west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Monday, September 30, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

XTO ENERGY, INC.
810 HOUSTON STREET
FORT WORTH, TX 76102

Re: Permit Modification Approval for ICE SOUTH UNIT 9H
47-033-05958-00-00

Shortening Conductor Casing from 40ft to 20ft.

XTO ENERGY, INC.

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: ICE SOUTH UNIT 9H
Farm Name: XTO ENERGY INC
U.S. WELL NUMBER: 47-033-05958-00-00
Horizontal 6A New Drill
Date Modification Issued: 09/30/2019

WW-6B
(04/15)

API NO. 47- 033 - 05958
OPERATOR WELL NO. Ice South Unit 9H
Well Pad Name: Ice Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

| 1) Well Operator: | XTO Energy Inc. | 494487940 | Harrison | Clay | Shinnston |
|---|---|---|---|---|---|
| | | Operator ID | County | District | Quadrangle |

2) Operator's Well Number: Ice South Unit 9H Well Pad Name: Ice Pad

3) Farm Name/Surface Owner: XTO Energy Inc. Public Road Access: CR 8/6 (Nutter Run)

4) Elevation, current ground: 1,360' Elevation, proposed post-construction: 1,360'

5) Well Type (a) Gas X Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow X Deep _____
Horizontal X

SPW 9/20/2019

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Target Formation: Marcellus, Depth 7,433', Anticipated Thickness: 150', Associated pressure: 4,650 psi

8) Proposed Total Vertical Depth: 7,564'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17,616'

11) Proposed Horizontal Leg Length: 9,416'

12) Approximate Fresh Water Strata Depths: 115' - 470'

13) Method to Determine Fresh Water Depths: Offsetting Reports & Local Stream Elevations. See additional page.

14) Approximate Saltwater Depths: 1,200'

15) Approximate Coal Seam Depths: 390', 490'

16) Approximate Depth to Possible Void (coal mine, karst, other): 480' - 490'

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No X

RECEIVED
Office of Oil and Gas
SEP 24 2019
WV Department of
Environmental Protection

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

WW-6B
(04/15)

API NO. 47- 033 - 05958
OPERATOR WELL NO. Ice South Unit 9H
Well Pad Name: Ice Pad

18) **CASING AND TUBING PROGRAM**

| TYPE | Size (in) | New or Used | Grade | Weight per ft. (lb/ft) | FOOTAGE: For Drilling (ft) | INTERVALS: Left in Well (ft) | CEMENT: Fill-up (Cu. Ft.)/CTS |
|---|---|---|---|---|---|---|---|
| Conductor | 24 | New | A-252 | 95 | 20 | 20 | 46 / CTS |
| Fresh Water | 13.375 | New | H-40 | 48 | 540 | 540 | 488 / CTS |
| Coal | | | | | | | |
| Intermediate | 9.625 | New | J55 | 36 | 2,910 | 2,910 | 1,185 / CTS |
| Production | 5.5 | New | P110 | 20 | 17,616 | 17,616 | 3,330 / 6,434 |
| Tubing | | | | | | | |
| Liners | | | | | | | |

SDW
9/20/2019

| TYPE | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|---|---|---|---|---|---|---|---|
| Conductor | 24 | 30 | 0.375 | 940 | 20 | Class A | 1.19 |
| Fresh Water | 13.375 | 17.5 | 0.33 | 1,730 | 440 | Class A | 1.19 |
| Coal | | | | | | | |
| Intermediate | 9.625 | 12.25 | 0.352 | 3,520 | 2,370 | Class A | 1.19 |
| Production | 5.5 | 8.5 | 0.361 | 14,360 | 6,140 | 65:35 POZ/Class H | 1.1 / 1.57 |
| Tubing | | | | | | | |
| Liners | | | | | | | |

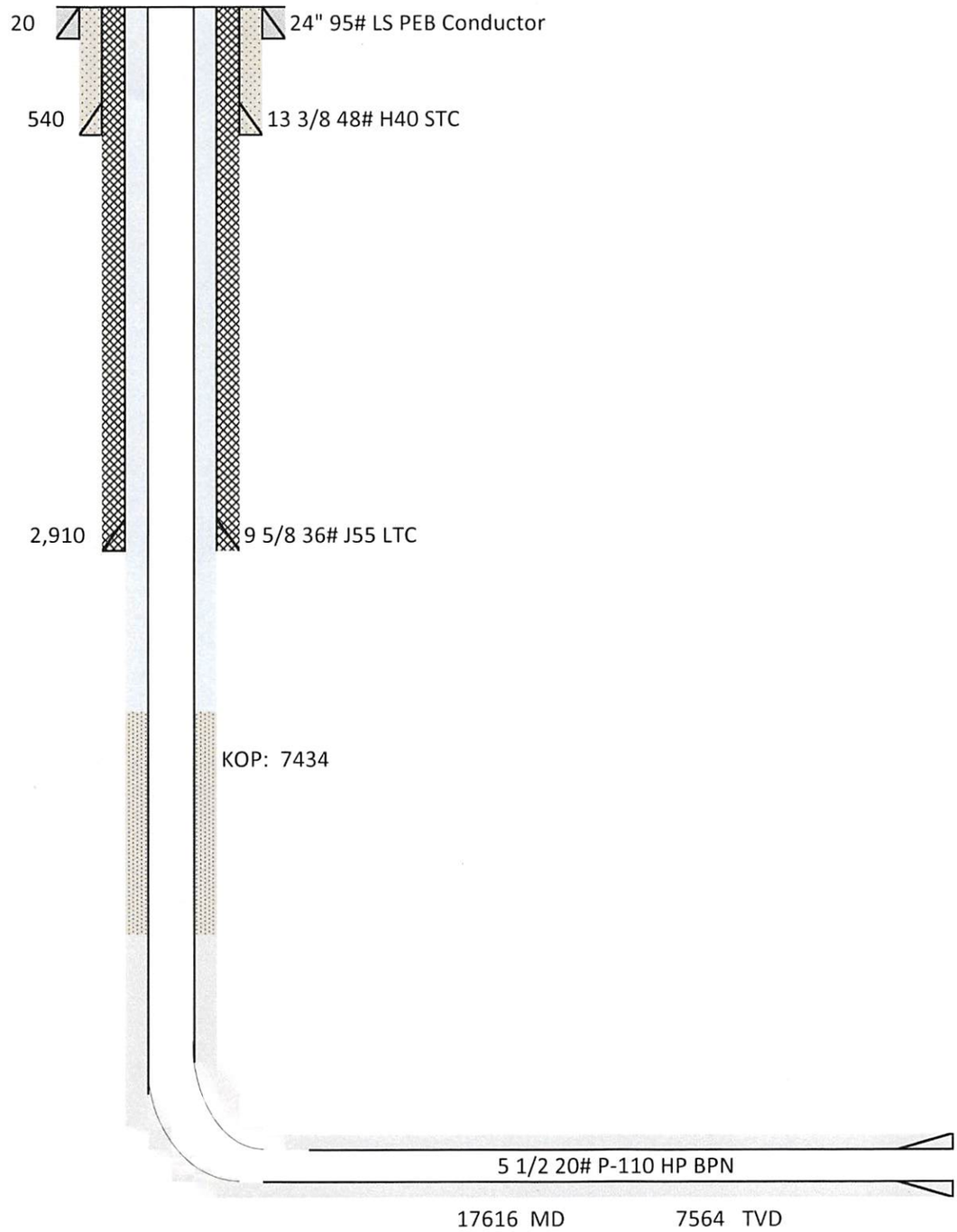
**PACKERS**

| | | | | |
|---|---|---|---|---|
| Kind: | | | | |
| Sizes: | | | | |
| Depths Set: | | | | |

**Ice Pad - APIs Used for Estimating Water Depths**

| API | Elevation | Fresh Water Depth |
|---|---|---|
| 4703304605 | 1300 | 217 |
| 4703304584 | 1125 | 208 |
| 4703304639 | 1258 | 140 |
| 4703301550 | 1366 | 180 |
| 4703300609 | 1102 | 60 |

**Ice South Unit 9H**
**Harrison County, West Virginia**



XTO Energy Inc.
480 Industrial Park Road
Jane Lew, WV 26378
(304)884-6001
(304)884-6809

**WVDEP – Office of Oil & Gas**
**601 57th St. SE**
**Charleston, WV 25304**

**September 20, 2019**

**Attn: Mr. Wade Stansberry**

**RE: Ice South Unit 9H Modification – API 47-033-05958**

Dear Mr. Stansberry,

Please see the enclosed modification requests for the subject well. The modification is an adjustment to the conductor depth which was approved in the field by Sam Ward – the County Inspector. Please don't hesitate to contact me if you have any questions or need further information.

* Shortening Conductor -20ft

Sincerely,

Tim Sands
Regulatory Coordinator
XTO Energy, Inc.
PO Box 1008
Jane Lew, WV 26378
Tim_Sands@xtoenergy.com
304-884-6036

WW-6B
(04/15)

API NO. 47- 033 - 05958
OPERATOR WELL NO. Ice South Unit 9H
Well Pad Name: Ice Pad

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

| 1) Well Operator: XTO Energy Inc. | 494487940 | Harrison | Clay | Shinnston |
|---|---|---|---|---|
| | Operator ID | County | District | Quadrangle |

2) Operator's Well Number: Ice South Unit 9H Well Pad Name: Ice Pad

3) Farm Name/Surface Owner: XTO Energy Inc. Public Road Access: CR 8/6 (Nutter Run)

4) Elevation, current ground: 1,360' Elevation, proposed post-construction: 1,360'

5) Well Type (a) Gas X Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow X Deep _____
Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Target Formation: Marcellus, Depth 7,433', Anticipated Thickness: 150', Associated pressure: 4,650 psi

8) Proposed Total Vertical Depth: 7,564'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17,616'

11) Proposed Horizontal Leg Length: 9,416'

12) Approximate Fresh Water Strata Depths: 115' - 470'

13) Method to Determine Fresh Water Depths: Offsetting Reports & Local Stream Elevations. See additional page.

14) Approximate Saltwater Depths: 1,200'

15) Approximate Coal Seam Depths: 390', 490'

16) Approximate Depth to Possible Void (coal mine, karst, other): 480' - 490'

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No X

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

RECEIVED
Office of Oil and Gas
SEP 24 2019
WV Department of
Environmental Protection

WW-6B
(04/15)

API NO. 47- 033 - 05958
OPERATOR WELL NO. Ice South Unit 9H
Well Pad Name: Ice Pad

18) **CASING AND TUBING PROGRAM**

| TYPE | Size (in) | New or Used | Grade | Weight per ft. (lb/ft) | FOOTAGE: For Drilling (ft) | INTERVALS: Left in Well (ft) | CEMENT: Fill-up (Cu. Ft.)/CTS |
|---|---|---|---|---|---|---|---|
| Conductor | 24 | New | A-252 | 95 | 20 | 20 | 46 / CTS |
| Fresh Water | 13.375 | New | H-40 | 48 | 540 | 540 | 488 / CTS |
| Coal | | | | | | | |
| Intermediate | 9.625 | New | J55 | 36 | 2,910 | 2,910 | 1,185 / CTS |
| Production | 5.5 | New | P110 | 20 | 17,616 | 17,616 | 3,330 / 6,434 |
| Tubing | | | | | | | |
| Liners | | | | | | | |

| TYPE | Size (in) | Wellbore Diameter (in) | Wall Thickness (in) | Burst Pressure (psi) | Anticipated Max. Internal Pressure (psi) | Cement Type | Cement Yield (cu. ft./k) |
|---|---|---|---|---|---|---|---|
| Conductor | 24 | 30 | 0.375 | 940 | 20 | Class A | 1.19 |
| Fresh Water | 13.375 | 17.5 | 0.33 | 1,730 | 440 | Class A | 1.19 |
| Coal | | | | | | | |
| Intermediate | 9.625 | 12.25 | 0.352 | 3,520 | 2,370 | Class A | 1.19 |
| Production | 5.5 | 8.5 | 0.361 | 14,360 | 6,140 | 65:35 POZ/Class H | 1.1 / 1.57 |
| Tubing | | | | | | | |
| Liners | | | | | | | |

**PACKERS**

| | | | | |
|---|---|---|---|---|
| Kind: | | | | |
| Sizes: | | | | |
| Depths Set: | | | | |

RECEIVED
Office of Oil and Gas
SEP 24 2019
WV Department of
Environmental Protection

WW-6B
(10/14)

API NO. 47- 033 - 05958
OPERATOR WELL NO. Ice South Unit 9H
Well Pad Name: Ice Pad

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill a new horizontal Marcellus well, utilizing synthetic mud and a closed loop system for both drilling and completion. Install new casing with centralizers.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

1. Acid Stage - Typically 1500 gallons of 7.5% hydrochloric acid to clear the perforation path in the wellbore. 2. Sand / Proppant Stages - Several stages of pumping water combined with sand at a targeted 80 bpm rate. The highest pressure and rate anticipated is 9,500 psig and 100 bpm. The sand size may vary from 100 mesh to 30/50 mesh size. 12,500 bbls slick water with 220,000 lbs 40/70, 270,000 lbs 100 mesh sands and 2,200 gals FR 133, 1,500 gals Bioplex 301 and 1,190 gals antiscale 30. 3. Flush Stage - Slickwater water stage to fill the wellbore to flush the sand from the wellbore. Depending on the water quality, a biocide, friction reducer, iron control, and scale inhibitor may be injected during the completion as well.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 10.4 +/-

22) Area to be disturbed for well pad only, less access road (acres): 6.6 +/-

23) Describe centralizer placement for each casing string:

Conductor: None
Fresh Water: Every 3rd joint from shoe to surface
Mine: Every 3rd joint from shoe to surface (if applicable)
Intermediate: Every 3rd joint from shoe to surface
Production: Every joint from shoe to TOC

24) Describe all cement additives associated with each cement type:

Conductor: None
Fresh Water: Calcium Chloride and super flake
Mine: Calcium Chloride and super flake (if applicable)
Intermediate: Calcium Chloride and super flake
Production: Calcium Chloride, Bentonite, super flake, Air-Out, CR-1, FL-300, SEC10

RECEIVED
Office of Oil and Gas
SEP 24 2019
WV Department of
Environmental Protection

25) Proposed borehole conditioning procedures:

Conductor: Hole is auger drilled: No conditioning required.
Fresh Water: Condition hole with air at TD until visibly clean, run casing, circulate and clear 1.5x pipe volume with fresh water before cementing.
Mine: Condition hole with air at TD until visibly clean, run casing, circulate and clear 1.5x pipe volume with water before cementing (if applicable).
Intermediate: Condition hole with air at TD until visibly clean, run casing, circulate and clear 1.5x pipe volume with water before cementing.
Production: Circulate hole with synthetic based drilling fluid at TD (1 bottoms up for each 2,000' of lateral drilled). TOOH and circulate minimum of 1 bottoms up and until returns are minimal at the base of the curve. Run casing, circulate 1.5 x casing volume and ensure good returns before cementing.

*Note: Attach additional sheets as needed.