

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

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SEP 11 2018

WV Department of
Environmental Protection

API 47-051-01921 County Marshall District Franklin
Quad Powhatan Point 7.5' Pad Name Yoder Field/Pool Name _____
Farm name Nathan D. Yoder, et al Well Number Yoder E-5HM
Operator (as registered with the OOG) Tug Hill Operating, LLC
Address 380 Southpointe Boulevard, Plaza II, Suite 200 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,403,406.88 Easting 513,701.67
Landing Point of Curve Northing 4,403,597.43 Easting 513,907.19
Bottom Hole Northing 4,402,004.97 Easting 514,830.24

Elevation (ft) 1,084' GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
SOBM; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; Specific additives per WSSP and Permit.

Date permit issued 7/17/2017 Date drilling commenced 8/6/2017 Date drilling ceased 1/21/2018
Date completion activities began 3/8/2018 Date completion activities ceased 4/19/2018
Verbal plugging (Y/N) n/a Date permission granted n/a Granted by n/a

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 70' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1450' Void(s) encountered (Y/N) depths N
Coal depth(s) ft Sewickley Coal - 589'; Pittsburgh Coal - 679' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by: _____

Reviewed
Jim [Signature] 10/23/18

API 47-051 - 01921 Farm name Nathan D. Yoder, et al Well number Yoder E-5HM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	120	NEW	94.5#	N/A	YES
Surface	17 1/2	13 3/8	760	NEW	61#	N/A	YES
Coal	17 1/2	13 3/8	760	NEW	61#	N/A	YES
Intermediate 1	12 1/4	9 5/8	2623	NEW	36#	N/A	YES
Intermediate 2							
Intermediate 3							
Production	8 3/4	5 1/2	12,987	NEW	20#	N/A	YES
Tubing		2 3/8	6598	NEW	4.7#	N/A	
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	A	200	15.6	1.19	238	0	8
Surface	A	890	15.6	1.19	1059	0	8
Coal	A	890	15.6	1.19	1059	0	8
Intermediate 1	A	920	15.6	1.19	1095	0	8
Intermediate 2							
Intermediate 3							
Production	A	3191	14.5	1.17	3734	0	8
Tubing							

Drillers TD (ft) 13,014 Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) n/a
 Plug back procedure n/a

Kick off depth (ft) 5487

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 3 centralizers on surface casing at equal distance
Intermediate - 1 centralizer every other joint
Production - one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____ RECEIVED Office of Oil and Gas

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____ SEP 11 2018

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____ WV Department of Environmental Protection

API 47-051 - 01921

Farm name Nathan D. Yoder, et al

Well number Yoder E-5HM

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	See attached				

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
	attached							

Please insert additional pages as applicable.

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API 47- 051 - 01921 Farm name Nathan D. Yoder, et al Well number Yoder E-5HM

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6,193' - 6,243'</u> TVD	<u>6,891' - 13,014'</u> MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1500 psi Bottom Hole _____ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas Oil NGL Water GAS MEASURED BY

1728 mcfpd 288 bpd _____ bpd 1272 bpd Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
<u>see attached</u>	<u>0</u>		<u>0</u>		

Please insert additional pages as applicable.

Drilling Contractor Nabors Drilling USA
Address 605 West Greens Road, Suite 1000 City Houston State TX Zip 77067

Logging Company n/a
Address _____ City _____ State _____ Zip _____

Cementing Company C&J Well Services
Address 380 Southpointe Boulevard, Suite 210 City Canonsburg State PA Zip 15317

Stimulating Company Halliburton Energy Services, Inc.
Address 121 Champion Way, Suite 200 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Sean Gasser Telephone 817-632-5200
Signature _____ Title Engineer Date _____

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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**Yoder E-5HM
Perforation Record**

Stage	Date Perforated	Bottom Perf (ft)	Top Perf (ft)	Number of Perfs	Formation
1	3/10/2018	12,891	12,843	2	Marcellus
2	3/11/2018	12,758	11,612	48	Marcellus
3	3/11/2018	12,583	12,437	48	Marcellus
4	3/12/2018	12,408	12,262	48	Marcellus
5	3/12/2018	12,233	12,087	48	Marcellus
6	3/13/2018	12,058	11,912	48	Marcellus
7	3/14/2018	11,883	11,737	48	Marcellus
8	3/14/2018	11,708	11,562	48	Marcellus
9	3/15/2018	11,533	11,387	48	Marcellus
10	3/15/2018	11,358	11,212	48	Marcellus
11	3/16/2018	11,183	11,037	48	Marcellus
12	3/16/2018	11,008	10,862	48	Marcellus
13	3/17/2018	10,833	10,687	48	Marcellus
14	3/18/2018	10,658	10,512	48	Marcellus
15	3/19/2018	10,483	10,337	48	Marcellus
16	3/19/2018	10,308	10,162	48	Marcellus
17	3/19/2018	10,133	9,987	48	Marcellus
18	3/20/2018	9,958	9,812	48	Marcellus
19	3/20/2018	9,783	9,637	48	Marcellus
20	3/21/2018	9,608	9,462	48	Marcellus
21	3/21/2018	9,433	9,287	48	Marcellus
22	3/22/2018	9,258	9,112	48	Marcellus
23	3/22/2018	9,083	8,937	48	Marcellus
24	3/23/2018	8,908	8,762	48	Marcellus
25	3/24/2018	8,733	8,587	48	Marcellus
26	3/24/2018	8,558	8,412	48	Marcellus
27	3/25/2018	8,383	8,237	48	Marcellus
28	3/25/2018	8,208	8,062	48	Marcellus
29	3/26/2018	8,033	7,887	48	Marcellus
30	3/26/2018	7,858	7,712	48	Marcellus
31	3/27/2018	7,683	7,537	48	Marcellus
32	3/28/2018	7,508	7,362	48	Marcellus
33	3/28/2018	7,333	7,187	48	Marcellus
34	3/28/2018	7,158	7,012	48	Marcellus
35	3/29/2018	6,983	6,837	48	Marcellus

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**Yoder E-5HM
Stimulation Summary**

Stage	Avg. Pump Rate (BPM)	Avg. Treating Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Proppant Total (lbs)	Water Total (bbls)	N2 Volume (scf)
1	84.2	7,028	4,624	2,879	330,400	7,899	0
2	88.4	7,263	5,417	3,553	342,450	8,066	0
3	87.2	7,163	5,281	4,045	340,070	7,668	0
4	88.4	7,367	5,109	3,712	455,715	8,491	0
5	87.9	7,620	5,459	3,957	453,980	8,502	0
6	88.1	7,294	5,513	3,508	459,760	8,576	0
7	87.7	7,009	5,432	3,173	446,320	8,501	0
8	86.1	6,976	5,027	3,683	443,700	8,272	0
9	89.3	7,321	5,412	3,877	449,700	8,556	0
10	89.8	7,000	5,009	3,770	446,640	9,214	0
11	89.2	7,159	5,190	3,799	449,300	8,465	0
12	88.7	7,283	5,369	3,818	453,380	8,534	0
13	86.9	7,079	5,276	3,943	450,300	8,196	0
14	88.3	7,316	5,313	3,989	453,873	8,321	0
15	87.8	6,856	5,514	3,930	449,280	8,249	0
16	89.6	6,887	5,614	4,540	448,880	8,420	0
17	86.6	6,946	5,268	3,710	463,850	8,556	0
18	87.8	6,751	5,066	3,990	446,400	8,247	0
19	87.3	6,686	5,299	4,460	448,720	8,489	0
20	89	6,711	4,903	4,669	448,160	8,313	0
21	88.5	6,625	5,143	4,258	441,480	8,735	0
22	89.5	6,754	4,823	4,679	443,080	8,193	0
23	89.8	6,689	4,891	4,757	437,840	8,222	0
24	89.6	6,457	4,986	4,119	443,160	8,077	0
25	89.7	6,475	5,056	3,902	443,240	8,154	0
26	89.6	6,198	5,063	4,060	460,120	8,540	0
27	89.7	6,509	5,419	4,328	458,820	8,298	0
28	89.7	6,441	4,840	4,026	457,530	8,376	0
29	89.1	6,467	4,999	4,501	455,520	8,258	0
30	89.2	6,380	4,687	4,147	457,320	8,467	0
31	88.3	6,393	5,005	3,467	447,720	8,582	0
32	89.7	6,225	5,233	4,348	460,550	8,368	0
33	89.8	6,053	5,032	4,096	454,250	8,300	0
34	89.6	5,966	4,945	4,052	460,820	8,390	0
35	88.3	6,041	5,034	4,196	460,620	8,423	0

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Yoder E-5HM
Formations/Lithology Information

FORMATION	TOP TVD	BASE TVD	TOP MD	BASE MD	DESCRIBE ROCKY TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H2S ETC)
Maxton	1640	1712	1640	1712	Sandstone
Big Lime	1712	1821	1712	1822	Limestone
Big Injun	1821	2129	1822	2132	Sandstone
Weir	2129	2319	2132	2323	Sandstone
Berea	2319	2637	2323	2641	Sandstone
Gordon	2637	2739	2641	2744	Sandstone
Fifty Foot	2739	3312	2744	3331	Sandstone
Speechley	3312	4648	3331	4840	Sandstone
Benson	4648	5017	4840	5251	Sandstone
Alexander	5017	5624	5251	5893	Siltstone
Rhinstreet	5624	5996	5893	6352	Black shale
Middlesex	5996	6077	6352	6507	Black shale
Geneseo/Burkett	6077	6118	6507	6603	Black shale
Tully	6118	6137	6603	6654	Limestone
Hamilton	6137	6146	6654	6678	Grey shale
Marcellus	6146	-	6678	-	Black shale

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Hydraulic Fracturing Fluid Product Component Information Disclosure

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Job Start Date:	4/12/2018
Job End Date:	4/12/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01921-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Yoder E-5HM
Latitude:	39.78049375
Longitude:	-80.83999435
Datum:	WGS84
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,229
Total Base Water Volume (gal):	12,511,869
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	86.59210	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.56065	

HYDROCHLORIC ACID	Halliburton	Solvent					
				Listed Below			
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
				Listed Below			
OILPERM A	Halliburton	Non-ionic Surfactant					
				Listed Below			
SAND-PREMIUM WHITE-30/50, BULK	Halliburton	Proppant					
				Listed Below			
MC S-2510T	Halliburton	Scale Inhibitor					
				Listed Below			
LD-2850	Halliburton	Friction Reducer					
				Listed Below			
MC B-8614	Halliburton	Biocide					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			

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SP BREAKER	Halliburton	Breaker					
				Listed Below			
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			

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Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.

			Crystalline silica, quartz	14808-60-7	100.00000	12.83173	
			Hydrochloric acid	7647-01-0	15.00000	0.08410	
			Guar gum	9000-30-0	100.00000	0.01328	
			Ethanol	64-17-5	60.00000	0.00054	
			Methanol	67-56-1	60.00000	0.00053	
			Sodium persulfate	7775-27-1	100.00000	0.00046	
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00036	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00027	
			Ethoxylated alcohols	Proprietary	30.00000	0.00026	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
			Fatty acids, tall oil	Proprietary	30.00000	0.00026	
			Modified thiourea polymer	Proprietary	30.00000	0.00026	
			Olefins	Proprietary	5.00000	0.00011	
			Propargyl alcohol	107-19-7	10.00000	0.00009	
			Naphthalene	91-20-3	5.00000	0.00004	

			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)- omega-hydroxy-, branched	127087-87-0	5.00000	0.00004	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
			Sodium sulfate	7757-82-6	0.10000	0.00000	
			Ethylene Glycol	107-21-1	60.00000		
			Quaternary ammonium compounds, benzyl-C12- 16-alkyldimethyl chlorides	68424-85-1	5.00000		
			Neutralized Polyacrylic Emulsion	Proprietary	10.00000		
			Phosphoric acid	7664-38-2	0.10000		
			Glutaraldehyde	111-30-8	30.00000		

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* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



Well: Yoder E-5HM
 Site: Yoder
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Design: rev3

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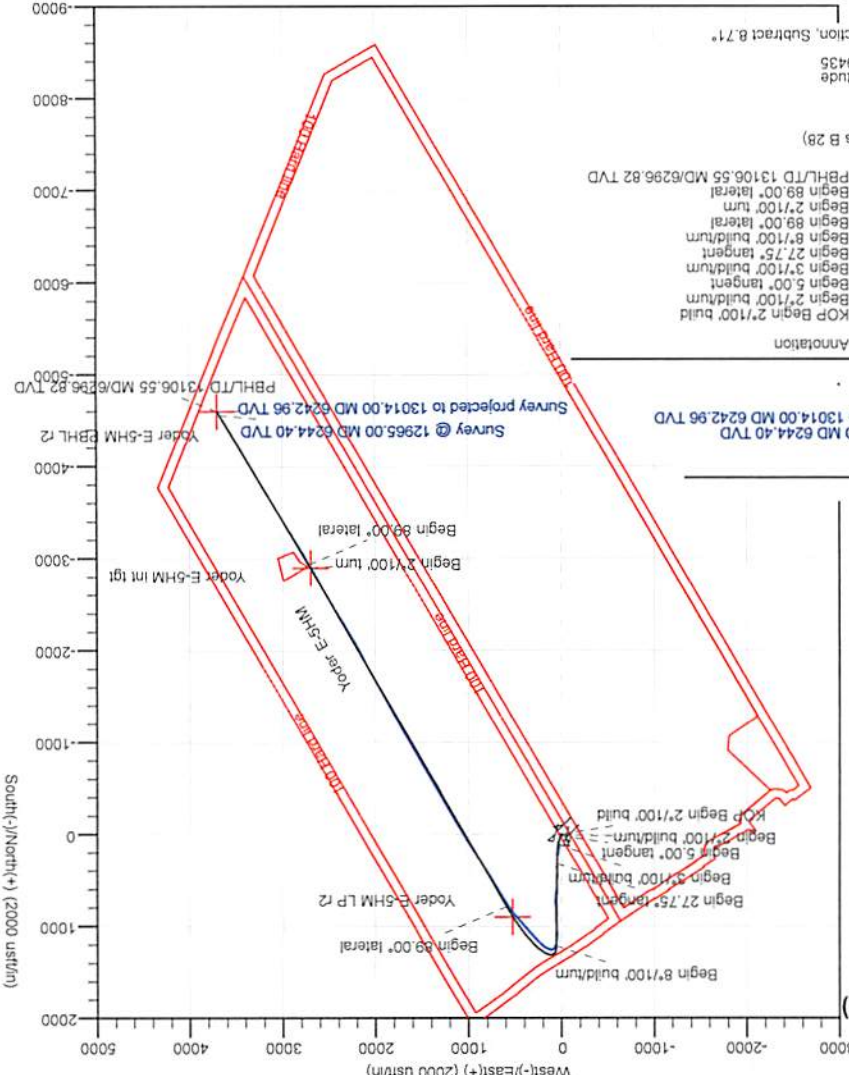
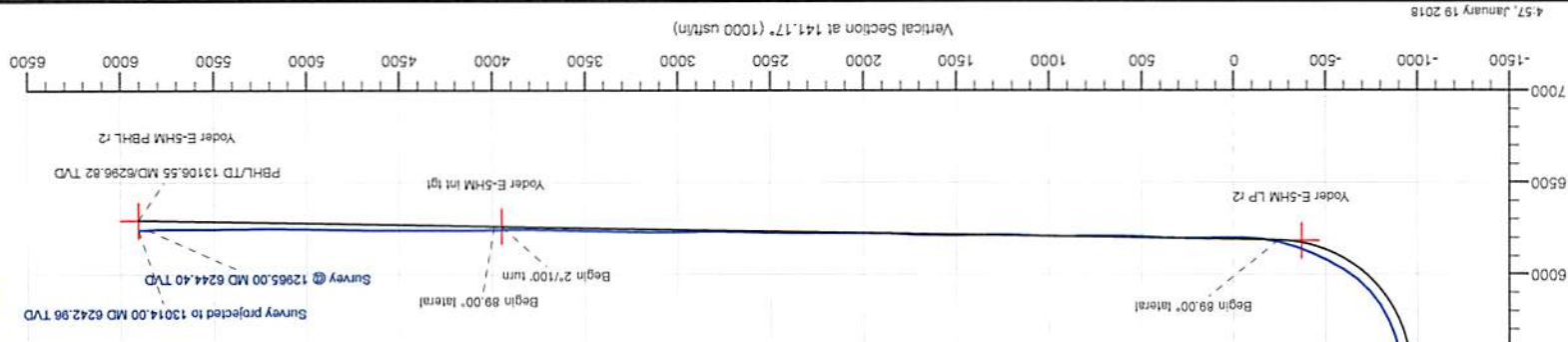
MD	Inc	Azi	TVD	+N/S	+E/W	Vsect	Annotations
13014.00	91.69	148.36	6242.96	-4599.15	3702.63	5904.38	Survey @ 12965.00 MD 6242.96 TVD
12965.00	91.69	148.36	6244.40	-4557.45	3676.94	5855.78	Survey @ 12965.00 MD 6244.40 TVD
268.00	0.21	279.45	268.00	0.08	-0.48	-0.37	MWD surveys
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	KOP Begin 27'100" build
1550.00	5.00	45.00	1549.68	7.71	45.00	-1.17	Begin 27'100" tangent
1679.26	5.00	15.00	1678.47	17.13	13.15	-104.95	Begin 5.00' tangent
2805.07	5.00	15.00	2800.00	111.91	38.55	-63.01	Begin 37'100" build
3569.86	27.75	0.52	3529.11	325.02	48.94	-17.37	Begin 27.75' tangent
5487.29	27.75	0.52	5225.96	1217.87	57.09	0.00	Begin 87'100" build
6882.64	88.00	150.24	6188.08	788.91	590.76	8.08	Begin 89.00' lateral
11132.64	88.00	150.24	6262.25	-2900.00	2700.00	0.00	Begin 27'100" turn
11171.89	88.00	149.45	6262.94	-2933.93	2719.71	2.00	Begin 89.00' lateral
13106.55	89.00	149.45	6296.82	-4599.87	3702.79	0.00	PBHLTD 13106.55 MD/6296.82 TVD

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Diag	Tface	Vsect	Annotation
1	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 27'100" build
2	1550.00	5.00	45.00	1549.68	7.71	45.00	-1.17	45.00	0.00	Begin 27'100" tangent
3	1679.26	5.00	15.00	1678.47	17.13	13.15	-104.95	-5.10	0.00	Begin 5.00' tangent
4	2805.07	5.00	15.00	2800.00	111.91	38.55	-63.01	-63.01	0.00	Begin 37'100" build
5	3569.86	27.75	0.52	3529.11	325.02	48.94	-17.37	-222.49	3.00	Begin 27.75' tangent
6	5487.29	27.75	0.52	5225.96	1217.87	57.09	0.00	-912.89	0.00	Begin 87'100" build
7	6882.64	88.00	150.24	6188.08	788.91	590.76	8.08	-244.11	146.86	Begin 89.00' lateral
8	11132.64	88.00	150.24	6262.25	-2900.00	2700.00	0.00	3952.08	0.00	Begin 27'100" turn
9	11171.89	88.00	149.45	6262.94	-2933.93	2719.71	2.00	3990.87	-90.26	Begin 89.00' lateral
10	13106.55	89.00	149.45	6296.82	-4599.87	3702.79	0.00	5905.04	0.00	PBHLTD 13106.55 MD/6296.82 TVD

Surface Location: RKB=1083+26 @ 1109.00uoft (Nabors B 28)
 Universal Transverse Mercator (US Survey Feet)
 NAD83 West Virginia - HARN
 Zone 17N (84 W to 78 W)

Northing 1446843.78
 Easting 1685369.56
 Longitude 39.78049300
 Latitude -80.83999435

Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Subtract 8.71'



Azinuths to Grid North
 True North: -0.10'
 Magnetic North: -8.71'
 Magnetic Field
 Strength: 52.121 Tani
 Dip Angle: 66.92'
 Date: 1/8/2018
 Model: IGRF2015



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Survey Report

WV Department of
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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Yoder				
Site Position:		Northing:	14,446,864.35 usft	Latitude:	39.78054955
From:	Lat/Long	Easting:	1,685,354.97 usft	Longitude:	-80.84004615
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.10 °

Well	Yoder E-5HM					
Well Position	+N/-S	0.00 usft	Northing:	14,446,843.79 usft	Latitude:	39.78049300
	+E/-W	0.00 usft	Easting:	1,685,369.56 usft	Longitude:	-80.83999435
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,083.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/8/2018	-8.61	66.92	52,121.69447283

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	141.17	

Survey Program	Date	1/19/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
268.00	13,014.00	MWD (Original Hole)	MWD	MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
268.00	0.21	279.45	268.00	0.08	-0.48	-0.37	0.08	0.08	0.00	
MWD surveys										
347.00	0.27	314.60	347.00	0.24	-0.76	-0.66	0.20	0.08	44.49	
439.00	0.29	224.83	439.00	0.22	-1.08	-0.85	0.43	0.02	-97.58	
530.00	0.03	162.19	530.00	0.04	-1.23	-0.80	0.30	-0.29	-68.84	
622.00	0.27	173.57	622.00	-0.20	-1.20	-0.60	0.26	0.26	12.37	
713.00	0.58	250.25	713.00	-0.57	-1.61	-0.57	0.64	0.34	84.26	
817.00	0.24	323.67	816.99	-0.57	-2.24	-0.96	0.54	-0.33	70.60	
908.00	0.27	303.02	907.99	-0.30	-2.53	-1.35	0.11	0.03	-22.69	
1,002.00	0.30	5.75	1,001.99	0.06	-2.69	-1.74	0.32	0.03	66.73	

SEP 11 2018



Survey Report

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,082.00	0.34	354.20	1,081.99	0.51	-2.69	-2.08	0.09	0.05	-14.44
1,176.00	0.37	13.38	1,175.99	1.08	-2.65	-2.50	0.13	0.03	20.40
1,285.00	1.62	35.49	1,284.97	2.68	-1.67	-3.14	1.18	1.15	20.28
1,380.00	3.53	32.67	1,379.87	6.23	0.68	-4.43	2.01	2.01	-2.97
1,475.00	5.19	36.85	1,474.59	12.13	4.84	-6.42	1.78	1.75	4.40
1,570.00	4.84	37.63	1,569.23	18.75	9.86	-8.42	0.38	-0.37	0.82
1,665.00	2.66	45.38	1,664.02	23.47	13.88	-9.58	2.35	-2.29	8.16
1,758.00	2.25	38.94	1,756.93	26.40	16.56	-10.18	0.53	-0.44	-6.92
1,851.00	4.00	23.46	1,849.79	30.80	19.00	-12.08	2.07	1.88	-16.65
1,946.00	5.69	13.93	1,944.45	38.41	21.46	-16.47	1.96	1.78	-10.03
2,041.00	7.33	8.16	2,038.84	48.98	23.45	-23.45	1.86	1.73	-6.07
2,135.00	6.80	10.72	2,132.12	60.39	25.34	-31.15	0.66	-0.56	2.72
2,228.00	5.53	24.09	2,224.59	69.89	28.19	-36.77	2.05	-1.37	14.38
2,323.00	4.51	30.20	2,319.22	77.29	31.94	-40.19	1.21	-1.07	6.43
2,418.00	2.91	20.69	2,414.02	82.78	34.67	-42.75	1.80	-1.68	-10.01
2,512.00	3.39	356.74	2,507.88	87.79	35.35	-46.22	1.48	0.51	-25.48
2,685.00	5.40	339.53	2,680.37	100.52	32.21	-58.11	1.38	1.16	-9.95
2,780.00	5.90	355.74	2,774.92	109.58	30.29	-66.37	1.75	0.53	17.06
2,874.00	7.89	4.89	2,868.24	120.83	30.48	-75.01	2.41	2.12	9.73
2,971.00	10.83	9.85	2,963.94	136.44	32.61	-85.84	3.14	3.03	5.11
3,066.00	12.65	10.02	3,056.94	155.48	35.94	-98.58	1.92	1.92	0.18
3,161.00	14.39	6.38	3,149.31	177.46	39.07	-113.75	2.04	1.83	-3.83
3,256.00	16.66	7.29	3,240.84	202.70	42.11	-131.50	2.40	2.39	0.96
3,351.00	19.22	6.05	3,331.21	231.76	45.48	-152.03	2.72	2.69	-1.31
3,446.00	22.16	4.26	3,420.08	265.19	48.46	-176.20	3.17	3.09	-1.88
3,540.00	26.08	0.70	3,505.86	303.54	50.03	-205.09	4.45	4.17	-3.79
3,635.00	29.76	0.32	3,589.78	348.02	50.42	-239.50	3.88	3.87	-0.40
3,730.00	29.46	359.34	3,672.38	394.95	50.28	-276.15	0.60	-0.32	-1.03
3,824.00	28.52	358.48	3,754.60	440.50	49.42	-312.17	1.09	-1.00	-0.91
3,919.00	27.21	1.11	3,838.59	484.89	49.24	-346.86	1.89	-1.38	2.77
4,013.00	27.85	3.07	3,921.94	528.31	50.83	-379.68	1.18	0.68	2.09
4,109.00	27.74	4.56	4,006.87	572.97	53.81	-412.61	0.73	-0.11	1.55
4,204.00	28.87	5.05	4,090.51	617.86	57.59	-445.21	1.21	1.19	0.52
4,298.00	29.50	4.87	4,172.58	663.52	61.55	-478.30	0.68	0.67	-0.19
4,393.00	29.02	1.49	4,255.46	709.87	64.13	-512.78	1.81	-0.51	-3.56
4,488.00	27.97	359.06	4,338.95	755.18	64.37	-547.93	1.65	-1.11	-2.56
4,583.00	29.27	359.49	4,422.34	800.68	63.79	-583.74	1.39	1.37	0.45
4,678.00	28.96	359.09	4,505.34	846.90	63.22	-620.10	0.39	-0.33	-0.42
4,772.00	28.30	358.09	4,587.85	891.92	62.12	-655.87	0.87	-0.70	-1.06
4,867.00	27.17	356.41	4,671.93	936.08	60.01	-691.59	1.45	-1.19	-1.77
4,962.00	26.43	358.23	4,756.73	978.86	58.00	-726.18	1.16	-0.78	1.92
5,057.00	26.38	356.11	4,841.82	1,021.05	55.91	-760.35	0.99	-0.05	-2.23
5,150.00	25.13	356.02	4,925.58	1,061.37	53.14	-793.49	1.34	-1.34	-0.10

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Survey Report

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,245.00	25.43	4.22	5,011.51	1,101.84	53.24	-824.96	3.70	0.32	8.63	
5,339.00	25.49	4.41	5,096.38	1,142.14	56.28	-854.45	0.11	0.06	0.20	
5,459.00	20.75	7.39	5,206.71	1,188.99	61.00	-887.99	4.07	-3.95	2.48	
5,554.00	15.65	21.27	5,296.97	1,217.65	67.83	-906.04	7.01	-5.37	14.61	
5,648.00	13.67	37.01	5,387.95	1,238.35	79.12	-915.08	4.71	-2.11	16.74	
5,742.00	13.58	68.73	5,479.43	1,251.24	96.11	-914.47	7.85	-0.10	33.74	
5,837.00	16.79	93.26	5,571.19	1,254.51	120.23	-901.89	7.48	3.38	25.82	
5,932.00	21.05	110.83	5,661.11	1,247.65	149.92	-877.94	7.44	4.48	18.49	
6,026.00	25.85	125.77	5,747.40	1,229.65	182.37	-843.56	8.09	5.11	15.89	
6,121.00	33.27	132.89	5,830.00	1,199.75	218.33	-797.73	8.63	7.81	7.49	
6,216.00	40.92	136.32	5,905.73	1,159.45	258.97	-740.85	8.34	8.05	3.61	
6,310.00	50.77	139.66	5,971.14	1,109.31	303.92	-673.60	10.78	10.48	3.55	
6,405.00	57.54	140.80	6,026.74	1,050.13	353.12	-596.65	7.19	7.13	1.20	
6,500.00	62.55	138.34	6,074.16	987.54	406.51	-514.41	5.73	5.27	-2.59	
6,594.00	66.15	137.46	6,114.85	924.68	463.32	-429.83	3.92	3.83	-0.94	
6,689.00	70.55	141.51	6,149.90	857.56	520.62	-341.61	6.09	4.63	4.26	
6,784.00	77.71	145.37	6,175.87	784.19	574.96	-250.39	8.49	7.54	4.06	
6,879.00	83.03	148.45	6,191.76	705.75	626.05	-157.24	6.45	5.60	3.24	
6,973.00	87.78	149.59	6,199.29	625.44	674.26	-64.45	5.20	5.05	1.21	
7,067.00	90.55	150.21	6,200.66	544.13	721.39	28.44	3.02	2.95	0.66	
7,161.00	90.33	149.51	6,199.94	462.84	768.59	121.36	0.78	-0.23	-0.74	
7,255.00	91.08	148.27	6,198.78	382.37	817.16	214.50	1.54	0.80	-1.32	
7,350.00	89.41	147.57	6,198.37	301.88	867.61	308.83	1.91	-1.76	-0.74	
7,445.00	87.21	147.31	6,201.18	221.85	918.71	403.22	2.33	-2.32	-0.27	
7,540.00	87.34	149.77	6,205.69	140.91	968.23	497.32	2.59	0.14	2.59	
7,635.00	88.62	149.51	6,209.04	58.99	1,016.22	591.22	1.37	1.35	-0.27	
7,730.00	89.49	149.07	6,210.61	-22.67	1,064.72	685.26	1.03	0.92	-0.46	
7,825.00	90.68	148.10	6,210.47	-103.74	1,114.24	779.46	1.62	1.25	-1.02	
7,919.00	90.59	149.68	6,209.43	-184.22	1,162.80	872.60	1.68	-0.10	1.68	
8,014.00	89.27	149.59	6,209.54	-266.18	1,210.83	966.56	1.39	-1.39	-0.09	
8,108.00	88.18	151.18	6,211.63	-347.88	1,257.26	1,059.32	2.05	-1.16	1.69	
8,202.00	88.57	150.56	6,214.30	-429.96	1,303.00	1,151.94	0.78	0.41	-0.66	
8,297.00	89.67	150.21	6,215.76	-512.54	1,349.94	1,245.70	1.22	1.16	-0.37	
8,392.00	90.86	150.12	6,215.32	-594.94	1,397.20	1,339.53	1.26	1.25	-0.09	
8,487.00	89.85	150.38	6,214.73	-677.42	1,444.34	1,433.34	1.10	-1.06	0.27	
8,582.00	90.51	150.30	6,214.43	-759.97	1,491.35	1,527.12	0.70	0.69	-0.08	
8,676.00	88.92	149.94	6,214.90	-841.47	1,538.18	1,619.97	1.73	-1.69	-0.38	
8,771.00	87.38	150.56	6,217.97	-923.90	1,585.30	1,713.73	1.75	-1.62	0.65	
8,866.00	88.04	150.03	6,221.76	-1,006.35	1,632.33	1,807.45	0.89	0.69	-0.56	
8,961.00	89.19	149.59	6,224.06	-1,088.44	1,680.09	1,901.34	1.30	1.21	-0.46	
9,056.00	89.05	151.61	6,225.52	-1,171.19	1,726.72	1,995.04	2.13	-0.15	2.13	
9,151.00	90.42	151.61	6,225.96	-1,254.76	1,771.89	2,088.47	1.44	1.44	0.00	
9,244.00	89.67	151.26	6,225.88	-1,336.44	1,816.36	2,179.98	0.89	-0.81	-0.38	

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Survey Report

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,339.00	90.77	151.53	6,225.52	-1,419.85	1,861.84	2,273.47	1.19	1.16	0.28
9,434.00	89.23	151.18	6,225.52	-1,503.22	1,907.38	2,366.97	1.66	-1.62	-0.37
9,528.00	88.35	150.74	6,227.50	-1,585.38	1,953.00	2,459.58	1.05	-0.94	-0.47
9,623.00	89.32	150.82	6,229.44	-1,668.27	1,999.36	2,553.22	1.02	1.02	0.08
9,717.00	88.53	150.47	6,231.20	-1,750.19	2,045.43	2,645.92	0.92	-0.84	-0.37
9,812.00	88.44	152.23	6,233.71	-1,833.52	2,090.96	2,739.39	1.85	-0.09	1.85
9,907.00	89.89	152.41	6,235.10	-1,917.64	2,135.09	2,832.59	1.54	1.53	0.19
10,000.00	91.08	152.58	6,234.31	-2,000.12	2,178.04	2,923.77	1.29	1.28	0.18
10,095.00	91.82	150.30	6,231.90	-2,083.53	2,223.44	3,017.21	2.52	0.78	-2.40
10,190.00	90.15	149.42	6,230.27	-2,165.67	2,271.13	3,111.10	1.99	-1.76	-0.93
10,284.00	89.23	148.36	6,230.78	-2,246.15	2,319.69	3,204.25	1.49	-0.98	-1.13
10,378.00	88.04	148.80	6,233.02	-2,326.34	2,368.68	3,297.43	1.35	-1.27	0.47
10,472.00	88.04	148.54	6,236.23	-2,406.59	2,417.53	3,390.58	0.28	0.00	-0.28
10,567.00	88.18	150.12	6,239.37	-2,488.25	2,465.96	3,484.56	1.67	0.15	1.66
10,662.00	89.27	150.47	6,241.48	-2,570.75	2,513.02	3,578.33	1.21	1.15	0.37
10,757.00	89.49	149.33	6,242.51	-2,652.93	2,560.66	3,672.22	1.22	0.23	-1.20
10,851.00	88.53	150.03	6,244.13	-2,734.06	2,608.11	3,765.17	1.26	-1.02	0.74
10,945.00	89.98	151.26	6,245.36	-2,815.98	2,654.18	3,857.88	2.02	1.54	1.31
11,038.00	91.16	150.91	6,244.43	-2,897.38	2,699.15	3,949.48	1.32	1.27	-0.38
11,133.00	90.29	150.82	6,243.23	-2,980.35	2,745.40	4,043.12	0.92	-0.92	-0.09
11,227.00	91.43	150.91	6,241.82	-3,062.45	2,791.16	4,135.76	1.22	1.21	0.10
11,321.00	89.45	149.68	6,241.10	-3,144.09	2,837.73	4,228.57	2.48	-2.11	-1.31
11,416.00	89.23	148.71	6,242.19	-3,225.68	2,886.38	4,322.63	1.05	-0.23	-1.02
11,511.00	89.85	148.45	6,242.95	-3,306.74	2,935.90	4,416.83	0.71	0.65	-0.27
11,606.00	91.16	148.54	6,242.12	-3,387.74	2,985.54	4,511.05	1.38	1.38	0.09
11,701.00	89.27	148.98	6,241.76	-3,468.96	3,034.81	4,605.21	2.04	-1.99	0.46
11,796.00	89.85	148.45	6,242.49	-3,550.14	3,084.14	4,699.39	0.83	0.61	-0.56
11,891.00	88.26	148.71	6,244.06	-3,631.20	3,133.66	4,793.58	1.70	-1.67	0.27
11,985.00	89.01	148.63	6,246.29	-3,711.47	3,182.52	4,886.75	0.80	0.80	-0.09
12,080.00	88.88	150.38	6,248.04	-3,793.31	3,230.72	4,980.72	1.85	-0.14	1.84
12,175.00	89.32	150.21	6,249.54	-3,875.81	3,277.79	5,074.51	0.50	0.46	-0.18
12,270.00	89.45	150.30	6,250.56	-3,958.29	3,324.92	5,168.31	0.17	0.14	0.09
12,362.00	90.37	150.03	6,250.70	-4,038.10	3,370.69	5,259.18	1.04	1.00	-0.29
12,456.00	90.86	149.77	6,249.69	-4,119.42	3,417.83	5,352.08	0.59	0.52	-0.28
12,551.00	90.07	149.86	6,248.92	-4,201.53	3,465.59	5,446.00	0.84	-0.83	0.09
12,645.00	91.34	150.03	6,247.76	-4,282.89	3,512.67	5,538.89	1.36	1.35	0.18
12,740.00	89.89	149.51	6,246.74	-4,364.96	3,560.49	5,632.82	1.62	-1.53	-0.55
12,835.00	90.24	148.71	6,246.64	-4,446.48	3,609.26	5,726.90	0.92	0.37	-0.84
12,930.00	91.34	148.63	6,245.33	-4,527.62	3,658.65	5,821.08	1.16	1.16	-0.08
12,965.00	91.69	148.36	6,244.40	-4,557.45	3,676.94	5,855.78	1.26	1.00	-0.77
Survey @ 12965.00 MD 6244.40 TVD									
13,014.00	91.69	148.36	6,242.96	-4,599.15	3,702.63	5,904.38	0.00	0.00	0.00
Survey projected to 13014.00 MD 6242.96 TVD									



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
268.00	268.00	0.08	-0.48	MWD surveys
12,965.00	6,244.40	-4,557.45	3,676.94	Survey @ 12965.00 MD 6244.40 TVD
13,014.00	6,242.96	-4,599.15	3,702.63	Survey projected to 13014.00 MD 6242.96 TVD

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Survey Report - Geographic

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Yoder				
Site Position:		Northing:	14,446,864.35 usft	Latitude:	39.78054955
From:	Lat/Long	Easting:	1,685,354.97 usft	Longitude:	-80.84004615
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.10 °

Well	Yoder E-5HM					
Well Position	+N/-S	0.00 usft	Northing:	14,446,843.79 usft	Latitude:	39.78049300
	+E/-W	0.00 usft	Easting:	1,685,369.56 usft	Longitude:	-80.83999435
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,083.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/8/2018	-8.61	66.92	52,121.69447283

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.00	0.00	0.00	141.17

Survey Program	Date	1/19/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
268.00	13,014.00	MWD (Original Hole)	MWD	MWD - Standard	

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	14,446,843.79	1,685,369.56	39.78049300	-80.83999435
268.00	0.21	279.45	268.00	0.08	-0.48	14,446,843.87	1,685,369.08	39.78049323	-80.83999608
MWD surveys									
347.00	0.27	314.60	347.00	0.24	-0.76	14,446,844.02	1,685,368.80	39.78049365	-80.83999705
439.00	0.29	224.83	439.00	0.22	-1.08	14,446,844.01	1,685,368.48	39.78049362	-80.83999819
530.00	0.03	162.19	530.00	0.04	-1.23	14,446,843.82	1,685,368.33	39.78049311	-80.83999874
622.00	0.27	173.57	622.00	-0.20	-1.20	14,446,843.59	1,685,368.36	39.78049245	-80.83999863
713.00	0.58	250.25	713.00	-0.57	-1.61	14,446,843.22	1,685,367.95	39.78049144	-80.84000009
817.00	0.24	323.67	816.99	-0.57	-2.24	14,446,843.22	1,685,367.32	39.78049144	-80.84000231
908.00	0.27	303.02	907.99	-0.30	-2.53	14,446,843.49	1,685,367.03	39.78049218	-80.84000335
1,002.00	0.30	5.75	1,001.99	0.06	-2.69	14,446,843.85	1,685,366.87	39.78049319	-80.84000392
1,082.00	0.34	354.20	1,081.99	0.51	-2.69	14,446,844.30	1,685,366.87	39.78049441	-80.84000393

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Survey Report - Geographic

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,176.00	0.37	13.38	1,175.99	1.08	-2.65	14,446,844.87	1,685,366.91	39.78049598	-80.84000378
1,285.00	1.62	35.49	1,284.97	2.68	-1.67	14,446,846.47	1,685,367.89	39.78050036	-80.84000029
1,380.00	3.53	32.67	1,379.87	6.23	0.68	14,446,850.02	1,685,370.24	39.78051011	-80.83999188
1,475.00	5.19	36.85	1,474.59	12.13	4.84	14,446,855.92	1,685,374.40	39.78052630	-80.83997705
1,570.00	4.84	37.63	1,569.23	18.75	9.86	14,446,862.53	1,685,379.42	39.78054443	-80.83995912
1,665.00	2.66	45.38	1,664.02	23.47	13.88	14,446,867.26	1,685,383.44	39.78055739	-80.83994480
1,758.00	2.25	38.94	1,756.93	26.40	16.56	14,446,870.19	1,685,386.12	39.78056543	-80.83993523
1,851.00	4.00	23.46	1,849.79	30.80	19.00	14,446,874.59	1,685,388.56	39.78057749	-80.83992652
1,946.00	5.69	13.93	1,944.45	38.41	21.46	14,446,882.20	1,685,391.02	39.78059839	-80.83991774
2,041.00	7.33	8.16	2,038.84	48.98	23.45	14,446,892.77	1,685,393.01	39.78062741	-80.83991057
2,135.00	6.80	10.72	2,132.12	60.39	25.34	14,446,904.17	1,685,394.90	39.78065871	-80.83990379
2,228.00	5.53	24.09	2,224.59	69.89	28.19	14,446,913.68	1,685,397.75	39.78068479	-80.83989357
2,323.00	4.51	30.20	2,319.22	77.29	31.94	14,446,921.08	1,685,401.50	39.78070512	-80.83988018
2,418.00	2.91	20.69	2,414.02	82.78	34.67	14,446,926.57	1,685,404.23	39.78072017	-80.83987043
2,512.00	3.39	356.74	2,507.88	87.79	35.35	14,446,931.57	1,685,404.91	39.78073391	-80.83986796
2,685.00	5.40	339.53	2,680.37	100.52	32.21	14,446,944.31	1,685,401.78	39.78076890	-80.83987905
2,780.00	5.90	355.74	2,774.92	109.58	30.29	14,446,953.37	1,685,399.85	39.78079379	-80.83988584
2,874.00	7.89	4.89	2,868.24	120.83	30.48	14,446,964.61	1,685,400.04	39.78082468	-80.83988509
2,971.00	10.83	9.85	2,963.94	136.44	32.61	14,446,980.23	1,685,402.17	39.78086755	-80.83987742
3,066.00	12.65	10.02	3,056.94	155.48	35.94	14,446,999.27	1,685,405.50	39.78091982	-80.83986542
3,161.00	14.39	6.38	3,149.31	177.46	39.07	14,447,021.25	1,685,408.63	39.78098016	-80.83985417
3,256.00	16.66	7.29	3,240.84	202.70	42.11	14,447,046.49	1,685,411.67	39.78104947	-80.83984319
3,351.00	19.22	6.05	3,331.21	231.76	45.48	14,447,075.55	1,685,415.04	39.78112927	-80.83983099
3,446.00	22.16	4.26	3,420.08	265.19	48.46	14,447,108.98	1,685,418.02	39.78122104	-80.83982017
3,540.00	26.08	0.70	3,505.86	303.54	50.03	14,447,147.33	1,685,419.59	39.78132638	-80.83981433
3,635.00	29.76	0.32	3,589.78	348.02	50.42	14,447,191.81	1,685,419.98	39.78144851	-80.83981267
3,730.00	29.46	359.34	3,672.38	394.95	50.28	14,447,238.74	1,685,419.84	39.78157741	-80.83981286
3,824.00	28.52	358.48	3,754.60	440.50	49.42	14,447,284.29	1,685,418.98	39.78170251	-80.83981564
3,919.00	27.21	1.11	3,838.59	484.89	49.24	14,447,328.68	1,685,418.80	39.78182442	-80.83981600
4,013.00	27.85	3.07	3,921.94	528.31	50.83	14,447,372.10	1,685,420.39	39.78194363	-80.83981006
4,109.00	27.74	4.56	4,006.87	572.97	53.81	14,447,416.76	1,685,423.37	39.78206628	-80.83979918
4,204.00	28.87	5.05	4,090.51	617.86	57.59	14,447,461.64	1,685,427.15	39.78218953	-80.83978545
4,298.00	29.50	4.87	4,172.58	663.52	61.55	14,447,507.31	1,685,431.11	39.78231492	-80.83977105
4,393.00	29.02	1.49	4,255.46	709.87	64.13	14,447,553.65	1,685,433.69	39.78244218	-80.83976156
4,488.00	27.97	359.06	4,338.95	755.18	64.37	14,447,598.97	1,685,433.93	39.78256662	-80.83976043
4,583.00	29.27	359.49	4,422.34	800.68	63.79	14,447,644.47	1,685,433.35	39.78269158	-80.83976218
4,678.00	28.96	359.09	4,505.34	846.90	63.22	14,447,690.69	1,685,432.78	39.78281852	-80.83976392
4,772.00	28.30	358.09	4,587.85	891.92	62.12	14,447,735.71	1,685,431.68	39.78294217	-80.83976757
4,867.00	27.17	356.41	4,671.93	936.08	60.01	14,447,779.87	1,685,429.57	39.78306345	-80.83977479
4,962.00	26.43	358.23	4,756.73	978.86	58.00	14,447,822.65	1,685,427.56	39.78318095	-80.83978168
5,057.00	26.38	356.11	4,841.82	1,021.05	55.91	14,447,864.84	1,685,425.47	39.78329683	-80.83978883
5,150.00	25.13	356.02	4,925.58	1,061.37	53.14	14,447,905.15	1,685,422.70	39.78340755	-80.83979844
5,245.00	25.43	4.22	5,011.51	1,101.84	53.24	14,447,945.63	1,685,422.80	39.78351872	-80.83979783
5,339.00	25.49	4.41	5,096.38	1,142.14	56.28	14,447,985.93	1,685,425.84	39.78362936	-80.83978675
5,459.00	20.75	7.39	5,206.71	1,188.99	61.00	14,448,032.78	1,685,430.57	39.78375801	-80.83976964
5,554.00	15.65	21.27	5,296.97	1,217.65	67.83	14,448,061.44	1,685,437.39	39.78383669	-80.83974518
5,648.00	13.67	37.01	5,387.95	1,238.35	79.12	14,448,082.14	1,685,448.68	39.78389347	-80.83970485
5,742.00	13.58	68.73	5,479.43	1,251.24	96.11	14,448,095.03	1,685,465.67	39.78392879	-80.83964428
5,837.00	16.79	93.26	5,571.19	1,254.51	120.23	14,448,098.30	1,685,489.79	39.78393765	-80.83955839
5,932.00	21.05	110.83	5,661.11	1,247.65	149.92	14,448,091.44	1,685,519.48	39.78391868	-80.83945278
6,026.00	25.85	125.77	5,747.40	1,229.65	182.37	14,448,073.43	1,685,551.93	39.78386906	-80.83933737
6,121.00	33.27	132.89	5,830.00	1,199.75	218.33	14,448,043.54	1,685,587.89	39.78378679	-80.83920957
6,216.00	40.92	136.32	5,905.73	1,159.45	258.97	14,448,003.24	1,685,628.53	39.78367592	-80.83906516
6,310.00	50.77	139.66	5,971.14	1,109.31	303.92	14,447,953.10	1,685,673.48	39.78353798	-80.83890549
6,405.00	57.54	140.80	6,026.74	1,050.13	353.12	14,447,893.92	1,685,722.68	39.78337523	-80.83873072



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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well: Yoder E-5HM
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Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.00	62.55	138.34	6,074.16	987.54	406.51	14,447,831.33	1,685,776.07	39.78320306	-80.83854108
6,594.00	66.15	137.46	6,114.85	924.68	463.32	14,447,768.47	1,685,832.88	39.78303016	-80.83833927
6,689.00	70.55	141.51	6,149.90	857.56	520.62	14,447,701.35	1,685,890.18	39.78284553	-80.83813575
6,784.00	77.71	145.37	6,175.87	784.19	574.96	14,447,627.98	1,685,944.52	39.78264377	-80.83794280
6,879.00	83.03	148.45	6,191.76	705.75	626.05	14,447,549.54	1,685,995.61	39.78242809	-80.83776144
6,973.00	87.78	149.59	6,199.29	625.44	674.26	14,447,469.23	1,686,043.82	39.78220730	-80.83759035
7,067.00	90.55	150.21	6,200.66	544.13	721.39	14,447,387.92	1,686,090.96	39.78198377	-80.83742311
7,161.00	90.33	149.51	6,199.94	462.84	768.59	14,447,306.63	1,686,138.15	39.78176029	-80.83725564
7,255.00	91.08	148.27	6,198.78	382.37	817.16	14,447,226.16	1,686,186.72	39.78153905	-80.83708330
7,350.00	89.41	147.57	6,198.37	301.88	867.61	14,447,145.67	1,686,237.17	39.78131775	-80.83690424
7,445.00	87.21	147.31	6,201.18	221.85	918.71	14,447,065.64	1,686,288.27	39.78109771	-80.83672286
7,540.00	87.34	149.77	6,205.69	140.91	968.23	14,446,984.70	1,686,337.79	39.78087519	-80.83654712
7,635.00	88.62	149.51	6,209.04	58.99	1,016.22	14,446,902.78	1,686,385.78	39.78064997	-80.83637686
7,730.00	89.49	149.07	6,210.61	-22.67	1,064.72	14,446,821.12	1,686,434.28	39.78042545	-80.83620473
7,825.00	90.68	148.10	6,210.47	-103.74	1,114.24	14,446,740.04	1,686,483.80	39.78020256	-80.83602901
7,919.00	90.59	149.68	6,209.43	-184.22	1,162.80	14,446,659.57	1,686,532.36	39.77998131	-80.83585668
8,014.00	89.27	149.59	6,209.54	-266.18	1,210.83	14,446,577.61	1,686,580.39	39.77975596	-80.83568629
8,108.00	88.18	151.18	6,211.63	-347.88	1,257.26	14,446,495.91	1,686,626.82	39.77953137	-80.83552153
8,202.00	88.57	150.56	6,214.30	-429.96	1,303.00	14,446,413.83	1,686,672.56	39.77930573	-80.83535926
8,297.00	89.67	150.21	6,215.76	-512.54	1,349.94	14,446,331.25	1,686,719.50	39.77907871	-80.83519273
8,392.00	90.86	150.12	6,215.32	-594.94	1,397.20	14,446,248.85	1,686,766.76	39.77885216	-80.83502505
8,487.00	89.85	150.38	6,214.73	-677.42	1,444.34	14,446,166.37	1,686,813.90	39.77862542	-80.83485781
8,582.00	90.51	150.30	6,214.43	-759.97	1,491.35	14,446,083.82	1,686,860.91	39.77839847	-80.83469103
8,676.00	88.92	149.94	6,214.90	-841.47	1,538.18	14,446,002.32	1,686,907.74	39.77817440	-80.83452489
8,771.00	87.38	150.56	6,217.97	-923.90	1,585.30	14,445,919.89	1,686,954.86	39.77794778	-80.83435774
8,866.00	88.04	150.03	6,221.76	-1,006.35	1,632.33	14,445,837.44	1,687,001.89	39.77772111	-80.83419087
8,961.00	89.19	149.59	6,224.06	-1,088.44	1,680.09	14,445,755.35	1,687,049.65	39.77749543	-80.83402143
9,056.00	89.05	151.61	6,225.52	-1,171.19	1,726.72	14,445,672.60	1,687,096.28	39.77726793	-80.83385601
9,151.00	90.42	151.61	6,225.96	-1,254.76	1,771.89	14,445,589.02	1,687,141.45	39.77703819	-80.83369580
9,244.00	89.67	151.26	6,225.88	-1,336.44	1,816.36	14,445,507.35	1,687,185.92	39.77681365	-80.83353807
9,339.00	90.77	151.53	6,225.52	-1,419.85	1,861.84	14,445,423.94	1,687,231.40	39.77658437	-80.83337674
9,434.00	89.23	151.18	6,225.52	-1,503.22	1,907.38	14,445,340.57	1,687,276.94	39.77635518	-80.83321521
9,528.00	88.35	150.74	6,227.50	-1,585.38	1,953.00	14,445,258.41	1,687,322.56	39.77612930	-80.83305339
9,623.00	89.32	150.82	6,229.44	-1,668.27	1,999.36	14,445,175.52	1,687,368.92	39.77590142	-80.83288892
9,717.00	88.53	150.47	6,231.20	-1,750.19	2,045.43	14,445,093.60	1,687,414.99	39.77567622	-80.83272549
9,812.00	88.44	152.23	6,233.71	-1,833.52	2,090.96	14,445,010.27	1,687,460.52	39.77544712	-80.83256399
9,907.00	89.89	152.41	6,235.10	-1,917.64	2,135.09	14,444,926.15	1,687,504.65	39.77521589	-80.83240750
10,000.00	91.08	152.58	6,234.31	-2,000.12	2,178.04	14,444,843.66	1,687,547.60	39.77498914	-80.83225520
10,095.00	91.82	150.30	6,231.90	-2,083.53	2,223.44	14,444,760.26	1,687,593.00	39.77475985	-80.83209417
10,190.00	90.15	149.42	6,230.27	-2,165.67	2,271.13	14,444,678.12	1,687,640.69	39.77453402	-80.83192498
10,284.00	89.23	148.36	6,230.78	-2,246.15	2,319.69	14,444,597.64	1,687,689.25	39.77431275	-80.83175267
10,378.00	88.04	148.80	6,233.02	-2,326.34	2,368.68	14,444,517.45	1,687,738.24	39.77409227	-80.83157885
10,472.00	88.04	148.54	6,236.23	-2,406.59	2,417.53	14,444,437.20	1,687,787.09	39.77387164	-80.83140554
10,567.00	88.18	150.12	6,239.37	-2,488.25	2,465.96	14,444,355.54	1,687,835.52	39.77364711	-80.83123372
10,662.00	89.27	150.47	6,241.48	-2,570.75	2,513.02	14,444,273.04	1,687,882.58	39.77342032	-80.83106677
10,757.00	89.49	149.33	6,242.51	-2,652.93	2,560.66	14,444,190.86	1,687,930.22	39.77319437	-80.83089777
10,851.00	88.53	150.03	6,244.13	-2,734.06	2,608.11	14,444,109.73	1,687,977.67	39.77297132	-80.83072946
10,945.00	89.98	151.26	6,245.36	-2,815.98	2,654.18	14,444,027.81	1,688,023.75	39.77274611	-80.83056603
11,038.00	91.16	150.91	6,244.43	-2,897.38	2,699.15	14,443,946.41	1,688,068.71	39.77252232	-80.83040655
11,133.00	90.29	150.82	6,243.23	-2,980.35	2,745.40	14,443,863.44	1,688,114.96	39.77229422	-80.83024252
11,227.00	91.43	150.91	6,241.82	-3,062.45	2,791.16	14,443,781.34	1,688,160.72	39.77206852	-80.83008021
11,321.00	89.45	149.68	6,241.10	-3,144.09	2,837.73	14,443,699.70	1,688,207.29	39.77184407	-80.82991500
11,416.00	89.23	148.71	6,242.19	-3,225.68	2,886.38	14,443,618.11	1,688,255.94	39.77161975	-80.82974242
11,511.00	89.85	148.45	6,242.95	-3,306.74	2,935.90	14,443,537.04	1,688,305.46	39.77139685	-80.82956672
11,606.00	91.16	148.54	6,242.12	-3,387.74	2,985.54	14,443,456.05	1,688,355.10	39.77117417	-80.82939060



Survey Report - Geographic

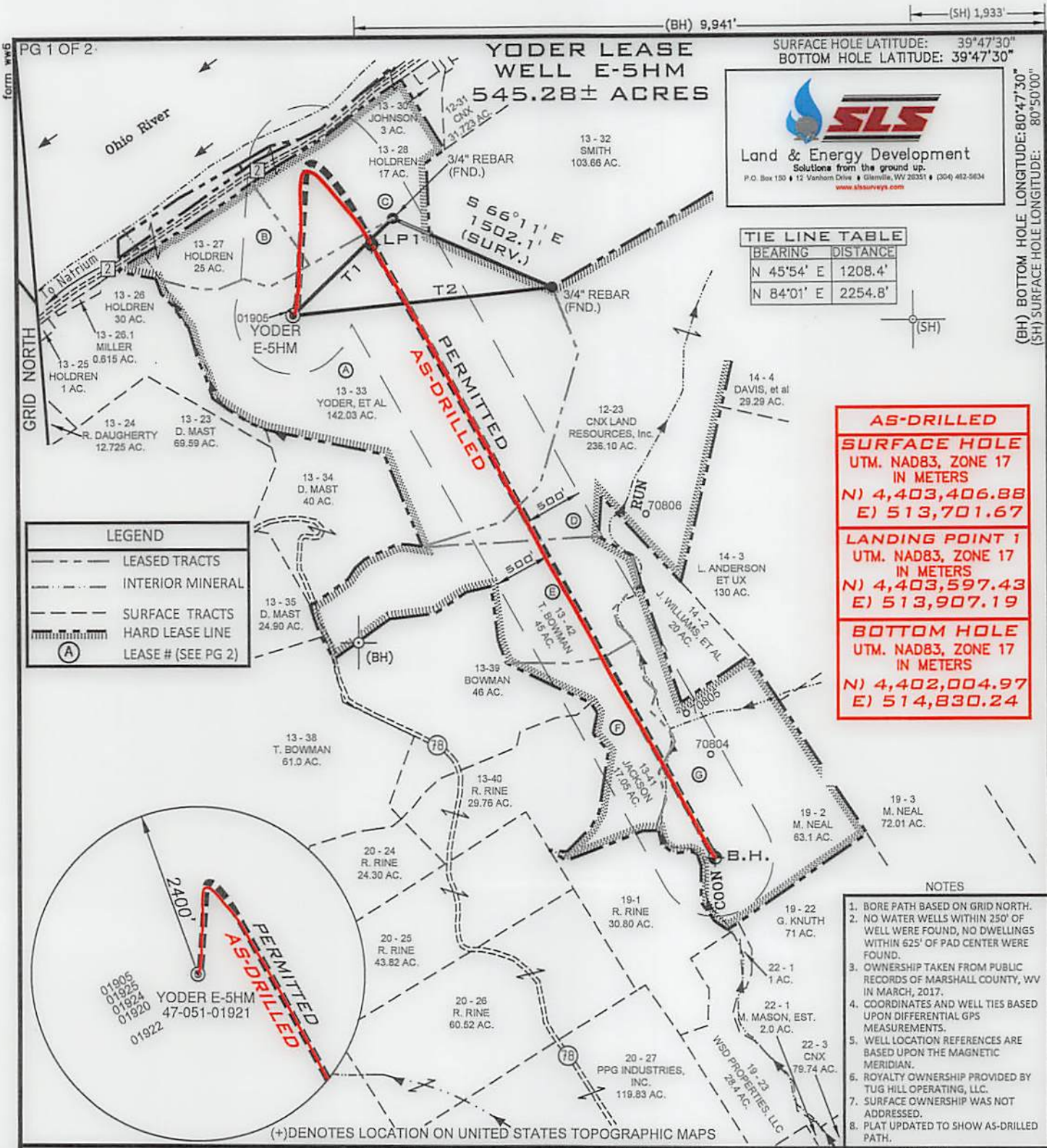


Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-5HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-5HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,701.00	89.27	148.98	6,241.76	-3,468.96	3,034.81	14,443,374.83	1,688,404.37	39.77095085	-80.82921582
11,796.00	89.85	148.45	6,242.49	-3,550.14	3,084.14	14,443,293.65	1,688,453.70	39.77072764	-80.82904080
11,891.00	88.26	148.71	6,244.06	-3,631.20	3,133.66	14,443,212.59	1,688,503.22	39.77050478	-80.82886513
11,985.00	89.01	148.63	6,246.29	-3,711.47	3,182.52	14,443,132.32	1,688,552.08	39.77028408	-80.82869178
12,080.00	88.88	150.38	6,248.04	-3,793.31	3,230.72	14,443,050.48	1,688,600.28	39.77005906	-80.82852081
12,175.00	89.32	150.21	6,249.54	-3,875.81	3,277.79	14,442,967.97	1,688,647.35	39.76983223	-80.82835386
12,270.00	89.45	150.30	6,250.56	-3,958.29	3,324.92	14,442,885.50	1,688,694.48	39.76960547	-80.82818669
12,362.00	90.37	150.03	6,250.70	-4,038.10	3,370.69	14,442,805.69	1,688,740.25	39.76938606	-80.82802435
12,456.00	90.86	149.77	6,249.69	-4,119.42	3,417.83	14,442,724.37	1,688,787.39	39.76916249	-80.82785714
12,551.00	90.07	149.86	6,248.92	-4,201.53	3,465.59	14,442,642.26	1,688,835.15	39.76893672	-80.82768773
12,645.00	91.34	150.03	6,247.76	-4,282.89	3,512.67	14,442,560.90	1,688,882.23	39.76871305	-80.82752076
12,740.00	89.89	149.51	6,246.74	-4,364.96	3,560.49	14,442,478.83	1,688,930.05	39.76848740	-80.82735112
12,835.00	90.24	148.71	6,246.64	-4,446.48	3,609.26	14,442,397.31	1,688,978.82	39.76826326	-80.82717811
12,930.00	91.34	148.63	6,245.33	-4,527.62	3,658.65	14,442,316.17	1,689,028.21	39.76804016	-80.82700290
12,965.00	91.69	148.36	6,244.40	-4,557.45	3,676.94	14,442,286.34	1,689,046.50	39.76795814	-80.82693804
Survey @ 12965.00 MD 6244.40 TVD									
13,014.00	91.69	148.36	6,242.96	-4,599.15	3,702.63	14,442,244.64	1,689,072.19	39.76784349	-80.82684689
Survey projected to 13014.00 MD 6242.96 TVD									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
268.00	268.00	0.08	-0.48	MWD surveys
12,965.00	6,244.40	-4,557.45	3,676.94	Survey @ 12965.00 MD 6244.40 TVD
13,014.00	6,242.96	-4,599.15	3,702.63	Survey projected to 13014.00 MD 6242.96 TVD

RECEIVED
Office of Oil and Gas
SEP 11 2018
WV Department of
Environmental Protection



FILE NUMBER **8836**

DRAWING NUMBER **8836ADE5HM.dwg**

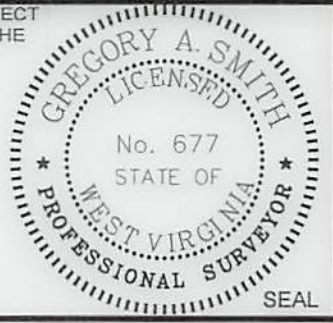
SCALE **1" = 1200'**

MINIMUM DEGREE OF ACCURACY **1/2500**

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. 677
Gregory A. Smith



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



DATE: **JULY 17, 2018**

OPERATORS WELL NO. **YODER E-5HM (AS-DRILLED)**

API WELL NO. **47-051-01921**

STATE COUNTY PERMIT

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

LOCATION ELEVATION **1084'** WATERSHED (HUC 10) **FRENCH CREEK - OHIO RIVER**

DISTRICT **FRANKLIN** COUNTY **MARSHALL**

QUADRANGLE **POWHATAN POINT 7.5'** LEASE NUMBER **SEE ATTACHED PG 2 OF 2**

SURFACE OWNER **NATHAN D. YODER, et al** ACREAGE **142.03**

OIL & GAS ROYALTY OWNER **NATHAN D. YODER, et al - SEE PG 2** LEASE ACREAGE **545.28**

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION

PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____

TARGET FORMATION **MARCELLUS** PLUG & ABANDON CLEAN OUT & REPLUG

WELL OPERATOR **TUG HILL OPERATING, LLC** DESIGNATED AGENT **DIANNA STAMPER CT CORPORATION SYSTEM**

ADDRESS **1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107** ADDRESS **5400 D BIG TYLER ROAD CHARLESTON, WV 25313**

COUNTY NAME PERMIT

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

TARGET FORMATION MARCELLUS
 ESTIMATED DEPTH TVD 6,243', TMD:13,014'
 PLUG & ABANDON CLEAN OUT & REPLUG

PERMIT

PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION _____
 OIL & GAS ROYALTY OWNER NATHAN D. YODER, et al - SEE PG 2
 LEASE ACREAGE 242.28
 SURFACE OWNER NATHAN D. YODER, et al
 ACREAGE 142.03

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER _____ SEE ATTACHED PG 2 OF 2
 DISTRICT FRANKLIN COUNTY MARSHALL

LOCATION ELEVATION 1084' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER
 (IF "GAS") PRODUCTION STORAGE DEEP SHALLOW
 WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL

API WELL NO. _____
 OPERATORS WELL NO. YODER E-5HM (AS-DRILLED)
 DATE: JULY 17, 2018

WVDEP
 OFFICE OF OIL & GAS
 601 5TH STREET, SE
 CHARLESTON, WV 25304

GRADE GPS
 SUBMETER MAPPING
 PROVEN SOURCE
 OF ACCURACY 1/2500
 MINIMUM DEGREE
 SCALE 1" = 1200'
 DRAWING NUMBER 8836ADE5HM.dwg
 FILE NUMBER 8836

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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. 677
Gregory A. Smith

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, 2017.
4. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
5. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
6. ROYALTY OWNERSHIP PROVIDED BY TUG HILL OPERATING, LLC.
7. SURFACE OWNERSHIP WAS NOT ADDRESSED.
8. PLAN UPDATED TO SHOW AS-DRILLED PATH.

AS-DRILLED SURFACE HOLE
 UTM. NAD83, ZONE 17
 IN METERS
 (N) 4,403,406.88
 (E) 213,701.67

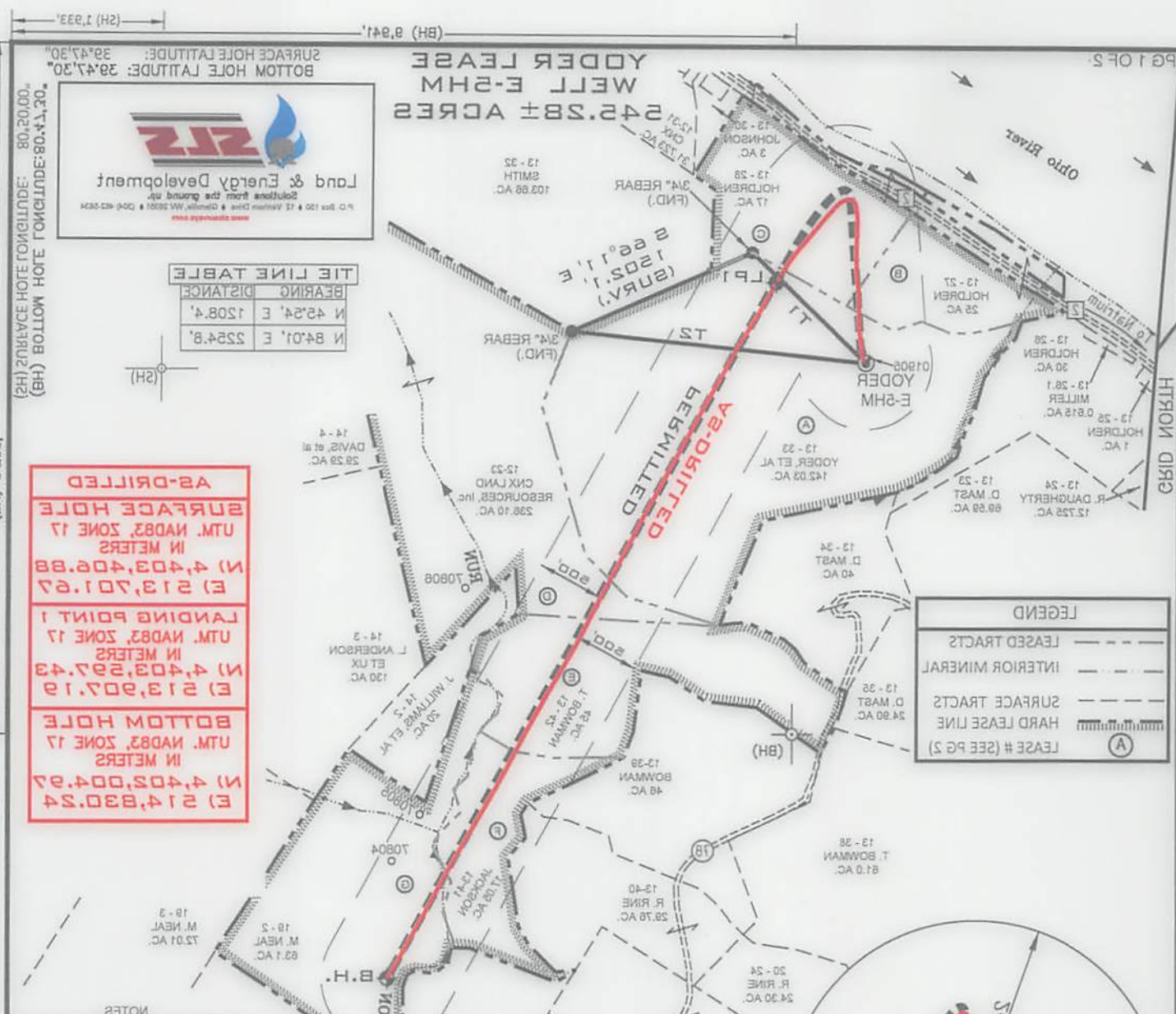
LANDING POINT 1
 UTM. NAD83, ZONE 17
 IN METERS
 (N) 4,403,527.43
 (E) 213,907.19

BOTTOM HOLE
 UTM. NAD83, ZONE 17
 IN METERS
 (N) 4,402,004.92
 (E) 214,830.24

THE LINE TABLE

BEARING	DISTANCE
N 42°24' E	1208.4'
N 84°01' E	2254.8'

SLZ
 Land & Energy Development
 Solutions from the ground up.
 P.O. Box 150 • 17 Veterans Drive • Charles, WV 25024 • (204) 423-0284
 www.slzenergy.com



**YODER WELL E-5HM
WELL PLAT LEASE INFORMATION**

LEASE NO.	TAG	PARCEL	Oil & Gas Royalty Owner	DEED BOOK / PG	
10*14701	A	5-13-33	ROSEITA THORNTON	885	600
10*14702	A	5-13-33	NATHAN D. YODER	708	71
10*16538	B	5-13-27	AMP FUND III LP	915	187
10*14942	C	5-13-28	AARON PAUL HOLDREN	720	132
10*14652	C	5-13-28	CANDICE GUTIERREZ	842	388
10*14644	C	5-13-28	CHERYL HILL	809	517
10*14651	C	5-13-28	DAVID V CALDWELL	842	386
10*14649	C	5-13-28	DONALD GARY GROVES II	842	382
10*14639	C	5-13-28	GARY PARSONS	794	521
10*14638	C	5-13-28	HUGH YOHO	794	478
10*14647	C	5-13-28	JAMES W ROBINSON III	836	102
10*14635	C	5-13-28	KATHY JO RUNYON & ROBERT PATRICK KIRWIN	775	21
10*14654	C	5-13-28	KATHY JO RUNYON & ROBERT PATRICK KIRWIN	854	607
10*14637	C	5-13-28	KIMBERLY S. DENNY	794	511
10*14653	C	5-13-28	KRISTIN DOUGLAS	842	390
10*14641	C	5-13-28	LORA LANGLEY	800	621
10*14648	C	5-13-28	LORI ANN ROBINSON	836	104
10*14643	C	5-13-28	MARTHA RENEE ROBINSON	809	541
10*14642	C	5-13-28	MARY B. FERRIS BY REBECCA R. F	808	457
10*14645	C	5-13-28	RANDY BERISFORD	810	328
10*14640	C	5-13-28	SHERRI SNYDER	799	545
10*14650	C	5-13-28	TIMOTHY DWIGHT GROVES	842	384
10*14636	C	5-13-28	WANDA RIDING	794	503
10*14699	D	5-12-23	CNX GAS COMPANY LLC AND NOBLE	833	514
10*14526	E	5-13-42	THOMAS WILLIAM BOWMAN	761	432
10*14527	E	5-13-42	VICTORIA BOWMAN	761	434
10*14461	F	5-13-41	RODNEY JACKSON	739	411
10*14040	G	5-19-2	MILTON R NEAL AND LINDA L NEAL	665	498
10*14041	G	5-19-2	SHIBEN ESTATES INC	718	496

WELL OPERATOR TUG HILL OPERATING, LLC
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500
 FORT WORTH TX, 76107

DESIGNATED AGENT DIANNA STAMPER
 CT CORPORATION SYSTEM
 ADDRESS 5400 D BIG TYLER ROAD
 CHARLESTON WV, 25313

LEASE NO.	TAG	PARCEL	Oil & Gas Royalty Owner	DEED BOOK \ PG
10*14041	G	2-12-2	SHIBEN ESTATES INC	718
10*14040	G	2-12-2	MILTON R NEAL AND LINDA J NEAL	662
10*14461	F	2-13-41	RODNEY JACKSON	739
10*14257	E	2-13-42	VICTORIA BOWMAN	761
10*14256	E	2-13-42	THOMAS WILLIAM BOWMAN	761
10*14699	D	2-12-23	NOBLE CNX GAS COMPANY LLC AND	833
10*14636	C	2-13-28	WANDA RIDING	794
10*14650	C	2-13-28	TIMOTHY DWIGHT GROVES	842
10*14640	C	2-13-28	SHERRI SNYDER	799
10*14642	C	2-13-28	RANDY BERTSFORD	810
10*14642	C	2-13-28	MARY B. FERRIS BY REBECCA R. F.	808
10*14643	C	2-13-28	MARTHA RENEE ROBINSON	809
10*14648	C	2-13-28	LORI ANN ROBINSON	836
10*14641	C	2-13-28	LORA LANGLEY	800
10*14623	C	2-13-28	KRISTIN DOUGLAS	842
10*14637	C	2-13-28	KIMBERLY S. DENNY	794
10*14624	C	2-13-28	PATRICK KIRWIN KATHY JO RUNYON & ROBERT	824
10*14632	C	2-13-28	PATRICK KIRWIN KATHY JO RUNYON & ROBERT	772
10*14647	C	2-13-28	JAMES W ROBINSON III	836
10*14638	C	2-13-28	HUGH YOHO	794
10*14639	C	2-13-28	GARY PARSONS	794
10*14649	C	2-13-28	DONALD GARY GROVES II	842
10*14621	C	2-13-28	DAVID V CALDWELL	842
10*14644	C	2-13-28	CHERYL HILL	809
10*14622	C	2-13-28	CANDICE GUTIERREZ	842
10*14942	C	2-13-28	AARON PAUL HOLDREN	720
10*16238	B	2-13-27	AMP FUND III LP	912
10*14702	A	2-13-33	NATHAN D. YODER	708
10*14701	A	2-13-33	ROSEITA THORNTON	882