

# XTO ENERGY INC.

Penrose 03-08H

APD Data

March 11, 2015

**Surface Location:** 872' FSL x 952' FWL, Sec 8, T32N, R06W

**County:** La Plata

**State:** Colorado

**OBJECTIVE:** Fruitland Coal

**Est KB ELEV:** 6404' (16' AGL)

**APPROX GR ELEV:** 6388'

## 1. MUD PROGRAM:

	Surface	Intermediate	Lower Lateral	Upper Lateral
INTERVAL	0' to 225'	225' to 3195'	2725' to TD	2665' to TD
HOLE SIZE	12.25"	8.75"	6.125"	6.125"
MUD TYPE	FW/Spud Mud	FW/Polymer	FW/ Polymer	FW/ Polymer
WEIGHT	8.6-9.0	8.4-9.2	8.4-8.6	8.4-8.6
VISCOSITY	28-32	28-36	28-36	28-36
WATER LOSS	NC	NC	NC	NC

Remarks: Use fibrous materials as needed to control seepage and lost circulation. Pump high viscosity sweeps as needed for hole cleaning.

## 2. CASING PROGRAM:

**Surface Casing:** 9.625" casing to be pre-set at  $\pm 225'$  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'-225'	225'	36.0#	J-55	ST&C	2020	3520	394	8.921	8.765	12.44	6.12	3.68

<sup>1</sup>Collapse SF is based on full evacuated casing and 15.8 ppg cement from TVD to surface.

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

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

**Intermediate Casing:** 7" casing to be set at  $\pm 3175'$  MD, 2833' TVD in 8.75" hole filled with 9.20 ppg mud.

**Bottomhole Location:** 1192' FSL x 1923' FWL, Sec 8, T32N, R06W

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'-3175'	3175'	23.0#	J-55	ST&C	3270	4360	284	6.366	6.151	1.91	2.77	1.81

<sup>1</sup>Collapse SF is based on full evacuated casing and 13.5 ppg cement 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.

**Lower Lateral Production Casing:** 4.5" pre-perforated casing to be set at ±6345' MD, 2732' TVD in 6.125" hole filled with 8.4 ppg FW + additives.

**Bottomhole Location:** 710' FNL x 1929' FWL, Sec 8, T32N, R06W

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>
2725'-6345'	3620'	10.5	J-55	ST&C	4010	4790	132	4.052	3.927	4.38	3.68	1.34

**Upper Lateral Production Casing:** 4.5" pre-perforated casing to be set at ±6323' MD, 2708' TVD in 6.125" hole filled with 8.4 ppg FW + additives.

**Bottomhole Location:** 710' FNL x 1883' FWL, Sec 8, T32N, R06W

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>
2665'-6323'	3658'	10.5	J-55	ST&C	4010	4790	132	4.052	3.927	4.38	3.68	1.34

<sup>1</sup>Collapse SF is based on full evacuated casing and FW external gradient from 2,750' TVD to surface.

<sup>2</sup>Burst SF is based on evacuated casing annulus, 8.6 ppg mud, and 500 psi max surface pressure.

<sup>3</sup>Tensile SF is based on buoyed hanging weight of liner at measured with 8.6 ppg mud and 65 k-lbs overpull.

<sup>4</sup>2,750' TVD used for both upper and lower laterals for worst case scenarios.

### 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 2-1/16" 3000# studed outlets. Manufactured to API Spec 6A.

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

- A. Surface: 9.625", 36.0#, J-55, ST&C casing to be set at ± 225' in 12.25" hole.

± 125 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 141 ft<sup>3</sup>, 100% excess of calculated annular volume to 225'.*

- B. Intermediate Casing: 7", 23#/ft, J-55, ST&C casing to be set at ± 3175' MD, 2833' TVD in 8.75" hole.

#### LEAD:

± 240 sx Class G (or equivalent) typically containing accelerator, LCM, dispersant, and fluid loss additives at 12.3 ppg, 2.36 ft<sup>3</sup>/sk, & 12.95 gal wtr/sk.

#### TAIL:

± 195 sx Class G (or equivalent) cement typically containing accelerator, LCM, dispersant, and fluid loss additives at 13.5 ppg, 1.81 ft<sup>3</sup>/sk, & 8.85 gal wtr/sk.

*Total estimated slurry volume for the 7" production casing is 925 ft<sup>3</sup>.*

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

C. Production Liners:

Lower Lateral: 4.5", 10.5#/ft, J-55, ST&C pre-perforated casing is to be set at 6345' MD, 2732' TVD in 6.125" hole.

Upper Lateral: 4.5", 10.5#/ft, J-55, ST&C pre-perforated casing is to be set at 6323' MD, 2708' TVD in 6.125" hole.

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

5. LOGGING PROGRAM:

A. Mud Logger: As requested by Fort Worth Geology, the mud logger will come on after setting surface casing and will remain on the hole until TD.

B. Run Compensated Neutron and Gamma Ray logs from Intermediate TD (3175') to the bottom of the surface csg. MWD Gamma Ray will be run in the Laterals.

C. Coring and Drill stem Testing: No operations are planned for this site

6. FORMATION TOPS:

Est. KB Elevation: 6404'

FORMATION	Sub-Sea	TVD
Nacimiento Formation	Surface	Surface
Animas Formation		
Ojo Alamo SS	4855	1549
Kirtland Shale	4764	1640
Farmington SS		
Fruitland Formation	4008	2396
Upper Fruitland Coal	3765	2639
Middle Fruitland Coal**	3700	2704
Pictured Cliffs Tongue		
Lower Fruitland Coal*	3676	2728
Pictured Cliffs SS	3586	2818

\* Primary Objective

\*\* Secondary Objective

\*\*\*\* Maximum anticipated BHP should be <1,400 psig \*\*\*\*

7. ANTICIPATED OIL, GAS, & WATER ZONES:

A.

Formation	Expected Fluids	Well Depth-TVD'
Nacimiento Formation	Water	
Animas Formation	Water	
Ojo Alamo SS	Water	1549
Kirtland Shale	Water	1640
Farmington SS	Water	
Fruitland Formation	Water	2396
Upper Fruitland Coal	Gas	2639
Middle Fruitland Coal	Gas	2704
Pictured Cliffs Tongue	Gas	
Lower Fruitland Coal	Gas	2728
Pictured Cliffs SS	Gas	2818

B. All anticipated Appreciable Water Zones will be covered by surface casing.

C. Appropriately weighted mud will be used to isolate potential gas, oil, and water zones until such time as casing can be cemented into place for zonal isolation.

D. H<sub>2</sub>S is not anticipated at this site.

8. COMPANY PERSONNEL:

Name	Title	Office Phone	Cellular Phone
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Bobby Jackson	Drilling Superintendent	303-397-3720	505-486-4706
Michael Williams	Project Geologist	817-885-6632	

By: Alex Jones

Date: 3/4/2015

Drilling Manager Reviewed:

Date: 3/10/15

