

OCD-HOBBS

HOBBS OCD

OCT 05 2011

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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. NMNM124664
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	3b. Phone No. (include area code) 575-748-6940	8. Lease Name and Well No. 68866 Gunner 8 Federal #8H
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 990' FSL & 330' FWL Unit Letter M (SWSW) Sec. 8 - T26S - R34E SHL At proposed prod. Zone 1980' FNL & 375' FWL Unit Letter E (SWNW) Sec. 5-T26S-R34E BHL		9. API Well No. 30-025-40309
14. Distance in miles and direction from nearest town or post office* About 17 miles from Jal		10. Field and Pool, or Exploratory 96403 Wildcat; Bone Spring
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'		11. Sec., T.R.M. or Blk and Survey or Area Sec. 8 - T26S - R34E
16. No. of acres in lease 1120		12. County or Parish Lea County
17. Spacing Unit dedicated to this well 320 280		13. State NM
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. 600'		20. BLM/BIA Bond No. on file NMB000215 NMB000740
19. Proposed Depth PHTD.12250 TVD. 9724 MD. 17112		21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3361
22. Approximate date work will start* 9/1/2011		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 4/13/2011
Title Regulatory Analyst		
Approved by (Signature) <i>/s/ Don Peterson</i>	Name (Printed/Typed) <i>/s/ Don Peterson</i>	Date OCT 05 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)

CARLSBAD CONTROLLED WATER BASIN
SEE ATTACHED FOR
CONDITIONS OF APPROVAL

K210/06/11

APPROVAL SUBJECT TO
GENERAL REQUIREMENTS
AND SPECIAL STIPULATIONS
ATTACHED

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: April 13, 2011

Lease #: NMNM124664
Gunner 8 Federal #8H

Legal Description: Sec. 8 – T26S – R34E
Lea County, New Mexico

Formation(s): Bone Springs

Bond Coverage: Statewide

BLM Bond File #: NMB000740 + *NMB000215*

BA

COG OPERATING LLC



Mayte Reyes
Regulatory Analyst

HOBBES OCD

OCT 05 2011

DISTRICT I
1825 N. FRANCHIS DR. HOBBES, NM 87240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-102
Revised October 12, 2005
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210

OIL CONSERVATION DIVISION 1990 SOUTH ST. FRANCIS DR. Santa Fe, New Mexico 87505

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410

DISTRICT IV
1000 S. ST. FRANCIS DR., SANTA FE, NM 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number 30-025-40309 92403		Pool Code 92403	Pool Name Wildcat; Bone Spring
Property Code 34865	Property Name GUNNER 8 FEDERAL		Well Number 8H
OGRID No. 229137	Operator Name COG OPERATING, LLC		Elevation 3361'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	8	26-S	34-E		990	SOUTH	330	WEST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
	5	26-S	34-E		1980	NORTH	375'	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
320			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=384112.9 N X=758519.1 E LAT.=32.053295° N LONG.=103.498916° W BOTTOM HOLE LOCATION Y=391705.0 N X=758500.3 E	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>[Signature]</i> 4-18-11 Signature Date Printed Name
	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. MARCH 18, 2011 Date Surveyed Signature of Surveyor Professional Surveyor NEW MEXICO 111067580 3/18/2011 Cert. No. GARY C. EIDSON 12641 RONALD E. EIDSON 3239	

**COG Operating LLC
DRILLING AND OPERATIONS PROGRAM**

**Gunner 8 Federal #8H
SHL: 990' FSL & 330' FWL of Section 8
BHL: 1980' FNL & 375' FWL of Section 5
T26S R34E
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	~ 150'	
Top of Salt	1256'	
Base of Salt	5147'	
Delaware	5319'	Oil
Bone Spring	9599'	
Avalon Shale	9604'	Oil/Gas
1 st BSS	10542'	
2 nd BSS	11224'	
3 rd BSS	12239'	
Pilot Hole TD	12,250'	
TD TVD	9724'	
TMD	17,112'	

*Rustler extending
per operator*

5/25/11

*Rustler @ 861'
per Seth Wild
8/2/11
LIE (Use CFO copy)*

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 1100' 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 200' inside 9-5/8" shoe.

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"	<i>see COA</i> 0' - 1100' 795	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#	STC	J-55	1.125	1.125	1.6
12 1/4"	3500' - 5250'	Intrmd	9 5/8"	New	40#	STC	J-55	1.125	1.125	1.6
8 3/4"	5250' - 12,250'	Pilot Hole								
7 7/8"	0' - 17,112'	Production Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6

4. Proposed Cement Program

- a. 13-3/8" Surface
- Lead: 450 sx Class C + Gilsonite + HR-800
(12.7 ppg / 1.88 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: 1000 sx Class C + Gilsonite + HR-800
(12.7 ppg / 1.88 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
- 1st Stage:
- Lead: 750 sx Class H + Acid soluble
(15.0 ppg / 2.6 cuft/sx)
- 2nd Stage:
- Lead: 700 sx Class H + Bentonite + HALAD-322
(12.7 ppg / 1.89 cuft/sx)
- Tail: 100 sx Class H
(15.6 ppg / 1.19 cuft/sx)
- DVT @ 8700' (approx depth)
- **Calculated w/35% excess on OH volumes

- 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 200' inside 9-5/8" csg shoe.
- After logging the PH, will plug back to kick off point by setting the following plugs:

PH TD Plug f/PH TD – 11,500'
275 sx Class H @ 15.6 ppg/1.18 ft³/sx + HR-800
Kick Off Plug f/9250' – 9750'
225 sx Class H @ 17.2 ppg /0.98 ft³/sx + CFR3 + HR-800

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 3" system tested to 2000# 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:

- PH TD = 5312 psi
- Lateral TD = 4215 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' – 1100'	Fresh Water	8.4	29	N.C.
1100' – 5250'	Brine	10	29	N.C.
5250' – 12250' (PH)	Cut Brine	8.9 – 9.2	29	N.C.
5250' – 17111' (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.

8. Auxiliary Well Control and Monitoring Equipment:

- A Kelly cock will be in the drill string at all times.
- A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
- 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 COA*

- Drill stem tests will be based on geological sample shows.
- The open hole electrical logging program will be:
 - Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
 - Total Depth to Surface: Compensated Neutron with Gamma Ray
 - No coring program is planned
 - 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:

- 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:

- 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

Lea County(NAD27)

Gunner 8 Federal

#8H

OH

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Plan: Design #1

Pathfinder X & Y Planning Report

12 April, 2011

PATHFINDER

A Schlumberger Company



Pathfinder
Pathfinder X & Y Planning Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.00usft (21' KB)
MD Reference: WELL @ 3382.00usft (21' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Lea 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	Gunner 8 Federal		
Site Position:		Northing:	384,112.900 usft
From	Map	Easting:	758,519.100 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 3' 11.862 N
		Longitude:	103° 29' 56.099 W
		Grid Convergence:	0.44 °

Well	#8H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 3' 11.862 N
		Longitude:	103° 29' 56.099 W
		Ground Level:	3,361.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF200510	04/12/11	(°)
			7.55
			Dip Angle
			(°)
			60.07
			Field Strength
			(nT)
			48,575

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			359.86

Survey Tool Program	Date	04/12/11		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
0.00	17,111.18	Design #1 (OH)	MWD	MWD - Standard



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
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MD Reference: WELL @ 3382.00usft (21' KB)
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	3,382.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
100.00	0.00	0.00	100.00	3,282.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
200.00	0.00	0.00	200.00	3,182.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
300.00	0.00	0.00	300.00	3,082.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
400.00	0.00	0.00	400.00	2,982.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
500.00	0.00	0.00	500.00	2,882.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
600.00	0.00	0.00	600.00	2,782.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
700.00	0.00	0.00	700.00	2,682.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
800.00	0.00	0.00	800.00	2,582.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
900.00	0.00	0.00	900.00	2,482.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,000.00	0.00	0.00	1,000.00	2,382.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,100.00	0.00	0.00	1,100.00	2,282.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,200.00	0.00	0.00	1,200.00	2,182.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,300.00	0.00	0.00	1,300.00	2,082.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,400.00	0.00	0.00	1,400.00	1,982.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,500.00	0.00	0.00	1,500.00	1,882.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,600.00	0.00	0.00	1,600.00	1,782.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,700.00	0.00	0.00	1,700.00	1,682.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,800.00	0.00	0.00	1,800.00	1,582.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
1,900.00	0.00	0.00	1,900.00	1,482.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,000.00	0.00	0.00	2,000.00	1,382.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,100.00	0.00	0.00	2,100.00	1,282.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,200.00	0.00	0.00	2,200.00	1,182.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,300.00	0.00	0.00	2,300.00	1,082.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,400.00	0.00	0.00	2,400.00	982.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,500.00	0.00	0.00	2,500.00	882.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
2,600.00	0.00	0.00	2,600.00	782.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

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2,700.00	0.00	0.00	2,700.00	682.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
2,800.00	0.00	0.00	2,800.00	582.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
2,900.00	0.00	0.00	2,900.00	482.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,000.00	0.00	0.00	3,000.00	382.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,100.00	0.00	0.00	3,100.00	282.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,200.00	0.00	0.00	3,200.00	182.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,300.00	0.00	0.00	3,300.00	82.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,400.00	0.00	0.00	3,400.00	-18.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,500.00	0.00	0.00	3,500.00	-118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,600.00	0.00	0.00	3,600.00	-218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,700.00	0.00	0.00	3,700.00	-318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,800.00	0.00	0.00	3,800.00	-418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
3,900.00	0.00	0.00	3,900.00	-518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,000.00	0.00	0.00	4,000.00	-618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,100.00	0.00	0.00	4,100.00	-718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,200.00	0.00	0.00	4,200.00	-818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,300.00	0.00	0.00	4,300.00	-918.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,400.00	0.00	0.00	4,400.00	-1,018.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,500.00	0.00	0.00	4,500.00	-1,118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,600.00	0.00	0.00	4,600.00	-1,218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,700.00	0.00	0.00	4,700.00	-1,318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,800.00	0.00	0.00	4,800.00	-1,418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
4,900.00	0.00	0.00	4,900.00	-1,518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
5,000.00	0.00	0.00	5,000.00	-1,618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
5,100.00	0.00	0.00	5,100.00	-1,718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
5,200.00	0.00	0.00	5,200.00	-1,818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	
5,300.00	0.00	0.00	5,300.00	-1,918.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10	



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.00usft (21' KB)
MD Reference: WELL @ 3382.00usft (21' KB)
North Reference: Gnd
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)
5,400.00	0.00	0.00	5,400.00	-2,018.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
5,500.00	0.00	0.00	5,500.00	-2,118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
5,600.00	0.00	0.00	5,600.00	-2,218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
5,700.00	0.00	0.00	5,700.00	-2,318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
5,800.00	0.00	0.00	5,800.00	-2,418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
5,900.00	0.00	0.00	5,900.00	-2,518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,000.00	0.00	0.00	6,000.00	-2,618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,100.00	0.00	0.00	6,100.00	-2,718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,200.00	0.00	0.00	6,200.00	-2,818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,300.00	0.00	0.00	6,300.00	-2,918.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,400.00	0.00	0.00	6,400.00	-3,018.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,500.00	0.00	0.00	6,500.00	-3,118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,600.00	0.00	0.00	6,600.00	-3,218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,700.00	0.00	0.00	6,700.00	-3,318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,800.00	0.00	0.00	6,800.00	-3,418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
6,900.00	0.00	0.00	6,900.00	-3,518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,000.00	0.00	0.00	7,000.00	-3,618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,100.00	0.00	0.00	7,100.00	-3,718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,200.00	0.00	0.00	7,200.00	-3,818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,300.00	0.00	0.00	7,300.00	-3,918.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,400.00	0.00	0.00	7,400.00	-4,018.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,500.00	0.00	0.00	7,500.00	-4,118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,600.00	0.00	0.00	7,600.00	-4,218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,700.00	0.00	0.00	7,700.00	-4,318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,800.00	0.00	0.00	7,800.00	-4,418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
7,900.00	0.00	0.00	7,900.00	-4,518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,000.00	0.00	0.00	8,000.00	-4,618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10



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A Schlumberger Company

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Wellbore: OH
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North Reference: Grd
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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	-4,718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,200.00	0.00	0.00	8,200.00	-4,818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,300.00	0.00	0.00	8,300.00	-4,918.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,400.00	0.00	0.00	8,400.00	-5,018.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,500.00	0.00	0.00	8,500.00	-5,118.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,600.00	0.00	0.00	8,600.00	-5,218.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,700.00	0.00	0.00	8,700.00	-5,318.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,800.00	0.00	0.00	8,800.00	-5,418.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
8,900.00	0.00	0.00	8,900.00	-5,518.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
9,000.00	0.00	0.00	9,000.00	-5,618.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
9,100.00	0.00	0.00	9,100.00	-5,718.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
9,200.00	0.00	0.00	9,200.00	-5,818.00	0.00	0.00	0.00	0.00	384,112.90	758,519.10
9,246.50	0.00	0.00	9,246.50	-5,864.50	0.00	0.00	0.00	0.00	384,112.90	758,519.10
9,250.00	0.42	359.86	9,250.00	-5,868.00	0.01	0.00	0.01	12.00	384,112.91	758,519.10
9,275.00	3.42	359.86	9,274.98	-5,892.98	0.85	0.00	0.85	12.00	384,113.75	758,519.10
9,300.00	6.42	359.86	9,299.89	-5,917.89	2.99	-0.01	2.99	12.00	384,115.89	758,519.09
9,325.00	9.42	359.86	9,324.65	-5,942.65	6.44	-0.02	6.44	12.00	384,119.34	758,519.08
9,350.00	12.42	359.86	9,349.19	-5,967.19	11.17	-0.03	11.17	12.00	384,124.07	758,519.07
9,375.00	15.42	359.86	9,373.45	-5,991.45	17.19	-0.04	17.19	12.00	384,130.09	758,519.06
9,400.00	18.42	359.86	9,397.37	-6,015.37	24.46	-0.06	24.46	12.00	384,137.36	758,519.04
9,425.00	21.42	359.86	9,420.87	-6,038.87	32.98	-0.08	32.98	12.00	384,145.88	758,519.02
9,450.00	24.42	359.86	9,443.90	-6,061.90	42.71	-0.10	42.71	12.00	384,155.61	758,519.00
9,475.00	27.42	359.86	9,466.38	-6,084.38	53.64	-0.13	53.64	12.00	384,166.54	758,518.97
9,500.00	30.42	359.86	9,488.26	-6,106.26	65.72	-0.16	65.72	12.00	384,178.62	758,518.94
9,525.00	33.42	359.86	9,509.48	-6,127.48	78.94	-0.19	78.94	12.00	384,191.84	758,518.91
9,550.00	36.42	359.86	9,529.97	-6,147.97	93.25	-0.23	93.25	12.00	384,206.15	758,518.87
9,575.00	39.42	359.86	9,549.69	-6,167.69	108.61	-0.27	108.61	12.00	384,221.51	758,518.83



Pathfinder
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PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.00usft (21' KB)
MD Reference: WELL @ 3382.00usft (21' KB)
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)
9,600.00	42.42	359.86	9,568.58	-6,186.58	124.98	-0.31	124.98	12.00	384,237.88	758,518.79
9,625.00	45.42	359.86	9,586.59	-6,204.59	142.32	-0.35	142.32	12.00	384,255.22	758,518.75
9,650.00	48.42	359.86	9,603.66	-6,221.66	160.58	-0.39	160.58	12.00	384,273.48	758,518.71
9,675.00	51.42	359.86	9,619.76	-6,237.76	179.70	-0.44	179.70	12.00	384,292.60	758,518.66
9,700.00	54.42	359.86	9,634.83	-6,252.83	199.64	-0.49	199.64	12.00	384,312.54	758,518.61
9,725.00	57.42	359.86	9,648.84	-6,266.84	220.35	-0.54	220.35	12.00	384,333.25	758,518.56
9,750.00	60.42	359.86	9,661.75	-6,279.75	241.75	-0.59	241.76	12.00	384,354.65	758,518.51
9,775.00	63.42	359.86	9,673.52	-6,291.52	263.81	-0.64	263.81	12.00	384,376.71	758,518.46
9,800.00	66.42	359.86	9,684.11	-6,302.11	286.45	-0.70	286.45	12.00	384,399.35	758,518.40
9,825.00	69.41	359.86	9,693.51	-6,311.51	309.61	-0.76	309.61	12.00	384,422.51	758,518.34
9,850.00	72.41	359.86	9,701.69	-6,319.69	333.23	-0.81	333.23	12.00	384,446.13	758,518.29
9,875.00	75.41	359.86	9,708.61	-6,326.61	357.25	-0.87	357.25	12.00	384,470.15	758,518.23
9,900.00	78.41	359.86	9,714.27	-6,332.27	381.60	-0.93	381.60	12.00	384,494.50	758,518.17
9,925.00	81.41	359.86	9,718.65	-6,336.65	406.21	-0.99	406.21	12.00	384,519.11	758,518.11
9,950.00	84.41	359.86	9,721.73	-6,339.73	431.02	-1.05	431.02	12.00	384,543.92	758,518.05
9,975.00	87.41	359.86	9,723.51	-6,341.51	455.95	-1.11	455.95	12.00	384,568.85	758,517.99
9,996.56	90.00	359.86	9,724.00	-6,342.00	477.50	-1.17	477.50	12.00	384,590.40	758,517.93
10,000.00	90.00	359.86	9,724.00	-6,342.00	480.94	-1.18	480.94	0.00	384,593.84	758,517.92
10,100.00	90.00	359.86	9,724.00	-6,342.00	580.94	-1.42	580.94	0.00	384,693.84	758,517.68
10,200.00	90.00	359.86	9,724.00	-6,342.00	680.94	-1.66	680.94	0.00	384,793.84	758,517.44
10,300.00	90.00	359.86	9,724.00	-6,342.00	780.94	-1.91	780.94	0.00	384,893.84	758,517.19
10,400.00	90.00	359.86	9,724.00	-6,342.00	880.94	-2.15	880.94	0.00	384,993.84	758,516.95
10,500.00	90.00	359.86	9,724.00	-6,342.00	980.94	-2.40	980.94	0.00	385,093.84	758,516.70
10,600.00	90.00	359.86	9,724.00	-6,342.00	1,080.94	-2.64	1,080.94	0.00	385,193.84	758,516.46
10,700.00	90.00	359.86	9,724.00	-6,342.00	1,180.94	-2.89	1,180.94	0.00	385,293.84	758,516.21
10,800.00	90.00	359.86	9,724.00	-6,342.00	1,280.94	-3.13	1,280.94	0.00	385,393.84	758,515.97
10,900.00	90.00	359.86	9,724.00	-6,342.00	1,380.94	-3.37	1,380.94	0.00	385,493.84	758,515.73



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
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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)
11,000.00	90.00	359.86	9,724.00	-6,342.00	1,480.94	-3.62	1,480.94	0.00	385,593.84	758,515.48
11,100.00	90.00	359.86	9,724.00	-6,342.00	1,580.94	-3.86	1,580.94	0.00	385,693.84	758,515.24
11,200.00	90.00	359.86	9,724.00	-6,342.00	1,680.94	-4.11	1,680.94	0.00	385,793.84	758,514.99
11,300.00	90.00	359.86	9,724.00	-6,342.00	1,780.94	-4.35	1,780.94	0.00	385,893.84	758,514.75
11,400.00	90.00	359.86	9,724.00	-6,342.00	1,880.94	-4.60	1,880.94	0.00	385,993.84	758,514.50
11,500.00	90.00	359.86	9,724.00	-6,342.00	1,980.94	-4.84	1,980.94	0.00	386,093.84	758,514.26
11,600.00	90.00	359.86	9,724.00	-6,342.00	2,080.94	-5.08	2,080.94	0.00	386,193.84	758,514.02
11,700.00	90.00	359.86	9,724.00	-6,342.00	2,180.94	-5.33	2,180.94	0.00	386,293.84	758,513.77
11,800.00	90.00	359.86	9,724.00	-6,342.00	2,280.94	-5.57	2,280.94	0.00	386,393.84	758,513.53
11,900.00	90.00	359.86	9,724.00	-6,342.00	2,380.94	-5.82	2,380.94	0.00	386,493.84	758,513.28
12,000.00	90.00	359.86	9,724.00	-6,342.00	2,480.94	-6.06	2,480.94	0.00	386,593.84	758,513.04
12,100.00	90.00	359.86	9,724.00	-6,342.00	2,580.94	-6.31	2,580.94	0.00	386,693.84	758,512.79
12,200.00	90.00	359.86	9,724.00	-6,342.00	2,680.94	-6.55	2,680.94	0.00	386,793.84	758,512.55
12,300.00	90.00	359.86	9,724.00	-6,342.00	2,780.94	-6.80	2,780.94	0.00	386,893.84	758,512.30
12,400.00	90.00	359.86	9,724.00	-6,342.00	2,880.94	-7.04	2,880.94	0.00	386,993.84	758,512.06
12,500.00	90.00	359.86	9,724.00	-6,342.00	2,980.94	-7.28	2,980.94	0.00	387,093.84	758,511.82
12,600.00	90.00	359.86	9,724.00	-6,342.00	3,080.94	-7.53	3,080.94	0.00	387,193.84	758,511.57
12,700.00	90.00	359.86	9,724.00	-6,342.00	3,180.94	-7.77	3,180.94	0.00	387,293.84	758,511.33
12,800.00	90.00	359.86	9,724.00	-6,342.00	3,280.93	-8.02	3,280.94	0.00	387,393.83	758,511.08
12,900.00	90.00	359.86	9,724.00	-6,342.00	3,380.93	-8.26	3,380.94	0.00	387,493.83	758,510.84
13,000.00	90.00	359.86	9,724.00	-6,342.00	3,480.93	-8.51	3,480.94	0.00	387,593.83	758,510.59
13,100.00	90.00	359.86	9,724.00	-6,342.00	3,580.93	-8.75	3,580.94	0.00	387,693.83	758,510.35
13,200.00	90.00	359.86	9,724.00	-6,342.00	3,680.93	-8.99	3,680.94	0.00	387,793.83	758,510.11
13,300.00	90.00	359.86	9,724.00	-6,342.00	3,780.93	-9.24	3,780.94	0.00	387,893.83	758,509.86
13,400.00	90.00	359.86	9,724.00	-6,342.00	3,880.93	-9.48	3,880.94	0.00	387,993.83	758,509.62
13,500.00	90.00	359.86	9,724.00	-6,342.00	3,980.93	-9.73	3,980.94	0.00	388,093.83	758,509.37
13,600.00	90.00	359.86	9,724.00	-6,342.00	4,080.93	-9.97	4,080.94	0.00	388,193.83	758,509.13



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13,700.00	90.00	359.86	9,724.00	-6,342.00	4,180.93	-10.22	4,180.94	0.00	388,293.83	758,508.88
13,800.00	90.00	359.86	9,724.00	-6,342.00	4,280.93	-10.46	4,280.94	0.00	388,393.83	758,508.64
13,900.00	90.00	359.86	9,724.00	-6,342.00	4,380.93	-10.70	4,380.94	0.00	388,493.83	758,508.40
14,000.00	90.00	359.86	9,724.00	-6,342.00	4,480.93	-10.95	4,480.94	0.00	388,593.83	758,508.15
14,100.00	90.00	359.86	9,724.00	-6,342.00	4,580.93	-11.19	4,580.94	0.00	388,693.83	758,507.91
14,200.00	90.00	359.86	9,724.00	-6,342.00	4,680.93	-11.44	4,680.94	0.00	388,793.83	758,507.66
14,300.00	90.00	359.86	9,724.00	-6,342.00	4,780.93	-11.68	4,780.94	0.00	388,893.83	758,507.42
14,400.00	90.00	359.86	9,724.00	-6,342.00	4,880.93	-11.93	4,880.94	0.00	388,993.83	758,507.17
14,500.00	90.00	359.86	9,724.00	-6,342.00	4,980.93	-12.17	4,980.94	0.00	389,093.83	758,506.93
14,600.00	90.00	359.86	9,724.00	-6,342.00	5,080.93	-12.42	5,080.94	0.00	389,193.83	758,506.68
14,700.00	90.00	359.86	9,724.00	-6,342.00	5,180.93	-12.66	5,180.94	0.00	389,293.83	758,506.44
14,800.00	90.00	359.86	9,724.00	-6,342.00	5,280.93	-12.90	5,280.94	0.00	389,393.83	758,506.20
14,900.00	90.00	359.86	9,724.00	-6,342.00	5,380.93	-13.15	5,380.94	0.00	389,493.83	758,505.95
15,000.00	90.00	359.86	9,724.00	-6,342.00	5,480.93	-13.39	5,480.94	0.00	389,593.83	758,505.71
15,100.00	90.00	359.86	9,724.00	-6,342.00	5,580.93	-13.64	5,580.94	0.00	389,693.83	758,505.46
15,200.00	90.00	359.86	9,724.00	-6,342.00	5,680.93	-13.88	5,680.94	0.00	389,793.83	758,505.22
15,300.00	90.00	359.86	9,724.00	-6,342.00	5,780.93	-14.13	5,780.94	0.00	389,893.83	758,504.97
15,400.00	90.00	359.86	9,724.00	-6,342.00	5,880.93	-14.37	5,880.94	0.00	389,993.83	758,504.73
15,500.00	90.00	359.86	9,724.00	-6,342.00	5,980.93	-14.61	5,980.94	0.00	390,093.83	758,504.49
15,600.00	90.00	359.86	9,724.00	-6,342.00	6,080.93	-14.86	6,080.94	0.00	390,193.83	758,504.24
15,700.00	90.00	359.86	9,724.00	-6,342.00	6,180.93	-15.10	6,180.94	0.00	390,293.83	758,504.00
15,800.00	90.00	359.86	9,724.00	-6,342.00	6,280.93	-15.35	6,280.94	0.00	390,393.83	758,503.75
15,900.00	90.00	359.86	9,724.00	-6,342.00	6,380.93	-15.59	6,380.94	0.00	390,493.83	758,503.51
16,000.00	90.00	359.86	9,724.00	-6,342.00	6,480.93	-15.84	6,480.94	0.00	390,593.83	758,503.26
16,100.00	90.00	359.86	9,724.00	-6,342.00	6,580.93	-16.08	6,580.94	0.00	390,693.83	758,503.02
16,200.00	90.00	359.86	9,724.00	-6,342.00	6,680.92	-16.32	6,680.94	0.00	390,793.82	758,502.78
16,300.00	90.00	359.86	9,724.00	-6,342.00	6,780.92	-16.57	6,780.94	0.00	390,893.82	758,502.53



Pathfinder
Pathfinder X & Y Planning Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.00usft (21' KB)
MD Reference: WELL @ 3382.00usft (21' KB)
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)
16,400.00	90.00	359.86	9,724.00	-6,342.00	6,880.92	-16.81	6,880.94	0.00	390,993.82	758,502.29
16,500.00	90.00	359.86	9,724.00	-6,342.00	6,980.92	-17.06	6,980.94	0.00	391,093.82	758,502.04
16,600.00	90.00	359.86	9,724.00	-6,342.00	7,080.92	-17.30	7,080.94	0.00	391,193.82	758,501.80
16,700.00	90.00	359.86	9,724.00	-6,342.00	7,180.92	-17.55	7,180.94	0.00	391,293.82	758,501.55
16,800.00	90.00	359.86	9,724.00	-6,342.00	7,280.92	-17.79	7,280.94	0.00	391,393.82	758,501.31
16,900.00	90.00	359.86	9,724.00	-6,342.00	7,380.92	-18.04	7,380.94	0.00	391,493.82	758,501.06
17,000.00	90.00	359.86	9,724.00	-6,342.00	7,480.92	-18.28	7,480.94	0.00	391,593.82	758,500.82
17,100.00	90.00	359.86	9,724.00	-6,342.00	7,580.92	-18.52	7,580.94	0.00	391,693.82	758,500.58
17,111.18	90.00	359.86	9,724.00	-6,342.00	7,592.10	-18.55	7,592.12	0.00	391,705.00	758,500.55
PBHL(Gunner#8)										

Checked By: _____ Approved By: _____ Date: _____



Project: Lea County(NAD27)
 Site: Gunner 8 Federal
 Well: #8H
 Wellbore: OH
 Plan: Design #1 (#8H/OH)



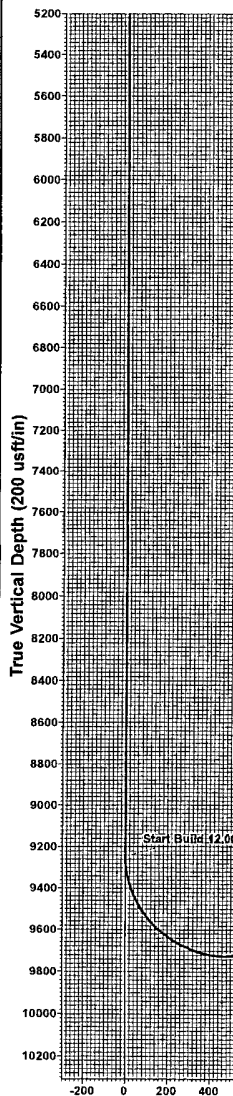
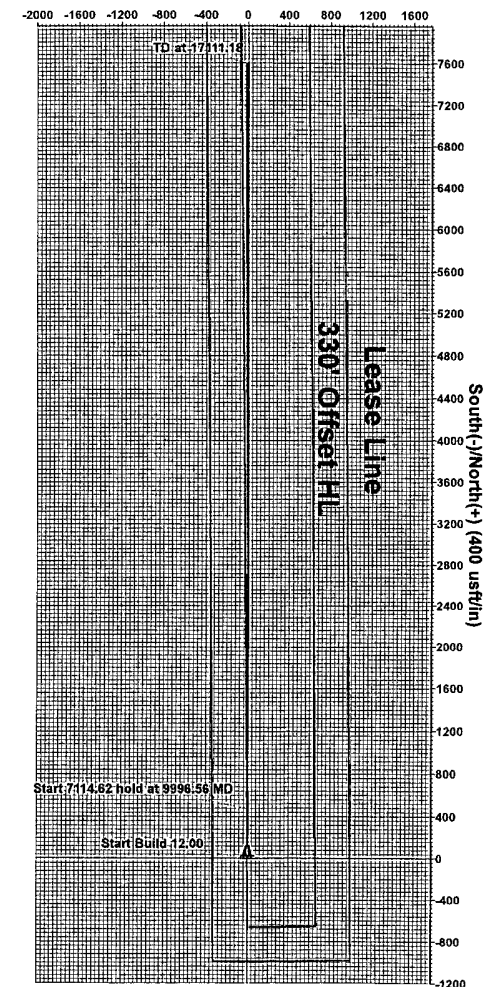
Azimuths to Grid North
 True North: -0.44°
 Magnetic North: 7.11°

Magnetic Field
 Strength: 48575.1snT
 Dip Angle: 60.07°
 Date: 04/12/2011
 Model: IGRF200510

PATHFINDER

A Schlumberger Company

West(-)/East(+) (400 usft/in)



PROJECT DETAILS: Lea County(NAD27)
 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

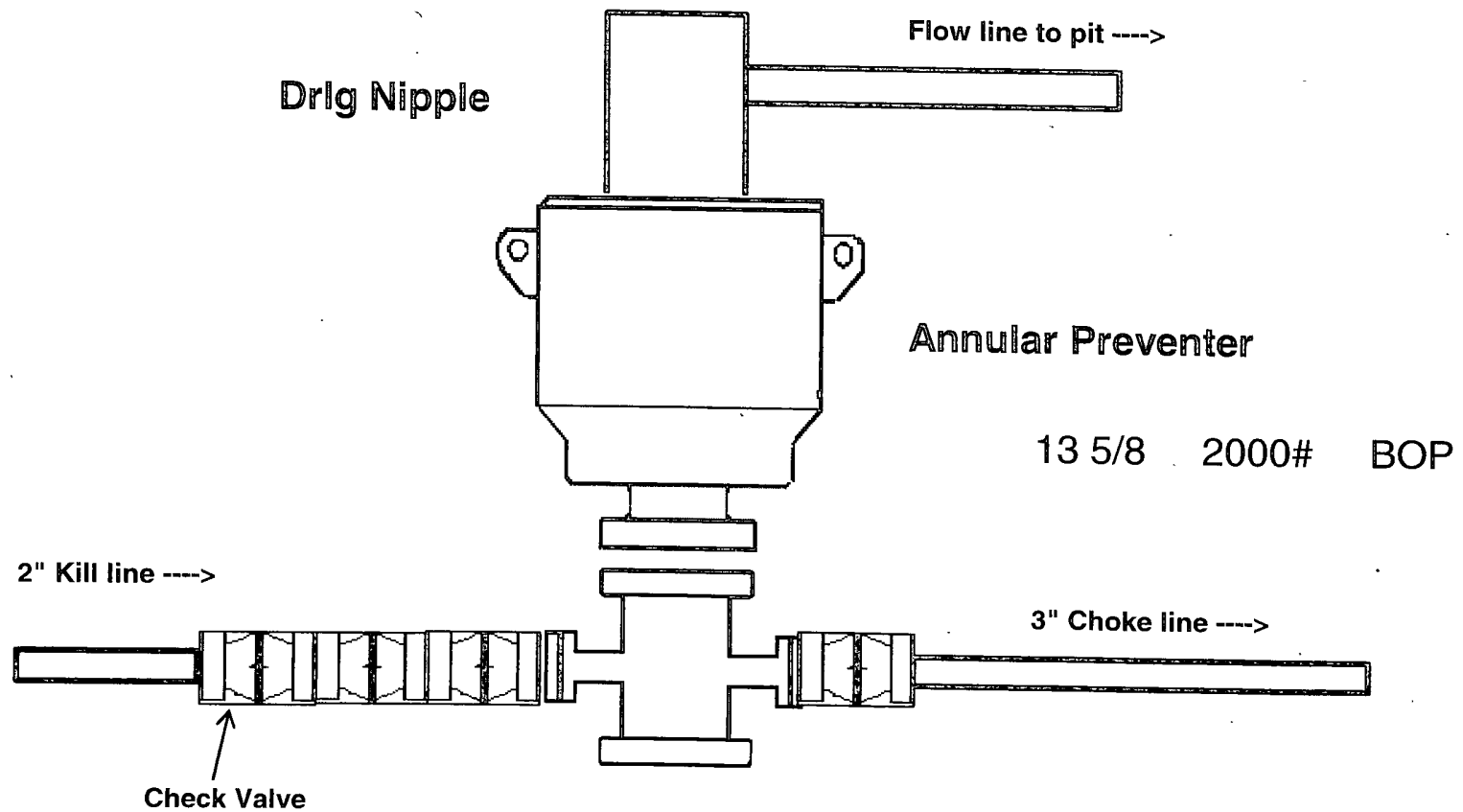
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
9246.50	0.00	0.00	9246.50	0.00	0.00	0.00	0.00	0.00	
9996.56	90.00	359.86	9724.00	477.50	-1.17	12.00	359.86	477.50	
17111.18	90.00	359.86	9724.00	7592.10	-18.55	0.00	0.00	7592.12	PBHL(Gunner#8)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL(Gunner#8)	9724.00	7592.10	-18.80	391705.000	758500.300	Point

WELL DETAILS #8H						
Ground Elevation		3361.00				
RKB Elevation		WELL @ 3382.00usft (21' KB)				
Rig Name		21' KB				
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	384112.900	758519.100	32° 3' 11.862 N	103° 29' 56.099 W	

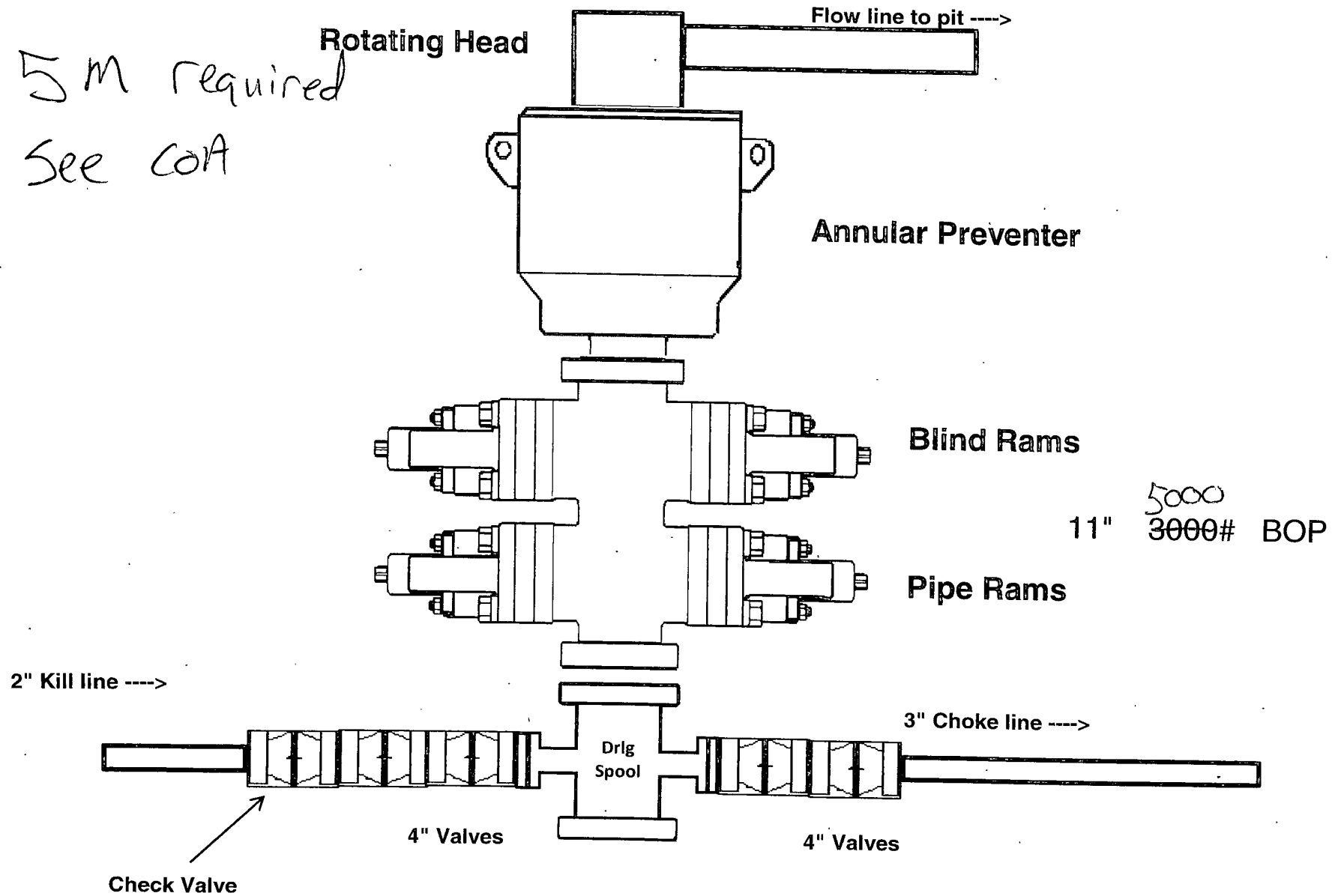
Vertical Section at 359.86° (200 usft/in)

2,000 psi BOP Schematic

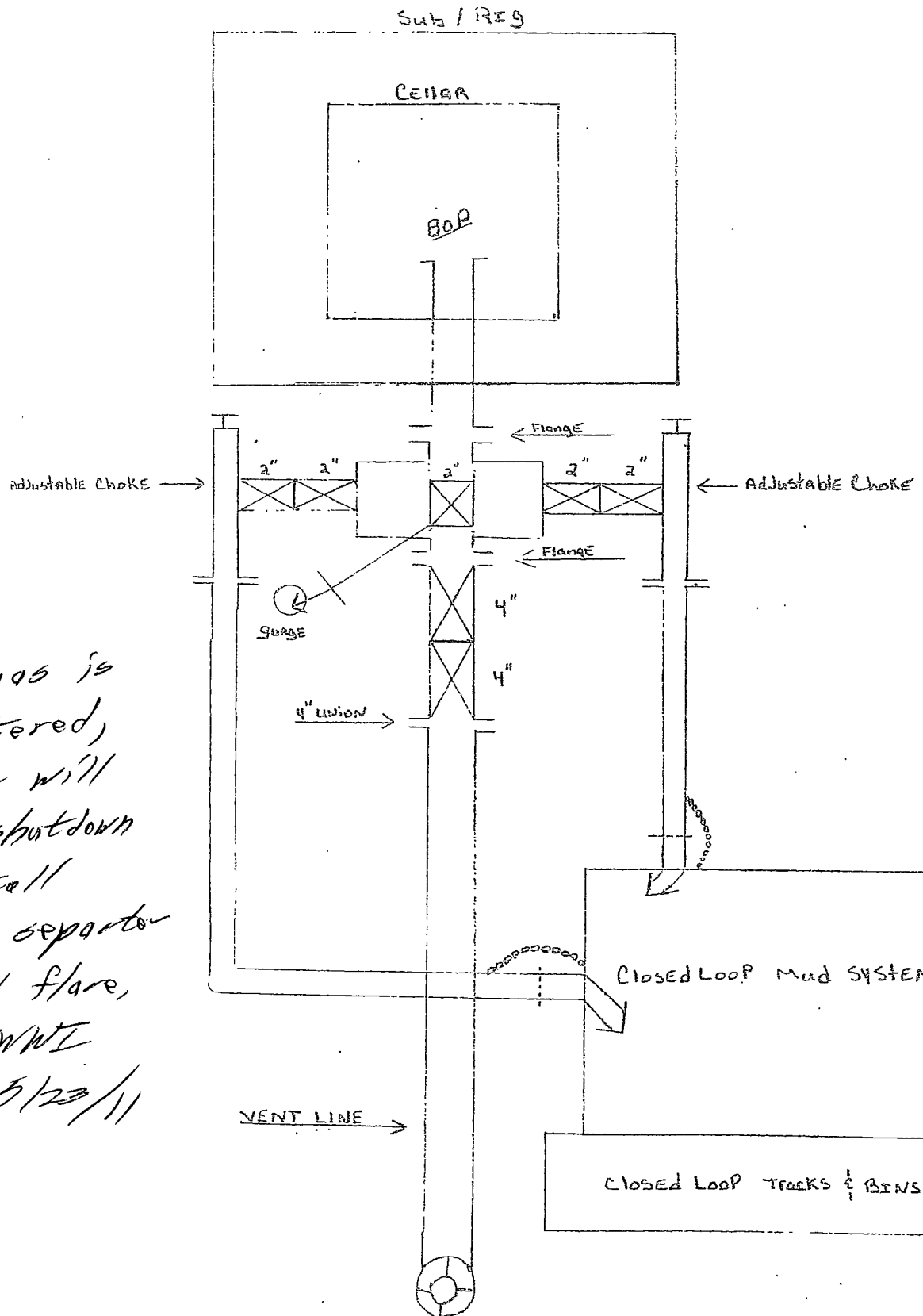


⁵ ~~3,000~~ psi BOP Schematic

5M required
See COA



2M Choke Manifold Equipment



If any gas is encountered,
operator will
either shutdown
and install
mud gas separator
or kill flare,

WWT
5/23/11

5M Required
~~45M~~ Choke Manifold Equipment

See
COA

