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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)

Tuesday, April 7, 2020  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit Modification Approval for ARMSTRONG S-10HU  
47-051-02256-00-00

**Modified Lateral for a TMD of 22,321' with SSP and AOR**

TUG HILL OPERATING, LLC

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

A blue ink signature of James A. Martin, written in a cursive style.

Operator's Well Number: ARMSTRONG S-10HU  
Farm Name: CONSOL RCPC, LLC  
U.S. WELL NUMBER: 47-051-02256-00-00  
Horizontal 6A New Drill  
Date Modification Issued: April 7, 2020

Promoting a healthy environment.



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west virginia department of environmental protection

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Oil and Gas Conservation Commission  
601 57<sup>th</sup> Street SE, Charleston, WV 25304  
304-926-0499 Ext 1274

Randall M. Albert, Chairman  
dep.wv.gov

February 19, 2020

Department of Environmental Protection  
Office of Oil and Gas  
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-051-02256

COMPANY: Tug Hill Operating, LLC

FARM: CONSOL RCPC, LLC Armstrong 1S-10HU

COUNTY: Marshall DISTRICT: Franklin QUAD: Powhatan Point

The deep well review of the application for the above company is Approved to drill to Trenton for Point Pleasant completion.

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Comments to Notice of Deviation filed? No
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: \*\*yes; Docket 292-293 Exception Location Hearing
4. Provided a plat showing that the proposed location is a distance of 400 feet from the nearest lease line or unit boundary with the exception of the toe which is 10 feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

A handwritten signature in blue ink that reads 'Susan Rose'.

Susan Rose  
Administrator

WW-6B  
(04/15)

4705108856 MOD  
API NO. 47-051  
OPERATOR WELL NO. Armstrong S-10HU  
Well Pad Name: Armstrong

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

1) Well Operator: Tug Hill Operating, LLC      494510851      Marshall      Franklin      Powhatan Point Z  
Operator ID      County      District      Quadrangle

2) Operator's Well Number: Armstrong S-10HU      Well Pad Name: Armstrong

3) Farm Name/Surface Owner: CONSOL RCPC, LLC      Public Road Access: Burch Ridge Road - CR 29

4) Elevation, current ground: 1279.12'      Elevation, proposed post-construction: 1279.12'

5) Well Type (a) Gas  Oil  Underground Storage   
Other

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No Yes

*ju*  
2/4/2020

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Point Pleasant is the target formation at a depth of 11,204' - 11,084' - thickness of 120' and anticipated pressure of approx. 9500 psi.

8) Proposed Total Vertical Depth: 11,354'

9) Formation at Total Vertical Depth: Trenton, plug back to Reedsville

10) Proposed Total Measured Depth: 22,321'

11) Proposed Horizontal Leg Length: 10,443.47'

12) Approximate Fresh Water Strata Depths: 70' ; 870'

13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickley Coal - 776' ; Pittsburgh Coal - 869'

16) Approximate Depth to Possible Void (coal mine, karst, other): none

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: \_\_\_\_\_

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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	30"	NEW	BW	BW	120'	120'	259FT^3(CTS)
Fresh Water	20"	NEW	J55	106.5#	970'	970'	1,568FT^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2701'	2701'	1,906FT^3(CTS)
Intermediate	9 5/8"	NEW	HPP110	47#	10,255'	10,255'	3,346FT^3(CTS)
Production	5 1/2"	NEW	P110	23#	22,321'	22,321'	5,288FT^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		10,981'	
Liners							

*je 11/7/19*

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	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	20"	26"	.5	2,410	1,928	SEE # 24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.472	10,730	6,968	SEE #24	1.99
Production	5 1/2"	8 1/2"	.415	16,510	10,864	SEE #24	1.18
Tubing	2 7/8"			11,385	11,624		
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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4705102256 *mon*

API NO. 47- 051 -  
OPERATOR WELL NO. Armstrong S-10HU  
Well Pad Name: Armstrong

WW-6B  
(10/14)

*me*  
*2/4/2020*

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. Log vertical section and run a solid cement plug back to proposed KOP (10,481'). Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 26,105,000 lb proppant and 403,602 bbl of water. Max rate = 80 bpm; max psi = 12,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 12.64 acres

22) Area to be disturbed for well pad only, less access road (acres): 3.21 acres

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediate will have 1 centralizer every third joint. Production casing will have one centralizer every third joint in lateral, one centralizer every joint through curve, one centralizer every third joint to surface.

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

\*See Attachment

25) Proposed borehole conditioning procedures:

Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH

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\*Note: Attach additional sheets as needed.

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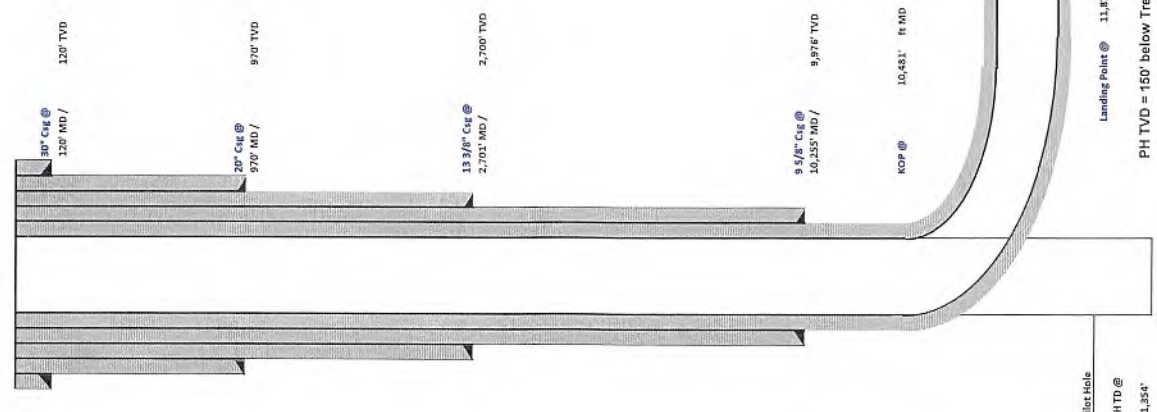
WELL NAME: Armstrong S-10HU  
STATE: WV COUNTY: Marshall  
DISTRICT: Franklin  
DF Elev: 1,279' GL Elev: 1,279'  
TD: 22,321'  
TH Latitude: 39.75380024  
TH Longitude: -80.80834447  
BH Latitude: 39.725535  
BH Longitude: -80.795893

Formation	Depth TVD
Deepest Fresh Water	870'
Sawickley Coal	776'
Pittsburgh Coal	869'
Big Lime	1,985'
Berea	2,527'
Tully	6,327'
Marcellus	6,386'
Onondaga	6,438'
Salina	7,130'
Lockport	8,135'
Utica	10,839'
Point Pleasant	11,084'
Landing Depth	11,134'
Trenton	11,204'
Pilot Hole TD	11,354'

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	26	20	970'	970'	106.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,701'	2,700'	54.5	J55	Surface
Intermediate 2	12 1/4	9 5/8	10,255'	9,976'	47	HPP110	Surface
Production	8 1/2	5 1/2	22,321'	11,316'	23	HCP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centralizer Notes	
338	A	15.6	Air	None	
1,691	A	15.6	Air	3 Centralizers at equal distance	
2,065	A	15	Air	1 Centralizer every other ft	
2,829	A	16.5	Air	1 Centralizer every other ft	
4,680	A	15	Air / SOBMA	1 every other joint in lateral; 1 per joint in curves; 1 every other ft to ft	

*Handwritten signature*



Lateral TD @ 22,321' ft MD  
11,316' ft TVD

Landing Point @ 11,879' MD / 11,134' TVD  
PH TD @ 11,354'  
PH TVD = 150' below Trenton Top

4705102256 MOD



**TUG HILL**  
**OPERATING**

**Tug Hill Operating, LLC Casing and Cement Program**

**Armstrong S-10HU**

**Casing**

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	970'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,701'	CTS
Intermediate 2	9 5/8"	HPP110	12 1/4"	10,255'	CTS
Production	5 1/2"	HCP110	8 1/2"	22,321'	CTS

**Cement**

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate 1: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.2

Intermediate 2: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.99

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.18

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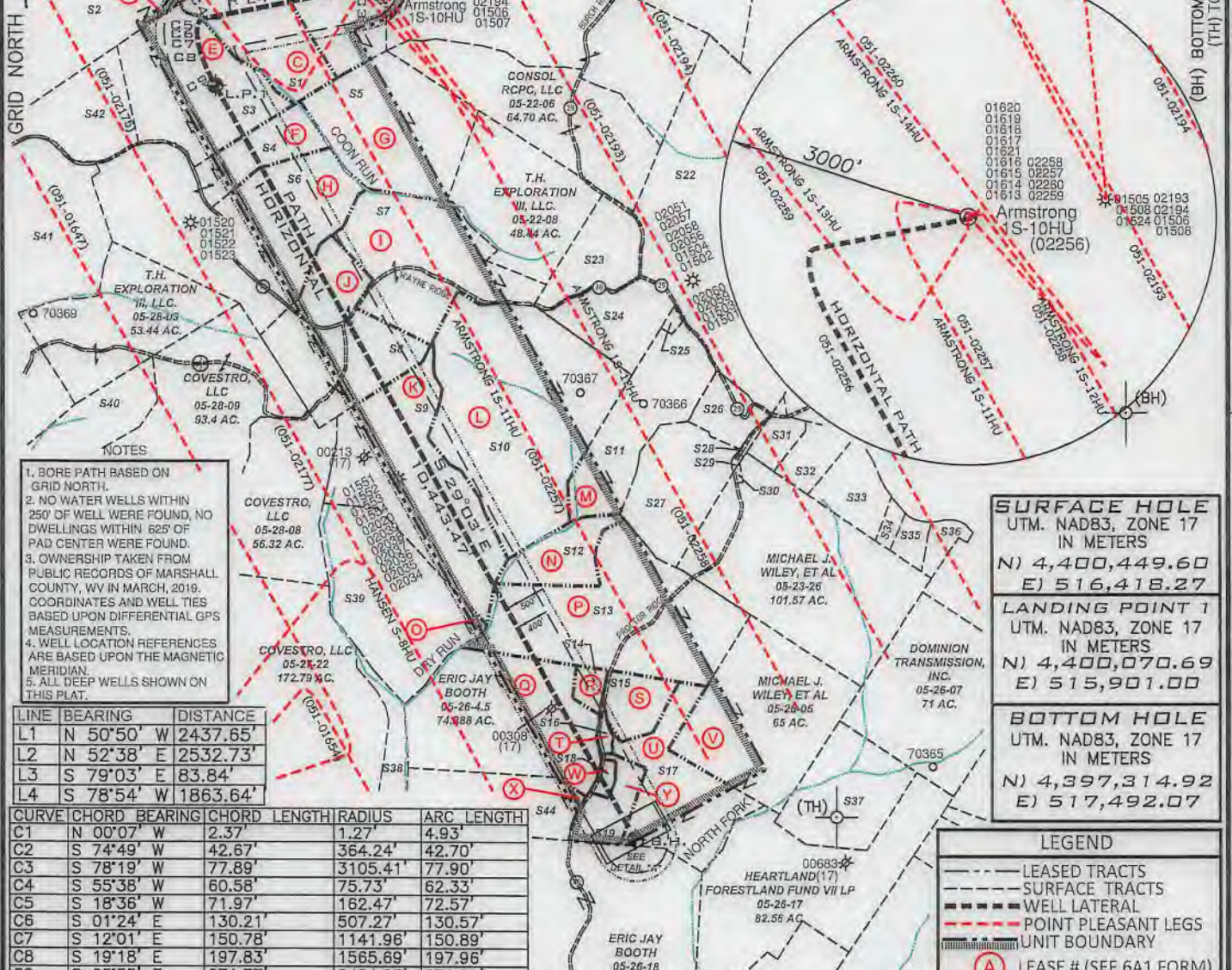
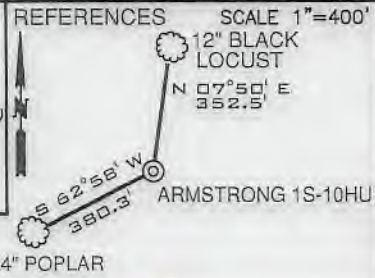
form wwf6

# ARMSTRONG LEASE WELL 1S-10HU 621.5151 ± ACRES

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

**DETAIL** (01620) Armstrong 9H  
**SKETCH "A"** (01619) Armstrong 8H  
**SCALE** 1"=200'  
 Armstrong 7H (01618)  
 (01617) Armstrong 6H  
 (01621) Armstrong 5H (02258)  
 (01616) Armstrong 4H  
 (01615) Armstrong 3H  
 (01614) Armstrong 2H  
 (01613) Armstrong 1H

TOP HOLE LATITUDE: 39°47'30"  
 BOTTOM HOLE LATITUDE: 39°45'00"



- NOTES**
1. BORE PATH BASED ON GRID NORTH.
  2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
  3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2019. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
  4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
  5. ALL DEEP WELLS SHOWN ON THIS PLAT.

LINE	BEARING	DISTANCE
L1	N 50°50' W	2437.65'
L2	N 52°38' E	2532.73'
L3	S 79°03' E	83.84'
L4	S 78°54' W	1863.64'

CURVE	CHORD	BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 00°07' W	2.37'	1.27'	4.93'	
C2	S 74°49' W	42.67'	364.24'	42.70'	
C3	S 78°19' W	77.89'	3105.41'	77.90'	
C4	S 55°38' W	60.58'	75.73'	62.33'	
C5	S 18°36' W	71.97'	162.47'	72.57'	
C6	S 01°24' E	130.21'	507.27'	130.57'	
C7	S 12°01' E	150.78'	1141.96'	150.89'	
C8	S 19°18' E	197.83'	1565.89'	197.96'	
C9	S 25°55' E	271.77'	2424.95'	271.91'	

**SURFACE HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,400,449.60  
 E) 516,418.27

**LANDING POINT 1**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,400,070.69  
 E) 515,901.00

**BOTTOM HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,397,314.92  
 E) 517,492.07

**LEGEND**

- LEASED TRACTS
- SURFACE TRACTS
- WELL LATERAL
- POINT PLEASANT LEGS
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

FILE NUMBER \_\_\_\_\_  
 DRAWING NUMBER: ARMSTRONG 1S-10HU REV 1  
 SCALE: 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING  
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. David L Jackson  
 708



JACKSON SURVEYING INC.  
 P.O. Box 1460  
 Clarksburg, WV 26302  
 304-823-5851

WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET, SE  
 CHARLESTON, WV 25304

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_  
 (IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP X SHALLOW \_\_\_  
 DATE: SEPTEMBER 24, 2019  
 REVISED: NOVEMBER 05, 2019  
 OPERATORS WELL NO. Armstrong 1S-10HU  
 API WELL NO. 47-051-02256  
 STATE MO COUNTY PERMIT

LOCATION ELEVATION 1279.12' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER  
 DISTRICT FRANKLIN COUNTY MARSHALL  
 QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER SEE WW-6A1 Form

SURFACE OWNER CONSOL RCPC, LLC ACREAGE 159.05  
 OIL & GAS ROYALTY OWNER CONSOL RCPC, LLC LEASE ACREAGE 159.05  
 PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_  
 PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH TVD: 11,354' TMD: 22,321'  
 WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER  
CT CORPORATION SYSTEM  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD  
FORT WORTH, TX 76107 CHARLESTON, WV 25313

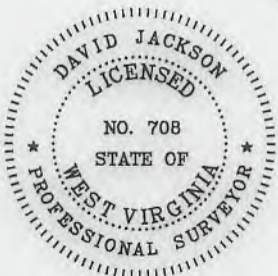
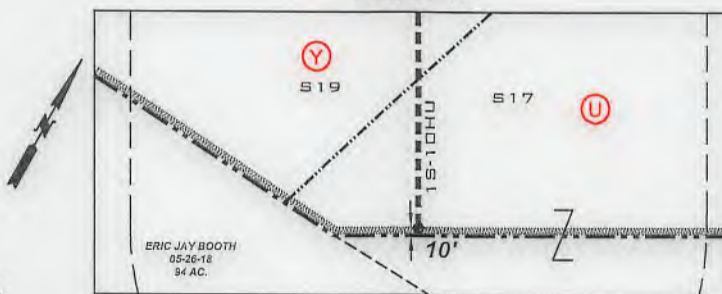
COUNTY NAME  
 PERMIT



**ARMSTRONG LEASE  
WELL 1S-10HU  
621.5151± ACRES**

Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S1 C	05-22-17	Consol RCPC, LLC.	37.5
S2 D	05-22-18	Edward R. Yoho, Jr.	77.13
S3 E	05-22-16	Edward R. Yoho, Jr.	57.0
S4 F	05-22-12	T.H. Exploration III, LLC.	61.49
S5 G	05-22-10	T.H. Exploration III, LLC.	58.40
S6 H	05-22-11	T.H. Exploration III, LLC.	55.65
S7 I	05-22-9	T.H. Exploration III, LLC.	63.44
S8 J	05-28-4	T.H. Exploration III, LLC.	48.44
S9 K	05-28-6	Ula F. Nelson	70.0
S10 L	05-28-5	T.H. Exploration III, LLC.	105.9
S11 M	05-23-28	Gregg D. Minor	39.43
S12 N	05-26-1	Edwin Booth Anderson & Mark W. Booth	12.94
S13 P	05-26-2	Edwin Booth Anderson & Mark W. Booth	67.5
S14 R	05-26-4	James R. & Melody A. Anderson	3.887
S15 S	05-26-4.6	Otis F. Rush Jr.	12.268
S16 T	05-26-4.2	Otis S. Rush, et ux	1.58
S17 U	05-26-4.4	Otis F. & Glenda M. Rush	39.436
S18 W	05-26-4.3	Crystal & Randolph F. Matask	2.253
S19 Y	05-26-4.1	Otis S. Rush, et ux	12.188
S20	05-19-18.2	Paul V. & Carol Neely	32.672
S21	05-19-18	Mark E. Yoho, et ux	55.948
S22	05-23-1	Patricia Accettolo, et al	146.66
S23	05-22-7.1	XcL Exploration II, LLC & Atinum Marcellus I, LLC	20.68
S24	05-22-7	Patricia Accettolo, et al	25.02
S25	05-23-28.1	Troy W. & Erin M. Thomas	1.0
S26	05-23-28.2	Tammac Holdings Corporation	10.8
S27	05-23-27	Michael J. Wiley, et al	33.140
S28	05-23-23	Michael J. Wiley, et al	1.0
S29	05-23-24	Michael J. Wiley, et al	0.25
S30	05-23-25	Arthur A. Wiley	0.43
S31	05-23-22	Daniel D. Rhyand & Laurel R. Greene	6.25
S32	05-23-17.1	Curtis E. Hall, et ux	10.051
S33	05-23-17.2	Dick Rowan, Jr. & Carol J. Rowan	14.920
S34	05-23-17.4	Tammy D. Meadows	2.605
S35	05-23-17	Tammy & Thomas E. Brown	4.62
S36	05-23-17.3	William & Katherine Flewelling	5.018
S37	05-26-6	Heartwood Forestland Fund VII LP	36.17
S38	05-27-23	Robert. F. Rothlisberger	35.77
S39 O	05-28-7	Carl L. Corfield, Sr. & Lana R. Coffield	64.0
S40	05-28-10	Carol Martin	100.0
S41	05-22-13	John M. Moore, Theresa F. Moore, & Andrea S. Moore	40.57
S42	05-22-15	Edward R. Yoho, Jr.	25.5
S43	05-19-21	Sammy E. Whitlatch, et al	116.45
S44 X	05-26-19	Eric Jay Booth & Karroll S. Booth	50.0

DETAIL "A"



4705102256 mod

P.S. 708 *David L Jackson*



**TUG HILL**  
**OPERATING**

OPERATOR'S  
WELL #: Armstrong 1S-10HU  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV  
API: 47-051-02256

WELL PLAT  
PAGE 2 OF 3  
DATE: 09/24/2019  
REVISED: 11/05/2019

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
-------------------------	-----------------------	-----------------------	---------	-----------

\*See attached pages


\*Co-tenancy utilization – At least 7 mineral owners in tract. At least 75% of the royalty owners have executed a lease on the tract. The interests of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act.

**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC  
 By: Amy L. Miller   
 Its: Permitting Specialist - Appalachia Region



## ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from SWN PRODUCTION COMPANY, LLC, a Texas limited liability company ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on December 18, 2017 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 24, 2017 (the "*Acreage Trade Agreement*").

### ARTICLE 1 ASSIGNMENT OF ASSETS

**Section 1.1 Assignment.** For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby **GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS** unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") INsofar AND ONLY INsofar as they cover those lands described on Exhibit A (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*").

**TO HAVE AND TO HOLD** the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

**Section 1.2 Assignment Subject to Acreage Trade Agreement.** This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

### ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

**Section 2.1 Special Warranty of Title.** Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

**Section 2.2 Disclaimers of Warranties and Representations.**

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR



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Lease No.	Tract	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	
10*18529	A	5-22-5	CWX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	733	500	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA
10*14033	B	5-22-4	LAWRENCE C AND LORRAINE J MCWHORTER	GASTAR EXPLORATION USA INC	1/8+	665	554	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14034	B	5-22-4	LAWRENCE C AND LORRAINE J MCWHORTER	GASTAR EXPLORATION USA INC	1/8+	665	391	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14035	B	5-22-4	PEGGY MAE WHITE	GASTAR EXPLORATION USA INC	1/8+	695	446	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14036	B	5-22-4	WILDA WINTERS	GASTAR EXPLORATION USA INC	1/8+	701	579	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14037	B	5-22-4	JUDITH L CHAMBERS	GASTAR EXPLORATION USA INC	1/8+	701	577	NA	NA	23/353 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14038	B	5-22-4	HAYHURST COMPANY A FLORIDA PARTNERSHIP	CHESAPEAKE APPALACHIA LLC	1/8+	724	7	NA	25/582 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14039	B	5-22-4	CHESTNUT HOLDINGS LLC	GASTAR EXPLORATION INC	1/8+	827	554	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14507	C	5-22-17	MARY THERESA SOLEAU AND THOMAS SOLEAU	GASTAR EXPLORATION USA INC	1/8+	749	524	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14508	C	5-22-17	JEAN W FOSTER	GASTAR EXPLORATION USA INC	1/8+	752	200	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14509	C	5-22-17	JAMES ROBERT WELLS	GASTAR EXPLORATION USA INC	1/8+	752	202	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14510	C	5-22-17	MARY AGNES CARROLL	GASTAR EXPLORATION USA INC	1/8+	749	528	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14511	C	5-22-17	ELIZABETH JANE KELLER	GASTAR EXPLORATION USA INC	1/8+	754	242	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14513	C	5-22-17	CAROLYN LYNN PORTER	GASTAR EXPLORATION USA INC	1/8+	767	256	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14514	C	5-22-17	CHARLES ARTHUR WELLS	GASTAR EXPLORATION USA INC	1/8+	768	494	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14515	C	5-22-17	JERRY TODD WELLS	GASTAR EXPLORATION USA INC	1/8+	773	572	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14516	C	5-22-17	JAMIE WELLS AIF	GASTAR EXPLORATION USA INC	1/8+	773	570	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14517	C	5-22-17	CARL W BACH JR	GASTAR EXPLORATION INC	1/8+	852	250	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14518	C	5-22-17	RAE ELLEN FLOYD AND KENNETH FLOYD	GASTAR EXPLORATION INC	1/8+	854	599	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14519	C	5-22-17	DOUGLAS M BACH	GASTAR EXPLORATION INC	1/8+	854	597	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*16471	C	5-22-17	CWX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	905	155	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*16652	C	5-22-17	MARY JUDITH BRANSON AND MICHAEL L BRANSON	TH EXPLORATION, LLC	1/8+	942	35	NA	NA	26/639 Gaster Exploration USA Inc and Gaster Exploration II LLC	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC



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10*14305	L	5-28-5	HELEN BOYMAN	GASTAR EXPLORATION USA INC	1/8+	749	362	NA	NA	26/639 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14306	L	5-28-5	RANDY GODDARD	GASTAR EXPLORATION USA INC	1/8+	759	248	NA	NA	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14418	L	5-28-5	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	35/144 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*21218	M	5-23-28	GREGG D MINOR	TH EXPLORATION, LLC	1/8+	952	647	NA	NA	NA	NA	NA
10*22330	M	5-23-28	GREGG D MINOR	TH EXPLORATION, LLC	1/8+	963	156	NA	NA	NA	NA	NA
10*14916	N	5-26-1	MARK W BOOTH	GASTAR EXPLORATION USA INC	1/8+	836	110	NA	NA	32/428 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14917	N	5-26-1	EDWIN BOOTH ANDERSON	GASTAR EXPLORATION USA INC	1/8+	836	108	NA	NA	32/428 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14065	O	5-28-7	CARL COFFIELD	GASTAR EXPLORATION USA INC	1/8+	655	363	NA	NA	32/428 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14916	P	5-26-2	MARK W BOOTH	GASTAR EXPLORATION USA INC	1/8+	836	110	NA	NA	32/428 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14917	P	5-26-2	EDWIN BOOTH ANDERSON	GASTAR EXPLORATION USA INC	1/8+	836	108	NA	NA	32/428 Gaster Exploration USA Inc to Athium Marcellus LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*17137	Q	5-26-4.5	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17153	Q	5-26-4.5	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17137	R	5-26-4	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17153	R	5-26-4	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17137	S	5-26-4.6	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17153	S	5-26-4.6	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17137	T	5-26-4.2	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17153	T	5-26-4.2	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17137	U	5-26-4.4	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*17153	U	5-26-4.4	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Production Company Exchange Titleholder LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	41/256 SWN Production Company LLC to TH Exploration II LLC
10*14742	V	5-26-5	SUSAN E GORE	GASTAR EXPLORATION USA INC	1/8+	790	505	NA	NA	NA	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger to TH Exploration II LLC	36/9 Gaster Exploration Inc to TH Exploration II LLC



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10*14744	V	5-26-5	THE SAMUEL MILTON SHEETS TRUST PAULINE RUTH SHEETS TRUSTEE	GASTAR EXPLORATION USA INC	1/8+	791	637	NA	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14745	V	5-26-5	RALPH B TAYLOR	GASTAR EXPLORATION USA INC	1/8+	794	485	NA	NA	8/6/1 Gastar Exploration USA Inc to Atinum Marcellus LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*17716	V	5-26-5	MICHAEL J AND BARBARA I WILEY	TH EXPLORATION, LLC	1/8+	919	638	NA	NA	NA	NA	NA
10*17777	V	5-26-5	MICHELLE E AND ROBERT T BAKER	TH EXPLORATION, LLC	1/8+	921	128	NA	NA	NA	NA	NA
10*21420	V	5-26-5	DAVID D BURKETT	TH EXPLORATION, LLC	1/8+	957	3	NA	NA	NA	NA	NA
10*21421	V	5-26-5	BRYANNA FLYNN BARKIN	TH EXPLORATION, LLC	1/8+	957	5	NA	NA	NA	NA	NA
10*21437	V	5-26-5	REBECCA MCMILLAN AND ROBERT MCMILLAN	TH EXPLORATION, LLC	1/8+	957	1	NA	NA	NA	NA	NA
10*21821	V	5-26-5	LINDA K TAYLOR AND RAY P MAGEE	TH EXPLORATION, LLC	1/8+	951	631	NA	NA	NA	NA	NA
10*25633	V	5-26-5	CHESTRUT HOLDINGS LLC	TH EXPLORATION, LLC	1/8+	1034	546	NA	NA	NA	NA	NA
10*17137	W	5-26-4.3	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/756 SWN Production Company LLC to TH Exploration LLC
10*17153	W	5-26-4.3	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	23/16 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration LLC
10*19908	X	5-26-19	GOIDA K ANDERSON	TH EXPLORATION, LLC	1/8+	945	434	NA	NA	NA	NA	NA
10*21935	X	5-26-19	KARROLL S BOOTH AND LOIS E BOOTH	AMERICAN PETROLEUM PARTNERS LLC	1/8+	940	593	NA	NA	NA	NA	41/224 American Petroleum Partners Operating LLC to TH Exploration LLC
10*22015	X	5-26-19	ERIC JAY BOOTH	AMERICAN PETROLEUM PARTNERS LLC	1/8+	942	217	NA	NA	NA	NA	41/224 American Petroleum Partners Operating LLC to TH Exploration LLC
10*17137	Y	5-26-4.1	MARK E SMITH AND VALERIE SMITH LIFE TENANT	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration LLC
10*17153	Y	5-26-4.1	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	23/16 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia LLC to SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration LLC

\* Co-tenancy information - At least 75% of the royalty owners have executed a lease on the tract. At least 75% of the remaining co-tenants were acquired pursuant to the Co-tenancy Modernization and Majority Protection Act.