

15-589

Form 3160-3
(March 2012)

OCD Hobbs

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTERUNORTHODOX
LOCATION
HOBBS

5. Lease Serial No.

NMLC0065710A

6. If Indian, Allottee or Tribe Name

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

Lusk Deep Unit - NMNM 070982X

8. Lease Name and Well No.

Lusk Deep Unit A #31H

9. API Well No.

30-025-43124

10. Field and Pool, or Exploratory

Lusk; Bone Spring

11. Sec., T.R.M. or Blk and Survey or Area

Section 20 - T19S - R32E

12. County or Parish

Lea County

13. State

NM

1a. Type of Work: ☒ DRILL ☐ REENTER1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other☒ Single Zone

2. Name of Operator

COG Operating LLC.

3a. Address

2208 West Main Street
Artesia, NM 88210

3b. Phone No. (include area code)

575-748-6940

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

At surface 500' FNL & 190' FEL Unit Letter A (NENE) SHL Sec 20-T19S-R32E

At proposed prod. Zone 380' FNL & 330' FWL Unit Letter D (NWNW) BHL Sec 20-T19S-R32E

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

Approximately 12 miles from Maljamar

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

190'

16. No. of acres in lease

640

17. Spacing Unit dedicated to this well

160

18. Distance from location*
to nearest well, drilling, completed,
applied for, on this lease, ft.

SHL: 220' BHL: 1312'

19. Proposed Depth

TVD: 9,330' MD: 13,846'

20. BLM/BIA Bond No. on file

NMB000740 & NMB000215

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

3591.0' GL

22. Approximate date work will start*

8/1/2015

23. Estimated duration

30 days

24. Attachments

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

1. Well plat certified by a registered surveyor.

2. A Drilling Plan

3. A Surface Use Plan (if the location is on National Forest System Lands, the
SUPO shall be filed with the appropriate Forest Service Office).4. Bond to cover the operations unless covered by an existing bond on file (see
Item 20 above).

5. Operator certification

6. Such other site specific information and/or plans as may be required by the
authorized officer.

25. Signature

Name (Printed/Typed)

Date

Title

Regulatory Analyst

Approved by (Signature)

Steve Caffey

Name (Printed/Typed)

Date

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)

Capitan Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations AttachedSEE ATTACHED FOR
CONDITIONS OF APPROVAL

MAR 14 2016

*(Instructions on page 2)

E-PERM KZ

KZ
03/14/16

HOBBS OCD

MAR 14 2016

RECEIVED

LUSK DEEP UNIT A #31H															
FID	Shape	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	Point	COG OPERATING LLC	STEALTH FEDERAL COM 002	32.654103	-103.786252	3002339485	17	19.05	32E	330 S		1980 E		0 New (Not drilled or compl)	
1	Point	ENDURANCE RESOURCES LLC	LUSK 16 STATE 001	32.65499	-103.777635	3002500898	16	19.05	32E	660 S		660 W		3612 Active	
2	Point	LEN MAYER	HUMBLE STATE 001	32.665881	-103.777662	3002500899	16	19.05	32E	660 N		660 W		3001 Plugged	
3	Point	EL PASO NATURAL GAS	LUSK DEEP UNIT 002	32.655057	-103.803432	3002500900	18	19.05	32E	660 S		1980 E		13974 Plugged	
4	Point	P B ENGLISH	MILLER 001	32.658669	-103.799132	3002500901	18	19.05	32E	1980 S		660 E		4016 Plugged	
5	Point	TANDEM ENERGY CORPORATION	MILLER FEDERAL 001	32.64783	-103.812035	3002500902	19	19.05	32E	1980 N		660 W		2634 Active	
6	Point	CARPER DRILLING CO	MILLER 001	32.651458	-103.812049	3002500903	19	19.05	32E	660 N		660 W		2710 Plugged	
7	Point	CARPER DRILLING CO	MILLER 002	32.644182	-103.807712	3002500904	19	19.05	32E	1980 S		660 W		2862 Plugged	
8	Point	COG OPERATING LLC	LUSK DEEP UNIT A 001	32.651413	-103.799113	3002500905	19	19.05	32E	660 N		660 E		12453 Active	
9	Point	TOM R CONE	SOUTHERN CALIFORNIA PET FEDERAL 001	32.6478	-103.803413	3002500906	19	19.05	32E	1980 N		1980 E		2715 Active	
10	Point	KELLY G STOUT	SOUTHERN CALIFORNIA 002	32.645079	-103.804484	3002500907	19	19.05	32E	2310 S		2310 E		2552 Plugged	
11	Point	KELLY G STOUT	SOUTHERN CALIFORNIA 003	32.650526	-103.804497	3002500908	19	19.05	32E	990 N		2310 E		2695 Plugged	
12	Point	TOM R CONE	GULF FEDERAL 001	32.647819	-103.808803	3002500909	19	19.05	32E	1980 N		1650 W		2490 Active	
13	Point	TOM R CONE	GULF FEDERAL 002	32.647812	-103.806648	3002500910	19	19.05	32E	1980 N		2310 W		2500 Active	
14	Point	CULBERTSON,IRWIN &	LYNCH 004	32.640481	-103.781902	3002500912	20	19.05	32E	660 S		660 E		2820 Plugged	
15	Point	EL PASO NATURAL GAS	LUSK DEEP UNIT 003	32.648679	-103.794797	3002500913	20	19.05	32E	1650 N		660 W		12621 Plugged	
16	Point	SHACKELFORD OIL CO	LYNCH 001	32.64047	-103.777593	3002500914	21	19.05	32E	660 S		660 W		2886 Plugged	
17	Point	CULBERTSON & IRWIN	LYNCH 002	32.644098	-103.777604	3002500915	21	19.05	32E	1980 S		660 W		2820 Plugged	
18	Point	SHACKELFORD OIL CO	LYNCH 003	32.645009	-103.773245	3002500916	21	19.05	32E	678 S		1992 W		2778 Plugged	
19	Point	KERSEY & COMPANY	ATLANTIC 001	32.643189	-103.776524	3002500917	21	19.05	32E	1650 S		990 W		2710 Plugged	
20	Point	SHELL OIL CO	MIDDELTON A FEDERAL 001	32.662309	-103.800219	3002508104	18	19.05	32E	1980 N		990 E		12505 Plugged	
21	Point	COG OPERATING LLC	LUSK DEEP UNIT A 005	32.644168	-103.803404	3002520122	19	19.05	32E	1930 S		660 W		12554 Active	
22	Point	PAN AMERICAN PETROLEUM CORP	PLAINS UNIT 004	32.643961	-103.777603	3002520323	21	19.05	32E	1980 S		660 W		11517 Plugged	
23	Point	CIMAREX ENERGY CO. OF COLORADO	PLAINS UNIT FEDERAL 004Y	32.640608	-103.777593	3002520518	21	19.05	32E	710 S		660 W		11514 Plugged	
24	Point	SHACKELFORD OIL CO	PLAINS 006	32.647733	-103.777615	3002520769	21	19.05	32E	1980 N		660 W		11690 Active	
25	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 012	32.643232	-103.793707	3002520874	20	19.05	32E	1650 S		990 W		11467 Active	
26	Point	EL PASO NATURAL GAS	LUSK DEEP UNIT 009	32.665919	-103.793764	3002520875	17	19.05	32E	660 N		990 W		11510 Plugged	
27	Point	TOM R CONE	GULF FEDERAL 003	32.648726	-103.808715	3002520876	19	19.05	32E	1650 N		1678 W		11223 Active	
28	Point	ENDURANCE RESOURCES LLC	LUSK 16 STATE 002	32.658607	-103.773334	3002520904	16	19.05	32E	1980 S		1980 W		12948 Active	
29	Point	EL PASO NATURAL GAS	LUSK DEEP UNIT 011	32.657747	-103.793743	3002521042	17	19.05	32E	1650 S		990 W		11470 Plugged	
30	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 010	32.64412	-103.786222	3002521488	20	19.05	32E	1980 S		1980 E		11550 Active	
31	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 007	32.648635	-103.78728	3002524869	20	19.05	32E	1660 N		2300 E		12759 Active	
32	Point	COG OPERATING LLC	LUSK DEEP UNIT A 013	32.658701	-103.807766	3002524974	18	19.05	32E	1980 S		1980 W		12520 Active	
33	Point	CIMAREX ENERGY CO. OF COLORADO	STATE DR 001	32.662241	-103.773343	3002525540	16	19.05	32E	1980 N		1980 W		12957 Active	
34	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 105	32.648643	-103.778694	3002530439	21	19.05	32E	1650 N		330 W		6700 Plugged	
35	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 106	32.648632	-103.774385	3002530456	21	19.05	32E	1650 N		1650 W		6690 Plugged	
36	Point	SHACKELFORD OIL CO	LUSK DEEP UNIT A 014	32.639584	-103.786208	3002530490	20	19.05	32E	330 S		1980 E		7200 TA	
37	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 008	32.648646	-103.780849	3002530494	20	19.05	32E	1651 N		330 E		7220 Plugged	
38	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 104	32.651365	-103.778703	3002530496	21	19.05	32E	660 N		330 W		6650 Active	
39	Point	FRED POOL DRUG INC	LUSK FEDERAL 001	32.658685	-103.803442	3002530500	18	19.05	32E	1980 S		1980 E		2820 Plugged	
40	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 001	32.652277	-103.78086	3002530518	20	19.05	32E	330 N		330 E		7500 Active	
41	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 002	32.652286	-103.785188	3002530523	20	19.05	32E	330 N		1656 E		7220 Plugged	
42	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 009	32.645016	-103.781915	3002530524	20	19.05	32E	2310 S		660 E		7230 Plugged	
43	Point	MERIDIAN OIL INC	STATE DR 005	32.662229	-103.769115	3002530528	16	19.05	32E	1980 N		1980 E		6607 Plugged	
44	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 103	32.650446	-103.774391	3002530572	21	19.05	32E	990 N		1650 W		6650 Active	
45	Point	ENDURANCE RESOURCES LLC	PIPELINE FEDERAL 001	32.654091	-103.780865	3002530597	17	19.05	32E	330 S		330 E		7205 Active	
46	Point	ENDURANCE RESOURCES LLC	LUSK 16 STATE 006	32.657714	-103.778719	3002530638	16	19.05	32E	1650 S		330 W		5600 Active	
47	Point	SHACKELFORD OIL CO	MOBIL FEDERAL 003	32.645008	-103.778684	3002530694	21	19.05	32E	2310 S		330 W		7240 Plugged	
48	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 111	32.644998	-103.774375	3002530791	21	19.05	32E	2310 S		1650 W		7230 Active	
49	Point	SHACKELFORD OIL CO	MOBIL FEDERAL 006	32.640253	-103.777592	3002533317	21	19.05	32E	581 S		660 W		2798 Active	
50	Point	SHACKELFORD OIL CO	MOBIL FEDERAL 007	32.645283	-103.778684	3002533548	21	19.05	32E	2410 S		330 W		5070 Active	
51	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 016	32.64139	-103.782982	3002534031	20	19.05	32E	990 S		990 E		6600 Plugged	
52	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 006	32.648671	-103.791076	3002534032	20	19.05	32E	1650 N		1800 W		7165 Active	
53	Point	SHACKELFORD OIL CO	LUSK WEST DELAWARE UNIT 901	32.637757	-103.780816	3002534131	29	19.05	32E	330 N		330 E		6927 Active	
54	Point	CIMAREX ENERGY CO. OF COLORADO	LUSK WEST DELAWARE UNIT 011	32.644131	-103.790477	3002534173	20	19.05	32E	1980 S		1980 W		6630 Plugged	
55	Point	COG OPERATING LLC	LUSK DEEP UNIT A 014	32.648734	-103.810961	3002534573	19	19.05	32E	1650 N		990 W		12540 Active	
56	Point	ENDURANCE RESOURCES LLC	LUSK 16 STATE 003	32.654074	-103.7744	3002534721	16	19.05	32E	330 S		1650 W		7235 Active	

57 Point	COG OPERATING LLC	LUSK DEEP UNIT A 016	32.65543	-103.812064	3002535053	18 19.05	32E	785 S	660 W	12780 Plugged
58 Point	COG OPERATING LLC	LUSK DEEP UNIT A 017	32.640511	-103.794026	3002535095	20 19.05	32E	660 S	890 W	12750 Active
59 Point	COG OPERATING LLC	LUSK DEEP UNIT A 019	32.655021	-103.791581	3002535244	17 19.05	32E	660 S	1650 W	12754 Active
60 Point	OCCIDENTAL PERMIAN LTD	AMOCO 21 FEDERAL 001H	32.65185	-103.764784	3002540753	21 19.05	32E	470 N	660 E	13566 New (Not drilled or compl)
61 Point	COG OPERATING LLC	STEALTH FEDERAL COM 001H	32.654093	-103.781746	3002539484	17 19.05	32E	330 S	600 E	12968 Active
62 Point	COG OPERATING LLC	LUSK DEEP UNIT A 023H	32.639615	-103.79817	3002540260	19 19.05	32E	330 S	380 E	13595 New (Not drilled or compl)
63 Point	COG OPERATING LLC	LUSK DEEP UNIT A 025H	32.648269	-103.795874	3002540193	20 19.05	32E	1800 N	330 W	13706 New (Not drilled or compl)
64 Point	COG OPERATING LLC	LUSK DEEP UNIT A 030H	32.639608	-103.795754	3002541513	20 19.05	32E	330 S	360 W	9332 New (Not drilled or compl)
65 Point	COG OPERATING LLC	LUSK DEEP UNIT A 024H	32.652365	-103.812052	3002540863	19 19.05	32E	330 N	660 W	13660 Active
66 Point	COG OPERATING LLC	LUSK DEEP UNIT A 032H	32.644143	-103.795635	3002542210	20 19.05	32E	1980 S	400 W	0 New (Not drilled or compl)
67 Point	COG OPERATING LLC	LUSK DEEP UNIT A 035H	32.64774	-103.780389	3002542211	20 19.05	32E	1980 N	190 E	0 New (Not drilled or compl)

COG Operating LLC – Lusk Deep Unit 31H

1. Geologic Formations

TVD of target	9330'	Pilot hole depth	NA
MD at TD:	13,846'	Deepest expected fresh water:	225

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	715	Water	
Top of Salt	806	Salt	
Tansill	2149	Salt	
Yates	2525	Oil/Gas	
Reef	2837	Brackish Water	Loss Circulation
Queen	3839	Oil/Gas	
Delaware	4379	Oil/Gas	
Bone Spring Lime	7069	Oil/Gas	
U. Avalon Shale	7384	Oil/Gas	
L. Avalon Shale	7692	Oil/Gas	
1 st Bone Spring Sand	8325	Oil/Gas	
2 nd Bone Spring Sand	9015	Oil/Gas Target Zone	
3 rd Bone Spring Sand	9835	Oil/Gas	

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	2409.00	13.375"	54.5	J55	STC	3.26	1.5	12.74
12.25"	0	3500	9.625"	36	J55	STC	1.15	.73	2.92
12.25"	3500	4300	9.625"	40	J55	STC	1.15	.81	3.01
8.75"	0	13,846'	5.5"	17	P110	LTC	1.77	2.19	2.87
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Pi/BHP > 0.7 for the intermediate burst calcs.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

	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).	Y
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

See
COA

COG Operating LLC – Lusk Deep Unit 31H

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?	N
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?	

3. Cementing Program *See COA*

Casing	#Sks	Wt. lb/ gal	Yld ft ³ / sack	H ₂ O gal/s k	500# Comp. Strength (hours)	Slurry Description
<u>Surf.</u>	<u>250</u>	13.5	<u>1.75</u>	9	12	Lead: Class C + 4% Gel + 2% CaCl ₂
	<u>250</u>	14.8	<u>1.34</u>	6.34	8	Tail: Class C + 2% CaCl ₂
Int. 1 st Stage	300	12.7	2	10.6	12	1 st stage Lead: Econocem HLC 65:35:6 + 5% Salt
	250	14.8	1.34	6.34	8	1 st stage Tail: Class C + 2% CaCl
Int. 2 nd Stage	600	13.5	1.75	9.11	12	2 nd stage Lead: Class C + 4% Gel (DV @ ~ 2725')
	100	14.8	1.34	6.34	8	2 nd stage Tail: Class C + 2% CaCl
Prod	1000	12.7	2	10.6	18	Lead: 35:65:6 H Blend
	1400	14.4	1.24	5.7	18	Tail: Versacem 50:50:2 Class H + 1% Salt

Plan on DV Tool set above Reef at approximately 2725'.

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results

Casing String	TOC	% Excess
Surface	0'	50% OH
Intermediate 1 st Stage	DVT	50% OH
Intermediate 2 nd Stage	0	35% OH
Production	2650'	35% OH

COG Operating LLC – Lusk Deep Unit 31H

4. Pressure Control Equipment *See COA*

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			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.

X	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.
N	Are anchors required by manufacturer?
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.

COG Operating LLC – Lusk Deep Unit 31H

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe (740')	FW Gel	8.6-8.8	28-34	N/C
740' 900	4300'	Saturated Brine	10.0-10.2	28-34	N/C
2800	4300' – if losses occur	FW	8.4	28-34	N/C
4300'	13,746'	Cut Brine	8.4-9.2	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?	PVT/Pason/Visual Monitoring
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6. Logging and Testing Procedures - *See COA*

Logging, Coring and Testing	
Y	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.
N	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain
N	Coring? If yes, explain

Additional logs planned		Interval
N	Resistivity	
N	Density	
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

COG Operating LLC – Lusk Deep Unit 31H

7. Drilling Conditions See COA

Condition	Specify what type and where?
BH Pressure at deepest TVD	4350 psi at 9330' TVD (EOC - Lateral)
Abnormal Temperature	NO

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times. Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

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.

☒ <u>Y</u>	<u>H2S is present</u>
☐ Y	H2S Plan attached

8. Other facets of operation

Is this a walking operation? NO If yes, describe.
Will be pre-setting casing? NO If yes, describe.

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, NM
Lusk Deep Unit A
#31H

OH

Plan: Design #1

Standard Planning Report

02 April, 2015



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #31H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3609.0usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3609.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	North Reference:	Grid
Well:	#31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project	Lea County, NM		
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:	Northings:	603,696.00 usft	Latitude: 32° 39' 30.900 N
From: Map	Easting:	660,099.70 usft	Longitude: 103° 48' 47.247 W
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.28 °

Well	#31H		
Well Position	+N/-S	-2,452.0 usft	Northings: 601,244.00 usft
	+E/-W	10,237.5 usft	Easting: 670,337.20 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level: 3,591.0 usft

Wellbore	OH		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/2/2015	7.25	60.45	48,469

Design	Design #1		
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Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°) 271.24

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	
8,802.5	0.00	0.00	8,802.5	0.0	0.0	0.00	0.00	0.00	0.00	
9,547.0	89.33	271.24	9,280.0	10.2	-471.8	12.00	12.00	0.00	271.24	
13,846.4	89.33	271.24	9,330.3	103.2	-4,769.9	0.00	0.00	0.00	0.00	0.00 PBHL(LDUA#31H)



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Site:	Lusk Deep Unit A	North Reference:	Grid
Well:	#31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00



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Project:	Lea County, NM	MD Reference:	WELL @ 3609.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	North Reference:	Grid
Well:	#31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
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	
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,802.5	0.00	0.00	8,802.5	0.0	0.0	0.0	0.00	0.00	0.00	
KOP - 8802.5 'MD, 0.00° INC, 0.00° AZI										
8,825.0	2.70	271.24	8,825.0	0.0	-0.5	0.5	12.00	12.00	0.00	
8,850.0	5.70	271.24	8,849.9	0.1	-2.4	2.4	12.00	12.00	0.00	
8,875.0	8.70	271.24	8,874.7	0.1	-5.5	5.5	12.00	12.00	0.00	
8,900.0	11.70	271.24	8,899.3	0.2	-9.9	9.9	12.00	12.00	0.00	
8,925.0	14.70	271.24	8,923.7	0.3	-15.6	15.6	12.00	12.00	0.00	
8,950.0	17.70	271.24	8,947.7	0.5	-22.6	22.6	12.00	12.00	0.00	
8,975.0	20.70	271.24	8,971.3	0.7	-30.8	30.8	12.00	12.00	0.00	
9,000.0	23.70	271.24	8,994.4	0.9	-40.3	40.3	12.00	12.00	0.00	
9,025.0	26.70	271.24	9,017.0	1.1	-50.9	50.9	12.00	12.00	0.00	
9,050.0	29.70	271.24	9,039.1	1.4	-62.7	62.7	12.00	12.00	0.00	
9,075.0	32.70	271.24	9,060.4	1.6	-75.6	75.7	12.00	12.00	0.00	
9,100.0	35.69	271.24	9,081.1	1.9	-89.7	89.7	12.00	12.00	0.00	
9,125.0	38.69	271.24	9,101.0	2.3	-104.8	104.8	12.00	12.00	0.00	
9,150.0	41.69	271.24	9,120.1	2.6	-120.9	121.0	12.00	12.00	0.00	
9,175.0	44.69	271.24	9,138.4	3.0	-138.0	138.1	12.00	12.00	0.00	
9,200.0	47.69	271.24	9,155.7	3.4	-156.1	156.1	12.00	12.00	0.00	
9,225.0	50.69	271.24	9,172.0	3.8	-175.0	175.0	12.00	12.00	0.00	



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Site:	Lusk Deep Unit A	North Reference:	Grid
Well:	#31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,250.0	53.69	271.24	9,187.3	4.2	-194.7	194.8	12.00	12.00	0.00	
9,275.0	56.69	271.24	9,201.6	4.7	-215.2	215.3	12.00	12.00	0.00	
9,300.0	59.69	271.24	9,214.8	5.1	-236.5	236.5	12.00	12.00	0.00	
9,325.0	62.69	271.24	9,226.8	5.6	-258.4	258.4	12.00	12.00	0.00	
9,350.0	65.69	271.24	9,237.7	6.1	-280.9	281.0	12.00	12.00	0.00	
9,375.0	68.69	271.24	9,247.4	6.6	-303.9	304.0	12.00	12.00	0.00	
9,400.0	71.69	271.24	9,255.9	7.1	-327.4	327.5	12.00	12.00	0.00	
9,425.0	74.69	271.24	9,263.1	7.6	-351.4	351.4	12.00	12.00	0.00	
9,450.0	77.69	271.24	9,269.1	8.1	-375.6	375.7	12.00	12.00	0.00	
9,475.0	80.69	271.24	9,273.7	8.7	-400.2	400.3	12.00	12.00	0.00	
9,500.0	83.69	271.24	9,277.1	9.2	-424.9	425.0	12.00	12.00	0.00	
9,525.0	86.69	271.24	9,279.2	9.7	-449.8	449.9	12.00	12.00	0.00	
9,547.0	89.33	271.24	9,280.0	10.2	-471.8	471.9	12.00	12.00	0.00	
EOC- 9547.0 'MD, 89.33° INC, 271.24° AZI										
9,600.0	89.33	271.24	9,280.6	11.4	-524.8	524.9	0.00	0.00	0.00	
9,700.0	89.33	271.24	9,281.8	13.5	-624.8	624.9	0.00	0.00	0.00	
9,800.0	89.33	271.24	9,283.0	15.7	-724.7	724.9	0.00	0.00	0.00	
9,900.0	89.33	271.24	9,284.1	17.9	-824.7	824.9	0.00	0.00	0.00	
10,000.0	89.33	271.24	9,285.3	20.0	-924.7	924.9	0.00	0.00	0.00	
10,100.0	89.33	271.24	9,286.5	22.2	-1,024.6	1,024.9	0.00	0.00	0.00	
10,200.0	89.33	271.24	9,287.6	24.3	-1,124.6	1,124.9	0.00	0.00	0.00	
10,300.0	89.33	271.24	9,288.8	26.5	-1,224.6	1,224.9	0.00	0.00	0.00	
10,400.0	89.33	271.24	9,290.0	28.7	-1,324.6	1,324.9	0.00	0.00	0.00	
10,500.0	89.33	271.24	9,291.1	30.8	-1,424.5	1,424.9	0.00	0.00	0.00	
10,600.0	89.33	271.24	9,292.3	33.0	-1,524.5	1,524.9	0.00	0.00	0.00	
10,700.0	89.33	271.24	9,293.5	35.2	-1,624.5	1,624.8	0.00	0.00	0.00	
10,800.0	89.33	271.24	9,294.7	37.3	-1,724.4	1,724.8	0.00	0.00	0.00	
10,900.0	89.33	271.24	9,295.8	39.5	-1,824.4	1,824.8	0.00	0.00	0.00	
11,000.0	89.33	271.24	9,297.0	41.7	-1,924.4	1,924.8	0.00	0.00	0.00	
11,100.0	89.33	271.24	9,298.2	43.8	-2,024.3	2,024.8	0.00	0.00	0.00	
11,200.0	89.33	271.24	9,299.3	46.0	-2,124.3	2,124.8	0.00	0.00	0.00	
11,300.0	89.33	271.24	9,300.5	48.1	-2,224.3	2,224.8	0.00	0.00	0.00	
11,400.0	89.33	271.24	9,301.7	50.3	-2,324.3	2,324.8	0.00	0.00	0.00	
11,500.0	89.33	271.24	9,302.8	52.5	-2,424.2	2,424.8	0.00	0.00	0.00	
11,600.0	89.33	271.24	9,304.0	54.6	-2,524.2	2,524.8	0.00	0.00	0.00	
11,700.0	89.33	271.24	9,305.2	56.8	-2,624.2	2,624.8	0.00	0.00	0.00	
11,800.0	89.33	271.24	9,306.3	59.0	-2,724.1	2,724.8	0.00	0.00	0.00	
11,900.0	89.33	271.24	9,307.5	61.1	-2,824.1	2,824.8	0.00	0.00	0.00	
12,000.0	89.33	271.24	9,308.7	63.3	-2,924.1	2,924.8	0.00	0.00	0.00	
12,100.0	89.33	271.24	9,309.9	65.5	-3,024.0	3,024.8	0.00	0.00	0.00	
12,200.0	89.33	271.24	9,311.0	67.6	-3,124.0	3,124.7	0.00	0.00	0.00	
12,300.0	89.33	271.24	9,312.2	69.8	-3,224.0	3,224.7	0.00	0.00	0.00	
12,400.0	89.33	271.24	9,313.4	71.9	-3,324.0	3,324.7	0.00	0.00	0.00	
12,500.0	89.33	271.24	9,314.5	74.1	-3,423.9	3,424.7	0.00	0.00	0.00	
12,600.0	89.33	271.24	9,315.7	76.3	-3,523.9	3,524.7	0.00	0.00	0.00	
12,700.0	89.33	271.24	9,316.9	78.4	-3,623.9	3,624.7	0.00	0.00	0.00	
12,800.0	89.33	271.24	9,318.0	80.6	-3,723.8	3,724.7	0.00	0.00	0.00	
12,900.0	89.33	271.24	9,319.2	82.8	-3,823.8	3,824.7	0.00	0.00	0.00	
13,000.0	89.33	271.24	9,320.4	84.9	-3,923.8	3,924.7	0.00	0.00	0.00	
13,100.0	89.33	271.24	9,321.5	87.1	-4,023.7	4,024.7	0.00	0.00	0.00	
13,200.0	89.33	271.24	9,322.7	89.3	-4,123.7	4,124.7	0.00	0.00	0.00	
13,300.0	89.33	271.24	9,323.9	91.4	-4,223.7	4,224.7	0.00	0.00	0.00	
13,400.0	89.33	271.24	9,325.1	93.6	-4,323.6	4,324.7	0.00	0.00	0.00	
13,500.0	89.33	271.24	9,326.2	95.8	-4,423.6	4,424.7	0.00	0.00	0.00	



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #31H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3609.0usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3609.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	North Reference:	Grid
Well:	#31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,600.0	89.33	271.24	9,327.4	97.9	-4,523.6	4,524.6	0.00	0.00	0.00
13,700.0	89.33	271.24	9,328.6	100.1	-4,623.6	4,624.6	0.00	0.00	0.00
13,800.0	89.33	271.24	9,329.7	102.2	-4,723.5	4,724.6	0.00	0.00	0.00
13,846.4	89.33	271.24	9,330.3	103.2	-4,769.9	4,771.0	0.00	0.00	0.00
TD at 13846.4 - PBHL(LDUA#31H)									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL(LDUA#31H)	0.00	0.00	9,330.0	103.0	-4,769.9	601,347.00	665,567.30	32° 39' 7.386 N	103° 47' 43.432 W
- hit/miss target									
- Shape									
- plan misses target center by 0.4usft at 13846.4usft MD (9330.3 TVD, 103.2 N, -4769.9 E)									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,802.5	8,802.5	0.0	0.0	KOP - 8802.5 'MD, 0.00° INC, 0.00° AZI
9,547.0	9,280.0	10.2	-471.8	EOC- 9547.0 'MD, 89.33° INC, 271.24° AZI
13,846.4	9,330.3	103.2	-4,769.9	TD at 13846.4

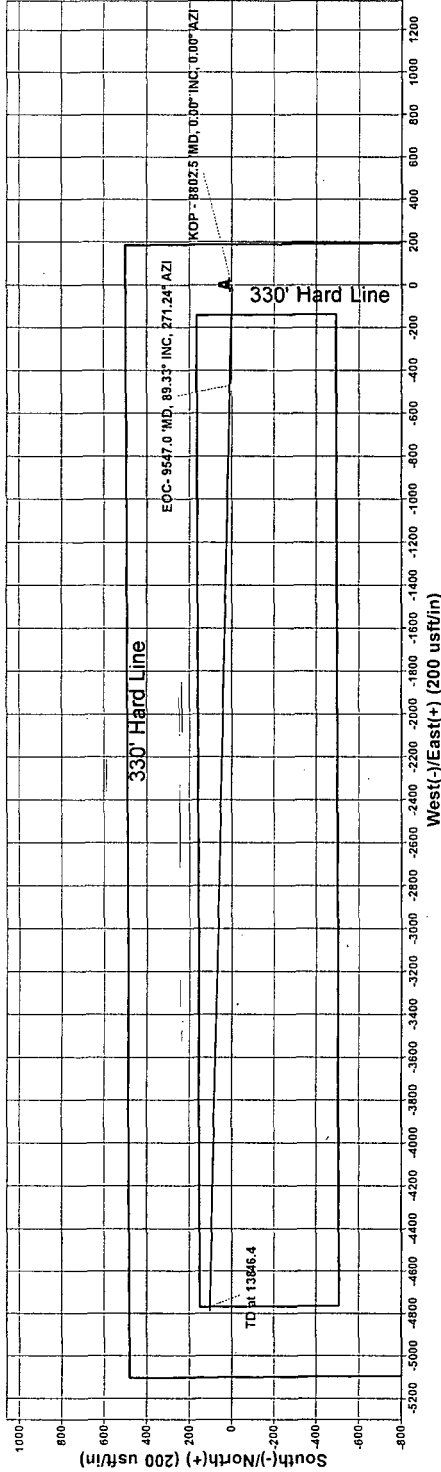


COG Operating LLC
Project: Lea County, NM
Site: Lusk Deep Unit A
Well: #31H
Wellbore: OH
an: Design #1 (#31H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	8802.5	0.00	0.00	8802.5	0.0	0.0	0.00	0.00	0.0
3	9547.0	89.33	271.24	9280.0	10.2	-471.8	12.00	271.24	471.9
4	13846.4	89.33	271.24	9330.3	103.2	-4769.9	0.00	0.00	4771.0

PBHL(LDUJA#31H)



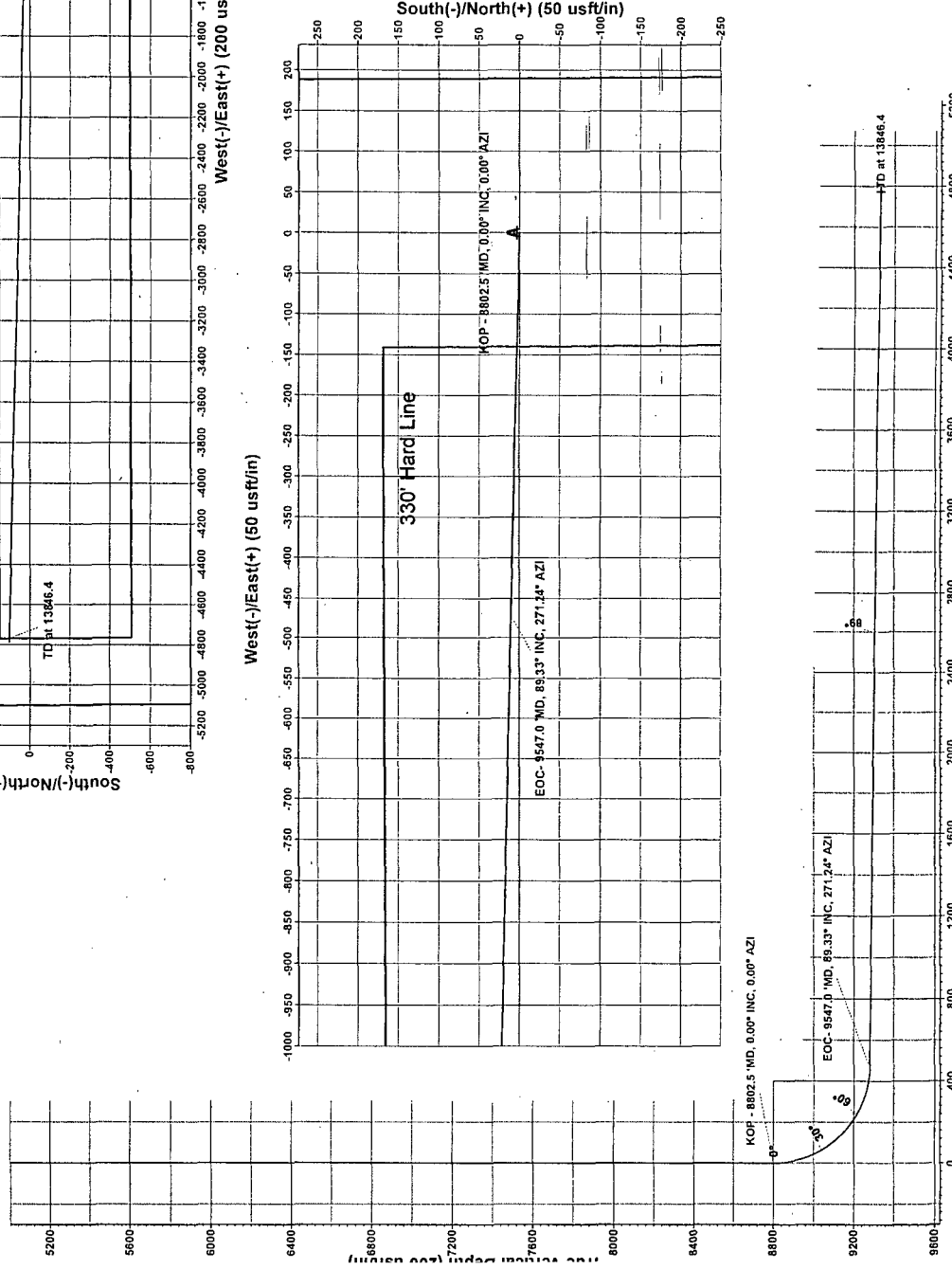
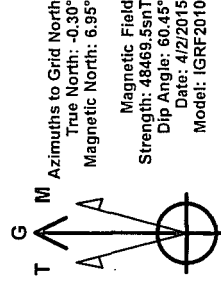
West(-)/East(+) (50 usft/in)

West(-)/East(+) (200 usft/in)

WELL DETAILS: #31H

Ground Elevation: 3591.0
RKB Elevation: WELL @ 3609.0usft (Original Well Elev)
Rig Name: Original Well Elev

Northing 601244.00
Easting 670337.20
Latitude 32° 39' 6.125 N
Longitude 103° 46' 47.649 W



NEXUS
DIRECTIONAL SOLUTIONS, L.P.

Vertical Section at 271.24° (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	Q	Q	Sec	Tws	Range	X	Y	Depth Well	Depth Water	Water Column
CP 00639				LE	3	1	20	19S	32E		613029	3612880*	350	345	5

Average Depth to Water: 345 feet

Minimum Depth: 345 feet

Maximum Depth: 345 feet

Record Count: 1

PLSS Search:

Section(s): 20

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	19	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
CP 00812		LE		4	4	01	19S	32E		620623	3616973*	200		

Average Depth to Water: **223 feet**

Minimum Depth: **102 feet**

Maximum Depth: **345 feet**

Record Count: 6

PLSS Search:

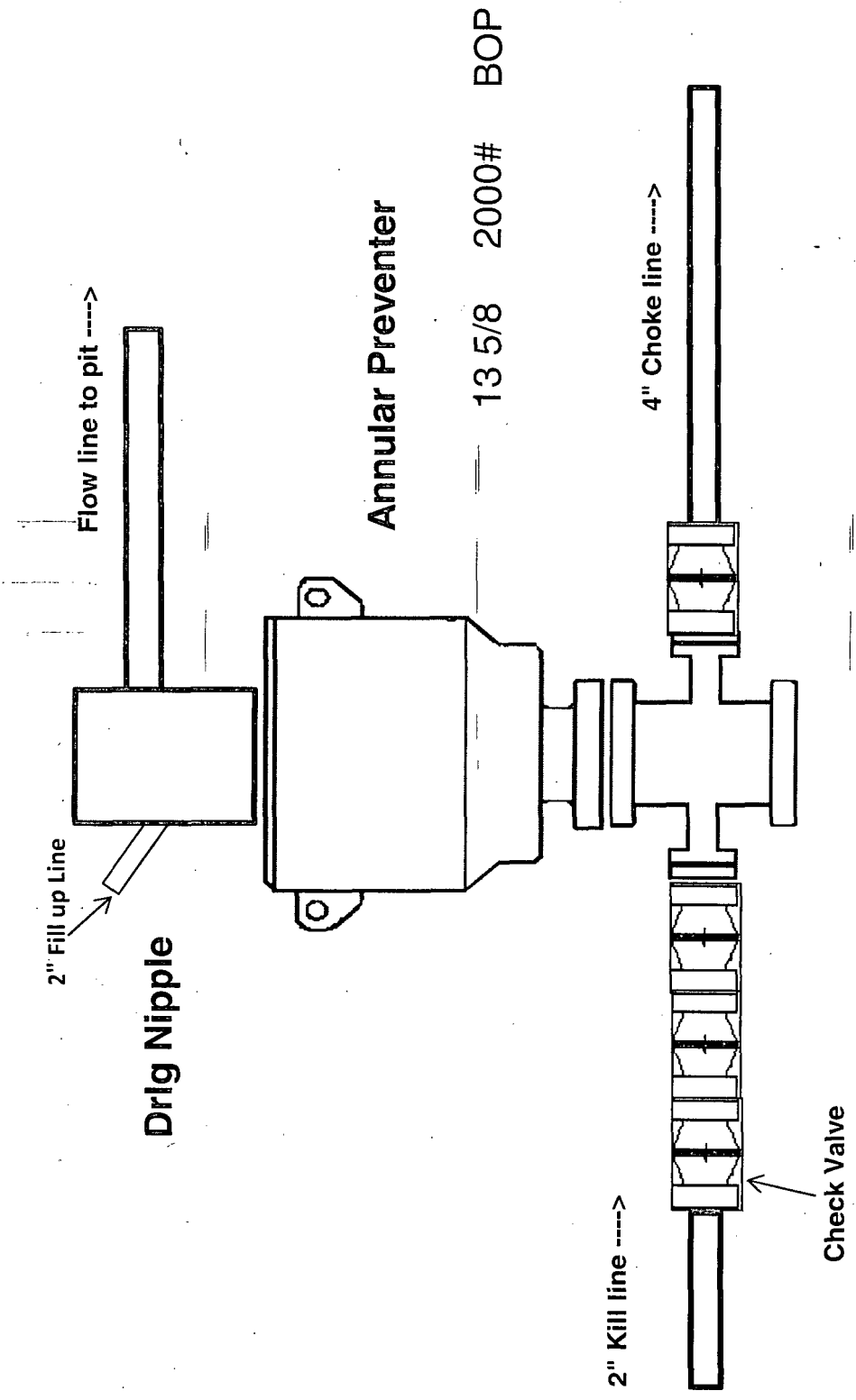
Township: 19S

Range: 32E

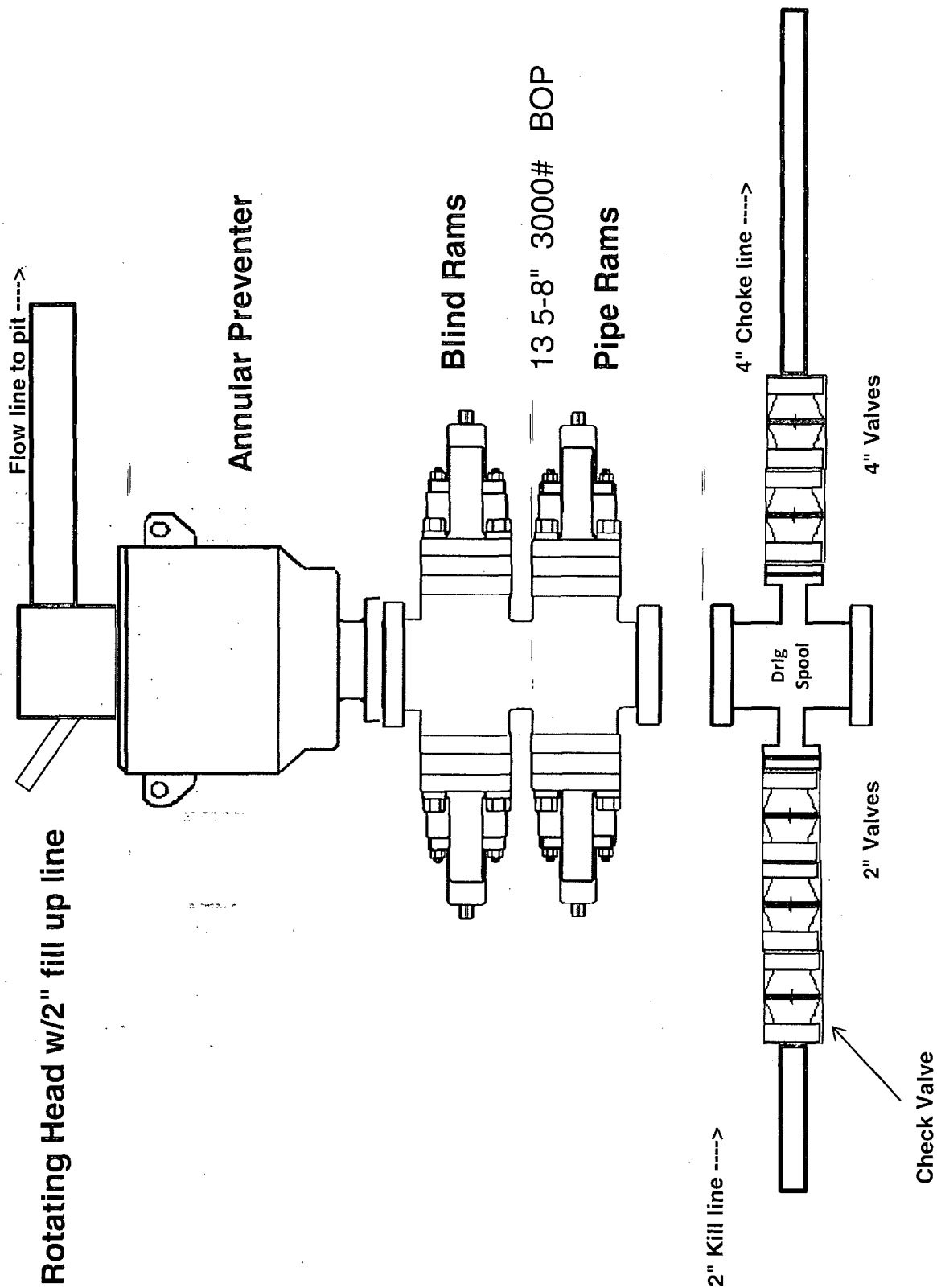
*UTM location was derived from PLSS - see Help

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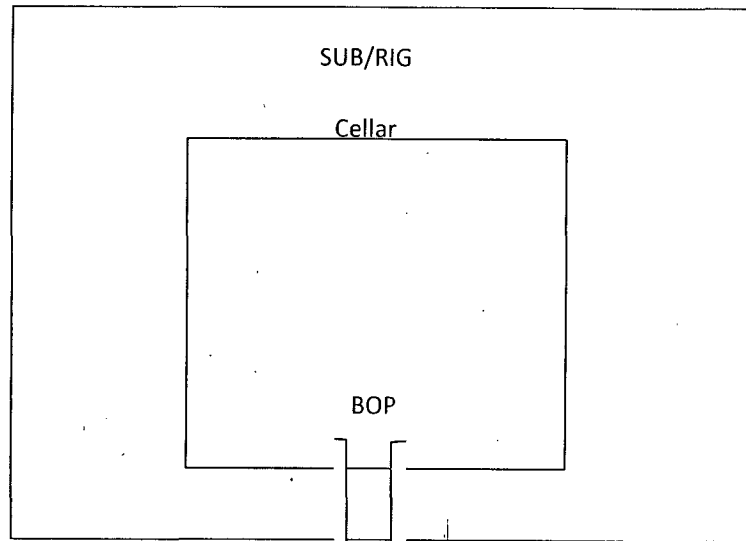
2,000 psi BOP Schematic



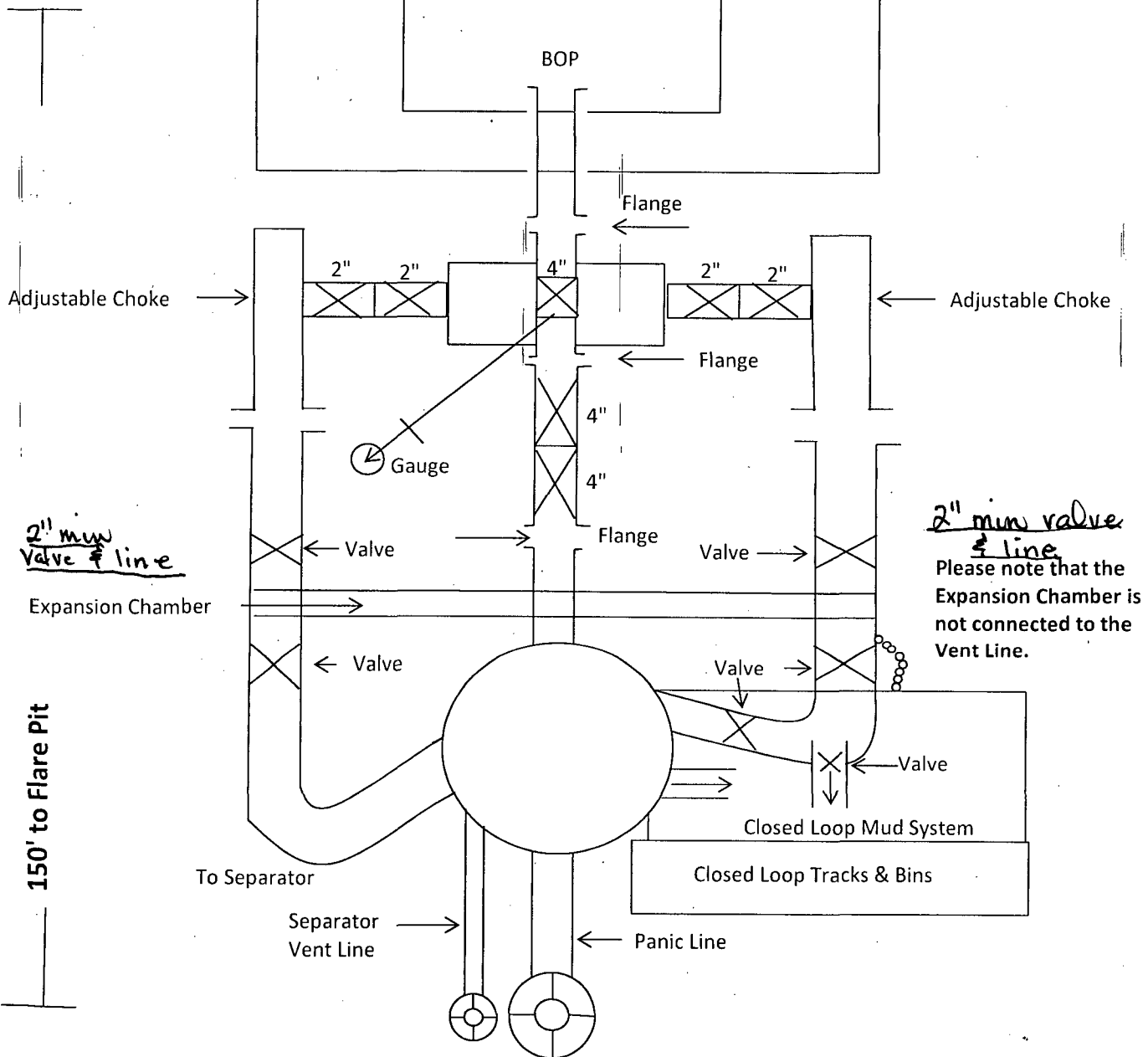
3,000 psi BOP Schematic



2M Choke Manifold Equipment

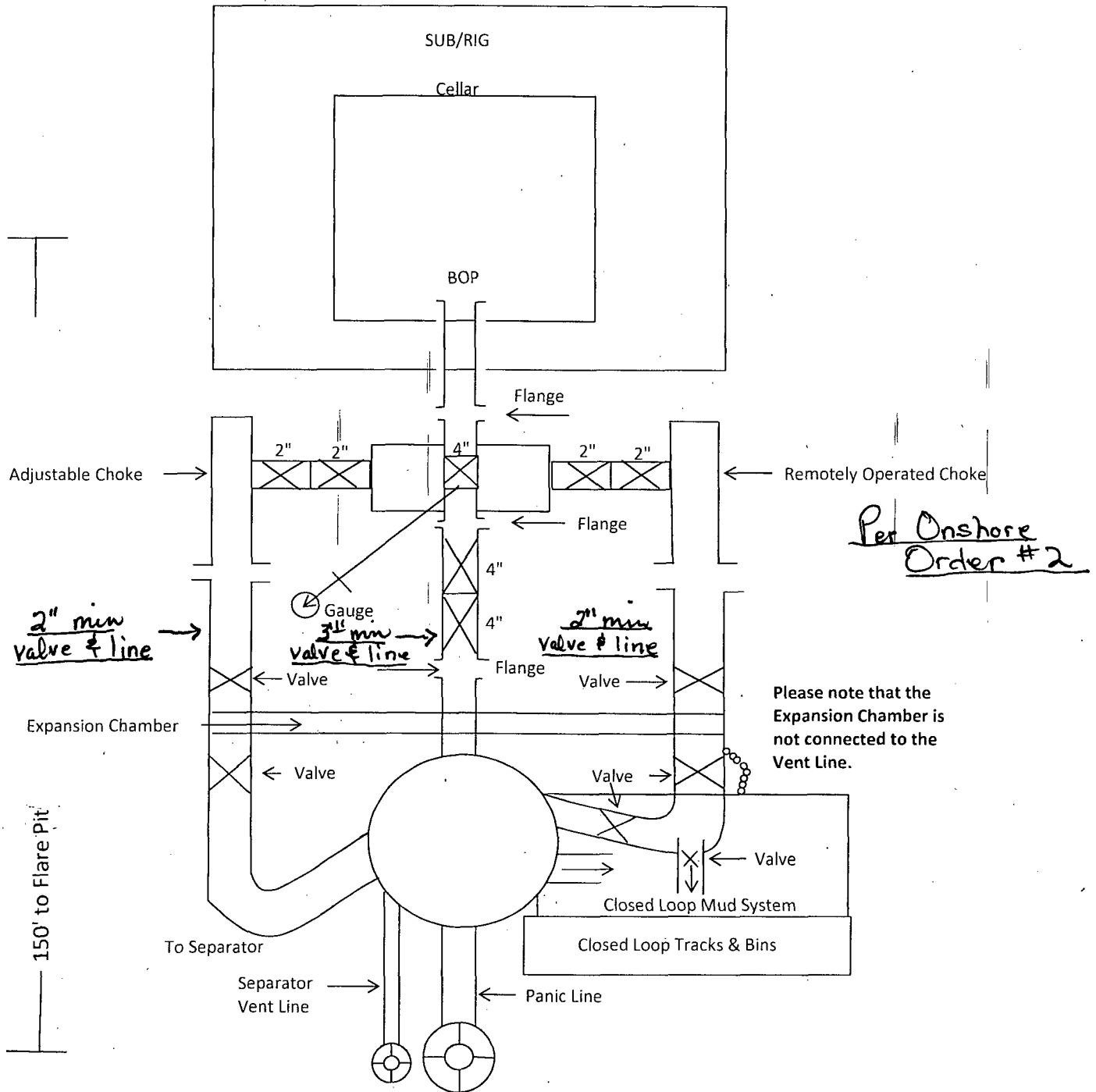


Per Onshore
Order #2



2" min valve & line
Please note that the Expansion Chamber is not connected to the Vent Line.

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

Flare Lines will be from both Choke
Manifold & Separator to edge of
location.

NORTH

170'

170'

170'

170'

Fluid

Storage

Tanks

Roll Off Cutting
Containers on
Tracks

Centrifuge or
Solids Sep.

Shakers

Flow line

Steel pits

Mud Pumps

Drig Separator

Choke
Manifold

Transfer Pump

Cellar

Water Tanks

Pipe
Racks

Trailer

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

Exhibit 1