

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

| | | |
|--|--|--|
| 1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other | | 5. Lease Serial No. NMLC064894 |
| 2. Name of Operator CHESAPEAKE AGENT FOR BOPCO E-Mail: linda.good@chk.com | | 6. If Indian, Allottee or Tribe Name |
| 3a. Address P.O. BOX 18496 OKLAHOMA CITY, OK 73154-0496 | | 7. If Unit or CA/Agreement, Name and/or No. |
| 3b. Phone No. (include area code) Ph: 405-935-4275 | | 8. Well Name and No. PLU ROSS RANCH 20 FEDERAL 1H |
| 4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 20 T25S R30E NWNW 100FNL 400FWL | | 9. API Well No. 30-015-38357 |
| | | 10. Field and Pool, or Exploratory UNDESIGNATED Bone Springs |
| | | 11. County or Parish, and State EDDY COUNTY, NM |

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| TYPE OF SUBMISSION | TYPE OF ACTION | | | |
|--|---|---|--|---|
| <input checked="" type="checkbox"/> Notice of Intent | <input type="checkbox"/> Acidize | <input type="checkbox"/> Deepen | <input type="checkbox"/> Production (Start/Resume) | <input type="checkbox"/> Water Shut-Off |
| <input type="checkbox"/> Subsequent Report | <input type="checkbox"/> Alter Casing | <input type="checkbox"/> Fracture Treat | <input type="checkbox"/> Reclamation | <input type="checkbox"/> Well Integrity |
| <input type="checkbox"/> Final Abandonment Notice | <input type="checkbox"/> Casing Repair | <input type="checkbox"/> New Construction | <input type="checkbox"/> Recomplete | <input checked="" type="checkbox"/> Other |
| | <input type="checkbox"/> Change Plans | <input type="checkbox"/> Plug and Abandon | <input type="checkbox"/> Temporarily Abandon | Change to Original |
| | <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Plug Back | <input type="checkbox"/> Water Disposal | PD |

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

CHESAPEAKE, RESPECTFULLY, REQUESTS PERMISSION TO MAKE THE FOLLOWING CHANGES:

RIG CHANGE TO PATTERSON 62
CHANGE IN DIRECTIONAL DRLG PLAN
CHANGE IN FORMATION TOPS
CHANGE IN CASING SETTING DEPTHS

ATTACHED IS THE RIG PLAT, BOP/CHOKE SCHEMATICS FOR PATTERSON 62, REVISED DRILLING PROGRAM (CHANGES HIGHLIGHTED), REVISED DIRECTIONAL DRLG PLAN AND REVISED WELLBORE SCHEMATIC.

WE PLAN TO SPUD THIS WELL AROUND JANUARY 17, 2011.

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

| | |
|---|--------------------------------------|
| 14. I hereby certify that the foregoing is true and correct. Electronic Submission #100181 verified by the BLM Well Information System For CHESAPEAKE AGENT FOR BOPCO, sent to the Carlsbad | |
| Name (Printed/Typed) LINDA GOOD | Title SR. REGULATORY COMPLIANCE SPEC |
| Signature (Electronic Submission) | Date 01/07/2011 |
| THIS SPACE FOR FEDERAL OR STATE OFFICE USE | |
| Approved By | Title |
| Conditions of approval, if any, are attached. Approval of this notice 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. | |
| Office | |

APPROVED

JAN 13 2011

C. P. U. Fernandez
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

ONSHORE ORDER NO. 1
Chesapeake Operating, Inc. Agent for BOPCO
PLU Ross Ranch 20 Federal 1H
SL: 100' FNL & 400' FWL
BL: 330' FSL & 400' FWL
Section 20-25S-30E
Eddy County, New Mexico

CONFIDENTIAL – TIGHT HOLE
Lease Contract No. NMLC 064894

REVISED DRILLING PROGRAM 1/7/2011

Page 1

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 | SUB-SEA | KBTVD | MD |
|------------------|---------|-------|---------|
| Rustler | 2757' | 460' | |
| Top of Salt | 1979' | 1238' | |
| Lamar | -393' | 3610' | |
| Bell Canyon | -445' | 3662' | |
| Brushy Canyon | -2526' | 5743' | |
| Bone Spring Lime | -4192' | 7409' | |
| Upper Avalon | -4366' | 7583' | |
| Lower Avalon | -4753' | 7970' | |
| Lateral TD | | 8136' | 12,853' |

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 | Bell Canyon | 3675' |
| Oil/Gas | Brushy canyon | 5743' |
| Oil/Gas | Bone Spring | 7409' |

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

ONSHORE ORDER NO. 1
Chesapeake Operating, Inc. Agent for BOPCO
PLU Ross Ranch 20 Federal 1H
SL: 100' FNL & 400' FWL
BL: 330' FSL & 400' FWL
Section 20-25S-30E
Eddy County, New Mexico
3. BOP EQUIPMENT:

CONFIDENTIAL – TIGHT HOLE
Lease Contract No. NMLC 064894

REVISED DRILLING PROGRAM 1/7/2011

Page 2

Will have a 5000 psi rig stack (see proposed schematic) for drill out below surface casing, but this system will be tested to 3000 psi working pressure and 3000 psi working pressure for the annular preventer; therefore, no shoe tests will be conducted.

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-2.

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~~ ^{shall} 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.

REVISED DRILLING PROGRAM 1/7/2011

Page 3

1. In each case, the individual components should be monitored for leaks for **10 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.

| <u>System Operating Pressures</u> | <u>Precharge Pressure</u> |
|-----------------------------------|---------------------------|
| 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

ONSHORE ORDER NO. 1
Chesapeake Operating, Inc. Agent for BOPCO
PLU Ross Ranch 20 Federal 1H
SL: 100' FNL & 400' FWL
BL: 330' FSL & 400' FWL
Section 20-25S-30E
Eddy County, New Mexico

CONFIDENTIAL – TIGHT HOLE
Lease Contract No. NMLC 064894

REVISED DRILLING PROGRAM 1/7/2011

Page 4

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:

| <u>System Pressure</u> | <u>Remaining Pressure At Conclusion of Test</u> |
|------------------------|---|
| 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:

See COA

| <u>Purpose</u> | <u>Interval</u> | <u>Hole Size</u> | <u>Casing Size</u> | <u>Weight</u> | <u>Grade</u> | <u>Thread</u> | <u>Condition</u> |
|----------------|---------------------------------|------------------|--------------------|---------------|--------------|---------------|------------------|
| Surface | Surface - 560' | 17-1/2" | 13-3/8" | 48.0# | H-40 | STC | New |
| Intermediate | Surface - 3,625' | 11" | 8-5/8" | 32.0# | J-55 | LTC | New |
| Production | Surface - 12,853' | 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:
13-3/8" Surface Casing: SFb = 1.44, SFc = 3.04 and SFt = 1.57
8-5/8" Intermediate Casing: SFb = 2.15, SFc = 1.61 and SFt = 1.88
5-1/2" Production Casing: SFb = 1.21, SFc = 2.4 and SFt = 1.74
- d. The cementing program will be as follows:

ONSHORE ORDER NO. 1
Chesapeake Operating, Inc. Agent for BOPCO
PLU Ross Ranch 20 Federal 1H
SL: 100' FNL & 400' FWL
BL: 330' FSL & 400' FWL
Section 20-25S-30E
Eddy County, New Mexico
5. Cementing Program

CONFIDENTIAL – TIGHT HOLE
Lease Contract No. NMLC 064894

REVISED DRILLING PROGRAM 1/7/2011

Page 5

| <u>Interval</u> | <u>Type</u> | <u>Weight</u> | <u>Amount</u> | <u>Yield</u> | <u>Top Of Cement</u> | <u>Open Hole Excess</u> |
|----------------------------------|----------------------------------|---------------|---------------|--------------|----------------------|-------------------------|
| Surface | C+4%Gel | 13.5 ppg | 585 sks | 1.73 | Surface | 150% |
| Inter-mediate | Lead: TXL | 12.0 ppg | 890 sks | 1.82 | Surface | 150% |
| | Tail: 50/50 C/Poz +2%Gel, 5%Salt | 14.2 ppg | 470 sks | 1.37 | 2,660' | 150% |
| Production 1 st Stage | Lead: TXL + 1% Salt | 12.0 ppg | 377 sks | 1.83 | 4,900' (DV) | 65% |
| | Tail: 50/50 H/Poz +6%Gel, 5%Salt | 13.2 ppg | 945 sks | 1.74 | 7,000' | 65% |
| Production 2 nd Stage | Lead: TXL | 12.0 ppg | 345 sks | 1.83 | 3,125' | 200% |
| | Tail: C | 14.8 ppg | 100 sks | 1.33 | 4,650' | 200% |

- 1) Final cement volumes will be determined by caliper.
- 2) Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint
- 3) The production casing will be cemented in two stages with DV tool placed at 4,900'
- 4) Production casing will have centralizer on every other joint.

Pilot Hole Plugging Plan:

There will be no pilot hole for this well.

6. MUD PROGRAM

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

| <u>Interval</u> | <u>Mud Type</u> | <u>Mud Weight</u> | <u>Viscosity</u> | <u>Fluid Loss</u> |
|--------------------------|-----------------|-------------------|------------------|-------------------|
| 0' - 560' | FW/Gel | 8.4 - 8.7 | 32-34 | NC |
| 560' - 3,625' | Brine | 9.8 - 10.1 | 28-29 | NC |
| 3,625' - 7,735' (KOP) | FW/Cut Brine | 8.4 - 8.6 | 28-29 | NC |
| 7,735' - Lateral TD | FW/Cut Brine | 8.4-9.0 | 28-32 | NC |

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-toilet and then hauled to an approved sanitary

*
See
COA

ONSHORE ORDER NO. 1
Chesapeake Operating, Inc. Agent for BOPCO
PLU Ross Ranch 20 Federal 1H
SL: 100' FNL & 400' FWL
BL: 330' FSL & 400' FWL
Section 20-25S-30E
Eddy County, New Mexico

CONFIDENTIAL – TIGHT HOLE
Lease Contract No. NMLC 064894

REVISED DRILLING PROGRAM 1/7/2011

Page 6

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

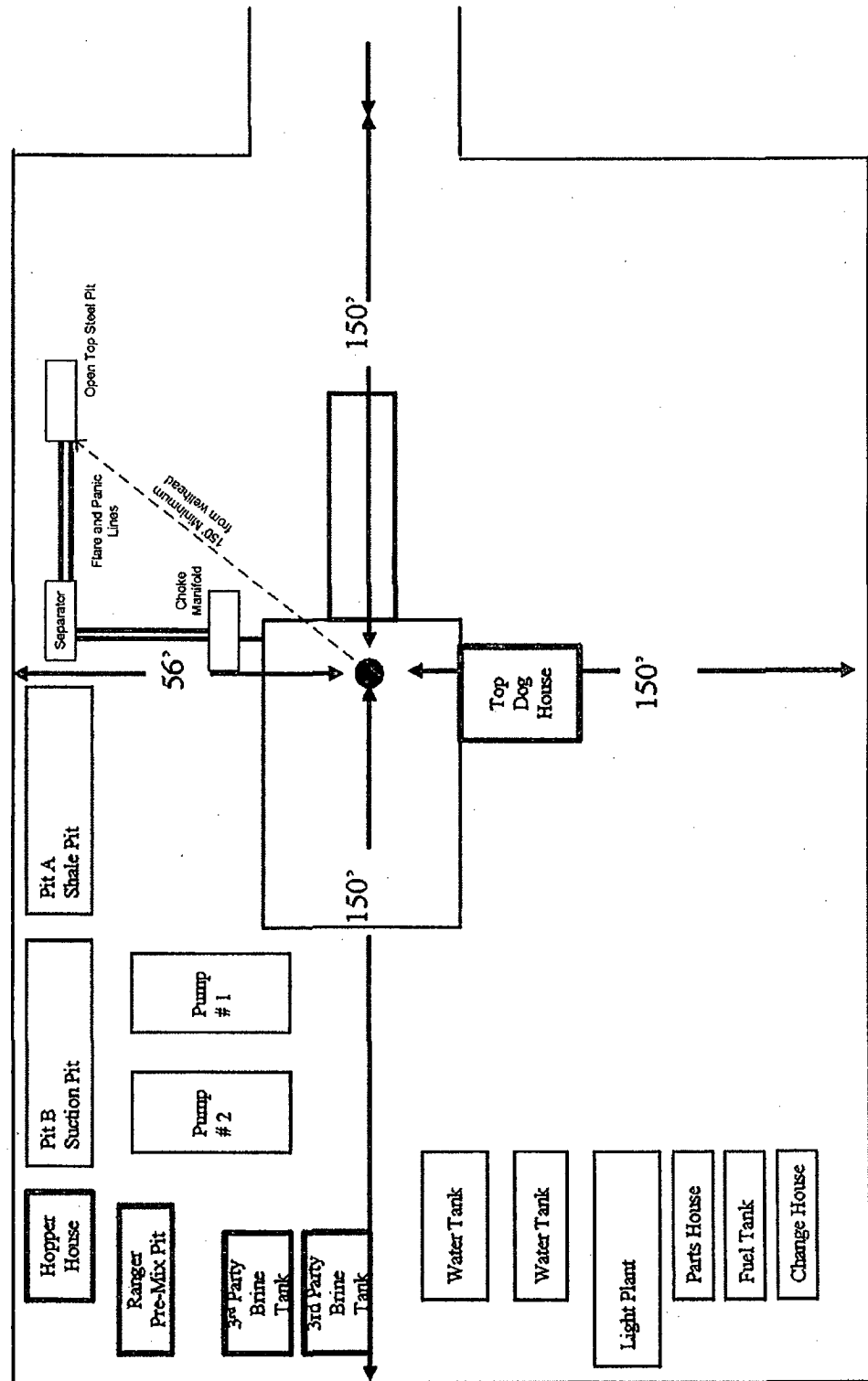
The anticipated type and amount of testing, logging and coring are as follows:

- a. Drill stem tests are not planned.
- b. The logging program will consist of Natural GR, Density-Neutron, PE & Dual Laterolog from pilot hole TD to surface casing; Neutron-GR surface casing to surface. GR in lateral.
- c. Cores samples are not planned.
- d. A Directional Survey will be run.

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

- a. The estimated bottom hole pressure is 3850 psi. No abnormal pressures or temperatures are anticipated.
- b. Hydrogen sulfide gas is not anticipated.

RIG 62



Revised
EXHIBIT

BLOWOUT PREVENTOR SCHEMATIC

CHESAPEAKE OPERATING INC

Permian District-Minimum Requirements

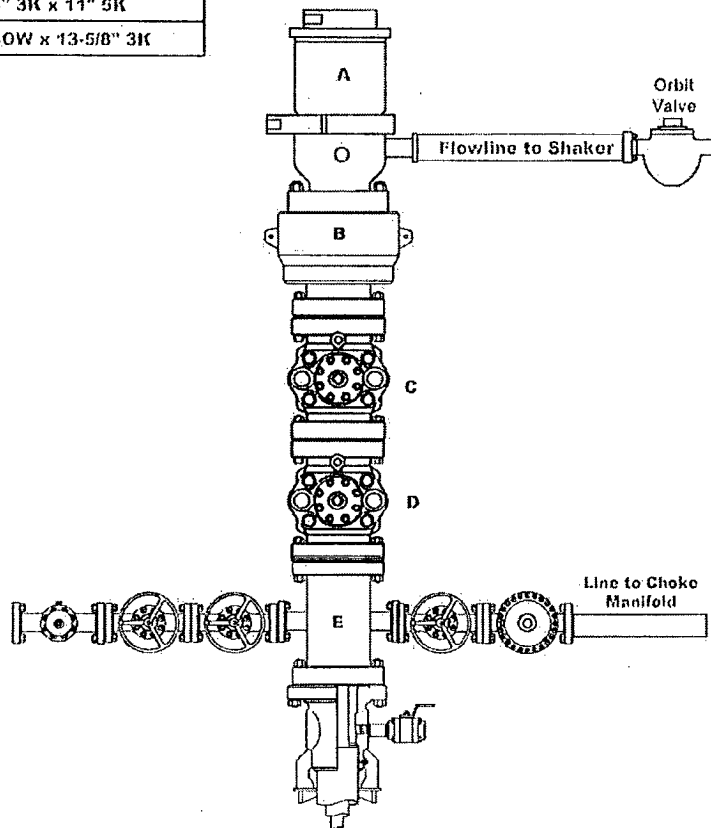
FIELD : Avalon

OPERATION: Intermediate and Production Hole Sections

| SIZE | PRESSURE | DESCRIPTION |
|-------|--------------------------------|---------------|
| A | 500 | Rotating Head |
| B | 13 5/8" 5,000 | Annular |
| C | 13 5/8" 5,000 | Pipe Ram |
| D | 13 5/8" 5,000 | Blind Ram |
| E | 13 5/8" 5,000 | Mud Cross |
| F | | |
| DSA | As required for each hole size | |
| C-Sec | | |
| B-Sec | 13-5/8" 3K x 11" 5K | |
| A-Sec | 13-3/8" SOW x 13-5/8" 3K | |

Test Notes:

- Pressure test to rating of BOP or wellhead every 21 days.
- Function test on trips
- H2S service trim required



Kill Line

| SIZE | PRESSURE | DESCRIPTION |
|------|----------|-------------|
| 2" | 5,000 | Check Valve |
| 2" | 5,000 | Gate Valve |
| 2" | 5,000 | Gate Valve |
| | | |
| | | |

Choke Line

| SIZE | PRESSURE | DESCRIPTION |
|------|----------|-----------------|
| 3" | 5,000 | Gate Valve |
| 3" | 5,000 | HCR Valve |
| 3" | 5,000 | Steel Line Only |
| | | |
| | | |

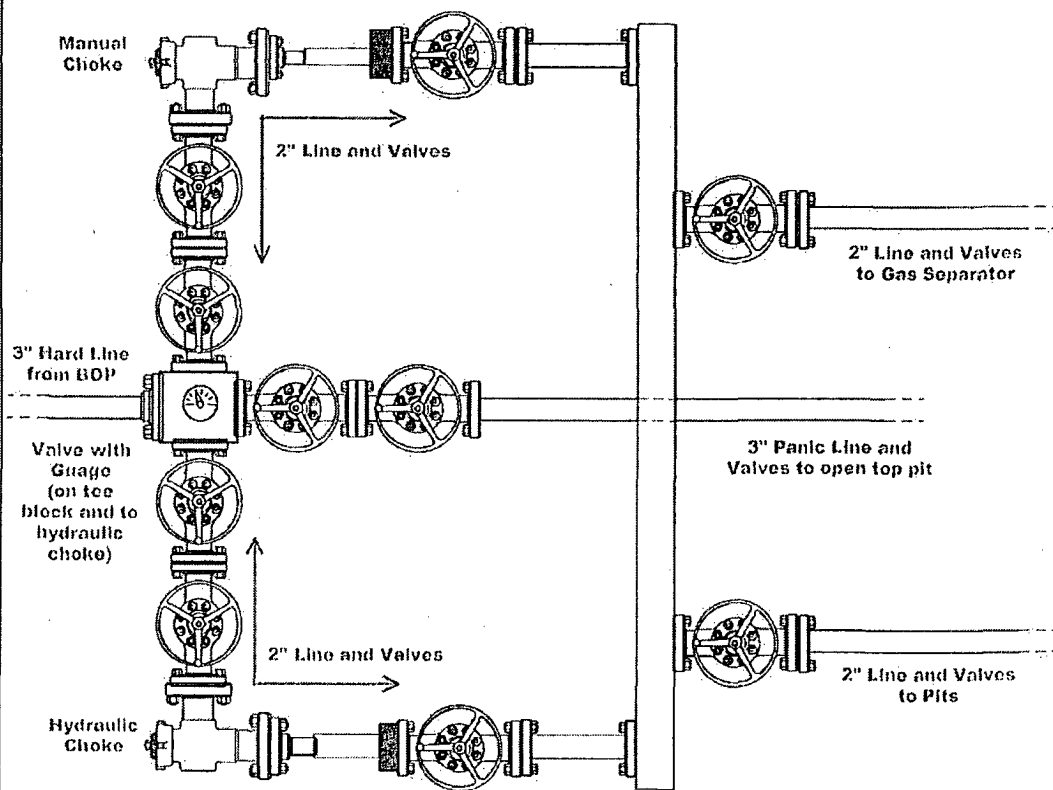
Revised
EXHIBIT F-1

CHOKE MANIFOLD SCHEMATIC

CHESAPEAKE OPERATING INC

Permian District

Avalon Minimum Requirements



Choke Manifold

| SIZE | PRESSURE | DESCRIPTION |
|----------|----------|------------------------------------|
| 2" or 3" | 5,000 | Gate Valves |
| 3'x15' | | Gas Separator |
| 8" | | Gas Separator vent line (anchored) |
| | | |

Revised
EXHIBIT E-2

Chesapeake Energy Corporation

Survey Report - Geographic

| | | | |
|-----------|--------------------------|------------------------------|-------------------------------|
| Company: | Permian District | Local Co-ordinate Reference: | Well PLU Ross Ranch 20 Fed 1H |
| Project: | Poker Lake | TVD Reference: | well2 @ 3221.0ft |
| Site: | PLU Ross Ranch 20 Fed 1H | MD Reference: | well2 @ 3221.0ft |
| Well: | PLU Ross Ranch 20 Fed 1H | North Reference: | Grid |
| Wellbore: | PLU Ross Ranch 20 Fed 1H | Survey Calculation Method: | Minimum Curvature |
| Design: | Plat | Database: | Drilling Database |

| | | | |
|-------------|-----------------------------|---------------|--------------|
| Project: | Poker Lake, Eddy County, NM | | |
| Map System: | US State Plane 1983 | System Datum: | Ground Level |
| Geo Datum: | North American Datum 1983 | | |
| Map Zone: | New Mexico Eastern Zone | | |

| | | | |
|-----------------------|--------------------------|-------------------|-----------------|
| Site: | PLU Ross Ranch 20 Fed 1H | | |
| Site Position: | | Northing: | 408,587.82 usft |
| From: | Map | Easting: | 672,146.35 usft |
| Position Uncertainty: | 0.0 ft | Slot Radius: | 0.000 in |
| | | Latitude: | 32.12258188 |
| | | Longitude: | -103.91079158 |
| | | Grid Convergence: | 0.2247000 ° |

| | | | |
|-----------------------|--------------------------|---------------------|---------------------------|
| Well: | PLU Ross Ranch 20 Fed 1H | | |
| Well Position: | +N/-S | 0.0 ft | Northing: 408,587.82 usft |
| | +E/-W | 0.0 ft | Easting: 672,146.35 usft |
| Position Uncertainty: | 0.0 ft | Wellhead Elevation: | 3,199.0 ft |
| | | Ground Level: | 3,199.0 ft |

| | | | |
|---------------------|-----------------|---------------------------------|-------------|
| Survey Tool Program | Date 12/30/2010 | | |
| From (ft) | To (ft) | Survey (Wellbore) | Tool Name |
| 0.0 | 12,652.9 | Plat (PLU Ross Ranch 20 Fed 1H) | Tolco |
| | | | Description |

| Planned Survey | | | | | | | | | |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|---------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 100.0 | 0.00 | 0.00 | 100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 200.0 | 0.00 | 0.00 | 200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 500.0 | 0.00 | 0.00 | 500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 600.0 | 0.00 | 0.00 | 600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 700.0 | 0.00 | 0.00 | 700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 800.0 | 0.00 | 0.00 | 800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 900.0 | 0.00 | 0.00 | 900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,000.0 | 0.00 | 0.00 | 1,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,100.0 | 0.00 | 0.00 | 1,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,200.0 | 0.00 | 0.00 | 1,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,400.0 | 0.00 | 0.00 | 1,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,500.0 | 0.00 | 0.00 | 1,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,600.0 | 0.00 | 0.00 | 1,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,700.0 | 0.00 | 0.00 | 1,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,800.0 | 0.00 | 0.00 | 1,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 1,900.0 | 0.00 | 0.00 | 1,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,000.0 | 0.00 | 0.00 | 2,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,100.0 | 0.00 | 0.00 | 2,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,200.0 | 0.00 | 0.00 | 2,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,300.0 | 0.00 | 0.00 | 2,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,400.0 | 0.00 | 0.00 | 2,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,500.0 | 0.00 | 0.00 | 2,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,600.0 | 0.00 | 0.00 | 2,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,700.0 | 0.00 | 0.00 | 2,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |

Chesapeake Energy Corporation

Survey Report - Geographic

| | | | |
|-----------|--------------------------|------------------------------|-------------------------------|
| Company: | Permian District | Local Co-ordinate Reference: | Well PLU Ross Ranch 20 Fed 1H |
| Project: | Poker Lake | TVD Reference: | well2 @ 3221.0ft |
| Site: | PLU Ross Ranch 20 Fed 1H | MD Reference: | well2 @ 3221.0ft |
| Well: | PLU Ross Ranch 20 Fed 1H | North Reference: | Grid |
| Wellbore: | PLU Ross Ranch 20 Fed 1H | Survey Calculation Method: | Minimum Curvature |
| Design: | Plat | Database: | Drilling Database |

| Planned Survey | | | | | | | | | |
|------------------------|--------------------|----------------|------------------------|---------------|---------------|------------------------|-----------------------|-------------|---------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
| 2,800.0 | 0.00 | 0.00 | 2,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 2,900.0 | 0.00 | 0.00 | 2,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,000.0 | 0.00 | 0.00 | 3,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,100.0 | 0.00 | 0.00 | 3,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,200.0 | 0.00 | 0.00 | 3,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,300.0 | 0.00 | 0.00 | 3,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,400.0 | 0.00 | 0.00 | 3,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,500.0 | 0.00 | 0.00 | 3,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,600.0 | 0.00 | 0.00 | 3,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,700.0 | 0.00 | 0.00 | 3,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,800.0 | 0.00 | 0.00 | 3,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 3,900.0 | 0.00 | 0.00 | 3,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,000.0 | 0.00 | 0.00 | 4,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,100.0 | 0.00 | 0.00 | 4,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,200.0 | 0.00 | 0.00 | 4,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,300.0 | 0.00 | 0.00 | 4,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,400.0 | 0.00 | 0.00 | 4,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,500.0 | 0.00 | 0.00 | 4,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,600.0 | 0.00 | 0.00 | 4,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,700.0 | 0.00 | 0.00 | 4,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,800.0 | 0.00 | 0.00 | 4,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 4,900.0 | 0.00 | 0.00 | 4,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,000.0 | 0.00 | 0.00 | 5,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,100.0 | 0.00 | 0.00 | 5,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,200.0 | 0.00 | 0.00 | 5,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,300.0 | 0.00 | 0.00 | 5,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,400.0 | 0.00 | 0.00 | 5,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,500.0 | 0.00 | 0.00 | 5,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,600.0 | 0.00 | 0.00 | 5,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,700.0 | 0.00 | 0.00 | 5,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,800.0 | 0.00 | 0.00 | 5,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 5,900.0 | 0.00 | 0.00 | 5,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,000.0 | 0.00 | 0.00 | 6,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,100.0 | 0.00 | 0.00 | 6,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,200.0 | 0.00 | 0.00 | 6,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,300.0 | 0.00 | 0.00 | 6,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,400.0 | 0.00 | 0.00 | 6,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,500.0 | 0.00 | 0.00 | 6,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,600.0 | 0.00 | 0.00 | 6,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,700.0 | 0.00 | 0.00 | 6,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,800.0 | 0.00 | 0.00 | 6,800.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 6,900.0 | 0.00 | 0.00 | 6,900.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,000.0 | 0.00 | 0.00 | 7,000.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,100.0 | 0.00 | 0.00 | 7,100.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,200.0 | 0.00 | 0.00 | 7,200.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,300.0 | 0.00 | 0.00 | 7,300.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,400.0 | 0.00 | 0.00 | 7,400.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,500.0 | 0.00 | 0.00 | 7,500.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,600.0 | 0.00 | 0.00 | 7,600.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,700.0 | 0.00 | 0.00 | 7,700.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,734.6 | 0.00 | 0.00 | 7,734.6 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| 7,800.0 | 9.16 | 179.76 | 7,799.7 | -5.2 | 0.0 | 408,582.59 | 672,146.37 | 32.12256752 | -103.91079158 |
| 7,900.0 | 23.16 | 179.76 | 7,895.5 | -33.0 | 0.1 | 408,554.82 | 672,146.49 | 32.12249118 | -103.91079155 |
| 8,000.0 | 37.16 | 179.76 | 7,981.8 | -83.1 | 0.4 | 408,504.70 | 672,146.70 | 32.12235340 | -103.91079150 |
| 8,100.0 | 51.16 | 179.76 | 8,053.3 | -152.8 | 0.6 | 408,435.20 | 672,147.00 | 32.12216235 | -103.91079143 |

Chesapeake Energy Corporation

Survey Report - Geographic

| | | | |
|-----------|--------------------------|------------------------------|-------------------------------|
| Company: | Permian District | Local Co-ordinate Reference: | Well PLU Ross Ranch 20 Fed 1H |
| Project: | Poker Lake | TVD Reference: | well2 @ 3221.0ft |
| Site: | PLU Ross Ranch 20 Fed 1H | MD Reference: | well2 @ 3221.0ft |
| Well: | PLU Ross Ranch 20 Fed 1H | North Reference: | Grid |
| Wellbore: | PLU Ross Ranch 20 Fed 1H | Survey Calculation Method: | Minimum Curvature |
| Design: | Plat | Database: | Drilling Database |

| Planned Survey | | | | | | | | | | |
|---------------------|-----------------|-------------|---------------------|----------|----------|---------------------|--------------------|-------------|---------------|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | N-S (ft) | E-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 8,200.0 | 65.16 | 179.76 | 8,106.0 | -237.4 | 1.0 | 408,350.46 | 672,147.36 | 32.12192939 | -103.91079135 | |
| 8,300.0 | 79.16 | 179.76 | 8,136.5 | -332.3 | 1.4 | 408,255.50 | 672,147.76 | 32.12166837 | -103.91079125 | |
| 8,378.1 | 90.10 | 179.76 | 8,143.8 | -410.0 | 1.7 | 408,177.85 | 672,148.09 | 32.12145492 | -103.91079117 | |
| 8,400.0 | 90.10 | 179.76 | 8,143.8 | -431.9 | 1.8 | 408,155.96 | 672,148.18 | 32.12139474 | -103.91079115 | |
| 8,500.0 | 90.10 | 179.76 | 8,143.6 | -531.9 | 2.2 | 408,055.96 | 672,148.60 | 32.12111985 | -103.91079105 | |
| 8,600.0 | 90.10 | 179.76 | 8,143.4 | -631.9 | 2.7 | 407,955.96 | 672,149.02 | 32.12084496 | -103.91079095 | |
| 8,700.0 | 90.10 | 179.76 | 8,143.2 | -731.9 | 3.1 | 407,855.96 | 672,149.45 | 32.12057007 | -103.91079085 | |
| 8,800.0 | 90.10 | 179.76 | 8,143.1 | -831.9 | 3.5 | 407,755.96 | 672,149.87 | 32.12029516 | -103.91079075 | |
| 8,900.0 | 90.10 | 179.76 | 8,142.9 | -931.9 | 3.9 | 407,655.97 | 672,150.29 | 32.12002029 | -103.91079065 | |
| 9,000.0 | 90.10 | 179.76 | 8,142.7 | -1,031.9 | 4.4 | 407,555.97 | 672,150.72 | 32.11974541 | -103.91079055 | |
| 9,100.0 | 90.10 | 179.76 | 8,142.5 | -1,131.9 | 4.8 | 407,455.97 | 672,151.14 | 32.11947052 | -103.91079045 | |
| 9,200.0 | 90.10 | 179.76 | 8,142.4 | -1,231.8 | 5.2 | 407,355.97 | 672,151.56 | 32.11919563 | -103.91079035 | |
| 9,300.0 | 90.10 | 179.76 | 8,142.2 | -1,331.8 | 5.6 | 407,255.97 | 672,151.99 | 32.11892074 | -103.91079025 | |
| 9,400.0 | 90.10 | 179.76 | 8,142.0 | -1,431.8 | 6.1 | 407,155.97 | 672,152.41 | 32.11864585 | -103.91079015 | |
| 9,500.0 | 90.10 | 179.76 | 8,141.9 | -1,531.8 | 6.5 | 407,055.97 | 672,152.83 | 32.11837096 | -103.91079005 | |
| 9,600.0 | 90.10 | 179.76 | 8,141.7 | -1,631.8 | 6.9 | 406,955.97 | 672,153.25 | 32.11809607 | -103.91078995 | |
| 9,700.0 | 90.10 | 179.76 | 8,141.5 | -1,731.8 | 7.3 | 406,855.97 | 672,153.66 | 32.11782118 | -103.91078985 | |
| 9,800.0 | 90.10 | 179.76 | 8,141.3 | -1,831.8 | 7.7 | 406,755.98 | 672,154.10 | 32.11754629 | -103.91078975 | |
| 9,900.0 | 90.10 | 179.76 | 8,141.2 | -1,931.8 | 8.2 | 406,655.98 | 672,154.52 | 32.11727140 | -103.91078965 | |
| 10,000.0 | 90.10 | 179.76 | 8,141.0 | -2,031.8 | 8.6 | 406,555.98 | 672,154.95 | 32.11699651 | -103.91078955 | |
| 10,100.0 | 90.10 | 179.76 | 8,140.8 | -2,131.8 | 9.0 | 406,455.98 | 672,155.37 | 32.11672162 | -103.91078945 | |
| 10,200.0 | 90.10 | 179.76 | 8,140.6 | -2,231.8 | 9.4 | 406,355.98 | 672,155.79 | 32.11644673 | -103.91078935 | |
| 10,300.0 | 90.10 | 179.76 | 8,140.5 | -2,331.8 | 9.9 | 406,255.98 | 672,156.22 | 32.11617184 | -103.91078925 | |
| 10,400.0 | 90.10 | 179.76 | 8,140.3 | -2,431.8 | 10.3 | 406,155.98 | 672,156.64 | 32.11589695 | -103.91078915 | |
| 10,500.0 | 90.10 | 179.76 | 8,140.1 | -2,531.8 | 10.7 | 406,055.98 | 672,157.06 | 32.11562206 | -103.91078905 | |
| 10,600.0 | 90.10 | 179.76 | 8,139.9 | -2,631.8 | 11.1 | 405,955.98 | 672,157.48 | 32.11534717 | -103.91078895 | |
| 10,700.0 | 90.10 | 179.76 | 8,139.8 | -2,731.8 | 11.6 | 405,855.98 | 672,157.91 | 32.11507228 | -103.91078885 | |
| 10,800.0 | 90.10 | 179.76 | 8,139.6 | -2,831.8 | 12.0 | 405,755.98 | 672,158.33 | 32.11479739 | -103.91078875 | |
| 10,900.0 | 90.10 | 179.76 | 8,139.4 | -2,931.8 | 12.4 | 405,655.99 | 672,158.75 | 32.11452250 | -103.91078865 | |
| 11,000.0 | 90.10 | 179.76 | 8,139.2 | -3,031.8 | 12.8 | 405,555.99 | 672,159.18 | 32.11424761 | -103.91078855 | |
| 11,100.0 | 90.10 | 179.76 | 8,139.1 | -3,131.8 | 13.2 | 405,455.99 | 672,159.60 | 32.11397272 | -103.91078845 | |
| 11,200.0 | 90.10 | 179.76 | 8,138.9 | -3,231.8 | 13.7 | 405,355.99 | 672,160.02 | 32.11369784 | -103.91078835 | |
| 11,300.0 | 90.10 | 179.76 | 8,138.7 | -3,331.8 | 14.1 | 405,255.99 | 672,160.45 | 32.11342295 | -103.91078825 | |
| 11,400.0 | 90.10 | 179.76 | 8,138.5 | -3,431.8 | 14.5 | 405,155.99 | 672,160.87 | 32.11314806 | -103.91078815 | |
| 11,500.0 | 90.10 | 179.76 | 8,138.4 | -3,531.8 | 14.9 | 405,055.99 | 672,161.29 | 32.11287317 | -103.91078805 | |
| 11,600.0 | 90.10 | 179.76 | 8,138.2 | -3,631.8 | 15.4 | 404,955.99 | 672,161.71 | 32.11259828 | -103.91078795 | |
| 11,700.0 | 90.10 | 179.76 | 8,138.0 | -3,731.8 | 15.8 | 404,856.00 | 672,162.14 | 32.11232339 | -103.91078785 | |
| 11,800.0 | 90.10 | 179.76 | 8,137.8 | -3,831.8 | 16.2 | 404,756.00 | 672,162.56 | 32.11204850 | -103.91078775 | |
| 11,900.0 | 90.10 | 179.76 | 8,137.7 | -3,931.8 | 16.6 | 404,656.00 | 672,162.98 | 32.11177361 | -103.91078765 | |
| 12,000.0 | 90.10 | 179.76 | 8,137.5 | -4,031.8 | 17.1 | 404,556.00 | 672,163.41 | 32.11149872 | -103.91078755 | |
| 12,100.0 | 90.10 | 179.76 | 8,137.3 | -4,131.8 | 17.5 | 404,456.00 | 672,163.83 | 32.11122383 | -103.91078745 | |
| 12,200.0 | 90.10 | 179.76 | 8,137.1 | -4,231.8 | 17.9 | 404,356.00 | 672,164.25 | 32.11094894 | -103.91078735 | |
| 12,300.0 | 90.10 | 179.76 | 8,137.0 | -4,331.8 | 18.3 | 404,256.00 | 672,164.68 | 32.11067405 | -103.91078725 | |
| 12,400.0 | 90.10 | 179.76 | 8,136.8 | -4,431.8 | 18.7 | 404,156.00 | 672,165.10 | 32.11039916 | -103.91078715 | |
| 12,500.0 | 90.10 | 179.76 | 8,136.6 | -4,531.8 | 19.2 | 404,056.00 | 672,165.52 | 32.11012427 | -103.91078705 | |
| 12,600.0 | 90.10 | 179.76 | 8,136.4 | -4,631.8 | 19.6 | 403,956.00 | 672,165.95 | 32.10984938 | -103.91078695 | |
| 12,700.0 | 90.10 | 179.76 | 8,136.3 | -4,731.8 | 20.0 | 403,856.01 | 672,166.37 | 32.10957449 | -103.91078685 | |
| 12,800.0 | 90.10 | 179.76 | 8,136.1 | -4,831.8 | 20.4 | 403,756.01 | 672,166.79 | 32.10929960 | -103.91078675 | |
| 12,852.9 | 90.10 | 179.76 | 8,136.0 | -4,884.7 | 20.7 | 403,703.11 | 672,167.02 | 32.10915419 | -103.91078670 | |

Chesapeake Energy Corporation

Survey Report - Geographic

| | | | |
|------------------|--------------------------|-------------------------------------|-------------------------------|
| Company: | Permian District | Local Co-ordinate Reference: | Well PLU Ross Ranch 20 Fed 1H |
| Project: | Poker Lake | TVD Reference: | well2 @ 3221.0ft |
| Site: | PLU Ross Ranch 20 Fed 1H | MD Reference: | well2 @ 3221.0ft |
| Well: | PLU Ross Ranch 20 Fed 1H | North Reference: | Grid |
| Wellbore: | PLU Ross Ranch 20 Fed 1H | Survey Calculation Method: | Minimum Curvature |
| Design: | Plat | Database: | Drilling Database |

| Design Targets | | | | | | | | | |
|---|-----------|----------|---------|----------|-------|------------|------------|-------------|---------------|
| Target Name | Dip Angle | Dip Dir. | TVD | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude |
| - hit/miss target | (°) | (°) | (ft) | (ft) | (ft) | (usft) | (usft) | | |
| - Shape | | | | | | | | | |
| RR 20 BHL- target chan | 0.00 | 0.00 | 8,136.0 | -4,884.7 | 20.7 | 403,703.11 | 672,167.02 | 32.10915419 | -103.91078670 |
| - plan hits target center | | | | | | | | | |
| - Point | | | | | | | | | |
| RR20- SHL | 0.00 | 0.00 | 8,145.0 | 0.0 | 0.0 | 408,587.82 | 672,146.35 | 32.12258188 | -103.91079158 |
| - plan misses target center by 170.4ft at 8059.3ft MD (8026.3 TVD, -122.2 N, 0.5 E) | | | | | | | | | |
| - Point | | | | | | | | | |

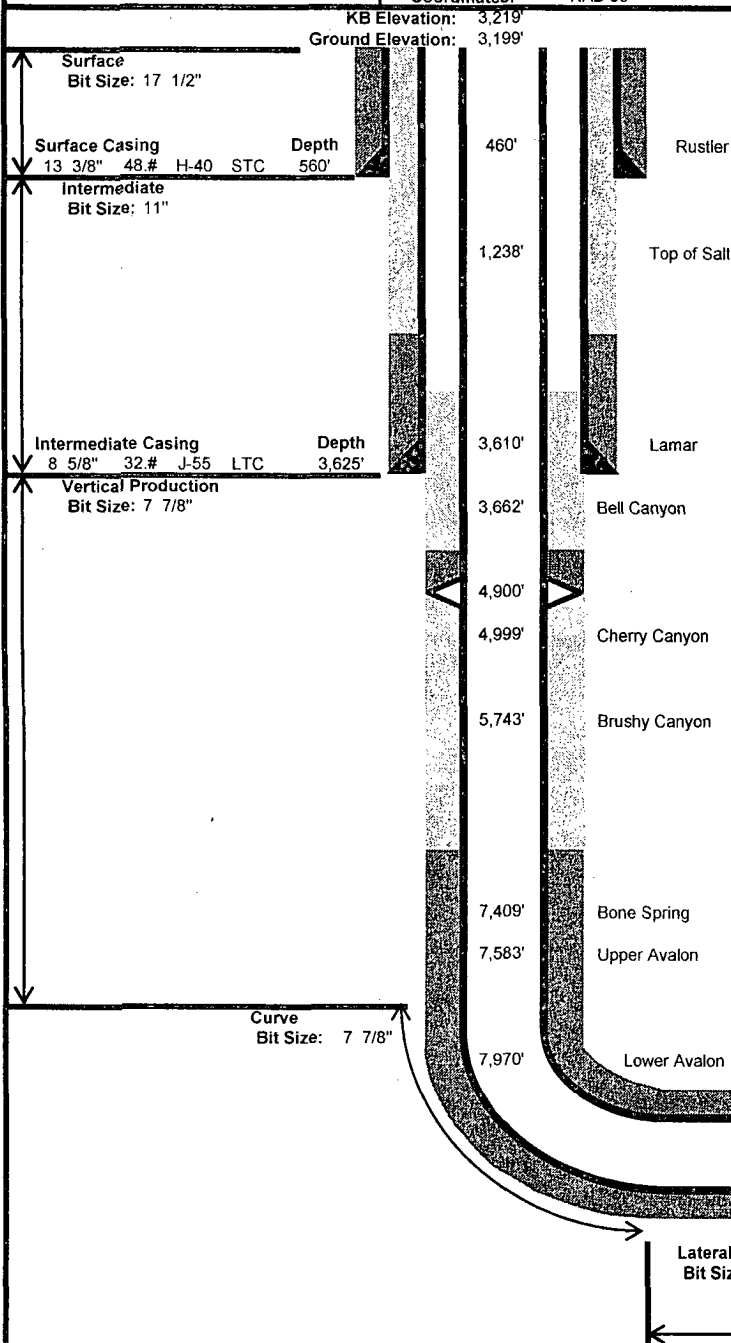


Drilling Engineer: Chris Gray
Superintendent: Cecil Luttrull
Geologist: Chima Nzewunwah

Well Name: PLU Ross Ranch 20 Federal 1H
County, State: Eddy County, NM
Surface Location: 100' FNL 400' FWL, Section 20, Township 25S, Range 30E
BH Location: 330' FSL 400' FWL, Section 20, Township 25S, Range 30E

SHL Latitude: 32.122585 SHL North: 408588
SHL Longitude: -103.910800 SHL East: 672146
BHL Latitude: 32.10915696 BHL North: 403703
BHL Longitude: -103.9107945 BHL East: 672167
Coordinates: NAD 83 Coordinates: NMSPC

Drilling Rig: Patterson 62
Dir. Drilling: Phoenix
Drilling Mud: Nova
Cement: Schlumberger
Wellhead: Sunbelt
Property Number: 632399
AFE Number: 153054



| Wellhead Equipment | |
|---|--------------------------|
| Casing Head | 13-3/8" x 13-5/8" 5K SOW |
| Casing Spool | 13-5/8" 5K x 11" 5K |
| Tubing Spool | 11" 5K x 7-1/16" 10K |
| Required BOP Stack | |
| 13-5/8" 5K- Double, Annular, Rot Head w/Orbit Valve | |

| Mud | | | | |
|------------------|--------------|----------|--------|-------|
| Depth | Type | Weight | F. Vis | FL |
| 0' - 560' | Spud Mud | 8.4-8.7 | 32-34 | NC-NC |
| 560' - 3,625' | Brine | 9.8-10.1 | 28-29 | NC-NC |
| 3,625' - 7,735' | FW/Cut Brine | 8.4-8.6 | 28-29 | NC-NC |
| 7,735' - 8,378' | FW/Cut Brine | 8.4-9 | 28-29 | NC-NC |
| 8,378' - 12,853' | FW/Cut Brine | 8.4-9 | 28-32 | NC-NC |

| Cement | | | | | | | |
|----------------|--------|---------|------|------|------|-----|-----|
| Slurry | Top | Btm | Wt | Yld | %Exc | Bbl | Sx |
| Surface | | | | | | | |
| Lead | 0' | 560' | 13.5 | 1.73 | 150 | 180 | 585 |
| Intermediate | | | | | | | |
| Lead | 0' | 2,660' | 12.0 | 1.8 | 150 | 285 | 890 |
| Tail | 2,660' | 3,625' | 14.2 | 1.37 | 150 | 115 | 470 |
| Production | | | | | | | |
| 1st Stage Lead | 4,650' | 7,400' | 12.0 | 1.83 | 65 | 156 | 478 |
| 1st Stage Tail | 7,400' | 12,710' | 13.2 | 1.74 | 65 | 272 | 879 |
| 2nd Stage Lead | 3,125' | 4,650' | 12.0 | 1.8 | 200 | 111 | 345 |
| 2nd Stage Tail | 4,650' | 4,900' | 14.8 | 1.33 | 200 | 23 | 98 |

Notes:

| Directional Plan | | | | | | |
|------------------|---|-------|--------|--------|--------|-------|
| Target Line: | 8145' TVD at 0°VS w/0.1 deg dip | | | | | |
| Target Window: | 20' above and 20' below | | | | | |
| | MD | INC | AZM | TVD | VS | DLS |
| KOP | 7,735' | 0.00 | 0.00 | 7,735' | 0' | 0.00 |
| EOB | 8,378' | 90.10 | 179.76 | 8,144' | 410' | 14.00 |
| TD | 12,853' | 90.10 | 179.76 | 8,136' | 4,885' | 0.00 |
| Hardlines: | Lateral- 330' from all lease lines. | | | | | |
| | Vertical- Actual Lease Lines | | | | | |
| Notes: | Please note SHL and BHL distance from lease lines | | | | | |

Production Casing
5 1/2" 20# L-80 LTC
Depth
12,853'

Lateral
Bit Size: 7 7/8"

| Type | Logs | Interval | Timing | Vendor |
|--------|--------------------------------------|---------------------------|----------------------|---------|
| Mudlog | Mudlogging | Int Shoe to Base of Curve | After set Int Casing | TBD |
| OH | GR/Ind/Neutron/Density/Pe/Dual Induc | Curve to Int Shoe | After Curve | TBD |
| OH | GR/Neutron | Int Shoe to Surface | After Curve | TBD |
| | | | | |
| LWD | Gamma/MWD | Curve and Lateral | While Drilling | Phoenix |

CONDITIONS OF APPROVAL

| | |
|-----------------------|--------------------------------------|
| OPERATOR'S NAME: | CHESAPEAKE AGENT FOR BOPCO |
| LEASE NO.: | NMLC064849 |
| WELL NAME & NO.: | 1H-PLU ROSS RANCH 20 FEDERAL |
| SURFACE HOLE FOOTAGE: | 0100' FNL & 0400' FWL |
| BOTTOM HOLE FOOTAGE: | 0330' FSL & 0400' FWL |
| LOCATION: | Section 20, T. 25 S., R. 30 E., NMPM |
| COUNTY: | Eddy County, New Mexico |

Commercial Well Determination

A commercial well determination will need to be submitted after production has been established for at least six months

A. DRILLING OPERATIONS REQUIREMENTS

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

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

☒ **Eddy County**

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

1. A Hydrogen Sulfide (H₂S) Drilling Plan should be activated 500 feet prior to drilling into the **Delaware** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

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

B. CASING

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.

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.

Medium cave/karst

Possible water/brine flows in the Salado and Delaware Mountain Groups

Possible lost circulation in the Delaware and Bone Spring formations

1. **The 13-3/8 inch surface casing shall be set at approximately 800 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. If the salt is encountered at a shallower depth, the casing must be set 25 feet above the top of the salt. Fresh water mud to be used to setting 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 **8-5/8** inch intermediate casing is:
- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Casing to be set in the Lamar Limestone. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

If 75% or greater lost circulation occurs while drilling the intermediate casing hole, the cement on the production casing must come to surface.

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

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
- a. First stage to DV tool, cement shall:
 - ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.
 - b. Second stage above DV tool, cement shall:
 - ☒ 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 **3000 (3M)** psi.
 - a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.
3. 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 or where the float does not hold, the minimum wait time before cut-off is eight hours after bumping the plug or when the cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. BOP/BOPE testing can begin after the above conditions are satisfied.
 - 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) prior to initiating the test.
 - c. The results of the test shall be reported to the appropriate BLM office.
 - d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
 - e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

D. 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.

EGF 011311