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west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://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

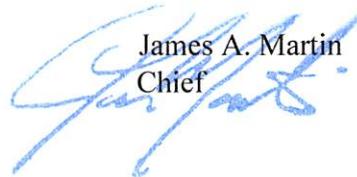
Re: Permit Modification Approval for ICE SOUTH UNIT 10H  
47-033-05963-00-00

**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 10H  
Farm Name: XTO ENERGY INC  
U.S. WELL NUMBER: 47-033-05963-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 09/30/2019

Promoting a healthy environment.

WW-6B  
(04/15)

API NO. 47-033 - 05983  
OPERATOR WELL NO. Ice South Unit 10H  
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.

<u>494487940</u>	<u>Harrison</u>	<u>Clay</u>	<u>Shinnston</u>
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Operator ID      County      District      Quadrangle

2) Operator's Well Number: Ice South Unit 10H      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  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_  
(b) If Gas Shallow  Deep \_\_\_\_\_  
Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Target Formation: Marcellus, Depth 7,448', Anticipated Thickness: 150', Associated pressure: 4,650 psi

8) Proposed Total Vertical Depth: 7,579'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17,969'

11) Proposed Horizontal Leg Length: 10,038'

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 \_\_\_\_\_

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

*SPW  
9/20/2019*

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WW-6B  
(04/15)

API NO. 47- 033 - 05963  
 OPERATOR WELL NO. Ice South Unit 10H  
 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	17,969	17,969	3,539 / 6,086
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	6,150	85-35 POZ/Class H	1.1 / 1.57
Tubing							
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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**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

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**AUG 26 2019**

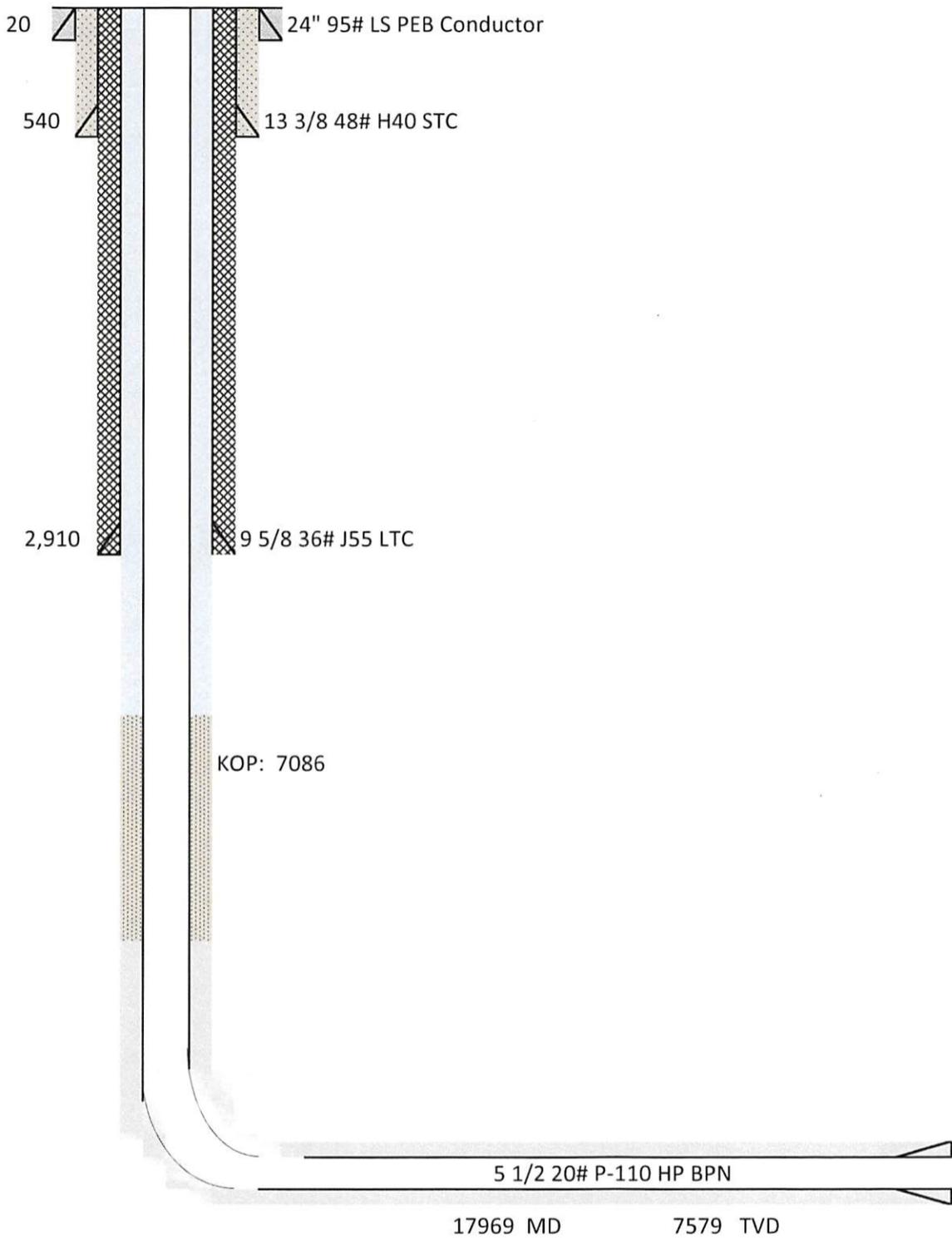
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**SEP 9 4 2019**

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Ice South Unit 10H  
Harrison County, West Virginia



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

WVDEP – Office of Oil & Gas  
601 57<sup>th</sup> St. SE  
Charleston, WV 25304

September 20, 2019

Attn: Mr. Wade Stansberry

RE: Ice South Unit 10H Modification – API 47-033-05963

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.

Sincerely,

A handwritten signature in black ink that appears to read 'Tim Sands'.

Tim Sands  
Regulatory Coordinator  
XTO Energy, Inc.  
PO Box 1008  
Jane Lew, WV 26378  
[Tim\\_Sands@xtoenergy.com](mailto:Tim_Sands@xtoenergy.com)  
304-884-6036

*\* Shortening Conductor  
- 20ft*

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WW-6B  
(04/15)

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Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

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WW-6B  
(04/15)

API NO. 47- 033 - 05963  
 OPERATOR WELL NO. Ice South Unit 10H  
 Well Pad Name: Ice Pad

18) **CASING AND TUBING PROGRAM**

<b>TYPE</b>	<b>Size (in)</b>	<b>New or Used</b>	<b>Grade</b>	<b>Weight per ft. (lb/ft)</b>	<b>FOOTAGE: For Drilling (ft)</b>	<b>INTERVALS: Left in Well (ft)</b>	<b>CEMENT: Fill-up (Cu. Ft.)/CTS</b>
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Tubing							
Liners							

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**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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WW-6B  
(10/14)

API NO. 47- 033 - 05963  
OPERATOR WELL NO. Ice South Unit 10H  
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 antiscala 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

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 circulate returns before cementing.

\*Note: Attach additional sheets as needed.

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