

OCD Hobbs

HOBBS OCD

AUG 21 2015

ATS-15-188

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

(H)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of Work: ☒ DRILL ☐ REENTER		RECEIVED	
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		8. Lease Name and Well No. (308161) Lusk Deep Unit A #26H	
2. Name of Operator COG Operating LLC. (229137)		9. API Well No. 30-025-42750	
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940		10. Field and Pool, or Exploratory Lusk; Bone Spring (41440)
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 330' FSL & 1780' FWL Unit Letter N (SESW) SHL Sec 19-T19S-R32E At proposed prod. Zone 330' FNL & 1980' FWL Unit Letter C (NENW) BHL Sec 19-T19S-R32E		11. Sec., T.R.M. or Blk and Survey or Area Section 19 - T19S - R32E	
14. Distance in miles and direction from nearest town or post office* Approximately 12 miles from Maljamar		12. County or Parish Lea County	13. State NM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'	16. No. of acres in lease SHL: 120 - UL "K": 121.77 UL "F": 40 BHL: 80.83	17. Spacing Unit dedicated to this well 160	
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 331' BHL: 1320' Closest to wellbore: 41'	19. Proposed Depth TVD: 9,210' MD: 13,620'	20. BLM/BIA Bond No. on file NMB000740 & NMB000215	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3542.8' GL	22. Approximate date work will start* 12/1/2014	23. Estimated duration 30 days	

24. Attachments

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

- | | |
|---|--|
| 1. Well plat certified by a registered surveyor. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan | 5. Operator certification |
| 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). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature <i>Mayte Reyes</i>	Name (Printed/Typed) Mayte Reyes	Date 11-18-14
Title Regulatory Analyst		
Approved by (Signature) Steve Caffey	Name (Printed/Typed)	Date AUG 19 2015
Title FIELD MANAGER	Office CARLSBAD FIELD OFFICE	

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

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)

Capitan Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL
AUG 24 2015

COG Production LLC, Lusk Deep Unit A 26H

AUG 21 2015

1. Geologic Formations

RECEIVED

TVD of target	9210'	Pilot hole depth	NA
MD at TD:	13620'	Deepest expected fresh water:	223'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	223'	Water	
Rustler	726'	Water	
Top of Salt	806'	Salt	
Tansill	2,401'	Barren	
Yates	2,556'	Barren	
Seven Rivers	2,751'	Barren	
Capitan Reef	2,827'	Water	Possible Lost Circ
Delaware Group	4,357'	Oil/Gas	Possible lost circ
Bone Spring	8488'	Oil/Gas	
2 nd Bone Spring	9,001'	Target Zone	

2. Casing Program

See COA

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0'	150' 825'	13.375"	54.5	J55	STC	3.22	1.5	12.57
12.25"	0'	3500'	9.625"	36	J55	LTC	1.11	.73	3.53
12.25"	2700'	2727'	DVT/ECP – will be set 100' above Capitan Reef to ensure cmt job.						
12.25"	3500'	4350'	9.625"	40	J55	LTC	1.14	1.75	26.94
8.75"	0'	13620'	5-1/2"	17	P110	LTC	1.79	2.22	2.36
BLM Minimum Safety Factor							1.125	1.00	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations.
- Used 9 PPG for pore pressure calculations
- Explanation for SF's below BLM's minimum standards:
 - 9-5/8" 36# J55 Burst SF @ 0.73 – used BLM's frac gradient scenario to qualify.
 $3520 \text{ psi}/4650' = 0.76 > 0.70$

COG Production LLC, Lusk Deep Unit A 26H

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

2. Cementing Program

Casing	# Sk	Wt. lb/ gal	Yld ft3/ sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	300	13.5	1.75	9.2	12	Lead: Class C + 4% Gel + 2% CaCl ₂
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl ₂
1 Inter. <i>Stage 1</i>	250	12.7	2	11.5	13	Lead: 35:65:6 H Blend
	250	14.8	1.34	6.4	6	Tail: Class C
2 Inter. <i>Stage 2</i>	700	13.5	1.75	9.2	13	Lead: Class C + 4% Gel
	250	14.8	1.34	6.4	6	Tail: Class C
Prod.	1100	12.7	2	11.5	18	Lead: 35:65:6 H Blend (FR, Retarder, FL adds as necessary)
	1400	14.4	1.25	5.7	22	Tail: 50:50:2 H blend (FR, Retarder, FL adds as necessary)

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

DV tool
@ 2700'

COG Production LLC, Lusk Deep Unit A 26H

Casing String	TOC	% Excess
Surface	0'	50%
Intermediate	0'	35%
Production	2675'	35%

Pilot hole depth No pilot hole
KOP 8730'

4. Pressure Control Equipment

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	50% of working pressure
			Blind Ram		See COA 2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		

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

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

COG Production LLC, Lusk Deep Unit A 26H

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

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6 – 9.0	28-34	N/C
Surf csg	Int shoe	Saturated Brine	10.0 - 10.2	28-34	N/C
Int shoe	TMD	Cut Brine	8.6 - 9.2	28-34	N/C

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

What will be used to monitor the loss or gain of fluid?	Pason PVT
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6. Logging and Testing Procedures

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

Additional logs planned	Interval
None	

COG Production LLC, Lusk Deep Unit A 26H

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	4300 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions.

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

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

N	H ₂ S is present
Y	H ₂ S Plan attached

8. Other facets of operation

Is this a walking operation? No.

Will be pre-setting casing? No.

Attachments

- Directional Plan
- BOP & Choke Schematics
- C102 and supporting maps
- Rig plat
- H₂S schematic
- H₂S contingency plan
- Interim reclamation plat



COG Operating LLC

Lea County, New Mexico

Lusk Deep Unit A

Lusk Deep Unit A Well No. 26H

Original hole

SHL: 330 FSL 1780 FWL

BHL: 330 FNL 1980 FWL

Plan: rev0

Standard_report

12 June, 2014



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Project	Lea County, New Mexico		
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	Lusk Deep Unit A		
Site Position:		Northing:	599,764.20 usft
From:	Map	Easting:	670,347.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.64763363
		Longitude:	-103.77989322
		Grid Convergence:	0.30 °

Well	Lusk Deep Unit A Well No. 26H, Surf Loc: 330 FSL 1780 FWL Sect 19		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32.63952837
		Longitude:	-103.80791283
		Ground Level:	3,542.80 usft

Wellbore	Original hole		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	6/12/2014	7.36
			Dip Angle
			60.46
			Field Strength
			48,540

Design	rev0		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			2.08

Survey Tool Program	Date 6/12/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		Description
0.00	13,619.19	rev0 (Original hole)	MWD
			MWD - Standard



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100ft)	V. Sec (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Planned Survey											
MD (usft)	Inc (°)	Azl (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100ft)	V. Sec (usft)	Northing (usft)	Easting (usft)		
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90		



Standard_report

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5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90	



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100ft)	V. Sec (usft)	Northing (usft)	Easting (usft)
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	596,771.70	661,737.90
8,732.54	0.00	0.00	8,732.54	0.00	0.00	0.00	0.00	596,771.70	661,737.90
KOP Begin 12°/100' build									
8,800.00	8.10	2.08	8,799.78	4.75	0.17	12.00	4.76	596,776.45	661,738.07
8,900.00	20.10	2.08	8,896.59	29.05	1.06	12.00	29.07	596,800.75	661,738.96
9,000.00	32.10	2.08	8,986.23	72.92	2.65	12.00	72.97	596,844.62	661,740.55
9,100.00	44.10	2.08	9,064.79	134.47	4.89	12.00	134.56	596,906.17	661,742.79
9,200.00	56.10	2.08	9,128.82	210.99	7.68	12.00	211.13	596,982.69	661,745.58
9,300.00	68.10	2.08	9,175.53	299.14	10.88	12.00	299.34	597,070.84	661,748.78
9,400.00	80.10	2.08	9,202.89	395.07	14.38	12.00	395.34	597,166.77	661,752.28
9,482.54	90.00	2.08	9,210.00	477.15	17.36	12.00	477.46	597,248.85	661,755.26
Begin 90.00° lateral									
9,500.00	90.00	2.08	9,210.00	494.60	18.00	0.00	494.93	597,266.30	661,755.90
9,600.00	90.00	2.08	9,210.00	594.53	21.63	0.00	594.93	597,366.23	661,759.53
9,700.00	90.00	2.08	9,210.00	694.47	25.27	0.00	694.93	597,466.17	661,763.17
9,800.00	90.00	2.08	9,210.00	794.40	28.91	0.00	794.93	597,566.10	661,766.81
9,900.00	90.00	2.08	9,210.00	894.33	32.54	0.00	894.93	597,666.03	661,770.44
10,000.00	90.00	2.08	9,210.00	994.27	36.18	0.00	994.93	597,765.97	661,774.08
10,100.00	90.00	2.08	9,210.00	1,094.20	39.81	0.00	1,094.93	597,865.90	661,777.71
10,200.00	90.00	2.08	9,210.00	1,194.14	43.45	0.00	1,194.93	597,965.84	661,781.35
10,300.00	90.00	2.08	9,210.00	1,294.07	47.09	0.00	1,294.93	598,065.77	661,784.99



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Planned Survey

MD. (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100ft)	V. Sec (usft)	Northing (usft)	Easting (usft)
10,400.00	90.00	2.08	9,210.00	1,394.00	50.72	0.00	1,394.93	598,165.70	661,788.62
10,500.00	90.00	2.08	9,210.00	1,493.94	54.36	0.00	1,494.93	598,265.64	661,792.26
10,600.00	90.00	2.08	9,210.00	1,593.87	58.00	0.00	1,594.93	598,365.57	661,795.90
10,700.00	90.00	2.08	9,210.00	1,693.80	61.63	0.00	1,694.93	598,465.50	661,799.53
10,800.00	90.00	2.08	9,210.00	1,793.74	65.27	0.00	1,794.93	598,565.44	661,803.17
10,900.00	90.00	2.08	9,210.00	1,893.67	68.90	0.00	1,894.93	598,665.37	661,806.80
11,000.00	90.00	2.08	9,210.00	1,993.61	72.54	0.00	1,994.93	598,765.31	661,810.44
11,100.00	90.00	2.08	9,210.00	2,093.54	76.18	0.00	2,094.93	598,865.24	661,814.08
11,200.00	90.00	2.08	9,210.00	2,193.47	79.81	0.00	2,194.93	598,965.17	661,817.71
11,300.00	90.00	2.08	9,210.00	2,293.41	83.45	0.00	2,294.93	599,065.11	661,821.35
11,400.00	90.00	2.08	9,210.00	2,393.34	87.09	0.00	2,394.93	599,165.04	661,824.99
11,500.00	90.00	2.08	9,210.00	2,493.28	90.72	0.00	2,494.93	599,264.98	661,828.62
11,600.00	90.00	2.08	9,210.00	2,593.21	94.36	0.00	2,594.93	599,364.91	661,832.26
11,700.00	90.00	2.08	9,210.00	2,693.14	97.99	0.00	2,694.93	599,464.84	661,835.89
11,800.00	90.00	2.08	9,210.00	2,793.08	101.63	0.00	2,794.93	599,564.78	661,839.53
11,900.00	90.00	2.08	9,210.00	2,893.01	105.27	0.00	2,894.93	599,664.71	661,843.17
12,000.00	90.00	2.08	9,210.00	2,992.94	108.90	0.00	2,994.93	599,764.64	661,846.80
12,100.00	90.00	2.08	9,210.00	3,092.88	112.54	0.00	3,094.93	599,864.58	661,850.44
12,200.00	90.00	2.08	9,210.00	3,192.81	116.18	0.00	3,194.93	599,964.51	661,854.08
12,300.00	90.00	2.08	9,210.00	3,292.75	119.81	0.00	3,294.93	600,064.45	661,857.71
12,400.00	90.00	2.08	9,210.00	3,392.68	123.45	0.00	3,394.93	600,164.38	661,861.35
12,500.00	90.00	2.08	9,210.00	3,492.61	127.08	0.00	3,494.93	600,264.31	661,864.98
12,600.00	90.00	2.08	9,210.00	3,592.55	130.72	0.00	3,594.93	600,364.25	661,868.62
12,700.00	90.00	2.08	9,210.00	3,692.48	134.36	0.00	3,694.93	600,464.18	661,872.26
12,800.00	90.00	2.08	9,210.00	3,792.42	137.99	0.00	3,794.93	600,564.12	661,875.89
12,900.00	90.00	2.08	9,210.00	3,892.35	141.63	0.00	3,894.93	600,664.05	661,879.53
13,000.00	90.00	2.08	9,210.00	3,992.28	145.27	0.00	3,994.93	600,763.98	661,883.17



Standard_report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Lusk Deep Unit A Well No. 26H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Site:	Lusk Deep Unit A	MD Reference:	RKB=3542.8+18 @ 3560.80usft (Patriot 6)
Well:	Lusk Deep Unit A Well No. 26H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	rev0	Database:	EDM 5000.1 Ddatabase

Planned Survey										
MD (usft)	Inc (°)	Azi. (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100ft)	V. Sec (usft)	Northing (usft)	Easting (usft)	
13,100.00	90.00	2.08	9,210.00	4,092.22	148.90	0.00	4,094.93	600,863.92	661,886.80	
13,200.00	90.00	2.08	9,210.00	4,192.15	152.54	0.00	4,194.93	600,963.85	661,890.44	
13,300.00	90.00	2.08	9,210.00	4,292.09	156.17	0.00	4,294.93	601,063.79	661,894.07	
13,400.00	90.00	2.08	9,210.00	4,392.02	159.81	0.00	4,394.93	601,163.72	661,897.71	
13,500.00	90.00	2.08	9,210.00	4,491.95	163.45	0.00	4,494.93	601,263.65	661,901.35	
13,600.00	90.00	2.08	9,210.00	4,591.89	167.08	0.00	4,594.93	601,363.59	661,904.98	
13,619.73	90.00	2.08	9,210.00	4,611.60	167.80	0.00	4,614.65	601,383.30	661,905.70	
PBHL/TD										

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,732.54	8,732.54	0.00	0.00	KOP Begin 12°/100' build
9,482.54	9,210.00	477.15	17.36	Begin 90.00° lateral
13,619.73	9,210.00	4,611.60	167.80	PBHL/TD



COG Operating LLC

Well: Lusk Deep Unit A Well No. 26H
 Site: Lusk Deep Unit A
 Project: Lea County, New Mexico
 Design: rev0
 Rig: Patriot 6

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	8732.54	0.00	0.00	8732.54	0.00	0.00	0.00	0.00	0.00	KOP Begin 12°/100' build
3	9482.54	90.00	2.08	9210.00	477.15	17.36	12.00	2.08	477.46	Begin 90.00° lateral
4	13619.73	90.00	2.08	9210.00	4611.60	167.80	0.00	0.00	4614.65	PBHL/TD

Surface Location: RKB=3542.8+18 @ 3560.80usft (Patriot 6)
 US State Plane 1927 (Exact solution)
 New Mexico East 3001

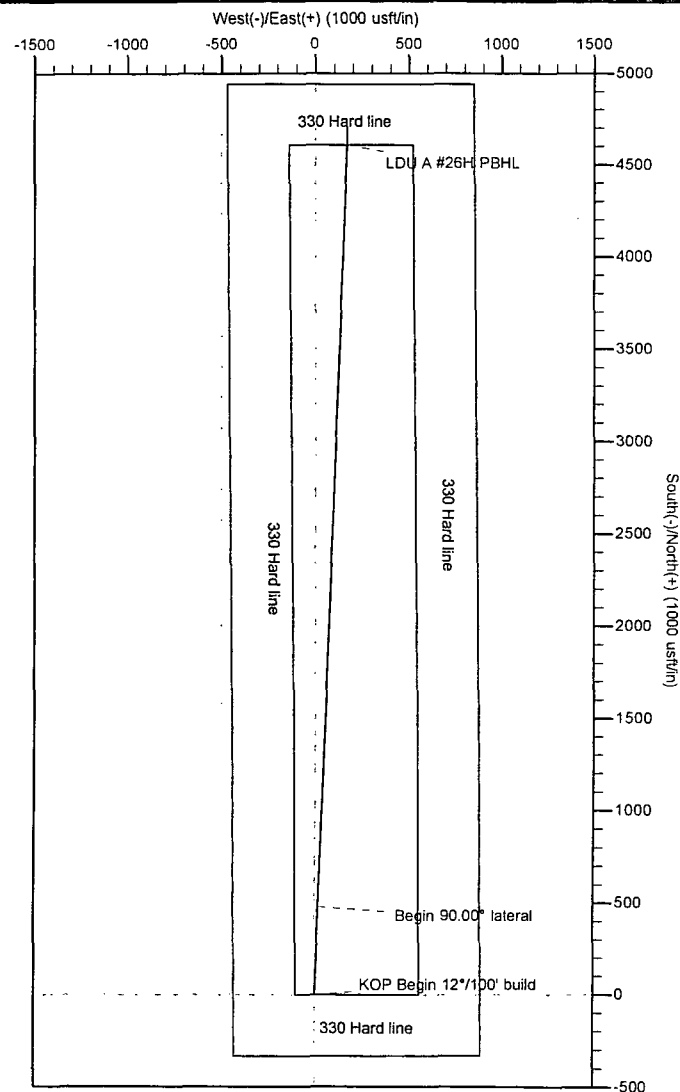
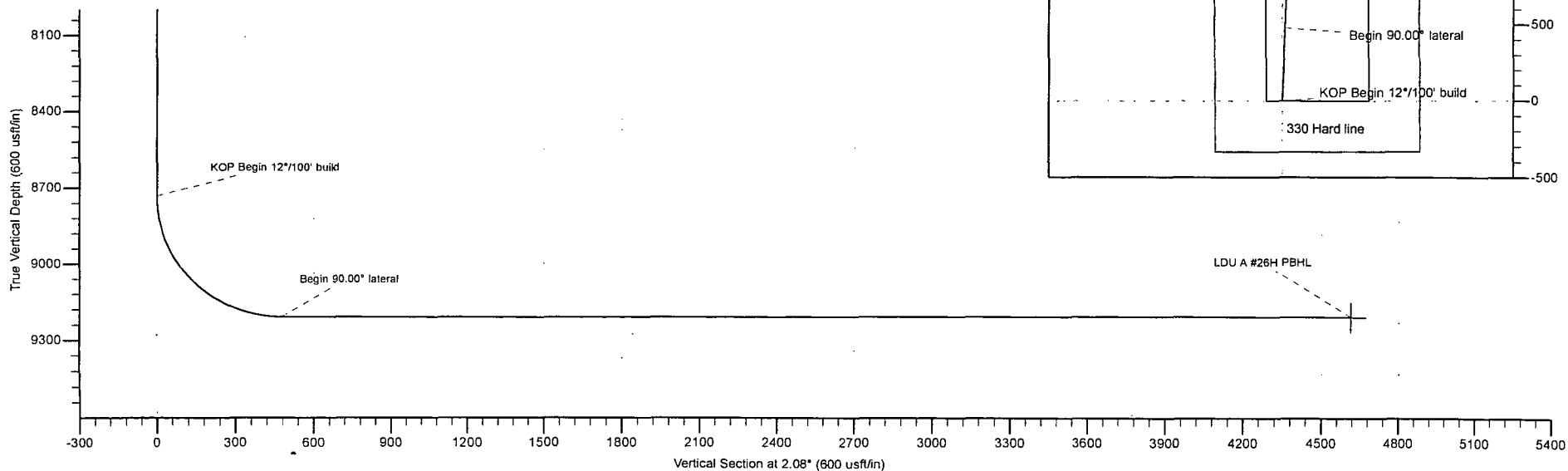
Northing: 596771.70 Easting: 661737.90 Latitude: 32.63952837 Longitude: -103.80791283
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Add 7.07°



Azimuths to Grid North
 True North: -0.28°
 Magnetic North: 7.07°

Magnetic Field
 Strength: 48540.2snT
 Dip Angle: 60.46°
 Date: 6/12/2014
 Model: IGRF2010

N-ZONE





COG Operating LLC.
Project: Lea County, NM
Site: Lusk Deep Unit A
Well: #26H
Wellbore: OH
Plan: Design #1 (#26H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.0	0.00	50.00	0.0	0.0	0.0	0.00	0.00	0.0
2	8732.5	0.00	50.00	8732.5	0.0	0.0	0.00	50.00	0.0
3	9482.6	90.00	12.50	9210.0	466.2	103.3	12.00	12.50	469.6
4	9889.4	90.00	0.29	9210.0	869.7	148.6	3.00	-90.00	874.6
5	13631.2	90.00	0.29	9210.0	4611.5	167.8	0.00	0.00	4614.6

WELL DETAILS: #26H

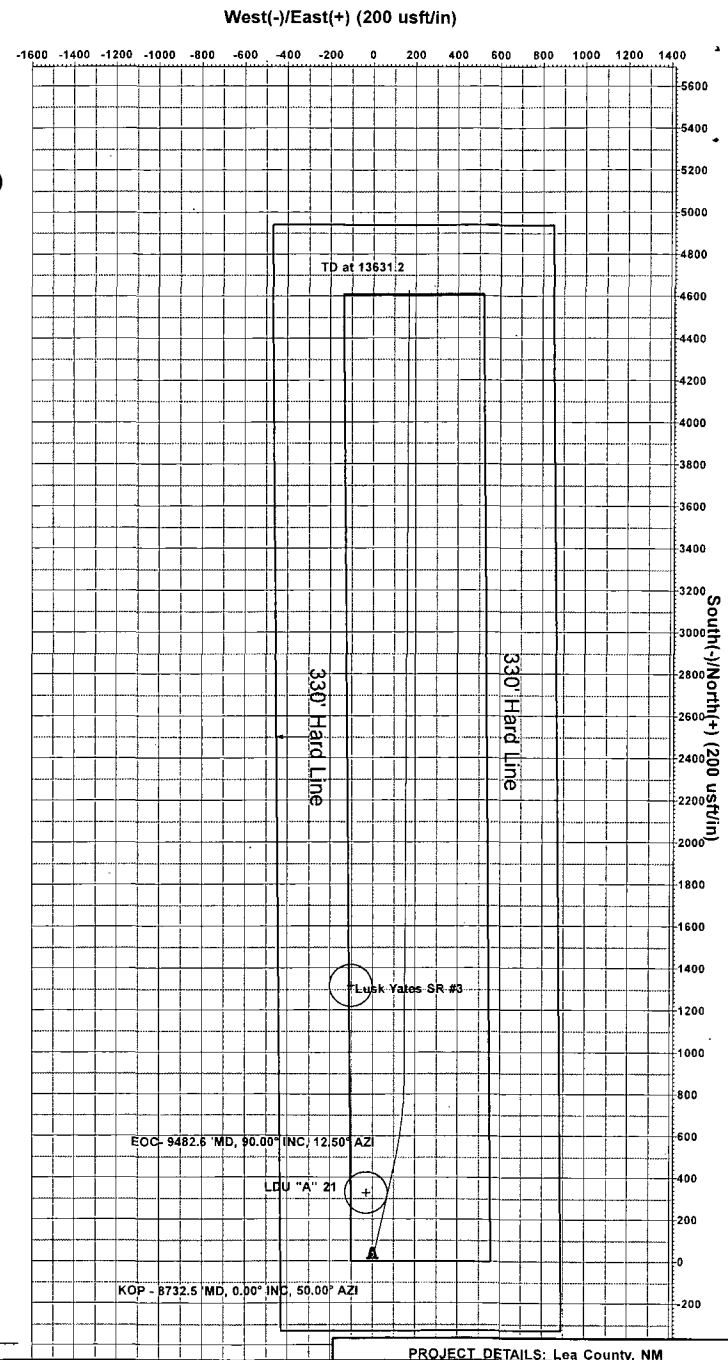
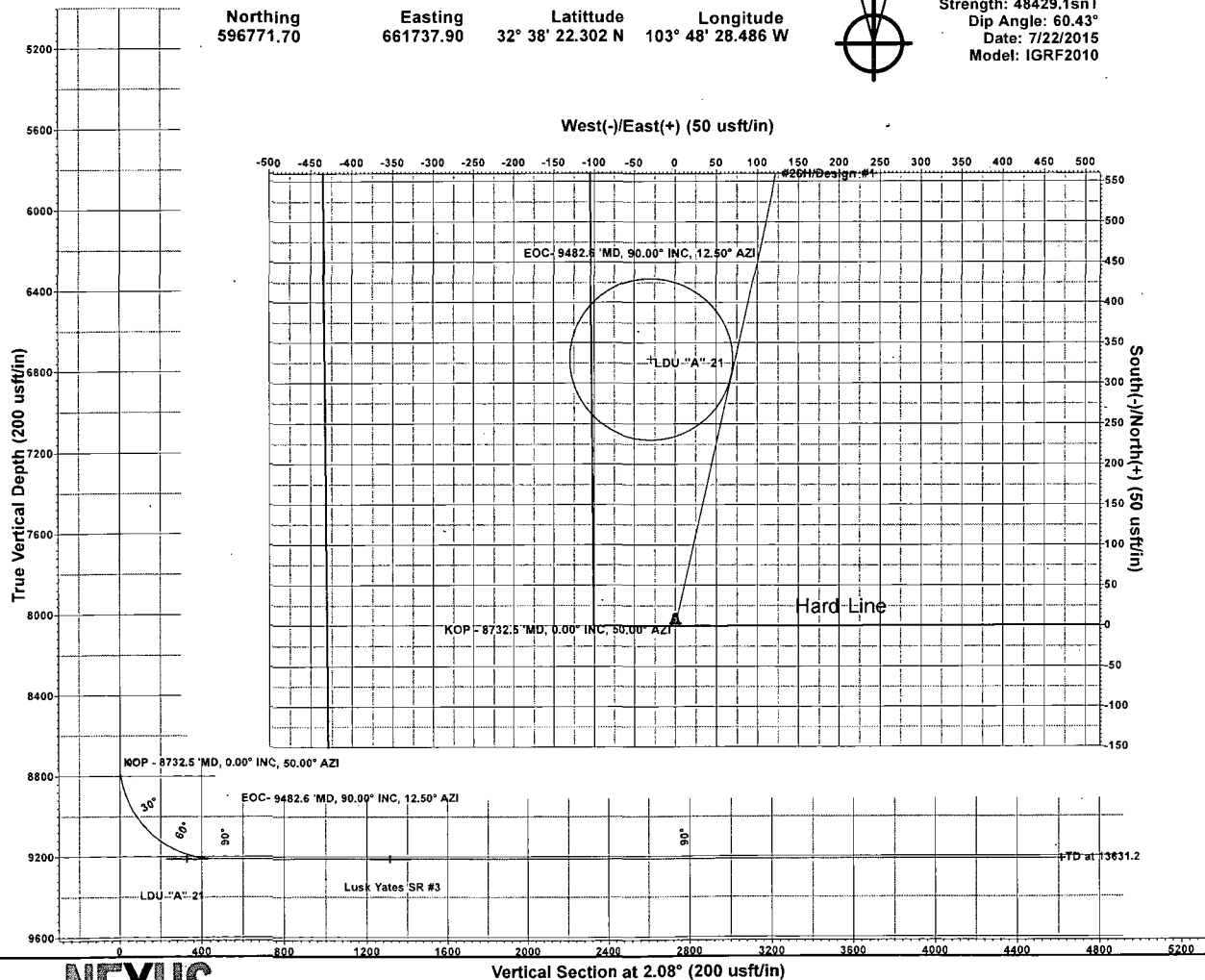
Ground Elevation:: 3542.8
RKB Elevation: WELL @ 3560.8usft (Original Well Elev)
Rig Name: Original Well Elev

Northing 596771.70 Easting 661737.90 Latitude 32° 38' 22.302 N Longitude 103° 48' 28.486 W



Azimuths to Grid North
True North: -0.28°
Magnetic North: 6.94°

Magnetic Field
Strength: 48429.1snT
Dip Angle: 60.43°
Date: 7/22/2015
Model: IGRF2010



NEXUS
DIRECTIONAL SOLUTIONS, L.P.

Vertical Section at 2.08° (200 usft/in)

Nexus Directional Solutions

PROJECT DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

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

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

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

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00563			LE	1	1	2	19	19S	32E	612118	3613376*	300		
CP 00640			LE	2	2	19	19S	32E	612621	3613280*		260	102	158

Average Depth to Water: **102 feet**

Minimum Depth: **102 feet**

Maximum Depth: **102 feet**

Record Count: 2

PLSS Search:

Section(s): 19

Township: 19S

Range: 32E

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

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

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

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

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00073			LE	2	4	34	19S	32E		617502	3609301*	575		
CP 00075			LE	2	4	34	19S	32E		617502	3609301*	575		
CP 00563			LE	1	1	2	19S	32E		612118	3613376*	300		
CP 00639			LE	3	1	20	19S	32E		613029	3612880*	350	345	5
CP 00640			LE	2	2	19	19S	32E		612621	3613280*	260	102	158

Average Depth to Water: **223 feet**

Minimum Depth: **102 feet**

Maximum Depth: **345 feet**

Record Count: 5

PLSS Search:

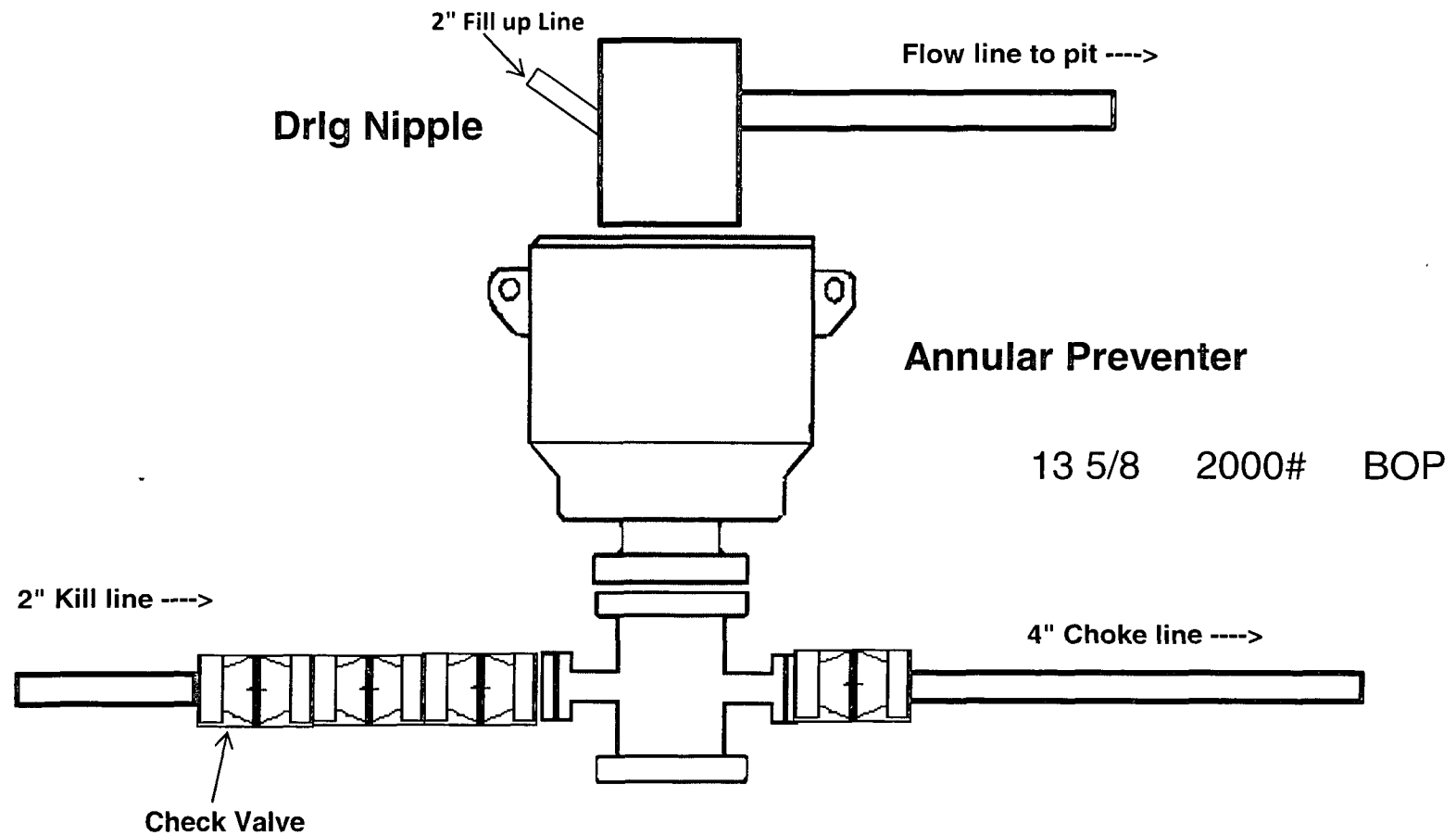
Township: 19S

Range: 32E

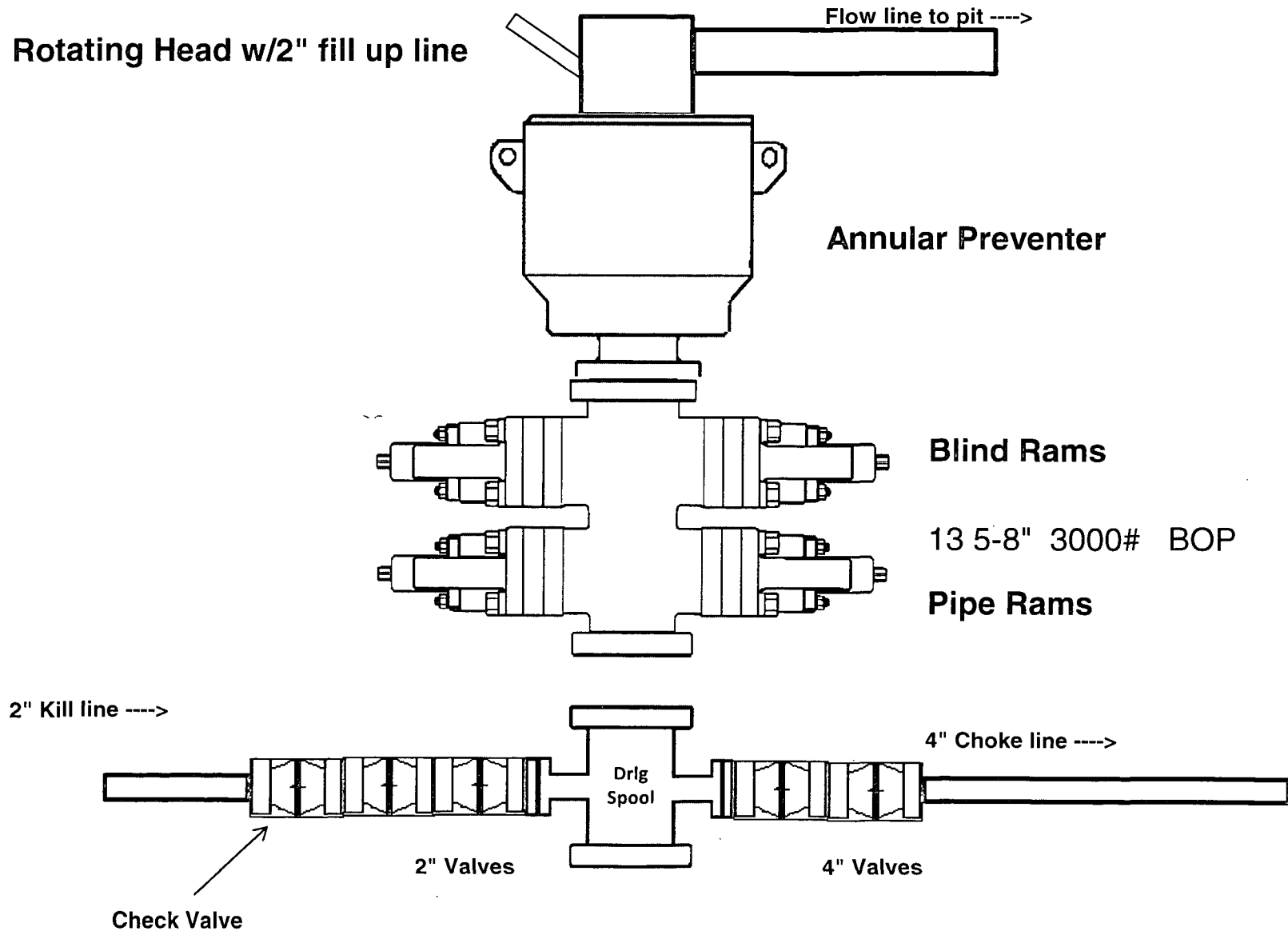
*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

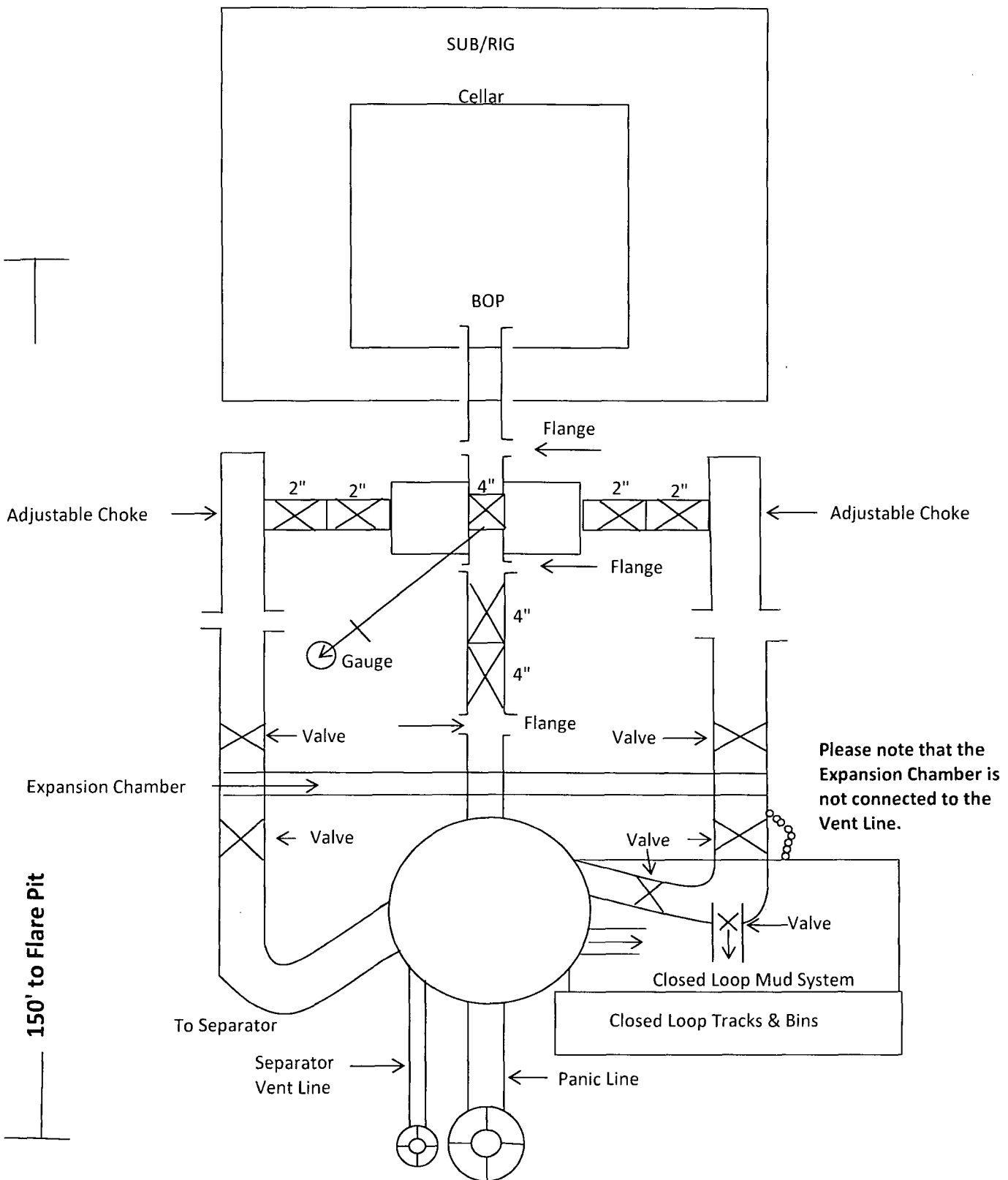
2,000 psi BOP Schematic



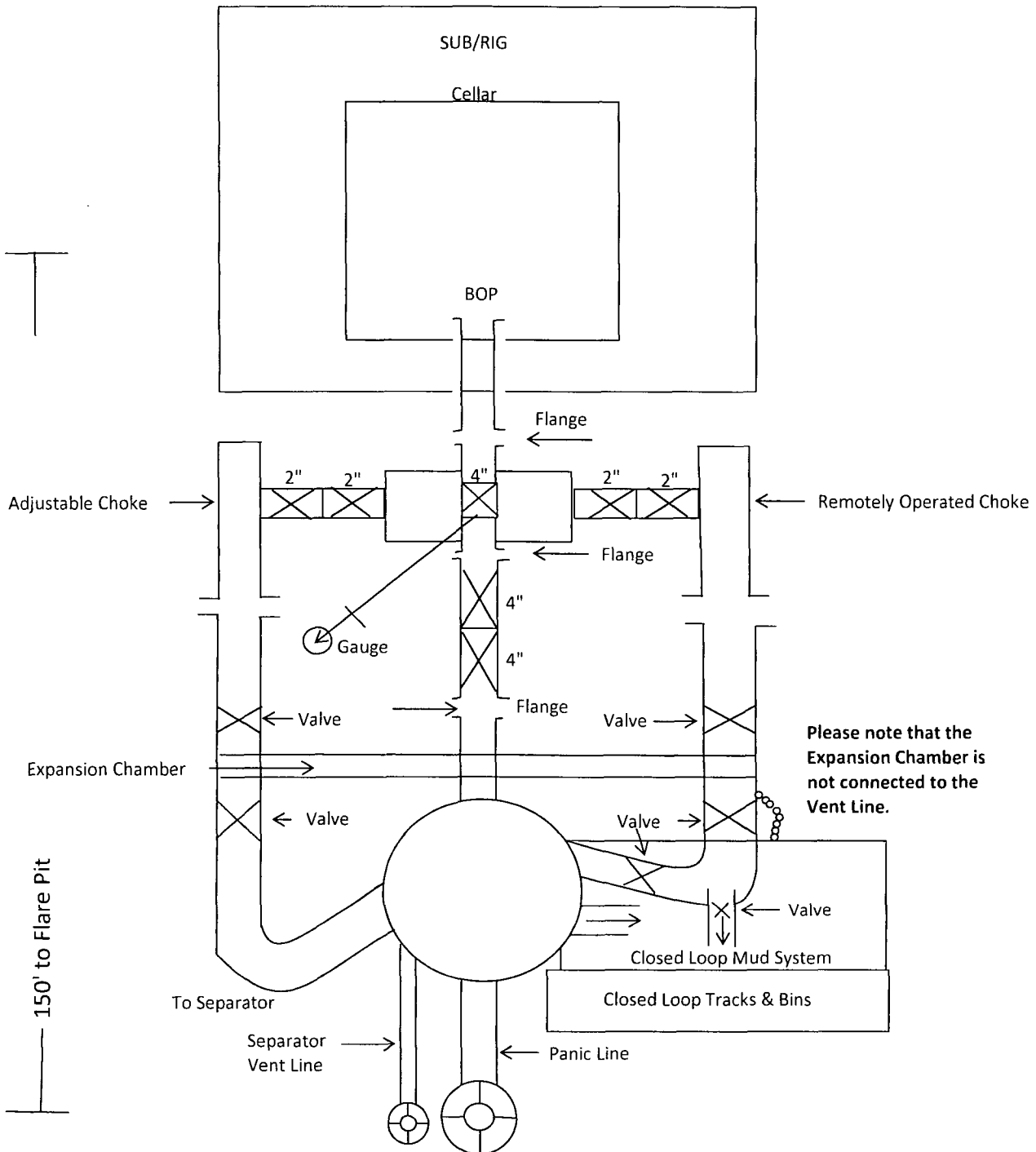
3,000 psi BOP Schematic



2M Choke Manifold Equipment



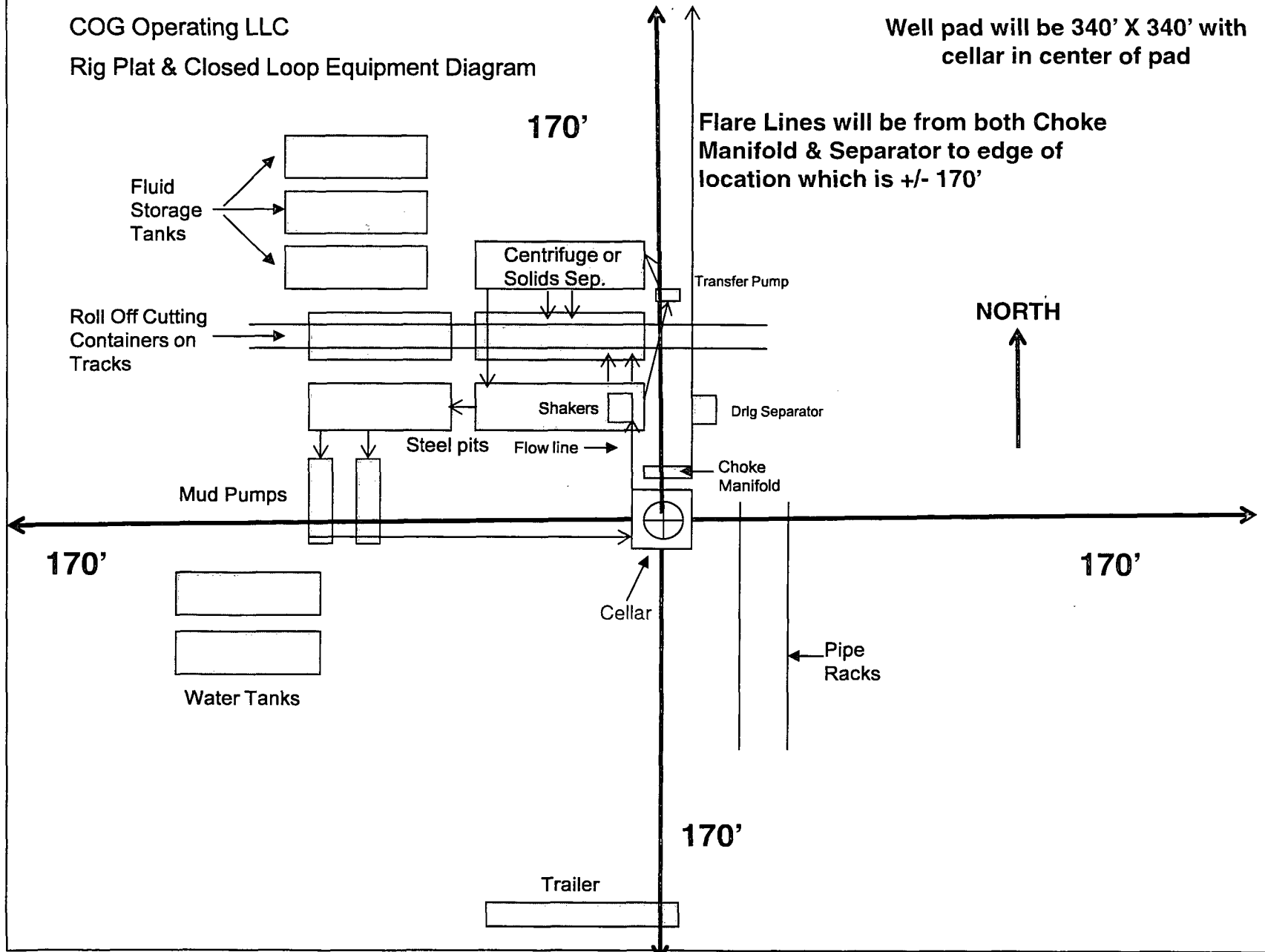
3M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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



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

COG Operating LLC
H₂S Equipment Schematic
Terrain: Shinnery sand hills.

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

Secondary egress.

