Form 3160-3
(March 2012)

RECEIVED
APR 24 2013
NMOCD ARTESIA

OCD 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.
SHL: NMNM110346
BHL: STATE

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. (39846)
Windmill 32 Federal Com #4H

2. Name of Operator
COG Operating LLC.

9. API Well No.
30-015-41286

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

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

10. Field and Pool, or Exploratory
**Wildcat; Bone Spring**

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 580' FSL & 190' FEL Unit Letter P (SESE) SHL Sec 32-T18S-R27E
At proposed prod. Zone 380' FSL & 330' FWL Unit Letter M (SWSW) BHL Sec 32-T18S-R27E

11. Sec., T.R.M. or Blk and Survey or Area
Sec.32 - T18S - R27E

14. Distance in miles and direction from nearest town or post office*
Approximately 5 miles from Lakewood

12. County or Parish
Eddy County

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'

16. No. of acres in lease
SHL: 760.03
BHL: STATE

17. Spacing Unit dedicated to this well
160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1326' BHL: 2326'

19. Proposed Depth
BH TVD: 5750' MD: 10463'
MAX TVD - 5900'

20. BLM/BIA Bond No. on file
NMB000740 &NMB00215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3348.9' GL

22. Approximate date work will start*
5/1/2013

23. Estimated duration
30 days

## 24. Attachments

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

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: Mayte Reyes
Name *(Printed/Typed)*: Mayte Reyes 748-6945
Date: 3/8/2013

Title: Regulatory Analyst

Approved by *(Signature)*: /s/George MacDonell
Name *(Printed/Typed)*:
Date: APR 23 2013

Title: FIELD MANAGER
Office: CARLSBAD FIELD 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)

Roswell Controlled Water Basin

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

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

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

Sheryl Baker
Drilling Superintendent
COG Operating LLC
2208 West Main Street
Artesia, NM 88210
Phone (575) 748-6940 (office)
(432) 934-1873 (cell)

Ray Peterson
Drilling Manager
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
Phone (432) 685-4304 (office)
(432) 818-2254 (business)

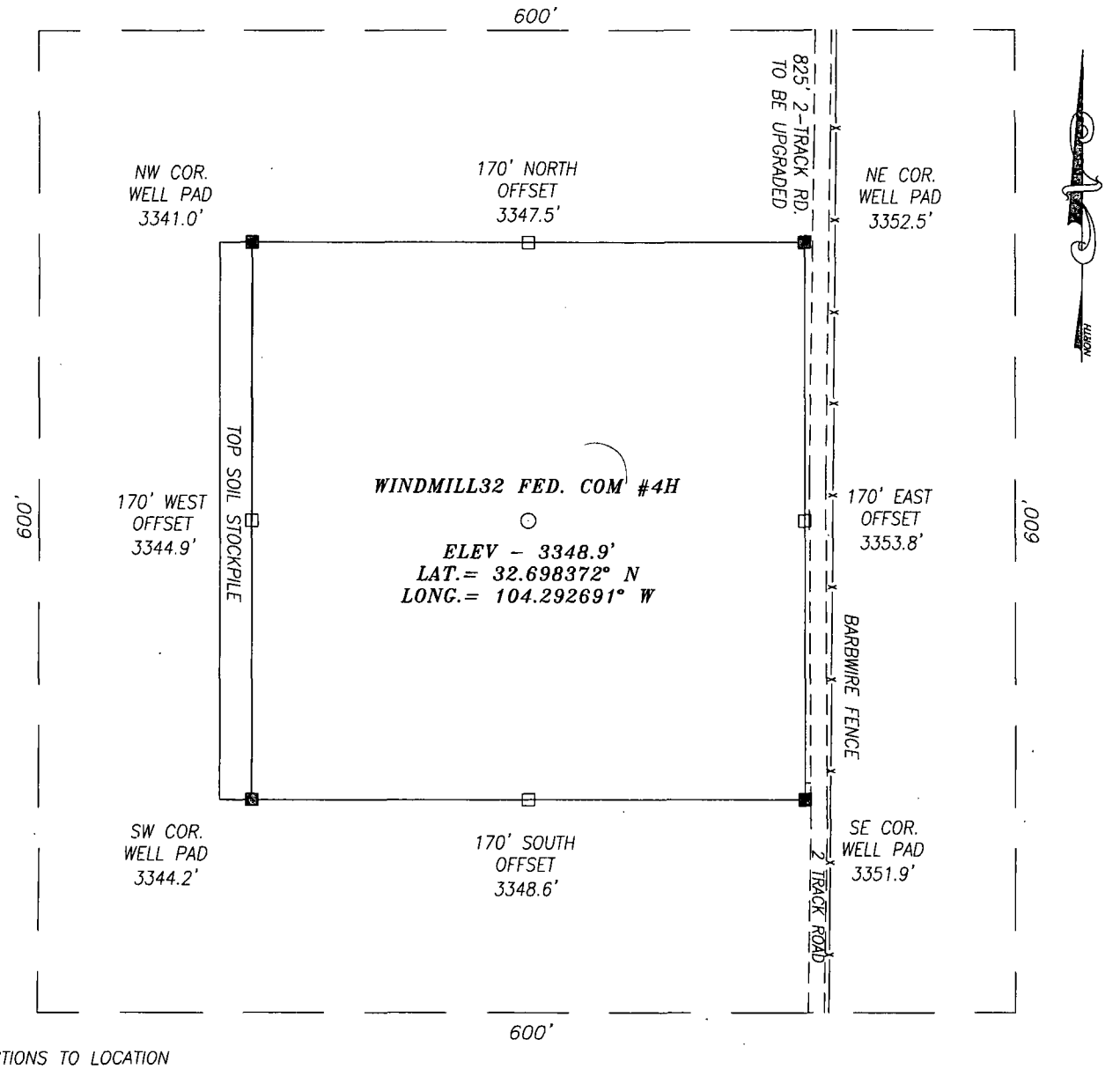
I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating, LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 1st day of April, 2013.

Signed: Melanie Parker

Printed Name: Melanie J. Parker
Position: Regulatory Coordinator
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6940
Field Representative (if not above signatory): Rand French
E-mail: mparker@concho.com

# SECTION 32, TOWNSHIP 18 SOUTH, RANGE 27 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO




DIRECTIONS TO LOCATION

HEADING SOUTH ON CR #206 ILLINOIS CAMP ROAD TURN RIGHT (SOUTHWEST) ONTO CR #234 OIL CENTER ROAD. GO APPROX 0.7 MILES TURN RIGHT (WEST) ONTO A CALICHE ROAD. STAY ON CALICHE ROAD FOR APPROX. 3.3 MILES. TURN LEFT (MEANDERING SOUTHERLY THEN EASTERLY) STAY ON ROAD FOR APPROX. 1.1 MILES. TURN LEFT (MEANDERING SOUTHERLY AND EASTERLY) STAY ON ROAD FOR APPROX. 2.2 MILES. TURN RIGHT (SOUTH) GO 995 FEET AND WELL IS 170 FEET WEST.

100 0 100 200 Feet

Scale: 1"=100'


HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA, N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

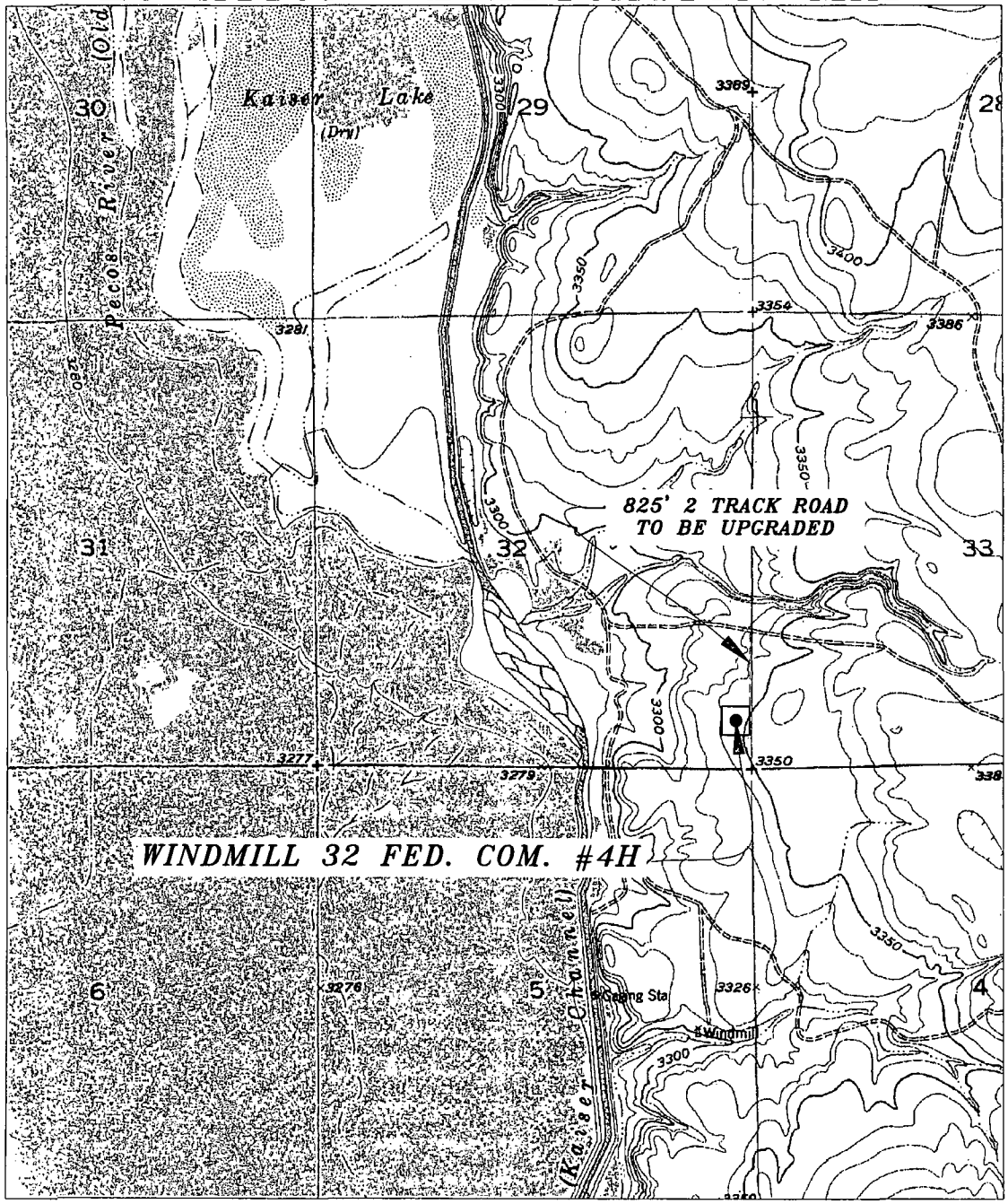

## COG OPERATING, LLC

WINDMILL 32 FED. COM #4H WELL
LOCATED 580 FEET FROM THE SOUTH LINE
AND 190 FEET FROM THE EAST LINE OF SECTION 32,
TOWNSHIP 18 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

| | | |
|---|---|---|
| SURVEY DATE: 02/19/2013 | | PAGE: 1 OF 1 |
| DRAFTING DATE: 02/24/2013 | | |
| APPROVED BY: CH | DRAWN BY: VD | FILE: 13-44 |

# EXHIBIT 2

## LOCATION VERIFICATION MAP




SCALE: 1" = 2000'

CONTOUR INTERVAL: 10'

SEC. 32 TWP. 18-S RGE. 27-E
SURVEY N.M.P.M.
COUNTY EDDY STATE NEW MEXICO
DESCRIPTION 580' FSL & 190' FEL
ELEVATION 3348.9'
OPERATOR COG OPERATING, LLC
LEASE WINDMILL 32 FEDERAL COM.
U.S.G.S. TOPOGRAPHIC MAP
LAKE McMILLAN NORTH, N.M.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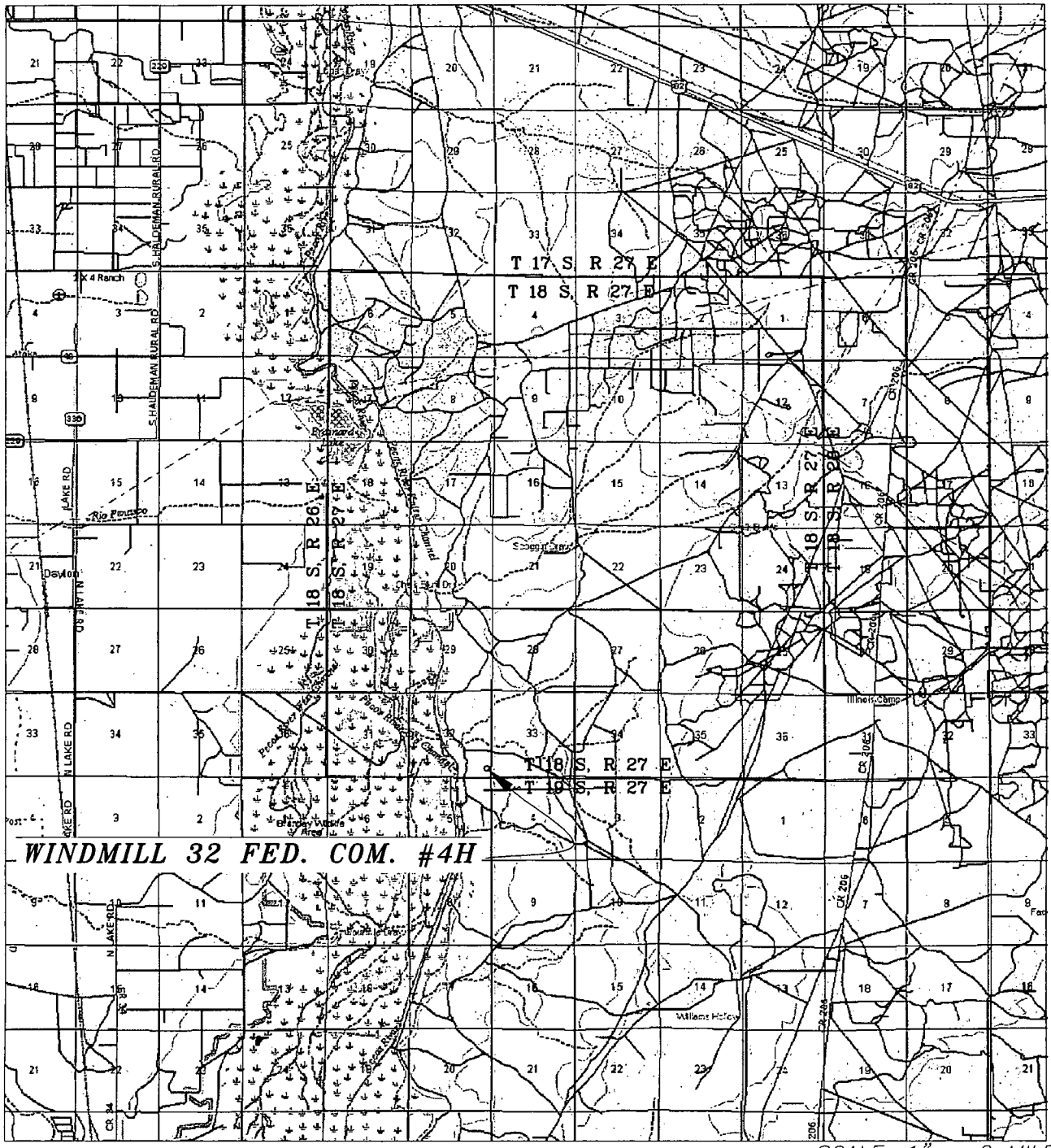
| COG OPERATING, LLC | | |
|---|---|---|
| SURVEY DATE: FEB. 19, 2013 | | PAGE: 1 OF 1 |
| DRAFTING DATE: FEB. 24, 2013 | | |
| APPROVED BY: CH | DRAWN BY: DDSI | FILE: 13-044 |

# VICINITY MAP




SCALE: 1" = 2 MILES

SEC. 32 TWP. 18-S RGE. 27-E
SURVEY N.M.P.M.
COUNTY EDDY STATE NEW MEXICO
DESCRIPTION 580' FSL & 190' FEL
ELEVATION 3348.9'
OPERATOR COG OPERATING, LLC
LEASE WINDMILL 32 FEDERAL COM.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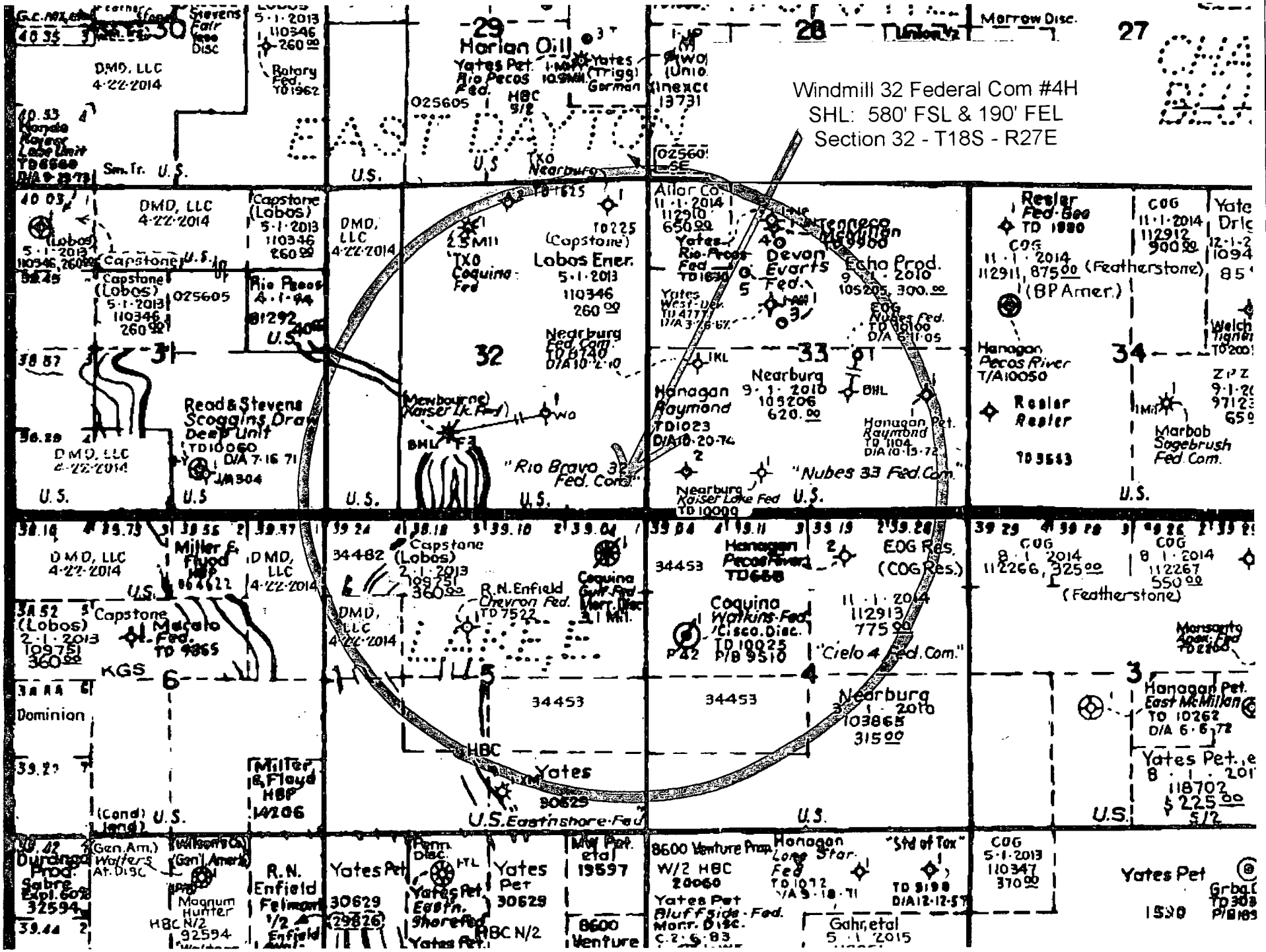
| DRAFTING DATE: FEB. 24, 2013 | | |
| APPROVED BY: CH | DRAWN BY: DDSI | FILE: 13-044 |


Windmill 32 Federal Com #4H
SHL: 580' FSL & 190' FEL
Section 32 - T18S - R27E
ARTESIA
29
28
27
32
33
34
3
6
5
4
Harlan Oil
Yates Pet. et al
Rio Pecos Fed.
HBC S/2
025605
Rotary Fed. TD 1962
DMD, LLC 4-22-2014
Capstone (Lobos) 5-1-2013 110346 260.00
Lobos Ener. 5-1-2013 110346 260.00
Nearburg Fed. Com. TD 8740
Read & Stevens Scoggins Draw Deep Unit TD 10060
"Rio Bravo 32 Fed. Com."
Devon Evarts Fed.
Echo Prod. 9-1-2010 105205, 300.00
Nearburg 9-1-2010 105206 620.00
Hanagan Raymond TD 1023
Hanagan Pet. Raymond TD 1104
"Nubes 33 Fed. Com."
Nearburg Kaiser Lake Fed TD 10000
Reeser Fed. Gas TD 1880
COG 11-1-2014 112911, 875.00 (Featherstone)
(BP Amer.)
Hanagan Pecos River T/A 10050
Reeser Reeser TD 9543
Marbob Sagebrush Fed. Com.
Capstone (Lobos) 5-1-2013 110346 260.00
Rio Pecos 4-1-94 31292
Miller & Floyd HBP 64622
Capstone Macalo Fed. TD 9865
34482
R.N. Enfield Chevron Fed. TD 7522
Coquina Gulf Fed Mort. Disc
Hanagan Pecos River TD 6688
EOG Res. (COG Res.)
Coquina Watkins Fed (Cisco Disc.) TD 10025 P/B 9510
"Cielo 4 Fed. Com."
34453
Nearburg 3-1-2010 103865 315.00
COG 8-1-2014 112266, 325.00 (Featherstone)
COG 8-1-2014 112267 550.00
Hanagan Pet. East McMillan TD 10262 D/A 6-6-72
Yates Pet. et al 8-1-201 118702 $225.00 S/2
Dominion
Miller & Floyd HBP 14206
Durango Prod. Sabre Expl. 60% 32594
Gen. Am. Wolfers At. Disc
Wilson Co. (Gen'l Amer.)
Magnum Hunter HBC N/2 92594
R.N. Enfield Feiman 1/2 Enfield
Yates Pet 30629 (29826)
Yates Pet. Eastn. Shoreline
HBC N/2
Yates Pet 30629
Mar Pet. et al 19597
8600 Venture
8600 Venture Prop. W/2 HBC 20060
Yates Pet Bluff Side Fed. Mort. Disc. C-2-6-83
Hanagan Lone Star Fed TD 10172
"Std of Tex" TD 9198 D/A 12-12-57
Gahr, et al 5-1-2015
COG 5-1-2013 110347 370.00
Yates Pet
1590
U.S.
Sm. Tr.
TXO Nearburg
TXO Coquina Fed
Allar Co. 11-1-2014 112910 650.00
Yates Rio Pecos Fed TD 1630
Yates West Dev. TD 4777
Tenneco Morrow TD 9900
EOG Nubes Fed. TD 10100
Capstone (Lobos) 5-1-2013 110346 260.00
Rio Pecos 4-1-94 31292
Read & Stevens Scoggins Draw Deep Unit TD 10060
DMD, LLC 4-22-2014
Capstone Macalo Fed. TD 9865
Miller & Floyd HBP 64622
Capstone (Lobos) 2-1-2013 109751 360.00
Coquina Gulf Fed Mort. Disc
R.N. Enfield Chevron Fed. TD 7522
Hanagan Pecos River TD 6688
EOG Res. (COG Res.)
Coquina Watkins Fed (Cisco Disc.) TD 10025 P/B 9510
"Cielo 4 Fed. Com."
Nearburg 3-1-2010 103865 315.00
Hanagan Pet. East McMillan TD 10262 D/A 6-6-72
Yates Pet. et al 8-1-201 118702 $225.00 S/2
Dominion
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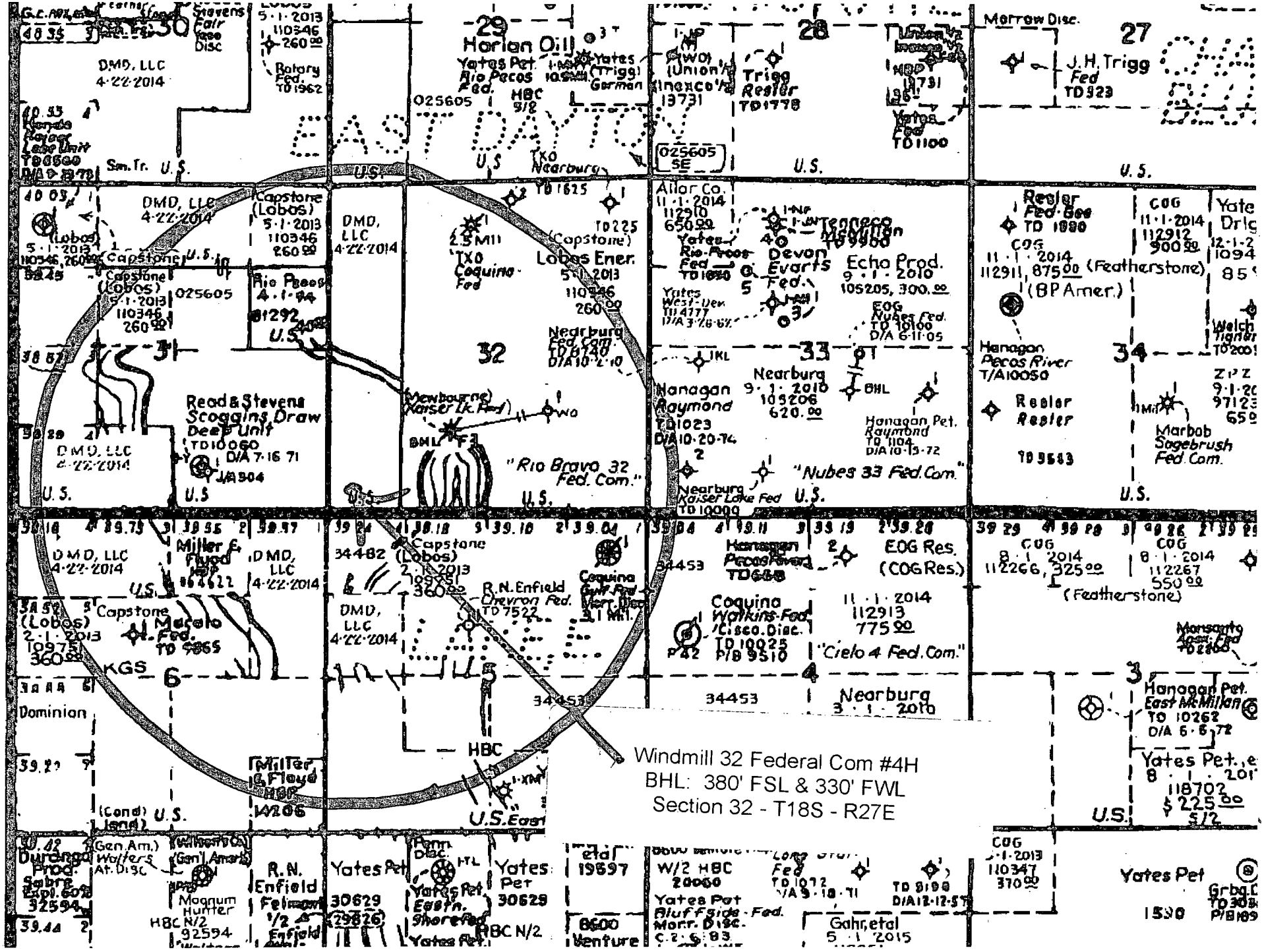
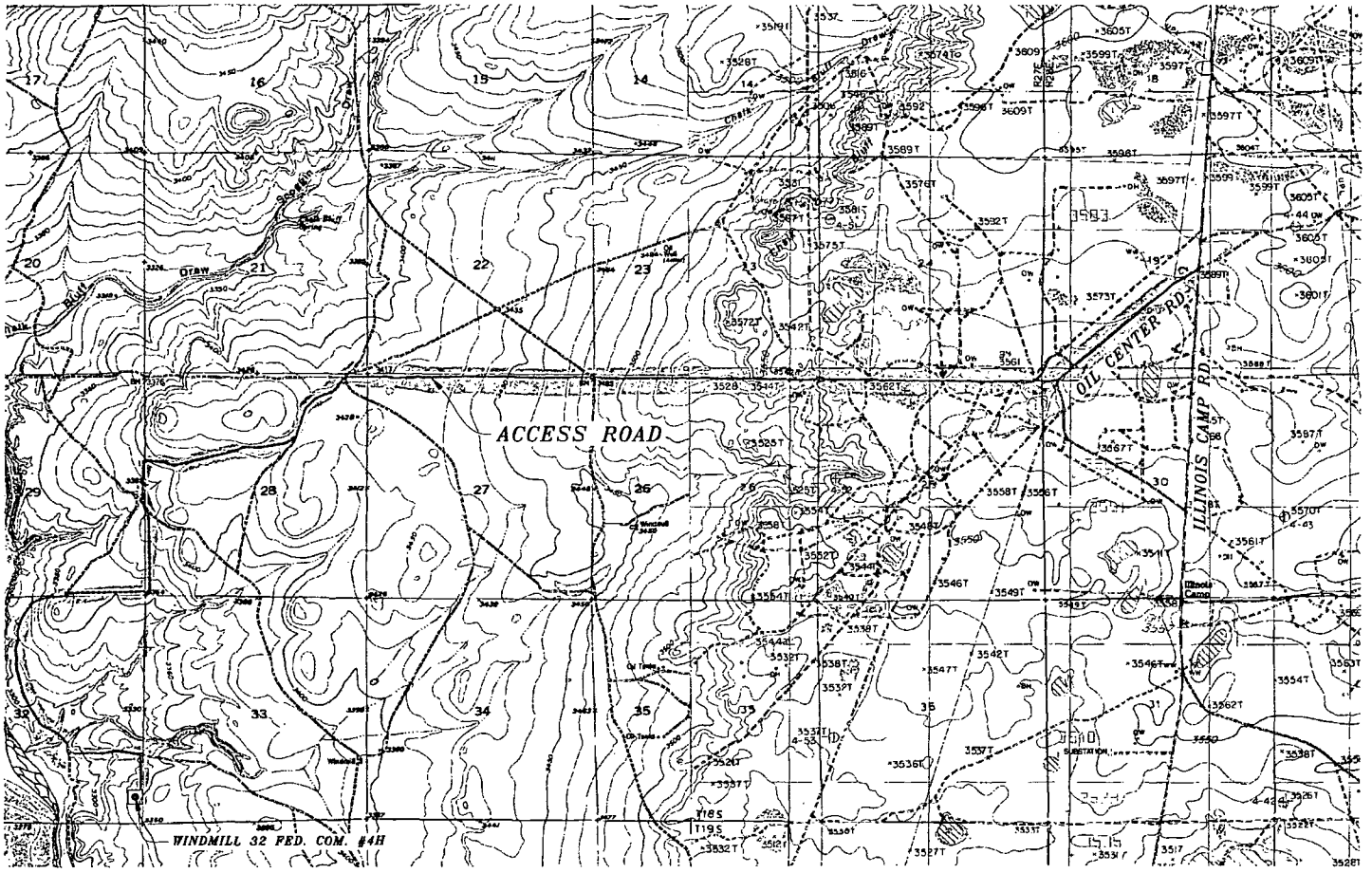

Windmill 32 Federal Com #4H
BHL: 380' FSL & 330' FWL
Section 32 - T18S - R27E

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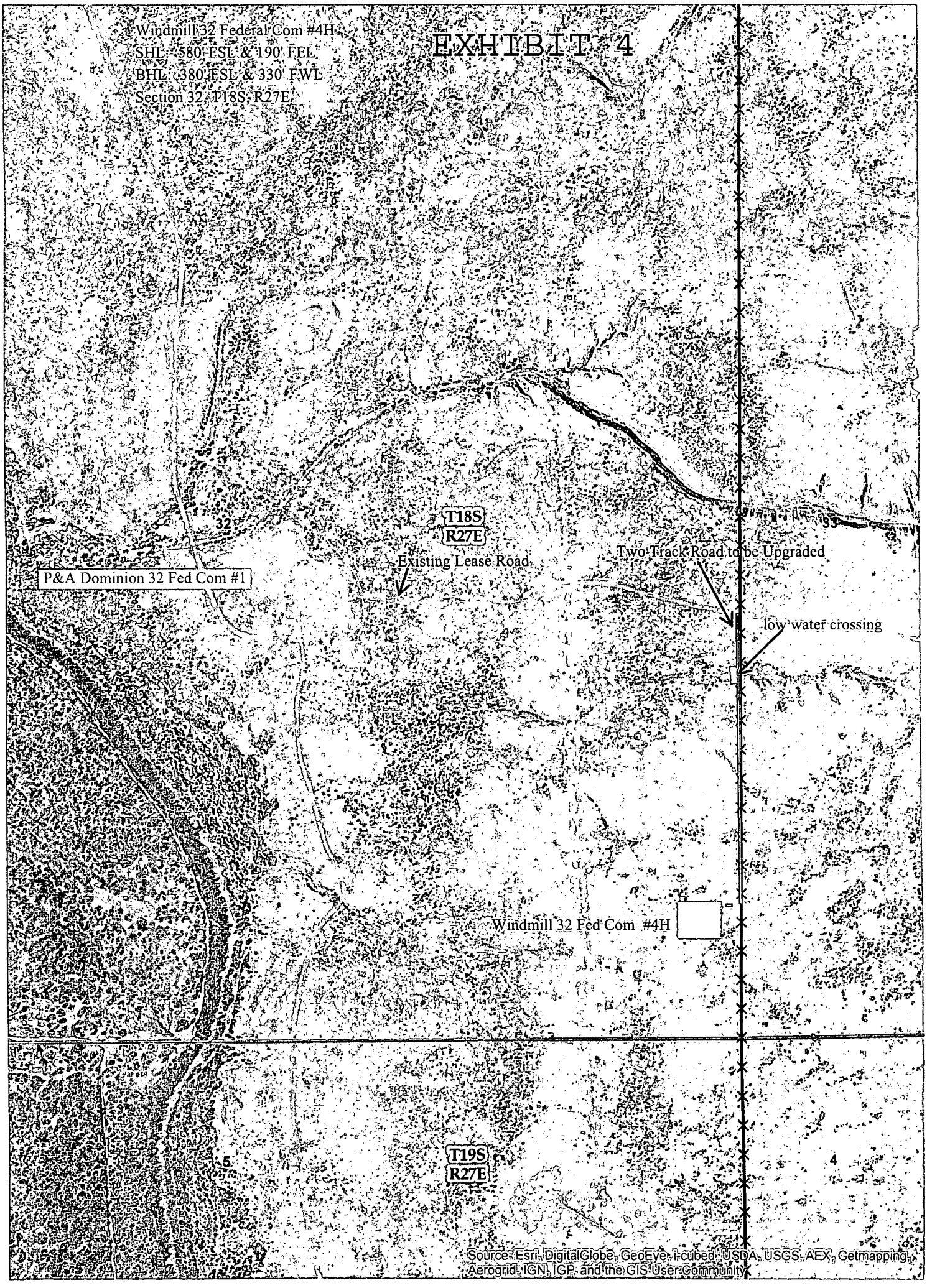
# EXHIBIT 2

| COG OPERATING, LLC | | |
|---|---|---|
| SURVEY DATE: FEB 19, 2013 | | PAGE 1 OF 1 |
| DRAFTING DATE: MAR 5, 2013 | | |
| APPROVED BY: CH | DRAWN BY: DDSI | FILE: 13-044 |

Windmill 32 Federal Com #4H
SHL: 580' FSL & 190' FEL
BHL: 380' FSL & 330' FWL
Section 32, T18S, R27E

# EXHIBIT 4



**COG Operating LLC**
**DRILLING AND OPERATIONS PROGRAM**
**Windmill 32 Fed Com 4H**
**SHL: 580' FSL & 190' FEL**
**BHL: 380' FSL & 330' FWL**
**Section 32 T18S R27E**
**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 | 71' | |
| Seven Rivers | 182' | |
| Queen | 839' | |
| Grayburg | 1,246' | |
| San Andreas | 1,629' | |
| Bone Spring | 2,897' | Oil |
| TD TVD | 5,750' | |
| TD MD | 10,463' | |

No other formations are expected to give up oil, gas or fresh water in measurable quantities. The surface fresh water sands will be protected by setting 13-3/8" casing at ~~180'~~ 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 500' into the 9-5/8" csg.

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

| Hole Size | Depths ~~A~~ See COA | Section | OD Casing | New/ Used | Wt | Collar | Grade | Collapse Design Factor | Burst Design Factor | Tension Design Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 ½" | 0' – ~~180'~~ 375 | Surface | 13 3/8" | New | 48# | STC | H-40 | 1.125 | 1.125 | 1.6 |
| 12 ¼" | 0' – 1600' | Intrmd | 9 5/8" | New | 36# | STC | J-55 | 1.125 | 1.125 | 1.6 |
| 7 7/8" | 0' – 10,463' | 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. 13-3/8" Surface — Cmt: 175 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
**Calculated w/50% excess on OH volumes

b. 9 5/8" Intermediate: — Lead: 200 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

c. 5 ½" Production — Lead: 550 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 1.89 cuft/sx)
Tail: 950 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 9-5/8" intermediate string is designed to circulate to surface.
- The production string will tie back a minimum of 500' into 9-5/8" csg.

## 5. Control:

Nipple up on 13 3/8 with 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 9 5/8 with 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 = 2632 psi
Lateral TD= 117°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' – 180' 575 | Fresh Water | 8.4 | 29 | N.C. |
| 180' – 1,600' | Cut Brine | 8.8 – 9.2 | 29 | N.C. |
| 1,600' – 10,463' (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 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 13 3/8" casing shoe until the 5 ½" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

**9. Testing, Logging and Coring Program:** See COA

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.

**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 Windmill 32 Federal Com #4H Rev0 MDT 7Mar13 Proposal Geodetic Report

(Def Plan)

| | | | |
|---|---|---|---|
| **Report Date:** | March 07, 2013 - 11:09 AM | **Survey / DLS Computation:** | Minimum Curvature / Lubinski |
| **Client:** | COG | **Vertical Section Azimuth:** | 267.637 ° (Grid North) |
| **Field:** | NM Eddy County (NAD 27) | **Vertical Section Origin:** | 0.000 ft, 0.000 ft |
| **Structure / Slot:** | COG Windmill 32 Federal Com #4H / COG Windmill 32 Federal Com #4H | **TVD Reference Datum:** | RKB |
| **Well:** | COG Windmill 32 Federal Com #4H | **TVD Reference Elevation:** | 3366.900 ft above MSL |
| **Borehole:** | Original Borehole | **Seabed / Ground Elevation:** | 3348.900 ft above MSL |
| **UWI / API#:** | Unknown / Unknown | **Magnetic Declination:** | 7.850 ° |
| **Survey Name:** | COG Windmill 32 Federal Com #4H Rev0 MDT 7Mar13 | **Total Gravity Field Strength:** | 999.2092 mgn (9.8 based) |
| **Survey Date:** | March 07, 2013 | **Total Magnetic Field Strength:** | 48621.525 nT |
| **Tort / AHD / DDI / ERD Ratio:** | 92.012 ° / 4764.692 ft / 5.891 / 0.808 | **Magnetic Dip Angle:** | 60.418 ° |
| **Coordinate Reference System:** | NAD27 New Mexico State Plane, Eastern Zone, US Feet | **Declination Date:** | March 07, 2013 |
| **Location Lat / Long:** | N 32° 41' 54.13877", W 104° 17' 33.68973" | **Magnetic Declination Model:** | BGGM 2012 |
| **Location Grid N/E Y/X:** | N 617781.100 ftUS, E 512502.300 ftUS | **North Reference:** | Grid North |
| **CRS Grid Convergence Angle:** | 0.0220 ° | **Grid Convergence Used:** | 0.0220 ° |
| **Grid Scale Factor:** | 0.99990927 | **Total Corr Mag North->Grid North:** | 7.8279 ° |
| | | **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 | 267.64 | 0.00 | 0.00 | 0.00 | 0.00 | N/A | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 100.00 | 0.00 | 267.64 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 200.00 | 0.00 | 267.64 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 300.00 | 0.00 | 267.64 | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 400.00 | 0.00 | 267.64 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 500.00 | 0.00 | 267.64 | 500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 600.00 | 0.00 | 267.64 | 600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 700.00 | 0.00 | 267.64 | 700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 800.00 | 0.00 | 267.64 | 800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 900.00 | 0.00 | 267.64 | 900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1000.00 | 0.00 | 267.64 | 1000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1100.00 | 0.00 | 267.64 | 1100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1200.00 | 0.00 | 267.64 | 1200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1300.00 | 0.00 | 267.64 | 1300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1400.00 | 0.00 | 267.64 | 1400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1500.00 | 0.00 | 267.64 | 1500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1600.00 | 0.00 | 267.64 | 1600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1700.00 | 0.00 | 267.64 | 1700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1800.00 | 0.00 | 267.64 | 1800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 1900.00 | 0.00 | 267.64 | 1900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2000.00 | 0.00 | 267.64 | 2000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2100.00 | 0.00 | 267.64 | 2100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2200.00 | 0.00 | 267.64 | 2200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2300.00 | 0.00 | 267.64 | 2300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2400.00 | 0.00 | 267.64 | 2400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2500.00 | 0.00 | 267.64 | 2500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2600.00 | 0.00 | 267.64 | 2600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2700.00 | 0.00 | 267.64 | 2700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2800.00 | 0.00 | 267.64 | 2800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 2900.00 | 0.00 | 267.64 | 2900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3000.00 | 0.00 | 267.64 | 3000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3100.00 | 0.00 | 267.64 | 3100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3200.00 | 0.00 | 267.64 | 3200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3300.00 | 0.00 | 267.64 | 3300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3400.00 | 0.00 | 267.64 | 3400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3500.00 | 0.00 | 267.64 | 3500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3600.00 | 0.00 | 267.64 | 3600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3700.00 | 0.00 | 267.64 | 3700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3800.00 | 0.00 | 267.64 | 3800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 3900.00 | 0.00 | 267.64 | 3900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4000.00 | 0.00 | 267.64 | 4000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4100.00 | 0.00 | 267.64 | 4100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4200.00 | 0.00 | 267.64 | 4200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4300.00 | 0.00 | 267.64 | 4300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4400.00 | 0.00 | 267.64 | 4400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4500.00 | 0.00 | 267.64 | 4500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4600.00 | 0.00 | 267.64 | 4600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4700.00 | 0.00 | 267.64 | 4700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4800.00 | 0.00 | 267.64 | 4800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 4900.00 | 0.00 | 267.64 | 4900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5000.00 | 0.00 | 267.64 | 5000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5100.00 | 0.00 | 267.64 | 5100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5200.00 | 0.00 | 267.64 | 5200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5300.00 | 0.00 | 267.64 | 5300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5400.00 | 0.00 | 267.64 | 5400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| KOP Build @ 12° DLS | 5422.83 | 0.00 | 267.64 | 5422.83 | 0.00 | 0.00 | 0.00 | 0.00 | 617781.10 | 512502.30 | N 32 41 54.14 | W 104 17 33.69 |
| | 5500.00 | 9.26 | 267.64 | 5499.66 | 6.22 | -0.26 | -6.22 | 12.00 | 617780.84 | 512496.08 | N 32 41 54.14 | W 104 17 33.76 |
| | 5600.00 | 21.26 | 267.64 | 5595.96 | 32.50 | -1.34 | -32.47 | 12.00 | 617779.76 | 512469.84 | N 32 41 54.13 | W 104 17 34.07 |
| | 5700.00 | 33.26 | 267.64 | 5684.69 | 78.22 | -3.22 | -78.15 | 12.00 | 617777.88 | 512424.16 | N 32 41 54.11 | W 104 17 34.60 |
| | 5800.00 | 45.26 | 267.64 | 5761.98 | 141.38 | -5.83 | -141.26 | 12.00 | 617775.27 | 512361.05 | N 32 41 54.08 | W 104 17 35.34 |
| | 5900.00 | 57.26 | 267.64 | 5824.44 | 219.24 | -9.04 | -219.06 | 12.00 | 617772.06 | 512283.27 | N 32 41 54.05 | W 104 17 36.25 |
| | 6000.00 | 69.26 | 267.64 | 5869.35 | 308.38 | -12.71 | -308.12 | 12.00 | 617768.39 | 512194.21 | N 32 41 54.01 | W 104 17 37.30 |
| | 6100.00 | 81.26 | 267.64 | 5894.75 | 404.92 | -16.69 | -404.57 | 12.00 | 617764.41 | 512097.76 | N 32 41 53.98 | W 104 17 38.42 |

| 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 ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Landing Point | 6189.59 | 92.01 | 267.64 | 5900.00 | 494.23 | -20.37 | -493.81 | 12.00 | 617760.73 | 512008.54 | N 32 41 53.94 | W 104 17 39.47 |
| | 6200.00 | 92.01 | 267.64 | 5899.64 | 504.62 | -20.80 | -504.20 | 0.00 | 617760.30 | 511998.15 | N 32 41 53.93 | W 104 17 39.59 |
| | 6300.00 | 92.01 | 267.64 | 5896.12 | 604.56 | -24.92 | -604.05 | 0.00 | 617756.18 | 511898.31 | N 32 41 53.89 | W 104 17 40.76 |
| | 6400.00 | 92.01 | 267.64 | 5892.61 | 704.50 | -29.04 | -703.90 | 0.00 | 617752.06 | 511798.46 | N 32 41 53.85 | W 104 17 41.93 |
| | 6500.00 | 92.01 | 267.64 | 5889.10 | 804.44 | -33.16 | -803.76 | 0.00 | 617747.94 | 511698.62 | N 32 41 53.81 | W 104 17 43.10 |
| | 6600.00 | 92.01 | 267.64 | 5885.59 | 904.38 | -37.28 | -903.61 | 0.00 | 617743.82 | 511598.77 | N 32 41 53.77 | W 104 17 44.26 |
| | 6700.00 | 92.01 | 267.64 | 5882.08 | 1004.32 | -41.40 | -1003.46 | 0.00 | 617739.70 | 511498.93 | N 32 41 53.73 | W 104 17 45.43 |
| | 6800.00 | 92.01 | 267.64 | 5878.57 | 1104.26 | -45.52 | -1103.32 | 0.00 | 617735.58 | 511399.09 | N 32 41 53.69 | W 104 17 46.60 |
| | 6900.00 | 92.01 | 267.64 | 5875.06 | 1204.19 | -49.64 | -1203.17 | 0.00 | 617731.46 | 511299.24 | N 32 41 53.65 | W 104 17 47.77 |
| | 7000.00 | 92.01 | 267.64 | 5871.55 | 1304.13 | -53.76 | -1303.02 | 0.00 | 617727.34 | 511199.40 | N 32 41 53.61 | W 104 17 48.94 |
| | 7100.00 | 92.01 | 267.64 | 5868.04 | 1404.07 | -57.88 | -1402.88 | 0.00 | 617723.22 | 511099.55 | N 32 41 53.57 | W 104 17 50.11 |
| | 7200.00 | 92.01 | 267.64 | 5864.53 | 1504.01 | -62.00 | -1502.73 | 0.00 | 617719.10 | 510999.71 | N 32 41 53.53 | W 104 17 51.27 |
| | 7300.00 | 92.01 | 267.64 | 5861.02 | 1603.95 | -66.12 | -1602.58 | 0.00 | 617714.99 | 510899.87 | N 32 41 53.49 | W 104 17 52.44 |
| | 7400.00 | 92.01 | 267.64 | 5857.51 | 1703.89 | -70.24 | -1702.44 | 0.00 | 617710.87 | 510800.02 | N 32 41 53.45 | W 104 17 53.61 |
| | 7500.00 | 92.01 | 267.64 | 5854.00 | 1803.82 | -74.36 | -1802.29 | 0.00 | 617706.75 | 510700.18 | N 32 41 53.41 | W 104 17 54.78 |
| | 7600.00 | 92.01 | 267.64 | 5850.49 | 1903.76 | -78.48 | -1902.14 | 0.00 | 617702.63 | 510600.33 | N 32 41 53.37 | W 104 17 55.95 |
| | 7700.00 | 92.01 | 267.64 | 5846.98 | 2003.70 | -82.60 | -2002.00 | 0.00 | 617698.51 | 510500.49 | N 32 41 53.33 | W 104 17 57.12 |
| | 7800.00 | 92.01 | 267.64 | 5843.47 | 2103.64 | -86.72 | -2101.85 | 0.00 | 617694.39 | 510400.64 | N 32 41 53.29 | W 104 17 58.29 |
| | 7900.00 | 92.01 | 267.64 | 5839.96 | 2203.58 | -90.84 | -2201.70 | 0.00 | 617690.27 | 510300.80 | N 32 41 53.25 | W 104 17 59.45 |
| | 8000.00 | 92.01 | 267.64 | 5836.45 | 2303.52 | -94.96 | -2301.56 | 0.00 | 617686.15 | 510200.96 | N 32 41 53.21 | W 104 18 0.62 |
| | 8100.00 | 92.01 | 267.64 | 5832.94 | 2403.45 | -99.08 | -2401.41 | 0.00 | 617682.03 | 510101.11 | N 32 41 53.17 | W 104 18 1.79 |
| | 8200.00 | 92.01 | 267.64 | 5829.43 | 2503.39 | -103.20 | -2501.26 | 0.00 | 617677.91 | 510001.27 | N 32 41 53.13 | W 104 18 2.96 |
| | 8300.00 | 92.01 | 267.64 | 5825.92 | 2603.33 | -107.32 | -2601.12 | 0.00 | 617673.79 | 509901.42 | N 32 41 53.09 | W 104 18 4.13 |
| | 8400.00 | 92.01 | 267.64 | 5822.41 | 2703.27 | -111.44 | -2700.97 | 0.00 | 617669.67 | 509801.58 | N 32 41 53.05 | W 104 18 5.30 |
| | 8500.00 | 92.01 | 267.64 | 5818.90 | 2803.21 | -115.56 | -2800.82 | 0.00 | 617665.55 | 509701.74 | N 32 41 53.00 | W 104 18 6.46 |
| | 8600.00 | 92.01 | 267.64 | 5815.39 | 2903.15 | -119.68 | -2900.68 | 0.00 | 617661.43 | 509601.89 | N 32 41 52.96 | W 104 18 7.63 |
| | 8700.00 | 92.01 | 267.64 | 5811.88 | 3003.08 | -123.80 | -3000.53 | 0.00 | 617657.31 | 509502.05 | N 32 41 52.92 | W 104 18 8.80 |
| | 8800.00 | 92.01 | 267.64 | 5808.37 | 3103.02 | -127.92 | -3100.38 | 0.00 | 617653.19 | 509402.20 | N 32 41 52.88 | W 104 18 9.97 |
| | 8900.00 | 92.01 | 267.64 | 5804.86 | 3202.96 | -132.04 | -3200.24 | 0.00 | 617649.07 | 509302.36 | N 32 41 52.84 | W 104 18 11.14 |
| | 9000.00 | 92.01 | 267.64 | 5801.35 | 3302.90 | -136.16 | -3300.09 | 0.00 | 617644.95 | 509202.51 | N 32 41 52.80 | W 104 18 12.31 |
| | 9100.00 | 92.01 | 267.64 | 5797.84 | 3402.84 | -140.28 | -3399.95 | 0.00 | 617640.84 | 509102.67 | N 32 41 52.76 | W 104 18 13.47 |
| | 9200.00 | 92.01 | 267.64 | 5794.32 | 3502.78 | -144.40 | -3499.80 | 0.00 | 617636.72 | 509002.83 | N 32 41 52.72 | W 104 18 14.64 |
| | 9300.00 | 92.01 | 267.64 | 5790.81 | 3602.71 | -148.52 | -3599.65 | 0.00 | 617632.60 | 508902.98 | N 32 41 52.68 | W 104 18 15.81 |
| | 9400.00 | 92.01 | 267.64 | 5787.30 | 3702.65 | -152.64 | -3699.51 | 0.00 | 617628.48 | 508803.14 | N 32 41 52.64 | W 104 18 16.98 |
| | 9500.00 | 92.01 | 267.64 | 5783.79 | 3802.59 | -156.76 | -3799.36 | 0.00 | 617624.36 | 508703.29 | N 32 41 52.60 | W 104 18 18.15 |
| | 9600.00 | 92.01 | 267.64 | 5780.28 | 3902.53 | -160.88 | -3899.21 | 0.00 | 617620.24 | 508603.45 | N 32 41 52.56 | W 104 18 19.32 |
| | 9700.00 | 92.01 | 267.64 | 5776.77 | 4002.47 | -165.00 | -3999.07 | 0.00 | 617616.12 | 508503.61 | N 32 41 52.52 | W 104 18 20.49 |
| | 9800.00 | 92.01 | 267.64 | 5773.26 | 4102.41 | -169.12 | -4098.92 | 0.00 | 617612.00 | 508403.76 | N 32 41 52.48 | W 104 18 21.65 |
| | 9900.00 | 92.01 | 267.64 | 5769.75 | 4202.34 | -173.24 | -4198.77 | 0.00 | 617607.88 | 508303.92 | N 32 41 52.44 | W 104 18 22.82 |
| | 10000.00 | 92.01 | 267.64 | 5766.24 | 4302.28 | -177.36 | -4298.63 | 0.00 | 617603.76 | 508204.07 | N 32 41 52.40 | W 104 18 23.99 |
| | 10100.00 | 92.01 | 267.64 | 5762.73 | 4402.22 | -181.48 | -4398.48 | 0.00 | 617599.64 | 508104.23 | N 32 41 52.36 | W 104 18 25.16 |
| | 10200.00 | 92.01 | 267.64 | 5759.22 | 4502.16 | -185.60 | -4498.33 | 0.00 | 617595.52 | 508004.38 | N 32 41 52.32 | W 104 18 26.33 |
| | 10300.00 | 92.01 | 267.64 | 5755.71 | 4602.10 | -189.72 | -4598.19 | 0.00 | 617591.40 | 507904.54 | N 32 41 52.28 | W 104 18 27.50 |
| | 10400.00 | 92.01 | 267.64 | 5752.20 | 4702.04 | -193.84 | -4698.04 | 0.00 | 617587.28 | 507804.70 | N 32 41 52.24 | W 104 18 28.66 |
| COG Windmill 32 Federal Com #4H PBHL | 10462.69 | 92.01 | 267.64 | 5750.00 | 4764.69 | -196.42 | -4760.64 | 0.00 | 617584.70 | 507742.10 | N 32 41 52.21 | W 104 18 29.40 |

**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 Borehole / COG Windmill 32 Federal Com #4H |
| | 18.000 | 10462.694 | 1/100.000 | 30.000 | 30.000 | SLB_MWD-STD | Original Borehole / COG Windmill 32 Federal Com #4H |

# New Mexico Office of the State Engineer
# Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

| POD Number | POD Code | Subbasin | County | Q 64 | Q 16 | Q 4 | Sec | Tws | Rng | X | Y | Depth Well | Depth Water | Water Column |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RA 03714 | | | CH | 4 | 4 | 2 | 08 | 18S | 27E | 566212 | 3625253* | 381 | | |
| RA 03917 | | | LE | 4 | 1 | 2 | 10 | 18S | 27E | 569019 | 3625660* | 130 | 50 | 80 |
| RA 04048 | | | LE | 1 | 4 | 4 | 14 | 18S | 27E | 570841 | 3623030* | 2096 | | |
| RA 04211 | | | CH | | 3 | 1 | 28 | 18S | 27E | 566512 | 3620562* | 120 | 100 | 20 |
| RA 04298 | | | ED | | 1 | 2 | 19 | 18S | 27E | 564082 | 3622523* | 92 | | |
| RA 05524 | | | ED | | 2 | 4 | 33 | 18S | 27E | 567721 | 3618532* | 90 | 49 | 41 |
| RA 05660 | | | ED | | 3 | 4 | 31 | 18S | 27E | 564094 | 3618090* | 305 | 65 | 240 |
| RA 05664 | | | ED | | 4 | 1 | 33 | 18S | 27E | 566914 | 3618936* | | 145 | |
| RA 06091 | | | ED | 1 | 2 | 3 | 29 | 18S | 27E | 565211 | 3620222* | 90 | 17 | 73 |

Average Depth to Water: **71 feet**

Minimum Depth: **17 feet**

Maximum Depth: **145 feet**

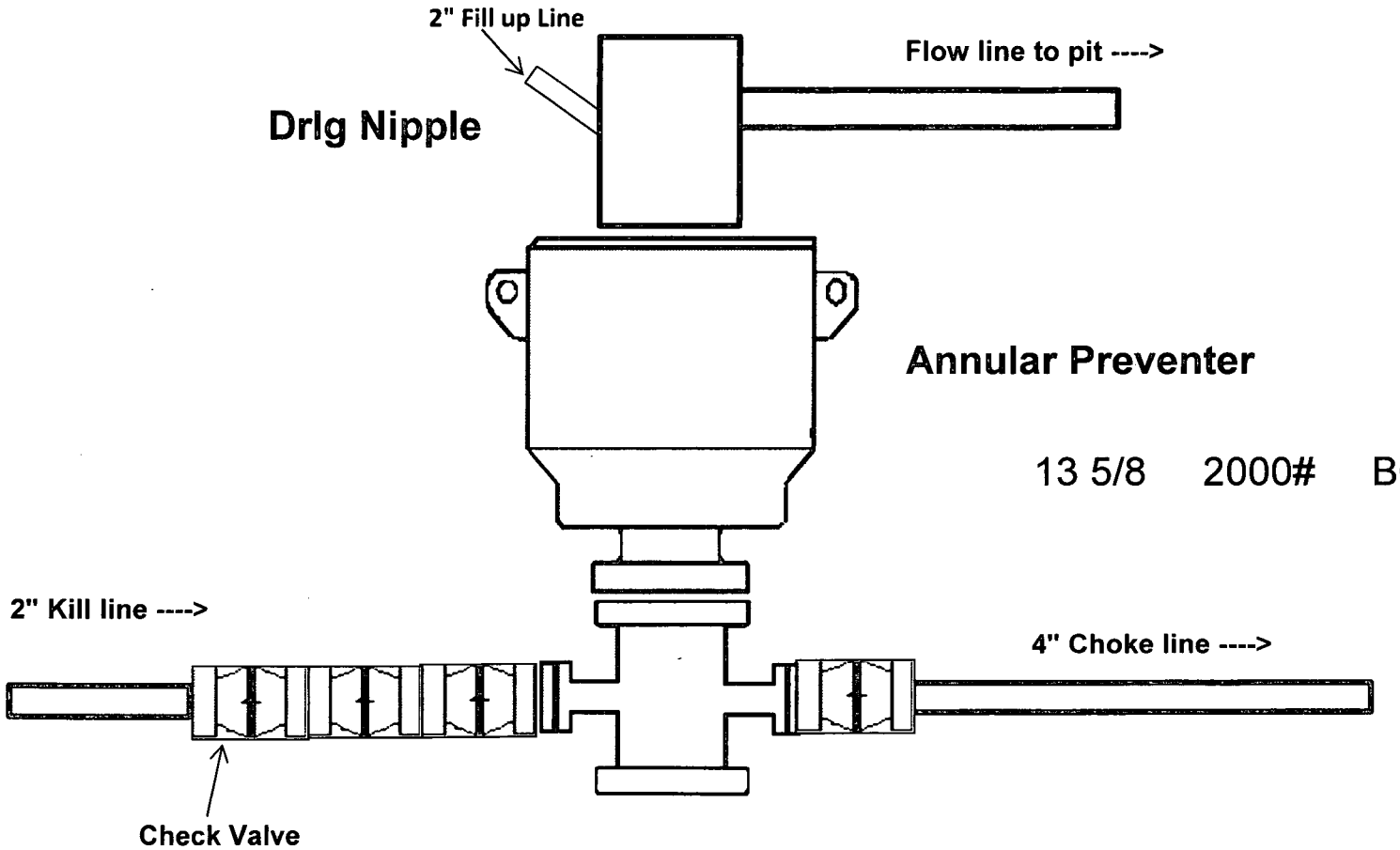
**Record Count:** 9

**PLSS Search:**

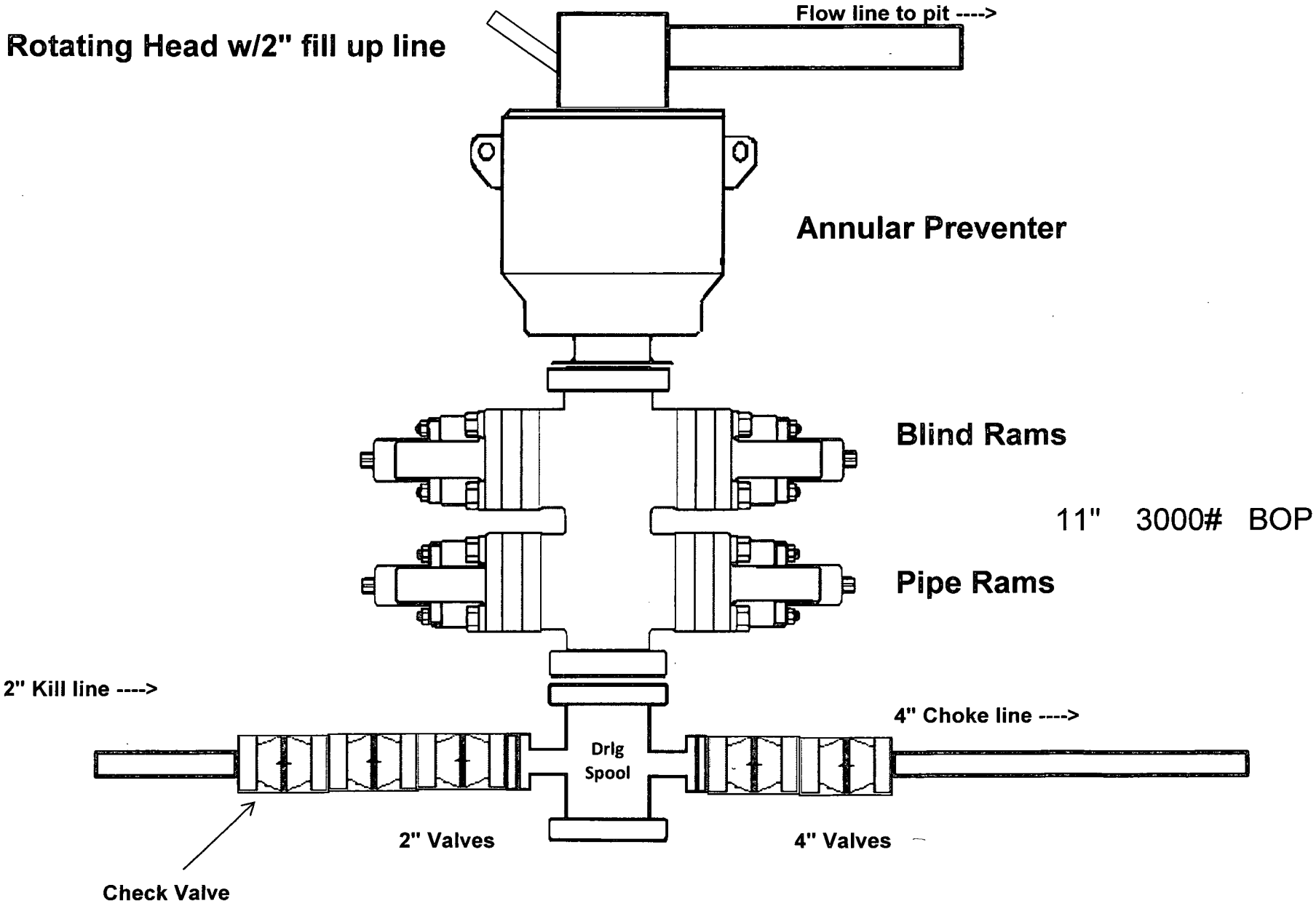
**Township:** 18S **Range:** 27E

***UTM location was derived from PLSS - see Help**

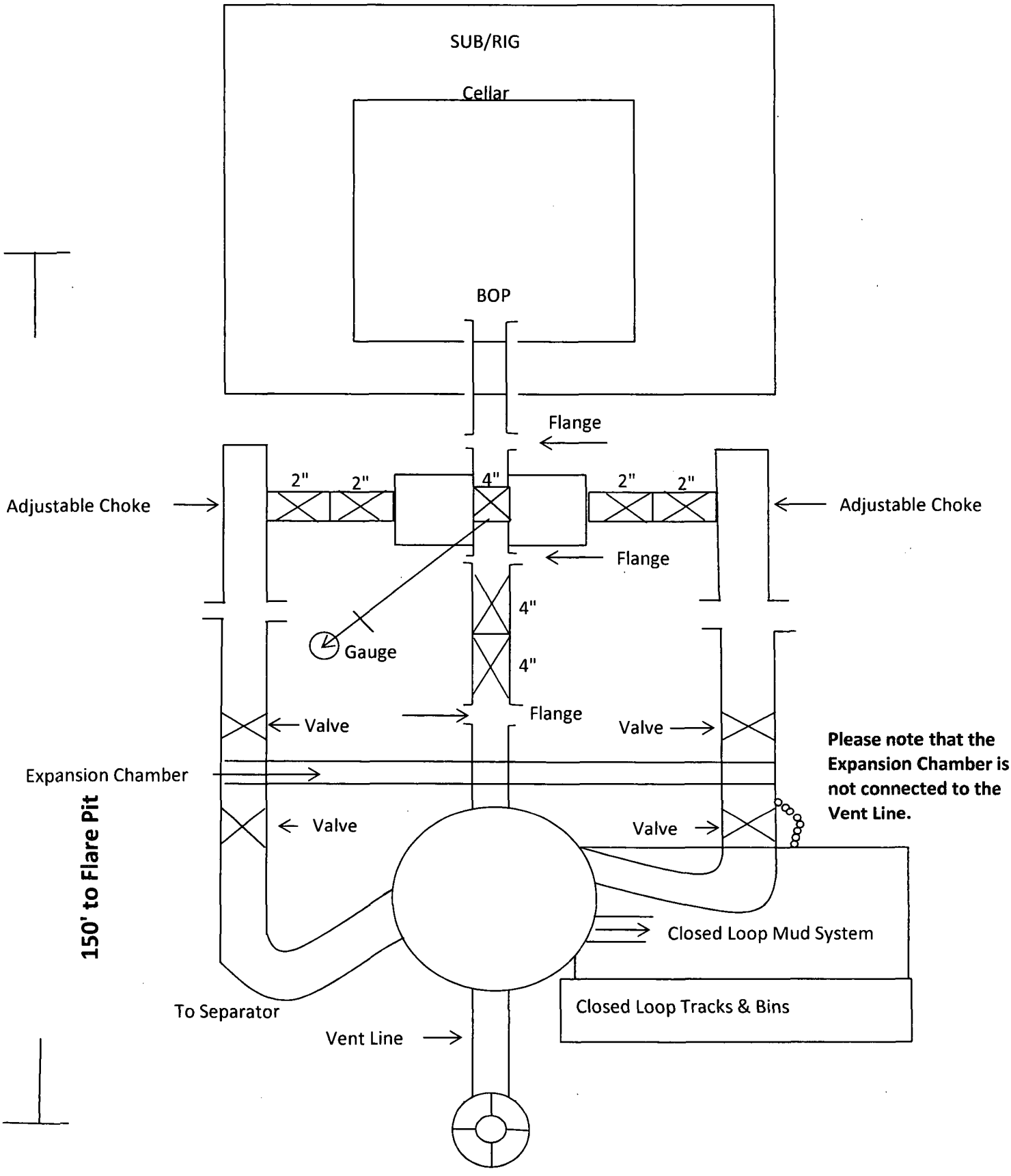
# 2,000 psi BOP Schematic



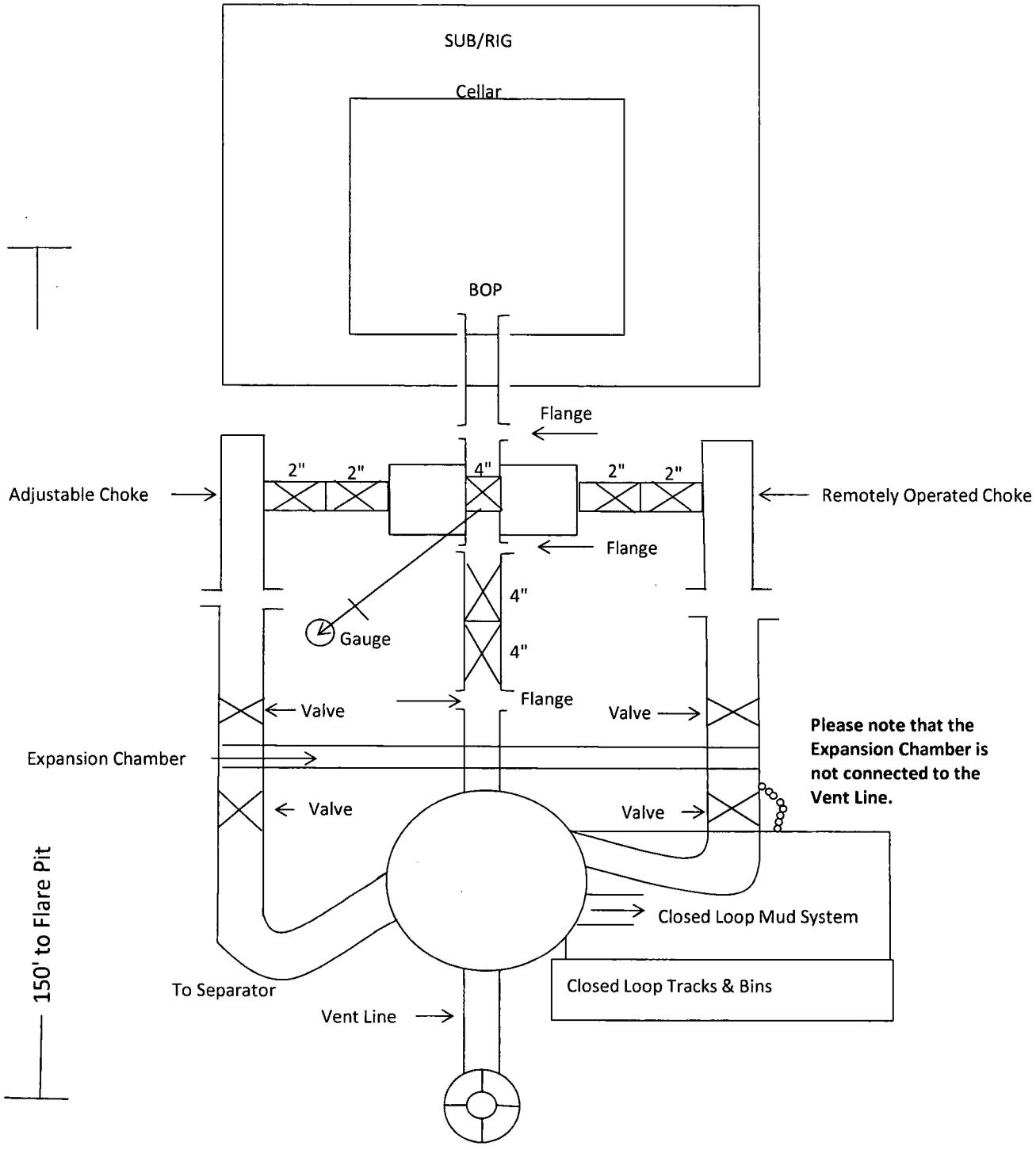
# 3,000 psi BOP Schematic



# 2M Choke Manifold Equipment



# 3M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

**Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'**

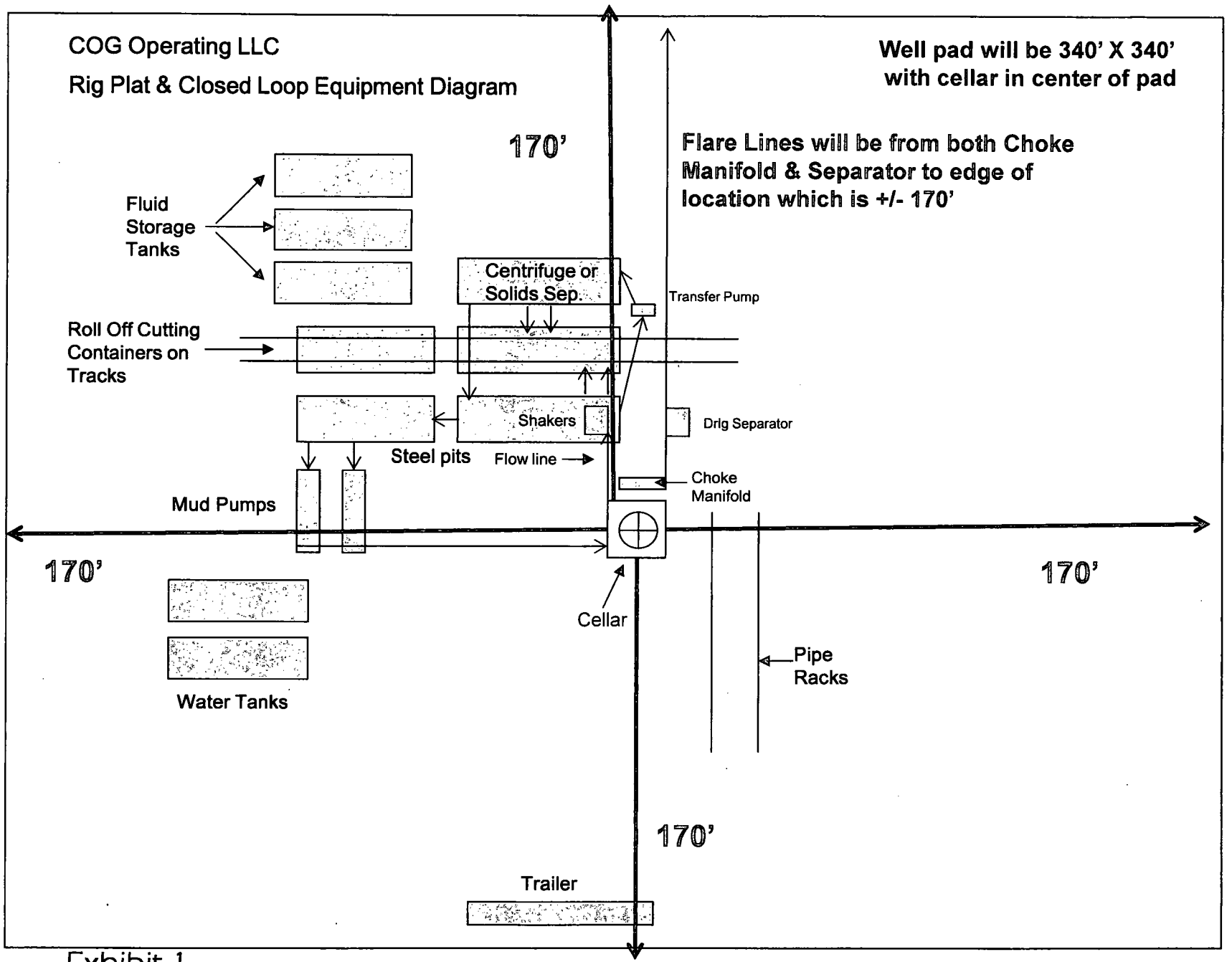



Exhibit 1

# Design Plan
# Operating and Maintenance Plan
# Closure Plan
## Windmill 32 Fed Com 4H
## SHL: 580' FSL & 190' FEL
## BHL: 380' FSL & 330' FWL
## Section 32 T18S R27E
## 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 H2S 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 H2S 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.
   Choke manifold with remotely operated choke.
   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.

# WARNING

**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

# 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 |

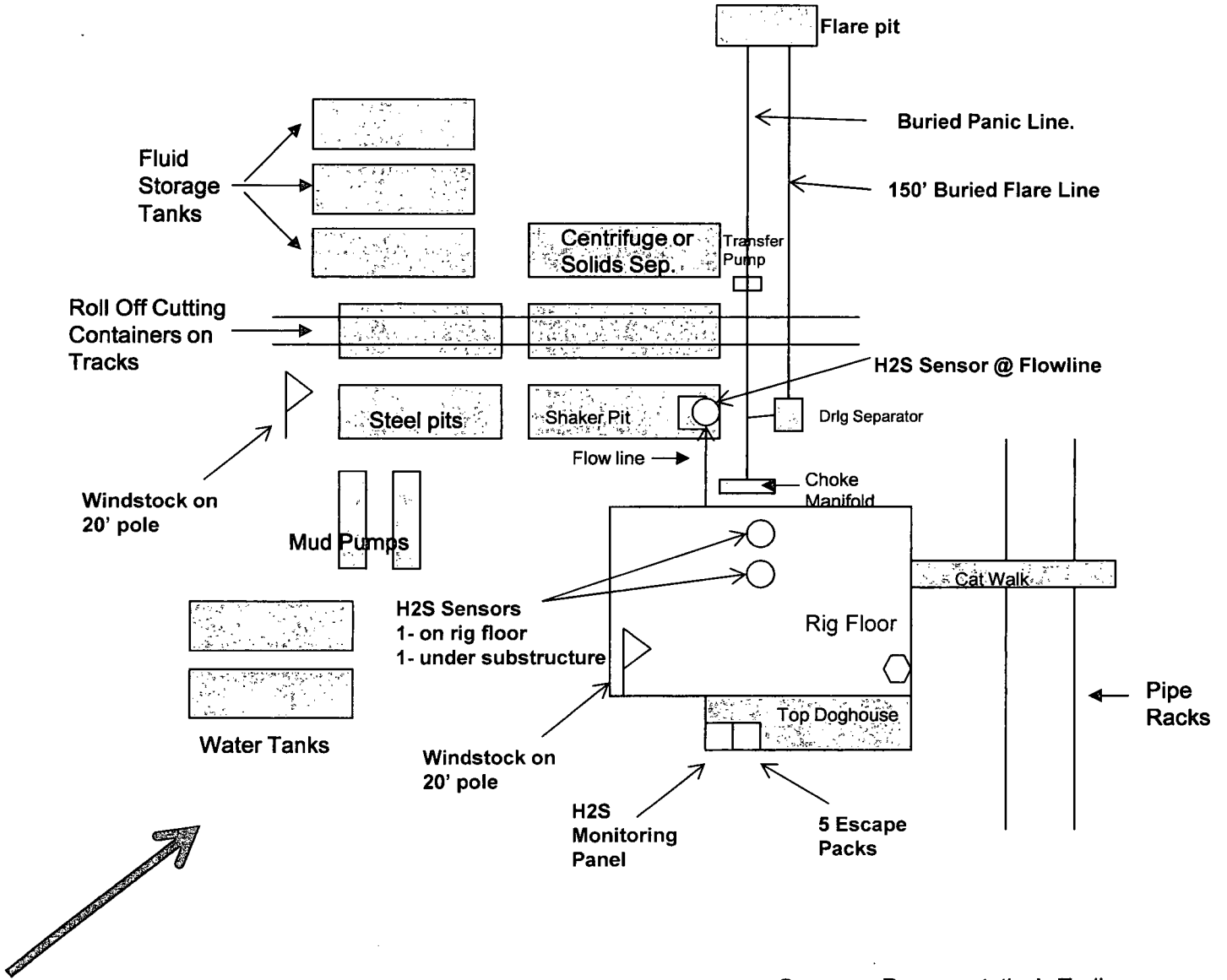
# EMERGENCY RESPONSE NUMBERS

| | 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
$H_2S$ Equipment Schematic
Terrain: Shinnery sand hills.

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

**Location Entry Condition Sign**



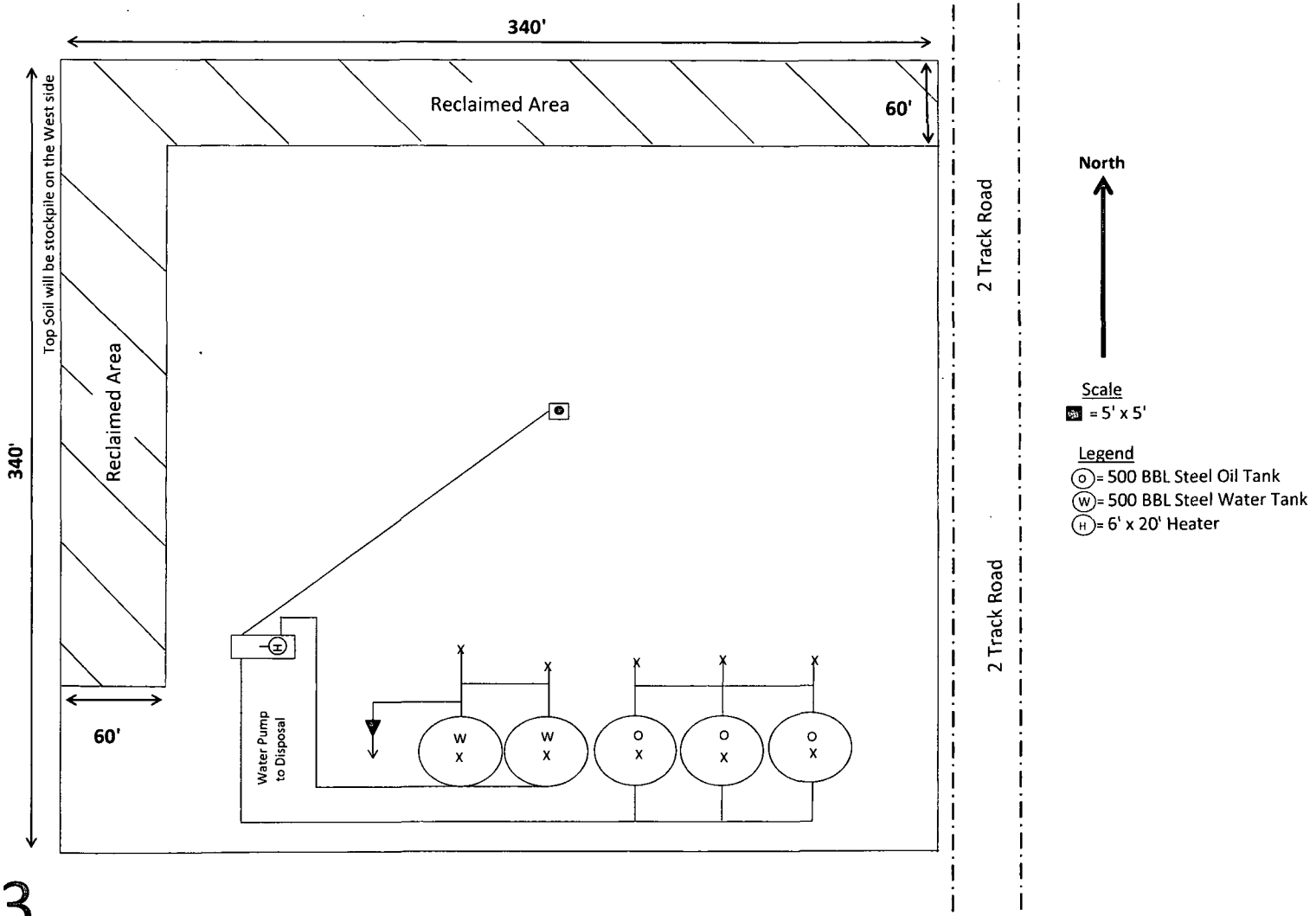
CONCHO

COG Operating LLC
2208 West Main
Artesia, NM 88210

# Production Facility Layout

## Windmill 32 Federal Com #4H

## Section 32-T18S-R27E




# Exhibit 3

# Surface Use & Operating Plan

## Windmill 32 Federal Com #4H

- Surface Owner: Bureau of Reclamation
- No New Road. Upgrade 825' of two track road.
- Flow Line: on well pad
- Facilities: will be constructed on well pad – see Exhibit 3

**Well Site Information**

V Door: East

Topsoil: West

Interim Reclamation: North and West

**Notes**

**Onsite**: Gerald Herrera, COG and Legion Brumley, BLM

# SURFACE USE AND OPERATING PLAN

## 1. Existing & Proposed Access Roads

A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.

B. A new Exhibit 2 is attached. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in the new Exhibit 2. The road highlighted in Exhibit 2 will be used to access the well. Exhibit 4 shows a larger scale of the existing lease road and proposed upgrade to the existing two track road.

C. Directions to location: See 600 x 600 plat.

D. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in section 2A of this Surface Use and Operating Plan.

## 2. Proposed Access Road:

No new access road will be required for this location. We will upgrade 825' of the existing two track road.

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. A low water crossing and a cattleguard will be installed and are shown on Exhibit 4.

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.

**3. Location of Existing Well:**

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

There is one SWD; Upper Penn SWD in Section 30, T18S, R27E, two well producing from the Lake; Morrow, Gas in Section 5, T19S, R27E, and Section 4, T19S, R27E, one well producing from the Red Lake; Penn formation in Section 29, T18S, R27E, and numerous wells producing from the Dayton; Grayburg, East formation within the one-mile radius area.

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

A. COG Operating LLC does not operate a production facility on this lease.

B. If the well is productive, contemplated facilities will be as follows:

1) A tank battery and facilities will be constructed as shown on Exhibit 3.

2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.

3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.

4) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.

5) If the well is productive, rehabilitation plans will include the following:

- The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

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

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Exhibit #1. If a

commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

**6. Source of Construction Materials 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.

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

A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.

B. Drilling fluids will be contained in steel mud pits.

C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.

D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.

E. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).

F. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

**8. Ancillary Facilities:**

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

**9. Well Site Layout:**

A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. 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.

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

A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

**11.Surface Ownership:**

A. The surface is owned by the U.S. Government and is administered by the Bureau of Reclamation. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.

B. The proposed road routes and surface location will be restored as directed by the BLM

**12.Other Information:**

A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.

B. **This well is 1700' from live water (Pecos River), 1580' from FEMA flood zone and is 70' above the flood plain.**

C. There are no dwellings within 2 miles of this location.

**D.** If needed, a Cultural Resources Examination is being prepared by Southern New Mexico Archaeological Services, Inc. P.O. Box 1, Bent New Mexico, 88314, phone # 505-671-4797 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

**13. Bond Coverage:**

Bond Coverage is Statewide Bonds # NMB000215 and NMB000740

# PECOS DISTRICT
# CONDITIONS OF APPROVAL

| | |
|---|---|
| OPERATOR'S NAME: | COG Operating |
| LEASE NO.: | NM110346 |
| WELL NAME & NO.: | 4H Windmill 32 Federal Com |
| SURFACE HOLE FOOTAGE: | 580' FSL & 190' FEL |
| BOTTOM HOLE FOOTAGE | 380' FSL & 330' FWL |
| LOCATION: | Section 32, T.18 S., R.27 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)

## Cave and Karst

** Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

### Cave/Karst Surface Mitigation

The following stipulations will be applied to minimize impacts during construction, drilling and production.

**Construction:**
In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

**No Blasting:**
No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

**Pad Berming:**
The pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the pad. All sides will be bermed.

**Tank Battery Liners and Berms:**
Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

**Leak Detection System:**
A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating values and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

**Automatic Shut-off Systems**:
Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

### Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and ground water concerns:

**Rotary Drilling with Fresh Water:**
Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

**Directional Drilling:**
Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

**Lost Circulation:**
ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

**Abandonment Cementing:**
Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

**Pressure Testing:**
Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

**Communitization Agreement**
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. In addition, the well sign shall include the surface and bottom hole lease numbers. If the Communitization Agreement number is known, it shall also be on the sign. If not, it shall be placed on the sign when the sign is replaced.

# 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 4 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-five (25) 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.

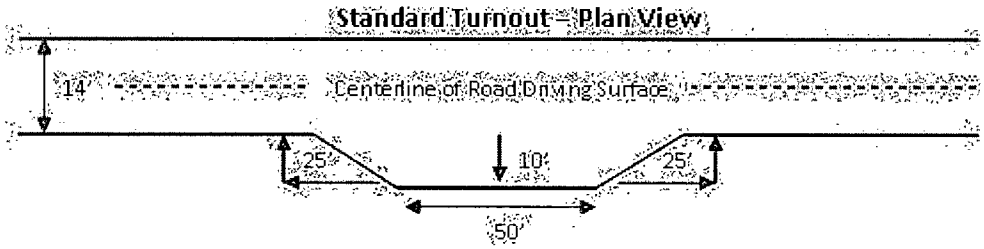
The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing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

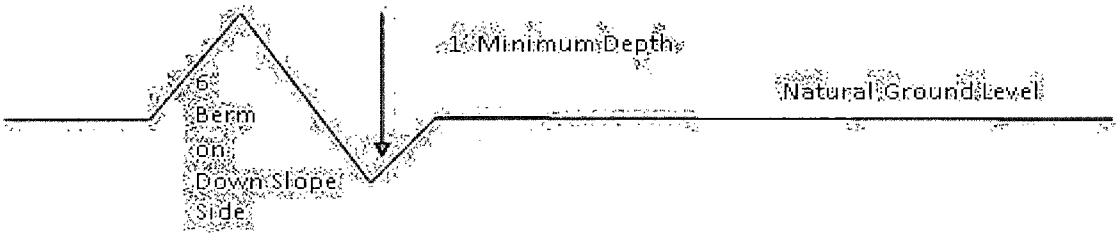
**Turnouts**
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:




**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:

400 foot road with 4% road slope: $\frac{400'}{4\%} + 100' = 200'$ 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**

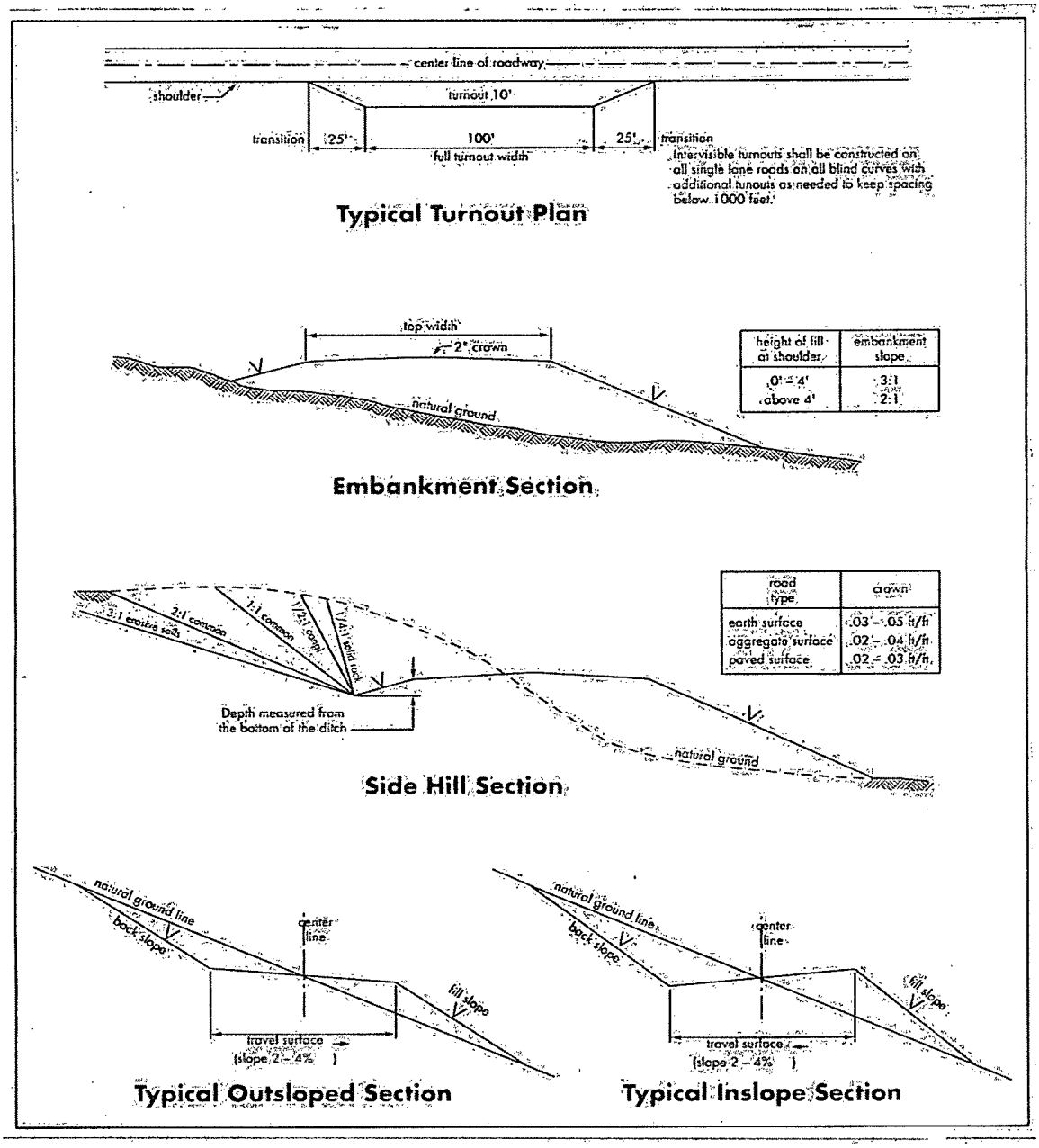
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

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. **Hydrogen Sulfide has been reported as a hazard in formations deeper than the proposed depth. It is recommended that monitoring equipment be onsite for potential Hydrogen Sulfide. If Hydrogen Sulfide is encountered, report measurements 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. **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.**

## 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. 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.**

**HIGH CAVE/KARST –A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH THEREFORE, ONE INCH OPERATIONS WILL NOT BE PERMITTED.**

**Possible lost circulation in the Grayburg and San Andres formations.**

1. The **13-3/8** inch surface casing shall be set at approximately **375** feet and cemented to the surface. **Additional cement will be required due to change in depth.**

    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 **9-5/8** inch intermediate casing is:

    ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst concerns.**

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

   ☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

## C. PRESSURE CONTROL

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

2. 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.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 9-5/8 inch 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 a water basin, 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. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

   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 from the BLM Standard Environmental Color Chart (CC-001: June 2008).

## B. PIPELINES (not applied for in APD)

## C. ELECTRIC LINES (not applied for in APD)

# 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 4, for Gypsum 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 |
|---|---|
| Alkali Sacaton (Sporobolus airoides) | 1.0 |
| DWS Four-wing saltbush (Atriplex canescens) | 5.0 |

DWS: DeWinged Seed

*Pounds of pure live seed:

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