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west virginia department of environmental protection

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

Harold D. Ward, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Wednesday, March 10, 2021  
PERMIT MODIFICATION APPROVAL  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BOULEVARD, PLAZA II  
SUITE 200  
CANONSBURG, PA 15317

Re: Permit Modification Approval for GOUDY 1S-4HM  
47-051-02330-00-00

**Extended lateral length**

TUG HILL OPERATING, LLC

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

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

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin  
Chief

Operator's Well Number: GOUDY 1S-4HM  
Farm Name: TH EXPLORATION III, LLC  
U.S. WELL NUMBER: 47-051-02330-00-00  
Horizontal 6A New Drill  
Date Modification Issued: March 10, 2021

Promoting a healthy environment.

03/26/2021

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 New Martinsville  
Operator ID County District Quadrangle

2) Operator's Well Number: Goudy 1S-4HM Well Pad Name: Goudy

3) Farm Name/Surface Owner: TH Exploration III, LLC Public Road Access: Wells Hill Road (County Route 2/2)

4) Elevation, current ground: 1242' Elevation, proposed post-construction: 1242'

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

(b) If Gas Shallow  Deep   
Horizontal

6) Existing Pad: Yes or No Yes

*Barry Stetler*  
*1-14-21*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6382 - 6440' thickness of 58' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,540'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 19,218'

11) Proposed Horizontal Leg Length: 12,029.39'

12) Approximate Fresh Water Strata Depths: 70', 863'

13) Method to Determine Fresh Water Depths: Use shallow offset wells to determine deepest freshwater. Or determine using prodrill tests, testing while drilling or petrophysical evaluation of resistivity.

14) Approximate Saltwater Depths: 1,480'

15) Approximate Coal Seam Depths: Sewickley Coal - 762' and Pittsburgh Coal - 857'

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

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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	13 3/8"	NEW	H40	48#	970'	970'	1024ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	970'	970'	1024ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,653'	2,653'	879ft^3(CTS)
<b>Production</b>	5 1/2"	NEW	P110	20#	19,218'	19,218'	4903ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,867'	
Liners							

*1-14-21  
Bang Hays*

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	13 3/8"	17 1/2"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	2,740	2,192	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE#24	1.19
Production	5 1/2"	8 7/8_8 3/4	.361	12,640	10,112	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

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**PACKERS**

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

WW-6B  
(10/14)

API NO. 47-051 - 02330  
OPERATOR WELL NO. Goudy 1S-4HM  
Well Pad Name: Goudy

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

Drill through the Marcellus and TD Pilot Hole 100' into the Onondaga. 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.

1-14-21  
Bryce Stalter

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

Well to be completed with approximately 30,100,000 lb. proppant and 545,000 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 11.56 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.81 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 other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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

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Sfc - Premium NE-1 + 2% CaCl; Int1 - Premium NE-1 + 1.5% CaCL + Flake; Int2 - Lead: Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170 Tail: Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate; Kick Plug - Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L; Prod - Lead: 50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L Tail: 25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L

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.

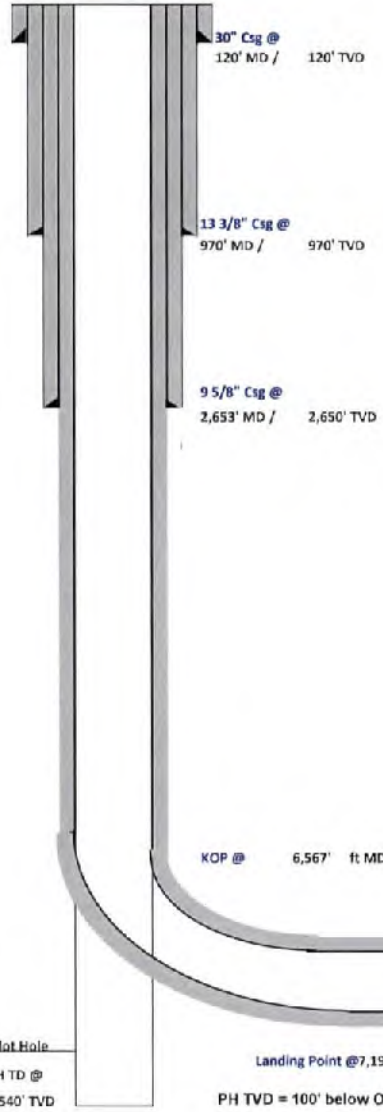


WELL NAME: Goudy 15-4HM  
 STATE: WV COUNTY: Marshall  
 DISTRICT: Franklin  
 DF Elev: 1,242' GL Elev: 1,242'  
 TD: 19,218'  
 TH Latitude: 39.73705024  
 TH Longitude: -80.8266864  
 BH Latitude: 839.703165  
 BH Longitude: -80.802808

FORMATION TDPS	
Formation	Depth TVD
Deepest Fresh Water	863
Sewickley Coal	762
Pittsburgh Coal	857
Big Lime	1925
Weir	2313
Berea	2468
Gordon	2814
Rhinestreet	5821
Genesee/Burkett	6333
Tully	6353
Hamilton	6373
Marcellus	6382
Landing Depth	6417
Onondaga	6440
Pilot Hole Depth	6540

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	17.5	13 3/8	970'	970'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,653'	2,650'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	19,218'	6,626'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,030	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	885	A	15	Air	1 Centralizer every other jt
Production	4,506	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



*Ray Stalge*  
1-14-21

Pilot Hole  
 PH TD @ 5,540' TVD  
 Landing Point @ 7,191' MD / 6,417' TVD  
 PH TVD = 100' below Onondaga Top

Lateral TD @ 19,218' ft MD  
 6,626' ft TVD

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

**Goudy 1S-4HM**

**Casing**

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	970'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,653'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	19,218'	CTS

**Cement**

- Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2
- Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
- Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19
- Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug
- 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 = 1.19

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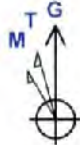
Well: Goudy 1S-04HM (K)  
 Site: Goudy  
 Project: Marshall County, West Virginia.  
 Design: rev4

SECTION DETAILS

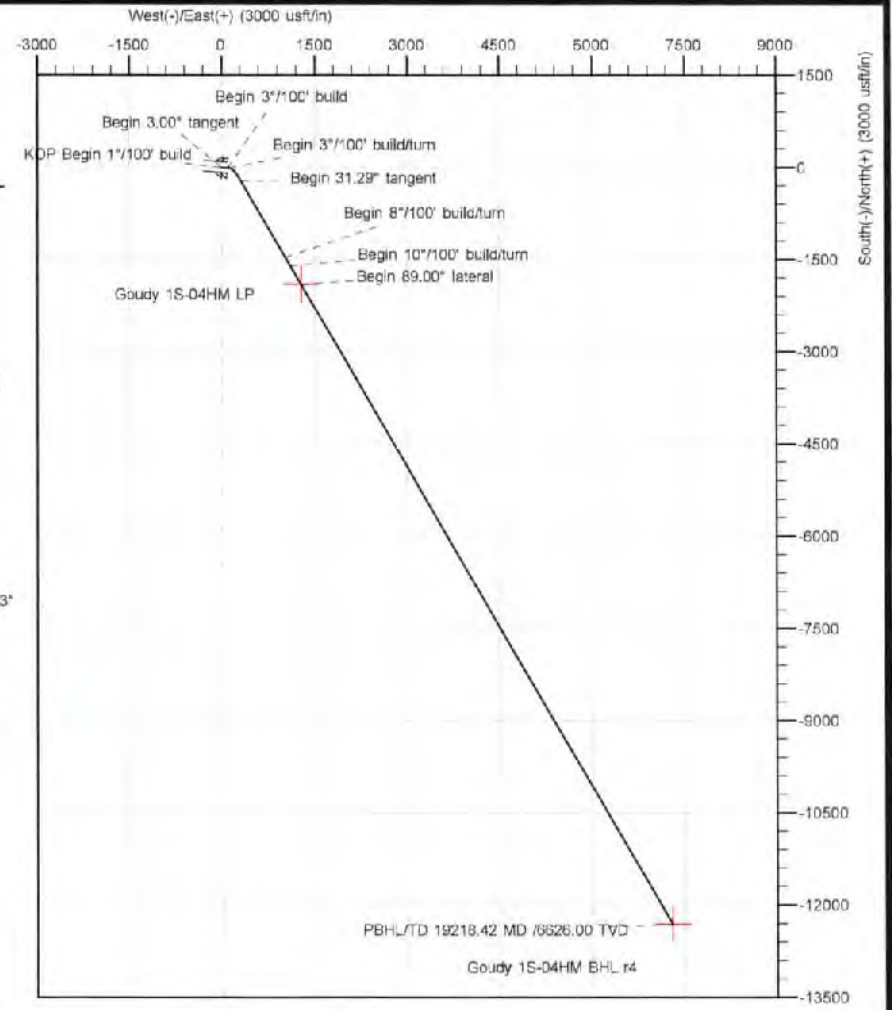
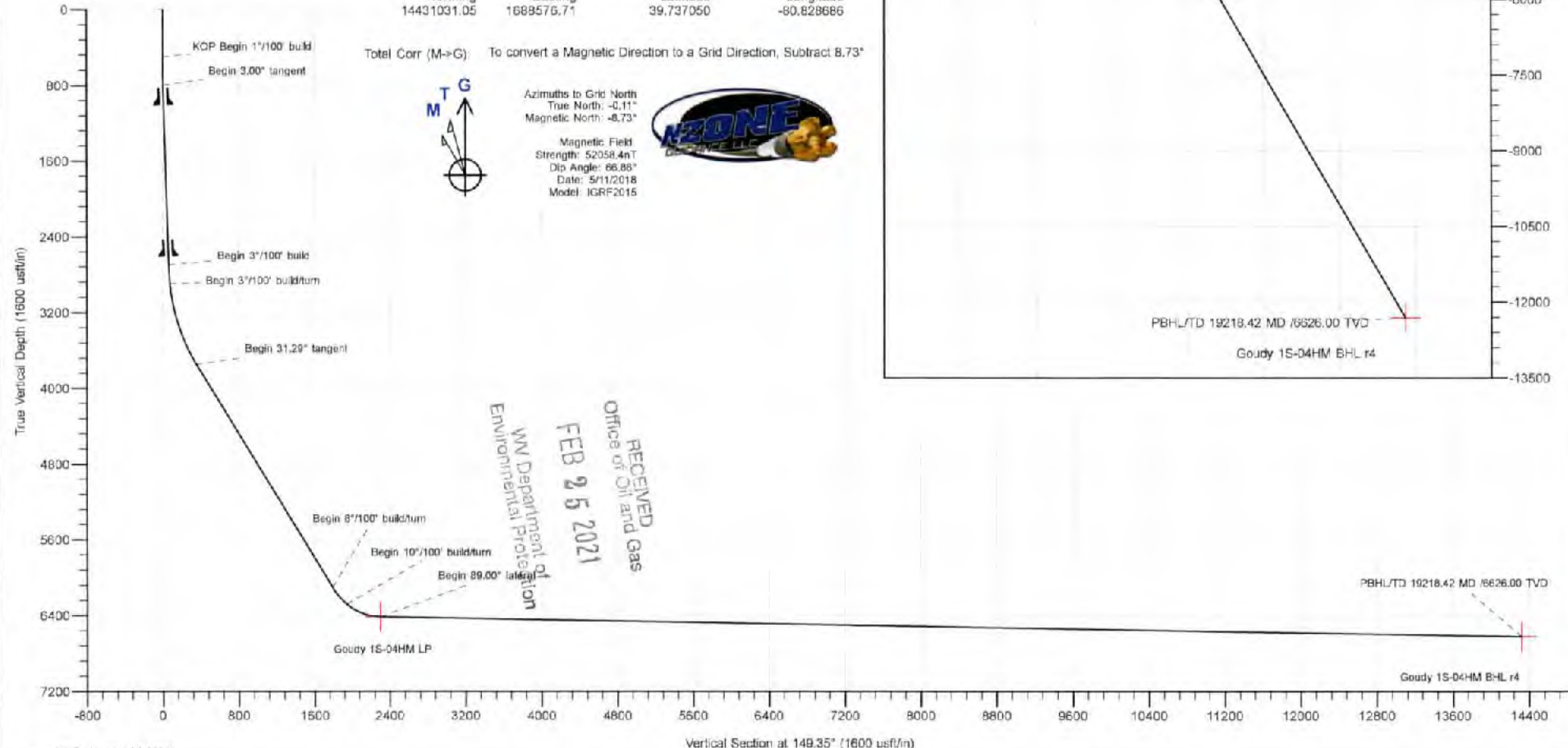
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 1°/100' build
3	800.00	3.00	95.00	799.86	-0.68	7.82	1.00	95.00	4.58	Begin 3.00° tangent
4	2702.74	3.00	95.00	2700.00	-9.36	107.03	0.00	0.00	62.61	Begin 3°/100' build
5	2902.74	9.00	95.00	2898.81	-11.18	127.84	3.00	0.00	74.79	Begin 3°/100' build/turn
6	3805.06	31.29	150.16	3745.77	-224.57	318.27	3.00	69.51	355.44	Begin 31.29° tangent
7	6557.35	31.29	150.16	6106.35	-1468.98	1031.99	0.00	0.00	1799.86	Begin 8°/100' build/turn
8	6801.25	50.00	150.08	6263.04	-1600.49	1107.57	8.00	-0.20	1941.52	Begin 10°/100' build/turn
9	7191.30	89.90	149.98	6417.00	-1910.90	1286.60	10.00	-0.15	2299.83	Begin 89.00° lateral
10	19218.43	89.90	149.98	6626.00-12323.45	7302.16	0.00	0.00	0.00	14324.41	PBHL/TD 19218.42 MD /6626.00 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 @ 1241.00ustf  
 Northing: 14431031.05 Easting: 1688576.71 Latitude: 39.737050 Longitude: -80.828686

Total Corr (M→G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.73°



Azimuths to Grid North  
 True North: -0.11°  
 Magnetic North: -8.73°  
 Magnetic Field  
 Strength: 52058.4nT  
 Dip Angle: 66.86°  
 Date: 5/11/2018  
 Model: IGRF2015



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Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Goudy 1S-04HM (K)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1241.00usft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1241.00usft
<b>Site:</b>	Goudy	<b>North Reference:</b>	Grid
<b>Well:</b>	Goudy 1S-04HM (K)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev4		

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

<b>Site</b>	Goudy		
<b>Site Position:</b>		<b>Northing:</b>	14,430,942.40 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,688,559.77 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.736807
		<b>Longitude:</b>	-80.828748

<b>Well</b>	Goudy 1S-04HM (K)					
<b>Well Position</b>	+N/-S	0.00 usft	<b>Northing:</b>	14,431,031.05 usft	<b>Latitude:</b>	39.737050
	+E/-W	0.00 usft	<b>Easting:</b>	1,688,576.71 usft	<b>Longitude:</b>	-80.828687
<b>Position Uncertainty</b>	0.00 usft		<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	1,241.00 usft
<b>Grid Convergence:</b>	0.11 °					

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	5/11/2018	-8.62	66.86	52,058.42689591

<b>Design</b>	rev4			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	149.35

<b>Plan Survey Tool Program</b>	<b>Date</b>	1/4/2021		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	19,218.43 rev4 (Original Hole)	MWD MWD - Standard	

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Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Goudy 1S-04HM (K)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1241.00usft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1241.00usft
<b>Site:</b>	Goudy	<b>North Reference:</b>	Grid
<b>Well:</b>	Goudy 1S-04HM (K)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev4		

Plan Sections											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00		
800.00	3.00	95.00	799.86	-0.68	7.82	1.00	1.00	0.00	95.00		
2,702.74	3.00	95.00	2,700.00	-9.36	107.03	0.00	0.00	0.00	0.00		
2,902.74	9.00	95.00	2,898.81	-11.18	127.84	3.00	3.00	0.00	0.00		
3,805.06	31.29	150.16	3,745.77	-224.57	318.27	3.00	2.47	8.11	69.51		
6,567.35	31.29	150.16	6,106.35	-1,468.98	1,031.99	0.00	0.00	0.00	0.00		
6,801.26	50.00	150.08	6,283.04	-1,600.49	1,107.57	8.00	8.00	-0.04	-0.20		
7,191.30	89.00	149.98	6,417.00	-1,910.90	1,286.60	10.00	10.00	-0.02	-0.15		
19,218.43	89.00	149.98	6,626.00	-12,323.45	7,302.16	0.00	0.00	0.00	0.00	Goudy 1S-04HM BHL	



Planning Report - Geographic

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<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1241.00usft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1241.00usft
<b>Site:</b>	Goudy	<b>North Reference:</b>	Grid
<b>Well:</b>	Goudy 1S-04HM (K)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev4		

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
100.00	0.00	0.00	100.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
200.00	0.00	0.00	200.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
300.00	0.00	0.00	300.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
400.00	0.00	0.00	400.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
500.00	0.00	0.00	500.00	0.00	0.00	14,431,031.05	1,688,576.71	39.737050	-80.828687
<b>KOP Begin 1°/100' build</b>									
600.00	1.00	95.00	599.99	-0.08	0.87	14,431,030.97	1,688,577.58	39.737050	-80.828684
700.00	2.00	95.00	699.96	-0.30	3.48	14,431,030.74	1,688,580.19	39.737049	-80.828674
800.00	3.00	95.00	799.86	-0.68	7.82	14,431,030.36	1,688,584.53	39.737048	-80.828659
<b>Begin 3.00° tangent</b>									
900.00	3.00	95.00	899.73	-1.14	13.04	14,431,029.91	1,688,589.74	39.737047	-80.828640
1,000.00	3.00	95.00	999.59	-1.60	18.25	14,431,029.45	1,688,594.96	39.737046	-80.828622
1,100.00	3.00	95.00	1,099.45	-2.05	23.46	14,431,029.00	1,688,600.17	39.737045	-80.828603
1,200.00	3.00	95.00	1,199.31	-2.51	28.68	14,431,028.54	1,688,605.39	39.737043	-80.828585
1,300.00	3.00	95.00	1,299.18	-2.97	33.89	14,431,028.08	1,688,610.60	39.737042	-80.828566
1,400.00	3.00	95.00	1,399.04	-3.42	39.10	14,431,027.63	1,688,615.81	39.737041	-80.828548
1,500.00	3.00	95.00	1,498.90	-3.88	44.32	14,431,027.17	1,688,621.03	39.737039	-80.828529
1,600.00	3.00	95.00	1,598.77	-4.33	49.53	14,431,026.71	1,688,626.24	39.737038	-80.828511
1,700.00	3.00	95.00	1,698.63	-4.79	54.75	14,431,026.26	1,688,631.45	39.737037	-80.828492
1,800.00	3.00	95.00	1,798.49	-5.25	59.96	14,431,025.80	1,688,636.67	39.737036	-80.828473
1,900.00	3.00	95.00	1,898.36	-5.70	65.17	14,431,025.35	1,688,641.88	39.737034	-80.828455
2,000.00	3.00	95.00	1,998.22	-6.16	70.39	14,431,024.89	1,688,647.10	39.737033	-80.828436
2,100.00	3.00	95.00	2,098.08	-6.61	75.60	14,431,024.43	1,688,652.31	39.737032	-80.828418
2,200.00	3.00	95.00	2,197.94	-7.07	80.81	14,431,023.98	1,688,657.52	39.737030	-80.828399
2,300.00	3.00	95.00	2,297.81	-7.53	86.03	14,431,023.52	1,688,662.74	39.737029	-80.828381
2,400.00	3.00	95.00	2,397.67	-7.98	91.24	14,431,023.07	1,688,667.95	39.737028	-80.828362
2,500.00	3.00	95.00	2,497.53	-8.44	96.45	14,431,022.61	1,688,673.16	39.737027	-80.828344
2,600.00	3.00	95.00	2,597.40	-8.89	101.67	14,431,022.15	1,688,678.38	39.737025	-80.828325
2,700.00	3.00	95.00	2,697.26	-9.35	106.88	14,431,021.70	1,688,683.59	39.737024	-80.828307
2,702.74	3.00	95.00	2,700.00	-9.36	107.03	14,431,021.68	1,688,683.73	39.737024	-80.828308
<b>Begin 3°/100' build</b>									
2,800.00	5.92	95.00	2,796.95	-10.02	114.58	14,431,021.03	1,688,691.27	39.737022	-80.828279
2,900.00	8.92	95.00	2,896.10	-11.15	127.42	14,431,019.90	1,688,704.12	39.737019	-80.828234
2,902.74	9.00	95.00	2,898.81	-11.18	127.84	14,431,019.88	1,688,704.55	39.737019	-80.828232
<b>Begin 3°/100' build/turn</b>									
3,000.00	10.38	110.34	2,994.69	-14.89	143.64	14,431,016.15	1,688,720.35	39.737009	-80.828176
3,100.00	12.37	121.79	3,092.74	-23.67	161.20	14,431,007.37	1,688,737.91	39.736984	-80.828113
3,200.00	14.70	129.90	3,189.96	-37.46	180.05	14,430,993.59	1,688,756.76	39.736947	-80.828046
3,300.00	17.24	135.75	3,286.10	-56.22	200.12	14,430,974.83	1,688,776.83	39.736895	-80.827975
3,400.00	19.90	140.11	3,380.89	-79.89	221.38	14,430,951.18	1,688,798.09	39.736830	-80.827900
3,500.00	22.64	143.47	3,474.07	-108.42	243.75	14,430,922.62	1,688,820.46	39.736751	-80.827820
3,600.00	25.44	146.13	3,565.39	-141.73	267.19	14,430,889.32	1,688,843.90	39.736660	-80.827737
3,700.00	28.28	148.29	3,654.60	-179.72	291.61	14,430,851.33	1,688,868.32	39.736555	-80.827651
3,800.00	31.14	150.08	3,741.45	-222.29	316.97	14,430,808.75	1,688,893.68	39.736438	-80.827561
3,805.06	31.29	150.16	3,745.78	-224.57	318.28	14,430,806.48	1,688,894.98	39.736432	-80.827558
<b>Begin 31.29° tangent</b>									
3,900.00	31.29	150.16	3,826.91	-267.34	342.81	14,430,763.71	1,688,919.51	39.736314	-80.827469
4,000.00	31.29	150.16	3,912.37	-312.39	368.64	14,430,718.66	1,688,945.35	39.736190	-80.827378
4,100.00	31.29	150.16	3,997.82	-357.44	394.48	14,430,673.61	1,688,971.19	39.736067	-80.827286
4,200.00	31.29	150.16	4,083.28	-402.49	420.32	14,430,628.56	1,688,997.03	39.735943	-80.827194
4,300.00	31.29	150.16	4,168.74	-447.54	446.16	14,430,583.51	1,689,022.87	39.735819	-80.827103
4,400.00	31.29	150.16	4,254.19	-492.59	471.99	14,430,538.46	1,689,048.70	39.735695	-80.827011
4,500.00	31.29	150.16	4,339.65	-537.64	497.83	14,430,493.41	1,689,074.54	39.735571	-80.826920



Planning Report - Geographic

Database: DB\_Dec2220\_v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia.  
 Site: Goudy  
 Well: Goudy 1S-04HM (K)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Goudy 1S-04HM (K)  
 TVD Reference: GL @ 1241.00usft  
 MD Reference: GL @ 1241.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,600.00	31.29	150.18	4,425.11	-582.69	523.67	14,430,448.36	1,689,100.38	39.735447	-80.826828
4,700.00	31.29	150.16	4,510.56	-627.74	549.51	14,430,403.31	1,689,126.22	39.735323	-80.826736
4,800.00	31.29	150.16	4,596.02	-672.79	575.35	14,430,358.25	1,689,152.05	39.735200	-80.826645
4,900.00	31.29	150.16	4,681.48	-717.84	601.18	14,430,313.21	1,689,177.89	39.735076	-80.826553
5,000.00	31.29	150.16	4,766.93	-762.89	627.02	14,430,268.18	1,689,203.73	39.734952	-80.826462
5,100.00	31.29	150.16	4,852.39	-807.94	652.86	14,430,223.11	1,689,229.57	39.734828	-80.826370
5,200.00	31.29	150.16	4,937.85	-852.99	678.70	14,430,178.06	1,689,255.41	39.734704	-80.826278
5,300.00	31.29	150.16	5,023.31	-898.04	704.54	14,430,133.01	1,689,281.24	39.734580	-80.826187
5,400.00	31.29	150.16	5,108.78	-943.09	730.37	14,430,087.96	1,689,307.08	39.734456	-80.826095
5,500.00	31.29	150.16	5,194.22	-988.14	756.21	14,430,042.91	1,689,332.92	39.734333	-80.826004
5,600.00	31.29	150.16	5,279.68	-1,033.19	782.05	14,429,997.86	1,689,358.76	39.734209	-80.825912
5,700.00	31.29	150.16	5,365.13	-1,078.24	807.89	14,429,952.81	1,689,384.60	39.734085	-80.825820
5,800.00	31.29	150.16	5,450.59	-1,123.29	833.72	14,429,907.76	1,689,410.43	39.733961	-80.825729
5,900.00	31.29	150.16	5,536.05	-1,168.34	859.56	14,429,862.71	1,689,436.27	39.733837	-80.825637
6,000.00	31.29	150.16	5,621.50	-1,213.39	885.40	14,429,817.66	1,689,462.11	39.733713	-80.825546
6,100.00	31.29	150.16	5,706.96	-1,258.44	911.24	14,429,772.61	1,689,487.95	39.733589	-80.825454
6,200.00	31.29	150.16	5,792.42	-1,303.49	937.08	14,429,727.56	1,689,513.78	39.733466	-80.825362
6,300.00	31.29	150.16	5,877.88	-1,348.54	962.91	14,429,682.51	1,689,539.62	39.733342	-80.825271
6,400.00	31.29	150.16	5,963.33	-1,393.59	988.75	14,429,637.46	1,689,565.46	39.733218	-80.825179
6,500.00	31.29	150.16	6,048.79	-1,438.64	1,014.59	14,429,592.41	1,689,591.30	39.733094	-80.825088
6,567.35	31.29	150.16	6,106.35	-1,468.98	1,031.99	14,429,562.07	1,689,606.70	39.733011	-80.825028
<b>Begin 8°/100' build/turn</b>									
6,600.00	33.90	150.15	6,133.85	-1,484.23	1,040.74	14,429,546.81	1,689,617.45	39.732969	-80.824995
6,700.00	41.90	150.11	6,212.70	-1,537.46	1,071.31	14,429,493.59	1,689,648.02	39.732822	-80.824867
6,800.00	49.90	150.08	6,282.23	-1,599.66	1,107.09	14,429,431.39	1,689,683.80	39.732651	-80.824760
6,801.26	50.00	150.08	6,283.04	-1,600.49	1,107.57	14,429,430.56	1,689,684.28	39.732649	-80.824758
<b>Begin 10°/100' build/turn</b>									
6,900.00	59.87	150.05	6,339.70	-1,670.44	1,147.85	14,429,360.60	1,689,724.56	39.732457	-80.824615
7,000.00	69.87	150.02	6,382.10	-1,748.78	1,193.01	14,429,282.27	1,689,769.72	39.732241	-80.824455
7,100.00	79.87	150.00	6,408.16	-1,832.29	1,241.20	14,429,188.76	1,689,817.91	39.732012	-80.824284
7,191.30	89.00	149.98	6,417.00	-1,910.90	1,286.60	14,429,120.15	1,689,863.31	39.731796	-80.824123
<b>Begin 89.00° lateral</b>									
7,200.00	89.00	149.98	6,417.15	-1,918.43	1,290.95	14,429,112.62	1,689,867.66	39.731775	-80.824108
7,300.00	89.00	149.98	6,416.69	-2,005.00	1,340.97	14,429,026.04	1,689,917.67	39.731537	-80.823931
7,400.00	89.00	149.98	6,420.63	-2,081.58	1,390.98	14,428,939.47	1,689,967.69	39.731299	-80.823753
7,500.00	89.00	149.96	6,422.37	-2,178.15	1,441.00	14,428,852.89	1,690,017.71	39.731061	-80.823576
7,600.00	89.00	149.98	6,424.10	-2,264.73	1,491.02	14,428,766.32	1,690,067.72	39.730823	-80.823399
7,700.00	89.00	149.96	6,425.84	-2,351.31	1,541.03	14,428,679.74	1,690,117.74	39.730585	-80.823221
7,800.00	89.00	149.98	6,427.58	-2,437.88	1,591.05	14,428,593.17	1,690,167.76	39.730347	-80.823044
7,900.00	89.00	149.98	6,429.32	-2,524.46	1,641.07	14,428,506.59	1,690,217.77	39.730109	-80.822867
8,000.00	89.00	149.98	6,431.05	-2,611.03	1,691.08	14,428,420.02	1,690,267.79	39.729871	-80.822690
8,100.00	89.00	149.98	6,432.79	-2,697.61	1,741.10	14,428,333.44	1,690,317.81	39.729633	-80.822512
8,200.00	89.00	149.98	6,434.53	-2,784.18	1,791.12	14,428,246.86	1,690,367.82	39.729395	-80.822335
8,300.00	89.00	149.98	6,436.27	-2,870.76	1,841.13	14,428,160.29	1,690,417.84	39.729157	-80.822158
8,400.00	89.00	149.98	6,438.00	-2,957.33	1,891.15	14,428,073.71	1,690,467.86	39.728918	-80.821980
8,500.00	89.00	149.98	6,439.74	-3,043.91	1,941.18	14,427,987.14	1,690,517.87	39.728680	-80.821803
8,600.00	89.00	149.98	6,441.48	-3,130.49	1,991.19	14,427,900.56	1,690,567.89	39.728442	-80.821626
8,700.00	89.00	149.98	6,443.22	-3,217.06	2,041.20	14,427,813.99	1,690,617.91	39.728204	-80.821449
8,800.00	89.00	149.98	6,444.96	-3,303.64	2,091.21	14,427,727.41	1,690,667.92	39.727966	-80.821271
8,900.00	89.00	149.98	6,446.69	-3,390.21	2,141.23	14,427,640.84	1,690,717.94	39.727728	-80.821094
9,000.00	89.00	149.98	6,448.43	-3,476.79	2,191.25	14,427,554.26	1,690,767.96	39.727490	-80.820917
9,100.00	89.00	149.98	6,450.17	-3,563.36	2,241.26	14,427,467.69	1,690,817.97	39.727252	-80.820740
9,200.00	89.00	149.98	6,451.91	-3,649.94	2,291.28	14,427,381.11	1,690,867.99	39.727014	-80.820562
9,300.00	89.00	149.98	6,453.64	-3,736.51	2,341.30	14,427,294.53	1,690,918.01	39.726776	-80.820385



Planning Report - Geographic

Database: DB\_Dec2220\_v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia  
 Site: Goudy  
 Well: Goudy 1S-04HM (K)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Goudy 1S-04HM (K)  
 TVD Reference: GL @ 1241.00usft  
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 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

WV Department of  
 Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,400.00	89.00	149.98	6,455.38	-3,823.08	2,391.31	14,427,207.96	1,690,968.02	39.725538	-80.820208
8,500.00	89.00	149.98	6,457.12	-3,909.67	2,441.33	14,427,121.38	1,691,018.04	39.726300	-80.820030
8,600.00	89.00	149.98	6,458.86	-3,896.24	2,491.35	14,427,034.81	1,691,068.06	39.726062	-80.819853
8,700.00	89.00	149.98	6,460.60	-4,082.82	2,541.36	14,426,948.23	1,691,118.07	39.725824	-80.819676
8,800.00	89.00	149.98	6,462.33	-4,169.39	2,591.38	14,426,861.66	1,691,168.09	39.725586	-80.819499
8,900.00	89.00	149.98	6,464.07	-4,255.97	2,641.40	14,426,775.08	1,691,218.11	39.725348	-80.819321
9,000.00	89.00	149.98	6,465.81	-4,342.54	2,691.41	14,426,688.51	1,691,268.12	39.725110	-80.819144
10,100.00	89.00	149.98	6,467.55	-4,429.12	2,741.43	14,426,601.93	1,691,318.14	39.724872	-80.818967
10,200.00	89.00	149.98	6,469.28	-4,515.69	2,791.45	14,426,515.35	1,691,368.16	39.724634	-80.818790
10,300.00	89.00	149.98	6,471.02	-4,602.27	2,841.46	14,426,428.78	1,691,418.17	39.724396	-80.818612
10,400.00	89.00	149.98	6,472.76	-4,688.84	2,891.48	14,426,342.20	1,691,468.19	39.724158	-80.818435
10,500.00	89.00	149.98	6,474.50	-4,775.42	2,941.50	14,426,255.63	1,691,518.21	39.723920	-80.818258
10,600.00	89.00	149.98	6,476.23	-4,862.00	2,991.51	14,426,169.05	1,691,568.22	39.723682	-80.818081
10,700.00	89.00	149.98	6,477.97	-4,948.57	3,041.53	14,426,082.48	1,691,618.24	39.723444	-80.817903
10,800.00	89.00	149.98	6,479.71	-5,035.15	3,091.55	14,425,995.90	1,691,668.26	39.723206	-80.817726
10,900.00	89.00	149.98	6,481.45	-5,121.72	3,141.56	14,425,909.33	1,691,718.27	39.722967	-80.817549
11,000.00	89.00	149.98	6,483.19	-5,208.30	3,191.58	14,425,822.75	1,691,768.29	39.722729	-80.817371
11,100.00	89.00	149.98	6,484.92	-5,294.87	3,241.60	14,425,736.17	1,691,818.31	39.722491	-80.817194
11,200.00	89.00	149.98	6,486.66	-5,381.45	3,291.61	14,425,649.60	1,691,868.32	39.722253	-80.817017
11,300.00	89.00	149.98	6,488.40	-5,468.02	3,341.63	14,425,563.02	1,691,918.34	39.722015	-80.816840
11,400.00	89.00	149.98	6,490.14	-5,554.60	3,391.65	14,425,476.45	1,691,968.35	39.721777	-80.816662
11,500.00	89.00	149.98	6,491.87	-5,641.18	3,441.66	14,425,389.87	1,692,018.37	39.721539	-80.816485
11,600.00	89.00	149.98	6,493.61	-5,727.75	3,491.68	14,425,303.30	1,692,068.39	39.721301	-80.816308
11,700.00	89.00	149.98	6,495.35	-5,814.33	3,541.70	14,425,216.72	1,692,118.40	39.721063	-80.816131
11,800.00	89.00	149.98	6,497.09	-5,900.90	3,591.71	14,425,130.15	1,692,168.42	39.720825	-80.815954
11,900.00	89.00	149.98	6,498.83	-5,987.48	3,641.73	14,425,043.57	1,692,218.44	39.720587	-80.815776
12,000.00	89.00	149.98	6,500.56	-6,074.05	3,691.75	14,424,957.00	1,692,268.45	39.720349	-80.815599
12,100.00	89.00	149.98	6,502.30	-6,160.63	3,741.76	14,424,870.42	1,692,318.47	39.720111	-80.815422
12,200.00	89.00	149.98	6,504.04	-6,247.20	3,791.78	14,424,783.84	1,692,368.49	39.719873	-80.815245
12,300.00	89.00	149.98	6,505.78	-6,333.78	3,841.80	14,424,697.27	1,692,418.50	39.719635	-80.815067
12,400.00	89.00	149.98	6,507.51	-6,420.36	3,891.81	14,424,610.69	1,692,468.52	39.719397	-80.814890
12,500.00	89.00	149.98	6,509.25	-6,506.93	3,941.83	14,424,524.12	1,692,518.54	39.719159	-80.814713
12,600.00	89.00	149.98	6,510.99	-6,593.51	3,991.85	14,424,437.54	1,692,568.55	39.718921	-80.814536
12,700.00	89.00	149.98	6,512.73	-6,680.08	4,041.86	14,424,350.97	1,692,618.57	39.718683	-80.814358
12,800.00	89.00	149.98	6,514.46	-6,766.66	4,091.88	14,424,264.39	1,692,668.59	39.718445	-80.814181
12,900.00	89.00	149.98	6,516.20	-6,853.23	4,141.90	14,424,177.82	1,692,718.60	39.718207	-80.814004
13,000.00	89.00	149.98	6,517.94	-6,939.81	4,191.91	14,424,091.24	1,692,768.62	39.717969	-80.813827
13,100.00	89.00	149.98	6,519.68	-7,026.38	4,241.93	14,424,004.66	1,692,818.64	39.717730	-80.813649
13,200.00	89.00	149.98	6,521.42	-7,112.96	4,291.94	14,423,918.09	1,692,868.65	39.717492	-80.813472
13,300.00	89.00	149.98	6,523.15	-7,199.53	4,341.96	14,423,831.51	1,692,918.67	39.717254	-80.813295
13,400.00	89.00	149.98	6,524.89	-7,286.11	4,391.98	14,423,744.94	1,692,968.69	39.717016	-80.813118
13,500.00	89.00	149.98	6,526.63	-7,372.69	4,441.99	14,423,658.36	1,693,018.70	39.716778	-80.812941
13,600.00	89.00	149.98	6,528.37	-7,459.26	4,492.01	14,423,571.79	1,693,068.72	39.716540	-80.812763
13,700.00	89.00	149.98	6,530.10	-7,545.84	4,542.03	14,423,485.21	1,693,118.74	39.716302	-80.812586
13,800.00	89.00	149.98	6,531.84	-7,632.41	4,592.04	14,423,398.64	1,693,168.75	39.716064	-80.812409
13,900.00	89.00	149.98	6,533.58	-7,718.99	4,642.06	14,423,312.06	1,693,218.77	39.715826	-80.812232
14,000.00	89.00	149.98	6,535.32	-7,805.56	4,692.08	14,423,225.48	1,693,268.79	39.715588	-80.812054
14,100.00	89.00	149.98	6,537.06	-7,892.14	4,742.09	14,423,138.91	1,693,318.80	39.715350	-80.811877
14,200.00	89.00	149.98	6,538.79	-7,978.71	4,792.11	14,423,052.33	1,693,368.82	39.715112	-80.811700
14,300.00	89.00	149.98	6,540.53	-8,065.29	4,842.13	14,422,965.76	1,693,418.84	39.714874	-80.811523
14,400.00	89.00	149.98	6,542.27	-8,151.87	4,892.14	14,422,879.18	1,693,468.85	39.714636	-80.811346
14,500.00	89.00	149.98	6,544.01	-8,238.44	4,942.16	14,422,792.61	1,693,518.87	39.714398	-80.811168
14,600.00	89.00	149.98	6,545.74	-8,325.02	4,992.18	14,422,706.03	1,693,568.89	39.714160	-80.810991
14,700.00	89.00	149.98	6,547.48	-8,411.59	5,042.19	14,422,619.46	1,693,618.90	39.713922	-80.810814
14,800.00	89.00	149.98	6,549.22	-8,498.17	5,092.21	14,422,532.88	1,693,668.92	39.713684	-80.810637



Planning Report - Geographic

Database: DB\_Dec2220\_v16  
 Company: Tug Hill Operating LLC  
 Project: Marshall County, West Virginia.  
 Site: Goudy  
 Well: Goudy 1S-04HM (K)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Goudy 1S-04HM (K)  
 TVD Reference: GL @ 1241.00usft  
 MD Reference: GL @ 1241.00usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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 FEB 25 2021  
 WV Department of  
 Environmental Protection

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,900.00	89.00	149.98	6,550.96	-8,584.74	5,142.23	14,422,446.30	1,893,718.94	39.713446	-80.810460
15,000.00	89.00	149.98	6,552.70	-8,671.32	5,192.24	14,422,359.73	1,893,768.95	39.713207	-80.810282
15,100.00	89.00	149.98	6,554.43	-8,757.89	5,242.26	14,422,273.15	1,893,818.97	39.712969	-80.810105
15,200.00	89.00	149.98	6,556.17	-8,844.47	5,292.28	14,422,186.58	1,893,868.99	39.712731	-80.809928
15,300.00	89.00	149.98	6,557.91	-8,931.05	5,342.29	14,422,100.00	1,893,919.00	39.712493	-80.809751
15,400.00	89.00	149.98	6,559.65	-9,017.62	5,392.31	14,422,013.43	1,893,969.02	39.712255	-80.809574
15,500.00	89.00	149.98	6,561.38	-9,104.20	5,442.33	14,421,926.85	1,894,019.04	39.712017	-80.809396
15,600.00	89.00	149.98	6,563.12	-9,190.77	5,492.34	14,421,840.28	1,894,069.05	39.711779	-80.809219
15,700.00	89.00	149.98	6,564.86	-9,277.35	5,542.36	14,421,753.70	1,894,119.07	39.711541	-80.809042
15,800.00	89.00	149.98	6,566.60	-9,363.92	5,592.38	14,421,667.13	1,894,169.09	39.711303	-80.808865
15,900.00	89.00	149.98	6,568.33	-9,450.50	5,642.39	14,421,580.55	1,894,219.10	39.711065	-80.808688
16,000.00	89.00	149.98	6,570.07	-9,537.07	5,692.41	14,421,493.97	1,894,269.12	39.710827	-80.808510
16,100.00	89.00	149.98	6,571.81	-9,623.65	5,742.43	14,421,407.40	1,894,319.13	39.710589	-80.808333
16,200.00	89.00	149.98	6,573.55	-9,710.23	5,792.44	14,421,320.82	1,894,369.15	39.710351	-80.808156
16,300.00	89.00	149.98	6,575.29	-9,796.80	5,842.46	14,421,234.25	1,894,419.17	39.710113	-80.807979
16,400.00	89.00	149.98	6,577.02	-9,883.38	5,892.48	14,421,147.67	1,894,469.18	39.709875	-80.807802
16,500.00	89.00	149.98	6,578.76	-9,969.95	5,942.49	14,421,061.10	1,894,519.20	39.709637	-80.807624
16,600.00	89.00	149.98	6,580.50	-10,056.53	5,992.51	14,420,974.52	1,894,569.22	39.709399	-80.807447
16,700.00	89.00	149.98	6,582.24	-10,143.10	6,042.53	14,420,887.95	1,894,619.23	39.709161	-80.807270
16,800.00	89.00	149.98	6,583.97	-10,229.68	6,092.54	14,420,801.37	1,894,669.25	39.708922	-80.807093
16,900.00	89.00	149.98	6,585.71	-10,316.25	6,142.56	14,420,714.79	1,894,719.27	39.708684	-80.806916
17,000.00	89.00	149.98	6,587.45	-10,402.83	6,192.58	14,420,628.22	1,894,769.28	39.708446	-80.806739
17,100.00	89.00	149.98	6,589.19	-10,489.40	6,242.59	14,420,541.64	1,894,819.30	39.708208	-80.806561
17,200.00	89.00	149.98	6,590.93	-10,575.98	6,292.61	14,420,455.07	1,894,869.32	39.707970	-80.806384
17,300.00	89.00	149.98	6,592.66	-10,662.56	6,342.63	14,420,368.49	1,894,919.33	39.707732	-80.806207
17,400.00	89.00	149.98	6,594.40	-10,749.13	6,392.64	14,420,281.92	1,894,969.35	39.707494	-80.806030
17,500.00	89.00	149.98	6,596.14	-10,835.71	6,442.66	14,420,195.34	1,895,019.37	39.707256	-80.805853
17,600.00	89.00	149.98	6,597.88	-10,922.28	6,492.68	14,420,108.77	1,895,069.38	39.707018	-80.805675
17,700.00	89.00	149.98	6,599.61	-11,008.86	6,542.69	14,420,022.19	1,895,119.40	39.706780	-80.805498
17,800.00	89.00	149.98	6,601.35	-11,095.43	6,592.71	14,419,935.61	1,895,169.42	39.706542	-80.805321
17,900.00	89.00	149.98	6,603.09	-11,182.01	6,642.72	14,419,849.04	1,895,219.43	39.706304	-80.805144
18,000.00	89.00	149.98	6,604.83	-11,268.58	6,692.74	14,419,762.46	1,895,269.45	39.706066	-80.804967
18,100.00	89.00	149.98	6,606.56	-11,355.16	6,742.76	14,419,675.89	1,895,319.47	39.705828	-80.804790
18,200.00	89.00	149.98	6,608.30	-11,441.74	6,792.77	14,419,589.31	1,895,369.48	39.705590	-80.804612
18,300.00	89.00	149.98	6,610.04	-11,528.31	6,842.79	14,419,502.74	1,895,419.50	39.705352	-80.804435
18,400.00	89.00	149.98	6,611.78	-11,614.89	6,892.81	14,419,416.16	1,895,469.52	39.705113	-80.804258
18,500.00	89.00	149.98	6,613.52	-11,701.46	6,942.82	14,419,329.59	1,895,519.53	39.704875	-80.804081
18,600.00	89.00	149.98	6,615.25	-11,788.04	6,992.84	14,419,243.01	1,895,569.55	39.704637	-80.803904
18,700.00	89.00	149.98	6,616.99	-11,874.61	7,042.86	14,419,156.44	1,895,619.57	39.704399	-80.803727
18,800.00	89.00	149.98	6,618.73	-11,961.19	7,092.87	14,419,069.86	1,895,669.58	39.704161	-80.803549
18,900.00	89.00	149.98	6,620.47	-12,047.76	7,142.89	14,418,983.28	1,895,719.60	39.703923	-80.803372
19,000.00	89.00	149.98	6,622.20	-12,134.34	7,192.91	14,418,896.71	1,895,769.62	39.703685	-80.803195
19,100.00	89.00	149.98	6,623.94	-12,220.92	7,242.92	14,418,810.13	1,895,819.63	39.703447	-80.803018
19,200.00	89.00	149.98	6,625.68	-12,307.49	7,292.94	14,418,723.56	1,895,869.65	39.703209	-80.802841
19,218.42	89.00	149.98	6,626.00	-12,323.44	7,302.15	14,418,707.61	1,895,878.86	39.703165	-80.802808
<b>PBHL/TD 19218.42 MD /6626.00 TVD</b>									
19,218.43	89.00	149.98	6,626.00	-12,323.45	7,302.16	14,418,707.60	1,895,878.87	39.703165	-80.802808



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Goudy 1S-04HM (K)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1241.00usft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1241.00usft
<b>Site:</b>	Goudy	<b>North Reference:</b>	Grid
<b>Well:</b>	Goudy 1S-04HM (K)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev4		

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FEB 25 2021

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Goudy 1S-04HM LP - plan hits target center - Point	0.00	0.00	6,417.00	-1,910.87	1,286.58	14,429,120.16	1,689,863.29	39.731796	-80.824123
Goudy 1S-04HM BHL r4 - plan hits target center - Point	0.00	0.00	6,626.00	-12,323.45	7,302.16	14,418,707.60	1,695,878.87	39.703165	-80.802808

WV Department of  
Environmental Protection

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,000.41	1,000.00	13 3/8" Casing	13-3/8	17
2,602.81	2,600.00	9 5/8" Casing	9-5/8	12-1/4

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.00	500.00	0.00	0.00	KOP Begin 1°/100' build
800.00	799.86	-0.68	7.82	Begin 3.00° tangent
2,702.74	2,700.00	-9.36	107.03	Begin 3°/100' build
2,902.74	2,898.81	-11.18	127.84	Begin 3°/100' build/turn
3,805.06	3,745.78	-224.57	318.28	Begin 31.29° tangent
6,567.35	6,106.35	-1,468.98	1,031.99	Begin 8°/100' build/turn
6,801.26	6,283.04	-1,600.49	1,107.57	Begin 10°/100' build/turn
7,191.30	6,417.00	-1,910.90	1,286.60	Begin 89.00° lateral
19,218.42	6,626.00	-12,323.44	7,302.15	PBHL/TD 19218.42 MD /6626.00 TVD



# Well Site Safety Plan

## Tug Hill Operating, LLC

*Bary Shilly*  
1-14-21

Well Name: Goudy 1S-4HM

Pad Location: Goudy Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,398,587.06

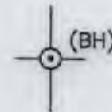
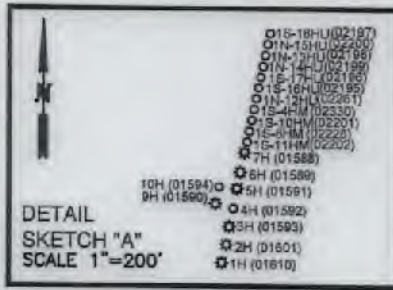
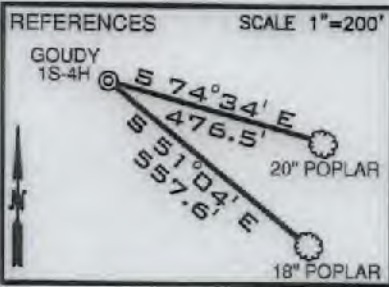
Easting: 514,679.21

January 2021

03/26/2021

**GOUDY LEASE  
WELL 1S-4HM  
818.9883± ACRES**

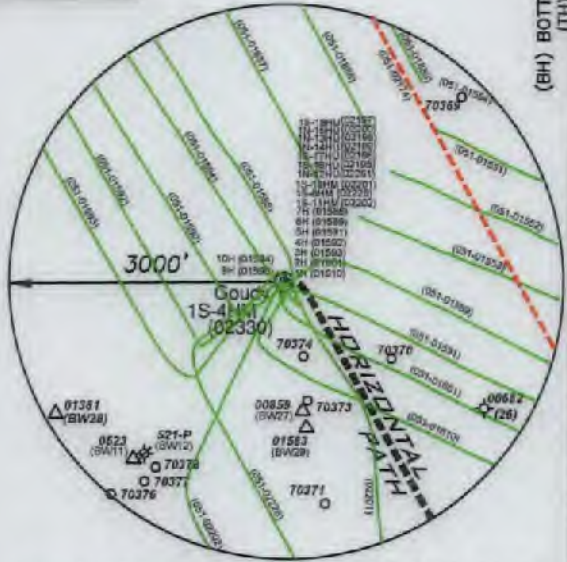
TOP HOLE LATITUDE: 39°45'00"  
BOTTOM HOLE LATITUDE: 39°42'30"



(BH) BOTTOM HOLE LONGITUDE: 80°47'30"  
(TH) TOP HOLE LONGITUDE: 80°47'30"

GRID NORTH

Detail "A" SCALE 1"=1000'



Detail "B" N.T.S.



(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

<b>SURFACE HOLE</b>
UTM. NAD83, ZONE 17 IN METERS
N) 4,398,587.06
E) 514,679.21
<b>LANDING POINT 1</b>
UTM. NAD83, ZONE 17 IN METERS
N) 4,398,004.62
E) 515,071.37
<b>BOTTOM HOLE</b>
UTM. NAD83, ZONE 17 IN METERS
N) 4,394,830.87
E) 516,904.91

- NOTES**
- SCORE PATH BASED ON GRID NORTH.
  - NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 525' OF PAD CENTER WERE FOUND.
  - OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN AUGUST, 2020. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
  - WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
  - BOUNDARIES ALONG ROADWAYS ARE BASED UPON MEMORANDUM BY DICKIE, MCCAMEY & CHILCOTE, P.C. FILE 0088304.0401147

LINE	BEARING	DISTANCE
L1	N 12°01' W	2266.53'
L2	S 52°10' E	1761.68'
L3	S 84°03' E	127.94'
L4	S 28°55' E	1740.06'

**LEGEND**

- LEASED TRACTS
- - - SURFACE TRACTS
- WELL LATERAL
- POINT PLEASANT LEGS
- MARCELLUS LEGS
- UNIT BOUNDARY

(A) LEASE # (SEE 6A1 FORM)

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	S 62°29' E	58.86'	107.86'	58.52'
C2	S 38°58' E	155.94'	508.13'	136.35'
C3	S 29°28' E	302.60'	4613.47'	302.55'

FILE NUMBER \_\_\_\_\_

DRAWING NUMBER GOUDY 1S-4HM REV 4

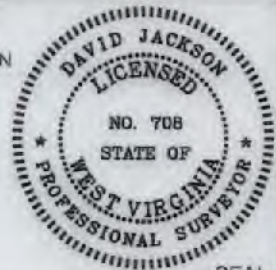
SCALE 1" = 2000'

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

*David L Jackson*



JACKSON SURVEYING INC.  
P.O. Box 1460  
Clarksburg, WV 25302  
304-623-5351

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

DATE: MARCH 25, 2019

REVISED: FEBRUARY 02, 2021

OPERATORS WELL NO. GOUDY 1S-4HM  
API WELL NO. \_\_\_\_\_

47-051-02330  
STATE COUNTY PERMIT

WELL TYPE: OIL \_\_\_ GAS \_\_\_ LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_  
(IF "GAS") PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X

LOCATION ELEVATION 1,242.00' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER SEE WW-6A1 FORM

SURFACE OWNER TH EXPLORATION III, LLC. ACREAGE 70.0

OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC., ET AL THEIR SUCCESSORS OR ASSIGNS LEASE ACREAGE 70.0

PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_  
PERFORATE NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,540' TMD: 19,218'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER  
1320 SOUTH UNIVERSITY DRIVE, SUITE 500 CT CORPORATION SYSTEM  
ADDRESS FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD  
CHARLESTON, WV 25313

COUNTY NAME PERMIT

03/26/2021



form. wv0

# GOUDY LEASE WELL 1S-4HM 818.9883± ACRES



P.S. 708 *David L Jackson*

Scale  
1" = 2000'

03/26/2021

	OPERATOR'S	WELL PLAT
	WELL #: <u>Goudy 1S-4HM</u>	PAGE 2 OF 4
	DISTRICT: <u>Franklin</u>	DATE: <u>03/25/19</u>
	COUNTY: <u>Marshall</u>	REVISED: <u>02/02/2021</u>
	STATE: <u>WV</u>	
API # <u>47-051-02330</u>		

form web

PG 3 OF 4 **GOUDY LEASE**  
**WELL 1S-4HM**  
**818.9883± ACRES**

Number	TAX MAP -PARCEL	SURFACE OWNER	ACRES
S1	C 05-28-12	TH Exploration III, LLC	20.226
S2	D 05-28-11	Carol A. Martin	24.681
S3	E 05-27-19	Covestro, LLC	33.786
S4	F 05-27-20	Covestro LLC	93.027
S5	G 05-27-20.1	Appalachian Power Co.	43.973
S6	H 05-27-27	James Andrew & Karen Lynna Richmond	8.9353
S7	J 05-27-25	James Andrew & Karen Lynna Richmond	41.35
S8	12-01-31	Steven Jack & Susan Louise Hafer	20.0
S9	12-01-29	Baxter Farm, LLC	2.0
S10	O 12-01-28	Steven J. & Susan L. Hafer	88.39
S11	12-01-7.1	Harry Wayman Estate	2.0
S12	K 12-01-04	Robert F. Rothlisberger	6.0
S13	12-01-03	Charles D. & Edith Feenerty Harrison	7.8
S14	12-01-02	James Andrew & Karen L. Richmond	2.7
S15	L 12-01-05	Irvin L. Hoyt, Jr. & David L. Hoyt	36.8
S16	12-01-06	Mona Parsons, et al	52.75
S17	12-01-16	Vivian A. Parsons, et al	5.125
S18	12-01-01	Covestro, LLC	135.0
S19	12-01-1.7	Colombia Gas Transmission, Corp.	0.15
S20	12-23-15	Donna Jo Cain	0.70
S21	12-23-15.1	Robert F. Rothlisberger	0.47
S22	12-23-13	Donna Jo Cain	0.38
S23	05-27-27.2	Donna Jo. Cain	0.1767
S24	05-27-27.1	Donald P. Cain	1.645
S25	05-27-27.3	Donna Jo. Cain	1.018
S26	05-27-28	Covestro, LLC	8.0
S27	12-23-12	Donna Jo Cain	0.37
S28	12-23-11	Covestro, LLC	1.25
S29	12-23-10	Covestro, LLC	1.28
S30	12-23-05	Covestro, LLC	3.69
S31	05-27-40	Covestro, LLC	3.36
S32	12-23-06	Covestro, LLC	0.34
S33	12-27-44	Covestro, LLC	0.21
S34	05-27-43	Covestro, LLC	0.63
S35	05-27-42	Covestro, LLC	0.52
S36	05-27-42.1	Covestro, LLC	0.52
S37	05-27-41	Martha Jean Arrick	0.99
S38	05-27-31.2	Appalachian Power Co.	3.33
S39	05-27-31	Covestro, LLC	16.1
S40	05-27-30	Covestro, LLC	0.371
S41	05-27-31.1	Covestro, LLC	3.0
S42	05-27-32.2	Covestro, LLC	3.95
S43	05-27-29	Covestro, LLC	9.0
S44	05-27-45	Covestro, LLC	0.3627
S45	05-27-32	Covestro, LLC	33.53
S46	05-27-03	Covestro, LLC	1.27
S47	05-27-04	Covestro, LLC	2.52
S48	05-27-05	Covestro, LLC	2.52
S49	05-27-06	Covestro, LLC	2.52
S50	05-27-07	Covestro, LLC	2.52
S51	05-27-08	Covestro, LLC	2.52
S52	05-27-09	Covestro, LLC	1.87
S53	05-27-10	Covestro, LLC	0.52
S54	05-27-12	Covestro, LLC	1.0
S55	05-27-13	Covestro, LLC	0.34
S56	05-27-14	Covestro, LLC	0.25
S57	05-27-15	Covestro, LLC	0.47
S58	05-27-16	Covestro, LLC	0.23
S59	05-27-18	Covestro, LLC	0.97
S60	05-27-17	Covestro, LLC	0.88
S61	05-27-19.3	Cemetery	2.0
S62	05-27-02	Covestro, LLC	28.099
S63	05-27-19.2	Wheeling Electric Co.	0.75
S64	05-28-12.2	Covestro, LLC	3.1
S65	05-28-12.3	Covestro, LLC	18.784
S66	05-28-13.1	Air Products & Chemicals, Inc	5.522
S67	05-27-19.1	Covestro, LLC	21.267
S68	05-27-11	Covestro, LLC	0.03
S69	A 05-28-13	TH Exploration III, LLC	70.0
S70	05-28-13.2	Covestro, LLC	11.02
S71	05-28-1.1	Covestro, LLC	5.2217
S72	12-23-14	Robert E. Rothlisberger	0.27
S73	05-21-3.1	Eagle Natrium, LLC	98.613
S74	12-01-19	Steven J. & Susan L. Hafer	36.5
S75	12-01-27	Steven J. & Susan L. Hafer	83.69
S76	12-01-18	Travis Darrell Blake & Angela Dawn Mitchell	48.4



P.S. 708 *David L Jackson*

03/26/2021



**TUG HILL**  
**OPERATING**

OPERATOR'S  
 WELL #: Goudy 1S-4HM  
 DISTRICT: Franklin  
 COUNTY: Marshall  
 STATE: WV  
 API # 47-051-02330

**WELL PLAT**  
**PAGE 3 OF 4**  
 DATE: 03/25/19  
 REVISED: 2/02/2021

PG 4 OF 4 **GOUDY LEASE**  
**WELL 1S-4HM**  
**818.9883± ACRES**

Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S98	12-06-16	Brock T. & Emma J. Conners	27.0
S99	12-6A-01	Ronald E. McCoy	6.51
S100	12-06-05	Steven & Susan Louis Hafer	9.0
S101	12-06-04	Steven & Susan Hafer	6.5
S102	12-01-27	Steven J. & Susan Hafer	83.69
S103	12-01-26	William Joseph Blake	13.83
S104	12-01-25	Jack R. & Linda S. Blake	17.42
S105	12-01-15.3	Daniel L. & Vickie L. Williams	7.0
S106	12-01-1.1	W.V. D.O.H	10.59
S107	12-01-15.2	Michael Goddard	1.09
S108	12-01-15.1	Marshall & Tara Cecil (L/C), Roy Yoho	1.46
S109	12-01-22	William D. Glover	18.84
S110	12-01-23.2	Raymond L. Pribble	0.782
S111	12-01-23	Raymond L. Pribble	1.55
S112	12-01-23.1	RHL Properties, LLC	34.17
S113	12-01-25.1	Timothy Q. & Ronda K. Bohrer	1.2
S114	12-01-24	Mitzilou Cecil, Trustee of the Tiger Cecil Irrevocable	0.85
S115	12-06-02	Brock T. Conner	23.83
S116	12-06-49	Kirkland Enterprises, LLC.	10.32
S117	12-06-51	Steven & Susan Hafer	0.599
S118	12-06-48	Ronald E. & Susan L. McCoy	0.36
S119	05-27-39	Covestro, LLC	3.74
S120	12-23-04	Pittsburgh Plate Glass Corp.	2.41
S121	12-23-09	Covestro, LLC	3.95
S122	12-23-08	Dora N. Moore Hrs., Et al	6.95
S123	12-01-1.5	United States of America	7.14
S124	12-23-02	Covestro, LLC	1.27
S125	12-23-03	Covestro, LLC	4.67
S126	12-27-38	Covestro, LLC	2.72
S127	12-27-37	Covestro, LLC	3.20
S128	12-27-35	Covestro, LLC	1.79
S129	12-27-34	Covestro, LLC	1.91
S130	12-27-36	Covestro, LLC	1.58
S131	12-27-33	Covestro, LLC	1.95
S137	12-01-1.2	West Virginia Dept. of Transportation	0.27
S138	12-22-59	Kenneth R. Morris	2.00
S139	12-22-60	Franklin W. & Barbara J. Cogar	0.5
S140	12-22-09	M.B. Investment	0.20
S141	12-22-10	M.B. Investment	0.24
S142	12-22-12	Jack Ray & Linda S. Blake	0.16
S143	12-22-13	Dewayne E. & Patricia A. Yost	0.07
S144	12-22-28	Kenneth R. Morris	0.12
S145	12-22-29	Jack R. & Linda S. Blake	0.50
S146	12-22-30	Jack R. & Linda S. Blake	0.24
S147	12-22-32	Ren Realty, LLC.	0.27
S148	12-22-33	Ren Realty, LLC.	0.08
S149	12-22-34	Ren Realty, LLC.	0.08
S150	12-22-51	Eric R. & Debra S. Sims	0.10
S151	12-22-52	Eric R. & Debra S. Sims	0.10
S152	12-22-53	Eric R. & Debra S. Sims	0.10
S153	12-22-54	Eric R. & Debra S. Sims	0.10
S154	12-22-55	Eric R. & Debra S. Sims	0.19
S155	12-22-56	Michael L. & Joyce D. Durig	0.22
S156	12-22-57	Michael L. & Joyce D. Durig	0.11
S157	12-22-58	Michael L. & Joyce D. Durig	0.15
S158	12-22-50	Michael L. & Joyce D. Durig	0.17
S159	12-22-49	Daniel J. Stillwagoner	0.13
S160	12-22-62	Virginia Bohrer, et al	0.05
S161	12-22-62.1	John R. & Toni Wright	0.314
S162	12-22-44	John R. & Toni Wright	0.52
S163	12-01-1.9	Grandview Doolin Public Service District	0.13
S164	12-22-27	Grandview Doolin Public Service District	0.27
S165	12-01-1.12	United States of America	22.55
S166	12-01-1.8	Grandview Doolin Public Service District	0.0895



P.S. 708

*David L Jackson*

03/26/2021



**TUG HILL**  
**OPERATING**

OPERATOR'S  
 WELL #: Goudy 1S-4HM  
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 COUNTY: Marshall  
 STATE: WV  
 API # 47-051-02330

**WELL PLAT**  
 PAGE 4 OF 4  
 DATE: 03/25/19  
 REVISED: 02/02/2021

**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
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\*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. Morris *Amy L. Morris*  
 Its: Permitting Specialist - Appalachia Region

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14300	5-28-13	A	PPG INDUSTRIES INC	GASTAR EXPLORATION USA INC	1/8+	725 123	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14498	5-28-2	B	BAYER MATERIALSCIENCE LLC	GASTAR EXPLORATION USA INC	1/8+	757 340	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 26/639	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14300	5-28-12	C	PPG INDUSTRIES, INC.	GASTAR EXPLORATION USA INC	1/8+	725 123	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14658	5-28-12	C	THOMAS WILLIAM ABERSOLD	GASTAR EXPLORATION USA INC	1/8+	775 314	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14659	5-28-12	C	JUDITH LEE ABERSOLD	GASTAR EXPLORATION USA INC	1/8+	781 609	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 28/499	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14565	5-28-11	D	HARRY LEE GOUDY	CENTRAL MICHIGAN EXPLORATION LLC	1/8+	670 59	N/A	N/A	N/A	Central Michigan Exploration LLC to Stone Energy Corporation: 21/288 & 21/356	Stone Energy Corporation to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/160	Gastar Exploration USA Inc merged into Gastar Exploration Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14493	5-27-19	E	BETTY JEAN NEELY	GASTAR EXPLORATION USA INC	1/8+	748	468	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14494	5-27-19	E	MARY LOU WILSON	GASTAR EXPLORATION USA INC	1/8+	748	471	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14495	5-27-19	E	PATRICIA HARTMAN	GASTAR EXPLORATION USA INC	1/8+	752	197	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14496	5-27-19	E	STEPHANIE L BATES	GASTAR EXPLORATION USA INC	1/8+	752	215	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14497	5-27-19	E	CAROL DEEN GARDNER	GASTAR EXPLORATION USA INC	1/8+	752	212	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14498	5-27-19	E	BAYER MATERIALSCIENCE LLC	GASTAR EXPLORATION USA INC	1/8+	757	340	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*22926	5-27-19	E	COVESTRO LLC	TH EXPLORATION LLC	1/8+	976	27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14493	5-27-20	F	BETTY JEAN NEELY	GASTAR EXPLORATION USA INC	1/8+	748 468	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14494	5-27-20	F	MARY LOU WILSON	GASTAR EXPLORATION USA INC	1/8+	748 471	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14495	5-27-20	F	PATRICIA HARTMAN	GASTAR EXPLORATION USA INC	1/8+	752 197	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14496	5-27-20	F	STEPHANIE L BATES	GASTAR EXPLORATION USA INC	1/8+	752 215	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14497	5-27-20	F	CAROL DEEN GARDNER	GASTAR EXPLORATION USA INC	1/8+	752 212	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14498	5-27-20	F	BAYER MATERIALSCIENCE LLC	GASTAR EXPLORATION USA INC	1/8+	757 340	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*22926	5-27-20	F	COVESTRO LLC	TH EXPLORATION LLC	1/8+	976 27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14493	5-27-20.1	G	BETTY JEAN NEELY	GASTAR EXPLORATION USA INC	1/8+	748 468	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14494	5-27-20.1	G	MARY LOU WILSON	GASTAR EXPLORATION USA INC	1/8+	748 471	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14495	5-27-20.1	G	PATRICIA HARTMAN	GASTAR EXPLORATION USA INC	1/8+	752 197	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14496	5-27-20.1	G	STEPHANIE L BATES	GASTAR EXPLORATION USA INC	1/8+	752 215	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14497	5-27-20.1	G	CAROL DEEN GARDNER	GASTAR EXPLORATION USA INC	1/8+	752 212	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14499	5-27-20.1	G	UNION CARBIDE CORPORATION	GASTAR EXPLORATION USA INC	1/8+	815 221	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563



Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14505	5-27-27	H	JAMES ANDREW & KAREN RICHMOND	GASTAR EXPLORATION USA INC	1/8+	752 447	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*14498	5-27-26	I	BAYER MATERIALSCIENCE LLC	GASTAR EXPLORATION USA INC	1/8+	757 340	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*22926	5-27-26	I	COVESTRO LLC	TH EXPLORATION LLC	1/8+	976 27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14505	5-27-25	J	JAMES ANDREW & KAREN RICHMOND	GASTAR EXPLORATION USA INC	1/8+	752 447	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*23502	12-1-4	K	ROBERT F ROTHLSBERGER	TH EXPLORATION LLC	1/8+	210A 801	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*15075	12-1-5	L	BARBARA P MAZER AS TRSTEE OF THE BARBARA MAZER TRST UNDER AGMT DTD APR 17 2013	GASTAR EXPLORATION USA INC	1/8+	129A 693	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*15076	12-1-5	L	EDWARD PENNINGTON	GASTAR EXPLORATION USA INC	1/8+	130A 979	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*15079	12-1-5	L	JAMES K. HALL	GASTAR EXPLORATION USA INC	1/8+	132A 704	N/A	N/A	N/A	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 24/332	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc to TH Exploration II LLC: 36/9	Memorandum of Operating Agreement between TH Exploration LLC and Atinum Marcellus I LLC & TH Exploration II LLC: 34/277	Atinum Marcellus I LLC To TH Exploration II, LLC: 43/563
10*18122	12-1-5	L	ANNE L HALL AND RICHARD S WURST	TH EXPLORATION LLC	1/8+	187A 626	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18175	12-1-5	L	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	188A 791	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18177	12-1-5	L	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	188A 793	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18233	12-1-5	L	SUSAN G HALL	TH EXPLORATION LLC	1/8+	188A 429	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18286	12-1-5	L	ELIZABETH H HALL	TH EXPLORATION LLC	1/8+	188A 431	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lease ID	TMP	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19511	12-1-7	M	CORT D ACKER	TH EXPLORATION LLC	1/8+	195A 168	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24538	12-1-7	M	BRC MINERALS, LP	BRC WORKING INTEREST COMPANY LLC	1/8+	103A 320	BRC Working Interest Company LLC to Chesapeake Appalachia LLC: 103A/470	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 120A/109	Chesapeake Appalachia LLC to SWN Production Company: 157A/540	Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC: 158A/801	SWN Exchange Titleholder LLC merged with and into SWN Production Company LLC: 13/296	SWN Production Company LLC to Antero Exchange Properties LLC: 177A/533	Statoil USA Onshore Properties Inc to Antero Exchange Properties LLC: 177A/738	Antero Exchange Properties LLC merged with and into Antero Resources Corporation: 13/311	Antero Resources Corporation to TH Exploration LLC: 218A/755
10*22580	12-1-17	N	JAMES H PARSONS JR	TH EXPLORATION LLC	1/8+	209A 265	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23524	12-1-17	N	HAMMETT LAND & MINERALS LLC	TH EXPLORATION LLC	1/8+	210A 807	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23525	12-1-17	N	HAMMETT LAND & MINERALS LLC	TH EXPLORATION LLC	1/8+	210A 809	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23906	12-1-17	N	JOHN M PARSONS & ANTOINETTE L COSTANTINO	TH EXPLORATION LLC	1/8+	214A 675	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25450	12-1-17	N	MURIEL A MILLER	TH EXPLORATION LLC	1/8+	222A 465	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25644	12-1-17	N	JOHN P SNYDER	TH EXPLORATION LLC	1/8+	222A 434	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*26612	12-1-17	N	DOROTHY J HAAS	TH EXPLORATION LLC	1/8+	224A 549	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24090	12-1-17	N	VIVIAN A PARSONS	TH EXPLORATION LLC	1/8+	216A 371	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24317	12-1-17	N	ROY C PARSONS	TH EXPLORATION LLC	1/8+	218a 480	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21141	12-1-28	O	SHARON S ANDREWS AND GERARD S ANDREWS	TH EXPLORATION LLC	1/8+	200A 443	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21299	12-1-28	O	BOUNTY MINERALS LLC	TH EXPLORATION LLC	1/8+	200A 361	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21366	12-1-28	O	BONNIE BOLDEN	TH EXPLORATION LLC	1/8+	201A 434	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21672	12-1-28	O	VICKIE L BOLDEN	TH EXPLORATION LLC	1/8+	201A 436	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21676	12-1-28	O	CLAUDIA R SCHEEHLE	TH EXPLORATION LLC	1/8+	212A 66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21677	12-1-28	O	SHARON E YOHO	TH EXPLORATION LLC	1/8+	209A 257	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21682	12-1-28	O	CHARLES ROBERT MYERS	TH EXPLORATION LLC	1/8+	219A 268	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21683	12-1-28	O	RICHARD S WHITE II	TH EXPLORATION LLC	1/8+	210a 173	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21684	12-1-28	O	SHIRLEY DORSEY	TH EXPLORATION LLC	1/8+	201A 430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21692	12-1-28	O	GREGG D MINOR	TH EXPLORATION LLC	1/8+	201a 421	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21697	12-1-28	O	CONNIE SIMS	TH EXPLORATION LLC	1/8+	214A 364	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21699	12-1-28	O	PATRICIA M LEOHR	TH EXPLORATION LLC	1/8+	212A 35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21700	12-1-28	O	NANCY SELLERS	TH EXPLORATION LLC	1/8+	213A 408	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22067	12-1-28	O	SHIRLEY K WHITE	TH EXPLORATION LLC	1/8+	212A 38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22069	12-1-28	O	RUTH ANN SHINGLETON	TH EXPLORATION LLC	1/8+	210A 170	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22071	12-1-28	O	SALLY BROKKEN AND TOM BROKKEN	TH EXPLORATION LLC	1/8+	202A 820	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22072	12-1-28	O	HAROLD E SELLERS	TH EXPLORATION LLC	1/8+	213A 682	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22204	12-1-28	O	JAMES A MAIBACH & MELISSA F MAIBACH	TH EXPLORATION LLC	1/8+	216A 169	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22211	12-1-28	O	DENVER J MINOR GREGG D MINOR TRUSTEE	TH EXPLORATION LLC	1/8+	202A 798	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22218	12-1-28	O	SANDRA L SCHAFER	TH EXPLORATION LLC	1/8+	202A 788	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22231	12-1-28	O	MARILYN SLATER	TH EXPLORATION LLC	1/8+	204A 144	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23344	12-1-28	O	JEFFREY S MAIBACH	TH EXPLORATION LLC	1/8+	214A 678	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23346	12-1-28	O	EMILY B MORRIS	TH EXPLORATION LLC	1/8+	214A 682	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23442	12-1-28	O	FTC LLC	TH EXPLORATION LLC	1/8+	212A 43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23443	12-1-28	O	LOST RIVER TRADING COMPANY LLC	TH EXPLORATION LLC	1/8+	212A 45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23445	12-1-28	O	ARBOR MINERAL COMPANY LLC	TH EXPLORATION LLC	1/8+	212A 41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24021	12-1-28	O	KELLI PAGE MARTI	TH EXPLORATION LLC	1/8+	215A 884	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24081	12-1-28	O	DON MATTHEW PAGE	TH EXPLORATION LLC	1/8+	216A 401	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24318	12-1-28	O	LORI PAGE ESBORN AND MICHAEL ESBORN	TH EXPLORATION LLC	1/8+	217A 164	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24356	12-1-28	O	BEATRICE TORRES	TH EXPLORATION LLC	1/8+	218A 179	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23038	12-1-28	O	SHIRLEY JANE MILLIKEN	TH EXPLORATION LLC	1/8+	220A 280	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23044	12-1-28	O	DONNA R WOLFE AND DWIGHT WOLFE	TH EXPLORATION LLC	1/8+	204A 160	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25516	12-1-28	O	GOLDEN EAGLE RESOURCES II LLC	AMERICAN PETROLEUM PARTNERS LLC	1/8+	215A 250	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	American Petroleum Partners LLC to TH Exploration LLC: 224A/459
10*26681	12-1-28	O	DENVER J MINOR GREGG D MINOR TRUSTEE	TH EXPLORATION LLC	1/8+	225A 495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22081	12-1-28	O	ROBERT J WITTMAN FIVE STAR RESOURCES	TH EXPLORATION LLC	1/8+	202A 816	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A