30-005-39137



ONSHORE OIL & GAS ORDER NO. 1
Approval of Operations on Onshore
Federal and Indian Oil and Gas Leases

All lease and/or unit operations are to be conducted in such a manner that full compliance is made with the applicable laws, regulations (CFR 43, Part 3160) and the approved Application for Permit to Drill. The operator is considered fully responsible for the actions of his subcontractors. A copy of the approved APD must be on location during construction, drilling and completion operations.

Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease, which would entitle the applicant to conduct operations thereon.

## 1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

| FORMATION | SS PILOT | MD PILOT | SS Landing | TVD Landing | SS BHL | TVD BHL |
|---|---|---|---|---|---|---|
| Rustler | 3040 | 1382' | | | | |
| Yates | 2008 | 2414' | | | | |
| Grayburg | 789 | 3633' | | | | |
| San Andres | 460 | 3962' | | | | |
| Glorieta | -1060 | 5482' | | | | |
| Tubb | -2336 | 6758' | | | | |
| Abo Shale | -3094 | 7516' | | | | |
| KO Point | -3888 | 8310' | | | | |
| *Wolfcamp Pay | -4350 | 8772' | | | | |
| *TARGET* | -4365 | 8787' | -4361 | 8783' | -4322 | 8744' |
| TD | | | | | | |

*Potential Pay zones

## 2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas or other mineral bearing formations are expected to be encountered are as follows:

| Substance | Formation | Depth |
|---|---|---|
| Oil/Gas | Wolfcamp | 8772' |

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT:

Will have a 5000 psi rig stack (see proposed schematic) for drill out below surface casing; the pipe rams will be tested to 5000 psi working pressure and annular preventer tested to 3,500 psi working pressure.

Chesapeake Operating, Inc.'s minimum specifications for pressure control equipment are as follows:

I. BOP, Annular, Choke Manifold, Pressure Test - See Exhibit F-1 and F-3

A. Equipment
1. The equipment to be tested includes all of the following that is installed on the well:
(a) Ram-type and annular preventers,
(b) Choke manifolds and valves,
(c) Kill lines and valves, and
(d) Upper and lower kelly cock valves, inside BOP's and safety valves.

B. Test Frequency
1. All tests should be performed with clear **water**,
(a) when installed,
(b) before drilling out each casing string,
(c) at any time that there is a repair requiring a pressure seal to be broken in the assembly, and
(d) at least once every **30 days** while drilling.

C. Test Pressure
1. In some drilling operations, the pressures to be used for low and high-pressure testing of preventers and casing may be different from those given below due to governmental regulations, or approved local practices.
2. If an individual component does not test at the low pressure, **do not,** test to the high pressure and then drop back down to the low pressure.
3. All valves located downstream of a valve being tested must be placed in the open position.
4. All equipment will be tested with an initial "low pressure" test at 250 psi.
5. The subsequent "high pressure" test will be conducted at the rated working pressure of the equipment for all equipment except the annular preventer.
6. The "high pressure" test for the annular preventer will be conducted at 70% of the rated working pressure.
7. A record of all pressures will be made on a pressure-recording chart.

D. Test Duration
1. In each case, the individual components should be monitored for leaks for **5 minutes,** with no observable pressure decline, once the test pressure as been applied.

II. Accumulator Performance Test

A. Scope

1. The purpose of this test is to check the capabilities of the BOP control systems, and to detect deficiencies in the hydraulic oil volume and recharge time.

B. Test Frequency
1. The accumulator is to be tested each time the BOP's are tested, or any time a major repair is performed.

C. Minimum Requirements
1. The accumulator should be of sufficient volume to supply 1.5 times the volume to close and hold all BOP equipment in sequence, **without recharging** and the **pump turned off**, and have remaining pressures of **200 PSI above the precharge pressure**.

2. Minimum precharge pressures for the various accumulator systems per **manufacturers recommended specifications** are as follows:
3.

| System Operating Pressures | Precharge Pressure |
|---|---|
| 1500 PSI | 750 PSI |
| 2000 PSI | 1,000 PSI |
| 3000 PSI | 1,000 PSI |

3. Closing times for the Hydril should be less than **20 seconds**, and for the ram-type preventers less than **10 seconds**.

4. System Recharge time should not exceed **10 minutes**.

D. Test Procedure
1. Shut accumulator pumps off and record accumulator pressure.

2. In sequence, close the annular and one set of properly sized pipe rams, and open the HCR valve.

3. Record time to close or open each element and the remaining accumulator pressure after each operation.

4. Record the remaining accumulator pressure at the end of the test sequence. Per the previous requirement, this pressure **should not be less** than the following pressures:

| System Pressure | Remaining Pressure At Conclusion of Test |
|---|---|
| 1,500 PSI | 950 PSI |
| 2,000 PSI | 1,200 PSI |
| 3,000 PSI | 1,200 PSI |

5. Turn the accumulator pumps on and record the recharge time. This time should not exceed **10 minutes.**

6. Open annular and ram-type preventers. Close HCR valve.

7. Place all 4-way control valves in **full open** or **full closed** position. **Do not leave in neutral position**.

4. CASING PROGRAM

a. The proposed casing program will be as follows:

| Purpose | Interval | Hole Size | Casing Size | Weight | Grade | Thread | Condition |
|---|---|---|---|---|---|---|---|
| Surface | Surface – 400' | 13-1/2" | 11-3/4" | 32.0# | H-40 | STC | New |
| Intermediate | Surface – 3,950' | 11" | 8-5/8" | 32.0# | J-55 | LTC | New |
| Production | Surface – 13,466' | 7-7/8" | 5-1/2" | 20.0# | L-80 | LTC | New |

b. Casing design subject to revision based on geologic conditions encountered.

c. Casing Safety Factors:
11-3/4" Surface Casing: SFb = 3.34, SFc = 5.52 and SFt = 3.75
8-5/8" Intermediate Casing: SFb = 1.88, SFc = 1.36 and SFt = 2.37
5-1/2" Production Casing: SFb = 1.29, SFc = 2.39 and SFt = 1.42

d. The cementing program will be as follows:

5. Cementing Program

| Interval | Slurry Weight | Top of cement | Number of sacks | Yield | Excess |
|---|---|---|---|---|---|
| Surface | 13.5 ppg | Surface | 290 sks | 1.73 | 100% |
| Intermediate | Lead: 10.2 ppg (Litecrete) | Surface | 710 sks | 2.32 | 100% |
| | Tail: 14.2 ppg | | 490 sks | 1.37 | 100% |
| Production 1st Stage | Lead: 12.0 ppg | 500' inside previous casing shoe (3,450') | 360 sks | 1.83 | 40% |
| | Tail: 13.2 ppg | | 790 sks | 1.74 | 40% |
| Production 2nd Stage | Lead: 12.0 ppg | | 360 sks | 1.83 | 40% |
| | Tail: 13.2 ppg | | 790 sks | 1.74 | 40% |

6. MUD PROGRAM

a. The proposed circulating mediums to be used in drilling are as follows:

| Interval | Mud Type | Mud Weight | Viscosity | Fluid Loss |
|---|---|---|---|---|
| 0' – 400' | FW/Gel | 8.5 – 8.9 | 30-36 | NC |
| 400' – 3,950' | Native/Brine | 8.8 – 9.9 | 28-30 | NC |
| 3,950' - TD | FW/LSND | 9.0 – 9.5 | 34-45 | 20-10 |

A closed system will be utilized consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toliet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

7. TESTING, LOGGING AND CORING

The anticipated type and amount of testing, logging and coring are as follows:

a. Drill stem tests are not planned.
b. The logging program will consist of Natural GR, Density-Neutron, PE & Dual Laterolog from TD to surface casing; Neutron-GR surface casing to surface.
c. Cores samples are not planned.

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE
   a. The maximum estimated bottom hole pressure is 3,929 psi. No abnormal pressures or temperatures are anticipated.
   b. Hydrogen sulfide gas is anticipated. Low levels of H2S have been monitored in producing wells in the area, so H2S may be present while drilling the well. (See Exhibit H)

**ONSHORE ORDER NO. 1**
**Chesapeake Operating, Inc.**
**Perseus 10 Federal Com 3H**
**SL: 1980' FNL & 200' FEL**
**BL: 1980' FNL & 330' FWL**
**Section 10-15S-31E**
**Chaves County, NM**

**CONFIDENTIAL – TIGHT HOLE**

**Lease Contract No. NMNM105885**

## CERTIFICATION

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

Executed this 10th day of February, 2010

Name: _____
Bud Cravey, Sr. Field Representative

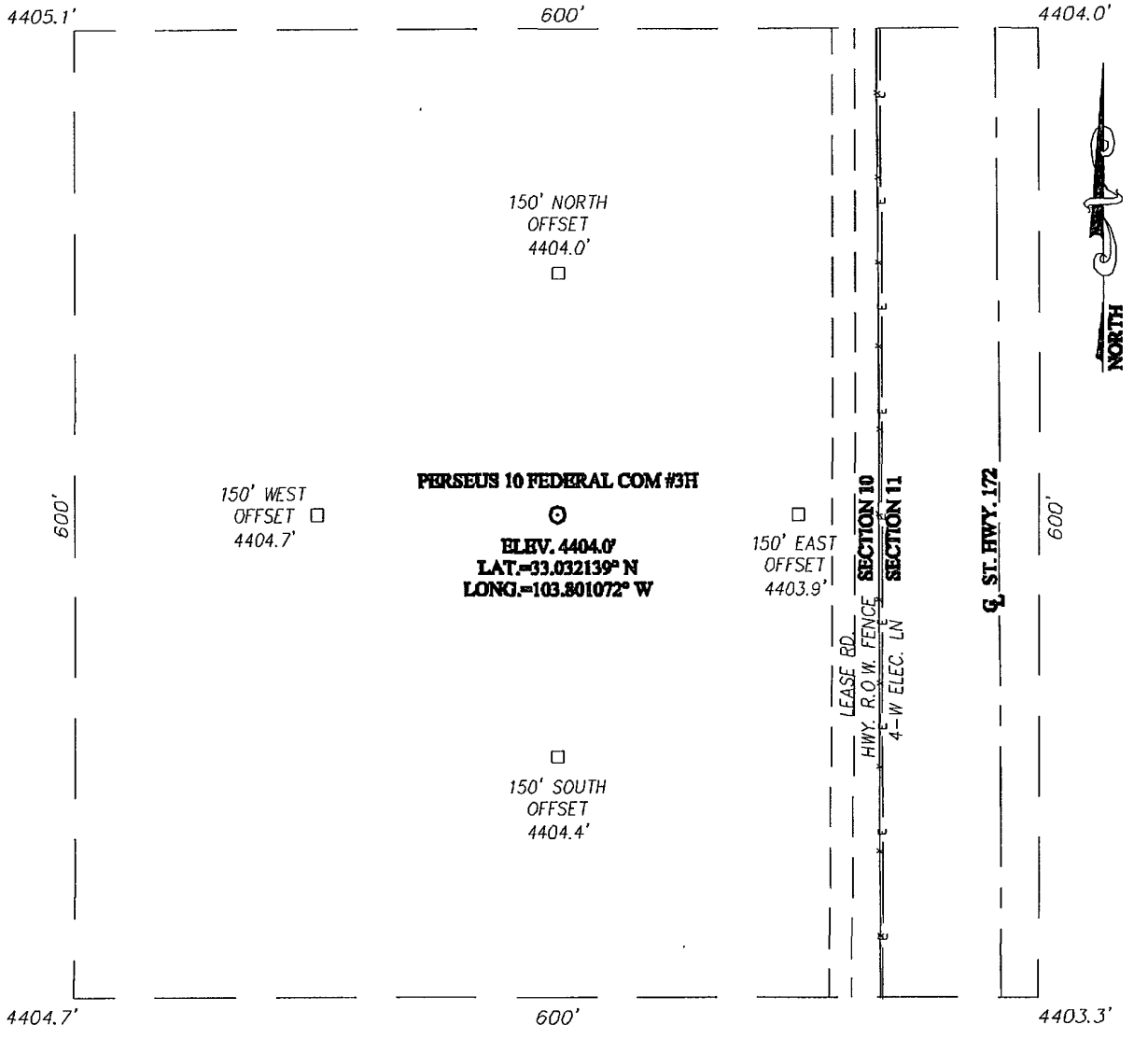
Address: 2010 Rankin Highway, Midland, TX 79701

Telephone: 432-238-7293

E-mail: bud.cravey@chk.com

# SECTION 10, TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M.

CHAVES COUNTY NEW MEXICO




DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. HWY. #249 AND ST. HWY. #172, GO NORTH ON ST. HWY 172 APPROX. 2.2 MILES. TURN LEFT AND GO WEST APPROX. 100 FEET. TURN LEFT AND GO SOUTH APPROX. 0.9 MILES. THIS LOCATION STAKE IS APPROX. 175 FEET WEST OF LEASE RD.

100 0 100 200 Feet

Scale: 1"=100'


PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(575) 393-3117

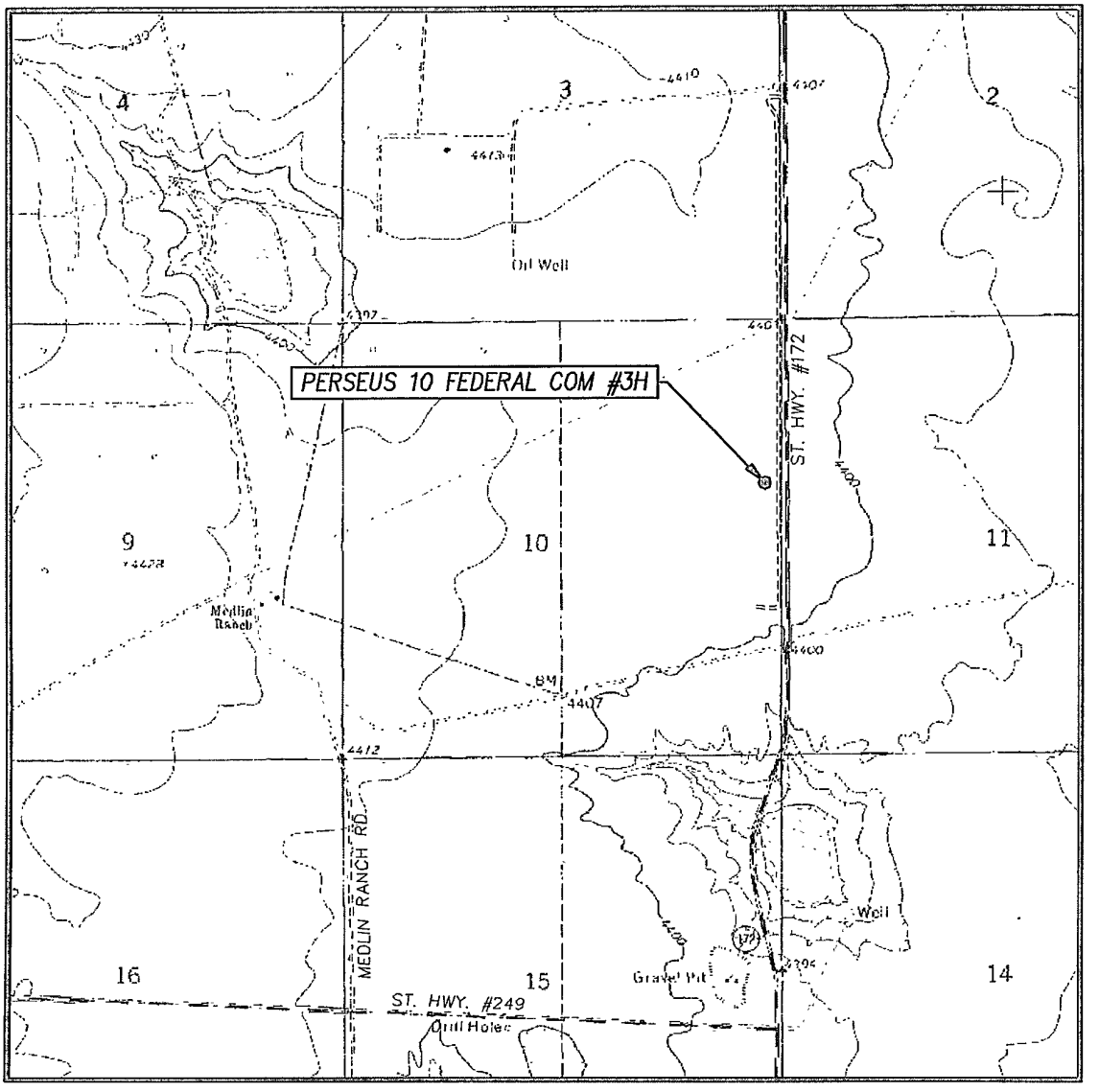

## CHESAPEAKE OPERATING, INC.

PERSEUS 10 FFEDERAL COM #3H WELL
LOCATED 1980 FEET FROM THE NORTH LINE
AND 200 FEET FROM THE EAST LINE OF SECTION 10,
TOWNSHIP 15 SOUTH, RANGE 31 EAST, N.M.P.M.,
CHAVES COUNTY, NEW MEXICO

| | | | |
|---|---|---|---|
| Survey Date: 01/29/10 | Sheet 1 of 1 Sheets | | |
| W.O. Number: 10.11.0139 | Dr. By: DSS | Rev 1:. | |
| Date: 02/02/10 | Rel. W.O.:. | 101101393 | Scale: 1"=100' |

EXHIBIT A-2

# LOCATION VERIFICATION MAP




SCALE: 1" = 2000'

CONTOUR INTERVAL:
CEDAR POINT SE, N.M. – 10'

SEC. 10 TWP. 15-S RGE. 31-E

SURVEY N.M.P.M.

COUNTY CHAVES STATE NEW MEXICO

DESCRIPTION 1980' FNL & 200' FEL

ELEVATION 4404'

OPERATOR CHESAPEAKE OPERATING, INC.

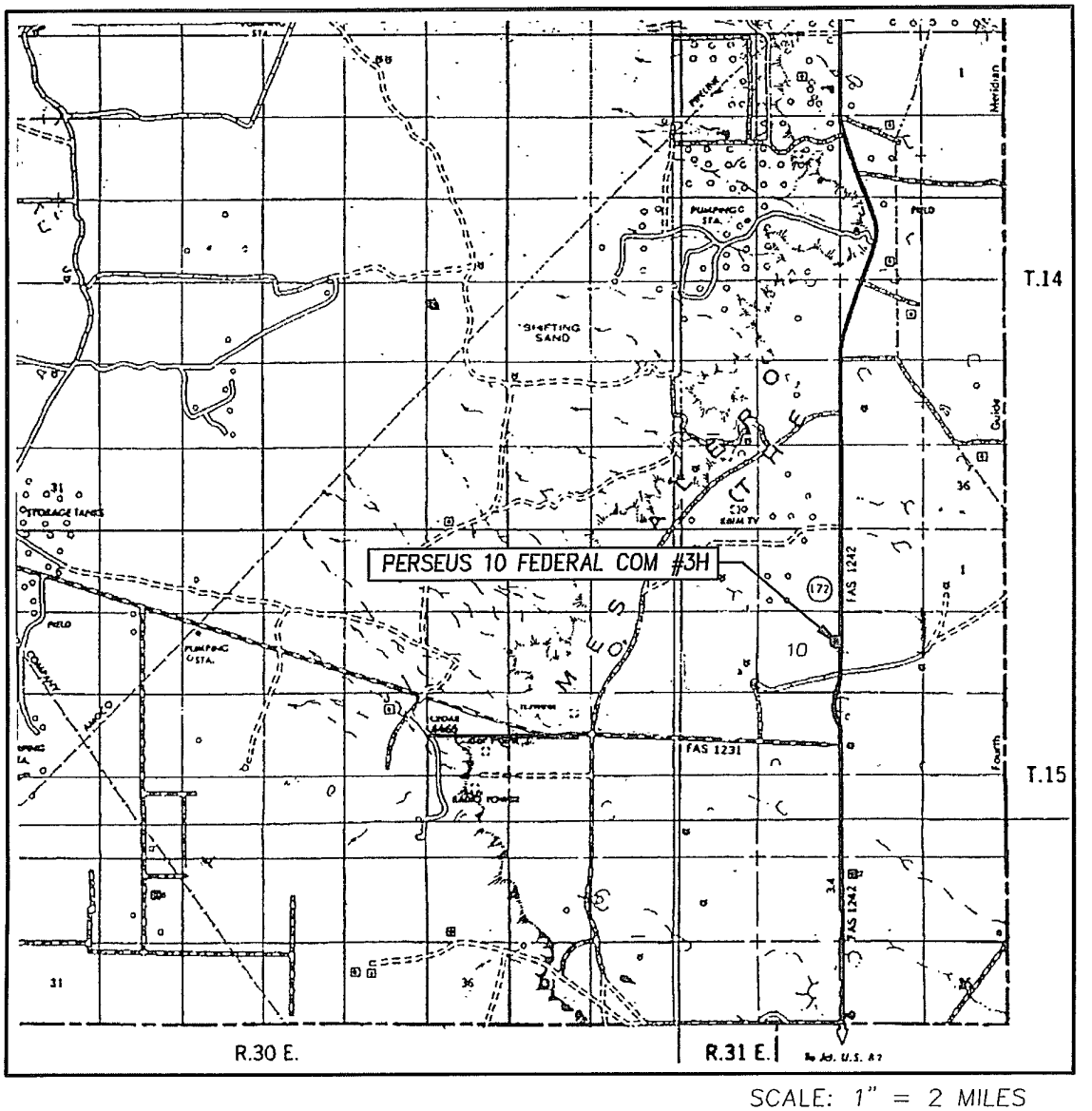
LEASE PERSEUS 10 FEDERAL COM

U.S.G.S. TOPOGRAPHIC MAP
CEDAR POINT SE, N.M.

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(575) 393-3117

EXHIBIT A-3

# VICINITY MAP




SCALE: 1" = 2 MILES

SEC. 10 TWP. 15-S RGE. 31-E

SURVEY N.M.P.M.

COUNTY CHAVES STATE NEW MEXICO

DESCRIPTION 1980' FNL & 200' FEL

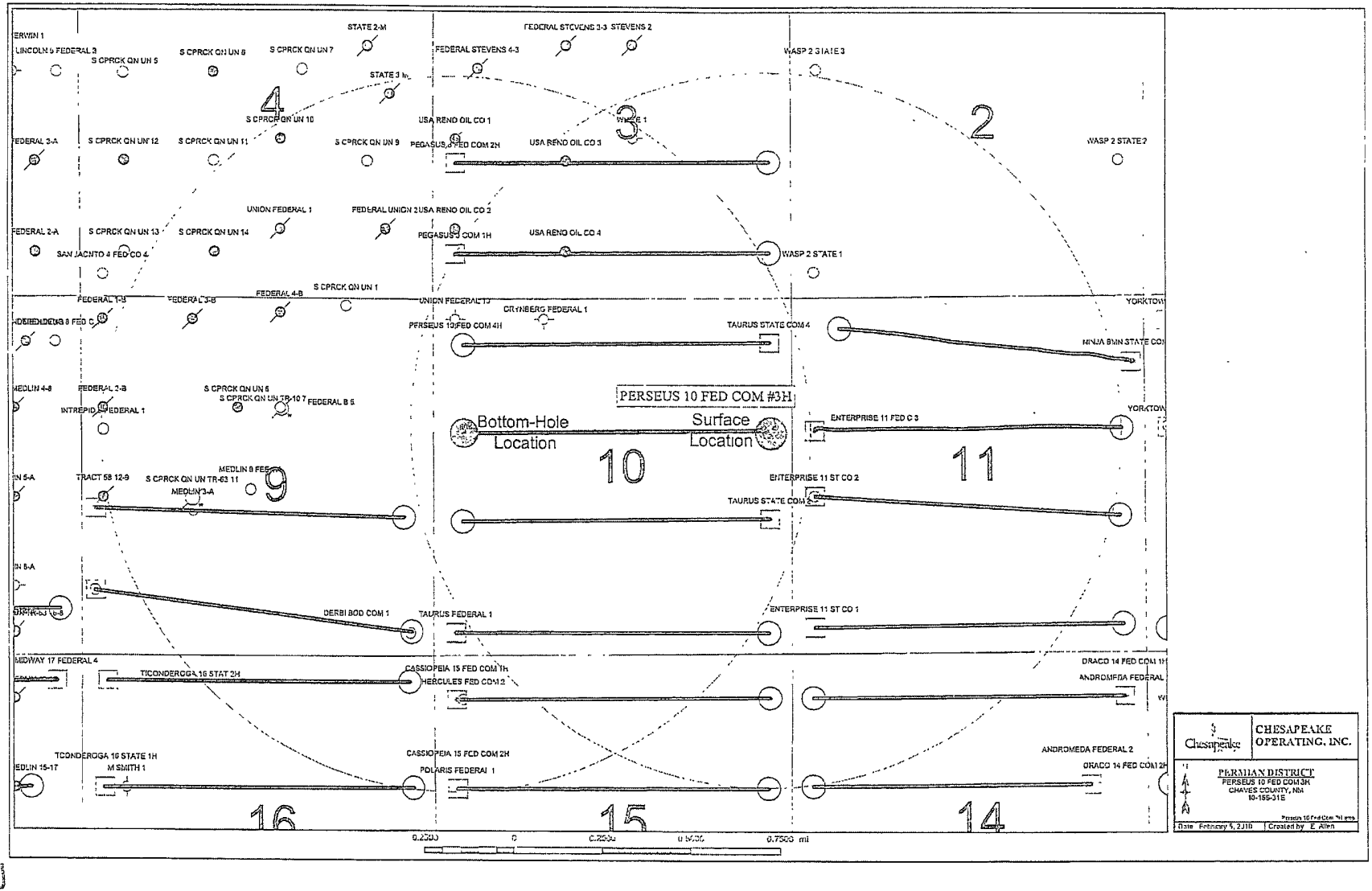
ELEVATION 4404'

OPERATOR CHESPEAKE OPERATING, INC.

LEASE PERSEUS 10 FEDERAL COM


PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M 88240
(575) 393-3117


EXHIBIT A-4




CHESAPEAKE OPERATING, INC.

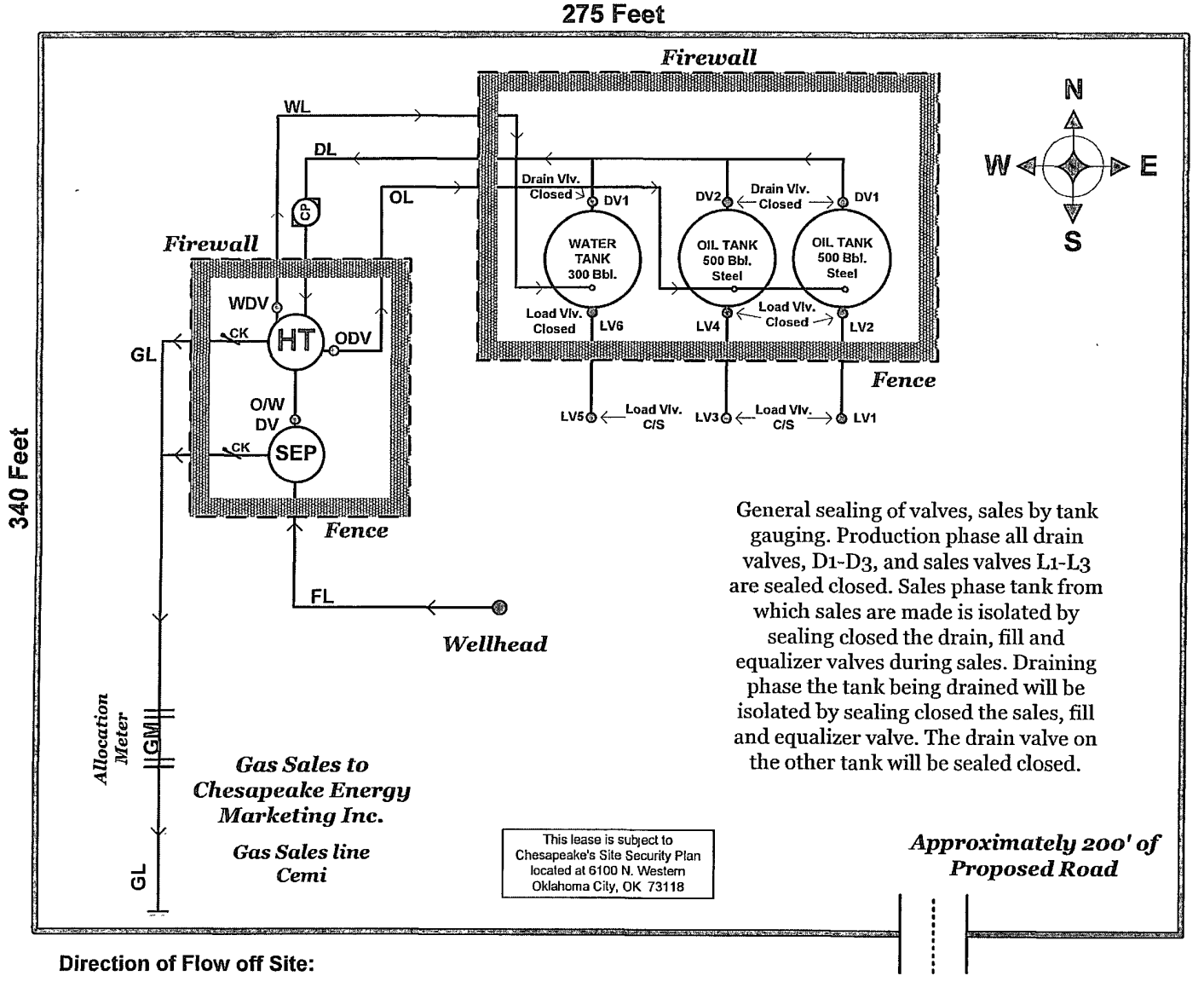
PERMIAN DISTRICT
PERSEUS 10 FED COM 3H
CHAVES COUNTY, NM
10-18S-31E

Date: February 5, 2018 | Created by: E. Allen

# CHESAPEAKE OPERATING, INC.

# PERSEUS 10 FEDERAL COM #3H

## 1980' FNL & 330' FWL - S10-T15S-R31E
## CHAVES COUNTY, NM




**Prepared by:** Jackie Reynolds
**Date:** 2/8/2010

**Approved by:**
**Date:**

EXHIBIT C

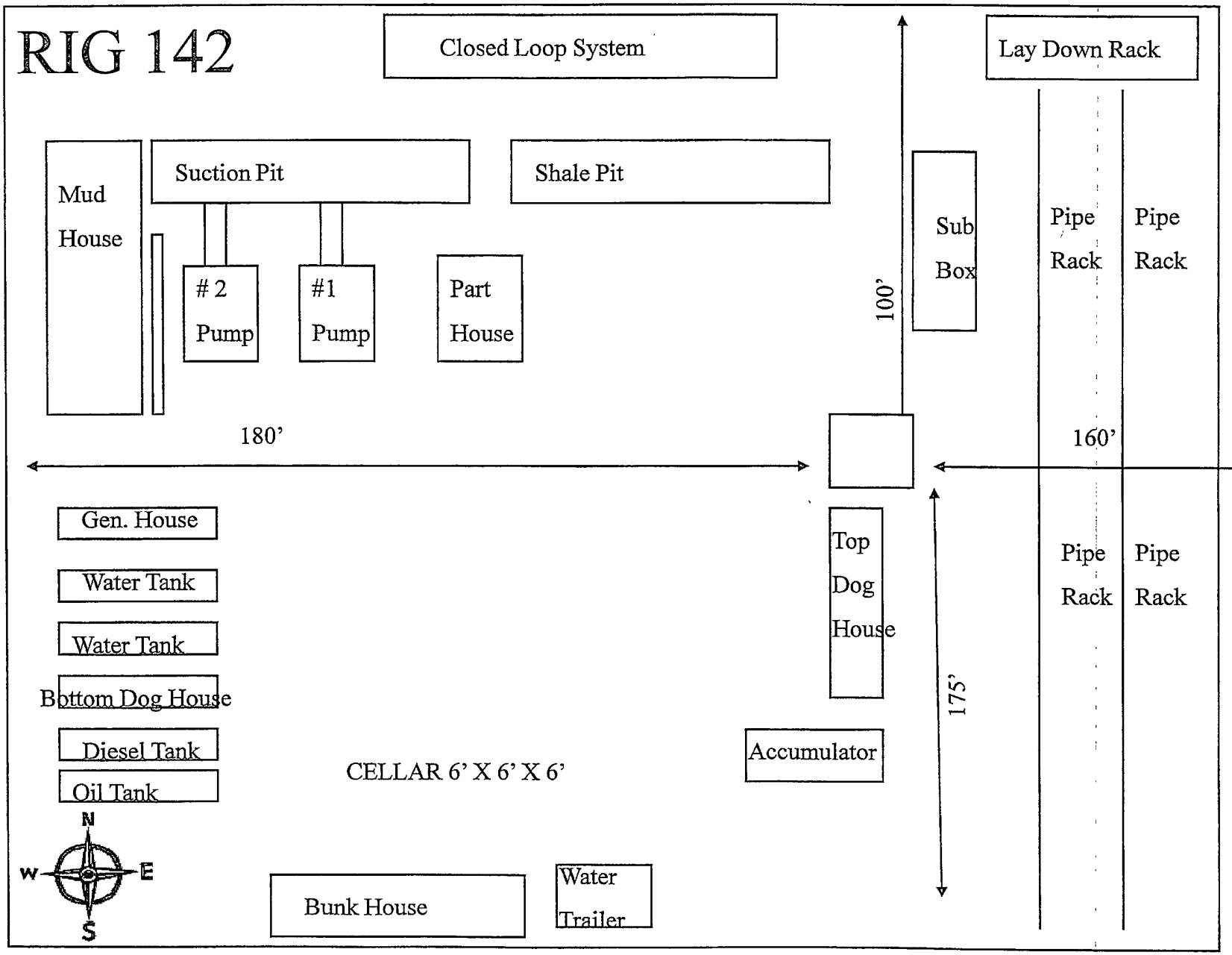

RIG 142
Closed Loop System
Lay Down Rack
Mud House
Suction Pit
Shale Pit
# 2 Pump
#1 Pump
Part House
Sub Box
Pipe Rack
Pipe Rack
100'
180'
160'
Gen. House
Water Tank
Water Tank
Bottom Dog House
Diesel Tank
Oil Tank
Top Dog House
Pipe Rack
Pipe Rack
175'
Accumulator
CELLAR 6' X 6' X 6'
N
W
E
S
Bunk House
Water Trailer

EXHIBIT D

# BLOWOUT PREVENTOR SCHEMATIC

## CHESAPEAKE OPERATING INC

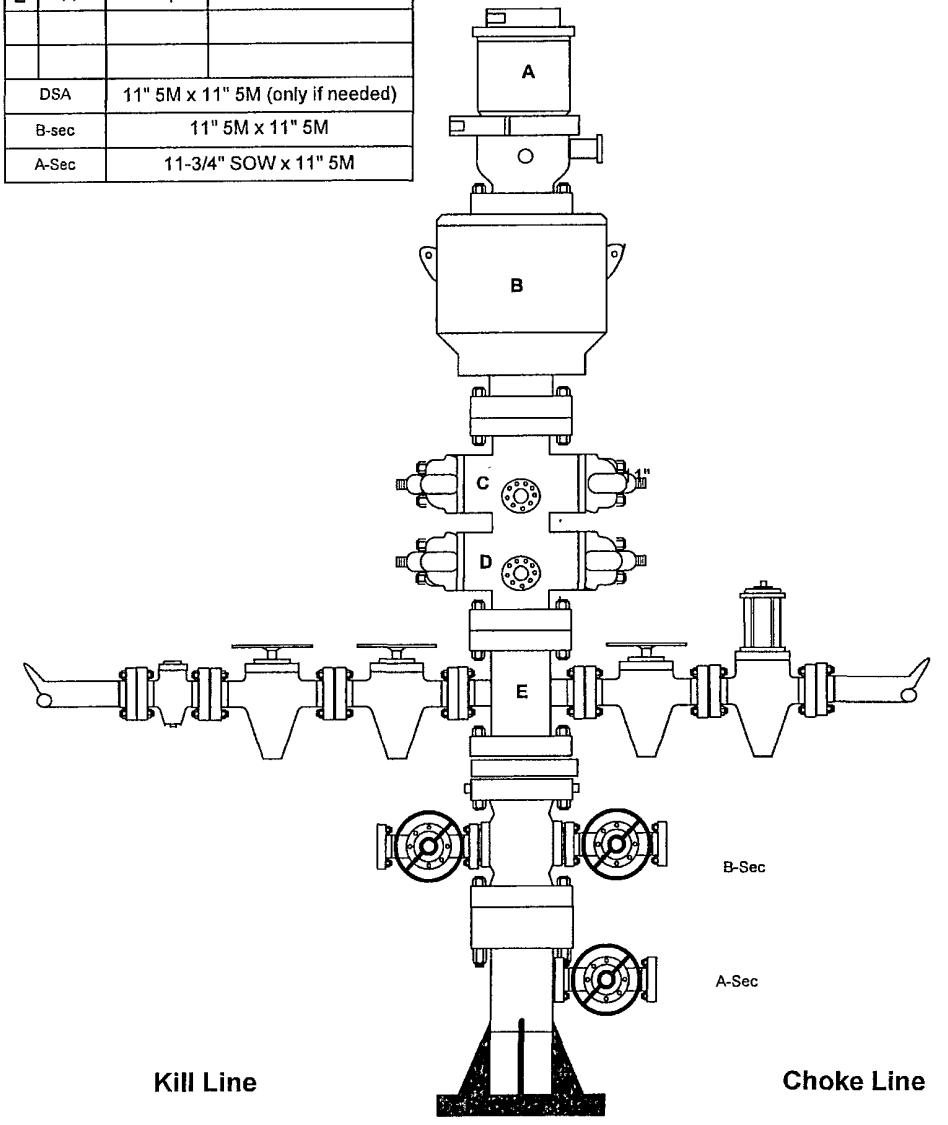
**WELL** : **PERSEUS 10 FEDERAL COM 3H**

**RIG** : **TBA**

**COUNTY** : **CHAVES** **STATE: New Mexico**

**OPERATION: DRILL OUT BELOW 11-¾" SURFACE CASING** (11" hole size)

| | SIZE | PRESSURE | DESCRIPTION |
|---|---|---|---|
| A | 11" | 500 psi | Rot Head |
| B | 11" | 5000 psi | Annular |
| C | 11" | 5000 psi | Pipe Rams |
| D | 11" | 5000 psi | Blind Rams |
| E | 11" | 5000 psi | Mud Cross |
| | | | |
| | | | |
| DSA | | 11" 5M x 11" 5M (only if needed) | |
| B-sec | | 11" 5M x 11" 5M | |
| A-Sec | | 11-3/4" SOW x 11" 5M | |




**Kill Line**

| SIZE | PRESSURE | DESCRIPTION |
|---|---|---|
| 2" | 5000 psi | Check Valve |
| 2" | 5000 psi | Gate Valve |
| 2" | 5000 psi | Gate Valve |
| | | |
| | | |

**Choke Line**

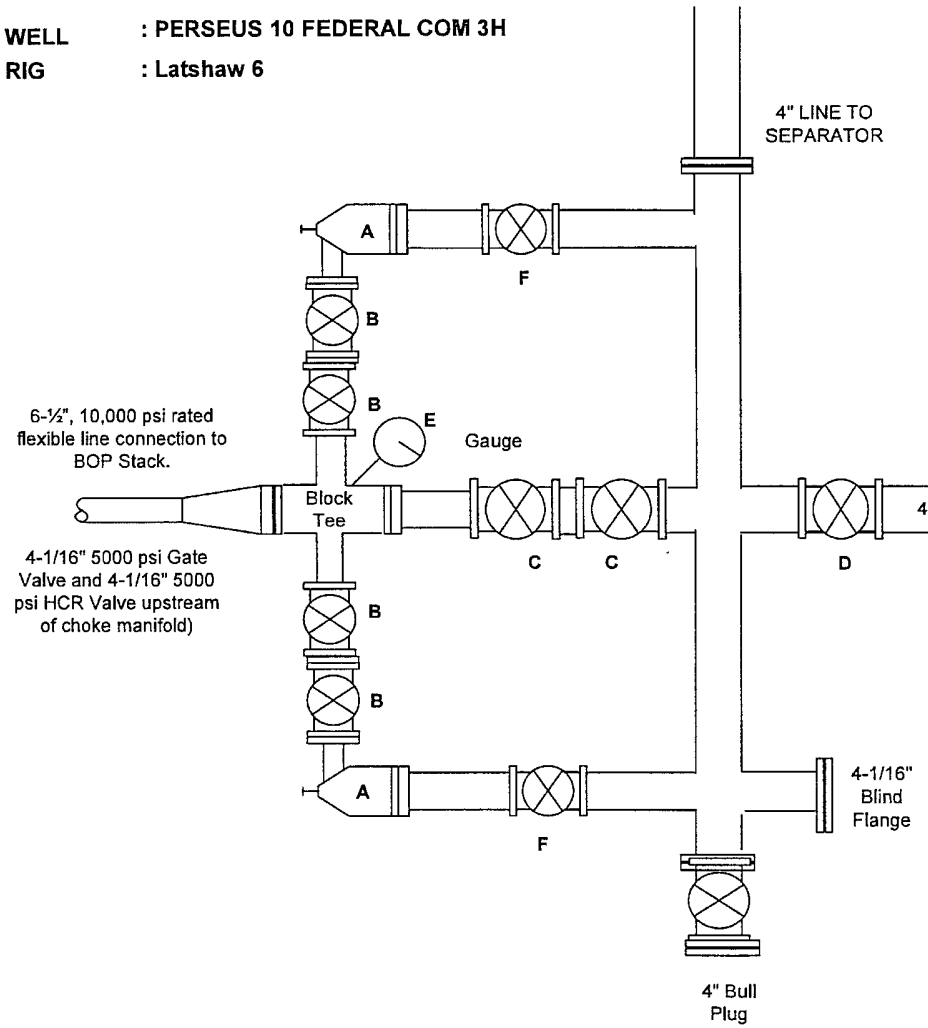
| SIZE | PRESSURE | DESCRIPTION |
|---|---|---|
| 4" | 5000 psi | Gate Valve |
| 4" | 5000 psi | HCR Valve |
| | | |
| | | |
| | | |

EXHIBIT F-1

# SCHEMATIC OF CHOKE MANIFOLD SHOWING CLOSED LOOP SYSTEM

**WELL** : **PERSEUS 10 FEDERAL COM 3H**
**RIG** : **Latshaw 6**

**COUNTY** : **Chaves** **STATE** : **New Mexico**
**OPERATION: Drilling below 13-3/8" surface casing**




| | SIZE | PRESSURE | DESCRIPTION |
|---|---|---|---|
| A | 2-1/16" | 10,000 psi | Remotely Operated Choke With Manual Backup |
| B | 3-1/16" | 10,000 psi | Gate Valve |
| C | 4-1/16" | 10,000 psi | Gate Valve |
| D | 4-1/16" | 5000 psi | Gate Valve |
| F | 3-1/16" | 5,000 psi | Gate Valve |
| E | 2-1/16" | 10000 psi | Valve on top og Block Tee with manual gauge and gauge to hydraulic choke |