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HOBBSOCD

Form 3160-3
(February 2005)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Oil Cons. Division
French Dr.
NM 88240

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a Type of work ☑ DRILL ☐ REENTER	5 Lease Serial No. **NMNM 105885**
	6 If Indian, Allotee or Tribe Name **N/A**
	7 If Unit or CA Agreement, Name and No **N/A**
1b. Type of Well ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone	8 Lease Name and Well No. **Hercules Federal Com #4H** (37347)
2 Name of Operator **C.O.G. Operating L.L.C.** (229137)	9 API Well No 30-005-29076
3a Address **550 W. Texas, #1300 Midland, Texas 79701**	3b Phone No. *(include area code)* **432-685-9158**
	10 Field and Pool or Exploratory ~~Crow Flats Abo~~ Wildcat
4 Location of Well *(Report location clearly and in accordance with any State requirements *)* At surface **990' FSL & 330' FEL, Unit P** At proposed prod zone **660' FSL & 330' FWL, Unit M**	11 Sec, T R M or Blk 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 **4620'**	19 Proposed Depth **13114' MD 8750' TVD**	20 BLM/BIA Bond No on file **NMB 000215**
21 Elevations (Show whether DF, KDB, RT, GL, etc) **4392' GL**	22 Approximate date work will start* **12/01/2008**	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 **Lee Ann Rollins**	Name *(Printed/Typed)* **Lee Ann Rollins**	Date 10-6-08
Title **Agent**		

Approved by *(Signature)* /S/ Angel Mayes	Name *(Printed/Typed)* /S/ Angel Mayes	Date DEC 19 2008
Title Assistant Field Manager, Lands And Minerals	Office ROSWELL FIELD OFFICE	APPROVED FOR 2 YEARS

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.

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)

KZ

DECLARED WATER BASIN

CEMENT BEHIND THE 13 3/8" CASING MUST BE CIRCULATED

WITNESS

APPROVAL SUBJECT TO GENERAL REQUIREMENTS AND SPECIAL STIPULATIONS ATTACHED

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: Lease No – Bottom Hole Location:	State of New Mexico V0-8010-0000 NMNM #105885
Well Name:	Hercules Fed Com #4H
Legal Description of Land:	SL: 990' FSL & 330' FEL, Unit P BHL: 660' FSL & 330' FWL, Unit M Sec 15, T15S, R31E Chaves County, NM
Formation(s) (if applicable):	Crow Flats Abo
Bond Coverage:	$25,000 statewide bond of C.O.G. Operating, LLC
BLM Bond File No:	NMB 000215

10-6-08
Date

John Coffman
C.O.G. Operating, LLC

EXHIBIT "A"

DISTRICT I
1625 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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-005-29076	✓	~~Cedar Flats~~ Wildcat ABO

Property Code	Property Name	Well Number
37347	HERCULES FEDERAL COM	4H

OGRID No.	Operator Name	Elevation
229137	C.O.G. OPERATING L.L.C.	4392'

Surface Location

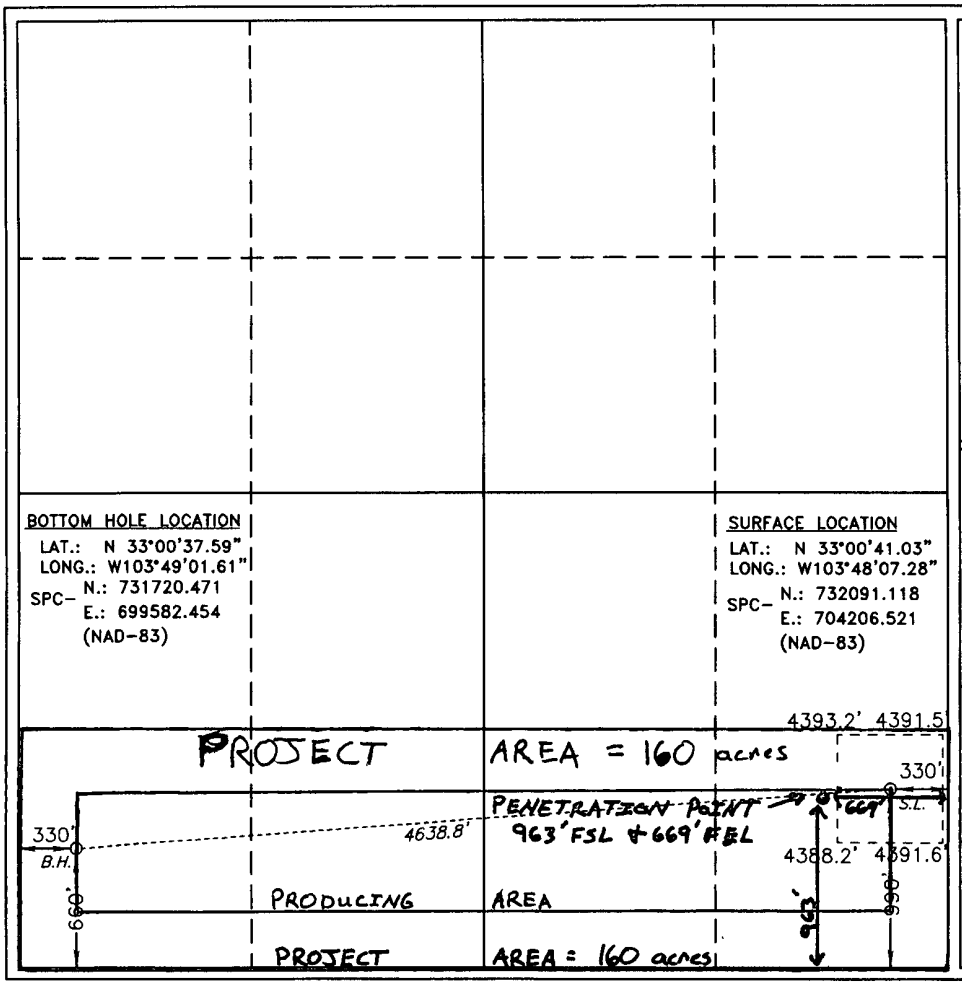
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	15	15 S	31 E		990	SOUTH	330	EAST	CHAVES

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
M	15	15 S	31 E		660	SOUTH	330	WEST	CHAVES

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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



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.

Signature 9/29/08 Date

DWAINE MOORE AGENT FOR COG
Printed Name

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervison, and that the same is true and correct to the best of my belief.

AUGUST 5, 2007
Date Surveyed

Signature & Seal of Professional Surveyor

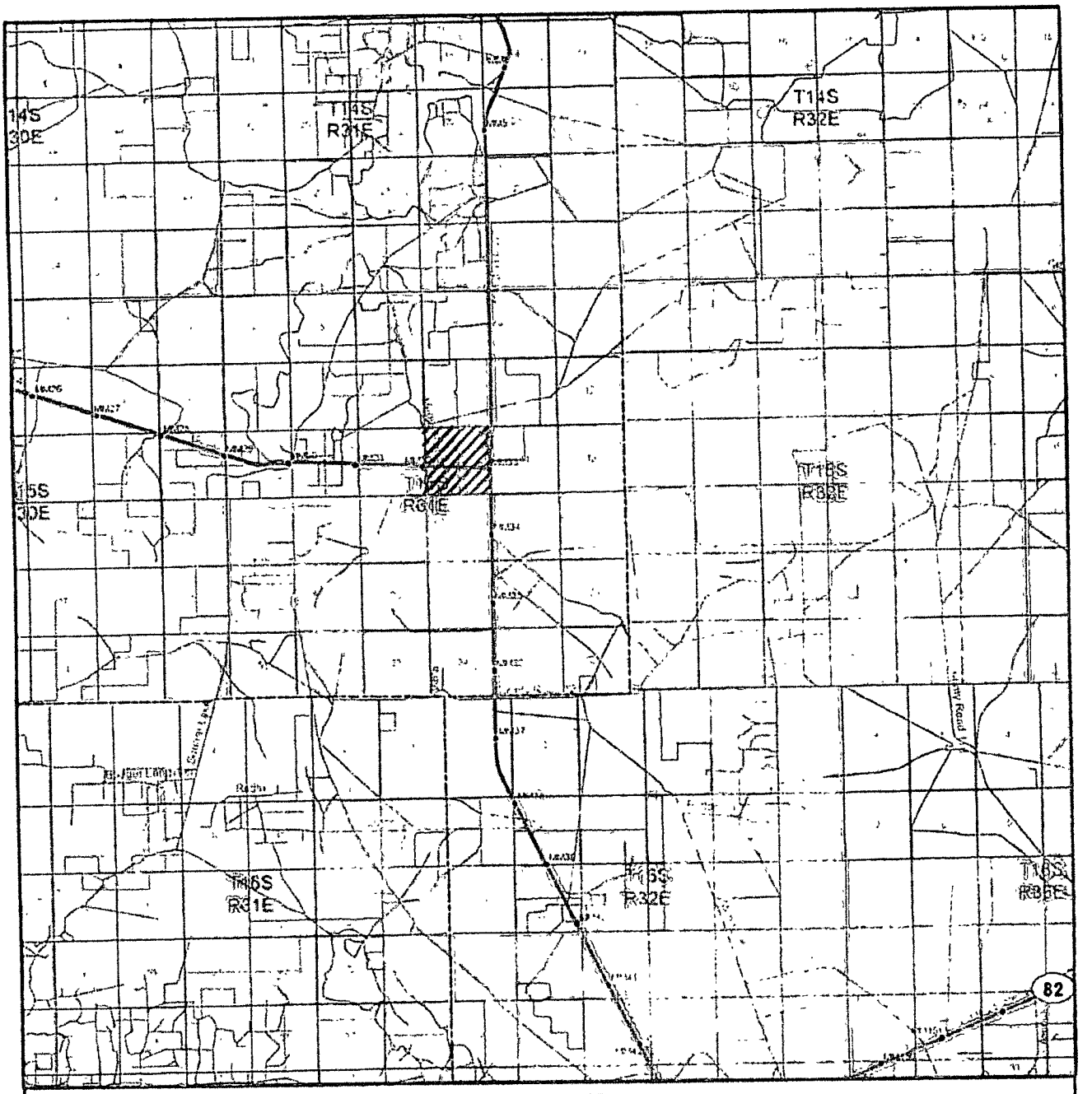
GARY L. JONES
NEW MEXICO
7977
REGISTERED PROFESSIONAL SURVEYOR

W.O.

Certificate No. Gary L. Jones 7977

BASIN SURVEYS

EXHIBIT B



HERCULES FEDERAL COM #4H
Located at 990' FSL and 330 FEL
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
basinsurveys.com

W.O. Number:	JMS 20273
Survey Date:	08-05-2008
Scale:	1" = 2 MILES
Date:	08-07-2008

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

EXHIBIT C-1

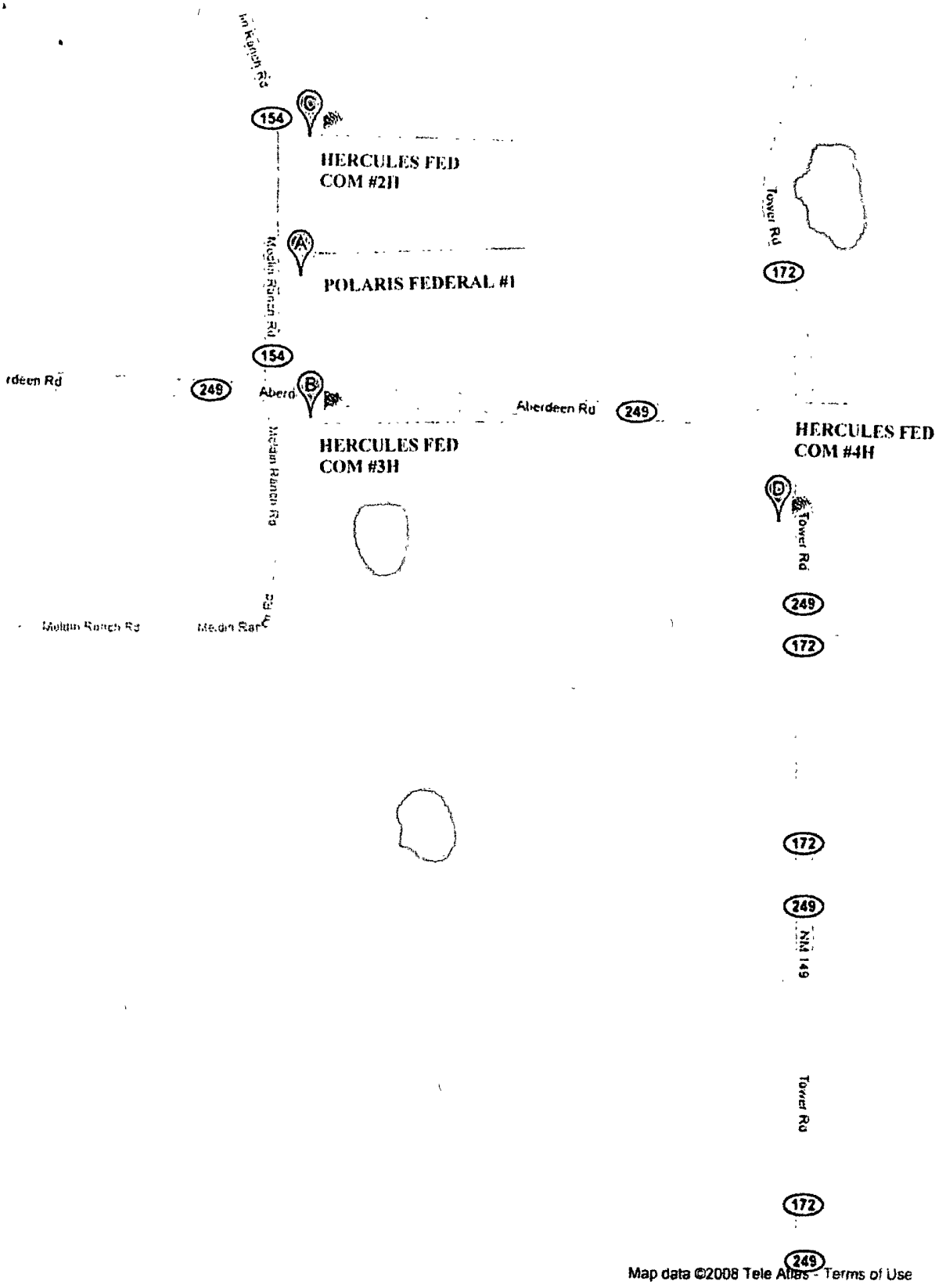
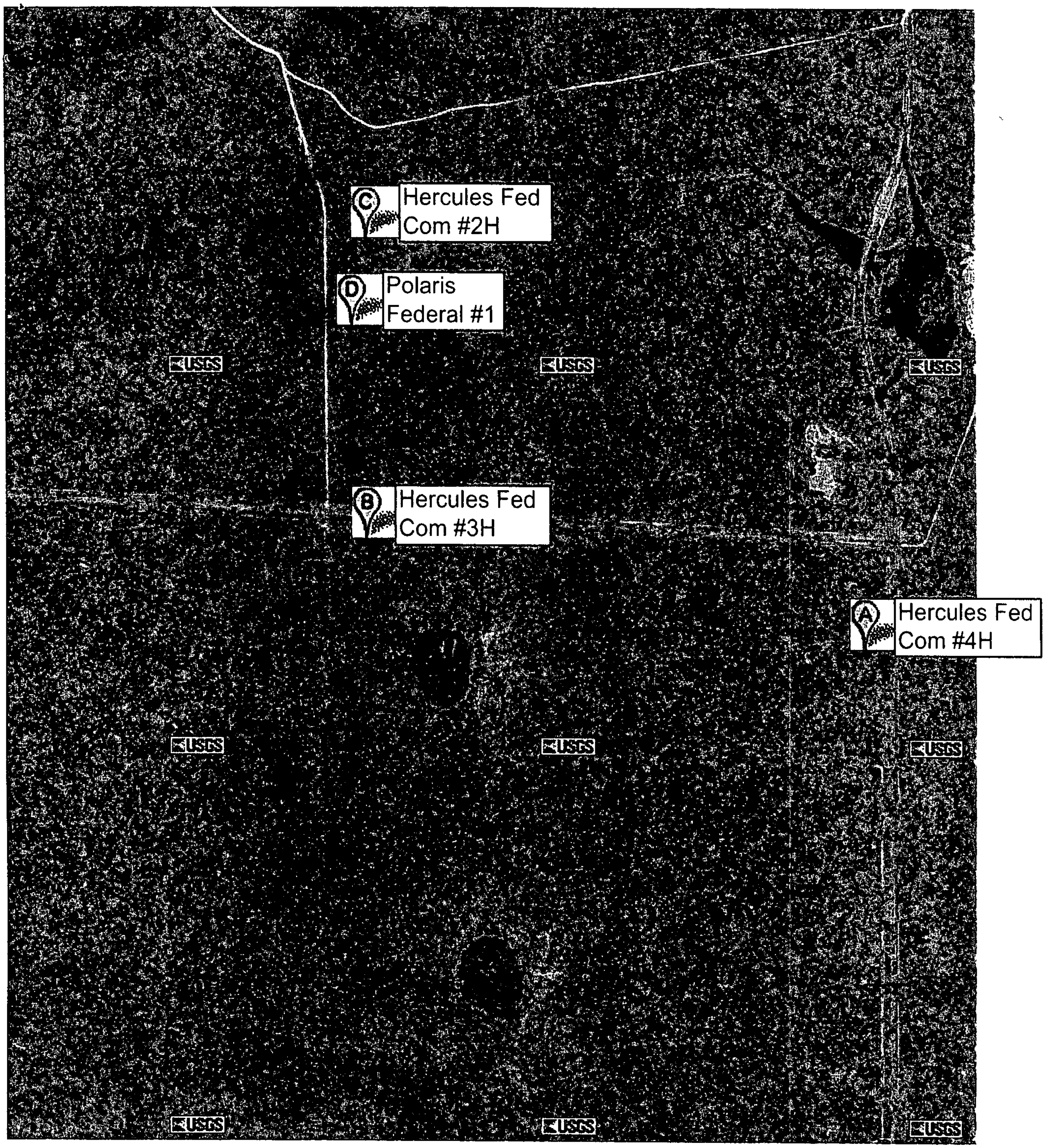
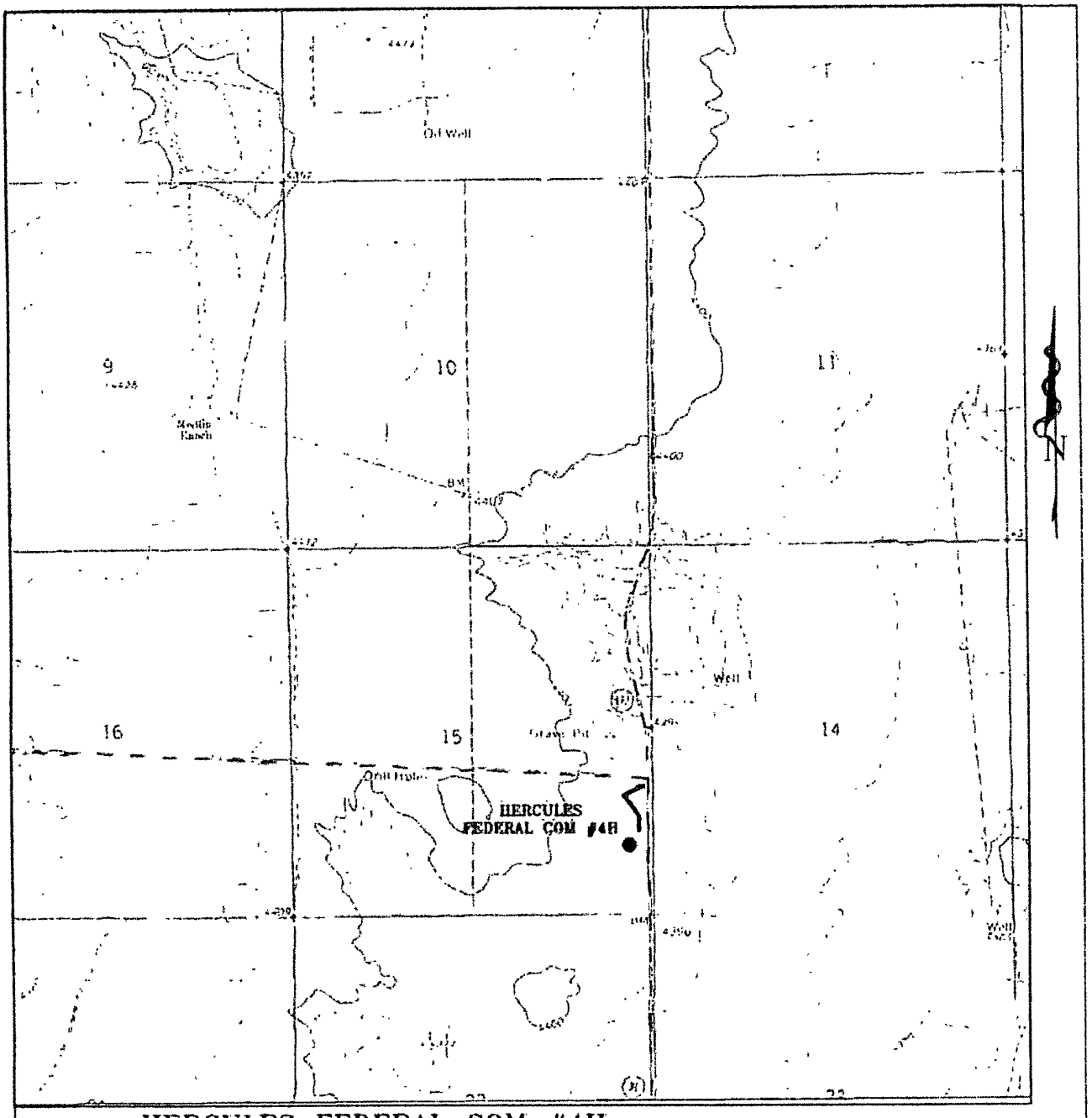

HERCULES FED COM #2H
POLARIS FEDERAL #1
HERCULES FED COM #3H
HERCULES FED COM #4H
Aberdeen Rd
Tower Rd
NM 149
154
249
172
Map data ©2008 Tele Atlas - Terms of Use

EXHIBIT C-2



Imagery by USGS / Service by TerraServer - Terms of Use

EXHIBIT D



HERCULES FEDERAL COM #4H
Located at 990' FSL and 330' FEL
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(505) 393-7316 - Office
(505) 392-3074 - Fax
basinsurveys.com

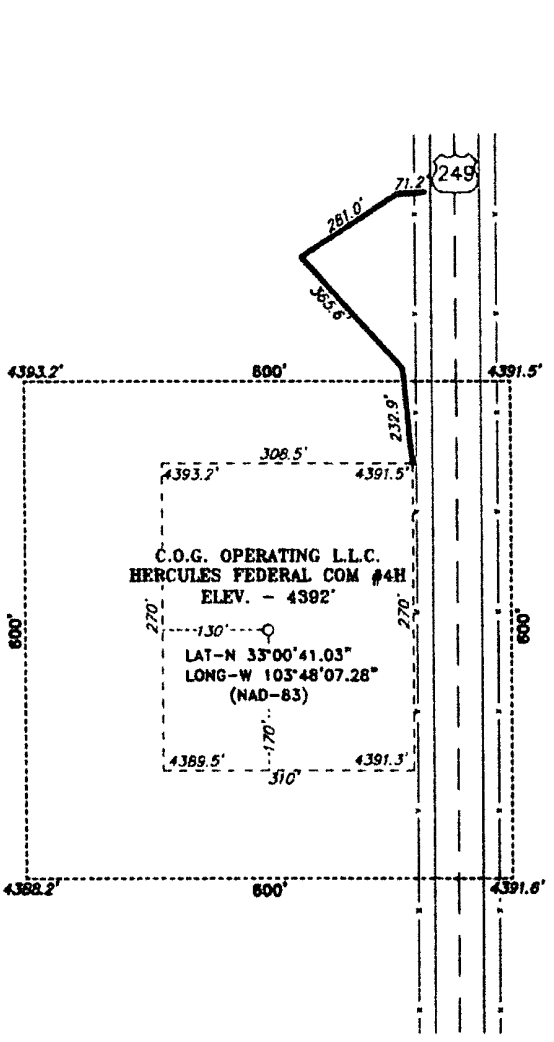
W.O Number:	JMS 20273
Survey Date:	08-05-2008
Scale:	1" = 2000'
Date:	08-07-2008

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.



N

200 0 200 400 FEET

SCALE: 1" = 200'

DIRECTIONS TO LOCATION:

FROM MILE MARKER 34 OF HWY 249, GO NORTH 0.9 MILES TO PROPOSED LEASE ROAD.

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

REF: HERCULES FEDERAL COM #4H / Well Pad Topo

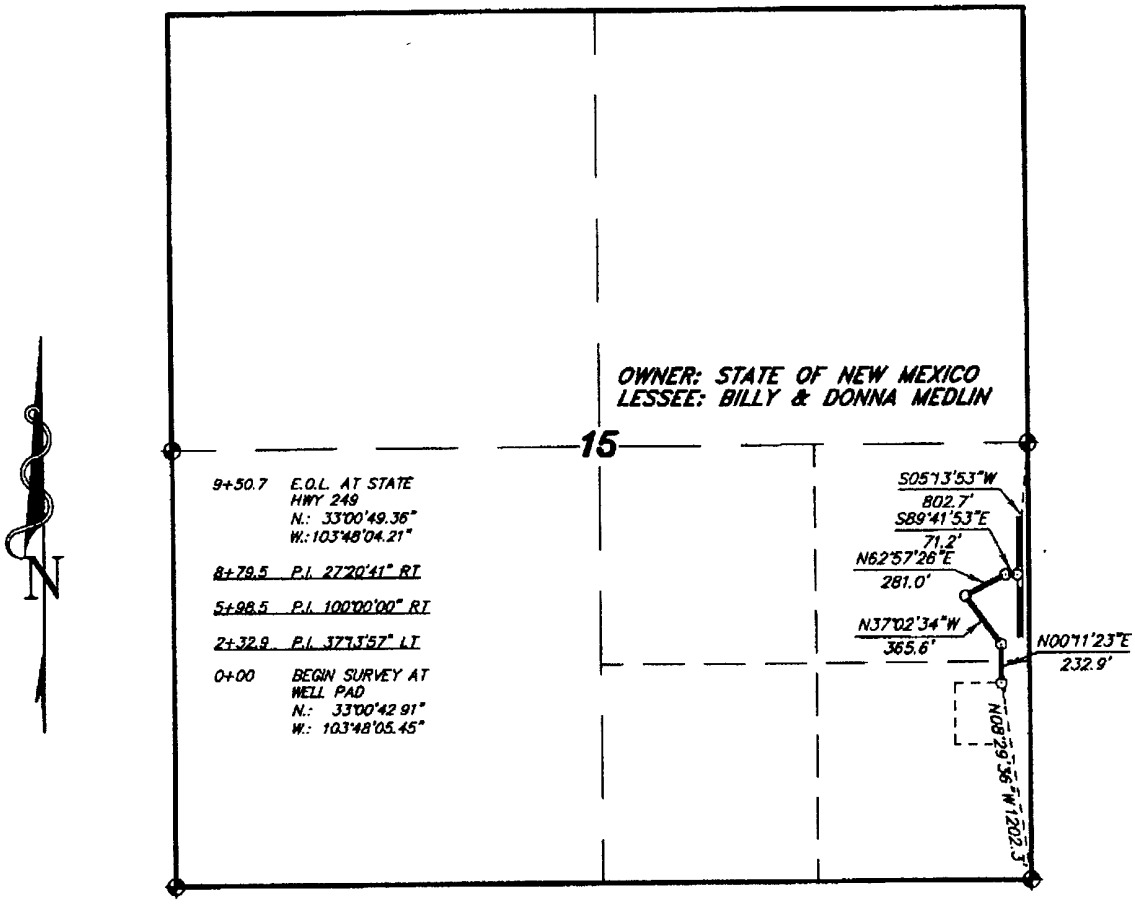
THE HERCULES FEDERAL COM #4H LOCATED 990' FROM THE SOUTH LINE AND 330' FROM THE EAST LINE OF SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M., CHAVES COUNTY, NEW MEXICO.

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

W.O. Number: 20273	Drawn By: J. M. SMALL		
Date: 08-07-2008	Disk: JMS 20273	Survey Date: 08-05-2008	Sheet 1 of 1 Sheets

EXHIBIT E-3

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



LEGAL DESCRIPTION

A STRIP OF LAND 20.0 FEET WIDE, LOCATED IN SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M., CHAVES COUNTY, NEW MEXICO AND BEING 10.0 FEET LEFT AND RIGHT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY.

BEGINNING AT A POINT WHICH LIES N.08°29'36"W., 1202.3 FEET FROM THE SOUTHEAST CORNER OF SAID SECTION 15; THENCE N.00°11'23"E., 232.9 FEET; THENCE N.37°02'34"W., 365.6 FEET; THENCE N.62°57'26"E., 281.0 FEET; THENCE N.89°41'53"E., 71.2 FEET TO THE END OF THIS LINE WHICH LIES S.05°13'53"W., 802.7 FEET FROM THE EAST QUARTER CORNER OF SAID SECTION 15. SAID STRIP OF LAND BEING 950.7 FEET OR 57.62 RODS IN LENGTH AND CONTAINING 0.44 ACRES, MORE OR LESS, AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

SE/4 SE/4 = 7.90 RODS = 0.06 ACRES NE/4 SE/4 = 49.72 RODS = 0.38 ACRES

1000 0 1000 2000 FEET

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THE STATE.

GARY L. JONES NEW MEXICO No. 7977
TEXAS No. 5074

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

W.O. Number: 20273	Drawn By: J. M. SMALL
Date: 09-04-2008	Disk: JMS 20273

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

REF: PROP. LEASE ROAD TO THE HERCULES FEDERAL COM #4H

A LEASE ROAD CROSSING STATE LAND IN SECTION 15, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M., CHAVES COUNTY, NEW MEXICO.

Survey Date: 08-05-2008	Sheet 1 of 1 Sheets

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
Hercules Fed Com #4H
SL: 990' FSL & 330' FEL, Unit P
BHL: 660' FSL & 330' FWL, Unit M
Sec 15, T15S, R31E
Chaves County, NM

1. PRORATION UNIT SPACING: 160 Acres

2. GROUND ELEVATION: 4392'

3. PROPOSED DEPTHS: Pilot hole TD = 8960', Horizontal TVD = 8750', MD = 13114'

4. ESTIMATED TOPS OF GEOLOGICAL MARKERS:

Quaternary	MD	TVD
Yates	2410'	2410'
Queen	3220'	3220'
San Andres	3950'	3950'
Tubb	6770'	6770'
Abo	7460'	7460'
Top Basal Abo	8660'	8814'

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
Top Basal Abo	8660'	Oil / Gas

6. CASING PROGRAM - Proposed

Hole size	Interval	OD of Casing	Weight	Cond.	Collar	Grade
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' – 8000'	7"	26#	New	LTC	P-110
Collapse sf – 2.18, Burst sf – 1.53, Tension sf – 4.37						
6-1/8"	7900' – 13114'	4-1/2"	11.6#	New	LTC	P-110
Collapse sf – 2.47, Burst sf – 1.64, Tension sf – 4.48						

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.

7" Production Casing set at +/- 8000' MD, Cement with +/- 500 sx. 50/50/10 "C", 2.45 yd & +/- 200 sx Class "H", 1.18 yd., Est. TOC @ 200' minimum tie back into intermediate casing.

4 ½" Production Liner set from +/- 7900' to +/-13114' MD, 8750' TVD, Liner run with +/- 5 isolation Packers and Sliding sleeves in un-cemented Lateral.

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 1000 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:

Interval	Mud Wt.	Visc.	FL	Type Mud System
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' - 13114'	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.

11. PRODUCTION HOLE DRILLING SUMMARY:

Drill 8-3/4" pilot hole thru Top Basal Abo to +/- 8960', run open hole logs. Spot 350 sx. "H" Kick off plug from +/- 8500' to +/-7900'. Dress off to 8000' and set 7" production casing. Drill 6-1/8" hole and kick off at +/- 8150', building curve over +/- 350' to horizontal at 8680' TVD. Drill horizontal section in a Westerly direction for +/-4500' lateral to TD at +/-13114' MD, 8750' TVD. Run 4-1/2" production liner in Open hole lateral and set isolation packers and liner top packer @ +/- 7900' MD

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 ½" 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 November 1, 2008 with drilling and completion operations lasting approximately 45 days.

C.O.G. Operating, LLC
Hercules Fed Com #4H
SL: 990' FSL & 330' FEL, UNIT P
BHL: 660' FSL & 330' FWL, UNIT M
Sec 15, T15S, R31E
Chaves County, New Mexico

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 performed 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.

10-6-08
Date

John Coffman
C.O.G. Operating, LLC

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: Lease No – Bottom Hole Location:	State of New Mexico V0-8010-0000 NMNM #105885
Well Name:	Hercules Fed Com #4H
Legal Description of Land:	SL: 990' FSL & 330' FEL, Unit P BHL: 660' FSL & 330' FWL, Unit M Sec 15, T15S, R31E Chaves County, NM
Formation(s) (if applicable):	Crow Flats Abo
Bond Coverage:	$25,000 statewide bond of C.O.G. Operating, LLC
BLM Bond File No:	NMB 000215

10-6-08
Date

John Coffman
C.O.G. Operating, LLC

EXHIBIT "F"

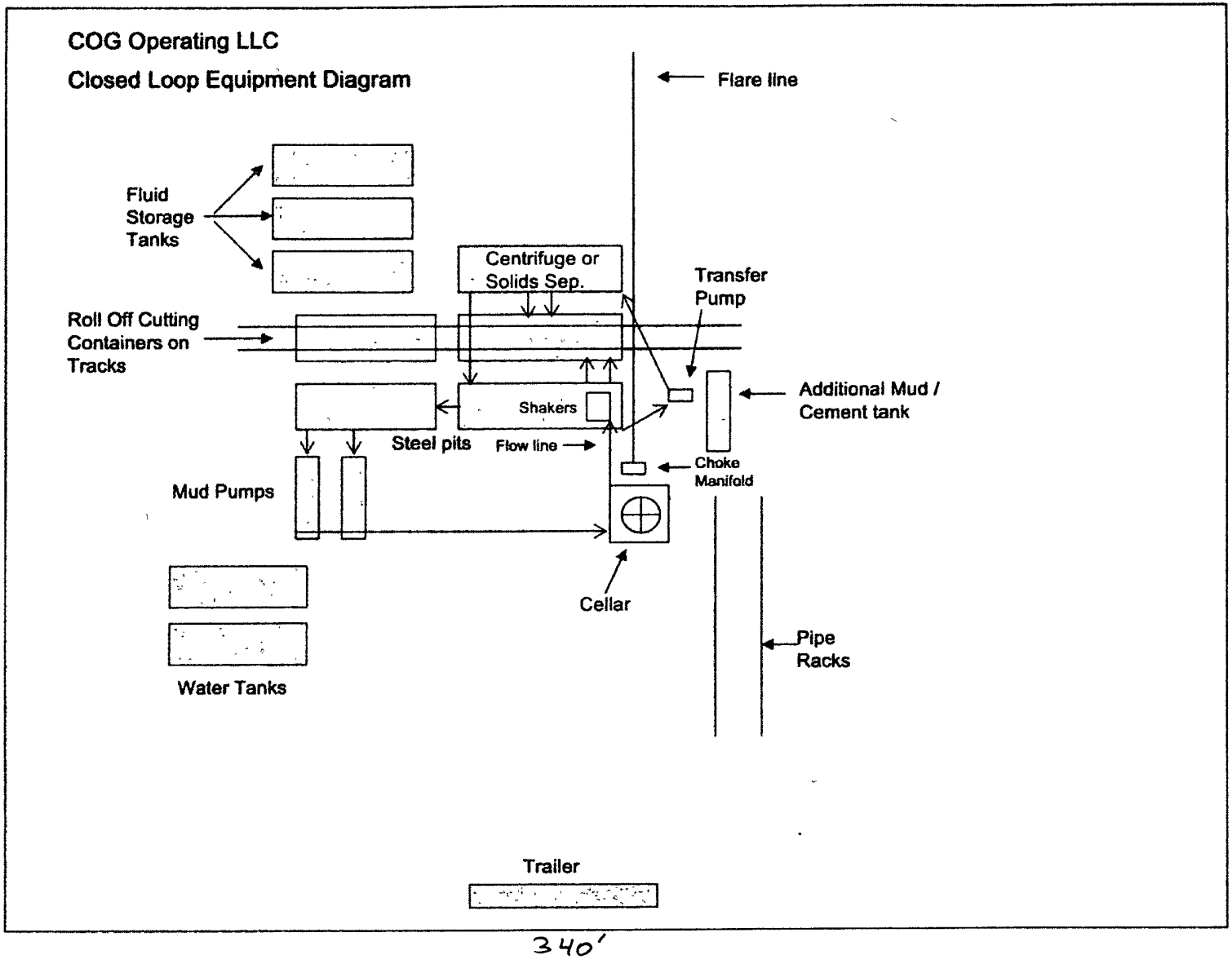
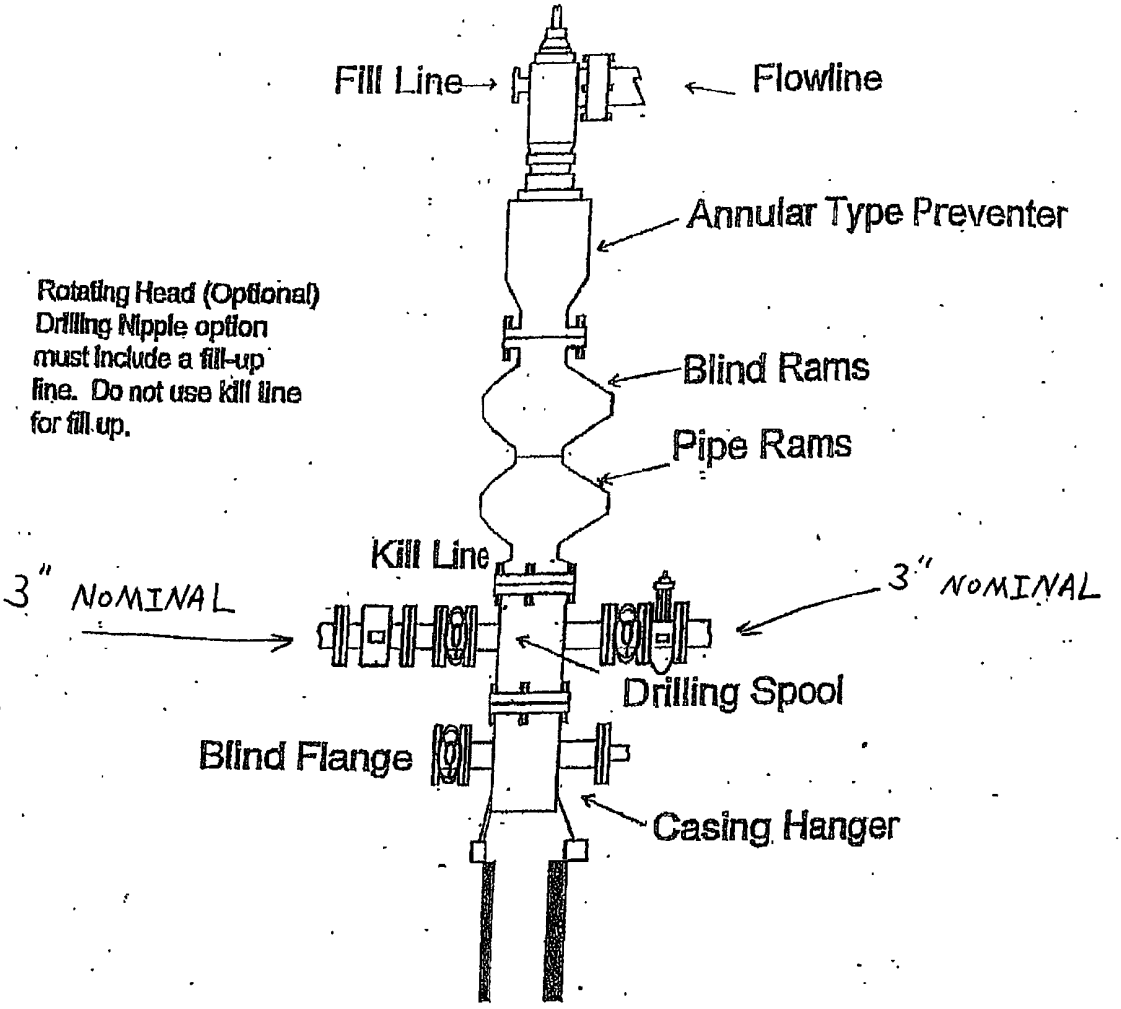

COG Operating LLC
Closed Loop Equipment Diagram
Flare line
Fluid Storage Tanks
Centrifuge or Solids Sep.
Transfer Pump
Roll Off Cutting Containers on Tracks
Shakers
Additional Mud / Cement tank
Steel pits
Flow line
Choke Manifold
Mud Pumps
Cellar
Pipe Racks
Water Tanks
Trailer
255'
340'

EXHIBIT G

BOPE SCHEMATIC

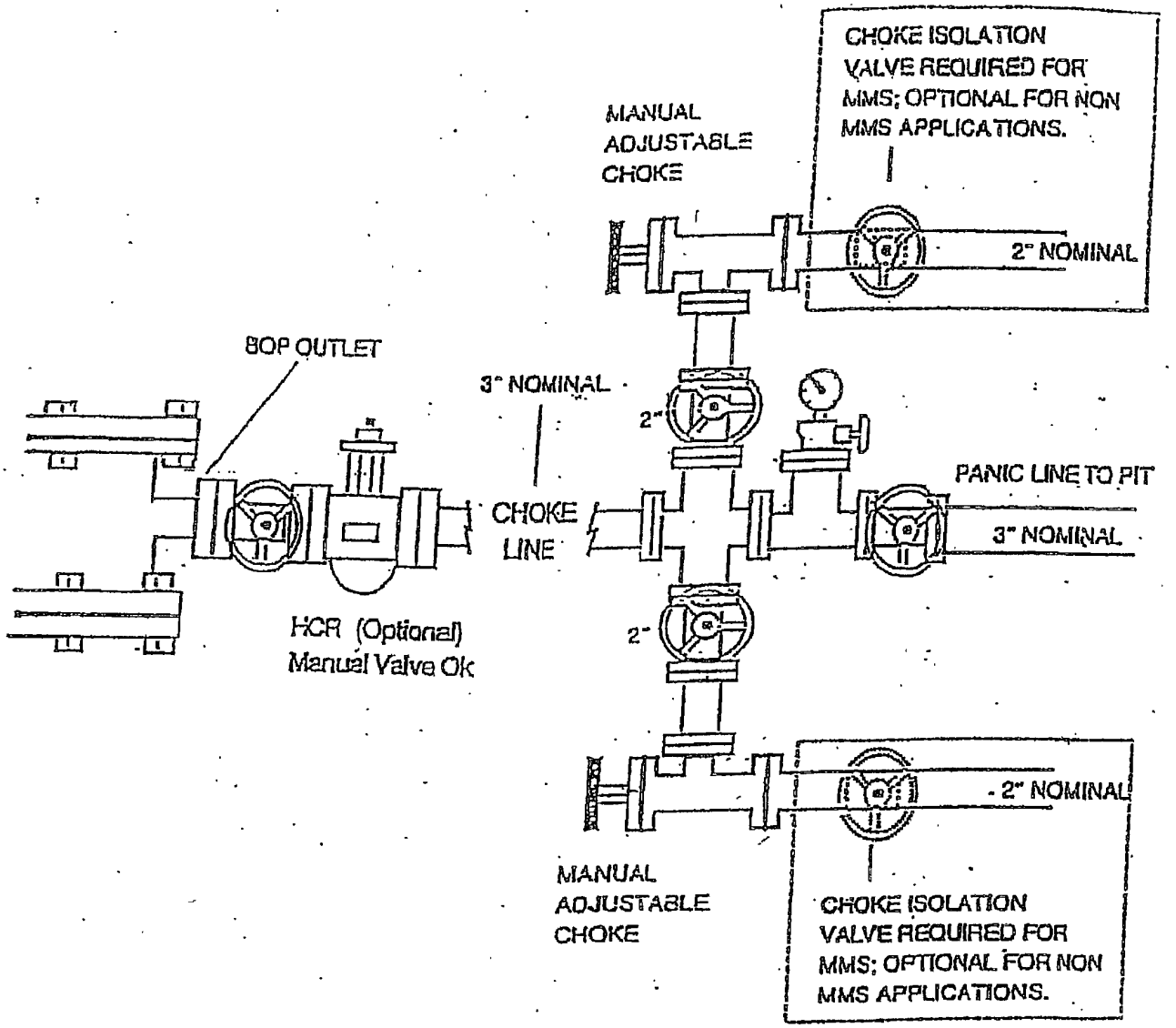


900 SERIES

EXHIBIT H

CHOKE MANIFOLD

3M SERVICE



COG Operating LLC

Chaves County
Hercules Federal Com #4H
Hercules Federal Com #4H
Original Hole

Plan: Plan #1

Pathfinder X & Y Survey Report

25 August, 2008

PATHFINDER
ENERGY SERVICES

COG Operating, L.L.C.

Azimuths to Grid North
True North: -0.29°
Magnetic North: 7.83°

Magnetic Field
Strength: 49429.4snT
Dip Angle: 60.97°
Date: 2008/04/30
Model: IGRF200510

PATHFINDER ENERGY SERVICES

Project: Chaves County
Site: Hercules Federal Com #4H
Well: Hercules Federal Com #4H
Wellbore: Original Hole
Plan: Plan #1 (Hercules Federal Com #4H/Original Hole)

WELL DETAILS Hercules Federal Com #4H

Ground Elevation 4391.00
RKB Elevation EST RKB @ 4391.00ft
Rig Name

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	732091.118	704205.521	33° 0' 40.997 N	103° 48' 7.275 W	

SECTION DETAILS

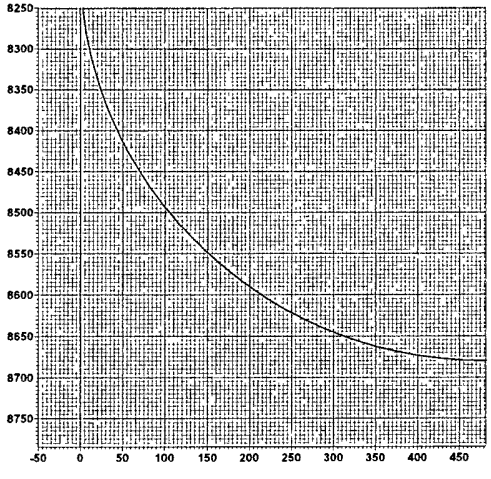
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	8202.50	0.00	0.00	8202.50	0.00	0.00	0.00	0.00	0.00	
3	8944.66	89.04	265.42	8680.00	-37.50	-468.07	12.00	265.42	469.57	
4	9024.52	89.04	265.42	8681.34	-43.87	-547.66	0.01	-116.38	549.41	
5	13113.58	89.04	265.42	8750.00	-370.65	-4623.07	0.00	0.00	4637.90	PBHL (HFC4)

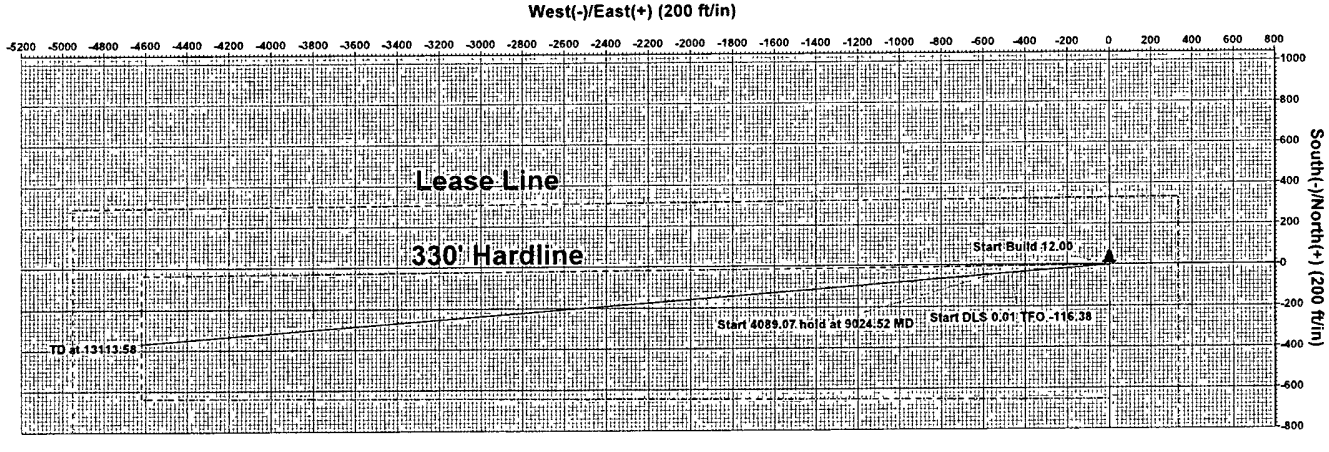
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

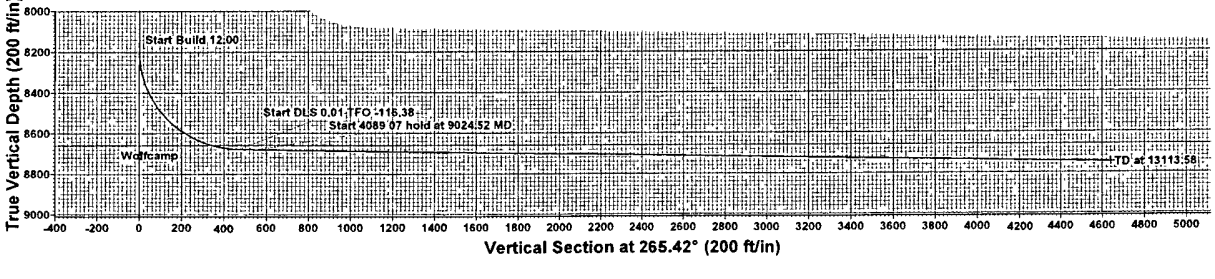
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (HFC4)	8750.00	-370.65	-4623.07	731720.471	699582.454	Point

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2410.00	2410.00	Yates
3220.00	3220.00	Queen
3950.00	3950.00	San Andres D
6770.00	6770.00	Tubb
7460.00	7460.00	Abo
8660.00	8813.73	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 #4H/Original Hole)
Created By: Nate Bingham Date 12 44, August 25 2008
Checked _____ Date _____

Pathfinder Energy Services

Pathfinder X & Y Survey Report

PATHFINDER ENERGY SERVICES

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**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 #4H

Site Position:		**Northing:**	732,091.118 ft	**Latitude:**	33° 0' 40.997 N
From:	Map	**Easting:**	704,205.521 ft	**Longitude:**	103° 48' 7.275 W
Position Uncertainty:	0.00 ft	**Slot Radius:**	"	**Grid Convergence:**	0.29 °

Well Hercules Federal Com #4H

Well Position	**+N/-S**	0.00 ft	**Northing:**	732,091.118 ft	**Latitude:**	33° 0' 40.997 N
	+E/-W	0.00 ft	**Easting:**	704,205.521 ft	**Longitude:**	103° 48' 7.275 W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,391.00 ft

Wellbore Original Hole

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	2008/04/30	8.12	60.97	49,429

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**
	0.00	0.00	0.00	265.42

Survey Tool Program **Date** 2008/08/25

From (ft)	**To (ft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
0.00	13,113.58	Plan #1 (Original Hole)	MWD	MWD - Standard

Pathfinder Energy Services

Pathfinder X & Y Survey Report

PATHFINDER ENERGY SERVICES

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
0.00	0.00	0.00	0.00	-4,391.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
100.00	0.00	0.00	100.00	-4,291.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
200.00	0.00	0.00	200.00	-4,191.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
300.00	0.00	0.00	300.00	-4,091.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
400.00	0.00	0.00	400.00	-3,991.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
500.00	0.00	0.00	500.00	-3,891.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
600.00	0.00	0.00	600.00	-3,791.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
700.00	0.00	0.00	700.00	-3,691.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
800.00	0.00	0.00	800.00	-3,591.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
900.00	0.00	0.00	900.00	-3,491.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,000.00	0.00	0.00	1,000.00	-3,391.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,100.00	0.00	0.00	1,100.00	-3,291.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,200.00	0.00	0.00	1,200.00	-3,191.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,300.00	0.00	0.00	1,300.00	-3,091.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,400.00	0.00	0.00	1,400.00	-2,991.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,500.00	0.00	0.00	1,500.00	-2,891.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,600.00	0.00	0.00	1,600.00	-2,791.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,700.00	0.00	0.00	1,700.00	-2,691.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,800.00	0.00	0.00	1,800.00	-2,591.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
1,900.00	0.00	0.00	1,900.00	-2,491.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,000.00	0.00	0.00	2,000.00	-2,391.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,100.00	0.00	0.00	2,100.00	-2,291.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,200.00	0.00	0.00	2,200.00	-2,191.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,300.00	0.00	0.00	2,300.00	-2,091.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,400.00	0.00	0.00	2,400.00	-1,991.00	0.00	0.00	0 00	0.00	732,091.12	704,205.52
2,410.00	0.00	0.00	2,410.00	-1,981.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
Yates										

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
2,500.00	0.00	0.00	2,500.00	-1,891.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,600.00	0.00	0.00	2,600.00	-1,791.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,700.00	0.00	0.00	2,700.00	-1,691.00	0.00	0.00	0 00	0.00	732,091.12	704,205.52
2,800.00	0.00	0.00	2,800.00	-1,591.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
2,900.00	0.00	0.00	2,900.00	-1,491.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,000.00	0.00	0.00	3,000.00	-1,391.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,100.00	0.00	0.00	3,100.00	-1,291.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,200.00	0.00	0.00	3,200.00	-1,191.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,220.00	0.00	0.00	3,220.00	-1,171.00	0.00	0.00	0.00	0.00	732,091.12	704,205 52
Queen										
3,300.00	0.00	0.00	3,300.00	-1,091.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,400.00	0.00	0.00	3,400.00	-991.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,500.00	0.00	0.00	3,500.00	-891.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,600.00	0.00	0.00	3,600.00	-791.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,700.00	0.00	0.00	3,700.00	-691.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,800.00	0.00	0.00	3,800.00	-591.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,900.00	0.00	0.00	3,900.00	-491.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
3,950.00	0.00	0.00	3,950.00	-441.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
San Andres D										
4,000.00	0.00	0.00	4,000.00	-391.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,100.00	0.00	0.00	4,100.00	-291.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,200.00	0.00	0.00	4,200.00	-191.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,300.00	0.00	0.00	4,300.00	-91.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,400.00	0.00	0.00	4,400.00	9.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,500.00	0.00	0.00	4,500.00	109.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,600.00	0.00	0.00	4,600.00	209.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,700.00	0.00	0.00	4,700.00	309.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
4,800.00	0.00	0.00	4,800.00	409.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
4,900.00	0.00	0.00	4,900.00	509.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,000.00	0.00	0.00	5,000.00	609.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,100.00	0.00	0.00	5,100.00	709.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,200.00	0.00	0.00	5,200.00	809.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,300.00	0.00	0.00	5,300.00	909.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,400.00	0.00	0.00	5,400.00	1,009.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,500.00	0.00	0.00	5,500.00	1,109.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,600.00	0.00	0.00	5,600.00	1,209.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,700.00	0.00	0.00	5,700.00	1,309.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,800.00	0.00	0.00	5,800.00	1,409.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
5,900.00	0.00	0.00	5,900.00	1,509.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,000.00	0.00	0.00	6,000.00	1,609.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,100.00	0.00	0.00	6,100.00	1,709.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,200.00	0.00	0.00	6,200.00	1,809.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,300.00	0.00	0.00	6,300.00	1,909.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,400.00	0.00	0.00	6,400.00	2,009.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,500.00	0.00	0.00	6,500.00	2,109.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,600.00	0.00	0.00	6,600.00	2,209.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,700.00	0.00	0.00	6,700.00	2,309.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,770.00	0.00	0.00	6,770.00	2,379.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
Tubb										
6,800.00	0.00	0.00	6,800.00	2,409.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
6,900.00	0.00	0.00	6,900.00	2,509.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,000.00	0.00	0.00	7,000.00	2,609.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,100.00	0.00	0.00	7,100.00	2,709.00	0.00	0 00	0.00	0.00	732,091.12	704,205.52
7,200.00	0.00	0.00	7,200.00	2,809.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
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Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
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Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
7,300.00	0.00	0.00	7,300.00	2,909.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,400.00	0.00	0.00	7,400.00	3,009.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,460.00	0.00	0.00	7,460.00	3,069.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
Abo										
7,500.00	0.00	0.00	7,500.00	3,109.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,600.00	0.00	0.00	7,600.00	3,209.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,700.00	0.00	0.00	7,700.00	3,309.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,800.00	0.00	0.00	7,800.00	3,409.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
7,900.00	0.00	0.00	7,900.00	3,509.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
8,000.00	0.00	0.00	8,000.00	3,609.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
8,100.00	0.00	0.00	8,100.00	3,709.00	0.00	0.00	0.00	0.00	732,091.12	704,205.52
8,202.50	0.00	0.00	8,202.50	3,811.50	0.00	0.00	0.00	0.00	732,091.12	704,205.52
8,225.00	2.70	265.42	8,224.99	3,833.99	-0.04	-0.53	0.53	12.00	732,091.08	704,204.99
8,250.00	5.70	265.42	8,249.92	3,858.92	-0.19	-2.35	2.36	12.00	732,090.93	704,203.17
8,275.00	8.70	265.42	8,274.72	3,883.72	-0.44	-5.48	5.49	12.00	732,090.68	704,200.05
8,300.00	11.70	265.42	8,299.32	3,908.32	-0.79	-9.89	9.92	12.00	732,090.33	704,195.63
8,325.00	14.70	265.42	8,323.66	3,932.66	-1.25	-15.58	15.63	12.00	732,089.87	704,189.95
8,350.00	17.70	265.42	8,347.67	3,956.67	-1.80	-22.53	22.60	12.00	732,089.31	704,183.00
8,375.00	20.70	265.42	8,371.27	3,980.27	-2.46	-30.72	30.82	12.00	732,088.66	704,174.80
8,400.00	23.69	265.42	8,394.42	4,003.42	-3.21	-40.13	40.26	12.00	732,087.90	704,165.39
8,425.00	26.69	265.42	8,417.04	4,026.04	-4.06	-50.74	50.90	12.00	732,087.05	704,154.78
8,450.00	29.69	265.42	8,439.07	4,048.07	-5.01	-62.51	62.71	12.00	732,086.11	704,143.01
8,475.00	32.69	265.42	8,460.45	4,069.45	-6.04	-75.42	75.66	12.00	732,085.08	704,130.10
8,500.00	35.69	265.42	8,481.13	4,090.13	-7.16	-89.42	89.71	12.00	732,083.95	704,116.10
8,525.00	38.69	265.42	8,501.04	4,110.04	-8.37	-104.48	104.82	12.00	732,082.75	704,101.04
8,550.00	41.69	265.42	8,520.14	4,129.14	-9.66	-120.56	120.95	12.00	732,081.46	704,084.96
8,575.00	44.69	265.42	8,538.36	4,147.36	-11.02	-137.62	138.06	12.00	732,080.09	704,067.91

Pathfinder Energy Services

Pathfinder X & Y Survey Report

PATHFINDER ENERGY SERVICES

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
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MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
8,600.00	47.69	265.42	8,555.67	4,164.67	-12.46	-155.60	156.10	12.00	732,078.65	704,049.92
8,625.00	50.69	265.42	8,572.00	4,181.00	-13.98	-174.46	175.02	12.00	732,077.14	704,031.06
8,650.00	53.69	265.42	8,587.33	4,196.33	-15.55	-194.14	194.76	12.00	732,075.57	704,011.38
8,675.00	56.69	265.42	8,601.60	4,210.60	-17.19	-214.60	215.29	12.00	732,073.93	703,990.92
8,700.00	59.69	265.42	8,614.78	4,223.78	-18.89	-235.77	236.53	12.00	732,072.23	703,969.75
8,725.00	62.69	265.42	8,626.82	4,235.82	-20.64	-257.61	258.43	12.00	732,070.48	703,947 91
8,750.00	65.69	265.42	8,637.71	4,246.71	-22.43	-280.04	280.93	12.00	732,068.69	703,925.48
8,775.00	68.69	265.42	8,647.40	4,256.40	-24.27	-303.01	303.98	12.00	732,066.85	703,902.52
8,800.00	71.68	265.42	8,655.87	4,264.87	-26.15	-326.45	327.49	12.00	732,064.97	703,879.07
8,813.73	73.33	265.42	8,660.00	4,269.00	-27.20	-339.50	340.59	12.00	732,063.92	703,866.02
Wolfcamp										
8,825.00	74.68	265.42	8,663.11	4,272.11	-28.06	-350.30	351.42	12.00	732,063.06	703,855.22
8,850.00	77.68	265.42	8,669.08	4,278.08	-30.00	-374.50	375.70	12.00	732,061.12	703,831.03
8,875.00	80.68	265.42	8,673.77	4,282.77	-31.96	-398.97	400.25	12.00	732,059.16	703,806.55
8,900.00	83.68	265.42	8,677.17	4,286.17	-33.94	-423.66	425.01	12.00	732,057.18	703,781.87
8,925.00	86.68	265.42	8,679.27	4,288.27	-35.93	-448.49	449.92	12.00	732,055.19	703,757.04
8,944.66	89.04	265.42	8,680.00	4,289.00	-37.50	-468.07	469.57	12.00	732,053.62	703,737.45
9,000.00	89.04	265.42	8,680.93	4,289.93	-41.92	-523.22	524.90	0.01	732,049.20	703,682.30
9,024.52	89.04	265.42	8,681.34	4,290.34	-43.87	-547.66	549.41	0.01	732,047.24	703,657.86
9,100.00	89.04	265.42	8,682.61	4,291.61	-49.91	-622.89	624.88	0.00	732,041.21	703,582.63
9,200.00	89.04	265.42	8,684.29	4,293.29	-57.90	-722.55	724.87	0.00	732,033.22	703,482.97
9,300.00	89.04	265.42	8,685.97	4,294.97	-65.89	-822.22	824.86	0.00	732,025.23	703,383.30
9,400.00	89.04	265.42	8,687.64	4,296.64	-73.88	-921.89	924.84	0.00	732,017.24	703,283.63
9,500.00	89.04	265 42	8,689.32	4,298.32	-81.87	-1,021.55	1,024.83	0.00	732,009.25	703.183.97
9,600.00	89.04	265.42	8,691.00	4,300.00	-89.86	-1,121.22	1,124.81	0.00	732,001.25	703,084.30
9,700.00	89.04	265.42	8,692.68	4,301.68	-97.85	-1,220.89	1,224.80	0.00	731,993.26	702,984.64
9,800.00	89.04	265.42	8,694.36	4,303.36	-105.85	-1,320.55	1,324.79	0.00	731,985.27	702,884.97

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
9,900.00	89.04	265.42	8,696.04	4,305.04	-113.84	-1,420.22	1,424.77	0.00	731,977.28	702,785.30
10,000.00	89.04	265.42	8,697.72	4,306.72	-121.83	-1,519.88	1,524.76	0.00	731,969.29	702,685.64
10,100.00	89.04	265.42	8,699.40	4,308.40	-129.82	-1,619.55	1,624.74	0.00	731,961.30	702,585.97
10,200.00	89.04	265.42	8,701.08	4,310.08	-137 81	-1,719.22	1,724.73	0.00	731,953.31	702,486.31
10,300.00	89.04	265.42	8,702.76	4,311.76	-145.80	-1,818.88	1,824.72	0.00	731,945.32	702,386.64
10,400.00	89.04	265.42	8,704.44	4,313.44	-153.79	-1,918.55	1,924.70	0.00	731,937.32	702,286.97
10,500.00	89.04	265.42	8,706.11	4,315.11	-161.79	-2,018.21	2,024.69	0.00	731,929.33	702,187.31
10,600.00	89.04	265.42	8,707.79	4,316.79	-169.78	-2,117.88	2,124.67	0.00	731,921.34	702,087.64
10,700.00	89.04	265.42	8,709.47	4,318.47	-177.77	-2,217.55	2,224.66	0.00	731,913.35	701,987.98
10,800 00	89.04	265.42	8,711.15	4,320.15	-185.76	-2,317.21	2,324.65	0.00	731,905.36	701,888.31
10,900.00	89.04	265.42	8,712.83	4,321.83	-193.75	-2,416.88	2,424.63	0.00	731,897.37	701,788.64
11,000.00	89.04	265.42	8,714.51	4,323.51	-201.74	-2,516.54	2,524.62	0.00	731,889.38	701,688.98
11,100.00	89.04	265.42	8,716.19	4,325.19	-209.73	-2,616.21	2,624.60	0.00	731,881.38	701,589.31
11,200.00	89.04	265.42	8,717.87	4,326.87	-217.73	-2,715.88	2,724.59	0.00	731,873.39	701,489.65
11,300.00	89.04	265.42	8,719.55	4,328.55	-225.72	-2,815.54	2,824.57	0.00	731,865.40	701,389.98
11,400.00	89.04	265.42	8,721.23	4,330.23	-233.71	-2,915.21	2,924.56	0.00	731,857.41	701,290.31
11,500.00	89.04	265.42	8,722.91	4,331.91	-241.70	-3,014.87	3,024.55	0.00	731,849.42	701,190.65
11,600.00	89.04	265.42	8,724.59	4,333.59	-249.69	-3,114.54	3,124.53	0.00	731,841.43	701,090.98
11,700.00	89.04	265.42	8,726.26	4,335.26	-257.68	-3,214.21	3,224.52	0.00	731,833.44	700,991.32
11,800 00	89.04	265.42	8,727.94	4,336.94	-265.67	-3,313.87	3,324.50	0.00	731,825.44	700,891.65
11,900.00	89.04	265.42	8,729.62	4,338.62	-273.66	-3,413.54	3,424.49	0.00	731,817.45	700,791.98
12,000.00	89.04	265.42	8,731.30	4,340.30	-281.66	-3,513.20	3,524.48	0.00	731,809.46	700,692.32
12,100.00	89.04	265.42	8,732.98	4,341.98	-289.65	-3,612.87	3,624.46	0.00	731,801.47	700,592.65
12,200.00	89.04	265.42	8,734.66	4,343.66	-297.64	-3,712.54	3,724.45	0.00	731,793.48	700,492.99
12,300.00	89.04	265.42	8,736.34	4,345.34	-305.63	-3,812.20	3,824.43	0.00	731,785.49	700,393.32
12,400.00	89.04	265.42	8,738.02	4,347.02	-313.62	-3,911.87	3,924.42	0.00	731,777.50	700,293.65
12,500.00	89.04	265.42	8,739.70	4,348.70	-321.61	-4,011.53	4,024.41	0.00	731,769.50	700,193.99

Pathfinder Energy Services

Pathfinder X & Y Survey Report

PATHFINDER ENERGY SERVICES

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well Hercules Federal Com #4H
Project:	Chaves County	**TVD Reference:**	EST RKB @ 4391.00ft
Site:	Hercules Federal Com #4H	**MD Reference:**	EST RKB @ 4391.00ft
Well:	Hercules Federal Com #4H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan #1	**Database:**	EDM 2003.16 Single User Db

Planned Survey

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
12,600.00	89.04	265.42	8,741.38	4,350.38	-329.60	-4,111.20	4,124.39	0.00	731,761.51	700,094.32
12,700.00	89.04	265.42	8,743.06	4,352.06	-337.60	-4,210.87	4,224.38	0.00	731,753.52	699,994.65
12,800.00	89.04	265.42	8,744.73	4,353.73	-345.59	-4,310.53	4,324.36	0.00	731,745.53	699,894.99
12,900.00	89.04	265.42	8,746.41	4,355.41	-353.58	-4,410.20	4,424.35	0.00	731,737.54	699,795.32
13,000.00	89.04	265.42	8,748.09	4,357.09	-361.57	-4,509.86	4,524.34	0.00	731,729.55	699,695.66
13,100.00	89.04	265.42	8,749.77	4,358.77	-369.56	-4,609.53	4,624.32	0.00	731,721.56	699,595.99
13,113.58	89.04	265.42	8,750.00	4,359.00	-370.65	-4,623.07	4,637.90	0.00	731,720.47	699,582.45
PBHL (HFC4)										

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 (HFC4) - plan hits target - Point	0.00	0.00	8,750.00	-370.65	-4,623.07	731,720.471	699,582.454	33° 0' 37.557 N	103° 49' 1.587 W

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,220.00	3,220.00	Queen		0.00	
7,460.00	7,460.00	Abo		0.00	
8,813.73	8,660.00	Wolfcamp		0.00	
6,770.00	6,770.00	Tubb		0.00	
3,950.00	3,950.00	San Andres D		0.00	
2,410.00	2,410.00	Yates		0.00	

Checked By: _____ Approved By: _____ Date: _____

EXHIBIT A
PECOS DISTRICT - RFO
CONDITIONS OF APPROVAL

December, 2008

OPERATORS NAME: **C.O.G. Operating L.L.C.**
LEASE NO.: **NM-105885**
WELL NAME & NO: **Hercules Federal Com. #4H**
SURFACE HOLE FOOTAGE: **990' FSL & 330' FEL**
BOTTOM HOLE FOOTAGE: **660' FSL & 330' FWL**
LOCATION: **Section 15, T. 15 S., R. 31 E., NMPM**
COUNTY: **Chaves County, New Mexico**

GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

I. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD (Filing of a Sundry Notice is required for this 60 day extension).

II. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

III. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations (access road and/or well pad). Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

IV. CONSTRUCTION

A. NOTIFICATION:

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Roswell Field Office at (505) 627-0247 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved Application for Permit to Drill and Conditions of Approval on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL:

The operator shall stockpile the topsoil of the well pad. The topsoil to be stripped is approximately 6 inches in depth. The topsoil shall not be used to backfill the reserve pit and will be used for interim and final reclamation. The soil shall be stockpiled on the southwest corner of the well pad.

C. CLOSED LOOP SYSTEM: No reserve pit will be used.

The lieu of reserve pit the operator has opted to use the closed loop system. Steel tanks are required for drilling operations: No Pits Allowed. The operator shall properly dispose of drilling contents at an authorized disposal site

Containment structures or earthen dikes shall be constructed and maintained on the south and west sides of the outside boundary of the well pad. The containment structure or earthen dike shall be constructed two (2) feet high (the containment structure or earthen dike can be constructed higher than the two (2) feet high minimum). The topsoil shall not be used for construction of the containment structures or earthen dikes. The containment structure or earthen dike is required so that if oilfield waste contaminant or product contaminant were leaked, spilled, and or released upon the well pad the oilfield waste contaminant or product contaminant shall be contained on the well pad. If the well pad is constructed into a cut on a slope then the uphill side of the well pad will not require the construction of the containment structure or earthen dike, but the construction of the containment structure or dike will be required on the remaining sides of the well pad which will extend into the uphill portion of the well pad. This containment structure shall be constructed and maintained during the drilling phase and production phase of the well.

D. FEDERAL MINERAL MATERIALS PIT:

If the operator elects to surface the access road and/or well pad, mineral materials can be obtained from a private source.

E. WELL PAD SURFACING:

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation.

The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational need.

F. ON LEASE ACCESS ROADS:

Road Egress and Ingress

The access road shall be constructed to access the northeast corner of the well pad.

Road Width

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed thirty (30) feet.

Surfacing

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

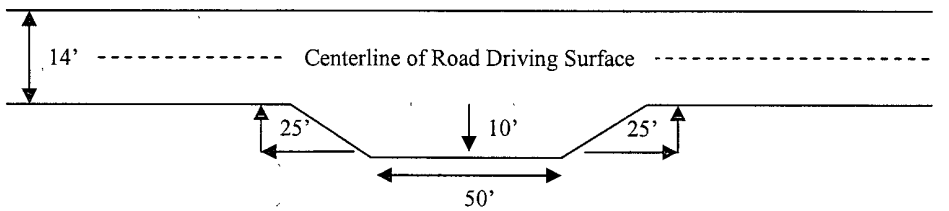
Crowning

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Turnouts

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:

Standard Turnout – Plan View

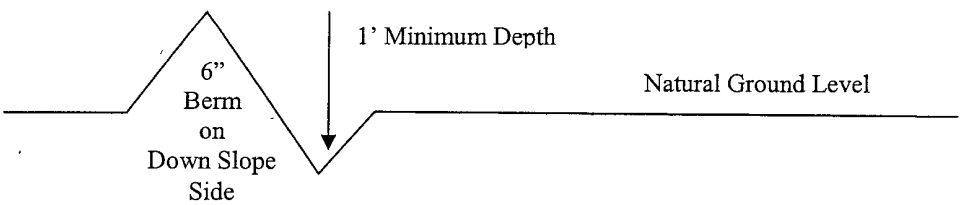


Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section Of Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval Of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$\text{400 foot road with 4\% road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Cattleguards

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s).

Any existing cattleguard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguard(s) that are in place and are utilized during lease operations.

A gate shall be constructed and fastened securely to H-braces.

Fence Requirement

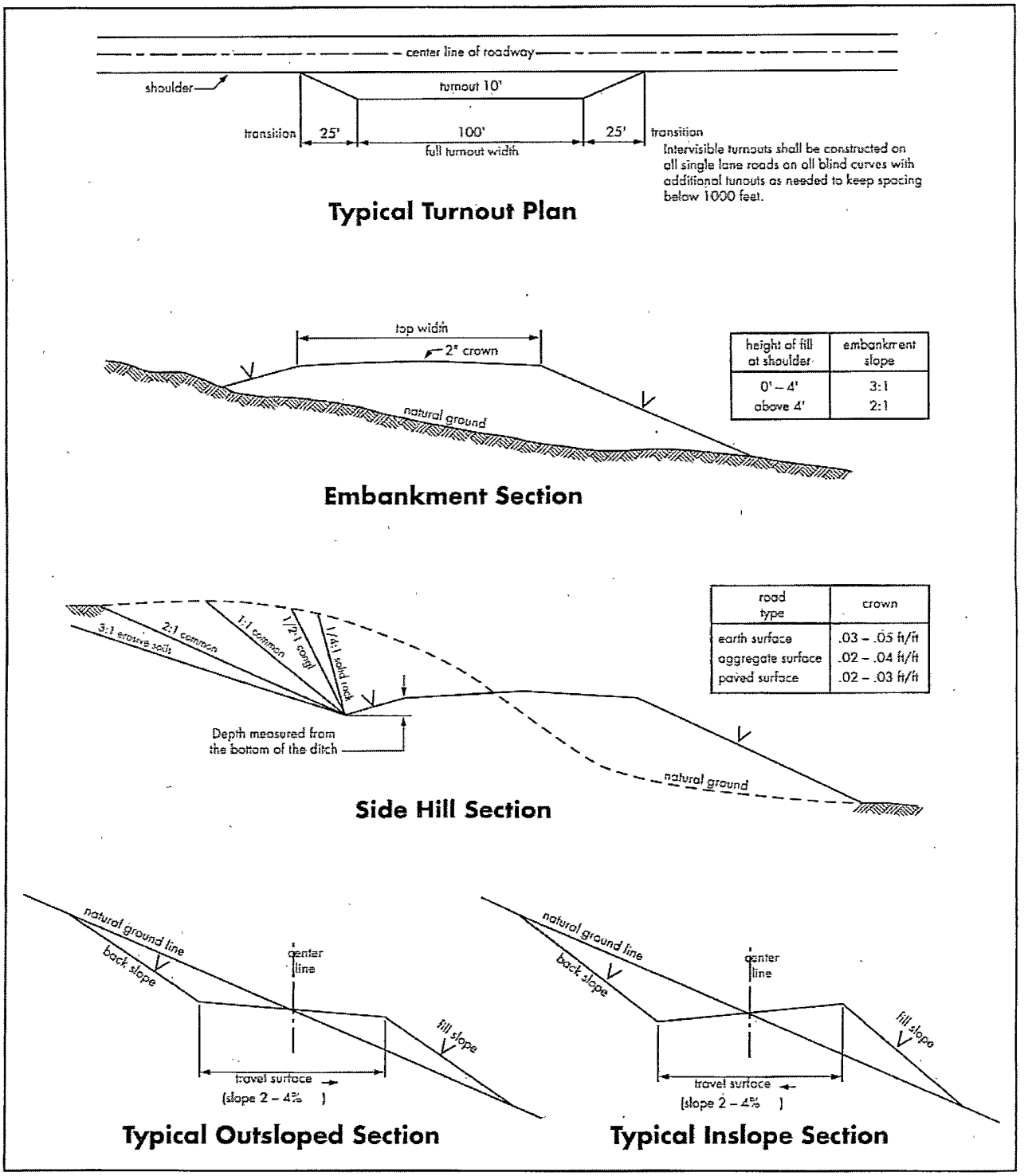
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Figure 1 – Cross Sections and Plans For Typical Road Sections



V. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

1. Call the Roswell Field Office, 2909 West Second St., Roswell, NM 88201. During office hours call (575) 627-0205 or after office hours call (575) 910-6024. Engineer on call during office hours call (575) 627-0275 or after office hours call (575) 626-5749.

2. The BLM is to be notified a minimum of 24 hours in advance for a representative to witness:

a. Spudding well
b. Setting and/or Cementing of all casing strings

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

BOPE Tests

3. 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.

4. Include the API Number assigned to well by NMOCD on the subsequent report of setting the first casing string.

5. A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales.

6. The operator will accurately measure the drilling rate in ft/min to set the base of the usable water protection casing string(s) opposite competent rock. The record of the drilling rate along with the caliper-gamma ray-neutron well log run to surface will be submitted to this office as well as all other logs run on the borehole 30 days from completion

7. Air, air-mist or fresh water and non toxic drilling mud shall be used to drill to the base of the usable water protection casing string(s). Any polymers used will be water based and non-toxic.

B. CASING

1. The 13-3/8 inch usable water protection casing string(s) shall be set at approximately 400 feet opposite competent bedrock.

If not the operator is required to set usable water protecting casing in the next thick competent bedding (i.e. 15 to 25 ft or greater) encountered and cemented to the surface.

a. If cement does not circulate to the surface, the Roswell Field 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 or 500 pounds compression 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 compression strength, whichever is greater.

d. If cement falls back, remedial action will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is **sufficient to circulate to the surface.** If cement does not circulate see B.1.a-d above.

3. The minimum required fill of cement behind the **7** inch production casing is **sufficient to tie back 500 feet above the uppermost perforation in the pay zone**. If cement does not circulate, 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.

4. There is no required fill of cement behind the **4-1/2** inch production liner since isolation packers and sliding sleeves will be used for lateral and will not require cementing.

5. 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. Before drilling below the **13-3/8** inch surface casing shoe, the blowout preventer assembly shall consist of a minimum of One Annular Preventer or Two Ram-Type Preventers and a Kelly Cock/Stabbing Valve. Before drilling below the **9-5/8** inch intermediate casing shoe, the blowout preventer assembly shall consist of a minimum of One Annular Preventer, Two Ram-Type Preventers, and a Kelly Cock/Stabbing Valve.

2. Before drilling below the **13-3/8** inch surface casing shoe, minimum working pressure of the blowout preventer and related equipment (BOPE) shall be **2000** psi. Before drilling below the **9-5/8** inch intermediate casing shoe, minimum working pressure of the blowout preventer and related equipment (BOPE) shall be **3000** psi.

3. The BOPE shall be installed before drilling below the **13-3/8** inch surface casing and the **9-5/8** inch intermediate casing and shall be tested as described in Onshore Order No. 2. Any equipment failing to test satisfactorily shall be repaired or replaced.

a. The BLM Roswell Field office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

b. The tests shall be done by an independent service company.

c. 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.

d. 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 BLM Roswell Field Office at 2909 West Second Street, Roswell, New Mexico 88201.

e. Testing fluid must be water or an appropriate clear liquid suitable for sub-freezing temperatures. Use of drilling mud for testing is not permitted since it can mask small leaks.

f. Testing must be done in a safe workman like manner. Hard line connections shall be required.

g. The requested variance to test the **13-3/8 inch surface casing and the BOPE** prior to **drilling below the 13-3/8 inch surface casing** to the reduced pressure of **1000** psi using the rig pumps is approved.

VI. PRODUCTION

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim re-contouring and re-vegetation of the well location.

Containment Structures

The containment structure shall be constructed to hold the capacity of the entire contents of the largest tank, plus 24 hour production, unless more stringent protective requirements are deemed necessary by the Authorized Officer.

Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Juniper Green**, from the standard environmental color chart.

VRM Facility Requirement

Low-profile tanks not greater than eight-feet-high shall be used.

VII. INTERIM RECLAMATION & RESERVE PIT CLOSURE

A. INTERIM RECLAMATION

If the well is a producer, interim reclamation shall be conducted on the well site in accordance with the orders of the Authorized Officer. The operator shall submit a Sundry Notices and Reports on Wells (Notice of Intent), Form 3160-5, prior to conducting interim reclamation.

If the well is a producer, the entire west side of the well pad will be reduced in size from 150 feet west from the center drill hole to 100 feet west of the center drill hole. All the caliche will be removed from area of the 50 foot reduction of the west side of the pad in order to protect the playa located west and southwest of the pad. The disturbed area exposed after the caliche removal will be seeded with the seed mixture stated below. The containment structure or earthen dike shall be constructed and maintained on the south and west sides of the outside boundary of the well pad. The containment structure or earthen dike shall be constructed two (2) feet high (the containment structure or earthen dike can be constructed higher than the two (2) feet high minimum). The containment structure or earthen dike is required so that if oilfield waste contaminant or product contaminant were leaked, spilled, and or released upon the well pad the oilfield waste contaminant or product contaminant shall be contained on the well pad.

If the well pad is constructed into a cut on a slope then the uphill side of the well pad will not require the construction of the containment structure or earthen dike, but the construction of the containment structure or dike will be required on the remaining sides of the well pad which will extend into the uphill portion of the well pad. This containment structure shall be constructed and maintained during the drilling phase and production phase of the well.

During the life of the development, all disturbed areas not needed for active support of production operations should undergo "interim" reclamation in order to minimize the environmental impacts of development on other resources and uses.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche may be used in road repairs, fire walls or for building other roads and locations. In addition, in order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

B. SEED MIXTURE – Closed Loop System

The operator should work with BLM surface management specialists to devise the best strategies to reduce the size of the location. Any reductions in the well pad should allow for remedial well operations, as well as, to provide a safe working area.

The disturbed areas shall be seeded as follows:

Loamy, SD-3 Ecological Site; Loamy CP-2; Gyp Upland CP-2 for HP-3 Loamy

Common Name and Preferred Variety	Scientific Name	Pounds of Pure Live Seed Per Acre
Blue grama,	*(Bouteloua gracilis)*	4.00 Lbs.
Sideoats grama,	*(Bouteloua curtipendula)*	1.00 Lb.
Sand dropseed	*(Sporobolus cryptandrus)*	0.50 Lb.
Vine mesquite	*(Panicum obtusum)*	1.00 Lb.
Plains bristlegrass	*(Setaria macrostachya)*	1.00 Lb.
Indian blanketflower	*(Gaillardia aristata)*	0.50 Lb.
Desert or Scarlet	*(Sphaeralcea ambigua)*	1.00 Lb.
Globemallow or	*(S. coccinea)*	
Annual sunflower	*(Helianthus annuus)*	0.75 Lb.
TOTAL POUNDS PURE LIVE SEED (pls) PER ACRE		9.75 Lbs.

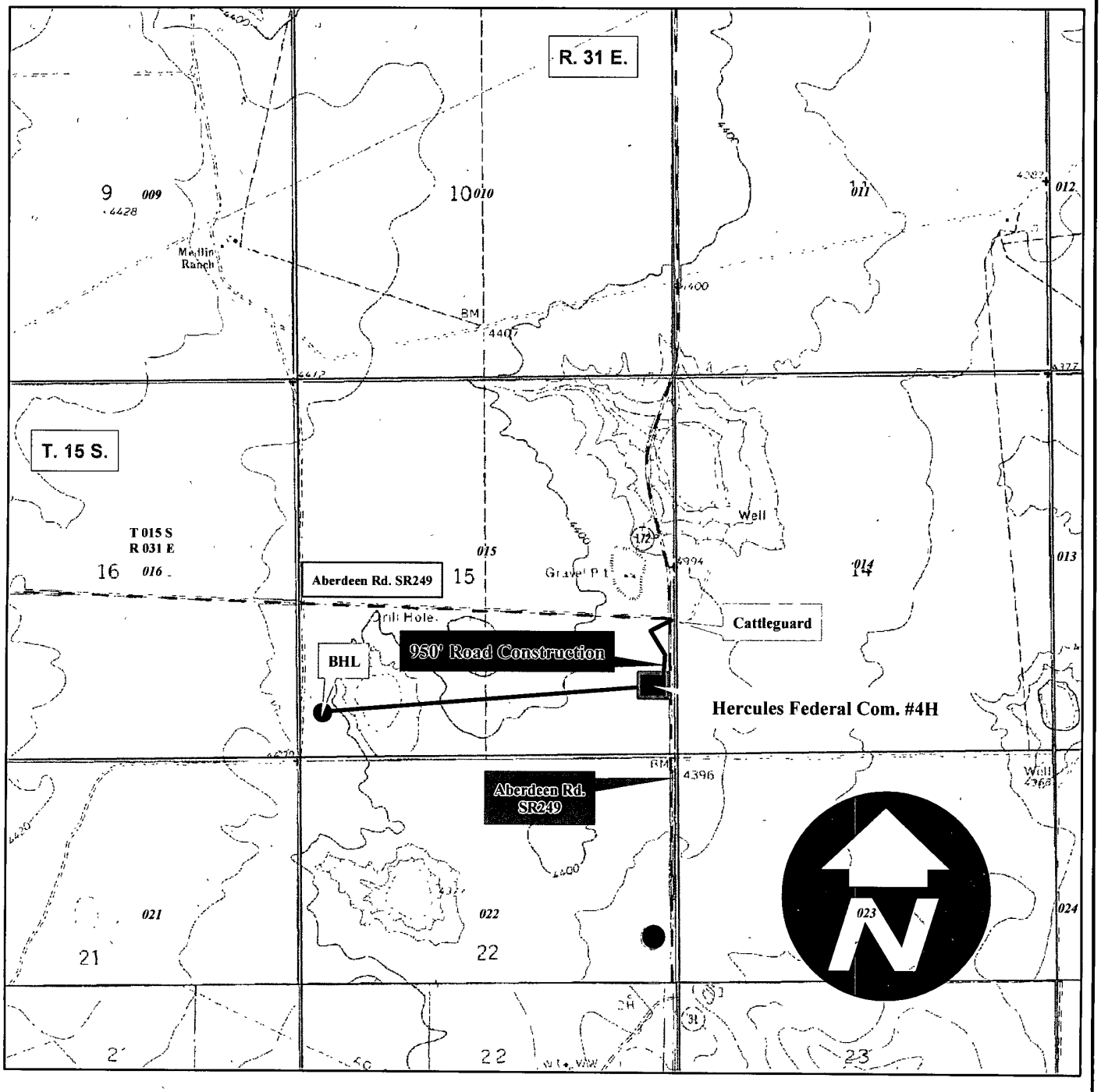
Certified Weed Free Seed. If one species is not available, increase ALL others proportionately. Use No Less than 4 species, including one forb. No less than 9.75 pounds (pls) per acre shall be applied.

VIII. FINAL ABANDONMENT & REHABILITATION REQUIREMENTS

Upon abandonment of the well and/or when the access road is no longer in service the Authorized Officer shall issue instructions and/or orders for surface reclamation and restoration of all disturbed areas.

On New Mexico State surface/Bureau of Land Management mineral estate land, the reclamation procedures on the road and well pad shall be accomplished in accordance with the New Mexico State Land Office agreements.

EXHIBIT B
HERCULES FEDERAL COM. #4H
Surface location; 990' FSL & 330' FEL,
Bottom Hole Location; 660' FSL & 330' FWL,
Section 15, T. 15 S., R. 31 E.,
Chaves County, New Mexico



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Feet
0 660 1,320 2,640 3,960 5,280