

OCD Hobbs

FORM APPROVED
OMB No. 1004-013
Expires July 31, 2010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

HOBBS OCD
NOV 15 2012

RECEIVED

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. SHL: NMNM016497, BHL: NMNM065863
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG Operating LLC.		7. If Unit or CA Agreement, Name and No. Lusk Deep Unit - NMNM70982X
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. Lusk Deep Unit A #24H
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-025-40863
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 330' FNL & 660' FWL Lot #1 (NWNW) SHL At proposed prod. Zone 330' FSL & 660' FWL Lot #4 (SWSW) BHL		10. Field and Pool, or Exploratory Lusk ; Bone Springs
14. Distance in miles and direction from nearest town or post office* About 12 miles from Maljamar		11. Sec , T.R.M. or Blk and Survey or Area Sec. 19 - T19S - R32E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'		12. County or Parish Lea County
16. No. of acres in lease SHL: 80.83 BHL: 121.77		13. State NM
17. Spacing Unit dedicated to this well 163.48		
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 330' BHL: 330'		20. BLM/BIA Bond No. on file NMB000740 & NMB00215
19. Proposed Depth TVD: 9200' MD: 13662'		21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3569'
22. Approximate date work will start* ASAP		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 7/19/2012
Title Regulatory Analyst		
Approved by (Signature) <i>/s/ Don Peterson</i>	Name (Printed/Typed)	Date NOV 13 2012
Title FIELD MANAGER		
Office CARLSBAD FIELD OFFICE		

Application approval 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.

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

NOV 19 2012

STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

The undersigned accepts all applicable terms, conditions, stipulations, and restrictions concerning operations conducted on the leased land or portion thereof, as described below:

Date: 7/19/2012

Lease #: SHL: NMNM016497; BHL: NMNM065863
Lusk Deep Unit A #24H

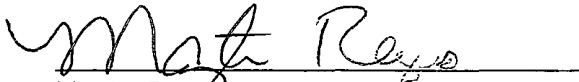
Legal Description: Sec. 19– T19S – R32E
Lea County, New Mexico

Formation(s): 2nd Bone Spring Sand

Bond Coverage: Statewide

BLM Bond File #: NMB000740 & NMB00215

COG OPERATING LLC

A handwritten signature in cursive script, appearing to read "Mayte Reyes", is written over a horizontal line.

Mayte Reyes
Regulatory Analyst

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Lusk Deep Unit A #24H
SHL: 330' FNL & 660' FWL
BHL: 330' FSL & 660' FWL
Section 19 T19S R32E
Lea County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Operating 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	~ 100'	
Rustler	691'	
Top of Salt	801'	
Base of Salt	2216'	
Yates	2401'	
7 Rivers	2511'	
Reef	2632'	
Delaware	4369'	Oil
Bone Spring	6992'	Oil
TD TVD	9200'	
TD MD	13,662'	

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 725' and circulating cement back to surface. All intervals will be isolated by setting 5 1/2" casing to total depth and tying back cement to a minimum of 50' above Capitan Reef.

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

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 725'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 3500'	Intrmd	9 5/8"	New	36#	BTC	J-55	1.125	1.125	1.6
12 1/4"	3500' - 4300'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 13,662'	Production 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.

4. Proposed Cement Program

- a. 13-3/8" Surface
- Lead: 300 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx)
- Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/50% excess on OH volumes
- b. 9 5/8" Intermediate
- 1st Stg:
- Lead: 300 sx 35:65:6 C+Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 1.89 cuft/sx)
- Tail: 250 sx Class C + 1% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- 2nd Stg: DVT/ECP @ +/- 2500'
- Lead: 550 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx)
- Tail: 100 sx Class C + 2% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/35% excess on OH volumes
- d. 5 1/2" Production
- Lead: 600 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(11.8 ppg / 2.5 cuft/sx)
- Tail: 950 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg / 1.25 cuft/sx)
- **Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending the caliper measurement from the open hole logs.
- The 9-5/8" intermediate string is designed to circulate to surface.
- The production string will at least tie back 50' above Capitan Reef

5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8 with annular preventer tested to 50% of rating working pressure by independent tester and the rest of the 2M system tested to 2000 psi.

Nipple up on 9 5/8 with 3M system tested 3000 psi to by independent tester.

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 3000 psi WP rating.

6. Estimated BHP:

Lateral TD = 4025 psi

See COA

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

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – 725'	Fresh Water	8.4	29	N.C.
725' – 4300'	Brine	10	29	N.C.
4300' – 13,662' (Lateral)	Cut Brine	8.9 – 9.2	29	N.C.

The necessary mud products for weight addition and fluid loss control will be on location at all times.

8. Auxiliary Well Control and Monitoring Equipment:

- A Kelly cock will be in the drill string at all times.
- A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
- 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:

- See COA*
- Drill stem tests will be based on geological sample shows.
 - If open hole electrical logging is preformed, the program will be:
 - Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
 - Total Depth to Surface: Compensated Neutron with Gamma Ray
 - No coring program is planned
 - 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:

- 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:

- Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be 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 Operating LLC

Lea County(NAD27)

Lusk Deep Unit A

#24H

OH

Plan: Plan #2

Pathfinder X&Y Report

12 July, 2012

HOBBS OCD

NOV 15 2012

ELG 11-15-2012
RECEIVED

PATHFINDER®

A Schlumberger Company



Pathfinder
Pathfinder X&Y Report

PATHFINDER
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Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #24H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Well:	#24H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #2	Database:	EDM 5000.1 Single User Db

Project:	Lea County(NAD27)		
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:	599,927.400 usft
From:	Map	Easting:	665,577.000 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32.648
		Longitude:	-103.795
		Grid Convergence:	0 29 °

Well		#24H				
Well Position	+N/-S	0.0 usft	Northing:	601,385.700 usft	Latitude:	32.652
	+E/-W	0.0 usft	Easting:	660,585.500 usft	Longitude:	-103.812
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	3,569.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	7/12/2012	7.59	60.54	48,779

Design	Plan #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	179.60

Survey Tool Program	Date	7/12/2012		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
0.0	13,662.1	Plan #2 (OH)		



Pathfinder
Pathfinder X&Y Report



Company: COG Operating LLC		Local Co-ordinate Reference:				Well #24H				
Project: Lea County(NAD27)		TVD Reference:				KB = 17' @ 3586.0usft (Original Well Elev)				
Site: Lusk Deep Unit A		MD Reference:				KB = 17' @ 3586.0usft (Original Well Elev)				
Well: #24H		North Reference:				Grid				
Wellbore: OH		Survey Calculation Method:				Minimum Curvature				
Design: Plan #2		Database:				EDM 5000.1 Single User Db				
Planned Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.0	0.00	0.00	0.0	-3,586.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
100.0	0.00	0.00	100.0	-3,486.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
200.0	0.00	0.00	200.0	-3,386.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
300.0	0.00	0.00	300.0	-3,286.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
400.0	0.00	0.00	400.0	-3,186.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
500.0	0.00	0.00	500.0	-3,086.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
600.0	0.00	0.00	600.0	-2,986.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
700.0	0.00	0.00	700.0	-2,886.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
800.0	0.00	0.00	800.0	-2,786.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
900.0	0.00	0.00	900.0	-2,686.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,000.0	0.00	0.00	1,000.0	-2,586.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,100.0	0.00	0.00	1,100.0	-2,486.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,200.0	0.00	0.00	1,200.0	-2,386.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,300.0	0.00	0.00	1,300.0	-2,286.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,400.0	0.00	0.00	1,400.0	-2,186.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,500.0	0.00	0.00	1,500.0	-2,086.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,600.0	0.00	0.00	1,600.0	-1,986.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,700.0	0.00	0.00	1,700.0	-1,886.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,800.0	0.00	0.00	1,800.0	-1,786.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
1,900.0	0.00	0.00	1,900.0	-1,686.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,000.0	0.00	0.00	2,000.0	-1,586.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,100.0	0.00	0.00	2,100.0	-1,486.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,200.0	0.00	0.00	2,200.0	-1,386.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,300.0	0.00	0.00	2,300.0	-1,286.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,400.0	0.00	0.00	2,400.0	-1,186.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,500.0	0.00	0.00	2,500.0	-1,086.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50
2,600.0	0.00	0.00	2,600.0	-986.0	0.0	0.0	0.0	0.0	601,385.70	660,585.50



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Lusk Deep Unit A
Well: #24H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference:
TVD Reference: Well #24H
MD Reference: KB = 17' @ 3586.0usft (Original Well Elev)
North Reference: KB = 17' @ 3586 0usft (Original Well Elev)
Survey Calculation Method: Grid
Database: Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
2,700.0	0.00	0.00	2,700.0	-886.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
2,800.0	0.00	0.00	2,800.0	-786.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
2,900.0	0.00	0.00	2,900.0	-686.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,000.0	0.00	0.00	3,000.0	-586.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,100.0	0.00	0.00	3,100.0	-486.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,200.0	0.00	0.00	3,200.0	-386.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,300.0	0.00	0.00	3,300.0	-286.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,400.0	0.00	0.00	3,400.0	-186.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,500.0	0.00	0.00	3,500.0	-86.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,600.0	0.00	0.00	3,600.0	14.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,700.0	0.00	0.00	3,700.0	114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,800.0	0.00	0.00	3,800.0	214.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
3,900.0	0.00	0.00	3,900.0	314.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,000.0	0.00	0.00	4,000.0	414.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,100.0	0.00	0.00	4,100.0	514.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,200.0	0.00	0.00	4,200.0	614.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,300.0	0.00	0.00	4,300.0	714.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,400.0	0.00	0.00	4,400.0	814.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,500.0	0.00	0.00	4,500.0	914.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,600.0	0.00	0.00	4,600.0	1,014.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,700.0	0.00	0.00	4,700.0	1,114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,800.0	0.00	0.00	4,800.0	1,214.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
4,900.0	0.00	0.00	4,900.0	1,314.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
5,000.0	0.00	0.00	5,000.0	1,414.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
5,100.0	0.00	0.00	5,100.0	1,514.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
5,200.0	0.00	0.00	5,200.0	1,614.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
5,300.0	0.00	0.00	5,300.0	1,714.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #2	Database:	EDM 5000.1 Single User Db

Planned Survey											
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5,400.0	0.00	0.00	5,400.0	1,814.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
5,500.0	0.00	0.00	5,500.0	1,914.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
5,600.0	0.00	0.00	5,600.0	2,014.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
5,700.0	0.00	0.00	5,700.0	2,114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
5,800.0	0.00	0.00	5,800.0	2,214.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
5,900.0	0.00	0.00	5,900.0	2,314.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,000.0	0.00	0.00	6,000.0	2,414.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,100.0	0.00	0.00	6,100.0	2,514.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,200.0	0.00	0.00	6,200.0	2,614.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,300.0	0.00	0.00	6,300.0	2,714.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,400.0	0.00	0.00	6,400.0	2,814.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,500.0	0.00	0.00	6,500.0	2,914.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,600.0	0.00	0.00	6,600.0	3,014.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,700.0	0.00	0.00	6,700.0	3,114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,800.0	0.00	0.00	6,800.0	3,214.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
6,900.0	0.00	0.00	6,900.0	3,314.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,000.0	0.00	0.00	7,000.0	3,414.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,100.0	0.00	0.00	7,100.0	3,514.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,200.0	0.00	0.00	7,200.0	3,614.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,300.0	0.00	0.00	7,300.0	3,714.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,400.0	0.00	0.00	7,400.0	3,814.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,500.0	0.00	0.00	7,500.0	3,914.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,600.0	0.00	0.00	7,600.0	4,014.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,700.0	0.00	0.00	7,700.0	4,114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,800.0	0.00	0.00	7,800.0	4,214.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
7,900.0	0.00	0.00	7,900.0	4,314.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	
8,000.0	0.00	0.00	8,000.0	4,414.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50	



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Lusk Deep Unit A
Well: #24H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #24H
KB = 17' @ 3586.0usft (Original Well Elev)
KB = 17' @ 3586.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
8,100.0	0.00	0.00	8,100.0	4,514.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,200.0	0.00	0.00	8,200.0	4,614.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,300.0	0.00	0.00	8,300.0	4,714.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,400.0	0.00	0.00	8,400.0	4,814.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,500.0	0.00	0.00	8,500.0	4,914.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,600.0	0.00	0.00	8,600.0	5,014.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,700.0	0.00	0.00	8,700.0	5,114.0	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,772.6	0.00	0.00	8,772.6	5,186.6	0.0	0.0	0.0	0.00	601,385.70	660,585.50
8,775.0	0.29	179.60	8,775.0	5,189.0	0.0	0.0	0.0	12.00	601,385.69	660,585.50
8,800.0	3.29	179.60	8,800.0	5,214.0	-0.8	0.0	0.8	12.00	601,384.91	660,585.51
8,825.0	6.29	179.60	8,824.9	5,238.9	-2.9	0.0	2.9	12.00	601,382.83	660,585.52
8,850.0	9.29	179.60	8,849.7	5,263.7	-6.3	0.0	6.3	12.00	601,379.44	660,585.54
8,875.0	12.29	179.60	8,874.2	5,288.2	-10.9	0.1	10.9	12.00	601,374.76	660,585.58
8,900.0	15.29	179.60	8,898.5	5,312.5	-16.9	0.1	16.9	12.00	601,368.80	660,585.62
8,925.0	18.29	179.60	8,922.4	5,336.4	-24.1	0.2	24.1	12.00	601,361.58	660,585.67
8,950.0	21.29	179.60	8,945.9	5,359.9	-32.6	0.2	32.6	12.00	601,353.12	660,585.73
8,975.0	24.29	179.60	8,969.0	5,383.0	-42.3	0.3	42.3	12.00	601,343.44	660,585.79
9,000.0	27.29	179.60	8,991.5	5,405.5	-53.1	0.4	53.1	12.00	601,332.57	660,585.87
9,025.0	30.29	179.60	9,013.4	5,427.4	-65.2	0.5	65.2	12.00	601,320.53	660,585.95
9,050.0	33.29	179.60	9,034.7	5,448.7	-78.3	0.5	78.3	12.00	601,307.36	660,586.04
9,075.0	36.29	179.60	9,055.2	5,469.2	-92.6	0.6	92.6	12.00	601,293.10	660,586.14
9,100.0	39.29	179.60	9,074.9	5,488.9	-107.9	0.7	107.9	12.00	601,277.78	660,586.25
9,125.0	42.29	179.60	9,093.9	5,507.9	-124.2	0.9	124.2	12.00	601,261.45	660,586.36
9,150.0	45.29	179.60	9,111.9	5,525.9	-141.5	1.0	141.5	12.00	601,244.16	660,586.48
9,175.0	48.29	179.60	9,129.0	5,543.0	-159.8	1.1	159.8	12.00	601,225.94	660,586.61
9,200.0	51.29	179.60	9,145.2	5,559.2	-178.9	1.2	178.9	12.00	601,206.85	660,586.74
9,225.0	54.29	179.60	9,160.3	5,574.3	-198.8	1.4	198.8	12.00	601,186.94	660,586.88



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #24H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Well:	#24H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #2	Database:	EDM 5000.1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
9,250.0	57.29	179.60	9,174.3	5,588.3	-219.4	1.5	219.4	12.00	601,166.27	660,587.02	
9,275.0	60.29	179.60	9,187.3	5,601.3	-240.8	1.7	240.8	12.00	601,144.89	660,587.17	
9,300.0	63.29	179.60	9,199.1	5,613.1	-262.8	1.8	262.8	12.00	601,122.86	660,587.32	
9,325.0	66.29	179.60	9,209.8	5,623.8	-285.5	2.0	285.5	12.00	601,100.25	660,587.48	
9,350.0	69.29	179.60	9,219.2	5,633.2	-308.6	2.1	308.6	12.00	601,077.11	660,587.64	
9,375.0	72.29	179.60	9,227.4	5,641.4	-332.2	2.3	332.2	12.00	601,053.50	660,587.80	
9,400.0	75.29	179.60	9,234.4	5,648.4	-356.2	2.5	356.2	12.00	601,029.50	660,587.97	
9,425.0	78.29	179.60	9,240.1	5,654.1	-380.5	2.6	380.5	12.00	601,005.17	660,588.14	
9,450.0	81.29	179.60	9,244.6	5,658.6	-405.1	2.8	405.1	12.00	600,980.57	660,588.31	
9,475.0	84.29	179.60	9,247.7	5,661.7	-429.9	3.0	429.9	12.00	600,955.77	660,588.48	
9,500.0	87.29	179.60	9,249.5	5,663.5	-454.9	3.2	454.9	12.00	600,930.84	660,588.65	
9,525.0	90.29	179.60	9,250.1	5,664.1	-479.9	3.3	479.9	12.00	600,905.85	660,588.83	
9,528.4	90.69	179.60	9,250.0	5,664.0	-483.2	3.3	483.2	12.00	600,902.47	660,588.85	
9,600.0	90.69	179.60	9,249.2	5,663.2	-554.8	3.8	554.9	0.00	600,830.85	660,589.35	
9,700.0	90.69	179.60	9,248.0	5,662.0	-654.8	4.5	654.9	0.00	600,730.86	660,590.04	
9,800.0	90.69	179.60	9,246.7	5,660.7	-754.8	5.2	754.8	0.00	600,630.87	660,590.73	
9,900.0	90.69	179.60	9,245.5	5,659.5	-854.8	5.9	854.8	0.00	600,530.88	660,591.43	
10,000.0	90.69	179.60	9,244.3	5,658.3	-954.8	6.6	954.8	0.00	600,430.89	660,592.12	
10,100.0	90.69	179.60	9,243.1	5,657.1	-1,054.8	7.3	1,054.8	0.00	600,330.90	660,592.81	
10,200.0	90.69	179.60	9,241.9	5,655.9	-1,154.8	8.0	1,154.8	0.00	600,230.91	660,593.50	
10,300.0	90.69	179.60	9,240.7	5,654.7	-1,254.8	8.7	1,254.8	0.00	600,130.92	660,594.20	
10,400.0	90.69	179.60	9,239.5	5,653.5	-1,354.8	9.4	1,354.8	0.00	600,030.93	660,594.89	
10,500.0	90.69	179.60	9,238.3	5,652.3	-1,454.8	10.1	1,454.8	0.00	599,930.94	660,595.58	
10,600.0	90.69	179.60	9,237.1	5,651.1	-1,554.7	10.8	1,554.8	0.00	599,830.95	660,596.28	
10,700.0	90.69	179.60	9,235.9	5,649.9	-1,654.7	11.5	1,654.8	0.00	599,730.96	660,596.97	
10,800.0	90.69	179.60	9,234.6	5,648.6	-1,754.7	12.2	1,754.8	0.00	599,630.97	660,597.66	
10,900.0	90.69	179.60	9,233.4	5,647.4	-1,854.7	12.9	1,854.8	0.00	599,530.98	660,598.36	



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Lusk Deep Unit A
Well: #24H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference:

TVD Reference:

MD Reference:

North Reference:

Survey Calculation Method:

Database:

Well #24H

KB = 17' @ 3586.0usft (Original Well Elev)

KB = 17' @ 3586.0usft (Original Well Elev)

Grid

Minimum Curvature

EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
11,000.0	90.69	179.60	9,232.2	5,646.2	-1,954.7	13.5	1,954.8	0.00	599,430.99	660,599.05
11,100.0	90.69	179.60	9,231.0	5,645.0	-2,054.7	14.2	2,054.7	0.00	599,331.00	660,599.74
11,200.0	90.69	179.60	9,229.8	5,643.8	-2,154.7	14.9	2,154.7	0.00	599,231.01	660,600.44
11,300.0	90.69	179.60	9,228.6	5,642.6	-2,254.7	15.6	2,254.7	0.00	599,131.02	660,601.13
11,400.0	90.69	179.60	9,227.4	5,641.4	-2,354.7	16.3	2,354.7	0.00	599,031.03	660,601.82
11,500.0	90.69	179.60	9,226.2	5,640.2	-2,454.7	17.0	2,454.7	0.00	598,931.04	660,602.51
11,600.0	90.69	179.60	9,225.0	5,639.0	-2,554.7	17.7	2,554.7	0.00	598,831.05	660,603.21
11,700.0	90.69	179.60	9,223.7	5,637.7	-2,654.6	18.4	2,654.7	0.00	598,731.06	660,603.90
11,800.0	90.69	179.60	9,222.5	5,636.5	-2,754.6	19.1	2,754.7	0.00	598,631.07	660,604.59
11,900.0	90.69	179.60	9,221.3	5,635.3	-2,854.6	19.8	2,854.7	0.00	598,531.08	660,605.29
12,000.0	90.69	179.60	9,220.1	5,634.1	-2,954.6	20.5	2,954.7	0.00	598,431.09	660,605.98
12,100.0	90.69	179.60	9,218.9	5,632.9	-3,054.6	21.2	3,054.7	0.00	598,331.10	660,606.67
12,200.0	90.69	179.60	9,217.7	5,631.7	-3,154.6	21.9	3,154.7	0.00	598,231.11	660,607.37
12,300.0	90.69	179.60	9,216.5	5,630.5	-3,254.6	22.6	3,254.7	0.00	598,131.12	660,608.06
12,400.0	90.69	179.60	9,215.3	5,629.3	-3,354.6	23.3	3,354.7	0.00	598,031.13	660,608.75
12,500.0	90.69	179.60	9,214.1	5,628.1	-3,454.6	23.9	3,454.6	0.00	597,931.14	660,609.45
12,600.0	90.69	179.60	9,212.9	5,626.9	-3,554.6	24.6	3,554.6	0.00	597,831.15	660,610.14
12,700.0	90.69	179.60	9,211.6	5,625.6	-3,654.5	25.3	3,654.6	0.00	597,731.16	660,610.83
12,800.0	90.69	179.60	9,210.4	5,624.4	-3,754.5	26.0	3,754.6	0.00	597,631.17	660,611.52
12,900.0	90.69	179.60	9,209.2	5,623.2	-3,854.5	26.7	3,854.6	0.00	597,531.17	660,612.22
13,000.0	90.69	179.60	9,208.0	5,622.0	-3,954.5	27.4	3,954.6	0.00	597,431.18	660,612.91
13,100.0	90.69	179.60	9,206.8	5,620.8	-4,054.5	28.1	4,054.6	0.00	597,331.19	660,613.60
13,200.0	90.69	179.60	9,205.6	5,619.6	-4,154.5	28.8	4,154.6	0.00	597,231.20	660,614.30
13,300.0	90.69	179.60	9,204.4	5,618.4	-4,254.5	29.5	4,254.6	0.00	597,131.21	660,614.99
13,400.0	90.69	179.60	9,203.2	5,617.2	-4,354.5	30.2	4,354.6	0.00	597,031.22	660,615.68
13,500.0	90.69	179.60	9,202.0	5,616.0	-4,454.5	30.9	4,454.6	0.00	596,931.23	660,616.38
13,600.0	90.69	179.60	9,200.8	5,614.8	-4,554.5	31.6	4,554.6	0.00	596,831.24	660,617.07



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #24H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3586.0usft (Original Well Elev)
Well:	#24H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #2	Database:	EDM 5000.1 Single User Db

Planned Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
13,662.1	90.69	179.60	9,200.0	5,614.0	-4,616.6	32.0	4,616.7	0.00	596,769.10	660,617.50	

Checked By: _____	Approved By: _____	Date: _____
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Project: Lea County(NAD27)
Site: Lusk Deep Unit A
Well: #24H
Wellbore: OH
Plan: Plan #2 (#24H/OH)



Azimuths to Grid North
True North: -0.28°
Magnetic North: 7.31°

Magnetic Field
Strength: 48779.3snT
Dip Angle: 60.54°
Date: 7/12/2012
Model: IGRF200510

PATHFINDER

A Schlumberger Company

PROJECT DETAILS: Lea County(NAD27)
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

WELL DETAILS: #24H

Ground Elevation: 3569.0
RKB Elevation, KB = 17' @ 3586.0usft (Original Well Elev)
Rig Name: Original Well Elev

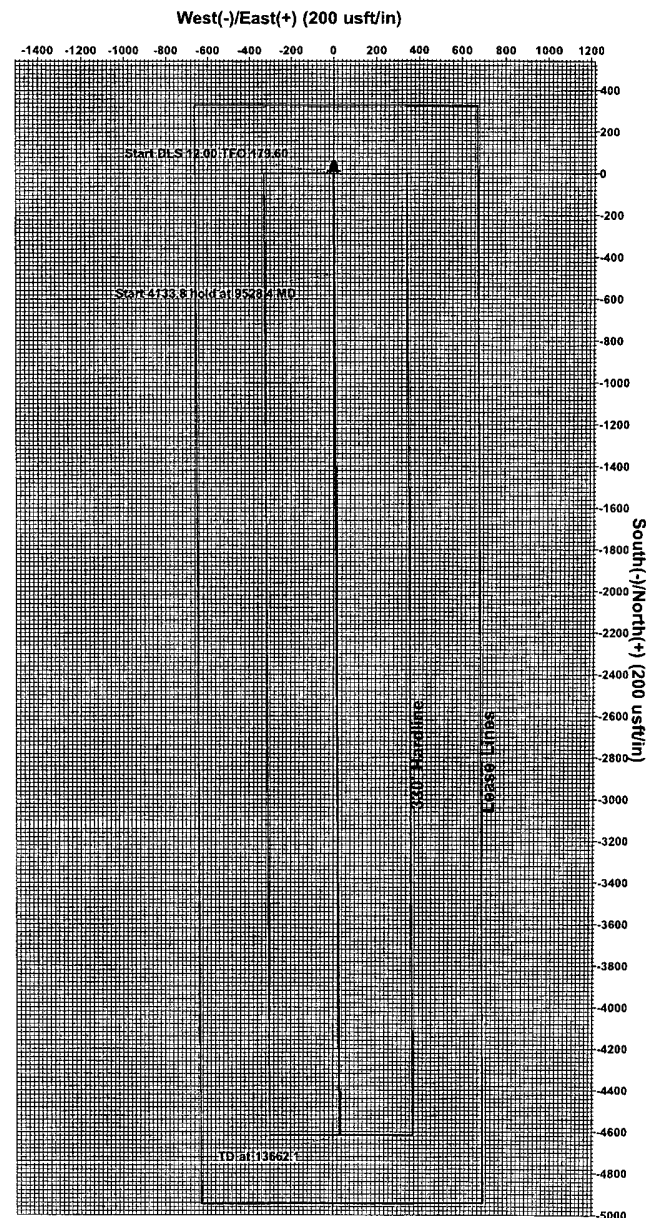
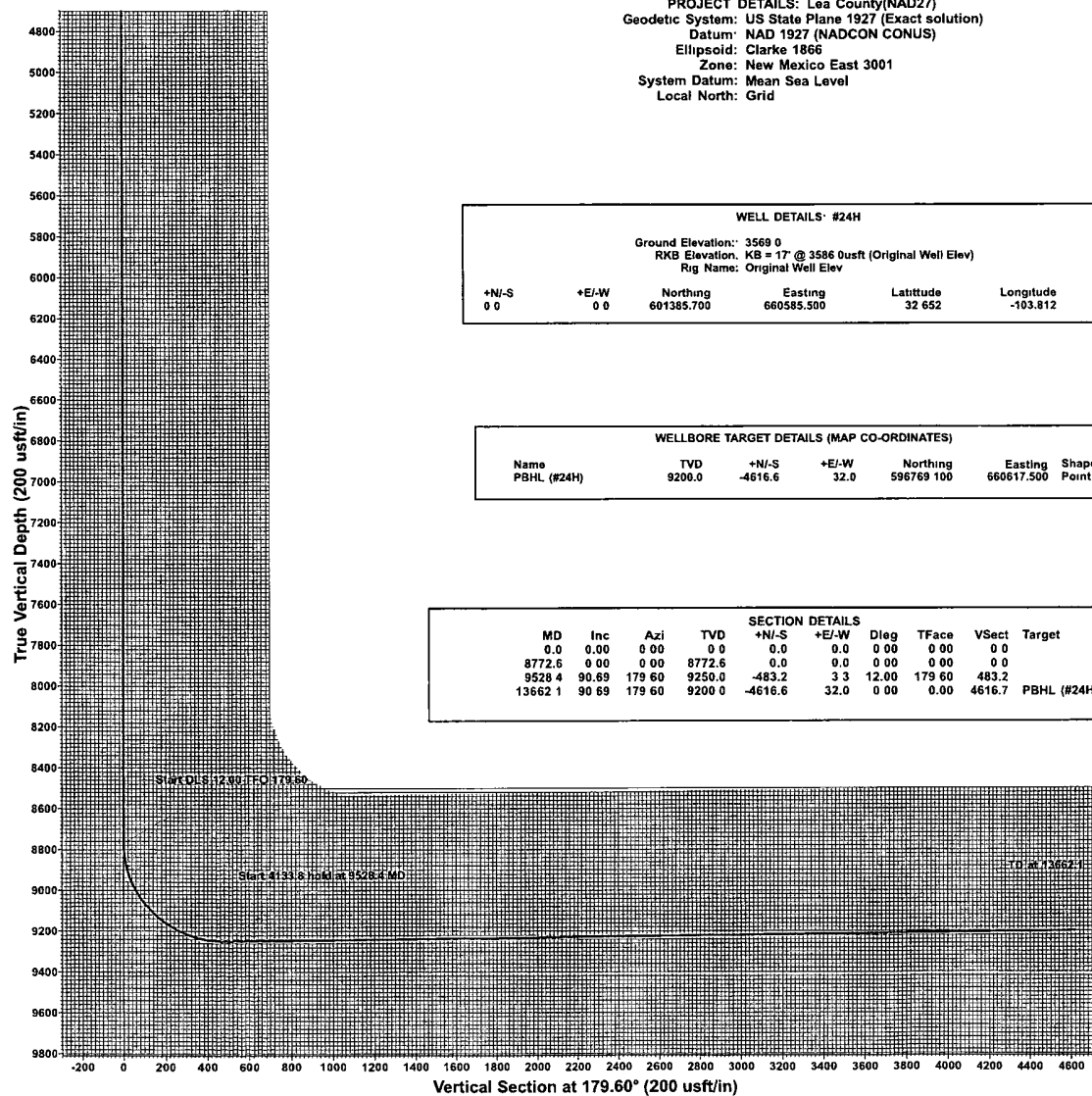
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	601385.700	660585.500	32.652	-103.812	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (#24H)	9200.0	-4616.6	32.0	596769.100	660617.500	Point

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
8772.6	0.00	0.00	8772.6	0.0	0.0	0.00	0.00	0.0	
9528.4	90.69	179.60	9250.0	-483.2	3.3	12.00	179.60	483.2	
13662.1	90.69	179.60	9200.0	-4616.6	32.0	0.00	0.00	4616.7	PBHL (#24H)



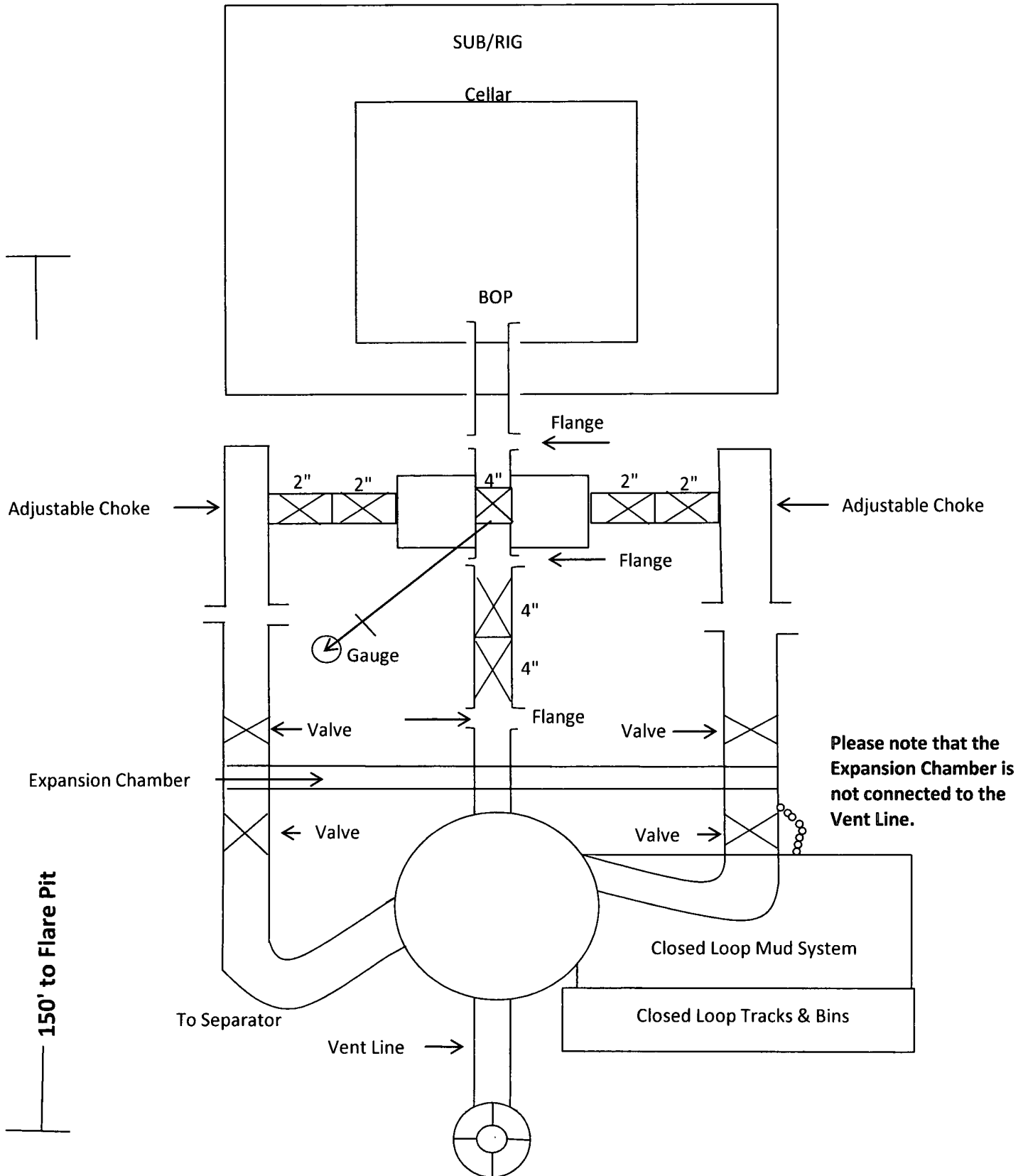
Plan Plan #2 (#24H/OH)

Created By: Michael Trout Date: 15/37, July 12 2012

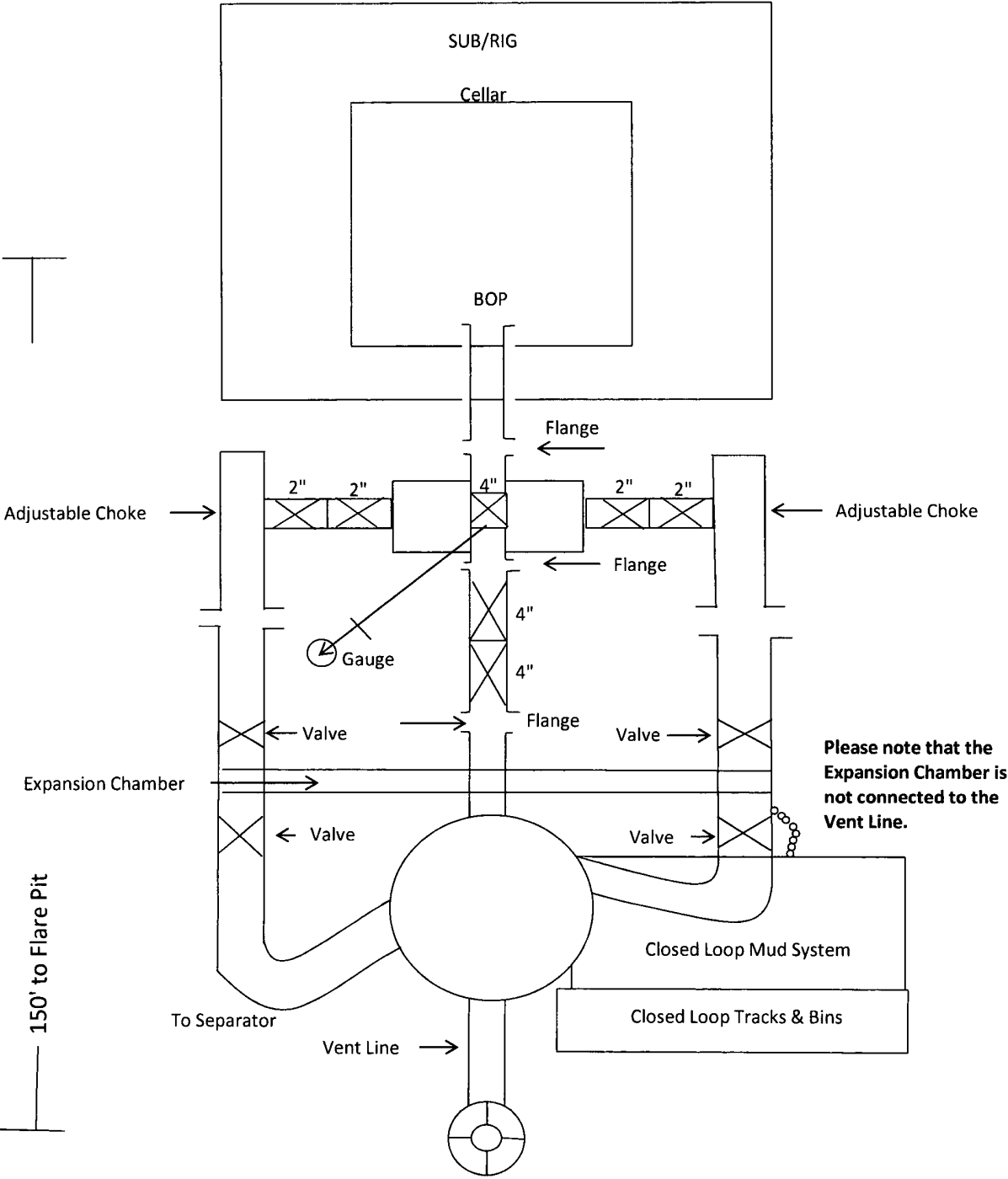
Checked: _____ Date: _____

CDG Operating LLC
Lea County(NAD27)
Lusk Deep Unit A
OH
Plan #2

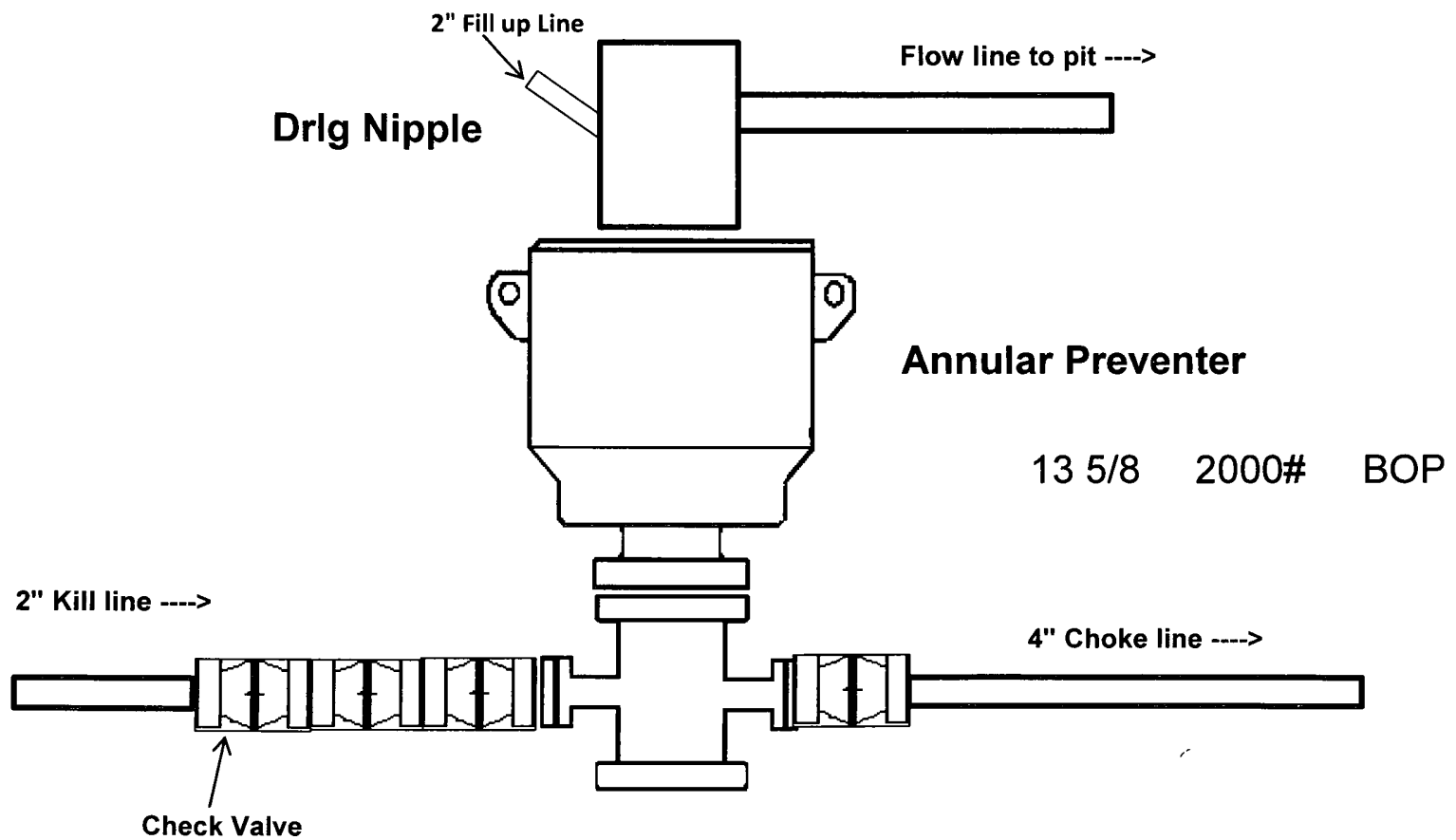
2M Choke Manifold Equipment



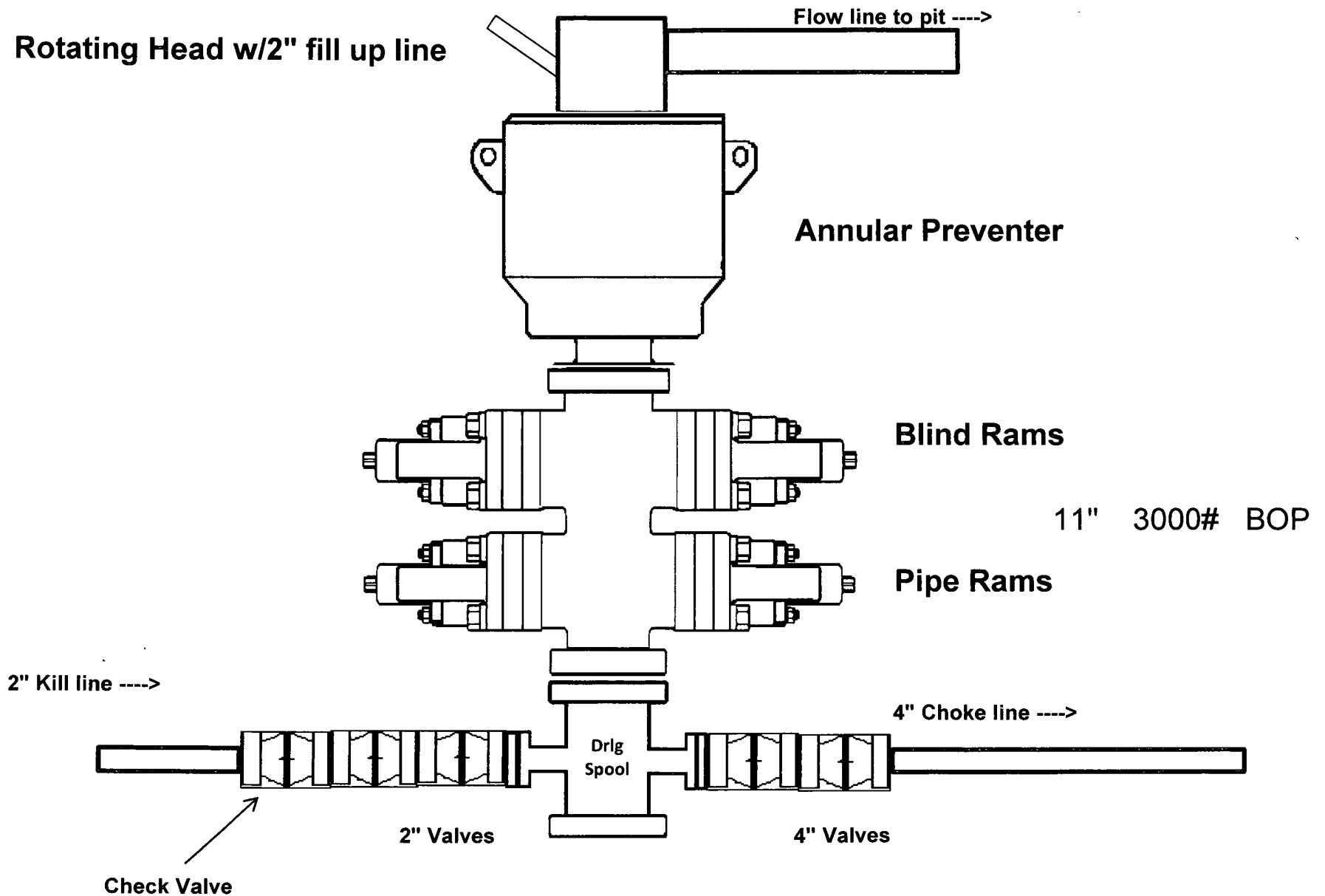
3M Choke Manifold Equipment



2,000 psi BOP Schematic



3,000 psi BOP Schematic



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

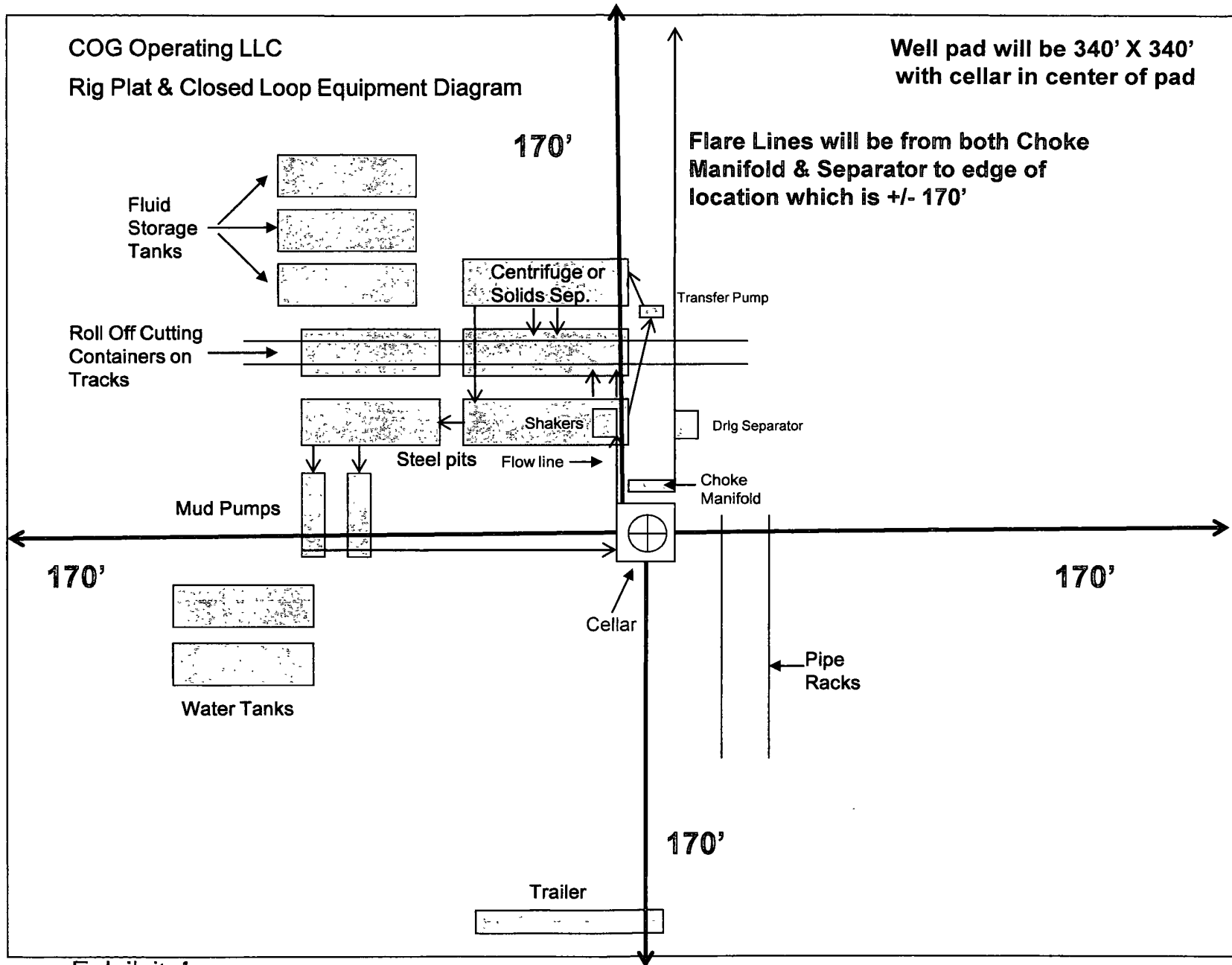


Exhibit 1

**Design Plan
Operating and Maintenance Plan
Closure Plan**

**Lusk Deep Unit A #24H
SHL: 330' FNL & 660' FWL
BHL: 330' FSL & 660' FWL
Section 19 T19S R32E
Lea County, New Mexico**

COG Operating LLC will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. All leaks should be kept to less than 5 barrels. Rig crews will monitor the tanks at all times.

Equipment List:

- 2- Mongoose Shale Shakers
- 1- 414 Centrifuge
- 1- 518 Centrifuge
- 2- Roll Off Bins w/ Tracks
- 2- 500 BBL Frac Tanks

During drilling operations all liquids, drilling fluids and cuttings will be hauled off via CRI (Controlled Recovery Inc.) Permit R-9166 or any other approved facility.

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) (NAD

(NAD83 UTM in meters) (In feet)

(In feet)

POD			Q Q Q								Depth	Depth	Water	
POD Number	Code	Subbasin	County	64	16	4	Sec	Tws	Rng	X	Y	Well	Water	Column
CP 00640 EXPL			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: 1

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.

COG Operating LLC

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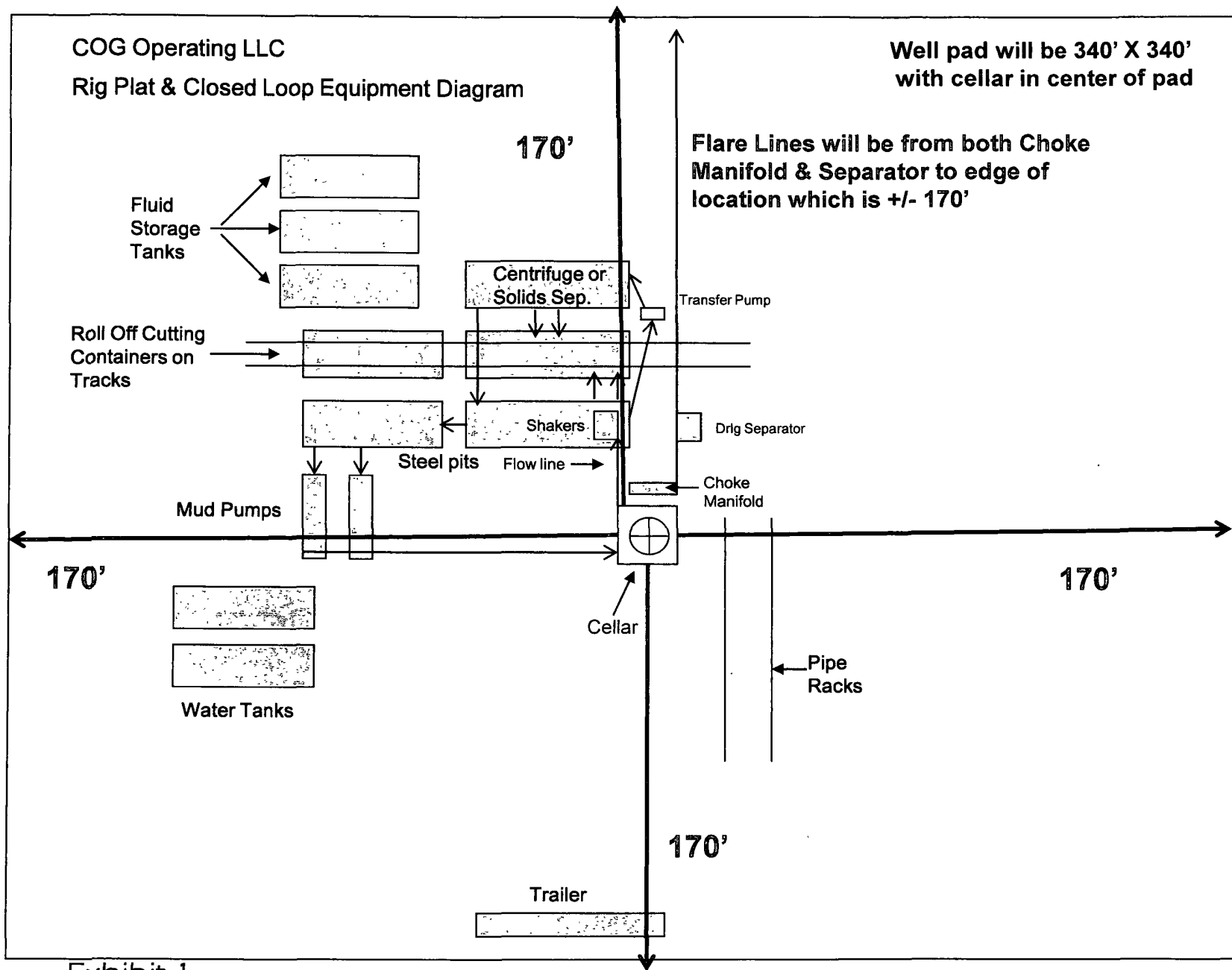


Exhibit 1