

ATS-12-427

OCD-ARTESIA

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CONFIDENTIAL

Form 3160-3  
(August 2007) JUL 24 2012

NMOC D ARTESIA

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

SECRETARY'S POTASH

FORM APPROVED  
OMB No. 1004-0137  
Expires July 31, 2010

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM02860
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input checked="" type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator CHESAPEAKE AGENT FOR BOPCO CONTACT: LYNDIE SONGER 41471997		7. If Unit or CA Agreement, Name and No. NMNM071016X
3a. Address PO BOX 18496 OKLAHOMA CITY, OK 73154-0496	3b. Phone No. (include area code) 405-935-2411	8. Lease Name and Well No. PLU Pierce Canyon 17 24 30 USA 1H
3a. Address PO BOX 18496 OKLAHOMA CITY, OK 73154-0496		9. API Well No. 30-015-40520
4. Location of Well (Report location clearly and in accordance with any State requirements *) At surface SWSW 237' FSL 1980' FWL At proposed prod. zone NWNW 100' FNL 1980' FWL		10. Field and Pool, or Exploratory WALDCAT, BONE SPRING
14. Distance in miles and direction from nearest town or post office* 33 MILES FROM LOVING, NM		11. Sec., T. R. M. or Blk. and Survey or Area 17-24S-30E
15. Distance from proposed* location to nearest property or lease line, ft (Also to nearest drig. unit line, if any) 237' TO THE SOUTH	16. No. of acres in lease 2520.60	12. County or Parish EDDY
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 540' to the W PLU #225 (Bass Operator)	19. Proposed Depth 12520 MD 7774 TVD	13. State NM
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3307 GL	22. Approximate date work will start* 08/31/2012	17. Spacing Unit dedicated to this well 160 ACRES
23. Estimated duration 30 DAYS		20. BLM/BIA Bond No. on file ESB000159

24. Attachments

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

- |   |   |
|---|---|
| 1. Well plat certified by a registered surveyor.  | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan.   | 5. Operator certification   |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office) | 6. Such other site specific information and/or plans as may be required by the BLM.             |

25. Signature <i>Lyndee Songer</i>	Name (Printed/Typed) LYNDEE SONGER	Date 04/24/2012
Title REGULATORY COMPLIANCE TECHNICIAN II		
Approved by (Signature) <i>Aden L. Seidlitz</i>	Name (Printed/Typed) <i>Aden L. Seidlitz</i>	Date JUL 12 2012
Title Mr. STATE DIRECTOR		
Office NM STATE OFFICE		

Application approval 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.

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

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO  
GENERAL REQUIREMENTS  
AND SPECIAL STIPULATIONS  
ATTACHED

ONSHORE ORDER NO. 1  
Chesapeake Agent for BOPCO  
PLU Pierce Canyon 17-24-30 USA 1H  
Eddy County, NM

CONFIDENTIAL – TIGHT HOLE  
OPERATOR CERTIFICATION

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 17<sup>th</sup> day of February, 2011

Name:   
Toby Reid - Field Superintendent

Address: 1616 W Bender Blvd Hobbs, NM 88240

Telephone: 575-725-8497

E-mail: [toby.reid@chk.com](mailto:toby.reid@chk.com)

**Additional Operator Remarks:**

Chesapeake Operating, Inc. respectfully requests permission to drill a well to 12,520' to test the Bone Spring formation. If productive, casing will be run and the well completed. If dry, the well will be plugged and abandoned as per BLM and New Mexico Oil Conservation Division requirements.

Please find the Surface Use Plan and Drilling Plan as required by Onshore Order No. 1.

Attached are the Exhibit A-1 to A-5 Survey plats, Exhibit B 1 mile radius plat, Exhibit C1-C3 Production facility, Exhibit D Patterson Rig #62 layout, Exhibit E- Fresh Water Line, Exhibit F-1 to F-2 BOP & Choke Manifold, Exhibit G Directional Drill Plan, and Exhibit H Well Bore Schematic.

Chesapeake is also submitting the Form C-144 for your convenience

The onsite was performed on 2/2/2012. Archeological Survey will be delivered to the BLM when completed.

Chesapeake Operating, Inc. has an agreement with the grazing lessee.

Please be advised that Chesapeake Operating, Inc. is the Designated Agent for BOPCO, the Operator of this unit. Chesapeake Operating, Inc. agrees to be responsible under the terms and conditions of the lease for the operations conducted upon the lease lands.

(CHK PN 644220)

Payment for this APD is being mailed via UPS overnight

DISTRICT I  
1625 N. French Dr., Hobbs, NM 88240  
Phone (505) 336-6181 Fax: (505) 336-0720

DISTRICT II  
811 S. First St., Artesia, NM 88210  
Phone (505) 740-1283 Fax: (505) 740-0720

DISTRICT III  
1000 Rio Brazos Rd., Aztec, NM 87410  
Phone (505) 334-6178 Fax: (505) 334-5170

DISTRICT IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone (505) 476-5460 Fax: (505) 476-5462

State of New Mexico  
Energy, Minerals and Natural Resources Department

Form C-102  
Revised August 1, 2011

Submit one copy to appropriate  
District Office

OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, New Mexico 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number <b>30-015-40520</b>	Pool No. <b>47545</b> 96403	Pool Name <b>NASH DRAW, DEL - BS AV SD</b> <del>WILDCAT, BONE SPRING</del>
Property Code <b>39364</b>	Property Name <b>PLU PIERCE CANYON 17 24 30 USA</b>	Well Number <b>1H</b>
OGRIID No. <b>147179</b>	Operator Name <b>CHESAPEAKE OPERATING CO.</b>	Elevation <b>3307'</b>

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	17	24 S	30 E		237	SOUTH	1980	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
C	17	24 S	30 E		100	NORTH	1980	WEST	EDDY
Dedicated Acres 160	Joint or Infill	Consolidation Code	Order No.						

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION **12520 7/12**

	<b>PROPOSED BOTTOM HOLE LOCATION</b> Lat - N 32.224656588 Long - W 103.905757411 NMSPCE - N 445726.953 E 673557.268 (NAD-83) Lat - N 32.224533597 Long - W 103.905270641 NMSPCE - N 445668.016 E 632373.311 (NAD-27)
	<b>SURFACE LOCATION</b> Lat - N 32.211045900 Long - W 103.905807974 NMSPCE - N 440775.527 E 673561.330 (NAD-83) Lat - N 32.210922763 Long - W 103.905321749 NMSPCE - N 440716.695 E 632377.226 (NAD-27)

**PROJECTED FIRST PERFORATIONS**  
330' FSL & 1980' FWL

**OPERATOR CERTIFICATION**  
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.  
Signature: *Bryan Arrant* Date: 02/17/2012  
Printed Name: Bryan Arrant  
Email Address: bryan.arrant@chk.com

**SURVEYOR CERTIFICATION**  
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my belief.  
Date Surveyed: 02/17/2012  
Signature & Seal of Professional Surveyor: *Gary L. Jones*  
Certificate No. Gary L. Jones 7977  
BASIN SURVEYS 26054

Eddy, NM

DRILLING PLAN  
PAGE, 1

OHSORE OIL & GAS ODER 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 AFD 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	2906	339	
Top of Salt	2578	667	
Base of Salt	-151	3396	
Lamar	-325	3570	
Bell Canyon	-343	3588	
Cherry Canyon	-1191	4436	
Brushy Canyon	-2422	5667	
Bone Spring	-4118	7363	
Lateral TD	-4529	7774	12520.51

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
Water	Rustler	339
Oil/Gas	Brushy Canyon	5667
Oil/Gas	Bone Spring	7363

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. Stack will be tested as specified below. Surface casing and Intermediate Casing shoes will be tested to 10.5 ppg equivalent after drilling out 10' of new formation.

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
  - (d) Upper and lower kelly cock valves, inside BOP's and safety valves

##### B Frequency

1. All tests 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
  - (d) at least once every 30 days while drilling

##### C Frequency

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

#### 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 Requency

1. The accumulator is to be tested each time the BO'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.

System Operating Pressure	Precharge Pressure
1500 psi	750 psi
2000 psi	1000 psi
3000 psi	1000 psi

3. Closing times for the annular preventer 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 Operating Pressure	Remaining Pressure After Test
1500 psi	950 psi
2000 psi	1200 psi
3000 psi	1200 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.

**3. CASING PROGRAM**

- a. The proposed casing program will be as follows:

Purpose	From	To	Hole Size	Csg. Size	Weight	Grade	Thread	Condition
Surface	0'	440'	17-1/2"	13-3/8"	48 #	H-40	STC	New
Shallow Intermediate	0'	3,500'	11"	8-5/8"	32 #	J-55	LTC	New
Production	0'	12,521'	7-7/8"	5-1/2"	170 #	P-110	LTC	New

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

## c Casing Safety Factors

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension
Surface	1.39	3.87	2.72
Shallow Intermediate	2.18	1.39	2.14
Production	1.4	1.96	2.09

Min SF is the smallest of a group of safety factors that include the following considerations.

	Surf	Int	Prod
<b>Burst Design</b>			
Pressure Test- Surface, Int, Prod Csg P external: Water P internal: Test psi + next section heaviest mud in csg	X	X	X
Displace to Gas- Surf Csg P external: Water P internal: Dry Gas from Next Csg Point	X		
Frac at Shoe, Gas to Surf- Int Csg P external: Water P internal: Dry Gas, 15 ppg Frac Gradient		X	
Stimulation (Frac) Pressures- Prod Csg P external: Water P internal: Max inj pressure w/ heaviest injected fluid			X
Tubing leak- Prod Csg (packer at KOP) P external: Water P internal: Leak just below surf, 8.7 ppg packer fluid			X
<b>Collapse Design</b>			
Full Evacuation P external: Water gradient in cement, mud above TOC P internal: none	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: water	X	X	X
<b>Tension Design</b>			
100k lb overpull	X	X	X

ONSHORE ORDER NO 1

Chesapeake Operating, Inc Agent for BOPCO

PLU Pierce Canyon 17-24-30 USA 1H

CONFIDENTIAL -- TIGHT HOLE

Lease No



## 5 CEMENTING PROGRAM

Slurry	Type	Top	Btm	Wt	Yld	%Exc.	Sx
Surface				(ppg)	(sx/cu ft)	Open Hole	
Single Slurry	C + 4% Gel	0'	440'	13.5	1.73	200	507
Shallow Int							
Lead	TXI + 5% Salt	0'	3,000'	12	1.99	200	1081
Tail	50C/50Poz +5% Salt	3,000'	3,500'	14.2	1.37	200	290
Production							
Lead	35/65Poz H +8% Gel	3,000'	7,297'	12.4	2.11	75	588
Tail	50/50Poz H +2% Gel	7,297'	12,521'	14.5	1.27	75	1257

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 a single stage
4. Production casing will have one centralizer on every other joint from TD to KOP (horizontal type) and from KOP to intermediate casing (bowspring type).

Pilot Hole Plugging Plan:  
No pilot Hole

ONSHORE ORDER NO. 1  
Chesapeake Operating, Inc. Agent for BOPCO  
PLU Pierce Canyon 17-24-30 USA 1H

CONFIDENTIAL -- TIGHT HOLE  
Lease No

Eddy, NM

DRILLING PLAN  
PAGE 6

## 6 MUD PROGRAM

From	To	Type	Weight	F. Vis	Filtrate
0'	440'	Spud Mud	8.4 - 8.7	32 - 34	NC - NC
440'	3,500'	Brine	9.5 - 10.1	28 - 29	NC - NC
3,500'	7,297'	Cut Brine	8.3 - 9	28 - 29	NC - NC
7,297'	8,047'	Cut Brine	8.3 - 9	28 - 29	NC - NC
8,047'	12,521'	Cut Brine	8.3 - 9	28 - 29	NC - 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

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

*See COA*

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 be as follows

TYPE	Logs	Interval	Timing	Vendor
Mud Log	2 man Mudlog	Int Csg to TD	Int Csg Drill Out	Suttles
OH	Triple Combo	Curve to Int Csg	After Curve	TBD
OH	GR/Neutron	Int Cas to Surf	After Curve	TBD
LWD	MWD Gamma	Curve and Lateral	While Drilling	Phoenix

- c. Core samples are not planned
- d. A Directional Survey will be run

## 8 ABNORMAL PRESSURES AND HYDROGEN SULFIDE

- a. No abnormal pressures or temperatures are expected. Estimated BHP is 3436 psi
- b. Hydrogen sulfide gas is not anticipated.

# **Permian District**

**Poker Lake**

**PLU Pierce Canyon 17-24-30 USA 1H**

**Well #1**

**Wellbore #1**

**Plan: Plat**

## **Standard Planning Report**

**27 March, 2012**

EXHIBIT 6

# Chesapeake Operating

## Planning Report

Database	Drilling Database	Local Co-ordinate Reference	Well Well #1
Company	Permian District	TVD Reference	WELL @ 0.00ft (Original Well Elev)
Project	Poker Lake	MD Reference	WELL @ 0.00ft (Original Well Elev)
Site	PLU Pierce Canyon 17-24-30 USA 1H	North Reference	Grid
Well	Well #1	Survey Calculation Method	Minimum Curvature
Wellbore	Wellbore #1		
Design	Plat		

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 Pierce Canyon 17-24-30 USA 1H		
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Site Position: Northing: 440,775 53 usft Latitude: 32 211046  
 From: Map Easting: 673,561 33 usft Longitude: -103.905808  
 Position Uncertainty: 0.00 ft Slot Radius: 13 200 in Grid Convergence: 0.23 °

Well	Well #1		
------	---------	--	--

Well Position +N/-S 0.00 ft Northing: 440,775 53 usft Latitude: 32 211046  
 +E/-W 0.00 ft Easting: 673,561 33 usft Longitude: -103.905808  
 Position Uncertainty 0.00 ft Wellhead Elevation: Ground Level: 0.00 ft

Wellbore	Wellbore #1		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2/14/2012	7 65	60 13	48,546

Design	Plat		
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### Audit Notes:

Version: Phase: PROTOTYPE Tie On Depth: 0 00

Vertical Section	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0 00	0 00	0 00	359 95

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0 00	0 00	0 00	0 00	0 00	0 00	0.00	0 00	0 00	0 00	
7,296 53	0 00	0 00	7,296 53	0 00	0 00	0.00	0 00	0 00	0 00	
8 046 54	90 00	359 95	7,774.00	477 47	-0.39	12.00	12 00	0 00	359 95	
12,520 51	90 00	359 95	7,774 00	4,951.44	-4 06	0.00	0 00	0 00	0 00	Pierce Canyon 17 1

# Chesapeake Operating

## Planning Report

Database	Drilling Database	Local Co-ordinate Reference	Well Well #1
Company	Permian District	TVD Reference:	WELL @ 0'00ft (Original Well Elev)
Project	Poker Lake	MD Reference:	WELL @ 0'00ft (Original Well Elev)
Site	PLU Pierce Canyon 17-24-30 USA 1H	North Reference:	Grid
Well	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore	Wellbore #1		
Design	Plat		

Planned/Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N/S (ft)	E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
100 00	0 00	0 00	100 00	0 00	0 00	0 00	0 00	0 00	0 00
200 00	0 00	0 00	200 00	0 00	0 00	0 00	0 00	0 00	0 00
300 00	0 00	0 00	300 00	0 00	0 00	0 00	0 00	0 00	0 00
400 00	0 00	0 00	400 00	0 00	0 00	0 00	0 00	0 00	0 00
500 00	0 00	0 00	500 00	0 00	0 00	0 00	0 00	0 00	0 00
600 00	0 00	0 00	600 00	0 00	0 00	0 00	0 00	0 00	0 00
700 00	0 00	0 00	700 00	0 00	0 00	0 00	0 00	0 00	0 00
800 00	0 00	0 00	800 00	0 00	0 00	0 00	0 00	0 00	0 00
900 00	0 00	0 00	900 00	0 00	0 00	0 00	0 00	0 00	0 00
1,000 00	0 00	0 00	1,000 00	0 00	0 00	0 00	0 00	0 00	0 00
1,100 00	0 00	0 00	1,100 00	0 00	0 00	0 00	0 00	0 00	0 00
1,200 00	0 00	0 00	1,200 00	0 00	0 00	0 00	0 00	0 00	0 00
1,300 00	0 00	0 00	1,300 00	0 00	0 00	0 00	0 00	0 00	0 00
1,400 00	0 00	0 00	1,400 00	0 00	0 00	0 00	0 00	0 00	0 00
1,500 00	0 00	0 00	1,500 00	0 00	0 00	0 00	0 00	0 00	0 00
1,600 00	0 00	0 00	1,600 00	0 00	0 00	0 00	0 00	0 00	0 00
1,700 00	0 00	0 00	1,700 00	0 00	0 00	0 00	0 00	0 00	0 00
1,800 00	0 00	0 00	1,800 00	0 00	0 00	0 00	0 00	0 00	0 00
1,900 00	0 00	0 00	1,900 00	0 00	0 00	0 00	0 00	0 00	0 00
2,000 00	0 00	0 00	2,000 00	0 00	0 00	0 00	0 00	0 00	0 00
2,100 00	0 00	0 00	2,100 00	0 00	0 00	0 00	0 00	0 00	0 00
2,200 00	0 00	0 00	2,200 00	0 00	0 00	0 00	0 00	0 00	0 00
2,300 00	0 00	0 00	2,300 00	0 00	0 00	0 00	0 00	0 00	0 00
2,400 00	0 00	0 00	2,400 00	0 00	0 00	0 00	0 00	0 00	0 00
2,500 00	0 00	0 00	2,500 00	0 00	0 00	0 00	0 00	0 00	0 00
2,600 00	0 00	0 00	2,600 00	0 00	0 00	0 00	0 00	0 00	0 00
2,700 00	0 00	0 00	2,700 00	0 00	0 00	0 00	0 00	0 00	0 00
2,800 00	0 00	0 00	2,800 00	0 00	0 00	0 00	0 00	0 00	0 00
2,900 00	0 00	0 00	2,900 00	0 00	0 00	0 00	0 00	0 00	0 00
3,000 00	0 00	0 00	3,000 00	0 00	0 00	0 00	0 00	0 00	0 00
3,100 00	0 00	0 00	3,100 00	0 00	0 00	0 00	0 00	0 00	0 00
3,200 00	0 00	0 00	3,200 00	0 00	0 00	0 00	0 00	0 00	0 00
3,300 00	0 00	0 00	3,300 00	0 00	0 00	0 00	0 00	0 00	0 00
3,400 00	0 00	0 00	3,400 00	0 00	0 00	0 00	0 00	0 00	0 00
3,500 00	0 00	0 00	3,500 00	0 00	0 00	0 00	0 00	0 00	0 00
3,600 00	0 00	0 00	3,600 00	0 00	0 00	0 00	0 00	0 00	0 00
3,700 00	0 00	0 00	3,700 00	0 00	0 00	0 00	0 00	0 00	0 00
3,800 00	0 00	0 00	3,800 00	0 00	0 00	0 00	0 00	0 00	0 00
3,900 00	0 00	0 00	3,900 00	0 00	0 00	0 00	0 00	0 00	0 00
4,000 00	0 00	0 00	4,000 00	0 00	0 00	0 00	0 00	0 00	0 00
4,100 00	0 00	0 00	4,100 00	0 00	0 00	0 00	0 00	0 00	0 00
4,200 00	0 00	0 00	4,200 00	0 00	0 00	0 00	0 00	0 00	0 00
4,300 00	0 00	0 00	4,300 00	0 00	0 00	0 00	0 00	0 00	0 00
4,400 00	0 00	0 00	4,400 00	0 00	0 00	0 00	0 00	0 00	0 00
4,500 00	0 00	0 00	4,500 00	0 00	0 00	0 00	0 00	0 00	0 00
4,600 00	0 00	0 00	4,600 00	0 00	0 00	0 00	0 00	0 00	0 00
4,700 00	0 00	0 00	4,700 00	0 00	0 00	0 00	0 00	0 00	0 00
4,800 00	0 00	0 00	4,800 00	0 00	0 00	0 00	0 00	0 00	0 00
4,900 00	0 00	0 00	4,900 00	0 00	0 00	0 00	0 00	0 00	0 00
5,000 00	0 00	0 00	5,000 00	0 00	0 00	0 00	0 00	0 00	0 00
5,100 00	0 00	0 00	5,100 00	0 00	0 00	0 00	0 00	0 00	0 00
5,200 00	0 00	0 00	5,200 00	0 00	0 00	0 00	0 00	0 00	0 00
5,300 00	0 00	0 00	5,300 00	0 00	0 00	0 00	0 00	0 00	0 00

# Chesapeake Operating

## Planning Report

Database:	Drilling Database	Local Co-ordinate Reference:	Well Well #1
Company:	Permian District	TVD Reference:	WELL @ 0.00ft (Original Well Elev)
Project:	Poker Lake	MD Reference:	WELL @ 0.00ft (Original Well Elev)
Site:	PLU Pierce Canyon 17-24-30 USA 1H	North Reference:	Grid
Well:	Well #1	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plat		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,296.53	0.00	0.00	7,296.53	0.00	0.00	0.00	0.00	0.00	0.00	
7,300.00	0.42	359.95	7,300.00	0.01	0.00	0.01	12.00	12.00	0.00	
7,400.00	12.42	359.95	7,399.19	11.17	-0.01	11.17	12.00	12.00	0.00	
7,500.00	24.42	359.95	7,493.90	42.70	-0.04	42.70	12.00	12.00	0.00	
7,600.00	36.42	359.95	7,579.98	93.23	-0.08	93.23	12.00	12.00	0.00	
7,700.00	48.42	359.95	7,653.67	160.56	-0.13	160.56	12.00	12.00	0.00	
7,800.00	60.42	359.95	7,711.75	241.74	-0.20	241.74	12.00	12.00	0.00	
7,900.00	72.42	359.95	7,751.69	333.22	-0.27	333.22	12.00	12.00	0.00	
8,000.00	84.42	359.95	7,771.73	431.00	-0.35	431.00	12.00	12.00	0.00	
8,046.54	90.00	359.95	7,774.00	477.47	-0.39	477.47	12.00	12.00	0.00	
8,100.00	90.00	359.95	7,774.00	530.93	-0.44	530.93	0.00	0.00	0.00	
8,200.00	90.00	359.95	7,774.00	630.93	-0.52	630.93	0.00	0.00	0.00	
8,300.00	90.00	359.95	7,774.00	730.93	-0.60	730.93	0.00	0.00	0.00	
8,400.00	90.00	359.95	7,774.00	830.93	-0.68	830.93	0.00	0.00	0.00	
8,500.00	90.00	359.95	7,774.00	930.93	-0.76	930.93	0.00	0.00	0.00	
8,600.00	90.00	359.95	7,774.00	1,030.93	-0.85	1,030.93	0.00	0.00	0.00	
8,700.00	90.00	359.95	7,774.00	1,130.93	-0.93	1,130.93	0.00	0.00	0.00	
8,800.00	90.00	359.95	7,774.00	1,230.93	-1.01	1,230.93	0.00	0.00	0.00	
8,900.00	90.00	359.95	7,774.00	1,330.93	-1.09	1,330.93	0.00	0.00	0.00	
9,000.00	90.00	359.95	7,774.00	1,430.93	-1.17	1,430.93	0.00	0.00	0.00	
9,100.00	90.00	359.95	7,774.00	1,530.93	-1.26	1,530.93	0.00	0.00	0.00	
9,200.00	90.00	359.95	7,774.00	1,630.93	-1.34	1,630.93	0.00	0.00	0.00	
9,300.00	90.00	359.95	7,774.00	1,730.93	-1.42	1,730.93	0.00	0.00	0.00	
9,400.00	90.00	359.95	7,774.00	1,830.93	-1.50	1,830.93	0.00	0.00	0.00	
9,500.00	90.00	359.95	7,774.00	1,930.93	-1.58	1,930.93	0.00	0.00	0.00	
9,600.00	90.00	359.95	7,774.00	2,030.93	-1.67	2,030.93	0.00	0.00	0.00	
9,700.00	90.00	359.95	7,774.00	2,130.93	-1.75	2,130.93	0.00	0.00	0.00	
9,800.00	90.00	359.95	7,774.00	2,230.93	-1.83	2,230.93	0.00	0.00	0.00	
9,900.00	90.00	359.95	7,774.00	2,330.93	-1.91	2,330.93	0.00	0.00	0.00	
10,000.00	90.00	359.95	7,774.00	2,430.93	-1.99	2,430.93	0.00	0.00	0.00	
10,100.00	90.00	359.95	7,774.00	2,530.93	-2.08	2,530.93	0.00	0.00	0.00	
10,200.00	90.00	359.95	7,774.00	2,630.93	-2.16	2,630.93	0.00	0.00	0.00	
10,300.00	90.00	359.95	7,774.00	2,730.93	-2.24	2,730.93	0.00	0.00	0.00	
10,400.00	90.00	359.95	7,774.00	2,830.93	-2.32	2,830.93	0.00	0.00	0.00	
10,500.00	90.00	359.95	7,774.00	2,930.93	-2.40	2,930.93	0.00	0.00	0.00	

# Chesapeake Operating

## Planning Report

<b>Database:</b>	Drilling Database	<b>Local Co-ordinate Reference:</b>	Well Well #1
<b>Company:</b>	Permian District	<b>TVD Reference:</b>	WELL @ 0.00ft (Original Well Elev)
<b>Project:</b>	Poker Lake	<b>MD Reference:</b>	WELL @ 0.00ft (Original Well Elev)
<b>Site:</b>	PLU Pierce Canyon 17-24-30 USA 1H	<b>North Reference:</b>	Grid
<b>Well:</b>	Well #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plat		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/S (ft)	+E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,600.00	90.00	359.95	7,774.00	3,030.93	-2.49	3,030.93	0.00	0.00	0.00	
10,700.00	90.00	359.95	7,774.00	3,130.93	-2.57	3,130.93	0.00	0.00	0.00	
10,800.00	90.00	359.95	7,774.00	3,230.93	-2.65	3,230.93	0.00	0.00	0.00	
10,900.00	90.00	359.95	7,774.00	3,330.93	-2.73	3,330.93	0.00	0.00	0.00	
11,000.00	90.00	359.95	7,774.00	3,430.93	-2.81	3,430.93	0.00	0.00	0.00	
11,100.00	90.00	359.95	7,774.00	3,530.93	-2.90	3,530.93	0.00	0.00	0.00	
11,200.00	90.00	359.95	7,774.00	3,630.93	-2.98	3,630.93	0.00	0.00	0.00	
11,300.00	90.00	359.95	7,774.00	3,730.93	-3.06	3,730.93	0.00	0.00	0.00	
11,400.00	90.00	359.95	7,774.00	3,830.93	-3.14	3,830.93	0.00	0.00	0.00	
11,500.00	90.00	359.95	7,774.00	3,930.93	-3.22	3,930.93	0.00	0.00	0.00	
11,600.00	90.00	359.95	7,774.00	4,030.93	-3.31	4,030.93	0.00	0.00	0.00	
11,700.00	90.00	359.95	7,774.00	4,130.93	-3.39	4,130.93	0.00	0.00	0.00	
11,800.00	90.00	359.95	7,774.00	4,230.93	-3.47	4,230.93	0.00	0.00	0.00	
11,900.00	90.00	359.95	7,774.00	4,330.93	-3.55	4,330.93	0.00	0.00	0.00	
12,000.00	90.00	359.95	7,774.00	4,430.93	-3.63	4,430.93	0.00	0.00	0.00	
12,100.00	90.00	359.95	7,774.00	4,530.93	-3.72	4,530.93	0.00	0.00	0.00	
12,200.00	90.00	359.95	7,774.00	4,630.93	-3.80	4,630.93	0.00	0.00	0.00	
12,300.00	90.00	359.95	7,774.00	4,730.93	-3.88	4,730.93	0.00	0.00	0.00	
12,400.00	90.00	359.95	7,774.00	4,830.93	-3.96	4,830.93	0.00	0.00	0.00	
12,500.00	90.00	359.95	7,774.00	4,930.93	-4.05	4,930.93	0.00	0.00	0.00	
12,520.51	90.00	359.95	7,774.00	4,951.44	-4.06	4,951.44	0.00	0.00	0.00	

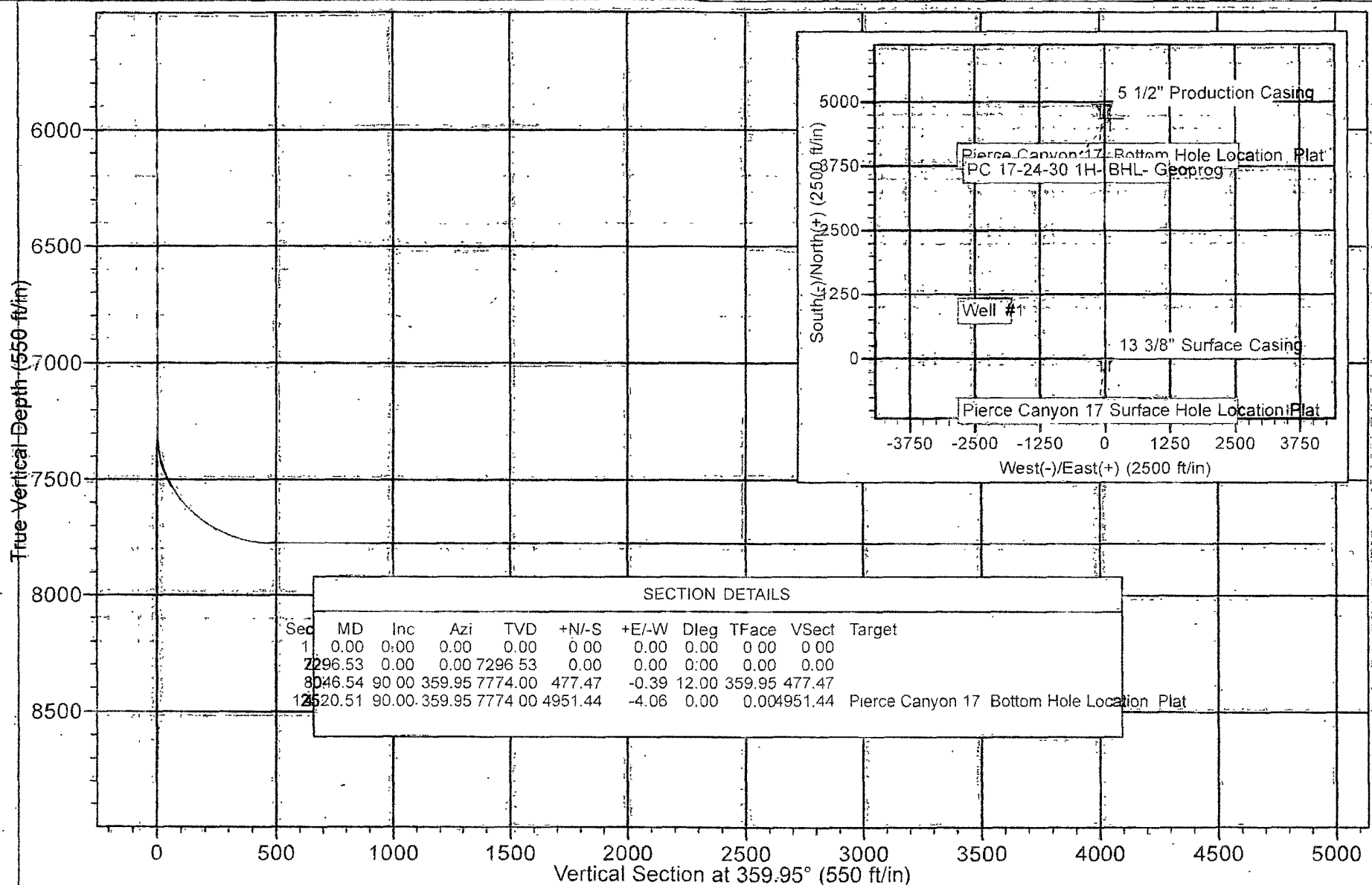
Design Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (ft)	+N/S (ft)	+E/W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Pierce Canyon 17 Sur		0.00	0.00	7,740.00	0.00	0.00	440,775.53	673,561.33	32.211046	-103.905808
- plan misses target center by 174.18ft at 7655.35ft MD (7622.52 TVD, 128.60 N, -0.11 E)										
- Point										
Pierce Canyon 17 Bo		0.00	0.00	7,774.00	4,951.44	-4.06	445,726.95	673,557.26	32.224657	-103.905758
- plan hits target center										
- Point										

Casing Points						
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)		
440.00	440.00	13 3/8" Surface Casing	13.375	17.500		
3,500.00	3,500.00	8 5/8" Intermediate Casing	8.625	11.000		
12,486.00	7,774.00	5 1/2" Production Casing	5.500	7.875		

Project: Poker Lake  
 Site: PLU Pierce Canyon 17-24-30 USA 1H  
 Well: Well #1  
 Wellbore: Wellbore #1  
 Design: Plat

# PROJECT DETAILS: Poker Lake

Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: New Mexico Eastern Zone



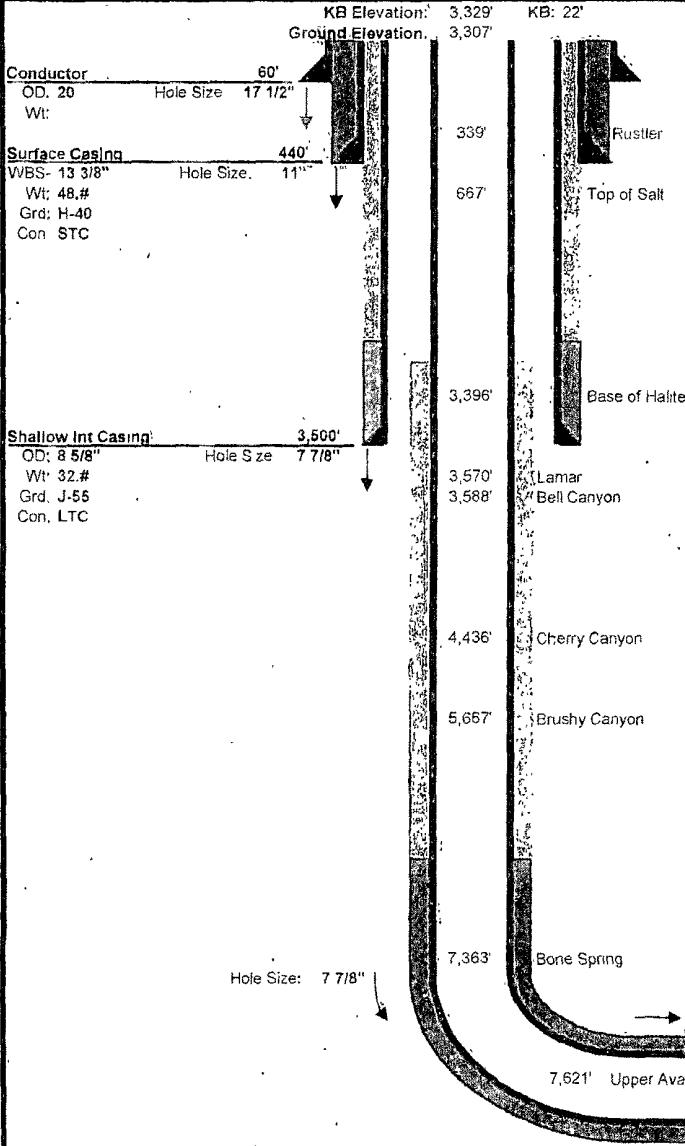




Drilling Engineer: Chris Gray  
 Superintendent: Daniel Gipson  
 Geologist: Chris Persellin

Well Name: PLU Pierce Canyon 17-24-30 USA 1H  
 Target: Upper Avalon Shale  
 County, State: Eddy, NM  
 Surface Location: 237' FSL 1980' FWL, Section 17, Township 24S Range 30 E  
 BH Location: 100 FNL 1980' FWL, Section 17, Township 24S, Range 30 E  
 SHL Latitude: 32.211046 SHL North: 440776  
 SHL Longitude: -103.905808 SHL East: 673561  
 BHL Latitude: 32.22465659 BHL North: 445727  
 BHL Longitude: -103.9057574 BHL East: 673557  
 Coordinates: NAD 83 Coordinates: NMSPCE

Drilling Rig: Patterson 62  
 Directional: Phoenix  
 Drilling Mud: Nova  
 Cement: Schlumberger  
 Wellhead: Sunbelt  
 Property Number: 644220  
 AFE Number: 170107



Wellhead Equipment	
A Section	13-3/8" x 13-5/8" 5K SOW (Multibowl)
B Section	N/A (Multibowl)
C Section	11" 5K X 7-1/16" 10K w/10k gate valve
D Section	N/A
Required BOP Stack	13-5/8" 5K Double Annular, Rot Head w/orbit valve

Mud				
Depth	Type	Weight	F. Vis	FL
0' - 440'	Spud Mud	8.4 - 8.7	32 - 34	NC - NC
440' - 3,500'	Brine	9.5 - 10.1	28 - 29	NC - NC
3,500' - 7,297'	Cut Brine	8.3 - 9	28 - 29	NC - NC
7,297' - 8,047'	Cut Brine	8.3 - 9	28 - 29	NC - NC
8,047' - 12,521'	Cut Brine	8.3 - 9	28 - 29	NC - NC

Cement						
Slurry	Top	Btm	Wt	Yld	%Exc	Bbl
Surface	0'	440'	13.5	1.73	200	156
Single Slurry	0'	440'	13.5	1.73	200	156
Shallow Int	0'	3,000'	12.0	1.99	200	383
Lead	0'	3,000'	12.0	1.99	200	383
Tail	3,000'	3,500'	14.2	1.37	200	71
Production	0'	7,297'	12.4	2.11	75	221
Lead	0'	7,297'	12.4	2.11	75	221
Tail	7,297'	12,521'	14.5	1.27	75	284

Type	Logs	Interval	Vendor
Mud Log	2 man Mudlog	Int Csg to TD	Suttles
OH	Triple Combo	Curve to Int Csg	TBD
OH	GR/Neutron	Int Cas to Surf	TBD
LWD	MWD Gamma	Curve and Lateral	Phoenix

Directional Plan						
Target Line:	7774' KBTV (oVS) @ 90.0 degrees inc					
Target Window:	20' above, 20' below, 50' left, 50' right					
KOP	7,297'	0.00	0.00	7,297'	0'	0.00
EOB	8,047'	90.00	359.95	7,774'	477'	12.00
TD	12,521'	90.00	359.95	7,774'	4,951'	0.00
Hardlines:	Lateral: 330' from parallel lease lines, Vertical: Actual Lease Lines					
Notes	Please note SHL and BHL distance from lease lines					

EXHIBIT H

# Chesapeake Minimum BOPE Requirements

Wellname: PLU Pierce Canyon 17-24-30 USA 1H

Operation: Intermediate and Production Hole Sections

## BLOWOUT PREVENTOR SCHEMATIC

CHESAPEAKE OPERATING INC

Permian District-Minimum Requirements

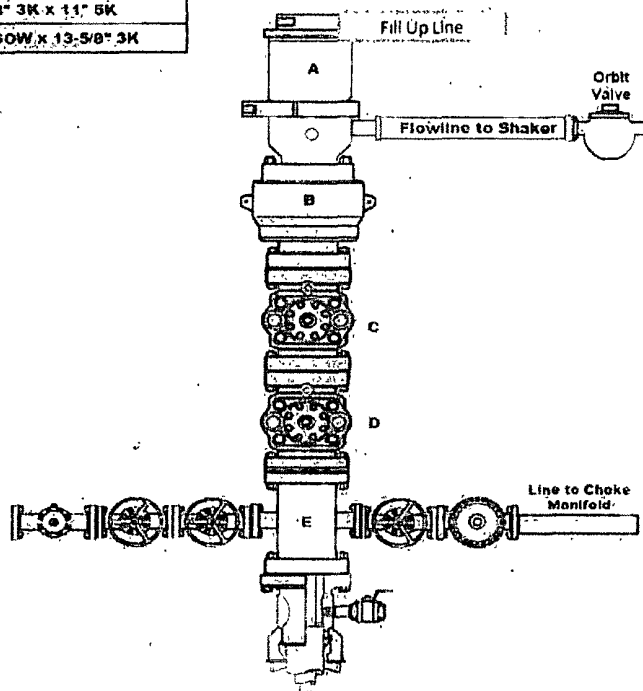
FIELD : Avalon

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

EXHIBIT F1

# Chesapeake Minimum BOPE Requirements

Wellname: PLU Pierce Canyon 17-24-30 USA 1H

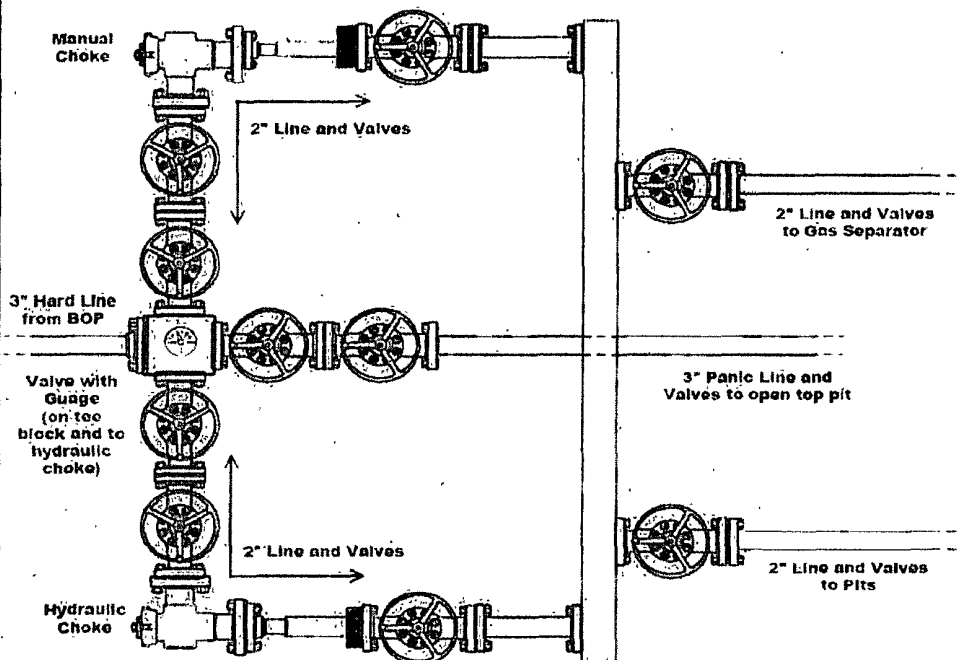
Operation: Intermediate and Production Hole Sections

## 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 (inched)

EXHIBIT F2

**Chesapeake Operating, Inc.'s Closed Loop System  
PLU PIERCE CANYON 17 24 30 USA 1H  
Unit N, Sec. 17, T-24-S R-30-E  
Eddy Co., NM  
API # TBD**

**Equipment & Design:**

Chesapeake Operating, Inc. is to use a closed loop system with roll-off steel pits.

This rig has:

One Derrick FLC-503 Dual Shale Shaker

One Derrick 3-Cone Desander

One Atmospheric Degasser

One 500 bbl frac tank for fresh water

One 500 bbl frac tank brine water

**Operations & Maintenance:**

During each and every tour, the rig's drilling crew will inspect and monitor closely the drilling fluids contained within the steel pits and visually monitor any spill which may occur.

Within 48 hours should a spill, release or leak occur, the NMOCD District II office in Artesia (575-748-1283) will be notified. Please note that notifications may be made earlier to the district office should a greater release occur.

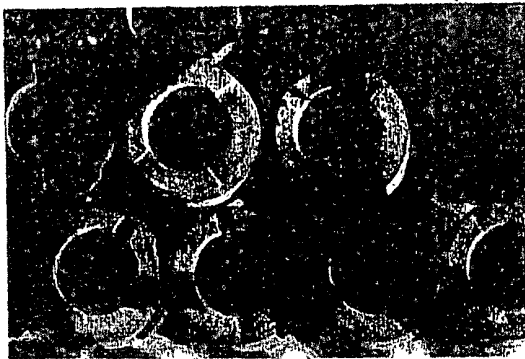
**Closure:**

During and after drilling operations, liquids (which apply), all drill cuttings and drilling fluids will be hauled and disposed to the Controlled Recovery, Inc.'s location.

The permit number for Controlled Recovery, Inc. is: NM-01-0006

The alternative disposal facility will be Sundance Disposal.

Their permit # is: NM-01-0003.



## RIG #62

### DRAWWORKS

Skytop Brewster N-75-M (1000HP)  
1 1/4" drill line, Parmac 342 auxiliary brake

### POWER

(2) Caterpillar 379 engines (550HP each)

### LIGHT PLANTS

(2) Caterpillar C-15 engines w/ 320 KW generators

### MAST

Ideal 137' w/ 622,000# capacity on 10 lines

### SUBSTRUCTURE

Ideal 15' box on box  
KB 17' Rotary beam clearance 12' 3"

### BLOCK HOOK

McKissick (300 Ton) combo

### PUMPS

(2) National 10-P-130, (1300HP each) triplex pumps  
Each independently powered by (1) Caterpillar 3512 engine

### MUD PITS

(2) tank system - 980 bbl capacity w/ 100 bbl slug pit

### SOLIDS EQUIPMENT

Derrick FLC-503 Dual Shaker  
Derrick 3-cone desander  
Derrick 20-cone desilter  
Atmospheric degasser  
(5) mud agitators

### BOP'S

13 5/8" X 5,000 psi Hydril annular  
13 5/8" X 5,000 psi Shaffer double

### ACCUMULATOR

Koomey 5-Station, 110 gallon accumulator

### CHOKE MANIFOLD

5,000 psi choke manifold

### SWIVEL

Continental Emsco (400 Ton)

### ROTARY TABLE

National (27 1/2")

### DRILL PIPE

4 1/2" drill pipe

### DRILL COLLARS

8" and 6 1/2" drill collars  
\*quantity subject to availability

### AUXILIARY EQUIPMENT

Pason EDR (base system)  
Fuel Tank - 10,000 gallon capacity  
Water Tank - (2) 500 barrel capacity each  
Fig Manager Quarters  
NOV ST-80 Iron Roughneck  
Satellite automatic driller  
Mathey survey unit

Revised 10.01.09



**PATTERSON-UTI  
DRILLING COMPANY**

# CHESAPEAKE OPERATING, INC.



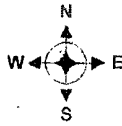
## PLU Pierce Canyon 20-24-30 USA 1H

NWNE Section 20 - T24S - R30E

75 FNL & 1725 FWL of Section

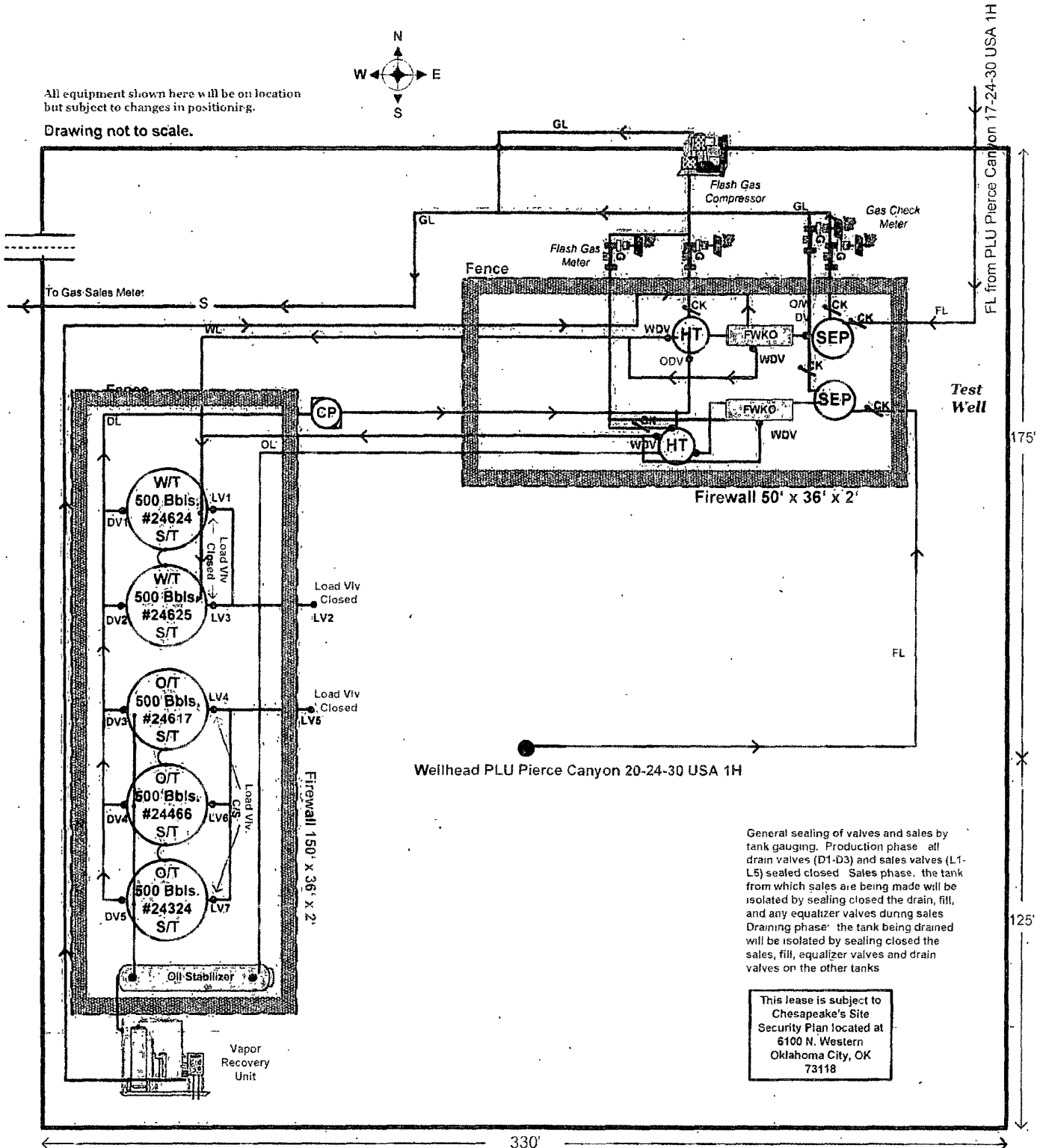
Lat.: 32.196736 - Long.: -103.905324

Eddy County, New Mexico



All equipment shown here will be on location but subject to changes in positioning.

Drawing not to scale.



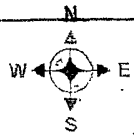
General sealing of valves and sales by tank gauging. Production phase: all drain valves (D1-D3) and sales valves (L1-L5) sealed closed. Sales phase: the tank from which sales are being made will be isolated by sealing closed the drain, fill, and any equalizer valves during sales. Draining phase: the tank being drained will be isolated by sealing closed the sales, fill, equalizer valves and drain valves on the other tanks.

This lease is subject to Chesapeake's Site Security Plan located at 6100 N. Western Oklahoma City, OK 73118

330'

Southern Union Gas will be laying pipeline to CHK

EXHIBIT C2



Patterson RIG 62

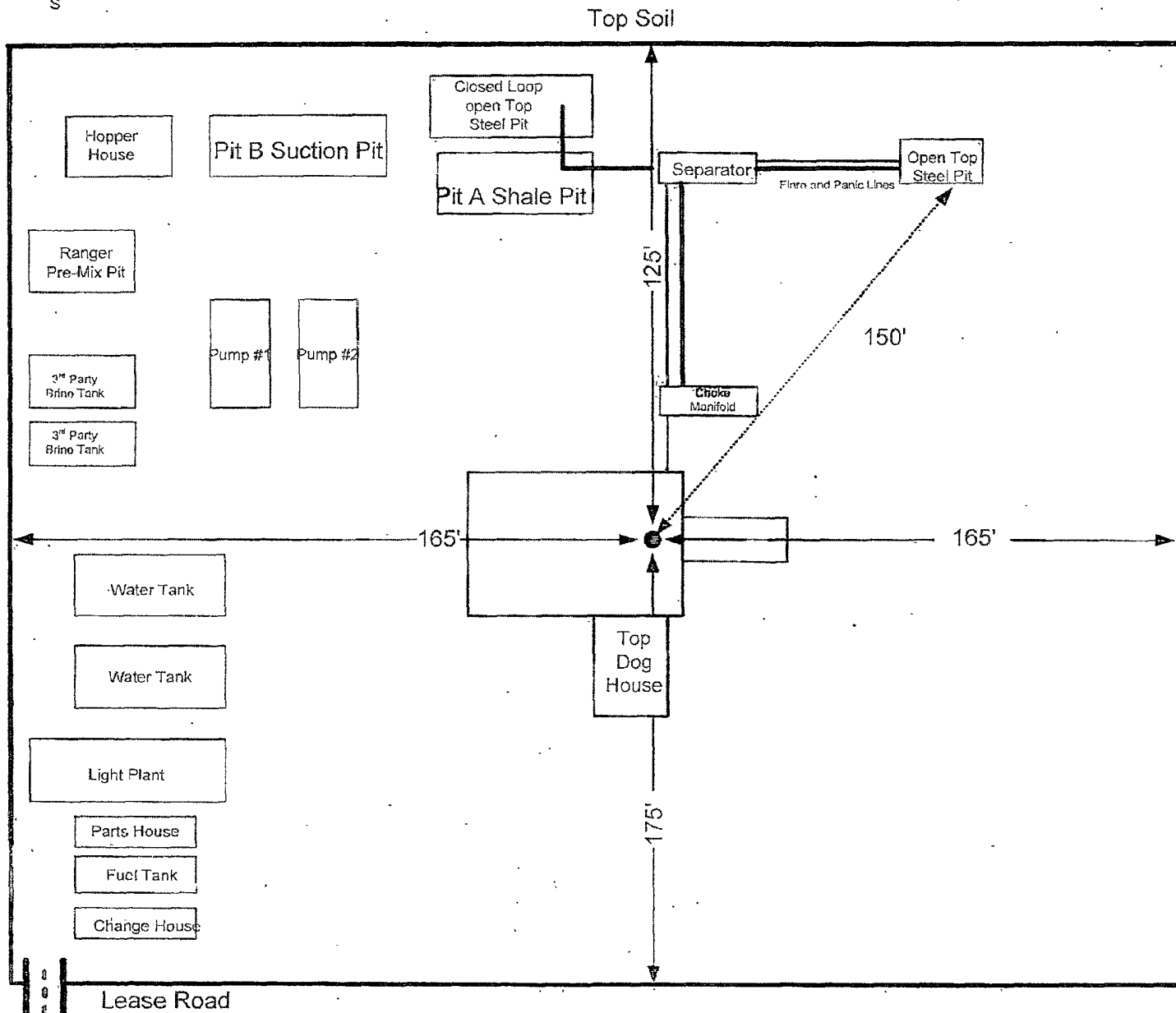


EXHIBIT D

# Chesapeake Operating, Inc.

Legals:

PLU Pierce Canyon 17-24-30 USA 1H

Eddy County, NM

UL N Section 17

Township 24 South

Lat: N 32.211045900

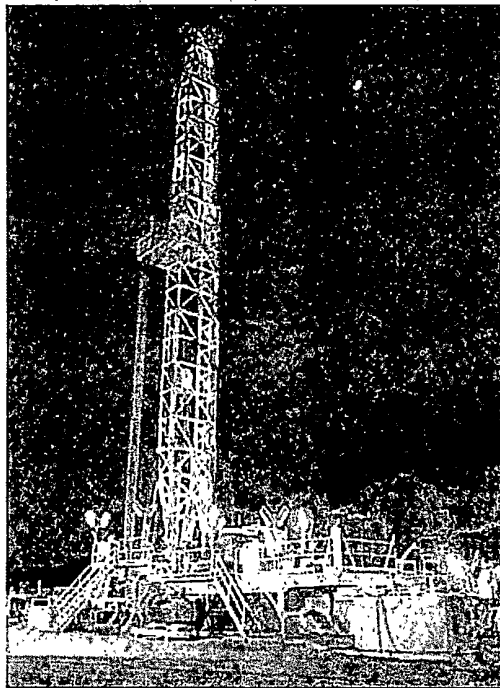
Lat: N 32.210922763

Long: W 103.905807974

Long: W 103.905321749

## H<sub>2</sub>S

### "Contingency Plan"



Safety Solutions, LLC  
7907 Industrial

(432) 563-0400  
Midland, TX 79706



## Emergency Assistance Telephone List

### **PUBLIC SAFETY:**

**911 or**

Lea County Sheriff's Department	(575) 396-3611
Jal City Police Dept	(575) 395-2121
Fire Department:	
Jal	(575) 395-2221
Eunice	(575) 394-2111
Ambulance: Jal	(575) 657-4355
Hobbs	
Hospitals:	
Lea Regional Medical Center (Hobbs)	(575) 492-5000
Permian Regional Medical Center (Andrews, TX)	(432) 523-2200
Dept. of Public Safety/Roswell	(575) 622-7200
Texas Dept. of Transportation	(432) 694-7951
U.S. Dept. of Labor	(505) 841-8405
AirMed/ Care Star	(877) 730-0009

### **Chesapeake Operating, Inc.**

Chesapeake / Midland	Office (432) 687-2992
----------------------	-----------------------

### **Company Drilling Consultants:**

Nathan Berg	Cell (405) 618-0767
Marcus Garcia	
Trailer	(832) 380-6700

### **Drilling Engineer**

Chris Gary	Cell (405) 935-4346
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### **Drilling Superintendent**

Tim Hartsfield	Cell (432) 940-9978
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### **Latshaw**

Office	(918) 355-4380
Safety- Cody Ashley	Cell (940) 867-4102
<b><u>Latshaw</u></b>	<b>(832) 380-6700</b>
Ray Ash Superintendent	Cell (432) 638-2008
Trailer	(832) 213-5247

### **Tool Pusher:**

Lupe Rodrigues	Cell (432) 755-4418
Jason	Cell (432) 556-0675

### **Safety Consultants**

Safety Solutions, LLC	Office (432) 563-0400
Cliff Strasner	Cell (432) 894-9789
Craig Strasner	Cell (432) 894-0341

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## H<sub>2</sub>S CONTINGENCY PLAN SECTION

### Scope:

This contingency plan provides an organized plan of action for alerting and protecting the *public* within an area of exposure prior to an intentional release, or following the accidental release of a potentially hazardous volume of hydrogen sulfide. The plan establishes guidelines for all personnel whose work activity may involve exposure to Hydrogen Sulfide Gas (H<sub>2</sub>S).

### Objective:

Prevent any and all accidents, and prevent the uncontrolled release of H<sub>2</sub>S into the atmosphere.

Provide proper evacuation procedures to cope with emergencies.

Provide immediate and adequate medical attention should an injury occur.

### Discussion of Plan:

#### Suspected Problem Zones:

**Implementation:** This plan, with all details, is to be fully implemented 1000' before drilling into the first sour zone.

**Emergency Response Procedure:** This section outlines the conditions and denotes steps to be taken in the event of an emergency.

**Emergency Equipment and Procedure:** This section outlines the safety and emergency equipment that will be required for the drilling of this well.

**Training Provisions:** This section outlines the training provisions that must be adhered to 1000' before drilling into the first sour zone.

**Emergency call list:** Included are the telephone numbers of all persons that would need to be contacted, should an H<sub>2</sub>S emergency occur.

**Briefing:** This section deals with the briefing of all persons involved with the drilling of this well.

**Public Safety:** Public Safety Personnel will be made aware of the drilling of this well.

**Check Lists:** Status check lists and procedural check lists have been included to ensure adherence to the plan.

**General Information:** A general information section has been included to supply support information.

## **EMERGENCY PROCEDURES SECTION**

**I. In the event of any evidence of H<sub>2</sub>S level above 10ppm, take the following steps immediately:**

- a. Secure breathing apparatus.
- b. Order non-essential personnel out of the danger zone.
- c. Take steps to determine if the H<sub>2</sub>S level can be corrected or suppressed, and if so, proceed with normal operations.

**II. If uncontrollable conditions occur, proceed with the following:**

- a. Take steps to protect and/or remove any public downwind of the rig, including partial evacuation or isolation. Notify necessary public safety personnel and the New Mexico Oil Conservation Division of the situation.
- b. Remove all personnel to the Safe Briefing Area.
- c. Notify public safety personnel for help with maintaining roadblocks and implementing evacuation.
- d. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety measures.

**III. Responsibility:**

- a. The Company Approved Supervisor shall be responsible for the total implementation of the plan.
- b. The Company Approved Supervisor shall be in complete command during any emergency.
- c. The Company Approved Supervisor shall designate a back up Supervisor in the event that he/she is not available.

## EMERGENCY PROCEDURE IMPLEMENTATION

### I. Drilling or Tripping

#### a. All Personnel

- i. When alarm sounds, don escape unit and report to upwind Safe Briefing Area.
- ii. Check status of other personnel (buddy system).
- iii. Secure breathing apparatus.
- iv. Wait for orders from supervisor.

#### b. Drilling Foreman

- i. Report to the upwind Safe Briefing Area.
- ii. Don Breathing Apparatus and return to the point of release with the Tool Pusher or Driller (buddy system).
- iii. Determine the concentration of H<sub>2</sub>S.
- iv. Assess the situation and take appropriate control measures.

#### c. Tool Pusher

- i. Report to the upwind Safe Briefing Area.
- ii. Don Breathing Apparatus and return to the point of release with the Drilling Foreman or the Driller (buddy system).
- iii. Determine the concentration of H<sub>2</sub>S.
- iv. Assess the situation and take appropriate control measures.

#### d. Driller

- i. Check the status of other personnel (in a rescue attempt, always use the buddy system).
- ii. Assign the least essential person to notify the Drilling Foreman and Tool Pusher, in the event of their absence.
- iii. Assume the responsibility of the Drilling Foreman and the Tool Pusher until they arrive, in the event of their absence.

**e. Derrick Man and Floor Hands**

- i. Remain in the upwind Safe Briefing Area until otherwise instructed by a supervisor.

**f. Mud Engineer**

- i. Report to the upwind Safe Briefing Area.
- ii. When instructed, begin check of mud for pH level and H<sub>2</sub>S level.

**g. Safety Personnel**

- i. Don Breathing Apparatus.
- ii. Check status of personnel.
- iii. Wait for instructions from Drilling Foreman or Tool Pusher.

**II. Taking a Kick**

- a. All Personnel report to the upwind Safe Briefing Area.
- b. Follow standard BOP procedures.

**III. Open Hole Logging**

- a. All unnecessary personnel should leave the rig floor.
- b. Drilling Foreman and Safety Personnel should monitor the conditions and make necessary safety equipment recommendations.

**IV. Running Casing or Plugging**

- a. Follow "Drilling or Tripping" procedures.
- b. Assure that all personnel have access to protective equipment.

## **SIMULATED BLOWOUT CONTROL DRILLS**

All drills will be initiated by activating alarm devices (air horn). One long blast, on the air horn, for ACTUAL and SIMULATED Blowout Control Drills. This operation will be performed by the Drilling Foreman or Tool Pusher at least one time per week for each of the following conditions, with each crew:

Drill #1            Bottom Drilling

Drill #2            Tripping Drill Pipe

In each of these drills, the initial reaction time to shutting in the well shall be timed as well as the total time for the crew to complete its entire pit drill assignment. The times must be recorded on the IADC Driller's Log as "Blowout Control Drill".

Drill No.:

Reaction Time to Shut-In:            minutes,            seconds.

Total Time to Complete Assignment:            minutes,            seconds.

### **I. Drill Overviews**

#### **a. Drill No. 1 – Bottom Drilling**

- i. Sound the alarm immediately.
- ii. Stop the rotary and hoist Kelly joint above the rotary table.
- iii. Stop the circulatory pump.
- iv. Close the drill pipe rams.
- v. Record casing and drill pipe shut-in pressures and pit volume increases.

#### **b. Drill No. 2 – Tripping Drill Pipe**

- i. Sound the alarm immediately.
- ii. Position the upper tool joint just above the rotary table and set the slips.
- iii. Install a full opening valve or inside blowout preventer tool in order to close the drill pipe.
- iv. Close the drill pipe rams.
- v. Record the shut-in annular pressure.
- vi.

## **II. Crew Assignments**

### **a. Drill No. 1 – Bottom Drilling**

#### ***i. Driller***

1. Stop the rotary and hoist Kelly joint above the rotary table.
2. Stop the circulatory pump.
3. Check Flow.
4. If flowing, sound the alarm immediately
5. Record the shut-in drill pipe pressure
6. Determine the mud weight increase needed or other courses of action.

#### ***ii. Derrick man***

1. Open choke line valve at BOP.
2. Signal Floor Man #1 at accumulator that choke line is open.
3. Close choke and upstream valve after pipe tam have been closed.
4. Read the shut-in annular pressure and report readings to Driller.

#### ***iii. Floor Man #1***

1. Close the pipe rams after receiving the signal from the Derrickman.
2. Report to Driller for further instructions.

#### ***iv. Floor Man #2***

1. Notify the Tool Pusher and Operator representative of the H<sub>2</sub>S alarms.
2. Check for open fires and, if safe to do so, extinguish them.
3. Stop all welding operations.
4. Turn-off all non-explosions proof lights and instruments.
5. Report to Driller for further instructions.

#### ***v. Tool Pusher***

1. Report to the rig floor.



2. Have a meeting with all crews.
3. Compile and summarize all information.
4. Calculate the proper kill weight.
5. Ensure that proper well procedures are put into action.

*vi. Operator Representative*

1. Notify the Drilling Superintendent.
2. Determine if an emergency exists and if so, activate the contingency plan.

**b. Drill No. 2 – Tripping Pipe**

**i. Driller**

1. Sound the alarm immediately when mud volume increase has been detected.
2. Position the upper tool joint just above the rotary table and set slips.
3. Install a full opening valve or inside blowout preventer tool to close the drill pipe.
4. Check flow.
5. Record all data reported by the crew.
6. Determine the course of action.

**ii. Derrick man**

1. Come down out of derrick.
2. Notify Tool Pusher and Operator Representative.
3. Check for open fires and, if safe to do so , extinguish them.
4. Stop all welding operations.
5. Report to Driller for further instructions.

**iii. Floor Man #1**

1. Pick up full opening valve or inside blowout preventer tool and stab into tool joint above rotary table (with Floor Man #2).

2. Tighten valve with back-up tongs.
3. Close pipe rams after signal from Floor Man #2.
4. Read accumulator pressure and check for possible high pressure fluid leaks in valves or piping.
5. Report to Driller for further instructions.

iv. Floor Man #2

1. Pick-up full opening valve or inside blowout preventer tool and stab into tool joint above rotary table (with Floor Man #1).
2. Position back-up tongs on drill pipe.
3. Open choke line valve at BOP.
4. Signal Floor Man #1 at accumulator that choke line is open.
5. Close choke and upstream valve after pipe rams have been closed.
6. Check for leaks on BOP stack and choke manifold.
7. Read annular pressure.
8. Report readings to the Driller.

v. Tool Pusher

1. Report to the rig floor.
2. Have a meeting with all of the crews.
3. Compile and summarize all information.
4. See that proper well kill procedures are put into action.

vi. Operator Representative

1. Notify Drilling Superintendent
2. Determine if an emergency exists, and if so, activate the contingency plan.

## **IGNITION PROCEDURES**

### **Responsibility:**

The decision to ignite the well is the responsibility of the DRILLING FOREMAN in concurrence with the STATE POLICE. In the event the Drilling Foreman is incapacitated, it becomes the responsibility of the RIG TOOL PUSHER. This decision should be made only as a last resort and in a situation where it is clear that:

1. Human life and property are endangered.
2. There is no hope of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

### **Instructions for Igniting the Well:**

1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and must use a full body harness and attach a retrievable safety line to the D-Ring in the back. One man must monitor the atmosphere for explosive gases with the LEL monitor, while the Drilling Foreman is responsible for igniting the well.
2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.
3. Ignite from upwind and do not approach any closer than is warranted.
4. Select the ignition site best suited for protection and which offers an easy escape route.
5. Before igniting, check for the presence of combustible gases.
6. After igniting, continue emergency actions and procedures as before.
7. All unassigned personnel will limit their actions to those directed by the Drilling Foreman.

Note: After the well is ignited, burning Hydrogen Sulfide will convert to Sulfur Dioxide, which is also highly toxic. Do not assume the area is safe after the well is ignited.

## **TRAINING PROGRAM**

When working in an area where Hydrogen Sulfide (H<sub>2</sub>S) might be encountered, definite training requirements must be carried out. The Company Supervisor will ensure that all personnel, at the well site, have had adequate training in the following:

1. Hazards and characteristics of Hydrogen Sulfide.
2. Physicals effects of Hydrogen Sulfide on the human body.
3. Toxicity of Hydrogen Sulfide and Sulfur Dioxide.
4. H<sub>2</sub>S detection, Emergency alarm and sensor location.
5. Emergency rescue.
6. Resuscitators.
7. First aid and artificial resuscitation.
8. The effects of Hydrogen Sulfide on metals.
9. Location safety.

Service company personnel and visiting personnel must be notified if the zone contains H<sub>2</sub>S, and each service company must provide adequate training and equipment for their employees before they arrive at the well site.

## **EMERGENCY EQUIPMENT REQUIREMENTS**

### **Lease Entrance Sign:**

Should be located at the lease entrance with the following information:

CAUTION – POTENTIAL POISON GAS  
HYDROGEN SULFIDE  
NO ADMITTANCE WITHOUT AUTHORIZATION

### **Respiratory Equipment:**

- Fresh air breathing equipment should be placed at the safe briefing areas and should include the following:
- Two SCBA's at each briefing area.
- Enough air line units to operate safely, anytime the H<sub>2</sub>S concentration reaches the IDLH level (100 ppm).
- Cascade system with enough breathing air hose and manifolds to reach the rig floor, the derrick man and the other operation areas.

### **Windsocks or Wind Streamers:**

- A minimum of two 10" windsocks located at strategic locations so that they may be seen from any point on location.
- Wind streamers (if preferred) should be placed at various locations on the well site to ensure wind consciousness at all times. (Corners of location).

### **Hydrogen Sulfide Detector and Alarms:**

- 1 - Four channel H<sub>2</sub>S monitor with alarms.
- Four (4) sensors located as follows: #1 – Rig Floor, #2 – Bell Nipple, #3 – Shale Shaker, #4 – Mud Pits.
- Gastec or Draeger pump with tubes.
- Sensor test gas.

**Well Condition Sign and Flags:**

The Well Condition Sign w/flags should be placed a minimum of 150' before you enter the location. It should have three (3) color coded flags (green, yellow and red) that will be used to denote the following location conditions:

GREEN – Normal Operating Conditions  
YELLOW – Potential Danger  
RED – Danger, H<sub>2</sub>S Gas Present

**Auxiliary Rescue Equipment:**

- Stretcher
- 2 – 100' Rescue lines.
- First Aid Kit properly stocked.

**Mud Inspection Equipment:**

Garret Gas Train or Hach Tester for inspection of Hydrogen Sulfide in the drilling mud system.

**Fire Extinguishers:**

Adequate fire extinguishers shall be located at strategic locations.

**Blowout Preventer:**

- The well shall have hydraulic BOP equipment for the anticipated BHP.
- The BOP should be tested upon installation.
- BOP, Choke Line and Kill Line will be tested as specified by Operator.

**Confined Space Monitor:**

There should be a portable multi-gas monitor with at least 3 sensors (O<sub>2</sub>, LEL H<sub>2</sub>S). This instrument should be used to test the atmosphere of any confined space before entering. It should also be used for atmospheric testing for LEL gas before beginning any type of Hot Work. Proper calibration documentation will need to be provided.

**Communication Equipment:**

- Proper communication equipment such as cell phones or 2-way radios should be available at the rig.
- Radio communication shall be available for communication between the company man's trailer, rig floor and the tool pusher's trailer.

- 
- 
- Communication equipment shall be available on the vehicles.

**Special Control Equipment:**

- Hydraulic BOP equipment with remote control on the ground.
- Rotating head at the surface casing point.

**Evacuation Plan:**

- Evacuation routes should be established prior to spudding the well.
- Should be discussed with all rig personnel.

**Designated Areas:**

***Parking and Visitor area:***

- All vehicles are to be parked at a pre-determined safe distance from the wellhead.
- Designated smoking area.

**Safe Briefing Areas:**

- Two Safe Briefing Areas shall be designated on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds or they are at a 180 degree angle if wind directions tend to shift in the area.
- Personal protective equipment should be stored at both briefing areas or if a moveable cascade trailer is used, it should be kept upwind of existing winds. When wind is from the prevailing direction, both briefing areas should be accessible.

***Note:***

- Additional equipment will be available at the Safety Solutions, LLC office.
- Additional personal H<sub>2</sub>S monitors are available for all employees on location.
- Automatic Flare Igniters are recommended for installation on the rig.

## CHECK LISTS

### Status Check List

Note: Date each item as they are implemented.

1. Sign at location entrance. \_\_\_\_\_
2. Two (2) wind socks (in required locations). \_\_\_\_\_
3. Wind Streamers (if required). \_\_\_\_\_
4. SCBA's on location for all rig personnel and mud loggers. \_\_\_\_\_
5. Air packs, inspected and ready for use. \_\_\_\_\_
6. Spare bottles for each air pack (if required). \_\_\_\_\_
7. Cascade system for refilling air bottles. \_\_\_\_\_
8. Cascade system and hose line hook up. \_\_\_\_\_
9. Choke manifold hooked-up and tested.  
(before drilling out surface casing.) \_\_\_\_\_
10. Remote Hydraulic BOP control (hooked-up and tested before  
drilling out surface casing). \_\_\_\_\_
11. BOP tested (before drilling out surface casing). \_\_\_\_\_
12. Mud engineer on location with equipment to test mud for H<sub>2</sub>S. \_\_\_\_\_
13. Safe Briefing Areas set-up \_\_\_\_\_
14. Well Condition sign and flags on location and ready. \_\_\_\_\_
15. Hydrogen Sulfide detection system hooked -up & tested. \_\_\_\_\_
16. Hydrogen Sulfide alarm system hooked-up & tested. \_\_\_\_\_
17. Stretcher on location at Safe Briefing Area. \_\_\_\_\_
18. 2 – 100' Life Lines on location. \_\_\_\_\_
19. 1 – 20# Fire Extinguisher in safety trailer. \_\_\_\_\_
20. Confined Space Monitor on location and tested. \_\_\_\_\_
21. All rig crews and supervisor trained (as required). \_\_\_\_\_



22. Access restricted for unauthorized personnel.

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23. Drills on H<sub>2</sub>S and well control procedures.

---

24. All outside service contractors advised of potential H<sub>2</sub>S on the well.

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25. NO SMOKING sign posted.

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26. H<sub>2</sub>S Detector Pump w/tubes on location.

---

27. 25mm Flare Gun on location w/flares.

---

28. Automatic Flare Igniter installed on rig.

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## **Procedural Check List**

Perform the following on each tour:

1. Check fire extinguishers to see that they have the proper charge.
2. Check breathing equipment to insure that they have not been tampered with.
3. Check pressure on the supply air bottles to make sure they are capable of recharging.
4. Make sure all of the Hydrogen Sulfide detection systems are operative.

Perform the following each week:

1. Check each piece of breathing equipment to make sure that they are fully charged and operational. This requires that the air cylinder be opened and the mask assembly be put on and tested to make sure that the regulators and masks are properly working. Negative and Positive pressure should be conducted on all masks.
2. BOP skills.
3. Check supply pressure on BOP accumulator stand-by source.
4. Check all breathing air mask assemblies to see that straps are loosened and turned back, ready for use.
5. Check pressure on cascade air cylinders to make sure they are fully charged and ready to use for refill purposes if necessary.
6. Check all cascade system regulators to make sure they work properly.
7. Perform breathing drills with on-site personnel.
8. Check the following supplies for availability:
  - Stretcher
  - Safety Belts and Ropes
  - Spare air Bottles
  - Spare Oxygen Bottles (if resuscitator required)
  - Gas Detector Pump and Tubes
  - Emergency telephone lists
9. Test the Confined Space Monitor to verify the batteries are good

## **BRIEFING PROCEDURES**

The following scheduled briefings will be held to ensure the effective drilling and operation of this project:

### **Pre-Spud Meeting**

**Date:** Prior to spudding the well.

**Attendance:** Drilling Supervisor  
Drilling Engineer  
Drilling Foreman  
Rig Tool Pushers  
Rig Drillers  
Mud Engineer  
All Safety Personnel  
Key Service Company Personnel

**Purpose:** Review and discuss the well program, step-by-step, to insure complete understanding of assignments and responsibilities.

## **EVACUATION PLAN**

### **General Plan**

The direct lines of action prepared by SAFETY SOLUTIONS, LLC to protect the public from hazardous gas situations are as follows:

1. When the company approved supervisor (Drilling Foreman, Tool Pusher or Driller) determine that Hydrogen Sulfide gas cannot be limited to the well location, and the public will be involved, he will activate the evacuation plan. Escape routes are noted on the area map.
2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists and evacuation needs to be implemented.
3. Company approved safety personnel that have been trained in the use of the proper emergency equipment will be utilized.
4. Law enforcement personnel (State Police, Local Police Department, Fire Department, and the Sheriff's Department) will be called to aid in setting up and maintaining road blocks. Also, they will aid in evacuation of the public if necessary.

**NOTE:** Law enforcement personnel will not be asked to come into a contaminated area. Their assistance will be limited to uncontaminated areas. Constant radio contact will be maintained with them.

5. After the discharge of gas has been controlled, "Company" safety personnel will determine when the area is safe for re-entry.

**See Emergency Action Plan**

### **Affected Notification List**

The geologic zones that will be encountered during drilling are known to contain hazardous quantities of H<sub>2</sub>S. The accompanying map illustrates the affected areas of the community. The residents within this radius will be notified via a hand delivered written notice describing the activities, potential hazards, conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

**Evacuee Description:**

**Residents:      THERE ARE NO RESIDENTS WITHIN 3000' ROE.**

**Notification Process:**

A continuous siren audible to all residence will be activated, signaling evacuation of previously notified and informed residents.

**Evacuation Plan:**

All evacuees will migrate lateral to the wind direction.

The Oil Company will identify all home bound or highly susceptible individuals and make special evacuation preparations, interfacing with the local and emergency medical service as necessary.

\*If at the time of a release the 100 ppm roe is calculated to be greater than 2000', then the Eddy county Sherriff's dept. will be contacted and informed of the potential danger to County Rd Galivan (746-A). See Page 34 for Map.

## PROTECTION OF THE GENERAL PUBLIC/ROE:

In the event greater than 100 ppm H<sub>2</sub>S is present, the ROE (Radius Of Exposure) calculations will be done to determine if the following is warranted:

- 100 ppm at any public area (any place not associated with this site)
- 500 ppm at any public road (any road which the general public may travel)
- 100 ppm radius of 3000' will be assumed if there is insufficient data to do the calculations, and there is a reasonable expectation that H<sub>2</sub>S could be present in concentrations greater than 100 ppm in the gas mixture.

### **Calculation for the 100 ppm ROE:**

6258

$$X = [(1.589) (\text{concentration}) (Q)]^{0.6258}$$

### **Calculation for the 500 ppm ROE:**

1

$$X = [(0.4546) (\text{concentration}) (Q)]^{0.6258}$$

EXAMPLE: If a well/facility has been determined to have 150 ppm H<sub>2</sub>S in the gas mixture and the well/facility is producing at a gas rate of 100 MCFPD then:

$$\begin{aligned} 100 \text{ PPM} \quad X &= [(1.589)(150/1,000,000)(100,000)]^{0.6258} \\ X &= 7' \end{aligned}$$

6258

$$\begin{aligned} 500 \text{ PPM} \quad X &= [(0.4546)(150/1,000,000)(100,000)]^{0.6258} \\ X &= 3' \end{aligned}$$

(These calculations will be forwarded to the appropriate District NMOCD office when applicable)

## Toxic Effects of H<sub>2</sub>S Poisoning

Hydrogen Sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 10 PPM, which is .001% by volume. Hydrogen Sulfide is heavier than air (specific gravity – 1.192) and is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen Sulfide and other gases are compared below in Table 1. Toxicity table for H<sub>2</sub>S and physical effects are shown in Table 2.

Table 1  
Permissible Exposure Limits of Various Gases

Common Name	Symbol	Sp. Gravity	TLV	STEL	IDLH
Hydrogen Cyanide	HCN	.94	4.7 ppm	C	
Hydrogen Sulfide	H <sub>2</sub> S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	SO <sub>2</sub>	2.21	2 ppm	5 ppm	
Chlorine	CL	2.45	.5 ppm	1 ppm	
Carbon Monoxide	CO	.97	25 ppm	200 ppm	
Carbon Dioxide	CO <sub>2</sub>	1.52	5000 ppm	30,000 ppm	
Methane	CH <sub>4</sub>	.55	4.7% LEL	14% UEL	

## Definitions

- A. TLV – Threshold Limit Value is the concentration employees may be exposed based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists) and regulated by OSHA.
- B. STEL – Short Term Exposure Limit is the 15 minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H<sub>2</sub>S is 19 PPM.
- C. IDLH – Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H<sub>2</sub>S is 100 PPM.
- D. TWA – Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed based on an TWA.

**TABLE 2**Toxicity Table of H<sub>2</sub>S

Percent %	PPM	Physical Effects
.0001	1	Can smell less than 1 ppm.
.001	10	TLV for 8 hours of exposure.
.0015	15	STEL for 15 minutes of exposure.
.01	100	Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes.
.02	200	Kills sense of smell quickly, may burn eyes and throat.
.05	500	Dizziness, cessation of breathing begins in a few minutes.
.07	700	Unconscious quickly, death will result if not rescued promptly.
.10	1000	Death will result unless rescued promptly. Artificial resuscitation may be necessary.



## PHYSICAL PROPERTIES OF H<sub>2</sub>S

The properties of all gases are usually described in the context of seven major categories:

COLOR  
ODOR  
VAPOR DENSITY  
EXPLOSIVE LIMITS  
FLAMMABILITY  
SOLUBILITY (IN WATER)  
BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

### ***COLOR – TRANSPARENT***

Hydrogen Sulfide is colorless so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence. In fact that makes this gas extremely dangerous to be around.

### ***ODOR – ROTTEN EGGS***

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs". For this reason it earned its common name "sour gas". However, H<sub>2</sub>S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

### ***VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192***

Hydrogen Sulfide is heavier than air so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H<sub>2</sub>S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

### ***EXPLOSIVE LIMITS – 4.3% TO 46%***

Mixed with the right proportion of air or oxygen, H<sub>2</sub>S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

### ***FLAMMABILITY***

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO<sub>2</sub>), another hazardous gas that irritates the eyes and lungs.

### ***SOLUBILITY – 4 TO 1 RATIO WITH WATER***

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H<sub>2</sub>S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H<sub>2</sub>S may release the gas into the air.

### ***BOILING POINT – (-76 degrees Fahrenheit)***

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.

## **RESPIRATOR USE**

The Occupational Safety and Health Administration (OSHA) regulate the use of respiratory protection to protect the health of employees. OSHA's requirements are written in the Code of Federal Regulations, Title 29, Part 1910, Section 134, Respiratory Protection. This regulation requires that all employees who might be required to wear respirators, shall complete a OSHA mandated medical evaluation questionnaire. The employee then should be fit tested prior to wearing any respirator while being exposed to hazardous gases.

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheric situations, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

Respirators shall be inspected prior to and after each use to make sure that the respirator has been properly cleaned, disinfected and that the respirator works properly. The unit should be fully charged prior to being used.

Anyone who may use respirators shall be properly trained in how to properly seal the face piece. They shall wear respirators in normal air and then in a test atmosphere. (Note: Such items as facial hair (beard or sideburns) and eyeglass temple pieces will not allow a proper seal.) Anyone that may be expected to wear respirators should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses. Contact lenses should not be allowed.

Respirators shall be worn during the following conditions:

- A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H<sub>2</sub>S.
- B. When breaking out any line where H<sub>2</sub>S can reasonably be expected.
- C. When sampling air in areas where H<sub>2</sub>S may be present.
- D. When working in areas where the concentration of H<sub>2</sub>S exceeds the Threshold Limit Value for H<sub>2</sub>S (10 ppm).
- E. At any time where there is a doubt as to the H<sub>2</sub>S level in the area to be entered.

## **EMERGENCY RESCUE PROCEDURES**

***DO NOT PANIC!!!***

**Remain Calm – Think**

1. Before attempting any rescue you must first get out of the hazardous area yourself. Go to a safe briefing area.
2. Sound alarm and activate the 911 system.
3. Put on breathing apparatus. At least two persons should do this, when available use the buddy system.
4. Rescue the victim and return them to a safe briefing area.
5. Perform an initial assessment and begin proper First Aid/CPR procedures.
6. Keep victim lying down with a blanket or coat, etc., under the shoulders to keep airway open. Conserve body heat and do not leave unattended.
7. If the eyes are affected by H<sub>2</sub>S, wash them thoroughly with potable water. For slight irritation, cold compresses are helpful.
8. In case a person has only minor exposure and does not lose consciousness totally, it's best if he doesn't return to work until the following day.
9. Any personnel overcome by H<sub>2</sub>S should always be examined by medical personnel. They should always be transported to a hospital or doctor.

**RAILROAD COMMISSION OF TEXAS  
OIL AND GAS DIVISION  
CERTIFICATE OF COMPLIANCE STATEWIDE RULE 36**

FORM H-9  
12/12/77

FILE WITH  
DISTRICT OFFICE  
IN TRIPLICATE

1. Operator <b>Chas Plate Operating Co.</b>		2. Operator Number (See Instruction 13) <b>147179</b>		3. RRC Dist.	
4. Street or P. O. Box No.		5. City		6. State <b>NM</b>	
7. Zip Code		8. Name of Lease, Facility or Operation <b>PLU Pierce Canyon 17 2430</b>		9. Field or Area Name	
10. County <b>Eddy</b>		11. General Operation Type - Circle One:			
A - Oil Field Production      B - Gas Field Production C - Pipeline or Gathering Sys.      D - Gasoline Plant <u>E - Drilling or Workover</u> F - Sweetening Unit G - Combination (explain)      H - Other (explain)		Other Explanation			
12. RRC ID# of Operation(s) to be Covered by This Certificate		Type ID Code (See Instruction 12)		Indicate if Filing for Storage Facility Only YES      NO	
13. Hydrogen Sulfide Concentration <b>N/A</b> PPM		14. Maximum Escape Volume <b>N/A</b> MCF/Day		15. 100 PPM Radius of Exposure (ROE) <b>N/A</b> Ft.	
16. 500 PPM Radius of Exposure (ROE) _____ Ft.		17. Operation is Existing <input type="checkbox"/> New <input type="checkbox"/>		18. Modification Resulting in Certificate Change Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
19. Workover or Drilling Well with 100 PPM ROE Greater than 3000' feet on Rule 36 Certified Well/Lease Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		20. Previous Certificate Number if Available (For Amended Certificates) <b>N/A</b>		21. The 100 PPM ROE includes any part of a public area except a public road Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
22. The 500 PPM ROE includes any part of a public road Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		23. Injection of fluid containing Hydrogen Sulfide (See Instruction 14) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		24. Date (or Depth) of Compliance with all applicable provisions of Rule 36 ____/____/19____ Mo      Day      Year	
25. Contingency Plan Location of Plan (See Instruction 15)		Has been prepared		Yes <input type="checkbox"/> No <input type="checkbox"/>	
26. Location of data used to prepare this certificate (See Instruction 15)					
<b>CERTIFICATE</b>					
I declare under penalties prescribed in Section 91.143, Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision, and that I am qualified to make this certification by virtue of my training and experience, and by my analysis of the operation being certified, or by the analysis of qualified person working under my supervision, and that the data and facts stated therein are true, correct, and complete, to the best of my knowledge.					
<b>Chad Spruill</b>		<b>HQS Specialist</b>		<b>(432) 238 0709</b>	
Representative of Company		Title		Phone No.	
				Date <b>20 APR 2012</b>	

**RAILROAD COMMISSION USE ONLY**

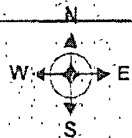
This operation and the equipment used therein is approved on the basis of the above certification and is subject to further Commission audit for compliance with the required provisions of Statewide Rule 36. This approval may be cancelled if investigation determines that the operation does not comply with the provisions of Statewide Rule 36.

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

REMARKS:

CERTIFICATION NUMBER: \_\_\_\_\_



\*\*Prevailing wind direction is from the Southwest.

Patterson 62

Top Soil

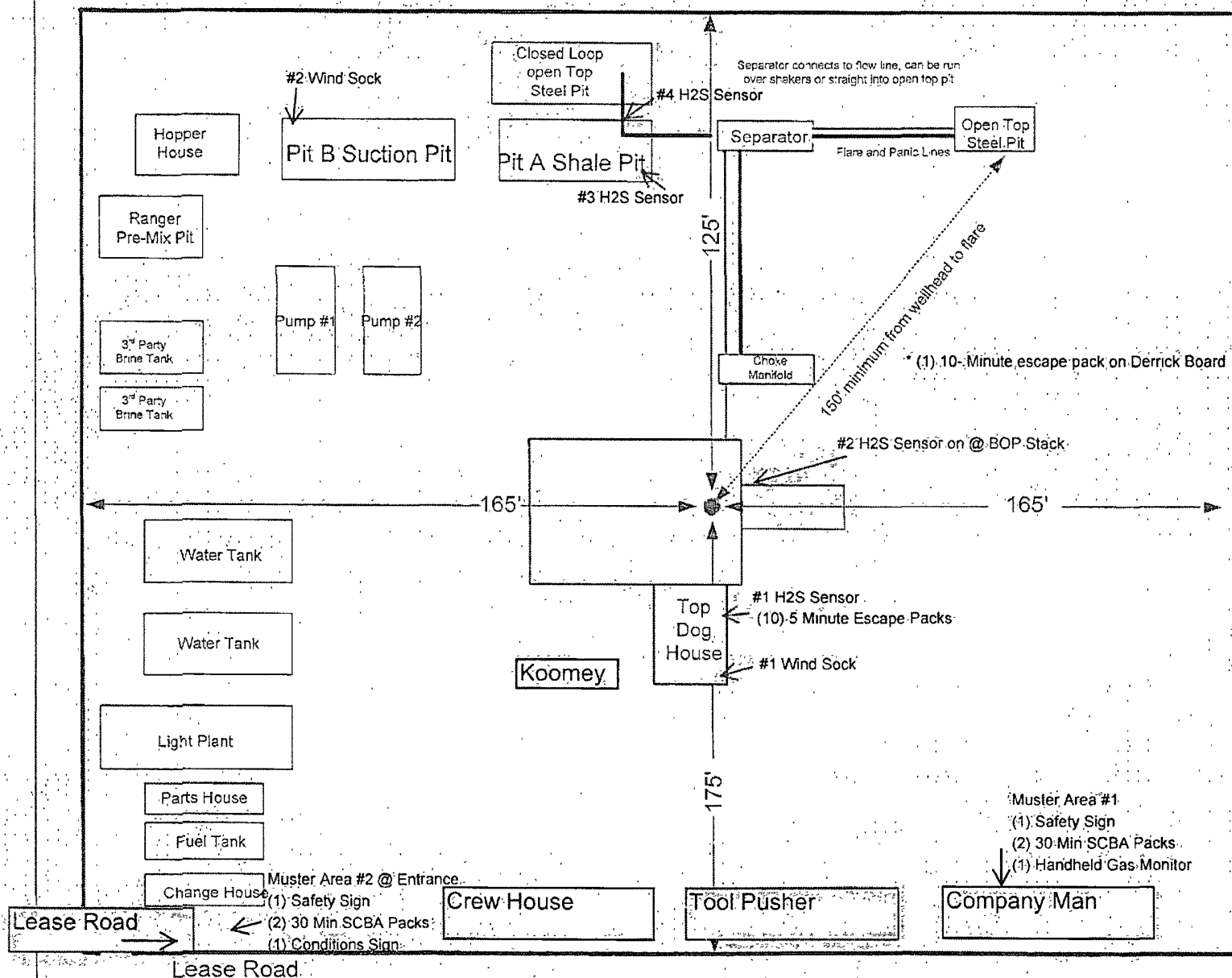
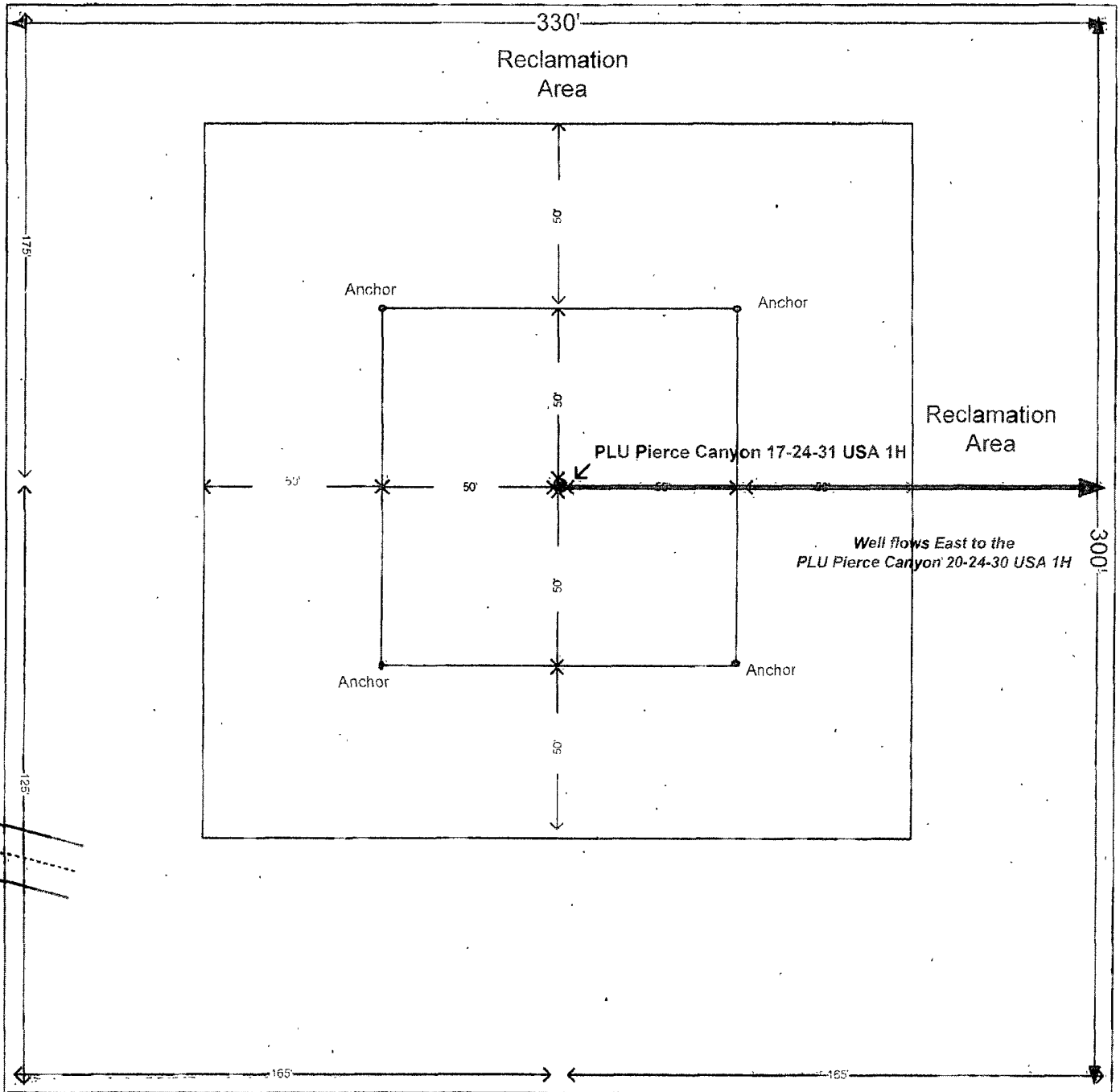
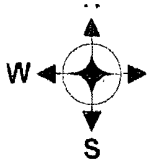


EXHIBIT D



# PLU Pierce Canyon 17-24-31 USA 1H

Property Number 644220 PAD SITE Number 915987  
Section 17 - T24S - R30E 237 FSL & 1980 FWL of Section  
Lat.: 32.21071 - Long.: -103.905515  
Eddy County, New Mexico



Drawing not to scale

This lease is subject to  
Chesapeake's Site Security Plan  
located at 6100 N. Western  
Oklahoma City, OK 73118

Prepared by: Donny Lowry  
Date: 02/17/2012

EXHIBIT CL

## PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Chespeake
LEASE NO.:	NM-02860
WELL NAME & NO.:	PLU Pierce Canyon 17 24 30 USA #1H
SURFACE HOLE FOOTAGE:	237' FSL & 1980' FWL
BOTTOM HOLE FOOTAGE	100' FNL & 1980' FWL
LOCATION:	Section 17, T.27 S., R.30 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.

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  - Roads
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- ☒ **Drilling**
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