

AUG 21 2008

Form 3160-3
 (February 2005)

HOBBS OCD
 UNITED STATES

DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

5 Lease Serial No.
NMNM 105885

6 If Indian, Allottee or Tribe Name
 N/A

7 If Unit or CA Agreement, Name and No
 N/A

8 Lease Name and Well No.
Hercules Federal Com #34

9 API Well No.
30-005-29050

1a. Type of work DRILL REENTER

1b. Type of Well Oil Well Gas Well Other Single Zone Multiple Zone

2 Name of Operator
C.O.G. Operating L.L.C. 229137

3a Address **550 W. Texas, #1300
 Midland, Texas 79701**

3b Phone No. (include area code)
432-685-9158

10 Field and Pool or Exploratory
W. Area Wolfcamp

4 Location of Well (Report location clearly and in accordance with any State requirements *)
 At surface **1980' FSL & 430' FWL, Unit L**
 At proposed prod zone **1980' FSL & 330' FEL, Unit I**

11 Sec., T R M or Bk and Survey or Area
Section 15, T15S, R31E

14 Distance in miles and direction from nearest town or post office*
Approximately 15 miles North of Maljamar, New Mexico

12 County or Parish
Chaves County

13 State
NM

15 Distance from proposed* location to nearest property or lease line, ft (Also to nearest drig unit line, if any)
330'

16 No of acres in lease
800

17 Spacing Unit dedicated to this well
160

18 Distance from proposed location* to nearest well, drilling completed applied for, on this lease, ft
1320'

19 Proposed Depth
13450' MD 8750' TVD

20 BLM/BIA Bond No. on file
NMB 000215

21 Elevations (Show whether DF, KDB, RT, GL, etc)
4400' GL

22 Approximate date work will start*
07/10/2008

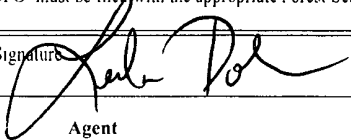
23 Estimated duration
45 Days

24. Attachments **ROSWELL CONTROLLED WATER BASIN**

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

- 1 Well plat certified by a registered surveyor
- 2 A Drilling Plan
- 3 A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office)

- 4 Bond to cover the operations unless covered by an existing bond on file (see Item 20 above)
- 5 Operator certification
- 6 Such other site specific information and/or plans as may be required by the BLM

25 Signature 
 Title **Agent**

Name (Printed Typed)
Lee Ann Rollins

Date
5/18/08

Approved by (Signature) **/s/ Angel Mayes**
 Title **Assistant Field Manager, Lands And Minerals**

Name (Printed Typed) **/s/ Angel Mayes**
 Office **ROSWELL FIELD OFFICE**

Date **AUG 19 2008**

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.

APPROVED FOR 2 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

*(Instructions on page 2)

**APPROVAL SUBJECT TO
 GENERAL REQUIREMENTS AND
 SPECIAL STIPULATIONS ATTACHED**

**WITNESS
 SURFACE & INTERMEDIATE
 CASING**

KA

EXHIBIT "A"

DISTRICT I
1825 N. French Dr., Hobbs, NM 88240

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

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

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 38-005-29050	Pool Code -	Pool Name Wildcat Wolfcamp
Property Code 37347	Property Name HERCULES FEDERAL COM	Well Number 38
OGRID No. 229137	Operator Name C.O.G. OPERATING L.L.C.	Elevation 4400'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	15	15 S	31 E		1980	SOUTH	430	WEST	CHAVES

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
I	15	15 S	31 E		1980	SOUTH	330	EAST	CHAVES

Dedicated Acres 160	Joint or Infill	Consolidation Code	Order No.
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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>SURFACE LOCATION LAT.: N 33°00'50.65" LONG.: W103°49'00.44" N.: 733044.316 SPC- E.: 699674.047 (NAD-83)</p>		<p>BOTTOM HOLE LOCATION LAT.: N 33°00'50.82" LONG.: W103°48'07.28" N.: 733084.176 SPC- E.: 704200.381 (NAD-83)</p>		<p>OPERATOR CERTIFICATION I hereby certify that the information contained 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 pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>John Dol</i> Signature Date 5/15/2008</p> <p>Printed Name</p>	
<p>4403.9' 4399.6'</p> <p>430'</p> <p>SL</p> <p>4401.9' 4397.2'</p> <p>1980'</p>		<p>160 acres</p> <p>Fed Lease</p> <p>4526.5'</p> <p>330'</p> <p>B.H.</p> <p>1980'</p> <p>08010-0000</p>		<p>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</p> <p>DECEMBER 11, 2007 Date Surveyed</p> <p><i>Gay L. Jones</i> Signature Professional Seal No. 7977</p> <p>W. No. 08010-0005</p> <p>Certificate No. Gay L. Jones 7977</p> <p>BASIN SURVEYS</p>	

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
Hercules '15' Federal Com #3H
SL: 1980' FSL & 430' FWL
BHL: 1980' FSL & 330' FEL
Sec 15, T15S, R31E
Chaves County, NM

1. Proration Unit Spacing: 160 Acres
2. Ground Elevation: 4400'
3. Proposed Depths: Pilot hole TD = 8960', Horizontal TVD = 8750', MD = 13450'
4. Estimated tops of geological markers:

Quaternary	Surface
Yates	2410'
Queen	3220'
San Andres	3950'
Tubb	6770'
Abo	7460'
Wolfcamp	8660'

5. Possible mineral bearing formations:

Water sand	150'	Fresh Water
Yates	2410'	Oil / Gas
Queen	3220'	Oil / Gas
San Andres	3950'	Oil / Gas
Tubb	6770'	Oil / Gas
Abo	7460'	Oil / Gas
Wolfcamp	8660'	Oil / Gas

6. Casing Program - Proposed

<u>Hole size</u>	<u>Interval</u>	<u>OD of Casing</u>	<u>Weight</u>	<u>Cond.</u>	<u>Collar</u>	<u>Grade</u>
17-1/2"	0' - +/-400'	13-3/8"	48#	New	STC	H40
Collapse sf – 3.78, Burst sf – 7.20, Tension sf – 15.72						
12 1/4"	0' - 4000'	9-5/8"	40#	New	STC	J-55
Collapse sf – 1.285, Burst sf – 1.17, Tension sf – 3.25						
8-3/4"	0' – 8500'	5-1/2"	17#	New	LTC	P-110
Collapse sf – 1.75, Burst sf – 2.42, Tension sf – 2.94						
7-7/8"	8500' – 13450'	5-1/2"	17#	New	BTC	P-110
Collapse sf – 1.68, Burst sf – 2.39, Tension sf – 79.28						

WITNESS

WITNESS

**ATTACHMENT TO FORM 3160-3
COG Operating, LLC
Hercules '15' Federal Com #3H
Page 2 of 3**

7. Cement Program

13 3/8" Surf. Csg. Set at +/- 400', Circ to Surf with +/- 400 sx Class "C" w/ 2% CaCl₂, 1.35 yd.
 9 5/8" Intrmd. Csg. Set at +/- 4000'. Circ to Surf with +/- 800 sx 35/65 Poz "C", 2.05 yd. & 200 sx Class "C" w/ 2% CaCl₂, 1.35 yd.
 5 1/2" Prod. Csg. Set at +/- 13300' MD. Cement casing with +/- 200 sx. 50/50/2 "C", 1.37 yd & +/- 900 sx Class "H", 1.18 yd. Est. TOC @ 8500'.

8. Pressure Control Equipment:

After setting 13 3/8" casing and installing 3000 psi casing head, NU 13 5/8" 3000 psi annular BOP. Test annular BOP, casing and manifold with clear fluid to 800 psi w/ rig pump. After setting 9 5/8" casing and installing 3000 psi casing spool, NU 3000 psi double ram BOP and 3000psi annular BOP. Test double ram BOP and manifold to 3000# with clear fluid and annular to 1500 psi using an independent tester and used continuously until TD is reached. Blind rams will be operationally checked on each trip out of hole. Pipe rams will be operationally checked each 24 hour period. These checks will be noted on daily tour sheets. Other accessories to the BOP equipment include a Kelly cock and floor safety valves, choke lines and choke manifold with 3000 psi WP rating.

9. Proposed Mud Circulating System

<u>Interval</u>	<u>Mud Wt.</u>	<u>Visc.</u>	<u>FL</u>	<u>Type Mud System</u>
0' - 400'	8.5	28	NC	Fresh water native mud w/ paper for seepage and sweeps. Lime for PH.
400' - 4000'	9.1	30	NC	Cut brine mud, lime for PH and paper for seepage and sweeps.
4000' - 7500'	9.1	29	NC	Drill section with fresh water/cut brine circulating the reserve utilizing periodic sweeps of paper as needed for seepage control and solids removal.
7500' - 13300'	9.5	36	10	Drill pilot hole, curve and horizontal section with XCD polymer / cut brine / starch.

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

10. 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.

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
Hercules '15' Federal Com #3H
Page 3 of 3

11. Production Hole Drilling Summary:

Drill 8-3/4" Pilot hole thru Wolfcamp, run open hole logs. Spot 150 sx. "H" Kick off plug from +/- 8800' to +/-8300'. Time drill and kick off 7-7/8" hole at +/- 8300', building curve over +/- 475' to horizontal at 8680' TVD. Drill horizontal section in a easterly direction for +/-4500' lateral. Run production casing and cement.

12. 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 ran from T.D. in vertical pilot hole to 9 5/8" casing shoe.
- B. The mud logging program will consist of lagged 10' samples from intermediate casing point to T.D. in vertical pilot hole and from Kick off point to TD in Horizontal hole.
- C. Drill Stem test is not anticipated.
- D. No conventional coring is anticipated.
- E. 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.

13. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 120 degrees and estimated maximum bottom hole pressure is 3750 psig. Low levels of Hydrogen sulfide have been monitored in producing wells in the area, so H2S may be present while drilling of the well. An H2S plan is attached to the Drilling Program. No major loss of circulation zones has been reported in offsetting wells.

14. Anticipated Starting Date

Drilling operations will commence approximately on July 10, 2008 with drilling and completion operations lasting approximately 45 days.

COG Operating LLC

Chaves County

Hercules Federal Com #3H

Hercules Federal Com #3H

Original Hole

Plan: Plan #1

Pathfinder Survey Report

30 April, 2008

COG Operating, L.L.C.



Azimuths to Grid North
 True North: -0.28°
 Magnetic North: 7.84°

Magnetic Field
 Strength: 49395.9snT
 Dip Angle: 60.97°
 Date: 4/30/2008
 Model: IGRF200510



WELL DETAILS: Hercules Federal Com #3H

Ground Elevation 4400.00
 RKB Elevation EST RKB @ 4400.00ft
 Rig Name

+N-S	+E-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	733044.316	699674.047	33° 0' 50.651 N	103° 49' 0.435 W	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	8200.00	0.00	0.00	0.00	0.00	0.00	
2	8200.00	0.00	0.00	8200.00	0.00	0.00	0.00	0.00	0.00	
3	8945.88	89.01	89.49	8680.00	4.20	471.76	11.93	89.49	471.78	
4	9007.88	89.01	89.50	8681.07	4.75	533.83	0.01	81.07	533.85	
5	13001.14	89.01	89.50	8750.00	39.86	4526.33	0.00	0.00	4526.51	PBHL (HFC3)

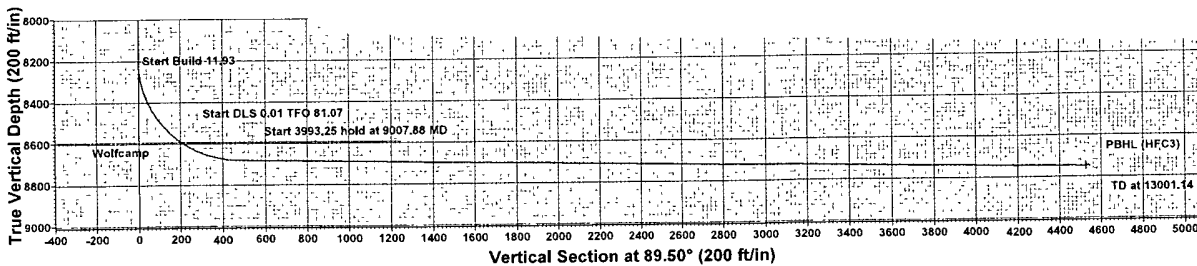
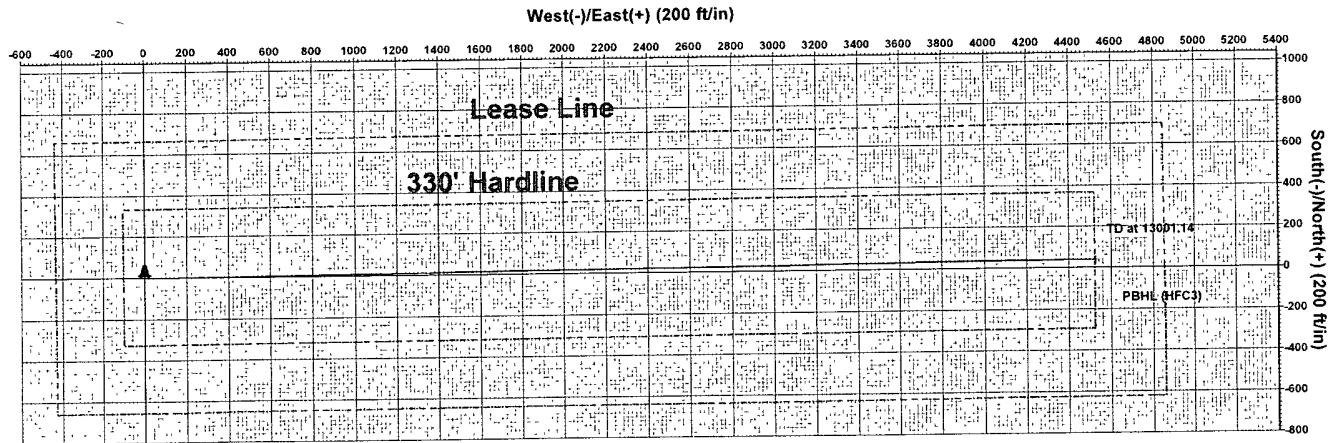
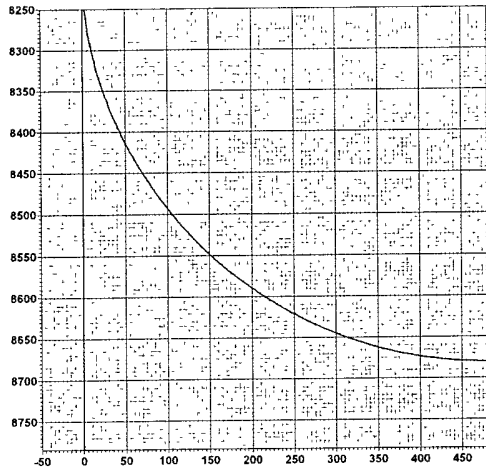
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N-S	+E-W	Northing	Easting	Shape
PBHL (HRZ3)	0.00	39.86	4526.33	733084.176	704200.381	Point

Project: Chaves County
 Site: Hercules Federal Com #3H
 Well: Hercules Federal Com #3H
 Wellbore: Original Hole
 Plan: Plan #1 (Hercules Federal Com #3H/Original Hole)

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2410.00	2410.00	Yates
3320.00	3320.00	Queen
3950.00	3950.00	San Andres S
6770.00	6770.00	Tubb
7460.00	7460.00	Abo
8592.77	8660.00	Wolfcamp



PROJECT DETAILS: Chaves County
 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

Plan: Plan #1 (Hercules Federal Com #3H/Original Hole)
 Created By: Mark Freeman Date: 13 57, April 30 2008
 Checked: _____ Date: _____

WHS

Pathfinder Survey Report

Company: COG Operating LLC	Local Co-ordinate Reference: Well Hercules Federal Com #3H
Project: Chaves County	TVD Reference: EST RKB @ 4400 00ft
Site: Hercules Federal Com #3H	MD Reference: EST RKB @ 4400 00ft
Well: Hercules Federal Com #3H	North Reference: Grid
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature
Design: Plan #1	Database: EDM 2003.16 Single User Db

Project	Chaves County		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Hercules Federal Com #3H

Site Position:	Northing: 733,044.316 ft	Latitude: 33° 0' 50.651 N
From: Map	Easting: 699,674 047 ft	Longitude: 103° 49' 0 435 W
Position Uncertainty: 0 00 ft	Slot Radius: "	Grid Convergence: 0.28 °

Well Hercules Federal Com #3H

Well Position	+N/-S 0 00 ft	Northing: 733,044 316 ft	Latitude: 33° 0' 50 651 N
	+E/-W 0.00 ft	Easting: 699,674 047 ft	Longitude: 103° 49' 0 435 W
Position Uncertainty	0 00 ft	Wellhead Elevation: ft	Ground Level: 4,400 00ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	4/30/2008	8 12	60.97	49,396

Design Plan #1

Audit Notes:

Version:	Phase: PLAN	Tie On Depth: 0 00
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Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0 00	0.00	0.00	89 50

Survey Tool Program		Date 4/30/2008			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	13,001 14	Plan #1 (Original Hole)	MWD	MWD - Standard	

Planned Survey:

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
100 00	0 00	0 00	100 00	0 00	0 00	0 00	0 00
200 00	0 00	0 00	200 00	0 00	0 00	0 00	0 00
300 00	0 00	0 00	300 00	0 00	0 00	0 00	0 00
400 00	0 00	0 00	400 00	0 00	0 00	0 00	0 00
500 00	0 00	0 00	500 00	0 00	0 00	0 00	0 00
600 00	0 00	0 00	600 00	0 00	0 00	0 00	0 00
700 00	0 00	0 00	700 00	0 00	0 00	0 00	0 00
800 00	0 00	0 00	800 00	0 00	0 00	0 00	0 00
900 00	0 00	0 00	900 00	0 00	0 00	0 00	0 00
1,000 00	0 00	0 00	1,000 00	0 00	0 00	0 00	0 00
1,100 00	0 00	0 00	1,100 00	0 00	0 00	0 00	0 00

WHS

Pathfinder Survey Report

Company: COG Operating LLC
Project: Chaves County
Site: Hercules Federal Com #3H
Well: Hercules Federal Com #3H
Wellbore: Original Hole
Design: Plan #1

Local Co-ordinate Reference: Well Hercules Federal Com #3H
TVD Reference: EST RKB @ 4400.00ft
MD Reference: EST RKB @ 4400.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00

WHS

Pathfinder Survey Report

Company: COG Operating LLC
Project: Chaves County
Site: Hercules Federal Com #3H
Well: Hercules Federal Com #3H
Wellbore: Original Hole
Design: Plan #1

Local Co-ordinate Reference: Well Hercules Federal Com #3H
TVD Reference: EST RKB @ 4400.00ft
MD Reference: EST RKB @ 4400 00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003 16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00
8,225.00	2.98	89.49	8,224.99	0.01	0.65	0.65	11.93
8,250.00	5.97	89.49	8,249.91	0.02	2.60	2.60	11.93
8,275.00	8.95	89.49	8,274.70	0.05	5.85	5.85	11.93
8,300.00	11.93	89.49	8,299.28	0.09	10.38	10.38	11.93
8,325.00	14.92	89.49	8,323.59	0.14	16.18	16.18	11.93
8,350.00	17.90	89.49	8,347.57	0.21	23.24	23.24	11.93
8,375.00	20.89	89.49	8,371.15	0.28	31.54	31.54	11.93
8,400.00	23.87	89.49	8,394.26	0.37	41.06	41.06	11.93
8,425.00	26.85	89.49	8,416.85	0.46	51.77	51.77	11.93
8,450.00	29.84	89.49	8,438.85	0.57	63.63	63.64	11.93
8,475.00	32.82	89.49	8,460.21	0.68	76.63	76.63	11.93
8,500.00	35.80	89.49	8,480.85	0.81	90.72	90.73	11.93
8,525.00	38.79	89.49	8,500.74	0.94	105.87	105.87	11.93
8,550.00	41.77	89.49	8,519.81	1.09	122.03	122.03	11.93
8,575.00	44.76	89.49	8,538.01	1.24	139.16	139.17	11.93
8,600.00	47.74	89.49	8,555.30	1.40	157.22	157.22	11.93
8,625.00	50.72	89.49	8,571.62	1.57	176.15	176.15	11.93

WHS

Pathfinder Survey Report

Company: COG Operating LLC
Project: Chaves County
Site: Hercules Federal Com #3H
Well: Hercules Federal Com #3H
Wellbore: Original Hole
Design: Plan #1

Local Co-ordinate Reference: Well Hercules Federal Com #3H
TVD Reference: EST RKB @ 4400.00ft
MD Reference: EST RKB @ 4400.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003 16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
8,650.00	53.71	89.49	8,586.94	1.74	195.90	195.91	11.93
8,675.00	56.69	89.49	8,601.20	1.93	216.43	216.43	11.93
8,700.00	59.67	89.49	8,614.38	2.12	237.67	237.68	11.93
8,725.00	62.66	89.49	8,626.44	2.31	259.56	259.57	11.93
8,750.00	65.64	89.49	8,637.34	2.51	282.06	282.07	11.93
8,775.00	68.63	89.49	8,647.05	2.72	305.09	305.10	11.93
8,800.00	71.61	89.49	8,655.55	2.92	328.60	328.61	11.93
8,825.00	74.59	89.49	8,662.82	3.14	352.51	352.53	11.93
8,850.00	77.58	89.49	8,668.83	3.35	376.78	376.79	11.93
8,875.00	80.56	89.49	8,673.57	3.57	401.32	401.33	11.93
8,900.00	83.54	89.49	8,677.03	3.79	426.07	426.09	11.93
8,925.00	86.53	89.49	8,679.19	4.01	450.98	450.99	11.93
8,945.80	89.01	89.49	8,680.00	4.20	471.76	471.78	11.93
9,007.88	89.01	89.50	8,681.07	4.75	533.83	533.85	0.01
9,100.00	89.01	89.50	8,682.66	5.56	625.93	625.95	0.00
9,200.00	89.01	89.50	8,684.39	6.44	725.91	725.94	0.00
9,300.00	89.01	89.50	8,686.11	7.32	825.89	825.92	0.00
9,400.00	89.01	89.50	8,687.84	8.20	925.87	925.91	0.00
9,500.00	89.01	89.50	8,689.57	9.08	1,025.85	1,025.89	0.00
9,600.00	89.01	89.50	8,691.29	9.95	1,125.84	1,125.88	0.00
9,700.00	89.01	89.50	8,693.02	10.83	1,225.82	1,225.86	0.00
9,800.00	89.01	89.50	8,694.74	11.71	1,325.80	1,325.85	0.00
9,900.00	89.01	89.50	8,696.47	12.59	1,425.78	1,425.84	0.00
10,000.00	89.01	89.50	8,698.20	13.47	1,525.76	1,525.82	0.00
10,100.00	89.01	89.50	8,699.92	14.35	1,625.74	1,625.81	0.00
10,200.00	89.01	89.50	8,701.65	15.23	1,725.72	1,725.79	0.00
10,300.00	89.01	89.50	8,703.38	16.11	1,825.70	1,825.78	0.00
10,400.00	89.01	89.50	8,705.10	16.99	1,925.69	1,925.76	0.00
10,500.00	89.01	89.50	8,706.83	17.87	2,025.67	2,025.75	0.00
10,600.00	89.01	89.50	8,708.55	18.75	2,125.65	2,125.73	0.00
10,700.00	89.01	89.50	8,710.28	19.63	2,225.63	2,225.72	0.00
10,800.00	89.01	89.50	8,712.01	20.51	2,325.61	2,325.70	0.00
10,900.00	89.01	89.50	8,713.73	21.39	2,425.59	2,425.69	0.00
11,000.00	89.01	89.50	8,715.46	22.26	2,525.57	2,525.67	0.00
11,100.00	89.01	89.50	8,717.18	23.14	2,625.55	2,625.66	0.00
11,200.00	89.01	89.50	8,718.91	24.02	2,725.54	2,725.64	0.00
11,300.00	89.01	89.50	8,720.64	24.90	2,825.52	2,825.63	0.00
11,400.00	89.01	89.50	8,722.36	25.78	2,925.50	2,925.61	0.00
11,500.00	89.01	89.50	8,724.09	26.66	3,025.48	3,025.60	0.00
11,600.00	89.01	89.50	8,725.81	27.54	3,125.46	3,125.58	0.00
11,700.00	89.01	89.50	8,727.54	28.42	3,225.44	3,225.57	0.00
11,800.00	89.01	89.50	8,729.27	29.30	3,325.42	3,325.55	0.00
11,900.00	89.01	89.50	8,730.99	30.18	3,425.40	3,425.54	0.00
12,000.00	89.01	89.50	8,732.72	31.06	3,525.39	3,525.52	0.00
12,100.00	89.01	89.50	8,734.45	31.94	3,625.37	3,625.51	0.00

WHS

Pathfinder Survey Report

Company: COG Operating LLC
Project: Chaves County
Site: Hercules Federal Com #3H
Well: Hercules Federal Com #3H
Wellbore: Original Hole
Design: Plan #1

Local Co-ordinate Reference: Well Hercules Federal Com #3H
TVD Reference: EST RKB @ 4400 00ft
MD Reference: EST RKB @ 4400.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003 16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)
12,200 00	89 01	89 50	8,736 17	32 82	3,725 35	3,725 49	0.00
12,300 00	89 01	89 50	8,737 90	33 70	3,825 33	3,825 48	0.00
12,400.00	89 01	89 50	8,739 62	34.57	3,925 31	3,925 46	0.00
12,500 00	89 01	89 50	8,741 35	35.45	4,025 29	4,025 45	0.00
12,600.00	89 01	89 50	8,743.08	36.33	4,125 27	4,125.43	0.00
12,700.00	89.01	89.50	8,744 80	37 21	4,225 25	4,225.42	0.00
12,800.00	89 01	89 50	8,746 53	38.09	4,325.24	4,325.40	0.00
12,900 00	89 01	89 50	8,748 25	38.97	4,425.22	4,425 39	0.00
13,001 14	89.01	89.50	8,750.00	39.86	4,526.33	4,526 51	0.00

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
PBHL (HFC3) - plan hits target - Point	0.00	0.00	8,750 00	39 86	4,526 33	733,084 176	704,200 381	33° 0' 50.823 N	103° 48' 7.276 W

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,950 00	3,950.00	San Andres D		0.00	
8,660 00	8,592 77	Wolfcamp		0.00	
6,770 00	6,770.00	Tubb		0.00	
3,320 00	3,320 00	Queen		0.00	
7,460 00	7,460.00	Abo		0.00	
2,410 00	2,410 00	Yates		0.00	

Checked By: _____ Approved By: _____ Date: _____

SURFACE USE AND OPERATIONS PLAN
FOR DRILLING, COMPLETION, AND PRODUCING

C.O.G. Operating, LLC
Hercules Federal Com #3H
SL: 1980' FSL & 430' FWL, Unit L
BHL: 1980' FSL & 330' FEL, Unit I
Sec 15, T15S, R31E
Chaves County, New Mexico

LOCATED:

Approximately 15 miles North of Maljamar, New Mexico

OIL & GAS LEASE

SL: NMNM #105885
BHL: State of New Mexico

RECORD TITLE LESSEE

SL: Chesapeake Exploration LP PO Box 18496, Oklahoma City, OK 73154
COG Oil and Gas LP 550 West Texas Ave., Suite 1300, Midland, TX 79701
BHL: State of New Mexico

BOND COVERAGE

\$25,000 statewide bond of C.O.G. Operating, L.L.C. NMB 000215

SURFACE OWNER

Billy & Donna Medlin, P.O. Box 50 Maljamar, NM 88264
Phone: (505) 676-4121

MINERAL OWNER

SL: Bureau of Land Management
BHL: State of New Mexico

POOL

Wolfcamp

PROPOSED TOTAL DEPTH

This well will be drilled to a Total Vertical Depth of approximately 8750' and a Measured Depth of approximately 13,450'.

EXHIBITS

- A. Well Location & Acreage Dedication Map
- B. Area Road Map
- C-1 & C-2. Vicinity Oil & Gas Map
- D. Topographic & Location Verification Map
- E-1 & E-2. Proposed Lease Road and Pad Layout Map
- F. Drilling Rig Layout
- G. BOPE Schematic
- H. Choke Manifold Schematic

EXISTING ROADS

- A. Exhibit A is a portion of a section map showing the location of the proposed well as staked.
- B. Exhibit B is a map showing existing roads in the vicinity of the proposed well site.
- C. Directions to well location:
From mile marker 32 of Highway 249, go east 243.0' to proposed lease road.

ACCESS ROADS

- A. Length and Width: 520.6' long and 30' wide. COG Operating LLC has an agreement with the surface owner for right-of-way for the proposed 520.6' lease road which is accessible from Highway 249.
- B. Surface Material: Existing
- C. Maximum Grad: Less than five percent
- D. Turnouts: None necessary
- E. Drainage Design: Existing
- F. Culverts: None necessary
- G. Gates and Cattle Guards: None needed

LOCATION OF EXISTING WELLS

Existing wells in the immediate area are shown in Exhibit C.

LOCATION OF EXISTING AND/OR PROPOSED FACILITIES

Necessary production facilities for this well will be located on the well pad.

LOCATION AND TYPE OF WATER SUPPLY

It is not contemplated that a water well will be drilled. Water necessary for drilling will be purchased and hauled to the site over existing roads shown on Exhibit E-1.

METHODS OF HANDLING WASTE DISPOSAL

- A. Drilling fluids will be allowed to evaporate in the drilling pits until the pits are dry.
- B. Water produced during tests will be disposed of in the drilling pits.
- C. Oil produced during tests will be stored in test tanks.
- D. Trash will be contained in a trash trailer and removed from well site.
- E. All trash and debris will be removed from the well site within 30 days after finishing drilling and/or completion operations.

ANCILLARY FACILITIES

None required.

WELL SITE LAYOUT

Exhibit F shows the relative location and dimensions of the well pad, mud pits, reserve pit, and trash pit, and the location of major rig components.

PLANS FOR RESTORATION OF THE SURFACE

- A. After completion of drilling and/or completion operations, all equipment and other material not needed for operations will be removed. The well site will be cleaned of all trash and junk to leave the site in an as aesthetically pleasing condition as possible.
- B. After abandonment, all equipment, trash, and junk will be removed and the site will be clean.

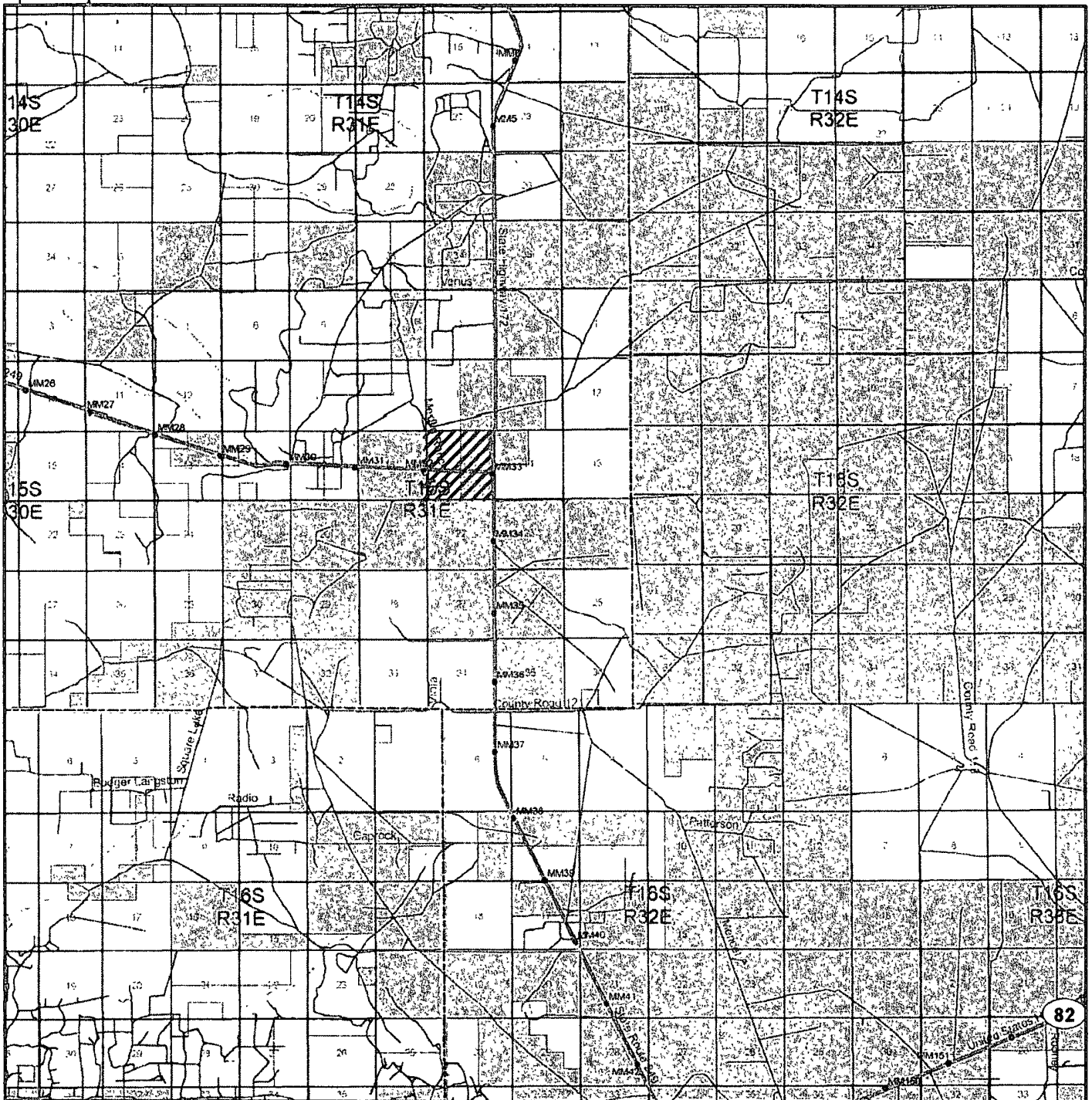
OTHER INFORMATION

- A. Topography:**
The topography consists of sandy soil with native grasses. No wildlife was observed, but the usual inhabitants of this region are Jackrabbits, Reptiles, Coyotes, etc.
- B. Soil:** Topsoil at the well site is sandy soil.
- C. Flora and Fauna:** The location is in an area sparsely covered with mesquite and range grasses.
- D. Ponds and Streams:** There are no rivers, lakes, ponds, or streams in the area.
- E. Residences and Other Structures:** There are no residences within a mile of the proposed well site.
- F. Archaeological, Historical, and Cultural sites:** An Archaeological Survey has been ordered and a copy to be sent to the BLM Office.
- G. Land Use:** Grazing

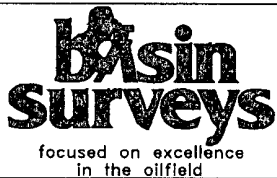
OPERATOR'S REPRESENTATIVE

John Coffman
C.O.G. Operating, LLC
550 W. Texas Ave, Suite 1300
Midland, TX 79701
(432) 683-7443

EXHIBIT "B"



HERCULES FEDERAL COM #3H
 Located at 1980' FSL and 430 FWL
 Section 15, Township 15 South, Range 31 East,
 N.M.P.M., Chaves County, New Mexico.



P.O. Box 1786
 1120 N. West County Rd.
 Hobbs, New Mexico 88241
 (505) 393-7316 - Office
 (505) 392-3074 - Fax
 basinsurveys.com

W.O. Number: JMS 18905TR

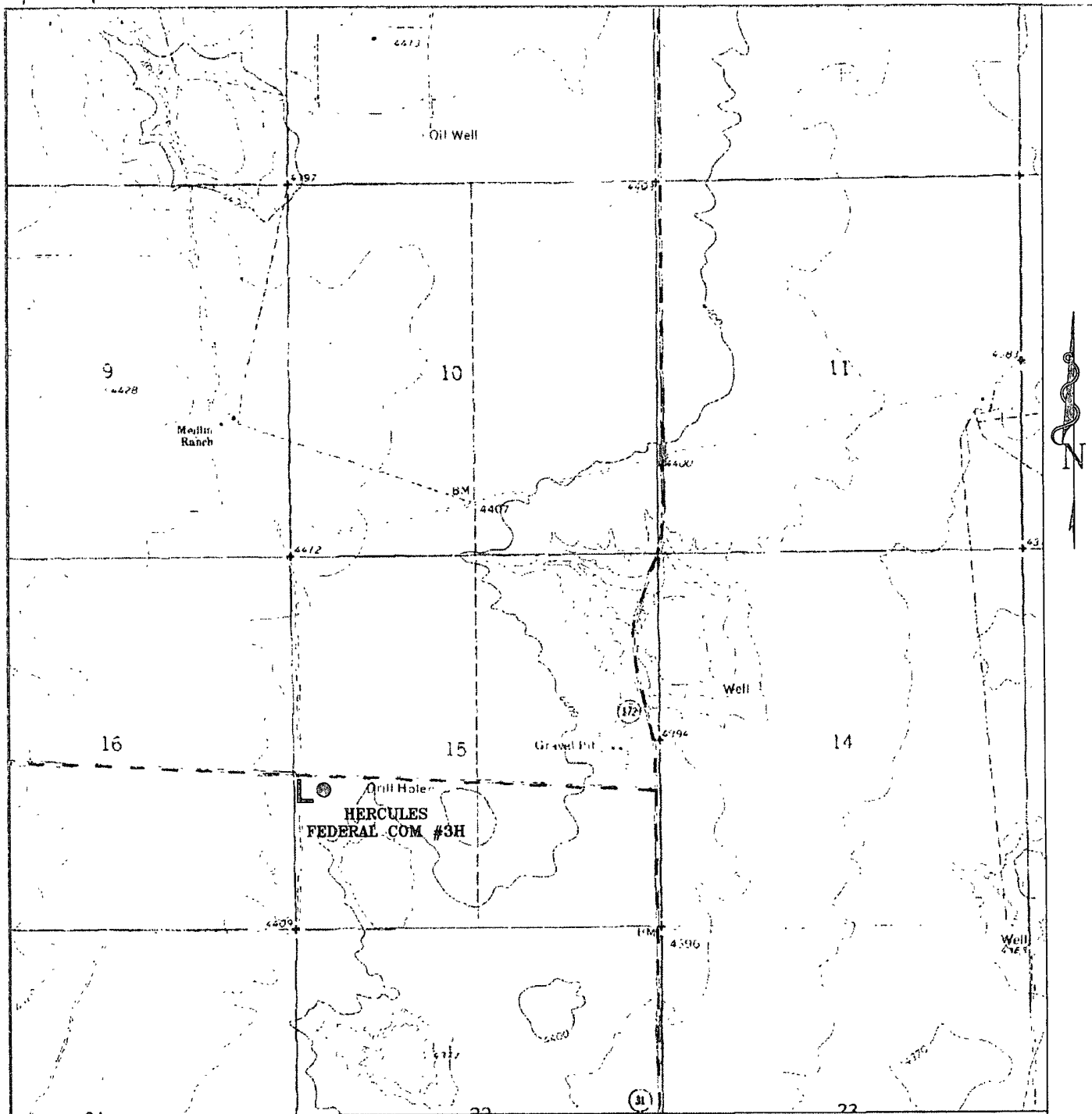
Survey Date: 12-11-2007

Scale: 1" = 2 MILES

Date: 12-11-2007

C.O.G.
 OPERATING
 L.L.C.

EXHIBIT "D"



HERCULES FEDERAL COM #3H
 Located at 1980' FSL and 430' FWL
 Section 15, Township 15 South, Range 31 East,
 N.M.P.M., Chaves County, New Mexico.

Basin Surveys
 focused on excellence
 in the oilfield

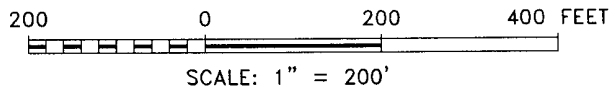
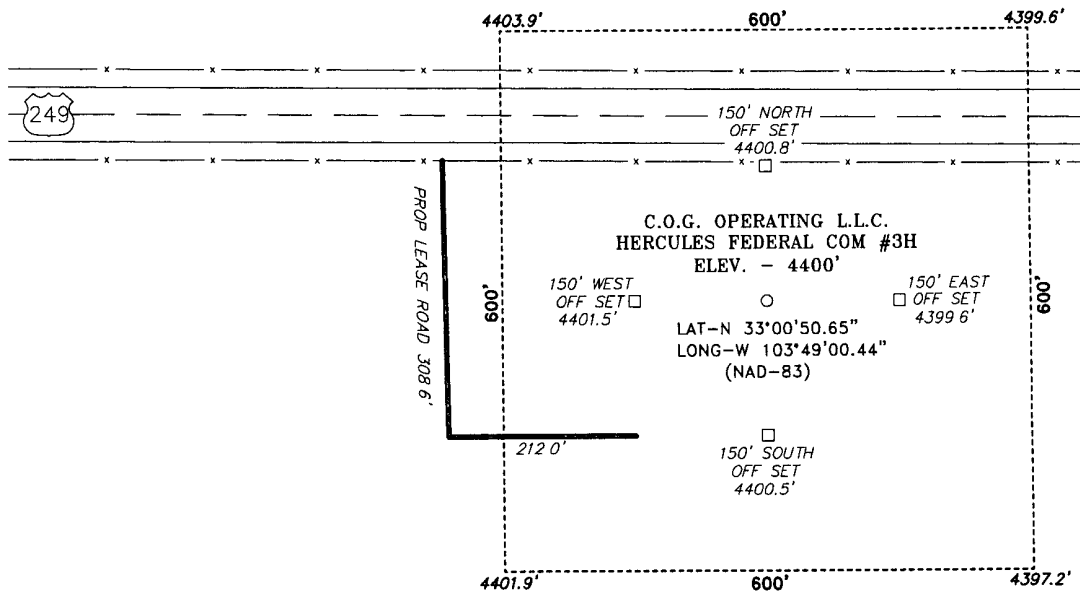
P.O. Box 1786
 1120 N. West County Rd.
 Hobbs, New Mexico 88241
 (505) 393-7316 - Office
 (505) 392-3074 - Fax
 basin-surveys.com

W.C. Number:	JMS 18905T
Survey Date:	12-11-2007
Scale:	1" = 2000'
Date:	12-11-2007

**C.O.G.
 OPERATING
 L.L.C.**

EXHIBIT "E-1"

SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M.,
CHAVES COUNTY, NEW MEXICO.



DIRECTIONS TO LOCATION:

FROM MILE MARKER 32 OF HWY 249, GO EAST 243.0'
TO PROPOSED LEASE ROAD

BASIN SURVEYS P.O. BOX 1786 - HOBBS, NEW MEXICO

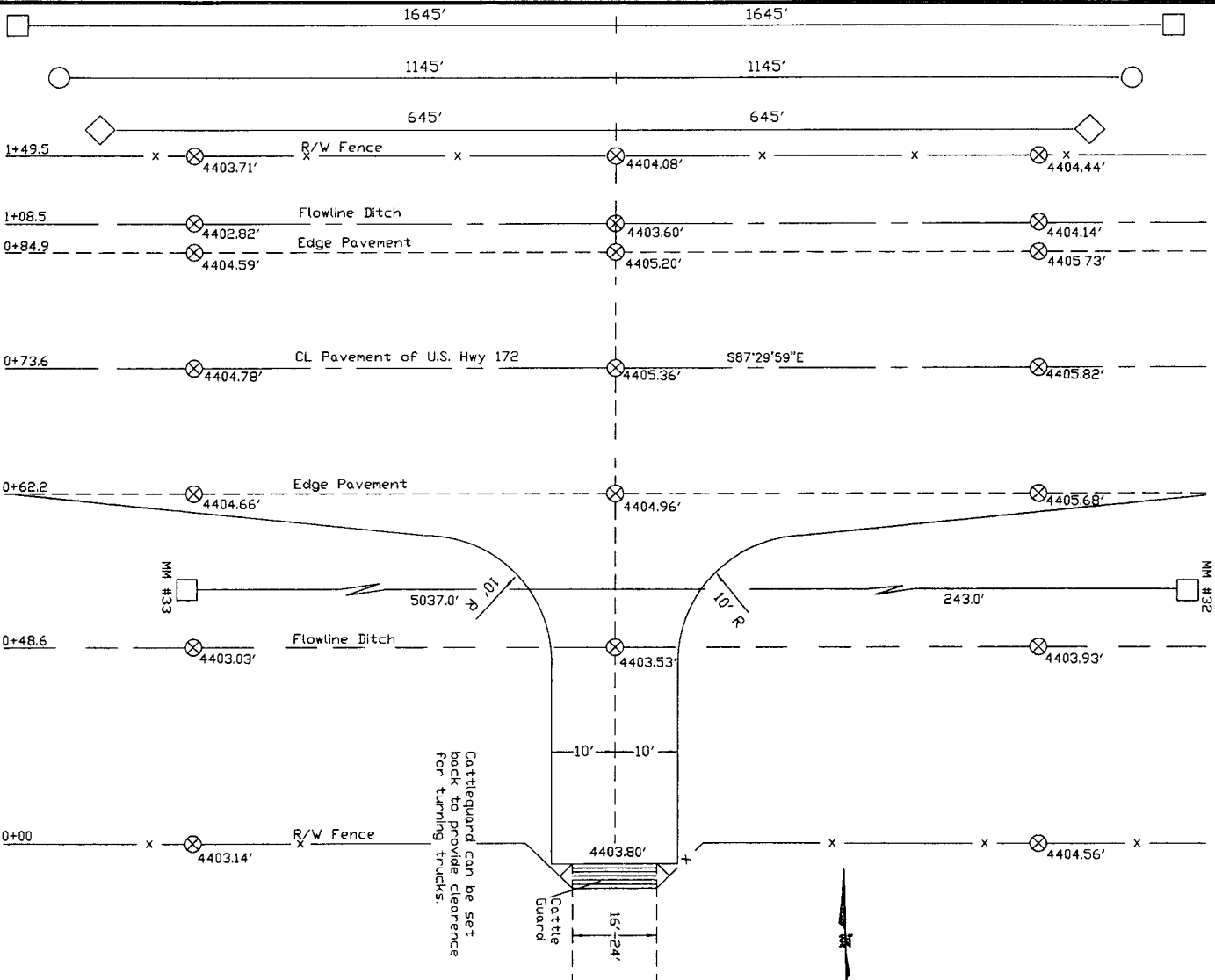
W.O. Number: 18905 Drawn By: J. M. SMALL

Date: 12-11-2007 Disk: JMS 18905W

C.O.G. OPERATING L.L.C.
REF: HERCULES FEDERAL COM #3H / Well Pad Topo
THE HERCULES FEDERAL COM #3H LOCATED 1980' FROM THE SOUTH LINE AND 430' FROM THE WEST LINE OF SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M., CHAVES COUNTY, NEW MEXICO.
Survey Date: 12-11-2007 Sheet 1 of 1 Sheets

EXHIBIT "E-2"

SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M.,
CHAVES COUNTY, NEW MEXICO.



'SHOULDER WORK AHEAD' and 'BE PREPARED TO STOP' signs shall remain in place from the time the construction starts until it is completed. 'FLAGMAN AHEAD' signs will be in place during the hours of construction men and equipment are working. A flagman will be on duty all the time that construction men and/or equipment are working. Signs will be 48" x 48" in size. Color will be black on orange and will meet the reflective quality specified in the New Mexico State Highway & Transportation Standard Specifications.

NOTE: Warning signs will be placed 1500 Feet in both directions during construction.

- Shoulder Work Ahead
- Be Prepared to Stop
- Flagman Ahead



BASIN SURVEYS P.O. BOX 1786-HOBBS, NEW MEXICO

W.O. Number: 18905 Drawn By: J. M. SMALL

Date: 12-11-2007 Disk: JMS 18905TURJN

C.O.G. OPERATING L.L.C.

REF: Highway turnout - STATE HWY 249

Survey Date: 12-11-2007 Sheet 1 of 1 Sheets

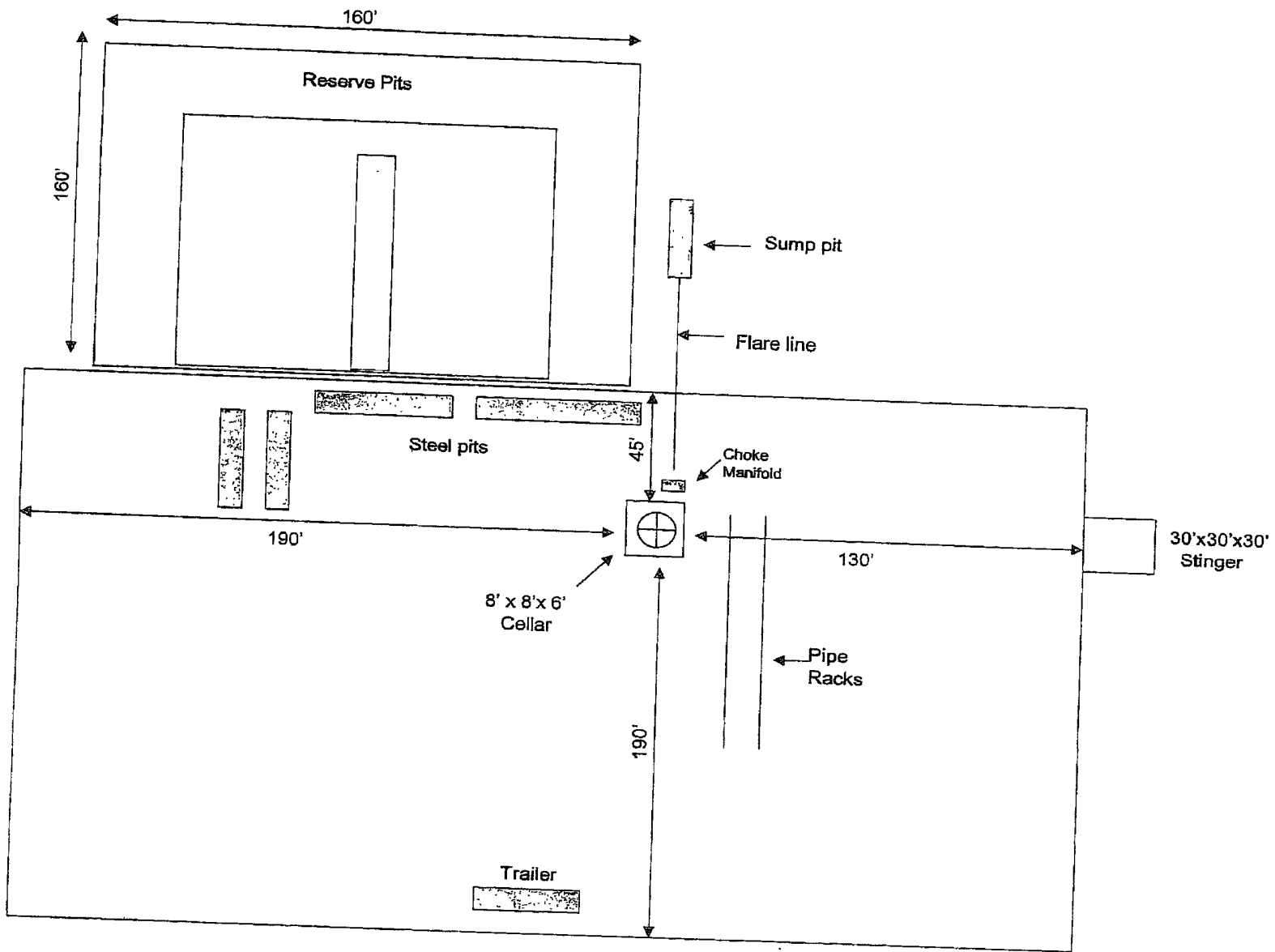
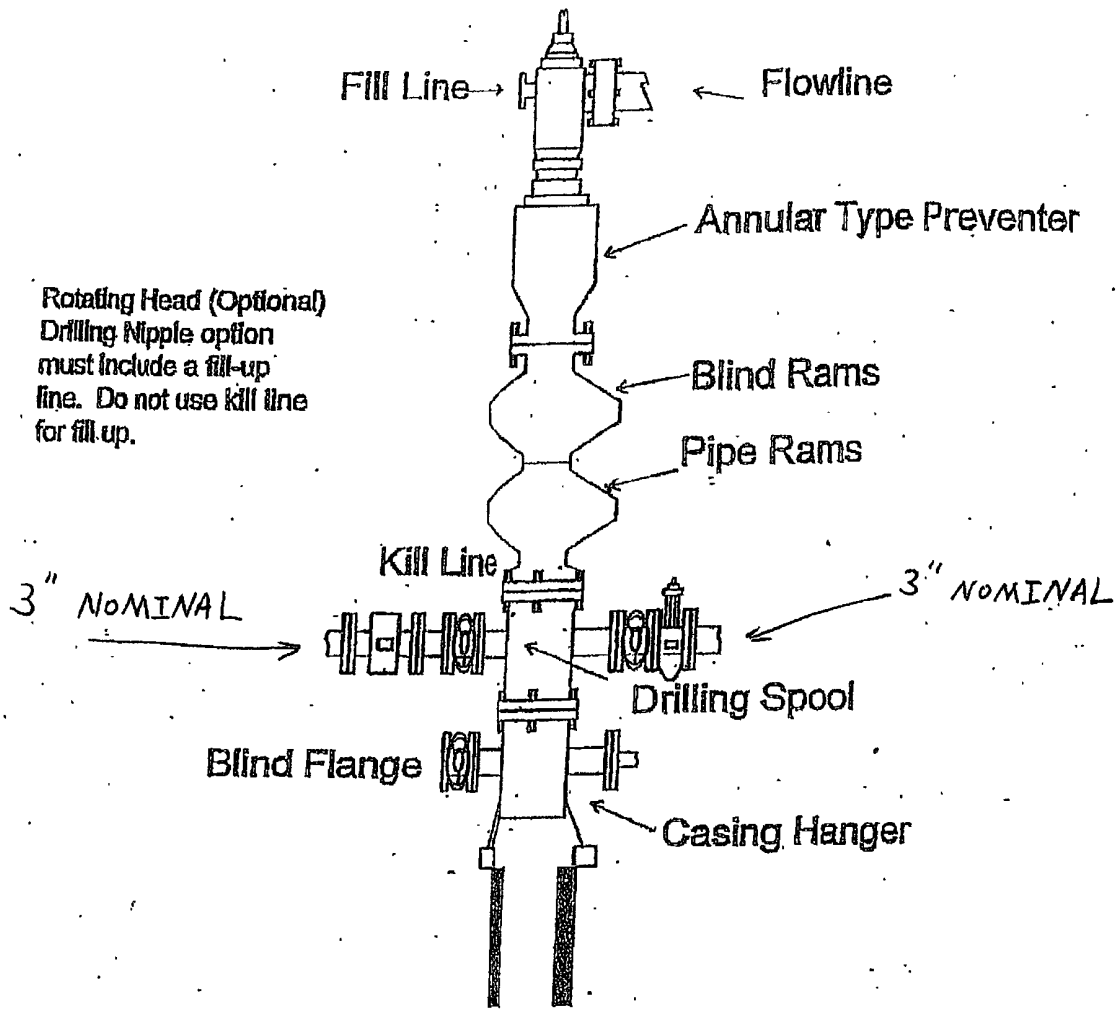


EXHIBIT "F"

EXHIBIT "G"

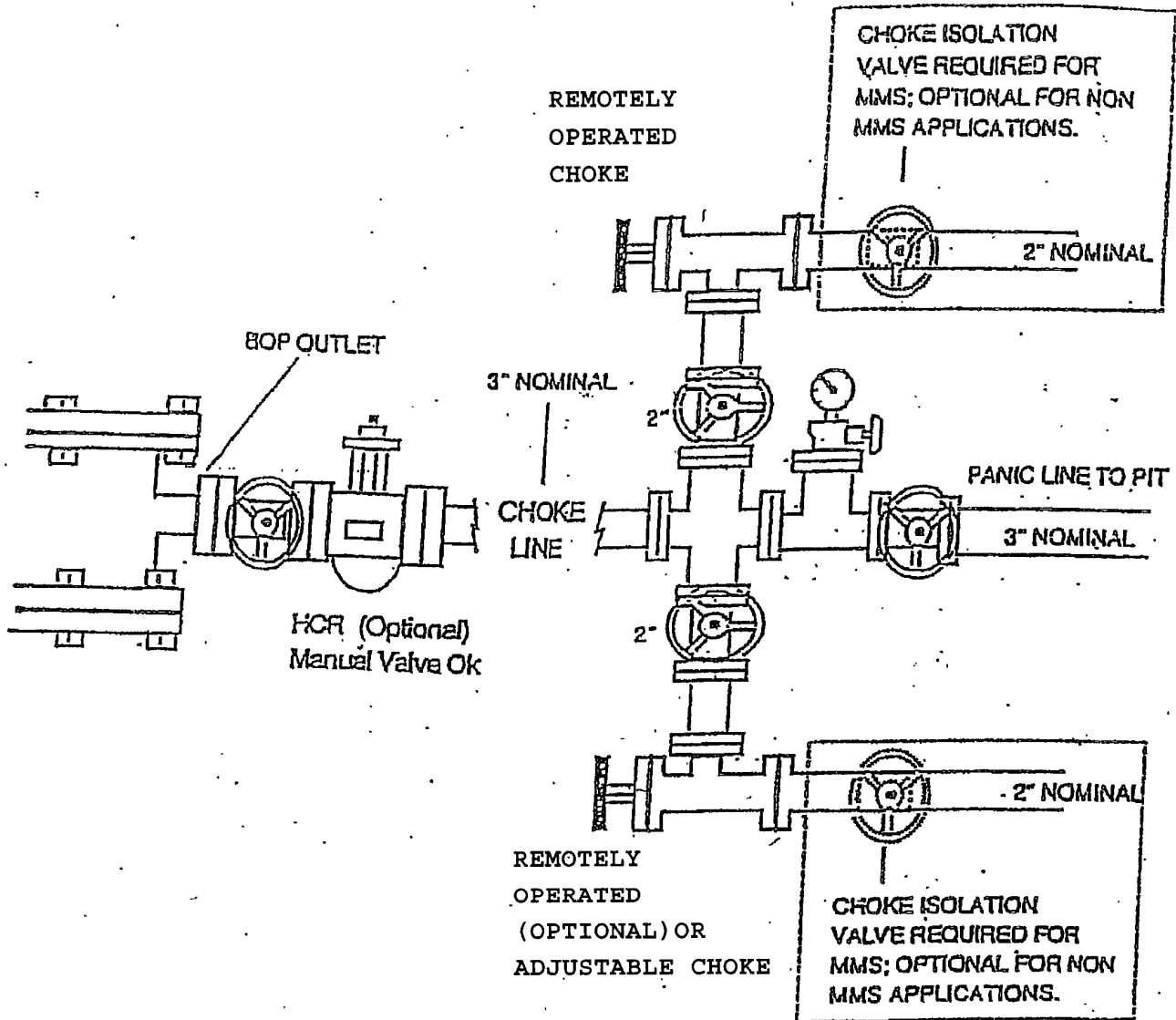
BOPE SCHEMATIC



900 SERIES

EXHIBIT "H"

CHOKE MANIFOLD 3M SERVICE



STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

C.O.G. Operating, LLC (229137)
550 W. Texas Avenue, Ste. 1300
Midland, TX 79701

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

Lease No – Surface Location: NMNM #105885
Lease No – Bottom Hole Location: State of New Mexico

Well Name: Hercules Federal Com #3H

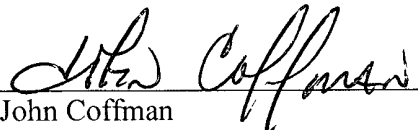
Legal Description of Land: SL: 1980' FSL & 430' FWL, Unit L
BHL: 1980' FSL & 330' FEL, Unit I
Sec 15, T15S, R31E
Chaves County, New Mexico

Formation(s) (if applicable): Wolfcamp

Bond Coverage: \$25,000 statewide bond of C.O.G. Operating, LLC

BLM Bond File No: NMB 000215

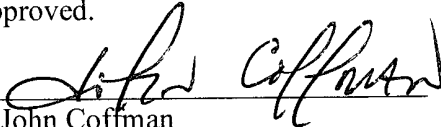
5/23/08
Date


John Coffman
C.O.G. Operating, LLC

CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed herein will be preformed by the C.O.G. Operating, LLC Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

5/23/08
Date


John Coffman
C.O.G. Operating, LLC

COG OPERATING, LLC

**HYDROGEN SULFIDE (H₂S) CONTINGENCY PLAN
FOR DRILLING / COMPLETING / WORKOVER / FACILITY
WITH THE EXPECTATION OF H₂S IN EXCESS OF 100 PPM**

**C.O.G. Operating, LLC
NEW DRILL WELL
Hercules Federal Com #3H
SL: 1980' FSL & 430' FWL, Unit L
BHL: 1980' FSL & 330' FEL, Unit I
Sec 15, T15S, R31E
Chaves County, New Mexico**

This well / facility is not expected to have H₂S, but the following is submitted as requested.

If at this time the supervising person determines the release of H2S cannot be contained to the site location and the general public is in harms way, he will immediately notify public safety personnel.

EMERGENCY CALL LIST

	<u>Office</u>	<u>Cell</u>	<u>Home</u>
John Coffman	432-683-7443	432-631-9762	432-699-5552
Erick Nelson	432-683-7443	432-238-7591	
Matt Corser	432-683-7443	432-413-0071	

EMERGENCY RESPONSE NUMBERS

Chaves County, New Mexico

State Police	505-748-9718
Chaves County Sheriff	505-624-6500
Emergency Medical Services (Ambulance)	911 or 505-624-6500
Chaves County Emergency Management	505-476-9600
State Emergency Response Center (SERC)	505-476-9620
New Mexico Oil Conservation Division	505-748-1283
Callaway Safety Equipment, Inc.	505-392-2973

PROTECTION OF THE GENERAL (ROE) RADIUS OF EXPOSURE

In the event greater than 100 ppb H₂S is present, the ROE calculations will be done to determine if the following is warranted:

- * 100 ppm at any public area (any place not associated with this site)
- * 500 ppm at any public road (any road which the general public may travel).
- * 100 ppm radius of 3000' will be assumed if there is insufficient data to do the calculations, and there is a reasonable expectation that H₂S could be present in concentrations greater than 100 ppm in the gas mixture.

Calculation for the 100 ppm ROE: (H₂S concentrations in decimal form)

$$X = [(1.589)(\text{concentration})(Q)] (0.6258) \quad 10,000 \text{ ppm} + = .01$$

$$1,000 \text{ ppm} + = .001$$

Calculation for the 500 ppm ROE: 100 ppm + = .0001

$$10 \text{ ppm} + = .00001$$

$$X = [(0.4546)(\text{concentration})(Q)] (.06258)$$

EXAMPLE: If a well / facility has been determined to have 150 ppm H₂S in the gas mixture and the well / facility is producing at a gas rate of 200 MCFD then:

$$\text{ROE for 100 ppm} \quad X = [(1.589)(.00010)(200,000)] (0.6258)$$

$$X = 8.8'$$

$$\text{ROE for 500 ppm} \quad X = [(0.4546)(.00050)(200,000)] (0.6258)$$

$$X = 10.9'$$

These calculations will be forwarded to the appropriate NMOCD district office when applicable.

PUBLIC EVACUATION PLAN

When the supervisor has determined that the general public will be involved, the following plan will be implemented.

1. Notification of the emergency response agencies of the hazardous condition and implement evacuation procedures.
2. A trained person in H2S safety shall monitor with detection equipment the H2S concentration, wind and area of exposure. This person will determine the outer perimeter of the hazardous area. The extent of the evacuation area will be determined from the data being collected. Monitoring shall continue until the situation has been resolved. All monitoring equipment shall be UL approved for use in Class I Groups A, B, C & D, Division I hazardous locations. All monitors will have a minimum capability of measuring H2S, oxygen, and flammable values.
3. Law enforcement shall be notified to set up necessary barriers and maintain such for the duration of the situation as well as aid in the evacuation procedure.
4. The company representative shall stay in communication with all agencies throughout the duration of the situation and inform such agencies when the situation has been contained and the effected area is safe to enter.

PROCEDURE FOR IGNITING AN UNCONTROLLABLE CONDITION

The decision to ignite a well should be a last resort and one, if not both, of the following pertain:

1. Human life and / or property are endangered.
2. There is no hope of bringing the situation under control with the prevailing conditions at the site.

Instructions for Igniting the Well:

1. Two people are required. They must be equipped with positive pressure, self-contained breathing apparatus and "D"-ring style, full body, OSHA approved safety harness. Non-flammable rope will be attached.
2. One of the people will be a qualified safety person who will test the atmosphere for H₂S, oxygen and LFL. The other person will be the company representative.
3. Ignite upwind from a distance no closer than necessary. Make sure that where you ignite from has the maximum escape avenue available. A 25mm flare gun with a range of approximately +/- 500 feet shall be used to ignite the gas.
4. Before igniting, check for the presence of combustible gases.
5. After igniting, continue emergency actions and procedures as before.

PHYSICAL PROPERTIES OF H₂S

The properties of all gasses are usually described in the context of seven major categories:

COLOR
ODOR
VAPOR DENSITY
EXPLOSIVE LIMITS
FLAMMABILITY
SOLUBILITY (IN WATER)
BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

COLOR – TRANSPARENT

Hydrogen Sulfide is colorless so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence, a fact that makes the gas extremely dangerous to be around.

ODOR – ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs". For this reason it earned its common name "sour gas". However, H₂S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H₂S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS – 4.3% TO 46%

Mixed with the right proportion of air or oxygen, H₂S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO₂), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY – 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H₂S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H₂S may release the gas into the air.

BOILING POINT – (-76 degrees Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.