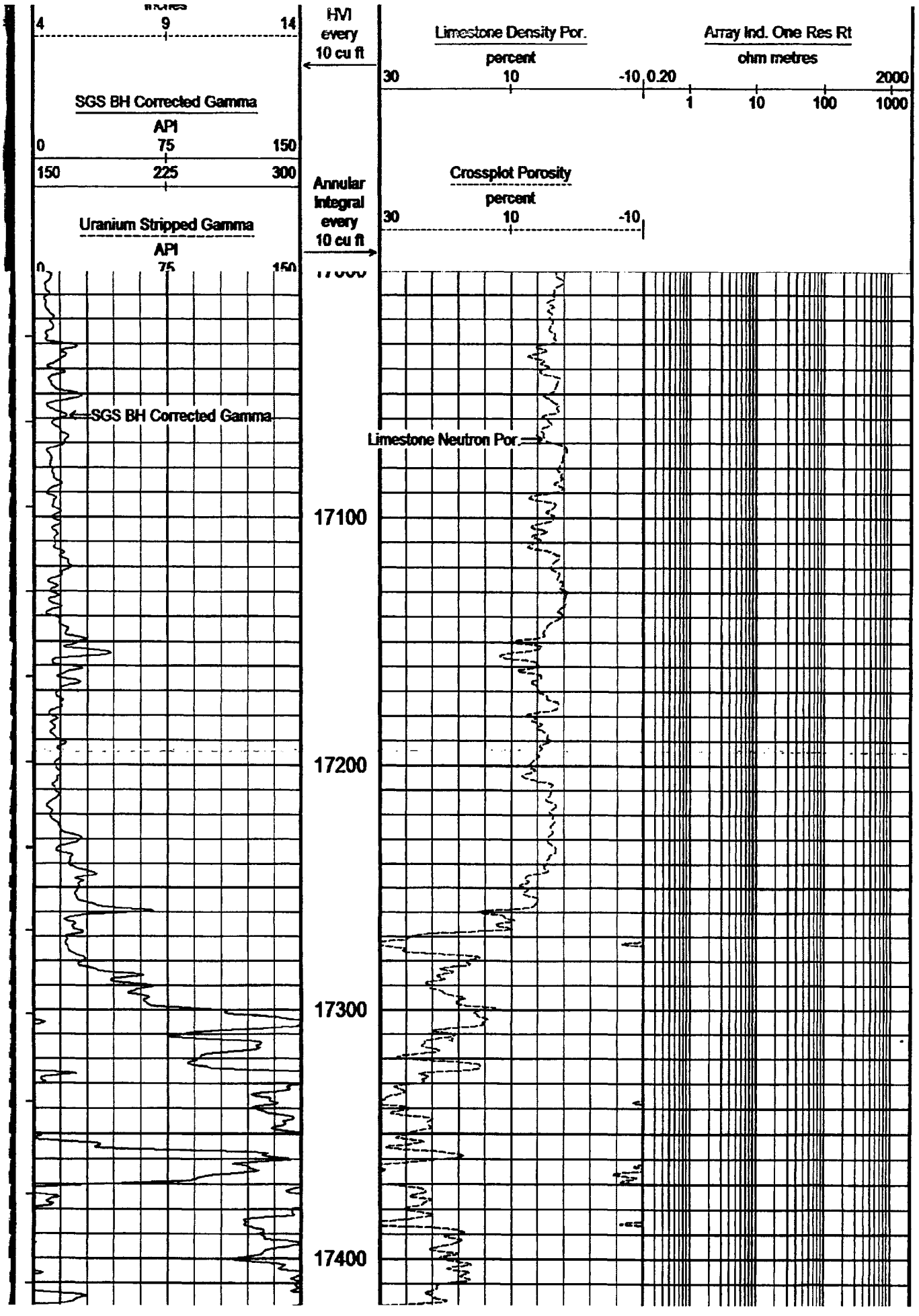
11) CREW AT YOUR SERVICE
ENGINEERS: MICHAEL RATHS
RUSHAT SHANGAREEV
OPERATORS: BRIAN GRAHMANN
HECTOR CARRILLO

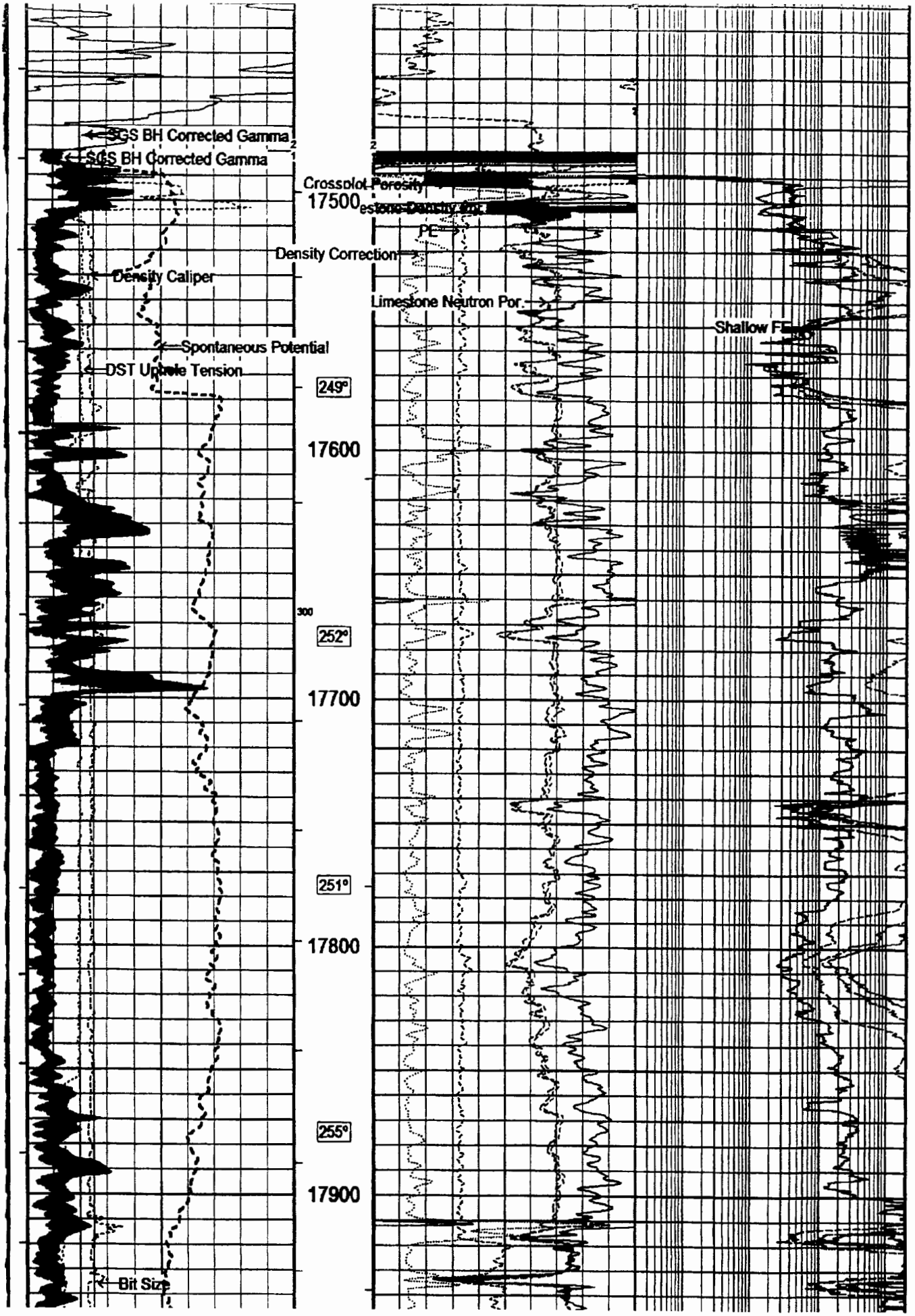
SALES ENGINEER: JEFF ANDERSON

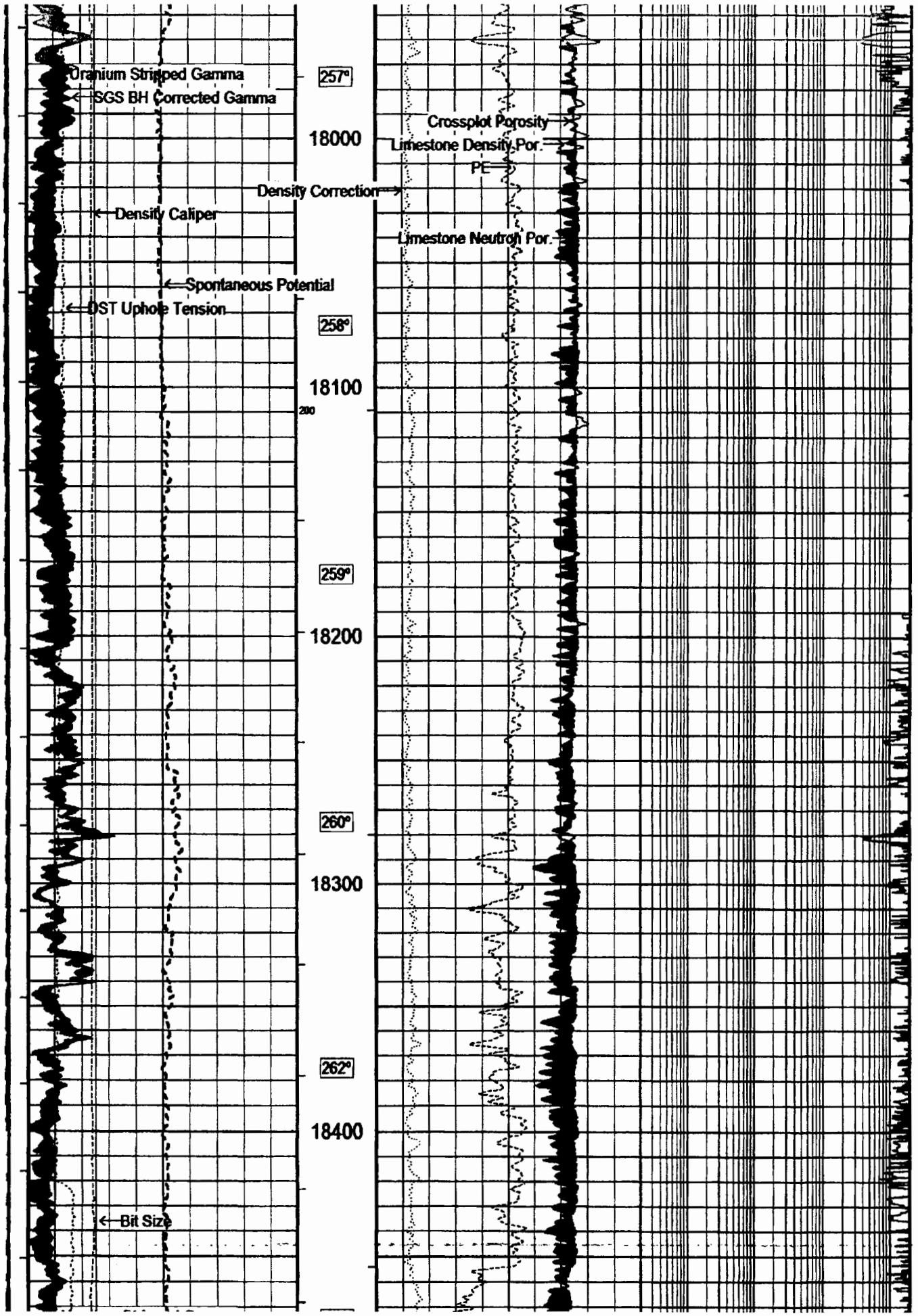
2 INCH MAIN PASS

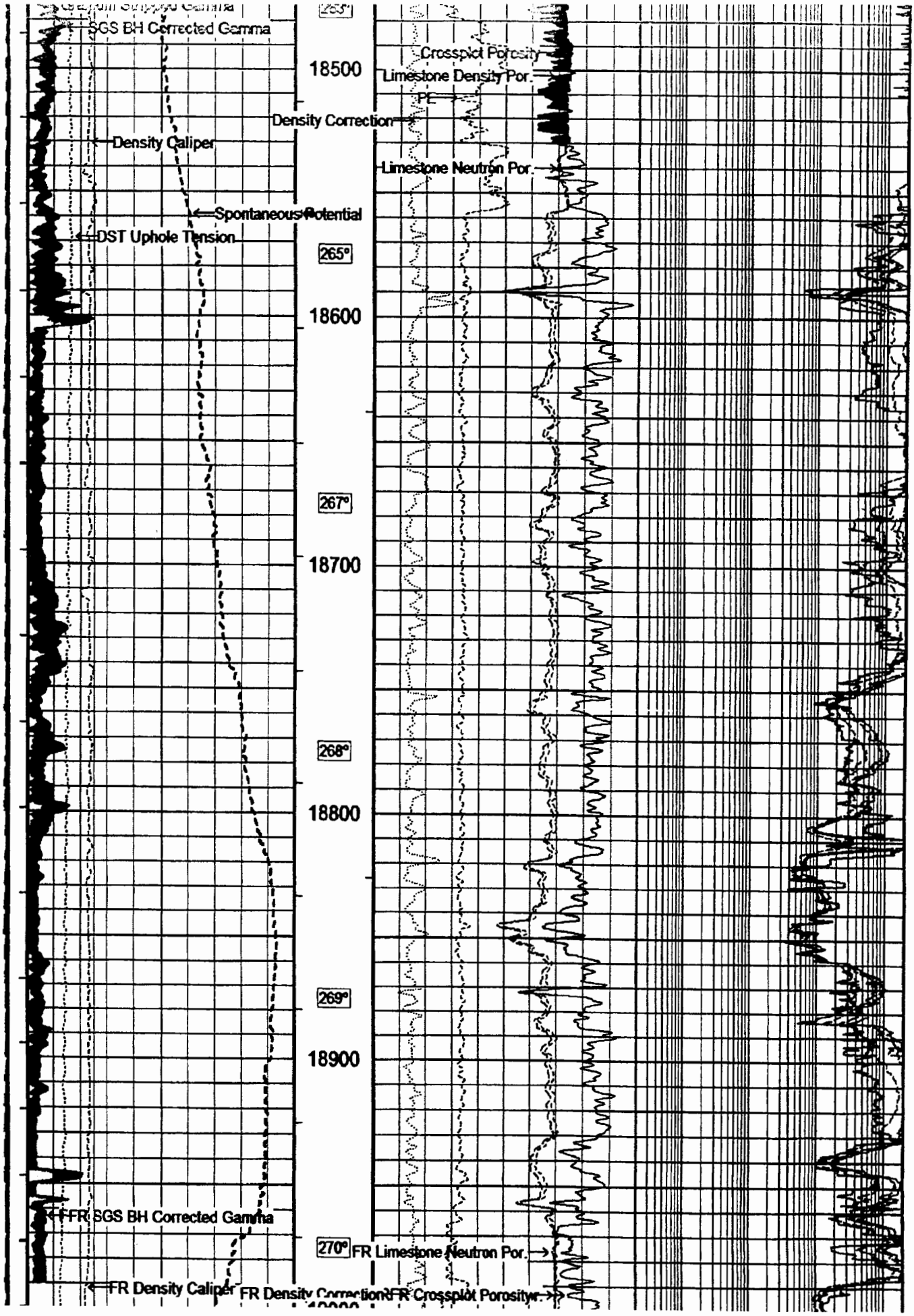
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 30-JAN-2017 11:13
Filename: ...\MESQUITE_VACA DRAW FEDERAL SWD #1_4362_172728084_RUN ONE_MAIN_1_4... — Recorded on 29-JAN-2017 12:05
System Versions: Logged with 16.05.4955 Processed with 16.05.4955 Plotted with 16.01.9059

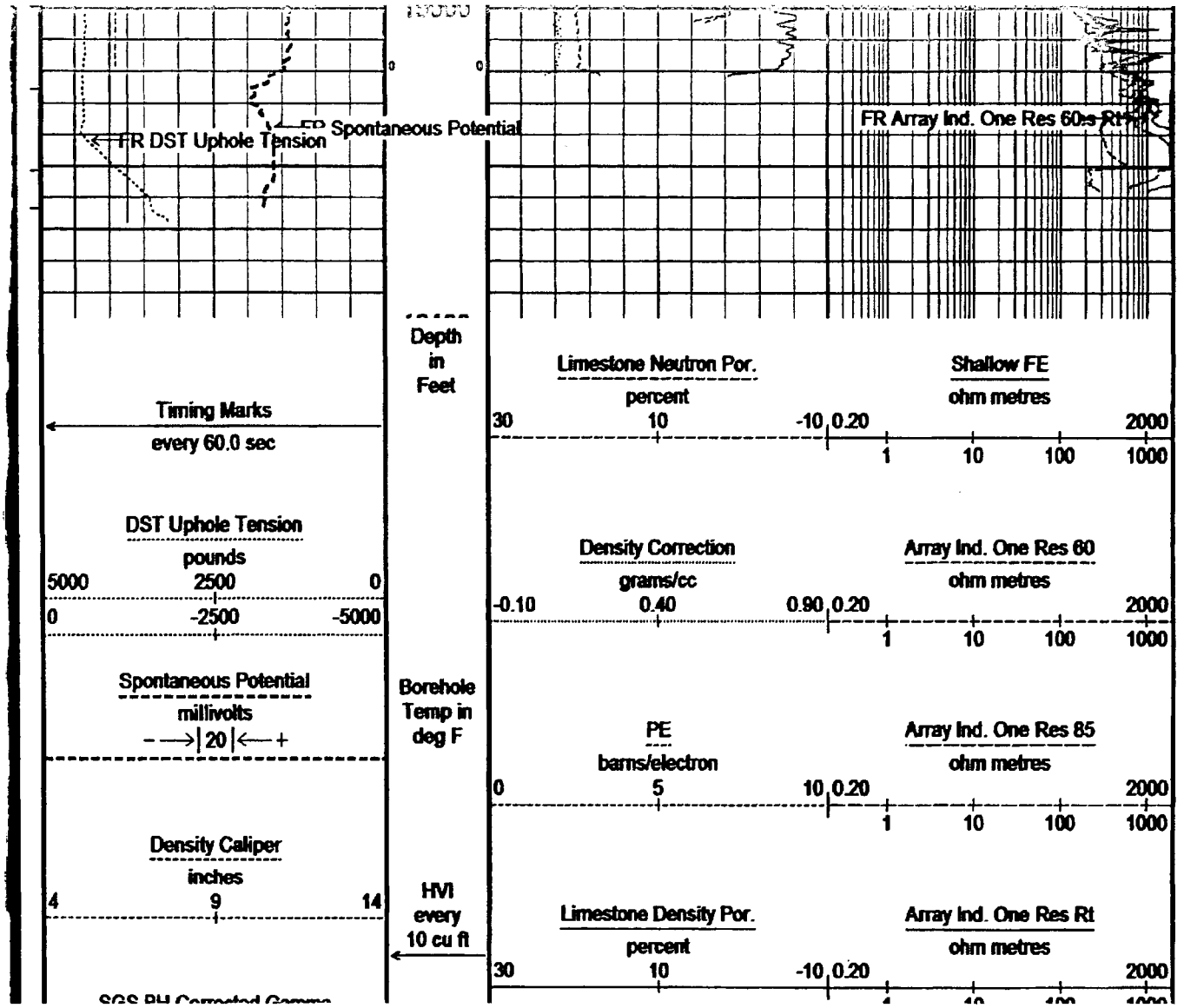



4
9
14
SGS BH Corrected Gamma
API
0
75
150
150
225
300
Uranium Stripped Gamma
API
0
75
150
HVI
every
10 cu ft
Annular
Integral
every
10 cu ft
Limestone Density Por.
percent
30
10
-10
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
Crossplot Porosity
percent
30
10
-10
SGS BH Corrected Gamma
Limestone Neutron Por.
17100
17200
17300
17400


SGS BH Corrected Gamma
SGS BH Corrected Gamma
Crossplot Porosity
17500
Density Correction
Density Caliper
Limestone Neutron Por.
Spontaneous Potential
DST Uphole Tension
249°
17600
252°
17700
251°
17800
255°
17900
Bit Size


Uranium Stripped Gamma
SGS BH Corrected Gamma
Density Caliper
Spontaneous Potential
DST Uphole Tension
Bit Size
257°
258°
259°
260°
262°
18000
18100
18200
18300
18400
200
Crossplot Porosity
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.


SGS BH Corrected Gamma
Density Caliper
Spontaneous Potential
DST Uphole Tension
FR SGS BH Corrected Gamma
FR Density Caliper
FR Density Correction
FR Crossplot Porosity
Crossplot Porosity
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.
FR Limestone Neutron Por.
18500
18600
18700
18800
18900
265°
267°
268°
269°
270°


FR DST Uphole Tension
FR Spontaneous Potential
FR Array Ind. One Res 60in Rt
Depth in Feet
Timing Marks
every 60.0 sec
DST Uphole Tension
pounds
5000 2500 0
0 -2500 -5000
Spontaneous Potential
millivolts
20
Density Caliper
inches
4 9 14
Borehole Temp in deg F
HVI every 10 cu ft
Limestone Neutron Por.
percent
30 10 -10 0.20
Shallow FE
ohm metres
2000
1 10 100 1000
Density Correction
grams/cc
-0.10 0.40 0.90 0.20
Array Ind. One Res 60
ohm metres
2000
1 10 100 1000
PE
barns/electron
0 5 10 0.20
Array Ind. One Res 85
ohm metres
2000
1 10 100 1000
Limestone Density Por.
percent
30 10 -10 0.20
Array Ind. One Res Rt
ohm metres
2000

XI.

Fresh Water Sample Analyses

BAKER HUGHES

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

Upstream Chemicals

REPORT DATE: 6/3/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	**ACCOUNT REP:**	KENNETH MORGAN
DISTRICT:	NEW MEXICO	**SAMPLE ID:**	201801033138
AREA/LEASE:	CONCHO SWD	**SAMPLE DATE:**	5/25/2018
SAMPLE POINT NAME	CONCHO SWD WATER WELL C02313	**ANALYSIS DATE:**	6/1/2018
SITE TYPE:	WELL SITES	**ANALYST:**	DG
SAMPLE POINT DESCRIPTION:	WELL HEAD		

COG OPERATING LLC, CONCHO SWD, CONCHO SWD WATER WELL C02313

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	83.0	2.3	Sodium (Na^+):	182.4	7.9
Final Temperature (°F):	80	Sulfate (SO_4^{2-}):	357.2	7.4	Potassium (K^+):	7.5	0.2
Initial Pressure (psi):	100	Borate (H_3BO_3):	2.5	0.0	Magnesium (Mg^{2+}):	32.6	2.7
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	23.6	1.2
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	1.6	0.0
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	0.0	0.0
pH at time of sampling:	9.5	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	0.0	0.0
		Phosphate (PO_4^{3-}):	ND		Manganese (Mn^{2+}):	0.0	0.0
		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^-):	293.0	4.8			Aluminum (Al^{3+}):	0.0	0.0
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+}):	0.0	0.0
aqueous CO_2 (ppm):	0.0	Formic Acid:	ND		Molybdenum (Mo^{2+}):	0.0	0.0
aqueous H_2S (ppm):	0.0	Acetic Acid:	ND		Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND	Propionic Acid:	ND		Tin (Sn^{2+}):	ND	
		Butyric Acid:	ND		Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	981	Valeric Acid:	ND		Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	0.9978				Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	1.0012				Lithium (Li^+):	ND	
Conductivity (mmhos):	ND						
Resistivity:	ND				Total Hardness:	195	N/A
MCF/D:	No Data						
BOPD:	No Data						
BWPD:	No Data	Anion/Cation Ratio:		1.22	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 ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi		0.000	1.59	19.132	-1.57	0.000	-1.82	0.000
99°F	24 psi		0.000	1.63	19.259	-1.57	0.000	-1.74	0.000
118°F	34 psi		0.000	1.68	19.390	-1.55	0.000	-1.64	0.000
137°F	43 psi		0.000	1.72	19.513	-1.52	0.000	-1.52	0.000
156°F	53 psi		0.000	1.77	19.622	-1.49	0.000	-1.39	0.000
174°F	62 psi		0.000	1.81	19.716	-1.45	0.000	-1.25	0.000
193°F	72 psi		0.000	1.84	19.795	-1.40	0.000	-1.10	0.000
212°F	81 psi		0.000	1.88	19.868	-1.34	0.000	-0.95	0.000
231°F	91 psi		0.000	1.90	19.935	-1.28	0.000	-0.78	0.000
250°F	100 psi		0.000	1.93	20.001	-1.22	0.000	-0.62	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	-1.06	0.000	-6.44	0.000	0	0.000		0.000
99°F	24 psi	-1.05	0.000	-6.46	0.000	0	0.000		0.000
118°F	34 psi	-1.02	0.000	-6.47	0.000	0	0.000		0.000
137°F	43 psi	-0.98	0.000	-6.48	0.000	0	0.000		0.000
156°F	53 psi	-0.93	0.000	-6.48	0.000	0	0.000		0.000
174°F	62 psi	-0.86	0.000	-6.47	0.000	0	0.000		0.000
193°F	72 psi	-0.77	0.000	-6.46	0.000	0	0.000		0.000
212°F	81 psi	-0.68	0.000	-6.45	0.000	0	0.000		0.000
231°F	91 psi	-0.57	0.000	-6.43	0.000	0	0.000		0.000
250°F	100 psi	-0.45	0.000	-6.41	0.000	0	0.000		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. $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments:

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(R=POD has been replaced and no longer serves this file, C=the file is closed) (quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest) (NAD83 UTM in meters)

(acre ft per annum)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q q q 6416 4	Sec	Tws	Rng	X	Y
C 02313	CUB	STK	3	MARK T. AND ANNETTE E. MCCLOY	LE	C 02313				2 3 3	26	25S	33E	636971	3552098*

Record Count: 1

PLSS Search:

Section(s): 25, 26, 27, 34, 35, 36 **Township:** 25S **Range:** 33E

Sorted by: File Number

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 02313	CUB	LE	2	3	3	26	25S	33E	636971	3552098*	150	110	40

Average Depth to Water: **110 feet**

Minimum Depth: **110 feet**

Maximum Depth: **110 feet**

Record Count: 1

PLSS Search:

Section(s): 25, 26, 27, 34, 35, 36 Township: 25S Range: 33E

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 1, 2 **Township:** 26S **Range:** 33E

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 1, 2 Township: 26S Range: 33E

May 30, 2018

Hobbs News-Sun
P.O. Box 850
Hobbs, NM 88240

Re: **Legal Notice**
Salt Water Disposal Well
Valor 35 Fee SWD 1

To Whom It May Concern:

Enclosed is a legal notice regarding New Mexico Oil Conservation Division C-108 Application for Authorization to Inject for a salt water disposal well.

Please run this notice and return the proof of notice to the undersigned at:

COG Operating LLC, 2208 W. Main St., Artesia, NM 88210

Sincerely,

Brian Collins
Senior Operations Engineer

BC/sw
Enclosures

HOBBS NEWS-SUN
LEGAL NOTICES

COG Operating LLC, 2208 W. Main Street, Artesia, New Mexico, 88210, has filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Valor 35 Fee SWD No. 1, is located 1500' FNL and 580' FEL, Section 35, Township 25 South, Range 33 East, Lea County, New Mexico. Disposal water will be sourced from area wells producing from the Delaware, Bone Spring and Wolfcamp formations. The disposal water will be injected into the Devonian/Silurian formation at a depth of 17,450' to 19,450' at a maximum surface pressure of 3490 psi and a maximum rate of 40,000 BWPD. The proposed SWD well is located approximately 20 miles west of Jal. Any interested party who has an objection to this must give notice in writing to the Oil Conservation Division, 1220 South Saint Francis Street, Santa Fe, New Mexico, 87505, within fifteen (15) days of this notice. Any interested party with questions or comments may contact Brian Collins at COG Operating LLC, 2208 W. Main Street, Artesia, New Mexico 88210, or call 575-748-6940.

Published in the Hobbs News-Sun Hobbs, New Mexico
_____, 2018.

CONCHO

June 4, 2018

New Mexico Oil Conservation Division
Attn: Phillip Goetze
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: **Application For Authorization To Inject**
Valor 35 Fee SWD #1
1500' FNL, 580' FEL
Unit H, Section 35, Township 25 South, Range 33 East, N.M.P.M.
Lea County, New Mexico

Dear Mr. Goetze:

COG Operating LLC respectfully requests administrative approval for authorization to inject for the referenced well. Attached, for your review, is a copy of the C-108 application. Once we receive the newspaper publication and all certified return receipts, we will send you a copy.

Our geologic prognosis has the top of the Devonian at 17658' and Fusselman at 18498'. We're permitting the injection interval a couple of hundred feet shallower and deeper than the prognosis just in case the formation tops are different than expected due to the lack of deep well control in this area.

Please do not hesitate to contact me at (575) 748-6940 should you have any questions.

Sincerely,

Brian Collins
Facilities Engineering Advisor

BC/mv
Enclosures

CORPORATE ADDRESS
[illegible] MIDLAND, TEXAS 79701
P [illegible] F [illegible]

ARTESIA WEST OFFICE
2208 MAIN STREET | ARTESIA, NEW MEXICO 88210
P 575.748.6940 | F 575.746.2096