Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

5. Lease Serial No.
NMNM103595

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
CALI ROLL 24 FEDERAL COM 2H

2. Name of Operator
COG OPERATING LLC
Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

9. API Well No.
30-015-39388-00-X1

3a. Address
ONE CONCHO CENTER 600 W ILLINOIS AVENUE
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 575.748.6945

10. Field and Pool, or Exploratory
WILDCAT

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 24 T26S R25E NENE 330FNL 430FEL

11. County or Parish, and State
EDDY COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original A PD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Operating LLC, respectfully requests approval for the following drilling changes to the original approved APD.

NM OIL CONSERVATION
ARTESIA DISTRICT
JUN 29 2015
RECEIVED

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Accepted for record
NMOCD
7/31/2015

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #306343 verified by the BLM Well Information System
For COG OPERATING LLC, sent to the Carlsbad
Committed to AFMSS for processing by JENNIFER SANCHEZ on 06/24/2015 (15JAS0413SE)

Name *(Printed/Typed)* MAYTE X REYES — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 06/24/2015

APPROVED
JUN 24 2015
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ Title _____ Date _____

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

COG Operating LLC, Cali Roll 24 Federal 2H

COG, Operating, LLC respectfully requests the following modifications to the approved drilling plan based on recently drilled offsets.

Geologic Formations

TVD of target	8070'	Pilot hole depth	NA
MD at TD:	17868'	Deepest expected fresh water:	50'

Casing Program

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.
12.25"	0'	1640'	9-5/8"	36	J55	LTC
8.75"	0'	17868'	5-1/2"	17	P110	BTC

Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Inter.	345	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 1% CaCl2
	200	14.8	1.34	6.4	6	Tail: Class C + 1% CaCl2
Prod.	730	10.3	3.52	21.3	75	Lead: Halliburton Tuned Lite w/ 2# kolseal, 1.5# salt, 1/4# D-Air 5000, 1/8# PEF, etc
	2450	14.4	1.25	5.7	22	Tail:50:50:2 H blend (FR, Retarder, FL adds as necessary)

Casing String	TOC	% Excess
Intermediate	0'	83%
Production	*1340'	35%

*Production cement is designed to overlap into intermediate casing 300'.

Pilot hole depth: NA

KOP: 7593'

N	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.

Is this a walking operation? Yes. Will walk to and drill Glacier Federal Com 1H after this well.
Will be pre-setting casing? No.
Will well be hydraulically fractured? Yes.

If you move rig prior to setting + cementing the production string, you will need approval.

Attachments
- Revised Directional Plan
- Flex hose certification

CONCHO

COG Operating, LLC

Eddy County, NM (NAD 83)
Sec 24, T26S, R25E
Cali Roll 24 Federal Com #2H

Wellbore #1

Plan: Design #2

DDC Well Planning Report

25 March, 2015

DDC
The DIRECTIONAL DRILLING COMPANY

Database:	Compass	Local Co-ordinate Reference:	Well Cali Roll 24 Federal Com #2H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Project:	Eddy County, NM (NAD 83)	MD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Cali Roll 24 Federal Com #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Project Eddy County, NM (NAD 83)

Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Sec 24, T26S, R25E

Site Position:		Northing:	376,201.46 usft	Latitude:	32° 2' 3.327 N
From:	Map	Easting:	538,606.31 usft	Longitude:	104° 20' 31.730 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.00 °

Well Cali Roll 24 Federal Com #2H

Well Position	+N/-S	0.0 usft	Northing:	376,201.46 usft	Latitude:	32° 2' 3.327 N
	+E/-W	0.0 usft	Easting:	538,606.31 usft	Longitude:	104° 20' 31.730 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,547.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/7/2014	7.57	59.81	48,127

Design Design #2

Audit Notes:

Version:		Phase:	PLAN	Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	179.68

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	
7,593.2	0.00	0.00	7,593.2	0.0	0.0	0.00	0.00	0.00	0.00	
8,369.2	93.12	179.68	8,070.0	-503.4	2.8	12.00	12.00	23.16	179.68	
12,872.4	93.12	179.68	7,825.0	-4,999.9	27.9	0.00	0.00	0.00	0.00	Intermediate Target C
12,957.4	91.42	179.68	7,821.6	-5,084.8	28.4	2.00	-2.00	0.00	179.93	
17,868.2	91.42	179.68	7,700.0	-9,994.0	55.6	0.00	0.00	0.00	0.00	PBHL Cali Roll 24 Fe

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Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Cali Roll 24 Federal Com #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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
Rustler									
65.0	0.00	0.00	65.0	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
TOS									
389.0	0.00	0.00	389.0	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
BOS (Fletcher)									
1,433.0	0.00	0.00	1,433.0	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
LMAR (Top Delaware)									
1,620.0	0.00	0.00	1,620.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
1,664.0	0.00	0.00	1,664.0	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
CYCN									
2,523.0	0.00	0.00	2,523.0	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
BYCN									
3,632.0	0.00	0.00	3,632.0	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

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Well:	Cali Roll 24 Federal Com #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
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
Bone Sprg (BSGL)									
5,129.0	0.00	0.00	5,129.0	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
U Avalon Sh									
5,236.0	0.00	0.00	5,236.0	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
L Avalon S									
5,553.0	0.00	0.00	5,553.0	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
FBSG_sand									
6,017.0	0.00	0.00	6,017.0	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
SBSG_sand									
6,718.0	0.00	0.00	6,718.0	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
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 12° / 100'									
7,593.2	0.00	0.00	7,593.2	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.82	179.68	7,600.0	0.0	0.0	0.0	12.00	12.00	0.00
7,700.0	12.82	179.68	7,699.1	-11.9	0.1	11.9	12.00	12.00	0.00
TBSG_sand									
7,787.3	23.30	179.68	7,782.0	-38.9	0.2	38.9	12.00	12.00	0.00

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Wellbore:	Wellbore #1		
Design:	Design #2		

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)
7,800.0	24.82	179.68	7,793.6	-44.1	0.2	44.1	12.00	12.00	0.00
7,900.0	36.82	179.68	7,879.3	-95.2	0.5	95.2	12.00	12.00	0.00
8,000.0	48.82	179.68	7,952.5	-163.1	0.9	163.1	12.00	12.00	0.00
8,100.0	60.82	179.68	8,010.1	-244.6	1.4	244.6	12.00	12.00	0.00
8,200.0	72.82	179.68	8,049.4	-336.4	1.9	336.4	12.00	12.00	0.00
8,300.0	84.82	179.68	8,068.7	-434.3	2.4	434.3	12.00	12.00	0.00
EOB @ 93.12° Inc / 179.68° Azm / 8070' TVD									
8,369.2	93.12	179.68	8,070.0	-503.4	2.8	503.5	12.00	12.00	0.00
8,400.0	93.12	179.68	8,068.3	-534.2	3.0	534.2	0.00	0.00	0.00
8,500.0	93.12	179.68	8,062.8	-634.0	3.5	634.1	0.00	0.00	0.00
8,600.0	93.12	179.68	8,057.4	-733.9	4.1	733.9	0.00	0.00	0.00
8,700.0	93.12	179.68	8,052.0	-833.7	4.7	833.8	0.00	0.00	0.00
8,800.0	93.12	179.68	8,046.5	-933.6	5.2	933.6	0.00	0.00	0.00
8,900.0	93.12	179.68	8,041.1	-1,033.4	5.8	1,033.5	0.00	0.00	0.00
9,000.0	93.12	179.68	8,035.6	-1,133.3	6.3	1,133.3	0.00	0.00	0.00
9,100.0	93.12	179.68	8,030.2	-1,233.2	6.9	1,233.2	0.00	0.00	0.00
9,200.0	93.12	179.68	8,024.8	-1,333.0	7.4	1,333.0	0.00	0.00	0.00
9,300.0	93.12	179.68	8,019.3	-1,432.9	8.0	1,432.9	0.00	0.00	0.00
9,400.0	93.12	179.68	8,013.9	-1,532.7	8.6	1,532.7	0.00	0.00	0.00
9,500.0	93.12	179.68	8,008.4	-1,632.6	9.1	1,632.6	0.00	0.00	0.00
9,600.0	93.12	179.68	8,003.0	-1,732.4	9.7	1,732.4	0.00	0.00	0.00
9,700.0	93.12	179.68	7,997.6	-1,832.3	10.2	1,832.3	0.00	0.00	0.00
9,800.0	93.12	179.68	7,992.1	-1,932.1	10.8	1,932.1	0.00	0.00	0.00
9,900.0	93.12	179.68	7,986.7	-2,032.0	11.3	2,032.0	0.00	0.00	0.00
10,000.0	93.12	179.68	7,981.2	-2,131.8	11.9	2,131.8	0.00	0.00	0.00
10,100.0	93.12	179.68	7,975.8	-2,231.7	12.5	2,231.7	0.00	0.00	0.00
10,200.0	93.12	179.68	7,970.4	-2,331.5	13.0	2,331.5	0.00	0.00	0.00
10,300.0	93.12	179.68	7,964.9	-2,431.4	13.6	2,431.4	0.00	0.00	0.00
10,400.0	93.12	179.68	7,959.5	-2,531.2	14.1	2,531.2	0.00	0.00	0.00
10,500.0	93.12	179.68	7,954.0	-2,631.1	14.7	2,631.1	0.00	0.00	0.00
10,600.0	93.12	179.68	7,948.6	-2,730.9	15.3	2,730.9	0.00	0.00	0.00
10,700.0	93.12	179.68	7,943.2	-2,830.8	15.8	2,830.8	0.00	0.00	0.00
10,800.0	93.12	179.68	7,937.7	-2,930.6	16.4	2,930.7	0.00	0.00	0.00
10,900.0	93.12	179.68	7,932.3	-3,030.5	16.9	3,030.5	0.00	0.00	0.00
11,000.0	93.12	179.68	7,926.9	-3,130.3	17.5	3,130.4	0.00	0.00	0.00
11,100.0	93.12	179.68	7,921.4	-3,230.2	18.0	3,230.2	0.00	0.00	0.00
11,200.0	93.12	179.68	7,916.0	-3,330.0	18.6	3,330.1	0.00	0.00	0.00
11,300.0	93.12	179.68	7,910.5	-3,429.9	19.2	3,429.9	0.00	0.00	0.00
11,400.0	93.12	179.68	7,905.1	-3,529.7	19.7	3,529.8	0.00	0.00	0.00
11,500.0	93.12	179.68	7,899.7	-3,629.6	20.3	3,629.6	0.00	0.00	0.00
11,600.0	93.12	179.68	7,894.2	-3,729.4	20.8	3,729.5	0.00	0.00	0.00
11,700.0	93.12	179.68	7,888.8	-3,829.3	21.4	3,829.3	0.00	0.00	0.00
11,800.0	93.12	179.68	7,883.3	-3,929.1	21.9	3,929.2	0.00	0.00	0.00
11,900.0	93.12	179.68	7,877.9	-4,029.0	22.5	4,029.0	0.00	0.00	0.00
12,000.0	93.12	179.68	7,872.5	-4,128.8	23.1	4,128.9	0.00	0.00	0.00
12,100.0	93.12	179.68	7,867.0	-4,228.7	23.6	4,228.7	0.00	0.00	0.00
12,200.0	93.12	179.68	7,861.6	-4,328.5	24.2	4,328.6	0.00	0.00	0.00
12,300.0	93.12	179.68	7,856.1	-4,428.4	24.7	4,428.4	0.00	0.00	0.00
12,400.0	93.12	179.68	7,850.7	-4,528.2	25.3	4,528.3	0.00	0.00	0.00
12,500.0	93.12	179.68	7,845.3	-4,628.1	25.8	4,628.1	0.00	0.00	0.00
12,600.0	93.12	179.68	7,839.8	-4,727.9	26.4	4,728.0	0.00	0.00	0.00
12,700.0	93.12	179.68	7,834.4	-4,827.8	27.0	4,827.8	0.00	0.00	0.00
12,800.0	93.12	179.68	7,828.9	-4,927.6	27.5	4,927.7	0.00	0.00	0.00
Drop 2° / 100'									

Database:	Compass	Local Co-ordinate Reference:	Well Cali Roll 24 Federal Com #2H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Project:	Eddy County, NM (NAD 83)	MD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Cali Roll 24 Federal Com #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
12,872.4	93.12	179.68	7,825.0	-4,999.9	27.9	5,000.0	0.00	0.00	0.00
12,900.0	92.57	179.68	7,823.6	-5,027.5	28.1	5,027.6	2.00	-2.00	0.00
EOD @ 91.42° Inc									
12,957.4	91.42	179.68	7,821.6	-5,084.8	28.4	5,084.9	2.00	-2.00	0.00
13,000.0	91.42	179.68	7,820.6	-5,127.4	28.6	5,127.5	0.00	0.00	0.00
13,100.0	91.42	179.68	7,818.1	-5,227.4	29.2	5,227.5	0.00	0.00	0.00
13,200.0	91.42	179.68	7,815.6	-5,327.4	29.7	5,327.4	0.00	0.00	0.00
13,300.0	91.42	179.68	7,813.2	-5,427.3	30.3	5,427.4	0.00	0.00	0.00
13,400.0	91.42	179.68	7,810.7	-5,527.3	30.9	5,527.4	0.00	0.00	0.00
13,500.0	91.42	179.68	7,808.2	-5,627.3	31.4	5,627.3	0.00	0.00	0.00
13,600.0	91.42	179.68	7,805.7	-5,727.2	32.0	5,727.3	0.00	0.00	0.00
13,700.0	91.42	179.68	7,803.2	-5,827.2	32.5	5,827.3	0.00	0.00	0.00
13,800.0	91.42	179.68	7,800.8	-5,927.2	33.1	5,927.3	0.00	0.00	0.00
13,900.0	91.42	179.68	7,798.3	-6,027.1	33.6	6,027.2	0.00	0.00	0.00
14,000.0	91.42	179.68	7,795.8	-6,127.1	34.2	6,127.2	0.00	0.00	0.00
14,100.0	91.42	179.68	7,793.3	-6,227.1	34.7	6,227.2	0.00	0.00	0.00
14,200.0	91.42	179.68	7,790.9	-6,327.0	35.3	6,327.1	0.00	0.00	0.00
14,300.0	91.42	179.68	7,788.4	-6,427.0	35.8	6,427.1	0.00	0.00	0.00
14,400.0	91.42	179.68	7,785.9	-6,527.0	36.4	6,527.1	0.00	0.00	0.00
14,500.0	91.42	179.68	7,783.4	-6,626.9	37.0	6,627.0	0.00	0.00	0.00
14,600.0	91.42	179.68	7,781.0	-6,726.9	37.5	6,727.0	0.00	0.00	0.00
14,700.0	91.42	179.68	7,778.5	-6,826.9	38.1	6,827.0	0.00	0.00	0.00
14,800.0	91.42	179.68	7,776.0	-6,926.8	38.6	6,926.9	0.00	0.00	0.00
14,900.0	91.42	179.68	7,773.5	-7,026.8	39.2	7,026.9	0.00	0.00	0.00
15,000.0	91.42	179.68	7,771.0	-7,126.8	39.7	7,126.9	0.00	0.00	0.00
15,100.0	91.42	179.68	7,768.6	-7,226.7	40.3	7,226.9	0.00	0.00	0.00
15,200.0	91.42	179.68	7,766.1	-7,326.7	40.8	7,326.8	0.00	0.00	0.00
15,300.0	91.42	179.68	7,763.6	-7,426.7	41.4	7,426.8	0.00	0.00	0.00
15,400.0	91.42	179.68	7,761.1	-7,526.6	41.9	7,526.8	0.00	0.00	0.00
15,500.0	91.42	179.68	7,758.7	-7,626.6	42.5	7,626.7	0.00	0.00	0.00
15,600.0	91.42	179.68	7,756.2	-7,726.6	43.1	7,726.7	0.00	0.00	0.00
15,700.0	91.42	179.68	7,753.7	-7,826.6	43.6	7,826.7	0.00	0.00	0.00
15,800.0	91.42	179.68	7,751.2	-7,926.5	44.2	7,926.6	0.00	0.00	0.00
15,900.0	91.42	179.68	7,748.8	-8,026.5	44.7	8,026.6	0.00	0.00	0.00
16,000.0	91.42	179.68	7,746.3	-8,126.5	45.3	8,126.6	0.00	0.00	0.00
16,100.0	91.42	179.68	7,743.8	-8,226.4	45.8	8,226.6	0.00	0.00	0.00
16,200.0	91.42	179.68	7,741.3	-8,326.4	46.4	8,326.5	0.00	0.00	0.00
16,300.0	91.42	179.68	7,738.8	-8,426.4	46.9	8,426.5	0.00	0.00	0.00
16,400.0	91.42	179.68	7,736.4	-8,526.3	47.5	8,526.5	0.00	0.00	0.00
16,500.0	91.42	179.68	7,733.9	-8,626.3	48.0	8,626.4	0.00	0.00	0.00
16,600.0	91.42	179.68	7,731.4	-8,726.3	48.6	8,726.4	0.00	0.00	0.00
16,700.0	91.42	179.68	7,728.9	-8,826.2	49.2	8,826.4	0.00	0.00	0.00
16,800.0	91.42	179.68	7,726.5	-8,926.2	49.7	8,926.3	0.00	0.00	0.00
16,900.0	91.42	179.68	7,724.0	-9,026.2	50.3	9,026.3	0.00	0.00	0.00
17,000.0	91.42	179.68	7,721.5	-9,126.1	50.8	9,126.3	0.00	0.00	0.00
17,100.0	91.42	179.68	7,719.0	-9,226.1	51.4	9,226.2	0.00	0.00	0.00
17,200.0	91.42	179.68	7,716.6	-9,326.1	51.9	9,326.2	0.00	0.00	0.00
17,300.0	91.42	179.68	7,714.1	-9,426.0	52.5	9,426.2	0.00	0.00	0.00
17,400.0	91.42	179.68	7,711.6	-9,526.0	53.0	9,526.2	0.00	0.00	0.00
17,500.0	91.42	179.68	7,709.1	-9,626.0	53.6	9,626.1	0.00	0.00	0.00
17,600.0	91.42	179.68	7,706.6	-9,725.9	54.1	9,726.1	0.00	0.00	0.00
17,700.0	91.42	179.68	7,704.2	-9,825.9	54.7	9,826.1	0.00	0.00	0.00
17,800.0	91.42	179.68	7,701.7	-9,925.9	55.3	9,926.0	0.00	0.00	0.00

Database:	Compass	Local Co-ordinate Reference:	Well Cali Roll 24 Federal Com #2H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Project:	Eddy County, NM (NAD 83)	MD Reference:	Well @ 3573.0usft (Scadrill Freedom)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Cali Roll 24 Federal Com #2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
PBHL @ 17868' MD / 7700' TVD									
17,868.2	91.42	179.68	7,700.0	-9,994.0	55.6	9,994.2	0.00	0.00	0.00

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
PBHL Cali Roll 24 Feder - plan hits target center - Point	0.00	0.01	7,700.0	-9,994.0	55.6	366,207.43	538,661.94	32° 0' 24.422 N	104° 20' 31.075 W
Intermediate Target Cali - plan hits target center - Point	0.00	0.01	7,825.0	-4,999.9	27.9	371,201.53	538,634.24	32° 1' 13.846 N	104° 20' 31.401 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
65.0	234.0	Rustler		-1.42	179.68
389.0	558.0	TOS		-1.42	179.68
1,433.0	1,602.0	BOS (Fletcher)		-1.42	179.68
1,620.0	1,789.0	LMAR (Top Delaware)		-1.42	179.68
1,664.0	1,833.0	BLCN		-1.42	179.68
2,523.0	2,692.0	CYCN		-1.42	179.68
3,632.0	3,801.0	BYCN		-1.42	179.68
5,129.0	5,298.0	Bone Sprg (BSGL)		-1.42	179.68
5,236.0	5,405.0	U Avalon Sh		-1.42	179.68
5,553.0	5,722.0	L Avalon S		-1.42	179.68
6,017.0	6,186.0	FBSG_sand		-1.42	179.68
6,718.0	6,887.0	SBSG_sand		-1.42	179.68
7,787.3	7,951.0	TBSG_sand		-1.42	179.68

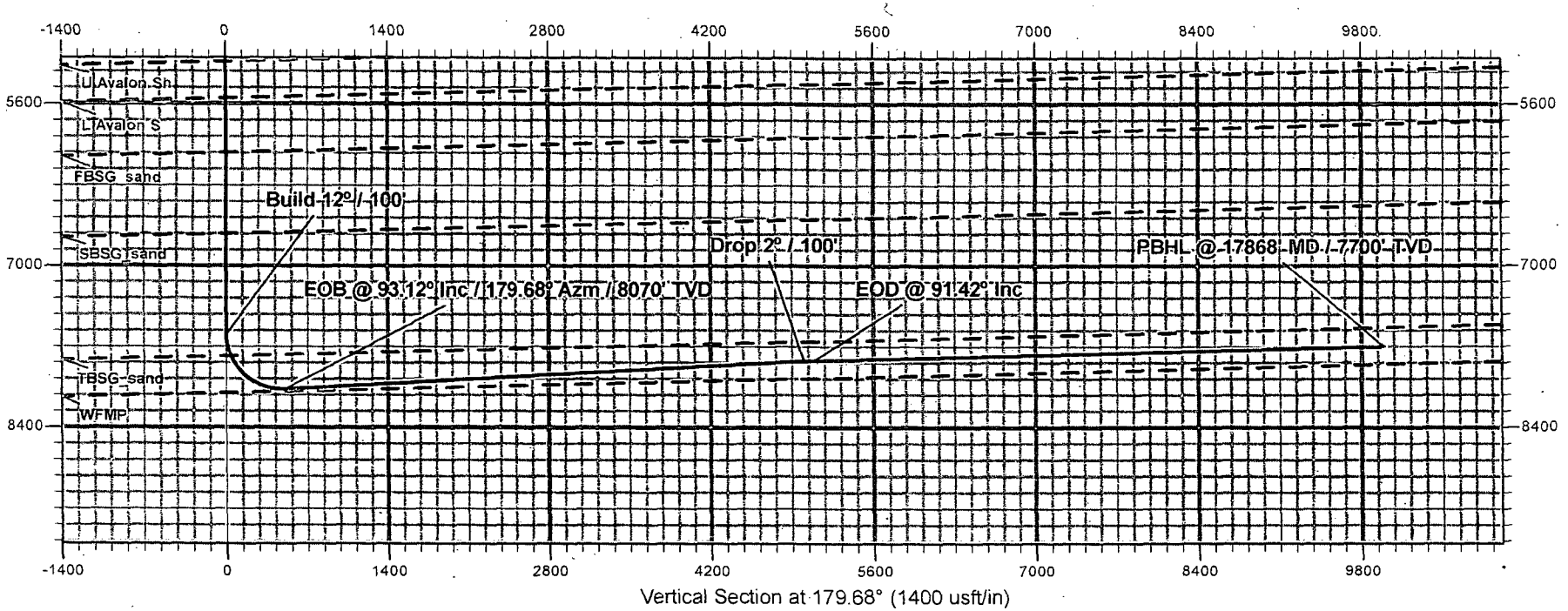
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
7,593.2	7,593.2	0.0	0.0	Build 12° / 100'
8,369.2	8,070.0	-503.4	2.8	EOB @ 93.12° Inc / 179.68° Azm / 8070' TVD
12,872.4	7,825.0	-4,999.9	27.9	Drop 2° / 100'
12,957.4	7,821.6	-5,084.8	28.4	EOD @ 91.42° Inc
17,868.2	7,700.0	-9,994.0	55.6	PBHL @ 17868' MD / 7700' TVD

CONCHO

Eddy County, NM (NAD 83)
Sec 24, T26S, R25E
Cali Roll 24 Federal Com #2H
Design #2

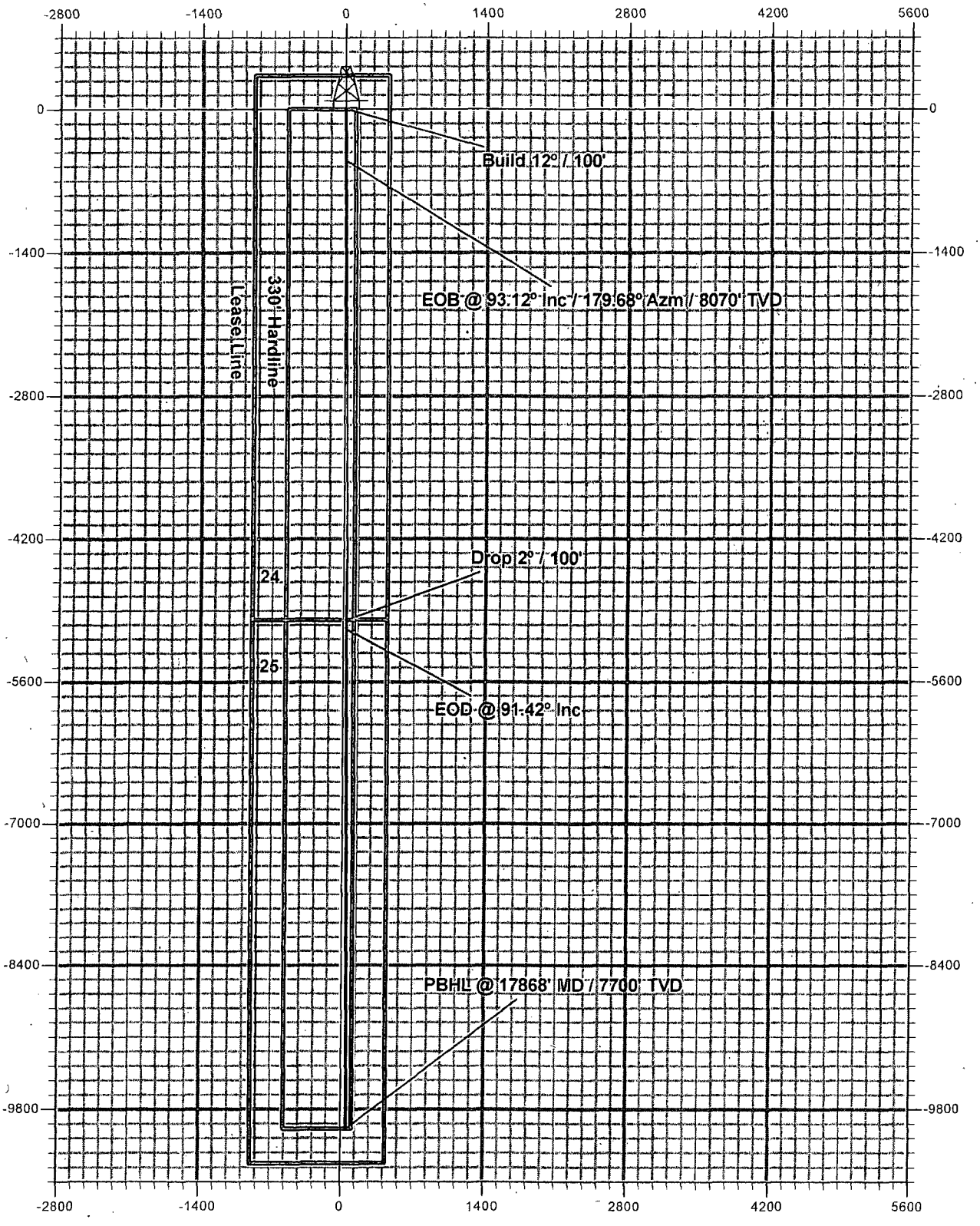
DDC
The DIRECTIONAL DRILLING COMPANY



CONCHO

Eddy County, NM (NAD 83)
Sec 24, T26S, R25E
Cali Roll 24 Federal Com #2H
Design #2

PDC The DIRECTIONAL DRILLING COMPANY



PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating, LLC
LEASE NO.:	NMNM-104666
WELL NAME & NO.:	Cali Roll 24 Federal Com 2H
SURFACE HOLE FOOTAGE:	0330' FNL & 0430' FEL
BOTTOM HOLE FOOTAGE	0330' FSL & 0380' FEL Sec. 25, T. 26 S., R. 25 E.
LOCATION:	Section 24, T. 26 S., R. 25 E., NMPM
COUNTY:	Eddy County, New Mexico

Special Requirements:

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.

I. 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 Hydrogen Sulfide has not been reported in the area, it is always a potential hazard. If Hydrogen Sulfide is encountered, report measured amounts 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
Possible sulfur water flows within the Castile formation.
Possible loss of circulation in the Delaware.
Possible abnormally high pressures in the Wolfcamp.

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** 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 **1500** feet (**Lamar Limestone**), 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 should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

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. 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 **3000 (3M)** psi.

    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. 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 (18 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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