NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 30 2015 OCD Artesia

Form 3160-3
(March 2012)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR RECEIVED
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. BHL
SHL: State. UL "D, E, M": NMNM012559
UL "L": Fee

1a. Type of Work: ☑ DRILL ☐ REENTER

NMAT-14883

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.
Cottonmouth 23 Federal Com #2H

2. Name of Operator
COG Production LLC.

9. API Well No.
30-015-43015

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

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

10. Field and Pool, or Exploratory
Hay Hollow; Bone Spring

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 190' FNL & 330' FEL Unit Letter A (NWNW) Sec 22-T26S-R28E
At proposed prod. Zone 330' FSL & 990' FWL Unit Letter M (SWSW) Sec 23-T26S-R28E
UNORTHODOX LOCATION

11. Sec., T.R.M. or Blk and Survey or Area
Sec. 22 - T26S - R28E

14. Distance in miles and direction from nearest town or post office*
Approximately 13 miles from Malaga

12. County or Parish
Eddy

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
190'	NMNM012559: 1400	160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.	**19. Proposed Depth**	**20. BLM/BIA Bond No. on file**
SHL: 488' BHL: 4516'	TVD: 8,088' MD: 12,835'	NMB000860 &NMB000845
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	**22. Approximate date work will start***	**23. Estimated duration**
2979.8' GL	8/1/2014	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	Name *(Printed/Typed)*	Date
Mayte Reyes	Mayte Reyes	6-17-14

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
Steve Caffey		MAR 26 2015
Title	**Office**	
FIELD MANAGER	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

3/31/2015

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Approval Subject to General Requirements
& Special Stipulations Attached

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 Production 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 17th day of June, 2014.

Signed: Melanie 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

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 30 2015
RECEIVED

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
1301 W. GRAND AVENUE, 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
11885 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
11885 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015- 43015	30215	Hay Hollow; Bone Spring

Property Code	Property Name	Well Number
38980	COTTONMOUTH 23 FEDERAL COM	2H

OGRID No.	Operator Name	Elevation
217955	COG PRODUCTION, LLC	2979.8

Surface Location

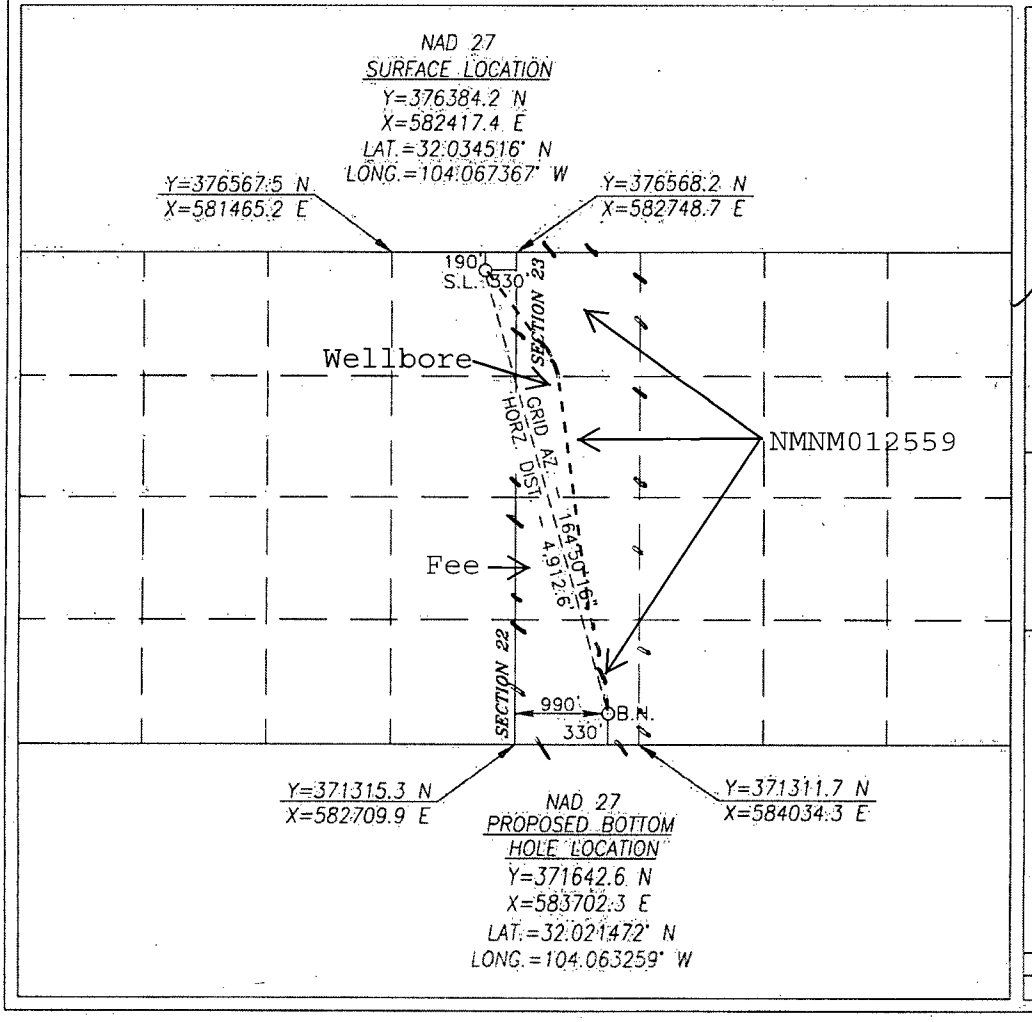
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	22	26-S	28-E		190	NORTH	330	EAST	EDDY

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
M	23	26-S	28-E		330	SOUTH	990	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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 6/16/14
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.

JANUARY 6, 2014
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

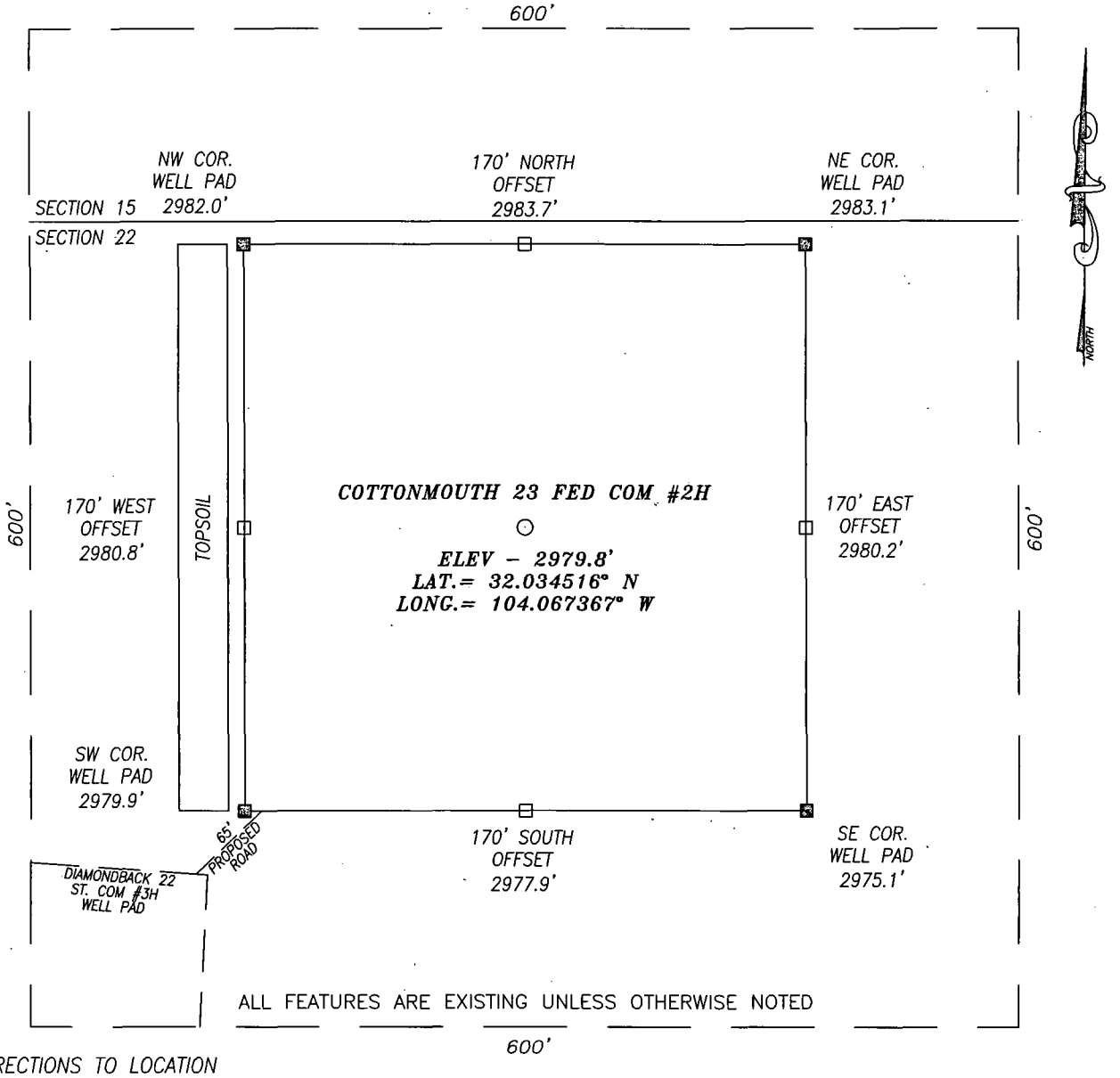
Chad Harcrow 1/29/14

Certificate No. CHAD HARCROW 17777

W.O. # 14-60 DRAWN BY: SP

SECTION 22, TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

HEADING SOUTH ON HWY 285 TURN RIGHT (WEST) ONTO CR #724 (WHITES CITY RD) AND GO APPROX. 0.9 MILE; THEN TURN LEFT (SOUTHEAST) AND GO APPROX. 1.0 MILE; THEN ROAD CURVES TO THE RIGHT (WEST) AND GO APPROX. 0.6 MILE; THEN TURN LEFT (SOUTHEAST) AND GO APPROX. 1.0 MILE TO THE EXISTING DIAMONDBACK 22 ST. COM #1H WELL PAD; THEN TURN LEFT (EAST) AND GO APPROX. 0.2 MILE TO THE EXISTING DIAMONDBACK 22 ST. COM #3H WELL PAD; GO TO NORTHEAST PAD CORNER; THEN PROPOSED WELL IS APPROX. 285 FEET NORTHEAST.

100 0 100 200 Feet

Scale: 1"=100'

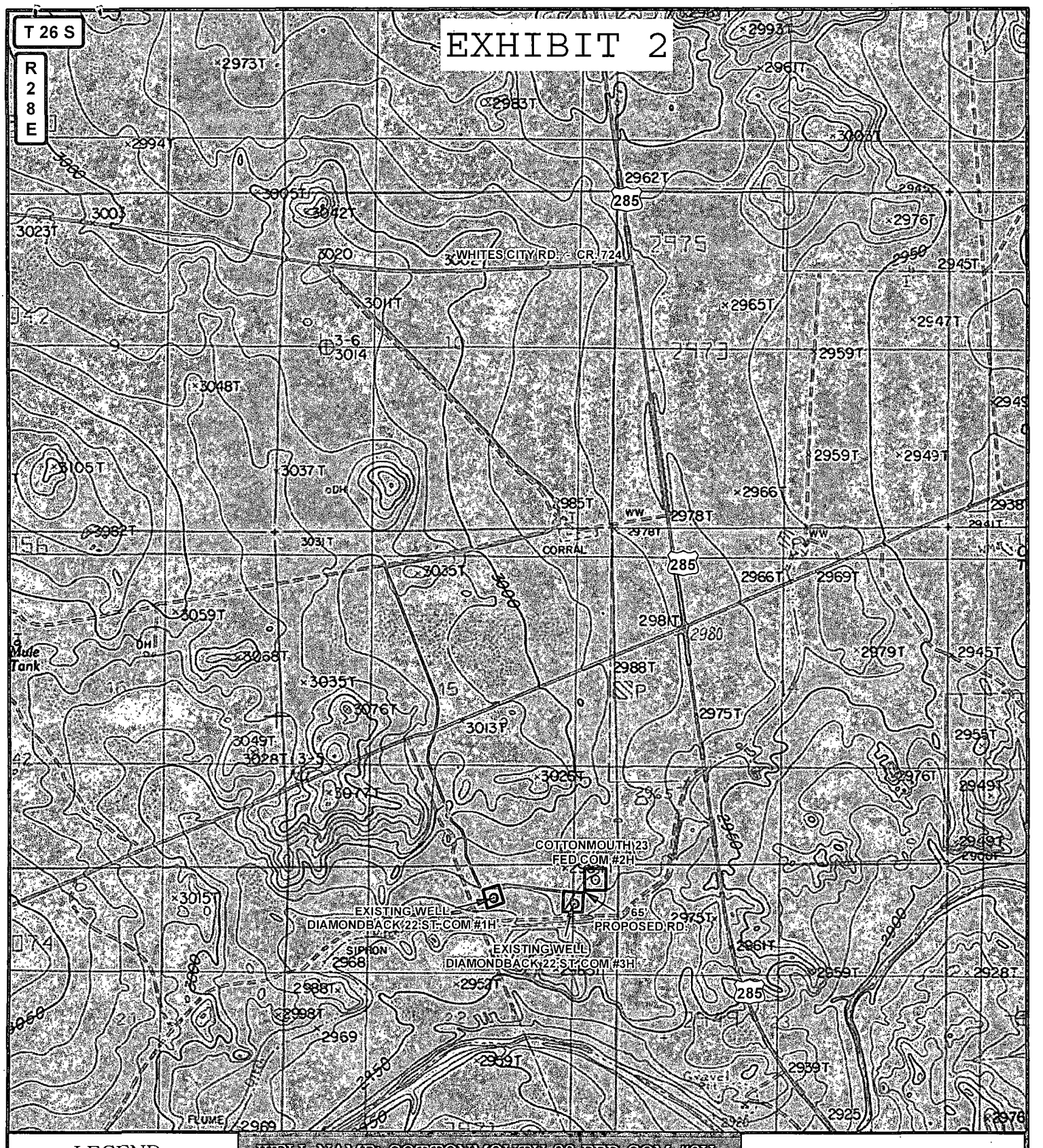
HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

COG PRODUCTION, LLC

COTTONMOUTH 23 FED COM #2H WELL
LOCATED 190 FEET FROM THE NORTH LINE
AND 330 FEET FROM THE EAST LINE OF SECTION 22,
TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: 01/06/2014		PAGE: 1 OF 1
DRAFTING DATE: 01/24/2014		
APPROVED BY: CH	DRAWN BY: SP	FILE: 14-60

EXHIBIT 2



LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

WELL NAME: COTTONMOUTH 23 FED COM #2H

SEC: 22	TWP: 26 S.	RGE: 28 E.	ELEVATION: 2979.8'
STATE: NEW MEXICO	COUNTY: EDDY		190' FNL & 330' FEL
W.O. # 14-60	LEASE: COTTONMOUTH 23 FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles 1 IN = 2,000 FT

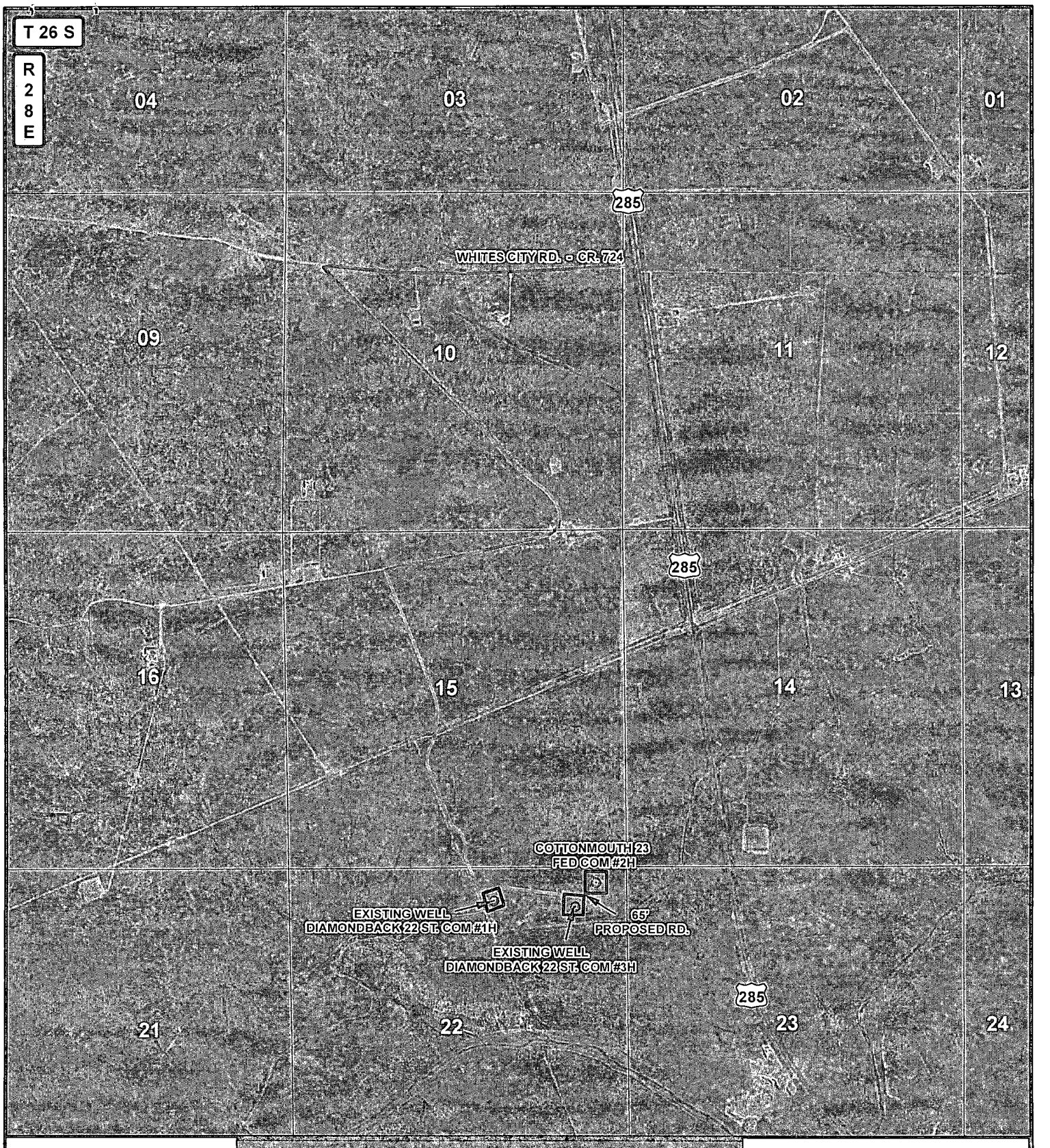
LOCATION MAP TOPO 01/24/2014 S.P.

CONCHO

COG PRODUCTION, LLC

N

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-3158
chad_harcrow77@yahoo.com



LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

WELL NAME: COTTONMOUTH 23 FED COM #2H

SEC: 22	TWP: 26 S.	RGE: 28 E.	ELEVATION: 2979.8'
STATE: NEW MEXICO		COUNTY: EDDY	190' FNL & 330' FEL
W.O. # 14-60	LEASE: COTTONMOUTH 23 FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles

1 IN = 2,000 FT

LOCATION MAP IMAGERY 01/24/2014 S.P.

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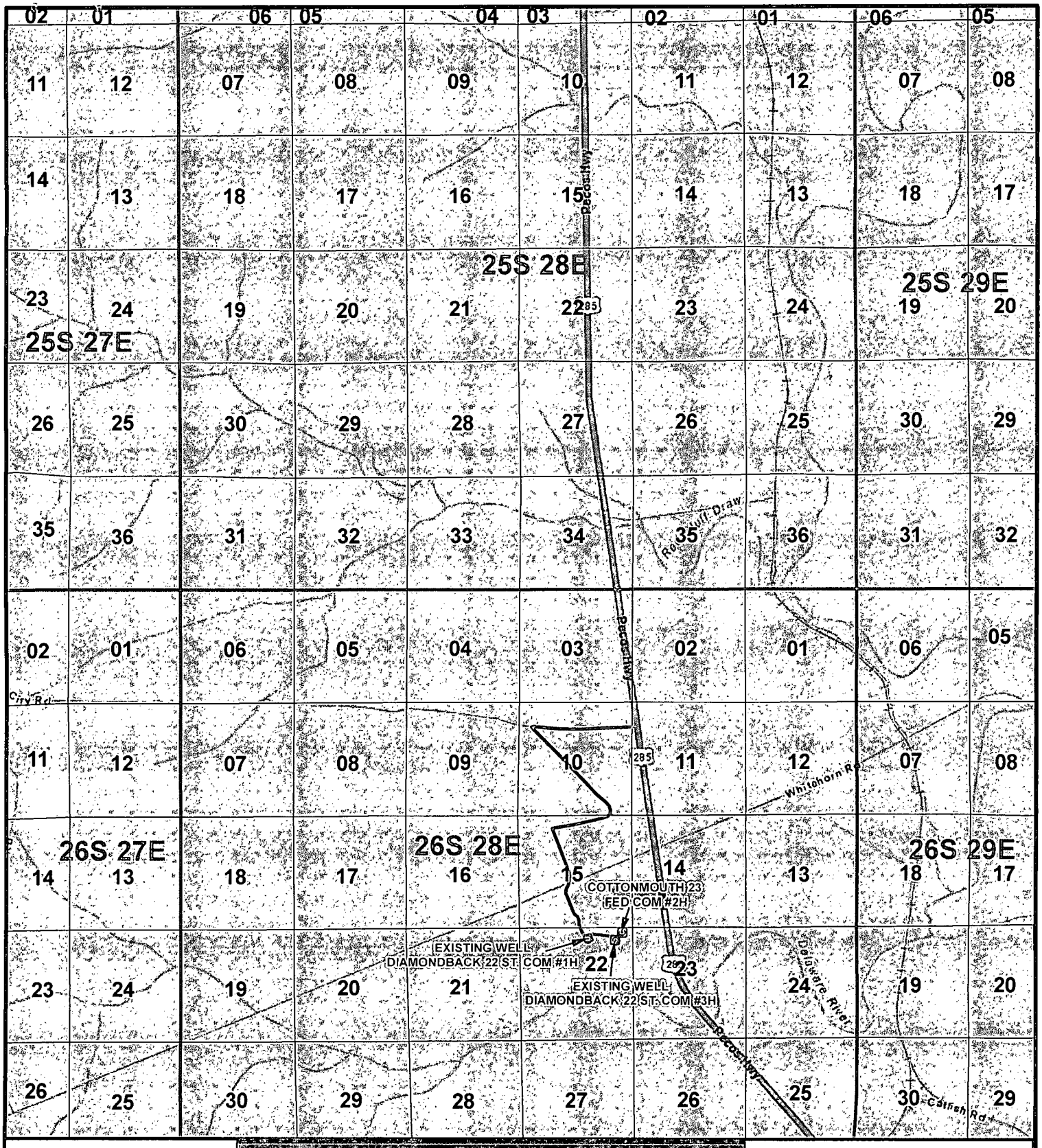

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

WELL NAME: COTTONMOUTH 23 FED COM #2H

SEC: 22 TWP: 26 S. RGE: 28 E. ELEVATION: 2979.8'

STATE: NEW MEXICO COUNTY: EDDY 190' FNL & 330' FEL

W.O. # 14-60 LEASE: COTTONMOUTH 23 FED COM SURVEY: N.M.P.M

0 2,500 5,000 7,500 10,000 12,500 15,000 FEET

0 0.4 0.8 1.6 Miles

1 IN = 6,000 FT

VICINITY MAP 01/24/2014 S.P.

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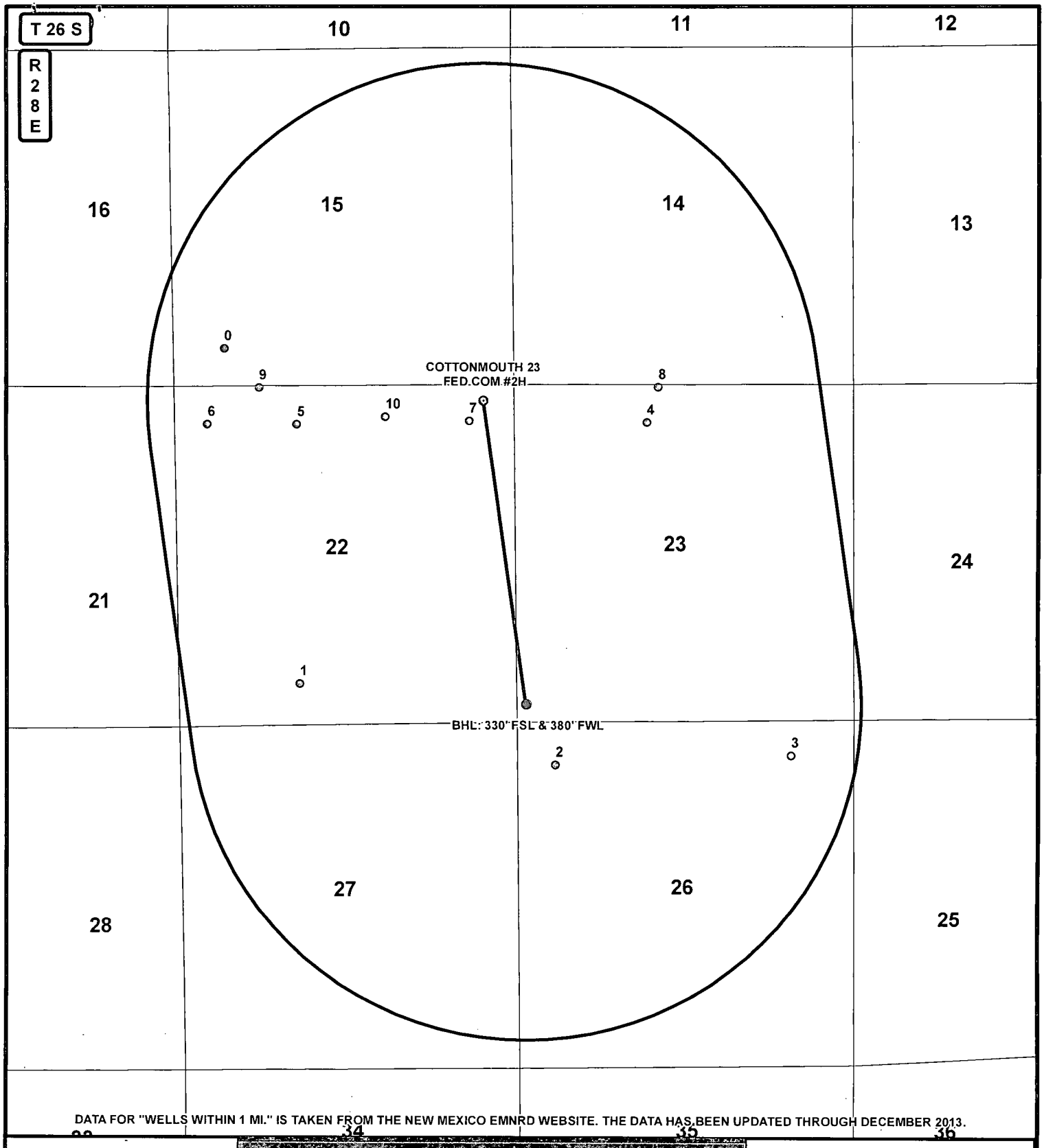

DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH DECEMBER 2013.

LEGEND

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

WELL NAME: COTTONMOUTH 23 FED COM #2H

SEC: 22 TWP: 26 S. RGE: 28 E. ELEVATION: 2979.8'

STATE: NEW MEXICO COUNTY: EDDY 190' FNL & 330' FEL

W.O. # 14-60 LEASE: COTTONMOUTH 23 FED COM SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles

1 IN = 2,000 FT

1 MILE MAP 01/24/2014 S.P.

N

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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	SUN OIL CO	STATE OF NM "B" 001	32.036889	-104.080989	3001502527	15	26.0S	28E	600	S	860	W	0	Plugged
1	BENNETT J	HUMBLE FOWLKES 001	32.022515	-104.077183	3001502531	22	26.0S	28E	660	S	1980	W	0	Plugged
2	BENNETT J	Sinclair 001	32.019029	-104.064224	3001502533	26	26.0S	28E	660	N	660	W	0	Plugged
3	MAX WILSON INC	ATLANTIC 001	32.019417	-104.052255	3001522690	26	26.0S	28E	547	N	930	E	0	Plugged
4	POGO PRODUCING CO	BRANTLEY FED 001	32.033712	-104.059545	3001523515	23	26.0S	28E	580	N	2130	W	0	Plugged
5	HARWICK OIL CO	AMINOIL ST 001	32.033636	-104.077313	3001524358	22	26.0S	28E	590	N	1980	W	0	Plugged
6	COG PRODUCTION, LLC	DIAMONDBACK 22 STATE COM 002H	32.03364	-104.081853	3001539105	22	26.0S	28E	580	N	580	W	10775	New (Not drilled or compl)
7	COG PRODUCTION, LLC	DIAMONDBACK 22 STATE COM 003H	32.033791	-104.068594	3001539861	22	26.0S	28E	550	N	660	E	10360	New (Not drilled or compl)
8	COG PRODUCTION, LLC	COTTONMOUTH 23 FEDERAL COM 001H	32.035209	-104.058978	3001539784	23	26.0S	28E	35	N	2310	W	8148	New (Not drilled or compl)
9	COG PRODUCTION, LLC	DIAMONDBACK 22 STATE COM 004H	32.035193	-104.079235	3001540816	22	26.0S	28E	20	N	1393	W	8071	New (Not drilled or compl)
10	COG PRODUCTION, LLC	DIAMONDBACK 22 STATE COM 001H	32.033962	-104.072811	3001538528	22	26.0S	28E	480	N	1960	E	12365	New (Not drilled or compl)

COG Production, LLC
DRILLING AND OPERATIONS PROGRAM
Cottonmouth 23 Federal Com 2H
SHL: 190' FNL & 330' FEL Section 22, T26S, R28E
BHL: 330' FSL & 380' FWL Section 23, T26S, R28E
Eddy County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Production LLC submits the following eleven items of pertinent information in accordance with BLM requirements.

1. Geological surface formation: Permian

2. The estimated tops of geologic markers & estimated depths at which anticipated water, oil or gas formations are expected to be encountered are as follows:

Fresh Water	300'	
Rustler	417'	
Salado	781'	
Fletcher	2363'	
Lamar Lime	2550'	
Bell Canyon	2597'	Oil
Cherry Canyon	3405'	Oil
Brushy Canyon	4621'	Oil
Bone Spring	6269'	Oil
Upper Avalon Shale	6589'	Oil
Lower Avalon Shale	6835'	Oil
First Bone Spring	7169'	Oil
Second Bone Spring	7881'	Oil
Third Bone Spring	8954'	Oil
Lateral TD MD	12,835'	
Lateral TD TVD	8088'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities.

The surface fresh water sands will be protected by setting 13-3/8" casing at ~~450'~~ 375' and circulating cement back to surface.

The salt sections will be isolated by setting 9-5/8" casing at ~~2575'~~ 2500' and circulating cement back to surface.

Other intervals will be isolated by setting 5 1/2" casing to total depth and circulating cement back to surface.

3. Proposed Casing Program: All casing is new and API approved

See COA

Hole Size	Depths	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' – ~~450'~~ 375'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 ¼"	0' – ~~2575'~~ 2500'	Intrmd	9 5/8"	New	36#	LTC	J-55	1.125	1.125	1.6
7 7/8"	0' – 12,835'	Prod, Vert, Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6

- While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.
- Will run one centralizer every other joint in lateral section of well.

4. Proposed Cement Program

a. 13-3/8" Surface — Tail: 450 sx Class C + 2% $CaCl_2$
(14.8 ppg / 6.35 gal/sk / 1.34 ft^3/sk)
**Calculated w/75% excess on OH volumes

b. 9 5/8" Intermediate: — Lead: 500 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /9.2 gal/sk / 1.75 ft^3/sk)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 6.35 gal/sk / 1.34 ft^3/sk)
**Calculated w/35% excess on OH volumes

c. 5 1/2" Production — Lead: 900 sx 50:50:10 H w/ 5% Salt, 5 pps Gilsonite, 0.125 pps CelloFlake, 0.3% CFR-3
(11.9 ppg / 14.07 gal/sk / 2.50 ft^3/sk)
Tail: 1000 sx 50:50:2 H w/ 1% salt, 0.4% GasStop, 0.3% CFR-3
(14.4 ppg / 5.66 gal/sk 1.25 ft^3/sk)
**Calculated w/55% excess on OH volumes

- The above cement volumes could be revised pending caliper measurements.
- All casing strings are designed to circulate cement to surface.

5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8" with minimum 2M annular preventer. Annular and remainder of system tested to 2000 psi by independent tester.

Nipple up on 9 5/8" with minimum 3M annular and double ram preventers. Annular will be tested to 2000 psi and remainder of system tested to 3000 psi by independent tester.

See COA

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.

A 2" kill line and a minimum 3" choke line will be included in the drilling spool located below the ram-type BOP. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold with 5000 psi WP rating.

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string depth or 1500 psig, whichever is greater, but not to exceed 70 percent of casing's minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action will be taken.

While drilling the intermediate section, if a reading of H2S is greater than 100 ppm, well will be shut-in and a remote operated choke will be installed.

6. Estimated BHP & BHT:

Lateral TD = 3529 psi
Lateral TD = 140° F

7. Mud Program: The applicable depths and properties of this system are as follows:

See COA

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' - ~~450'~~ 375'	Fresh Water	8.4 – 9.0	29	N.C.
~~450' - 2575'~~ 2500'	Brine	10.0 – 10.3	29	N.C.
~~2575' – 12,835'~~ (Lateral)	Cut Brine	8.7 – 9.2	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume totalizer, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. Auxiliary Well Control and Monitoring Equipment:

a. A Kelly cock will be in the drill string at all times.
b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 5 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

9. Testing, Logging and Coring Program:

a. Drill stem tests will be based on geological sample shows.
b. If open hole electrical logging is performed, the program will be:
   i. Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
   ii. Total Depth to Surface: Compensated Neutron with Gamma Ray
   iii. No cores are planned.
   iv. Additional testing will be initiated subsequent to setting the 5 1/2" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows and drill stem tests.

10. Potential Hazards:

a. No abnormal pressures or temperatures are expected. There is no known presence of H2S in this area. If H2S is encountered the operator will comply with the provisions of Onshore Oil and Gas Order No. 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. No H2S is anticipated to be encountered.

11. Anticipated starting date and Duration of Operations:

a. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.

COG Production LLC

Eddy County, N.M.
Section 22/23T26-S-R28-E,Cottonmouth 23 Fed Com #2
Cottonmouth 23 Federal Com #2H

Original Hole

Plan: Plan #1

Standard Planning Report

12 June, 2014

Stryker Directional
Planning Report

Database:	Stryker EDM	**Local Co-ordinate Reference:**	Well Cottonmouth 23 Federal Com #2H
Company:	COG Production LLC	**TVD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Project:	Eddy County, N.M.	**MD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Site:	Section 22/23 T26-S R28-E Cottonmouth 23 Fed Com #2	**North Reference:**	Grid
Well:	Cottonmouth 23 Federal Com #2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan #1		

Project Eddy County, N.M.

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 Section 22/23 T26-S R28-E Cottonmouth 23 Fed Com #2

Site Position:		**Northing:**	376,384.20 usft	**Latitude:**	32° 2' 4.257 N
From:	Map	**Easting:**	582,417.40 usft	**Longitude:**	104° 4' 2.521 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.14 °

Well Cottonmouth 23 Federal Com #2H

Well Position	**+N/-S**	0.0 usft	**Northing:**	376,384.20 usft	**Latitude:**	32° 2' 4.257 N
	+E/-W	0.0 usft	**Easting:**	582,417.40 usft	**Longitude:**	104° 4' 2.521 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	2,979.8 usft

Wellbore Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/10/2014	7.43	59.85	48,153

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	164.84

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	
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.00	0.00	0.00	0.00	
7,483.6	22.04	114.15	7,479.2	-14.3	31.8	12.00	12.00	0.00	114.15	
8,606.2	89.86	141.29	8,078.0	-616.0	655.4	6.27	6.04	2.42	28.97	Cottonmouth 23 Fe
9,763.0	89.87	175.99	8,080.8	-1,677.0	1,070.3	3.00	0.00	3.00	90.03	
12,835.2	89.87	175.99	8,088.0	-4,741.6	1,284.9	0.00	0.00	0.00	0.00	Cottonmouth 23 Fe

Stryker Directional
Planning Report

Database:	Stryker_EDM	**Local Co-ordinate Reference:**	Well Cottonmouth 23 Federal Com #2H
Company:	COG Production LLC	**TVD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Project:	Eddy County, NM	**MD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Site:	Section 22/23T26S-R28E Cottonmouth 23 Fed Com #2	**North Reference:**	Grid
Well:	Cottonmouth 23 Federal Com #2H	**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
1,300.0	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
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
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

Stryker Directional
Planning Report

Database:	Stryker_EDM	**Local Co-ordinate Reference:**	Well Cottonmouth 23 Federal Com #2H
Company:	COG Production LLC	**TVD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Project:	Eddy County N.M.	**MD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Site:	Section 22/23T26-S R28-E Cottonmouth 23 Fed Com #2	**North Reference:**	Grid
Well:	Cottonmouth 23 Federal Com #2H	**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)
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
5,700.0	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
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7300' MD KOP									
7,325.0	3.00	114.15	7,325.0	-0.3	0.6	0.4	12.00	12.00	0.00
7,350.0	6.00	114.15	7,349.9	-1.1	2.4	1.7	12.00	12.00	0.00
7,375.0	9.00	114.15	7,374.7	-2.4	5.4	3.7	12.00	12.00	0.00
7,400.0	12.00	114.15	7,399.3	-4.3	9.5	6.6	12.00	12.00	0.00
7,425.0	15.00	114.15	7,423.6	-6.7	14.8	10.3	12.00	12.00	0.00
7,450.0	18.00	114.15	7,447.5	-9.6	21.3	14.8	12.00	12.00	0.00
7,475.0	21.00	114.15	7,471.1	-13.0	28.9	20.1	12.00	12.00	0.00
7,483.6	22.03	114.15	7,479.1	-14.3	31.8	22.1	12.00	12.00	0.00
7483.6' Build 12°/100'									
7,500.0	22.94	115.43	7,494.3	-16.9	37.5	26.1	6.28	5.53	7.77
7,550.0	25.75	118.79	7,539.8	-26.3	55.8	40.0	6.27	5.62	6.73
7,600.0	28.63	121.53	7,584.3	-37.8	75.6	56.3	6.27	5.75	5.47
7,650.0	31.55	123.80	7,627.5	-51.4	96.6	74.8	6.27	5.84	4.54
7,700.0	34.50	125.72	7,669.5	-66.9	119.0	95.7	6.27	5.91	3.84
7,750.0	37.48	127.37	7,709.9	-84.4	142.6	118.8	6.27	5.96	3.30
7,800.0	40.48	128.81	7,748.8	-103.8	167.4	144.0	6.27	6.00	2.88
7,850.0	43.50	130.08	7,785.9	-125.1	193.2	171.2	6.27	6.03	2.55
7,900.0	46.52	131.22	7,821.3	-148.1	220.0	200.5	6.27	6.06	2.28
7,950.0	49.56	132.25	7,854.7	-172.9	247.7	231.6	6.27	6.08	2.06
8,000.0	52.61	133.20	7,886.1	-199.3	276.3	264.6	6.27	6.09	1.88
8,050.0	55.66	134.06	7,915.4	-227.2	305.6	299.2	6.27	6.11	1.74
8,100.0	58.72	134.87	7,942.5	-256.7	335.6	335.5	6.27	6.12	1.61
8,150.0	61.79	135.63	7,967.3	-287.5	366.2	373.2	6.27	6.13	1.51
8,200.0	64.86	136.34	7,989.7	-319.6	397.2	412.4	6.27	6.14	1.43
8,250.0	67.93	137.02	8,009.8	-352.9	428.6	452.8	6.27	6.14	1.36
8,300.0	71.00	137.67	8,027.3	-387.4	460.3	494.3	6.27	6.15	1.30
8,350.0	74.08	138.29	8,042.3	-422.8	492.3	536.8	6.27	6.15	1.25
8,400.0	77.16	138.90	8,054.7	-459.1	524.3	580.3	6.27	6.16	1.21
8,450.0	80.23	139.49	8,064.5	-496.2	556.3	624.5	6.27	6.16	1.18
8,500.0	83.32	140.07	8,071.7	-534.0	588.3	669.3	6.27	6.16	1.16
8,550.0	86.40	140.65	8,076.2	-572.4	620.0	714.6	6.27	6.16	1.15

Stryker Directional
Planning Report

Database:	Stryker EDM	**Local Co-ordinate Reference:**	Well Cottonmouth 23 Federal Com #2H
Company:	COG Production LLC	**TVD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Project:	Eddy County, NM	**MD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Site:	Section 22/23 T26S R28E Cottonmouth 23 Fed Com #2	**North Reference:**	Grid
Well:	Cottonmouth 23 Federal Com #2H	**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)
8,600.0	89.48	141.22	8,078.0	-611.2	651.5	760.3	6.27	6.16	1.14
8,606.2	89.86	141.29	8,078.0	-616.0	655.4	766.0	6.27	6.16	1.14
8606.2' MD LP									
8,700.0	89.86	144.10	8,078.2	-690.6	712.2	852.8	3.00	0.00	3.00
8,800.0	89.86	147.10	8,078.5	-773.1	768.7	947.2	3.00	0.00	3.00
8,900.0	89.86	150.10	8,078.7	-858.5	820.8	1,043.2	3.00	0.00	3.00
9,000.0	89.86	153.10	8,079.0	-946.4	868.4	1,140.6	3.00	0.00	3.00
9,100.0	89.86	156.10	8,079.2	-1,036.7	911.2	1,239.0	3.00	0.00	3.00
9,200.0	89.86	159.10	8,079.5	-1,129.2	949.3	1,338.2	3.00	0.00	3.00
9,300.0	89.86	162.10	8,079.7	-1,223.5	982.5	1,437.9	3.00	0.00	3.00
9,400.0	89.86	165.10	8,080.0	-1,319.4	1,010.8	1,537.9	3.00	0.00	3.00
9,500.0	89.86	168.10	8,080.2	-1,416.7	1,033.9	1,637.8	3.00	0.00	3.00
9,600.0	89.86	171.10	8,080.5	-1,515.0	1,052.0	1,737.4	3.00	0.00	3.00
9,700.0	89.86	174.10	8,080.7	-1,614.2	1,064.8	1,836.5	3.00	0.00	3.00
9,763.0	89.87	175.99	8,080.8	-1,677.0	1,070.3	1,898.5	3.00	0.00	3.00
9763' Build 3°/100									
9,800.0	89.87	175.99	8,080.9	-1,713.9	1,072.9	1,934.8	0.00	0.00	0.00
9,900.0	89.87	175.99	8,081.2	-1,813.6	1,079.9	2,032.9	0.00	0.00	0.00
10,000.0	89.87	175.99	8,081.4	-1,913.4	1,086.8	2,131.0	0.00	0.00	0.00
10,100.0	89.87	175.99	8,081.6	-2,013.1	1,093.8	2,229.1	0.00	0.00	0.00
10,200.0	89.87	175.99	8,081.9	-2,112.9	1,100.8	2,327.2	0.00	0.00	0.00
10,300.0	89.87	175.99	8,082.1	-2,212.6	1,107.8	2,425.4	0.00	0.00	0.00
10,400.0	89.87	175.99	8,082.3	-2,312.4	1,114.8	2,523.5	0.00	0.00	0.00
10,500.0	89.87	175.99	8,082.6	-2,412.2	1,121.8	2,621.6	0.00	0.00	0.00
10,600.0	89.87	175.99	8,082.8	-2,511.9	1,128.8	2,719.7	0.00	0.00	0.00
10,700.0	89.87	175.99	8,083.0	-2,611.7	1,135.7	2,817.8	0.00	0.00	0.00
10,800.0	89.87	175.99	8,083.3	-2,711.4	1,142.7	2,915.9	0.00	0.00	0.00
10,900.0	89.87	175.99	8,083.5	-2,811.2	1,149.7	3,014.0	0.00	0.00	0.00
11,000.0	89.87	175.99	8,083.7	-2,910.9	1,156.7	3,112.1	0.00	0.00	0.00
11,100.0	89.87	175.99	8,084.0	-3,010.7	1,163.7	3,210.2	0.00	0.00	0.00
11,200.0	89.87	175.99	8,084.2	-3,110.4	1,170.7	3,308.4	0.00	0.00	0.00
11,300.0	89.87	175.99	8,084.4	-3,210.2	1,177.7	3,406.5	0.00	0.00	0.00
11,400.0	89.87	175.99	8,084.7	-3,310.0	1,184.6	3,504.6	0.00	0.00	0.00
11,500.0	89.87	175.99	8,084.9	-3,409.7	1,191.6	3,602.7	0.00	0.00	0.00
11,600.0	89.87	175.99	8,085.1	-3,509.5	1,198.6	3,700.8	0.00	0.00	0.00
11,700.0	89.87	175.99	8,085.4	-3,609.2	1,205.6	3,798.9	0.00	0.00	0.00
11,800.0	89.87	175.99	8,085.6	-3,709.0	1,212.6	3,897.0	0.00	0.00	0.00
11,900.0	89.87	175.99	8,085.8	-3,808.7	1,219.6	3,995.1	0.00	0.00	0.00
12,000.0	89.87	175.99	8,086.1	-3,908.5	1,226.6	4,093.2	0.00	0.00	0.00
12,100.0	89.87	175.99	8,086.3	-4,008.2	1,233.5	4,191.3	0.00	0.00	0.00
12,200.0	89.87	175.99	8,086.5	-4,108.0	1,240.5	4,289.5	0.00	0.00	0.00
12,300.0	89.87	175.99	8,086.8	-4,207.8	1,247.5	4,387.6	0.00	0.00	0.00
12,400.0	89.87	175.99	8,087.0	-4,307.5	1,254.5	4,485.7	0.00	0.00	0.00
12,500.0	89.87	175.99	8,087.2	-4,407.3	1,261.5	4,583.8	0.00	0.00	0.00
12,600.0	89.87	175.99	8,087.5	-4,507.0	1,268.5	4,681.9	0.00	0.00	0.00
12,700.0	89.87	175.99	8,087.7	-4,606.8	1,275.5	4,780.0	0.00	0.00	0.00
12,800.0	89.87	175.99	8,087.9	-4,706.5	1,282.4	4,878.1	0.00	0.00	0.00
12,835.2	89.87	175.99	8,088.0	-4,741.6	1,284.9	4,912.6	0.00	0.00	0.00
12835.2' MD PBHL									

Stryker Directional
Planning Report

Database:	Stryker EDM	**Local Co-ordinate Reference:**	Well Cottonmouth 23 Federal Com #2H
Company:	COG Production LLC	**TVD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Project:	Eddy County, N.M.	**MD Reference:**	GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
Site:	Section 22/23T26-S-R28-E Cottonmouth 23 Fed Com #2	**North Reference:**	Grid
Well:	Cottonmouth 23 Federal Com #2H	**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
Cottonmouth 23 Fed (- plan hits target center - Point	0.00	0.01	8,078.0	-616.0	655.4	375,768.20	583,072.80	32° 1' 58.144 N	104° 3' 54.925 W
Cottonmouth 23 Fed (- plan hits target center - Point	0.00	0.01	8,088.0	-4,741.6	1,284.9	371,642.60	583,702.30	32° 1' 17.300 N	104° 3' 47.732 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
7,300.0	7,300.0	0.0	0.0	7300' MD KOP
7,483.6	7,479.1	-14.3	31.8	7483.6' Build 12°/100
8,606.2	8,078.0	-616.0	655.4	8606.2' MD LP
9,763.0	8,080.8	-1,677.0	1,070.3	9763' Build 3°/100
12,835.2	8,088.0	-4,741.6	1,284.9	12835.2' MD PBHL

COMPANY: COG Production LLC
WELL: Cottonmouth 23 Federal Com #2H
COUNTY: Eddy County, N.M.
DATUM: NAD 1927 (NADCON CONUS)
RIG: Silver Oak #7
GRID CORRECTION: To convert a Magnetic Direction to a Grid Direction, Add 7.29°

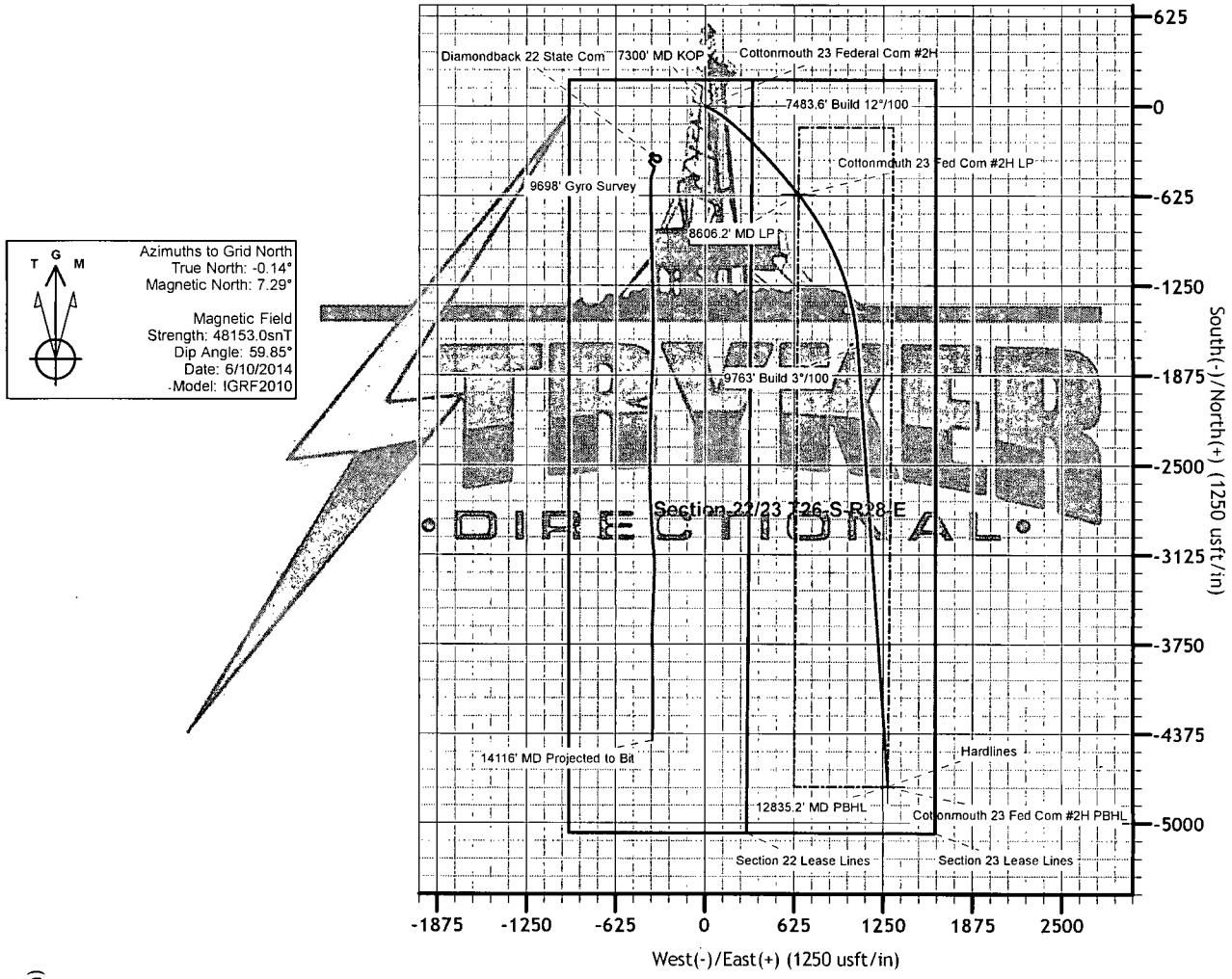
OFFICE: 936.582.7296

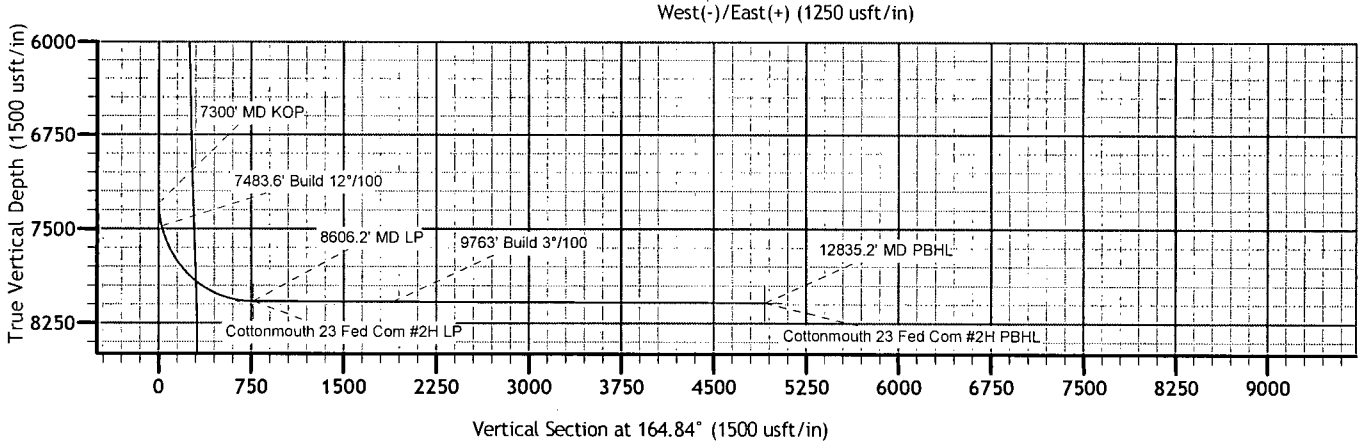
GEODETIC ZONE: New Mexico East 3001
GL 2979.8+17 @ 2996.8usft (Silver Oak #7)
GROUND ELEVATION: 2979.8

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	376384.20	582417.40	32° 2' 4.257 N	104° 4' 2.521 W	

PLAN SECTIONS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	7300.0	0.00	0.00	7300.0	0.0	0.0	0.00	0.00	0.0	
3	7483.6	22.04	114.15	7479.2	-14.3	31.8	12.00	114.15	22.1	
4	8606.2	89.86	141.29	8078.0	-616.0	655.4	6.27	28.97	766.0	Cottonmouth 23 Fed Com #2H LP
5	9763.0	89.87	175.99	8080.8	-1677.0	1070.3	3.00	90.03	1898.5	
6	12835.2	89.87	175.99	8088.0	-4741.6	1284.9	0.00	0.00	4912.6	Cottonmouth 23 Fed Com #2H PBHL





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

No records found.

PLSS Search:

Section(s): 23 **Township:** 26S **Range:** 28E

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

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

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

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

(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Code	Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 02160 S7			ED	3	3	1	22	26S	28E	586638	3543998*	300	120	180

Average Depth to Water: **120 feet**

Minimum Depth: **120 feet**

Maximum Depth: **120 feet**

Record Count: 1

PLSS Search:

Section(s): 22 **Township:** 26S **Range:** 28E

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

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

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

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

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Code	Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 01668			ED		3	3	12	26S	28E	589957	3546554*	250	100	150
C 02160			ED	4	1	2	14	26S	28E	589243	3546044*	300	120	180
C 02160 S			ED	1	1	2	14	26S	28E	589043	3546244*	300	120	180
C 02160 S2			ED	1	1	2	14	26S	28E	589043	3546244*	300	120	180
C 02160 S3			ED	2	2	1	14	26S	28E	588834	3546241*	300	120	180
C 02160 S4			ED	2	2	1	14	26S	28E	588834	3546241*	300	120	180
C 02160 S5			ED	1	1	1	14	26S	28E	588225	3546237*	300	120	180
C 02160 S6			ED	3	3	1	14	26S	28E	588232	3545635*	300	120	180
C 02160 S7			ED	3	3	1	22	26S	28E	586638	3543998*	300	120	180
C 02160 S8			ED	2	3	3	12	26S	28E	590056	3546653*	200	120	80
C 02160 S9			ED	3	3	2	02	26S	28E	589020	3548868*	300	120	180
C 02477		CUB	ED		1	1	03	26S	28E	586687	3549347*	150		
C 02478		CUB	ED		2	1	05	26S	28E	583848	3549325*	100		
C 02479		CUB	ED		4	4	10	26S	28E	587909	3546534*	200		
C 02480		CUB	ED		4	4	10	26S	28E	587909	3546534*	150		
C 02481		CUB	ED		1	1	14	26S	28E	588326	3546138*	200		
C 02894		C	ED	2	2	3	12	26S	28E	590458	3547061*	240		
C 02924		C	ED	1	3	2	11	26S	28E	589032	3547451*			

Average Depth to Water: **118 feet**

Minimum Depth: **100 feet**

Maximum Depth: **120 feet**

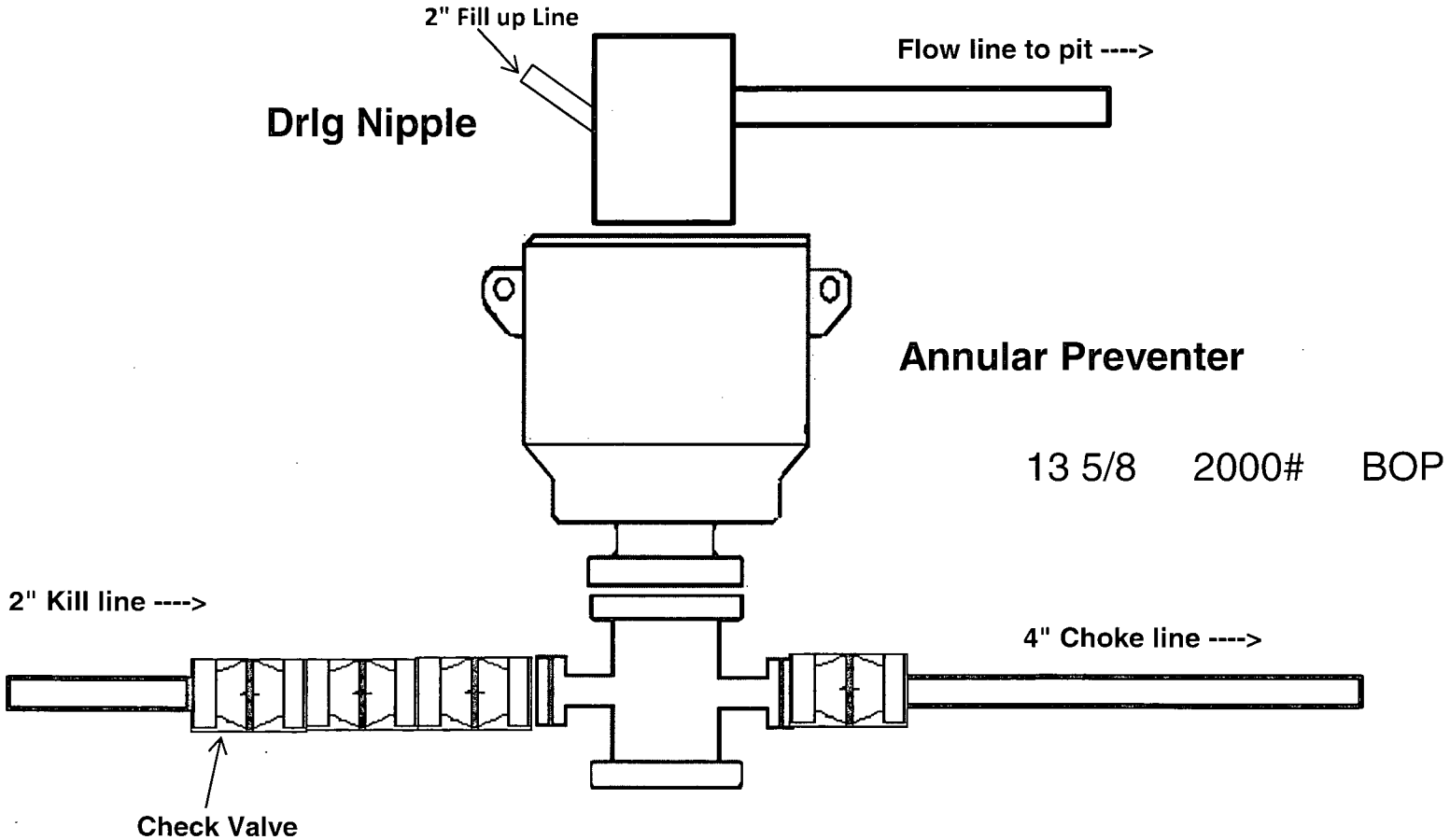
Record Count: 18

PLSS Search:

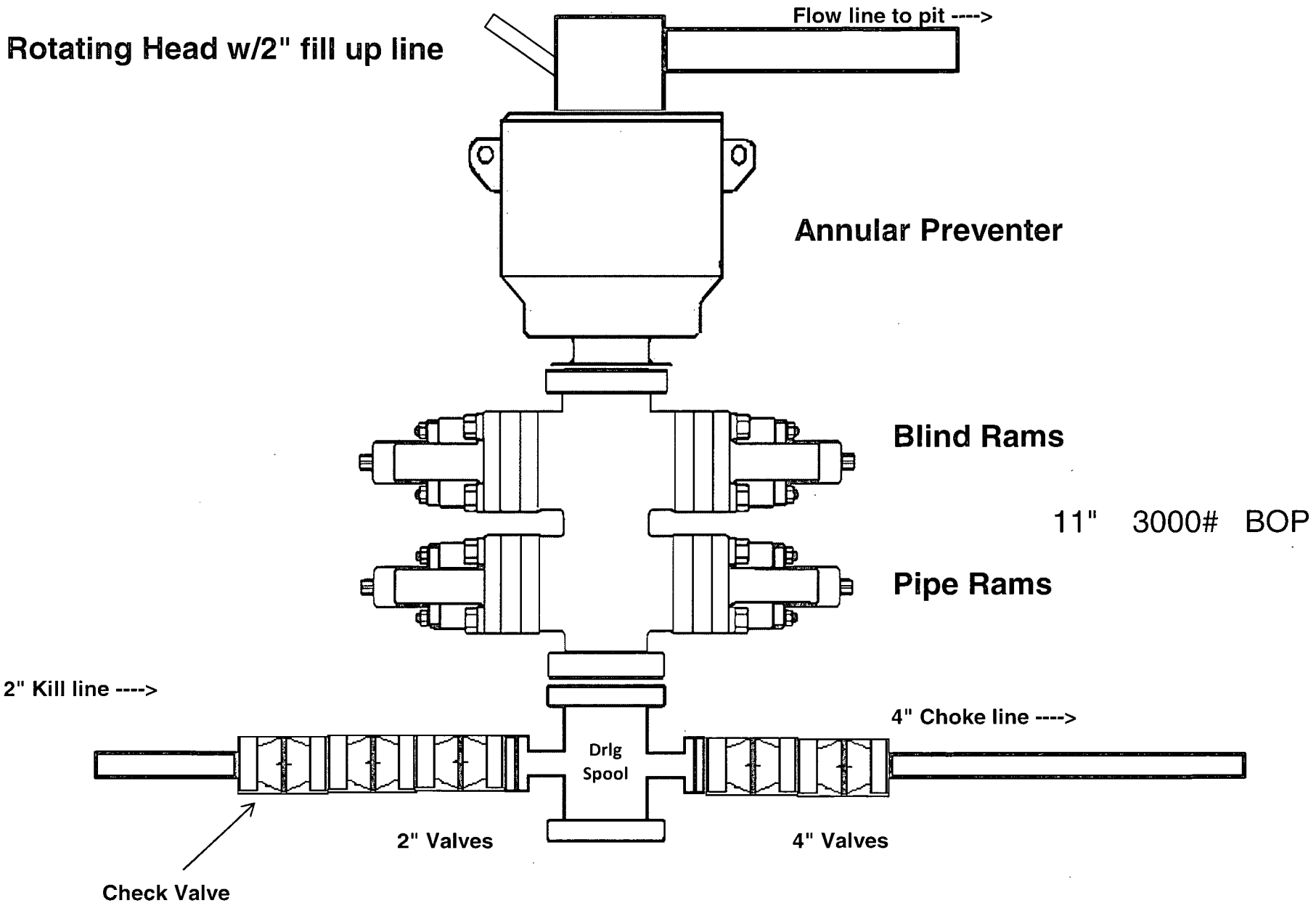
Township: 26S **Range:** 28E

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

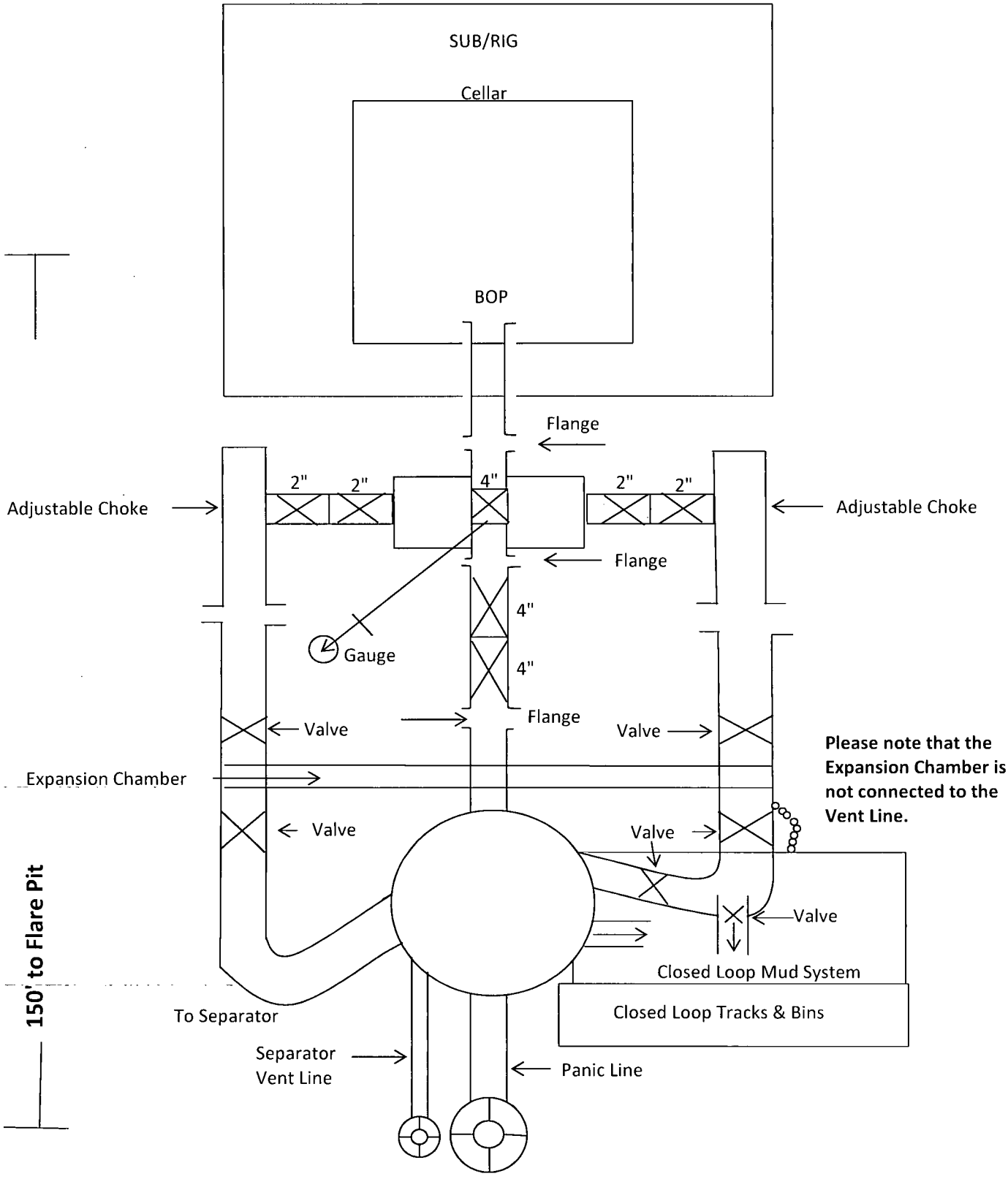
2,000 psi BOP Schematic



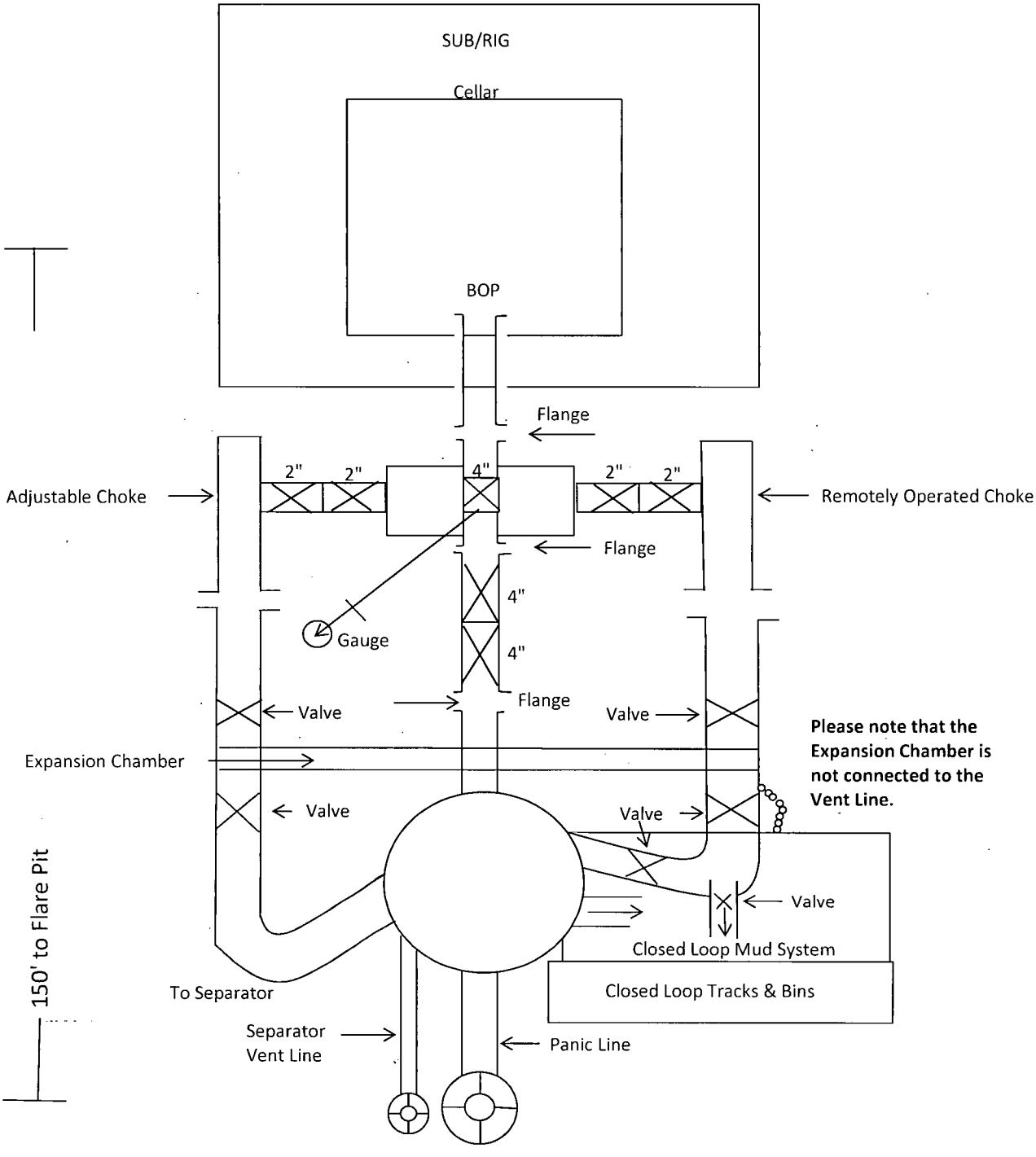
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



COG Production LLC

Rig Plat & Closed Loop Equipment Diagram

Well pad will be 340' X 340' with cellar in center of pad

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

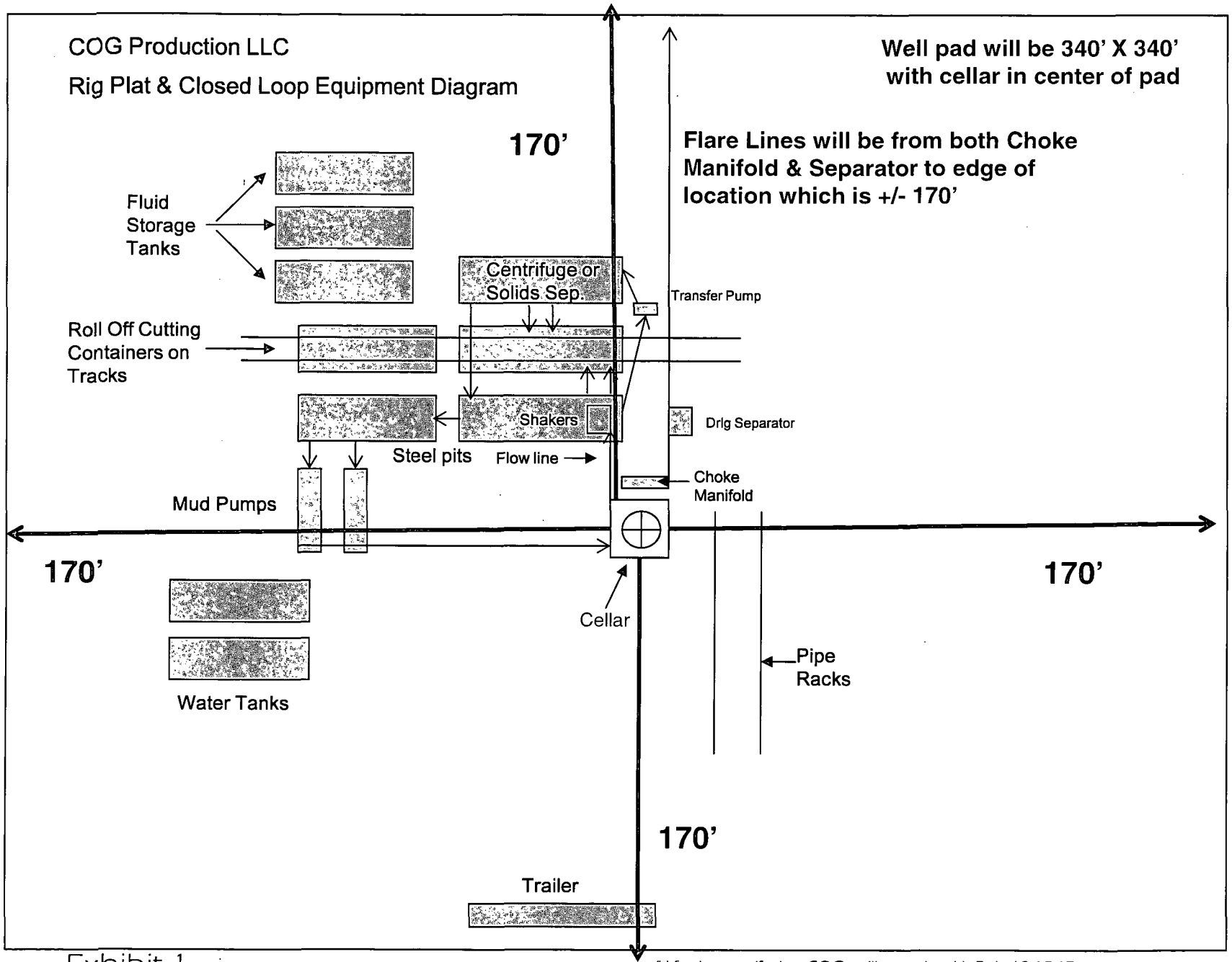


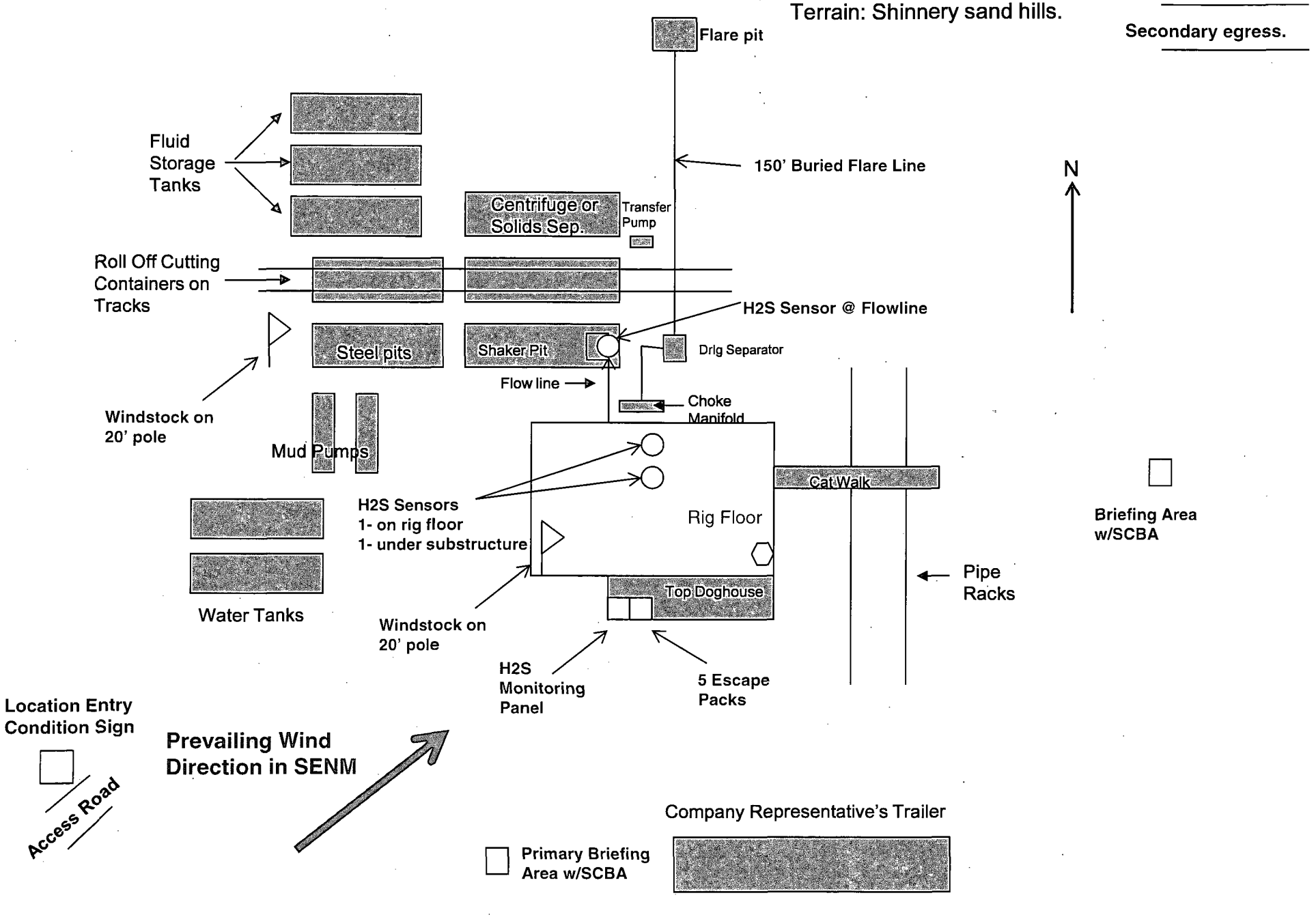
Exhibit 1

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

Well pad will be 340' X 340' with cellar in center of pad

COG Production LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.

Secondary egress.



COG PRODUCTION 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 PRODUCTION 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 PRODUCTION LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG PRODUCTION 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

COG Production LLC
2208 West Main
Artesia, NM 88210

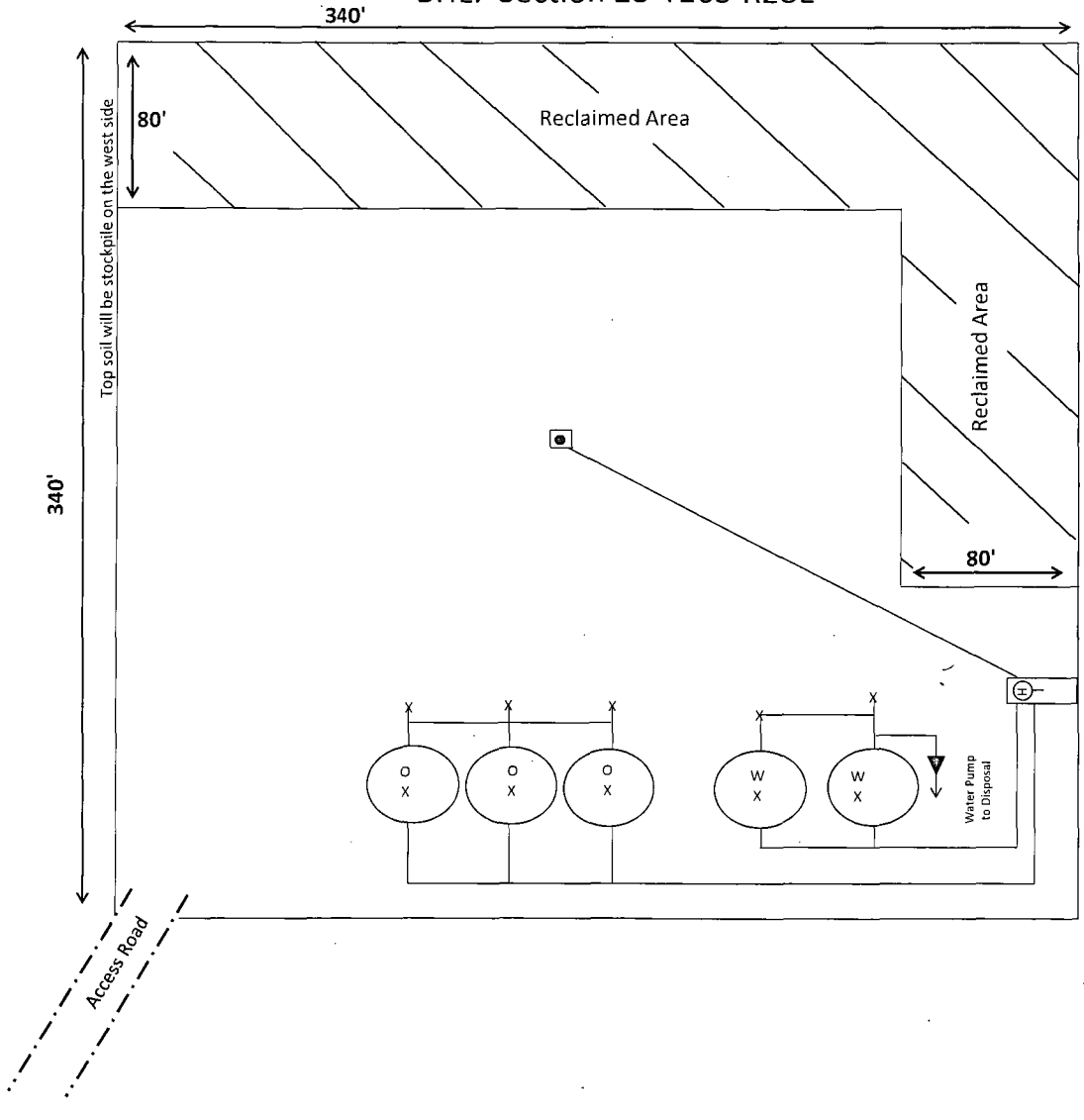
Production Facility Layout

Cottonmouth 23 Federal Com #2H

SHL: Section 22-T26S-R28E

BHL: Section 23-T26S-R28E

Exhibit 3



North

Scale
= 5' x 5'

Legend
O = 500 BBL Steel Oil Tank
W = 500 BBL Steel Water Tank
H = 6' x 20' Heater

Surface Use & Operating Plan

Cottonmouth 23 Federal Com #2H

- Surface Owner: State of New Mexico
- New Road: 65'
- Flow Line: On well pad
- Facilities: Will be constructed on well pad – see Exhibit 3

Well Site Information

V Door: East

Topsoil: West

Interim Reclamation: North & East

Notes

Onsite: On-site was done by Tanner Nygren (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 65' 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 proposed wellbore.

4. Location of Existing and/or Proposed Facilities:

A. COG Production 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 and facilities will be constructed as shown on 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 State of New Mexico. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.

B. A well pad business lease will be obtained from NM State Land Office.

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 # NMB000860 and NMB000845

14. Lessee's and Operator's Representative:

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

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

Ray Peterson
Drilling Manager
COG Production 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 Production, LLC**
LEASE NO.:	**NMNM-12559**
WELL NAME & NO.:	**Cottonmouth 23 Federal Com 2H**
SURFACE HOLE FOOTAGE:	**0190' FNL & 0330' FEL**
BOTTOM HOLE FOOTAGE	**0330' FSL & 0990' FWL Sec. 23, T. 26 S., R 28 E.**
LOCATION:	**Section 22, T. 26 S., R 28 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

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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 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.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

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.

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.

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 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.

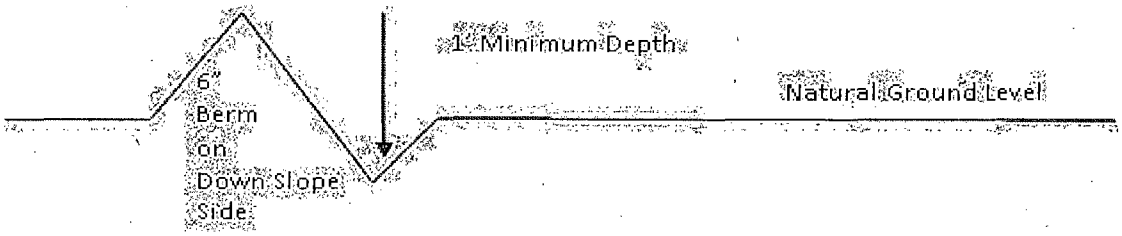
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

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

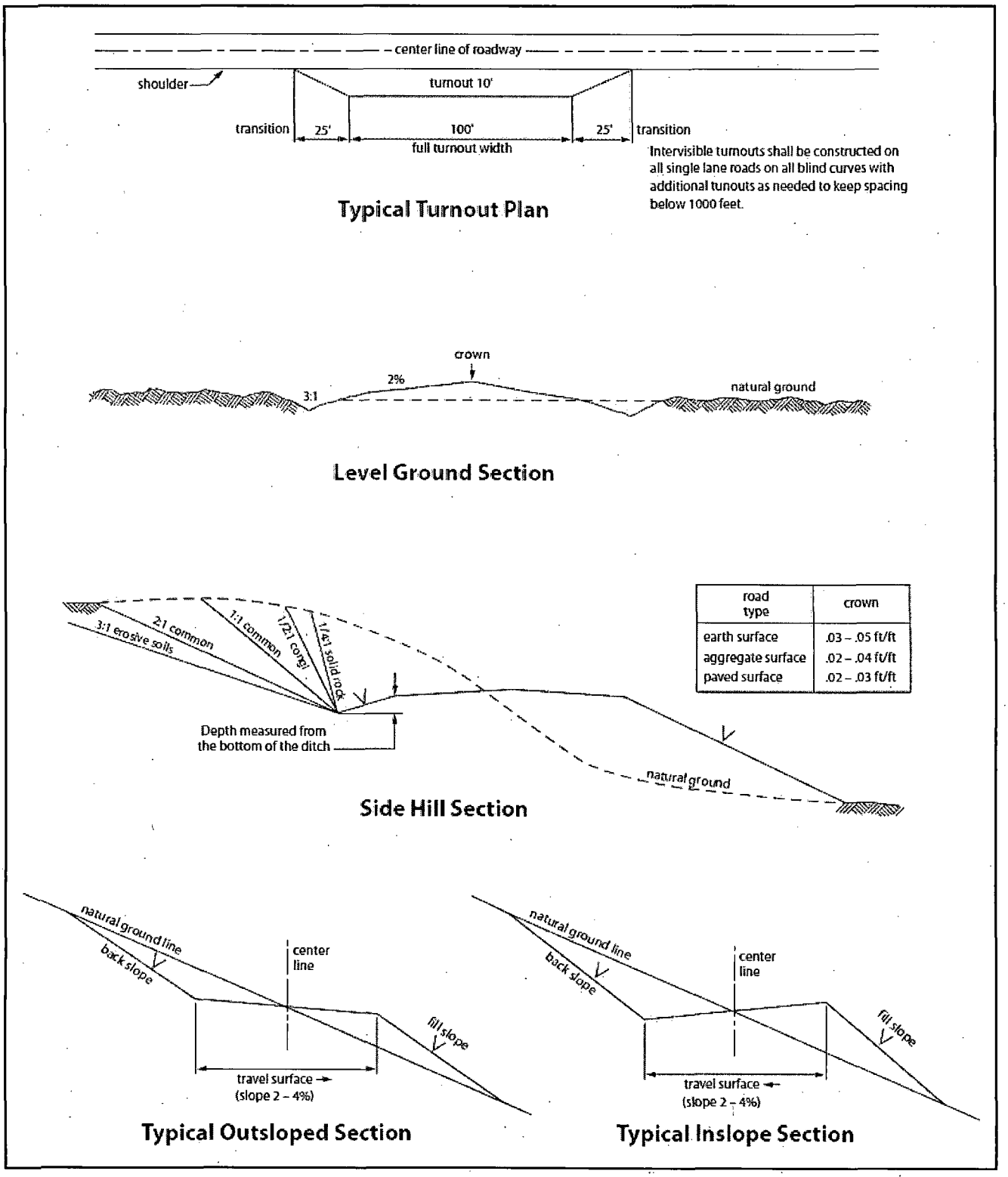


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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. **Although there are no measured amounts of Hydrogen Sulfide reported, it is always a potential hazard. Operator has stated that they will have monitoring equipment in place prior to drilling out of the surface shoe. 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 Rustler top and 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 Rustler and Delaware.

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 **375** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) 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, which shall be set at approximately **2500** feet **(top of the Lamar Limestone or basal anhydrite of the Castiler formation),** 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.**

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 RP 53 Sec. 17.

2. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

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.

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 **3000 (3M)** psi.

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**.

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).