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Form 3160-3
(March 2012)

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.: NMNM002386A

6. If Indian, Allotee or Tribe Name:

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

7. If Unit or CA Agreement, Name and No.: Brinninstool Unit; NMNM070796X

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

8. Lease Name and Well No.: (310195) Brinninstool Unit #3H

2. Name of Operator: COG Operating LLC. (229137)

9. API Well No.: 30-025-41371

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

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

10. Field and Pool, or Exploratory: (96865) Cruz; Bone Spring

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

At surface: 330' FSL & 2260' FEL Unit Letter O (SWSE) SHL

At proposed prod. Zone: 330' FNL & 2260' FEL Unit Letter B (NWNE) BHL

11. Sec., T.R.M. or Blk and Survey or Area: Sec. 20 - T23S - R33E

14. Distance in miles and direction from nearest town or post office*: Approximately 25 miles from Eunice

12. County or Parish: Lea County

13. State: NM

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

16. No. of acres in lease: 560

17. Spacing Unit dedicated to this well: 160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.: SHL: 1633' BHL: 1673' Closest to the wellbore: 280''

19. Proposed Depth: TVD:11,040' MD: 15,500'

20. BLM/BIA Bond No. on file: NMB000740 &NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3695.4' GL

22. Approximate date work will start*: 8/15/2013

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 — Date: 6/26/2013

Title: Regulatory Analyst

Approved by *(Signature)*: /s/ James Stovall — Name *(Printed/Typed)*: — Date: AUG 29 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)

Carlsbad Controlled Water Basin

KZ 09/04/13

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

SEP 05 2013

**COG Operating LLC**
**DRILLING AND OPERATIONS PROGRAM**
**Brinninstool Unit 3H**
**SHL: 330' FSL & 2260' FEL**
**BHL: 330' FNL & 2260' FEL**
**Section 20 T23S R33E**
**Lea 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 | 347' | |
| Rustler | 1329' | |
| Top of Salt | 1433' | |
| Base of Salt | 4922' | |
| Delaware | 5173' | Oil |
| Bone Spring | 8982' | Oil |
| TD TVD | 11,040' | |
| TD MD | 15,500' | |

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 1460' ~~1355'~~ 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" casing.

See 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 ½" | 0' – ~~1355~~ 1460' | Surface | 13 3/8" | New | 54.5# | STC | J-55 | 1.125 | 1.125 | 1.6 |
| 12 ¼" | 0' – 4500' | Intrmd | 9 5/8" | New | 40# | LTC | J-55 | 1.125 | 1.125 | 1.6 |
| 12 ¼" | 4500' – ~~5200~~ 5160' | Intrmd | 9 5/8" | New | 40# | LTC | N-80 | 1.125 | 1.125 | 1.6 |
| 7 7/8" | 0' – 15,500' | 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.

See COA

## 4. Proposed Cement Program

a. 13-3/8" Surface

Lead: 650 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/50% excess on OH volumes

b. 9 5/8" Intermediate:

Lead: 975 sx 35:65:6 C Blend
(12.7 ppg /1.89 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

1st Stage:
Lead: 425 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)
2nd Stage: DVT set @ 7250'- See COA
Lead: 250 sx 50:50:10 Interfill C Blend
(11.9 ppg / 2.51 cuft/sx)
Tail: 250 sx Class C Neat
(14.8 ppg /1.34 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 cement to surface.
- The production string will tie back a minimum of 500' into the 9-5/8" casing.

## 5. Pressure 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. See COA
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 = 5110 psi
Lateral TD= 165°F

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

See COA

| Depth | Type System | Mud Weight | Viscosity (sec) | Waterloss (cc) |
|---|---|---|---|---|
| 0' – 1355' 1400' | Fresh Water | 8.4 | 29 | N.C. |
| 1355' – 5200' 5100' | Brine | 10 | 29 | N.C. |
| 5200' – 15,500' (Lateral) | Cut Brine | 8.8 – 8.9 | 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 tourly 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.

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.

See COA

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.

CONCHO

# Brinninstool Unit 3H

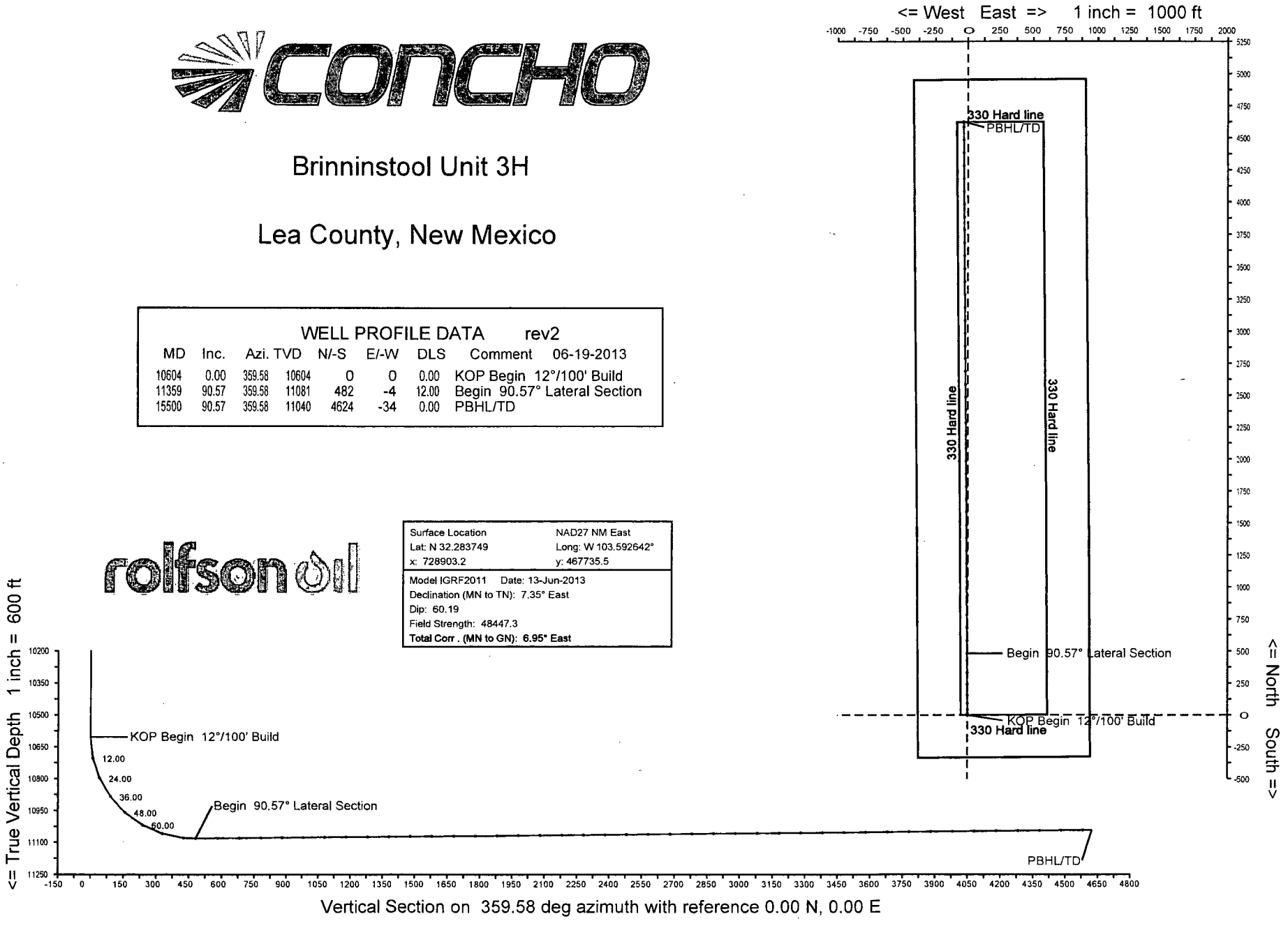
## Lea County, New Mexico

WELL PROFILE DATA rev2

| MD | Inc. | Azi. | TVD | N/-S | E/-W | DLS | Comment 06-19-2013 |
|---|---|---|---|---|---|---|---|
| 10604 | 0.00 | 359.58 | 10604 | 0 | 0 | 0.00 | KOP Begin 12°/100' Build |
| 11359 | 90.57 | 359.58 | 11081 | 482 | -4 | 12.00 | Begin 90.57° Lateral Section |
| 15500 | 90.57 | 359.58 | 11040 | 4624 | -34 | 0.00 | PBHL/TD |

rolfson oil

| | |
|---|---|
| Surface Location | NAD27 NM East |
| Lat: N 32.283749 | Long: W 103.592642° |
| x: 728903.2 | y: 467735.5 |
| Model IGRF2011 Date: 13-Jun-2013 | |
| Declination (MN to TN): 7.35° East | |
| Dip: 60.19 | |
| Field Strength: 48447.3 | |
| **Total Corr . (MN to GN): 6.95° East** | |



# Rolfson Oilfield Services, Inc.

Company: COG Operating, LLC
Well: Brinninstool Unit 3H
Location: Lea County, New Mexico Sect7-24S-33E

Date: 19-Jun-2013
Rev 2
Page 1
Job# : 7311
NAD27 NM East gr elev=3696.2 RKB=3718.2

| MD (feet) | Inclination (degrees) | Azimuth (degrees) | TVD RKB (feet) | N/-S (feet) | E/-W (feet) | DLS (deg/100') | VS @ 359.58° Az (feet) | Grid Y | Grid X | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Surface Location** | | | | | | | | **467735.50** | **728903.20** | |
| 10603.76 | 0.00 | 359.58 | 10603.76 | 0.00 | 0.00 | 0.00 | 0.00 | 467735.50 | 728903.20 | KOP Begin 12°/100' Build |
| 10703.76 | 12.00 | 359.58 | 10703.03 | 10.43 | -0.08 | 12.00 | 10.43 | 467745.93 | 728903.12 | |
| 10803.76 | 24.00 | 359.58 | 10797.96 | 41.28 | -0.30 | 12.00 | 41.28 | 467776.78 | 728902.90 | |
| 10903.76 | 36.00 | 359.58 | 10884.41 | 91.19 | -0.66 | 12.00 | 91.19 | 467826.69 | 728902.54 | |
| 11003.76 | 48.00 | 359.58 | 10958.59 | 157.97 | -1.15 | 12.00 | 157.98 | 467893.47 | 728902.05 | |
| 11103.76 | 60.00 | 359.58 | 11017.26 | 238.73 | -1.74 | 12.00 | 238.73 | 467974.23 | 728901.46 | |
| 11203.76 | 72.00 | 359.58 | 11057.86 | 329.91 | -2.40 | 12.00 | 329.92 | 468065.41 | 728900.80 | |
| 11303.76 | 84.00 | 359.58 | 11078.61 | 427.54 | -3.12 | 12.00 | 427.56 | 468163.04 | 728900.08 | |
| 11358.51 | 90.57 | 359.58 | 11081.20 | 482.20 | -3.51 | 12.00 | 482.21 | 468217.70 | 728899.69 | Begin 90.57° Lateral Section |
| 11458.51 | 90.57 | 359.58 | 11080.21 | 582.19 | -4.24 | 0.00 | 582.21 | 468317.69 | 728898.96 | |
| 11558.51 | 90.57 | 359.58 | 11079.21 | 682.19 | -4.97 | 0.00 | 682.20 | 468417.69 | 728898.23 | |
| 11658.51 | 90.57 | 359.58 | 11078.22 | 782.18 | -5.70 | 0.00 | 782.20 | 468517.68 | 728897.50 | |
| 11758.51 | 90.57 | 359.58 | 11077.22 | 882.17 | -6.43 | 0.00 | 882.20 | 468617.67 | 728896.77 | |
| 11858.51 | 90.57 | 359.58 | 11076.23 | 982.16 | -7.16 | 0.00 | 982.19 | 468717.66 | 728896.04 | |
| 11958.51 | 90.57 | 359.58 | 11075.23 | 1082.16 | -7.89 | 0.00 | 1082.19 | 468817.66 | 728895.31 | |
| 12058.51 | 90.57 | 359.58 | 11074.24 | 1182.15 | -8.62 | 0.00 | 1182.18 | 468917.65 | 728894.58 | |
| 12158.51 | 90.57 | 359.58 | 11073.25 | 1282.14 | -9.34 | 0.00 | 1282.18 | 469017.64 | 728893.86 | |
| 12258.51 | 90.57 | 359.58 | 11072.25 | 1382.13 | -10.07 | 0.00 | 1382.17 | 469117.63 | 728893.13 | |
| 12358.51 | 90.57 | 359.58 | 11071.26 | 1482.13 | -10.80 | 0.00 | 1482.17 | 469217.63 | 728892.40 | |
| 12458.51 | 90.57 | 359.58 | 11070.26 | 1582.12 | -11.53 | 0.00 | 1582.16 | 469317.62 | 728891.67 | |
| 12558.51 | 90.57 | 359.58 | 11069.27 | 1682.11 | -12.26 | 0.00 | 1682.16 | 469417.61 | 728890.94 | |
| 12658.51 | 90.57 | 359.58 | 11068.27 | 1782.10 | -12.99 | 0.00 | 1782.15 | 469517.60 | 728890.21 | |
| 12758.51 | 90.57 | 359.58 | 11067.28 | 1882.10 | -13.72 | 0.00 | 1882.15 | 469617.60 | 728889.48 | |
| 12858.51 | 90.57 | 359.58 | 11066.28 | 1982.09 | -14.45 | 0.00 | 1982.14 | 469717.59 | 728888.75 | |
| 12958.51 | 90.57 | 359.58 | 11065.29 | 2082.08 | -15.18 | 0.00 | 2082.14 | 469817.58 | 728888.02 | |
| 13058.51 | 90.57 | 359.58 | 11064.29 | 2182.07 | -15.90 | 0.00 | 2182.13 | 469917.57 | 728887.30 | |
| 13158.51 | 90.57 | 359.58 | 11063.30 | 2282.07 | -16.63 | 0.00 | 2282.13 | 470017.57 | 728886.57 | |
| 13258.51 | 90.57 | 359.58 | 11062.30 | 2382.06 | -17.36 | 0.00 | 2382.12 | 470117.56 | 728885.84 | |
| 13358.51 | 90.57 | 359.58 | 11061.31 | 2482.05 | -18.09 | 0.00 | 2482.12 | 470217.55 | 728885.11 | |
| 13458.51 | 90.57 | 359.58 | 11060.31 | 2582.04 | -18.82 | 0.00 | 2582.11 | 470317.54 | 728884.38 | |

# Rolfson Oilfield Services, Inc.

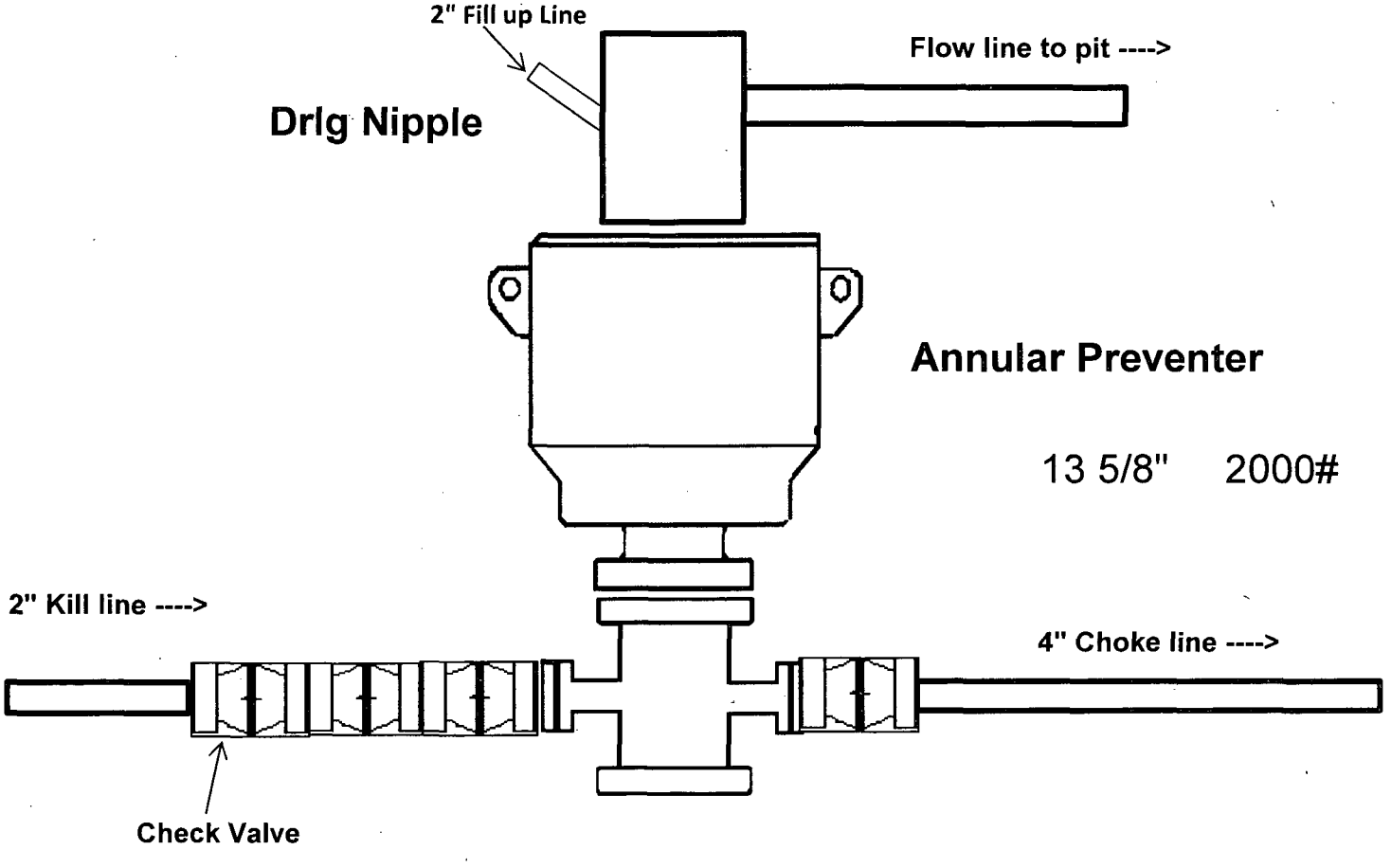
Company: COG Operating, LLC
Well: Brinninstool Unit 3H
Location: Lea County, New Mexico Sect7-24S-33E

Date: 19-Jun-2013
Rev 2

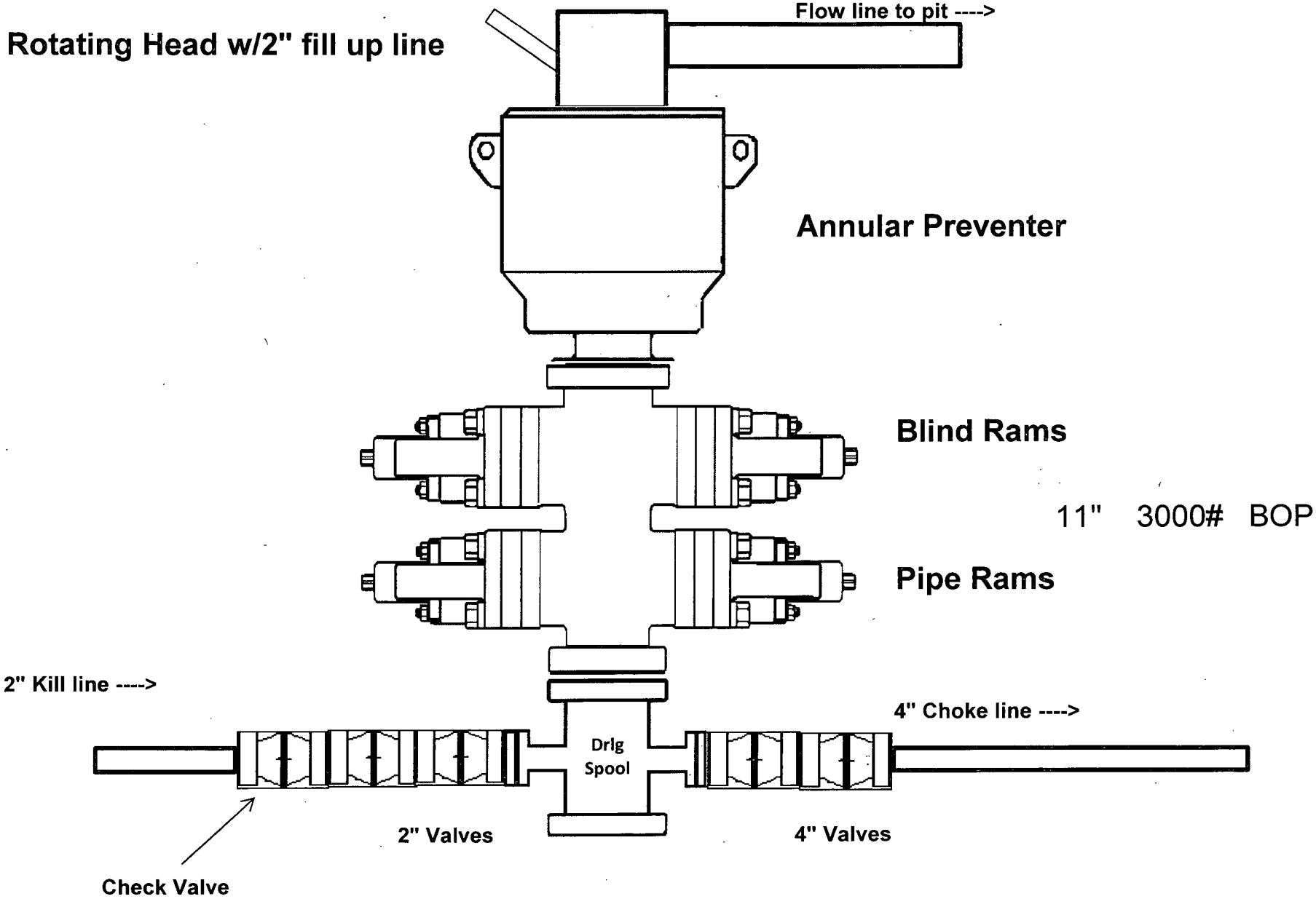
Job# : 7311
NAD27 NM East gr elev=3696.2 RKB=3718.2

| MD (feet) | Inclination (degrees) | Azimuth (degrees) | TVD RKB (feet) | N/-S (feet) | E/-W (feet) | DLS (deg/100') | VS @ 359.58° Az (feet) | Grid Y | Grid X | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 13558.51 | 90.57 | 359.58 | 11059.32 | 2682.04 | -19.55 | 0.00 | 2682.11 | 470417.54 | 728883.65 | |
| 13658.51 | 90.57 | 359.58 | 11058.32 | 2782.03 | -20.28 | 0.00 | 2782.10 | 470517.53 | 728882.92 | |
| 13758.51 | 90.57 | 359.58 | 11057.33 | 2882.02 | -21.01 | 0.00 | 2882.10 | 470617.52 | 728882.19 | |
| 13858.51 | 90.57 | 359.58 | 11056.33 | 2982.01 | -21.73 | 0.00 | 2982.09 | 470717.51 | 728881.47 | |
| 13958.51 | 90.57 | 359.58 | 11055.34 | 3082.00 | -22.46 | 0.00 | 3082.09 | 470817.50 | 728880.74 | |
| 14058.51 | 90.57 | 359.58 | 11054.34 | 3182.00 | -23.19 | 0.00 | 3182.08 | 470917.50 | 728880.01 | |
| 14158.51 | 90.57 | 359.58 | 11053.35 | 3281.99 | -23.92 | 0.00 | 3282.08 | 471017.49 | 728879.28 | |
| 14258.51 | 90.57 | 359.58 | 11052.35 | 3381.98 | -24.65 | 0.00 | 3382.07 | 471117.48 | 728878.55 | |
| 14358.51 | 90.57 | 359.58 | 11051.36 | 3481.97 | -25.38 | 0.00 | 3482.07 | 471217.47 | 728877.82 | |
| 14458.51 | 90.57 | 359.58 | 11050.36 | 3581.97 | -26.11 | 0.00 | 3582.06 | 471317.47 | 728877.09 | |
| 14558.51 | 90.57 | 359.58 | 11049.37 | 3681.96 | -26.84 | 0.00 | 3682.06 | 471417.46 | 728876.36 | |
| 14658.51 | 90.57 | 359.58 | 11048.37 | 3781.95 | -27.56 | 0.00 | 3782.05 | 471517.45 | 728875.64 | |
| 14758.51 | 90.57 | 359.58 | 11047.38 | 3881.94 | -28.29 | 0.00 | 3882.05 | 471617.44 | 728874.91 | |
| 14858.51 | 90.57 | 359.58 | 11046.38 | 3981.94 | -29.02 | 0.00 | 3982.04 | 471717.44 | 728874.18 | |
| 14958.51 | 90.57 | 359.58 | 11045.39 | 4081.93 | -29.75 | 0.00 | 4082.04 | 471817.43 | 728873.45 | |
| 15058.51 | 90.57 | 359.58 | 11044.40 | 4181.92 | -30.48 | 0.00 | 4182.03 | 471917.42 | 728872.72 | |
| 15158.51 | 90.57 | 359.58 | 11043.40 | 4281.91 | -31.21 | 0.00 | 4282.03 | 472017.41 | 728871.99 | |
| 15258.51 | 90.57 | 359.58 | 11042.41 | 4381.91 | -31.94 | 0.00 | 4382.02 | 472117.41 | 728871.26 | |
| 15358.51 | 90.57 | 359.58 | 11041.41 | 4481.90 | -32.67 | 0.00 | 4482.02 | 472217.40 | 728870.53 | |
| 15458.51 | 90.57 | 359.58 | 11040.42 | 4581.89 | -33.40 | 0.00 | 4582.01 | 472317.39 | 728869.80 | |
| 15500.33 | 90.57 | 359.58 | 11040.00 | 4623.70 | -33.70 | 0.00 | 4623.82 | 472359.20 | 728869.50 | PBHL/TD |

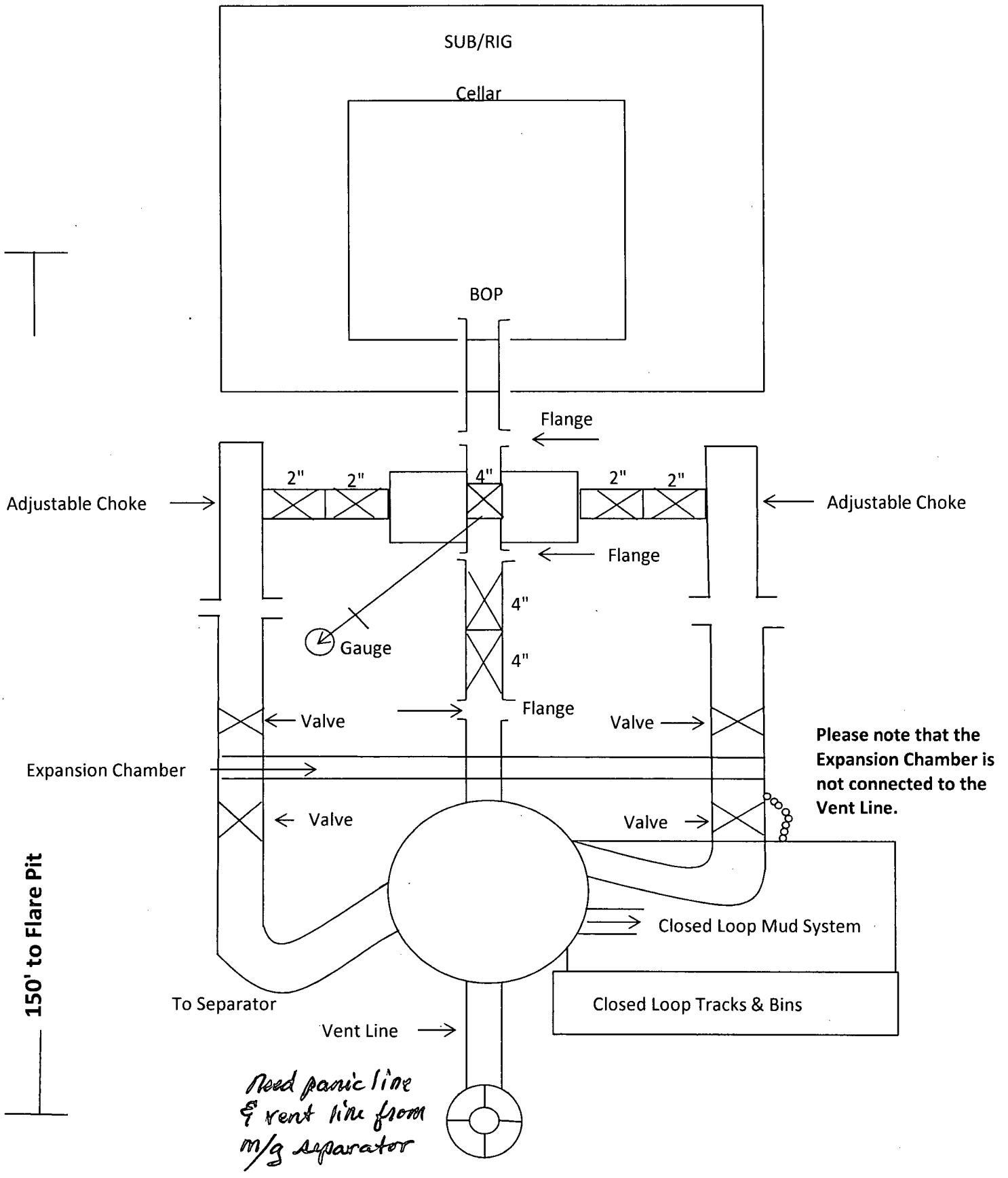
# 2,000 psi BOP Schematic



# 3,000 psi BOP Schematic



# 2M Choke Manifold Equipment



# 3M Choke Manifold Equipment