13-147

Form 3160-3
(March 2012)

SECRETARY'S POTASH

RECEIVED
OCD Artesia
JUL 26 2013
NMOCD ARTESIA

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM97136

6. If Indian, Allotee or Tribe Name:

1a. Type of Work: [✓] DRILL [ ] REENTER

7. If Unit or CA Agreement, Name and No.:

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other [ ] Single Zone [✓] Multiple Zone

8. Lease Name and Well No.: Marauder 31 Federal #3H

2. Name of Operator: COG Operating LLC.

9. API Well No.: 30-015-41569

3a. Address: 2208 West Main Street, Artesia, NM 88210

3b. Phone No. *(include area code)*: 575-748-6940

10. Field and Pool, or Exploratory: Gatuna Canyon; Bone Spring

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: 330' FNL & 1650' FEL Unit Letter B (NWNE) Section 31-T19S-R31E

At proposed prod. Zone: 330' FSL & 1980' FEL Unit Letter O (SWSE) Section 31-T19S-R31E

11. Sec., T.R.M. or Blk and Survey or Area: Section 31-T19S-R31E

14. Distance in miles and direction from nearest town or post office*: Approximately 13 miles to Carlsbad

12. County or Parish: Eddy

13. State: New Mexico

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
330'	877.4	160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.		**20. BLM/BIA Bond No. on file**
SHL:1025' BHL: 1322'	TVD: 8860' MD: 13282'	NMB000740 &NMB00215
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	**22. Approximate date work will start***	**23. Estimated duration**
3447.9' GL	6/2/2013	30 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
Mayte Reyes	Mayte Reyes	11/15/2012

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/s/ Aden L. Seidlitz		JUL 17 2013
Title	**Office**	
STATE DIRECTOR	NM STATE OFFICE	

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations theron.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

CAPITAN CONTROLLED WATER BASIN

SEE ATTACHED FOR CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO GENERAL REQUIREMENTS AND SPECIAL STIPULATIONS ATTACHED

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

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

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

DISTRICT IV
11885 S. ST. FRANCIS DR., SANTA FE, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION
11885 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised October 12, 2010
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code	Pool Name
30-015- 41569	96688	Gatuna Canyon; Bone Spring

Property Code	Property Name	Well Number
40044	MARAUDER 31 FEDERAL	3H

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	3447.9'

Surface Location

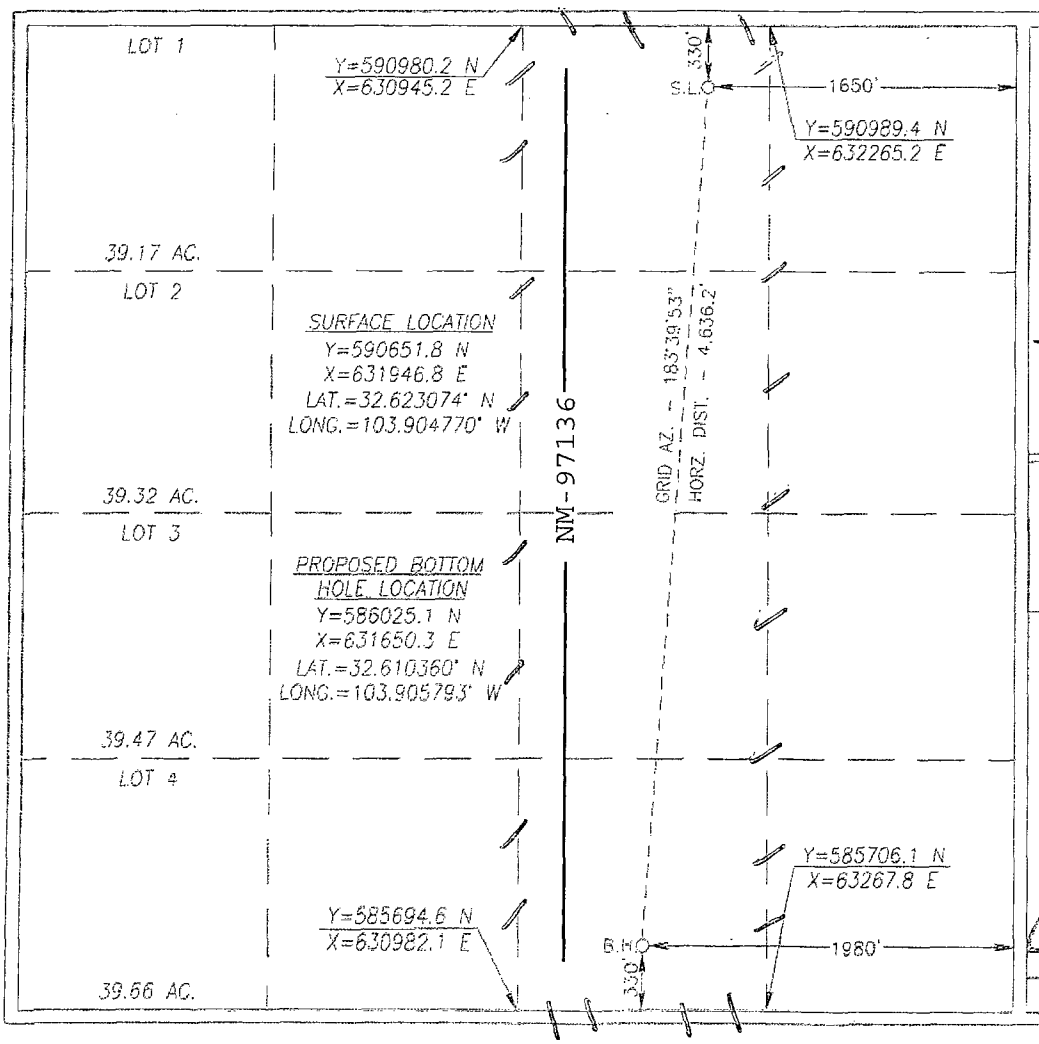
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	31	19-S	31-E		330	NORTH	1650	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	31	19-S	31-E		330	SOUTH	1980	EAST	EDDY

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 herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Melanie Stanton 3/12/13
Signature Date

Melanie J. Parker
Printed Name

SURVEYOR CERTIFICATION

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

JANUARY 2, 2013
Date Surveyed
Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
PROFESSIONAL SURVEYOR

Chad Harcrow 11/21/13
Certificate No. CHAD HARCROW 17777

W.O. # 12-267 DRAWN BY: VD

COG OPERATING LLC
Marauder Federal 3H
Section 31-T19S-R31E

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in the APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

Executed this 15th day of November, 2012.

Signed: Melanie Parker

Name : Melanie Parker

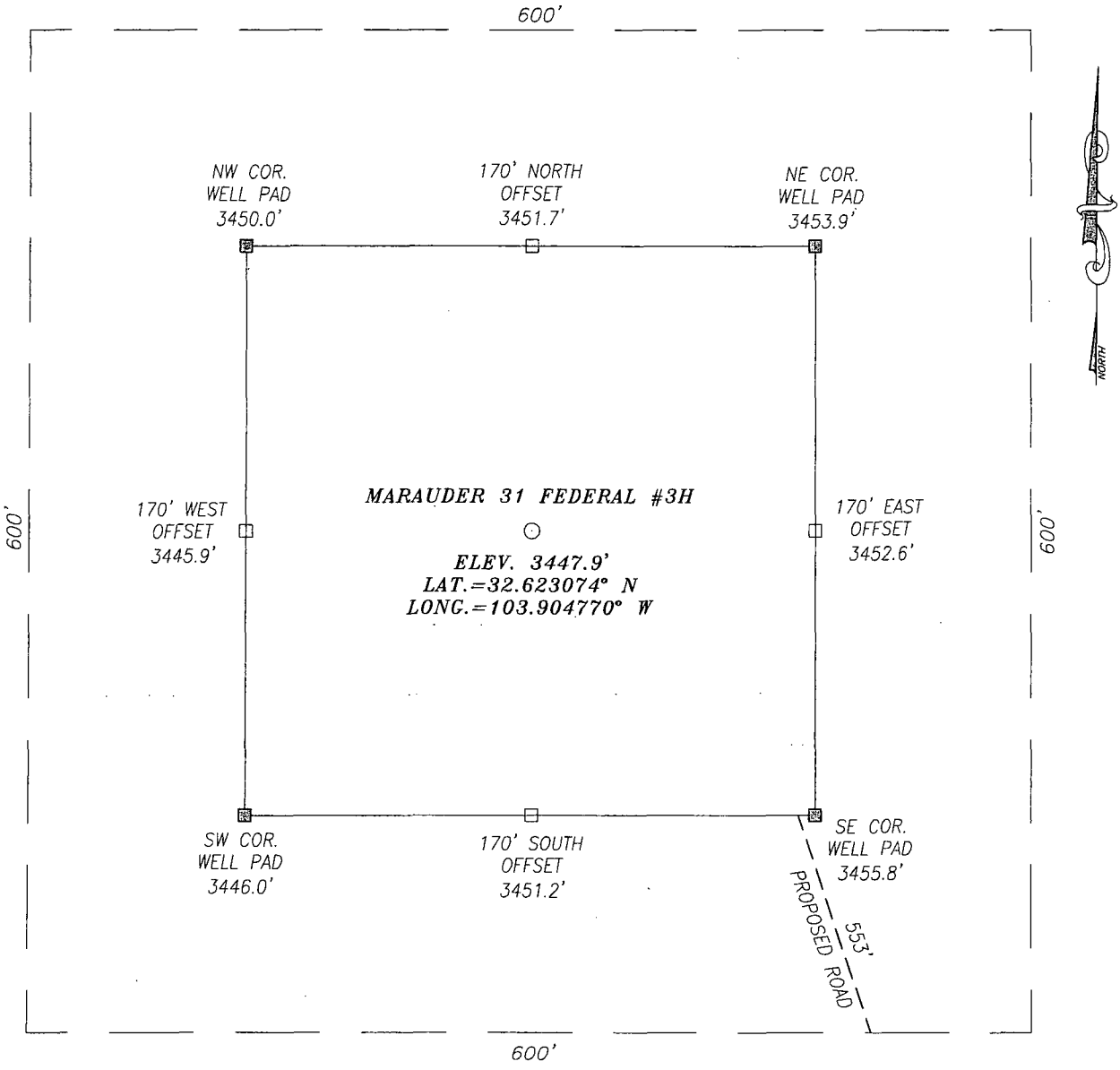
Position Title: Regulatory Coordinator

Address: 2208 West Main Street, Artesia, NM 88210

Telephone: 575-748-6940

SECTION 31, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTON OF HIGHWAY 360 AND COUNTY ROAD 22 GO NE ON C.R. 222 4.6 MILES. PROPOSED WELL IS APPROX. 771' LEFT (NORTHWEST) ALONG PROPOSED ROAD.

100 0 100 200 Feet

Scale: 1"=100'

HARCROW SURVEYING
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570
FAX: (575) 746-2808
EST. 2007

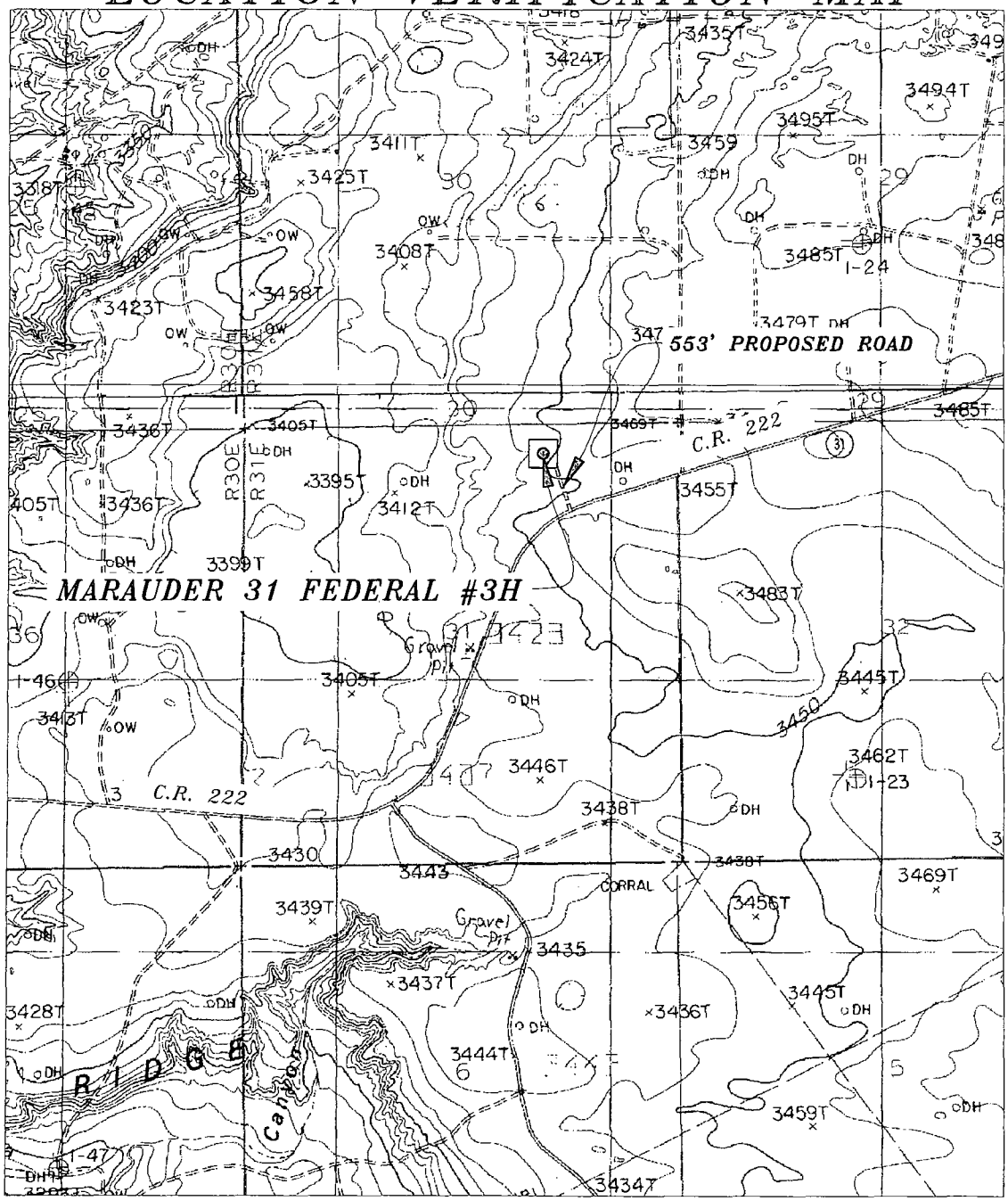
COG OPERATING, LLC

MARAUDER 31 FEDERAL #3H WELL
LOCATED 330 FEET FROM THE NORTH LINE
AND 1650 FEET FROM THE EAST LINE OF SECTION 31,
TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: JANUARY 2, 2012	PAGE: 1 OF 1	
DRAFTING DATE: JANUARY 14, 2013		
APPROVED BY: CH	DRAWN BY: VD	FILE: 12-267

EXHIBIT 2

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL: 10'

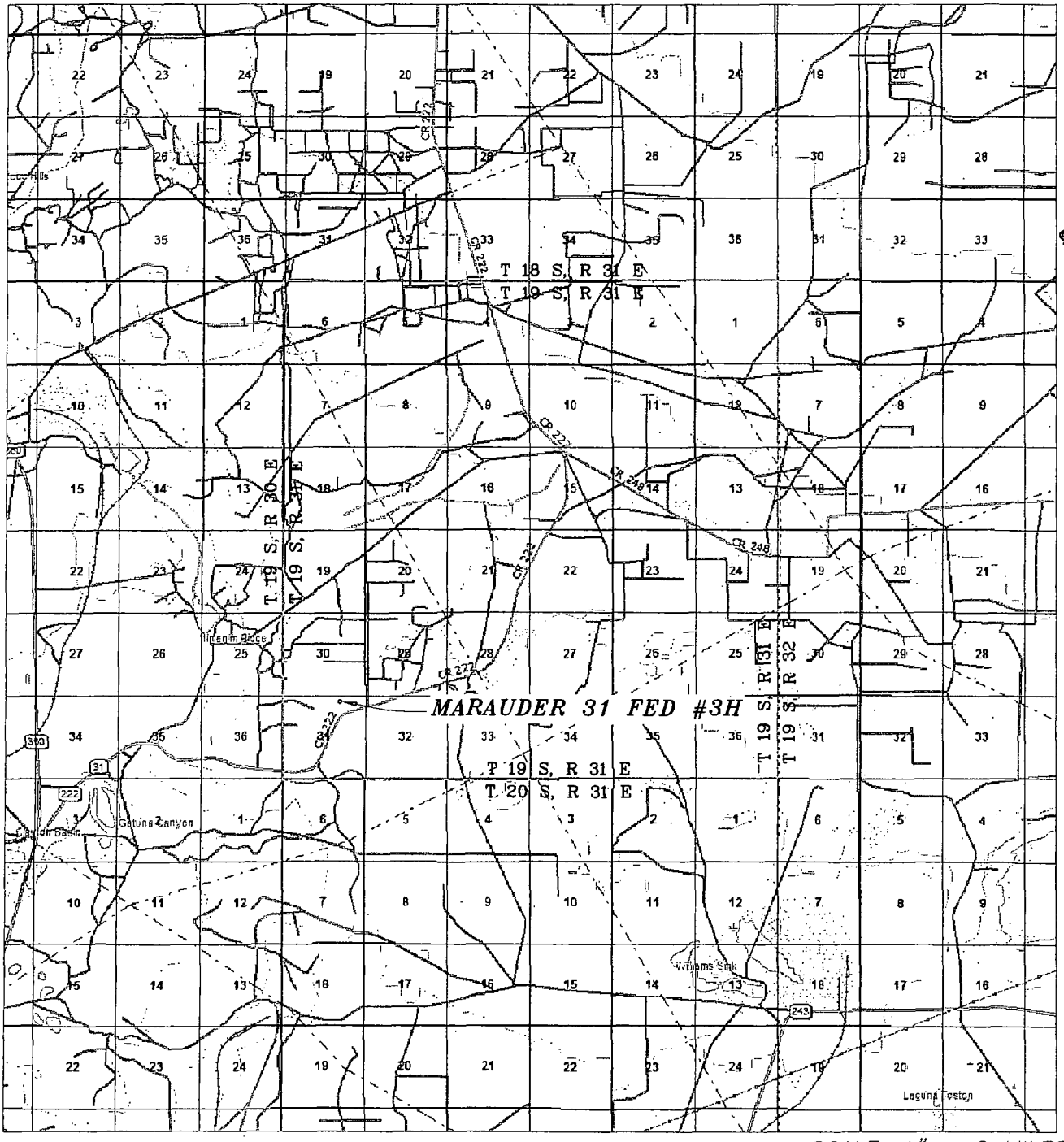
SEC. 31 TWP. 19-S RGE. 31-E
SURVEY N.M.P.M.
COUNTY EDDY STATE NEW MEXICO
DESCRIPTION 330' FNL & 1650' FEL
ELEVATION 3447.9'
OPERATOR COG OPERATING, LLC
LEASE MARAUDER 31 FEDERAL
U.S.G.S. TOPOGRAPHIC MAP
TOWER HILL NORTH, N.M.

HARCROW SURVEYING
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570
FAX: (575) 746-2808
EST. 2007

COG OPERATING, LLC

SURVEY DATE: JAN. 02, 2013		PAGE: 1 OF 1
DRAFTING DATE: JAN. 11, 2013		
APPROVED BY: CH	DRAWN BY: DDSI	FILE: 12-267

VICINITY MAP

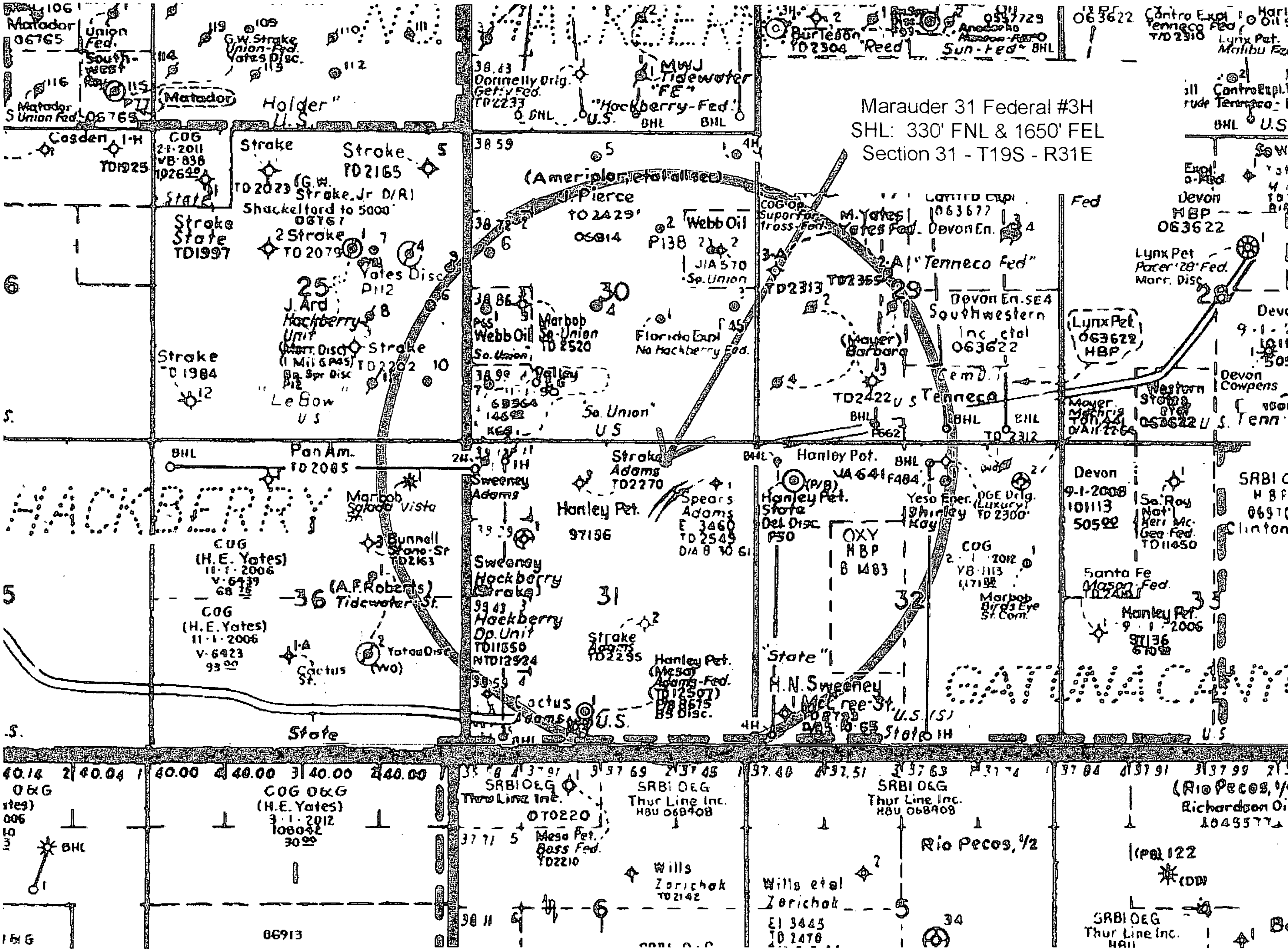


SCALE: 1" = 2 MILES

SEC. 31 TWP. 19-S RGE. 31-E
SURVEY N.M.P.M.
COUNTY EDDY STATE NEW MEXICO
DESCRIPTION 330' FNL & 1650' FEL
ELEVATION 3447.9'
OPERATOR COG OPERATING, LLC
LEASE MARAUDER 31 FEDERAL

HARCROW SURVEYING
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570
FAX: (575) 746-2808
EST. 2007

COG OPERATING, LLC		
SURVEY DATE: JAN. 02, 2013		PAGE: 1 OF 1
DRAFTING DATE: JAN. 11, 2013		
APPROVED BY: CH	DRAWN BY: DDSI	FILE: 12-267


Marauder 31 Federal #3H
SHL: 330' FNL & 1650' FEL
Section 31 - T19S - R31E
HACKBERRY
Strake
Stroke
Strake State
Yates Disc
J. Ard
Hackberry Unit
Le Bow
Pan Am.
Marbob
Bunnell
(A.F.Roberts)
Tidewater St.
Cactus St.
State
J. Pierce
Webb Oil
Florida Expl
Marbob So. Union
So. Union
Hanley Pet.
Sweeney Adams
Strake Adams
Spears Adams
Sweeney Hackberry Strake
Hackberry Dp. Unit
Cactus
U.S.
M. Yates
Yates Fed.
Devon En.
"Tenneco Fed"
Southwestern
Tenneco
Lynx Pet.
OXY
HBP
State
H.N. Sweeney
McCree St.
Devon
Santa Fe
Mason Fed.
Western States
SRBI O&G
Thur Line Inc.
COG O&G
(H.E. Yates)
Rio Pecos, ½
Richardson Oil
Meso Pet.
Bass Fed.
Wills
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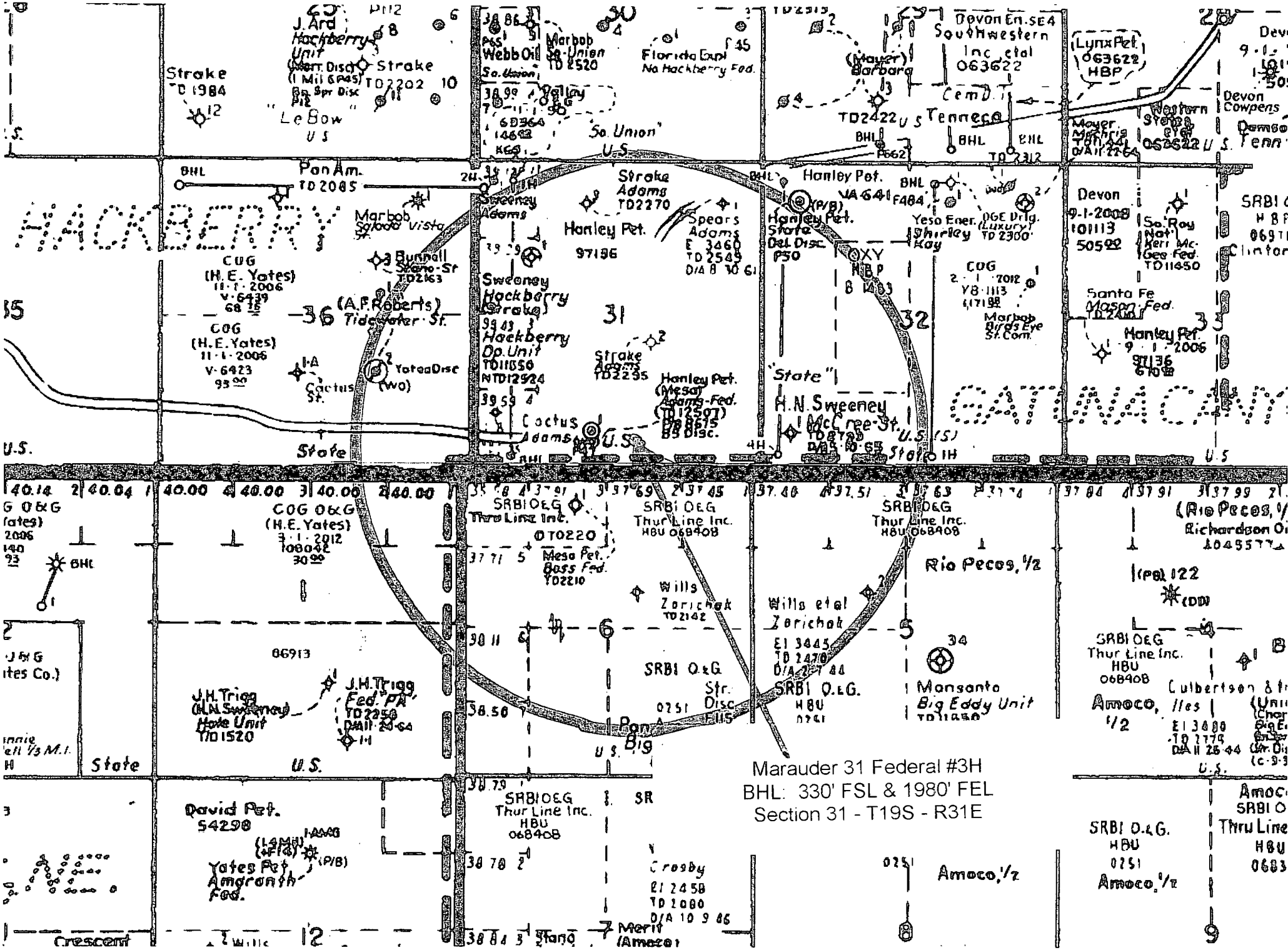

Marauder 31 Federal #3H
BHL: 330' FSL & 1980' FEL
Section 31 - T19S - R31E

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Marauder 31 Fed 3H
SHL: 330' FNL & 1650' FEL
BHL: 330' FSL & 1980' FEL
Section 31 T19S R31E
Eddy County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Operating LLC submits the following eleven items of pertinent information in accordance with BLM requirements.

1. Geological surface formation: Permian
2. The estimated tops of geologic markers & estimated depths at which anticipated water, oil or gas formations are expected to be encountered are as follows:

Fresh Water	~ 148'	
Rustler	423'	
Top of Salt	506'	
Base of Salt	1933'	
Yates	2048'	
7 Rivers	2123'	
Capitan Reef	2280'	
Delaware	4158'	Oil
Bone Spring	6676'	Oil
2nd BoneSpring	8708'	Oil
TD TVD	8860'	
TD MD	13,282'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities. The surface fresh water sands will be protected by setting 16" casing at 450' and circulating cement back to surface. All intervals will be isolated by setting 5 ½" casing to total depth and tying back cement to a minimum of 50' above Capitan Reef.

Sel COA

3. **Proposed Casing Program: All casing is new and API approved**

Hole Size	Depths	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
20"	0' - 450'	Surface	16"	New	65#	STC	H-40	1.125	1.125	1.6
14 3/4"	0' – ~~2150'~~2395'	Intrmd	11 3/4"	New	47#	STC	J-55	1.125	1.125	1.6
10 5/8"	0' – 4100'	Intrmd	8 5/8"	New	32#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' – 13,282'	Production Curve & Lateral	5 ½"	New	17#	LTC	P-110	1.125	1.125	1.6

- While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.

4. Proposed Cement Program

a. 16" Surface

Cmt: 425 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
**Calculated w/50% excess on OH volumes See COA

b. 11 3/4" Intermediate:

Lead: 500 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
**Calculated w/35% excess on OH volumes See COA

c. 8 5/8" Intermediate

1st Stg:
Lead: 200 sx 35:65:6 C+Salt+Gilsonite
(12.7 ppg /1.89 cuft/sx)
Tail: 250 sx Class C + 1% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
2nd Stg: DVT/ECP @ +/- ~~2180'~~ See COA
Lead: 250 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx)
Tail: 100 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/35% excess on OH volumes

d. 5 ½" Production

Lead: 925 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 1.89 cuft/sx)
Tail: 925 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg /1.25 cuft/sx)
**Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending the caliper measurement.
- The 11-3/4" & 8-5/8" intermediate strings are designed to circulate to surface.
- The production string will tie back a minimum of 50' above the Capitan Reef.

5. Control:

6.

Nipple up on 16" with 20" 2M annular preventer tested to 50% of rated working pressure by independent tester and the rest of the 2M system tested to 2000 psi.
Nipple up on 11 3/4" with 13 5/8" 2M annular preventer tested to 50% of rated working pressure by independent tester and the rest of the 2M system tested to 2000 psi.
Nipple up on 8-5/8" with 11" 3M system tested to 3000 psi by independent tester.
Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. A 2" kill line and a minimum 3" choke line will be included in the drilling spool located below the ram-type BOP. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold with 3000 psi WP rating. A remotely operated choke will be installed before drilling out intermediate shoe.

6. **Estimated BHP & BHT:**
   Lateral TD = 4054 psi
   Lateral TD= 145°F

7. **Mud Program:** The applicable depths and properties of this system are as follows:

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – 450'	Fresh Water	8.4	29	N.C.
450' – ~~2,130'~~ 2395'	Brine	10	29	N.C.
See COA 2,~~130~~ – 4,100'	Fresh Water	8.4	29	N.C.
4,100' – 13,282' (Lateral)	Cut Brine	8.8 – 9.2	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume total, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with hourly check by rig personnel.
- After setting the 8-5/8" intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. **Auxiliary Well Control and Monitoring Equipment:**
   a. A Kelly cock will be in the drill string at all times.
   b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
   c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 16" casing shoe until the 5 ½" casing is cemented. Breathing equipment will be on location upon drilling the 16" shoe until total depth is reached.

See COA

9. **Testing, Logging and Coring Program:**
   a. Drill stem tests will be based on geological sample shows.
   b. If open hole electrical logging is performed, the program will be:
      i. Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
      ii. Total Depth to Surface: Compensated Neutron with Gamma Ray
      iii. No coring program is planned
      iv. Additional testing will be initiated subsequent to setting the 5 ½" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows and drill stem tests.

10. **Potential Hazards:**
    a. No abnormal pressures or temperatures are expected. There is no known presence of H2S in this area. If H2S is encountered the operator will comply with the provisions of Onshore Oil and Gas Order No. 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. No H2S is anticipated to be encountered.

SM COA

11. Anticipated starting date and Duration of Operations:

a. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.

COG Marauder 31 Federal #3H Rev1 MDT 11Mar12 Proposal Geodetic Report

(Def Plan)

PATHFINDER
A Schlumberger Company

Report Date:	March 11, 2013 - 11:11 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG	**Vertical Section Azimuth:**	183.667 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG Marauder 31 Federal #3H / COG Marauder 31 Federal #3H	**TVD Reference Datum:**	Unknown
Well:	COG Marauder 31 Federal #3H	**TVD Reference Elevation:**	3465.900 ft above MSL
Borehole:	Original Hole	**Seabed / Ground Elevation:**	3447.900 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.664 °
Survey Name:	COG Marauder 31 Federal #3H Rev1 MDT 11Mar12	**Total Gravity Field Strength:**	999.1934 mgn (9.8 based)
Survey Date:	March 11, 2013	**Total Magnetic Field Strength:**	48622.234 nT
Tort / AHD / DDI / ERD Ratio:	89.862 ° / 4636.529 ft / 5.796 / 0.523	**Magnetic Dip Angle:**	60.417 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	March 11, 2013
Location Lat / Long:	N 32° 37' 23.06674", W 103° 54' 17.17040"	**Magnetic Declination Model:**	BGGM 2012
Location Grid N/E Y/X:	N 590651.800 ftUS, E 631946.800 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2310 °	**Grid Convergence Used:**	0.2310 °
Grid Scale Factor:	0.99992903	**Total Corr Mag North->Grid North:**	7.4334 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	183.67	0.00	0.00	0.00	0.00	N/A	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	100.00	0.00	183.67	100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	200.00	0.00	183.67	200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	300.00	0.00	183.67	300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	400.00	0.00	183.67	400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	500.00	0.00	183.67	500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	600.00	0.00	183.67	600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	700.00	0.00	183.67	700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	800.00	0.00	183.67	800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	900.00	0.00	183.67	900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1000.00	0.00	183.67	1000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1100.00	0.00	183.67	1100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1200.00	0.00	183.67	1200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1300.00	0.00	183.67	1300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1400.00	0.00	183.67	1400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1500.00	0.00	183.67	1500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1600.00	0.00	183.67	1600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1700.00	0.00	183.67	1700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1800.00	0.00	183.67	1800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	1900.00	0.00	183.67	1900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2000.00	0.00	183.67	2000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2100.00	0.00	183.67	2100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2200.00	0.00	183.67	2200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2300.00	0.00	183.67	2300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2400.00	0.00	183.67	2400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2500.00	0.00	183.67	2500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2600.00	0.00	183.67	2600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2700.00	0.00	183.67	2700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2800.00	0.00	183.67	2800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	2900.00	0.00	183.67	2900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3000.00	0.00	183.67	3000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3100.00	0.00	183.67	3100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3200.00	0.00	183.67	3200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3300.00	0.00	183.67	3300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3400.00	0.00	183.67	3400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3500.00	0.00	183.67	3500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3600.00	0.00	183.67	3600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3700.00	0.00	183.67	3700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3800.00	0.00	183.67	3800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	3900.00	0.00	183.67	3900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4000.00	0.00	183.67	4000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4100.00	0.00	183.67	4100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4200.00	0.00	183.67	4200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4300.00	0.00	183.67	4300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4400.00	0.00	183.67	4400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4500.00	0.00	183.67	4500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4600.00	0.00	183.67	4600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4700.00	0.00	183.67	4700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4800.00	0.00	183.67	4800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	4900.00	0.00	183.67	4900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5000.00	0.00	183.67	5000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5100.00	0.00	183.67	5100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5200.00	0.00	183.67	5200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5300.00	0.00	183.67	5300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5400.00	0.00	183.67	5400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5500.00	0.00	183.67	5500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5600.00	0.00	183.67	5600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5700.00	0.00	183.67	5700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5800.00	0.00	183.67	5800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	5900.00	0.00	183.67	5900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6000.00	0.00	183.67	6000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6100.00	0.00	183.67	6100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6200.00	0.00	183.67	6200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6300.00	0.00	183.67	6300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6400.00	0.00	183.67	6400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6500.00	0.00	183.67	6500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6600.00	0.00	183.67	6600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6700.00	0.00	183.67	6700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6800.00	0.00	183.67	6800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	6900.00	0.00	183.67	6900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7000.00	0.00	183.67	7000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7100.00	0.00	183.67	7100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7200.00	0.00	183.67	7200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7300.00	0.00	183.67	7300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7400.00	0.00	183.67	7400.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7500.00	0.00	183.67	7500.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7600.00	0.00	183.67	7600.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7700.00	0.00	183.67	7700.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7800.00	0.00	183.67	7800.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	7900.00	0.00	183.67	7900.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	8000.00	0.00	183.67	8000.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	8100.00	0.00	183.67	8100.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	8200.00	0.00	183.67	8200.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	8300.00	0.00	183.67	8300.00	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
KOP Build @ 12°/100'	8372.54	0.00	183.67	8372.54	0.00	0.00	0.00	0.00	590651.80	631946.80	N 32 37 23.07	W 103 54 17.17
	8400.00	3.30	183.67	8399.98	0.79	-0.79	-0.05	12.00	590651.01	631946.75	N 32 37 23.06	W 103 54 17.17
	8500.00	15.30	183.67	8498.49	16.91	-16.88	-1.08	12.00	590634.92	631945.72	N 32 37 22.90	W 103 54 17.18
	8600.00	27.30	183.67	8591.49	53.16	-53.05	-3.40	12.00	590598.75	631943.40	N 32 37 22.54	W 103 54 17.21
	8700.00	39.30	183.67	8674.93	107.96	-107.74	-6.90	12.00	590544.07	631939.90	N 32 37 22.00	W 103 54 17.26
	8800.00	51.30	183.67	8745.14	178.90	-178.54	-11.44	12.00	590473.28	631935.36	N 32 37 21.30	W 103 54 17.31
	8900.00	63.30	183.67	8799.08	262.90	-262.36	-16.81	12.00	590389.46	631929.99	N 32 37 20.47	W 103 54 17.38
	9000.00	75.30	183.67	8834.37	356.27	-355.54	-22.76	12.00	590296.29	631924.02	N 32 37 19.55	W 103 54 17.45
	9100.00	87.30	183.67	8849.47	454.93	-454.00	-29.09	12.00	590197.83	631917.71	N 32 37 18.58	W 103 54 17.53
Landing Point	9121.39	89.86	183.67	8850.00	476.32	-475.34	-30.46	12.00	590176.49	631916.34	N 32 37 18.36	W 103 54 17.55
	9200.00	89.86	183.67	8850.19	554.92	-553.79	-35.49	0.00	590098.05	631911.31	N 32 37 17.59	W 103 54 17.61
	9300.00	89.86	183.67	8850.43	654.92	-653.58	-41.88	0.00	589998.26	631904.92	N 32 37 16.60	W 103 54 17.69
	9400.00	89.86	183.67	8850.67	754.92	-753.38	-48.28	0.00	589898.48	631898.52	N 32 37 15.61	W 103 54 17.77
	9500.00	89.86	183.67	8850.91	854.92	-853.17	-54.68	0.00	589798.69	631892.13	N 32 37 14.63	W 103 54 17.85
	9600.00	89.86	183.67	8851.15	954.92	-952.97	-61.07	0.00	589698.90	631885.73	N 32 37 13.64	W 103 54 17.93
	9700.00	89.86	183.67	8851.39	1054.92	-1052.76	-67.47	0.00	589599.11	631879.34	N 32 37 12.65	W 103 54 18.01
	9800.00	89.86	183.67	8851.63	1154.92	-1152.56	-73.86	0.00	589499.33	631872.94	N 32 37 11.67	W 103 54 18.09
	9900.00	89.86	183.67	8851.87	1254.92	-1252.35	-80.26	0.00	589399.54	631866.55	N 32 37 10.68	W 103 54 18.17
	10000.00	89.86	183.67	8852.11	1354.92	-1352.15	-86.65	0.00	589299.75	631860.15	N 32 37 9.69	W 103 54 18.25
	10100.00	89.86	183.67	8852.35	1454.92	-1451.94	-93.05	0.00	589199.96	631853.76	N 32 37 8.70	W 103 54 18.33
	10200.00	89.86	183.67	8852.60	1554.92	-1551.74	-99.44	0.00	589100.17	631847.36	N 32 37 7.72	W 103 54 18.41
	10300.00	89.86	183.67	8852.84	1654.92	-1651.53	-105.84	0.00	589000.39	631840.97	N 32 37 6.73	W 103 54 18.49
	10400.00	89.86	183.67	8853.08	1754.92	-1751.33	-112.23	0.00	588900.60	631834.58	N 32 37 5.74	W 103 54 18.57
	10500.00	89.86	183.67	8853.32	1854.92	-1851.12	-118.63	0.00	588800.81	631828.18	N 32 37 4.76	W 103 54 18.64
	10600.00	89.86	183.67	8853.56	1954.92	-1950.92	-125.02	0.00	588701.02	631821.79	N 32 37 3.77	W 103 54 18.72
	10700.00	89.86	183.67	8853.80	2054.92	-2050.71	-131.42	0.00	588601.24	631815.39	N 32 37 2.78	W 103 54 18.80
	10800.00	89.86	183.67	8854.04	2154.92	-2150.51	-137.81	0.00	588501.45	631809.00	N 32 37 1.79	W 103 54 18.88
	10900.00	89.86	183.67	8854.28	2254.92	-2250.30	-144.21	0.00	588401.66	631802.60	N 32 37 0.81	W 103 54 18.96
	11000.00	89.86	183.67	8854.52	2354.92	-2350.10	-150.61	0.00	588301.87	631796.21	N 32 36 59.82	W 103 54 19.04
	11100.00	89.86	183.67	8854.76	2454.92	-2449.89	-157.00	0.00	588202.09	631789.81	N 32 36 58.83	W 103 54 19.12
	11200.00	89.86	183.67	8855.00	2554.92	-2549.69	-163.40	0.00	588102.30	631783.42	N 32 36 57.84	W 103 54 19.20
	11300.00	89.86	183.67	8855.24	2654.92	-2649.48	-169.79	0.00	588002.51	631777.02	N 32 36 56.86	W 103 54 19.28
	11400.00	89.86	183.67	8855.48	2754.92	-2749.28	-176.19	0.00	587902.72	631770.63	N 32 36 55.87	W 103 54 19.36
	11500.00	89.86	183.67	8855.72	2854.92	-2849.07	-182.58	0.00	587802.93	631764.23	N 32 36 54.88	W 103 54 19.44
	11600.00	89.86	183.67	8855.96	2954.92	-2948.87	-188.98	0.00	587703.15	631757.84	N 32 36 53.90	W 103 54 19.52
	11700.00	89.86	183.67	8856.20	3054.92	-3048.66	-195.37	0.00	587603.36	631751.44	N 32 36 52.91	W 103 54 19.60
	11800.00	89.86	183.67	8856.44	3154.92	-3148.46	-201.77	0.00	587503.57	631745.05	N 32 36 51.92	W 103 54 19.68
	11900.00	89.86	183.67	8856.68	3254.92	-3248.25	-208.16	0.00	587403.78	631738.65	N 32 36 50.93	W 103 54 19.76
	12000.00	89.86	183.67	8856.92	3354.92	-3348.05	-214.56	0.00	587304.00	631732.26	N 32 36 49.95	W 103 54 19.84
	12100.00	89.86	183.67	8857.16	3454.92	-3447.84	-220.95	0.00	587204.21	631725.86	N 32 36 48.96	W 103 54 19.92
	12200.00	89.86	183.67	8857.40	3554.92	-3547.64	-227.35	0.00	587104.42	631719.47	N 32 36 47.97	W 103 54 20.00
	12300.00	89.86	183.67	8857.64	3654.92	-3647.43	-233.74	0.00	587004.63	631713.07	N 32 36 46.99	W 103 54 20.07
	12400.00	89.86	183.67	8857.88	3754.92	-3747.23	-240.14	0.00	586904.84	631706.68	N 32 36 46.00	W 103 54 20.15
	12500.00	89.86	183.67	8858.12	3854.92	-3847.02	-246.53	0.00	586805.06	631700.28	N 32 36 45.01	W 103 54 20.23
	12600.00	89.86	183.67	8858.36	3954.91	-3946.82	-252.93	0.00	586705.27	631693.89	N 32 36 44.02	W 103 54 20.31
	12700.00	89.86	183.67	8858.60	4054.91	-4046.61	-259.33	0.00	586605.48	631687.49	N 32 36 43.04	W 103 54 20.39
	12800.00	89.86	183.67	8858.84	4154.91	-4146.41	-265.72	0.00	586505.69	631681.10	N 32 36 42.05	W 103 54 20.47
	12900.00	89.86	183.67	8859.08	4254.91	-4246.20	-272.12	0.00	586405.91	631674.70	N 32 36 41.06	W 103 54 20.55
	13000.00	89.86	183.67	8859.32	4354.91	-4346.00	-278.51	0.00	586306.12	631668.31	N 32 36 40.08	W 103 54 20.63
	13100.00	89.86	183.67	8859.56	4454.91	-4445.79	-284.91	0.00	586206.33	631661.91	N 32 36 39.09	W 103 54 20.71
	13200.00	89.86	183.67	8859.80	4554.91	-4545.59	-291.30	0.00	586106.54	631655.52	N 32 36 38.10	W 103 54 20.79
COG Marauder 31 Federal #3H PBHL	13281.62	89.86	183.67	8860.00	4636.53	-4627.04	-296.52	0.00	586025.10	631650.30	N 32 36 37.30	W 103 54 20.85

Survey Type: Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Hole / COG Marauder 31 Federal #3H Rev1 MDT 11Mar12
	18.000	13281.616	1/100.000	30.000	30.000	SLB_MWD-STD	Original Hole / COG Marauder 31 Federal #3H Rev1 MDT 11Mar12

CONCHO

COG

Rev1

PATHFINDER
A Schlumberger Company

WELL	FIELD	STRUCTURE
COG Marauder 31 Federal #3H	NM Eddy County (NAD 27)	Patriot 6

Magnetic Parameters				Surface Location				NAD27 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	BGGM 2012	Dip:	60.417°	Date:	March 11, 2013	Lat:	N 32 37 23.067	Northing:	590651.80 fUS	Grid Conv:	0.231°	Slot:	Marauder 31 Federal #3H	TVD Ref:	RKB(3465.90 above MSL)
		Mag Dec:	7.664°	FS:	48622.2nT	Lon:	W 103 54 17.170	Easting:	631946.80 fUS	State Fact:	0.99992903	Plan:	Rev1 MDT 11Mar12	Srvy Date:	March 11, 2013

Legend

COG Marauder 31 Federal #3H PBHL

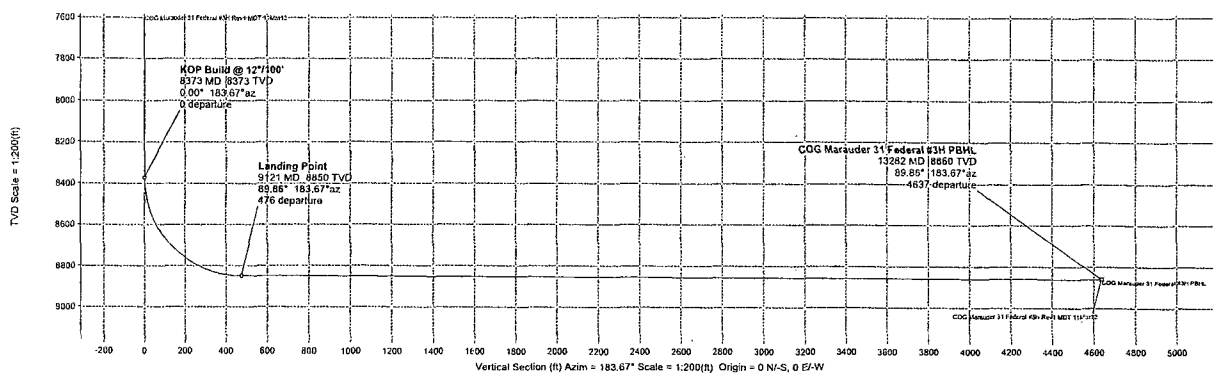
COG Marauder 31 Federal #3H Lease Lines

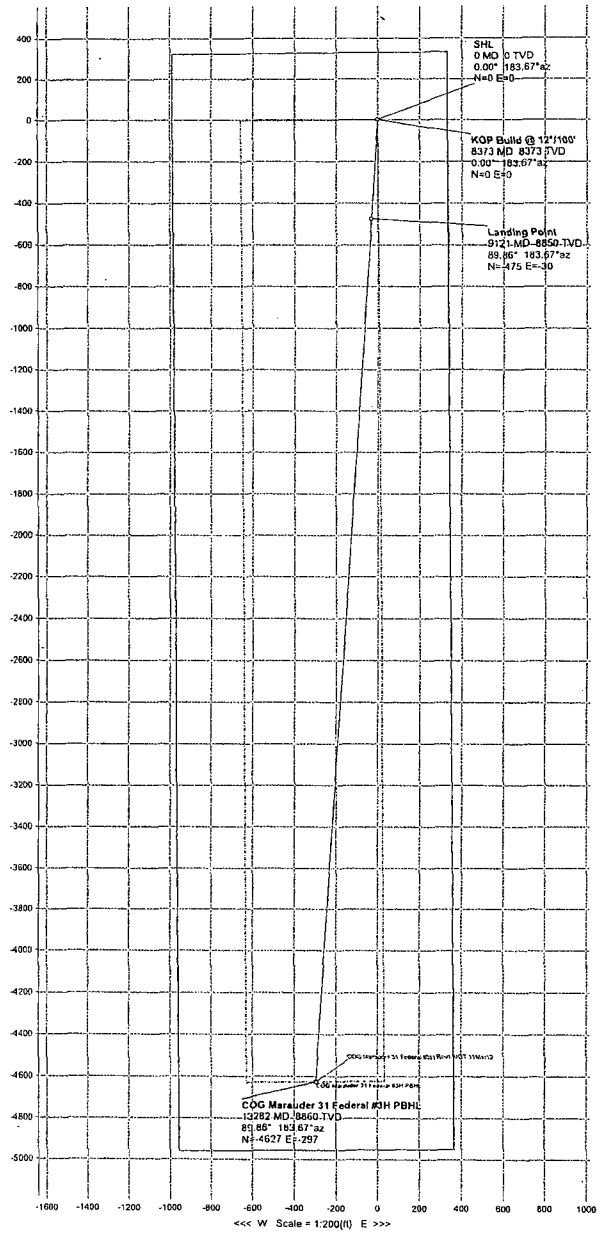
COG Marauder 31 Federal #3H 330' Pipeline

COG Marauder 31 Federal #3H Rev1 MDT 11Mar12

Grid North
Tot Corr (M->G 7.4334°)
Mag Dec (7.664°)
Grid Conv (0.231°)

Comments	Survey MD (ft)	Incl (deg)	Azimuth (deg)	TVD (ft)	Sub Sea TVD	+N/-S (ft)	+E/-W (ft)	Dogleg (°/100')	Latitude (deg)	Longitude (deg)	Easting (fUS)	Northing (fUS)	Closure (ft)	Closure Azimuth (deg)	DLS (°/100')	Tool Face (deg)
SHL	0.00	0.00	183.67	0.00	-3465.90	0.00	0.00	0.00	W 103 54 17.170	N 32 37 23.067	631946.80	590651.80	0.00	0.00		183.67
KOP Build @ 12°/100'	8372.54	0.00	183.67	8372.54	4906.64	0.00	0.00	0.00	W 103 54 17.170	N 32 37 23.067	631946.80	590651.80	0.00	0.00	0.00	183.67
Landing Point	9121.39	89.86	183.67	8850.00	5384.10	476.32	-475.34	-30.46	W 103 54 17.549	N 32 37 18.365	631916.34	590176.49	476.32	183.67	12.00	0.00
COG Marauder 31 Federal #3H PBHL	13281.62	89.86	183.67	8860.00	5394.10	4636.53	-4627.04	-296.52	W 103 54 20.855	N 32 36 37.295	631650.30	586025.10	4636.53	183.67	0.00	





Drawn By:	Current User
Date Created:	March 11, 2013 03:34:04 PM
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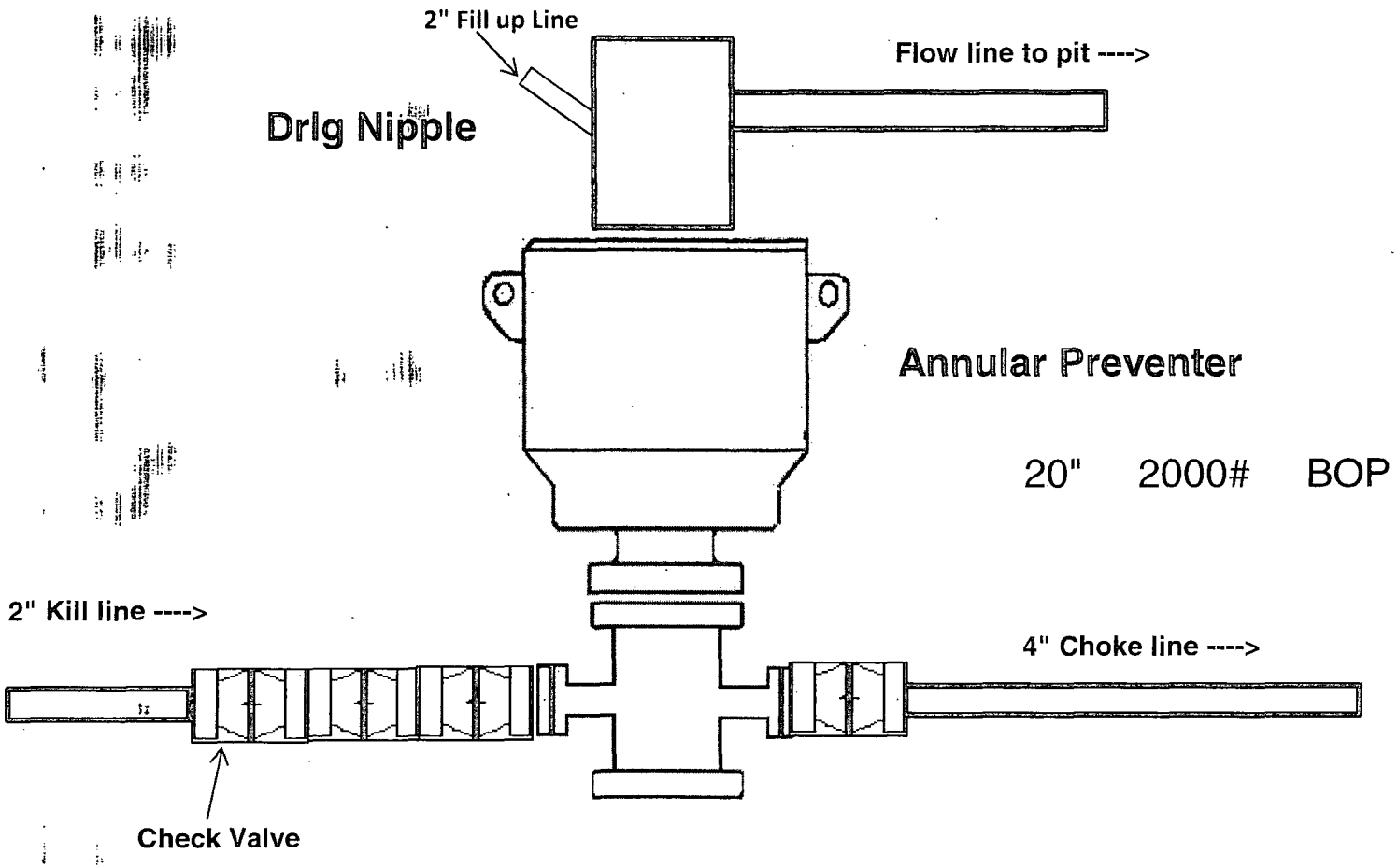
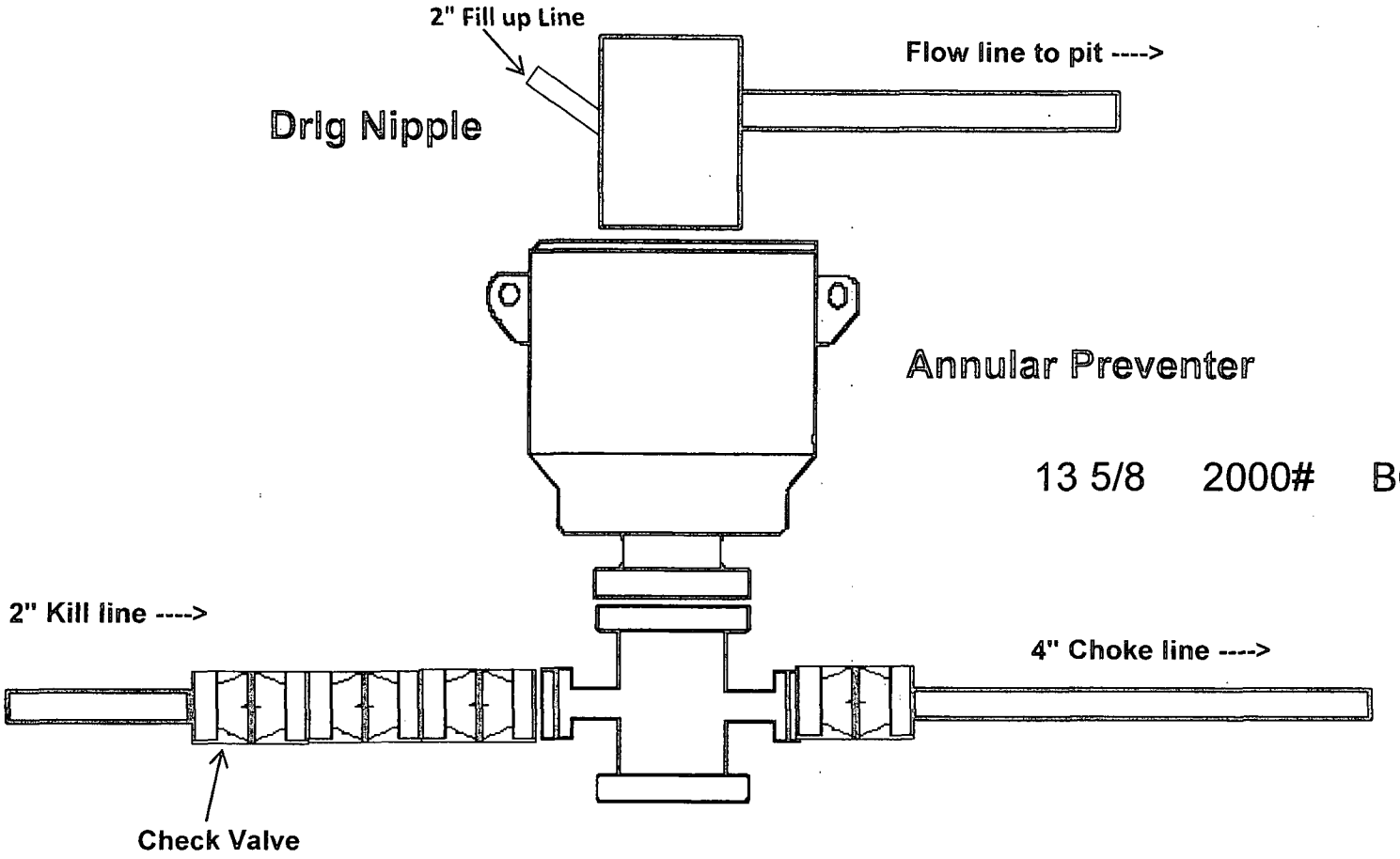
Approved Date:	

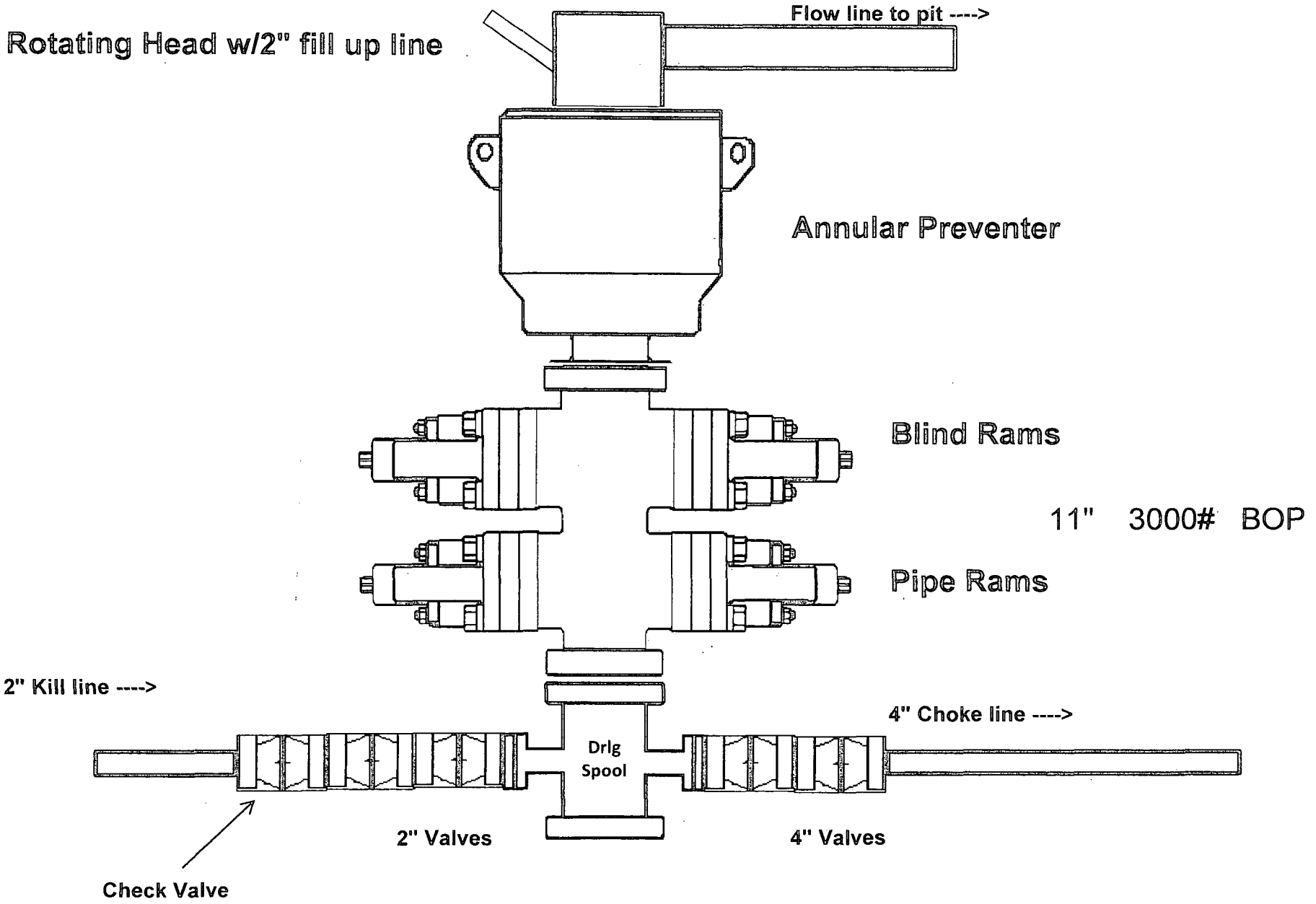
2,000 psi BOP Schematic



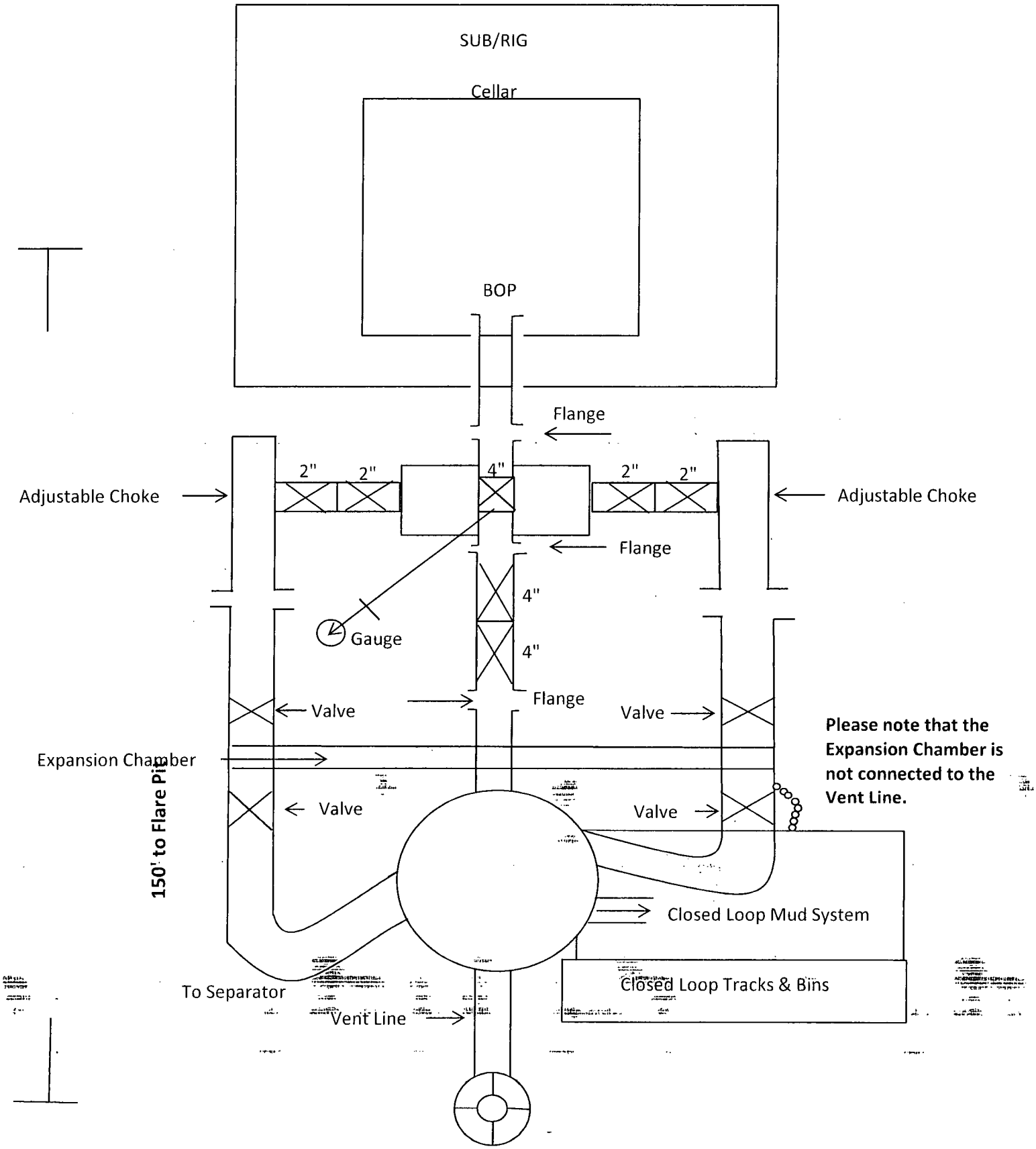
2,000 psi BOP Schematic



3,000 psi BOP Schematic

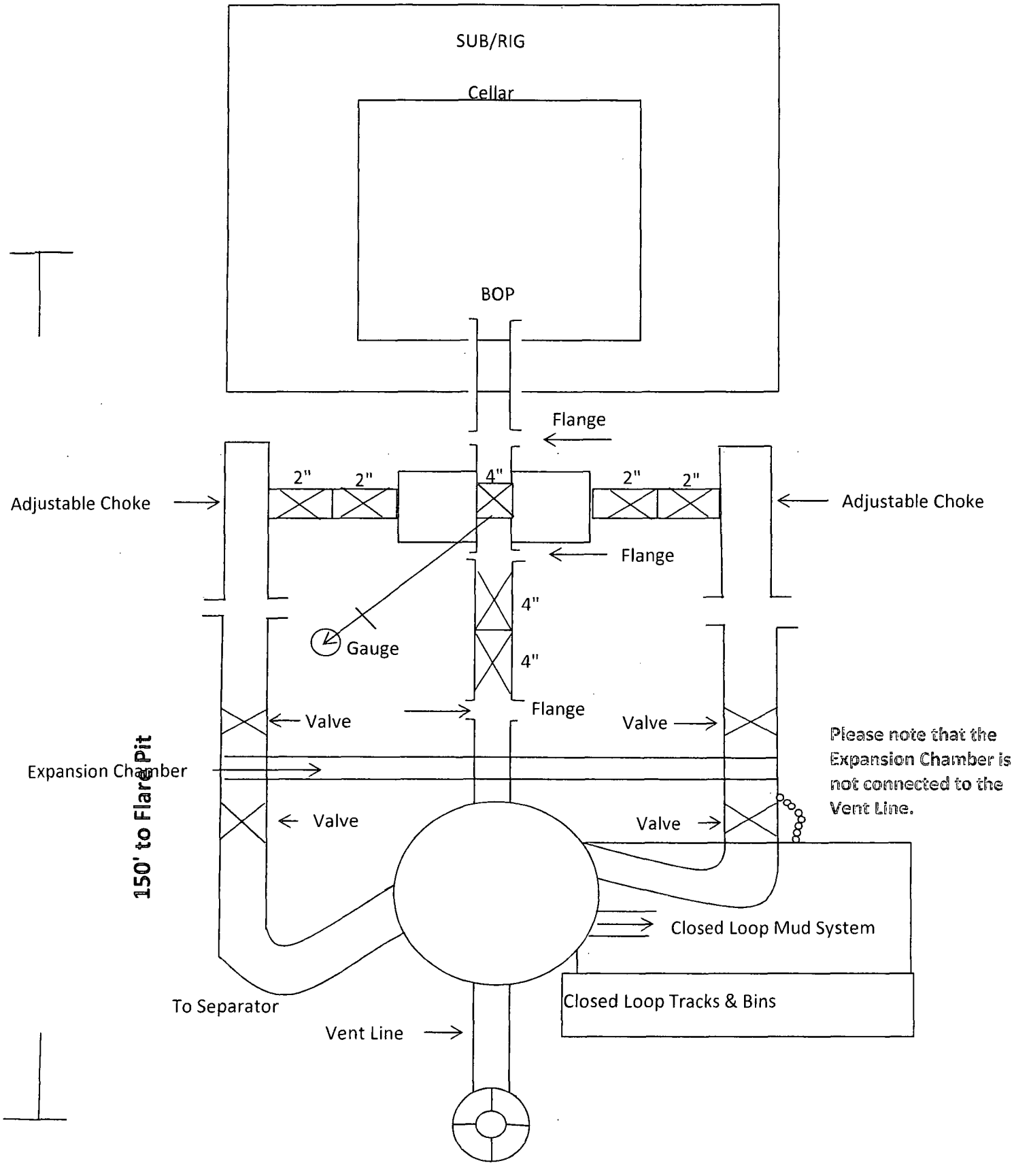


2M Choke Manifold Equipment

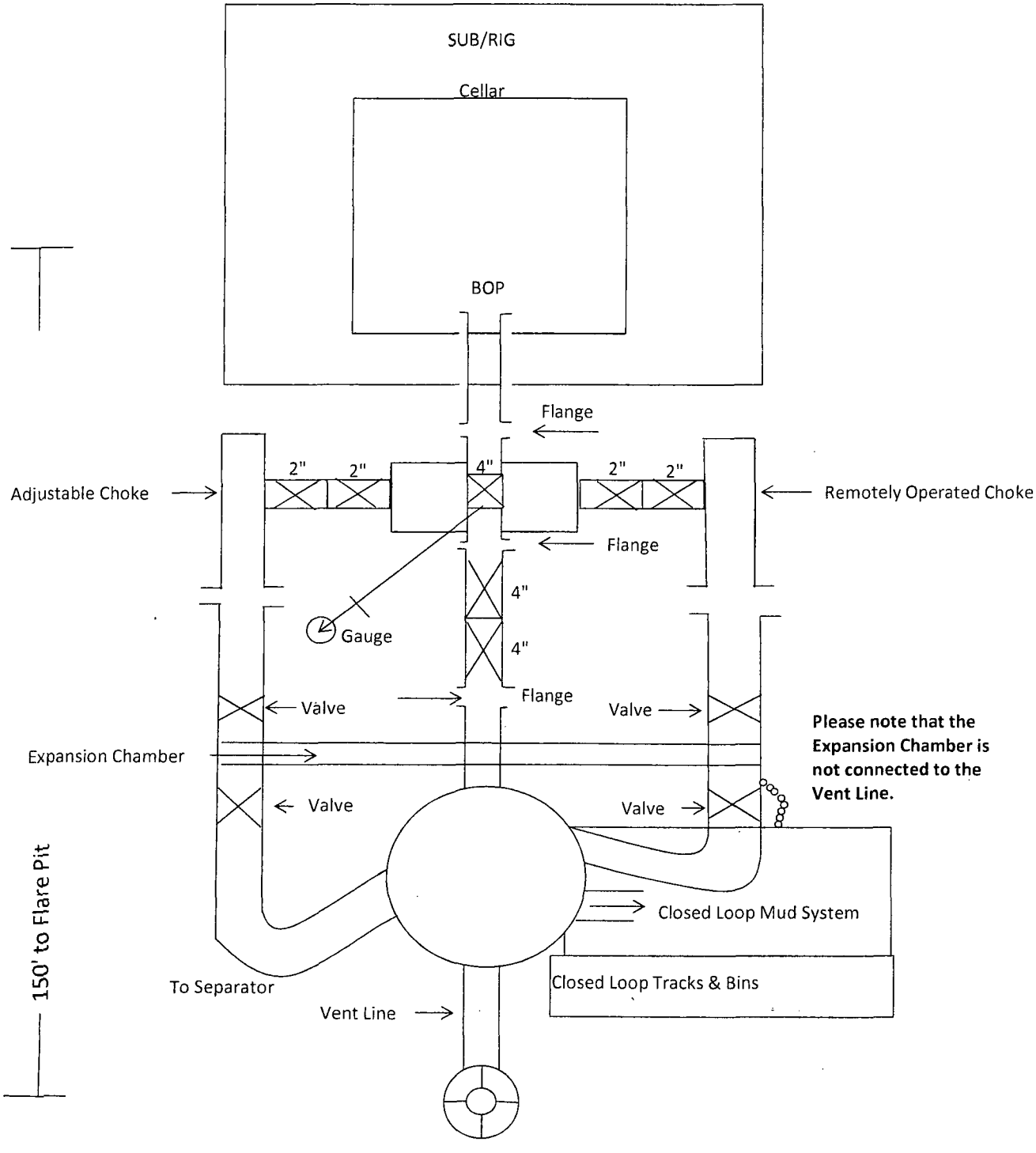


13-5/8"

2M Choke Manifold Equipment



3M Choke Manifold Equipment



Design Plan
Operating and Maintenance Plan
Closure Plan

Marauder Federal 3H
SHL: 330' FNL & 1980' FEL
BHL: 330' FSL & 1980' FEL
Section 31 T19S R31E
Eddy County, New Mexico

COG Operating LLC will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. All leaks should be kept to less than 5 barrels. Rig crews will monitor the tanks at all times.

Equipment List:
2- Mongoose Shale Shakers
1- 414 Centrifuge
1- 518 Centrifuge
2- Roll Off Bins w/ Tracks
2- 500 BBL Frac Tanks

During drilling operations all liquids, drilling fluids and cuttings will be hauled off via CRI (Controlled Recovery Inc.) Permit R-9166 or any other approved facility.

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

a. The hazards and characteristics of hydrogen sulfide (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
d. The proper techniques for first aid and rescue procedures.

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

a. The effects of H2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
c. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H2S.

a. Well Control Equipment:
Flare line. operabed
Choke manifold with remote choke ~~manifold~~. 25 5/8/13
Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.

c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.

d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.

f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

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

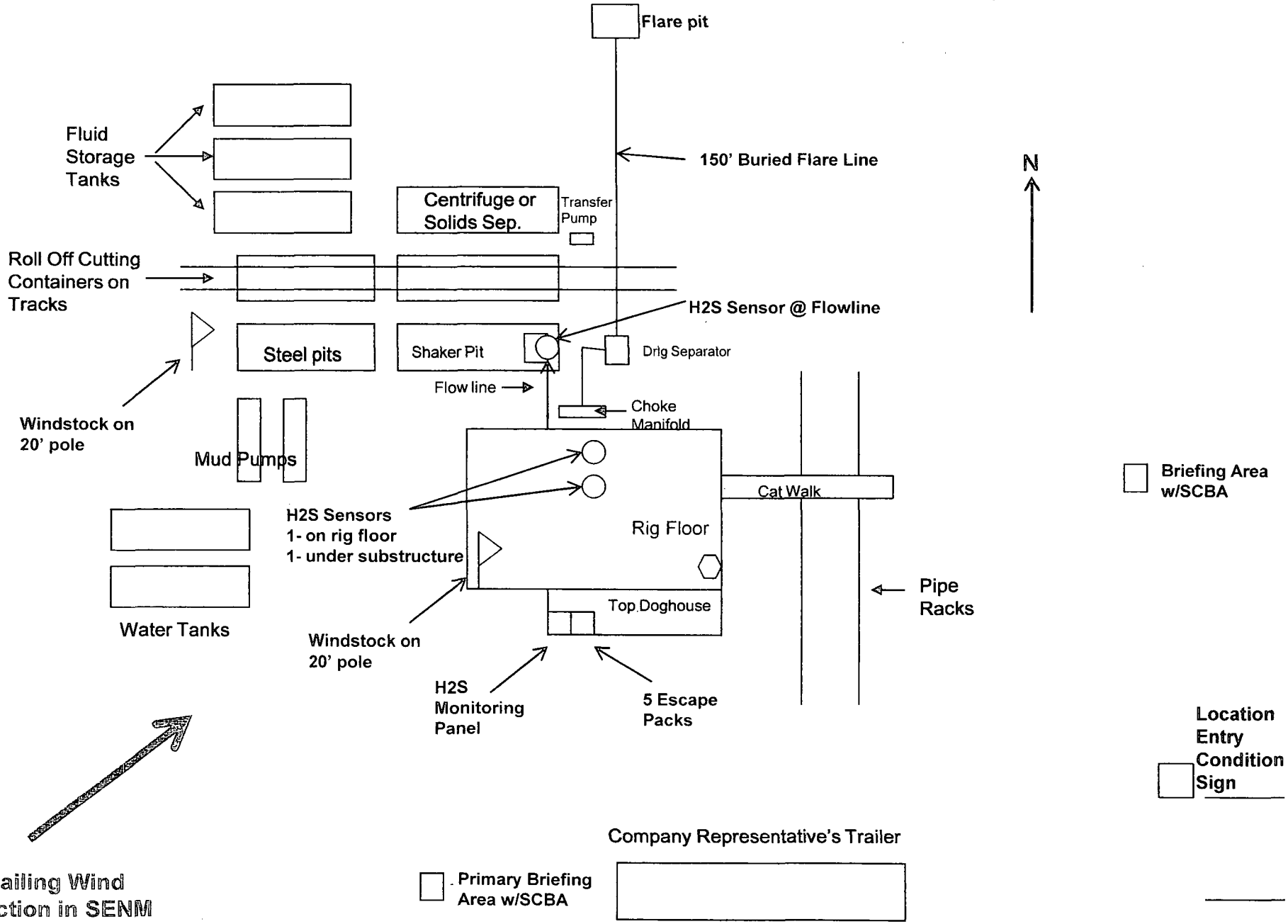
COG OPERATING LLC

1-575-748-6940

Secondary egress.

Well pad will be 340' X 340'
with cellar in center of pad

COG Operating LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.



EMERGENCY CALL LIST

	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SHERYL BAKER	575-748-6940	432-934-1873
KENT GREENWAY	575-746-2010	432-557-1694
SETH WILD	575-748-6940	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

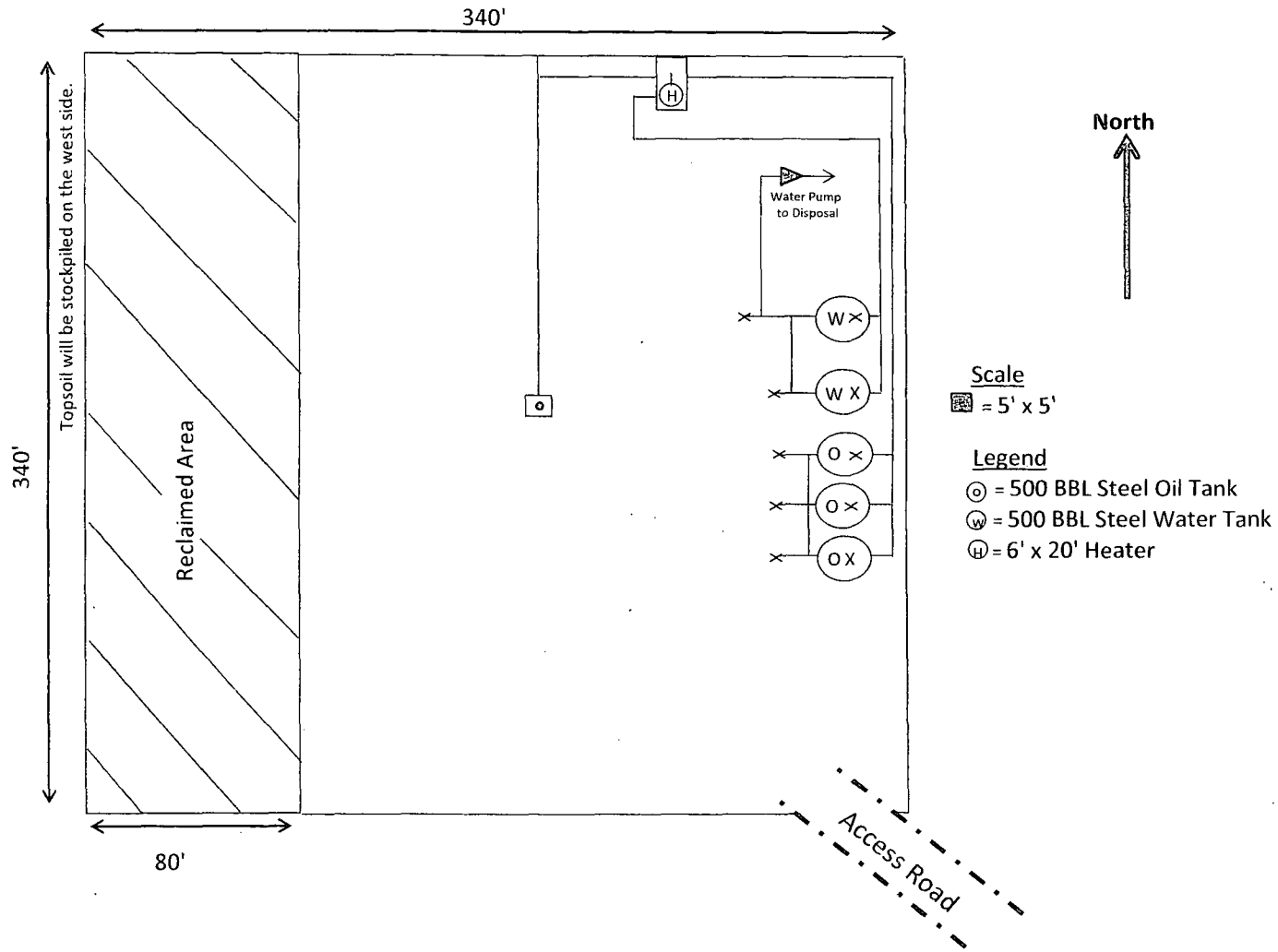
	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

COG Operating LLC
2208 West Main
Artesia, NM 88210

EXIBIT 3

Production Facility Layout

Marauder Federal #3H
Section 31-T19S-R31E



COG OPERATING LLC
MULTI-POINT SURFACE USE AND OPERATIONS PLAN

Marauder Federal 3H
SHL: 330' FNL & 1650' FEL
BHL: 330' FSL & 1980' FEL
Section 31 T19S R31E
Eddy County, New Mexico

This plan is submitted with Form 3160-3, Application for Permit to Drill, covering the above described well. The purpose of this plan is to describe the location of the proposed well, the proposed construction activities and operations plan, the magnitude of the surface disturbance involved and the procedures to be followed in rehabilitating the surface after completion of the operations, so that a complete appraisal can be made of the environmental effect associated with the operations.

1. EXISTING ROADS:

a. The well site and elevation plat for the proposed well are reflected on the well site layout; Form C-102. The well was staked by Harcrow Surveying.

b. Exhibit 2 is a portion of a topo map showing the well and roads in the vicinity of the location. The wellsite and the access route to the location are indicated in green on Exhibit 2. Right of way using this proposed route is being requested if necessary.

c. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease.

DIRECTIONS:
See attached 600' x 600' plat for directions to well.

PLANNED ACCESS ROAD:
The Elevation Plat shows that 553' of new access road will be required for this location. If any road is required it will be constructed as follows:

a. The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

b. The average grade will be less than 1%.

c. No turnouts are planned.

d. No culverts, cattleguard, gates, low water crossings or fence cuts are necessary.

e. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from the nearest BLM approved caliche pit.

2. Location of Existing Wells:

The One-Mile Radius Map shows existing wells within a one-mile radius of surface hole location and the bottom hole location.

According to records found in OCD online, there is one well producing from the Delaware formation, and numerous wells producing from the Yates Seven Rivers formation and numerous wells producing the Bone Spring formation within the one-mile radius area.

3. LOCATION OF EXISTING AND/OR PROPOSED FACILITIES:

a. In the event the well is found productive a tank battery would be constructed and the necessary production equipment will be installed at the well site. See Exhibit #3.
b. All flowlines will adhere to API standards
c. If electricity is needed, power will be obtained from Xcel Energy. Xcel Energy will apply for ROW for their power lines.
d. If the well is productive, rehabilitation plans are as follows:
   1. The original topsoil from the well site will be returned to the location. The drill site will then be contoured as close as possible to the original state.

4. LOCATION AND TYPES OF WATER SUPPLY:

This well will be drilled using a combination of water mud systems (outlined in the Drilling Program). The water will be obtained from commercial water stations in the area and hauled to location by transport truck using the existing and proposed roads shown in Exhibit #2. On occasion, water will be obtained form a pre-existing water well, running a pump directly to the drill rig. In these cases where a poly pipeline is used to transport water for drilling purposes, the existing and proposed road shown in Exhibit "2" will be utilized.

5. Source of Construction Materials and Location "Turn-Over" Procedure:

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

a. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

b. An approximate 160' X 160' area is used within the proposed well site to remove caliche.

c. **Subsoil is removed and stockpiled along the entire length of one side of a 340' x 340' pad.**

d. **When caliche is found, material will be stock piled within the pad site to build the location and road.**

e. **Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.**

f. **Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.**

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit or other source.

6. METHODS OF HANDLING WASTE MATERIAL:

a. All trash, junk and other waste material will be removed from the wellsite within 30 days after finishing drilling and/or completion operations. All waste material will be contained in trash cages or trash bins to prevent scattering. When the job is completed, all contents will be removed and disposed of in an approved sanitary landfill.

b. The supplier, including broken sacks, will pick up slats remaining after completion of well.

c. A porto-john will be provided for the rig crews. This equipment will be properly maintained during the drilling and completion operations and will be removed when all operations are complete.

d. Disposal of fluids to be transported by an approved disposal company.

7. ANCILLARY FACILITIES:

No campsite or other facilities will be constructed as a result of this well.

8. WELLSITE LAYOUT:

a. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is South. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.

b. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

9. PLANS FOR SURFACE RECLAMATION:

a. After finishing drilling and/or completion operations, if the well is found non commercial, the caliche will be removed from the pad and transported to the original caliche pit or used for other drilling locations. The road will be reclaimed as directed by the BLM. The original top soil will again be returned to the pad Caliche and contoured, as close as possible, to the original state.

b. The location and road will be rehabilitated as recommended by the BLM.

c. Caliche from areas of the pad site not required for operations will be reclaimed. The original top soil will be returned to the area of the drill pad not necessary to operate the well. These unused areas of the drill pad will be contoured, as close as possible, to match the original topography.

10. SURFACE OWNERSHIP:

The surface is owned by the US Government and is administered by the Bureau of Land Management. The surface is multiple use with the primary uses of the region for the grazing of livestock and the production of oil and gas. The proposed road routes and the surface location will be restored as directed by the BLM. The surface tenant is G & L Cattle, LLC, 23104 County Road 19, Springfield, CO 81073.

11. OTHER INFORMATION:

a. The area surrounding the well site is grassland. The vegetation is moderately sparse with native prairie grass and mesquite bushes. No wildlife was observed but it is likely that deer, rabbits, coyotes, and rodents traverse the area.

b. There is no permanent or live water in the general proximity of the location.

c. If the well is deemed commercially productive, caliche from areas of the pad site not required for operations will be reclaimed. The original top soil will be returned to the area of the drill pad not necessary to operate the well. These unused areas of the drill pad will be contoured, as close as possible, to match the original topography. Reserve pit will not be used on this location therefore no reclamation is needed.

d. Topsoil will be stockpiled on the *WEST SIDE* of the location until it is needed for interim reclamation described in paragraph above.

11. OPERATOR'S REPRESENTATIVE:

a. Through A.P.D. Approval:
Melanie Parker, Regulatory Coordinator
COG OPERATING LLC
Artesia, NM 88210
Phone (575)748-6940
Cell (432) 553-9834

b. Through Drilling Operations
Sheryl Baker, Drilling Supervisor
COG OPERATING LLC
Artesia, NM 88210
Phone (575)748-6940
Cell (432)934-7873

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC.**
LEASE NO.:	**NMNM-97136**
WELL NAME & NO.:	**Marauder 31 Federal 3H**
SURFACE HOLE FOOTAGE:	**0330' FNL & 1650' FWL**
BOTTOM HOLE FOOTAGE	**0330' FSL & 1980' FEL**
LOCATION:	**Section 31, T. 19 S., R 31 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

I. 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.

II. 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.)

III. 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.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. 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.

V. SPECIAL REQUIREMENT(S)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken: Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

Hackberry Lake Off-Highway Vehicle Special Recreation Management Area
Pipelines shall be buried a minimum of 24 inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. Power poles and associated ground structures (poles, guy wires) will not be placed within 20 feet of recreation trails. Guy wires must be equipped with a sleeve, tape or other industry approved apparatus that is highly visible during the day and reflective at night. Appropriate safety signage will be in place during all phases of the project. Upon completion of construction, the road shall be returned to pre-construction condition with no bumps or dips. All vehicle and equipment operators will observe speed limits and practice responsible defensive driving habits.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 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 APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall stockpile the topsoil in a low profile manner in order to prevent wind/water erosion of the topsoil. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be used for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

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 needs.

F. ON LEASE ACCESS ROADS

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 twenty (20) 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.

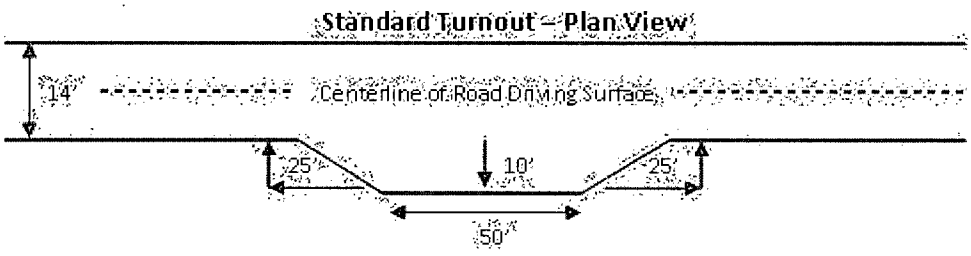
Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

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.

Ditching
Ditching shall be required on both sides of the road.

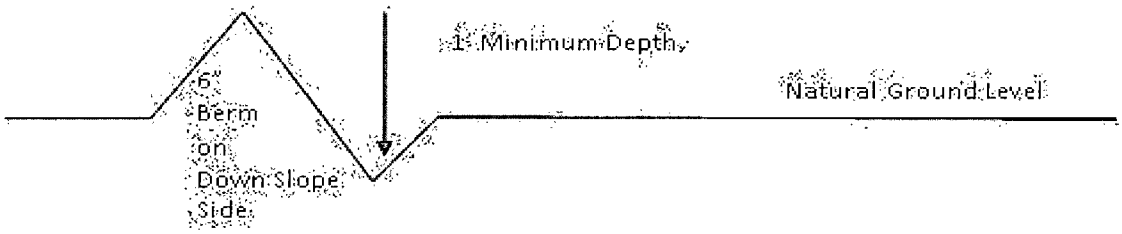
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:



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 a 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:

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

Culvert Installations
Appropriately sized culvert(s) shall be installed at the deep waterway channel flow crossing.

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

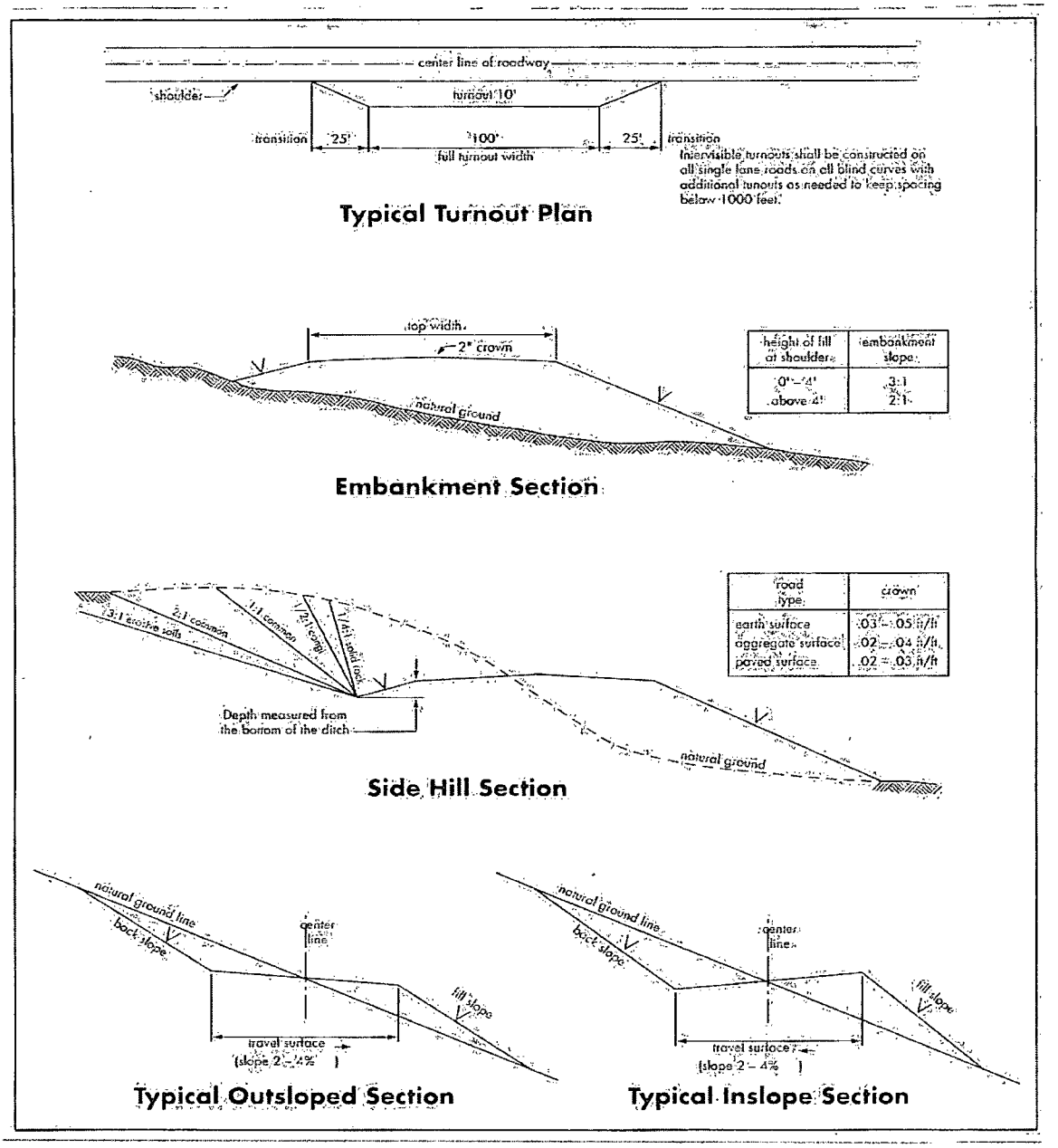
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

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



VII. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

1. A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Yates** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.).

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time prior to drilling out for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. IF OPERATOR DOES NOT HAVE THE WELL SPECIFIC CEMENT DETAILS ONSITE PRIOR TO PUMPING THE CEMENT FOR EACH CASING STRING, THE WOC WILL BE 30 HOURS. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Secretary's Potash
Capitan Reef
Possibility of water and brine flows in the Salado, Seven Rivers, Capitan Reef, and Delaware.
Possibility of lost circulation in the Rustler, Capitan Reef, Delaware, and Bone Spring.

1. The **16** inch surface casing shall be set at approximately **450** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt. Excess calculates to 5% - Additional cement may be required. Operator proposed 50% excess.**

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

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

2. The minimum required fill of cement behind the **11-3/4** inch 1st intermediate casing, which shall be set at approximately **2325** feet, is:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst. Excess calculates to 13% - Additional cement may be required.**

3. The minimum required fill of cement behind the **8-5/8** inch 2nd intermediate casing is:

Operator has proposed DV tool at depth of 2180', but with the change in casing depth this is no longer acceptable. DV tool shall be at least 50' below previous casing at a depth of 2375'. Operator shall adjust cement proportionately according to the depth change. Operator is to submit sundry if DV tool depth varies by more than 100' from approved depth.

a. First stage to DV tool:

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst and Capitan Reef. Excess calculates to negative 5% - Additional cement will be required.**

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

4. The minimum required fill of cement behind the **5-1/2** inch production casing is:

☒ Cement should tie-back at least 50' above top of Capitan Reef. Operator shall provide method of verification.

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. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

    a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **8-5/8** intermediate casing shoe shall be **3000 (3M)** psi.

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

    a. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time.

    b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (18 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

    c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock.

d. The results of the test shall be reported to the appropriate BLM office.

e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

f. 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. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

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VIII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities
Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation 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
Shale Green, Munsell Soil Color Chart # 5Y 4/2

IX. INTERIM RECLAMATION

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.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. 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.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

X. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture for LPC Sand/Shinnery Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

*Pounds of pure live seed:

Pounds of seed **x** percent purity **x** percent germination = pounds pure live seed