

OCD-ARTESIA

842
ATS-11-482

FORM APPROVED
OMB No. 1004-013
Expires July 31, 2010

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. NMNM100342	
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. Airbus 12 Federal #2H	
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-015-3503	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 330' FNL & 330' FWL Unit Letter D NWNW SHL At proposed prod. Zone 330' FSL & 380' FWL Unit Letter M (SWSW) BHL		10. Field and Pool, or Exploratory Green Wood; Bone Spring	
14. Distance in miles and direction from nearest town or post office* About 10 miles from Loco Hills		11. Sec., T.R.M. or Blk and Survey or Area Sec. 12 - T19S - R31E	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'		12. County or Parish Eddy County	
16. No. of acres in lease 320		13. State NM	
17. Spacing Unit dedicated to this well 160			
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. 330'		20. BLM/BIA Bond No. on file NMB000740 / 12 NMB000215	
19. Proposed Depth TVD. 9070' MD: 13469'		21. Estimated duration 30 days	
22. Approximate date work will start* 10/10/2011			
23. Elevations (Show whether DF, KDB, RT, GL, etc.) 3615'			

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 7/19/2011
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Regulatory Analyst		
Approved by (Signature) <i>/s/ Don Peterson</i>	Name (Printed/Typed) <i>/s/ Don Peterson</i>	Date OCT 04 2011
Title <i>for</i> 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)

CAPTAN CONTROLLED WATER BASIN

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO
GENERAL REQUIREMENTS
AND SPECIAL STIPULATIONS
ATTACHED

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM

Airbus 12 Federal #2H
SHL: 330' FNL & 330' FWL
BHL: 330' FSL & 380' FWL
Section 12 T19S R31E
Eddy 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	~130'	
Rustler	728'	
Top of Salt	810'	
Base of Salt	2350'	
Yates	2742'	Oil
Seven Rivers	2915'	
Queen	3437'	
San Andreas	4290'	
Delaware	5094'	Oil
Bone Spring	6747'	
1 st BSS	8086'	Oil
2 nd BSS	8767'	Oil
TD MD	13,469'	
TVD	9070'	

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 775' and circulating cement back to surface. All intervals will be isolated by setting 5 1/2" casing to total depth and tying back cement 500' into 9-5/8" csg.

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

Hole Size	Interval	Section	OD Casing	New or Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
	<i>See COA</i>									
17 1/2"	0' - 775' 825'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 3500'	Intrmd	9 5/8"	New	36#	BTC	J-55	1.125	1.125	1.6
12 1/4"	3500' - 4500' ✓	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 13469'	Producion	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.

4. Proposed Cement Program

- a. 13-3/8" Surface
- Lead: 300 sx Class C + 2% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx)
- Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/50% excess on OH volumes
- b. 9 5/8" Intermediate
- Lead: 950 sx 35:65:6 C + Gilsonite + Salt
(12.7 ppg / 1.89 cuft/sx)
- Tail: 250 sx Class C + 1% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/35% excess on OH volumes
- d. 5 1/2" Production
- Lead: 400 sx 36:65:6 H + Gilsonite + Salt + HR00 + CFR3
(12.7 ppg / 1.89 cuft/sx)
- Tail: 1150 sx 50:50:2 H + Salt + CFR3 + HR601 + HALAD344
(14.4 ppg / 1.25 cuft/sx)
- **Calculated w/35% excess on OH volumes
- See COA*

- The above cement volumes could be revised pending the caliper measurement from the open hole logs.
- The 9-5/8" intermediate string TOC is designed to circulate cement to surface.
- The production string TOC is designed to reach 500' inside 9-5/8" csg shoe or 100' above 9-5/8" ECP/DVT if it is ran.

5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8 with 2M system (Hydril) tested to 2000# by independent tester,
Nipple up on 9 5/8 with 3M system tested to 3000# 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 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 3000 psi WP rating.

6. Estimated BHP: Lateral TD = 3935 psi

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

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' - 775' 825'	Fresh Water	8.4	29	N.C.
775' - 5000'	Brine	10	29	N.C.
4500 5000' - 13,469'	Cut Brine	9.0-9.4	29	N.C.

The necessary mud products for weight addition and fluid loss control will be on location at all times.

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.

9. Testing, Logging and Coring Program: *See CDA*

- a. Drill stem tests will be based on geological sample shows.
- b. The open hole electrical logging 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:

- 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. No lost circulation is expected to occur. 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:

- a. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be 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

Eddy County(NAD27)

Airbus 12 Federal

#2H

OH

Plan: Design #1

Pathfinder X & Y Planning Report

07 April, 2011



A Schlumberger Company



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.00usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.00usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDM 5000.1 Single User Db

Project:	Eddy County(NAD27)		
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	Airbus 12 Federal				
Site Position:		Northing:	611,922.900 usft	Latitude:	32° 40' 52.556 N
From:	Map	Easting:	654,895.100 usft	Longitude:	103° 49' 47.669 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.27 °

Well	#2H					
Well Position	+N/-S	0.00 usft	Northing:	611,922.900 usft	Latitude:	32° 40' 52.556 N
	+E/-W	0.00 usft	Easting:	654,895.100 usft	Longitude:	103° 49' 47.669 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,615.00 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	04/07/11	(°)	(°)	(nT)
			7.76	60.57	48,881

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	178.94

Survey Tool Program	Date	04/07/11		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
0.00	13,469.21	Design #1 (OH)	MWD	MWD - Standard



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

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Wellbore: OH
Design: Design #1

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MD Reference: RKB-17' @ 3632.00usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	3,632.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
100.00	0.00	0.00	100.00	3,532.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
200.00	0.00	0.00	200.00	3,432.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
300.00	0.00	0.00	300.00	3,332.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
400.00	0.00	0.00	400.00	3,232.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
500.00	0.00	0.00	500.00	3,132.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
600.00	0.00	0.00	600.00	3,032.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
700.00	0.00	0.00	700.00	2,932.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
800.00	0.00	0.00	800.00	2,832.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
900.00	0.00	0.00	900.00	2,732.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,000.00	0.00	0.00	1,000.00	2,632.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,100.00	0.00	0.00	1,100.00	2,532.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,200.00	0.00	0.00	1,200.00	2,432.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,300.00	0.00	0.00	1,300.00	2,332.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,400.00	0.00	0.00	1,400.00	2,232.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,500.00	0.00	0.00	1,500.00	2,132.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,600.00	0.00	0.00	1,600.00	2,032.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,700.00	0.00	0.00	1,700.00	1,932.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,800.00	0.00	0.00	1,800.00	1,832.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
1,900.00	0.00	0.00	1,900.00	1,732.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,000.00	0.00	0.00	2,000.00	1,632.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,100.00	0.00	0.00	2,100.00	1,532.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,200.00	0.00	0.00	2,200.00	1,432.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,300.00	0.00	0.00	2,300.00	1,332.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,400.00	0.00	0.00	2,400.00	1,232.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,500.00	0.00	0.00	2,500.00	1,132.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,600.00	0.00	0.00	2,600.00	1,032.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10



Pathfinder
Pathfinder X & Y Planning Report

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A Schlumberger Company

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Site: Airbus 12 Federal
Well: #2H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #2H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
2,700.00	0.00	0.00	2,700.00	932.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,800.00	0.00	0.00	2,800.00	832.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
2,900.00	0.00	0.00	2,900.00	732.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,000.00	0.00	0.00	3,000.00	632.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,100.00	0.00	0.00	3,100.00	532.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,200.00	0.00	0.00	3,200.00	432.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,300.00	0.00	0.00	3,300.00	332.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,400.00	0.00	0.00	3,400.00	232.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,500.00	0.00	0.00	3,500.00	132.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,600.00	0.00	0.00	3,600.00	32.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,700.00	0.00	0.00	3,700.00	-68.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,800.00	0.00	0.00	3,800.00	-168.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
3,900.00	0.00	0.00	3,900.00	-268.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,000.00	0.00	0.00	4,000.00	-368.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,100.00	0.00	0.00	4,100.00	-468.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,200.00	0.00	0.00	4,200.00	-568.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,300.00	0.00	0.00	4,300.00	-668.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,400.00	0.00	0.00	4,400.00	-768.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,500.00	0.00	0.00	4,500.00	-868.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,600.00	0.00	0.00	4,600.00	-968.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,700.00	0.00	0.00	4,700.00	-1,068.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,800.00	0.00	0.00	4,800.00	-1,168.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
4,900.00	0.00	0.00	4,900.00	-1,268.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,000.00	0.00	0.00	5,000.00	-1,368.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,100.00	0.00	0.00	5,100.00	-1,468.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,200.00	0.00	0.00	5,200.00	-1,568.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,300.00	0.00	0.00	5,300.00	-1,668.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10



Pathfinder
Pathfinder X & Y Planning Report



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Project: Eddy County(NAD27)
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Wellbore: OH
Design: Design #1

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5,400.00	0.00	0.00	5,400.00	-1,768.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,500.00	0.00	0.00	5,500.00	-1,868.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,600.00	0.00	0.00	5,600.00	-1,968.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,700.00	0.00	0.00	5,700.00	-2,068.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,800.00	0.00	0.00	5,800.00	-2,168.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
5,900.00	0.00	0.00	5,900.00	-2,268.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,000.00	0.00	0.00	6,000.00	-2,368.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,100.00	0.00	0.00	6,100.00	-2,468.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,200.00	0.00	0.00	6,200.00	-2,568.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,300.00	0.00	0.00	6,300.00	-2,668.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,400.00	0.00	0.00	6,400.00	-2,768.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,500.00	0.00	0.00	6,500.00	-2,868.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,600.00	0.00	0.00	6,600.00	-2,968.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,700.00	0.00	0.00	6,700.00	-3,068.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,800.00	0.00	0.00	6,800.00	-3,168.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
6,900.00	0.00	0.00	6,900.00	-3,268.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,000.00	0.00	0.00	7,000.00	-3,368.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,100.00	0.00	0.00	7,100.00	-3,468.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,200.00	0.00	0.00	7,200.00	-3,568.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,300.00	0.00	0.00	7,300.00	-3,668.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,400.00	0.00	0.00	7,400.00	-3,768.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,500.00	0.00	0.00	7,500.00	-3,868.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,600.00	0.00	0.00	7,600.00	-3,968.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,700.00	0.00	0.00	7,700.00	-4,068.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,800.00	0.00	0.00	7,800.00	-4,168.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
7,900.00	0.00	0.00	7,900.00	-4,268.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,000.00	0.00	0.00	8,000.00	-4,368.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Airbus 12 Federal
Well: #2H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #2H
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MD Reference: RKB-17' @ 3632.00usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
8,100.00	0.00	0.00	8,100.00	-4,468.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,200.00	0.00	0.00	8,200.00	-4,568.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,300.00	0.00	0.00	8,300.00	-4,668.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,400.00	0.00	0.00	8,400.00	-4,768.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,500.00	0.00	0.00	8,500.00	-4,868.00	0.00	0.00	0.00	0.00	611,922.90	654,895.10
8,567.50	0.00	0.00	8,567.50	-4,935.50	0.00	0.00	0.00	0.00	611,922.90	654,895.10
KOP-8567.50°MD,0.00°INC,0.00°AZI,8567.50°TVD										
8,575.00	0.90	178.94	8,575.00	-4,943.00	-0.06	0.00	0.06	12.00	611,922.84	654,895.10
8,600.00	3.90	178.94	8,599.97	-4,967.97	-1.11	0.02	1.11	12.00	611,921.79	654,895.12
8,625.00	6.90	178.94	8,624.86	-4,992.86	-3.46	0.06	3.46	12.00	611,919.44	654,895.16
8,650.00	9.90	178.94	8,649.59	-5,017.59	-7.11	0.13	7.11	12.00	611,915.79	654,895.23
8,675.00	12.90	178.94	8,674.09	-5,042.09	-12.05	0.22	12.05	12.00	611,910.85	654,895.32
8,700.00	15.90	178.94	8,698.31	-5,066.31	-18.26	0.34	18.27	12.00	611,904.64	654,895.44
8,725.00	18.90	178.94	8,722.16	-5,090.16	-25.74	0.48	25.74	12.00	611,897.16	654,895.58
8,750.00	21.90	178.94	8,745.59	-5,113.59	-34.45	0.64	34.45	12.00	611,888.45	654,895.74
8,775.00	24.90	178.94	8,768.53	-5,136.53	-44.37	0.82	44.38	12.00	611,878.53	654,895.92
8,800.00	27.90	178.94	8,790.92	-5,158.92	-55.48	1.03	55.49	12.00	611,867.42	654,896.13
8,825.00	30.90	178.94	8,812.70	-5,180.70	-67.75	1.25	67.76	12.00	611,855.15	654,896.35
8,850.00	33.90	178.94	8,833.81	-5,201.81	-81.14	1.50	81.16	12.00	611,841.76	654,896.60
8,875.00	36.90	178.94	8,854.18	-5,222.18	-95.62	1.77	95.64	12.00	611,827.28	654,896.87
8,900.00	39.90	178.94	8,873.77	-5,241.77	-111.14	2.06	111.16	12.00	611,811.76	654,897.16
8,925.00	42.90	178.94	8,892.53	-5,260.53	-127.67	2.36	127.69	12.00	611,795.23	654,897.46
8,950.00	45.90	178.94	8,910.39	-5,278.39	-145.15	2.69	145.18	12.00	611,777.75	654,897.79
8,975.00	48.90	178.94	8,927.31	-5,295.31	-163.55	3.03	163.58	12.00	611,759.35	654,898.13
9,000.00	51.90	178.94	8,943.24	-5,311.24	-182.81	3.38	182.84	12.00	611,740.09	654,898.48
9,025.00	54.89	178.94	8,958.15	-5,326.15	-202.87	3.75	202.90	12.00	611,720.03	654,898.85
9,050.00	57.89	178.94	8,971.98	-5,339.98	-223.69	4.14	223.72	12.00	611,699.21	654,899.24



Pathfinder
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A Schlumberger Company

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Design: Design #1

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
9,075.00	60.89	178.94	8,984.71	-5,352.71	-245.20	4.54	245.24	12.00	611,677.70	654,899.64
9,100.00	63.89	178.94	8,996.29	-5,364.29	-267.34	4.95	267.39	12.00	611,655.56	654,900.05
9,125.00	66.89	178.94	9,006.70	-5,374.70	-290.07	5.37	290.12	12.00	611,632.83	654,900.47
9,150.00	69.89	178.94	9,015.91	-5,383.91	-313.30	5.80	313.36	12.00	611,609.60	654,900.90
9,175.00	72.89	178.94	9,023.88	-5,391.88	-336.99	6.24	337.05	12.00	611,585.91	654,901.34
9,200.00	75.89	178.94	9,030.61	-5,398.61	-361.06	6.68	361.12	12.00	611,561.84	654,901.78
9,225.00	78.89	178.94	9,036.06	-5,404.06	-385.45	7.13	385.52	12.00	611,537.45	654,902.23
9,250.00	81.89	178.94	9,040.24	-5,408.24	-410.09	7.59	410.16	12.00	611,512.81	654,902.69
9,275.00	84.89	178.94	9,043.11	-5,411.11	-434.92	8.05	435.00	12.00	611,487.98	654,903.15
9,300.00	87.89	178.94	9,044.69	-5,412.69	-459.86	8.51	459.94	12.00	611,463.04	654,903.61
9,314.65	89.65	178.94	9,045.00	-5,413.00	-474.51	8.78	474.59	12.00	611,448.39	654,903.88
EOC-9314.65°MD,89.65°INC,178.94°AZI,9045.00°TVD										
9,400.00	89.65	178.94	9,045.52	-5,413.52	-559.84	10.36	559.94	0.00	611,363.06	654,905.46
9,500.00	89.65	178.94	9,046.13	-5,414.13	-659.82	12.21	659.94	0.00	611,263.08	654,907.31
9,600.00	89.65	178.94	9,046.74	-5,414.74	-759.80	14.06	759.93	0.00	611,163.10	654,909.16
9,700.00	89.65	178.94	9,047.35	-5,415.35	-859.79	15.91	859.93	0.00	611,063.11	654,911.01
9,800.00	89.65	178.94	9,047.96	-5,415.96	-959.77	17.76	959.93	0.00	610,963.13	654,912.86
9,900.00	89.65	178.94	9,048.58	-5,416.58	-1,059.75	19.61	1,059.93	0.00	610,863.15	654,914.71
10,000.00	89.65	178.94	9,049.19	-5,417.19	-1,159.73	21.46	1,159.93	0.00	610,763.17	654,916.56
10,100.00	89.65	178.94	9,049.80	-5,417.80	-1,259.71	23.31	1,259.93	0.00	610,663.19	654,918.41
10,200.00	89.65	178.94	9,050.41	-5,418.41	-1,359.69	25.16	1,359.92	0.00	610,563.21	654,920.26
10,300.00	89.65	178.94	9,051.02	-5,419.02	-1,459.67	27.01	1,459.92	0.00	610,463.23	654,922.11
10,400.00	89.65	178.94	9,051.63	-5,419.63	-1,559.65	28.86	1,559.92	0.00	610,363.25	654,923.96
10,500.00	89.65	178.94	9,052.24	-5,420.24	-1,659.63	30.71	1,659.92	0.00	610,263.27	654,925.81
10,600.00	89.65	178.94	9,052.85	-5,420.85	-1,759.61	32.56	1,759.92	0.00	610,163.29	654,927.66
10,700.00	89.65	178.94	9,053.46	-5,421.46	-1,859.60	34.41	1,859.91	0.00	610,063.30	654,929.51
10,800.00	89.65	178.94	9,054.07	-5,422.07	-1,959.58	36.26	1,959.91	0.00	609,963.32	654,931.36



Pathfinder
Pathfinder X & Y Planning Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Airbus 12 Federal
Well: #2H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well #2H
RKB-17' @ 3632.00usft (Original Well Elev)
RKB-17' @ 3632.00usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,900.00	89.65	178.94	9,054.68	-5,422.68	-2,059.56	38.11	2,059.91	0.00	609,863.34	654,933.21
11,000.00	89.65	178.94	9,055.30	-5,423.30	-2,159.54	39.96	2,159.91	0.00	609,763.36	654,935.06
11,100.00	89.65	178.94	9,055.91	-5,423.91	-2,259.52	41.81	2,259.91	0.00	609,663.38	654,936.91
11,200.00	89.65	178.94	9,056.52	-5,424.52	-2,359.50	43.66	2,359.90	0.00	609,563.40	654,938.76
11,300.00	89.65	178.94	9,057.13	-5,425.13	-2,459.48	45.51	2,459.90	0.00	609,463.42	654,940.61
11,400.00	89.65	178.94	9,057.74	-5,425.74	-2,559.46	47.36	2,559.90	0.00	609,363.44	654,942.46
11,500.00	89.65	178.94	9,058.35	-5,426.35	-2,659.44	49.21	2,659.90	0.00	609,263.46	654,944.31
11,600.00	89.65	178.94	9,058.96	-5,426.96	-2,759.42	51.06	2,759.90	0.00	609,163.48	654,946.16
11,700.00	89.65	178.94	9,059.57	-5,427.57	-2,859.41	52.91	2,859.90	0.00	609,063.49	654,948.01
11,800.00	89.65	178.94	9,060.18	-5,428.18	-2,959.39	54.76	2,959.89	0.00	608,963.51	654,949.86
11,900.00	89.65	178.94	9,060.79	-5,428.79	-3,059.37	56.61	3,059.89	0.00	608,863.53	654,951.71
12,000.00	89.65	178.94	9,061.40	-5,429.40	-3,159.35	58.46	3,159.89	0.00	608,763.55	654,953.56
12,100.00	89.65	178.94	9,062.01	-5,430.01	-3,259.33	60.31	3,259.89	0.00	608,663.57	654,955.41
12,200.00	89.65	178.94	9,062.63	-5,430.63	-3,359.31	62.16	3,359.89	0.00	608,563.59	654,957.26
12,300.00	89.65	178.94	9,063.24	-5,431.24	-3,459.29	64.01	3,459.88	0.00	608,463.61	654,959.11
12,400.00	89.65	178.94	9,063.85	-5,431.85	-3,559.27	65.86	3,559.88	0.00	608,363.63	654,960.96
12,500.00	89.65	178.94	9,064.46	-5,432.46	-3,659.25	67.71	3,659.88	0.00	608,263.65	654,962.81
12,600.00	89.65	178.94	9,065.07	-5,433.07	-3,759.23	69.56	3,759.88	0.00	608,163.67	654,964.66
12,700.00	89.65	178.94	9,065.68	-5,433.68	-3,859.22	71.41	3,859.88	0.00	608,063.68	654,966.51
12,800.00	89.65	178.94	9,066.29	-5,434.29	-3,959.20	73.26	3,959.87	0.00	607,963.70	654,968.36
12,900.00	89.65	178.94	9,066.90	-5,434.90	-4,059.18	75.11	4,059.87	0.00	607,863.72	654,970.21
13,000.00	89.65	178.94	9,067.51	-5,435.51	-4,159.16	76.96	4,159.87	0.00	607,763.74	654,972.06
13,100.00	89.65	178.94	9,068.12	-5,436.12	-4,259.14	78.81	4,259.87	0.00	607,663.76	654,973.91
13,200.00	89.65	178.94	9,068.73	-5,436.73	-4,359.12	80.66	4,359.87	0.00	607,563.78	654,975.76
13,300.00	89.65	178.94	9,069.34	-5,437.34	-4,459.10	82.50	4,459.87	0.00	607,463.80	654,977.60
13,400.00	89.65	178.94	9,069.96	-5,437.96	-4,559.08	84.35	4,559.86	0.00	607,363.82	654,979.45



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MD (usft)	Inc (°)	Azi (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
13,469.23	89.65	178.94	9,070.38	-5,438.38	-4,628.30	85.64	4,629.10	0.00	607,294.60	654,980.74
TD at 13469.23										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N-S (usft)	+E-W (usft)	
8,567.50	8,567.50	0.00	0.00	KOP-8567.50°MD,0.00°INC,0.00°AZI,8567.50°TVD
9,314.65	9,045.00	-474.51	8.78	EOC-9314.65°MD,89.65°INC,178.94°AZI,9045.00°TVD
13,469.23	9,070.38	-4,628.30	85.64	TD at 13469.23

Checked By: _____ Approved By: _____ Date: _____



Project: Eddy County(NAD27)
Site: Airbus 12 Federal
Well: #2H
Wellbore: OH
Plan: Design #1 (#2H/OH)



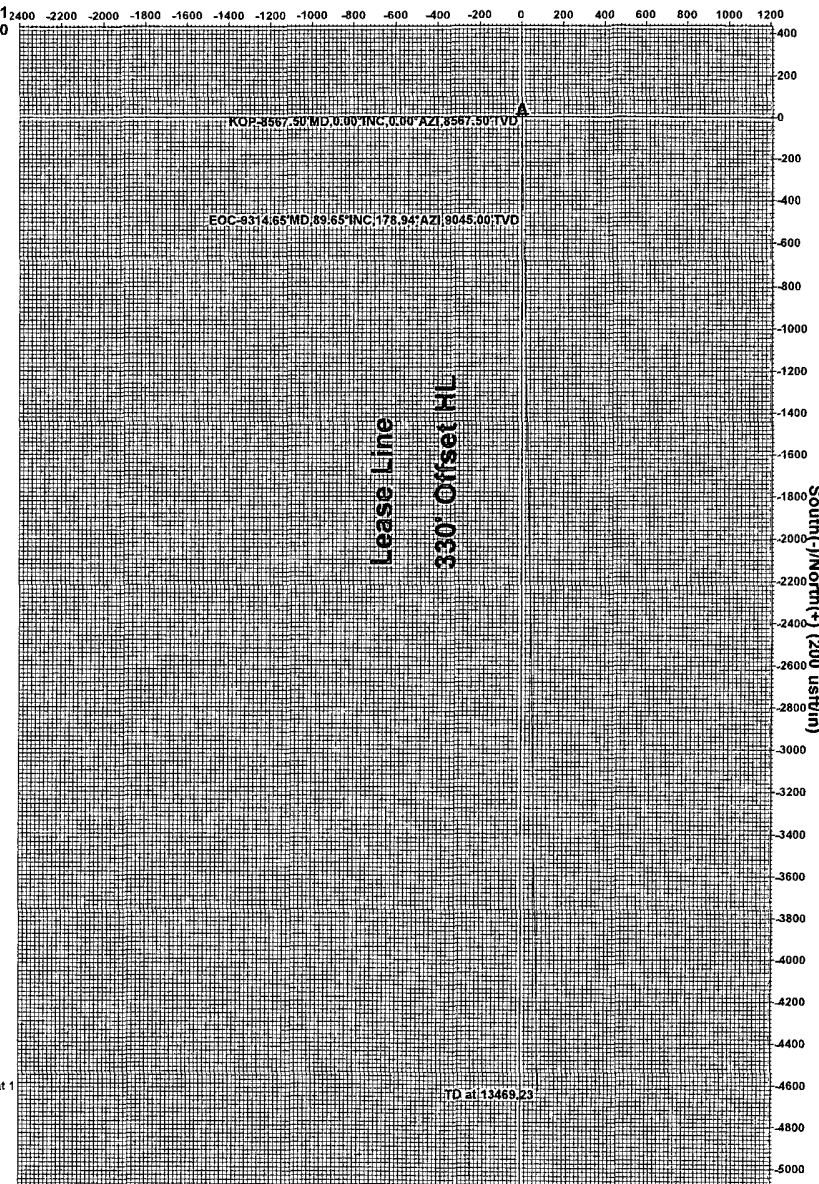
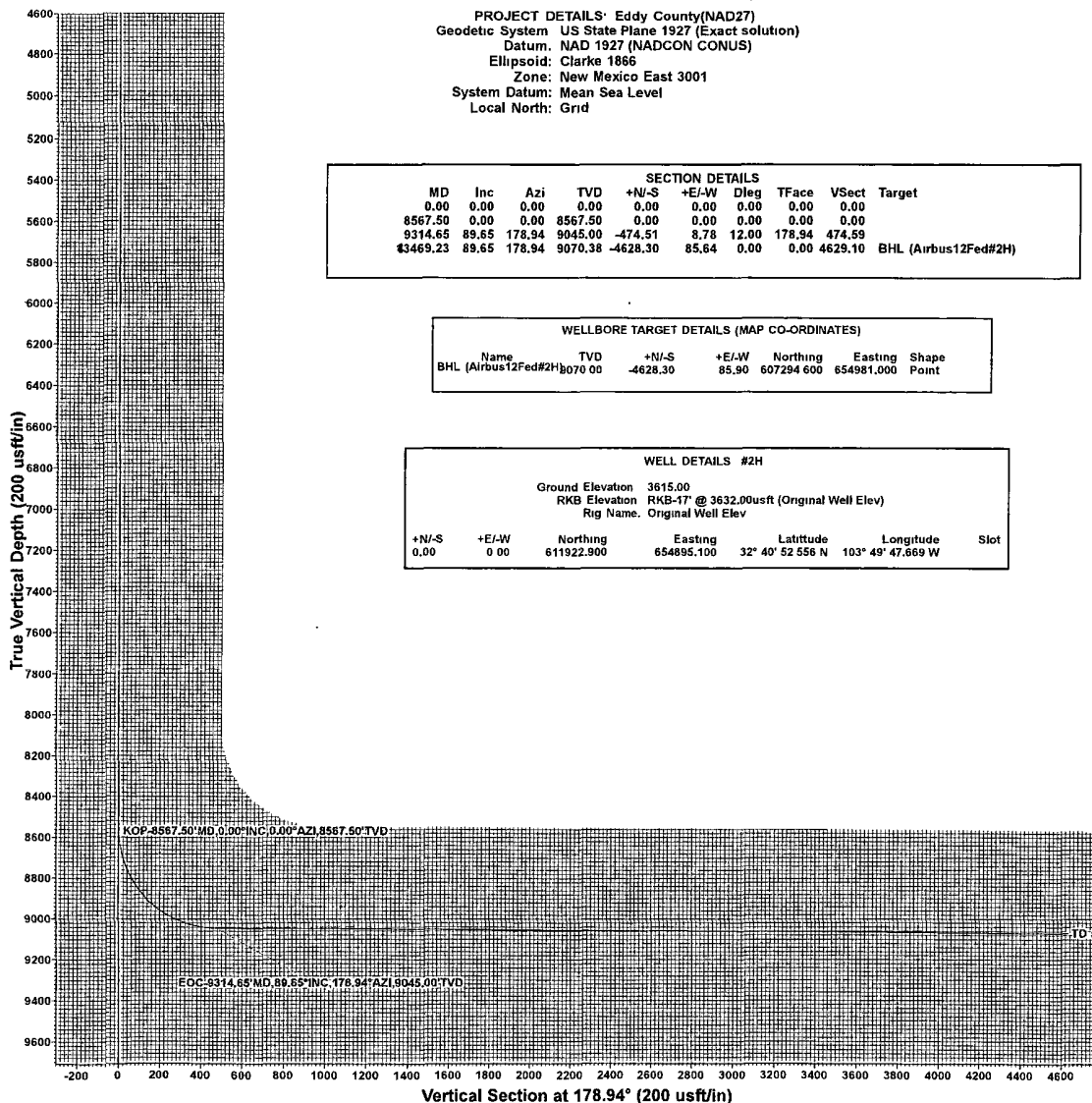
Azimuths to Grid North
True North: -0.27°
Magnetic North: 7.49°

Magnetic Field
Strength: 48881.2snT
Dip Angle: 60.57°
Date: 04/07/2011
Model: IGRF2010

PATHFINDER

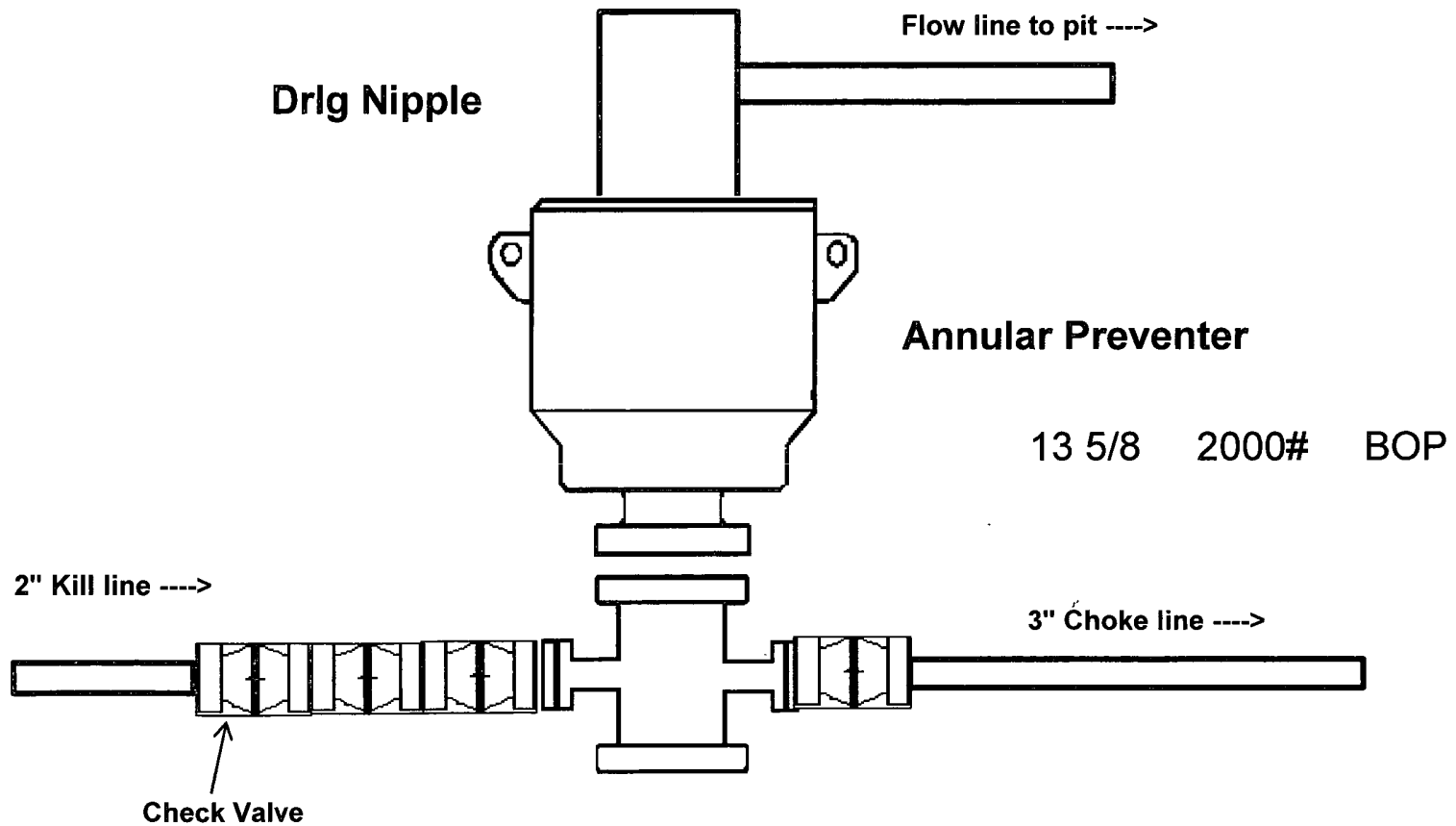
A Schlumberger Company

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

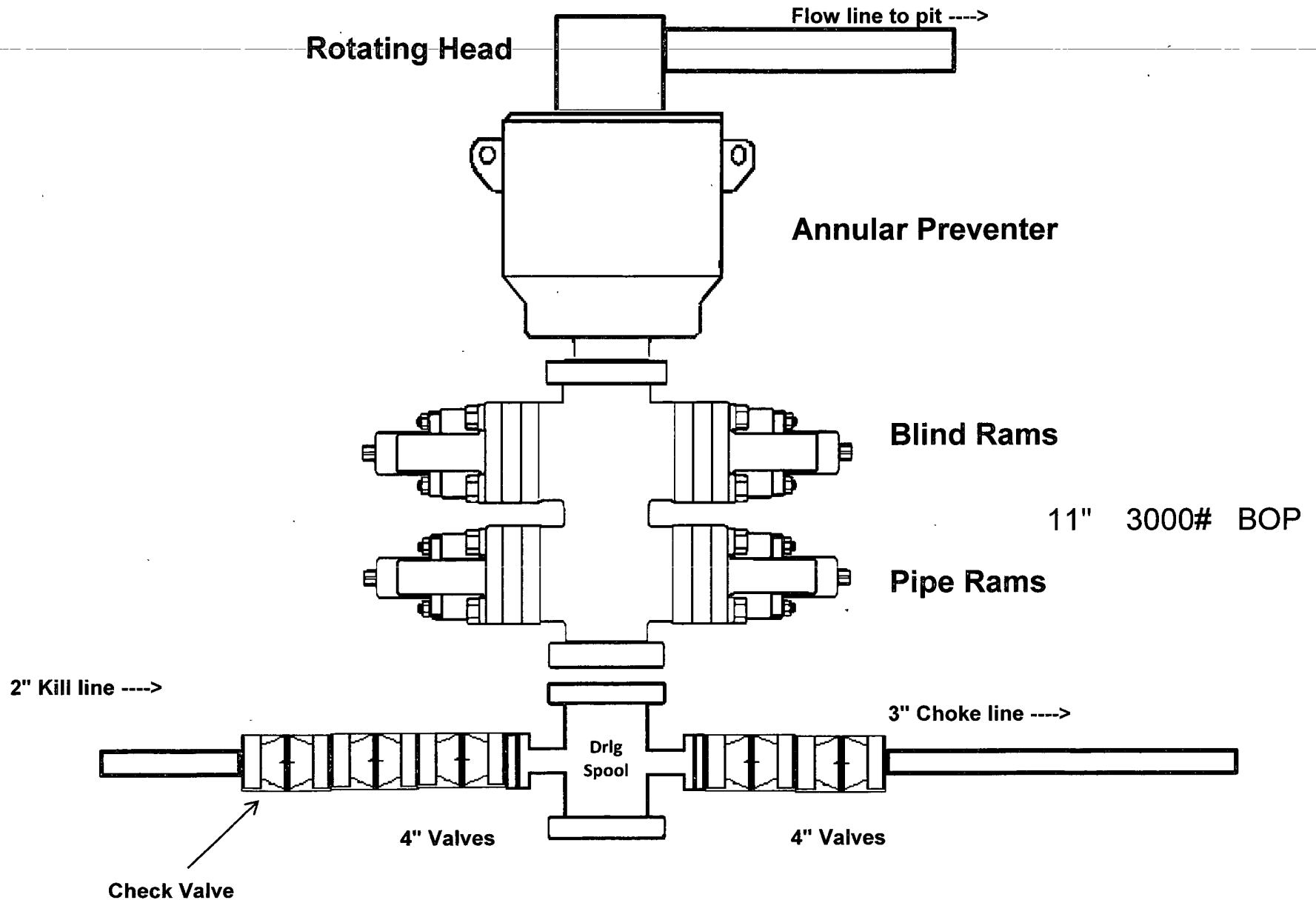


Plan Design #1 (#2H/OH)
Created By: Nate Bingham Date: 13 13, April 07 2011
Checked: _____ Date: _____

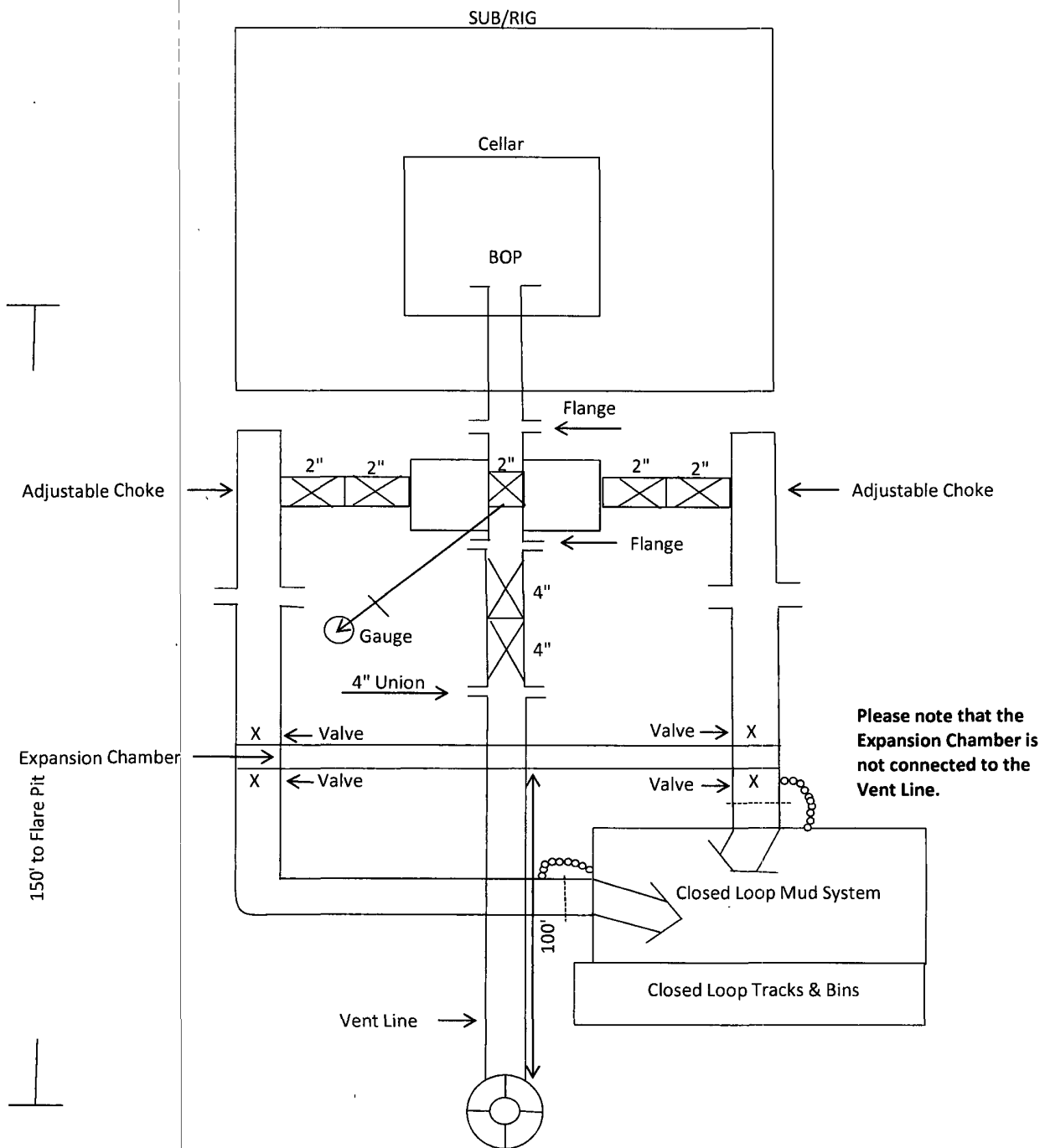
2,000 psi BOP Schematic



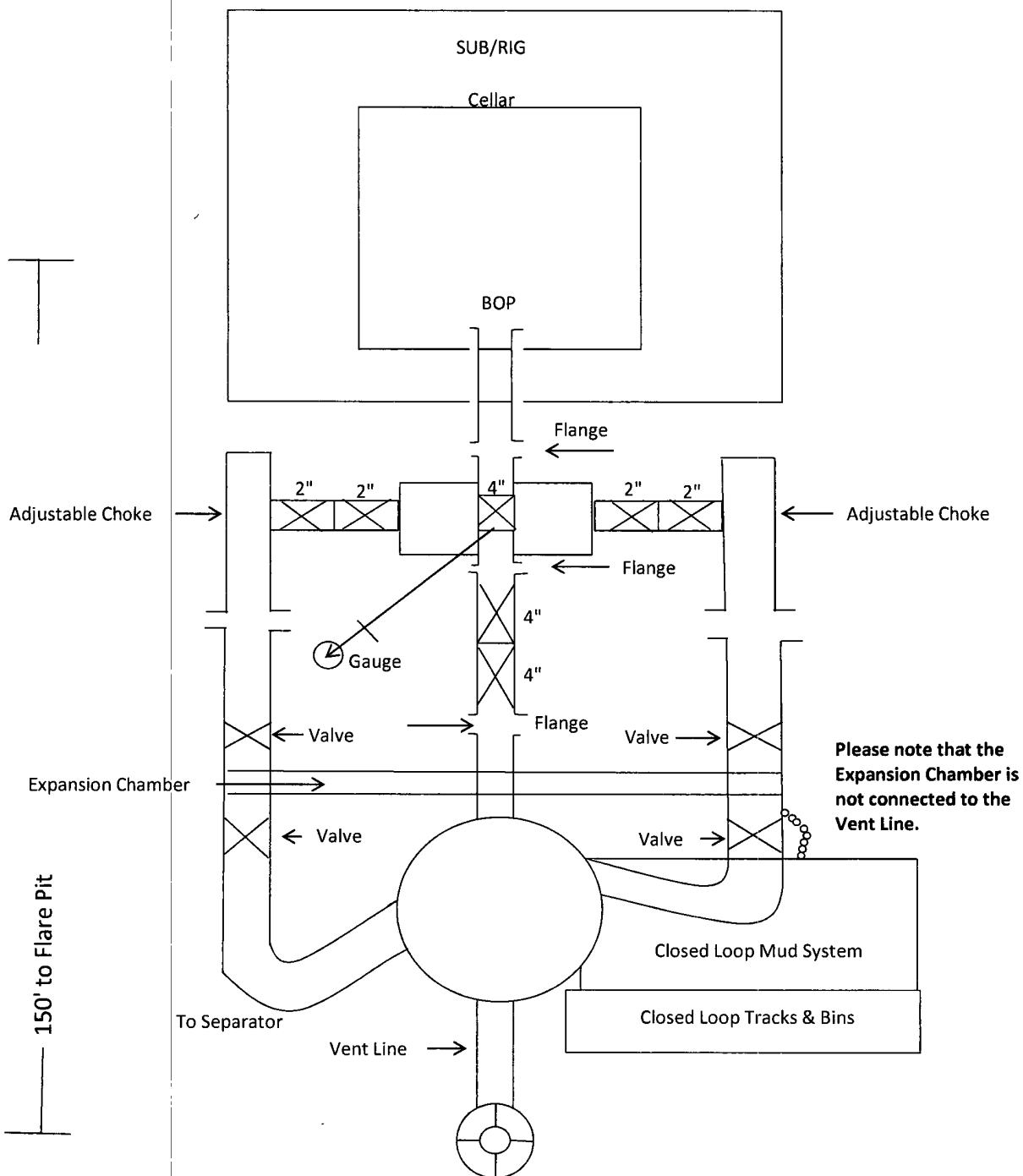
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



Airebus FEDERAL
(308241)

DISTRICT 1 --- CHECKLIST FOR INTENTS TO DRILL

Operator COG OGRID # 229137
Well Name & # Airebus 12 FEDERAL #2H Surface Type (F) (S) (P)
Location: UL D Sect 12 Township 19 s, RNG 31 e, Sub-surface Type (F) (S) (P)

- A. Date C101 rec'd 10/7/2011 C101 reviewed 10/7/2011
- B. 1. Check mark, Information is OK on Forms: ☒
OGRID ☒, BONDING ☒, PROP CODE ☒, WELL # 2H, SIGNATURE ☒
2. Inactive Well list as of: 10/7/2011 # wells 3624 # Inactive wells 10 ok
a. District Grant APD but see number of inactive wells:
No letter required ☐; Sent Letter to Operator ☐, to Santa Fe ☐
3. Additional Bonding as of: 10/7/2011
a. District Denial because operator needs addition bonding:
No Letter required ☒; Sent Letter to Operator ☐, To Santa Fe ☐
b. District Denial because of Inactive well list and Financial Assurance:
No Letter required ☒; Sent Letter to Operator ☐, To Santa Fe ☐
- C. C102 YES ☐, NO ☐, Signature _____
1. Pool GREENWOOD; Bone Spring, Code 29290
a. Dedicated acreage _____, What Units _____
b. SUR. Location Standard _____: Non-Standard Location _____
c. Well shares acres: Yes ☐, No ☐, # of wells _____ plus this well # _____
2. 2nd. Operator in same acreage, Yes ☐, No ☐
Agreement Letter ☐, Disagreement letter ☐
3. Intent to Directional Drill Yes ☒, No ☐
a. Dedicated acreage 160, What Units D-E-L-M
b. Bottomhole Location Standard _____, Non-Standard Bottomhole ☒
4. Downhole Commingle: Yes ☐, No ☒
a. Pool #2 _____, Code _____, Acres _____
Pool #3 _____, Code _____, Acres _____
Pool #4 _____, Code _____, Acres _____
5. POTASH Area Yes ☐, No ☒
- D. Blowout Preventer Yes ☒, No ☐
- E. H2S Yes ☒, No ☐
- F. C144 Pit Registration Yes ☐, No ☐
- G. Does APD require Santa Fe Approval:
1. Non-Standard Location: Yes ☐, No ☒, NSL # _____
2. Non-Standard Proration: Yes ☐, No ☒, NSP # _____
3. Simultaneous Dedication: Yes ☐, No ☒, SD # _____
Number of wells _____ Plus # _____
4. Injection order Yes ☐, No ☒; PMX # _____ or WFX # _____
5. SWD order Yes ☐, NO ☒; SWD # _____
6. DHC from SF _____; DHC-HOB _____; Holding _____
7. OCD Approval Date 10/17/2011 API #30-015- 39503
8. Reviewers _____