

13-989

UNORTHODOX
LOCATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

Split Estate
OCD Hobbs

FEB 25 2014

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

1a. Type of Work: ☒ DRILL ☐ REENTER		7. If Unit or CA Agreement, Name and No.
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		8. Lease Name and Well No. <40400> Sebastian Federal Com #3H
2. Name of Operator COG Operating LLC. <229137>		9. API Well No. 30-025-41688
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940	10. Field and Pool, or Exploratory <96434> Red Hills; Bone Spring, North
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FNL & 1770' FEL Unit Letter B (NWNE) SHL Sec. 18 - T24S - R34E At proposed prod. Zone 330' FSL & 1770' FEL Unit Letter O (SWSE) BHL Sec. 18 - T24S - R34E		11. Sec., T.R.M. or Blk and Survey or Area Sec. 18 - T24S - R34E
14. Distance in miles and direction from nearest town or post office* Approximately 17 miles from Jal		12. County or Parish Lea County
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'		13. State NM
16. No. of acres in lease 239.57		17. Spacing Unit dedicated to this well 160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1390' (Sebastian #4H) BHL: 2397' Closest to wellbore: 195'		20. BLM/BIA Bond No. on file NMB000740 & NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3583.2' GL		22. Approximate date work will start* 3/1/2014
		23. Estimated duration 30 days

24. Attachments

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

- | | |
|---|--|
| 1. Well plat certified by a registered surveyor. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan | 5. Operator certification |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature mate Reyes	Name (Printed/Typed)	Date 12/13/2013
Title Regulatory Analyst		
Approved by (Signature) /S/ STEPHEN J. CAFFEY	Name (Printed/Typed)	Date FEB 13 2014
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.

APPROVAL FOR TWO YEARS

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)

Carlsbad Controlled Water Basin

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

K2
02/26/14
Approval Subject to General Requirements
& Special Stipulations Attached

FEB 27 2014

FM

COG Production LLC
DRILLING AND OPERATIONS PROGRAM

Sebastian Federal Com 3H
SHL: 190' FNL & 1770' FEL
BHL: 330' FSL & 1770' FEL
Section 18 T24S R34E
Lea County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Operating LLC submits the following eleven items of pertinent information in accordance with BLM requirements.

1. Geological surface formation: Permian
2. The estimated tops of geologic markers & estimated depths at which anticipated water, oil or gas formations are expected to be encountered are as follows:

Fresh Water	~ 350'	
Rustler	1209'	
Top of Salt	1310'	
Fletcher Anhydrite	4983'	
Delaware	5132'	Oil
Bone Spring	8901'	Oil
Wolfcamp	11,849'	
TD TVD	10,985'	
TD MD	15,419'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities. The surface fresh water sands will be protected by setting 13-3/8" casing at ~~1250'~~ ^{1375'} and circulating cement back to surface. All intervals will be isolated by setting 5 1/2" casing to total depth and tying back cement to a minimum of 500' into 9-5/8" csg shoe.

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

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 1250' ^{1375'}	Surface	13 3/8"	New	54.5#	STC	J-55	2.05	2.18	8.67
12 1/4"	0' - 4300'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.149	1.91	3.57
12 1/4"	4300' - 5175'	Intrmd	9 5/8"	New	40#	LTC	N-80	1.15	2.79	4.14
8 3/4"	0' - 15,419'	Production Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.49	1.33	2.9

- While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.

4. Proposed Cement Program

- a. 13-3/8" Surface
- Lead: 600 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg, 1.75 cuft/sx, 9.2 gal/sx)
- Cmt: 250 sx Class C + 2% CaCl₂
(14.8 ppg, 1.35 cuft/sx, 6.3 gal/sx)
- **Calculated w/50% excess on OH volumes
- b. 9 5/8" Intermediate:
- Lead: 1050 sx 35:65:6 C +Salt+Gilsonite+CFR-3+ HR601
(12.8 ppg, 1.89 cuft/sx, 10.6 gal/sx)
- Tail: 250 sx Class C
(14.8 ppg, 1.35 cuft/sx, 6.3 gal/sx)
- **Calculated w/35% excess on OH volumes
- d. 5 1/2" Production
- Lead: 1100 sx 50:50:10 C +Salt+Gilsonite+CFR-3+ HR601
(11.9 ppg, 2.5 cuft/sx, 14.2 gal/sx)
- Tail: 950 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg, 1.25 cuft/sx, 5.7 gal/sx)
- **Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending the caliper measurements.
- The 13-3/8" surface cement is designed to circulate to surface.
- The 9-5/8" intermediate cement is designed to circulate to surface.
- The production TOC will tie back a minimum 500' into previous shoe.

5. Minimum Specifications for Pressure Control:

A 13 5/8" 2000 psi Hydril type annular preventer with mud cross, choke manifold, chokes, kill line, Kelly cock, safety valve and subs to fit all drill strings in use as provided for in Onshore Order #2 will be nipped up on the 13 3/8" x 2000 psi SOW X 13 5/8" x 2000 psi casing head (see attached BOPE drawings). This unit will be hydraulically operated and will be tested by independent tester using test plug to 250 psig/300 psig low and 1000 psig high. Choke line valve, chokes, upper Kelly cock valve, safety valve shall also be tested to 250 psig/300 psig low and 2000 psig high by independent tester.

C.O.2

After setting the 9 5/8" intermediate casing the following BOPE as provided for in Onshore Order #2 will be rigged up on the 9 5/8" intermediate casing spool (13 5/8" 2000 psi x 13 5/8" 3000 psi): 13 5/8" X 3000 psi annular, 13 5/8" X 3000 psi double ram type preventer with blind rams on top and 4 1/2" drill pipe rams on the bottom, choke, mud cross, choke manifold, 4" diameter choke line, 2" kill line, kelly cock, safety valve with proper subs for all drill string connections in use (see attached BOPE drawings). The BOPE including auxiliary equipment (chokes, choke manifold etc.) will be tested by independent tester.

Test plug will be used and all BOPE tested to 250 psig/ 300 psig low pressure and 3000 psig high pressure for 10 minutes. Annular preventer will be tested to 1500 psig. BOP stack will be used continuously until total depth is reached. 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. Any time a component of the BOP stack or choke manifold is changed or installed BOPE will be re-tested as required.

See
COA

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string depth or 1500 psig, whichever is greater, but not to exceed 70 percent of casing's minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action will be taken. If H₂S is monitored with 100 ppm in the gas stream while drilling intermediate, we will shut in and install a remote operated choke.

6. Estimated BHP & BHT:

Lateral TD = 4802 psi

Lateral TD = 158°F

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

See
COA

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' - 1250'	Fresh Water	8.4	29	N.C.
1250' - 5175'	Brine	10	29	N.C.
5175' - 15,419' (Lateral)	Cut Brine	8.9 - 9.2	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume totalizer, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. Auxiliary Well Control and Monitoring Equipment:

See
COA

- a. A Kelly cock will be in the drill string at all times.
- b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
- c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 5 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

9. Testing, Logging and Coring Program:

- a. Drill stem tests will be based on geological sample shows.
- b. If open hole electrical logging is performed, the program will be:
 - i. Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron - Z Density log with Gamma Ray and Caliper.
 - ii. Total Depth to Surface: Compensated Neutron with Gamma Ray
 - iii. No coring program is planned
 - iv. Additional testing will be initiated subsequent to setting the 5 1/2" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows and drill stem tests.

10. Potential Hazards:

See
COA

- a. No abnormal pressures or temperatures are expected. There is no known presence of H₂S in this area. If H₂S is encountered the operator will comply with the provisions of Onshore Oil and Gas Order No. 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. No H₂S is anticipated to be encountered.

11. Anticipated starting date and Duration of Operations:

Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.



COG Operating LLC

Lea County, NM (NAD27 NME)

Sebastian Fed Com

3H

OH

Plan: Design #1

Standard Planning Report - Geographic

22 October, 2013



Nexus Directional Solutions L.P.
Planning Report - Geographic



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well 3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3601.2usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3601.2usft (Original Well Elev)
Site:	Sebastian Fed Com	North Reference:	Grid
Well:	3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project:	Lea County, NM (NAD27 NME)		
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:	Sebastian Fed Com		
Site Position:	Map	Northing:	446,238.10 usft
From:		Easting:	753,093.60 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 13' 27.033 N
		Longitude:	103° 30' 53.651 W
		Grid Convergence:	0.44 °

Well:	3H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level:

Wellbore:	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	10/22/13	7.27
			Dip Angle
			(°)
			60.14
			Field Strength
			(nT)
			48,387

Design:	Design #1		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			179.52

Plan Sections:										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,387.8	0.00	0.00	10,387.8	0.0	0.0	0.00	0.00	0.00	0.00	
11,124.5	88.40	179.52	10,865.1	-464.1	3.9	12.00	12.00	0.00	179.52	
15,419.5	88.40	179.52	10,985.0	-4,757.3	40.0	0.00	0.00	0.00	0.00	0.00 PBHL Sebastian Fed



Nexus Directional Solutions L.P.
Planning Report - Geographic



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Company:	COG Operating LLC	TVD Reference:	WELL @ 3601.2usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3601.2usft (Original Well Elev)
Site:	Sebastian Fed Com	North Reference:	Grid
Well:	3H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
100.0	0.00	0.00	100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
200.0	0.00	0.00	200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
300.0	0.00	0.00	300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
400.0	0.00	0.00	400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
500.0	0.00	0.00	500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
600.0	0.00	0.00	600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
700.0	0.00	0.00	700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
800.0	0.00	0.00	800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
900.0	0.00	0.00	900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,300.0	0.00	0.00	5,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W



Nexus Directional Solutions L.P.
Planning Report - Geographic



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well 3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3601.2usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3601.2usft (Original Well Elev)
Site:	Sebastian Fed Com	North Reference:	Grid
Well:	3H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,500.0	0.00	0.00	5,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,600.0	0.00	0.00	6,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,700.0	0.00	0.00	6,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,200.0	0.00	0.00	8,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,300.0	0.00	0.00	8,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,400.0	0.00	0.00	8,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,600.0	0.00	0.00	8,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,700.0	0.00	0.00	8,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,800.0	0.00	0.00	8,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
8,900.0	0.00	0.00	8,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,000.0	0.00	0.00	9,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,100.0	0.00	0.00	9,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,200.0	0.00	0.00	9,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,300.0	0.00	0.00	9,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,400.0	0.00	0.00	9,400.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,500.0	0.00	0.00	9,500.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,600.0	0.00	0.00	9,600.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,700.0	0.00	0.00	9,700.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,800.0	0.00	0.00	9,800.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
9,900.0	0.00	0.00	9,900.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,000.0	0.00	0.00	10,000.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,100.0	0.00	0.00	10,100.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,200.0	0.00	0.00	10,200.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,300.0	0.00	0.00	10,300.0	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,387.8	0.00	0.00	10,387.8	0.0	0.0	446,260.70	755,928.00	32° 13' 27.042 N	103° 30' 20.655 W
10,400.0	1.46	179.52	10,400.0	-0.2	0.0	446,260.54	755,928.00	32° 13' 27.040 N	103° 30' 20.655 W
10,425.0	4.46	179.52	10,425.0	-1.4	0.0	446,259.25	755,928.01	32° 13' 27.027 N	103° 30' 20.655 W
10,450.0	7.46	179.52	10,449.8	-4.0	0.0	446,256.65	755,928.03	32° 13' 27.002 N	103° 30' 20.655 W
10,475.0	10.46	179.52	10,474.5	-7.9	0.1	446,252.76	755,928.06	32° 13' 26.963 N	103° 30' 20.655 W
10,500.0	13.46	179.52	10,499.0	-13.1	0.1	446,247.58	755,928.11	32° 13' 26.912 N	103° 30' 20.655 W



Nexus Directional Solutions L.P.
Planning Report - Geographic



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well 3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3601.2usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3601.2usft (Original Well Elev)
Site:	Sebastian Fed Com	North Reference:	Grid
Well:	3H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,525.0	16.46	179.52	10,523.1	-19.6	0.2	446,241.12	755,928.16	32° 13' 26.848 N	103° 30' 20.655 W
10,550.0	19.46	179.52	10,546.9	-27.3	0.2	446,233.41	755,928.23	32° 13' 26.772 N	103° 30' 20.655 W
10,575.0	22.46	179.52	10,570.2	-36.2	0.3	446,224.47	755,928.30	32° 13' 26.683 N	103° 30' 20.655 W
10,600.0	25.46	179.52	10,593.1	-46.4	0.4	446,214.32	755,928.39	32° 13' 26.583 N	103° 30' 20.655 W
10,625.0	28.46	179.52	10,615.4	-57.7	0.5	446,202.98	755,928.48	32° 13' 26.470 N	103° 30' 20.655 W
10,650.0	31.46	179.52	10,637.0	-70.2	0.6	446,190.50	755,928.59	32° 13' 26.347 N	103° 30' 20.655 W
10,675.0	34.46	179.52	10,658.0	-83.8	0.7	446,176.90	755,928.70	32° 13' 26.212 N	103° 30' 20.655 W
10,700.0	37.46	179.52	10,678.2	-98.5	0.8	446,162.22	755,928.82	32° 13' 26.067 N	103° 30' 20.655 W
10,725.0	40.46	179.52	10,697.7	-114.2	1.0	446,146.50	755,928.96	32° 13' 25.911 N	103° 30' 20.654 W
10,750.0	43.46	179.52	10,716.2	-130.9	1.1	446,129.79	755,929.10	32° 13' 25.746 N	103° 30' 20.654 W
10,775.0	46.46	179.52	10,733.9	-148.6	1.2	446,112.12	755,929.25	32° 13' 25.571 N	103° 30' 20.654 W
10,800.0	49.46	179.52	10,750.7	-167.1	1.4	446,093.56	755,929.40	32° 13' 25.388 N	103° 30' 20.654 W
10,825.0	52.46	179.52	10,766.4	-186.6	1.6	446,074.14	755,929.57	32° 13' 25.195 N	103° 30' 20.654 W
10,850.0	55.46	179.52	10,781.1	-206.8	1.7	446,053.93	755,929.74	32° 13' 24.995 N	103° 30' 20.654 W
10,875.0	58.46	179.52	10,794.7	-227.7	1.9	446,032.97	755,929.91	32° 13' 24.788 N	103° 30' 20.653 W
10,900.0	61.46	179.52	10,807.3	-249.4	2.1	446,011.33	755,930.09	32° 13' 24.574 N	103° 30' 20.653 W
10,925.0	64.46	179.52	10,818.6	-271.6	2.3	445,989.07	755,930.28	32° 13' 24.354 N	103° 30' 20.653 W
10,950.0	67.46	179.52	10,828.8	-294.5	2.5	445,966.24	755,930.47	32° 13' 24.128 N	103° 30' 20.653 W
10,975.0	70.46	179.52	10,837.8	-317.8	2.7	445,942.91	755,930.67	32° 13' 23.897 N	103° 30' 20.653 W
11,000.0	73.46	179.52	10,845.5	-341.6	2.9	445,919.14	755,930.87	32° 13' 23.662 N	103° 30' 20.653 W
11,025.0	76.46	179.52	10,852.0	-365.7	3.1	445,895.00	755,931.07	32° 13' 23.423 N	103° 30' 20.652 W
11,050.0	79.46	179.52	10,857.2	-390.1	3.3	445,870.55	755,931.28	32° 13' 23.181 N	103° 30' 20.652 W
11,075.0	82.46	179.52	10,861.1	-414.8	3.5	445,845.87	755,931.48	32° 13' 22.936 N	103° 30' 20.652 W
11,100.0	85.46	179.52	10,863.8	-439.7	3.7	445,821.01	755,931.69	32° 13' 22.690 N	103° 30' 20.652 W
11,124.5	88.40	179.52	10,865.1	-464.1	3.9	445,796.58	755,931.90	32° 13' 22.449 N	103° 30' 20.652 W
11,200.0	88.40	179.52	10,867.2	-539.6	4.5	445,721.08	755,932.53	32° 13' 21.702 N	103° 30' 20.651 W
11,300.0	88.40	179.52	10,870.0	-639.6	5.4	445,621.12	755,933.37	32° 13' 20.712 N	103° 30' 20.650 W
11,400.0	88.40	179.52	10,872.8	-739.5	6.2	445,521.16	755,934.22	32° 13' 19.723 N	103° 30' 20.649 W
11,500.0	88.40	179.52	10,875.6	-839.5	7.1	445,421.21	755,935.06	32° 13' 18.734 N	103° 30' 20.648 W
11,600.0	88.40	179.52	10,878.4	-939.5	7.9	445,321.25	755,935.90	32° 13' 17.745 N	103° 30' 20.648 W
11,700.0	88.40	179.52	10,881.1	-1,039.4	8.7	445,221.29	755,936.74	32° 13' 16.756 N	103° 30' 20.647 W
11,800.0	88.40	179.52	10,883.9	-1,139.4	9.6	445,121.33	755,937.58	32° 13' 15.766 N	103° 30' 20.646 W
11,900.0	88.40	179.52	10,886.7	-1,239.3	10.4	445,021.38	755,938.42	32° 13' 14.777 N	103° 30' 20.645 W
12,000.0	88.40	179.52	10,889.5	-1,339.3	11.3	444,921.42	755,939.26	32° 13' 13.788 N	103° 30' 20.644 W
12,100.0	88.40	179.52	10,892.3	-1,439.2	12.1	444,821.46	755,940.10	32° 13' 12.799 N	103° 30' 20.644 W
12,200.0	88.40	179.52	10,895.1	-1,539.2	12.9	444,721.50	755,940.94	32° 13' 11.810 N	103° 30' 20.643 W
12,300.0	88.40	179.52	10,897.9	-1,639.2	13.8	444,621.55	755,941.78	32° 13' 10.821 N	103° 30' 20.642 W
12,400.0	88.40	179.52	10,900.7	-1,739.1	14.6	444,521.59	755,942.62	32° 13' 9.831 N	103° 30' 20.641 W
12,500.0	88.40	179.52	10,903.5	-1,839.1	15.5	444,421.63	755,943.46	32° 13' 8.842 N	103° 30' 20.640 W
12,600.0	88.40	179.52	10,906.3	-1,939.0	16.3	444,321.67	755,944.30	32° 13' 7.853 N	103° 30' 20.639 W
12,700.0	88.40	179.52	10,909.1	-2,039.0	17.1	444,221.72	755,945.14	32° 13' 6.864 N	103° 30' 20.639 W
12,800.0	88.40	179.52	10,911.9	-2,138.9	18.0	444,121.76	755,945.98	32° 13' 5.875 N	103° 30' 20.638 W
12,900.0	88.40	179.52	10,914.7	-2,238.9	18.8	444,021.80	755,946.82	32° 13' 4.885 N	103° 30' 20.637 W
13,000.0	88.40	179.52	10,917.4	-2,338.9	19.7	443,921.84	755,947.66	32° 13' 3.896 N	103° 30' 20.636 W
13,100.0	88.40	179.52	10,920.2	-2,438.8	20.5	443,821.89	755,948.50	32° 13' 2.907 N	103° 30' 20.635 W
13,200.0	88.40	179.52	10,923.0	-2,538.8	21.3	443,721.93	755,949.34	32° 13' 1.918 N	103° 30' 20.634 W
13,300.0	88.40	179.52	10,925.8	-2,638.7	22.2	443,621.97	755,950.18	32° 13' 0.929 N	103° 30' 20.634 W
13,400.0	88.40	179.52	10,928.6	-2,738.7	23.0	443,522.01	755,951.02	32° 12' 59.940 N	103° 30' 20.633 W
13,500.0	88.40	179.52	10,931.4	-2,838.6	23.9	443,422.06	755,951.86	32° 12' 58.950 N	103° 30' 20.632 W
13,600.0	88.40	179.52	10,934.2	-2,938.6	24.7	443,322.10	755,952.71	32° 12' 57.961 N	103° 30' 20.631 W
13,700.0	88.40	179.52	10,937.0	-3,038.6	25.5	443,222.14	755,953.55	32° 12' 56.972 N	103° 30' 20.630 W
13,800.0	88.40	179.52	10,939.8	-3,138.5	26.4	443,122.19	755,954.39	32° 12' 55.983 N	103° 30' 20.630 W
13,900.0	88.40	179.52	10,942.6	-3,238.5	27.2	443,022.23	755,955.23	32° 12' 54.994 N	103° 30' 20.629 W
14,000.0	88.40	179.52	10,945.4	-3,338.4	28.1	442,922.27	755,956.07	32° 12' 54.005 N	103° 30' 20.628 W
14,100.0	88.40	179.52	10,948.2	-3,438.4	28.9	442,822.31	755,956.91	32° 12' 53.015 N	103° 30' 20.627 W



Nexus Directional Solutions L.P.
Planning Report - Geographic



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well 3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3601.2usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3601.2usft (Original Well Elev)
Site:	Sebastian Fed Com	North Reference:	Grid
Well:	3H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,200.0	88.40	179.52	10,951.0	-3,538.3	29.8	442,722.36	755,957.75	32° 12' 52.026 N	103° 30' 20.626 W
14,300.0	88.40	179.52	10,953.7	-3,638.3	30.6	442,622.40	755,958.59	32° 12' 51.037 N	103° 30' 20.625 W
14,400.0	88.40	179.52	10,956.5	-3,738.3	31.4	442,522.44	755,959.43	32° 12' 50.048 N	103° 30' 20.625 W
14,500.0	88.40	179.52	10,959.3	-3,838.2	32.3	442,422.48	755,960.27	32° 12' 49.059 N	103° 30' 20.624 W
14,600.0	88.40	179.52	10,962.1	-3,938.2	33.1	442,322.53	755,961.11	32° 12' 48.069 N	103° 30' 20.623 W
14,700.0	88.40	179.52	10,964.9	-4,038.1	34.0	442,222.57	755,961.95	32° 12' 47.080 N	103° 30' 20.622 W
14,800.0	88.40	179.52	10,967.7	-4,138.1	34.8	442,122.61	755,962.79	32° 12' 46.091 N	103° 30' 20.621 W
14,900.0	88.40	179.52	10,970.5	-4,238.0	35.6	442,022.65	755,963.63	32° 12' 45.102 N	103° 30' 20.620 W
15,000.0	88.40	179.52	10,973.3	-4,338.0	36.5	441,922.70	755,964.47	32° 12' 44.113 N	103° 30' 20.620 W
15,100.0	88.40	179.52	10,976.1	-4,438.0	37.3	441,822.74	755,965.31	32° 12' 43.124 N	103° 30' 20.619 W
15,200.0	88.40	179.52	10,978.9	-4,537.9	38.2	441,722.78	755,966.15	32° 12' 42.134 N	103° 30' 20.618 W
15,300.0	88.40	179.52	10,981.7	-4,637.9	39.0	441,622.82	755,966.99	32° 12' 41.145 N	103° 30' 20.617 W
15,400.0	88.40	179.52	10,984.5	-4,737.8	39.8	441,522.87	755,967.83	32° 12' 40.156 N	103° 30' 20.616 W
15,419.5	88.40	179.52	10,985.0	-4,757.3	40.0	441,503.40	755,968.00	32° 12' 39.963 N	103° 30' 20.616 W

Design Targets									
Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
hit/miss target									
Shape									
PBHL Sebastian Fed Co	0.00	0.00	10,985.0	-4,757.3	40.0	441,503.40	755,968.00	32° 12' 39.963 N	103° 30' 20.616 W
- plan hits target center									
- Point									



NEXUS

DIRECTIONAL SOLUTIONS, L.P.

Sebastian Fed Com 3H
Lea County, NM (NAD27 NME)
Northing: (Y) 446260.70
Easting: (X) 755928.00
Design #1



Azinuths to Grid North
True North: -0.44°
Magnetic North: 6.83°

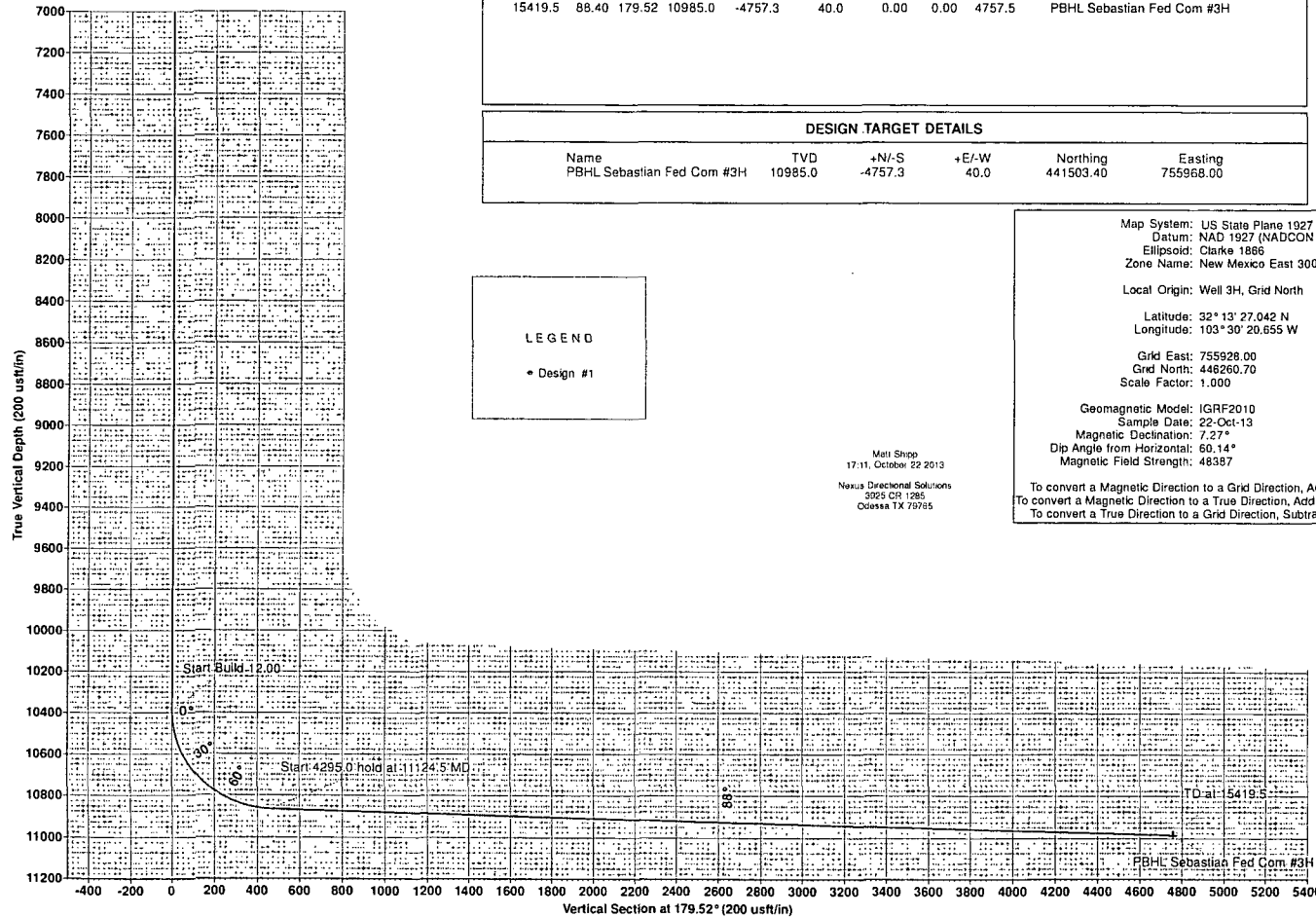
Magnetic Field
Strength: 48386.8nT
Dip Angle: 60.14°
Date: 10/22/2013
Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 6.82°
To convert a True Direction to a Grid Direction, Subtract 0.44°

WELL DETAILS:									
WELL @ 3601.2usft (Original Well Elev)									
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude				
0.0	0.0	446260.70	755928.00	32° 13' 27.042 N	103° 30' 20.655 W				

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
10387.8	0.00	0.00	10387.8	0.0	0.0	0.00	0.00	0.0	
11124.5	88.40	179.52	10865.1	-464.1	3.9	12.00	179.52	464.1	
15419.5	88.40	179.52	10985.0	-4757.3	40.0	0.00	0.00	4757.5	PBHL Sebastian Fed Com #3H

DESIGN TARGET DETAILS					
Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL Sebastian Fed Com #3H	10985.0	-4757.3	40.0	441503.40	755968.00

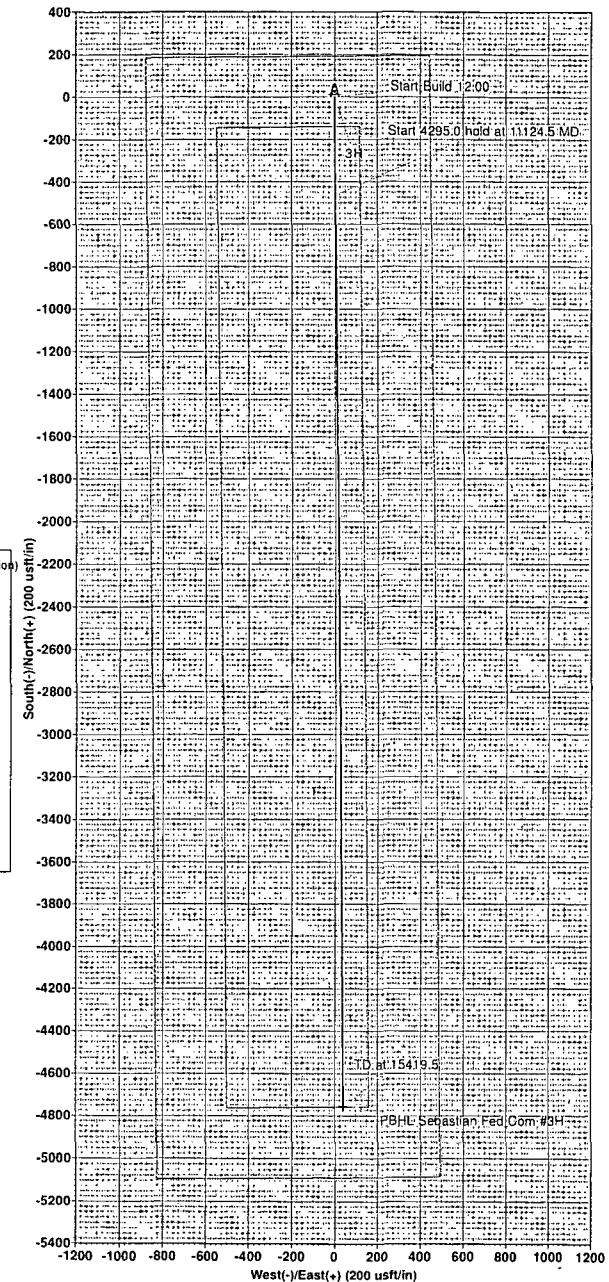


LEGEND

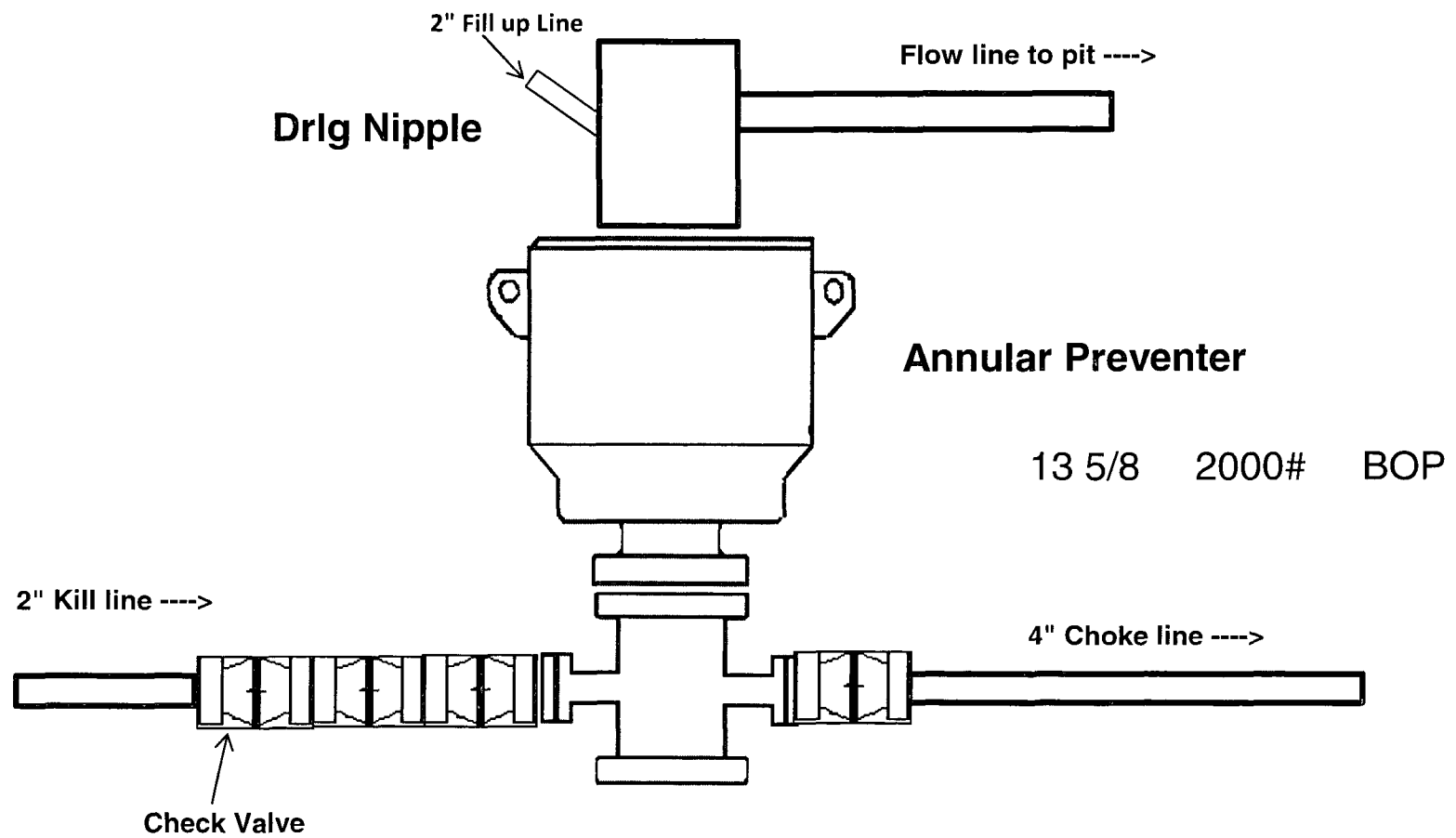
• Design #1

Well Ship
17.11, October 22 2013
Nexus Directional Solutions
3095 CR 1285
Odessa TX 79705

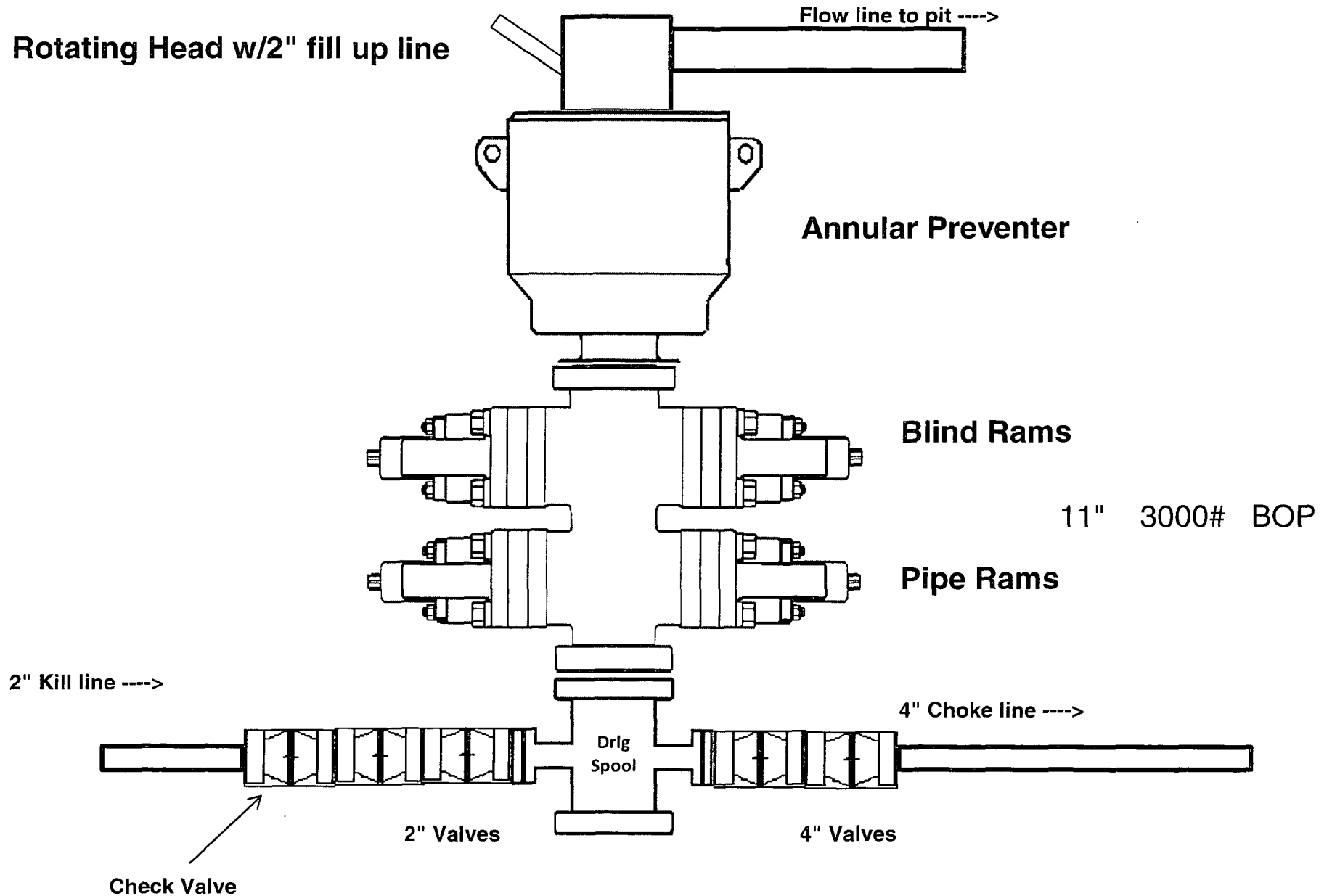
Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well 3H, Grid North
Latitude: 32° 13' 27.042 N
Longitude: 103° 30' 20.655 W
Grid East: 755928.00
Grid North: 446260.70
Scale Factor: 1.000
Geomagnetic Model: IGRF2010
Sample Date: 22-Oct-13
Magnetic Declination: 7.27°
Dip Angle from Horizontal: 60.14°
Magnetic Field Strength: 48387
To convert a Magnetic Direction to a Grid Direction, Add 6.82°
To convert a Magnetic Direction to a True Direction, Add 7.27° East
To convert a True Direction to a Grid Direction, Subtract 0.44°



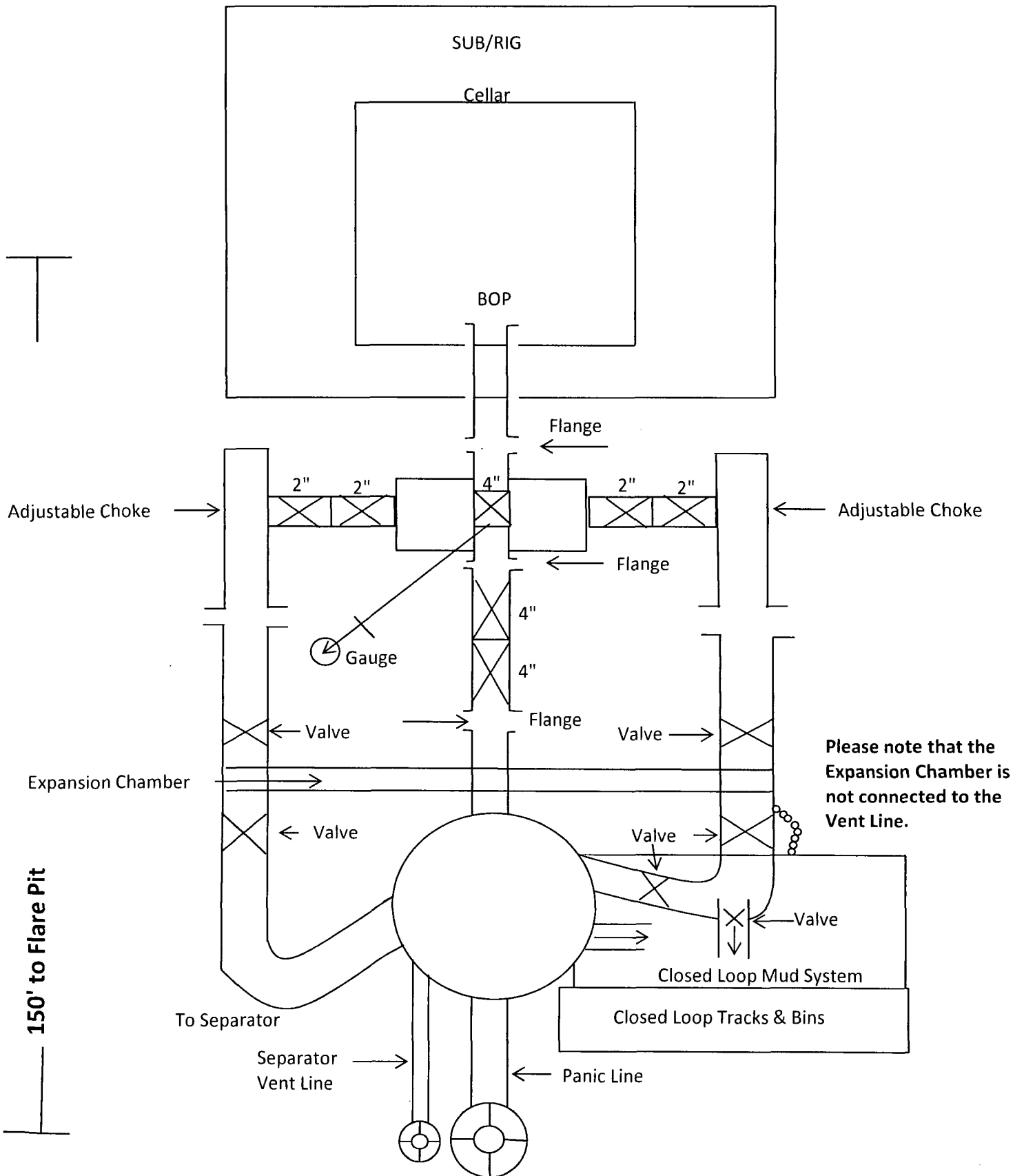
2,000 psi BOP Schematic



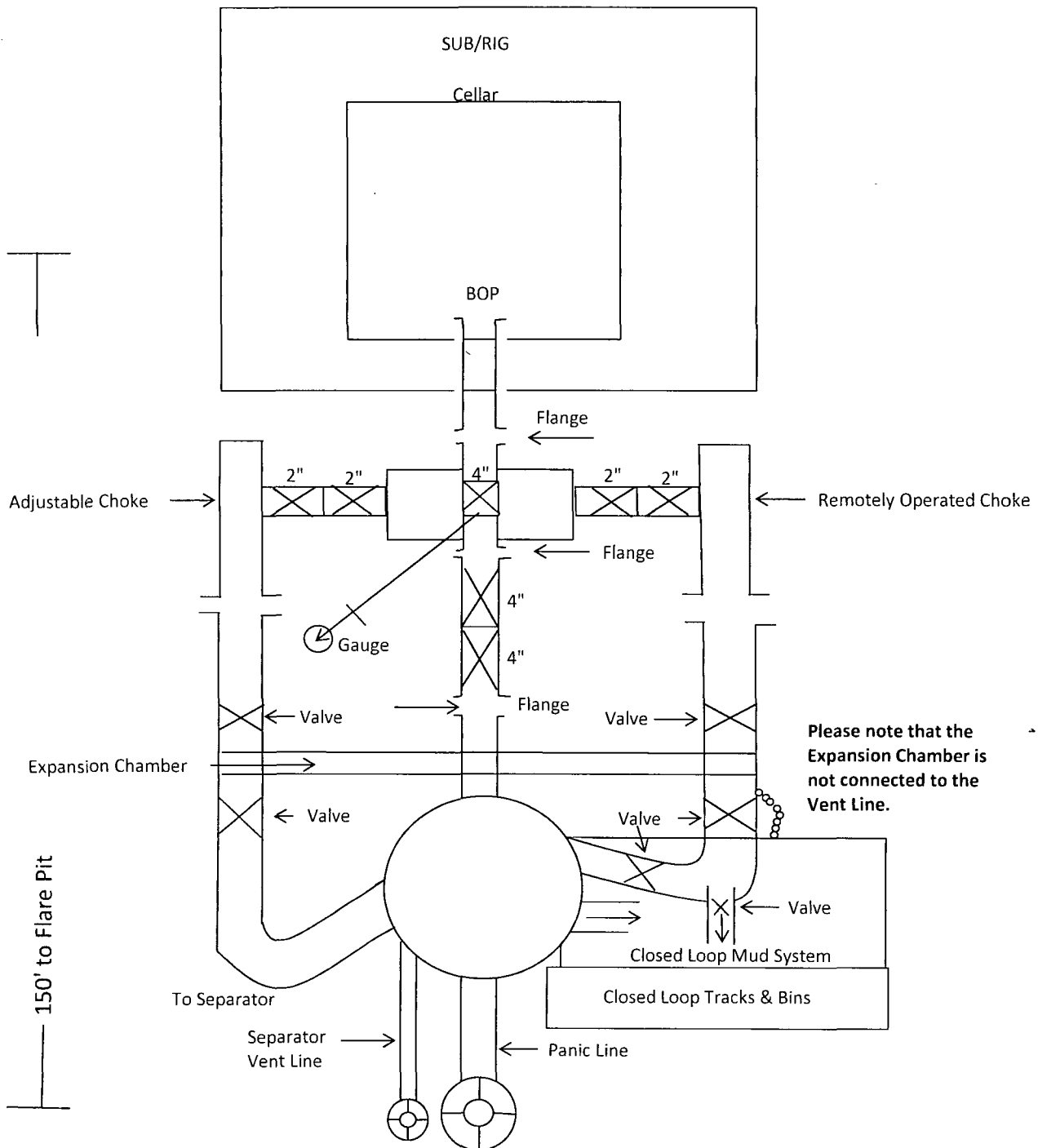
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

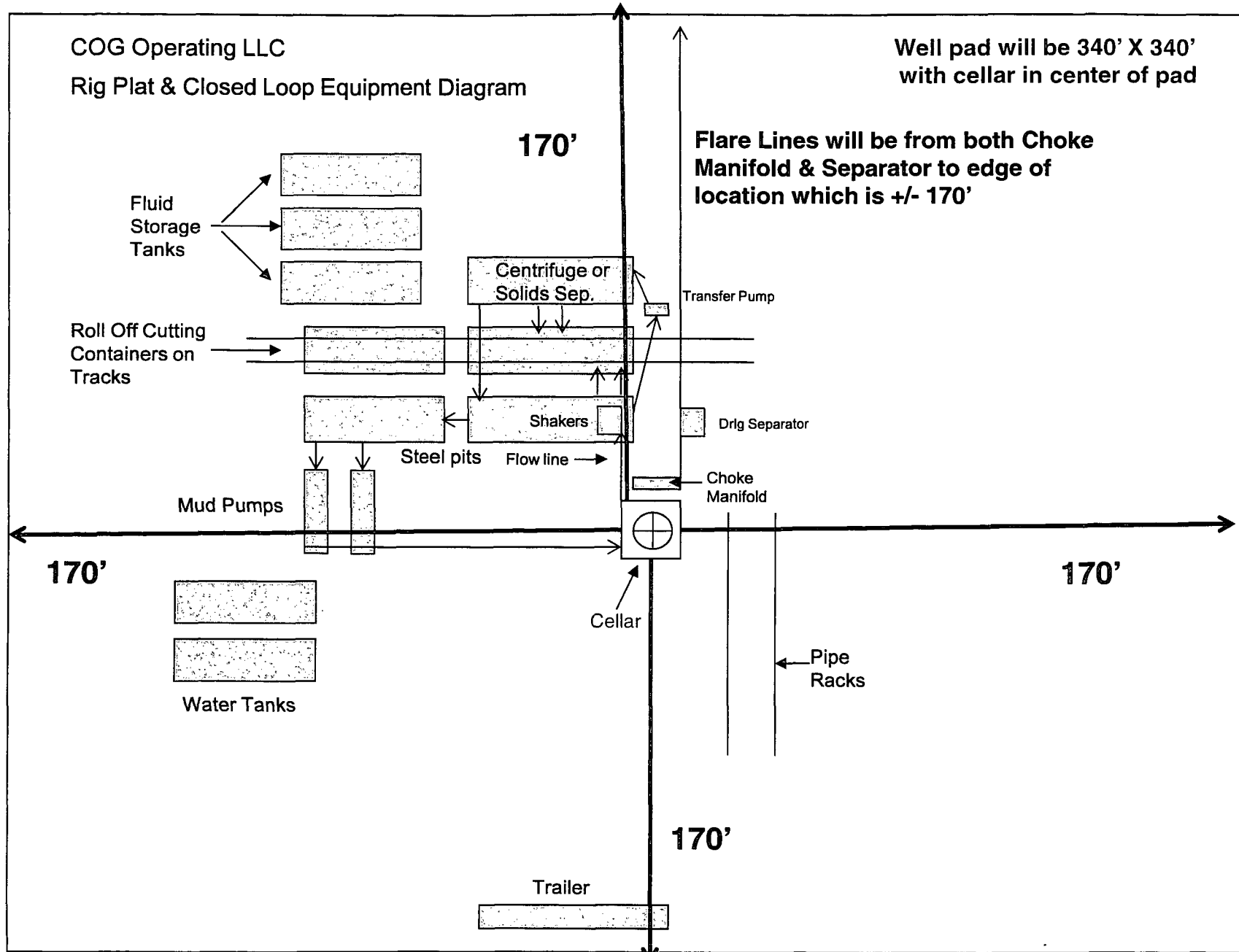


Exhibit 1

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