

# XTO ENERGY INC.

Southern Ute 3-35H

APD Data

January 4, 2016

**Surface Location:** 271' FSL x 943' FEL, Sec 35, T33N, R09W

**County:** La Plata

**State:** Colorado

Lat: 37.05393N Long: 107.78910W Nad 83

**OBJECTIVE:** Fruitland Coal

**Est KB ELEV:** 7353' (16' AGL)

**APPROX GR ELEV:** 7337'

## 1. MUD PROGRAM:

	Surface	Pilot Hole	Lateral #1	Lateral #2	Lateral #3
INTERVAL	0' to 400'	400' to 4504'	4030' to 7847'	3970' to 7819'	3910' to 7794'
HOLE SIZE	12.25"	8.75"	6.125"	6.125"	6.125"
MUD TYPE	FW/Spud Mud	FW/Polymer	NaCl/ CaCl <sub>2</sub> Water	NaCl/ CaCl <sub>2</sub> Water	NaCl/ CaCl <sub>2</sub> Water
WEIGHT	8.6-9.0	8.4-9.2	8.4-8.6	8.4-8.6	8.4-8.6
VISCOSITY	28-32	28-36	28-36	28-36	28-36
pH	7-8	8-10	8-11	8-11	8-11
SALINITY	0-500	0-500	25,000-35,000	25,000-35,000	25,000-35,000
WATER LOSS	NC	NC	NC	NC	NC

## 2. CASING PROGRAM:

**Surface Casing:** 9.625" casing to be set at ± 400' in a 12.25" 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 <sup>1</sup>	SF Burst <sup>2</sup>	SF Ten <sup>3</sup>
0'-400'	400'	36.0#	J-55	ST&C	2020	3520	394	8.921	8.765	13.72	7.04	3.50

<sup>1</sup>Collapse SF is based on full evacuated casing and 9.0 ppg pore pressure from TVD to surface.

<sup>2</sup>Burst SF is based on gas to surface, pore pressure gradient, and 500 psi max surface pressure.

<sup>3</sup>Tensile SF is based on buoyed casing string weight in 9.0 ppg mud at measured depth and 100 k-lbs overpull.

**Pilot Hole Casing:** 7" casing to be set at ±4504' MD, 4050' TVD in 8.75" hole filled with 9.20 ppg mud.

**Bottomhole Location:** 948' FSL x 2,030' FEL, Sec 35, T33N, R09W

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll <sup>1</sup>	SF Burst <sup>2</sup>	SF Ten <sup>3</sup>
0'-4504'	4504'	23.0#	J-55	ST&C	3270	4360	284	6.366	6.151	4.06	14.48	3.19

<sup>1</sup>Collapse SF is based on full evacuated casing and 9.0 pore pressure from TVD to surface.

<sup>2</sup>Burst SF is based on gas to surface, 9.2 ppg mud, and 500 psi max surface pressure.

<sup>3</sup>Tensile SF is based on buoyed casing string weight in FW at TVD and 100 k-lbs overpull.

**Lateral #1 Production Casing:** 4.5" pre-perforated casing to be set from ±4030' MD - 7847' MD, 3845' TVD in 6.125" hole filled with 8.4 ppg sodium/ calcium chloride drilling fluid + additives.

**Bottomhole Location:** 710' FNL x 1907' FEL, Sec 35, T33N, R09W

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll <sup>1</sup>	SF Burst <sup>2</sup>	SF Ten <sup>3</sup>
4030'-7847'	3817'	10.5	J-55	ST&C	4010	4790	132	4.052	3.927	7.51	3.00	1.39

**Lateral #2 Production Casing:** 4.5" pre-perforated casing to be set from ±3970' MD - 7819' MD, 3824' TVD in 6.125" hole filled with 8.4 ppg sodium/ calcium chloride drilling fluid + additives.

**Bottomhole Location:** 710' FNL x 1857' FEL, Sec 35, T33N, R09W

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll <sup>1</sup>	SF Burst <sup>2</sup>	SF Ten <sup>3</sup>
3970'-7819'	3849'	10.5	J-55	ST&C	4010	4790	132	4.052	3.927	7.51	3.00	1.39

**Lateral #3 Production Casing:** 4.5" pre-perforated casing to be set from ±3910' MD - 7794' MD, 3808' TVD in 6.125" hole filled with 8.4 ppg sodium/ calcium chloride drilling fluid + additives.

**Bottomhole Location:** 710' FNL x 1807' FEL, Sec 35, T33N, R09W

Interval	Length	Wt	Gr	Cplg	Coll Rating (psi)	Burst Rating (psi)	Jt Str (M-lbs)	ID (in)	Drift (in)	SF Coll <sup>1</sup>	SF Burst <sup>2</sup>	SF Ten <sup>3</sup>
3910'-7794'	3884'	10.5	J-55	ST&C	4010	4790	132	4.052	3.927	7.51	3.00	1.39

<sup>1</sup>Collapse SF is based on full evacuated casing and 8.4 external gradient from 3,845' TVD to surface.

<sup>2</sup>Burst SF is based on evacuated casing annulus, 8.4 ppg mud, and 500 psi max surface pressure. \*Pipe is pre-perforated.

<sup>3</sup>Tensile SF is based on buoyed hanging weight of liner at measured with 8.4 ppg mud and 60 k-lbs overpull.

<sup>4</sup>3,845' TVD used for worst case scenarios on all three laterals.

### 3. WELLHEAD:

A. Casing Head: 9 5/8" S.O.W. x 11" 3,000 psig WP with two 2" LPO w/ Test port nipple, XH BLK SMLS 2" x 6" valve ball, 11" x 7" casing mandrel. Manufactured to API Spec 6A.

B. Tubing Head: 11" x 7 1/16" 3,000 psig WP with two 2-3" 3000# studed outlets. Manufactured to API Spec 6A.

### 4. CEMENT PROGRAM (Slurry design may change slightly, but cement will be circulated to surface on both surface and intermediate casing strings):

A. Surface Cement : 9.625", 36.0#, J-55, ST&C casing to be set at ± 400' in 12.25" hole.

± 210 sx Class G cement (or equivalent) typically containing accelerator and LCM, mixed at 15.8 ppg, 1.17 ft<sup>3</sup>/sk, & 5.01 gal wtr/sk.

**Total slurry volume is 45 bbls, 100% excess of calculated annular volume to 400'.**

B. Pilot Hole Cement: 7", 23#/ft, J-55, ST&C casing to be set at ± 4504' MD, 4050' TVD in 8.75" hole.

LEAD:

± 357 sx Class G (or equivalent) typically containing accelerator, LCM, dispersant, and fluid loss additives at 12.3 ppg, 2.389 ft<sup>3</sup>/sk, & 13.27 gal wtr/sk.

TAIL:

± 247 sx Class G (or equivalent) cement typically containing accelerator, LCM, dispersant, and fluid loss additives at 13.5 ppg, 1.834 ft<sup>3</sup>/sk, & 9.12 gal wtr/sk.

**Total estimated slurry volume for the 7" production casing is 232 bbl.**

**Note: The slurry design may change slightly based upon actual conditions. Final cement volumes will be determined upon TD of the intermediate hole. Cement will be circulated to surface.**

C. Production Liners:

Lateral #1: 4.5", 10.5#/ft, J-55, ST&C pre-perforated casing is to be set from ±4030' MD - 7847' MD, 3845' TVD in 6.125" hole.

<b>Window Milling Details</b>	Measured Depth (ft)	TVD (ft)
Top of Window	4030	3715
Bottom of Window	4040	3722

Lateral #2: 4.5", 10.5#/ft, J-55, ST&C pre-perforated casing is to be set from ±3970' MD - 7819' MD, 3824' TVD in 6.125" hole.

<b>Window Milling Details</b>	Measured Depth (ft)	TVD (ft)
Top of Window	3970	3672
Bottom of Window	3980	3679

Lateral #3: 4.5", 10.5#/ft, J-55, ST&C pre-perforated casing is to be set from ±3910' MD - 7794' MD, 3808' TVD in 6.125" hole.

<b>Window Milling Details</b>	Measured Depth (ft)	TVD (ft)
Top of Window	3910	3630
Bottom of Window	3920	3637

**Note:** The production liners will be left uncemented using drop-off pre-perforated liners.

**5. LOGGING PROGRAM:**

A. Mud Logger: The mud logger will come on after setting surface casing and will remain on the hole until TD.

Sample Frequency Intervals\*

Surface Hole	N/A
Pilot Hole	60'
Lateral #1	30-60'
Lateral #2	30-60'
Lateral #3	30-60'

\*Dependent upon cutting returns, LCM concentrations, and drilling rate.

- B. Run cased hole gamma ray and neutron log from Intermediate TD (4504') to the bottom of the surface csg. MWD Gamma Ray will be utilized in the laterals.

**6. FORMATION TOPS:**

Est. KB Elevation: 7353'

<b>FORMATION</b>	<b>Sub-Sea</b>	<b>TVD</b>
Nacimiento Formation	Surface	Surface
Animas Formation	5768	1585
Ojo Alamo SS	4964	2389
Kirtland Shale	4860	2493
Farmington SS		
Fruitland Formation	4055	3298
Upper Fruitland Coal***	3714	3639
Middle Fruitland Coal**	3544	3809
Pictured Cliffs Tongue		
Lower Fruitland Coal*	3512	3841
Pictured Cliffs SS	3468	3885
*Primary Target **Secondary Target ***Tertiary Target		

\*\*\*\* Maximum anticipated BHP expected <1,500 psig \*\*\*\*\*

**7. ANTICIPATED OIL, GAS, & WATER ZONES:**

- A. The proposed gas well is located within an area where unconfined fresh water aquifers are mostly developed in bedrock formations consisting mainly of shale with intermittent sandstone stringers with limited areal extent or having pockets of isolated water reservoirs. Water wells found in these locations can vary in depth from 100' to 650'.

Respective to the proposed gas well, a one (1) mile radius of investigation of all offsetting fresh water wells has determined that there are no domestic water wells within that buffer zone. Just outside the 1 mile of radius of investigation, the deepest water well in close proximity is 139' deep, with a static water level of 89'. XTO Energy proposes a surface casing depth of 400' which exceeds the deepest water well depth by 261', ensuring complete protection of the freshwater resources of bedrock aquifers. The surface casing on the proposed well will be cemented from total depth to surface. The production casing on the proposed gas well will also be cemented from total depth to surface. This will serve two purposes (1) it will isolate and confine all hydrocarbon and brackish waters to their respective zones and (2) it will provide double protection for the fresh water aquifers which includes two concentric (2) steel casing strings and two concentric external (2) cement sheaths extending from total depth to surface

A plat mat was prepared for the location of the proposed gas well which includes a 1 mile envelope of investigation being drawn around the trajectory of the proposed well bore (Exhibit "B").

- B. All anticipated Water Zones will be covered by surface casing.
- C. Appropriately weighted mud will be used to isolate potential gas, oil, and water zones until casing can be cemented into place for zonal isolation.
- D. H<sub>2</sub>S is not anticipated at this site.

**8. METHODS FOR HANDLING WASTE:**

**A. Drill Cuttings**

The drilling operation will utilize a closed loop mud system with all make up fluids and mud return cuttings contained in above ground steel pits. All drill cuttings and non-recycled fluids will be transported off site to approved commercial disposal facilities. Where possible, fluids will be recycled during the drilling operation.

Drill Cuttings Disposal:

Facility Name: Industrial Ecosystems, Inc

Address: #49 CR 3150 Aztec, NM 87410

Permit #: NM 01-0010B

Unused Drilling Fluids Disposal:

Facility Name: Industrial Ecosystems, Inc

Address: #49 CR 3150 Aztec, NM 87410

Permit #: NM 01-0010B

**B. Fluids**

Unused drilling fluids will be collected within the closed loop mud system and disposed of at a commercial disposal facility. The completion and work-over operation(s) will utilize steel tanks to capture, contain and control all return fluids until these fluids are transported off site to approved commercial disposal facilities. Where possible, fluids will be recycled during completion or work-over operations.

Unused Drilling Fluids Disposal:

Facility Name: Industrial Ecosystems, Inc

Address: #49 CR 3150 Aztec, NM 87410

Permit #: NM 01-0010B

**9. COMPANY PERSONNEL:**

Name	Title	Office Phone	Cellular Phone
Ross Lubbers	Drilling Manager		
Alex Jones	Drilling Engineer	303-397-3845	402-432-4753
Bobby Jackson	Drilling Superintendent		
Michael Williams	Project Geologist	817-885-6632	