

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

API 47-051-01887 <sup>01757</sup> County Marshall District Franklin  
Quad Powhatan Point 7.5' Pad Name Greer Field/Pool Name \_\_\_\_\_  
Farm name PPG Industries, Inc. Well Number 1N-1HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 South University Drive, Suite 500 City Ft. Worth State TX Zip 76107

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,400,797.0 Easting 514,014.8  
Landing Point of Curve Northing 4,400,495.6 Easting 513,380.4  
Bottom Hole Northing 4,402,416.8 Easting 512,275.6

Elevation (ft) 1,251' 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 12/7/2016 Date drilling commenced 3/6/2017 Date drilling ceased 8/27/2017  
Date completion activities began 12/12/2017 Date completion activities ceased 3/4/2018  
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 1600' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft Sewickley 785' TVD, Pittsburgh 879' TVD Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

**Reviewed**

*Jr 10/23/18*

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Reviewed by: \_\_\_\_\_

API 47-051 -

01757  
01887

Farm name PPG Industries, Inc.

Well number 1N-1HM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	26	20	120	NEW	94.5#	N/A	YES
Surface	17 1/2	13 3/8	1,023	NEW	54.5#	N/A	YES
Coal	17 1/2	13 3/8	999	NEW	54.5#	N/A	YES
Intermediate 1	12 1/4	9 5/8	2,618	NEW	36#	N/A	YES
Intermediate 2							
Intermediate 3							
Production	8 3/4	5 1/2	14,667	NEW	20#	N/A	YES
Tubing		2 3/8	7,026	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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	A	200	15.6	1.19	238	0	8
Surface	A	800	15.6	1.19	960	0	8
Coal	A	800	15.6	1.19	960	0	8
Intermediate 1	A	850	15.6	1.19	1020	0	8
Intermediate 2							
Intermediate 3							
Production	A	2926	14.5	1.17	3423	0	8
Tubing							

Drillers TD (ft) 14,692'

Loggers TD (ft) \_\_\_\_\_

Deepest formation penetrated Marcellus

Plug back to (ft) n/a

Plug back procedure n/a

Kick off depth (ft) 6,173

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 \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

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**Greer N-1HM  
Perforation Record**

Stage	Date Perforated	Bottom Perf (ft)	Top Perf (ft)	Number of Perfs	Formation
1	N/A			2	Marcellus
2	12/14/2017	14,342	14,211	48	Marcellus
3	12/16/2017	14,167	14,033	48	Marcellus
4	12/16/2017	13,992	13,858	48	Marcellus
5	12/20/2017	12,817	12,683	48	Marcellus
6	12/22/2017	13,642	13,508	48	Marcellus
7	12/24/2017	13,467	13,333	48	Marcellus
8	12/29/2017	13,292	13,158	48	Marcellus
9	1/2/2018	13,139	12,983	48	Marcellus
10	1/3/2018	12,940	12,808	48	Marcellus
11	1/6/2018	12,769	12,633	48	Marcellus
12	1/8/2018	12,562	12,458	48	Marcellus
13	1/9/2018	12,417	12,283	48	Marcellus
14	1/11/2018	12,242	12,108	48	Marcellus
15	1/12/2018	12,067	11,933	48	Marcellus
16	1/16/2018	11,892	11,757	48	Marcellus
17	1/18/2018	11,715	11,586	48	Marcellus
18	1/18/2018	11,775	11,746	48	Marcellus
19	1/19/2018	11,543	11,408	48	Marcellus
20	1/22/2018	11,192	11,058	48	Marcellus
21	1/26/2018	11,017	10,883	48	Marcellus
22	1/31/2018	10,711	10,839	48	Marcellus
23	2/7/2018	10,667	10,533	48	Marcellus
24	2/9/2018	10,492	10,361	48	Marcellus
25	2/11/2018	10,317	10,183	48	Marcellus
26	2/12/2018	10,142	10,012	48	Marcellus
27	2/12/2018	9,969	9,833	48	Marcellus
28	2/13/2018	9,789	9,658	48	Marcellus
29	2/13/2018	9,617	9,483	48	Marcellus
30	2/13/2018	9,442	9,308	48	Marcellus
31	2/14/2018	9,267	9,133	48	Marcellus
32	2/16/2018	9,089	8,958	48	Marcellus
33	2/17/2018	8,917	8,783	48	Marcellus
34	2/18/2018	8,742	8,608	48	Marcellus
35	2/20/2018	8,567	8,433	48	Marcellus
36	2/21/2018	8,392	8,258	48	Marcellus
37	2/23/2018	8,217	8,083	48	Marcellus
38	2/24/2018	8,042	7,908	48	Marcellus
39	3/2/2018	7,867	7,733	48	Marcellus
40	3/3/2018	7,692	7,558	48	Marcellus
41	3/3/2018	7,517	7,383	48	Marcellus
42	3/3/2018	7,342	7,208	48	Marcellus

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**Stimulation Summary  
Greer 1H**

Stage	Avg. Pump Rate (BPM)	Avg. Treating Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Proppant Total (lbs)	Water Total (bbls)	Amount of N2 (scf)
1	88.7	8638	4579	2824	337165	6267.97619	0
2	87.6	8272	5105	2940	335243	6305.452381	0
3	89.9	8599	5546	3206	338393	6363.047619	0
4	88.3	8139	5555	3210	455017	8674.214286	0
5	89.8	8345	6285	3771	451348	7496.404762	0
6	87.9	8283	6072	3500	455060	8122.47619	0
7	84.9	8145	5120	3669	451907	7386.309524	0
8	84.2	8162	6472	3580	450176	9797.190476	0
9	86.5	8253	4721	3615	449928	7582.190476	0
10	87.5	8276	5916	4054	451509	7570.428571	0
11	84.3	8040	5986	4123	451398	7627.666667	0
12	85.1	8246	5615	3700	449271	7466.166667	0
13	87.4	8153	6150	3524	450824	7304.738095	0
14	89.9	8126	5513	4169	449929	7408.02381	0
15	89.3	8025	5273	3825	452466	7688.404762	0
16	75.7	8245	5902	3395	451534	7628.738095	0
17	84	7664	5538	3705	451000	7369.095238	0
18	82.5	7455	4890	3691	451460	7404.952381	0
19	69.5	7363	6182	3287	451104	9806.452381	0
20	84.8	7604	5541	3848	450362	7592.833333	0
21	87	7603	5407	3804	450102	7663.428571	0
22	89.1	6027	6604	3800	457292	7311.142857	0
23	5.7	8178	8256	9380	0	508.5238095	0
24	79.8	7706	6510	9229	448039	7629.285714	0
25	49.6	8788	7768	5990	2456	2990.5	0
26	78.4	7264	5671	3526	286780	10047.45238	0
27	77	7845	6296	3935	450322	9429.833333	0
28	86.1	7186	5260	4085	449468	9408.761905	0
29	85	7342	5513	4043	450764	7463.761905	0
30	83.1	7373	6004	4051	449494	7224.97619	0
31	85.9	7394	6035	3773	450146	7355.690476	0
32	88.5	7282	5580	3681	450160	7353.285714	0
33	87.1	7248	6010	3877	450814	7416.095238	0
34	88.9	7383	5822	3942	450989	7392.785714	0
35	87.6	7272	5487	3725	441695	7294.47619	0
36	88.5	7279	7018	3709	450500	7266.857143	0
37	87	7178	7176	3564	450224	7261.214286	0

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**Stimulation Summary  
Greer 1H**

38	32.2	6584	7100	8764	423831	2915.785714	0
39	71.3	7378	7120	3797	406952	6757.904762	0
40	79.4	7397	7134	3850	449902	6774.309524	0
41	85.5	7714	5228	3745	412788	7471.190476	0
42	89.3	7329	6836	4234	447146	6837.309524	0

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**Greer 1N-1HM**  
**Lithology/Formation 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	1857	1929	1861	1934	Sandstone
Big Lime	1929	2038	1934	2044	Limestone
Big Injun	2038	2346	2044	2354	Sandstone
Weir	2346	2536	2354	2545	Sandstone
Berea	2536	2854	2545	2842	Sandstone
Gordon	2854	2956	2842	2969	Sandstone
Fifty Foot	2956	3529	2969	3564	Sandstone
Speechley	3529	4865	3564	5159	Sandstone
Benson	4865	5234	5159	5621	Sandstone
Alexander	5234	5854	5621	6388	Siltstone
Rhinestreet	5854	6216	6388	6861	Black shale
Middlesex	6216	6302	6861	7030	Black shale
Geneseo/Burkett	6302	6331	7030	7112	Black shale
Tully	6331	6342	7109	7142	Limestone
Hamilton	6342	6352	7142	7183	Grey shale
Marcellus	6352	-	7183	-	Black shale

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**Tug Hill Operating LLC**  
**Well: Greer 1N-01M**  
**Site: Greer Unit N**  
**Project: Marshall County, WV**  
**Design: rev5**

**SECTION DETAILS**

MD	Inc	Azi	+N-S	+E-W	Dleg	TFace	VSec	Annotation
6089.00	35.53	220.85	5610.59	-1215.44	-1295.01	0.00	0.00	119.01
6170.00	35.53	220.85	5676.51	-1251.05	-1325.60	0.00	0.00	117.27
6360.73	35.53	220.85	5848.00	-1343.68	-1405.90	0.00	0.00	112.73
7250.19	80.00	319.70	6384.40	-1174.47	-1958.38	10.00	102.98	632.31
7401.22	91.00	330.10	6396.26	-1051.59	-2044.62	10.00	43.83	779.17
14749.03	91.00	330.10	6268.00	5317.03	-5707.20	0.00	0.00	7800.19

MD	Inc	Azi	+N-S	+E-W	VSecDeparture	Annotation
100.00	0.37	67.33	100.00	0.30	-0.13	0.32
2647.00	8.05	229.52	2637.48	-102.72	-125.72	22.35
14640.00	91.16	329.34	6357.08	-5679.75	7747.63	10000.64
14692.00	91.16	329.34	6356.02	5314.12	-5706.26	7797.51

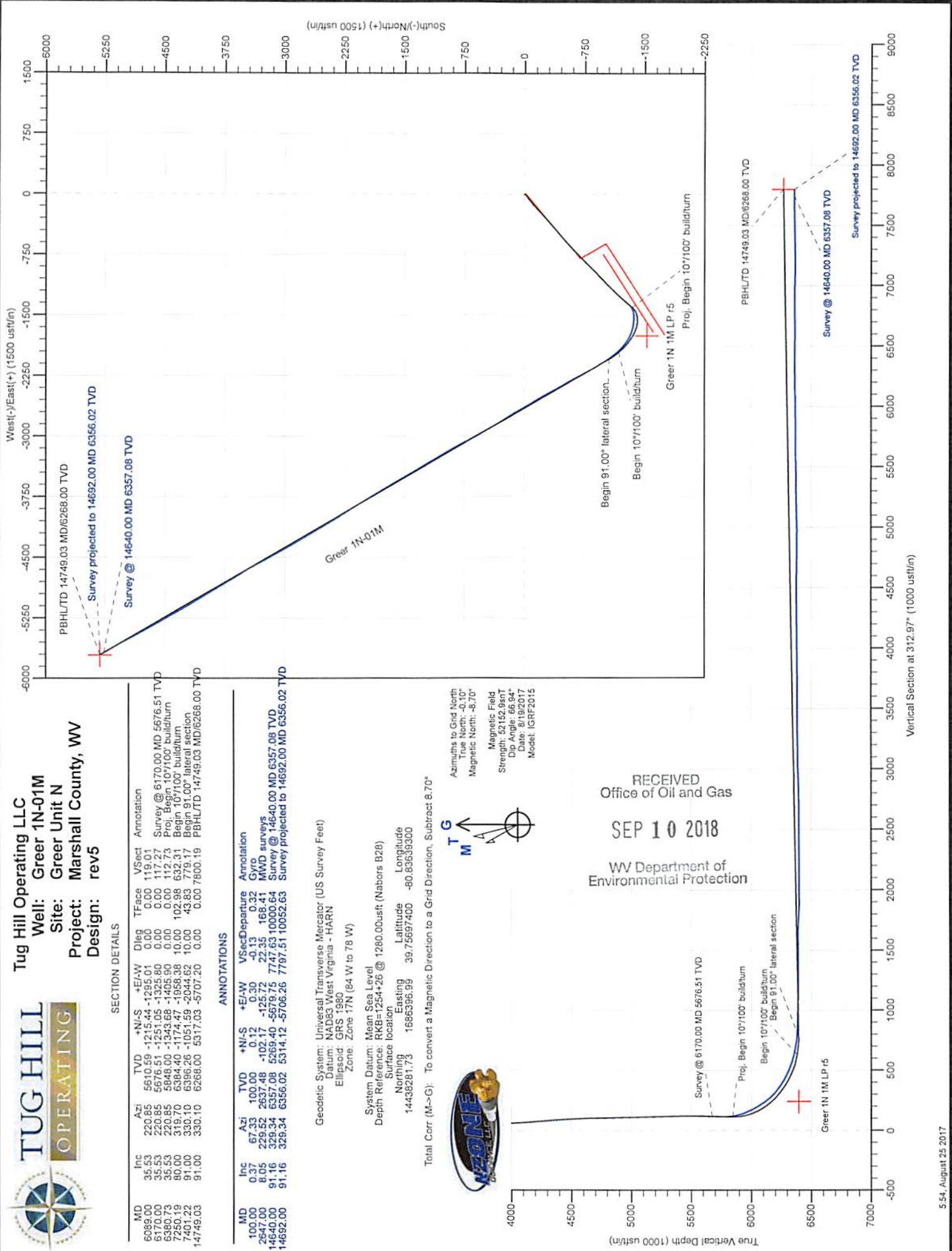
Geocentric System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level  
 Depth Reference: RKB=1254+26 @ 1280.00usft (Nabors B28)  
 Surface location  
 Northing Easting Latitude Longitude  
 14438281.73 1686396.99 39.75697400 -80.83639300

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.70°



Azimuths to Grid North  
 True North: -0.10°  
 Magnetic North: -8.70°  
 Magnetic Field  
 Strength: 52152.9nT  
 Dip Angle: 66.94°  
 Date: 8/19/2017  
 Model: IGRF2015



Company: Tug Hill Operations LLC  
 Well: Greer 1N1HM  
 API: 47-051-01757  
 Rig Name: Nabors B-28  
 State/County: West Virginia/Marshall  
 VS-Azi: 0.00 Degrees  
 Latitude: 39.75697, Longitude: -80.83639  
 Grid North = True North +0.85 degs (NAD 27)  
 Grid Correction Applied = +0.85 degs



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = 25.625 feet  
 DRILLOG HA GYRO SURVEY CALCULATIONS  
 Error Model: VESSI\_GYROFLEX.IPM  
 Minimum Curvature Method  
 Report Date/Time: 3/14/2017 / 00:57  
 VES Survey International  
 Morgantown, WV  
 304-777-2189  
 James Hollis

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Measured Incl Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	N/S FT	E/W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.37	67.33	100.00	0.12	0.29	0.12	0.32	67.33	0.37
200.00	0.18	27.58	200.00	0.39	0.66	0.39	0.77	59.62	0.25
300.00	0.55	275.62	300.00	0.58	0.26	0.58	0.63	24.32	0.64
400.00	0.22	221.84	399.99	0.48	-0.34	0.48	0.59	324.45	0.45
500.00	0.19	187.49	499.99	0.18	-0.49	0.18	0.52	289.56	0.13
600.00	0.21	7.19	599.99	0.20	-0.49	0.20	0.53	291.64	0.40
700.00	0.50	178.94	699.99	-0.06	-0.46	-0.06	0.47	262.87	0.71
800.00	0.21	72.17	799.99	-0.44	-0.28	-0.44	0.52	212.64	0.59
900.00	0.30	129.78	899.99	-0.55	0.10	-0.55	0.56	169.92	0.26
Tie in point from previous VES Survey									
935.00	0.25	96.89	934.99	-0.62	0.24	-0.62	0.66	158.37	0.47
1000.00	0.11	100.36	999.99	-0.65	0.45	-0.65	0.79	145.31	0.22
1100.00	0.23	115.56	1099.99	-0.75	0.72	-0.75	1.04	136.05	0.13
1200.00	2.05	208.04	1199.97	-2.42	0.07	-2.42	2.42	178.44	2.07
1300.00	4.13	219.12	1299.82	-6.79	-3.05	-6.79	7.44	204.17	2.15

1400.00	4.93	225.87	1399.51	-12.57	-8.40	-12.57	15.12	213.75	0.96
1500.00	6.09	235.75	1499.04	-18.54	-15.86	-18.54	24.40	220.55	1.49
1600.00	7.90	237.43	1598.30	-25.23	-26.04	-25.23	36.26	225.91	1.83
1700.00	8.58	235.25	1697.26	-33.18	-37.96	-33.18	50.42	228.85	0.75
1800.00	7.62	234.68	1796.26	-41.26	-49.50	-41.26	64.45	230.19	0.97
1900.00	7.43	232.19	1895.40	-49.06	-60.02	-49.06	77.51	230.74	0.38
2000.00	6.89	228.90	1994.63	-56.96	-69.64	-56.96	89.97	230.72	0.67
2100.00	7.74	227.58	2093.81	-65.45	-79.14	-65.45	102.69	230.41	0.86
2200.00	6.47	227.83	2193.04	-73.77	-88.28	-73.77	115.05	230.12	1.27
2300.00	4.82	229.35	2292.55	-80.29	-95.64	-80.29	124.87	229.99	1.66
2400.00	4.90	230.16	2392.19	-85.76	-102.11	-85.76	133.34	229.97	0.11
2500.00	6.74	238.98	2491.68	-91.52	-110.42	-91.52	143.42	230.35	2.04
2564.00	7.10	237.27	2555.21	-95.60	-116.97	-95.60	151.07	230.74	0.65

HORIZONTAL DISPLACEMENT IS  
151.07 FEET AT 230.74 DEGREES

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/6/2018
Job End Date:	3/6/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01954-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Greer 1N-1HM
Latitude:	39.75697400
Longitude:	-80.83639300
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,422
Total Base Water Volume (gal):	13,831,319
Total Base Non Water Volume:	0



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## 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	86.47898	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.36563	

MC B-8614	Halliburton	Biocide					
				Listed Below			
FR-76	Halliburton	Friction Reducer					
				Listed Below			
SCALECHEK LP-70	Halliburton	Scale Inhibitor					
				Listed Below			
SP BREAKER	Halliburton	Breaker					
				Listed Below			
MC MX 2-2822	Halliburton	Scale Inhibitor					
				Listed Below			
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant					
				Listed Below			
OILPERM A	Halliburton	Non-ionic Surfactant					
				Listed Below			
SAND-PREMIUM WHITE-40/70, BULK	Halliburton	Proppant					
				Listed Below			

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HYDROCHLORIC ACID	Halliburton	Solvent						
				Listed Below				
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor						
				Listed Below				
WG-36 GELLING AGENT	Halliburton	Gelling Agent						
				Listed Below				
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	13.08520		
			Hydrochloric acid	7647-01-0	15.00000	0.03905		
			Inorganic salt	Proprietary	30.00000	0.03437		
			Acrylamide acrylate copolymer	Proprietary	30.00000	0.03437	Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.03437		
			Guar gum	9000-30-0	100.00000	0.01183		
			Glutaraldehyde	111-30-8	30.00000	0.00761		
			Methanol	67-56-1	60.00000	0.00499		
			Amines, polyethylenepoly-, ethoxylated, phosphonomethylated, sodium salts	70900-16-2	30.00000	0.00434		
			Ethylene glycol	107-21-1	60.00000	0.00419		
			Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	5.00000	0.00127		
			Ethanol	64-17-5	60.00000	0.00088		

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			Sodium chloride	7647-14-5	5.00000	0.00072	
			Telmer	Proprietary	10.00000	0.00070	
			Sodium persulfate	7775-27-1	100.00000	0.00047	
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00042	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00031	
			Modified thiourea polymer	Proprietary	30.00000	0.00031	
			Fatty acids, tall oil	Proprietary	30.00000	0.00031	
			Ethoxylated alcohols	Proprietary	30.00000	0.00031	
			Olefins	Proprietary	5.00000	0.00012	
			Propargyl alcohol	107-19-7	10.00000	0.00010	
			Sodium polyacrylate	9003-04-7	1.00000	0.00007	
			Naphthalene	91-20-3	5.00000	0.00005	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			Phosphoric acid	7664-38-2	0.10000	0.00003	
			Formaldehyde	50-00-0	0.09000	0.00001	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
			Acrylic acid	79-10-7	0.01000	0.00000	
			Sodium sulfate	7757-82-6	0.10000	0.00000	

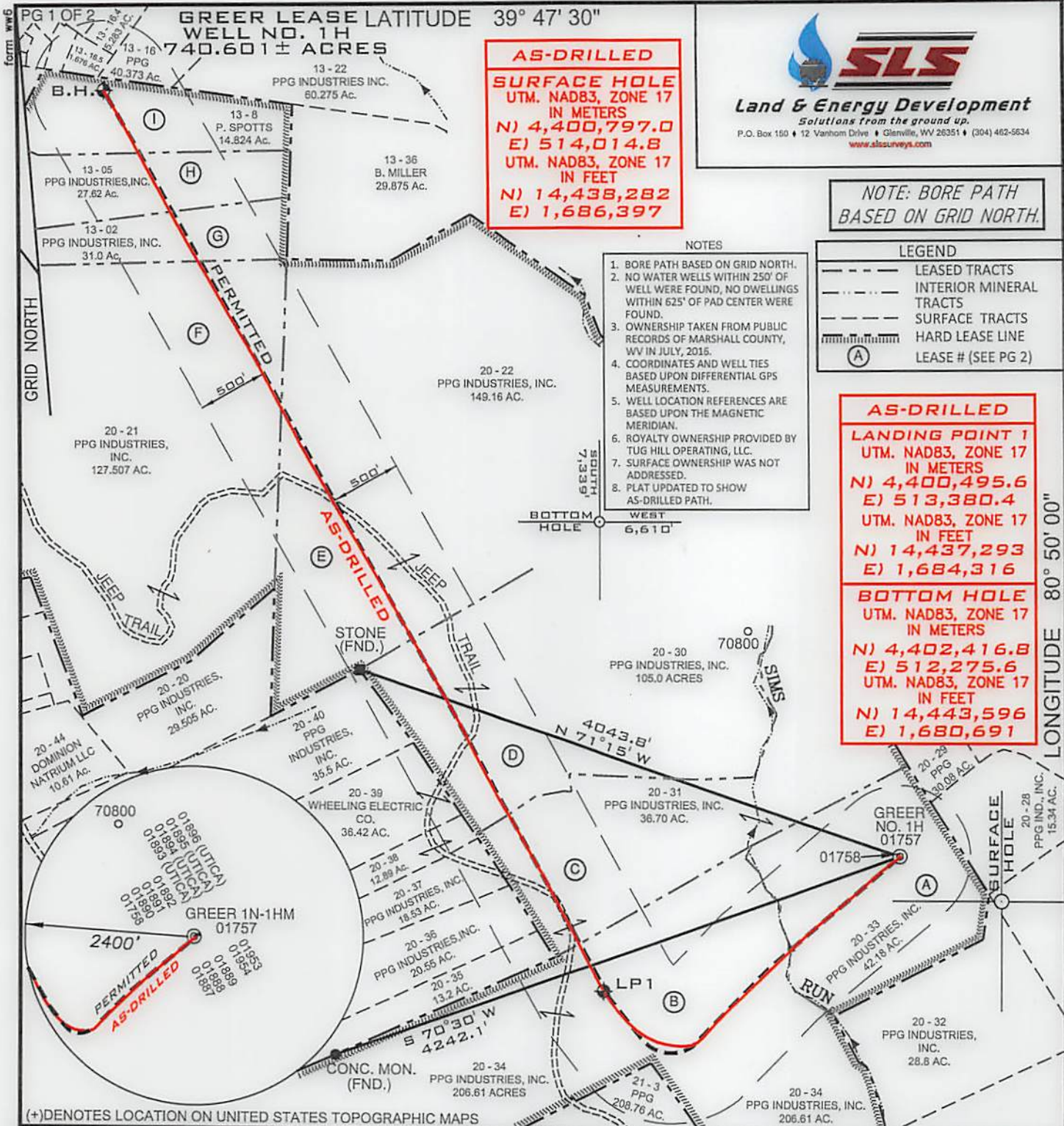
RECEIVED  
Office of Oil and Gas

SEP 10 2018

WV Department of  
Environmental Protection

- \* 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)



**AS-DRILLED**  
**SURFACE HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,400,797.0  
 E) 514,014.8  
 UTM. NAD83, ZONE 17  
 IN FEET  
 N) 14,438,282  
 E) 1,686,397



NOTE: BORE PATH  
 BASED ON GRID NORTH.

- 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 JULY, 2016.
  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. PLAT UPDATED TO SHOW AS-DRILLED PATH.

LEGEND

- LEASED TRACTS
- INTERIOR MINERAL TRACTS
- SURFACE TRACTS
- HARD LEASE LINE
- (A) LEASE # (SEE PG 2)

**AS-DRILLED**  
**LANDING POINT 1**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,400,495.6  
 E) 513,380.4  
 UTM. NAD83, ZONE 17  
 IN FEET  
 N) 14,437,293  
 E) 1,684,316  
**BOTTOM HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
 N) 4,402,416.8  
 E) 512,275.6  
 UTM. NAD83, ZONE 17  
 IN FEET  
 N) 14,443,596  
 E) 1,680,691

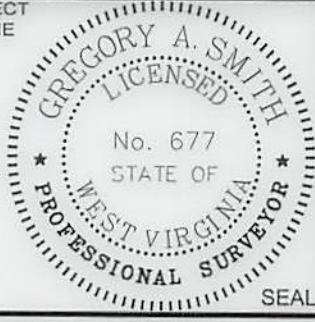
LONGITUDE 08 05 00

12,665'

FILE NUMBER **8837**  
 DRAWING NUMBER **8837ADG1N1HM.dwg**  
 SCALE **1" = 1000'**  
 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. **GREER NO. 1H AS-DRILLED**  
 API WELL NO. **47-051-01757**  
 STATE COUNTY PERMIT

WELL TYPE: OIL \_\_\_ GAS  LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_  
 (IF "GAS") PRODUCTION  STORAGE \_\_\_ DEEP \_\_\_ SHALLOW   
 LOCATION ELEVATION **1251'** WATERSHED (HUC 10) **FRENCH CREEK - OHIO RIVER (UNDEFINED)**  
 DISTRICT **FRANKLIN** COUNTY **MARSHALL**  
 QUADRANGLE **POWHATAN POINT 7.5'** LEASE NUMBER **SEE ATTACHED PG 2 OF 2**

SURFACE OWNER **PPG INDUSTRIES, INC.** ACREAGE **42.18**  
 OIL & GAS ROYALTY OWNER **PPG INDUSTRIES, INC., ET AL** LEASE ACREAGE **740.601**  
 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 \_\_\_  
 ESTIMATED DEPTH **TVD 6,356' TMD:14,692'**  
 WELL OPERATOR **TUG HILL OPERATING, LLC** DESIGNATED AGENT **DIANNA STAMPER**  
 ADDRESS **1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH TX, 76107** ADDRESS **5400 D BIG TYLER ROAD CHARLESTON WV, 25313**

COUNTY NAME PERMIT



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



GRADE GPS
SUBMETER MAPPING
PROVEN SOURCE
OF ELEVATION
1" = 1000'
SCALE
8837ADG11HM.dwg
DRAWING NUMBER
8837
FILE NUMBER

P.S. 677  
 PROTECTION INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL

TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT



WELL OPERATOR TUG HILL OPERATING, LLC  
 DESIGNATED AGENT CT CORPORATION SYSTEM  
 DIANNA STAMPER  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500  
 FORT WORTH TX, 76107

TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH TMD: 6,356', TMD: 14,692'  
 PLUG & ABANDON \_\_\_\_\_ CLEAN OUT & REPLUG \_\_\_\_\_ PERMIT \_\_\_\_\_

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

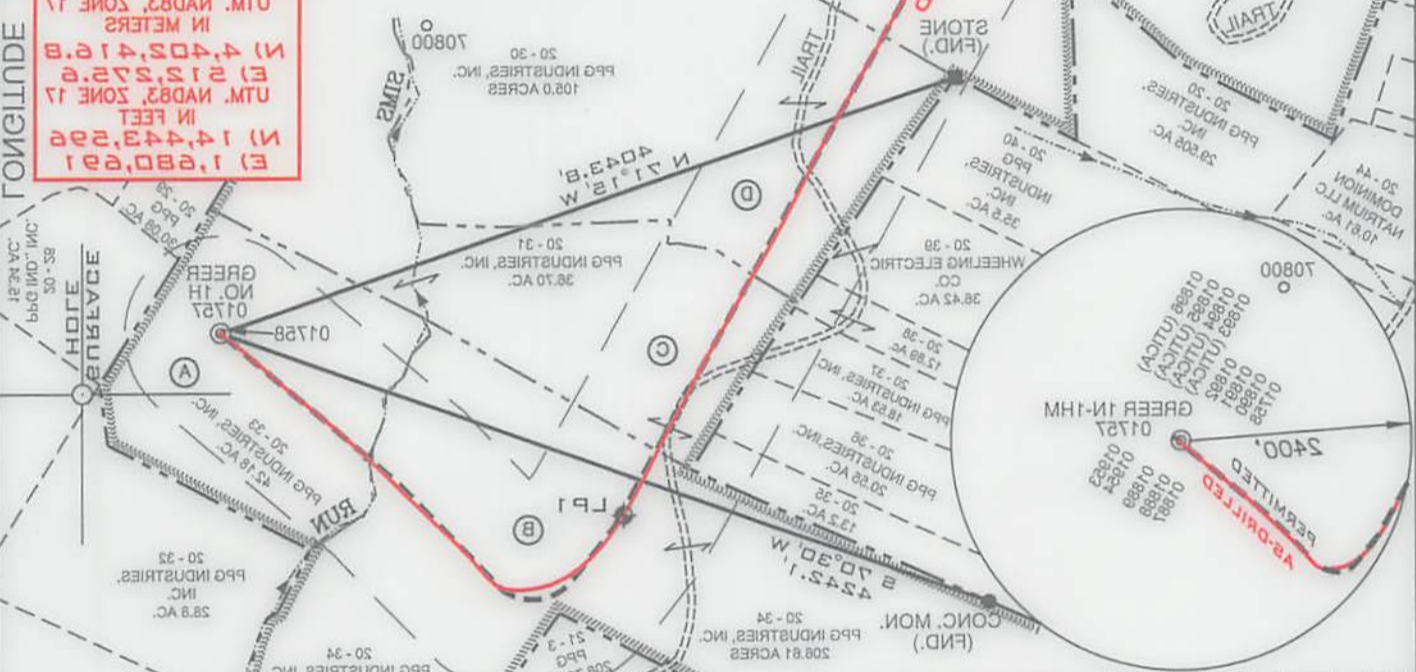
OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC., ET AL  
 LEASE ACREAGE 740.601  
 SURFACE OWNER PPG INDUSTRIES, INC.  
 QUADRANGLE POWHATAN POINT 7.2' LEASE NUMBER SEE ATTACHED PG 2 OF 2  
 DISTRICT FRANKLIN COUNTY MARSHALL

LOCATION ELEVATION 1251' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER (UNDEFINED)  
 (IF GAS) PRODUCTION  STORAGE  DEEP  SHALLOW   
 WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL

API WELL NO. 47-051-01757  
 STATE COUNTY PERMIT

OPERATORS WELL NO. GREER NO. 1H AS-DRILLED  
 DATE: JULY 17, 2018

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS



LEGEND

LEASING TRACTS	---
INTERIOR MINERAL TRACTS	---
SURFACE TRACTS	---
HARD LEASE LINE	---
LEASE # (SEE PG 2)	(A)

- 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 JULY, 2018.
  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. PLAT PLOTTED TO SHOW AS-DRILLED PATH.

AS-DRILLED  
 UTM. NAD83, ZONE 17  
 IN METERS  
 (N) 14,443,299  
 (E) 213,380.4  
 UTM. NAD83, ZONE 17  
 IN FEET  
 (N) 47,437.293  
 (E) 1,684,316

BOTTOM HOLE  
 UTM. NAD83, ZONE 17  
 IN METERS  
 (N) 4,402,416.8  
 (E) 212,272.6  
 UTM. NAD83, ZONE 17  
 IN FEET  
 (N) 14,443,299  
 (E) 1,680,691

AS-DRILLED  
 SURFACE HOLE  
 UTM. NAD83, ZONE 17  
 IN METERS  
 (N) 4,400,797.0  
 (E) 214,014.8  
 UTM. NAD83, ZONE 17  
 IN FEET  
 (N) 14,438,282  
 (E) 1,686,297

**SLZ**  
 Land & Energy Development  
 Solutions from the Ground up  
 P.O. Box 100 • 12 Veterans Drive • Grafton, WV 26032 • (304) 482-8824  
 www.slzenergy.com

NOTE: BORE PATH  
 BASED ON GRID NORTH.

**GREER WELL NO. 1H  
WELL PLAT LEASE INFORMATION**

Lease No.	Tag	Parcel	Oil & Gas Royalty Owner	Deed Book/Pg	
WV16-0076-001	A	5-20-33	PPG INDUSTRIES, INC.	725	123
WV16-0076-001	B	5-20-34	PPG INDUSTRIES, INC.	725	123
WV16-0076-001	C	5-20-31	PPG INDUSTRIES, INC.	725	123
WV16-0076-001	D	5-20-30	PPG INDUSTRIES, INC.	725	123
WV16-0076-068	D	5-20-30	DAN J. SWOVELAND	827	523
WV16-0076-069	D	5-20-30	CARRIE E METZGER FKA CARRIE ELIZABETH CHAMBERS	833	527
WV16-0076-070	D	5-20-30	CHRISTINA CHAMBERS	836	123
WV16-0076-071	D	5-20-30	JOSEPH LONG	836	106
WV16-0076-117	D	5-20-30	DAVID C WHITE, ESQ., SPECIAL COMMISSIONER ON BEHALF OF D.W. CHESS OR HIS HEIRS, SUCCESSORS, ASSIGNS, DEVISEES, OR DISTRIBUTEES	872	217
WV16-0076-063	D	5-20-30	ALLEN D. MASON	827	276
WV16-0076-064	D	5-20-30	RODNEY K. CHAMBERS	827	271
WV16-0076-065	D	5-20-30	CAROLYN STARKEY	827	226
WV16-0076-066	D	5-20-30	CHRISTINA I. CHILCOTE	827	525
WV16-0076-067	D	5-20-30	DAWN M. LAEMMIE	827	521
WV16-0076-058	D	5-20-30	GLENN L. MASON & SANDRA K. MASON	822	256
WV16-0076-059	D	5-20-30	FREDRIC RICHTER & BETTY RICHTER	822	270
WV16-0076-060	D	5-20-30	JORLENE POST	827	280
WV16-0076-061	D	5-20-30	CHRIS H. STEVENSON	827	282
WV16-0076-062	D	5-20-30	LUCYBELLE WELDON	827	278
WV16-0076-053	D	5-20-30	NORA WEBB	805	78
WV16-0076-054	D	5-20-30	BRIAN K. MARMIE & CAROL L. MARMIE	805	76
WV16-0076-055	D	5-20-30	KARI B. MARMIE	809	515
WV16-0076-056	D	5-20-30	TRAVIS D. MARMIE	808	491
WV16-0076-057	D	5-20-30	DEWAYNE STARKEY	815	228
WV16-0076-047	D	5-20-30	SHARON D. GREEN	799	463
WV16-0076-048	D	5-20-30	LAURA GLASSNER	800	406
WV16-0076-049	D	5-20-30	TERRY I. CHAMBERS	800	404
WV16-0076-050	D	5-20-30	GEORGEANN TIPPY	803	152
WV16-0076-051	D	5-20-30	HOWARD A. BROWN	805	98
WV16-0076-052	D	5-20-30	RAE JEAN NAMETH	805	80
WV16-0076-041	D	5-20-30	JOANN FRAZIER	799	59
WV16-0076-042	D	5-20-30	JOSEPH CHAMBERS	799	450
WV16-0076-043	D	5-20-30	ROBERT MARMIE	799	455
WV16-0076-044	D	5-20-30	FLORENCE L. MYERS	799	457
WV16-0076-045	D	5-20-30	BARBARA METZNER	799	459
WV16-0076-046	D	5-20-30	LYNNETTE L. KUGLER	799	461
WV16-0076-012	D	5-20-30	COLLIN A. WILLISON III	789	577
WV16-0076-032	D	5-20-30	LETTITIA TEMPLE	799	465
WV16-0076-037	D	5-20-30	MARY C. JOSEPH	797	196
WV16-0076-038	D	5-20-30	MARSHA L. SCHON	797	198
WV16-0076-039	D	5-20-30	WILLIAM M. DOYLE	797	187
WV16-0076-040	D	5-20-30	LOIS JEAN MYERS	797	189
WV16-0076-001	E	5-20-22	PPG INDUSTRIES, INC.	725	123
WV16-0185-001	E	5-20-22	ROGER R WEESE, SPECIAL COMMISSIONER ON BEHALF OF EMMA W STANDIFORD, MARY WILSON CRAMER, JANE TAYLOR, MAY BRIDENBECKER, ROSEBERRY L WILSON, ANNIE WILSON, BEATRICE WILSON KERLIN, COURTNEY T WILSON, GUY WILSON, CALLIE WILSON GATES, JAMES C WILSON, H L WILSO	836	488
WV16-0076-001	F	5-20-21	PPG INDUSTRIES, INC.	725	123
WV16-0076-001	G	5-13-2	PPG INDUSTRIES, INC.	725	123
WV16-0076-001	H	5-13-5	PPG INDUSTRIES, INC.	725	123
WV16-0142-000	I	5-13-8	PAUL F. SPOTTS	779	482

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

WELL PLAT LEASE INFORMATION  
GREER WELL NO. 1H

Lease No.	Tag	Parcel	Oil & Gas Royalty Owner	Deed Book/Pg
WV16-0145-000	I	2-13-8	PAUL F. SPOLTS	779 485
WV16-0076-001	H	2-13-2	PPG INDUSTRIES, INC.	752 153
WV16-0076-001	G	2-13-2	PPG INDUSTRIES, INC.	752 153
WV16-0076-001	F	2-20-21	PPG INDUSTRIES, INC.	752 153
WV16-0182-001	E	2-20-22	GATES, JAMES C WILSON, H J WILSON WILSON BEATRICE WILSON KERLIN, COURTNEY T WILSON, GUY WILSON, CALLIE WILSON WILSON GRAMER, JANE TAYLOR, MAY BRIDENBECKER, ROSEBERRY L WILSON, ANNIE ROGER R WESE, SPECIAL COMMISSIONER ON BEHALF OF EMMA W STANDIFORD, MARY	836 488
WV16-0076-001	E	2-20-22	PPG INDUSTRIES, INC.	752 153
WV16-0076-040	D	2-20-30	LOIS JEAN MYERS	797 189
WV16-0076-039	D	2-20-30	WILLIAM M. DOYLE	797 187
WV16-0076-038	D	2-20-30	MARSHA L SCHON	797 198
WV16-0076-037	D	2-20-30	MARY C JOSEPH	797 196
WV16-0076-035	D	2-20-30	LETITIA TEMPLE	799 462
WV16-0076-012	D	2-20-30	COLLIN A. WILLISON III	789 277
WV16-0076-046	D	2-20-30	LYNNETTE L KUGLER	799 461
WV16-0076-045	D	2-20-30	BARBARA METZNER	799 429
WV16-0076-044	D	2-20-30	FLORENCE L MYERS	799 422
WV16-0076-043	D	2-20-30	ROBERT MARMIE	799 422
WV16-0076-042	D	2-20-30	JOSEPH CHAMBERS	799 420
WV16-0076-041	D	2-20-30	JOANN FRAZIER	799 29
WV16-0076-025	D	2-20-30	RAE JEAN NAMETH	802 80
WV16-0076-021	D	2-20-30	HOWARD A. BROWN	802 98
WV16-0076-020	D	2-20-30	GEORGEANN TIPPY	803 122
WV16-0076-049	D	2-20-30	TERRY I. CHAMBERS	800 404
WV16-0076-048	D	2-20-30	LARA GLASNER	800 406
WV16-0076-047	D	2-20-30	SHARON D. GREEN	799 463
WV16-0076-027	D	2-20-30	DEWAYNE STARKEY	812 258
WV16-0076-026	D	2-20-30	TRAVIS D. MARMIE	808 491
WV16-0076-022	D	2-20-30	KARI B. MARMIE	809 212
WV16-0076-024	D	2-20-30	BRIAN K. MARMIE & CAROL L. MARMIE	802 76
WV16-0076-023	D	2-20-30	NORA WEBB	802 78
WV16-0076-062	D	2-20-30	LUCYBELLE WELDON	827 278
WV16-0076-061	D	2-20-30	CHRIS H. STEVENSON	827 282
WV16-0076-060	D	2-20-30	JORLENE POST	827 280
WV16-0076-029	D	2-20-30	FREDRIC RICHTER & BETTY RICHTER	825 270
WV16-0076-028	D	2-20-30	GLENN J. MASON & SANDRA K. MASON	825 226
WV16-0076-097	D	2-20-30	DAWN M. JACMIE	827 251
WV16-0076-066	D	2-20-30	CHRISTINA I. CHILCOTE	827 252
WV16-0076-062	D	2-20-30	CAROLYN STARKEY	827 256
WV16-0076-064	D	2-20-30	RODNEY K. CHAMBERS	827 271
WV16-0076-063	D	2-20-30	ALLEN D. MASON	827 276
WV16-0076-117	D	2-20-30	SUCCESSORS, ASSIGNS, DEVISEES, OR DISTRIBUTORS DAVID C WHITE, ESC, SPECIAL COMMISSIONER ON BEHALF OF D.W. CHESS OR HIS HEIRS,	827 217
WV16-0076-071	D	2-20-30	JOSEPH LONG	836 106
WV16-0076-070	D	2-20-30	CHRISTINA CHAMBERS	836 123
WV16-0076-069	D	2-20-30	CARRIE E METZGER FKA CARRIE ELIZABETH CHAMBERS	833 227
WV16-0076-088	D	2-20-30	DAN J. SWOVELAND	827 223
WV16-0076-001	D	2-20-30	PPG INDUSTRIES, INC.	752 153
WV16-0076-001	C	2-20-31	PPG INDUSTRIES, INC.	752 153
WV16-0076-001	B	2-20-34	PPG INDUSTRIES, INC.	752 153
WV16-0076-001	A	2-20-33	PPG INDUSTRIES, INC.	752 153

WELL OPERATOR TUG HILL OPERATING, LLC  
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