Form 3160-3
(March 2012)

OCD Artesia

NM OIL CONSERVATION
ARTESIA DISTRICT
JUL 23 2015
RECEIVED

ATS-14-1039

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

CRITICAL CAVEKARST

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: SHL: NMNM112900, BHL: NMNM104667

6. If Indian, Allotee or Tribe Name:

1a. Type of Work: [✓] DRILL [ ] REENTER

7. If Unit or CA Agreement, Name and No.:

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other [✓] Single Zone [ ] Multiple Zone

8. Lease Name and Well No.: Caverns Federal Com #4H

2. Name of Operator: COG Operating LLC.

9. API Well No.: 30-015-43291

3a. Address: 2208 West Main Street, Artesia, NM 88210

3b. Phone No. *(include area code)*: 575-748-6940

10. Field and Pool, or Exploratory: Wildcat; Bone Spring

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: 400' FNL & 460' FWL Unit Letter D (NWNW) SHL Sec 21-T26S-R25E

At proposed prod. Zone: 330' FSL & 380' FWL Lot #4 (SWSW) BHL Sec 33-T26S-R25E

11. Sec., T.R.M. or Blk and Survey or Area: Sec. 21 - T26S - R25E

14. Distance in miles and direction from nearest town or post office*: Approximately 20 miles from Malaga

12. County or Parish: Eddy County

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any): 330'

16. No. of acres in lease: SHL: 640, BHL: 1,621.12

17. Spacing Unit dedicated to this well: 382.83

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.: SHL: 2907' BHL: 3158'

19. Proposed Depth: TVD: 7,380' MD: 19,048'

20. BLM/BIA Bond No. on file: NMB000740 &NMB00215

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3735.1' GL

22. Approximate date work will start*: 11/1/2014

23. Estimated duration: 30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature: Mayte Reyes — Name *(Printed/Typed)*: Mayte Reyes — Date: 8-15-14

Title: Regulatory Analyst

Approved by *(Signature)*: /S/ Ed Fernandez for Steve Caffey — Name *(Printed/Typed)*: — Date: JUL 20 2015

Title: FIELD MANAGER — Office: CARLSBAD FIELD OFFICE

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations theron.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Controlled Water Basin

8/14/15

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 15th day of August, 2014.

Signed: Melanie J. Parker

Printed Name: Melanie J. Parker
Position: Regulatory Coordinator
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6940
Field Representative (if not above signatory): Rand French
E-mail: mparker@concho.com

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT WILDCAT S26 2522F;BS (GO)

API Number	Pool Code	Pool Name
30-015- 43291	97829	Wildcat; Bone Spring

Property Code	Property Name	Well Number
315067	CAVERNS FEDERAL COM	4H

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	3735.1

Surface Location

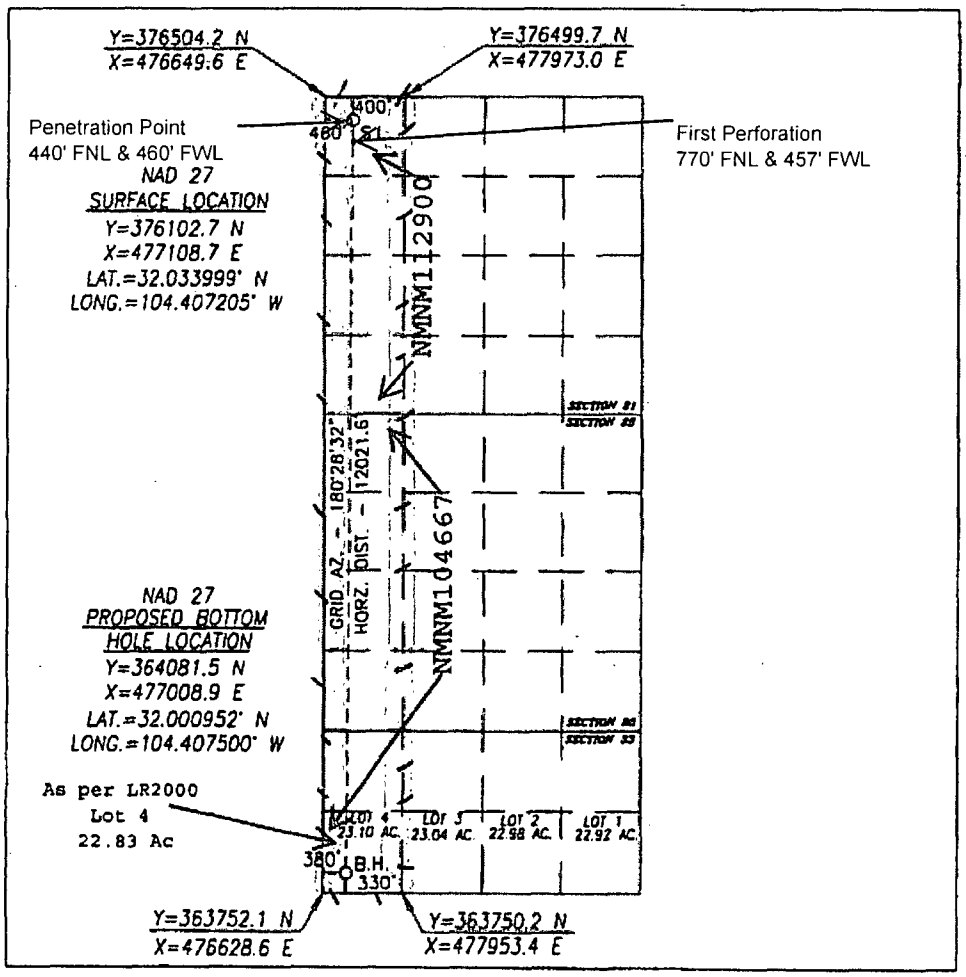
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	21	26-S	25-E		400	NORTH	460	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	33	26-S	25-E		330	SOUTH	380	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
382.83			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Melanie Parker 8/12/14
Signature Date

Melanie J Parker
Printed Name

mparker@concho.com
E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

MAY 30, 2014
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 7/21/14

Certificate No. CHAD HARCROW 17777

W.O. 14-632 DRAWN BY: J.G.

LLD ACREAGE REPORT

Admin State: NM

Geo State: NM

MTR: 23 0260S 0250E

Section: 033

Sur Type	Sur No	Lld Suff	NE NNSS EWWE	NW NNSS EWWE	SW NNSS EWWE	SE NNSS EWWE	Sur Note	Dup Flg	Sub Surf	Acreage
A			XX--	XX--	----	----				160.000
L	1		---X	----	----	----				22.630
L	2		--X-	----	----	----				22.690
L	3		----	---X	----	----				22.770
L	4		----	--X-	----	----				22.830
V			----	----	XXXX	XXXX				

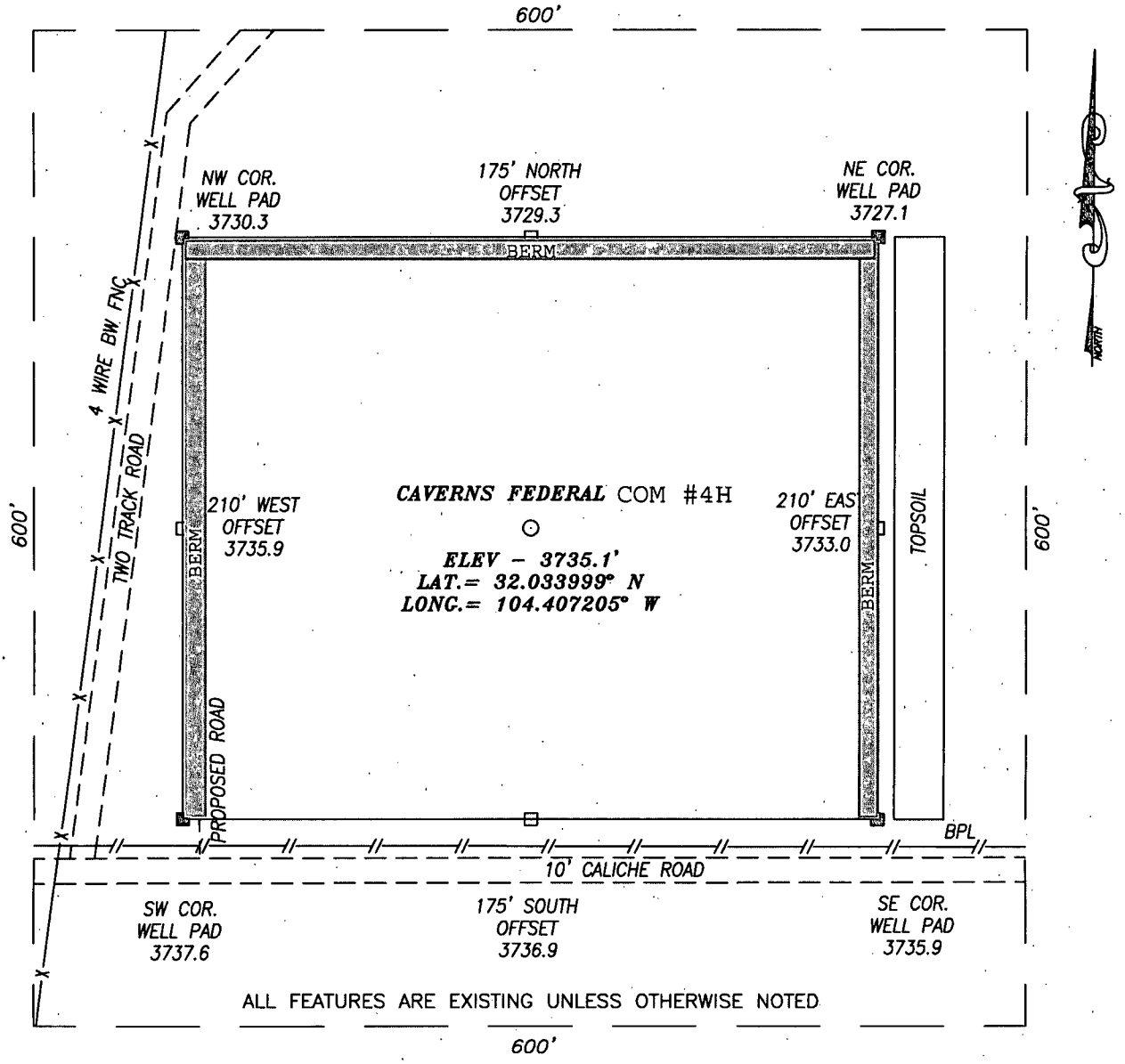
Section 033 Total: 250.920

MTR Total Exluding Survey Notes C/D/R and Sub Surf = Y 250.920

Grand Total Excluding Survey Notes C/D/R and Sub Surf = Y: 250.920

SECTION 21, TOWNSHIP 26 SOUTH, RANGE 25 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

HEADING SOUTH ON HWY 62/180 TURN LEFT (SOUTHEAST) APPROX. 0.1 MILE BEFORE MILE MARKER 5 ONTO A MEANDERING CALICHE LEASE ROAD AND GO APPROX. 1.6 MILES; THEN TURN LEFT (EAST) AND GO APPROX. 2.25 MILES; THEN PROPOSED WELL IS APPROX. 280 FEET NORTHEAST.

100 0 100 200 Feet

Scale: 1"=100'

HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

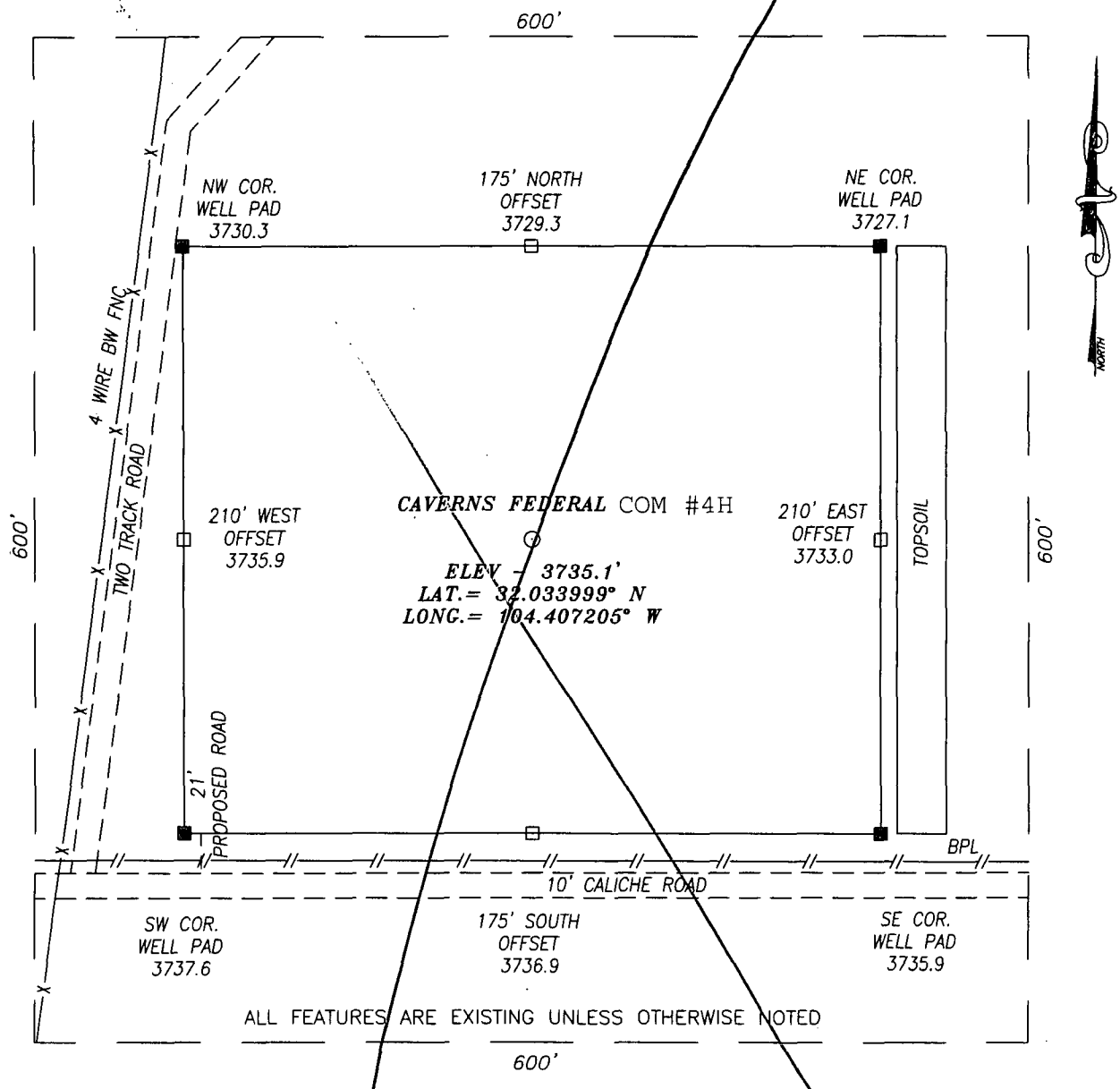
COG OPERATING, LLC

CAVERNS FEDERAL COM #4H
LOCATED 400 FEET FROM THE NORTH LINE
AND 460 FEET FROM THE WEST LINE OF SECTION 21,
TOWNSHIP 26 SOUTH, RANGE 25 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: 5/30/2014		PAGE: 1 OF 1
DRAFTING DATE: 6/3/2014		
APPROVED BY: CH	DRAWN BY: AM	FILE: 14-459

SECTION 21, TOWNSHIP 26 SOUTH, RANGE 25 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



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100 0 100 200 Feet

Scale: 1"=100'

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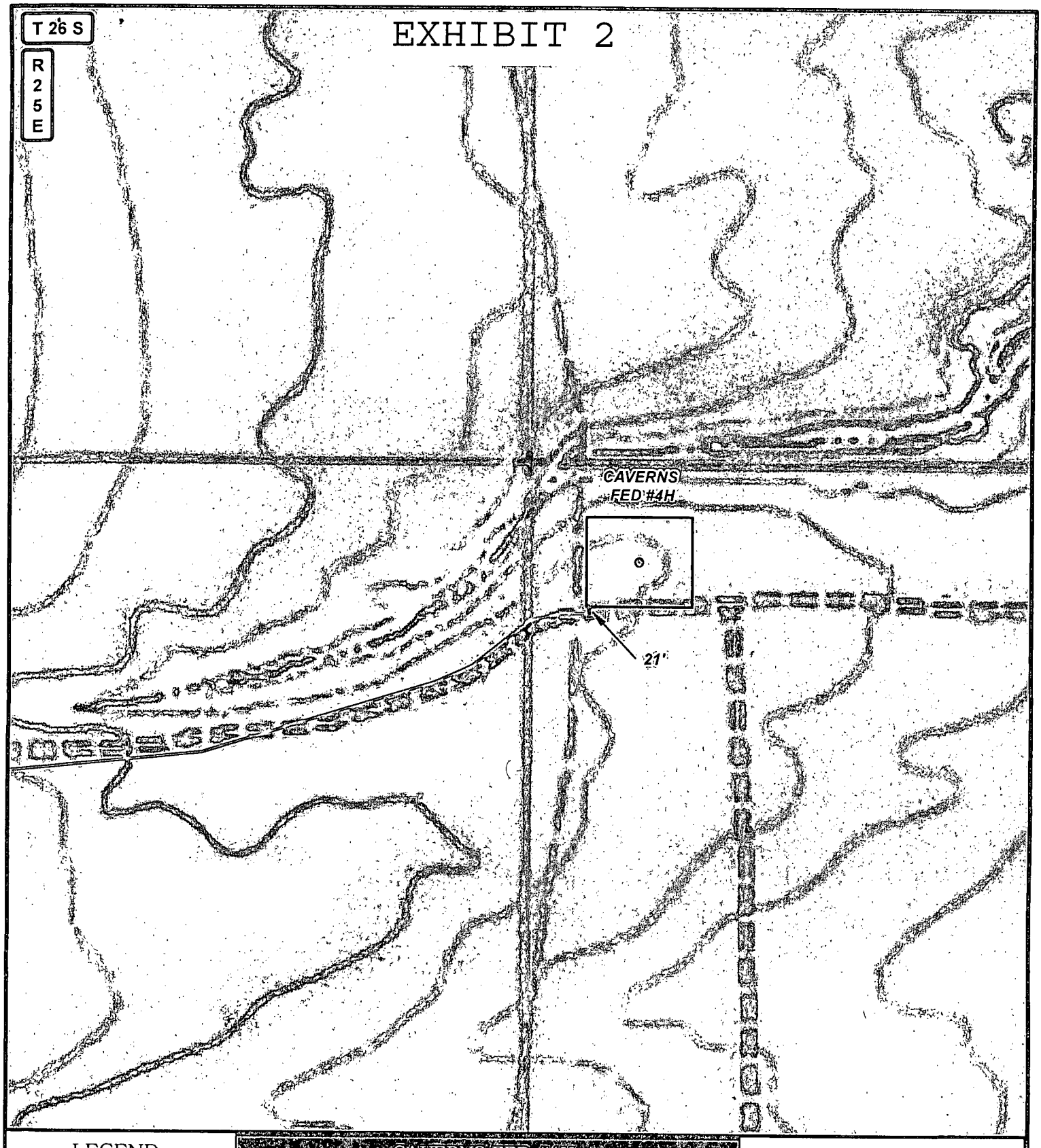
SURVEY DATE: 5/30/2014		PAGE: 1 OF 1
DRAFTING DATE: 6/3/2014		
APPROVED BY: CH	DRAWN BY: AM	FILE: 14-459

EXHIBIT 2



LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- EXISTING ROAD

CAVERNS FED #4H			
SEC: 21	TWP: 26 S.	RGE: 25 E.	ELEVATION: 3735.1'
STATE: NEW MEXICO		COUNTY: EDDY	400' FNL & 460' FWL
W.O. # 14-459	LEASE: CAVERNS FED		SURVEY: N.M.P.M

0 0.03250.065 0.13 Miles

1 IN = 500 FT

ROAD MAP TOPO 06/05/2014 S.E.

N

CONCHO

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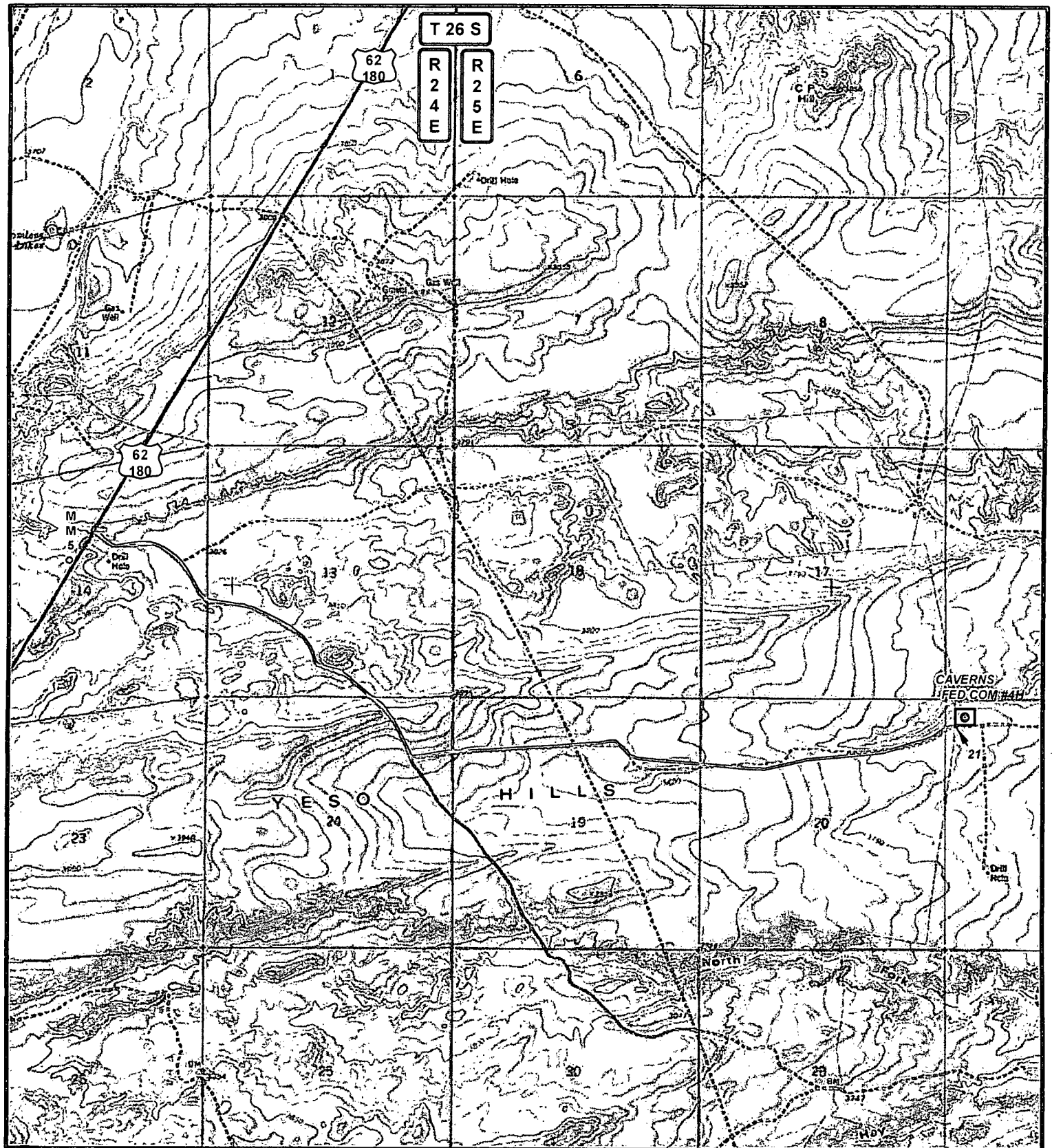

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- PROPOSED ROAD
- EXISTING ROAD

CAVERNS FED COM #4H

SEC: 21	TWP: 26 S.	RGE: 25 E.
ELEVATION: 3735.1'		
STATE: NEW MEXICO	COUNTY: EDDY	400' FNL & 460' FWL
W.O. # 14-459	LEASE: CAVERNS FED	SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,750 FT

LOCATION MAP TOPO 06/05/2014 S.P.

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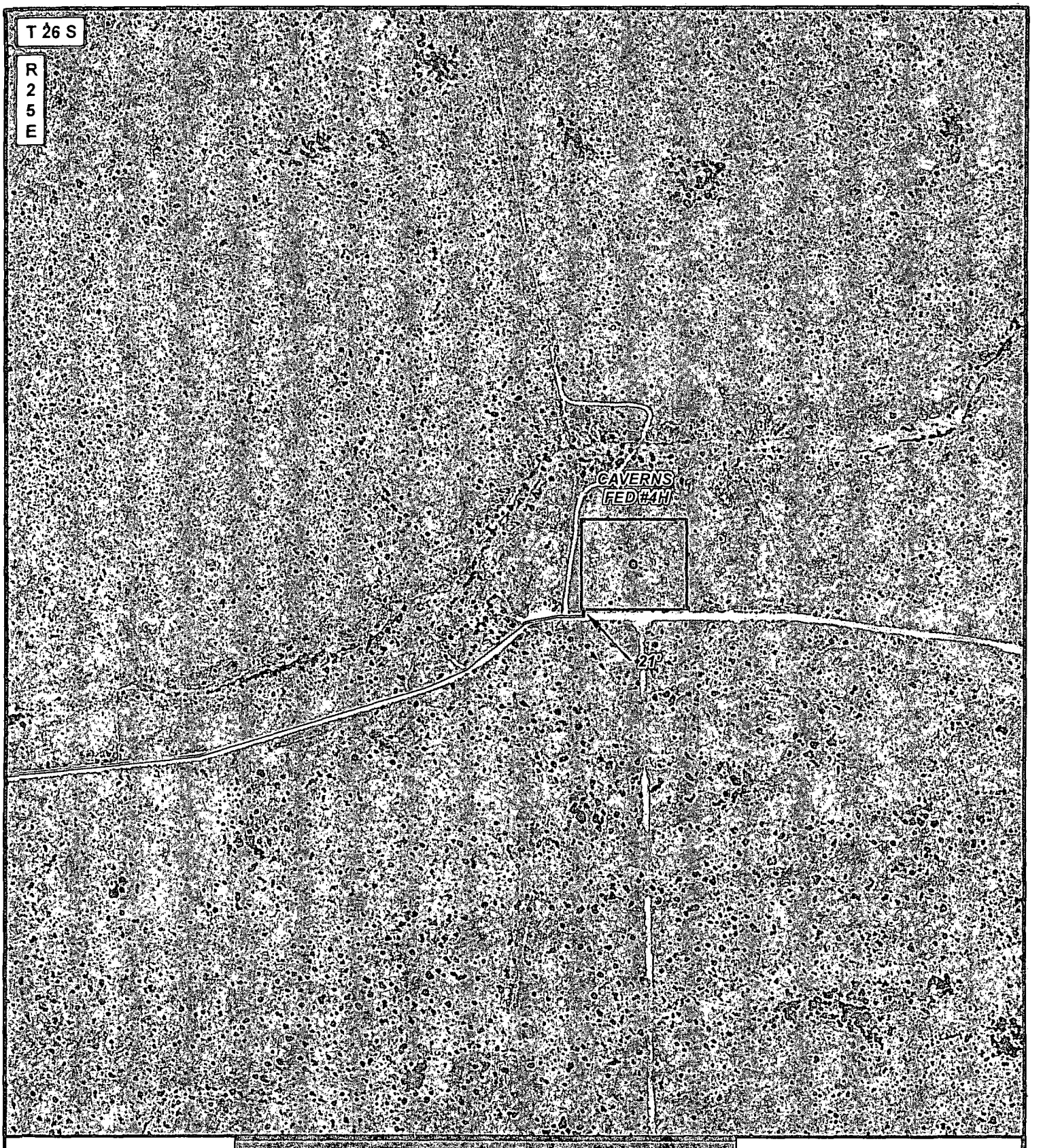

LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- EXISTING ROAD

CAVERNS FED #4H			
SEC: 21	TWP: 26 S.	RGE: 25 E.	ELEVATION: 3735.1'
STATE: NEW MEXICO		COUNTY: EDDY	400' FNL & 460' FWL
W.O. # 14-459	LEASE: CAVERNS FED		SURVEY: N.M.P.M

0 0.03250.065 0.13 Miles

1 IN = 500 FT

ROAD MAP IMAGERY 06/05/2014 S.P.

N

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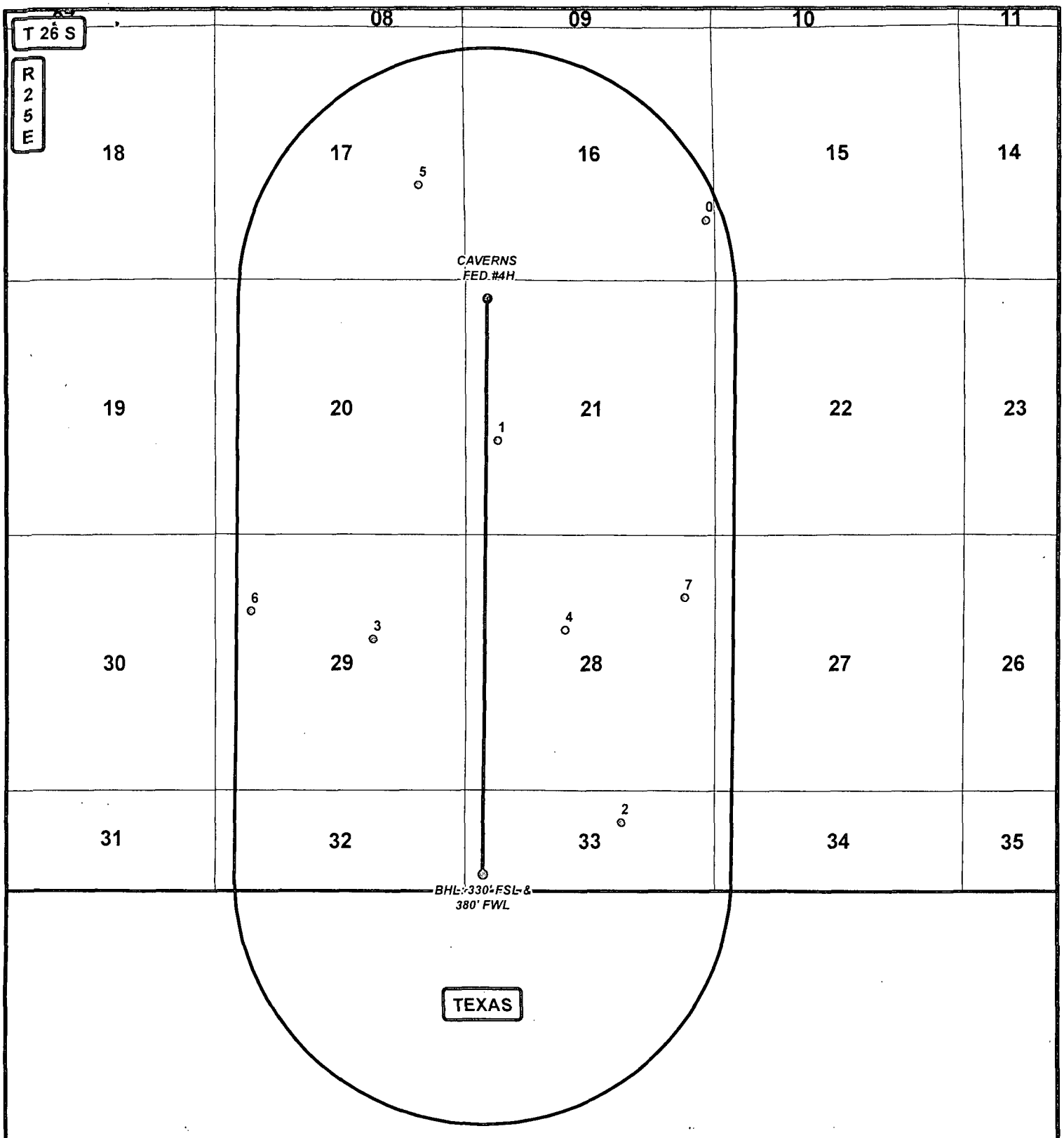

DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH MAY 11, 2014.

LEGEND

- WELL
- BOTTOMHOLE
- WELLS WITHIN 1 MI.
- 1 MI. BUFFER

CAVERNS FED #4H

SEC: 21	TWP: 26 S.	RGE: 25 E.	ELEVATION: 3735.1'
STATE: NEW MEXICO	COUNTY: EDDY	400' FNL & 460' FWL	
W.O. # 14-729	LEASE: CAVERNS FED	SURVEY: N.M.P.M	

0 2,500 5,000 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,750 FT

1 MILE MAP 08/08/2014 SP

CONCHO

COG OPERATING, LLC

N

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2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

FID	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	YATES PETROLEUM CORPORATION	SPANIEL BPB STATE COM 001H	32.038648	-104.392752	3001537550	16	26.0S	25E	1250	S	200	E	0	New (Not drilled or compl)
1	NATURAL GAS EXPL CO	WESTERN RESERVES FED 001	32.026018	-104.406993	3001520865	21	26.0S	25E	1980	S	660	W	0	Plugged
2	NATURAL GAS EXPL CO	E F JOHNSON 001	32.004089	-104.398518	3001521190	33	26.0S	25E	660	N	1980	E	0	Plugged
3	NATURAL GAS EXPL CO	DOROTHY J SCRIBNER 001	32.014598	-104.415558	3001521191	29	26.0S	25E	2180	N	1980	E	0	Plugged
4	COQUINA OIL CORP	BLACK RIVER FEDERAL 001	32.015126	-104.402394	3001521614	28	26.0S	25E	1980	N	2080	W	0	Plugged
5	LELAND A HODGES TRUSTEE	HUDSON FEDERAL 001	32.0407	-104.412441	3001522083	17	26.0S	25E	1980	S	990	E	0	Plugged
6	COG OPERATING LLC	WILD RIDE FEDERAL 001H	32.016209	-104.42394	3001536678	29	26.0S	25E	1600	N	720	W	7607	New (Not drilled or compl)
7	COG OPERATING LLC	TUNA 28 FEDERAL 001	32.016983	-104.394194	3001537645	28	26.0S	25E	1300	N	660	E	10000	Active

COG Operating LLC, Caverns Federal 4H

1. Geologic Formations

TVD of target	7380'	Pilot hole depth	8400'
MD at TD:	19048'	Deepest expected fresh water:	140'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	NP		
Rustler	NP		
Top of Salt	Surface	Salt	
Lamar	1201'	Oil/Gas	
Delaware Group	1249'	Oil/Gas	Possible lost circ
Bone Spring	4599'	Oil/Gas	
2nd Bone Spring Lime	5616'	Oil/Gas	
Wolfcamp	7256'	Target Zone	
Cisco	8056'	Oil/Gas	
Canyon	8106'	Oil/Gas	
Strawn	8206'	Oil/Gas	
Atoka	8406'	Oil/Gas	

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0'	400'	13.375"	48	H40	STC	6.04	2.73	16.77
12.25"	0'	1220'	9.625"	36	J55	LTC	3.18	0.80	12.84
8.75"	0'	19048'	5.5"	17	HCP110	LTC	1.86	2.77	1.69D
				BLM Minimum Safety Factor			1.125	1.00	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations.
- Assumed 10 ppg MW equivalent pore pressure from 9-5/8" shoe to deepest TVD (PH TVD/MD = 8400') in wellbore. This is justified by reported mud weights for the Yates Grange Bll Fed 1 well as indicated on the attached bit record.
- Explanation for SF's below BLM's minimum standards:
    - 9-5/8" Burst SF @ 0.80 – used BLM's frac gradient scenario to qualify. 3520 psi/1220'=2.88>0.70

Must have table for contingency casing

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Is casing API approved? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	N
Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	Y
If yes, are there three strings cemented to surface?	Y

2. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	-	-	-	-	-	Lead: No lead
	400	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Inter.	255	13.5	1.75	9.2	13	Lead: Class C + 4% Gel
	200	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Prod.	1010	11.9	2.51	14.1	72	Lead:50:50:10 H blend (FR, Retarder, FL adds as necessary)
	3550	14.4	1.25	5.7	22	Tail:50:50:2 H blend (FR, Retarder, FL adds as necessary)

Casing String	TOC	% Excess
Surface	0'	90%
Intermediate	0'	100%
Production	0'	50%

Pilot hole depth 8400'
KOP 6650'

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type
6500'	7400'	10	400	17.2	0.98	3.6	Class H w/ retarder, FL etc., as req'd.
8000'	8400'	10	200	17.2	0.98	3.6	Class H w/ retarder, FL etc., as req'd.

4. Pressure Control Equipment

BOP installed and tested before drilling which hole?	Size?	System Rated WP	Type		✓	Tested to:
12-1/4"	13-5/8"	*2M	Annular		x	1000 psi
			Blind Ram			
			Pipe Ram			
			Double Ram			
			Other*			
8-3/4"	13-5/8"	**5M	Annular		x	2500 psi
			Blind Ram			5000 psi
			Pipe Ram			
			Double Ram			
			Other*	Triple Ram	X	

* Actual equipment is 13-5/8" 5M Hydril Annular, will use for 2M WP System.

** - Actual equipment is 13-5/8" 5M Hydril Annular & 13-5/8" 10M Cameron Triple ram, will use for 5M WP System. Triple ram block: pipe/blind/pipe.

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	Are anchors required by manufacturer? No.
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.

See COA

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf csg	Int shoe	Saturated Brine	10.0 - 10.2	28-34	N/C
Int shoe	PH TD & TMD	Cut Brine	8.5 - 10.3	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	Pason PVT

6. Logging and Testing Procedures

Logging, Coring and Testing.	
X	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Additional logs planned		Interval
X	Resistivity	Pilot Hole TD to intermediate casing shoe
X	Density	Pilot Hole TD to intermediate casing shoe
	CBL	Not planned
X	Mud log	Intermediate shoe to TD
X	PEX	Pilot Hole TD to intermediate casing shoe
X	CMR-ECS	Pilot Hole TD to intermediate casing shoe

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	4368 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions.

- Lost circulation material/sweeps/mud scavengers.
- Maintain stock of LCM and weighting materials onsite.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
	H2S is present
X	H2S Plan attached

8. Other facets of operation

Is this a walking operation? No.
Will be pre-setting casing? No.

Attachments

- BOP & Choke Schematics
- Directional Plan
- Rig plat
- H2S Contingency Plan (including H2S schematic)
- Bit record for Yates Grange Bll Fed 1

CHILDRESS DIRECTIONAL DRILLING

COG Operating, LLC

Eddy, NM (Nad 27)
Caverns Federal Com
No.4H

Original Hole

Plan: Plan #1

Standard Planning Report

12 August, 2014

CONCHO

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well No.4H
Company:	COG Operating, LLC	**TVD Reference:**	RKB @ 3766.1usft (Ensign 772)
Project:	Eddy, NM (Nad 27)	**MD Reference:**	RKB @ 3766.1usft (Ensign 772)
Site:	Caverns Federal Com	**North Reference:**	Grid
Well:	No.4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Project Eddy, NM (Nad 27)

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site Caverns Federal Com

Site Position:		**Northing:**	376,102.70 usft	**Latitude:**	32° 2' 2.398 N
From:	Map	**Easting:**	477,108.70 usft	**Longitude:**	104° 24' 25.937 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.04 °

Well No.4H

Well Position	**+N/-S**	0.0 usft	**Northing:**	376,102.70 usft	**Latitude:**	32° 2' 2.398 N
	+E/-W	0.0 usft	**Easting:**	477,108.70 usft	**Longitude:**	104° 24' 25.937 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	3,735.1 usft

Wellbore Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2014/08/01	7.57	59.79	48,095

Design Plan #1

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	180.48

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
6,753.4	0.00	0.00	6,753.4	0.0	0.0	0.00	0.00	0.00	0.00	
7,497.2	89.26	180.48	7,230.8	-471.3	-3.9	12.00	12.00	0.00	180.48	
19,048.5	89.26	180.48	7,380.0	-12,021.2	-99.8	0.00	0.00	0.00	0.00	Caverns Fed 4H PBH

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well No.4H
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Project:	Eddy, NM (Nad 27)	**MD Reference:**	RKB @ 3766.1usft (Ensign 772)
Site:	Caverns Federal Com	**North Reference:**	Grid
Well:	No.4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,201.0	0.00	0.00	1,201.0	0.0	0.0	0.0	0.00	0.00	0.00
Lamar									
1,249.0	0.00	0.00	1,249.0	0.0	0.0	0.0	0.00	0.00	0.00
Delaware Group									
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,599.0	0.00	0.00	4,599.0	0.0	0.0	0.0	0.00	0.00	0.00
Bone Spring									
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00

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Project:	Eddy, NM (Nad 27)	**MD Reference:**	RKB @ 3766.1usft (Ensign 772)
Site:	Caverns Federal Com	**North Reference:**	Grid
Well:	No.4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,616.0	0.00	0.00	5,616.0	0.0	0.0	0.0	0.00	0.00	0.00
2nd Bone Spring Lime									
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,753.4	0.00	0.00	6,753.4	0.0	0.0	0.0	0.00	0.00	0.00
Build 12°/100'									
6,800.0	5.59	180.48	6,799.9	-2.3	0.0	2.3	12.00	12.00	0.00
6,900.0	17.59	180.48	6,897.7	-22.3	-0.2	22.3	12.00	12.00	0.00
(6,951.1)	(23.73)	(180.48)	(6,945.5)	(-40.4)	(-0.3)	(40.4)	(12.00)	(12.00)	(0.00)
(3rd Bone Spring Sand)									
7,000.0	29.59	180.48	6,989.2	-62.3	-0.5	62.3	12.00	12.00	0.00
7,100.0	41.59	180.48	7,070.3	-120.4	-1.0	120.4	12.00	12.00	0.00
7,200.0	53.59	180.48	7,137.7	-194.1	-1.6	194.1	12.00	12.00	0.00
7,300.0	65.59	180.48	7,188.2	-280.2	-2.3	280.2	12.00	12.00	0.00
7,400.0	77.59	180.48	7,219.7	-374.9	-3.1	374.9	12.00	12.00	0.00
7,497.2	89.26	180.48	7,230.8	-471.3	-3.9	471.3	12.00	12.00	0.00
Hold 89.26°									
7,500.0	89.26	180.48	7,230.9	-474.1	-3.9	474.1	0.00	0.00	0.00
7,600.0	89.26	180.48	7,232.1	-574.0	-4.8	574.1	0.00	0.00	0.00
7,700.0	89.26	180.48	7,233.4	-674.0	-5.6	674.1	0.00	0.00	0.00
7,800.0	89.26	180.48	7,234.7	-774.0	-6.4	774.1	0.00	0.00	0.00
7,900.0	89.26	180.48	7,236.0	-874.0	-7.3	874.0	0.00	0.00	0.00
8,000.0	89.26	180.48	7,237.3	-974.0	-8.1	974.0	0.00	0.00	0.00
8,100.0	89.26	180.48	7,238.6	-1,074.0	-8.9	1,074.0	0.00	0.00	0.00
8,200.0	89.26	180.48	7,239.9	-1,174.0	-9.7	1,174.0	0.00	0.00	0.00
8,300.0	89.26	180.48	7,241.2	-1,274.0	-10.6	1,274.0	0.00	0.00	0.00
8,400.0	89.26	180.48	7,242.5	-1,374.0	-11.4	1,374.0	0.00	0.00	0.00
8,500.0	89.26	180.48	7,243.8	-1,473.9	-12.2	1,474.0	0.00	0.00	0.00
8,600.0	89.26	180.48	7,245.1	-1,573.9	-13.1	1,574.0	0.00	0.00	0.00
8,700.0	89.26	180.48	7,246.3	-1,673.9	-13.9	1,674.0	0.00	0.00	0.00
8,800.0	89.26	180.48	7,247.6	-1,773.9	-14.7	1,774.0	0.00	0.00	0.00
8,900.0	89.26	180.48	7,248.9	-1,873.9	-15.6	1,874.0	0.00	0.00	0.00
9,000.0	89.26	180.48	7,250.2	-1,973.9	-16.4	1,974.0	0.00	0.00	0.00
9,100.0	89.26	180.48	7,251.5	-2,073.9	-17.2	2,073.9	0.00	0.00	0.00
9,200.0	89.26	180.48	7,252.8	-2,173.9	-18.0	2,173.9	0.00	0.00	0.00

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Site:	Caverns Federal Com	**North Reference:**	Grid
Well:	No.4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,700.0	89.26	180.48	7,323.8	-7,673.2	-63.7	7,673.5	0.00	0.00	0.00
14,800.0	89.26	180.48	7,325.1	-7,773.2	-64.5	7,773.5	0.00	0.00	0.00
14,900.0	89.26	180.48	7,326.4	-7,873.2	-65.4	7,873.5	0.00	0.00	0.00
15,000.0	89.26	180.48	7,327.7	-7,973.2	-66.2	7,973.4	0.00	0.00	0.00
15,100.0	89.26	180.48	7,329.0	-8,073.2	-67.0	8,073.4	0.00	0.00	0.00
15,200.0	89.26	180.48	7,330.3	-8,173.2	-67.9	8,173.4	0.00	0.00	0.00
15,300.0	89.26	180.48	7,331.6	-8,273.1	-68.7	8,273.4	0.00	0.00	0.00
15,400.0	89.26	180.48	7,332.9	-8,373.1	-69.5	8,373.4	0.00	0.00	0.00
15,500.0	89.26	180.48	7,334.2	-8,473.1	-70.3	8,473.4	0.00	0.00	0.00
15,600.0	89.26	180.48	7,335.5	-8,573.1	-71.2	8,573.4	0.00	0.00	0.00
15,700.0	89.26	180.48	7,336.8	-8,673.1	-72.0	8,673.4	0.00	0.00	0.00
15,800.0	89.26	180.48	7,338.0	-8,773.1	-72.8	8,773.4	0.00	0.00	0.00
15,900.0	89.26	180.48	7,339.3	-8,873.1	-73.7	8,873.4	0.00	0.00	0.00
16,000.0	89.26	180.48	7,340.6	-8,973.1	-74.5	8,973.4	0.00	0.00	0.00
16,100.0	89.26	180.48	7,341.9	-9,073.0	-75.3	9,073.4	0.00	0.00	0.00
16,200.0	89.26	180.48	7,343.2	-9,173.0	-76.2	9,173.3	0.00	0.00	0.00
16,300.0	89.26	180.48	7,344.5	-9,273.0	-77.0	9,273.3	0.00	0.00	0.00
16,400.0	89.26	180.48	7,345.8	-9,373.0	-77.8	9,373.3	0.00	0.00	0.00
16,500.0	89.26	180.48	7,347.1	-9,473.0	-78.6	9,473.3	0.00	0.00	0.00
16,600.0	89.26	180.48	7,348.4	-9,573.0	-79.5	9,573.3	0.00	0.00	0.00
16,700.0	89.26	180.48	7,349.7	-9,673.0	-80.3	9,673.3	0.00	0.00	0.00
16,800.0	89.26	180.48	7,351.0	-9,773.0	-81.1	9,773.3	0.00	0.00	0.00
16,900.0	89.26	180.48	7,352.3	-9,873.0	-82.0	9,873.3	0.00	0.00	0.00
17,000.0	89.26	180.48	7,353.5	-9,972.9	-82.8	9,973.3	0.00	0.00	0.00
17,100.0	89.26	180.48	7,354.8	-10,072.9	-83.6	10,073.3	0.00	0.00	0.00
17,200.0	89.26	180.48	7,356.1	-10,172.9	-84.5	10,173.3	0.00	0.00	0.00
17,300.0	89.26	180.48	7,357.4	-10,272.9	-85.3	10,273.3	0.00	0.00	0.00
17,400.0	89.26	180.48	7,358.7	-10,372.9	-86.1	10,373.2	0.00	0.00	0.00
17,500.0	89.26	180.48	7,360.0	-10,472.9	-86.9	10,473.2	0.00	0.00	0.00
17,600.0	89.26	180.48	7,361.3	-10,572.9	-87.8	10,573.2	0.00	0.00	0.00
17,700.0	89.26	180.48	7,362.6	-10,672.9	-88.6	10,673.2	0.00	0.00	0.00
17,800.0	89.26	180.48	7,363.9	-10,772.8	-89.4	10,773.2	0.00	0.00	0.00
17,900.0	89.26	180.48	7,365.2	-10,872.8	-90.3	10,873.2	0.00	0.00	0.00
18,000.0	89.26	180.48	7,366.5	-10,972.8	-91.1	10,973.2	0.00	0.00	0.00
18,100.0	89.26	180.48	7,367.7	-11,072.8	-91.9	11,073.2	0.00	0.00	0.00
18,200.0	89.26	180.48	7,369.0	-11,172.8	-92.8	11,173.2	0.00	0.00	0.00
18,300.0	89.26	180.48	7,370.3	-11,272.8	-93.6	11,273.2	0.00	0.00	0.00
18,400.0	89.26	180.48	7,371.6	-11,372.8	-94.4	11,373.2	0.00	0.00	0.00
18,500.0	89.26	180.48	7,372.9	-11,472.8	-95.2	11,473.2	0.00	0.00	0.00
18,600.0	89.26	180.48	7,374.2	-11,572.8	-96.1	11,573.1	0.00	0.00	0.00
18,700.0	89.26	180.48	7,375.5	-11,672.7	-96.9	11,673.1	0.00	0.00	0.00
18,800.0	89.26	180.48	7,376.8	-11,772.7	-97.7	11,773.1	0.00	0.00	0.00
18,900.0	89.26	180.48	7,378.1	-11,872.7	-98.6	11,873.1	0.00	0.00	0.00
19,000.0	89.26	180.48	7,379.4	-11,972.7	-99.4	11,973.1	0.00	0.00	0.00
19,048.5	89.26	180.48	7,380.0	-12,021.2	-99.8	12,021.6	0.00	0.00	0.00

PBHL @ 19048.5' MD, 7380.0' TVD

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well No.4H
Company:	COG Operating, LLC	**TVD Reference:**	RKB @ 3766.1usft (Ensign 772)
Project:	Eddy, NM (Nad 27)	**MD Reference:**	RKB @ 3766.1usft (Ensign 772)
Site:	Caverns Federal Com	**North Reference:**	Grid
Well:	No.4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Design Targets

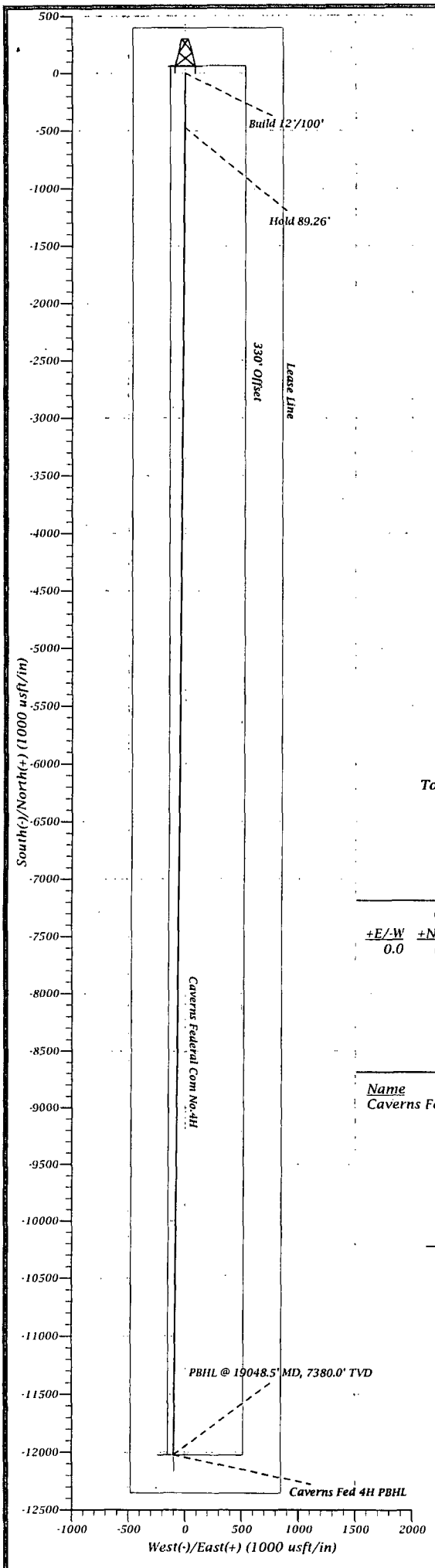
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Caverns Fed 4H PBHL - plan hits target center - Point	0.00	360.00	7,380.0	-12,021.2	-99.8	364,081.50	477,008.90	32° 0' 3.427 N	104° 24' 27.001 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,201.0	1,201.0	Lamar		0.74	180.48
1,249.0	1,249.0	Delaware Group		0.74	180.48
4,599.0	4,599.0	Bone Spring		0.74	180.48
5,616.0	5,616.0	2nd Bone Spring Lime		0.74	180.48
6,951.1	6,945.5	3rd Bone Spring Sand		0.74	180.48

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,753.4	6,753.4	0.0	0.0	Build 12°/100'
7,497.2	7,230.8	-471.3	-3.9	Hold 89.26°
19,048.5	7,380.0	-12,021.2	-99.8	PBHL @ 19048.5' MD, 7380.0' TVD



CONCHO

COG Operating, LLC
Eddy, NM (Nad 27)
Caverns Federal Com
No.4H
Plan #1

CHILDRESS DIRECTIONAL DRILLING

G T M

Azimuths to Grid North
True North: 0.04°
Magnetic North: 7.61°

Magnetic Field
Strength: 48095.2snT
Dip Angle: 59.79°
Date: 2014/08/01
Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 7.61°

Surface Location

Ground Elevation: 3735.1 RKB @ 3766.1usft (Ensign 772)

+E/-W	+N/-S	Northing	Easting	Latittude	Longitude
0.0	0.0	376102.70	477108.70	32° 2' 2.398 N	104° 24' 25.937 W

Targets

Name	TVD	+N/-S	+E/-W	Northing	Easting
Caverns Fed 4H PBHL	7380.0	-12021.2	-99.8	364081.50	477008.90

Formations

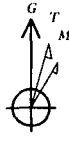
TVDPath	Formation	DipAngle	DipDir
1201.0	Lamar	0.74	180.48
1249.0	Delaware Group	0.74	180.48
4599.0	Bone Spring	0.74	180.48
5616.0	2nd Bone Spring Lime	0.74	180.48
6945.5	3rd Bone Spring Sand	0.74	180.48

Well Planner: Mark Adair
17:29, August 12 2014

CHILDRESS DIRECTIONAL DRILLING

COG Operating, LLC
Eddy, NM (Nad 27)
Caverns Federal Com
No.4H
Plan #1

CONCHO



Azimuths to Grid North
True North: 0.04°
Magnetic North: 7.61°

Magnetic Field
Strength: 48095.2snT
Dip Angle: 59.79°
Date: 2014/08/01
Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 7.61°

Surface Location

Ground Elevation: 3735.1 RKB @ 3766.1usft (Ensign 772)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	376102.70	477108.70	32° 2' 2.398 N	104° 24' 25.937 W

FORMATION TOP DETAILS

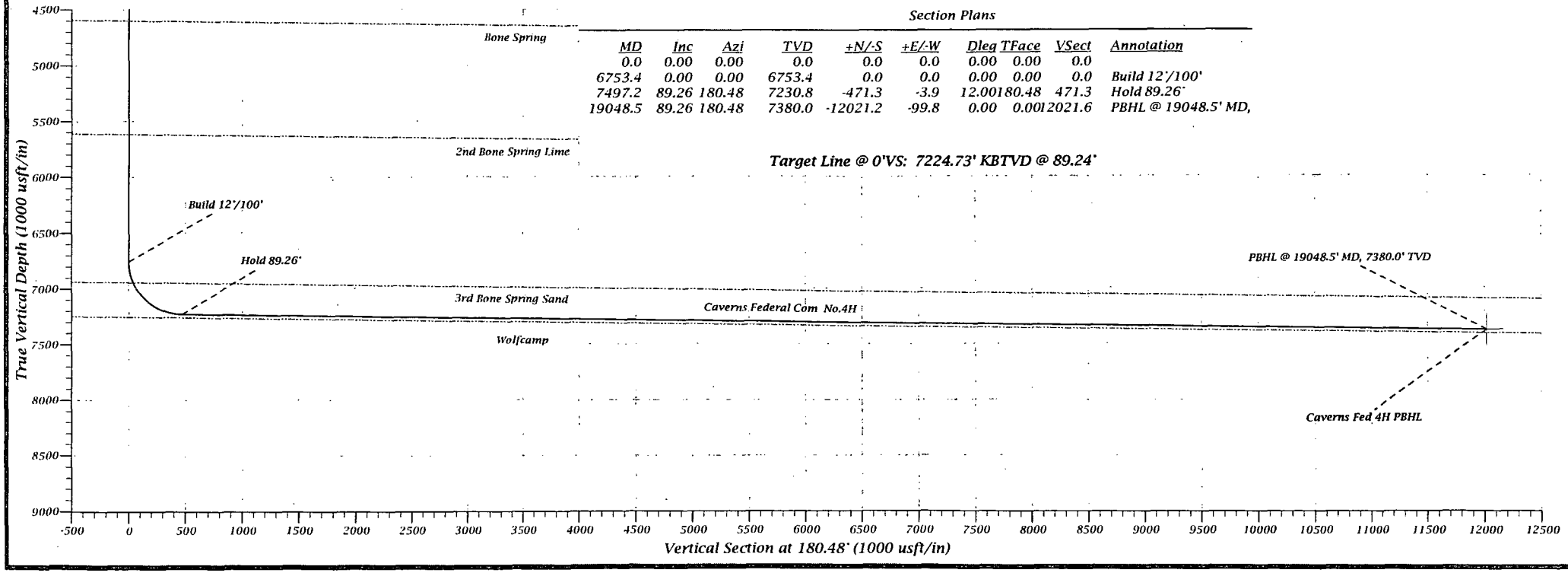
TVDPath	Formation	DipAngle	DipDir
1201.0	Lamar	0.74	180.48
1249.0	Delaware Group	0.74	180.48
4599.0	Bone Spring	0.74	180.48
5616.0	2nd Bone Spring Lime	0.74	180.48
6945.5	3rd Bone Spring Sand	0.74	180.48

Targets

Name	TVD	+N/-S	+E/-W	Northing	Easting
Caverns Fed 4H PBHL	7380.0	-12021.2	-99.8	364081.50	477008.90

Section Plans

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
6753.4	0.00	0.00	6753.4	0.0	0.0	0.00	0.00	0.0	Build 12°/100'
7497.2	89.26	180.48	7230.8	-471.3	-3.9	12.00	180.48	471.3	Hold 89.26°
19048.5	89.26	180.48	7380.0	-12021.2	-99.8	0.00	0.00	12021.6	PBHL @ 19048.5' MD,



Eddy County, NM
T26S, R25E

SHL	BHL
S-21	S-33
400' FNL	330' FSL
460' FWL	380' FWL

Caverns Fed 4H
3rd Bone Spring Sand
Proposed Wellbore
API: 30-015-TBD

Rig:	Ensign 772
Dir Drlg:	Childress
Well Type:	SLBS W PH 2M
AFE Days:	31
AFE M$:	$3,300
SHL Lat:	32.033999° N
SHL Long:	104.407205° W

KB: 3766', GL: 3735'

13-3/8" 48# H40 STC @ 400'

Bit Size: 17-1/2"

400 sx C w/ 2% $CaCl_2$ (14.8 / 1.34)

Est. 18.9" Hole Size + 100 sx, BHST = 73° F @ 400'

Surface Mud:
FW Spud Mud
8.4 ppg
FV 28-29
WL NC

Rustler NP

400'

9-5/8" 36# J55 LTC @ 1220'

Bit Size: 12-1/4"

Lead: 255 sx C w/ 4% gel & 2% $CaCl_2$ (13.5 / 1.75), TT: 3:00-4:00
Tail: 200 sx C w/ 2% $CaCl_2$ (14.8 / 1.34), TT: 3:00-3:30

Est. 13.3" Hole Size + 100 Sx Lead, BHST = 80° F @ 1220'

T/ Salt @ Surf

Intrmd Mud:
Brine
10 ppg,
FV @ 28-29
WL NC

B/ Salt (Fletcher) @ 1016'

Lamar Lime @ 1201'

1220'

Bell Canyon @ 1249'

5-1/2" 17# P110 Tenaris TXP @ 19030'

Bit Size: 8-3/4"

Lead: 1010 sx 50:50:10 Poz:H:Gel w/ 8# salt, 5# kolseal, 0.5% Halad-322, 0.3% HR-601, & 1/4# D-Air 5000 (11.9/2.51), TT: 5:30+

Tail: 3550 sx 50:50:2 Poz:H:Gel w/ 1% salt, 0.4% GasStop & 0.3% CFR-3, (14.4 / 1.25), TT: 5:00+

Est. 9.8" Hole + 100 sx, BHST = 129° F @ 7380'

No Wet Shoe Procedure

Cherry Canyon @ 2086'

Brushy Canyon @ 3058'

Bone Spring @ 4599'

U Avalon Shale @ 4887'

L Avalon Shale @ 5002'

Production & PH Mud
Cut Brine
8.8-9.5 ppg
FV 28-29
WL NC

1st Bone Spring Sand @ 5366'

2nd Bone Spring Sand @ 5866'

Short Jt 100' above KOP

Plan Lat KOP @ 6650'

Calc Lat KOP @ 6753'

EOC @
7496' MD
7230' TVD
89.26° Incl, 180.48° Az

EOL @
19048' MD,
7380' TVD

12,022' VS Lateral

3rd Bone Spring Sand @ 6945'

Formation Evaluation
RU Mud Loggers prior to DO 9-5/8"
Gyro (w/out GR)
OH Loggers - Schlumberger
PEX-Sonic: TD - ICP
CMR-ECS: TD - ICP
GR-CNL: ICP - Surf

Floatation Collar @ 7500'

Wolfcamp @ 7256'

Pilot Hole Plugs

8000' - 8400'	6500' – 7400'
200 sx H	440 sx H
17.2 / 0.98	17.2 / 0.98
BHST @ 9319' = 137 F	BHST @ 7400' = 129° F
TT: 2:30	TT: 3:00 – 3:30

Strawn @ 8206'

PH TD: 8400', TD: 19048', PBTD: 18985'

MEE: 07/31/2014

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BIT RECORD

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REPRESENTATIVE **SSEED**	Page 1 of 4	DOCUMENT NO. **SSEED1535**

OPERATOR	CONTRACTOR	RIG #	LEASE NAME	LEASE NO.	SEC	TWP	RGE
YATES PETROLEUM	**PATTERSON-UTI DRILLING COMPANY**	**511**	**GRANGE "BII" FED**	**11**	**29**	**25S**	**25E**

COMPANY MAN	OBJECTIVE	TOOLPUSHER	CONTRACT TYPE	BLOCK	SURVEY	API NUMBER
MIKE LARKIN	**VERTICAL**		**DAY WORK**			

COUNTRY	STATE	COUNTY	FIELD	LICENSE #	SUB BLOCK	LAT / LONG	LEGAL DESC.
USA	**NM**	**EDDY**				LAT **32.09510** LONG **-104.41200**	

DRILL PIPE OD WEIGHT TOOL JT	DRILL COLLAR LENGTH OD ID	PUMP NO. 1 MODEL	STROKE	LINER	RIG TYPE		SPUD DATE **2007/10/09**
			0.000	**0.000**	**LAND**		UNDER SURF **2007/10/12**
TD FORMATION		PUMP NO. 2 MODEL	STROKE	LINER	MUD TYPE		INT. DATE
			0.000	**0.000**			T.D. DATE **2007/12/03**

COMMENTS/DIRECTIONS: **AFE # 07-198-0**

BIT NO.	SIZE (in)	MFG	TYPE IADC	SERIAL NO NEW/RR/RT	JETS TFA (in²)	DEPTH OUT (ft)	DRILLED (ft)	HOURS	ROP (ft/hr)	ACC HOURS	WOB (kips)	MTR RPM	TOTAL RPM	VERT DEV.	PUMP PRESS (psi)	FLOW RATE (gpm)	PUMP SPM	MUD WT (ppg)	MUD VIS (cp)	IADC DULL GRADE I	O	DC	L	Brgs	G	O	R	FORMATION DATES
1	26.000		2GS	BE1844	3-22	**315**	275	39.5	**7.0**	39.5			80		250.0	0		9.0										
					TFA = 0.000											754		0.0	30								2007/10/10
						454	414	54.0	**7.7**	54.0	35		100		300.0	0		9.6									2007/10/11
																377		0.0	29								
BIT,BS,SS,8"DC,RMR,XO,9-8"DC. TD @454 SET 13 3/8"CSG																											
2	12.250	SLB	F47YAC	PG0653	3-12	**1074**	620	24.0	**25.8**	78.0	40		70		1130.0	0		9.7									2007/10/13
					TFA = 0.000											0		0.0	29								
BIT,COMBO,TELE,RMR,SS,11-8"DC,XO, TD @ 1575 SET 9 5/8" CSG																											
3	8.750	SLB	FHI37Y	PG8153	3-13	**1680**	105	3.0	**35.0**	81.0	20		45		950.0	0		8.8									2007/10/16
					TFA = 0.000											0		0.0	29								
						2660	1085	33.0	**32.9**	111.0	30		45		1200.0	0		9.3									2007/10/17
																0		0.0	30								
						3820	2245	71.3	**31.5**	149.3	30		45		1250.0	0		9.5									2007/10/19
																0		0.0	29								
						4600	3025	117.0	**25.9**	195.0	30		45		1250.0	0		9.4									2007/10/21
																0		0.0	29								
						4930	3355	138.3	**24.3**	216.3	30		45		1250.0	0		9.5		4	4	FC	A	E E F		TR	PR	2007/10/22
																0		0.0	29								
BIT,MTR,3PT,TELE,IB,DC,IB																											
4	8.750	SLB	FHI37Y	PG5836	3-13	**5210**	280	15.0	**18.7**	231.3	30		45		1475.0	0		9.5									2007/10/23
					TFA = 0.000											365		0.0	29								
						5660	730	36.5	**20.0**	252.8	30		45		1475.0	0		9.4									2007/10/24
																365		0.0	29								
						6090	1160	59.0	**19.7**	275.3	30		45		1450.0	0		9.7									2007/10/25
																365		0.0	29								
						6605	1675	102.5	**16.3**	318.8	30		45		1475.0	0		9.6									2007/10/27
																365		0.0	30								

BIT RECORD

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REPRESENTATIVE **SSEED**				Page 2 of 4			DOCUMENT NO. **SSEED1535**					
OPERATOR **YATES PETROLEUM**				CONTRACTOR **PATTERSON-UTI DRILLING COMPANY**		RIG # **511**	LEASE NAME **GRANGE "BII" FED**	LEASE NO. **11**		SEC **29**	TWP **25S**	RGE **25E**
COMPANY MAN **MIKE LARKIN**		OBJECTIVE **VERTICAL**		TOOLPUSHER		CONTRACT TYPE **DAY WORK**	BLOCK	SURVEY		API NUMBER		
COUNTRY **USA**	STATE **NM**	COUNTY **EDDY**		FIELD		LICENSE #	SUB BLOCK	LAT **32.09510** LONG **-104.41200**		LEGAL DESC.		
DRILL PIPE OD WEIGHT TOOL JT		DRILL COLLAR LENGTH OD ID		PUMP NO. 1 MODEL		STROKE LINER **0.000 0.000**	RIG TYPE **LAND**		SPUD DATE **2007/10/09** UNDER SURF **2007/10/12**			
TD FORMATION				PUMP NO. 2 MODEL		STROKE LINER **0.000 0.000**	MUD TYPE		INT. DATE T.D. DATE **2007/12/03**			

COMMENTS/DIRECTIONS: **AFE # 07-198-0**

BIT NO.	SIZE (in)	MFG	TYPE IADC	SERIAL NO NEW/RR/RT	JETS TFA (in²)	DEPTH OUT (ft)	DRILLED (ft)	HOURS	ROP (ft/hr)	ACC HOURS	WOB (kips)	MTR RPM	TOTAL RPM	VERT DEV	PUMP PRESS (psi)	FLOW RATE (gpm)	PUMP SPM	MUD WT (ppg)	MUD VIS (cp)	IADC DULL GRADE I	O	DC	L	Brgs	G	O	R	FORMATION DATES
						6945	2015	125.0	**16.1**	341.3	30		45		1475.0	0		9.5										
																365		0.0	29								2007/10/28
						7300	2370	147.8	**16.0**	364.0	30		45		1475.0	0		9.3		3	2	CT	MG	E E E	I	FC	HR	
																365		0.0	29								2007/10/29
BHA-SAME																											
5	8.750	SLB	F39HY	PG2686	3-13 TFA = 0.000	**7800**	500	34.0	**14.7**	398.0	30		45		1475.0	0		9.6									
																365		0.0	29								2007/10/31
						8085	785	57.0	**13.8**	421.0	30		45		1625.0	0		9.9									
																365		0.0	30								2007/11/01
						8305	1005	80.0	**12.6**	444.0	30		45		1575.0	0		10.0									
																365		0.0	33								2007/11/02
						8350	1050	84.0	**12.5**	448.0	30		45		1575.0	0		9.8		2	2	FC	A	E E E	I	NO	TD	
																365		0.0	29								2007/11/03
BHA-SAME TD @ 8350' SET 7" CSG																											
6	6.125	**ULT**	MS1355B	M4356	TFA = 0.000	**8628**	278	14.3	**19.5**	462.3			45		1475.0	0		9.8									
																0		0.0	32								2007/11/07
						8735	385	18.8	**20.5**	466.8	5		40		1500.0	0		9.8									
											10					0		0.0	36								2007/11/08
						8920	570	37.8	**15.1**	485.8			40		1750.0	0		9.6									
											8					243		0.0	36								2007/11/10
						9205	855	58.3	**14.7**	506.3			40		1850.0	0		10.6									
											8					221		0.0	37								2007/11/11
						9520	1170	81.8	**14.3**	529.8	10		40		1700.0	0		10.5									
											15					328		0.0	36								2007/11/12
						9835	1485	103.0	**14.4**	551.0			45		1800.0	0		10.5		2	3	CT	G	X X X	I	ER	FM	
											15					330		0.0	36								2007/11/13

BIT,MTR,TELE,IB,DC,IB,29-4 3/4"DC;plugged bit @ 8735 TOH FOR DIRECTIONAL TOOLS NEW BHA BIT,MTR,FS,XO,DBL BOX UBHO,NMDC,3PT RMR,DC,3PT RMR,29-DC

COPPER STATE RUBBER
VISUAL INSPECTION / HYDROSTATIC TEST REPORT
CHOKE & KILL / CEMENTING HOSE
10,000 P.S.I. W/P X 15,000 P.S.I. T/P
SPEC: 090-1915 HS
H2S SUITABLE

SHOP ORDER NO.: 20098 SIZE: 3" I.D.

SERIAL NO.: 24975 LENGTH 25 FT. IN.

CONNECTIONS: 4-1/16" 10,000 PSI API FLANGE EACH END

HT-A063355 - 06A1 - 08A1 - 06A2

VISUAL INSPECTION

(A) END CAPS / SLEEVE RECESS: OK
(B) EXTERIOR / COVER / BRANDING: OK
(C) INTERIOR TUBE: OK

HYDROSTATIC TEST

5 MIN. @ 10,000 PSI

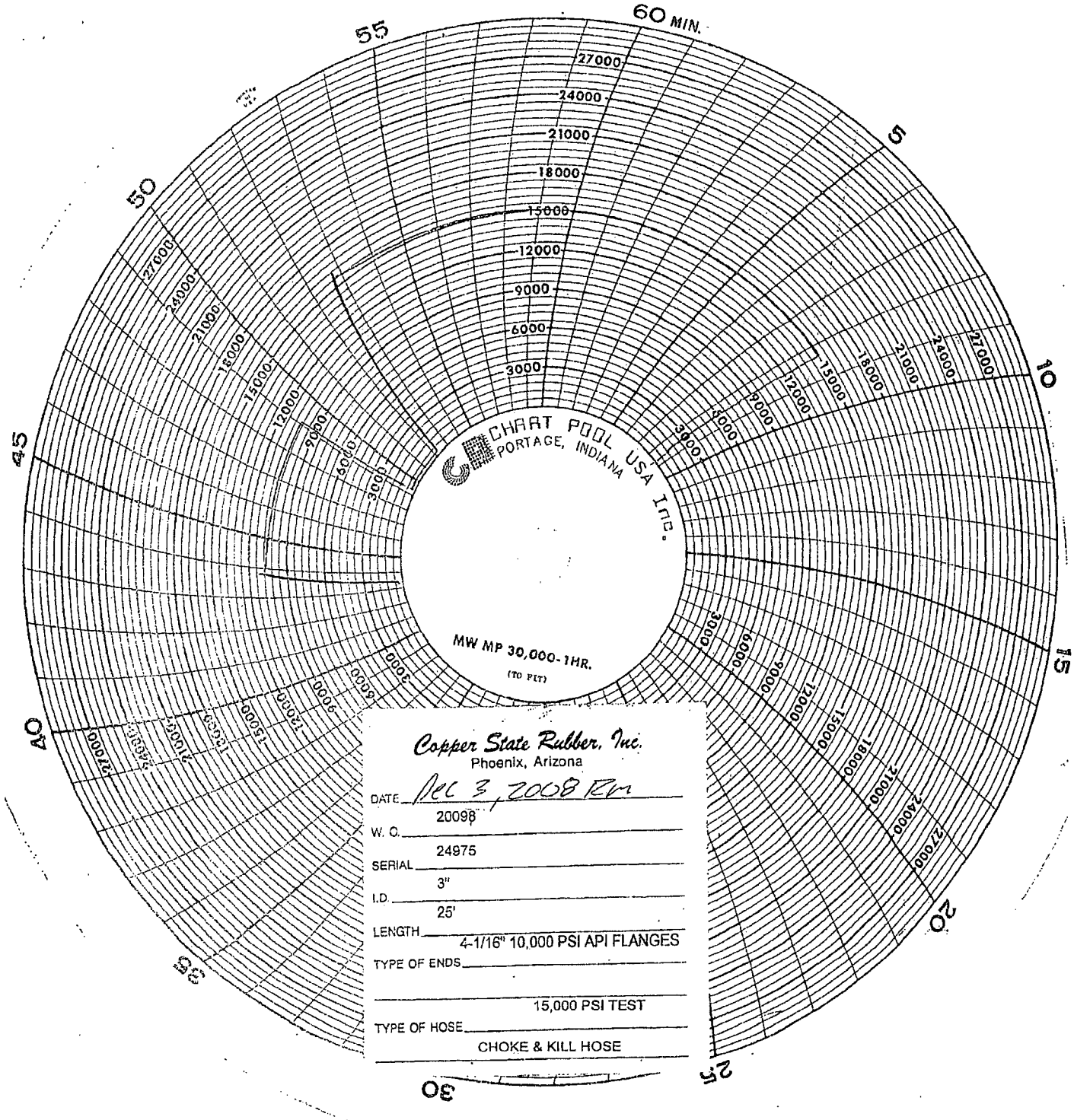
2 MIN. @ 0 PSI 25' - 3" OAL

15 MIN. @ 15,000 PSI

WITNESSED BY: Mike Smith

DATE December 3, 2008

FORM QA-21- REV-3
9/07


60 MIN.
55
5
50
10
45
15
40
20
35
25
30
27000
24000
21000
18000
15000
12000
9000
6000
3000
CHART POOL USA Inc.
PORTAGE, INDIANA
MW MP 30,000-1HR.
(TO PIT)
Copper State Rubber, Inc.
Phoenix, Arizona
DATE Dec 3, 2008 RM
W. O. 20098
SERIAL 24975
I.D. 3"
LENGTH 25'
TYPE OF ENDS 4-1/16" 10,000 PSI API FLANGES
15,000 PSI TEST
TYPE OF HOSE CHOKE & KILL HOSE

Robsco, Inc.
OILFIELD RUBBER PRODUCTS
4749 Eastpark Drive
Houston, TX 77028
United States of America

Gates Corporation Authorized Rotary and Vibrator Hose Subcontracted Fabricator

Certification of Compliance

Customer Name: OFS Global
Customer Address: 450 Gears Road Suite 777
Houston, Texas 77067
USA

Customer Purchase Order No: OFS-008331-1
Shipping Order No: 10031264

Quantity	Product Partnumber / Description / Specification
1	36701559R31X2F1502MXFDWS 2IN X 31FT Gates API 7K FSL 0 - Cementing Hose 10000 PSI WP / 15000 PSI Test SPEC 4651ZA with 2IN Figure 1502 Male X Female Hammer Union Ends and with Clamp X Clamp Safety Clamps with 4FT Wire Ropes Serial Numbers:IO10K-029010114R060614-1

Robsco, Inc. as an authorized Rotary and Vibrator Hose Subcontracted Fabricator certifies that all Parts and/or Materials included in the above mentioned order have been manufactured and/or processed in conformance with applicable drawings and specifications, and that records of required Tests are on file and subject to examination. The material is made / assembled to meet the Gates Oilfield Roughneck Agreement/Specifications and meet Gates Corporation quality standards.

QA Representative Signature

6/6/2014
Date

Robsco, Inc.
OILFIELD RUBBER PRODUCTS
4749 Eastpark Drive
Houston, TX 77028
United States of America

Gates Corporation Authorized Rotary and Vibrator Hose Subcontracted Fabricator

Hydrostatic Test Certification

Robsco, Inc. certifies that the following hose assembly has been tested to the Gates Oilfield Roughneck Agreement/Specification requirements and passed the hydrostatic test per API Spec 7K, Fifth Edition, June 2010, Test pressure 9.6.7 and per Table 9 to 15,000 psi in accordance with this product number. Hose burst pressure 9.6.7.2 exceeds the minimum of 2.25 times the working pressure per Table 9.

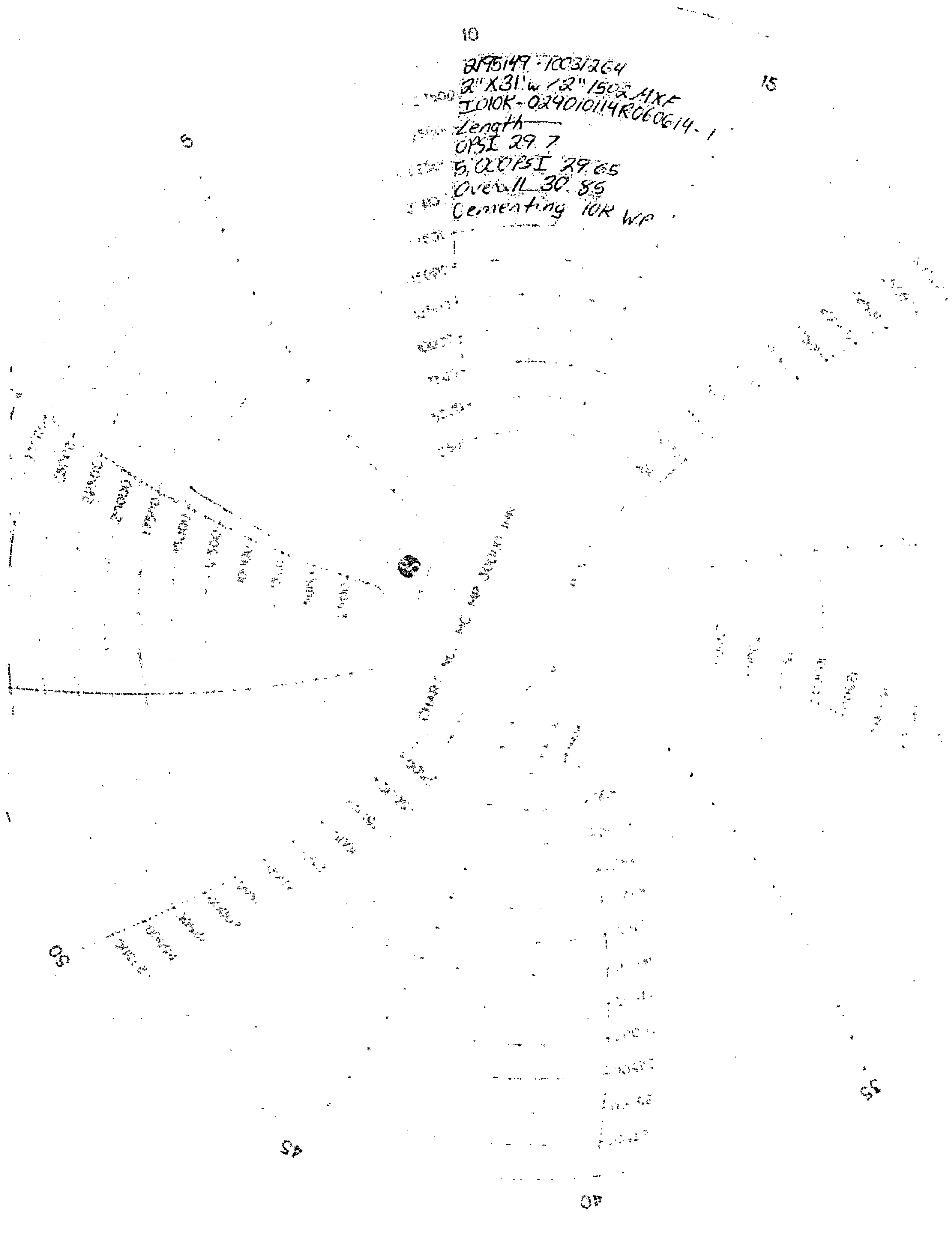
Assembly Part Number	**Serial Number / Date Code**
36701559R31X2F1502MXFDWS	IO10K-029010114R060614-1

		Chart Recorder Information	
Hose Size	**Testers**	**Serial Number**	**Calibration Date**
2IN X 31FT	OC CS	Recorder 22349	March 3rd 2014

Hydrostatic Test: Passed
Visual Inspection: Passed

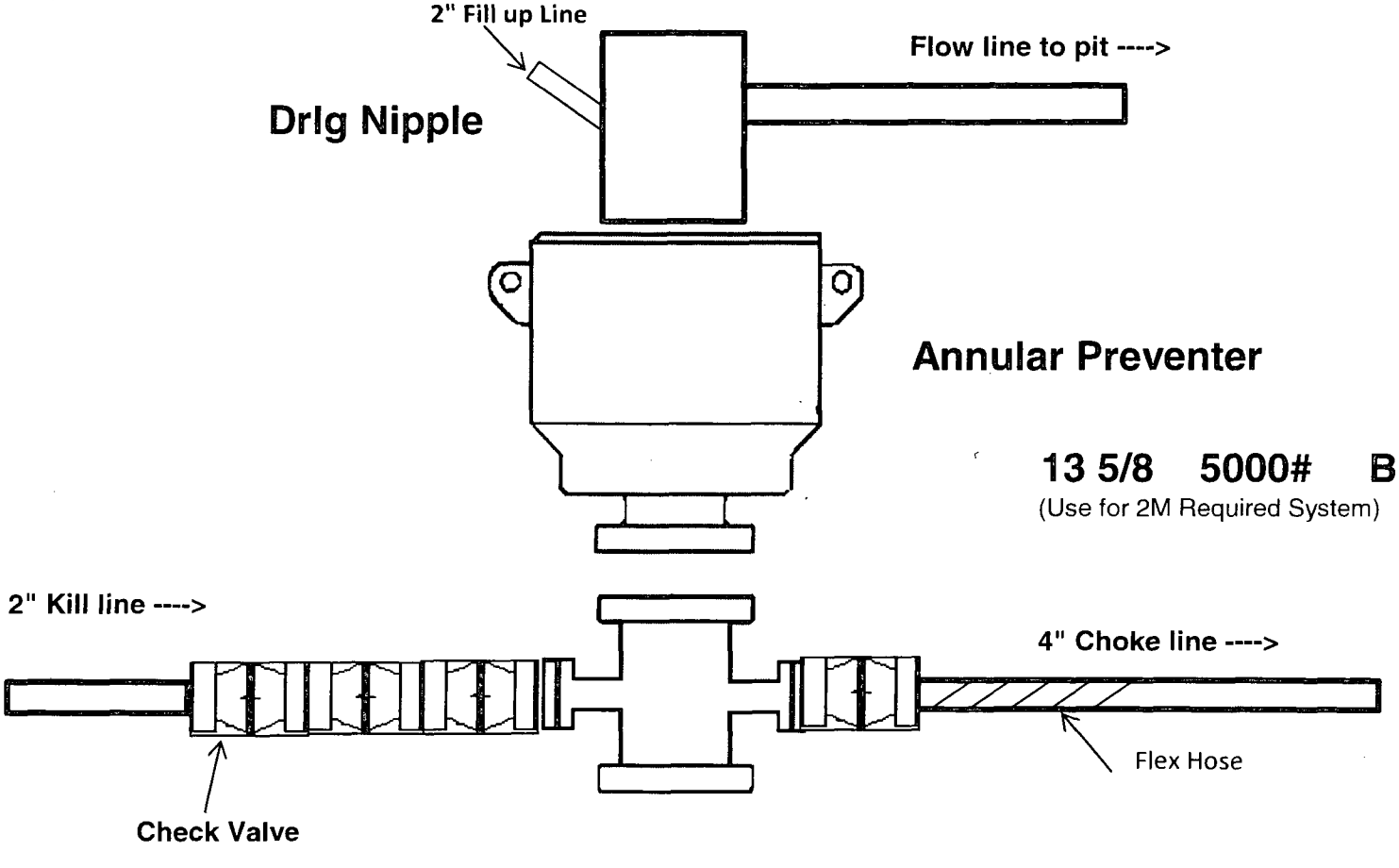
QA Representative Signature

6/6/2014 RS
Date & Initial

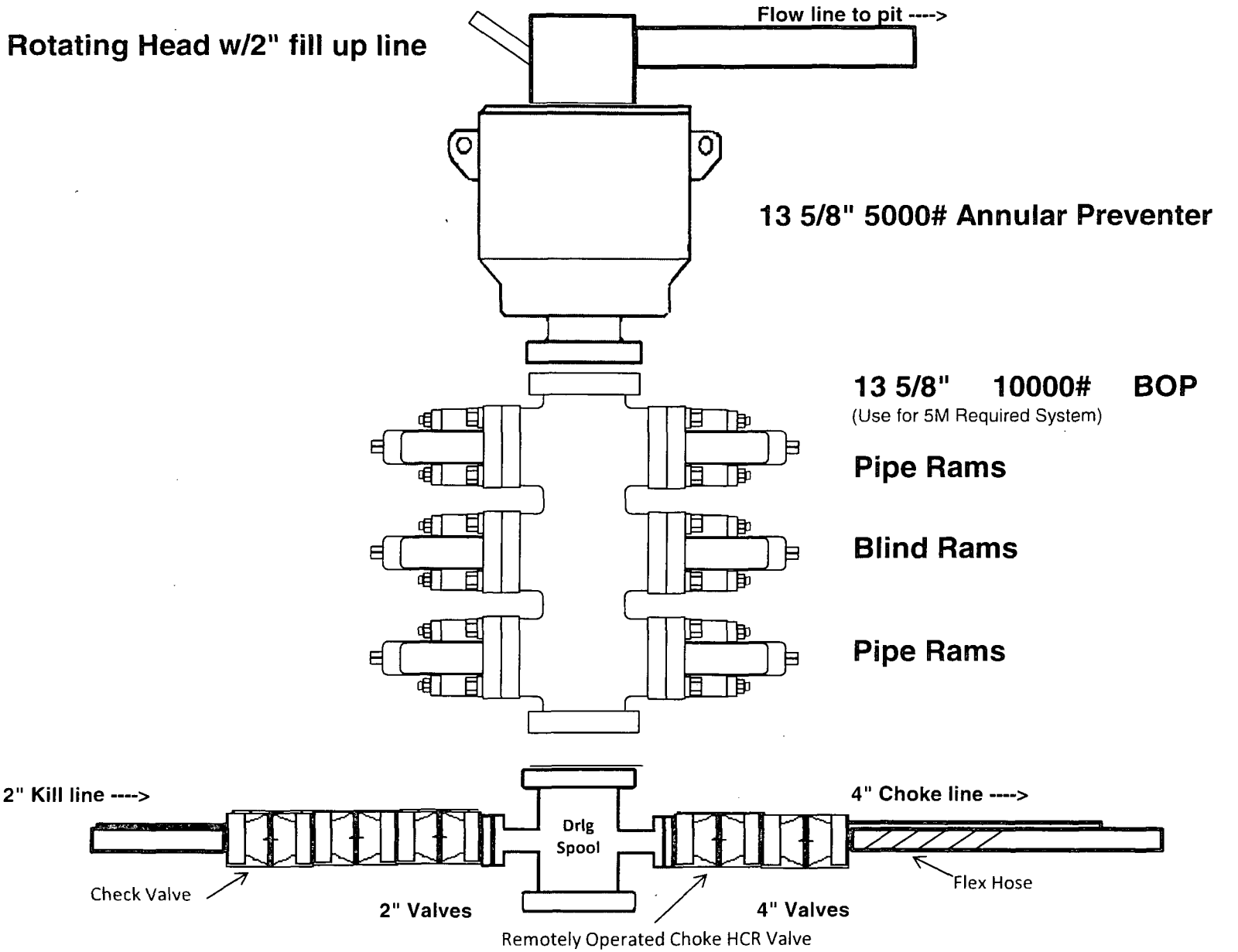


10
15
5
2195149-10031264
2"X31'w/2" 1502 MXF
I010K-0290101114R060614-1
Length
0PSI 29.7
5,000PSI 29.65
Overall 30.85
Cementing 10K WP
35
40
45
50

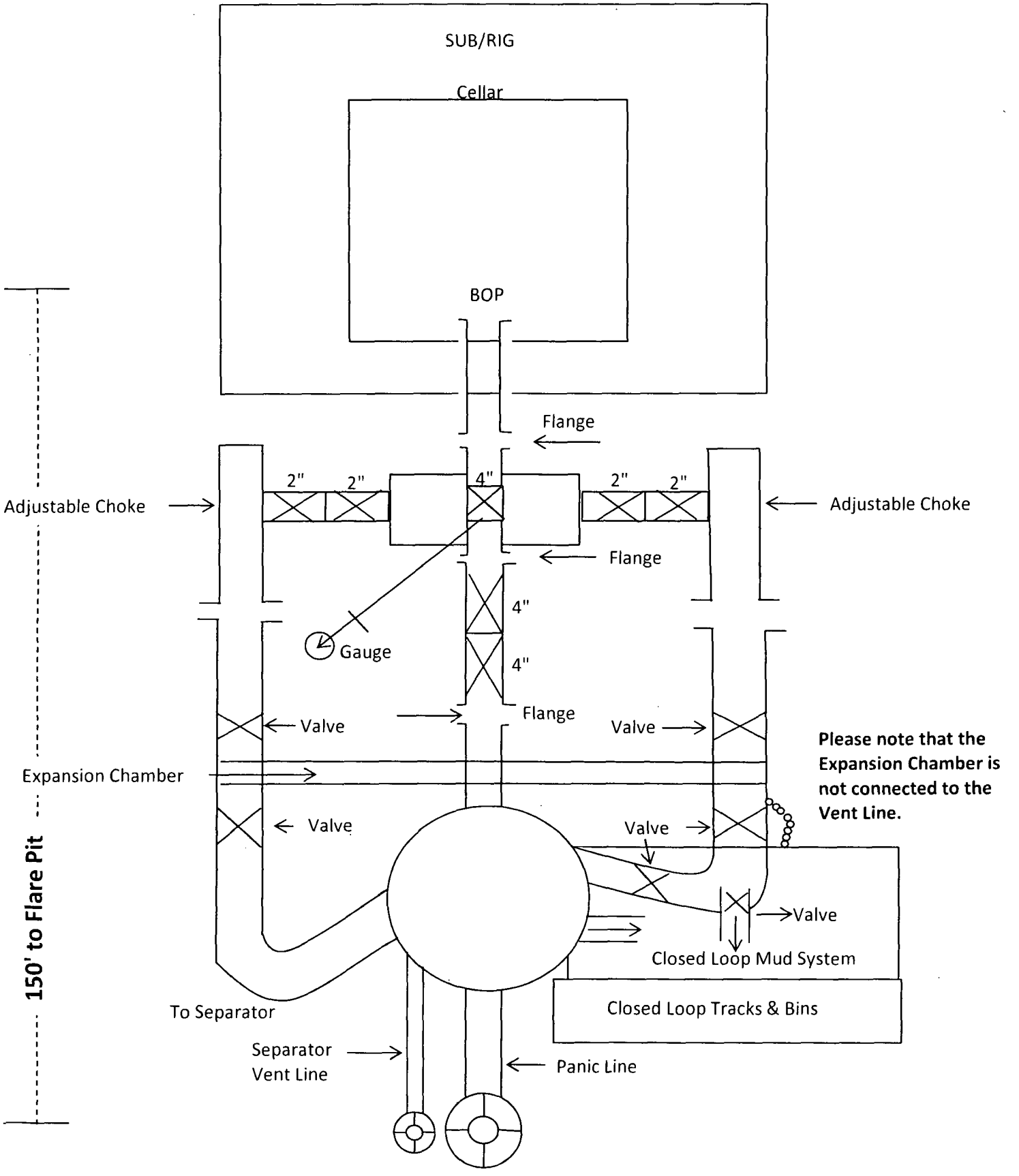
2,000 psi BOP Schematic



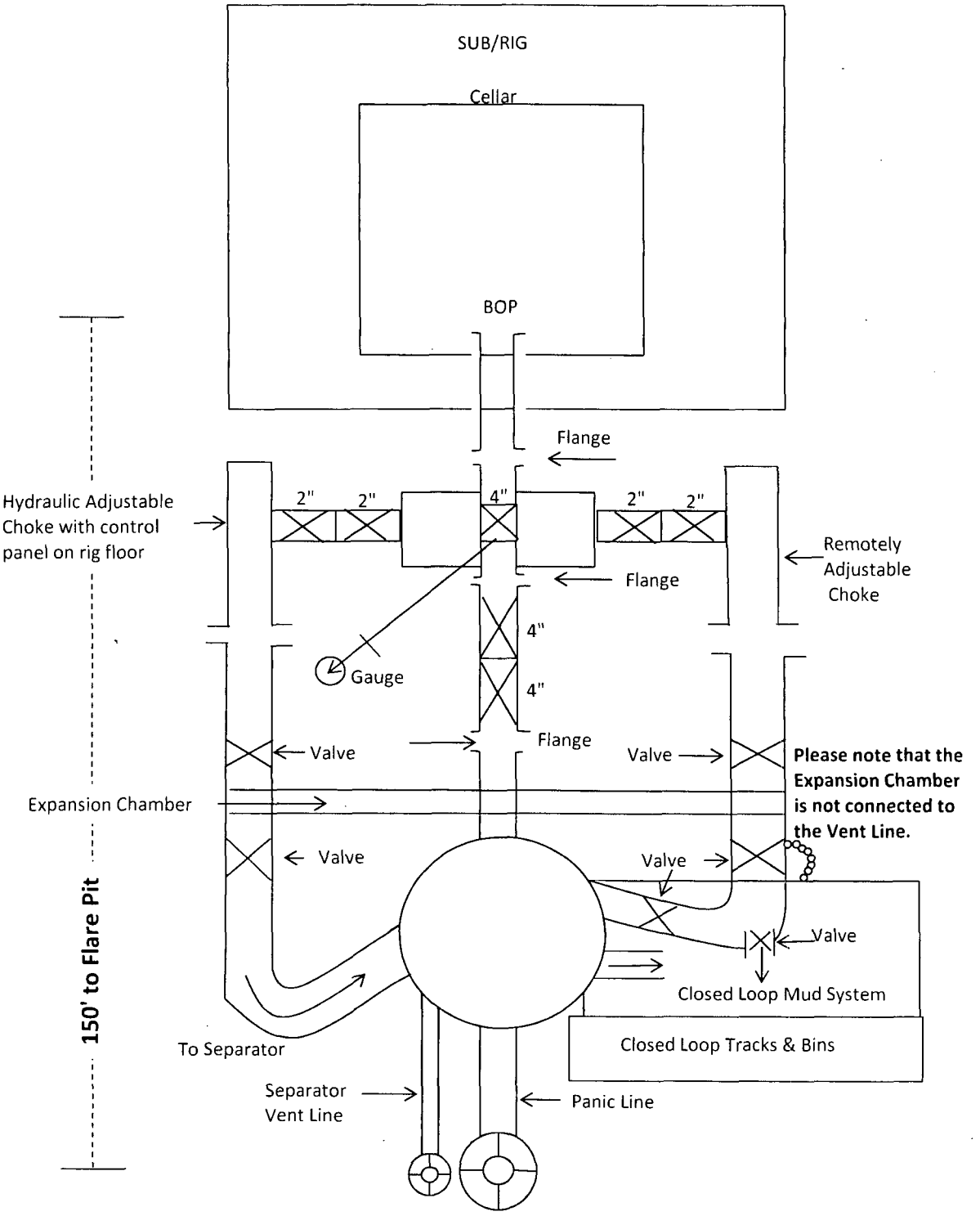
5,000 psi BOP Schematic



2M Choke Manifold Equipment



5M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

Well pad will be 420' X 350' with cellar in center of pad

Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'

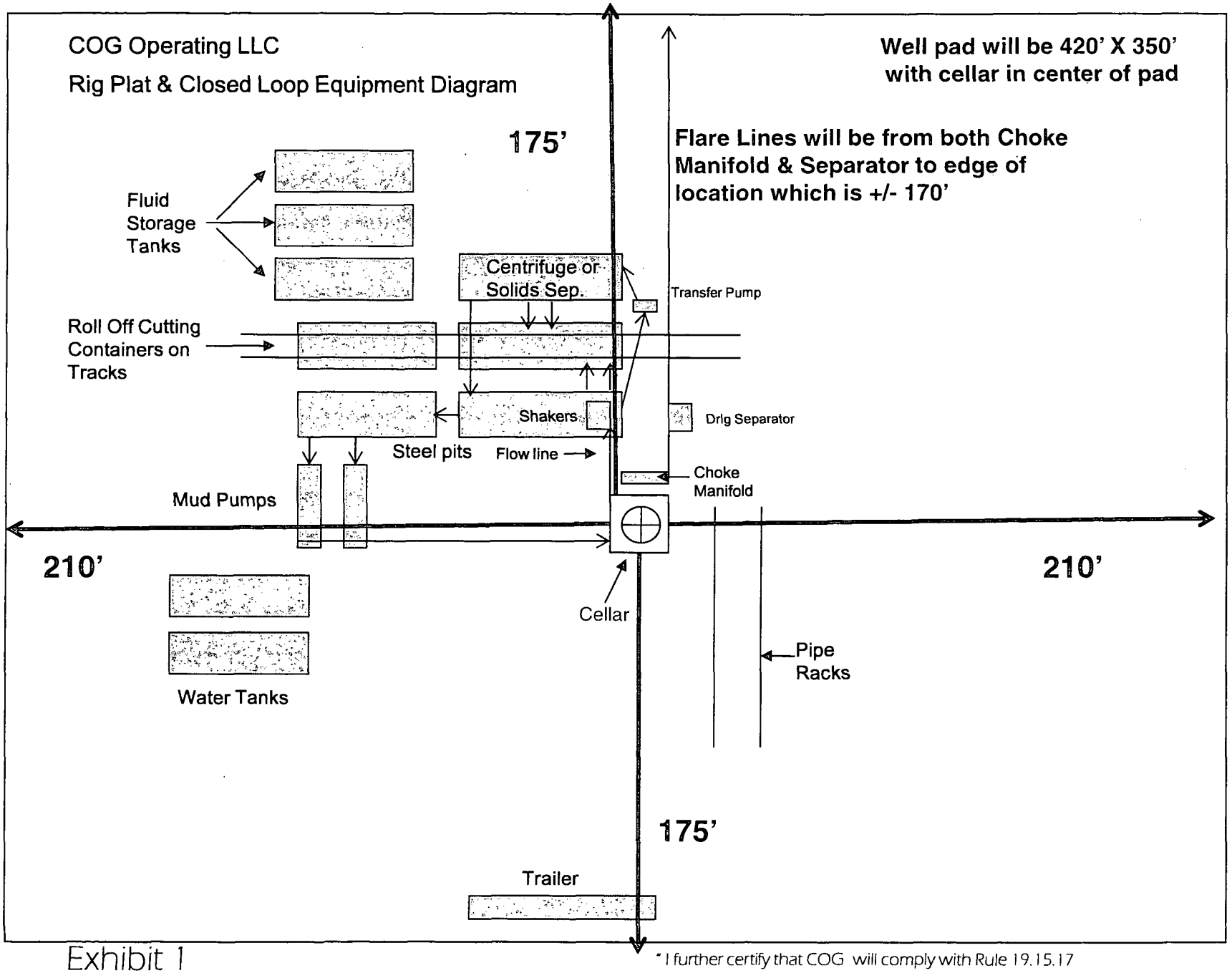
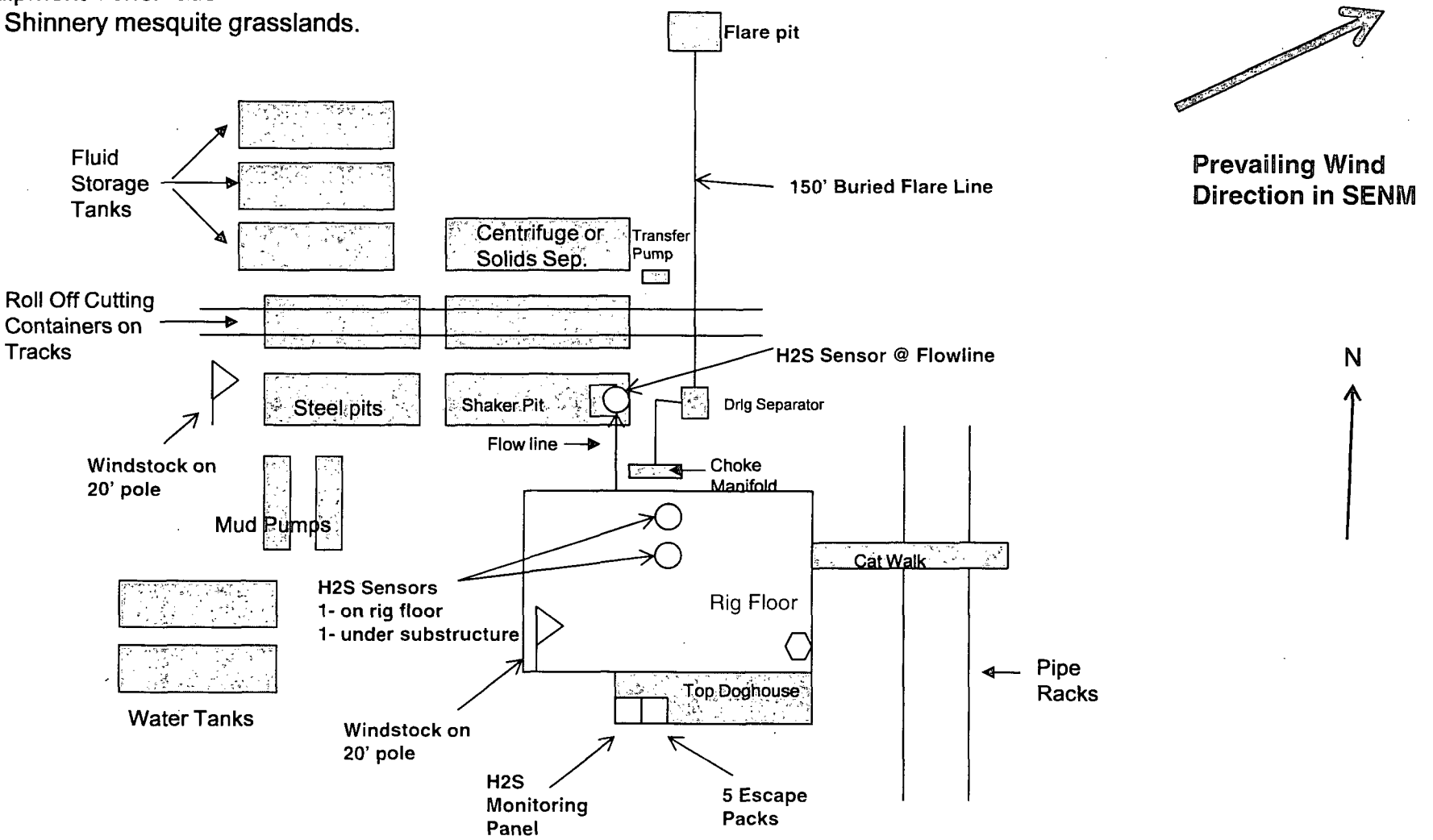


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

COG Operating, LLC
H_2S Equipment Schematic
Terrain: Shinnery mesquite grasslands.

Well pad will be 420' X 350'
with cellar in center of pad



COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

a. The hazards and characteristics of hydrogen sulfide (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

a. The effects of H2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
c. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H2S. If H2S greater than 100 ppm is encountered in the gas stream we will shut in and install H2S equipment.

a. Well Control Equipment:
   Flare line.
   Choke manifold with remotely operated choke.
   Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
   Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.

c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.

d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.

f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

WARNING

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

1. ***BEARDS OR CONTACT LENSES NOT ALLOWED***
2. ***HARD HATS REQUIRED***
3. ***SMOKING IN DESIGNATED AREAS ONLY***
4. ***BE WIND CONSCIOUS AT ALL TIMES***
5. ***CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SHERYL BAKER	575-748-6940	432-934-1873
KENT GREENWAY	575-746-2010	432-557-1694
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

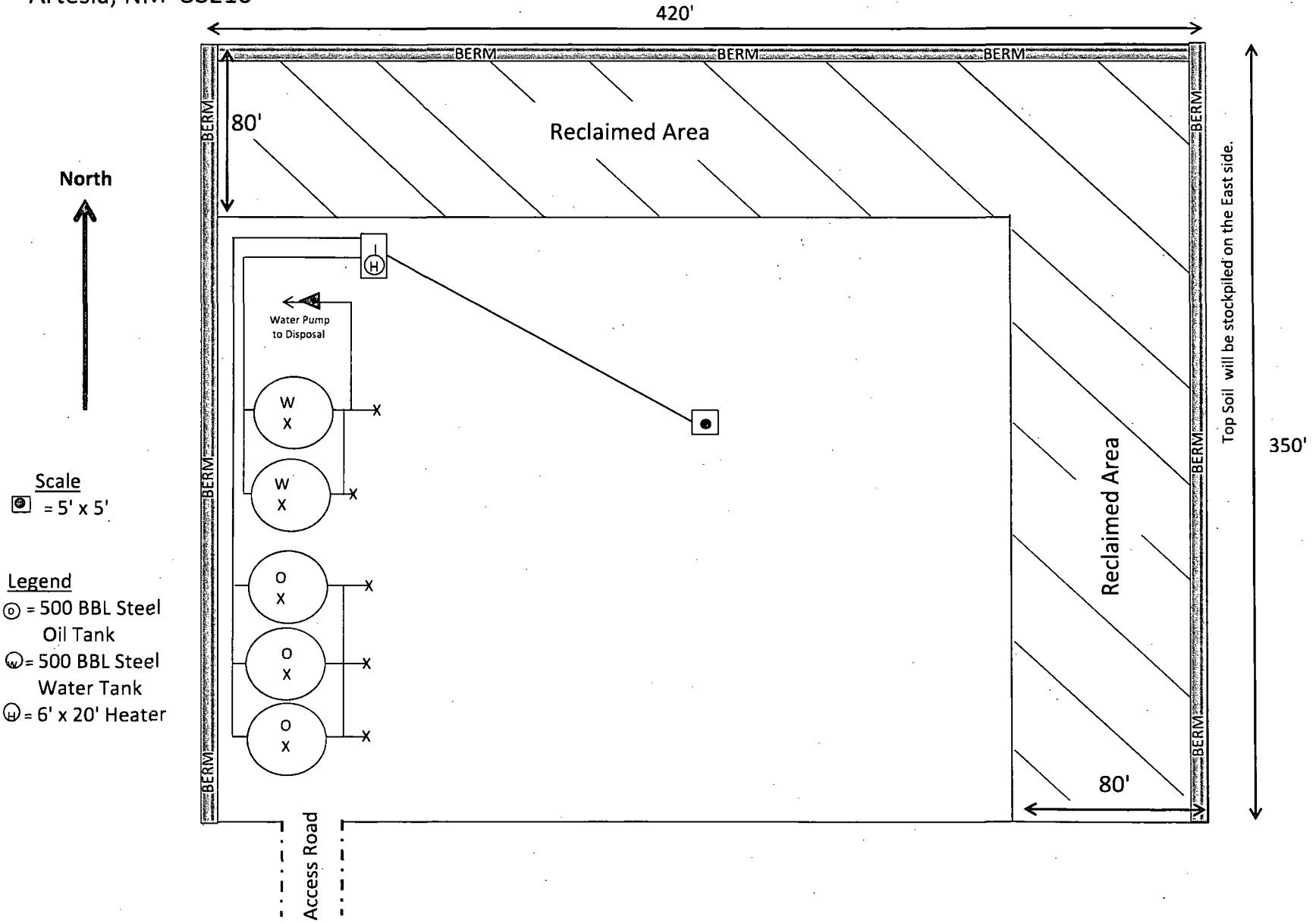
CONCHO

COG Operating LLC
2208 West Main
Artesia, NM 88210

Production Facility Layout

Caverns Federal Com #4H
Section 21-T26S-R25E

Exhibit 3



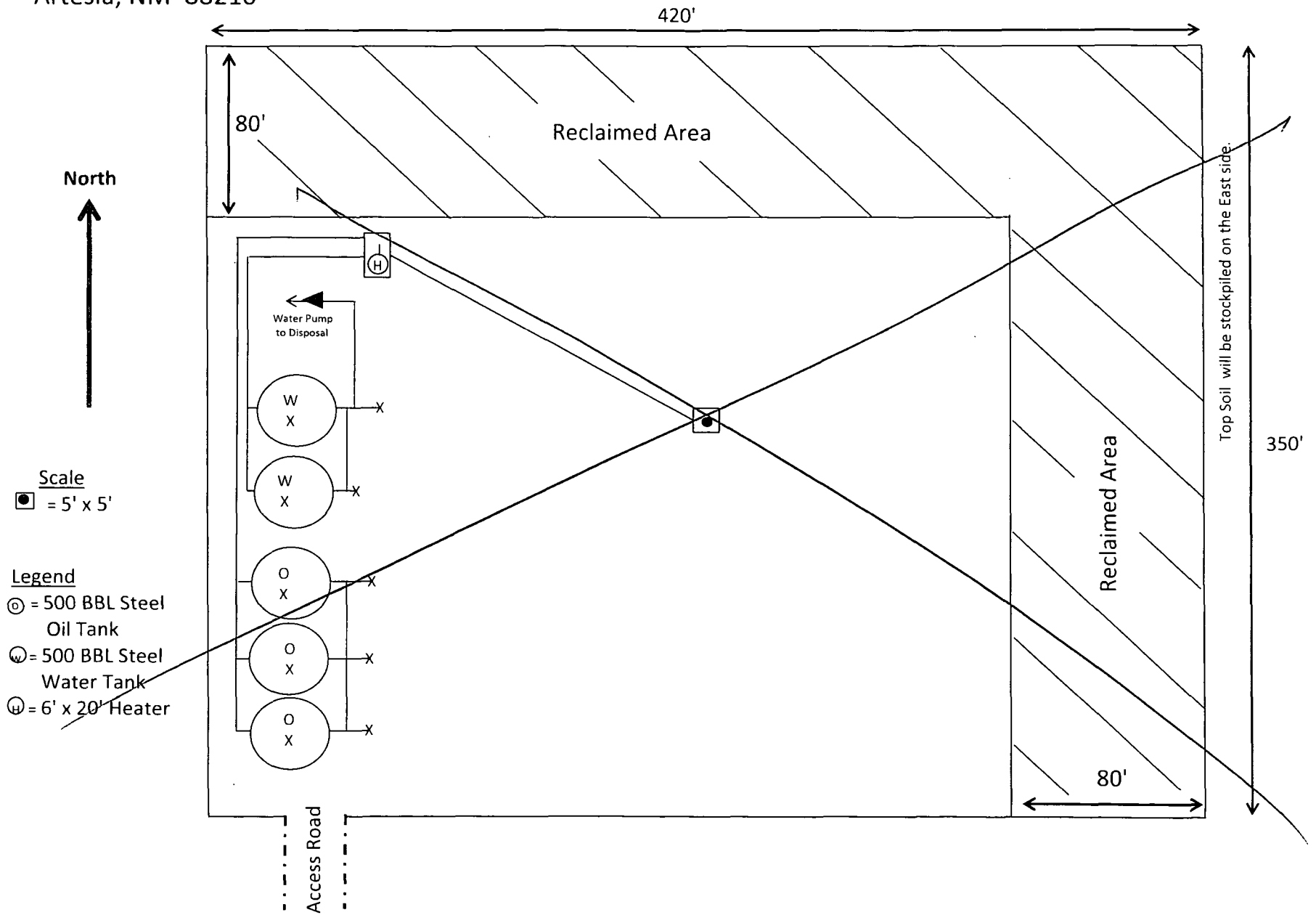
CONCHO

COG Operating LLC
2208 West Main
Artesia, NM 88210

Production Facility Layout

Caverns Federal #4H
Section 21-T26S-R25E

Exhibit 3



Surface Use & Operating Plan

Caverns Federal #4H

- Surface Tenant: Ronny Derrick, 2264 State Highway, Jal, NM 88252
- New Road: 21'
- Flow Line: On well pad.
- Facilities: Will be constructed on well pad – see Exhibit 3

- **Well Site Information**
  V Door: East
  Topsoil: East
  Interim Reclamation: North and East

Notes

Onsite: On-site was done by Indra Nahal (BLM); Gerald Herrera (COG) on May 29, 2014.

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.

B. All roads to the location are shown on the Location Verification Map Exhibit 2. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in Exhibit #2. The road shown in Exhibit #2 will be used to access the well.

C. Directions to location: See 600 x 600 plat

D. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in section 2 of this Surface Use and Operating Plan.

2. Proposed Access Road:

The Location Verification Map shows that 21' of new access road will be required for this location. If any road is required it will be constructed as follows:

The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

A. The average grade will be less than 1%.

B. No turnouts are planned.

C. No culvert, cattleguard, gates, low water crossings or fence cuts are necessary.

D. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from the nearest BLM approved caliche pit.

3. Location of Existing Well:

The One-Mile Radius Map shows existing wells within a one-mile radius of surface hole location and the bottom hole location.

4. Location of Existing and/or Proposed Facilities:

A. COG Operating LLC does not operate an oil production facility on this lease.

B. If the well is productive, contemplated facilities will be as follows:

1) A tank battery and facilities will be constructed as shown Exhibit 3.

2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.

3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.

4) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.

5) If the well is productive, rehabilitation plans will include the following:

- The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

5. Location and Type of Water Supply:

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Exhibit #2. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

6. Source of Construction Materials and Location "Turn-Over" Procedure:

Obtaining caliche: One primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well site. A caliche permit will be obtained from BLM prior to obtaining caliche. 2400 cubic yards is the maximum amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

B. An approximate 160' X 160' area is used within the proposed well site to remove caliche.

C. Subsoil is removed and stockpiled within the surveyed well pad.

D. When caliche is found, material will be stock piled within the pad site to build the location and road.

E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.

F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced.

G. Neither caliche, nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in the Well Site Layout or survey plat.

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit or other established mineral pit. A BLM mineral material permit will be acquired prior to obtaining any mineral material from BLM pits or land.

7. Methods of Handling Water Disposal:

A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.

B. Drilling fluids will be contained in steel mud pits.

C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.

D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.

E. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).

F. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

8. Ancillary Facilities:

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

9. Well Site Layout:

A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.

B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

10. Plans for Restoration of the Surface:

A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recountoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be re-seeded with a BLM approved mixture and re-vegetated as per BLM orders.

11. Surface Ownership:

A. The surface is owned by the U.S. Government and is administered by the Bureau of Land Management. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.

B. The surface tenant is Ronnie Derrick, 2264 State Highway, Hobbs, NM 88252.

C. The proposed road routes and surface location will be restored as directed by the BLM.

12. Other Information:

A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.

B. There is no permanent or live water in the immediate area.

C. There are no dwellings within 2 miles of this location.

D. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of NM, LLC., 2030 North Canal, Carlsbad, New Mexico, 88220, phone # 575-885-1352 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

13. Bond Coverage:

Bond Coverage is Statewide Bonds # NMB000740 and NMB000215

14. Lessee's and Operator's Representative:

The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

Sheryl Baker
Drilling Superintendent
COG Operating LLC
2208 West Main Street
Artesia, NM 88210
Phone (575) 748-6940 (office)
(432) 934-1873 (cell)

Ray Peterson
Drilling Manager
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
Phone (432) 685-4304 (office)
(432) 818-2254 (business)

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating, LLC.**
LEASE NO.:	**NMNM-104667**
WELL NAME & NO.:	**Caverns Federal Com 4H**
SURFACE HOLE FOOTAGE:	**0400' FNL & 0460' FWL**
BOTTOM HOLE FOOTAGE	**0330' FSL & 0380' FWL Sec. 33, T. 26 S., R 25 E.**
LOCATION:	**Section 21, T. 26 S., R 25 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Cave and Karst

** Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

Cave/Karst Surface Mitigation

The following stipulations will be applied to minimize impacts during construction, drilling and production.

Construction:
In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

No Blasting:
No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

Pad Berming:
The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located on to the east outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

Tank Battery Liners and Berms:
Tank battery locations and all facilities will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

Leak Detection System:

A method of detecting leaks **is required**. The method could incorporate gauges to measure loss, situating values and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

Automatic Shut-off Systems:
Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and ground water concerns:

Rotary Drilling with Fresh Water:
Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

Directional Drilling:
Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

Lost Circulation:
ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH.

ON TWO STRING DESIGN – CONTINGENCY CASING WILL BE REQUIRED IF LOST CIRCULATION (TOTAL LOSS) OCCURS WHILE DRILLING THE SURFACE HOLE. THE SURFACE HOLE WILL HAVE TO BE REAMED AND A LARGER CASING INSTALLED AND THE BLM IS TO BE CONTACTED PRIOR TO RUNNING THE CASING. NOTE: A DEEP CONDUCTOR WILL BE TREATED AND CEMENTED AS A CONTINGENCY CASING.

ON TWO STRING DESIGN WHERE THE SURACE CASING HAD A SUCCESSFUL CEMENT JOB; IF LOST CIRCULATION (TOTAL LOSS) OCCURS WHILE DRILLING THE PRODUCTION HOLE, THE CEMENT PROGRAM FOR THE PRODUCTION CASING WILL NEED TO BE MODIFIED AND THE BLM IS TO BE CONTACTED PRIOR TO RUNNING THE CASING. A DV TOOL WILL BE REQUIRED.

ON A THREE STRING DESIGN; IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

Abandonment Cementing:

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:
Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

Condition of Approval for protecting watershed:

- Surface disturbance will not be allowed (within 220 feet of the Ben Slaughter Draw drainage; or describe pad restriction).
- The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed.
- Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion.
- Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control.
- A silt barrier will be installed on the outside of the berm on the north and east sides of the pad. Silt screens, hay bails, excelcier logs, or other effective barrier may be used.

Drilling:

Communitization Agreement
A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales. In addition, the well sign shall include the surface and bottom hole lease numbers. If the Communitization Agreement number is known, it shall also be on the sign. If not, it shall be placed on the sign when the sign is replaced.

Watershed

- The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed.
- Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the **east edge of the well pad** as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation.The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing
The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width
The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing
Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching
Ditching shall be required on both sides of the road.

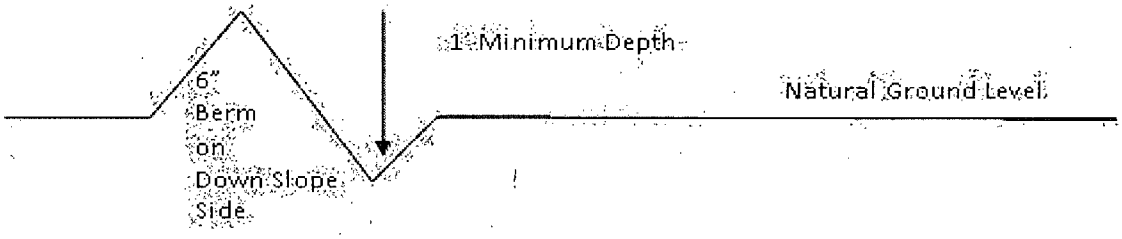
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

400 foot road with 4% road slope: $\frac{400'}{4\%} + 100' = 200'$ lead-off ditch interval

Cattleguards

An appropriately sized cattleguard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattleguards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguards that are in place and are utilized during lease operations.

Fence Requirement

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road
3. Redistribute topsoil
4. Revegetate slopes

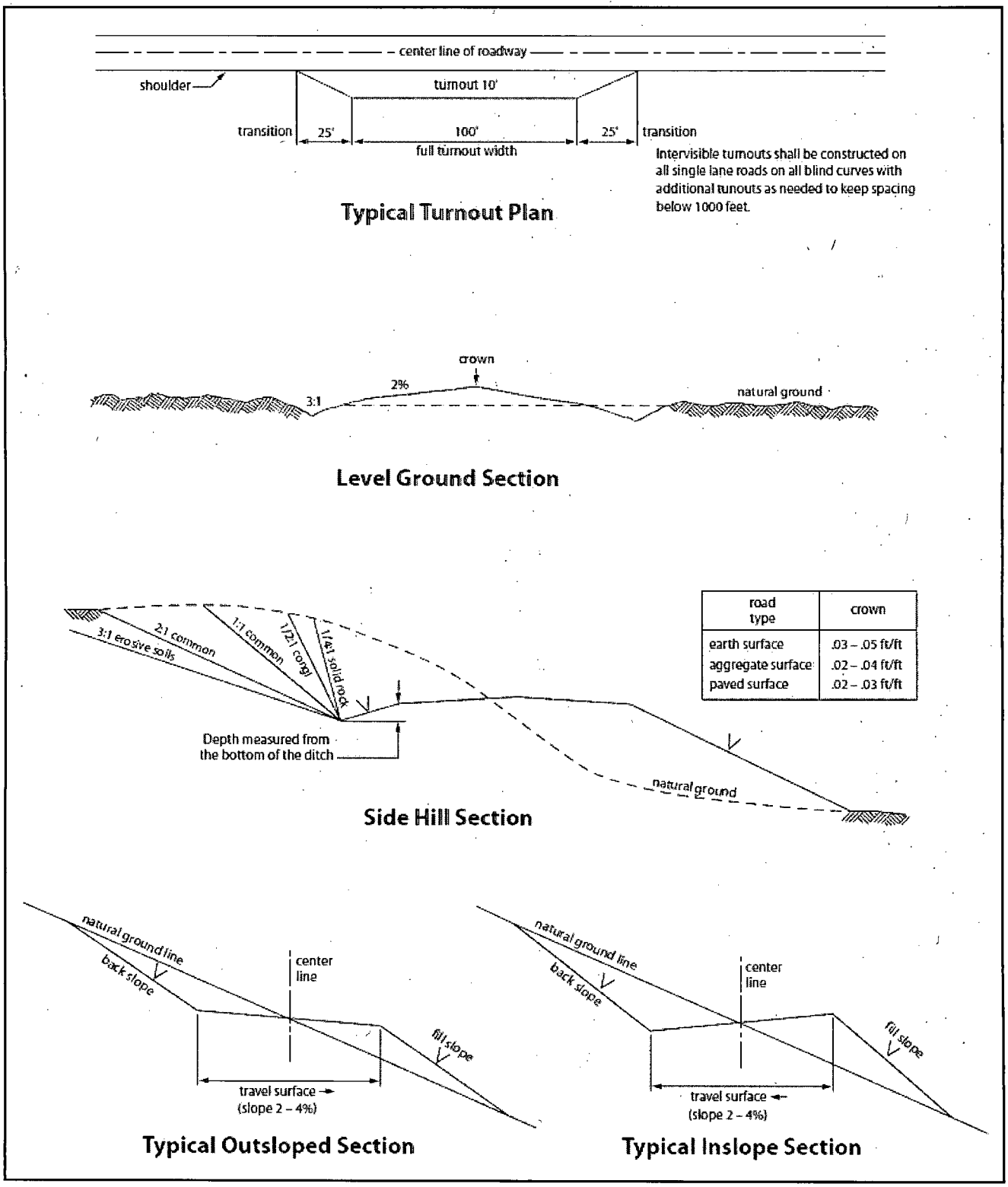


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

1. **Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Water Basin:
After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

High Cave/Karst.
Possibility of water flows in the Salado and Castile.
Possibility of lost circulation in the Salado and Delaware.
Abnormal pressure may be encountered within the 3rd Bone Spring Sandstone and Wolfcamp formation.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH. IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

1. The **13-3/8** inch surface casing shall be set at approximately **400** feet and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

    ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. Report results to BLM office.

Pilot hole is required to have a plug at the bottom of the hole. If two plugs are set, the BLM is to be contacted (575-361-2822) prior to tag of bottom plug, which must be a minimum of 200' in length. Operator can set one plug from bottom of pilot hole to kick-off point and save the WOC time for tagging the first plug.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

    ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.

2. Variance approved to use flex line from BOP to choke manifold. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. **Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi **(Installing 2M Annular)**.

    a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **5000 (5M)** psi. **5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

   a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

   b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

   c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

   d. The results of the test shall be reported to the appropriate BLM office.

   e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

   f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

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VIII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities
Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)
Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening
The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures
The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures
Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the

largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement
All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

IX. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

X. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by

drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture 4, for Gypsum Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Alkali Sacaton (*Sporobolus airoides*)	1.0
DWS Four-wing saltbush (*Atriplex canescens*)	5.0

DWS: DeWinged Seed

*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed