Form 3160-3
(June 2015)

OCD – HOBBS
04/17/2020
RECEIVED

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM119277

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

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

8. Lease Name and Well No.
VALOR FEDERAL COM
[327008]
708H

2. Name of Operator
COG OPERATING LLC [229137]

9. API Well No.
30-025-47105

3a. Address
600 West Illinois Ave, Midland, TX 79701

3b. Phone No. *(include area code)*
(432) 683-7443

10. Field and Pool, or Exploratory **[98094]**
MALAGA/PURPLE SAGE WOLFCAMP G

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWNW / 210 FNL / 675 FWL / LAT 32.093683 / LONG -103.549488
At proposed prod. zone SWNW / 2590 FNL / 990 FWL / LAT 32.07262 / LONG -103.548458

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 35/T25S/R33E/NMP

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

12. County or Parish
LEA

13. State
NM

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

16. No of acres in lease
480

17. Spacing Unit dedicated to this well
640.0

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

19. Proposed Depth
12440 feet / 20076 feet

20. BLM/BIA Bond No. in file
FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3324 feet

22. Approximate date work will start*
04/01/2020

23. Estimated duration
30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

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 must 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 requested by the BLM.

25. Signature
(Electronic Submission)

Name *(Printed/Typed)*
Stan Wagner / Ph: (432) 253-9685

Date
01/09/2020

Title
Regulatory Advisor

Approved by *(Signature)*
(Electronic Submission)

Name *(Printed/Typed)*
Cody Layton / Ph: (575) 234-5959

Date
04/17/2020

Title
Assistant Field Manager Lands & Minerals

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.

GCP Rec 04/17/2020

APPROVED WITH CONDITIONS

KZ
04/21/2020

SL

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 04/17/2020

Confidential

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC**
LEASE NO.:	**NMNM119277**
WELL NAME & NO.:	**Valor Federal Com 708H**
SURFACE HOLE FOOTAGE:	**210' FNL & 675' FWL**
BOTTOM HOLE FOOTAGE	**2590' FNL & 990' FWL**
LOCATION:	**Section 35, T 25S, R 33E, NMPM**
COUNTY:	**Lea County, New Mexico**

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	◉ Low	○ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ Unit

A. HYDROGEN SULFIDE

1. Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **10-3/4"** surface casing shall be set at approximately **1170'** (a minimum of 25' into the Rustler Anhydrite and above the salt) and cemented to surface.
   a. **If cement does not circulate to surface,** the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of **6 hours** after pumping cement, ideally between 8-10 hours after.
   b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
   c. If cement falls back, remedial cementing will be done prior to drilling out the shoe.
   d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The **7-5/8"** intermediate casing shall be cemented to surface.
   a. **If cement does not circulate to surface,** see B.1.a, c & d.
3. The **5-1/2" x 5"** production casing shall be cemented with at least **200' tie-back** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi. **Variance approved to use a 5M annular. This annular must be tested to 70% of its rated pressure (5000 psi).**

D. SPECIAL REQUIREMENTS

1. Submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
   a. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 4/16/2020

GENERAL REQUIREMENTS

1. The BLM is to be notified in advance for a representative to witness:
   a. Spudding the well (minimum of 24 hours)
   b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
   c. BOP/BOPE tests (minimum of 4 hours)
      ☒ Eddy County: Call the Carlsbad Field Office, (575) 361-2822
      ☒ Lea County: Call the Hobbs Field Station, (575) 393-3612
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig:
      i. Notify the BLM when moving in and removing the Spudder Rig.
      ii. Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      iii. BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be available upon request. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the

following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well-specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On the portion of well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. If the operator has proposed a multi-bowl wellhead assembly in the APD, it must meet or exceed the pressure rating of the BOP system. Additionally, the following requirements must be met:
    a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    c. Manufacturer representative shall install the test plug for the initial BOP test.
    d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
    e. Whenever any seal subject to test pressure is broken, all the tests in Onshore Order 2 III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the BOP/BOPE tests.
    a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
    b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test which can be initiated immediately after bumping the plug (only applies to single-stage cement jobs).
    c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be made available upon request.
    d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
    e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior

to the test at full stack pressure.

f. BOP/BOPE must be tested within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

1. Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

1. All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.
2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

COG Operating, LLC - Valor Federal Com 708H

1. Geologic Formations

TVD of target	12,450' EOL	Pilot hole depth	NA
MD at TD:	20,076'	Deepest expected fresh water:	207'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1054	Water	
Top of Salt	1387	Salt	
Base of Salt	4803	Salt	
Lamar	5061	Salt Water	
Bell Canyon	5089	Salt Water	
Cherry Canyon	6136	Oil/Gas	
Brushy Canyon	7717	Oil/Gas	
Bone Spring Lime	9172	Oil/Gas	
U. Avalon Shale	9474	Oil/Gas	
L. Avalon Shale	9636	Oil/Gas	
1st Bone Spring Sand	10171	Oil/Gas	
2nd Bone Spring Sand	10771	Oil/Gas	
3rd Bone Spring Sand	11850	Oil/Gas	
Wolfcamp	12262	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight	Grade	Conn.	SF	SF Burst	SF	SF
	From	To		(lbs)			Collapse		Body	Joint
14.75"	0	1170	10.75"	45.5	N80	BTC	4.61	1.67	19.54	20.61
9.875"	0	8500	7.625"	29.7	HCL80	BTC	1.56	1.07	2.88	2.90
8.750"	8500	12000	7.625"	29.7	HCP110	TL-FJ	1.26	1.11	2.64	1.85
6.75"	0	11800	5.5"	23	P110	BTC	1.79	1.85	3.25	3.23
6.75"	11800	20,076	5"	18	P110	BTC	1.79	1.85	3.25	3.23
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Surface burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface and
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

The 5" casing will be run back 200' into the intermediate casing to ensure the coupling OD clearance is greater than .422" for the cement bond tie in.

COG Operating, LLC - Valor Federal Com 708H

	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.	Y
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?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd 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 2nd 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 ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	558	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl2
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter. Stage 1	850	10.3	3.3	22	24	Halliburton tunded light
	250	14.8	1.35	6.6	8	Tail: Class H
Prod	548	12.7	2	10.7	72	Lead: 50:50:10 H Blend
	1048	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

If losses are encountered in the intermediate section a DV/ECP tool will be run ~50' above the Lamar Lime top, cement will be adjusted accordingly if this contingency is necessary.

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%
1st Intermediate	0’	50%
Production	8,000'	35% OH in Lateral (KOP to EOL)

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	x	Tested to:
9-7/8”	13-5/8”	5M	Annular	x	2500psi
			Blind Ram	x	5000psi
			Pipe Ram	x	
			Double Ram	x	
			Other*		
6-3/4”	13-5/8”	10M	5M Annular	x	5000psi
			Blind Ram	x	10000psi
			Pipe Ram	x	
			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.

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.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	N Are anchors required by manufacturer?
Y	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.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf csg	9-5/8" Int shoe	Brine Diesel Emulsion	8.4 - 9	28-34	N/C
7-5/8" Int shoe	Lateral TD	OBM	9.6 - 12.5	35-45	<20

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.
Y	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	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
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	8095 psi at 12450' TVD
Abnormal Temperature	NO 180 Deg. F.

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.	
N	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
Y	Is casing pre-set?

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

a. The hazards and characteristics of hydrogen sulfide (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

a. The effects of H2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
c. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H2S. If H2S greater than 100 ppm is encountered in the gas stream we will shut in and install H2S equipment.

a. Well Control Equipment:
   Flare line.
   Choke manifold with remotely operated choke.
   Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
   Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.

c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.

d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.

f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

1. ***BEARDS OR CONTACT LENSES NOT ALLOWED***
2. ***HARD HATS REQUIRED***
3. ***SMOKING IN DESIGNATED AREAS ONLY***
4. ***BE WIND CONSCIOUS AT ALL TIMES***
5. ***CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
JOHN COFFMAN	432-685-4310	432-631-9762

EMERGENCY RESPONSE NUMBERS

	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

NORTHERN DELAWARE BASIN

LEA COUNTY, NM
BULLDOG
VALOR FED COM 708H

OWB

Plan: PWP1

Standard Survey Report

31 December, 2019

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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 BULLDOG

Site Position:		**Northing:**	398,637.10 usft	**Latitude:**	32° 5' 36.820 N
From:	Map	**Easting:**	741,887.40 usft	**Longitude:**	103° 33' 8.116 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.42 °

Well VALOR FED COM 708H

Well Position	**+N/-S**	0.0 usft	**Northing:**	398,643.30 usft	**Latitude:**	32° 5' 36.810 N
	+E/-W	0.0 usft	**Easting:**	742,889.60 usft	**Longitude:**	103° 32' 56.466 W
Position Uncertainty		3.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,325.0 usft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/30/2019	6.66	59.91	47,603.25305630

Design PWP1

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	177.20

Survey Tool Program **Date** 12/31/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	12,001.9	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
12,001.9	20,076.6	PWP1 (OWB)	MWD+IFR1	OWSG MWD + IFR1

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

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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)
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

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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)
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start DLS 2.00 TFO 60.96									
5,600.0	2.00	60.96	5,600.0	0.8	1.5	-0.8	2.00	2.00	0.00
5,649.7	2.99	60.96	5,649.6	1.9	3.4	-1.7	2.00	2.00	0.00
Start 6320.1 hold at 5649.7 MD									
5,700.0	2.99	60.96	5,699.9	3.2	5.7	-2.9	0.00	0.00	0.00
5,800.0	2.99	60.96	5,799.7	5.7	10.3	-5.2	0.00	0.00	0.00
5,900.0	2.99	60.96	5,899.6	8.2	14.8	-7.5	0.00	0.00	0.00
6,000.0	2.99	60.96	5,999.5	10.8	19.4	-9.8	0.00	0.00	0.00
6,100.0	2.99	60.96	6,099.3	13.3	24.0	-12.1	0.00	0.00	0.00
6,200.0	2.99	60.96	6,199.2	15.8	28.5	-14.4	0.00	0.00	0.00
6,300.0	2.99	60.96	6,299.0	18.4	33.1	-16.7	0.00	0.00	0.00
6,400.0	2.99	60.96	6,398.9	20.9	37.7	-19.1	0.00	0.00	0.00
6,500.0	2.99	60.96	6,498.8	23.5	42.2	-21.4	0.00	0.00	0.00
6,600.0	2.99	60.96	6,598.6	26.0	46.8	-23.7	0.00	0.00	0.00
6,700.0	2.99	60.96	6,698.5	28.5	51.4	-26.0	0.00	0.00	0.00
6,800.0	2.99	60.96	6,798.4	31.1	55.9	-28.3	0.00	0.00	0.00
6,900.0	2.99	60.96	6,898.2	33.6	60.5	-30.6	0.00	0.00	0.00
7,000.0	2.99	60.96	6,998.1	36.1	65.1	-32.9	0.00	0.00	0.00
7,100.0	2.99	60.96	7,098.0	38.7	69.6	-35.2	0.00	0.00	0.00
7,200.0	2.99	60.96	7,197.8	41.2	74.2	-37.5	0.00	0.00	0.00
7,300.0	2.99	60.96	7,297.7	43.7	78.8	-39.8	0.00	0.00	0.00
7,400.0	2.99	60.96	7,397.5	46.3	83.3	-42.1	0.00	0.00	0.00
7,500.0	2.99	60.96	7,497.4	48.8	87.9	-44.5	0.00	0.00	0.00
7,600.0	2.99	60.96	7,597.3	51.3	92.5	-46.8	0.00	0.00	0.00
7,700.0	2.99	60.96	7,697.1	53.9	97.0	-49.1	0.00	0.00	0.00
7,800.0	2.99	60.96	7,797.0	56.4	101.6	-51.4	0.00	0.00	0.00
7,900.0	2.99	60.96	7,896.9	58.9	106.2	-53.7	0.00	0.00	0.00
8,000.0	2.99	60.96	7,996.7	61.5	110.7	-56.0	0.00	0.00	0.00
8,100.0	2.99	60.96	8,096.6	64.0	115.3	-58.3	0.00	0.00	0.00
8,200.0	2.99	60.96	8,196.5	66.5	119.9	-60.6	0.00	0.00	0.00
8,300.0	2.99	60.96	8,296.3	69.1	124.4	-62.9	0.00	0.00	0.00
8,400.0	2.99	60.96	8,396.2	71.6	129.0	-65.2	0.00	0.00	0.00
8,500.0	2.99	60.96	8,496.0	74.1	133.6	-67.5	0.00	0.00	0.00
8,600.0	2.99	60.96	8,595.9	76.7	138.1	-69.9	0.00	0.00	0.00
8,700.0	2.99	60.96	8,695.8	79.2	142.7	-72.2	0.00	0.00	0.00
8,800.0	2.99	60.96	8,795.6	81.8	147.3	-74.5	0.00	0.00	0.00
8,900.0	2.99	60.96	8,895.5	84.3	151.8	-76.8	0.00	0.00	0.00
9,000.0	2.99	60.96	8,995.4	86.8	156.4	-79.1	0.00	0.00	0.00
9,100.0	2.99	60.96	9,095.2	89.4	161.0	-81.4	0.00	0.00	0.00
9,200.0	2.99	60.96	9,195.1	91.9	165.5	-83.7	0.00	0.00	0.00
9,300.0	2.99	60.96	9,295.0	94.4	170.1	-86.0	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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)
9,400.0	2.99	60.96	9,394.8	97.0	174.7	-88.3	0.00	0.00	0.00
9,500.0	2.99	60.96	9,494.7	99.5	179.2	-90.6	0.00	0.00	0.00
9,600.0	2.99	60.96	9,594.5	102.0	183.8	-92.9	0.00	0.00	0.00
9,700.0	2.99	60.96	9,694.4	104.6	188.4	-95.2	0.00	0.00	0.00
9,800.0	2.99	60.96	9,794.3	107.1	192.9	-97.6	0.00	0.00	0.00
9,900.0	2.99	60.96	9,894.1	109.6	197.5	-99.9	0.00	0.00	0.00
10,000.0	2.99	60.96	9,994.0	112.2	202.1	-102.2	0.00	0.00	0.00
10,100.0	2.99	60.96	10,093.9	114.7	206.6	-104.5	0.00	0.00	0.00
10,200.0	2.99	60.96	10,193.7	117.2	211.2	-106.8	0.00	0.00	0.00
10,300.0	2.99	60.96	10,293.6	119.8	215.8	-109.1	0.00	0.00	0.00
10,400.0	2.99	60.96	10,393.4	122.3	220.3	-111.4	0.00	0.00	0.00
10,500.0	2.99	60.96	10,493.3	124.8	224.9	-113.7	0.00	0.00	0.00
10,600.0	2.99	60.96	10,593.2	127.4	229.5	-116.0	0.00	0.00	0.00
10,700.0	2.99	60.96	10,693.0	129.9	234.0	-118.3	0.00	0.00	0.00
10,800.0	2.99	60.96	10,792.9	132.4	238.6	-120.6	0.00	0.00	0.00
10,900.0	2.99	60.96	10,892.8	135.0	243.2	-123.0	0.00	0.00	0.00
11,000.0	2.99	60.96	10,992.6	137.5	247.7	-125.3	0.00	0.00	0.00
11,100.0	2.99	60.96	11,092.5	140.1	252.3	-127.6	0.00	0.00	0.00
11,200.0	2.99	60.96	11,192.4	142.6	256.9	-129.9	0.00	0.00	0.00
11,300.0	2.99	60.96	11,292.2	145.1	261.4	-132.2	0.00	0.00	0.00
11,400.0	2.99	60.96	11,392.1	147.7	266.0	-134.5	0.00	0.00	0.00
11,500.0	2.99	60.96	11,491.9	150.2	270.5	-136.8	0.00	0.00	0.00
11,600.0	2.99	60.96	11,591.8	152.7	275.1	-139.1	0.00	0.00	0.00
11,700.0	2.99	60.96	11,691.7	155.3	279.7	-141.4	0.00	0.00	0.00
11,800.0	2.99	60.96	11,791.5	157.8	284.2	-143.7	0.00	0.00	0.00
11,900.0	2.99	60.96	11,891.4	160.3	288.8	-146.0	0.00	0.00	0.00
11,969.8	2.99	60.96	11,961.1	162.1	292.0	-147.7	0.00	0.00	0.00
Start DLS 12.00 TFO 118.56									
12,000.0	3.42	129.41	11,991.3	161.9	293.4	-147.4	12.00	1.42	226.59
12,100.0	14.43	169.28	12,090.0	147.7	298.0	-133.0	12.00	11.01	39.87
12,200.0	26.31	174.23	12,183.5	113.3	302.6	-98.4	12.00	11.89	4.95
12,300.0	38.27	176.22	12,267.9	60.2	306.9	-45.1	12.00	11.95	1.99
12,400.0	50.24	177.37	12,339.4	-9.4	310.7	24.5	12.00	11.97	1.15
12,500.0	62.22	178.17	12,394.9	-92.3	313.9	107.5	12.00	11.98	0.80
12,600.0	74.21	178.81	12,431.9	-185.0	316.3	200.2	12.00	11.99	0.64
12,700.0	86.20	179.38	12,448.9	-283.3	317.8	298.5	12.00	11.99	0.57
12,732.4	90.08	179.56	12,450.0	-315.7	318.1	330.8	12.00	11.99	0.55
Start 7344.4 hold at 12732.4 MD									
12,800.0	90.08	179.56	12,449.9	-383.3	318.6	398.4	0.00	0.00	0.00
12,900.0	90.08	179.56	12,449.8	-483.3	319.4	498.3	0.00	0.00	0.00
13,000.0	90.08	179.56	12,449.6	-583.3	320.2	598.2	0.00	0.00	0.00
13,100.0	90.08	179.56	12,449.5	-683.3	320.9	698.1	0.00	0.00	0.00
13,200.0	90.08	179.56	12,449.3	-783.3	321.7	798.0	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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)
13,300.0	90.08	179.56	12,449.2	-883.3	322.5	898.0	0.00	0.00	0.00
13,400.0	90.08	179.56	12,449.1	-983.3	323.2	997.9	0.00	0.00	0.00
13,500.0	90.08	179.56	12,448.9	-1,083.3	324.0	1,097.8	0.00	0.00	0.00
13,600.0	90.08	179.56	12,448.8	-1,183.3	324.8	1,197.7	0.00	0.00	0.00
13,700.0	90.08	179.56	12,448.7	-1,283.3	325.5	1,297.6	0.00	0.00	0.00
13,800.0	90.08	179.56	12,448.5	-1,383.3	326.3	1,397.5	0.00	0.00	0.00
13,900.0	90.08	179.56	12,448.4	-1,483.3	327.0	1,497.5	0.00	0.00	0.00
14,000.0	90.08	179.56	12,448.3	-1,583.3	327.8	1,597.4	0.00	0.00	0.00
14,100.0	90.08	179.56	12,448.1	-1,683.3	328.6	1,697.3	0.00	0.00	0.00
14,200.0	90.08	179.56	12,448.0	-1,783.3	329.3	1,797.2	0.00	0.00	0.00
14,300.0	90.08	179.56	12,447.9	-1,883.3	330.1	1,897.1	0.00	0.00	0.00
14,400.0	90.08	179.56	12,447.7	-1,983.2	330.9	1,997.0	0.00	0.00	0.00
14,500.0	90.08	179.56	12,447.6	-2,083.2	331.6	2,096.9	0.00	0.00	0.00
14,600.0	90.08	179.56	12,447.4	-2,183.2	332.4	2,196.9	0.00	0.00	0.00
14,700.0	90.08	179.56	12,447.3	-2,283.2	333.1	2,296.8	0.00	0.00	0.00
14,800.0	90.08	179.56	12,447.2	-2,383.2	333.9	2,396.7	0.00	0.00	0.00
14,900.0	90.08	179.56	12,447.0	-2,483.2	334.7	2,496.6	0.00	0.00	0.00
15,000.0	90.08	179.56	12,446.9	-2,583.2	335.4	2,596.5	0.00	0.00	0.00
15,100.0	90.08	179.56	12,446.8	-2,683.2	336.2	2,696.4	0.00	0.00	0.00
15,200.0	90.08	179.56	12,446.6	-2,783.2	337.0	2,796.4	0.00	0.00	0.00
15,300.0	90.08	179.56	12,446.5	-2,883.2	337.7	2,896.3	0.00	0.00	0.00
15,400.0	90.08	179.56	12,446.4	-2,983.2	338.5	2,996.2	0.00	0.00	0.00
15,500.0	90.08	179.56	12,446.2	-3,083.2	339.3	3,096.1	0.00	0.00	0.00
15,600.0	90.08	179.56	12,446.1	-3,183.2	340.0	3,196.0	0.00	0.00	0.00
15,700.0	90.08	179.56	12,445.9	-3,283.2	340.8	3,295.9	0.00	0.00	0.00
15,800.0	90.08	179.56	12,445.8	-3,383.2	341.5	3,395.8	0.00	0.00	0.00
15,900.0	90.08	179.56	12,445.7	-3,483.2	342.3	3,495.8	0.00	0.00	0.00
16,000.0	90.08	179.56	12,445.5	-3,583.2	343.1	3,595.7	0.00	0.00	0.00
16,100.0	90.08	179.56	12,445.4	-3,683.2	343.8	3,695.6	0.00	0.00	0.00
16,200.0	90.08	179.56	12,445.3	-3,783.2	344.6	3,795.5	0.00	0.00	0.00
16,300.0	90.08	179.56	12,445.1	-3,883.2	345.4	3,895.4	0.00	0.00	0.00
16,400.0	90.08	179.56	12,445.0	-3,983.2	346.1	3,995.3	0.00	0.00	0.00
16,500.0	90.08	179.56	12,444.9	-4,083.2	346.9	4,095.2	0.00	0.00	0.00
16,600.0	90.08	179.56	12,444.7	-4,183.2	347.7	4,195.2	0.00	0.00	0.00
16,700.0	90.08	179.56	12,444.6	-4,283.2	348.4	4,295.1	0.00	0.00	0.00
16,800.0	90.08	179.56	12,444.5	-4,383.2	349.2	4,395.0	0.00	0.00	0.00
16,900.0	90.08	179.56	12,444.3	-4,483.2	349.9	4,494.9	0.00	0.00	0.00
17,000.0	90.08	179.56	12,444.2	-4,583.2	350.7	4,594.8	0.00	0.00	0.00
17,100.0	90.08	179.56	12,444.0	-4,683.2	351.5	4,694.7	0.00	0.00	0.00
17,200.0	90.08	179.56	12,443.9	-4,783.2	352.2	4,794.7	0.00	0.00	0.00
17,300.0	90.08	179.56	12,443.8	-4,883.2	353.0	4,894.6	0.00	0.00	0.00
17,400.0	90.08	179.56	12,443.6	-4,983.2	353.8	4,994.5	0.00	0.00	0.00
17,500.0	90.08	179.56	12,443.5	-5,083.2	354.5	5,094.4	0.00	0.00	0.00
17,600.0	90.08	179.56	12,443.4	-5,183.2	355.3	5,194.3	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

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)
17,700.0	90.08	179.56	12,443.2	-5,283.2	356.1	5,294.2	0.00	0.00	0.00
17,800.0	90.08	179.56	12,443.1	-5,383.1	356.8	5,394.1	0.00	0.00	0.00
17,900.0	90.08	179.56	12,443.0	-5,483.1	357.6	5,494.1	0.00	0.00	0.00
18,000.0	90.08	179.56	12,442.8	-5,583.1	358.3	5,594.0	0.00	0.00	0.00
18,100.0	90.08	179.56	12,442.7	-5,683.1	359.1	5,693.9	0.00	0.00	0.00
18,200.0	90.08	179.56	12,442.6	-5,783.1	359.9	5,793.8	0.00	0.00	0.00
18,300.0	90.08	179.56	12,442.4	-5,883.1	360.6	5,893.7	0.00	0.00	0.00
18,400.0	90.08	179.56	12,442.3	-5,983.1	361.4	5,993.6	0.00	0.00	0.00
18,500.0	90.08	179.56	12,442.1	-6,083.1	362.2	6,093.6	0.00	0.00	0.00
18,600.0	90.08	179.56	12,442.0	-6,183.1	362.9	6,193.5	0.00	0.00	0.00
18,700.0	90.08	179.56	12,441.9	-6,283.1	363.7	6,293.4	0.00	0.00	0.00
18,800.0	90.08	179.56	12,441.7	-6,383.1	364.5	6,393.3	0.00	0.00	0.00
18,900.0	90.08	179.56	12,441.6	-6,483.1	365.2	6,493.2	0.00	0.00	0.00
19,000.0	90.08	179.56	12,441.5	-6,583.1	366.0	6,593.1	0.00	0.00	0.00
19,100.0	90.08	179.56	12,441.3	-6,683.1	366.7	6,693.0	0.00	0.00	0.00
19,200.0	90.08	179.56	12,441.2	-6,783.1	367.5	6,793.0	0.00	0.00	0.00
19,300.0	90.08	179.56	12,441.1	-6,883.1	368.3	6,892.9	0.00	0.00	0.00
19,400.0	90.08	179.56	12,440.9	-6,983.1	369.0	6,992.8	0.00	0.00	0.00
19,500.0	90.08	179.56	12,440.8	-7,083.1	369.8	7,092.7	0.00	0.00	0.00
19,600.0	90.08	179.56	12,440.6	-7,183.1	370.6	7,192.6	0.00	0.00	0.00
19,700.0	90.08	179.56	12,440.5	-7,283.1	371.3	7,292.5	0.00	0.00	0.00
19,800.0	90.08	179.56	12,440.4	-7,383.1	372.1	7,392.4	0.00	0.00	0.00
19,900.0	90.08	179.56	12,440.2	-7,483.1	372.9	7,492.4	0.00	0.00	0.00
20,000.0	90.08	179.56	12,440.1	-7,583.1	373.6	7,592.3	0.00	0.00	0.00
20,076.8	90.08	179.56	12,440.0	-7,659.9	374.2	7,669.0	0.00	0.00	0.00
TD at 20076.8									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LTP (VALOR FED CO - plan misses target center by 26.8usft at 20000.0usft MD (12440.1 TVD, -7583.1 N, 373.6 E) - Point	0.00	0.00	12,440.0	-7,609.9	373.8	391,033.40	743,263.40	32° 4' 21.478 N	103° 32' 52.765 W
PBHL (VALOR FED C - plan hits target center - Rectangle (sides W100.0 H7,772.2 D20.0)	0.08	359.56	12,440.0	-7,659.9	374.2	390,983.40	743,263.80	32° 4' 20.983 N	103° 32' 52.765 W
FTP (VALOR FED CC - plan misses target center by 163.7usft at 12394.7usft MD (12336.0 TVD, -5.3 N, 310.5 E) - Circle (radius 50.0)	0.00	0.00	12,450.0	112.1	314.0	398,755.40	743,203.60	32° 5' 37.896 N	103° 32' 52.807 W

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well VALOR FED COM 708H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Site:	BULLDOG	**MD Reference:**	KB=30 @ 3355.0usft (SCAN QUEST)
Well:	VALOR FED COM 708H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	EDM_Users

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5500	5500	0	0	Start DLS 2.00 TFO 60.96
5650	5650	2	3	Start 6320.1 hold at 5649.7 MD
11,970	11,961	162	292	Start DLS 12.00 TFO 118.56
12,732	12,450	-316	318	Start 7344.4 hold at 12732.4 MD
20,077	12,440	-7660	374	TD at 20076.8

Checked By: _____ Approved By: _____ Date: _____

COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

Well pad will be 400' X 400' with cellar in center of pad

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

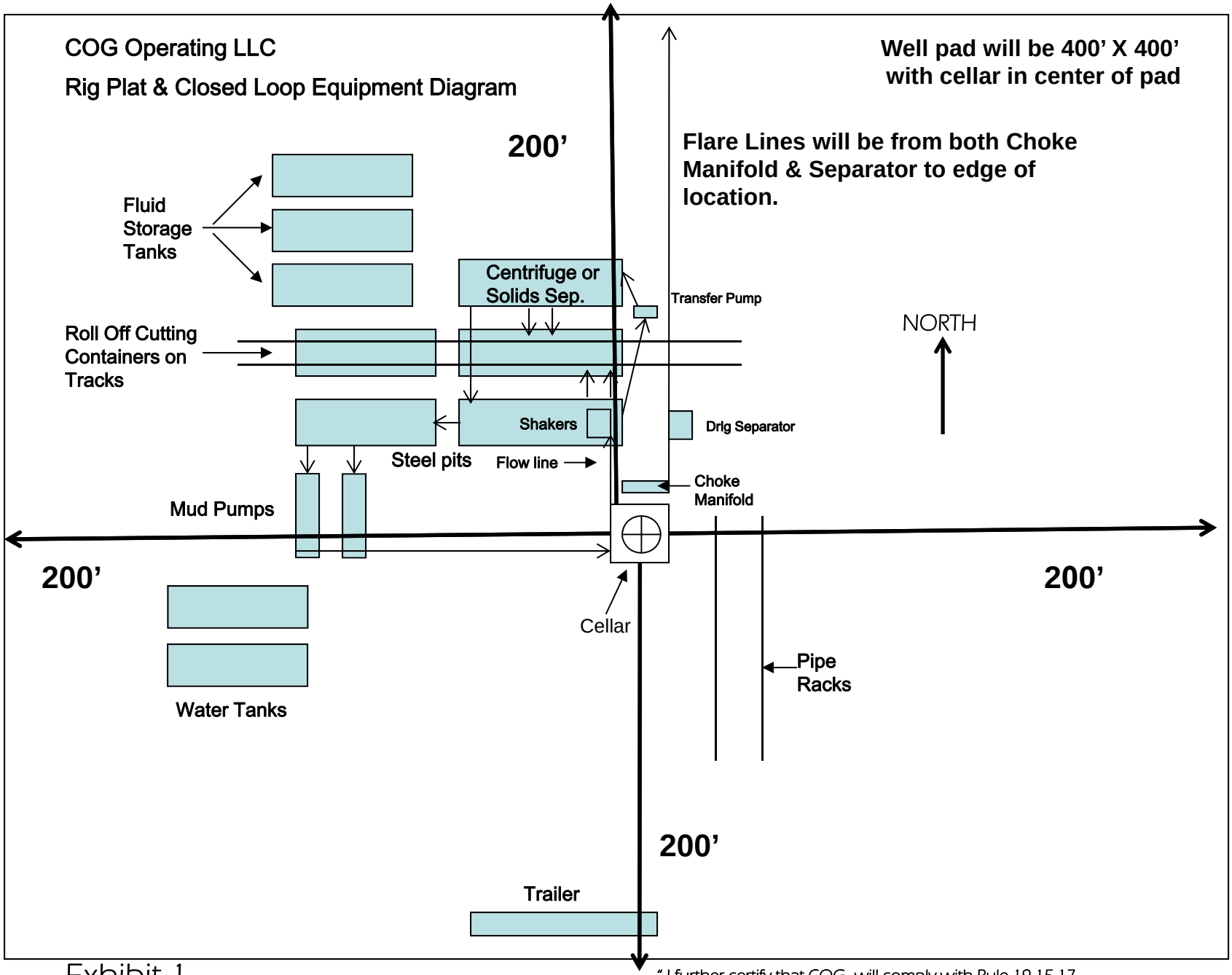

Exhibit 1

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