

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

1a. Type of Work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. SHL: NMLC0068947, UL "K": NMLC065853 UL "F": NMLC068019, BHL: NMNM0016497	
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name	
2. Name of Operator COG Operating LLC. (229137)		7. If Unit or CA Agreement, Name and No. Lusk Deep Unit - NMNM 070982X	
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. Lusk Deep Unit A #26Y (308161)	
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-025-42858	
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 330' FSL & 1810' 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		10. Field and Pool, or Exploratory Lusk; Bone Spring (41440)	
14. Distance in miles and direction from nearest town or post office* Approximately 12 miles from Maljamar		11. Sec., T.R.M. or Blk and Survey or Area Section 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: 120 - UL "K": 121.77 UL "F": 40 BHL: 80.83		13. State NM	
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.) 3542.9' GL		22. Approximate date work will start* 11/1/2015	
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.  | 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>Melanie J. Wilson</i>	Name (Printed/Typed) Melanie J. Wilson	Date 10/2/2015
Title Regulatory Analyst		
Approved by (Signature) <i>Steve Caffey</i>	Name (Printed/Typed) Steve Caffey	Date 10/8/15
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.

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)

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO  
GENERAL REQUIREMENTS AND  
SPECIAL STIPULATIONS  
ATTACHED

OCT 08 2015



# COG Operating, LLC – Lusk Deep Unit A 26Y

## 1. Geologic Formations

TVD of target	9210'	Pilot hole depth	NA
MD at TD:	13,632'	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	
Base of Salt	2401	Salt	
Yates	2556	Oil/Gas	
Reef	2750	Brackish Water	Loss Circulation
Delaware	4350	Oil/Gas	
Bone Spring Lime	7036	Oil/Gas	
1 <sup>st</sup> Bone Spring Sand	8281	Oil/Gas	
2 <sup>nd</sup> Bone Spring Sand	9001	Oil/Gas Target Zone	
3 <sup>rd</sup> Bone Spring Sand	9831	Oil/Gas	

## 2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
26"	0	800	20"	94	J55	STC	1.25	1.62	10.41
17.5"	0	2500	13.375"	54.5 lb	J55	STC	1.32	1.48	3.9
12.25"	0	4400	9.625"	40	J55	LTC	1.25	1.9	2.95
8.75"	0	13,632'	5.5"	17	P110	LTC	1.93	2.39	2.33
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

per operator

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
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

**COG Operating, LLC – Lusk Deep Unit A 26Y**

If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> 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 <sup>nd</sup> 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**

Casing	# Sks	Wt. lb/gal	Yld ft <sup>3</sup> /sack	H <sub>2</sub> O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	850	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl <sub>2</sub>
	250	14.8	1.34	6.34	8	Tail: Class C + 1% CaCl <sub>2</sub>
1 <sup>st</sup> Inter.	1150	12.7	2	10.6	16	Lead: Econocem HLC 65:35:6 + 5% Salt
	250	14.8	1.34	6.34	8	Tail: Class C + 1% CaCl
2 <sup>nd</sup> Int 1 <sup>st</sup> Stage	400	12.7	1.98	10.6	16	1 <sup>st</sup> stage Lead: Econocem HLC 65:35:6 + 5% Salt
	250	14.8	1.34	6.34	8	1 <sup>st</sup> stage Tail: Class C + 2% CaCl
2 <sup>nd</sup> Int 2 <sup>nd</sup> Stage	500	13.5	1.75	9.11	12	2 <sup>nd</sup> stage Lead: Class C + 4% Gel (DV @ ~1800')
	100	14.8	1.34	6.34	8	2 <sup>nd</sup> stage Tail: Class C + 2% CaCl
5.5 Prod 1 Stage	525	12.7	2.00	10.6	16	Lead: 35:65:6 H Blend
	1350	14.4	1.24	5.7	19	Tail: 50:50:2 H Blend
5.5 Prod 2 Stage	600	11.9	2.51	14.8	24	Lead: 50:50:10 C Blend
	400	14.8	1.33	6.34	8	Tail: Class C

The DVT/ECP for the 2<sup>nd</sup> intermediate casing will be set @ 2650'.

The DVT for the production string will be set @ 6,350'.

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

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

Casing String	TOC	% Excess
Surface	0'	50%
1 <sup>st</sup> Intermediate	0'	50% OH
2 <sup>nd</sup> Intermediate 1 <sup>st</sup> Stage	2650'	50%
2 <sup>nd</sup> Intermediate 2 <sup>nd</sup> Stage	0	50% OH
Production 1 <sup>st</sup> Stage	6350'	35% OH
Production 2 <sup>nd</sup> Stage	2600'	40% OH



**COG Operating, LLC – Lusk Deep Unit A 26Y**

**4. Pressure Control Equipment**

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.				
BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
17-1/2"	20"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
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 A 26Y

### 5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Csg pt	FW Gel	8.6-8.8	28-34	N/C
Surf csg	13-3/8" csg pt	Saturated Brine	10.0-10.2	28-34	N/C
13-3/8"	9-5/8" csg pt	Fresh Water	8.4-8.6	28-34	N/C
9-5/8"	Lateral TD	Cut Brine	8.6 – 9.4	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
---	-----------------------------

### 6. Logging and Testing Procedures

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	

### 7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	4300 psi at 9210' 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 (H<sub>2</sub>S) monitors will be installed prior to drilling out the surface shoe. If H<sub>2</sub>S 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 <sub>2</sub> S is present
Y	H <sub>2</sub> S Plan attached

**COG Operating, LLC – Lusk Deep Unit A 26Y**

**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