

ATS-08-58  
ET-08-126

Form 3160-3  
(April 2004)

DEC 07 2007

OCD-ARTESIA

OCD-ARTESIA

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

S

FORM APPROVED  
OMB No 1004-0137  
Expires March 31, 2007

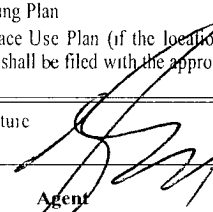
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work. <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No <b>LC-029338B</b>
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator <b>COG Operating LLC</b>		7. If Unit or CA Agreement, Name and No.
3a. Address <b>550 W. Texas, Suite 1300 Midland TX 79701</b>		8. Lease Name and Well No. <b>Harvard Federal #12</b>
3b. Phone No. (include area code) <b>(432) 685-4372</b>		9. API Well No <b>30-015-35961</b>
4. Location of Well (Report location clearly and in accordance with any State requirements *) At surface <b>700' FNL &amp; 700' FEL</b> At proposed prod. zone <b>330' FNL &amp; 330' FEL</b>		10. Field and Pool, or Exploratory <b>Loco Hills Glorietta-Yeso</b>
14. Distance in miles and direction from nearest town or post office* <b>3.5 miles northeast of Loco Hills, NM</b>		11. Sec., T. R. M. or Blk and Survey or Area <b>Sec 11, T17S, R30E</b>
15. Distance from proposed* location to nearest property or lease line, ft (Also to nearest drig unit line, if any) <b>330'</b>	16. No. of acres in lease <b>160</b>	17. Spacing Unit dedicated to this well <b>40</b>
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft <b>720'</b>	19. Proposed Depth <b>6050'</b>	20. BLM/BIA Bond No. on file <b>NMB000215</b>
21. Elevations (Show whether DF, KDB, RT, GL, etc) <b>3745' GL</b>	22. Approximate date work will start* <b>01/01/2008</b>	23. Estimated duration <b>10 Days</b>

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 	Name (Printed/Typed) <b>Gary E. Miller</b>	Date <b>10/08/2007</b>
Title <b>Agent</b>		
Approved by (Signature) <b>/s/ James Stovall</b>	Name (Printed/Typed) <b>/s/ James Stovall</b>	Date <b>DEC 5 2007</b>
Title <b>FIELD MANAGER</b>	Office <b>CARLSBAD FIELD OFFICE</b>	

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon  
Conditions of approval, if any, are attached

APPROVAL FOR TWO YEARS

Title 18 USC Section 1001 and Title 43 USC 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

\*(Instructions on page 2)

Roswell Controlled Water Basin

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO  
GENERAL REQUIREMENTS  
AND SPECIAL STIPULATIONS  
ATTACHED

DISTRICT I  
1625 N. FRENCH DR., HOBBS, NM 88240

State of New Mexico  
Energy, Minerals and Natural Resources Department

DISTRICT II  
1301 W GRAND AVENUE, ARTESIA, NM 88210

DISTRICT III  
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV  
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

OIL CONSERVATION DIVISION  
1220 SOUTH ST. FRANCIS DR.  
Santa Fe, New Mexico 87505

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code 96718	Pool Name LOCO HILLS; GLORIETA-YESO
Property Code 302440	Property Name HARVARD FEDERAL	Well Number 12
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3745'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	11	17-S	30-E		700	NORTH	700	EAST	EDDY

Bottom Hole Location If Different From Surface

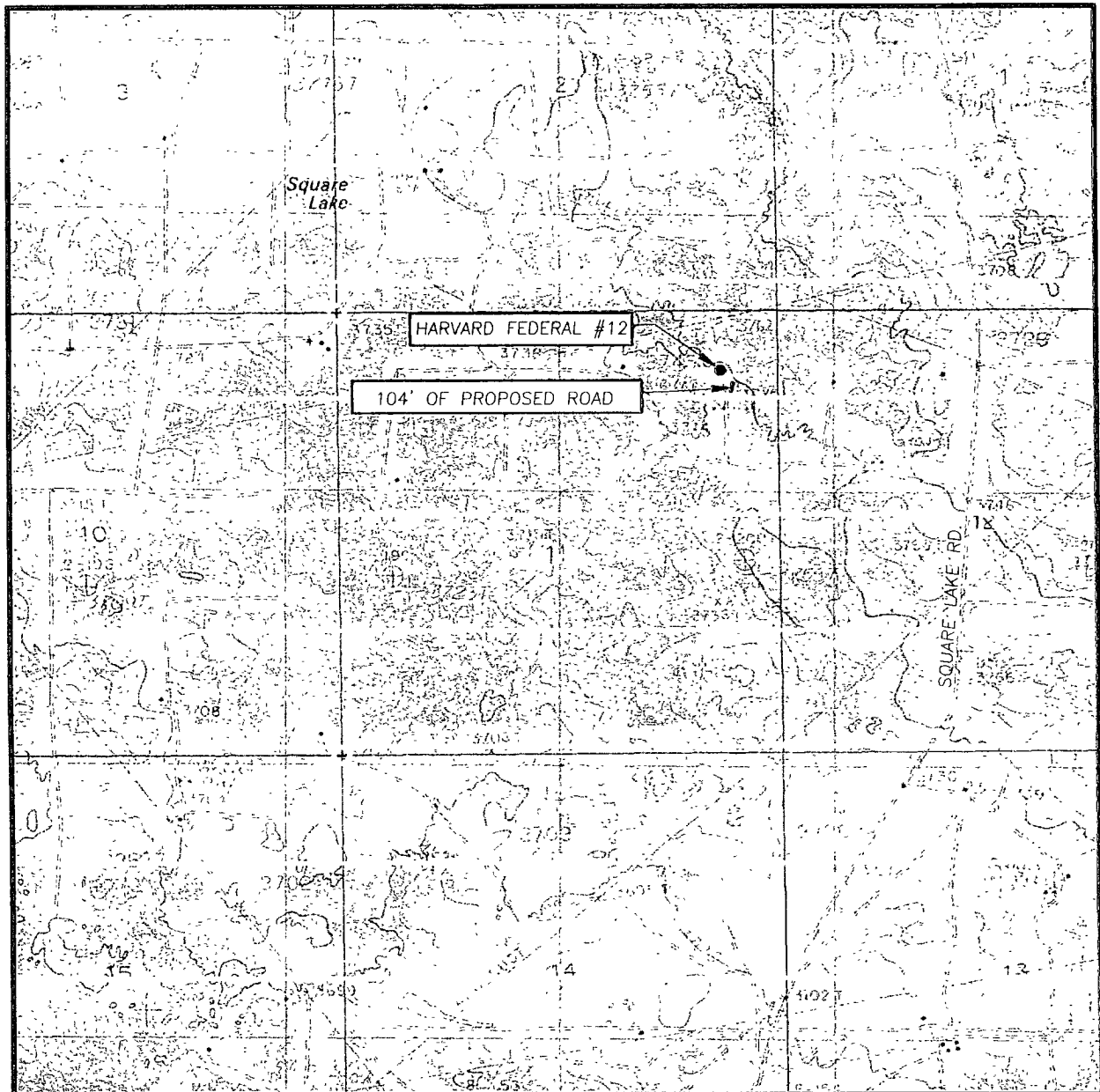
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	11	17-S	30-E		330	NORTH	330	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
40			

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

<p>BOTTOM HOLE LOCATION Y=675086.1 N X=622462.8 E</p>	<p>GRID. AZ = 45°16'32" HORZ DIST = 524.1'</p>	<p>SEE DETAIL</p>	<p>OPERATOR CERTIFICATION</p> <p>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.</p> <p><i>Phyllis A. Edwards</i> 10/5/07 Signature Date</p> <p>Phyllis A. Edwards Printed Name</p> <p>Regulatory Analyst</p>
<p>GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=674713.8 N X=622094.1 E</p>	<p>DETAIL</p> <p>3758.5' 3759.9' 600' 600' 3748.3' 3748.7'</p>		<p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>SEPTEMBER 10, 2007 Date Surveyed</p> <p>Signature of Professional Surveyor Professional Surveyor</p> <p>RONALD J. EIDSON 3239 11.098</p> <p>Certificate No. 12641 RONALD J. EIDSON 3239</p>

# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL.  
LOCO HILLS, N.M. - 10'

SEC. 11 TWP. 17-S RGE 30-E

SURVEY \_\_\_\_\_ N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

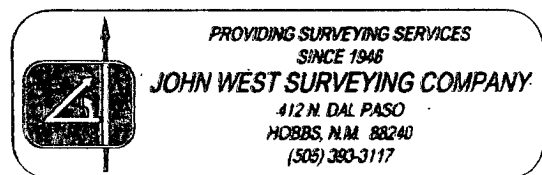
DESCRIPTION 700' FNL & 700' FEL

ELEVATION 3745'

OPERATOR COG OPERATING, LLC

LEASE HARVARD FEDERAL

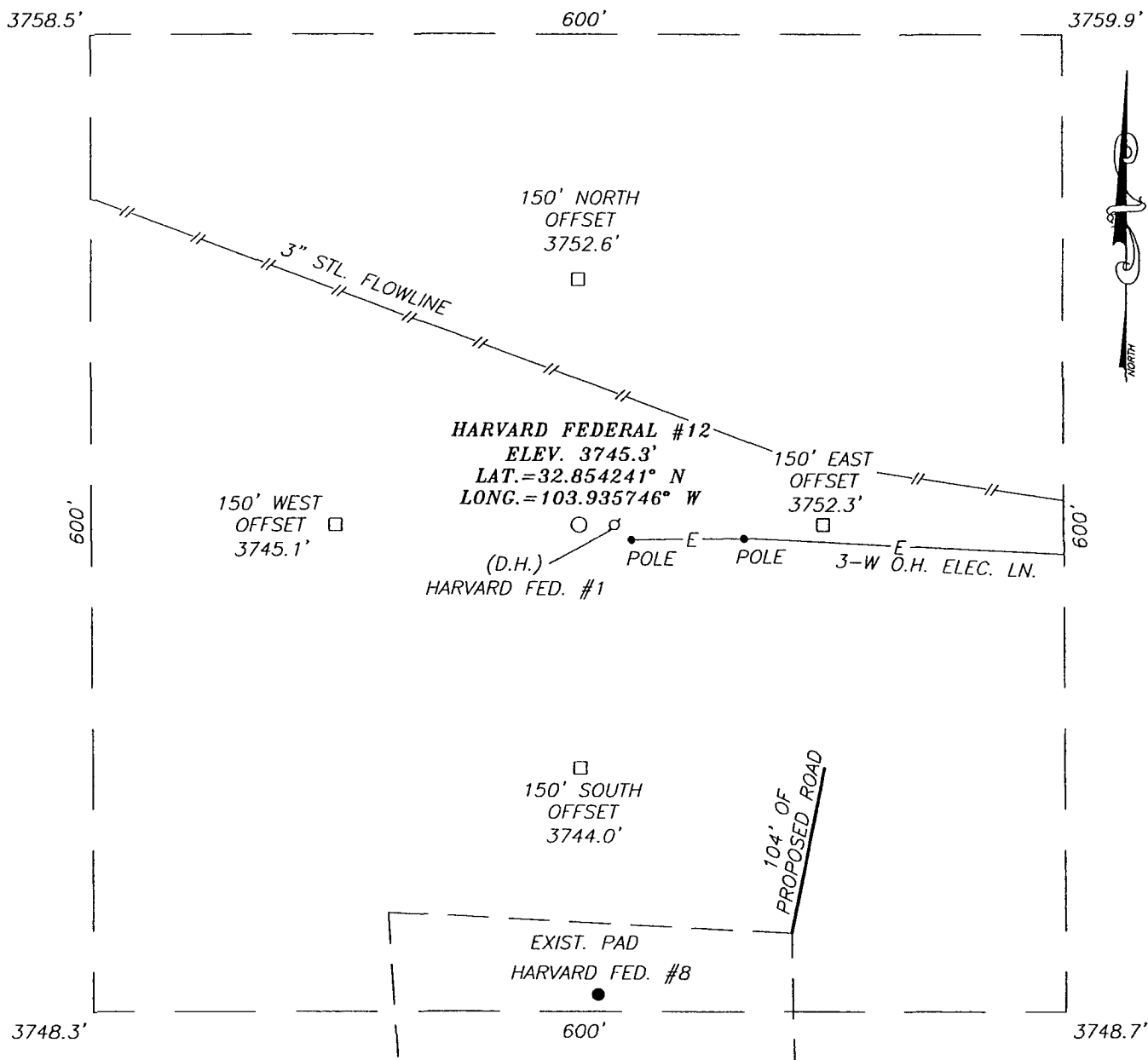
U.S.G.S. TOPOGRAPHIC MAP  
LOCO HILLS, N.M.



# SECTION 11, TOWNSHIP 17 SOUTH, RANGE 30 EAST, N.M.P.M.,

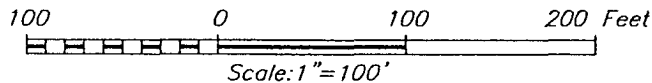
EDDY COUNTY,

NEW MEXICO



## DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF U.S HWY. #82 AND CO. RD. #220 (SQUARE LAKE RD), GO NORTH ON CO. RD. #220 FOR APPROX. 2.4 MILES. TURN LEFT AND GO WEST APPROX. 0.5 MILES. TURN RIGHT AND GO NORTH APPROX. 863 FEET TO AN EXISTING WELL PAD AND A PROPOSED ROAD SURVEY. FOLLOW ROAD SURVEY APPROX. 104 FEET NORTH TO THIS LOCATION.



## COG OPERATING, LLC

HARVARD FEDERAL #12 WELL  
LOCATED 700 FEET FROM THE NORTH LINE  
AND 700 FEET FROM THE EAST LINE OF SECTION 11,  
TOWNSHIP 17 SOUTH, RANGE 30 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.

Survey Date: 9/20/07		Sheet 1 of 1 Sheets	
W.O. Number: 07.11.0987		Dr By: LA	Rev 1:N/A
Date: 9/29/07	Disk: CD#6	07110987	Scale: 1"=100'

PROVIDING SURVEYING SERVICES  
SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
412 N. DAL PASO  
HOBBS, N.M. 88240  
(505) 393-3117

## MASTER DRILLING PROGRAM

### 1. Geologic Name of Surface Formation

Quaternary

### 2. Estimated Tops of Important Geologic Markers:

Quaternary	Surface
Top of Salt	500'
Base of Salt	1150'
Yates	1250'
Seven Rivers	1530'
Queen	2150'
Grayburg	2350'
San Andres	2850'
Glorietta	4300'
Paddock	4380'
Blaine	4850'

### 3. Estimated Depths of Anticipated Fresh Water, Oil and Gas

Water Sand	150'	Fresh Water
Grayburg	2350'	Oil/Gas
San Andres	2850'	Oil/Gas
Paddock	3925'	Oil/Gas
Blaine	4850'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to 425' and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be protected by setting 8 5/8" casing to 1300' and circulating cement back to the surface. Any shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them by cementing 5 1/2" production casing, to be run at TD.

### 4. Casing Program

Hole Size	Interval	OD Casing	Weight	Grade	Jt., Condition	Jt.	burst/collapse/tension
17 1/2"	0-425'	13 3/8"	48#	H-40	ST&C/New	ST&C	9.22/3.943/15.8
12 1/4"	0-1300'	8 5/8"	24#	J-55	ST&C/New	ST&C	3.03/2.029/7.82
7 7/8"	0-T.D.	5 1/2"	17#	J-55	LT&C/New	LT&C	1.88/1.731/2.42

## 5. Cement Program

13 3/8" Surface Casing:	Class C, 475 sx, yield 1.32.
8 5/8" Intermediate Casing:	Class C, 600 sx lead, yield-2.45 200 sx tail, yield-1.32
5 1/2" Production Casing:	Class C, 1400 sx, yield 1.37.

## 6. Minimum Specifications for Pressure Control

The blowout preventer equipment (BOP) shown in Exhibit #9 will consist of a double ram-type (2000 psi WP) preventer. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top of 4 1/2" drill pipe rams on the bottom. The BOP will be nipped up on the 13 3/8" surface casing and tested to 1500 psi by a third party. The BOP will then be nipped up on the 8 5/8" intermediate casing and tested by a third party to 2000 psi and used continuously until total depth is reached. All BOP's and accessory equipment will be tested to 2000 psi before drilling out of the intermediate casing. 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. Other accessories to the BOP equipment (Exhibit #10) will include a Kelly cock and floor safety valve, choke lines and a choke manifold (Exhibit #11) will a 2000 psi WP rating.

## 7. Types and Characteristics of the Proposed Mud System

The well will be drilled to TD with a combination of brine, cut brine and polymer mud system. The applicable depths and properties of this system are as follows:

DEPTH	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-425'	Fresh Water	8.5	28	N.C.
425-1300'	Brine	10	30	N.C.
1300'-TD	Cut Brine	9.1	29	N.C.

Sufficient mud materials will be kept at the well site to maintain mud properties and meet minimum lost circulation and weight increase requirements at all times.

## 8. Auxiliary Well Control and Monitoring Equipment

- A. Kelly cock will be kept in the drill string at all times.

- B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

**9. Logging, Testing and Coring Program**

- A. The electric logging program will consist of GR-Dual Laterolog, Spectral Density, Dual Spaced Neutron, CSNG Log and will be run from TD to 8 5/8" casing shoe.
- B. Drill Stem test is not anticipated.
- C. No conventional coring is anticipated.
- D. Further testing procedures will be determined after the 5 1/2" production casing has been cemented at TD, based on drill shows and log evaluation.

**10. Abnormal Conditions, Pressure, Temperatures and Potential Hazards**

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 110 degrees and the estimated maximum bottom hold pressure is 2300 psig. Low levels of hydrogen sulfide have been monitored in producing wells in the area, so H<sub>2</sub>S may be present while drilling the well. A Hydrogen Sulfide Drilling Operation Plan is attached to this program. No major loss of circulation zones has been reported in offsetting wells.

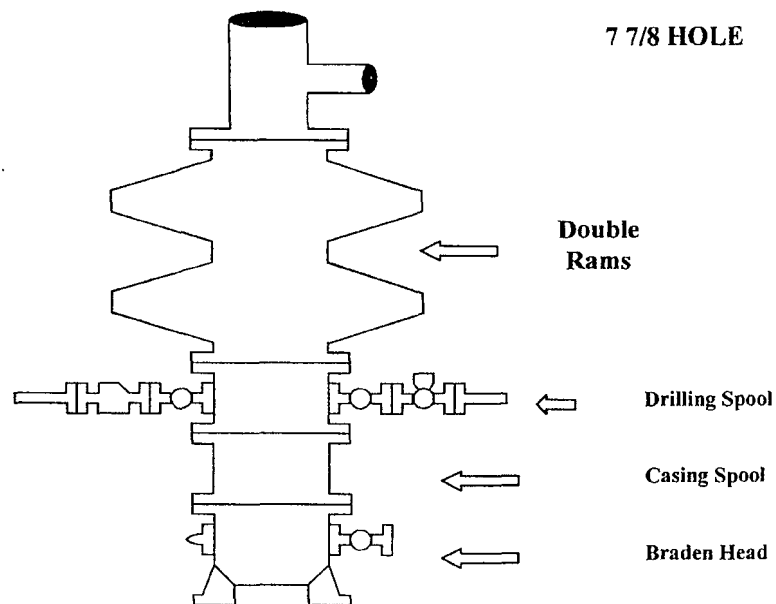
**11. Anticipated Starting Date and Duration of Operations**

Road and location work will not begin until approval has been received from the BLM. As this is a Master Drilling plan, please refer to the Form 3160-3 for the anticipated start date. Once commenced, drilling operations should be finished in approximately 10 days. If the well is productive, an additional 30 days will be required for completion and testing before a decision is made to install permanent facilities.

# COG Operating LLC

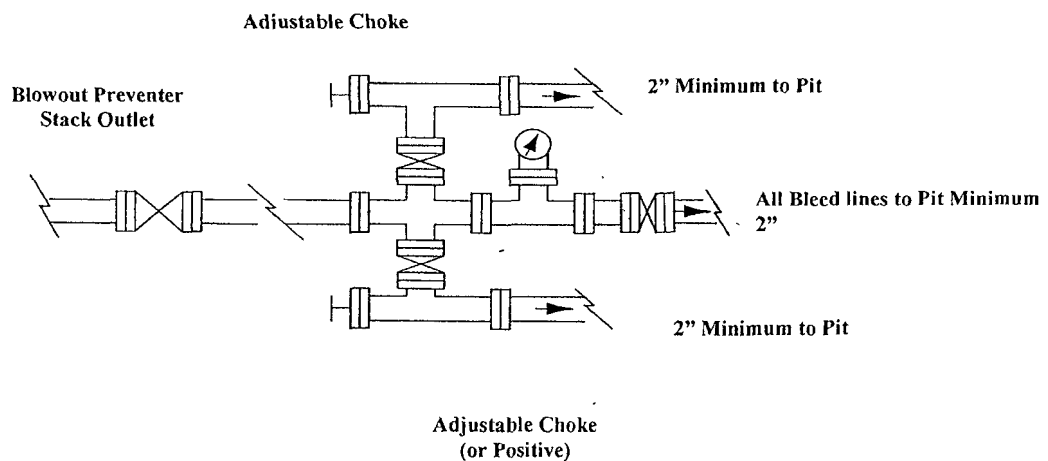
## Exhibit #9

### BOPE and Choke Schematic



Minimum 4" Nominal choke and kill lines

Choke Manifold Requirement (2000 psi WP)  
No Annular Required





**NOTES REGARDING THE BLOWOUT PREVENTERS**  
**Master Drilling Plan**  
**Eddy County, New Mexico**

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

# Proposal



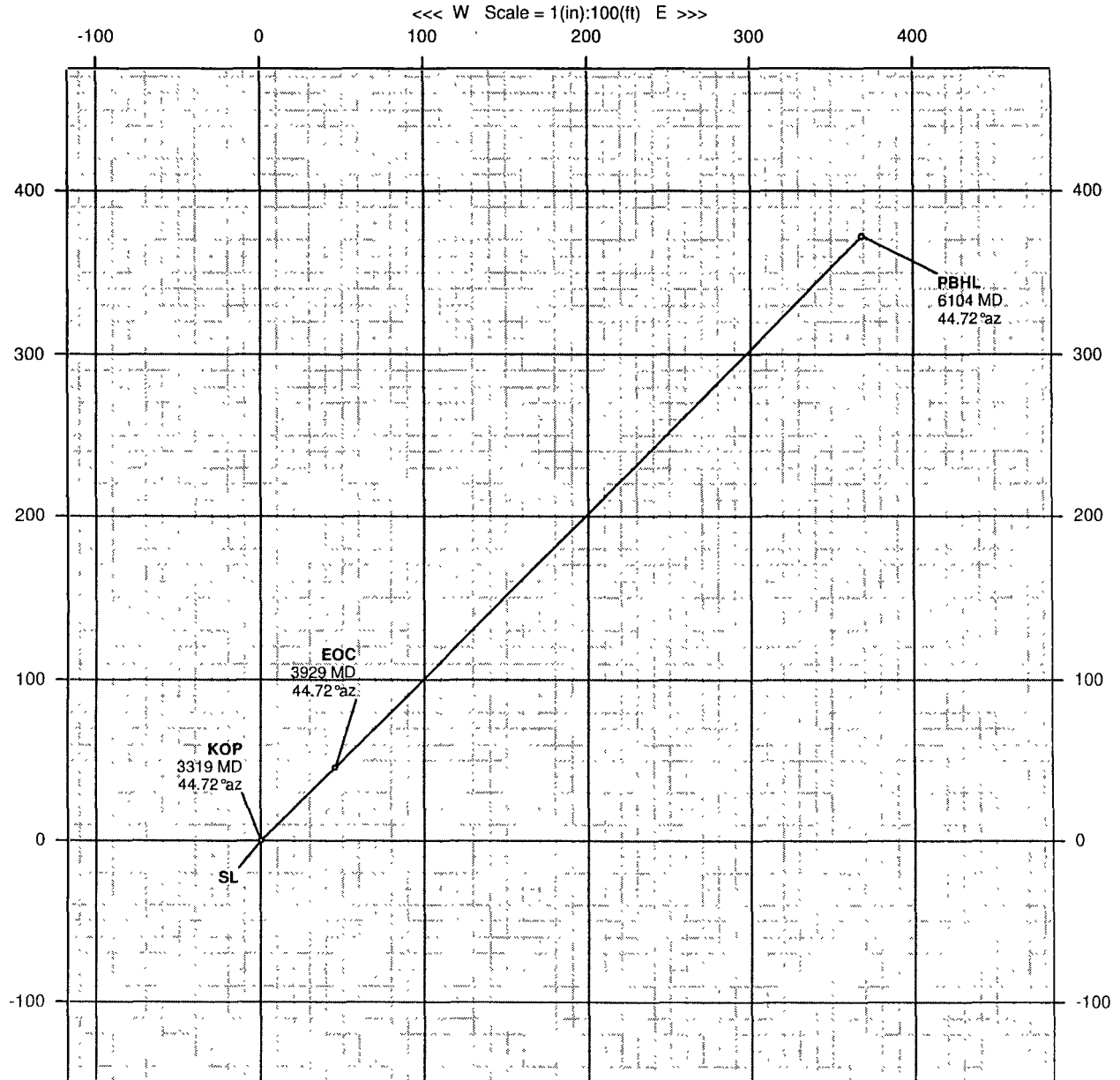
Report Date: October 5, 2007	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: COG Operating, LLC.	Vertical Section Azimuth: 44.720°
Field: Eddy County, NM	Vertical Section Origin: N 0 000 ft, E 0 000 ft
Structure / Slot: Harvard Federal #12 / Harvard Federal #12	TVD Reference Datum: RKB
Well: Harvard Federal #12	TVD Reference Elevation: 0.0 ft relative to
Borehole: Harvard Federal #12	Sea Bed / Ground Level Elevation: 0.000 ft relative to
UWI/API#:	Magnetic Declination: 8.235°
Survey Name / Date: Harvard Federal #12_r1 / October 5, 2007	Total Field Strength: 49374.222 nT
Tort / AHD / DDI / ERD ratio: 12 193° / 524 01 ft / 3.809 / 0.087	Magnetic Dip: 60.809°
Grid Coordinate System: NAD27 New Mexico State Planes, Eastern Zone, US Feet	Declination Date: October 05, 2007
Location Lat/Long: N 32 51 15.266, W 103 56 8.685	Magnetic Declination Model: IGRF 2005
Location Grid N/E Y/X: N 674713.800 ftUS, E 622094.100 ftUS	North Reference: Grid North
Grid Convergence Angle: +0.21569517°	Total Corr Mag North -> Grid North: +8 019°
Grid Scale Factor: 0.99992616	Local Coordinates Referenced To: Well Head

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
Tie-In	0.00	0.00	44.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	100.00	0.00	44.72	100.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	200.00	0.00	44.72	200.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	300.00	0.00	44.72	300.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	400.00	0.00	44.72	400.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	500.00	0.00	44.72	500.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	600.00	0.00	44.72	600.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	700.00	0.00	44.72	700.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	800.00	0.00	44.72	800.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	900.00	0.00	44.72	900.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1000.00	0.00	44.72	1000.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1100.00	0.00	44.72	1100.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1200.00	0.00	44.72	1200.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1300.00	0.00	44.72	1300.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1400.00	0.00	44.72	1400.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1500.00	0.00	44.72	1500.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1600.00	0.00	44.72	1600.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1700.00	0.00	44.72	1700.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1800.00	0.00	44.72	1800.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	1900.00	0.00	44.72	1900.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2000.00	0.00	44.72	2000.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2100.00	0.00	44.72	2100.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2200.00	0.00	44.72	2200.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2300.00	0.00	44.72	2300.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2400.00	0.00	44.72	2400.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2500.00	0.00	44.72	2500.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2600.00	0.00	44.72	2600.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2700.00	0.00	44.72	2700.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2800.00	0.00	44.72	2800.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	2900.00	0.00	44.72	2900.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	3000.00	0.00	44.72	3000.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	3100.00	0.00	44.72	3100.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	3200.00	0.00	44.72	3200.00	0.00	0.00	0.00	0.00	0.00	0.00	---
	3300.00	0.00	44.72	3300.00	0.00	0.00	0.00	0.00	0.00	0.00	---
KOP	3318.90	0.00	44.72	3318.90	0.00	0.00	0.00	0.00	0.00	0.00	44.72M
	3400.00	1.62	44.72	3399.99	1.15	0.82	0.81	1.15	44.72	2.00	44.72M
	3500.00	3.62	44.72	3499.88	5.72	4.07	4.03	5.72	44.72	2.00	44.72M
	3600.00	5.62	44.72	3599.55	13.78	9.79	9.70	13.78	44.72	2.00	HS

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
EOC	3700.00	7.62	44.72	3698.88	25.31	17.98	17.81	25.31	44.72	2.00	HS
	3800.00	9.62	44.72	3797.74	40.30	28.64	28.36	40.30	44.72	2.00	HS
	3900.00	11.62	44.72	3896.02	58.73	41.73	41.33	58.73	44.72	2.00	HS
	3928.54	12.19	44.72	3923.95	64.62	45.92	45.47	64.62	44.72	2.00	---
	4000.00	12.19	44.72	3993.80	79.72	56.64	56.09	79.72	44.72	0.00	---
	4100.00	12.19	44.72	4091.54	100.84	71.65	70.95	100.84	44.72	0.00	---
	4200.00	12.19	44.72	4189.29	121.96	86.65	85.82	121.96	44.72	0.00	---
	4300.00	12.19	44.72	4287.03	143.08	101.66	100.68	143.08	44.72	0.00	---
	4400.00	12.19	44.72	4384.77	164.20	116.67	115.54	164.20	44.72	0.00	---
	4500.00	12.19	44.72	4482.52	185.32	131.67	130.40	185.32	44.72	0.00	---
	4600.00	12.19	44.72	4580.26	206.44	146.68	145.26	206.44	44.72	0.00	---
	4700.00	12.19	44.72	4678.01	227.56	161.69	160.12	227.56	44.72	0.00	---
	4800.00	12.19	44.72	4775.75	248.68	176.69	174.99	248.68	44.72	0.00	---
	4900.00	12.19	44.72	4873.50	269.80	191.70	189.85	269.80	44.72	0.00	---
	5000.00	12.19	44.72	4971.24	290.92	206.71	204.71	290.92	44.72	0.00	---
	5100.00	12.19	44.72	5068.98	312.04	221.71	219.57	312.04	44.72	0.00	---
	5200.00	12.19	44.72	5166.73	333.16	236.72	234.43	333.16	44.72	0.00	---
	5300.00	12.19	44.72	5264.47	354.28	251.73	249.29	354.28	44.72	0.00	---
	5400.00	12.19	44.72	5362.22	375.40	266.73	264.15	375.40	44.72	0.00	---
	5500.00	12.19	44.72	5459.96	396.52	281.74	279.02	396.52	44.72	0.00	---
PBHL	5600.00	12.19	44.72	5557.70	417.64	296.75	293.88	417.64	44.72	0.00	---
	5700.00	12.19	44.72	5655.45	438.76	311.75	308.74	438.76	44.72	0.00	---
	5800.00	12.19	44.72	5753.19	459.88	326.76	323.60	459.88	44.72	0.00	---
	5900.00	12.19	44.72	5850.94	481.00	341.77	338.46	481.00	44.72	0.00	---
	6000.00	12.19	44.72	5948.68	502.12	356.77	353.32	502.12	44.72	0.00	---
	6100.00	12.19	44.72	6046.43	523.24	371.78	368.18	523.24	44.72	0.00	---
	6103.66	12.19	44.72	6050.00	524.01	372.33	368.73	524.01	44.72	0.00	---

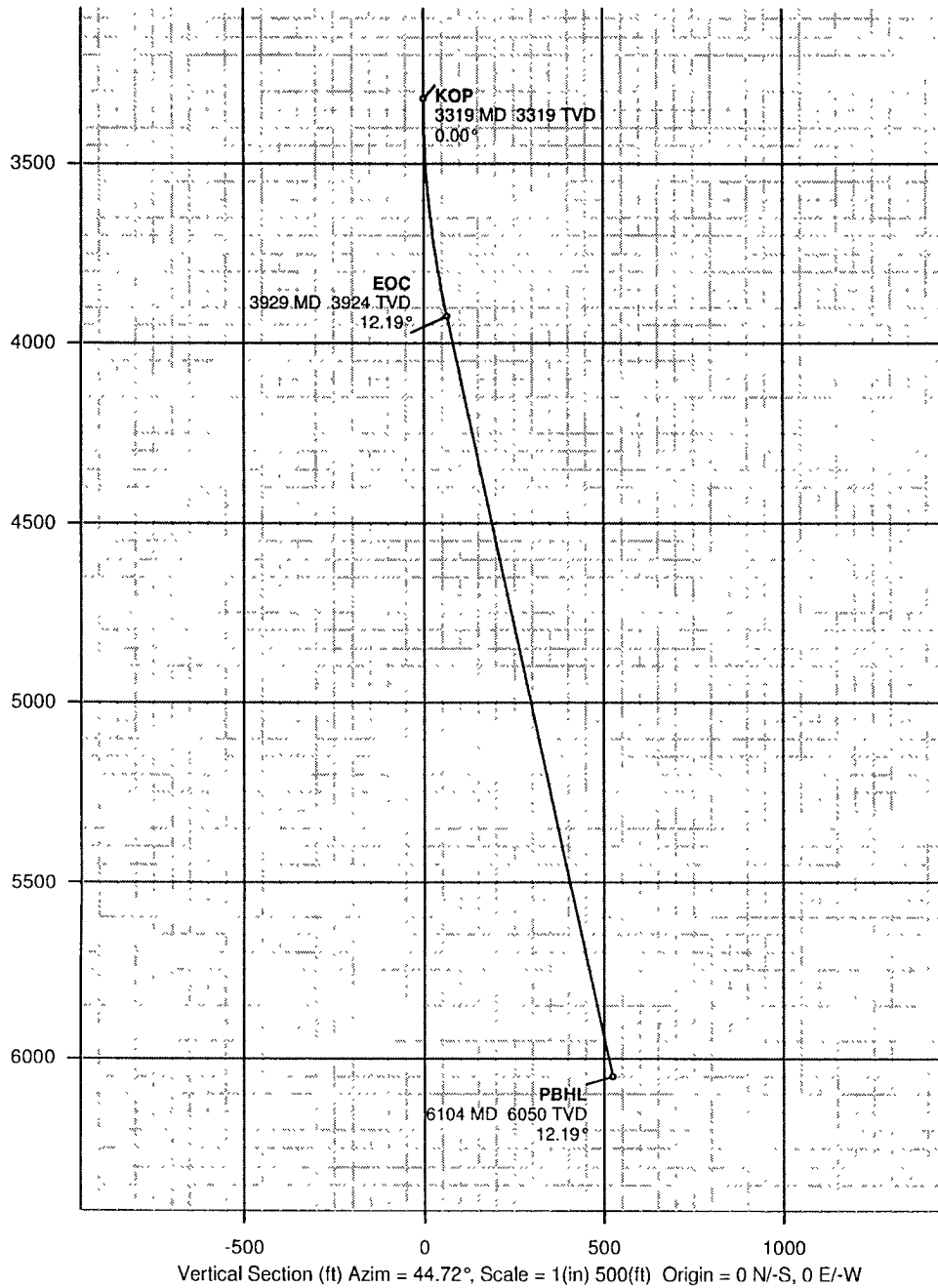
# COG Operating, LLC.

WELL Harvard Federal #12	FIELD Eddy County, NM	STRUCTURE Harvard Federal #12
Magnetic Parameters Model IGRF 2005 Dip 60.809° Mag Dec +8.235°	Date October 05, 2007 FS 49374.2 NT	Surface Location Lat N32 51 15.266 Lon W103 56 8.685 NAD27 New Mexico State Plane, Eastern Zone, US Feet Northing 674713.80 NUS Easting 622094.10 NUS Scale Fact 0.999281616 Miscellaneous Slot Harvard Federal #12 Plan Harvard Federal #12 r1 TVD Ref RKB (0.00 ft above) Srvy Date October 05, 2007



# COG Operating, LLC.

WELL	Harvard Federal #12	FIELD	Eddy County, NM	STRUCTURE	Harvard Federal #12
Magnetic Parameters Mode IGRF 2005 Dip 60.809° Mag Dec +8.235°		Surface Location Lat N29 51 15.266 Lon W100 56 8.685		Miscellaneous Site Harvard Federal #12 Plan Harvard Federal #12.11	
Date October 05, 2007 FS 49374.2 nT		Northings 674713.80 NUS 622094.10 NUS		TVD Ref RKB (0.00 ft above) Srvy Date October 05, 2007	
		Eastings 622094.10 NUS		Scale Fact 0.9999261616	



## COG Operating LLC

### Hydrogen Sulfide Drilling Operation Plan

#### I. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards and characteristics of hydrogen sulfide (H<sub>2</sub>S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H<sub>2</sub>S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H<sub>2</sub>S on metal components. If high tensile tubular are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H<sub>2</sub>S Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H<sub>2</sub>S zone (within 3 days or 500 feet) and weekly H<sub>2</sub>S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan. **The concentrations of H<sub>2</sub>S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

## **II. H2S SAFETY EQUIPMENT AND SYSTEMS**

Note: All H2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonable expected to contain H2S.

### **1. Well Control Equipment:**

- A. Flare line.
- B. Choke manifold.
- C. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
- D. Auxiliary equipment may include if applicable: annular preventer & rotating head.

### **2. Protective equipment for essential personnel:**

- A. Mark II Survive air 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

### **3. H2S detection and monitoring equipment:**

- A. 1 portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

### **4. Visual warning systems:**

- A. Wind direction indicators as shown on well site diagram (Exhibit #8).
- B. Caution/Danger signs (Exhibit #7) shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

### **5. Mud program:**

- A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices, and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

**6. Metallurgy:**

- A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H<sub>2</sub>S service.
- B. All elastomers used for packing and seals shall be H<sub>2</sub>S trim.

**7. Communication:**

- A. Radio communications in company vehicles including cellular telephone and 2-way radio.
- B. Land line (telephone) communication at Office.

**8. Well testing:**

- A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H<sub>2</sub>S environment will use the closed chamber method of testing.
- B. There will be no drill stem testing.

**EXHIBIT #7**

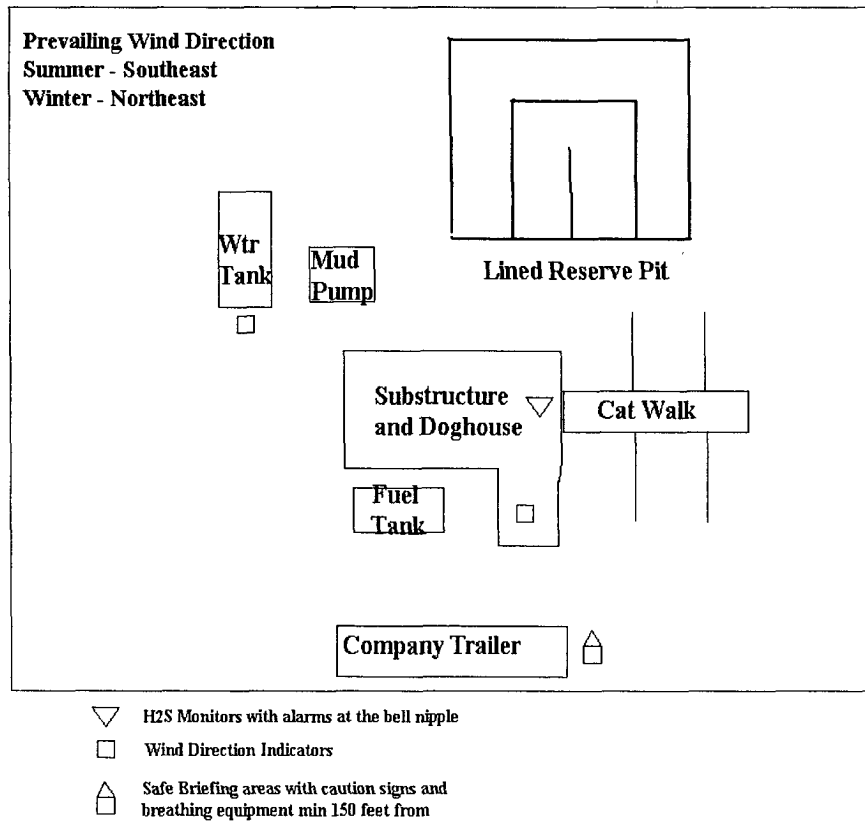
**WARNING**  
**YOU ARE ENTERING AN H<sub>2</sub>S**  
**AUTHORIZED PERSONNEL ONLY**

- 1. BEARDS OR CONTACT LENSES NOT ALLOWED
- 2. HARD HATS REQUIRED
- 3. SMOKING IN DESIGNATED AREAS ONLY
- 4. BE WIND CONSCIOUS AT ALL TIMES
- 5. CHECK WITH COG OPERATING FOREMAN AT

**COG OPERATING LLC**  
**1-432-683-7443**



# DRILLING LOCATION H<sub>2</sub>S SAFETY EQUIPMENT Exhibit # 8



## **SURFACE USE AND OPERATING PLAN**

### **1. Existing & Proposed Access Roads**

- A. The well site survey and elevation plat for the proposed well is shown in Exhibit #1. It was staked by John West Engineering, Hobbs, NM.
- B. All roads to the location are shown in the topographic map Exhibit #2. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary.
- C. Directions to Location: From Loco Hills, go east on US Highway 82 for 2.75 miles to the intersection with Co Rd. #220 (Square Lake Road). Go north on Co.Rd. #220 for approximately 2.4 miles. Turn left and go west approximately 0.5 miles on lease road. Turn right and go north approximately 863 feet to an existing well pad and a proposed road survey. Follow road survey approximately 104 feet north to location. See Vicinity Map, Exhibit #3
- D. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease.

### **2. Proposed Access Road:**

Exhibit #4 shows that the location, when constructed will be on the edge of the existing lease road. 104' of new access road will be required at this time. Any road needed will be located on the southwest corner of the location. The road will be constructed as follows:

The road will be constructed as follows:

- A. The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.
- B. The average grade will be less than 1%.
- C. One turnout may be required.
- D. No culverts, cattleguard, gates, low water crossings or fence cuts are necessary.
- E. Surfacing material will consist of native caliche. Caliche will be obtained from the nearest BLM approved caliche pit or reserve pit area.

**3. Location of Existing Well:**

Exhibit #5 shows all existing wells within a one-mile radius of this well. As shown on this plat there are numerous wells producing from the San Andres and Yeso formations.

**4. Location of Existing and/or Proposed Facilities:**

- A. COG Operating LLC does operate a production facility on this lease.
- B. If the well is productive, contemplated facilities will be as follows:
  - 1) Production will be sent to the Harvard Federal tank battery located at the Harvard Federal #5 well location. The facility location is shown in Exhibit #5.
  - 2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.
  - 3) Any additional caliche will be obtained from a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.
  - 4) Proposed flow lines, will follow an archaeologically approved route to the Tank Battery located at the Harvard Fed. #5 well location. The flowline will be SDR 7 3" poly line laid on the surface and will be approximately 2700' in length.
  - 5) It will be necessary to run electric power if this well is productive. Power will be provided by CVE and they will submit a separate plan and ROW for service to the well location.
  - 6) If the well is productive, rehabilitation plans will include the following:
    - a) The reserve pit contents will be allowed to dry and the cuttings will then be removed and placed into lined burial trench located adjacent to the pit area.(within 120 days after completion, weather permitting)
    - b) Sampling of the reserve pit bottom will be performed if required by the NMOCD and submitted for approval for closure.
    - c) All pit plastic and other materials will be removed and disposed of in the cuttings trench or at an approved NMOCD disposal facility.
    - d) The reserve pit will then be backfilled.
    - e) The original topsoil from the well site will be returned to the location. And the site will be re-contoured to as close to possible to the original site.

**5. Location and Type of Water Supply:**

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Exhibit #2. If a commercial fresh water source is nearby, fast line may be laid along

existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

**6. Source of Construction Materials:**

All caliche required for construction of the drill pad and proposed new access road (approximately 3000 cubic yards) will be obtained from a BLM approved caliche pit or the reserve pit.

**7. Methods of Handling Water Disposal:**

- A. Drill cuttings not retained for evaluation purposes will be disposed into the reserve pit.
- B. Drilling fluids will be contained in a lined working pit. The reserve pit will contain any excess drilling fluid or flow from the well during drilling, cementing and completion operations. The reserve pit will be an earthen pit, approximately 125' X 125' X 10' deep with a wall dividing it into two horseshoe style pits and fenced on three sides prior to drilling. It will be fenced on the fourth side immediately following rig removal. The reserve pit will be lined (12-mil thickness) to minimize loss of drilling fluids and saturation of the ground with brine water.
- C. Water produced from the well during completion may be disposed into the reserve pit or a steel tank (depending on the rates). After the well is permanently placed on production, produced water will be collected in tanks (fiberglass) until pumped to an approved disposal system, produced oil will be collected in steel tanks until sold.
- D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. All water and fluids will be disposed of into the reserve pit. Salts and other chemicals produced during drilling or testing will be disposed into the reserve pit. No toxic waste or hazardous chemicals will be produced by this operation.
- E. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. The reserve pit will be completely fenced and kept closed until it has dried. When the reserve pit is dry the pit will be backfill and reseeded as per BLM specifications as weather permits. In the event of a dry hole only a dry hole marker will remain.

**8. Ancillary Facilities:**

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

**9. Well Site Layout:**

- A. The drill pad layout, with elevations staked by John West Engineering, is shown in Exhibit #4. Dimensions of the pad and pits are shown on Exhibit #6. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.
- B. Exhibit #6 also shows the proposed orientation of reserve pit, working pit and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.
- C. The reserve pit will be lined with high quality plastic sheeting (12 mil thickness).

**10. Plans for Restoration of the Surface:**

- A. Upon completion of the drilling and/or completion operations, if the well is found to be non-commercial, the caliche will be removed from the pad and transported to the original caliche pit or used for other drilling locations in the area. The road will be reclaimed as directed by the BLM. The reserve pit will be reclaimed as described in Section 4.6 above. The original top soil will again be returned to the pad and contoured, as close as possible, to the original topography. The pit will be closed to NMOCD compliance regulations.
- B. The pit lining material will be buried in the cuttings trench or hauled to an approved NMOCD disposal facility in order to return the location and road to their pristine nature. All pits will be filled and the location leveled, weather permitting, within 120 days after abandonment.
- C. The location and road will be rehabilitated as recommended by the BLM.
- D. Three sides of the reserve pit will be fenced prior to and during drilling operations. At the time that the rig is removed, the reserve pit will be fenced on the rig (fourth) side to prevent livestock from being entrapped. The fencing will remain in place until the pit area is cleaned up and leveled. No oil will be left on the surface of the fluid in the pit.
- E. Upon completion of proposed operations, if the well is completed, the reserve pit area will be closed as outlined in Section 4.6 above within the same prescribed time. Any additional caliche required for facilities will be obtained from a BLM approved caliche pit. Topsoil removed from the drill site will be used to re-contour the pit area to its original natural level and reseeded as per BLM specifications.

**11. Surface Ownership:**

- A. The surface is owned by the U.S. Government and is administered by the Bureau of Land Management. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.
- B. The surface tenant for this site is Charles Martin, P.O. Box 706, Artesia NM 88211.
- C. The proposed road routes and surface location will be restored as directed by the BLM.

**12. Other Information:**

- A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. A Cultural Resources Examination is being prepared by Southern New Mexico Archaeological Services, Inc. P.O. Box 1, Bent New Mexico, 88314, phone # 505-671-4797 and the results will be forwarded to your office in the near future.

**13. Bond Coverage:**

Bond Coverage is Nationwide Bond # 000215

**14. Lessee's and Operator's Representative:**

The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

John Coffman,  
Drilling Superintendent  
COG Operating LLC  
550 W. Texas, Suite 1300  
Midland, TX 79701  
Phone (432) 683-7443 (office)  
(432) 631-9762 (cell)

Erick Nelson.  
Division Operations Manager  
COG Operating LLC  
550 W. Texas, Suite 1300  
Midland, TX 79701  
Phone (505) 746-2210 (office)  
(432) 238-7591 (cell)

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating, LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 8<sup>th</sup> day of October, 2007.

Signed: 

Printed Name: John Coffman  
Position: Drilling Superintendent  
Address: 550 W. Texas, Suite 1300, Midland, Texas 79701  
Telephone: (432) 683-7443  
Field Representative (if not above signatory): Same  
Address (if different from above):  
Telephone (if different from above):  
E-mail: JCOffman@conchoresources.com

**Exhibits:**

- |                    |   |
|--------------------|---|
| <b>Exhibit #1</b>  | <b>Wellsite and Elevation Plat<br/>Form C-102 Well location and acreage dedication plat</b> |
| <b>Exhibit #2</b>  | <b>Topographic Map (West)</b>   |
| <b>Exhibit #3</b>  | <b>Vicinity Map and area roads</b>  |
| <b>Exhibit #4</b>  | <b>Elevation Plat (West)</b>  |
| <b>Exhibit #5</b>  | <b>Topographic extract showing wells, roads and flowlines</b>                               |
| <b>Exhibit #6</b>  | <b>Pad Layout and orientation</b>   |
| <b>Exhibit #7</b>  | <b>H2S Signage</b>  |
| <b>Exhibit #8</b>  | <b>H2S Equipment location</b>   |
| <b>Exhibit #9</b>  | <b>BOP and Choke diagrams</b>   |
| <b>Exhibit #10</b> | <b>BOP Requirements</b>   |
| <b>Exhibit #11</b> | <b>Minimum Choke Manifold Requirements</b>  |
| <b>Exhibit #12</b> | <b>Form C-144 NMOCD pit permit application</b>  |





August 20, 2007

U.S. Department of Interior  
Bureau of Land Management

Sirs:

Please accept this letter as authorization for Gary E. Miller of Highlander Environmental Corp. to act as an agent of COG Operating, L.L.C. He will be submitting and signing permits and correspondence with your personnel on these matters for our company.

If you have any questions please call.

Sincerely,

A handwritten signature in cursive script, appearing to read "John Coffman".

COG Operating, L.L.C.

## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 2 hours in advance for a representative to witness:

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(505) 361-2822

- 1. A Hydrogen Sulfide (H<sub>2</sub>S) Drilling Plan should be activated 500 feet prior to drilling into the **Grayburg** formation. **Measurements between 500-1800 ppm in the gas stream.**
- 2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

### B. CASING

- 1. The 13-3/8 inch surface casing shall be set **a minimum of 25 feet into the Rustler Anhydrite at approximately 425 feet** and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement).
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial action will be done prior to drilling out that string.

**Possible lost circulation in the Grayburg and San Andres formations.  
Possible water flows in the Salado and Artesia Groups.**

2. The minimum required fill of cement behind the 8-5/8 inch intermediate casing is:  
☒ Cement to surface. If cement does not circulate see B.1.a-d above.
3. The minimum required fill of cement behind the 5-1/2 inch production casing is:  
☒ Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.
4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

**C. PRESSURE CONTROL**

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. The appropriate BLM office shall be notified a minimum of 2 hours in advance for a representative to witness the tests.
  - a. The tests shall be done by an independent service company.
  - b. The results of the test shall be reported to the appropriate BLM office.
  - c. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
  - d. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.
  - e. A variance to test the surface casing and BOP/BOPE to the reduced pressure of 1500 psi with a third party tester is approved.

**Engineer on call phone (after hours):      Carlsbad: (505) 706-2779**

**WWI 102307**