

HOBBS OCD

SEP 06 2013

OCD Hobbs

ATS-13-748

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

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

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. SHL: Fee, BHL: NMLC063798
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG Operating LLC.		7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. <40122> Deckard Federal Com #2H
3b. Phone No. (include area code) <229137> 575-748-6940		9. API Well No. 30-025-41382
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface 190' FNL & 1980' FWL Unit Letter C (NENW) SHL At proposed prod. Zone 330' FSL & 1980' FWL Unit Letter N (SESW) BHL		10. Field and Pool, or Exploratory <96434> Red Hills; Bone Spring, North
14. Distance in miles and direction from nearest town or post office* Approximately 18 miles from Jal		11. Sec., T.R.M. or Blk and Survey or Area Sec. 13 - T24S - R33E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'		12. County or Parish Lea County
16. No. of acres in lease 2480		13. State NM
17. Spacing Unit dedicated to this well 160		
18. Distance from location* to nearest well, drilling, completed, SHL: 1320' BHL: 1320' applied for, on this lease, ft.		20. BLM/BIA Bond No. on file NMB000740 & NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3592.4 GL		22. Approximate date work will start* 8/1/2013
		23. Estimated duration 30 days

24. Attachments

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

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

25. Signature <i>Mayte Reyes</i>	Name (Printed/Typed) Mayte Reyes	Date 7/1/2013
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Regulatory Analyst Approved by (Signature) <i>/s/George MacDonell</i>		Name (Printed/Typed) George MacDonell	Date SEP 3 - 2013
Title FIELD MANAGER		Office CARLSBAD FIELD OFFICE	

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Controlled Water Basin

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Approval Subject to General Requirements
& Special Stipulations Attached

SEP 11 2013

Surface Use Plan
COG Operating, LLC
Deckard Federal Com #2H
SL: 190' FNL & 1980' FWL UL C
Section 13, T24S, R33E
BHL: 330' FSL & 1980' FWL UL N
Section 13, T24S, R33E
Lea County, New Mexico

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STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

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

Date: July 1, 2013

Lease #: SHL: Fee
 BHL: NMLC0063798
 Deckard Federal Com #2H

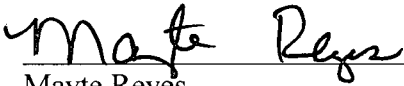
Legal Description: Sec. 13 – T24S – R33E
 Eddy County, New Mexico

Formation(s): Bone Spring

Bond Coverage: Statewide

BLM Bond File #: NMB000740 & NMB000215

COG OPERATING LLC



Mayte Reyes
Regulatory Analyst

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Deckard Federal Com 2H
SHL: 190' FNL & 1980' FWL
BHL: 330' FSL & 1980' FWL
Section 13 T24S R33E
Lea County, New Mexico

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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	~ 371'	
Rustler	1272'	
Top of Salt	1375'	
Base of Salt	4960'	
Delaware	5212'	Oil
Bone Spring	8992'	Oil
Wolfcamp	11,875'	
TD TVD	11,060'	
TD MD	15,510'	

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 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.

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

See COA

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 1300' ^{1375'}	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 5100'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 15,510'	Production Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6

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

See COA

4. Proposed Cement Program

- [illegible]

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

5. Minimum Specifications for Pressure Control: *See COA*

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

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

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. A 2" kill line and a minimum 3" choke line will be included in the drilling spool located below the ram-type BOP. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold with 5000 psi WP rating.

6. Estimated BHP & BHT:

Lateral TD = 4825 psi

Lateral TD = 159°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' - 1300'	Fresh Water	8.4	29	N.C.
1300' - 5100'	Brine	10	29	N.C.
5100' - 15,510' (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:

- 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.

See COA

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.

See COA

10. Potential Hazards:

- 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.

See COA

11. Anticipated starting date and Duration of Operations:

- a. 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.



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 13

Township: 24S

Range: 33E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

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WATER COLUMN/ AVERAGE
DEPTH TO WATER



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the
POD suffix indicates the
POD has been replaced
& no longer serves a
water right file.)

(R=POD has
been replaced,
O=orphaned,
C=the file is
closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Code	Subbasin	County	Q	Q	Q	Q	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<u>C 02308</u>			LE	1	3	1	10	24S	33E	634953	3567364*	40	20	20	
<u>C 02309</u>			LE	2	2	2	25	24S	33E	639638	3562994*	60	30	30	
<u>C 02310</u>			LE	2	3	2	33	24S	33E	634437	3560918*	120	70	50	
<u>C 02311</u>			LE	2	3	2	33	24S	33E	634437	3560918*	120	70	50	
<u>C 02430</u>			LE	3	3	3	16	24S	33E	633377	3564732*	643	415	228	
<u>C 02431</u>			LE	4	4	4	17	24S	33E	633175	3564728*	525	415	110	
<u>C 02432</u>			LE	4	4	4	17	24S	33E	633175	3564728*	640	415	225	
<u>C 02563</u>			LE	1	4	2	33	24S	33E	634639	3560923*	120			
<u>C 02564</u>			LE	2	4	2	33	24S	33E	634839	3560923*	120			
<u>C 02890</u>			LE		2	4	29	24S	33E	633114	3562012*	500			
<u>C 03565 POD3</u>			LE		3	4	08	24S	33E	632763	3566546			1533	
<u>C 03591 POD1</u>			LE	2	1	4	05	24S	33E	632731	3568518				
<u>C 03600 POD1</u>			LE	2	2	1	26	24S	33E	637275	3563023				
<u>C 03600 POD2</u>			LE	4	4	1	25	24S	33E	638824	3562329				
<u>C 03600 POD3</u>			LE	3	4	2	26	24S	33E	637784	3562340				
<u>C 03600 POD4</u>			LE	3	3	1	26	24S	33E	636617	3562293				
<u>C 03600 POD5</u>			LE	3	2	4	26	24S	33E	637857	3562020				
<u>C 03600 POD6</u>			LE	3	1	4	26	24S	33E	637383	3562026				
<u>C 03600 POD7</u>			LE	3	1	3	26	24S	33E	636726	3561968				
<u>C 03601 POD1</u>			LE	4	4	2	23	24S	33E	638124	3563937				
<u>C 03601 POD2</u>			LE	3	2	4	23	24S	33E	637846	3563588				
<u>C 03601 POD3</u>			LE	1	3	3	24	24S	33E	638142	3563413				
<u>C 03601 POD4</u>			LE	3	3	3	24	24S	33E	638162	3561375				
<u>C 03601 POD5</u>			LE	2	4	4	23	24S	33E	637988	3563334				
<u>C 03601 POD6</u>			LE	1	4	4	23	24S	33E	637834	3563338				
<u>C 03601 POD7</u>			LE	4	4	4	23	24S	33E	637946	3563170				
<u>C 03602 POD2</u>			LE	4	4	1	25	24S	33E	638824	3562329				

*UTM location was derived from PLSS - see Help

(R=POD has been replaced,
O=orphaned,
C=the file is closed)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD		Q Q Q			Depth		Depth		Water				
POD Number	Code Subbasin	County	64	16	4	Sec	Tws	Rng	X	Y	Well	Water	Column
<u>C 03603 POD1</u>		LE	3	2	2	35	24S	33E	637805	3561225			
<u>C 03603 POD2</u>		LE	3	1	2	35	24S	33E	637384	3561167			
<u>C 03603 POD3</u>		LE	4	1	1	35	24S	33E	636890	3561092			
<u>C 03603 POD4</u>		LE	3	2	4	35	24S	33E	637789	3560461			
<u>C 03603 POD5</u>		LE	3	3	2	35	24S	33E	636745	3560767			
<u>C 03603 POD6</u>		LE	3	1	3	35	24S	33E	636749	3560447			

Average Depth to Water: 371 feet

Minimum Depth: 20 feet

Maximum Depth: **1533 feet**

Record Count: 33

PLSS Search:

Township: 24S

Range: 33E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

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WATER COLUMN/ AVERAGE
DEPTH TO WATER

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COG Operating LLC

Lea County, NM

Deckard Federal Com

#2H

OH

Plan: Plan #1

Standard Planning Report

12 April, 2013



Planning Report



Database:	Houston R5000 Database	Local Co-ordinate Reference:	Well #2H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM	MD Reference:	WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
Site:	Deckard Federal Com	North Reference:	Grid
Well:	#2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		Deckard Federal Com				
Site Position:		Northing:	446,229.30 usft	Latitude:	32° 13' 27.045 N	
From:	Map	Easting:	751,773.80 usft	Longitude:	103° 31' 9.014 W	
Position Uncertainty:		2.0 usft	Slot Radius:	7-7/8 "	Grid Convergence:	0.43 °

Well	#2H					
Well Position	+N/-S	-13.6 usft	Northing:	446,215.70 usft	Latitude:	32° 13' 27.108 N
	+E/-W	-2,645.3 usft	Easting:	749,128.50 usft	Longitude:	103° 31' 39.808 W
Position Uncertainty	2.0 usft		Wellhead Elevation:		Ground Level:	3,592.4 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/12/2013	7.34	60.15	48,437

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	179.56

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,482.5	0.00	0.00	10,482.5	0.0	0.0	0.00	0.00	0.00	0.00	
11,221.6	88.66	179.56	10,960.0	-466.4	3.6	12.00	12.00	0.00	179.56	
15,510.1	88.66	179.56	11,060.3	-4,753.7	36.5	0.00	0.00	0.00	0.00	PBHL (DFed#2H)

Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Deckard Federal Com
Well: #2H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
MD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

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

Planning Report



Database:	Houston R5000 Database	Local Co-ordinate Reference:	Well #2H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM	MD Reference:	WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
Site:	Deckard Federal Com	North Reference:	Grid
Well:	#2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,200.0	0.00	0.00	10,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,300.0	0.00	0.00	10,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,400.0	0.00	0.00	10,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,482.5	0.00	0.00	10,482.5	0.0	0.0	0.0	0.00	0.00	0.00	
KOP - 10482.5' MD, 10482.5' TVD										

Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Deckard Federal Com
Well: #2H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
MD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
10,500.0	2.10	179.56	10,500.0	-0.3	0.0	0.3	12.00	12.00	0.00
10,525.0	5.10	179.56	10,524.9	-1.9	0.0	1.9	12.00	12.00	0.00
10,550.0	8.10	179.56	10,549.8	-4.8	0.0	4.8	12.00	12.00	0.00
10,575.0	11.10	179.56	10,574.4	-8.9	0.1	8.9	12.00	12.00	0.00
10,600.0	14.10	179.56	10,598.8	-14.4	0.1	14.4	12.00	12.00	0.00
10,625.0	17.09	179.56	10,622.9	-21.1	0.2	21.1	12.00	12.00	0.00
10,650.0	20.09	179.56	10,646.6	-29.1	0.2	29.1	12.00	12.00	0.00
10,675.0	23.09	179.56	10,669.8	-38.3	0.3	38.3	12.00	12.00	0.00
10,700.0	26.09	179.56	10,692.6	-48.7	0.4	48.7	12.00	12.00	0.00
10,725.0	29.09	179.56	10,714.7	-60.2	0.5	60.2	12.00	12.00	0.00
10,750.0	32.09	179.56	10,736.2	-73.0	0.6	73.0	12.00	12.00	0.00
10,775.0	35.09	179.56	10,757.1	-86.8	0.7	86.8	12.00	12.00	0.00
10,800.0	38.09	179.56	10,777.1	-101.7	0.8	101.7	12.00	12.00	0.00
10,825.0	41.09	179.56	10,796.4	-117.6	0.9	117.6	12.00	12.00	0.00
10,850.0	44.08	179.56	10,814.8	-134.5	1.0	134.5	12.00	12.00	0.00
10,875.0	47.08	179.56	10,832.3	-152.4	1.2	152.4	12.00	12.00	0.00
10,900.0	50.08	179.56	10,848.8	-171.1	1.3	171.1	12.00	12.00	0.00
10,925.0	53.08	179.56	10,864.4	-190.7	1.5	190.7	12.00	12.00	0.00
10,950.0	56.08	179.56	10,878.8	-211.1	1.6	211.1	12.00	12.00	0.00
10,975.0	59.08	179.56	10,892.3	-232.2	1.8	232.2	12.00	12.00	0.00
11,000.0	62.08	179.56	10,904.5	-254.0	2.0	254.0	12.00	12.00	0.00
11,025.0	65.08	179.56	10,915.7	-276.4	2.1	276.4	12.00	12.00	0.00
11,050.0	68.08	179.56	10,925.6	-299.3	2.3	299.3	12.00	12.00	0.00
11,075.0	71.08	179.56	10,934.3	-322.7	2.5	322.7	12.00	12.00	0.00
11,100.0	74.07	179.56	10,941.8	-346.6	2.7	346.6	12.00	12.00	0.00
11,125.0	77.07	179.56	10,948.0	-370.8	2.8	370.8	12.00	12.00	0.00
11,150.0	80.07	179.56	10,953.0	-395.3	3.0	395.3	12.00	12.00	0.00
11,175.0	83.07	179.56	10,956.6	-420.0	3.2	420.0	12.00	12.00	0.00
11,200.0	86.07	179.56	10,959.0	-444.9	3.4	444.9	12.00	12.00	0.00
11,221.6	88.66	179.56	10,960.0	-466.5	3.6	466.5	11.99	11.99	0.00
EOC - 11221.6' MD, 10960.0' TVD, 88.66° INC, 466.5' VS									
11,300.0	88.66	179.56	10,961.8	-544.8	4.2	544.8	0.00	0.00	0.00
11,400.0	88.66	179.56	10,964.2	-644.8	5.0	644.8	0.00	0.00	0.00
11,500.0	88.66	179.56	10,966.5	-744.8	5.7	744.8	0.00	0.00	0.00
11,600.0	88.66	179.56	10,968.8	-844.7	6.5	844.8	0.00	0.00	0.00
11,700.0	88.66	179.56	10,971.2	-944.7	7.3	944.7	0.00	0.00	0.00
11,800.0	88.66	179.56	10,973.5	-1,044.7	8.0	1,044.7	0.00	0.00	0.00
11,900.0	88.66	179.56	10,975.9	-1,144.7	8.8	1,144.7	0.00	0.00	0.00
12,000.0	88.66	179.56	10,978.2	-1,244.6	9.6	1,244.7	0.00	0.00	0.00
12,100.0	88.66	179.56	10,980.5	-1,344.6	10.3	1,344.6	0.00	0.00	0.00
12,200.0	88.66	179.56	10,982.9	-1,444.6	11.1	1,444.6	0.00	0.00	0.00
12,300.0	88.66	179.56	10,985.2	-1,544.5	11.9	1,544.6	0.00	0.00	0.00
12,400.0	88.66	179.56	10,987.6	-1,644.5	12.6	1,644.5	0.00	0.00	0.00
12,500.0	88.66	179.56	10,989.9	-1,744.5	13.4	1,744.5	0.00	0.00	0.00
12,600.0	88.66	179.56	10,992.2	-1,844.4	14.2	1,844.5	0.00	0.00	0.00
12,700.0	88.66	179.56	10,994.6	-1,944.4	14.9	1,944.5	0.00	0.00	0.00
12,800.0	88.66	179.56	10,996.9	-2,044.4	15.7	2,044.4	0.00	0.00	0.00
12,900.0	88.66	179.56	10,999.2	-2,144.3	16.5	2,144.4	0.00	0.00	0.00
13,000.0	88.66	179.56	11,001.6	-2,244.3	17.2	2,244.4	0.00	0.00	0.00
13,100.0	88.66	179.56	11,003.9	-2,344.3	18.0	2,344.4	0.00	0.00	0.00
13,200.0	88.66	179.56	11,006.3	-2,444.3	18.8	2,444.3	0.00	0.00	0.00
13,300.0	88.66	179.56	11,008.6	-2,544.2	19.5	2,544.3	0.00	0.00	0.00
13,400.0	88.66	179.56	11,010.9	-2,644.2	20.3	2,644.3	0.00	0.00	0.00
13,500.0	88.66	179.56	11,013.3	-2,744.2	21.1	2,744.2	0.00	0.00	0.00

Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Deckard Federal Com
Well: #2H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
MD Reference: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,600.0	88.66	179.56	11,015.6	-2,844.1	21.8	2,844.2	0.00	0.00	0.00
13,700.0	88.66	179.56	11,018.0	-2,944.1	22.6	2,944.2	0.00	0.00	0.00
13,800.0	88.66	179.56	11,020.3	-3,044.1	23.4	3,044.2	0.00	0.00	0.00
13,900.0	88.66	179.56	11,022.6	-3,144.0	24.1	3,144.1	0.00	0.00	0.00
14,000.0	88.66	179.56	11,025.0	-3,244.0	24.9	3,244.1	0.00	0.00	0.00
14,100.0	88.66	179.56	11,027.3	-3,344.0	25.7	3,344.1	0.00	0.00	0.00
14,200.0	88.66	179.56	11,029.7	-3,444.0	26.4	3,444.1	0.00	0.00	0.00
14,300.0	88.66	179.56	11,032.0	-3,543.9	27.2	3,544.0	0.00	0.00	0.00
14,400.0	88.66	179.56	11,034.3	-3,643.9	28.0	3,644.0	0.00	0.00	0.00
14,500.0	88.66	179.56	11,036.7	-3,743.9	28.8	3,744.0	0.00	0.00	0.00
14,600.0	88.66	179.56	11,039.0	-3,843.8	29.5	3,843.9	0.00	0.00	0.00
14,700.0	88.66	179.56	11,041.3	-3,943.8	30.3	3,943.9	0.00	0.00	0.00
14,800.0	88.66	179.56	11,043.7	-4,043.8	31.1	4,043.9	0.00	0.00	0.00
14,900.0	88.66	179.56	11,046.0	-4,143.7	31.8	4,143.9	0.00	0.00	0.00
15,000.0	88.66	179.56	11,048.4	-4,243.7	32.6	4,243.8	0.00	0.00	0.00
15,100.0	88.66	179.56	11,050.7	-4,343.7	33.4	4,343.8	0.00	0.00	0.00
15,200.0	88.66	179.56	11,053.0	-4,443.7	34.1	4,443.8	0.00	0.00	0.00
15,300.0	88.66	179.56	11,055.4	-4,543.6	34.9	4,543.8	0.00	0.00	0.00
15,400.0	88.66	179.56	11,057.7	-4,643.6	35.7	4,643.7	0.00	0.00	0.00
15,500.0	88.66	179.56	11,060.1	-4,743.6	36.4	4,743.7	0.00	0.00	0.00
15,510.1	88.66	179.56	11,060.3	-4,753.7	36.5	4,753.8	0.00	0.00	0.00

TD @ 15510.1' MD, 11060.3' TVD

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL (DFed#2H)	0.00	0.00	11,060.0	-4,753.7	36.9	441,462.00	749,165.40	32° 12' 40.065 N	103° 31' 39.793 W
- plan misses target center by 0.5usft at 15510.1usft MD (11060.3 TVD, -4753.7 N, 36.5 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,482.5	10,482.5	0.0	0.0	KOP - 10482.5' MD, 10482.5' TVD
11,221.6	10,960.0	-466.5	3.6	EOC - 11221.6' MD, 10960.0' TVD, 88.66° INC, 466.5' VS
15,510.1	11,060.3	-4,753.7	36.5	TD @ 15510.1' MD, 11060.3' TVD



COG Operating LLC
Project: Lea County, NM
Site: Deekard Federal Com
Well: #2H
Wellbore: OH
Plan: Plan #1 (#2H/OH)

WELL DETAILS: #2H

Ground Elevation: 3592.4
RKB Elevation: WELL @ 3610.4usft (Silver Oak #12 - 18' KB)
Rig Name: Silver Oak #12 - 18' KB

Surface Hole Location

Northing 446215.70 Easting 749128.50 Latitude 32° 13' 27.108 N Longitude 103° 31' 39.808 W



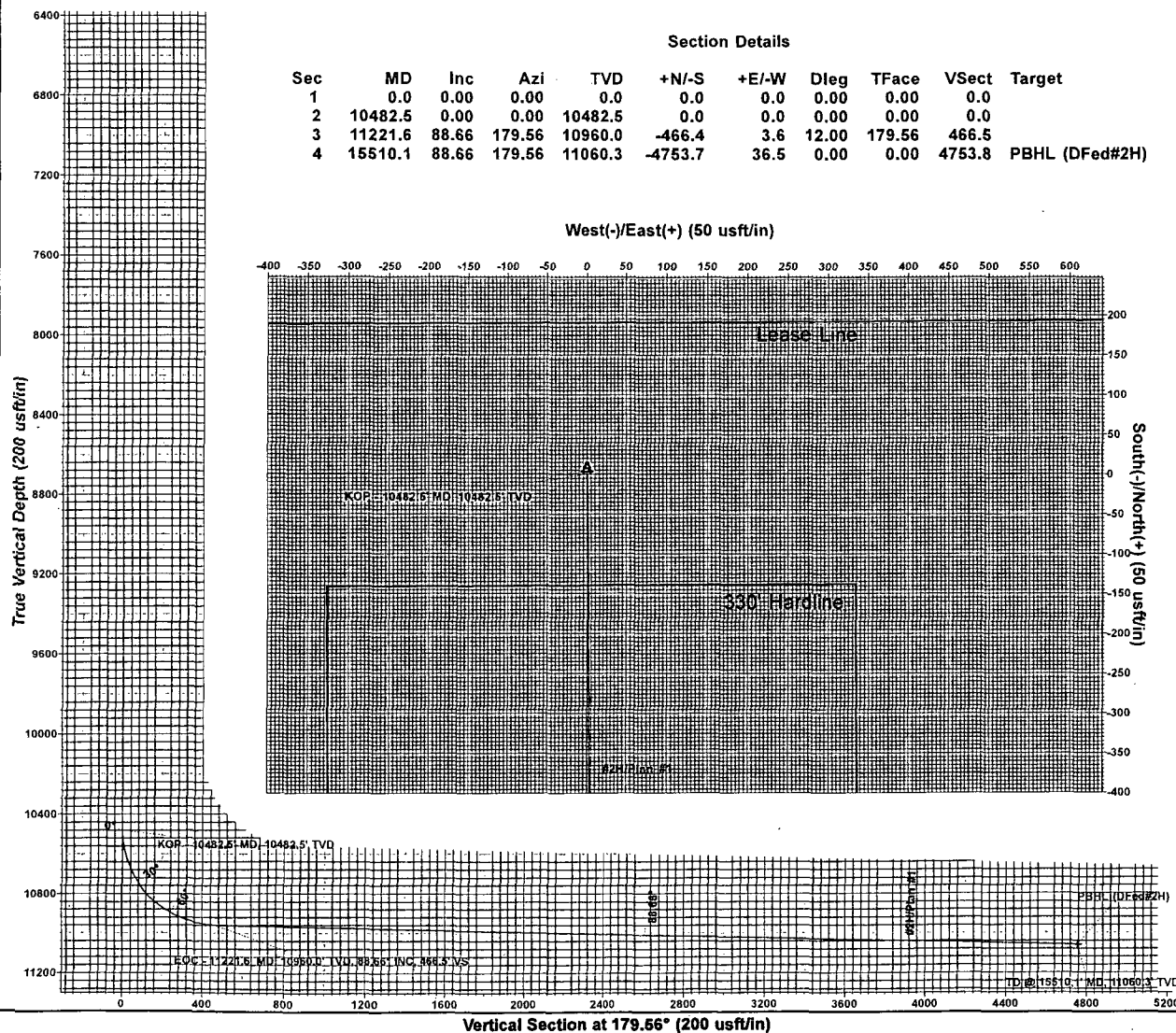
Azimuths to Grid North
True North: -0.43°
Magnetic North: 6.91°

Magnetic Field
Strength: 48437.4snT
Dip Angle: 60.15°
Date: 4/12/2013
Model: IGRF2010

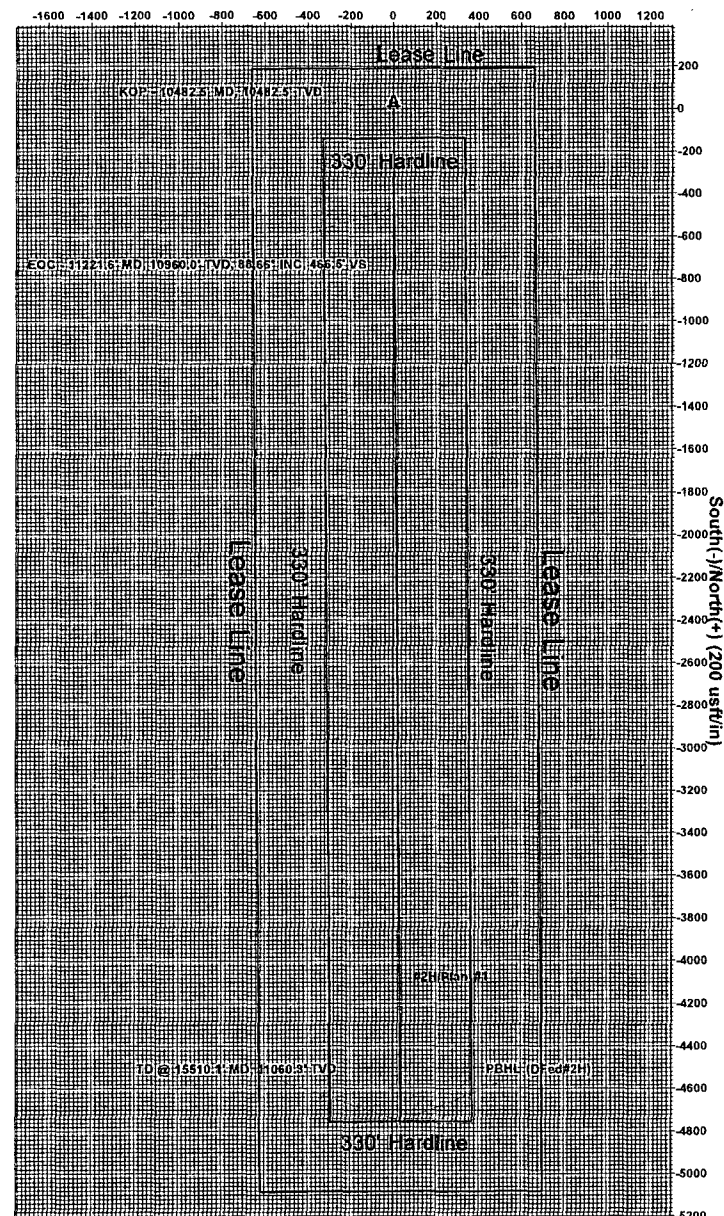
Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10482.5	0.00	0.00	10482.5	0.0	0.0	0.00	0.00	0.0	
3	11221.6	88.66	179.56	10960.0	-466.4	3.6	12.00	179.56	466.5	
4	15510.1	88.66	179.56	11060.3	-4753.7	36.5	0.00	0.00	4753.8	PBHL (DFed#2H)

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



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



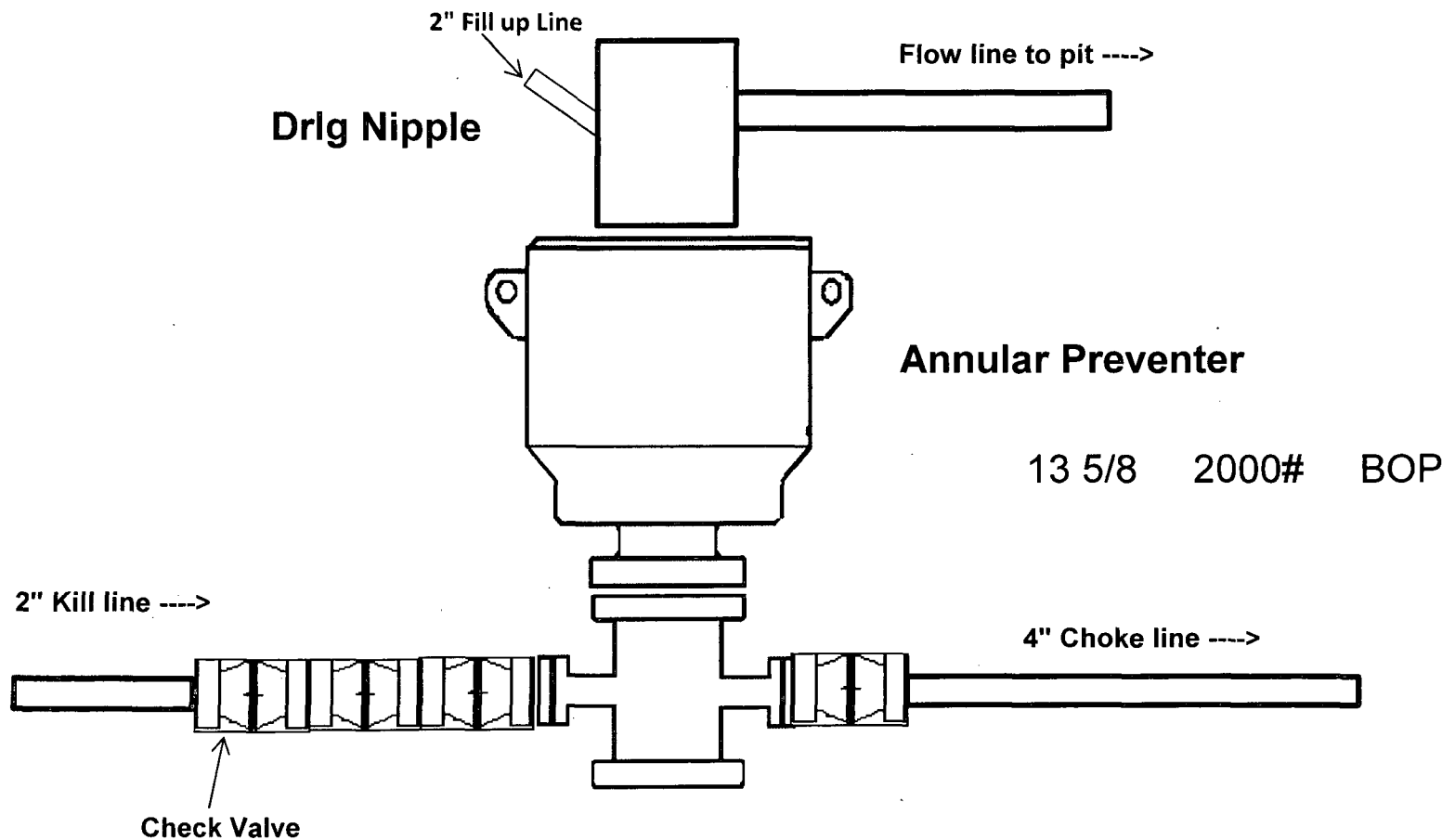
PROJECT DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



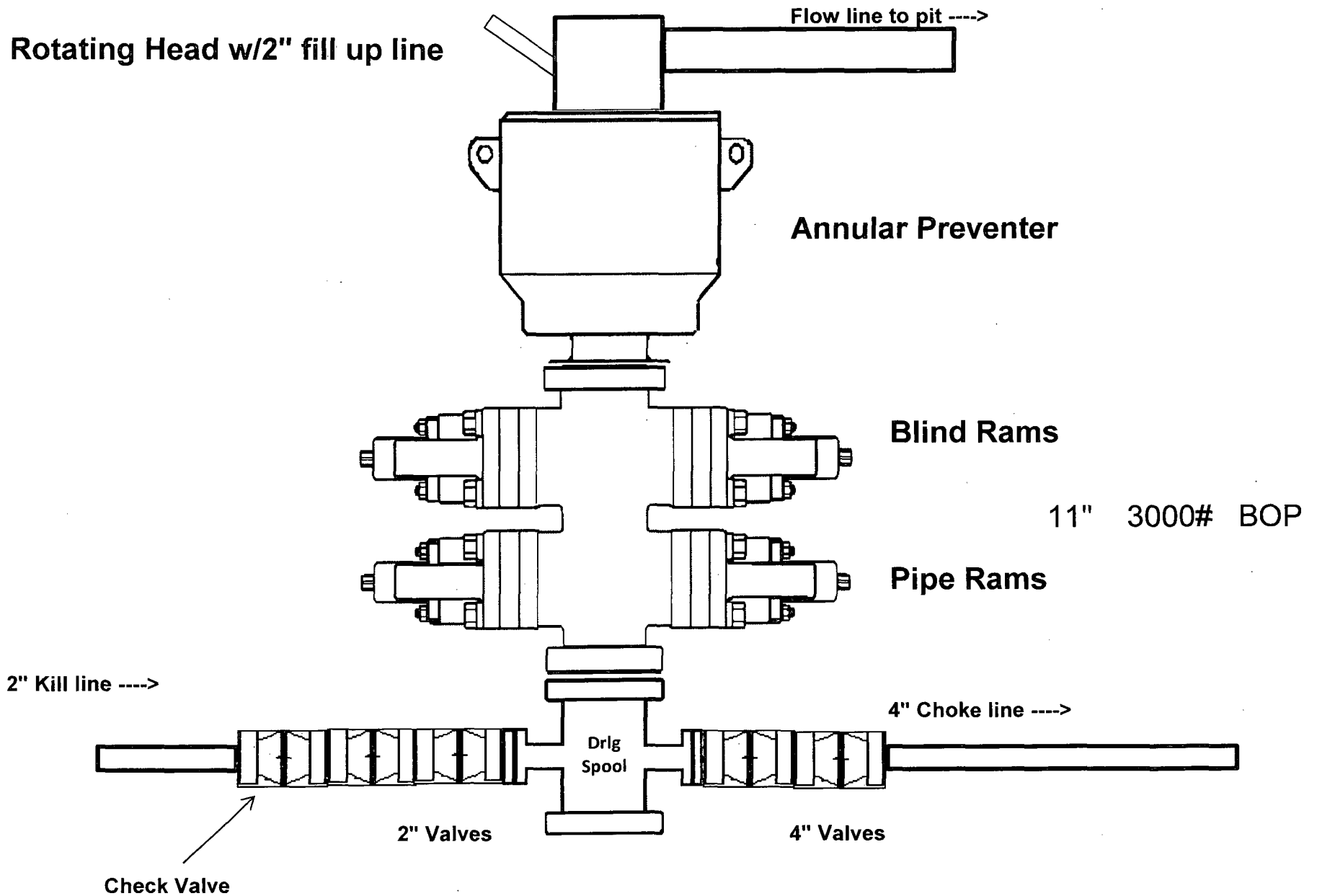
Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #1 (#2H/OH)
Created By: Matt Higgins Date: 14:10, April 12 2013

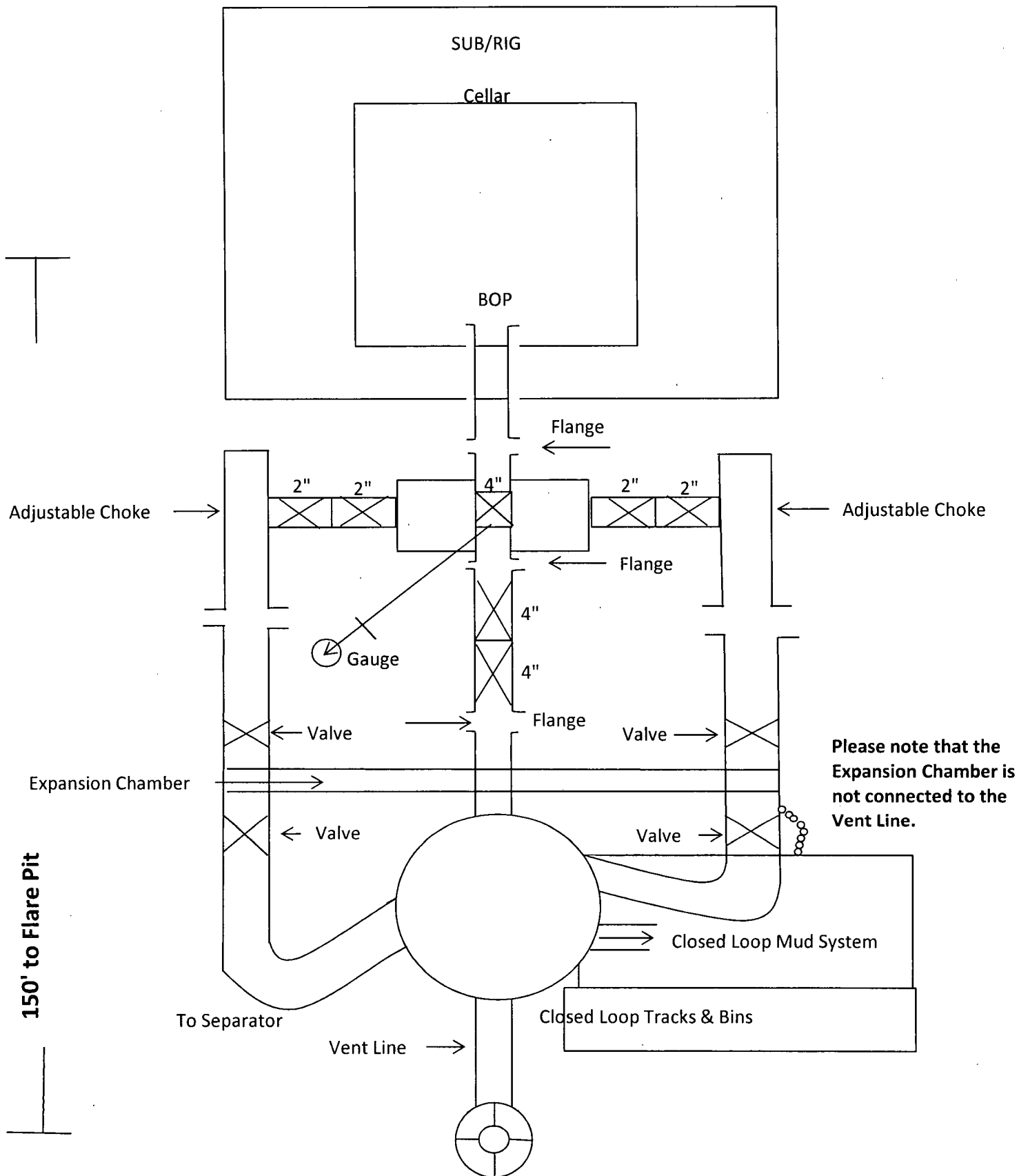
2,000 psi BOP Schematic



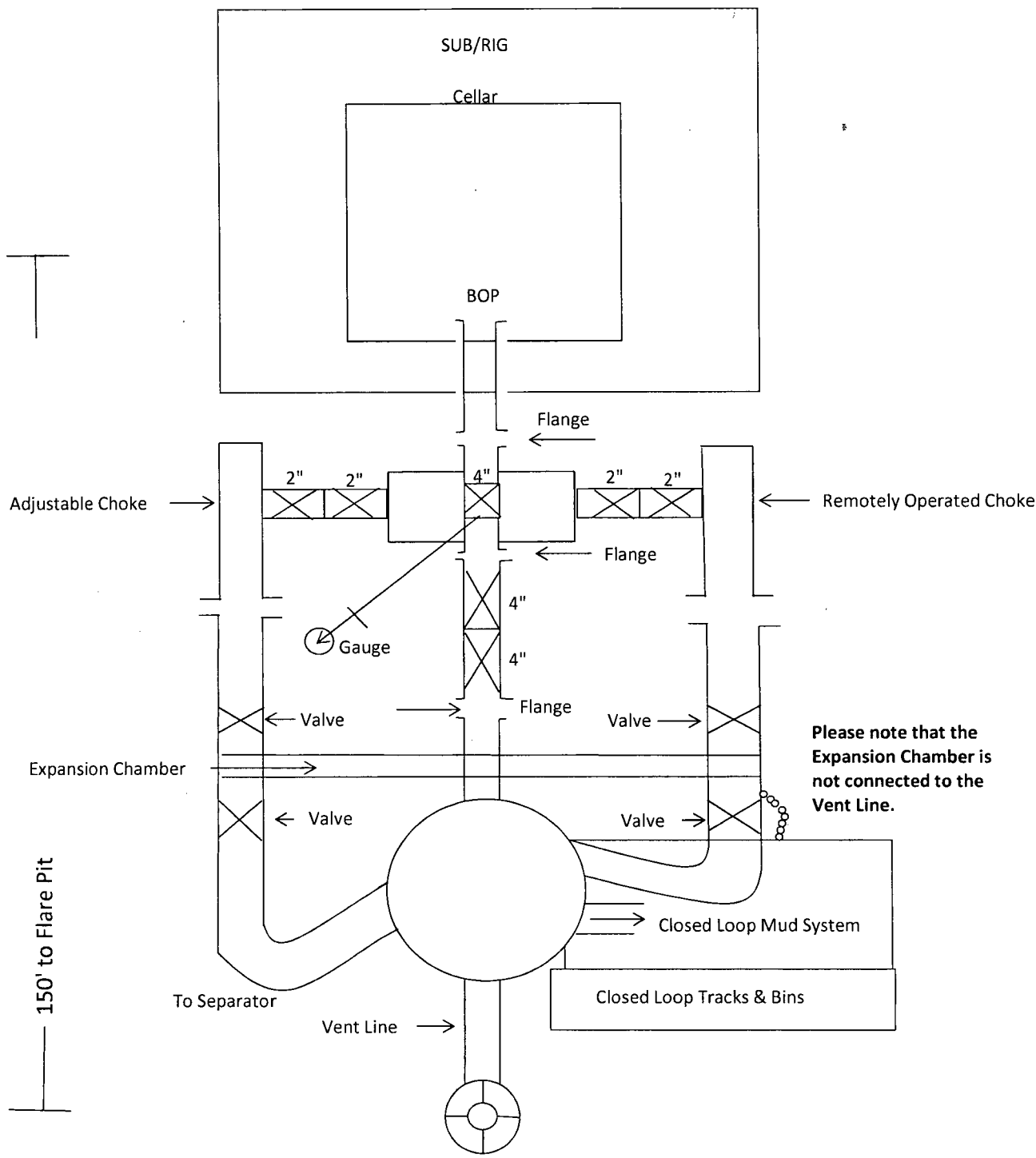
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment





COG Operating LLC
2208 West Main
Artesia, NM 88210

Exhibit 3

Production Facility Layout

Deckard Federal Com #2H
Section 13 - T24S - R33E

