Form 3160-3
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires March 31, 2007

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: BIA 142060462

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

6. If Indian, Allotee or Tribe Name: Ute Mountain Ute

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

7. Unit or CA Agreement Name and No.: N/A

2. Name of Operator: XTO Energy Inc.

8. Lease Name and Well No.: Ute Indians A #49

3a. Address: 2700 Farmington Ave., Bldg. K, Ste 1 Farmington, NM

3b. Phone No. (include area code): 505-324-1090

9. API Well No.: 30-045-34288

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

At surface: 1880' FNL x 1295' FWL in Sec 35, T32N, R14W

At proposed prod. zone: SAME Lot 4 (108)

10. Field and Pool, or Exploratory: Ute Dome Paradox

11. Sec., T., R., M., or Blk. and Survey or Area: (E) Sec 35, T32N, R14W

14. Distance in miles and direction from nearest town or post office*: Approximately 14 miles Northwest of Farmington, NM post office

12. County or Parish: San Juan

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drg. unit line, if any)	16. No. of Acres in lease	17. Spacing Unit dedicated to this well
1295'	4251.90	640 all
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	**19. Proposed Depth**	**20. BLM/BIA Bond No. on file**
220'	8723'	UTB-000138
21. Elevations (Show whether DF, KDB, RT, GL, etc.	**22. Approximate date work will start***	**23. Estimated duration**
6074' Ground Elevation	January 2007	4 weeks

24. Attachments

Venting / Flaring approved for 30 days per NTL-4A

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

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

25. Signature	Name (*Printed/Typed*)	Date
Kyla Vaughan	Kyla Vaughan	09/12/06

Title: Regulatory Compliance Tech

APPROVED FOR A PERIOD NOT TO EXCEED 1 YEAR.

Approved by (Signautre)	Name (*Printed/Typed*)	Date
/s/ Brian W. Davis	Acting Field Office Manager	APR 23 2007
Title	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.

SEE ATTACHED CONDITIONS OF APPROVAL

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowlingly 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.

(Instructions on page 2)

NOTIFY AZTEC OCD 24 HRS. PRIOR TO CASING & CEMENT

RECEIVED
SEP 15 2006
Bureau of Land Management
Durango, Colorado

RCVD APR 20 '07
OIL CONS. DIV.
DIST. 3

Approval of this agreement does not warrant or certify that the operator thereof and other holders of operating rights hold legal or equitable title to those rights in the subject lease which are committed hereto...

4/30/07

RCVD APR25'07

OIL CONS. DIV.
DIST. 3

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240

DISTRICT II
1301 W. Grand Ave., Artesia, N.M. 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410

DISTRICT IV
1220 South St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

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

Form C-102
Revised June 10, 2003

Submit to Appropriate District Office
State Lease – 4 Copies
Fee Lease – 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-045-34288	86760	Ute Dome Paradox

4 Property Code	5 Property Name	6 Well Number
22645	UTE INDIANS A	49

7 OGRID No.	8 Operator Name	9 Elevation
~~167067~~ 5380	XTO ENERGY INC.	6074

10 Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	35	32-N	14-W	1100	1880	NORTH	1295	WEST	SAN JUAN

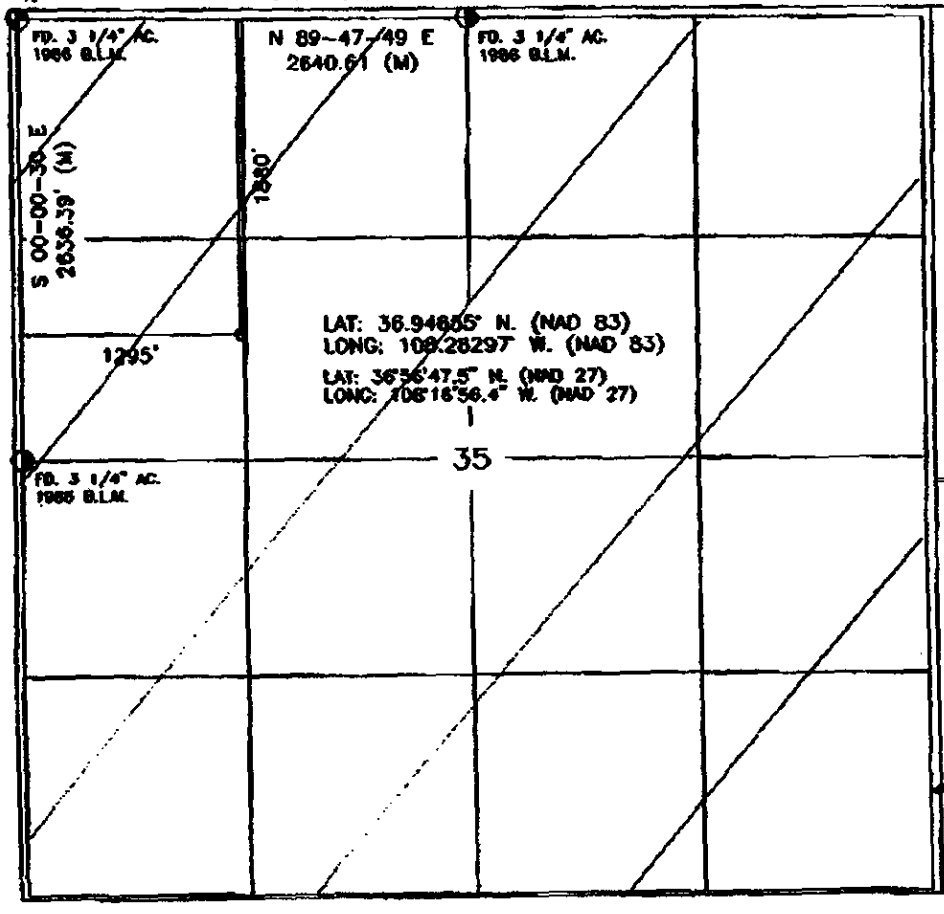
11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
All 640			

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

16



17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

K Small
Signature

K Small
Printed Name

Regulatory Compliance
Title

2/9/06
Date

18 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.

JANUARY 30, 2006
Date of Survey

Signature and Seal of Professional Surveyor

NEW MEXICO
14827
REGISTERED PROFESSIONAL SURVEYOR

Certificate Number

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 87240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

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

Form C-103
May 27, 2004

WELL API NO. 30-045-34288
5. Indicate Type of Lease STATE ☐ FEE ☐
6. State Oil & Gas Lease No. BIA 142060462

SUNDRY NOTICES AND REPORTS ON WELLS

(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name: Ute Indians A
1. Type of Well: Oil Well ☐ Gas Well ☒ Other
8. Well Number #49
2. Name of Operator XTO Energy Inc.
9. OGRID Number 167067
3. Address of Operator 2700 Farmington Ave., Bldg. K, Ste 1 Farmington, NM 87401
10. Pool name or Wildcat Ute Dome Paradox
4. Well Location

Unit Letter E : 1880 feet from the North line and 1295 feet from the West line

Section 35 Township 32N Range 14W NMPM NMEM County SAN JUAN

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)* 6074' Ground Elevation

Pit or Below-grade Tank Application ☒ or Closure ☐

Pit type DRILL Depth to Groundwater >100 Distance from nearest fresh water well >1000 Distance from nearest surface water >1000

Pit Liner Thickness: 12 mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

12. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	☐	PLUG AND ABANDON	☐	REMEDIAL WORK	☐	ALTERING CASING	☐
TEMPORARILY ABANDON	☐	CHANGE PLANS	☐	COMMENCE DRILLING OPNS.	☐	PLUG AND ABANDONMENT	☐
PULL OR ALTER CASING	☐	MULTIPLE COMPLETION	☐	CASING TEST AND CEMENT JOB	☐		
OTHER: PIT	☒			OTHER:			☐

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

XTO Energy intends to install a pit on location for drilling.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☒, a general permit ☐ or an (attached) alternative OCD-approved plan ☐

SIGNATURE Kyla Vaughan TITLE Regulatory Compliance Tech DATE 09/12/06

Type or print name Kyla Vaughan E-mail address: kyla_vaughan@xtoenergy.com Telephone No. 505-564-6726

For State Use Only

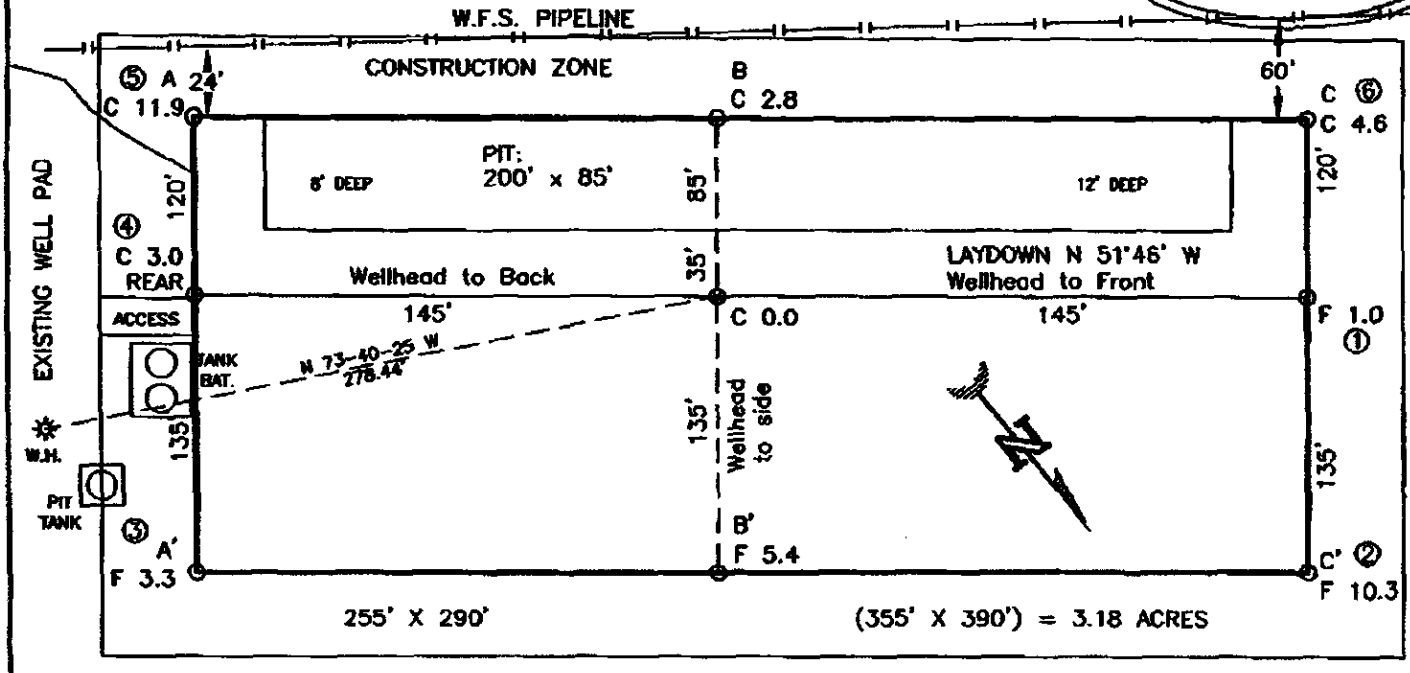
APPROVED BY _____ TITLE DEPUTY OIL & GAS INSPECTOR, DIST. #3 DATE APR 30 2007

Conditions of Approval, if any:

EXHIBIT D

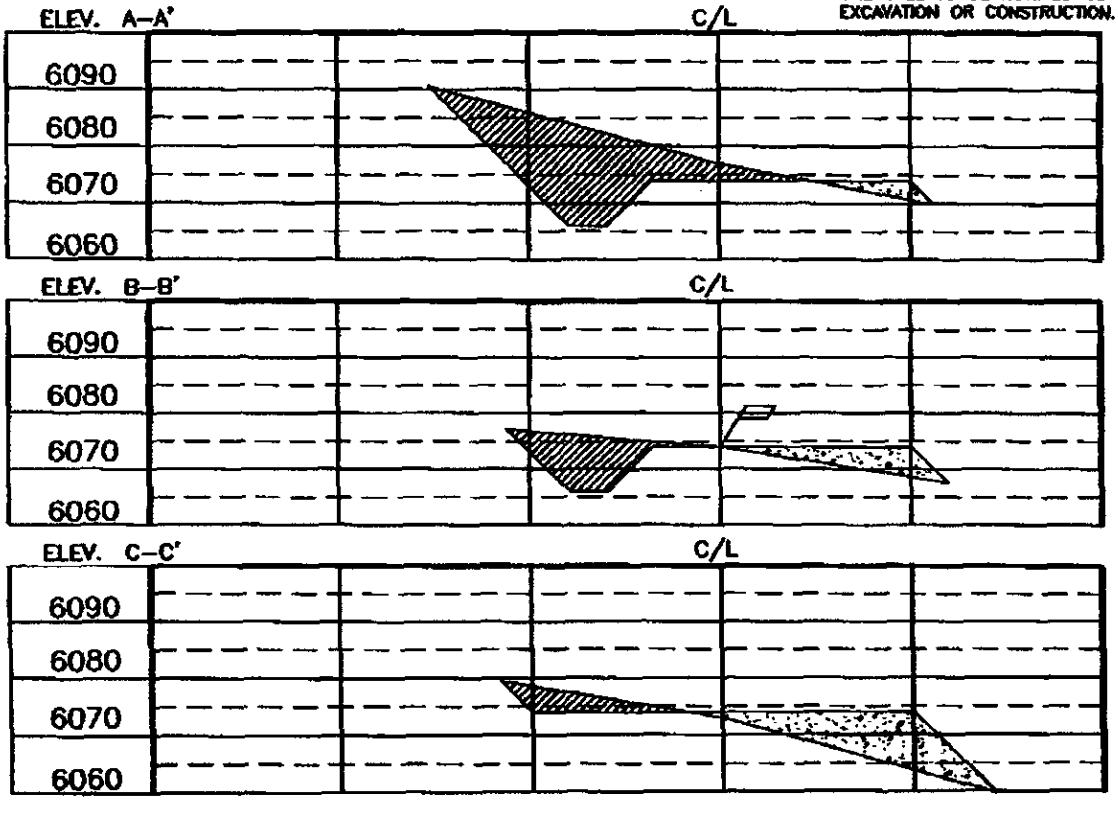
XTO ENERGY INC.
UTE INDIANS A No. 49, 1880 FNL 1295 FWL
SECTION 35, T32N, R14W, N.M.P.M., SAN JUAN COUNTY, N. M.
GROUND ELEVATION: 6074' DATE: JANUARY 31, 2006

NAD 83
LAT. = 36.94655° N
LONG. = 108.28297° W
NAD 27
LAT. = 36°56'47.5" N
LONG. = 108°16'58.4" W



RESERVE PIT DIKE: TO BE 8' ABOVE DEEP SIDE (OVERFLOW - 3' WIDE AND 1' ABOVE SHALLOW SIDE).
BLOW PIT: OVERFLOW PIPE HALFWAY BETWEEN TOP AND BOTTOM AND TO EXTEND OVER PLASTIC LINER AND INTO BLOW PIT.

NOTE: DAGGETT ENTERPRISES, INC. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. NEW MEXICO ONE CALL TO BE NOTIFIED 48 HOURS PRIOR TO EXCAVATION OR CONSTRUCTION.



NOTE: CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED BURIED PIPELINES OR CABLES ON WELL PAD AND OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

Daggett Enterprises, Inc.
Surveying and Oil Field Services
P. O. Box 15068 • Farmington, NM 87401
Phone (505) 326-1772 • Fax (505) 326-6019
NEW MEXICO L.S. No. 14831

EXHIBIT E

Replaced

XTO ENERGY INC.

Ute Indians A #49

~~APD Data~~

February 21, 2007

Location: 1880' FNL x 1295' FWL Sec 35, T32N, R14W **County:** San Juan **State:** New Mexico

GREATEST PROJECTED TD: 8723' OBJECTIVE: Ute Dome Paradox

APPROX GR ELEV: 6074' Est KB ELEV: 6086' (12' AGL)

1. MUD PROGRAM:

INTERVAL	0' to 360'	360' to 2500'	2500' to 8723
HOLE SIZE	12.25"	8.75"	8.75"
MUD TYPE	FW/Spud Mud	FW/Polymer	LSND / Gel Chemical
WEIGHT	8.6-9.0	8.4-8.8	8.6-
VISCOSITY	28-32	28-32	45-60
WATER LOSS	NC	NC	8-10

Remarks: Use fibrous materials as needed to control seepage and lost circulation. Pump high viscosity sweeps as needed for hole cleaning. Raise viscosity at TD for logging. Reduce viscosity after logging for cementing purposes.

2. CASING PROGRAM:

Surface Casing: 9.625" casing to be set at ± 360' in a 12-1/4" hole filled with 9.20 ppg mud

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll	SF Burst	SF Ten
0'-360'	360'	36.0#	J-55	ST&C	2020	3520	394	8.921	8.765	11.730	20.44	30.40

Production Casing: 5.5" casing to be set at TD (±8723') in 8.75" hole filled with 9.20 ppg mud.

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll	SF Burst	SF Ten
0'	8723'	17.0#	L-80	LT&C	6280	7740	348	4.892	4.767	1.50	1.85	2.35

3. WELLHEAD:

A. Casing Head: C-22, 11" 3,000 psi WP, 9-5/8" 8-rnd with 2 2" line pipe outlets.

B. Tubing Head: TCM 11" 3,000 psi WP by 7-1/16" 3,000 psi WP with two 2-1/16" 5,000 studded side outlets, with 9" BG Bottom Viton Seal. (Casing spool, if needed, C-22 11" 3,000 psi WP by 11" 3,000 psi WP, 18" tall.)

4. **CEMENT PROGRAM (Slurry design may change slightly, but the plan is to circulate cement to surface on both casing strings):**

A. Surface: 9.625", 36.0#, J-55, ST&C casing to be set at ± 360' in 12-1/4" hole.

162 sx of Type III cement (or equivalent) typically containing accelerator and LCM, mixed at 14.5 ppg, 1.39 ft^3/sk, & 6.70 gal wtr/sk.

Total slurry volume is 225 ft^3, 100% excess of calculated annular volume to 360'.

B. Production: 5.5", 17.0#, L-80, LT&C casing to be set at ±8723' in 8.75" hole. DV Tool set @ ±4600'

1st Stage

LEAD:
±610 sx of Premium Lite HS (Type III/Poz/Gel) or equivalent, with dispersant, fluid loss, accelerator, & LCM mixed at 12.5 ppg, 2.01 ft^3/sk, 10.55 gal wtr/sx.

TAIL:
150 sx Type III or equivalent cement with bonding additive, LCM, dispersant, & fluid loss mixed at 14.2 ppg, 1.54 cuft/sx, 8.00 gal/sx.

2nd Stage

LEAD:
±589 sx of Type III or equivalent cement with 8% gel & LCM mixed at 11.9 ppg, 2.54 ft^3/sk, 15.00 gal wtr/sx.

TAIL:
100 sx Type III neat mixed at 14.5 ppg, 1.39 cuft/sx, 6.3 gal/sx.

Total estimated slurry volume for the 5-1/2" production casing is 3093 ft^3.

Note: The slurry design may change slightly based upon actual conditions. Final cement volumes will be determined from the caliper logs plus 40%. It will be attempted to circulate cement to the surface.

5. **LOGGING PROGRAM:**

A. Mud Logger: The mud logger will come on at 2,900' and will remain on the hole until TD. The mud will be logged in 10' intervals.

B. Open Hole Logs as follows: Run Array Induction/SFL/GR/SP fr/TD (8723') to the bottom of the surface csg. Run Neutron/Lithodensity/Pe/GR/Cal from TD (8723') to 3,000'.

6. FORMATION TOPS:

Est. KB Elevation: 6086'

FORMATION	Sub-Sea Elev.	WELL DEPTH	FORMATION	Sub-Sea Elev.	WELL DEPTH
Gallup SS	4566	1,520	Chinle Fmtn	1975	4,111
Greenhorn LS	3832	2,254	Shinarump Congl.	1279	4,807
Graneros Shale	3769	2,317	Moenkopi Fmtn	1164	4,922
Dakota SS	3708	2,378	Cutler Group	940	5,146
Burro Canyon SS	3488	2,598	Hermosa Group	-863	6,949
Morrison Fmtn	3458	2,628	Paradox Fmtn	-1456	7,542
Bluff SS	2930	3,156	Ismay Member*	-1610	7,696
Summerville Fmtn	2570	3,516	Desert Creek *	-1710	7,796
Todilto LS	2495	3,591	Akah *	-1928	8,014
Entrada SS	2475	3,611	Barker Creek*	-2104	8,190
Carmel Fmtn	2355	3,731	Alkali Gulch	-2337	8,423
Wingate SS	2285	3,801	***Total Depth***	***-2637***	***8,723***

** Primary Objective* *** Secondary Objective*

**** Maximum anticipated BHP should be <4,000 psig (<0.45 psi/ft) *****

7. ANTICIPATED OIL, GAS, & WATER ZONES:

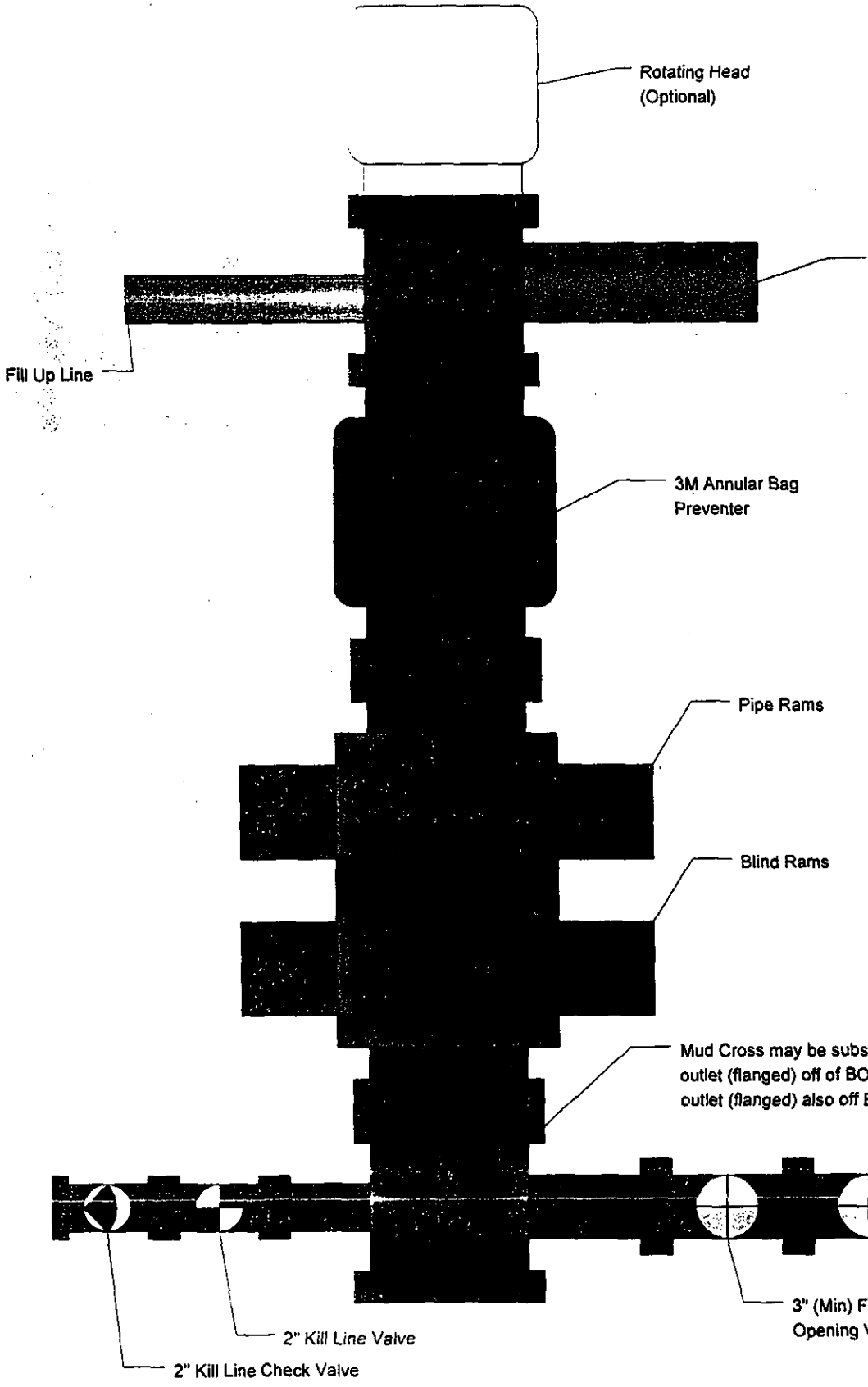
A. Oil & Gas Zones are anticipated at 2378'-2628' & 7696'-8423'.
B. No Appreciable Water Zones are anticipated.
C. Appropriately weighted mud will be used to isolate gas zones until such time as casing can be cemented into place for zonal isolation.
D. Once the Morrison is drilled the well will be treated as a potential source of H_2S.

8. COMPANY PERSONNEL:

Name	Title	Office Phone	Home Phone
John Egelston	Drilling Engineer	505-564-6734	505-330-6902
Jerry Lacy	Drilling Superintendent	505-566-7917	505-320-6543
Reed Meek	Project Geologist	817-885-2800	--

JWE
2/21/07

XTO Energy		
3M BOP Stack	11/8/2006	



Testing Procedure

1. Test Bop After Installation:
A.) Pressure test BOP to 200-300 psig (low pressure) for 5 minutes.
B.) Test BOP to Working pressure or 70% internal yield of surface casing for 10 minutes.
C.) Test Annular preventer to 50% of working pressure for 10 minutes.

2. Test operation of both rams on each trip. Test annular preventer function weekly.

3. Check and record Accumulator pressure on every tour.

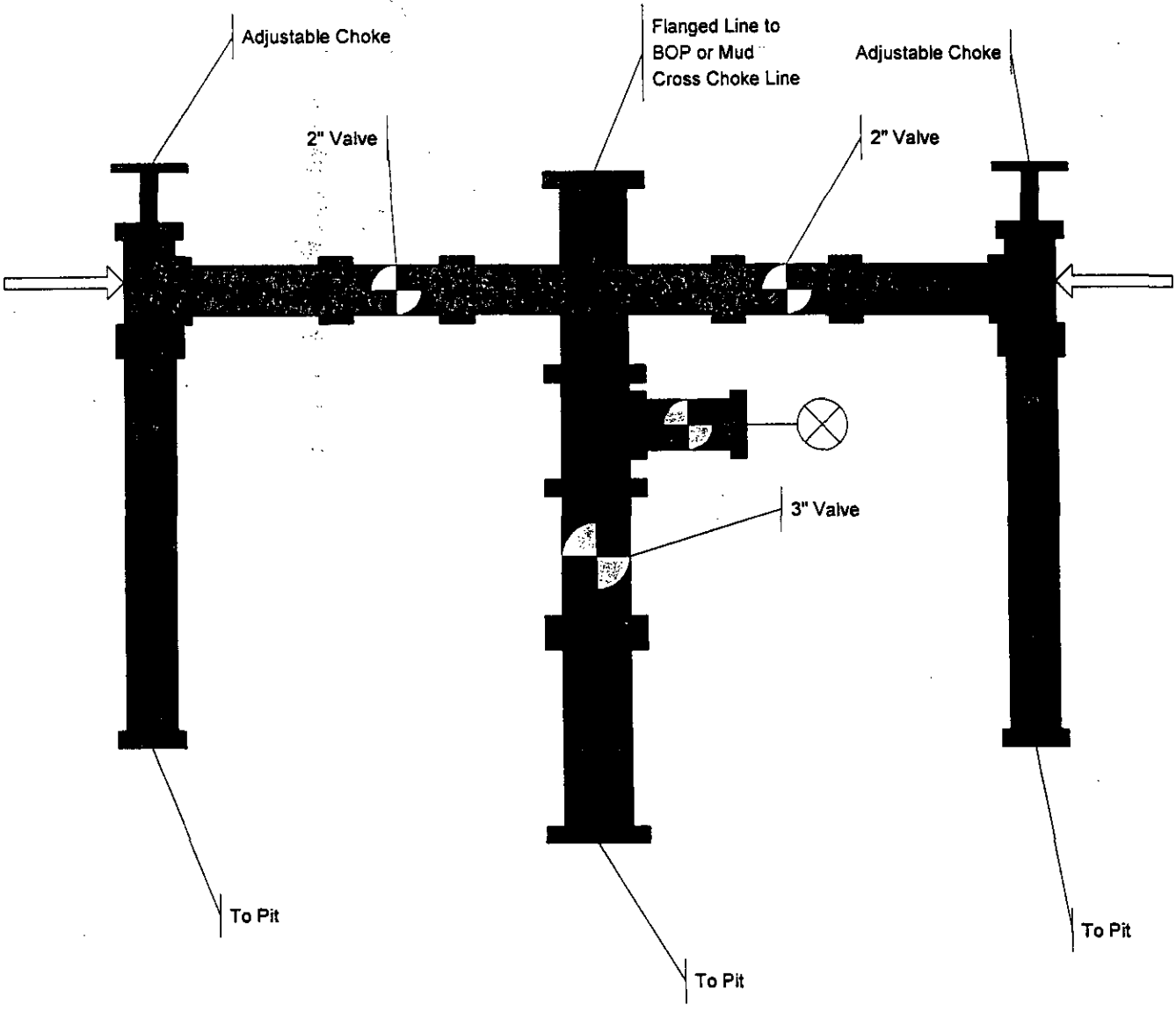
4. Re-pressure test BOP after changing rams or breaking any pressure tested seal.

5. Have kelly cock valve with handle available on rig floor.

6. Have safety valve and subs to fit all sizes of drill string.

7. Record all BOP tests in IADC book.

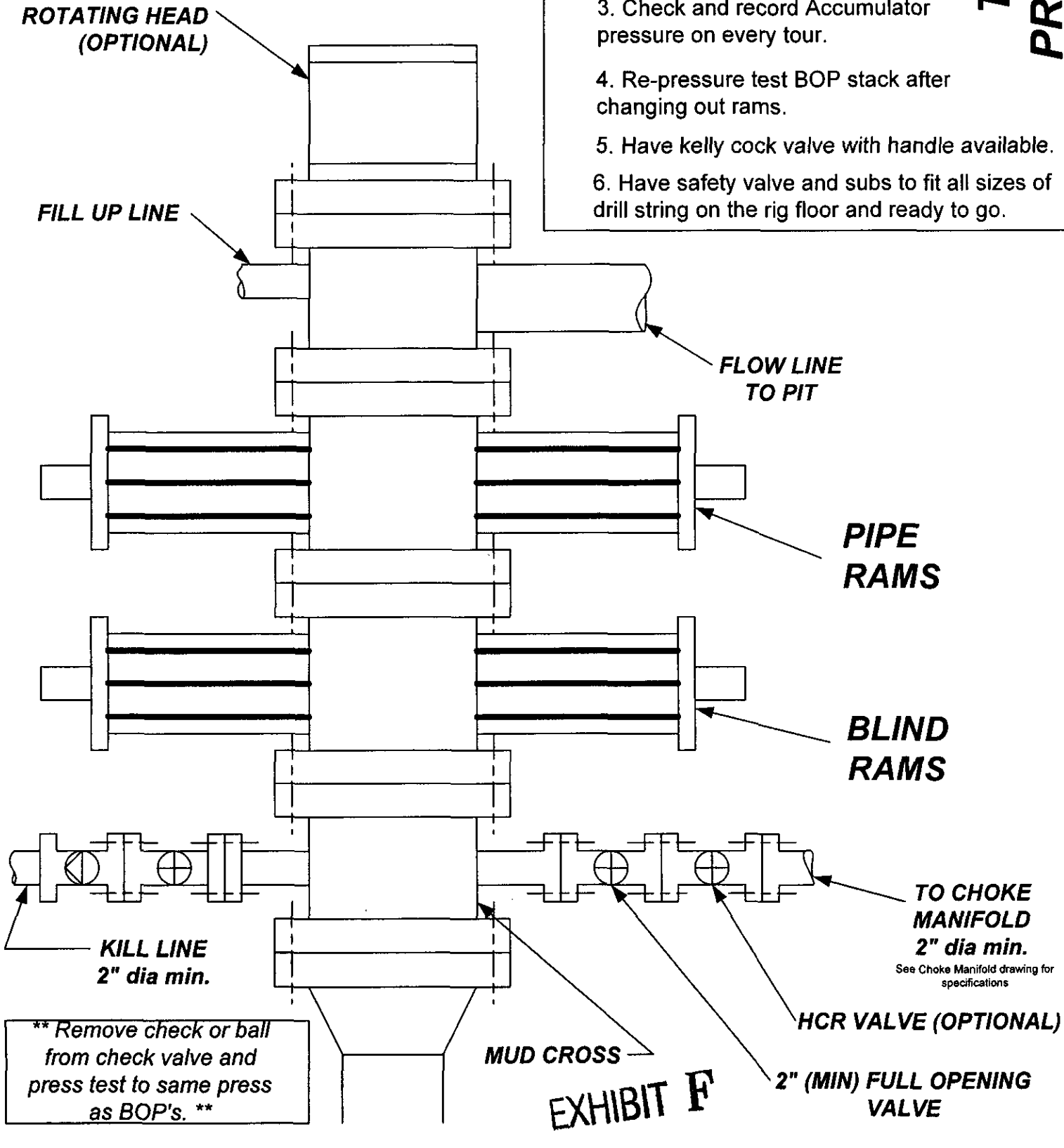
XTO Energy		
5M Choke Manifold	11/9/2006	



BOP SCHEMATIC FOR DRILLING OPERATIONS CLASS 1 (2M) NORMAL PRESSURE

TESTING PROCEDURE

1. Test BOP after installation:
   Pressure test BOP to 200-300 psig (low pressure) for 10 min.
   Test BOP to Working Press or to 70% internal yield of surf csg (10 min) or which ever is less.
2. Test operation of (both) rams on every trip.
3. Check and record Accumulator pressure on every tour.
4. Re-pressure test BOP stack after changing out rams.
5. Have kelly cock valve with handle available.
6. Have safety valve and subs to fit all sizes of drill string on the rig floor and ready to go.



** Remove check or ball from check valve and press test to same press as BOP's. **

EXHIBIT F

CHOKE MANIFOLD
SCHEMATIC FOR DRILLING OPERATIONS
CLASS 1 (2M) NORMAL PRESSURE

TESTING PROCEDURE

1. Stake all lines from choke manifold to pit.
2. Pressure test choke manifold after installation.
3. Pressure test manifold at the same time with the BOP Stack. Test manifold to the same test pressures.

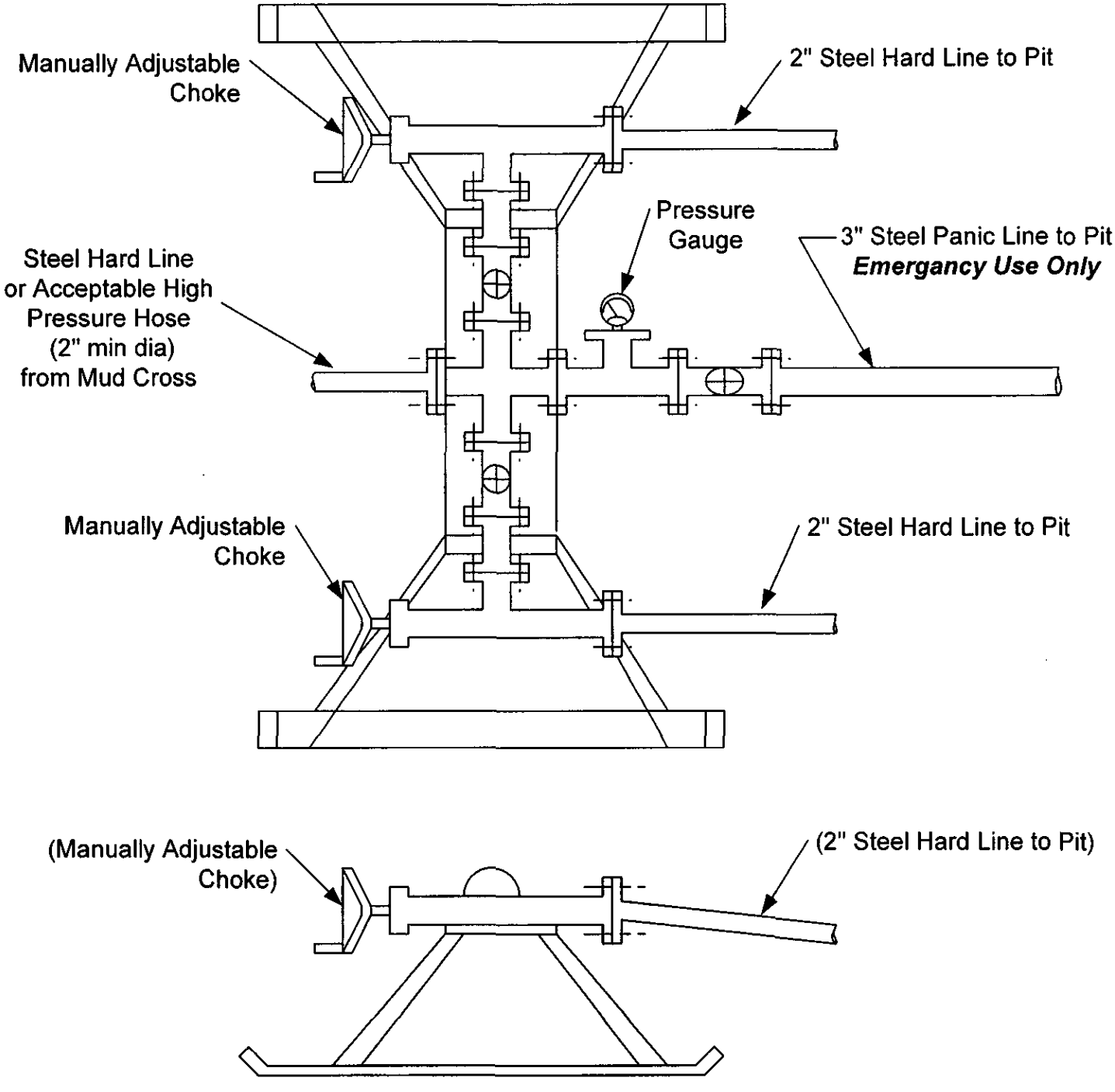


EXHIBIT F

H2S Contingency Plan
(Emergency Response and Public Protection Plan)
Drilling Operations

XTO Energy Inc.

Ute Indians A # 49
San Juan Basin Operations

PREPARED BY:
Jeff Clement

Office: 505) 324-1090
Cell: 505) 215-0533

H2S Contingency Plan

Company Name:	XTO Energy, Inc.
Address:	2700 Farmington Avenue, Farmington, NM 87401
Phone:	(505) 324-1090
Well Name:	Ute Indians A # 49 / 1880' FNL 1295' FWL
TD:	Varied Geological Tops
Location:	Sec.35-32N R 14W San Juan Co. New Mexico
	Lat. 36.94655 N / Long 108.28297 W (Nad 83)
	Lat. 36-56-47.5 N / Long 108-16-56.4 (Nad 27)
API #	30-045-
BIA	14-20-604-62
Formation	Paradox
Geological Tops	To be determined by data obtained during operations

Contact Personnel

XTO Energy Drilling Manager
Brent Martin
Office: (505) 324-1090
Cell: (505) 320-4074

XTO Energy Drilling Engineer
John Egelston
Office: (505) 324-1090
Cell: (505) 330-6902

XTO Energy Drilling Superintendent
Jerry Lacy
Office (505) 324-1090
Cell (505) 320-6543

XTO Energy Field Foremen
Dennis Elrod
Office: (505) 324-1090
Cell: (505) 486-6460

XTO Energy Health & Safety Supervisor
Jeff Clement
Office: (505) 324-1090
Cell: (505) 215-0533

RIG CONTRACTOR
To be determined
(505) 324-1090

CONTRACT SAFETY COMPANY
Jacobs Engineering
Al Lara
Office: (970) 564-1103
Cell: (970) 560-1349

CONTENTS

1.00 PURPOSE

This Emergency Response, and Public Protection Plan (Plan), is a specific plan, that applies to the San Juan Basin Operations, of New Mexico, operated by XTO Energy Inc. (XTO). This document is designed to provide for the safety and welfare of XTO and contract personnel, the community, the environment, and property, under H2S situations.

This plan establishes evacuation procedures, assigns response duties to specific individuals, provides for notification of outside agencies, and provides details of actions to alert and protect the public. This Plan will be activated immediately upon the detection of the release of a potentially hazardous volume of hydrogen sulfide (H2S).

2.00 GENERAL INFORMATION ON AND PHYSIOLOGICAL RESPONSES TO HYDROGEN SULFIDE (H2S) AND SULFUR DIOXIDE (SO2).

2.10 HYDROGEN SULFIDE (H2S)

Hydrogen sulfide is a flammable, highly toxic, colorless gas that is heavier than air, with the odor of rotten eggs. It can be detected by smell at the concentration of only 0.002 parts per million (ppm). Above concentrations of 100 ppm, it will deaden the sense of smell in a few minutes, and at a concentration of 600 + ppm, a single breath can be fatal. If ignited, it burns with a blue flame. In still air, it tends to accumulate in low places in dangerous concentrations. However, if it is warmer than the surrounding air, it may tend to rise. The upper flammability in air is 4% (40,000 ppm).

Breathing low concentrations of H2S can cause headaches. Higher concentrations (0.01 percent by volume) cause irritation of the eyes, nose, throat, and lungs. Eyes become red and swollen, accompanied by sharp pain in more severe cases. Still higher concentrations (0.05 percent by volume) cause dizziness, unconsciousness, and failure of respiration.

The Threshold Limit Value (TLV) is 10 ppm (0.001%) in air. This is the limit for eight hours of continuous exposure as recommended by the American Conference of Governmental Industrial Hygienists. The health and safety reference values of various concentrations of H2S are listed in the toxicity chart below. A Manufacturers Safety Data Sheet (MSDS) for hydrogen sulfide is included in Appendix D.

2.20 SULFUR DIOXIDE (S02)

Sulfur dioxide is formed with the burning of hydrogen sulfide gas. Sulfur dioxide is a pungent, irritating, suffocating, colorless gas. This gas is normally heavier than air and concentrations above 400 ppm are considered dangerous for even brief exposures.

Under special circumstances, hydrogen sulfide gas may be ignited in order to dissipate a gas cloud and reduce impact on a local area. Often these burning temperatures are enough to raise and mix the SO2 with air in a ratio well below toxic levels. However, great care and proper monitoring should be used when this is attempted.

Due to the irritating effect of SO2 at low concentrations of less than 5 ppm, there is usually no doubt as to it's presence in an area, which provides better warning characteristics than H2S.

2.30 TOXICITY CHART

NAME	SPECIFIC GRAVITY (1)	TLV (2) (ppm)	HAZARDOUS LIMIT (3)	LETHAL CONCENTRATION (4)
Hydrogen Sulfide	1.18	10	100 ppm/1hr.	600 + ppm
Sulfur Dioxide	2.21	2	50 ppm/1 hr.	400 ppm

Notes:

(1) Specific gravity of air = 1.00
(2) TLV – Threshold Limit Value
(3) Hazardous Limit – concentration that may cause death with short term exposure.
(4) Lethal concentration – concentration that may cause death with only a few breaths.

3.00 TREATMENT PROCEDURES FOR H2S AND SO2 EXPOSURE

A. Remove the patient to fresh air. Personnel should always use fresh air breathing equipment when entering an area to retrieve a person who has been overcome with H2S.

B. Call a physician and get patient under his care as soon as possible.

C. If breathing has ceased, begin artificial respiration immediately. Give cardiopulmonary resuscitation (CPR) only if there is no pulse and no breathing. Continue revival efforts until physician arrives or, if patient is mobile and it is determined that he should go to the hospital, continue oxygen inhalation under the physician's direction.

D. Administer oxygen to help eliminate toxic substances from blood stream.

E. Keep the patient at rest and protect from chilling.

4.00 INDIVIDUAL RESPONSIBILITIES

It is the responsibility of *all personnel* on the location to familiarize themselves with the procedures outlined in this contingency plan.

A. All Personnel
   1. Responsible for their assigned safety equipment.
   2. Responsible for familiarizing themselves with the location of all safety equipment.
   3. Responsible for reporting any indications of H2S to those in the area and to a supervisor.

B. Operations Supervisor
   1. Responsible for thoroughly understanding and seeing that all aspects of this contingency plan are enforced.
   2. Responsible for implementing all phases of this contingency plan.
   3. Responsible for keeping a minimum of personnel on the location during expected hazardous operations.
   4. Responsible for coordinating all well site operations and communications in the event that an emergency condition develops.
   5. Responsible for ensuring that all visitors receive an H2S safety orientation. A visitors log will be maintained as well as a list of all personnel on location after drilling has progressed to the suspected H2S formation.

4.10 LOCATION LAYOUT

The location should have at least two pre-determined safe areas to assemble at in the event of an emergency. These locations should be located 180 degrees to one another, and in the direction of the prevailing winds.

A. H2S rig monitor with at least three heads. One located at the bell nipple, one located at the shale shaker, and a third one on the rig floor.
The location and type of all air masks. Self-contained breathing apparatus for use by rig personnel for this well will be kept in the following location(s):

Type: 1-30 min. rescue unit	**Location: Safety Contractor's Trailer**
Type: 1-30 min. rescue unit	**Location: All Trailers**
Type: 2-30 min. rescue unit	**Location: Briefing Area #1**
Type: 2-30 min. rescue unit	**Location: Briefing Area #2**
Type: 5-Hoseline work unit	**Location: Safety Trailer**
Type: 3-5 min escape unit	**Location: Rig Floor**
Type: 1-5 min. escape unit	**Location: Tubing board (derrick)**

If a cascade system is utilized, indicate the location(s);

Type: 10 cylinder cascade	**Location: Safety Trailer located by rig base of catwalk.**

The location of windsocks or streamers. The wind directions indicators for this well will be located at:

Type: Windsock	**Location: Briefing Area #1**
Type: Windsock	**Location: Briefing Area #2**
Type: Windsock	**Location: On floor & pits**

The location of any other safety equipment used, such as flare guns or bug blowers.

Type: Flare gun	**Location: Safety Trailer**

The location of all telephones and/or means of communications are as follows:

Type: Cell phone	**Location: Drilling Superintendent** **Tool Pusher**

Warning Signs:
"No Smoking" signs should be strategically located around the rig and rig location. The following locations are appropriate:

Rig Floor
Dog house
Substructure
Lower landing of all stairs to rig floor
Mud pits
Shale shaker

"Poison Gas" signs should also be strategically located around the rig and rig location. The following locations are appropriate:

All entrances leading to location
Lower landing of all stairs leading to rig floor
All areas around substructure, including mud pits and shale shaker
Various points along the perimeter of the radius of exposure

NOTE: ***All warnings should be black and yellow in color and of readable size at a distance.***

4.20 OPERATING PROCEDURES

The following operating procedures will be utilized for drilling in areas with H2S.

A. **Plan of operation for handling gas kicks and other problems. Any gas kick will be controlled by using approved well control techniques. Upon evidence that ambient H2S concentrations have reached 10 ppm, all non-essential personnel will be evacuated to pre-determined safe areas. Personnel remaining on the rig floor will continue to control the well until the situation indicates the area is safe to re-enter.**

Special Operations:
Drill Stem Tests: **All drill stem tests must be closed chamber and conducted during daylight hours only.**
Coring: **After a core has been cut, circulate bottoms up and monitor for H2S. If hole conditions (and/or detectors) indicate potentially hazardous conditions, put breathing equipment on (10) ten stands before core barrel reaches surface. Breathing equipment will be worn by all personnel while core barrel is pulled, broken out and opened, and until a safe atmosphere is indicated.**
All equipment with potential for H2S shall be suitable for H2S service, i.e. Drill String, Casing, Well Head, Blowout Preventor equipment and trim, Rotating Head, Kill Lines, Choke Manifold and Lines.
A remote controlled choke will be installed prior to all H2S drilling.
Mud system pH will be maintained at or above 10.0 with sufficient materials on location to *maintain the required pH.*
A flare pit **will be located a minimum of 150" from the wellhead and 30" from the reserve pit. Should H2S be encountered during drilling operations an *ignitable flaring system*** **will be used and burnable gas will then be vented to the atmosphere. Extreme caution will be noted for Sulfur Dioxide that is a by product of Hydrogen Sulfide when burned.**

4.30 OPERATING CONDITIONS

Operating conditions are defined in three categories. A description of each of these conditions and the required action to take are given below.

A. **Condition I – Normal Operating Conditions, Potential Danger**
Characterized by: Normal Drilling Operations in zones which contain or may contain H2S.

Warning Flag:	**Yellow**
Alarm:	**None**
Probable Occurrence:	**No detectable gas present at surface**

General Action:
Know location of safety equipment.
Check safety equipment for proper function. Keep it available.
Be alert for a condition change.
Follow instructions of supervisor.

B. **Condition II – Potential to Moderate Danger to Life**
Characterized by: H2S gas present. Concentration less than 10 ppm.

Warning Flag:	**Orange**
Alarm:	***Flashing light at 10 ppm H2S. Intermittent blasts on horn at 10 ppm H2S.***
Probable Occurrence:	**As drill gas.**
	As trip gas when circulating bottoms up
	When a core barrel is pulled
	When a well kick is circulated out
	Surface pressure, well flow or lost operations
	Equipment failure during testing operations

General Action:
Follow instructions of supervisor.
Put on breathing equipment if directed, or is conditions warrant it.
Stay in "SAFE BRIEFING AREA" if instructed and not working to correct the problem.
The Drilling Superintendent will initiate action to reduce the H2S concentration to zero.

C. **Condition III – Moderate to Extreme Danger to Life**
Characterized by: H2S present in concentrations at or above 10 ppm. Critical well operations or well control problems. In the extreme, loss of well control.

Warning Flag:	**Red**
Alarm:	**Flashing light and continuous blast on horn at 10 ppm H2S**
Probable Occurrence:	**As drill gas**
	As trip gas when circulating bottoms up
	When a core barrel is pulled
	When a well kick is circulated out
	Surface pressure, well flow or lost return problems
	Equipment failure during testing operations

General Action:
Put on breathing equipment. Move to "SAFE BRIEFING AREA" and remain there is not working to correct or control problem.
Follow instructions of Drilling Superintendent or other supervisor.
The Drilling Superintendent will initiate emergency action as provided in the contingency plan and as appropriate to the actual conditions. If testing operations are in progress, the well will be shut in.
The Drilling Superintendent will conduct any necessary operations with an absolute minimum of personnel. All persons in the immediate area will wear a breathing apparatus. All other personnel will restrict their movements to those directed by the Superintendent.
If gas containing hydrogen sulfide (H2S) is ignited, the burning hydrogen sulfide will be converted to sulfur dioxide, which is poisonous.

5.00 HYDROGEN SULFIDE EMERGENCY PROCEDURES

The procedures listed below apply to drilling and testing operations:

A. **If at any time during Condition I, the mud logger, mud engineer, or any other person detects H2S, he will notify the Drilling Superintendent. All personnel should keep alert to the Drilling Superintendent's orders. He will:**
1. ***Immediately begin to ascertain the cause or the source of the H2S and take steps to reduce the H2S concentration to zero. This should include having the mud engineer run a sulfide and pH determination on the flowline mud if water-base mud is in use. If an oil-base mud is in use, the mud engineer should check the lime content of the mud.***
2. **Order non-essential personnel out of the potential danger area.**
3. **Order all personnel to check their safety equipment to see that it is working properly and in the proper location. Persons without breathing equipment will not be allowed to work in a hazard area.**
4. **Notify the Contract Supervisor of condition and action taken.**
5. **Continue gas monitoring activities and continue with caution.**
6. **Display the orange warning flag.**

B. **If the H2S concentration exceeds 10 ppm, the following steps will be taken:**
1. **Put on breathing equipment**
2. **Display red flag**
3. **Driller – prepare to shut the well in**
   a. **Pick up pipe to get Kelly out of BOP's**
   b. **Close BOP's if necessary**

4. If testing operations are in progress, the well will be shut-in
5. Help anyone who may be affected by the gas
6. Evacuate quickly to the "SAFE BRIEFING AREA" if instructed or conditions warrant

C. In the event a potentially hazardous volume of H2S is released into the atmosphere, the following steps must be taken to alert the public:
1. Remove all rig personnel from the danger area and assembly at a pre-determined safe area, preferable upwind from the well site.
2. Alert the drilling office, public safety personnel, regulatory agencies, and the general public of the existence and location of an H2S release. See List of Emergency Telephone Numbers.
3. Assign personnel to block any public road (and access road to location) at the boundary of the area of exposure. Any unauthorized people within the area should be informed that an emergency exists and be ordered to leave immediately.
4. Request assistance from public safety personnel to control traffic and/or evacuate people from the threatened area.

6.00 TRAINING PROGRAM

All personnel associated with the drilling operations will receive training to ensure efficient and correct action in all situations. This training will be in the general areas of:
(A) Personnel Safety (B) Rig Operations (C) Well Control Procedures

A. Personnel Safety Training – All Personnel shall have received H2S training in the following areas:
1. Hazards and characteristics of H2S.
2. Effect on mental components of the system.
3. Safety precautions.
4. Operation of safety equipment and life support systems.
5. Corrective action and shutdown procedures.

B. Rig Operations – All rig personnel shall have received training in the following areas:
1. Well control procedures.
2. Layout and operations of the well control equipment.

NOTE: *Proficiency will be developed through BOP drills which will be documented by the Drilling Superintendent.*

7. Service Company Personnel – All service personnel shall be trained by their employers in the hazards and characteristics of H2S, and the operation of safety equipment, and life support systems.

Visitors – All first time visitors to the location will be required to attend a safety orientation. The Drilling Superintendent shall be responsible for this orientation and he shall see that every visitor is logged correctly.

Public - The public within the area of exposure shall be given an advance briefing by the Drilling Superintendent. This briefing must include the following elements:
1. Hazards and characteristics of hydrogen sulfide. It is an extremely dangerous gas. It is normally detectable by its "rotten egg" odor, but odor is not a reliable means of detections because the sense of smell may be dulled or lost due to intake of the gas. It is colorless, transparent and flammable. It is heavier than air and may accumulate in low places.
2. The necessity of an emergency action plan. Due to the danger of persons exposed to hydrogen sulfide and the need for expeditious action should an emergency occur, this action plan will be put into effect if and when a leak occurs.
3. The location of hydrogen sulfide within the area of exposure at the drilling location.
4. The manner in which the public will be notified of an emergency.
5. Steps to be taken in case of an emergency.
6. Abandon danger area.

7. **Notify necessary agencies and request assistance for controlling traffic and evacuating people.**

7.00 PROTECTION OF THE GENERAL PUBLIC

7.10 NOTIFICATION OF POTENTIAL DANGER

- **Warning signs will be prominently displayed at the well site and at all access points.**

7.20 EMERGENCY EVACUATION AND ISOLATION OF DANGER AREA

In the event that toxic gases are released in such quantities as to be a possible hazard to the public, the following steps (in addition to the procedure outlines in Section 5.00) will be taken by the person in charge.

- **Choose a command post site in a safe area**
- **Alert by telephone the Incident Commander or the Safety Manager and notify the person of the situation and your choice of command posts.**
- **Notify local Law Enforcement Officials of the need to restrict entry to the area and the location of your command post. Request their assistance in restricting entry into the danger area by placing roadblocks or barriers in safe areas.**

NOTE: ***Alternate command posts and roadblocks may be required; the Incident Commander may make changes in the locations listed above. Care should be taken to notify all responders of the changes.***

- **If evacuation cannot be accomplished in a timely manner and the H2S release is posing an immediate threat to human life, the Incident Commander may choose to ignite the gas, Because of the increased *risks igniting the gas can pose for response personnel, only the* Incident Commander can give this order.**