

OCD Artesia

SECRETARY'S POTASH

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. NMNM093205 & NMNM081622
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. [229137]		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. Ice Dancer 30 Federal Com #2H [38857]
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 475' FSL & 1890' FEL Unit Letter O (SWSE) SHL At proposed prod. Zone 375' FNL & 1980' FEL Unit Letter B (NWNE) BHL		9. API Well No. 30-015-39423 [9526]
14. Distance in miles and direction from nearest town or post office* About 9 miles from Loving		10. Field and Pool, or Exploratory Forty Nine Ridge, West Bone Spring, West
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 475'		11. Sec., T.R.M. or Blk and Survey of Area Sec. 30 - T23S - R30E
16. No. of acres in lease NMNM093205. 80 NMNM081622. 1,200		12. County or Parish Eddy County
17. Spacing Unit dedicated to this well 160		13. State NM
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. 150'		20. BLM/BIA Bond No. on file NMB000740 + 215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3070.5 GL		22. Approximate date work will start* 7/15/2011
		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:

- Well plat certified by a registered surveyor.
- A Drilling Plan
- A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
- Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
- Operator certification
- 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 5/3/2011
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Approved by (Signature) <i>Jesse L. Iuen</i>	Name (Printed/Typed) Jesse L. Iuen	Date SEP 26 2011
Title STATE DIRECTOR	Office NM STATE 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

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Ice Dancer 30 Federal #2H
SHL: 475' FSL & 1890' FEL
BHL: 375' FNL & 1980' FEL
Section 30 T23S R30E
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	~ 400'	
Top of Salt	415'	
Base of Salt	3163'	
Delaware	3335'	Oil
Bone Spring	7063'	
Avalon Shale	7393'	Oil/Gas
1 st BSS	8115'	
2 nd BSS	8949'	
3 rd BSS	9989'	
Pilot Hole TD	10,380'	
TD TVD	7875'	
TMD	12,127'	

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 400' 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 <i>see COA</i>	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 400' <i>255</i>	Surface	13 3/8"	New	48#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 3300' ✓	Intrmd	9 5/8"	New	36#	STC	J-55	1.125	1.125	1.6
8 3/4"	3300' - 10,380'	Pilot Hole								
7 7/8"	0' - 12,127'	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.

4. Proposed Cement Program

- a. 13-3/8" Surface Tail: 400 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: 700 sx Class C + 4% Gel
(12.7 ppg / 1.88 cuft/sx)
Tail: 250 sx Class C
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/35% excess on OH volumes
- d. 5 1/2" Production 1st Stage:
Lead: 500 sx Class H + Acid soluble
(15.0 ppg / 2.6 cuft/sx)
2nd Stage:
Lead: 750 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 @ 7300' (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 500' inside 9-5/8" csg shoe.
- After logging the PH, will plug back to kick off point by setting the following plugs:

See
TOA

PH TD Plug f/PH TD - ~~10,400~~ 10,170'
100 sx Class H + HR-800 @ 15.6 ppg/1.18 ft³/sx
Kick Off Plug f/7400' - 7900'
250 sx Class H + CFR3 + HR-800 @ 17.2 ppg / 0.98 ft³/sx

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:

- a. PH TD = 4500 psi
b. Lateral TD = 3415 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' - 400' ²⁵⁵	Fresh Water	8.4	29	N.C.
400' - 3300'	Brine	10	29	N.C.
3300' - 10380' (PH)	Cut Brine	8.9 - 9.2	29	N.C.
3300' - 12127' (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

Eddy County(NAD83)

Ice Dancer 30 Fed

#2H

OH

Plan: Plan 1

Pathfinder X&Y Report

02 May, 2011

PATHFINDER[®]

A Schlumberger Company



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Ice Dancer 30 Fed
Well: #2H
Wellbore: OH
Design: Plan 1

Local Co-ordinate Reference: Well #2H
TVD Reference: KB=17' @ 3087.50usft (Original Well Elev)
MD Reference: KB=17' @ 3087 50usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project: Eddy County(NAD83)

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site: Ice Dancer 30 Fed

Site Position:	Northing:	462,156.920 usft	Latitude:	32° 16' 11.504 N
From: Map	Easting:	669,606.120 usft	Longitude:	103° 55' 5.985 W
Position Uncertainty: 0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.22 °

Well: #2H

Well Position	+N/-S	0.00 usft	Northing:	462,156.920 usft	Latitude:	32° 16' 11.504 N
	+E/-W	0.00 usft	Easting:	669,606.120 usft	Longitude:	103° 55' 5.985 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,070.50 usft

Wellbore: OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	5/2/2011	7.75	60.19	48,657

Design: Plan 1

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0 00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 00	0.00	0.00	358.51

Survey Tool Program Date 5/2/2011

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	12,126.68	Plan 1 (OH)	MWD	MWD - Standard



Pathfinder
Pathfinder X&Y Report

PATHFINDER
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Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	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	-3,087.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
100.00	0.00	0.00	100.00	-2,987.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
200.00	0.00	0.00	200.00	-2,887.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
300.00	0.00	0.00	300.00	-2,787.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
400.00	0.00	0.00	400.00	-2,687.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
500.00	0.00	0.00	500.00	-2,587.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
600.00	0.00	0.00	600.00	-2,487.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
700.00	0.00	0.00	700.00	-2,387.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
800.00	0.00	0.00	800.00	-2,287.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
900.00	0.00	0.00	900.00	-2,187.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,000.00	0.00	0.00	1,000.00	-2,087.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,100.00	0.00	0.00	1,100.00	-1,987.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,200.00	0.00	0.00	1,200.00	-1,887.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,300.00	0.00	0.00	1,300.00	-1,787.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,400.00	0.00	0.00	1,400.00	-1,687.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,500.00	0.00	0.00	1,500.00	-1,587.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,600.00	0.00	0.00	1,600.00	-1,487.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,700.00	0.00	0.00	1,700.00	-1,387.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,800.00	0.00	0.00	1,800.00	-1,287.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
1,900.00	0.00	0.00	1,900.00	-1,187.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,000.00	0.00	0.00	2,000.00	-1,087.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,100.00	0.00	0.00	2,100.00	-987.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,200.00	0.00	0.00	2,200.00	-887.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,300.00	0.00	0.00	2,300.00	-787.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,400.00	0.00	0.00	2,400.00	-687.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,500.00	0.00	0.00	2,500.00	-587.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,600.00	0.00	0.00	2,600.00	-487.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12



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Pathfinder X&Y Report

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2,700.00	0.00	0.00	2,700.00	-387.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,800.00	0.00	0.00	2,800.00	-287.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
2,900.00	0.00	0.00	2,900.00	-187.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,000.00	0.00	0.00	3,000.00	-87.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,100.00	0.00	0.00	3,100.00	12.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,200.00	0.00	0.00	3,200.00	112.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,300.00	0.00	0.00	3,300.00	212.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,400.00	0.00	0.00	3,400.00	312.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,500.00	0.00	0.00	3,500.00	412.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,600.00	0.00	0.00	3,600.00	512.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,700.00	0.00	0.00	3,700.00	612.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,800.00	0.00	0.00	3,800.00	712.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
3,900.00	0.00	0.00	3,900.00	812.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,000.00	0.00	0.00	4,000.00	912.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,100.00	0.00	0.00	4,100.00	1,012.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,200.00	0.00	0.00	4,200.00	1,112.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,300.00	0.00	0.00	4,300.00	1,212.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,400.00	0.00	0.00	4,400.00	1,312.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,500.00	0.00	0.00	4,500.00	1,412.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,600.00	0.00	0.00	4,600.00	1,512.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,700.00	0.00	0.00	4,700.00	1,612.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,800.00	0.00	0.00	4,800.00	1,712.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
4,900.00	0.00	0.00	4,900.00	1,812.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,000.00	0.00	0.00	5,000.00	1,912.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,100.00	0.00	0.00	5,100.00	2,012.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,200.00	0.00	0.00	5,200.00	2,112.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,300.00	0.00	0.00	5,300.00	2,212.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12



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Pathfinder X&Y Report

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A Schlumberger Company

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5,400.00	0.00	0.00	5,400.00	2,312.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,500.00	0.00	0.00	5,500.00	2,412.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,600.00	0.00	0.00	5,600.00	2,512.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,700.00	0.00	0.00	5,700.00	2,612.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,800.00	0.00	0.00	5,800.00	2,712.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
5,900.00	0.00	0.00	5,900.00	2,812.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,000.00	0.00	0.00	6,000.00	2,912.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,100.00	0.00	0.00	6,100.00	3,012.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,200.00	0.00	0.00	6,200.00	3,112.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,300.00	0.00	0.00	6,300.00	3,212.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,400.00	0.00	0.00	6,400.00	3,312.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,500.00	0.00	0.00	6,500.00	3,412.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,600.00	0.00	0.00	6,600.00	3,512.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,700.00	0.00	0.00	6,700.00	3,612.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,800.00	0.00	0.00	6,800.00	3,712.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
6,900.00	0.00	0.00	6,900.00	3,812.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,000.00	0.00	0.00	7,000.00	3,912.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,100.00	0.00	0.00	7,100.00	4,012.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,200.00	0.00	0.00	7,200.00	4,112.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,300.00	0.00	0.00	7,300.00	4,212.50	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,397.54	0.00	0.00	7,397.54	4,310.04	0.00	0.00	0.00	0.00	462,156.92	669,606.12
7,400.00	0.30	358.51	7,400.00	4,312.50	0.01	0.00	0.01	12.00	462,156.93	669,606.12
7,425.00	3.30	358.51	7,424.98	4,337.48	0.79	-0.02	0.79	12.00	462,157.71	669,606.10
7,450.00	6.30	358.51	7,449.89	4,362.39	2.88	-0.08	2.88	12.00	462,159.80	669,606.04
7,475.00	9.30	358.51	7,474.66	4,387.16	6.27	-0.16	6.27	12.00	462,163.19	669,605.96
7,500.00	12.30	358.51	7,499.22	4,411.72	10.95	-0.29	10.95	12.00	462,167.87	669,605.83
7,525.00	15.30	358.51	7,523.49	4,435.99	16.91	-0.44	16.91	12.00	462,173.83	669,605.68



Pathfinder
Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Ice Dancer 30 Fed
Well: #2H
Wellbore: OH
Design: Plan 1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #2H
KB=17' @ 3087.50usft (Original Well Elev)
KB=17' @ 3087 50usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
7,550.00	18.30	358.51	7,547.42	4,459.92	24.13	-0.63	24.13	12.00	462,181.05	669,605.49
7,575.00	21.30	358.51	7,570.94	4,483.44	32.59	-0.85	32.60	12.00	462,189.51	669,605.27
7,600.00	24.30	358.51	7,593.99	4,506.49	42.27	-1.10	42.29	12.00	462,199.19	669,605.02
7,625.00	27.30	358.51	7,616.49	4,528.99	53.14	-1.39	53.16	12.00	462,210.06	669,604.73
7,650.00	30.30	358.51	7,638.40	4,550.90	65.18	-1.70	65.20	12.00	462,222.10	669,604.42
7,675.00	33.30	358.51	7,659.65	4,572.15	78.35	-2.04	78.37	12.00	462,235.27	669,604.08
7,700.00	36.30	358.51	7,680.17	4,592.67	92.61	-2.42	92.64	12.00	462,249.53	669,603.70
7,725.00	39.30	358.51	7,699.93	4,612.43	107.92	-2.81	107.96	12.00	462,264.84	669,603.31
7,750.00	42.30	358.51	7,718.85	4,631.35	124.25	-3.24	124.29	12.00	462,281.17	669,602.88
7,775.00	45.30	358.51	7,736.89	4,649.39	141.54	-3.69	141.59	12.00	462,298.46	669,602.43
7,800.00	48.30	358.51	7,754.01	4,666.51	159.76	-4.17	159.81	12.00	462,316.68	669,601.95
7,825.00	51.30	358.51	7,770.14	4,682.64	178.84	-4.66	178.90	12.00	462,335.76	669,601.46
7,850.00	54.30	358.51	7,785.26	4,697.76	198.74	-5.18	198.81	12.00	462,355.66	669,600.94
7,875.00	57.30	358.51	7,799.31	4,711.81	219.41	-5.72	219.49	12.00	462,376.33	669,600.40
7,900.00	60.30	358.51	7,812.26	4,724.76	240.78	-6.28	240.87	12.00	462,397.70	669,599.84
7,925.00	63.30	358.51	7,824.08	4,736.58	262.81	-6.85	262.90	12.00	462,419.73	669,599.27
7,950.00	66.30	358.51	7,834.72	4,747.22	285.42	-7.44	285.51	12.00	462,442.34	669,598.68
7,975.00	69.30	358.51	7,844.17	4,756.67	308.55	-8.05	308.66	12.00	462,465.47	669,598.07
8,000.00	72.30	358.51	7,852.39	4,764.89	332.15	-8.66	332.26	12.00	462,489.07	669,597.46
8,025.00	75.30	358.51	7,859.37	4,771.87	356.14	-9.29	356.27	12.00	462,513.06	669,596.83
8,050.00	78.30	358.51	7,865.08	4,777.58	380.47	-9.92	380.60	12.00	462,537.39	669,596.20
8,075.00	81.30	358.51	7,869.51	4,782.01	405.07	-10.57	405.20	12.00	462,561.99	669,595.55
8,100.00	84.30	358.51	7,872.64	4,785.14	429.86	-11.21	430.00	12.00	462,586.78	669,594.91
8,125.00	87.30	358.51	7,874.47	4,786.97	454.78	-11.86	454.93	12.00	462,611.70	669,594.26
8,147.54	90.00	358.51	7,875.00	4,787.50	477.30	-12.45	477.47	12.00	462,634.22	669,593.67
8,200.00	90.00	358.51	7,875.00	4,787.50	529.74	-13.82	529.92	0.00	462,686.66	669,592.30
8,300.00	90.00	358.51	7,875.00	4,787.50	629.71	-16.42	629.92	0.00	462,786.63	669,589.70



Pathfinder
Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Ice Dancer 30 Fed
Well: #2H
Wellbore: OH
Design: Plan 1

Local Co-ordinate Reference:
TVD Reference: Well #2H
MD Reference: KB=17' @ 3087.50usft (Original Well Elev)
North Reference: KB=17' @ 3087.50usft (Original Well Elev)
Survey Calculation Method: Grid
Database: Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
8,400.00	90.00	358.51	7,875.00	4,787.50	729.68	-19.03	729.92	0.00	462,886.60	669,587.09
8,500.00	90.00	358.51	7,875.00	4,787.50	829.64	-21.64	829.92	0.00	462,986.56	669,584.48
8,600.00	90.00	358.51	7,875.00	4,787.50	929.61	-24.25	929.92	0.00	463,086.53	669,581.87
8,700.00	90.00	358.51	7,875.00	4,787.50	1,029.57	-26.85	1,029.92	0.00	463,186.49	669,579.27
8,800.00	90.00	358.51	7,875.00	4,787.50	1,129.54	-29.46	1,129.92	0.00	463,286.46	669,576.66
8,900.00	90.00	358.51	7,875.00	4,787.50	1,229.51	-32.07	1,229.92	0.00	463,386.43	669,574.05
9,000.00	90.00	358.51	7,875.00	4,787.50	1,329.47	-34.68	1,329.92	0.00	463,486.39	669,571.44
9,100.00	90.00	358.51	7,875.00	4,787.50	1,429.44	-37.28	1,429.92	0.00	463,586.36	669,568.84
9,200.00	90.00	358.51	7,875.00	4,787.50	1,529.40	-39.89	1,529.92	0.00	463,686.32	669,566.23
9,300.00	90.00	358.51	7,875.00	4,787.50	1,629.37	-42.50	1,629.92	0.00	463,786.29	669,563.62
9,400.00	90.00	358.51	7,875.00	4,787.50	1,729.34	-45.11	1,729.92	0.00	463,886.26	669,561.01
9,500.00	90.00	358.51	7,875.00	4,787.50	1,829.30	-47.71	1,829.92	0.00	463,986.22	669,558.41
9,600.00	90.00	358.51	7,875.00	4,787.50	1,929.27	-50.32	1,929.92	0.00	464,086.19	669,555.80
9,700.00	90.00	358.51	7,875.00	4,787.50	2,029.23	-52.93	2,029.92	0.00	464,186.15	669,553.19
9,800.00	90.00	358.51	7,875.00	4,787.50	2,129.20	-55.53	2,129.92	0.00	464,286.12	669,550.59
9,900.00	90.00	358.51	7,875.00	4,787.50	2,229.17	-58.14	2,229.92	0.00	464,386.09	669,547.98
10,000.00	90.00	358.51	7,875.00	4,787.50	2,329.13	-60.75	2,329.92	0.00	464,486.05	669,545.37
10,100.00	90.00	358.51	7,875.00	4,787.50	2,429.10	-63.36	2,429.92	0.00	464,586.02	669,542.76
10,200.00	90.00	358.51	7,875.00	4,787.50	2,529.06	-65.96	2,529.92	0.00	464,685.98	669,540.16
10,300.00	90.00	358.51	7,875.00	4,787.50	2,629.03	-68.57	2,629.92	0.00	464,785.95	669,537.55
10,400.00	90.00	358.51	7,875.00	4,787.50	2,729.00	-71.18	2,729.92	0.00	464,885.92	669,534.94
10,500.00	90.00	358.51	7,875.00	4,787.50	2,828.96	-73.79	2,829.92	0.00	464,985.88	669,532.33
10,600.00	90.00	358.51	7,875.00	4,787.50	2,928.93	-76.39	2,929.92	0.00	465,085.85	669,529.73
10,700.00	90.00	358.51	7,875.00	4,787.50	3,028.89	-79.00	3,029.92	0.00	465,185.81	669,527.12
10,800.00	90.00	358.51	7,875.00	4,787.50	3,128.86	-81.61	3,129.92	0.00	465,285.78	669,524.51
10,900.00	90.00	358.51	7,875.00	4,787.50	3,228.83	-84.22	3,229.92	0.00	465,385.75	669,521.90
11,000.00	90.00	358.51	7,875.00	4,787.50	3,328.79	-86.82	3,329.92	0.00	465,485.71	669,519.30



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Ice Dancer 30 Fed
Well: #2H
Wellbore: OH
Design: Plan 1

Local Co-ordinate Reference: Well #2H
TVD Reference: KB=17' @ 3087.50usft (Original Well Elev)
MD Reference: KB=17' @ 3087.50usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
11,100.00	90.00	358.51	7,875.00	4,787.50	3,428.76	-89.43	3,429.92	0.00	465,585.68	669,516.69
11,200.00	90.00	358.51	7,875.00	4,787.50	3,528.72	-92.04	3,529.92	0.00	465,685.64	669,514.08
11,300.00	90.00	358.51	7,875.00	4,787.50	3,628.69	-94.65	3,629.92	0.00	465,785.61	669,511.47
11,400.00	90.00	358.51	7,875.00	4,787.50	3,728.66	-97.25	3,729.92	0.00	465,885.58	669,508.87
11,500.00	90.00	358.51	7,875.00	4,787.50	3,828.62	-99.86	3,829.92	0.00	465,985.54	669,506.26
11,600.00	90.00	358.51	7,875.00	4,787.50	3,928.59	-102.47	3,929.92	0.00	466,085.51	669,503.65
11,700.00	90.00	358.51	7,875.00	4,787.50	4,028.55	-105.07	4,029.92	0.00	466,185.47	669,501.05
11,800.00	90.00	358.51	7,875.00	4,787.50	4,128.52	-107.68	4,129.92	0.00	466,285.44	669,498.44
11,900.00	90.00	358.51	7,875.00	4,787.50	4,228.49	-110.29	4,229.92	0.00	466,385.41	669,495.83
12,000.00	90.00	358.51	7,875.00	4,787.50	4,328.45	-112.90	4,329.92	0.00	466,485.37	669,493.22
12,100.00	90.00	358.51	7,875.00	4,787.50	4,428.42	-115.50	4,429.92	0.00	466,585.34	669,490.62
12,126.68	90.00	358.51	7,875.00	4,787.50	4,455.09	-116.20	4,456.61	0.00	466,612.01	669,489.92

Checked By: _____ Approved By: _____ Date: _____



Project: Eddy County(NAD83)
 Site: Ice Dancer 30 Fed
 Well: #2H
 Wellbore: OH
 Plan: Plan 1 (#2H/OH)



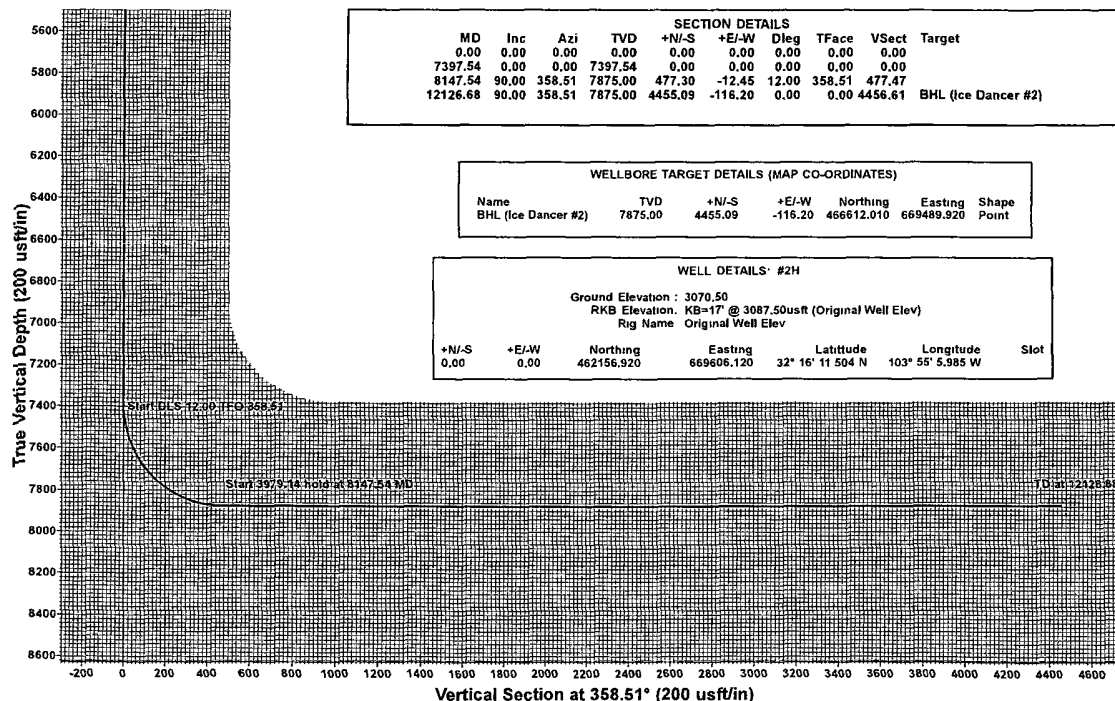
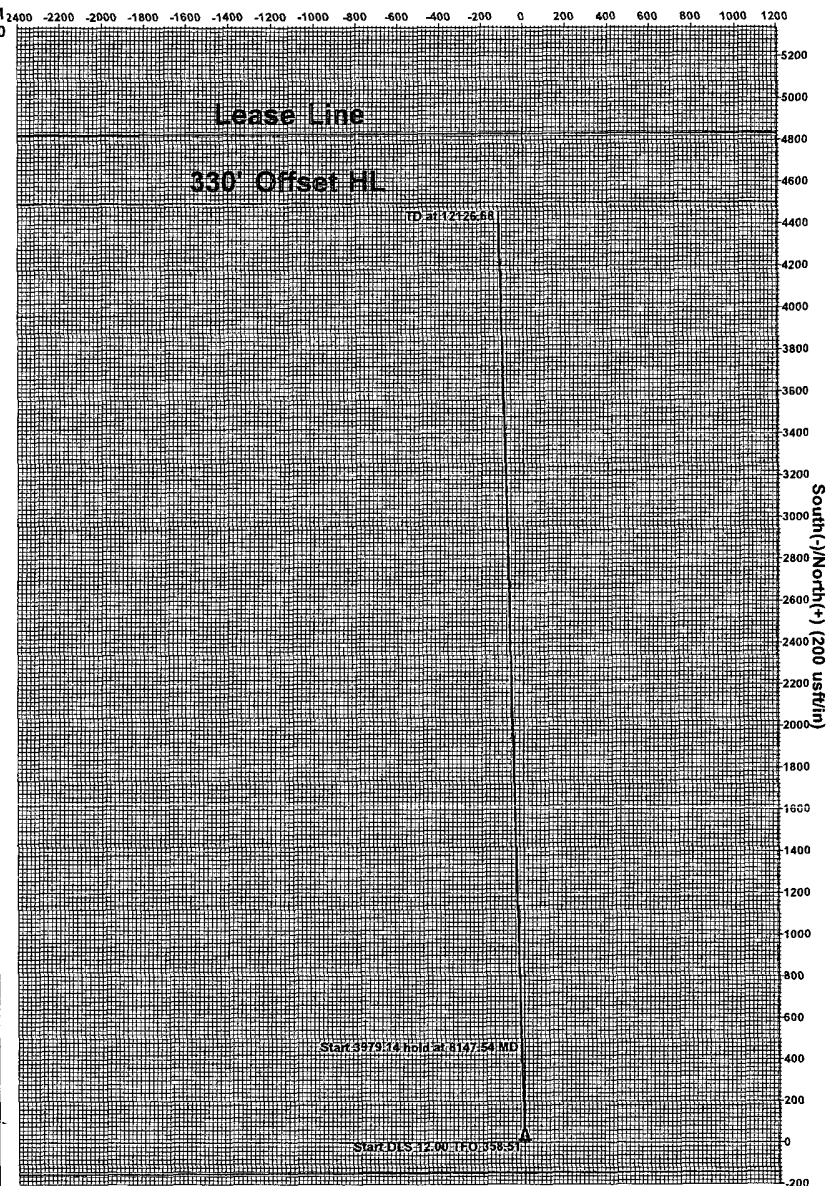
Azimuths to Grid North
 True North: -0.22°
 Magnetic North: 7.53°

Magnetic Field
 Strength: 48656.6snT
 Dip Angle: 60.19°
 Date: 5/2/2011
 Model: IGRF200510

PATHFINDER
 A Schlumberger Company

PROJECT DETAILS: Eddy County(NAD83)
 Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico Eastern Zone
 System Datum: Mean Sea Level
 Local North: Grid

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



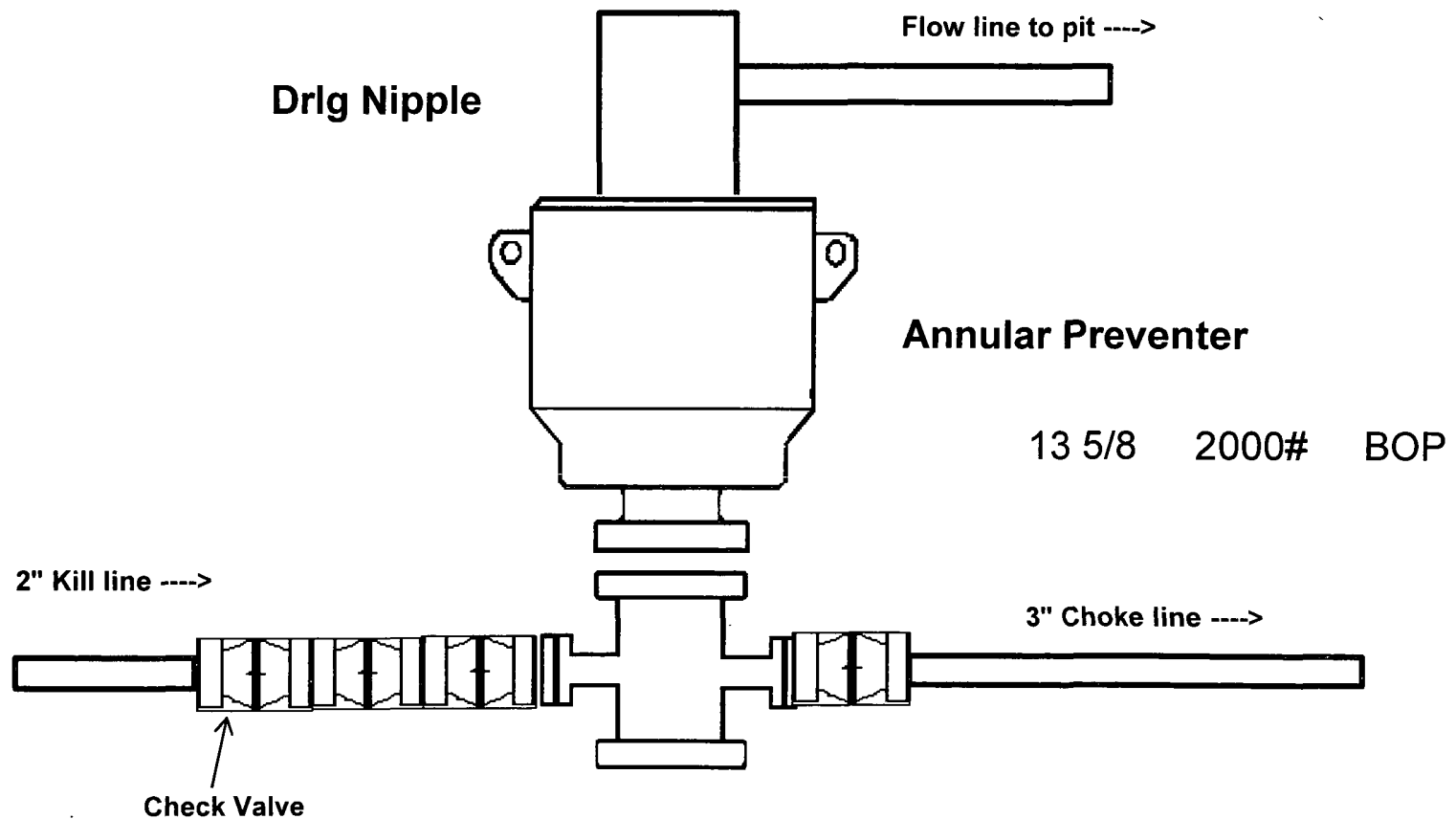
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7397.54	0.00	0.00	7397.54	0.00	0.00	0.00	0.00	0.00	
8147.54	90.00	358.51	7875.00	477.30	-12.45	12.00	358.51	477.47	
12126.68	90.00	358.51	7875.00	4455.09	-116.20	0.00	0.00	4456.61	BHL (Ice Dancer #2)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
BHL (Ice Dancer #2)	7875.00	4455.09	-116.20	466612.010	669489.920	Point

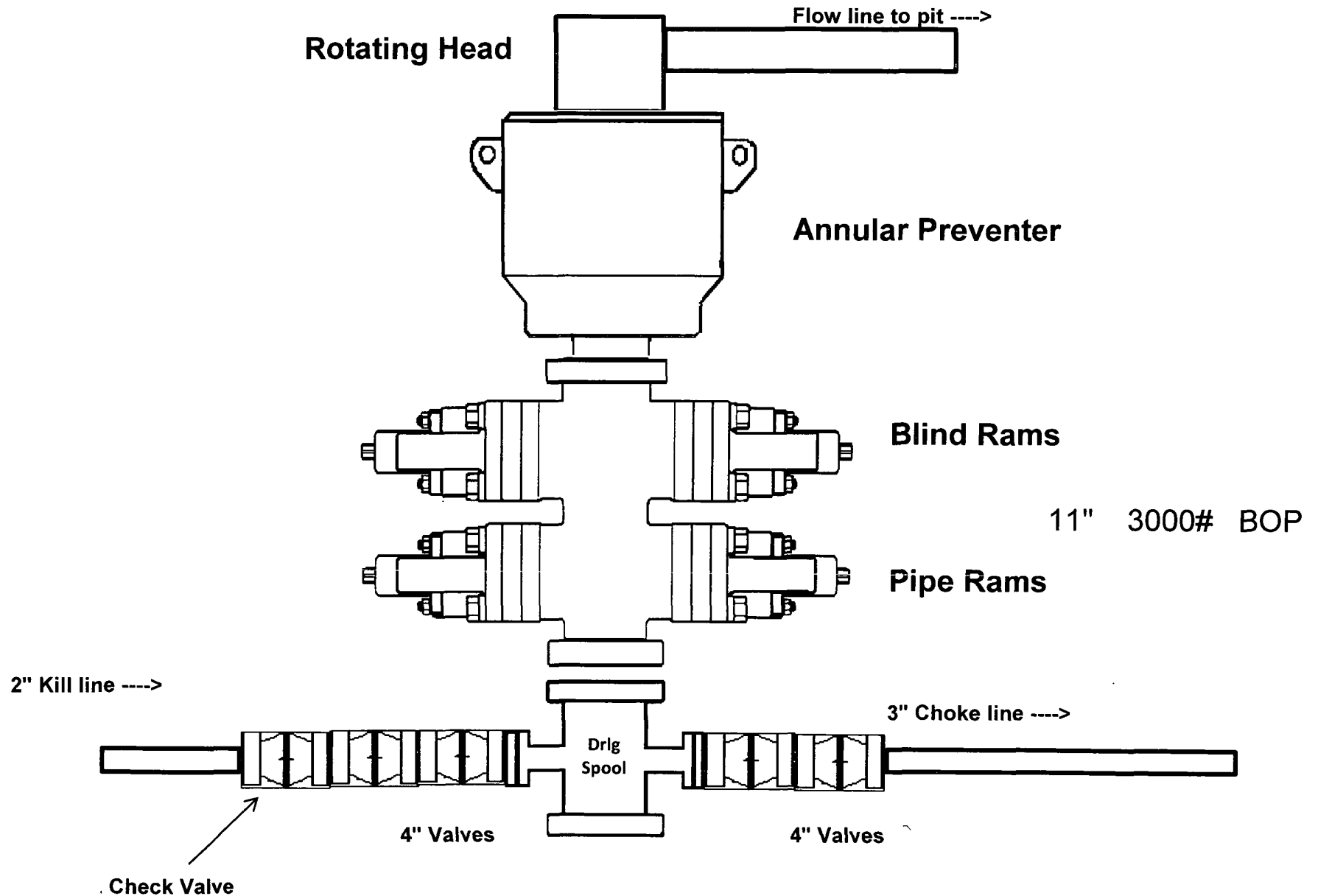
WELL DETAILS: #2H						
Ground Elevation : 3070.50						
RKB Elevation: KB=17' @ 3087.50usft (Original Well Elev)						
Rig Name: Original Well Elev						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	462156.920	669606.120	32° 16' 11 504 N	103° 55' 5.985 W	

Plan Plan 1 (#2H/OH)
 Created By: Sherman Solars Date: 12 49, May 02 2011
 Checked: _____ Date: _____

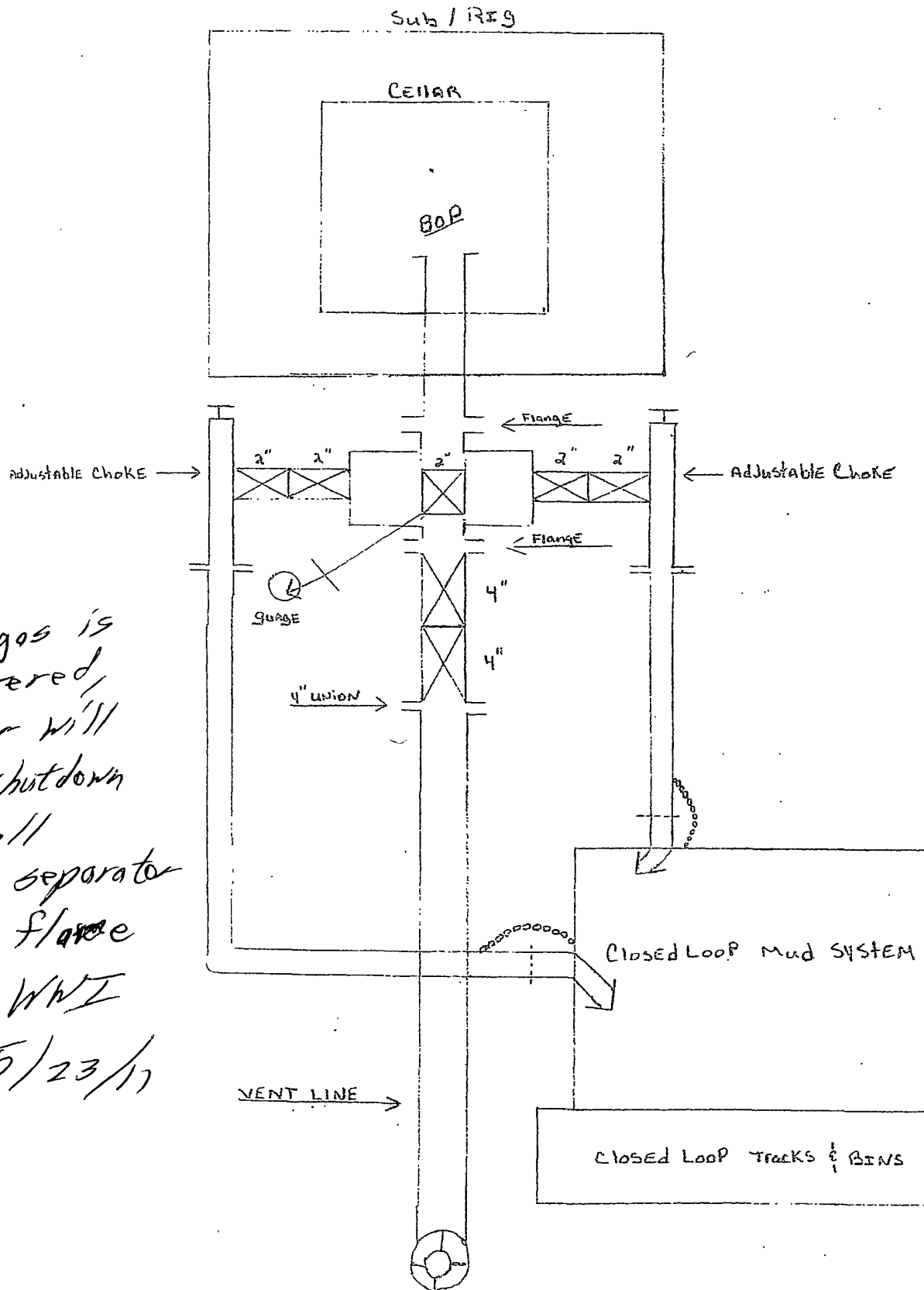
2,000 psi BOP Schematic



3,000 psi BOP Schematic



2M Choke Manifold Equipment

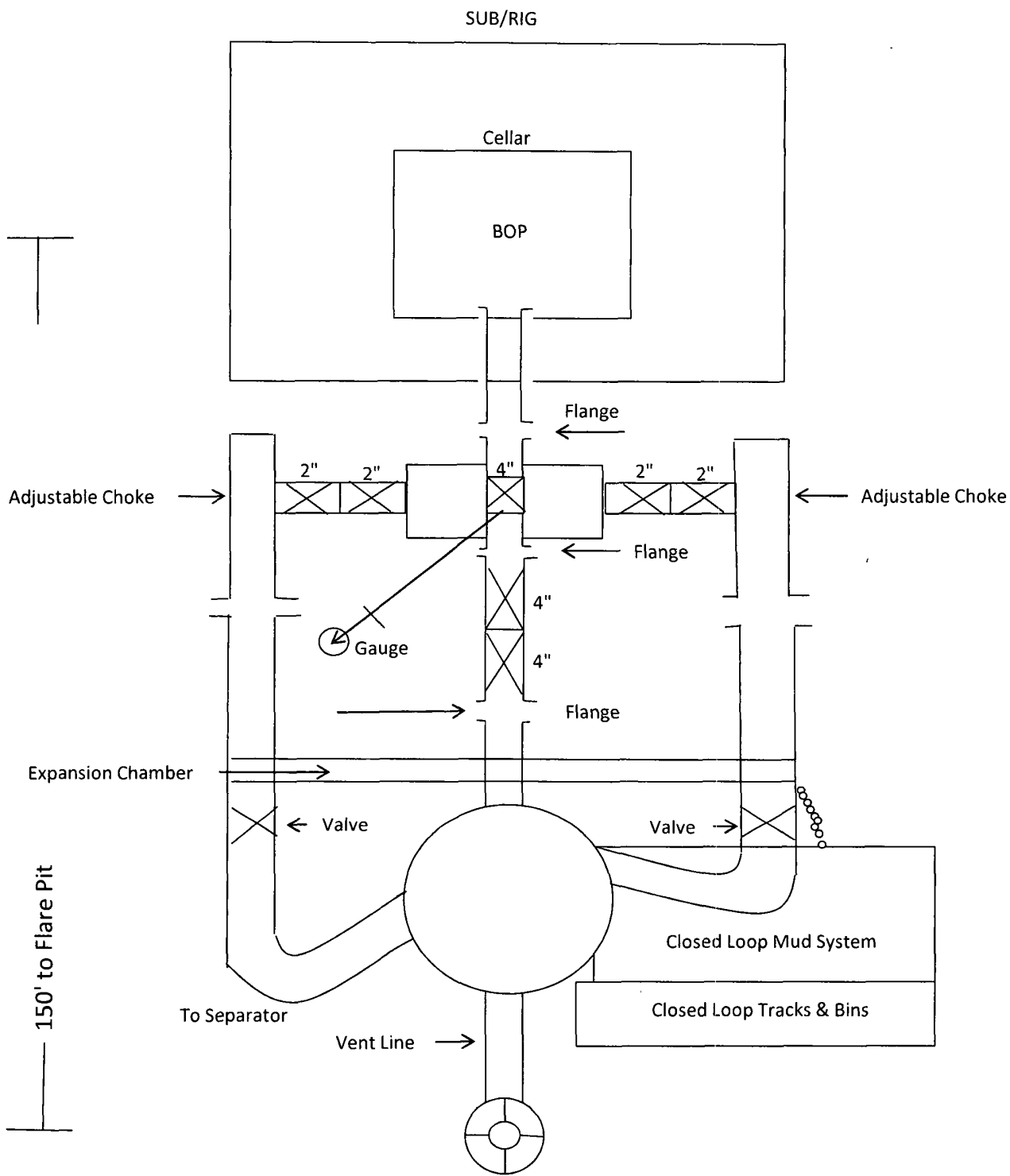


If any gas is encountered,
operator will either shutdown
to install
mud/gas separator
or will flame

WNI

5/23/17

3M Choke Manifold Equipment



DISTRICT 2 -- CHECKLIST FOR INTENTS TO DRILL

Operator COE Ope OGRID # 229134
 Well Name & # ICE DANCER 30 FEDERAL 217 Surface Type (F) (S) (P)
 Location: UL 0 Sect 30 Township 23 s, RNG 30 e, Sub-surface Type (F) (S) (P)

A. Date C101 rec'd 10/4/2011 C101 reviewed 10/5/2011

B. 1. Check mark, Information is OK on Forms:

OGRID ☒, BONDING ☒, PROP CODE ☒, WELL # 24, SIGNATURE TS

2. Inactive Well list as of: 10/5/2011 # wells 3016, # Inactive wells 11

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: 10/5/2011

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 Forty Niner Ridge; B.S., West Code [96526]

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 O-I-G-B

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 10/5/2011

API #30-015-39473 ☒

8. Reviewers TS