



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

Friday, November 22, 2019
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

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

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless 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: ARMSTRONG S-10HU
Farm Name: CONSOL RCPC, LLC
U.S. WELL NUMBER: 47-051-02256-00-00
Horizontal 6A New Drill
Date Issued: 11/22/2019

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.



west virginia department of environmental protection

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

Barry K. Lay, Chairman
dep.wv.gov

October 2, 2019

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 287-284 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 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

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 7
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

ju
7/18/19

6) Existing Pad: Yes or No Yes

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

10) Proposed Total Measured Depth: 21,881'

11) Proposed Horizontal Leg Length: 10,607.19'

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

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

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#	2700'	2700'	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#	21,881'	21,881'	5,187FT^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		10,981'	
Liners							

JW
2/18/19

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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Handwritten signature and date: 7/18/19

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. 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 25,005,000 lb proppant and 386,596 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

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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

*Note: Attach additional sheets as needed.



WELL NAME: Armstrong S-10HU COUNTY: Marshall
 STATE: WV DISTRICT: Franklin
 DE Elev: 1,279' GL Elev: 1,279'
 TD: 21,881'
 TH Latitude: 39.75380024
 TH Longitude: -80.80839447
 BH Latitude: 39.72658282
 BH Longitude: -80.79667238

30" Csg @ 120' MD / 120' TVD

20" Csg @ 970' MD / 970' TVD

13 3/8" Csg @ 2,701' MD / 2,700' TVD

9 5/8" Csg @ 10,255' MD / 9,976' TVD

KOP @ 10,481' ft MD

Pilot Hole
 PH TD @ 11,354'

Landing Point @ 1,879' MD / 11,134' TVD

PH TVD = 150' below Trenton Top

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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	21,881'	11,309'	23	HCP110	Surface

CEMENT SUMMARY

Type	Sacks	Class	Density	DRILLING DETAILS	
				Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,691	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	2,065	A	15	Air	1 Centralizer every other jt
Intermediate 2	2,829	A	14.5	Air	1 Centralizer every other jt
Production	4,586	A	15	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

FORMATION TOPS

Formation	Depth TVD
Deepest Fresh Water	870'
Sewickley 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	8,159'
Utica	10,829'
Point Pleasant	11,084'
Landing Depth	11,134'
Trenton	11,204'
Pilot Hole TD	11,354'

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Lateral TD @ 21,881' ft MD
 11,309 ft TVD



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"	21,881'	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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Well: Armstrong 1S-10 HU (slot L)
 Site: Armstrong Pad
 Project: Marshall County, West Virginia
 Design: rev0

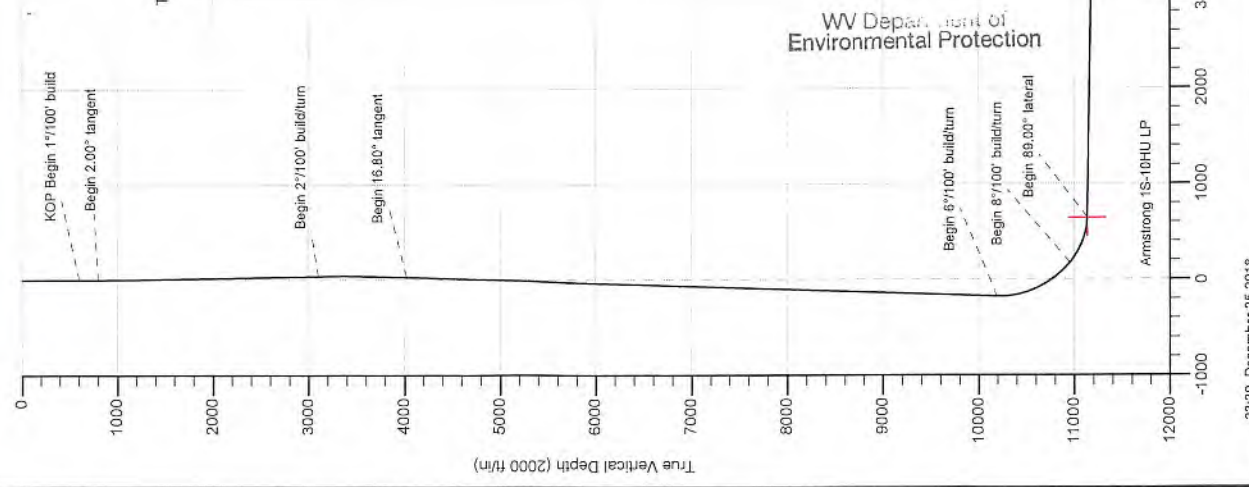
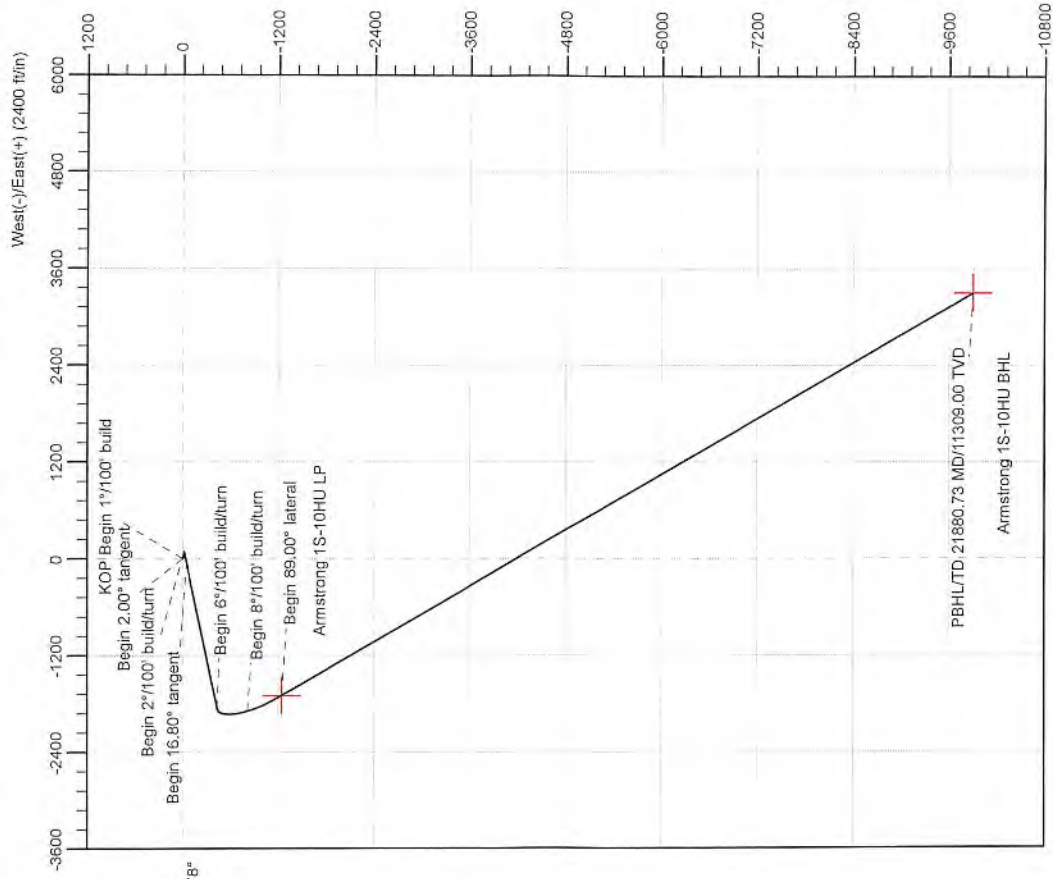
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 1°/100' build
3	800.00	2.00	100.00	799.96	-0.61	3.44	1.00	100.00	1.66	Begin 2.00° tangent
4	3101.44	2.00	100.00	3100.00	-14.55	82.54	0.00	0.00	39.92	Begin 2°/100' build/turn
5	4034.85	16.80	257.95	4021.37	-45.82	-34.38	2.00	160.18	32.59	Begin 16.80° tangent
6	10460.60	16.80	257.95	10192.02	-434.75	-1856.34	0.00	0.00	-174.91	Begin 6°/100' build/turn
7	11357.64	50.00	163.64	10957.55	-815.27	-1886.34	0.00	-107.50	175.94	Begin 8°/100' build/turn
8	11879.20	89.00	150.00	11134.00	-1243.10	-1697.08	8.00	-21.10	642.30	Begin 89.00° lateral
9	21880.73	89.00	150.00	11309.00	-9903.32	-3302.98	0.00	0.00	0.00	PBHL/TD 21880.73 MD/11309.00 TVD

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: GL @ 1276.00ft
 Northing: 14437141.71
 Easting: 1694282.25
 Latitude: 39.75380024
 Longitude: -80.80834447

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.78°



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Azimuths to Grid North
 True North: -0.12°
 Magnetic North: -8.78°
 Magnetic Field
 Strength: 51992.3nT
 Dip Angle: 66.82°
 Date: 12/25/2018
 Model: IGRF2015



4705102265



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Armstrong 1S-10 HU (slot L)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1279.00ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1279.00ft
Site:	Armstrong Pad	North Reference:	Grid
Well:	Armstrong 1S-10 HU (slot L)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Project	Marshall County, West Virginia		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Armstrong Pad				
Site Position:		Northing:	14,437,151.34 usft	Latitude:	39.75382662
From:	Lat/Long	Easting:	1,694,289.43 usft	Longitude:	-80.80831890
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	Armstrong 1S-10 HU (slot L)					
Well Position	+N/-S	0.00 ft	Northing:	14,437,141.72 usft	Latitude:	39.75380024
	+E/-W	0.00 ft	Easting:	1,694,282.26 usft	Longitude:	-80.80834447
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	1,279.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/25/2018	-8.66	66.82	51,992.25057497

Design	rev0				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	161.56	

Plan Survey Tool Program	Date	12/25/2018			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	21,880.73 rev0 (Original Hole)	MWD MWD - Standard		

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Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	2.00	100.00	799.96	-0.61	3.44	1.00	1.00	0.00	100.00	
3,101.44	2.00	100.00	3,100.00	-14.55	82.54	0.00	0.00	0.00	0.00	
4,034.85	16.80	257.95	4,021.37	-45.82	-34.38	2.00	1.59	16.92	160.18	
10,480.60	16.80	257.95	10,192.02	-434.75	-1,856.34	0.00	0.00	0.00	0.00	
11,367.64	50.00	163.64	10,957.55	-815.27	-1,888.34	6.00	3.74	-10.63	-107.50	
11,879.20	89.00	150.00	11,134.00	-1,243.10	-1,697.08	8.00	7.62	-2.67	-21.10	
21,880.73	89.00	150.00	11,309.00	-9,903.32	3,302.98	0.00	0.00	0.00	0.00	Armstrong 1S-10HU E



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Armstrong Pad
 Well: Armstrong 1S-10 HU (slot L)
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Armstrong 1S-10 HU (slot L)
 TVD Reference: GL @ 1279.00ft
 MD Reference: GL @ 1279.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
100.00	0.00	0.00	100.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
200.00	0.00	0.00	200.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
300.00	0.00	0.00	300.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
400.00	0.00	0.00	400.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
500.00	0.00	0.00	500.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
600.00	0.00	0.00	600.00	0.00	0.00	14,437,141.72	1,694,282.26	39.75380024	-80.80834447
KOP Begin 1°/100' build									
700.00	1.00	100.00	700.00	-0.15	0.86	14,437,141.57	1,694,283.12	39.75379982	-80.80834141
800.00	2.00	100.00	799.96	-0.61	3.44	14,437,141.11	1,694,285.70	39.75379856	-80.80833225
Begin 2.00° tangent									
900.00	2.00	100.00	899.90	-1.21	6.87	14,437,140.51	1,694,289.13	39.75379687	-80.80832002
1,000.00	2.00	100.00	999.84	-1.82	10.31	14,437,139.90	1,694,292.57	39.75379519	-80.80830780
1,100.00	2.00	100.00	1,099.78	-2.42	13.75	14,437,139.29	1,694,296.01	39.75379350	-80.80829557
1,200.00	2.00	100.00	1,199.72	-3.03	17.19	14,437,138.69	1,694,299.45	39.75379182	-80.80828335
1,300.00	2.00	100.00	1,299.66	-3.64	20.62	14,437,138.08	1,694,302.88	39.75379013	-80.80827113
1,400.00	2.00	100.00	1,399.60	-4.24	24.06	14,437,137.48	1,694,306.32	39.75378845	-80.80825890
1,500.00	2.00	100.00	1,499.54	-4.85	27.50	14,437,136.87	1,694,309.76	39.75378677	-80.80824668
1,600.00	2.00	100.00	1,599.48	-5.45	30.93	14,437,136.26	1,694,313.19	39.75378508	-80.80823445
1,700.00	2.00	100.00	1,699.41	-6.06	34.37	14,437,135.66	1,694,316.63	39.75378340	-80.80822223
1,800.00	2.00	100.00	1,799.35	-6.67	37.81	14,437,135.05	1,694,320.07	39.75378171	-80.80821001
1,900.00	2.00	100.00	1,899.29	-7.27	41.24	14,437,134.45	1,694,323.50	39.75378003	-80.80819778
2,000.00	2.00	100.00	1,999.23	-7.88	44.68	14,437,133.84	1,694,326.94	39.75377834	-80.80818556
2,100.00	2.00	100.00	2,099.17	-8.48	48.12	14,437,133.23	1,694,330.38	39.75377666	-80.80817333
2,200.00	2.00	100.00	2,199.11	-9.09	51.55	14,437,132.63	1,694,333.81	39.75377497	-80.80816111
2,300.00	2.00	100.00	2,299.05	-9.70	54.99	14,437,132.02	1,694,337.25	39.75377329	-80.80814889
2,400.00	2.00	100.00	2,398.99	-10.30	58.43	14,437,131.41	1,694,340.69	39.75377160	-80.80813666
2,500.01	2.00	100.00	2,498.93	-10.91	61.87	14,437,130.81	1,694,344.13	39.75376992	-80.80812444
2,600.01	2.00	100.00	2,598.87	-11.51	65.30	14,437,130.20	1,694,347.56	39.75376824	-80.80811221
2,700.01	2.00	100.00	2,698.81	-12.12	68.74	14,437,129.60	1,694,351.00	39.75376655	-80.80809999
2,800.01	2.00	100.00	2,798.75	-12.73	72.18	14,437,129.00	1,694,354.44	39.75376487	-80.80808777
2,900.01	2.00	100.00	2,898.69	-13.33	75.61	14,437,128.38	1,694,357.87	39.75376318	-80.80807554
3,000.01	2.00	100.00	2,998.63	-13.94	79.05	14,437,127.78	1,694,361.31	39.75376150	-80.80806332
3,100.01	2.00	100.00	3,098.56	-14.54	82.49	14,437,127.17	1,694,364.75	39.75375981	-80.80805109
3,101.44	2.00	100.00	3,100.00	-14.55	82.54	14,437,127.16	1,694,364.80	39.75375979	-80.80805092
Begin 2°/100' build/turn									
3,200.01	0.68	177.72	3,198.54	-15.44	84.25	14,437,126.28	1,694,366.51	39.75375734	-80.80804481
3,300.01	2.20	242.23	3,298.51	-16.93	82.58	14,437,124.79	1,694,364.84	39.75375326	-80.80805078
3,400.01	4.15	250.80	3,398.35	-19.01	77.47	14,437,122.71	1,694,359.73	39.75374758	-80.80806897
3,500.01	6.13	253.87	3,497.95	-21.68	68.93	14,437,120.04	1,694,351.19	39.75374029	-80.80809938
3,600.01	8.12	255.44	3,597.17	-24.94	56.97	14,437,116.78	1,694,339.23	39.75373141	-80.80814196
3,700.01	10.11	256.39	3,695.90	-28.78	41.60	14,437,112.94	1,694,323.86	39.75372095	-80.80819667
3,800.01	12.11	257.03	3,794.02	-33.20	22.85	14,437,108.52	1,694,305.11	39.75370893	-80.80826343
3,900.01	14.11	257.50	3,891.41	-38.19	0.73	14,437,103.53	1,694,282.99	39.75369535	-80.80834217
4,000.01	16.10	257.85	3,987.95	-43.75	-24.73	14,437,097.97	1,694,257.53	39.75368024	-80.80843279
4,034.85	16.80	257.95	4,021.37	-45.82	-34.38	14,437,095.90	1,694,247.88	39.75367461	-80.80846714
Begin 16.80° tangent									
4,100.01	16.80	257.95	4,083.75	-49.75	-52.80	14,437,091.97	1,694,229.46	39.75366392	-80.80853270
4,200.01	16.80	257.95	4,179.48	-55.78	-81.06	14,437,085.93	1,694,201.20	39.75364752	-80.80863331
4,300.01	16.80	257.95	4,275.21	-61.82	-109.33	14,437,079.90	1,694,172.93	39.75363111	-80.80873393
4,400.01	16.80	257.95	4,370.94	-67.85	-137.59	14,437,073.87	1,694,144.67	39.75361471	-80.80883455
4,500.01	16.80	257.95	4,466.68	-73.89	-165.86	14,437,067.83	1,694,116.40	39.75359830	-80.80893516
4,600.01	16.80	257.95	4,562.41	-79.92	-194.13	14,437,061.80	1,694,088.13	39.75358190	-80.80903578
4,700.01	16.80	257.95	4,658.14	-85.95	-222.39	14,437,055.76	1,694,059.87	39.75356549	-80.80913640



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Armstrong Pad
 Well: Armstrong 1S-10 HU (slot L)
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Armstrong 1S-10 HU (slot L)
 TVD Reference: GL @ 1279.00ft
 MD Reference: GL @ 1279.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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WV Department of Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,800.01	16.80	257.95	4,753.87	-91.99	-250.66	14,437,049.73	1,694,031.60	39.75354909	-80.80923701
4,900.01	16.80	257.95	4,849.61	-98.02	-278.92	14,437,043.70	1,694,003.34	39.75353268	-80.80933763
5,000.01	16.80	257.95	4,945.34	-104.06	-307.19	14,437,037.66	1,693,975.07	39.75351627	-80.80943825
5,100.01	16.80	257.95	5,041.07	-110.09	-335.46	14,437,031.63	1,693,946.80	39.75349987	-80.80953886
5,200.01	16.80	257.95	5,136.80	-116.12	-363.72	14,437,025.59	1,693,918.54	39.75348346	-80.80963948
5,300.01	16.80	257.95	5,232.53	-122.16	-391.99	14,437,019.56	1,693,890.27	39.75346706	-80.80974009
5,400.01	16.80	257.95	5,328.27	-128.19	-420.26	14,437,013.53	1,693,862.01	39.75345065	-80.80984071
5,500.01	16.80	257.95	5,424.00	-134.22	-448.52	14,437,007.49	1,693,833.74	39.75343425	-80.80994133
5,600.01	16.80	257.95	5,519.73	-140.26	-476.79	14,437,001.46	1,693,805.47	39.75341784	-80.81004194
5,700.01	16.80	257.95	5,615.46	-146.29	-505.05	14,436,995.43	1,693,777.21	39.75340143	-80.81014256
5,800.01	16.80	257.95	5,711.20	-152.33	-533.32	14,436,989.39	1,693,748.94	39.75338503	-80.81024317
5,900.01	16.80	257.95	5,806.93	-158.36	-561.59	14,436,983.36	1,693,720.68	39.75336862	-80.81034379
6,000.01	16.80	257.95	5,902.66	-164.39	-589.85	14,436,977.32	1,693,692.41	39.75335221	-80.81044441
6,100.01	16.80	257.95	5,998.39	-170.43	-618.12	14,436,971.29	1,693,664.14	39.75333581	-80.81054502
6,200.01	16.80	257.95	6,094.12	-176.46	-646.38	14,436,965.26	1,693,635.88	39.75331940	-80.81064564
6,300.01	16.80	257.95	6,189.86	-182.50	-674.65	14,436,959.22	1,693,607.61	39.75330299	-80.81074625
6,400.01	16.80	257.95	6,285.59	-188.53	-702.92	14,436,953.19	1,693,579.34	39.75328659	-80.81084687
6,500.01	16.80	257.95	6,381.32	-194.56	-731.18	14,436,947.15	1,693,551.08	39.75327018	-80.81094749
6,600.01	16.80	257.95	6,477.05	-200.60	-759.45	14,436,941.12	1,693,522.81	39.75325377	-80.81104810
6,700.01	16.80	257.95	6,572.79	-206.63	-787.72	14,436,935.09	1,693,494.55	39.75323737	-80.81114872
6,800.01	16.80	257.95	6,668.52	-212.67	-815.98	14,436,929.05	1,693,466.28	39.75322096	-80.81124933
6,900.01	16.80	257.95	6,764.25	-218.70	-844.25	14,436,923.02	1,693,438.01	39.75320455	-80.81134995
7,000.01	16.80	257.95	6,859.98	-224.73	-872.51	14,436,916.98	1,693,409.75	39.75318814	-80.81145056
7,100.01	16.80	257.95	6,955.71	-230.77	-900.78	14,436,910.95	1,693,381.48	39.75317174	-80.81155118
7,200.01	16.80	257.95	7,051.45	-236.80	-929.05	14,436,904.92	1,693,353.22	39.75315533	-80.81165179
7,300.01	16.80	257.95	7,147.18	-242.83	-957.31	14,436,898.88	1,693,324.95	39.75313892	-80.81175241
7,400.01	16.80	257.95	7,242.91	-248.87	-985.58	14,436,892.85	1,693,296.68	39.75312251	-80.81185302
7,500.02	16.80	257.95	7,338.64	-254.90	-1,013.84	14,436,886.82	1,693,268.42	39.75310611	-80.81195364
7,600.02	16.80	257.95	7,434.38	-260.94	-1,042.11	14,436,880.78	1,693,240.15	39.75308970	-80.81205425
7,700.02	16.80	257.95	7,530.11	-266.97	-1,070.38	14,436,874.75	1,693,211.89	39.75307329	-80.81215487
7,800.02	16.80	257.95	7,625.84	-273.00	-1,098.64	14,436,868.71	1,693,183.62	39.75305688	-80.81225548
7,900.02	16.80	257.95	7,721.57	-279.04	-1,126.91	14,436,862.68	1,693,155.35	39.75304047	-80.81235610
8,000.02	16.80	257.95	7,817.30	-285.07	-1,155.17	14,436,856.65	1,693,127.09	39.75302406	-80.81245671
8,100.02	16.80	257.95	7,913.04	-291.11	-1,183.44	14,436,850.61	1,693,098.82	39.75300766	-80.81255733
8,200.02	16.80	257.95	8,008.77	-297.14	-1,211.71	14,436,844.58	1,693,070.56	39.75299125	-80.81265794
8,300.02	16.80	257.95	8,104.50	-303.17	-1,239.97	14,436,838.54	1,693,042.29	39.75297484	-80.81275856
8,400.02	16.80	257.95	8,200.23	-309.21	-1,268.24	14,436,832.51	1,693,014.02	39.75295843	-80.81285917
8,500.02	16.80	257.95	8,295.97	-315.24	-1,296.51	14,436,826.48	1,692,985.76	39.75294202	-80.81295979
8,600.02	16.80	257.95	8,391.70	-321.28	-1,324.77	14,436,820.44	1,692,957.49	39.75292561	-80.81306040
8,700.02	16.80	257.95	8,487.43	-327.31	-1,353.04	14,436,814.41	1,692,929.23	39.75290920	-80.81316102
8,800.02	16.80	257.95	8,583.16	-333.34	-1,381.30	14,436,808.38	1,692,900.96	39.75289280	-80.81326163
8,900.02	16.80	257.95	8,678.89	-339.38	-1,409.57	14,436,802.34	1,692,872.69	39.75287639	-80.81336225
9,000.02	16.80	257.95	8,774.63	-345.41	-1,437.84	14,436,796.31	1,692,844.43	39.75285998	-80.81346286
9,100.02	16.80	257.95	8,870.36	-351.44	-1,466.10	14,436,790.27	1,692,816.16	39.75284357	-80.81356348
9,200.02	16.80	257.95	8,966.09	-357.48	-1,494.37	14,436,784.24	1,692,787.89	39.75282716	-80.81366409
9,300.02	16.80	257.95	9,061.82	-363.51	-1,522.63	14,436,778.21	1,692,759.63	39.75281075	-80.81376470
9,400.02	16.80	257.95	9,157.56	-369.55	-1,550.90	14,436,772.17	1,692,731.36	39.75279434	-80.81386532
9,500.02	16.80	257.95	9,253.29	-375.58	-1,579.17	14,436,766.14	1,692,703.10	39.75277793	-80.81396593
9,600.02	16.80	257.95	9,349.02	-381.61	-1,607.43	14,436,760.10	1,692,674.83	39.75276152	-80.81406655
9,700.02	16.80	257.95	9,444.75	-387.65	-1,635.70	14,436,754.07	1,692,646.56	39.75274511	-80.81416716
9,800.02	16.80	257.95	9,540.48	-393.68	-1,663.97	14,436,748.04	1,692,618.30	39.75272870	-80.81426778
9,900.02	16.80	257.95	9,636.22	-399.72	-1,692.23	14,436,742.00	1,692,590.03	39.75271229	-80.81436839
10,000.02	16.80	257.95	9,731.95	-405.75	-1,720.50	14,436,735.97	1,692,561.77	39.75269588	-80.81446900
10,100.02	16.80	257.95	9,827.68	-411.78	-1,748.76	14,436,729.93	1,692,533.50	39.75267947	-80.81456962
10,200.02	16.80	257.95	9,923.41	-417.82	-1,777.03	14,436,723.90	1,692,505.23	39.75266306	-80.81467023

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Armstrong Pad
 Well: Armstrong 1S-10 HU (slot L)
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Armstrong 1S-10 HU (slot L)
 TVD Reference: GL @ 1279.00ft
 MD Reference: GL @ 1279.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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JUL 26 2019
 WV Department of
 Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,300.02	16.80	257.95	10,019.15	-423.85	-1,805.30	14,436,717.87	1,692,476.97	39.75264665	-80.81477084
10,400.02	16.80	257.95	10,114.88	-429.89	-1,833.56	14,436,711.83	1,692,448.70	39.75263024	-80.81487146
10,480.60	16.80	257.95	10,192.02	-434.75	-1,856.34	14,436,706.97	1,692,425.92	39.75261702	-80.81495253
Begin 6°/100' build/turn									
10,500.02	16.49	254.04	10,210.63	-436.09	-1,861.73	14,436,705.63	1,692,420.53	39.75261336	-80.81497173
10,600.02	16.12	232.58	10,306.69	-448.44	-1,886.42	14,436,693.28	1,692,395.84	39.75257958	-80.81505967
10,700.02	17.83	212.77	10,402.41	-469.77	-1,905.75	14,436,671.95	1,692,376.51	39.75252111	-80.81512860
10,800.02	21.12	197.64	10,496.74	-499.85	-1,919.51	14,436,641.87	1,692,362.75	39.75243860	-80.81517778
10,900.02	25.39	186.89	10,588.63	-538.34	-1,927.55	14,436,603.38	1,692,354.71	39.75233294	-80.81520666
11,000.02	30.21	179.22	10,677.09	-584.82	-1,929.78	14,436,556.90	1,692,352.48	39.75220529	-80.81521493
11,100.02	35.37	173.54	10,761.15	-638.79	-1,926.18	14,436,502.93	1,692,356.09	39.75205705	-80.81520251
11,200.02	40.73	169.17	10,839.87	-699.66	-1,916.78	14,436,442.06	1,692,365.49	39.75188984	-80.81516951
11,300.02	46.23	165.66	10,912.41	-766.75	-1,901.69	14,436,374.97	1,692,380.58	39.75170551	-80.81511632
11,367.64	50.00	163.64	10,957.55	-815.27	-1,888.34	14,436,326.45	1,692,393.92	39.75157217	-80.81506919
Begin 8°/100' build/turn									
11,400.02	52.42	162.46	10,977.84	-839.41	-1,880.98	14,436,302.31	1,692,401.29	39.75150583	-80.81504317
11,500.02	59.97	159.26	11,033.44	-917.81	-1,853.66	14,436,223.91	1,692,428.60	39.75129038	-80.81494656
11,600.02	67.58	156.51	11,077.61	-1,000.81	-1,819.85	14,436,140.91	1,692,462.41	39.75106223	-80.81482688
11,700.02	75.23	154.05	11,109.47	-1,086.82	-1,780.21	14,436,054.90	1,692,502.06	39.75082581	-80.81468646
11,800.02	82.91	151.76	11,128.42	-1,174.14	-1,735.50	14,435,967.58	1,692,546.77	39.75058574	-80.81452803
11,879.20	89.00	150.00	11,134.00	-1,243.10	-1,697.08	14,435,898.62	1,692,585.19	39.75039615	-80.81439184
Begin 89.00° lateral									
11,900.02	89.00	150.00	11,134.37	-1,261.13	-1,686.66	14,435,880.59	1,692,595.60	39.75034656	-80.81435493
12,000.02	89.00	150.00	11,136.12	-1,347.72	-1,636.67	14,435,794.00	1,692,645.59	39.75010848	-80.81417771
12,100.02	89.00	150.00	11,137.87	-1,434.31	-1,586.68	14,435,707.41	1,692,695.58	39.74987040	-80.81400048
12,200.02	89.00	150.00	11,139.62	-1,520.90	-1,536.69	14,435,620.82	1,692,745.58	39.74963231	-80.81382325
12,300.02	89.00	150.00	11,141.37	-1,607.49	-1,486.69	14,435,534.23	1,692,795.57	39.74939423	-80.81364603
12,400.03	89.00	150.00	11,143.12	-1,694.08	-1,436.70	14,435,447.64	1,692,845.56	39.74915614	-80.81346881
12,500.03	89.00	150.00	11,144.87	-1,780.67	-1,386.71	14,435,361.06	1,692,895.56	39.74891806	-80.81329159
12,600.03	89.00	150.00	11,146.62	-1,867.25	-1,336.71	14,435,274.47	1,692,945.55	39.74867997	-80.81311436
12,700.03	89.00	150.00	11,148.37	-1,953.84	-1,286.72	14,435,187.88	1,692,995.54	39.74844189	-80.81293715
12,800.03	89.00	150.00	11,150.12	-2,040.43	-1,236.73	14,435,101.29	1,693,045.54	39.74820380	-80.81275993
12,900.03	89.00	150.00	11,151.87	-2,127.02	-1,186.73	14,435,014.70	1,693,095.53	39.74796571	-80.81258271
13,000.03	89.00	150.00	11,153.62	-2,213.61	-1,136.74	14,434,928.11	1,693,145.52	39.74772763	-80.81240549
13,100.03	89.00	150.00	11,155.36	-2,300.20	-1,086.75	14,434,841.52	1,693,195.51	39.74748954	-80.81222828
13,200.03	89.00	150.00	11,157.11	-2,386.79	-1,036.76	14,434,754.93	1,693,245.51	39.74725145	-80.81205107
13,300.03	89.00	150.00	11,158.86	-2,473.38	-986.76	14,434,668.34	1,693,295.50	39.74701337	-80.81187385
13,400.03	89.00	150.00	11,160.61	-2,559.97	-936.77	14,434,581.76	1,693,345.49	39.74677528	-80.81169664
13,500.03	89.00	150.00	11,162.36	-2,646.56	-886.78	14,434,495.17	1,693,395.49	39.74653719	-80.81151943
13,600.03	89.00	150.00	11,164.11	-2,733.15	-836.78	14,434,408.58	1,693,445.48	39.74629910	-80.81134223
13,700.03	89.00	150.00	11,165.86	-2,819.73	-786.79	14,434,321.99	1,693,495.47	39.74606102	-80.81116502
13,800.03	89.00	150.00	11,167.61	-2,906.32	-736.80	14,434,235.40	1,693,545.46	39.74582293	-80.81098781
13,900.03	89.00	150.00	11,169.36	-2,992.91	-686.80	14,434,148.81	1,693,595.46	39.74558484	-80.81081061
14,000.03	89.00	150.00	11,171.11	-3,079.50	-636.81	14,434,062.22	1,693,645.45	39.74534675	-80.81063340
14,100.03	89.00	150.00	11,172.86	-3,166.09	-586.82	14,433,975.63	1,693,695.44	39.74510866	-80.81045620
14,200.03	89.00	150.00	11,174.61	-3,252.68	-536.82	14,433,889.04	1,693,745.44	39.74487057	-80.81027900
14,300.03	89.00	150.00	11,176.36	-3,339.27	-486.83	14,433,802.45	1,693,795.43	39.74463248	-80.81010180
14,400.03	89.00	150.00	11,178.11	-3,425.86	-436.84	14,433,715.87	1,693,845.42	39.74439439	-80.80992460
14,500.03	89.00	150.00	11,179.86	-3,512.45	-386.85	14,433,629.28	1,693,895.42	39.74415630	-80.80974741
14,600.03	89.00	150.00	11,181.61	-3,599.04	-336.85	14,433,542.69	1,693,945.41	39.74391821	-80.80957021
14,700.03	89.00	150.00	11,183.36	-3,685.63	-286.86	14,433,456.10	1,693,995.40	39.74368012	-80.80939301
14,800.03	89.00	150.00	11,185.11	-3,772.21	-236.87	14,433,369.51	1,694,045.39	39.74344203	-80.80921582
14,900.03	89.00	150.00	11,186.86	-3,858.80	-186.87	14,433,282.92	1,694,095.39	39.74320393	-80.80903863
15,000.03	89.00	150.00	11,188.61	-3,945.39	-136.88	14,433,196.33	1,694,145.38	39.74296584	-80.80886144



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Armstrong Pad
 Well: Armstrong 1S-10 HU (slot L)
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Armstrong 1S-10 HU (slot L)
 TVD Reference: GL @ 1279.00ft
 MD Reference: GL @ 1279.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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 Environmental Protection

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,100.03	89.00	150.00	11,190.36	-4,031.98	-86.89	14,433,109.74	1,694,195.37	39.74272775	-80.80868425
15,200.03	89.00	150.00	11,192.11	-4,118.57	-36.89	14,433,023.15	1,694,245.37	39.74248966	-80.80850706
15,300.03	89.00	150.00	11,193.86	-4,205.16	13.10	14,432,936.57	1,694,295.36	39.74225157	-80.80832987
15,400.03	89.00	150.00	11,195.61	-4,291.75	63.09	14,432,849.98	1,694,345.35	39.74201347	-80.80815268
15,500.03	89.00	150.00	11,197.36	-4,378.34	113.08	14,432,763.39	1,694,395.34	39.74177538	-80.80797550
15,600.03	89.00	150.00	11,199.11	-4,464.93	163.08	14,432,676.80	1,694,445.34	39.74153729	-80.80779831
15,700.03	89.00	150.00	11,200.86	-4,551.52	213.07	14,432,590.21	1,694,495.33	39.74129919	-80.80762113
15,800.03	89.00	150.00	11,202.61	-4,638.11	263.06	14,432,503.62	1,694,545.32	39.74106110	-80.80744395
15,900.03	89.00	150.00	11,204.36	-4,724.70	313.06	14,432,417.03	1,694,595.32	39.74082300	-80.80726677
16,000.03	89.00	150.00	11,206.11	-4,811.28	363.05	14,432,330.44	1,694,645.31	39.74058491	-80.80708959
16,100.03	89.00	150.00	11,207.86	-4,897.87	413.04	14,432,243.85	1,694,695.30	39.74034681	-80.80691241
16,200.03	89.00	150.00	11,209.61	-4,984.46	463.04	14,432,157.26	1,694,745.30	39.74010872	-80.80673524
16,300.03	89.00	150.00	11,211.36	-5,071.05	513.03	14,432,070.68	1,694,795.29	39.73987062	-80.80655806
16,400.03	89.00	150.00	11,213.10	-5,157.64	563.02	14,431,984.09	1,694,845.28	39.73963253	-80.80638089
16,500.03	89.00	150.00	11,214.85	-5,244.23	613.02	14,431,897.50	1,694,895.27	39.73939443	-80.80620371
16,600.03	89.00	150.00	11,216.60	-5,330.82	663.01	14,431,810.91	1,694,945.27	39.73915633	-80.80602654
16,700.03	89.00	150.00	11,218.35	-5,417.41	713.00	14,431,724.32	1,694,995.26	39.73891824	-80.80584937
16,800.03	89.00	150.00	11,220.10	-5,504.00	762.99	14,431,637.73	1,695,045.25	39.73868014	-80.80567220
16,900.03	89.00	150.00	11,221.85	-5,590.59	812.99	14,431,551.14	1,695,095.25	39.73844204	-80.80549503
17,000.03	89.00	150.00	11,223.60	-5,677.18	862.98	14,431,464.55	1,695,145.24	39.73820395	-80.80531787
17,100.03	89.00	150.00	11,225.35	-5,763.76	912.97	14,431,377.96	1,695,195.23	39.73796585	-80.80514070
17,200.03	89.00	150.00	11,227.10	-5,850.35	962.97	14,431,291.38	1,695,245.22	39.73772775	-80.80496354
17,300.03	89.00	150.00	11,228.85	-5,936.94	1,012.96	14,431,204.79	1,695,295.22	39.73748965	-80.80478637
17,400.04	89.00	150.00	11,230.60	-6,023.53	1,062.95	14,431,118.20	1,695,345.21	39.73725155	-80.80460921
17,500.04	89.00	150.00	11,232.35	-6,110.12	1,112.95	14,431,031.61	1,695,395.20	39.73701345	-80.80443205
17,600.04	89.00	150.00	11,234.10	-6,196.71	1,162.94	14,430,945.02	1,695,445.20	39.73677536	-80.80425489
17,700.04	89.00	150.00	11,235.85	-6,283.30	1,212.93	14,430,858.43	1,695,495.19	39.73653726	-80.80407773
17,800.04	89.00	150.00	11,237.60	-6,369.89	1,262.92	14,430,771.84	1,695,545.18	39.73629916	-80.80390057
17,900.04	89.00	150.00	11,239.35	-6,456.48	1,312.92	14,430,685.25	1,695,595.18	39.73606106	-80.80372342
18,000.04	89.00	150.00	11,241.10	-6,543.07	1,362.91	14,430,598.66	1,695,645.17	39.73582296	-80.80354626
18,100.04	89.00	150.00	11,242.85	-6,629.66	1,412.90	14,430,512.07	1,695,695.16	39.73558486	-80.80336911
18,200.04	89.00	150.00	11,244.60	-6,716.24	1,462.90	14,430,425.49	1,695,745.15	39.73534676	-80.80319196
18,300.04	89.00	150.00	11,246.35	-6,802.83	1,512.89	14,430,338.90	1,695,795.15	39.73510865	-80.80301481
18,400.04	89.00	150.00	11,248.10	-6,889.42	1,562.88	14,430,252.31	1,695,845.14	39.73487055	-80.80283766
18,500.04	89.00	150.00	11,249.85	-6,976.01	1,612.88	14,430,165.72	1,695,895.13	39.73463245	-80.80266051
18,600.04	89.00	150.00	11,251.60	-7,062.60	1,662.87	14,430,079.13	1,695,945.13	39.73439435	-80.80248336
18,700.04	89.00	150.00	11,253.35	-7,149.19	1,712.86	14,429,992.54	1,695,995.12	39.73415625	-80.80230621
18,800.04	89.00	150.00	11,255.10	-7,235.78	1,762.86	14,429,905.95	1,696,045.11	39.73391814	-80.80212907
18,900.04	89.00	150.00	11,256.85	-7,322.37	1,812.85	14,429,819.36	1,696,095.10	39.73368004	-80.80195192
19,000.04	89.00	150.00	11,258.60	-7,408.96	1,862.84	14,429,732.77	1,696,145.10	39.73344194	-80.80177478
19,100.04	89.00	150.00	11,260.35	-7,495.55	1,912.83	14,429,646.19	1,696,195.09	39.73320384	-80.80159764
19,200.04	89.00	150.00	11,262.10	-7,582.14	1,962.83	14,429,559.60	1,696,245.08	39.73296573	-80.80142050
19,300.04	89.00	150.00	11,263.85	-7,668.73	2,012.82	14,429,473.01	1,696,295.08	39.73272763	-80.80124336
19,400.04	89.00	150.00	11,265.60	-7,755.31	2,062.81	14,429,386.42	1,696,345.07	39.73248952	-80.80106622
19,500.04	89.00	150.00	11,267.35	-7,841.90	2,112.81	14,429,299.83	1,696,395.06	39.73225142	-80.80088909
19,600.04	89.00	150.00	11,269.10	-7,928.49	2,162.80	14,429,213.24	1,696,445.06	39.73201331	-80.80071195
19,700.04	89.00	150.00	11,270.84	-8,015.08	2,212.79	14,429,126.65	1,696,495.05	39.73177521	-80.80053482
19,800.04	89.00	150.00	11,272.59	-8,101.67	2,262.79	14,429,040.06	1,696,545.04	39.73153710	-80.80035768
19,900.04	89.00	150.00	11,274.34	-8,188.26	2,312.78	14,428,953.47	1,696,595.03	39.73129900	-80.80018055
20,000.04	89.00	150.00	11,276.09	-8,274.85	2,362.77	14,428,866.89	1,696,645.03	39.73106089	-80.80000342
20,100.04	89.00	150.00	11,277.84	-8,361.44	2,412.76	14,428,780.30	1,696,695.02	39.73082279	-80.79982629
20,200.04	89.00	150.00	11,279.59	-8,448.03	2,462.76	14,428,693.71	1,696,745.01	39.73058468	-80.79964916
20,300.04	89.00	150.00	11,281.34	-8,534.62	2,512.75	14,428,607.12	1,696,795.01	39.73034657	-80.79947204
20,400.04	89.00	150.00	11,283.09	-8,621.21	2,562.74	14,428,520.53	1,696,845.00	39.73010847	-80.79929491
20,500.04	89.00	150.00	11,284.84	-8,707.79	2,612.74	14,428,433.94	1,696,894.99	39.72987036	-80.79911779



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Armstrong Pad
 Well: Armstrong 1S-10 HU (slot L)
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Armstrong 1S-10 HU (slot L)
 TVD Reference: GL @ 1279.00ft
 MD Reference: GL @ 1279.00ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,600.04	89.00	150.00	11,286.59	-8,794.38	2,662.73	14,428,347.35	1,696,944.98	39.72963225	-80.79894066
20,700.04	89.00	150.00	11,288.34	-8,880.97	2,712.72	14,428,260.76	1,696,994.98	39.72939415	-80.79876354
20,800.04	89.00	150.00	11,290.09	-8,967.56	2,762.72	14,428,174.17	1,697,044.97	39.72915604	-80.79858642
20,900.04	89.00	150.00	11,291.84	-9,054.15	2,812.71	14,428,087.58	1,697,094.96	39.72891793	-80.79840930
21,000.04	89.00	150.00	11,293.59	-9,140.74	2,862.70	14,428,001.00	1,697,144.96	39.72867982	-80.79823218
21,100.04	89.00	150.00	11,295.34	-9,227.33	2,912.70	14,427,914.41	1,697,194.95	39.72844171	-80.79805507
21,200.04	89.00	150.00	11,297.09	-9,313.92	2,962.69	14,427,827.82	1,697,244.94	39.72820360	-80.79787795
21,300.04	89.00	150.00	11,298.84	-9,400.51	3,012.68	14,427,741.23	1,697,294.94	39.72796549	-80.79770084
21,400.04	89.00	150.00	11,300.59	-9,487.10	3,062.67	14,427,654.64	1,697,344.93	39.72772738	-80.79752372
21,500.04	89.00	150.00	11,302.34	-9,573.69	3,112.67	14,427,568.05	1,697,394.92	39.72748927	-80.79734661
21,600.04	89.00	150.00	11,304.09	-9,660.27	3,162.66	14,427,481.46	1,697,444.91	39.72725116	-80.79716950
21,700.04	89.00	150.00	11,305.84	-9,746.86	3,212.65	14,427,394.87	1,697,494.91	39.72701305	-80.79699239
21,800.04	89.00	150.00	11,307.59	-9,833.45	3,262.65	14,427,308.28	1,697,544.90	39.72677494	-80.79681528
21,880.73	89.00	150.00	11,309.00	-9,903.32	3,302.98	14,427,238.42	1,697,585.24	39.72658282	-80.79667238

PBHL/TD 21880.73 MD/11309.00 TVD

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Armstrong 1S-10HU LP - hit/miss target - Shape - Point	0.00	0.00	11,134.00	-1,243.04	-1,697.03	14,435,898.68	1,692,585.24	39.75039629	-80.81439166
- plan misses target center by 0.07ft at 11879.18ft MD (11134.00 TVD, -1243.08 N, -1697.09 E)									
Armstrong 1S-10HU BH - plan hits target center - Point	0.00	0.00	11,309.00	-9,903.32	3,302.98	14,427,238.42	1,697,585.24	39.72658282	-80.79667238

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
600.00	600.00	0.00	0.00	KOP Begin 1°/100' build
800.00	799.96	-0.61	3.44	Begin 2.00° tangent
3,101.44	3,100.00	-14.55	82.54	Begin 2°/100' build/turn
4,034.85	4,021.37	-45.82	-34.38	Begin 16.80° tangent
10,480.60	10,192.02	-434.75	-1,856.34	Begin 6°/100' build/turn
11,367.64	10,957.55	-815.27	-1,888.34	Begin 8°/100' build/turn
11,879.20	11,134.00	-1,243.10	-1,697.08	Begin 89.00° lateral
21,880.73	11,309.00	-9,903.32	3,302.98	PBHL/TD 21880.73 MD/11309.00 TVD

47 05 * 02265



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Well Site Safety Plan

Tug Hill Operating, LLC

Handwritten signature and date: 2/1/19

Well Name: Armstrong S-10HU

Pad Location: Armstrong Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,400,449.60

Easting: 516,418.27

July 2019

WW-9
(4/16)

47 05 02265

API Number 47 - 051 -
Operator's Well No. Armstrong S-10HU

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

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FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek - Ohio River (Undefined) Quadrangle Powhatan Point 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper contain

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in a Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature James A Pancake

Company Official (Typed Name) James Pancake

Company Official Title Vice President - Geoscience

Subscribed and sworn before me this 18 day of JULY, 20 19

Maureen A Stead

Notary Public

My commission expires 1/28/23

Commonwealth of Pennsylvania - Notary Seal
MAUREEN A STEAD - Notary Public
Washington County
My Commission Expires Jan 28, 2023
Commission Number 1259926

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 12.64 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

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Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Orchard Grass	12
Spring Oats	96	Ladino	3
		White Clover	2

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Anderson*

Comments: _____

Title: Oil and Gas Inspector

Date: 7/18/19

Field Reviewed? () Yes () No

VW-9

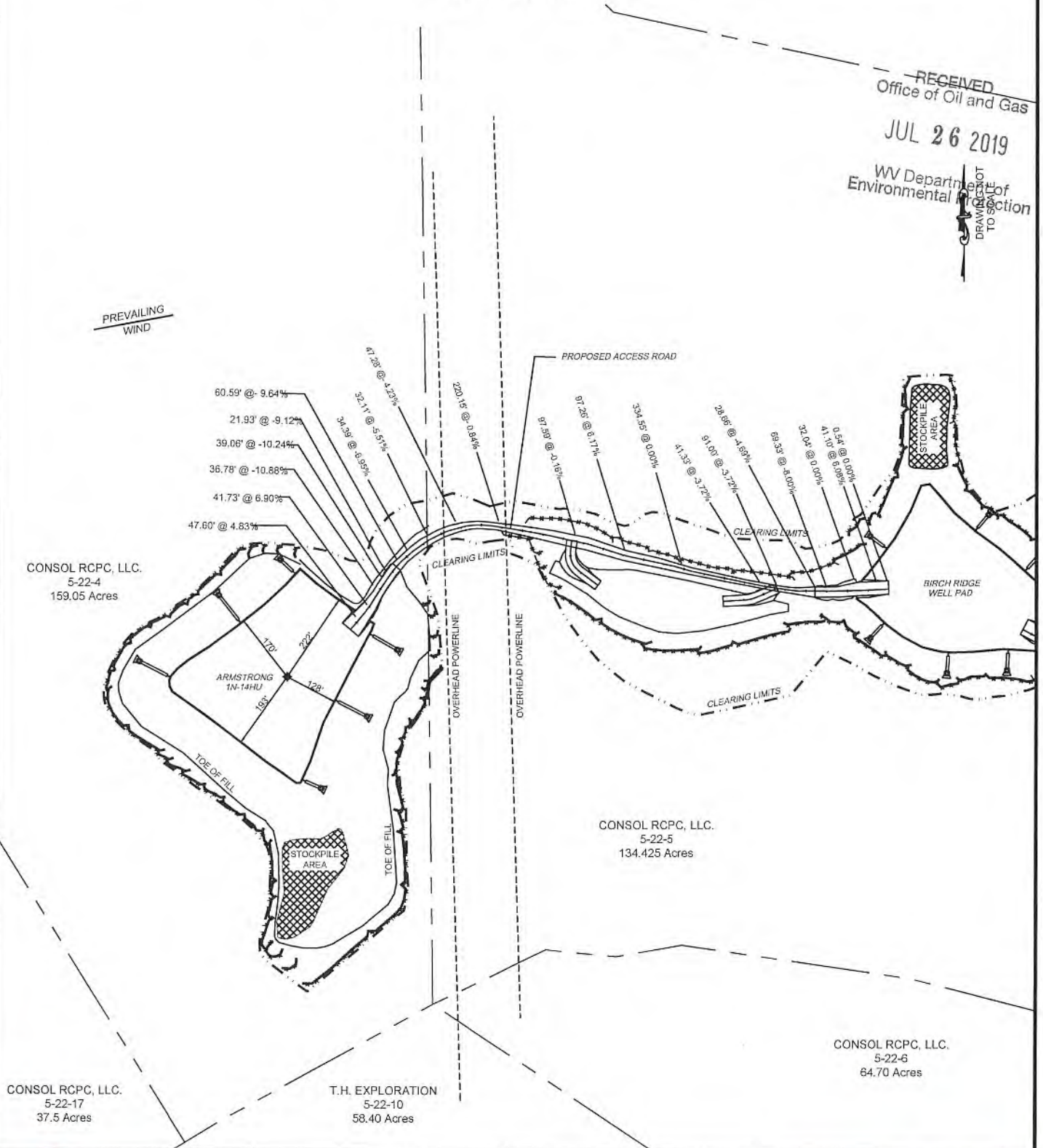
PROPOSED ARMSTRONG S-10HU

SUPPLEMENT PG 1

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JUL 26 2019
WV Department of Environmental Protection

DRAWING NOT TO SCALE

PREVAILING WIND



CONSOL RCPC, LLC.
5-22-17
37.5 Acres

T.H. EXPLORATION
5-22-10
58.40 Acres

CONSOL RCPC, LLC.
5-22-5
134.425 Acres

CONSOL RCPC, LLC.
5-22-6
64.70 Acres



Jackson Surveying Inc.
2413 E. Pike St.
Martinsburg, WV 26101
Phone: 304-623-5861

TOPO SECTION:		OPERATOR:	
POWHATAN POINT 7.5'		TUG HILL OPERATING, LLC	
COUNTY	DISTRICT	380 SOUTHPOINTE BLVD	
MARSHALL	FRANKLIN	SUITE 200	
DRAWN BY	JOB NO.	DATE	SCALE
J.A.H	494510851	07-16-2019	NONE



WWW-9

PROPOSED ARMSTRONG S-10HU

SUPPLEMENT PG 2

DRAWING NOT TO SCALE

RECEIVED
Office of Oil and Gas
JUL 26 2019
WV Department of Environmental Protection

MARK E. YOHO, ET UX
5-19-18.1
55,948 Acres

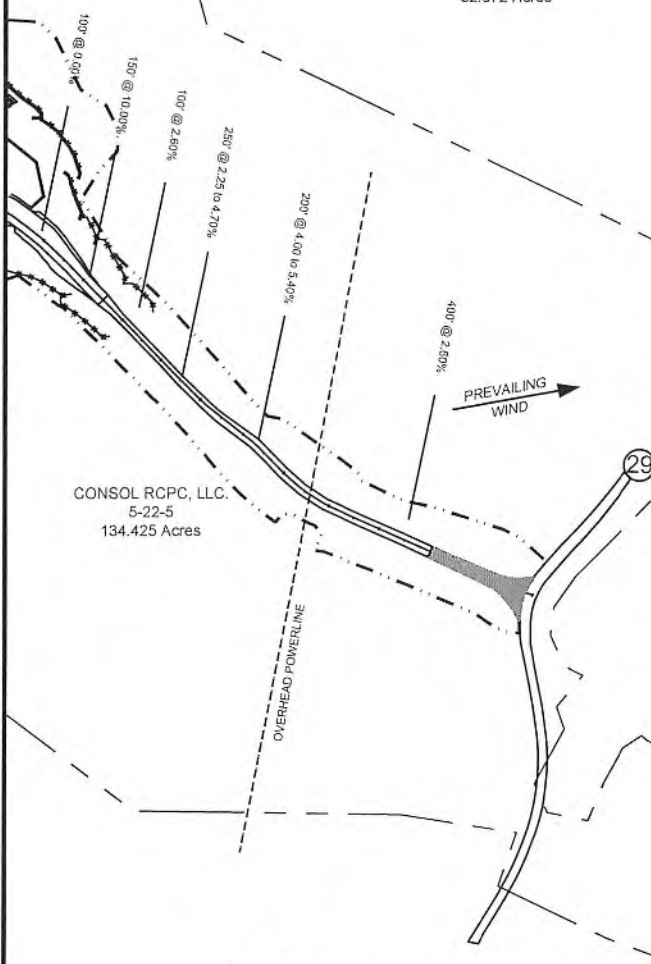
PAUL V. & CAROL NEELY.
5-19-18.2
32,672 Acres

MARK E. YOHO, ET UX
5-19-18
55,948 Acres

CONSOL RCPC, LLC.
5-22-5
134,425 Acres

WILLIAMS OHIO VALLEY
MIDSTREAM, LLC
5-22-5.1
12,875 Acres

CONSOL RCPC, LLC.
5-22-6
64,70 Acres



Jackson Surveying Inc.
2418 E. Pike St.
Clarksburg, WV 26301
Phone: 304-623-5851

TOPO SECTION:	
POWHATAN POINT 7.5'	
COUNTY	DISTRICT
MARSHALL	FRANKLIN
DRAWN BY	JOB NO
J.A.H	494510851

OPERATOR:	
PREPARED FOR:	
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	
DATE	SCALE
07-16-2019	NONE



WW-9

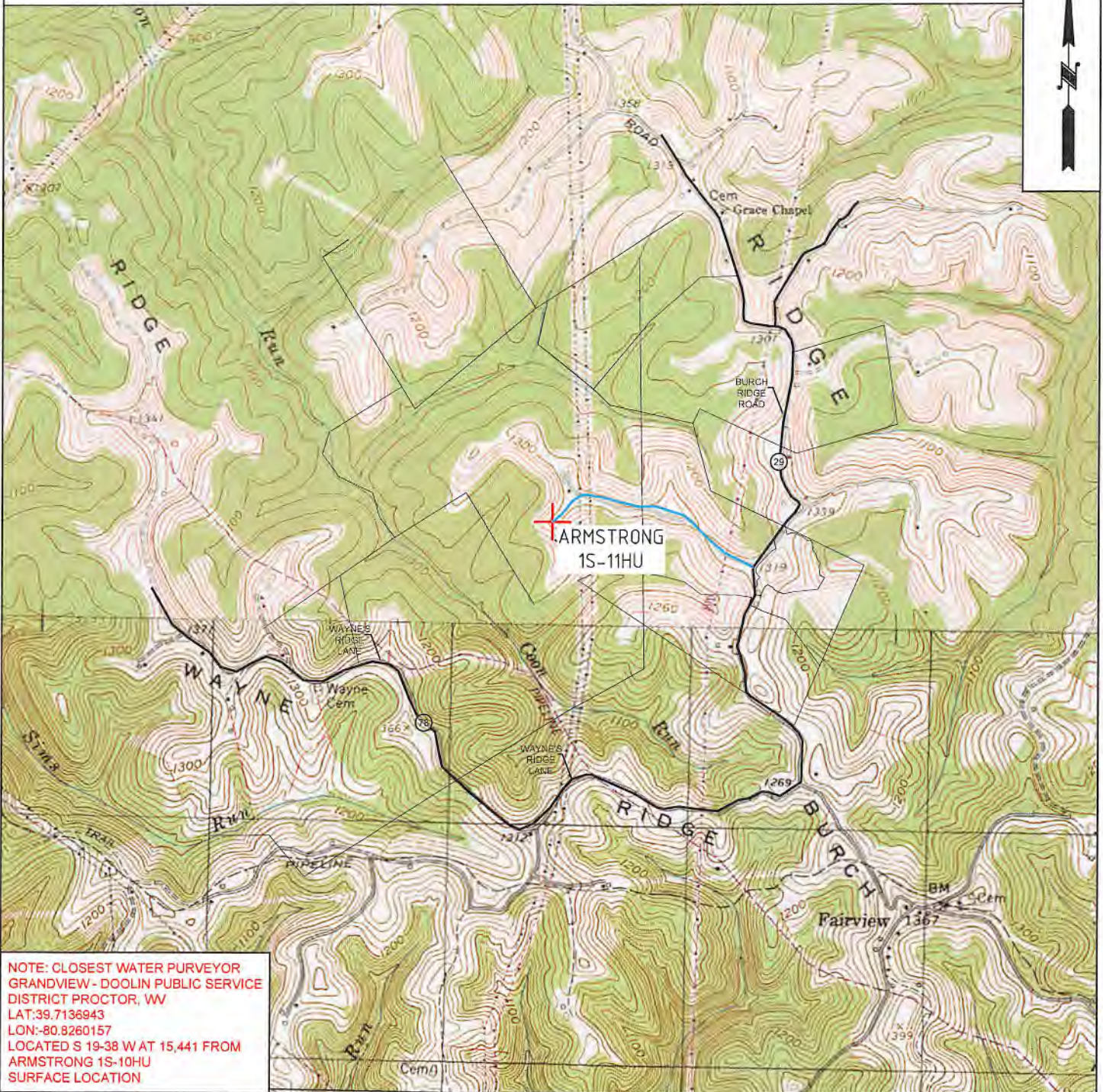
PROPOSED ARMSTRONG S-11HU

SUPPLEMENT PG. 2

Office of Oil and Gas

JUL 26 2019

WV Department of
Environmental Protection



NOTE: CLOSEST WATER PURVEYOR
 GRANDVIEW - DOOLIN PUBLIC SERVICE
 DISTRICT PROCTOR, WV
 LAT: 39.7136943
 LON: -80.8260157
 LOCATED S 19-38 W AT 15,441 FROM
 ARMSTRONG 1S-10HU
 SURFACE LOCATION



OPERATOR	494510851	TOPO SECTION	LEASE NAME
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	ARMSTRONG
		SCALE:	DATE:
		1" = 2000'	DATE: 07-16-2019

form WWS

ARMSTRONG LEASE WELL 1S-10HU 621.5151± ACRES

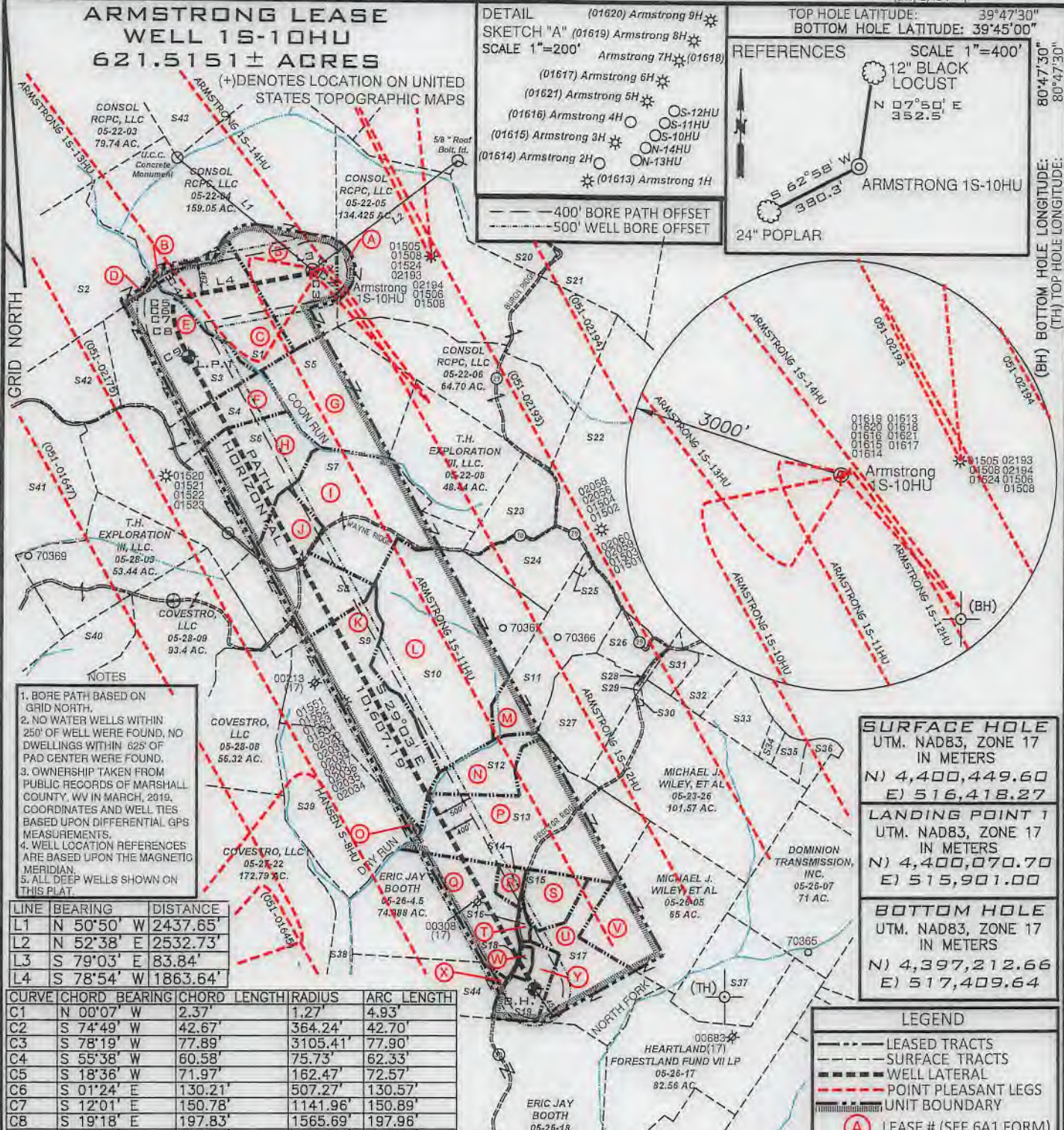
(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

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

--- 400' BORE PATH OFFSET
 - - - 500' WELL BORE OFFSET

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

REFERENCES SCALE 1"=400'
 12" BLACK LOCUST
 N 07°50' E 352.5'
 5 62°58' W 380.3'
 24" POPLAR



- 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, 2016. 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'	1565.69'	197.96'
C9	S 25°55' E	271.73'	2388.96'	271.87'

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) 4,400,070.70
 E) 515,901.00

BOTTOM HOLE
 UTM. NAD83, ZONE 17
 IN METERS
 N) 4,397,212.66
 E) 517,409.64

LEGEND

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

FILE NUMBER _____
 DRAWING NUMBER: ARMSTRONG_1S-10HU_REV 0
 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

DATE: JULY 22, 2019
 OPERATORS WELL NO. Armstrong 1S-10HU
 API WELL NO. 47-051-02256
 STATE WV COUNTY MARSHALL 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 CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____
 PLUG & ABANDON CLEAN OUT & REPLUG

TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH TVD: 11,354' TMD: 21,881'
 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

P.S. 708 *David L Jackson*



TUG HILL
OPERATING

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

WELL PLAT
PAGE 2 OF 3
DATE: 07/22/2019

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

Lease No.	Tags	Tax Parcel	Grantor, Lessor, Etc.	Deed Book	Page
10*19529	A	5-22-5	CNX GAS COMPANY LLC	733	500
10*14033	B	5-22-4	LAMOYNE BAKER	665	554
10*14034	B	5-22-4	LAWRENCE C AND LORRAINE J MCWHORTER	665	391
10*14035	B	5-22-4	PEGGY MAE WHITE	695	446
10*14036	B	5-22-4	WILDA WINTERS	701	579
10*14037	B	5-22-4	JUDITH L CHAMBERS	701	577
10*14038	B	5-22-4	HAYHURST COMPANY A FLORIDA PARTNERSHIP	724	7
10*14039	B	5-22-4	CHESTNUT HOLDINGS LLC	827	554
10*14507	C	5-22-17	MARY THERESA SOLEAU AND THOMAS SOLEAU	749	524
10*14508	C	5-22-17	JEAN W FOSTER	752	200
10*14509	C	5-22-17	JAMES ROBERT WELLS	752	202
10*14510	C	5-22-17	MARY AGNES CARROLL	749	528
10*14511	C	5-22-17	ELIZABETH JANE KELLER	754	242
10*14513	C	5-22-17	CAROLYN LYNN PORTER	767	256
10*14514	C	5-22-17	CHARLES ARTHUR WELLS	768	494
10*14515	C	5-22-17	JERRY TODD WELLS	773	572
10*14516	C	5-22-17	JAMES NESBITT WELLS BY JOANIE WELLS AIF	773	570
10*14517	C	5-22-17	CARL W BACH JR	852	250
10*14518	C	5-22-17	RAE ELLEN FLOYD AND KENNETH FLOYD	854	599
10*14519	C	5-22-17	DOUGLAS M BACH	854	597
10*16471	C	5-22-17	CNX GAS COMPANY LLC	905	155
10*16652	C	5-22-17	MARY JUDITH BRANSON AND	942	35
10*16674	C	5-22-17	CHARLOTTE A KASTELIC	942	37
10*26910	C	5-22-17	BRIDGET S AND DARRELL T GATES	1045	419
10*26940	C	5-22-17	PATRICK N WELLS	1045	413
10*14457	D	5-22-18	HARRY LEE GOUDY	731	140
10*14457	E	5-22-16	HARRY LEE GOUDY	731	140
10*14418	F	5-22-12	PPG INDUSTRIES, INC.	878	610
10*14418	G	5-22-10	PPG INDUSTRIES, INC.	878	610
10*14418	H	5-22-11	PPG INDUSTRIES, INC.	878	610
10*14418	I	5-22-9	PPG INDUSTRIES, INC.	878	610
10*14418	J	5-28-4	PPG INDUSTRIES, INC.	878	610
10*14572	K	5-28-6	VICKI LYNN WOOD	681	326
10*14573	K	5-28-6	AARON DEAN LITMAN	681	317
10*14574	K	5-28-6	KLOVA ANN MORRIS	681	320
10*14575	K	5-28-6	REVA JUNE ICARD	681	323
10*14576	K	5-28-6	WILLIAM L LITMAN	681	329
10*14577	K	5-28-6	ULA F NELSON	681	332
10*14578	K	5-28-6	BETTY KNOWLES	767	36
10*14304	L	5-28-5	RUTH MAE DULANEY	749	530
10*14305	L	5-28-5	HELEN BOWMAN	749	362
10*14306	L	5-28-5	RANDY GODDARD	759	248
10*14418	L	5-28-5	PPG INDUSTRIES, INC.	878	610
10*21218	M	5-23-28	GREGG D MINOR	952	647
10*22330	M	5-23-28	GREGG D MINOR	963	156
10*14916	N	5-26-1	MARK W BOOTH	836	110
10*14917	N	5-26-1	EDWIN BOOTH ANDERSON	836	108
10*14065	O	5-28-7	CARL COFFIELD	665	363
10*14916	P	5-26-2	MARK W BOOTH	836	110
10*14917	P	5-26-2	EDWIN BOOTH ANDERSON	836	108
10*17137	Q	5-26-4.5	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	Q	5-26-4.5	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*17137	R	5-26-4	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	R	5-26-4	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*17137	S	5-26-4.6	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	S	5-26-4.6	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*17137	T	5-26-4.2	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	T	5-26-4.2	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*17137	U	5-26-4.4	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	U	5-26-4.4	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*14742	V	5-26-5	SUSAN E GORE	790	505
10*14744	V	5-26-5	THE SAMUEL MILTON SHEETS TRUST PAULINE RUTH SHEETS TRUSTEE	791	637
10*14745	V	5-26-5	RALPH B TAYLOR	794	485
10*17716	V	5-26-5	MICHAEL J AND BARBARA L WILEY	919	638
10*17777	V	5-26-5	MICHELLE E AND ROBERT T BAKER	921	128
10*21420	V	5-26-5	DAVID D BURKETT	957	3
10*21421	V	5-26-5	BRYANNA FLYNN RANKIN	957	5
10*21437	V	5-26-5	REBECCA MCMILLAN AND ROBERT	957	1
10*21821	V	5-26-5	LINDA K TAYLOR AND RAY P MAGEE	951	631
10*25633	V	5-26-5	CHESTNUT HOLDINGS LLC	1034	546
10*17137	W	5-26-4.3	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	W	5-26-4.3	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46
10*19908	X	5-26-19	GOLDA K ANDERSON	945	434
10*21935	X	5-26-19	KARROLL S BOOTH AND LOIS E BOOTH	940	593
10*22015	X	5-26-19	ERIC JAY BOOTH	942	217
10*17137	Y	5-26-4.1	MARK E SMITH AND VALERIE SMITH LIFE TENANT	685	521
10*17153	Y	5-26-4.1	ALLEN SMITH & BARBARA SMITH REMAINDERMAN	687	46

P.S.
708

David L Jackson



**TUG HILL
OPERATING**

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

WELL PLAT

PAGE 3 OF 3

DATE: 07/22/2019

**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
-------------------------	-----------------------	-----------------------	---------	-----------

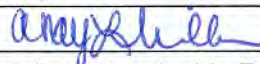
*See attached pages

**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

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19529	A	5-22-5	CNX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	733	500	NA	NA	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	NA	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14033	B	5-22-4	LAMOYNE BAKER	GASTAR EXPLORATION USA INC	1/8+	665	554	NA	NA	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	25/582 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gaster Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	27/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	27/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	27/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	28/499 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14516	C	5-22-17	JAMES NESBITT WELLS BY IOANIE WELLS AIF	GASTAR EXPLORATION USA INC	1/8+	773	570	NA	NA	NA	28/499 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	NA	NA	NA	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14518	C	5-22-17	RAE ELEN FLOYD AND KENNETH FLOYD	GASTAR EXPLORATION INC	1/8+	854	599	NA	NA	NA	NA	NA	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	NA	NA	NA	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*16471	C	5-22-17	CNX GAS COMPANY LLC	TH EXPLORATION, LLC	1/8+	905	155	NA	NA	NA	NA	NA	NA
10*16652	C	5-22-17	MARY JUDITH BRANSON AND MICHAEL L BRANSON	TH EXPLORATION, LLC	1/8+	942	35	NA	NA	NA	NA	NA	NA
10*16674	C	5-22-17	CHARLOTTE A KASTELIC	TH EXPLORATION, LLC	1/8+	942	37	NA	NA	NA	NA	NA	NA
10*26910	C	5-22-17	BRIDGET S AND DARRELL T GATES	TH EXPLORATION, LLC	1/8+	1045	419	NA	NA	NA	NA	NA	NA
10*26940	C	5-22-17	PATRICK N WELLS	TH EXPLORATION, LLC	1/8+	1045	413	NA	NA	NA	NA	NA	NA
10*14457	D	5-22-18	HARRY LEE GOUDY	GASTAR EXPLORATION USA INC	1/8+	731	140	NA	NA	NA	735/263 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14457	E	5-22-16	HARRY LEE GOUDY	GASTAR EXPLORATION USA INC	1/8+	731	140	NA	NA	NA	735/263 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14418	F	5-22-12	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	NA	35/144 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14418	G	5-22-10	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	NA	35/144 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14418	H	5-22-11	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	NA	35/144 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC

10*14418	I	5-22-9	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	NA	NA	NA	NA	NA	NA	35/144 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14418	J	5-28-4	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	878	610	NA	NA	NA	NA	NA	NA	NA	NA	35/144 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14572	K	5-28-6	VICKI LYNN WOOD	CHESAPEAKE APPALACHIA LLC	1/8+	681	326	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14573	K	5-28-6	AARON DEAN LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	317	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14574	K	5-28-6	KLOVA ANN MORRIS	CHESAPEAKE APPALACHIA LLC	1/8+	681	320	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14575	K	5-28-6	REVA JUNE ICARD	CHESAPEAKE APPALACHIA LLC	1/8+	681	323	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14576	K	5-28-6	WILLIAM L LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	329	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14577	K	5-28-6	ULA F NELSON	CHESAPEAKE APPALACHIA LLC	1/8+	681	332	NA	NA	NA	NA	NA	NA	NA	NA	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14578	K	5-28-6	BETTY KNOWLES	GASTAR EXPLORATION USA INC	1/8+	767	36	NA	NA	NA	NA	NA	NA	NA	NA	27/639 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC

10*14304	L	5-28-5	RUTH MAE DULANEY	GASTAR EXPLORATION USA INC	1/8+	749	530	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14305	L	5-28-5	HELEN BOWMAN	GASTAR EXPLORATION USA INC	1/8+	749	362	NA	NA	26/639 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	35/144 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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 Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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 Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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 Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	36/9 Gaster Exploration Inc to TH Exploration II LLC
10*14065	O	5-28-7	CARL COFFIELD	GASTAR EXPLORATION USA INC	1/8+	665	363	NA	NA	23/353 Gaster Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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 Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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 Atinum Marcellus I LLC	21/41 Gaster Exploration USA Inc and Gaster Exploration Inc merger	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration LLC
10*17133	Q	5-26-4.5	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration 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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	19/624 SWN Exchange Titleholder LLC merger into SWN Production Company LLC	41/256 SWN Production Company LLC to TH Exploration LLC

10*17153	R	5-26-4	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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*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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	S	5-26-4-6	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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*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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	T	5-26-4-2	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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*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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	U	5-26-4-4	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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*14742	V	5-26-5	SUSAN E GORE	GASTAR EXPLORATION USA INC	1/8+	790	505	NA	NA	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
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	NA	29/157 Gastar Exploration USA Inc to Atinum Marcellus I 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	NA	806/1 Gastar Exploration USA Inc to Atinum Marcellus I 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 L WILEY	TH EXPLORATION, LLC	1/8+	919	638	NA	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	NA
10*21420	V	5-26-5	DAVID D BURKETT	TH EXPLORATION, LLC	1/8+	957	3	NA	NA	NA	NA	NA	NA

10*21421	V	5-26-5	BRYANNA FLYNN RANKIN	TH EXPLORATION, LLC	1/8+	957	5	NA	NA	NA	NA	NA	NA	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	NA	NA	NA	NA	NA	NA
10*21821	V	5-26-5	LUNDA K TAYLOR AND RAY P MAGEE	TH EXPLORATION, LLC	1/8+	951	631	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10*25633	V	5-26-5	CHESTNUT HOLDINGS LLC	TH EXPLORATION, LLC	1/8+	1034	546	NA	NA	NA	NA	NA	NA	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	GOLDA K ANDERSON	TH EXPLORATION, LLC	1/8+	945	434	NA	NA	NA	NA	NA	NA	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	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	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC agreement	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					

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 Date Recorded 04/27/2016
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 Pages Recorded 77
 Book-Page 36-9
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 Additional \$13.00

WHEN RECORDED RETURN TO:
 TH Exploration II, LLC
 1320 South University Drive, Suite 500
 Fort Worth, Texas 76107
 Attn: David Kalish

Execution Version

ASSIGNMENT AND BILL OF SALE

STATE OF WV §
 COUNTY OF MARSHALL §

KNOW ALL MEN BY THESE PRESENTS:

THIS ASSIGNMENT AND BILL OF SALE (this "*Assignment*"), dated April 7, 2016, but effective as of 7:00 A.M. Houston time on January 1, 2016 (the "*Effective Time*"), is between Gstar Exploration Inc., a Delaware corporation, whose address is 1331 Lamar Street, Suite 650 Houston, Texas 77010 ("*Assignor*"), and TH Exploration II, LLC, a Texas limited liability company, whose address is 1320 South University Drive, Suite 500, Fort Worth, Texas 76107 ("*Assignee*"). Assignor and Assignee are each, individually, referred to herein as a "*Party*" and collectively, as the "*Parties*".

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 Department of

Capitalized terms used but not defined herein shall have the respective meanings set forth in that certain Purchase and Sale Agreement (the "*Purchase Agreement*"), dated as of February 19, 2016, by and between Assignor and Assignee (as successor-in-interest).

Section 1. Assignment. The conveyance and assignment herein shall be deemed effective as of the Effective Time.

For Ten Dollars (\$10.00) and other good and valuable consideration (the receipt and sufficiency of which are hereby acknowledged), Assignor does hereby forever GRANT, BARGAIN, SELL, CONVEY, ASSIGN, TRANSFER, SET OVER AND DELIVER unto Assignee, all of Assignor's right, title and interest in and to the following interests and properties (such right, title and interest described in subsections (a) through (k) of this Section 1, less and except the Excluded Assets, collectively, the "*Conveyed Interests*"):

- (a) all oil, gas and/or mineral leases of Assignor, together with any and all other right, title and interest of Assignor in and to the leasehold estates created thereby, including subleases, royalties, overriding royalties, net profits interest, carried interests or similar rights or interests in such leases, and together with all rights, privileges, benefits and powers conferred upon Assignor with respect to the use and occupation of the lands covered thereby that may be necessary, convenient or incidental to the possession and enjoyment of such leases, located in Marshall, Wetzel, Doddridge, Harrison, Lewis, Marion, and Monongalia Counties, West Virginia and Greene, Butler, Fayette, Somerset, and Clearfield Counties, Pennsylvania, including those described on Exhibit A—Part 1 attached hereto (subject to any reservations, limitations or depth restrictions described on Exhibit A—Part 1), (Assignor's interest in such leases and other right, title and interest as so limited, the "*Leases*");
- (b) all rights and interests in, under or derived from all unitization agreements in effect with respect to any of the Leases and the units created thereby, including those described

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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STATE OF WEST VIRGINIA §
 COUNTY OF MARSHALL §

Marshall County
 Jan Pest, Clerk
 Instrument 1436500
 02/14/2018 @ 01:32:11 PM
 ASSIGNMENTS
 Book 41 @ Page 224
 Pages Recorded 7
 Recording Cost \$ 13.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 5th day of February, 2018, and made effective December 12, 2017 (the "Effective Date"), by and between AMERICAN PETROLEUM PARTNERS OPERATING, LLC, (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated December 12, 2017 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in Exhibit "A", attached hereto and made a part hereof (hereinafter the "Leases"); and

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and subject to the limited warranties, restrictions and conditions hereinafter mentioned, the parties hereto, intending to be legally bound, do covenant and agree as follows:

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon.

TO HAVE AND TO HOLD such right, title and interest in and to the Leases unto Assignee or its designee, and their respective successors and assigns, forever, in accordance with the provisions of this Assignment.

2. Special Warranty. Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the

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TUG HILL

47 05 1 022 65

July 22, 2019

WV Department of Environmental Protection
Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304
Attention: Laura Adkins

RE: Armstrong S-10HU

Subject: Marshall County Route 78 and County Route 80 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 78 and Marshall County Route 80 in the area reflected on the Armstrong S-10HU well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me directly at 304-376-0111, or by email at amiller@tug-hilop.com.

Sincerely,

Amy Miller
Permit Specialist – Appalachia Region
Cell 304-376-0111
Email: amiller@tug-hilop.com

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION

Date of Notice Certification: 07/22/2019

API No. 47- 051 -
Operator's Well No. Armstrong S-10HU
Well Pad Name: Armstrong

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State:	<u>WV</u>	UTM NAD 83	Easting:	<u>516,418.27</u>
County:	<u>Marshall</u>		Northing:	<u>4,400,449.60</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Burch Ridge Road - CR 29</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>CONSOL RCPC, LLC</u>	
Watershed:	<u>French Creek - Ohio River</u>			

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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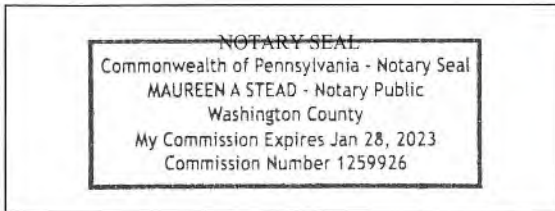
Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia Region</u>	Facsimile:	<u>724-338-2030</u>
Telephone:	<u>724-749-8388</u>	Email:	<u>amiller@tug-hillop.com</u>



Subscribed and sworn before me this 22 day of JULY, 2019.
Maureen A Stead Notary Public
 My Commission Expires 1/28/23

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 7/19/2019 **Date Permit Application Filed:** 7/22/2019

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)
 Name: CONSOL RCPC, LLC Attn: Casey Saunders (Well Pad and Access Road)
 Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317
 Name: _____
 Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
 Name: _____
 Address: _____
 Name: _____
 Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
 Name: _____
 Address: _____

COAL OWNER OR LESSEE
 Name: Appalachian Power Company
 Address: 1068 US-60
Milton, WV 25541
 COAL OPERATOR
 Name: _____
 Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
 Name: none within 2000'
 Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
 Name: _____
 Address: _____

*Please attach additional forms if necessary

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Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oils-and-gas/pages/default.aspx.

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Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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JUL 16 2019
WV Department of Environmental Protection

WW-6A
(8-13)

API NO. 47-451 **47 05 102265**
OPERATOR WELL NO. Armstrong S-10HU
Well Pad Name: Armstrong

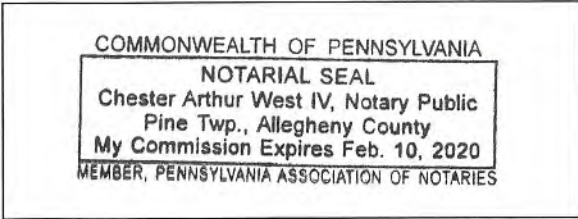
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com *amystiller*

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 18th day of July, 2019.
[Signature] Notary Public
My Commission Expires 2-10-2020

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WW-6A

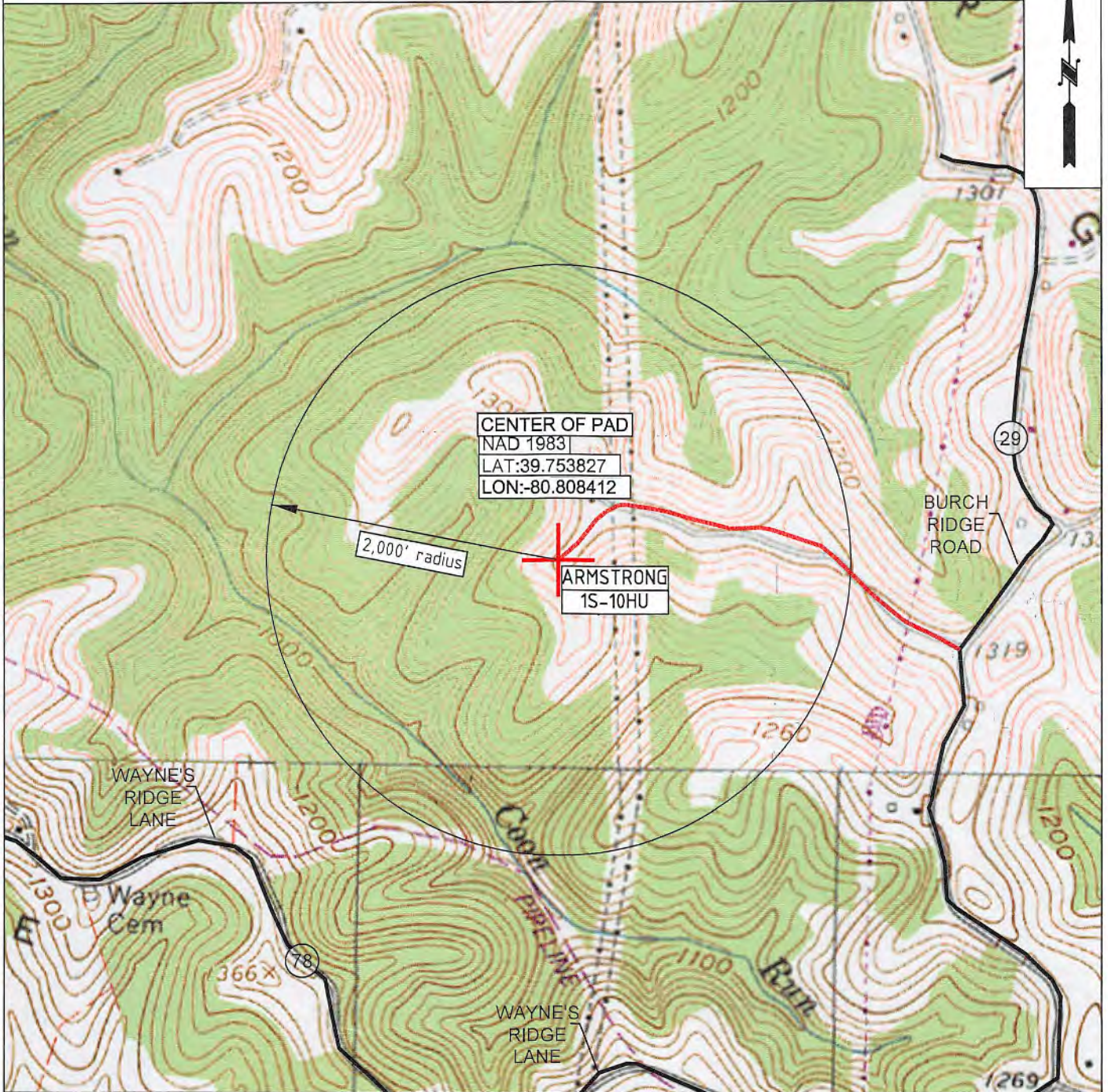
PROPOSED ARMSTRONG 1S-10HU

SUPPLEMENT PG 1

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JUL 26 2019

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THERE APPEAR TO BE NO (0) RESIDENCES WITHIN 1,500'



CENTER OF PAD
NAD 1983
LAT:39.753827
LON:-80.808412

2,000' radius

ARMSTRONG
1S-10HU

WAYNE'S
RIDGE
LANE

Wayne
Cem

WAYNE'S
RIDGE
LANE

BURCH
RIDGE
ROAD



OPERATOR 494510851
TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD
SUITE 200
CANONSBURG, PA 15317

TOPO SECTION
POWHATAN POINT 7.5'
SCALE:
1" = 1000'

LEASE NAME
ARMSTRONG
DATE:
DATE: 07-16-2019

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

Date of Notice: 1/31/2019 **Date of Planned Entry:** 2/7/2019

Delivery method pursuant to West Virginia Code § 22-6A-10a

- PERSONAL SERVICE
 REGISTERED MAIL
 METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(s)

Name: CONSOL RCPC, LLC Attn: Casey Saunders (Well Pad and Access Road)
 Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317
 Name: _____
 Address: _____
 Name: _____
 Address: _____

COAL OWNER OR LESSEE

Name: Appalachian Power Company
 Address: 1068 US-60
Milton, WV 25541

MINERAL OWNER(s)

Name: Chestnut Holdings *See attachment
 Address: 1441 Windchime Lane
Orlando, FL 32837

*please attach additional forms if necessary

RECEIVED
Office of Oil and Gas
JUL 26 2019
WV Department of
Environmental Protection

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>39.75388, -80.80841</u>
County: <u>Marshall</u>	Public Road Access: <u>Burch Ridge Road</u>
District: <u>Franklin</u>	Watershed: <u>French Creek - Ohio River</u>
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>CONSOL RCPC, LLC</u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: <u>Tug Hill Operating, LLC</u>	Address: <u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
Telephone: <u>724-749-8388</u>	<u>Canonsburg, PA 15317</u>
Email: <u>amiller@tug-hillop.com</u>	Facsimile: <u>724-338-2030</u>

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 07/22/2019 **Date Permit Application Filed:** 07/23/2019

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

- | | |
|--|-------------------------------|
| <input checked="" type="checkbox"/> CERTIFIED MAIL | <input type="checkbox"/> HAND |
| RETURN RECEIPT REQUESTED | DELIVERY |

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)

(at the address listed in the records of the sheriff at the time of notice):

Name: CONSOL RCPC, LLC Aitn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

Name: _____
Address: _____

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State: West Virginia
County: Marshall
District: Franklin
Quadrangle: Powhatan Point 7.5'
Watershed: French Creek - Ohio River

UTM NAD 83 Easting: 516,418.27
 Northing: 4,400,449.60
Public Road Access: Burch Ridge Road - CR 29
Generally used farm name: CONSOL RCPC, LLC

RECEIVED
Office of Oil and Gas
JUL 26 2019
WV Department of
Environmental Protection

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by W. Va. Code § 22-6A-10(b) to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
 Charleston, West Virginia 25305-0430 • (304) 558-3505

Byrd E. White, III
 Secretary of Transportation

July 8, 2019

Jimmy Wriston, P. E.
 Deputy Secretary/
 Acting Commissioner

James A. Martin, Chief
 Office of Oil and Gas
 Department of Environmental Protection
 601 57th Street, SE
 Charleston, WV 25304

Subject: DOH Permit for the Burch River & Armstrong Pads, Marshall County

Armstrong S-10HU Well site

RECEIVED
 Office of Oil and Gas
 JUL 26 2019
 WV Department of
 Environmental Protection

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2019-0438 transferred to Tug Hill Operating for access to the State Road for a well site located off Marshall County Route 29 SLS.

This operator is in compliance with §22-6A-20 of the WV Code. Operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated October 1, 2018.

Very Truly Yours,

Gary K. Clayton, P.E.
 Regional Maintenance Engineer
 Central Office O&G Coordinator

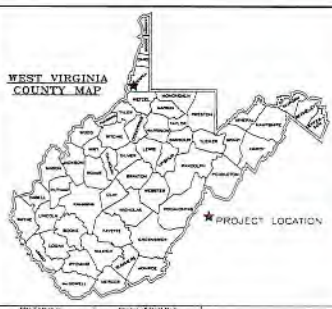
Cc: Amy Miller
 Tug Hill Operating
 CH, OM, D-6
 File



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

RECEIVED
Office of Oil and Gas
JUL 26 2019
WV Department of
Environmental Protection



WVDEP OOG
ACCEPTED AS-BUILT
Wd 10 / 17 / 2019

Armstrong Well Site
 Site Design, Construction Plan, &
 Erosion and Sediment Control Plans
 Tug Hill Operating
 Marshall County
 Franklin District
 Latitude 39.75382673°
 Longitude -80.80841198°
 Stillhouse Run - Ohio River Watershed

Pertinent Site Information
 Armstrong Well Site
 Emergency Number: 304-845-1920
 Franklin District, Marshall County, WV
 Watershed: Stillhouse Run - Ohio River Watershed
 Tug Hill Contact Number: 1-817-632-3400

Property Owner Information - Armstrong Well Site

Owner	Parcel	Well (ft)	Access Road (ft)	Topographic (ft)	AS (ft)	Grading (ft)	Storm (ft)
OWNERS FUTURE LLC	124	720	0	0	0	0	0
OWNERS FUTURE LLC	124	720	0	0	0	0	0

Exhibit A: Final Design: Issue for Permitting



Access Road

Stationing	TMF	PAV	PAV (ft)	PAV (ft)	PAV (ft)
0+00	0	0	0	0	0
0+10	0	0	0	0	0

Disturbed Area

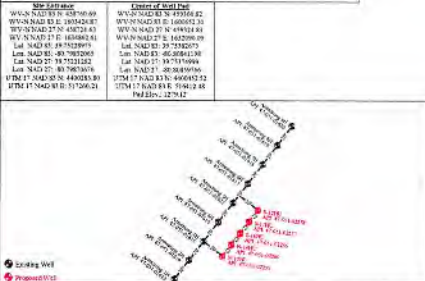
Category	Area (sq ft)
Disturbed Area	113.84
Additional Information	113.84

Armstrong Well Site Quantities

Item	Quantity	Unit
Excavation	113.84	sq ft
Fill	113.84	sq ft
Total	227.68	sq ft

Wellhead Impact (Square Feet)

Category	Area (sq ft)
Wellhead Impact	113.84
Total	113.84



Station	Station	Station	Station
ARMSTRONG 01	ARMSTRONG 02	ARMSTRONG 03	ARMSTRONG 04
ARMSTRONG 05	ARMSTRONG 06	ARMSTRONG 07	ARMSTRONG 08
ARMSTRONG 09	ARMSTRONG 10	ARMSTRONG 11	ARMSTRONG 12
ARMSTRONG 13	ARMSTRONG 14	ARMSTRONG 15	ARMSTRONG 16
ARMSTRONG 17	ARMSTRONG 18	ARMSTRONG 19	ARMSTRONG 20
ARMSTRONG 21	ARMSTRONG 22	ARMSTRONG 23	ARMSTRONG 24
ARMSTRONG 25	ARMSTRONG 26	ARMSTRONG 27	ARMSTRONG 28
ARMSTRONG 29	ARMSTRONG 30	ARMSTRONG 31	ARMSTRONG 32
ARMSTRONG 33	ARMSTRONG 34	ARMSTRONG 35	ARMSTRONG 36
ARMSTRONG 37	ARMSTRONG 38	ARMSTRONG 39	ARMSTRONG 40

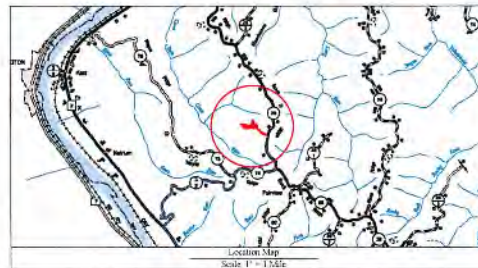


Project Contacts

Lead Designer: Kenneth Kelly
 Project Manager: Kenneth Kelly
 Designer: Kenneth Kelly
 Checker: Kenneth Kelly

Approach Routes:
 From the intersection of OH Rt 7 and WV Rt 2 near New Martinsville, WV, travel north on WV Rt 2 for 6.1 miles. Turn Right onto Co Rd 27 (Wells Hill Rd). Follow Co Rd 27 for 2.1 miles. Turn Right onto Co Rd 79 (Waynes Ridge). Follow Co Rd 79 for 0.5 miles. Turn left onto Co Rd 29 (Branch Ridge). Follow Co Rd 29 for 0.6 miles. The site entrance will be on the Left (West) side of the road.

Site Locations (NAD 27)			Site Locations (NAD 83)		
Station	Station	Length (ft)	Station	Station	Length (ft)
39 75382673	39 75382673	30.88	39 75382673	39 75382673	30.88



Well Location Assumptions:
 All P&I construction completed with the following conditions:
 *15' from existing well or developed area used for homes or domestic animals.
 *50' from any occupied dwelling or farm structure. See 2.5.6(3)(1) for further details.
 *10' from the edge of disturbance to any other existing or proposed well.
 *10' from any surface or groundwater intake to a public water supply.
 (WV Location Assumptions of WV Code 22A-4-2)



The design, construction, and maintenance of this well and access road have been prepared in accordance with the West Virginia Code of Laws, Division of Environmental Protection, Office of Water Use 22A-4-2. The design is intended to be used for the purposes stated on the title block.

DATE: 10/17/2019
 TIME: 2:30 PM

Sheet

Sheet	Description
1	Cover Sheet
2	Schedule of Quantities
3	Site Plan
4	Pre-Construction Site Conditions
5	Site Soil Map
6	Construction Exhibit
7	Overall Plan View
8	EAS Plan View
9	Plan View
10	Cross Sections - Well Pad
11	Cross Sections - Access Road
12	Geotechnical Exhibit
13-14	Landowner Disturbed Area Exhibit
15	Site Remediation
16	Production Exhibit
17-18	Erosion and Sediment Control Details
19	Access Road Details
20	Pad Details

MISS UTILITY OF WEST VIRGINIA
 1-800-245-4848
 P.O. Box 487000
 Charleston, WV 25348-7000
 811

Tug Hill Operating will obtain a Transportation Permit (Form M&T-109) from the WV Department of Transportation, Division of Highways prior to the commencement of any construction activities.

The WV Mines Website was cancelled. Previous (current) mining activities are not within the ACE.

WVDEP Website (see below) show that there are some active or abandoned gas wells within the ACE.

Preconstruction Conditions

Condition	Location
Open construction area	Well Pad
Clearing	Access Road
Excavation	Well Pad
Backfill	Well Pad
Grading	Well Pad
Drainage	Access Road
Erosion Control	Access Road
Sediment Control	Access Road

THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

TUG HILL OPERATING

THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

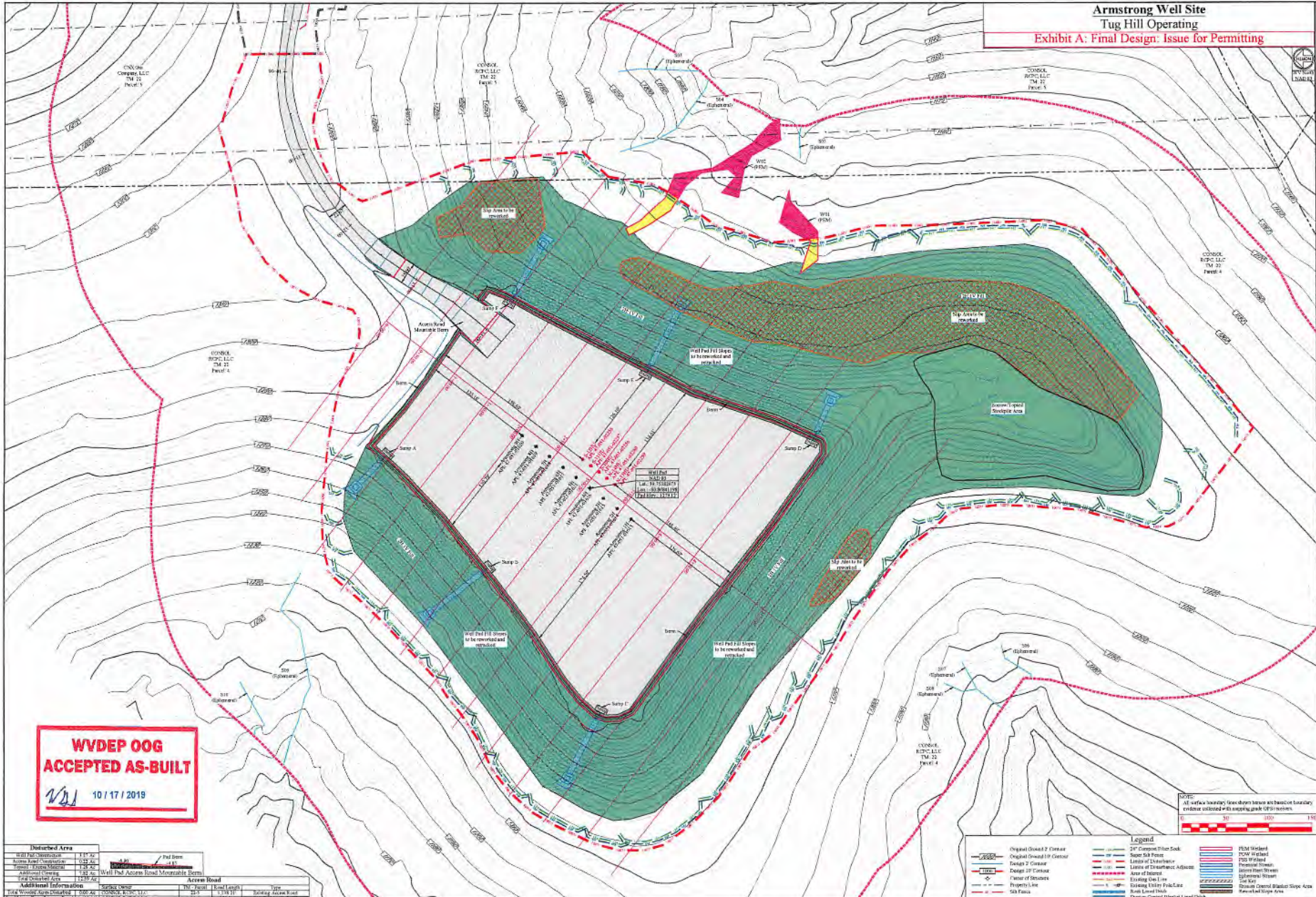
Kelly Surveys

Cover Sheet
 Armstrong Well Site
 Franklin District
 Marshall County, WV

DATE: 10/17/2019
 SCALE: AS SHOWN
 DRAWN BY: JK
 FILE NO:
 SHEET 1 OF 12

Armstrong Well Site
Tug Hill Operating

Exhibit A: Final Design: Issue for Permitting



**WVDEP OOG
ACCEPTED AS-BUILT**
10 / 17 / 2019

Disturbed Area	
Well Pad Construction	1.14
Access Road Construction	1.22
Access Road Maintenance	1.23
Well Pad #1 through #5	1.24
Well Pad #6 through #8	1.25
Well Pad #9 through #11	1.26
Well Pad #12 through #14	1.27
Well Pad #15 through #17	1.28
Well Pad #18 through #20	1.29
Well Pad #21 through #23	1.30
Well Pad #24 through #26	1.31
Well Pad #27 through #29	1.32
Well Pad #30 through #32	1.33
Well Pad #33 through #35	1.34
Well Pad #36 through #38	1.35
Well Pad #39 through #41	1.36
Well Pad #42 through #44	1.37
Well Pad #45 through #47	1.38
Well Pad #48 through #50	1.39
Well Pad #51 through #53	1.40
Well Pad #54 through #56	1.41
Well Pad #57 through #59	1.42
Well Pad #60 through #62	1.43
Well Pad #63 through #65	1.44
Well Pad #66 through #68	1.45
Well Pad #69 through #71	1.46
Well Pad #72 through #74	1.47
Well Pad #75 through #77	1.48
Well Pad #78 through #80	1.49
Well Pad #81 through #83	1.50
Well Pad #84 through #86	1.51
Well Pad #87 through #89	1.52
Well Pad #90 through #92	1.53
Well Pad #93 through #95	1.54
Well Pad #96 through #98	1.55
Well Pad #99 through #101	1.56
Well Pad #102 through #104	1.57
Well Pad #105 through #107	1.58
Well Pad #108 through #110	1.59
Well Pad #111 through #113	1.60
Well Pad #114 through #116	1.61
Well Pad #117 through #119	1.62
Well Pad #120 through #122	1.63
Well Pad #123 through #125	1.64
Well Pad #126 through #128	1.65
Well Pad #129 through #131	1.66
Well Pad #132 through #134	1.67
Well Pad #135 through #137	1.68
Well Pad #138 through #140	1.69
Well Pad #141 through #143	1.70
Well Pad #144 through #146	1.71
Well Pad #147 through #149	1.72
Well Pad #150 through #152	1.73
Well Pad #153 through #155	1.74
Well Pad #156 through #158	1.75
Well Pad #159 through #161	1.76
Well Pad #162 through #164	1.77
Well Pad #165 through #167	1.78
Well Pad #168 through #170	1.79
Well Pad #171 through #173	1.80
Well Pad #174 through #176	1.81
Well Pad #177 through #179	1.82
Well Pad #180 through #182	1.83
Well Pad #183 through #185	1.84
Well Pad #186 through #188	1.85
Well Pad #189 through #191	1.86
Well Pad #192 through #194	1.87
Well Pad #195 through #197	1.88
Well Pad #198 through #200	1.89
Well Pad #201 through #203	1.90
Well Pad #204 through #206	1.91
Well Pad #207 through #209	1.92
Well Pad #210 through #212	1.93
Well Pad #213 through #215	1.94
Well Pad #216 through #218	1.95
Well Pad #219 through #221	1.96
Well Pad #222 through #224	1.97
Well Pad #225 through #227	1.98
Well Pad #228 through #230	1.99
Well Pad #231 through #233	2.00
Well Pad #234 through #236	2.01
Well Pad #237 through #239	2.02
Well Pad #240 through #242	2.03
Well Pad #243 through #245	2.04
Well Pad #246 through #248	2.05
Well Pad #249 through #251	2.06
Well Pad #252 through #254	2.07
Well Pad #255 through #257	2.08
Well Pad #258 through #260	2.09
Well Pad #261 through #263	2.10
Well Pad #264 through #266	2.11
Well Pad #267 through #269	2.12
Well Pad #270 through #272	2.13
Well Pad #273 through #275	2.14
Well Pad #276 through #278	2.15
Well Pad #279 through #281	2.16
Well Pad #282 through #284	2.17
Well Pad #285 through #287	2.18
Well Pad #288 through #290	2.19
Well Pad #291 through #293	2.20
Well Pad #294 through #296	2.21
Well Pad #297 through #299	2.22
Well Pad #300 through #302	2.23
Well Pad #303 through #305	2.24
Well Pad #306 through #308	2.25
Well Pad #309 through #311	2.26
Well Pad #312 through #314	2.27
Well Pad #315 through #317	2.28
Well Pad #318 through #320	2.29
Well Pad #321 through #323	2.30
Well Pad #324 through #326	2.31
Well Pad #327 through #329	2.32
Well Pad #330 through #332	2.33
Well Pad #333 through #335	2.34
Well Pad #336 through #338	2.35
Well Pad #339 through #341	2.36
Well Pad #342 through #344	2.37
Well Pad #345 through #347	2.38
Well Pad #348 through #350	2.39
Well Pad #351 through #353	2.40
Well Pad #354 through #356	2.41
Well Pad #357 through #359	2.42
Well Pad #360 through #362	2.43
Well Pad #363 through #365	2.44
Well Pad #366 through #368	2.45
Well Pad #369 through #371	2.46
Well Pad #372 through #374	2.47
Well Pad #375 through #377	2.48
Well Pad #378 through #380	2.49
Well Pad #381 through #383	2.50
Well Pad #384 through #386	2.51
Well Pad #387 through #389	2.52
Well Pad #390 through #392	2.53
Well Pad #393 through #395	2.54
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Well Pad #399 through #401	2.56
Well Pad #402 through #404	2.57
Well Pad #405 through #407	2.58
Well Pad #408 through #410	2.59
Well Pad #411 through #413	2.60
Well Pad #414 through #416	2.61
Well Pad #417 through #419	2.62
Well Pad #420 through #422	2.63
Well Pad #423 through #425	2.64
Well Pad #426 through #428	2.65
Well Pad #429 through #431	2.66
Well Pad #432 through #434	2.67
Well Pad #435 through #437	2.68
Well Pad #438 through #440	2.69
Well Pad #441 through #443	2.70
Well Pad #444 through #446	2.71
Well Pad #447 through #449	2.72
Well Pad #450 through #452	2.73
Well Pad #453 through #455	2.74
Well Pad #456 through #458	2.75
Well Pad #459 through #461	2.76
Well Pad #462 through #464	2.77
Well Pad #465 through #467	2.78
Well Pad #468 through #470	2.79
Well Pad #471 through #473	2.80
Well Pad #474 through #476	2.81
Well Pad #477 through #479	2.82
Well Pad #480 through #482	2.83
Well Pad #483 through #485	2.84
Well Pad #486 through #488	2.85
Well Pad #489 through #491	2.86
Well Pad #492 through #494	2.87
Well Pad #495 through #497	2.88
Well Pad #498 through #500	2.89
Well Pad #501 through #503	2.90
Well Pad #504 through #506	2.91
Well Pad #507 through #509	2.92
Well Pad #510 through #512	2.93
Well Pad #513 through #515	2.94
Well Pad #516 through #518	2.95
Well Pad #519 through #521	2.96
Well Pad #522 through #524	2.97
Well Pad #525 through #527	2.98
Well Pad #528 through #530	2.99
Well Pad #531 through #533	3.00

TUG HILL
OPERATING



THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

K+S
SURVEYING

Site Plan
Armstrong Well Site
Franklin District
Marshall County, WV

Date: 03/09/2019
Scale: As Shown
Designed By: JES
Drawn By: JES
Sheet 10 of 12