



west virginia department of environmental protection

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

Jim Justice , Governor  
Austin Caperton , Cabinet Secretary  
www.dep.wv.gov

Friday, September 08, 2017  
WELL WORK PERMIT  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
550 BAILEY AVENUE, SUITE 510

FORT WORTH, TX 76107

Re: Permit approval for GREER 1W-14HM  
47-051-01954-00-00

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

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

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
Chief

Operator's Well Number: GREER 1W-14HM  
Farm Name: PPG INDUSTRIES, INC.  
U.S. WELL NUMBER: 47-051-01954-00-00  
Horizontal 6A / New Drill  
Date Issued: 9/8/2017

Promoting a healthy environment.

09/08/2017

# PERMIT CONDITIONS

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

## CONDITIONS

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

## PERMIT CONDITIONS

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

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

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

2) Operator's Well Number: Greer 1W-13HM Well Pad Name: Greer

3) Farm Name/Surface Owner: PPG Industries, Inc. Public Road Access: Waynes Ridge Rd. - County Route 78

4) Elevation, current ground: 1,254' Elevation, proposed post-construction: 1,254'

5) Well Type (a) Gas X Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow X Deep \_\_\_\_\_  
Horizontal X

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6369' - 6427', thickness of 58' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,527'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 15,169'

11) Proposed Horizontal Leg Length: 7,400'

12) Approximate Fresh Water Strata Depths: 70', 860'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickly Coal - 785' and Pittsburgh Coal - 879'

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

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes \_\_\_\_\_ No X

(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	125	120'	259FT^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	1,010	1,000	1045ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	1,010	1,000	1045ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,610	2,600	865ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	15,223	15,213	3941ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,655'	
Liners							

*ju*  
7/27/17

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"	17.5"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17.5"	.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							

**PACKERS**

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

WW-6B  
(10/14)

API NO. 47- 051 - \_\_\_\_\_  
OPERATOR WELL NO. Greer 1W-14HM  
Well Pad Name: Greer

*Handwritten signature and date: 7/27/17*

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

Drill through the Marcellus tagging less than 100' from the top of the Onondaga to get depths and log data. Plug back to proposed kick off point. Drill the horizontal section to planned and proposed TD. Run casing and cement to surface. Run Bond Log from app 60 deg to surface. Make clean out run and stimulate

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

Well to be completed with approximately 17,750,000 lb proppant and 274,428 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 17.78 Acres

22) Area to be disturbed for well pad only, less access road (acres): 5.38 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.

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

\*See Attachment

25) Proposed borehole conditioning procedures:

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

\*Note: Attach additional sheets as needed.

WW6B Attachment to #24.

**Conductor and Surface Casing Cement:**

*Premium NE-1 + 2% CaCl*

- Premium NE-1 – Class A Portland API Spec
- CaCl – Calcium Chloride

**Intermediate Casing:**

*Premium NE-1 + 1% CaCl + .25 lb/sk Cello Flake + .25% BA-10A + .75 gals/100sk FP-13L*

- Premium NE-1 – Class A Portland API spec
- CaCl – Calcium Chloride
- Cello Flake – Fluid Loss Preventer
- BA-10A – Bonding Agent
- FP-13L – Anti-Foaming Agent

**Production Casing Cement:**

Lead: *50:50 (Poz:Premium NE-1) + .2% R-3 + .2% MPA-170 + .75 gal/100sk FP-13L*

Tail: *Premium NE-1 + .5% R-3 + .1% ASA-301 + .25% MPA-170 + .35% BA-10A + .75 gal-100sk FP-13L + 60 lb/sk ASCA-1*

- Poz – Fly Ash
- Premium NE-1 – Class A Portland API spec
- R-3 – Cement Retarder
- MPA-170 – Gelling Agent
- FP-13L – Anti-Foaming Agent
- ASA-301 – Free Water Control Agent
- BA-10A – Bonding Agent
- ASCA-1 – Solubility Additive

## Area of Review

### Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

#### Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, [dducoeur@dpslandservices.com](mailto:dducoeur@dpslandservices.com) DPS GIS (12/19/2016) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

#### Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

#### Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits



Permit well - Greer 1W-14HM

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

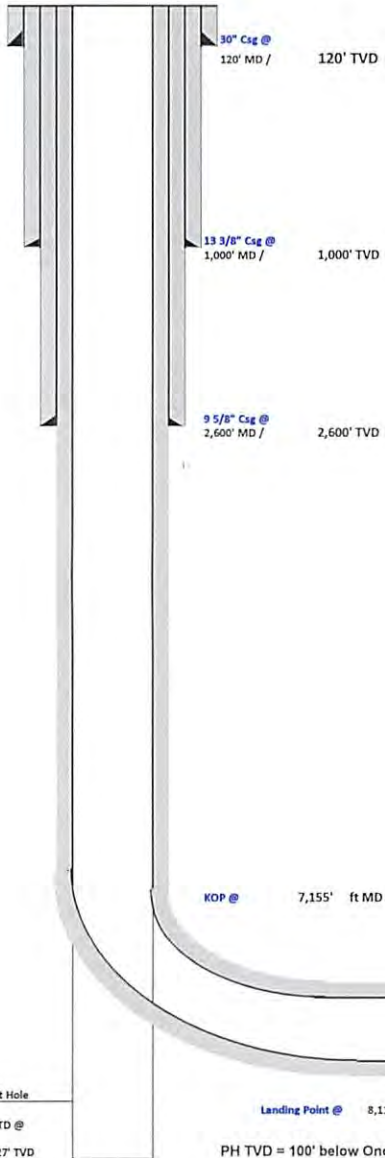
API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101757	Tug Hill Operating	6524' TVD proposed	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating permitted offset Marcellus well. Not yet drilled
4705101758	Tug Hill Operating	6399' TVD	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating offset Marcellus well. Drilled not yet completed
4705101890	Tug Hill Operating	6395' TVD	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating offset Marcellus well. Drilled not yet completed
4705101891	Tug Hill Operating	6422' TVD	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating offset Marcellus well. Drilled not yet completed
4705101892	Tug Hill Operating	6418' TVD	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating offset Marcellus well. Drilled not yet completed

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101887	Tug Hill Operating	6524' TVD proposed	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating permitted offset Marcellus well. Not yet drilled
4705101888	Tug Hill Operating	6524' TVD proposed	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating permitted offset Marcellus well. Not yet drilled
4705101889	Tug Hill Operating	6524' TVD proposed	Marcellus proposed	None	Yes. The well is planned to be drilled into the Marcellus Shale. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Marcellus wells	Tug Hill Operating permitted offset Marcellus well. Not yet drilled
4705101893	Tug Hill Operating	11640' TVD Proposed	Point Pleasant Proposed	None	Yes. The well is planned to be drilled into the Point Pleasant Formation. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Point Pleasant wells	Tug Hill Operating offset Point Pleasant well. Pilot hole drilled, lateral not yet drilled
4705101894	Tug Hill Operating	11784' TVD Proposed	Point Pleasant Proposed	None	Yes. The well is planned to be drilled into the Point Pleasant Formation. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Point Pleasant wells	Tug Hill Operating permitted offset Point Pleasant well. Not yet drilled
4705101895	Tug Hill Operating	11784' TVD Proposed	Point Pleasant Proposed	None	Yes. The well is planned to be drilled into the Point Pleasant Formation. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Point Pleasant wells	Tug Hill Operating permitted offset Point Pleasant well. Not yet drilled
4705101895	Tug Hill Operating	11784' TVD Proposed	Point Pleasant Proposed	None	Yes. The well is planned to be drilled into the Point Pleasant Formation. However, proper casing and cementing should prevent this well from being a conduit to surface for offset Point Pleasant wells	Tug Hill Operating permitted offset Point Pleasant well. Not yet drilled





WELL NAME: Greer 1W-14HM  
 STATE: West Virginia COUNTY: Marshall  
 DISTRICT: Meade  
 DF Elev: 1,280' GL Elev: 1,254'  
 TD: 15,213'  
 TH Latitude: 39.75708218  
 TH Longitude: -80.83616643  
 BH Latitude: 39.76864517  
 BH Longitude: -80.86066706



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	860
Sewickley Coal	785
Pittsburgh Coal	879
Big Lime	1937
Weir	2354
Berea	2544
Gordon	2862
Rhinestreet	5862
Geneseo/Burkett	6310
Tully	6340
Hamilton	6360
Marcellus	6369
Landing Depth	6373
Onondaga	6427
Pilot Hole Depth	6527

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	1,000'	1,000'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,600'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	15,213'	6,249'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,052	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	847	A	15	Air	1 Centralizer every other jt
Production	3,480	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

*Handwritten signature and date: 7/27/17*

Pilot Hole  
PH TD @  
6,527' TVD

Landing Point @ 8,115' MD / 6,373' TVD  
PH TVD = 100' below Onondaga Top

Lateral TD @ 15,213' ft MD  
6,249' ft TVD



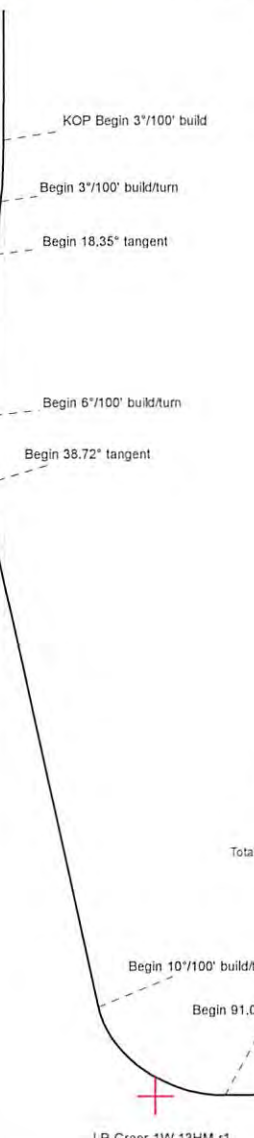


**TUG HILL**  
OPERATING

**Tug Hill Operating LLC**  
Well: Greer 1W-13HM  
Site: Greer Unit N  
Project: Marshall County, WV  
Design: rev1

True Vertical Depth (1000 usft/in)

500  
1000  
1500  
2000  
2500  
3000  
3500  
4000  
4500  
5000  
5500  
6000  
6500  
7000



Azimuths to Grid North  
True North: +0.10°  
Magnetic North: -8.70°  
  
Magnetic Field  
Strength: 52165.0snT  
Dip Angle: 66.95°  
Date: 7/12/2017  
Model: IGRF2015

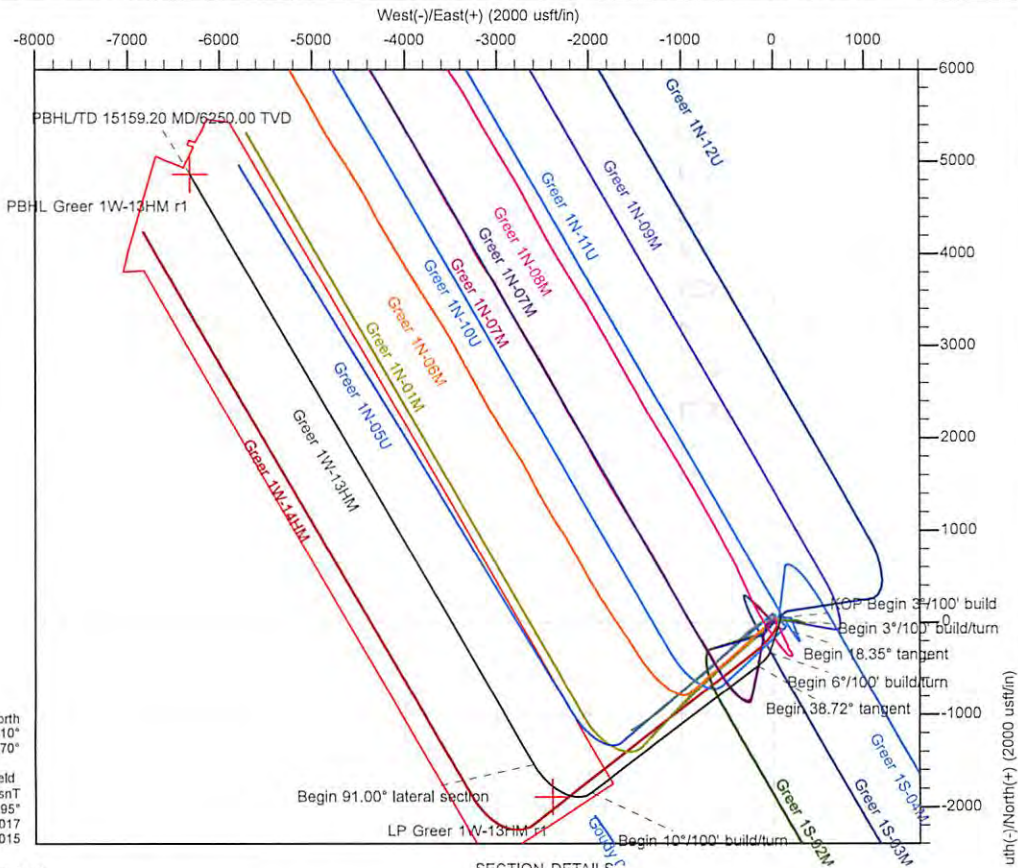
Geodetic System: Universal Transverse Mercator (US Survey Feet)  
Datum: NAD83 West Virginia - HARN  
Ellipsoid: GRS 1980  
Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level  
Depth Reference: RKB=1251+26 @ 1277.00usft (Nabors B28)  
Surface location  
Northing Easting Latitude Longitude  
14438327.85 1686471.20 39.75710028 -80.83612865

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

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	46.12	74.21	0.00	0.00	0.00	
2	1200.00	0.00	0.00	1200.00	46.12	74.21	0.00	0.00	0.00	KOP Begin 3°/100' build
3	1533.33	10.00	185.00	1531.64	17.21	71.68	3.00	185.00	-15.38	Begin 3°/100' build/turn
4	1833.33	18.35	199.39	1822.34	-53.42	53.70	3.00	30.00	-43.53	Begin 18.35° tangent
5	2758.01	18.35	199.39	2700.00	-328.01	-42.93	0.00	0.00	-131.62	Begin 6°/100' build/turn
6	3177.72	38.72	232.77	3068.87	-472.08	-171.45	6.00	53.98	-115.68	Begin 38.72° tangent
7	6806.77	38.72	232.77	5900.19	-1845.65	-1978.91	0.00	0.00	501.12	Begin 10°/100' build/turn
8	7759.21	91.00	329.91	6379.15	-1540.08	-2606.44	10.00	94.96	1186.18	Begin 91.00° lateral section
9	15159.21	91.00	329.91	6250.00	4861.71	-6315.94	0.00	0.00	8001.49	PBHL/TD 15159.20 MD/6250.00 TVD

Vertical Section at 307.00° (1000 usft/in)



SECTION DETAILS





Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Site Greer Unit N
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Site:</b>	Greer Unit N	<b>North Reference:</b>	Grid
<b>Well:</b>	Greer 1W-13HM	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

<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>	Greer Unit N				
<b>Site Position:</b>		<b>Northing:</b>	14,438,281.73 usft	<b>Latitude:</b>	39.75697400
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,686,396.99 usft	<b>Longitude:</b>	-80.83639300
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.10 °

<b>Well</b>	Greer 1W-13HM					
<b>Well Position</b>	<b>+N/-S</b>	46.12 usft	<b>Northing:</b>	14,438,327.85 usft	<b>Latitude:</b>	39.75710028
	<b>+E/-W</b>	74.21 usft	<b>Easting:</b>	1,686,471.20 usft	<b>Longitude:</b>	-80.83612865
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,251.00 usft

<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	7/12/2017	-8.59	66.95	52,165.03964904

<b>Design</b>	rev1			
<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	46.12	74.21	307.00

<b>Plan Survey Tool Program</b>	<b>Date</b>	7/20/2017		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	15,159.21 rev1 (Original Hole)	MWD	MWD - Standard

<b>Plan Sections</b>										
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	46.12	74.21	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	46.12	74.21	0.00	0.00	0.00	0.00	
1,533.33	10.00	185.00	1,531.64	17.21	71.68	3.00	3.00	0.00	185.00	
1,833.33	18.35	199.39	1,822.34	-53.42	53.70	3.00	2.78	4.80	30.00	
2,758.01	18.35	199.39	2,700.00	-328.01	-42.93	0.00	0.00	0.00	0.00	
3,177.72	38.72	232.77	3,068.87	-472.08	-171.45	6.00	4.85	7.95	53.98	
6,806.77	38.72	232.77	5,900.19	-1,845.65	-1,978.91	0.00	0.00	0.00	0.00	
7,759.21	91.00	329.91	6,379.15	-1,540.08	-2,606.44	10.00	5.49	10.20	94.96	
15,159.21	91.00	329.91	6,250.00	4,861.71	-6,315.94	0.00	0.00	0.00	0.00	PBHL Greer 1W-13Hf





Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Site Greer Unit N
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Site:</b>	Greer Unit N	<b>North Reference:</b>	Grid
<b>Well:</b>	Greer 1W-13HM	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

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	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
100.00	0.00	0.00	100.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
200.00	0.00	0.00	200.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
300.00	0.00	0.00	300.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
400.00	0.00	0.00	400.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
500.00	0.00	0.00	500.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
600.00	0.00	0.00	600.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
700.00	0.00	0.00	700.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
800.00	0.00	0.00	800.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
900.00	0.00	0.00	900.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
1,000.00	0.00	0.00	1,000.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
1,100.00	0.00	0.00	1,100.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
1,200.00	0.00	0.00	1,200.00	46.12	74.21	14,438,327.85	1,686,471.20	39.75710028	-80.83612865	
<b>KOP Begin 3°/100' build</b>										
1,300.00	3.00	185.00	1,299.95	43.51	73.98	14,438,325.25	1,686,470.97	39.75709312	-80.83612948	
1,400.00	6.00	185.00	1,399.63	35.70	73.30	14,438,317.43	1,686,470.28	39.75707166	-80.83613196	
1,500.00	9.00	185.00	1,498.77	22.69	72.16	14,438,304.43	1,686,469.15	39.75703596	-80.83613610	
1,533.33	10.00	185.00	1,531.64	17.21	71.68	14,438,298.95	1,686,468.67	39.75702092	-80.83613784	
<b>Begin 3°/100' build/turn</b>										
1,600.00	11.77	189.91	1,597.11	4.75	70.01	14,438,286.48	1,686,466.99	39.75698668	-80.83614388	
1,700.00	14.54	194.99	1,694.48	-17.44	65.00	14,438,264.30	1,686,461.99	39.75692578	-80.83616183	
1,800.00	17.39	198.46	1,790.61	-43.75	57.02	14,438,237.99	1,686,454.01	39.75685357	-80.83619041	
1,833.33	18.35	199.39	1,822.34	-53.42	53.70	14,438,228.31	1,686,450.69	39.75682702	-80.83620228	
<b>Begin 18.35° tangent</b>										
1,900.00	18.35	199.39	1,885.61	-73.22	46.73	14,438,208.52	1,686,443.72	39.75677269	-80.83622719	
2,000.00	18.35	199.39	1,980.53	-102.91	36.28	14,438,178.82	1,686,433.27	39.75669199	-80.83626457	
2,100.00	18.35	199.39	2,075.45	-132.61	25.83	14,438,149.13	1,686,422.82	39.75660969	-80.83630194	
2,200.00	18.35	199.39	2,170.36	-162.30	15.38	14,438,119.43	1,686,412.37	39.75652819	-80.83633932	
2,300.00	18.35	199.39	2,265.28	-192.00	4.93	14,438,089.73	1,686,401.92	39.75644669	-80.83637669	
2,400.00	18.35	199.39	2,360.19	-221.69	-5.52	14,438,060.04	1,686,391.47	39.75636519	-80.83641407	
2,500.00	18.35	199.39	2,455.11	-251.39	-15.97	14,438,030.34	1,686,381.02	39.75628369	-80.83645144	
2,600.00	18.35	199.39	2,550.02	-281.08	-26.41	14,438,000.65	1,686,370.57	39.75620219	-80.83648881	
2,700.00	18.35	199.39	2,644.94	-310.78	-36.86	14,437,970.95	1,686,360.12	39.75612069	-80.83652619	
2,758.01	18.35	199.39	2,700.00	-328.01	-42.93	14,437,953.73	1,686,354.06	39.75607341	-80.83654787	
<b>Begin 6°/100' build/turn</b>										
2,800.00	19.93	205.37	2,739.67	-340.71	-48.19	14,437,941.03	1,686,348.80	39.75603855	-80.83656667	
2,900.00	24.32	216.30	2,832.33	-372.73	-67.70	14,437,909.00	1,686,329.29	39.75595070	-80.83663631	
3,000.00	29.26	223.90	2,921.59	-406.97	-96.86	14,437,874.77	1,686,300.12	39.75585684	-80.83674030	
3,100.00	34.51	229.42	3,006.49	-443.03	-135.36	14,437,838.70	1,686,261.63	39.75575798	-80.83687749	
3,177.72	38.72	232.77	3,068.87	-472.08	-171.45	14,437,809.66	1,686,225.54	39.75567839	-80.83700611	
<b>Begin 38.72° tangent</b>										
3,200.00	38.72	232.77	3,086.25	-480.51	-182.55	14,437,801.22	1,686,214.44	39.75565529	-80.83704564	
3,300.00	38.72	232.77	3,164.27	-518.36	-232.35	14,437,763.37	1,686,164.64	39.75555159	-80.83722310	
3,400.00	38.72	232.77	3,242.29	-556.21	-282.16	14,437,725.52	1,686,114.83	39.75544789	-80.83740056	
3,500.00	38.72	232.77	3,320.31	-594.06	-331.96	14,437,687.68	1,686,065.03	39.75534420	-80.83757801	
3,600.00	38.72	232.77	3,398.32	-631.91	-381.77	14,437,649.83	1,686,015.22	39.75524050	-80.83775547	
3,700.00	38.72	232.77	3,476.34	-669.76	-431.57	14,437,611.98	1,685,965.41	39.75513680	-80.83793293	
3,800.00	38.72	232.77	3,554.36	-707.61	-481.38	14,437,574.13	1,685,915.61	39.75503310	-80.83811038	
3,900.00	38.72	232.77	3,632.38	-745.46	-531.18	14,437,536.28	1,685,865.80	39.75492940	-80.83828784	
4,000.00	38.72	232.77	3,710.40	-783.31	-580.99	14,437,498.43	1,685,816.00	39.75482570	-80.83846529	
4,100.00	38.72	232.77	3,788.42	-821.16	-630.79	14,437,460.58	1,685,766.19	39.75472200	-80.83864274	
4,200.00	38.72	232.77	3,866.43	-859.01	-680.60	14,437,422.73	1,685,716.39	39.75461831	-80.83882020	
4,300.00	38.72	232.77	3,944.45	-896.85	-730.40	14,437,384.88	1,685,666.58	39.75451461	-80.83899765	
4,400.00	38.72	232.77	4,022.47	-934.70	-780.21	14,437,347.03	1,685,616.78	39.75441091	-80.83917510	





Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Site Greer Unit N
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Site:</b>	Greer Unit N	<b>North Reference:</b>	Grid
<b>Well:</b>	Greer 1W-13HM	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,500.00	38.72	232.77	4,100.49	-972.55	-830.02	14,437,309.18	1,685,566.97	39.75430720	-80.83935255	
4,600.00	38.72	232.77	4,178.51	-1,010.40	-879.82	14,437,271.33	1,685,517.17	39.75420350	-80.83953000	
4,700.00	38.72	232.77	4,256.53	-1,048.25	-929.63	14,437,233.48	1,685,467.36	39.75409980	-80.83970745	
4,800.00	38.72	232.77	4,334.54	-1,086.10	-979.43	14,437,195.63	1,685,417.56	39.75399610	-80.83988490	
4,900.00	38.72	232.77	4,412.56	-1,123.95	-1,029.24	14,437,157.78	1,685,367.75	39.75389240	-80.84006235	
5,000.00	38.72	232.77	4,490.58	-1,161.80	-1,079.04	14,437,119.93	1,685,317.95	39.75378870	-80.84023980	
5,100.00	38.72	232.77	4,568.60	-1,199.65	-1,128.85	14,437,082.08	1,685,268.14	39.75368500	-80.84041725	
5,200.00	38.72	232.77	4,646.62	-1,237.50	-1,178.65	14,437,044.24	1,685,218.34	39.75358129	-80.84059470	
5,300.00	38.72	232.77	4,724.64	-1,275.35	-1,228.46	14,437,006.39	1,685,168.53	39.75347759	-80.84077214	
5,400.00	38.72	232.77	4,802.65	-1,313.20	-1,278.26	14,436,968.54	1,685,118.72	39.75337389	-80.84094959	
5,500.00	38.72	232.77	4,880.67	-1,351.05	-1,328.07	14,436,930.69	1,685,068.92	39.75327019	-80.84112703	
5,600.00	38.72	232.77	4,958.69	-1,388.90	-1,377.87	14,436,892.84	1,685,019.11	39.75316648	-80.84130448	
5,700.00	38.72	232.77	5,036.71	-1,426.75	-1,427.68	14,436,854.99	1,684,969.31	39.75306278	-80.84148193	
5,800.00	38.72	232.77	5,114.73	-1,464.60	-1,477.48	14,436,817.14	1,684,919.50	39.75295908	-80.84165937	
5,900.00	38.72	232.77	5,192.75	-1,502.44	-1,527.29	14,436,779.29	1,684,869.70	39.75285537	-80.84183681	
6,000.00	38.72	232.77	5,270.76	-1,540.29	-1,577.09	14,436,741.44	1,684,819.89	39.75275167	-80.84201426	
6,100.00	38.72	232.77	5,348.78	-1,578.14	-1,626.90	14,436,703.59	1,684,770.09	39.75264796	-80.84219170	
6,200.00	38.72	232.77	5,426.80	-1,615.99	-1,676.71	14,436,665.74	1,684,720.28	39.75254426	-80.84236914	
6,300.00	38.72	232.77	5,504.82	-1,653.84	-1,726.51	14,436,627.89	1,684,670.48	39.75244055	-80.84254658	
6,400.00	38.72	232.77	5,582.84	-1,691.69	-1,776.32	14,436,590.04	1,684,620.67	39.75233685	-80.84272402	
6,500.00	38.72	232.77	5,660.86	-1,729.54	-1,826.12	14,436,552.19	1,684,570.87	39.75223314	-80.84290146	
6,600.00	38.72	232.77	5,738.87	-1,767.39	-1,875.93	14,436,514.34	1,684,521.06	39.75212943	-80.84307891	
6,700.00	38.72	232.77	5,816.89	-1,805.24	-1,925.73	14,436,476.49	1,684,471.26	39.75202573	-80.84325634	
6,800.00	38.72	232.77	5,894.91	-1,843.09	-1,975.54	14,436,438.65	1,684,421.45	39.75192202	-80.84343378	
6,806.77	38.72	232.77	5,900.19	-1,845.65	-1,978.91	14,436,436.08	1,684,418.08	39.75191500	-80.84344580	
<b>Begin 10°/100' build/turn</b>										
6,900.00	38.86	247.67	5,973.02	-1,874.47	-2,029.29	14,436,407.26	1,684,367.69	39.75183609	-80.84362524	
7,000.00	41.05	262.90	6,049.85	-1,890.49	-2,091.06	14,436,391.24	1,684,305.93	39.75179239	-80.84384509	
7,100.00	45.03	276.37	6,123.08	-1,890.63	-2,158.97	14,436,391.10	1,684,238.02	39.75179234	-80.84408672	
7,200.00	50.37	287.82	6,190.47	-1,874.88	-2,230.97	14,436,406.85	1,684,166.01	39.75183593	-80.84434280	
7,300.00	56.67	297.50	6,249.99	-1,843.73	-2,304.88	14,436,438.01	1,684,092.11	39.75192184	-80.84460555	
7,400.00	63.61	305.82	6,299.82	-1,798.11	-2,378.43	14,436,483.62	1,684,018.55	39.75204746	-80.84486698	
7,500.00	70.97	313.16	6,338.45	-1,739.42	-2,449.41	14,436,542.31	1,683,947.58	39.75220898	-80.84511916	
7,600.00	78.60	319.87	6,364.71	-1,669.44	-2,515.65	14,436,612.29	1,683,881.33	39.75240149	-80.84535441	
7,700.00	86.37	326.22	6,377.79	-1,590.29	-2,575.14	14,436,691.44	1,683,821.84	39.75261913	-80.84556559	
7,759.21	91.00	329.91	6,379.15	-1,540.08	-2,606.44	14,436,741.65	1,683,790.55	39.75275718	-80.84567664	
<b>Begin 91.00° lateral section</b>										
7,800.00	91.00	329.91	6,378.44	-1,504.79	-2,626.89	14,436,776.94	1,683,770.10	39.75285418	-80.84574917	
7,900.00	91.00	329.91	6,376.69	-1,418.28	-2,677.02	14,436,863.45	1,683,719.97	39.75309201	-80.84592700	
8,000.00	91.00	329.91	6,374.95	-1,331.77	-2,727.15	14,436,949.96	1,683,669.84	39.75332983	-80.84610483	
8,100.00	91.00	329.91	6,373.20	-1,245.26	-2,777.27	14,437,036.47	1,683,619.71	39.75356765	-80.84628265	
8,200.00	91.00	329.91	6,371.46	-1,158.75	-2,827.40	14,437,122.98	1,683,569.58	39.75380547	-80.84646048	
8,300.00	91.00	329.91	6,369.71	-1,072.24	-2,877.53	14,437,209.49	1,683,519.46	39.75404329	-80.84663831	
8,400.00	91.00	329.91	6,367.96	-985.73	-2,927.66	14,437,296.01	1,683,469.33	39.75428111	-80.84681615	
8,500.00	91.00	329.91	6,366.22	-899.22	-2,977.79	14,437,382.52	1,683,419.20	39.75451893	-80.84699398	
8,600.00	91.00	329.91	6,364.47	-812.71	-3,027.92	14,437,469.03	1,683,369.07	39.75475675	-80.84717181	
8,700.00	91.00	329.91	6,362.73	-726.20	-3,078.04	14,437,555.54	1,683,318.94	39.75499457	-80.84734965	
8,800.00	91.00	329.91	6,360.98	-639.69	-3,128.17	14,437,642.05	1,683,268.81	39.75523239	-80.84752749	
8,900.00	91.00	329.91	6,359.24	-553.18	-3,178.30	14,437,728.56	1,683,218.69	39.75547020	-80.84770533	
9,000.00	91.00	329.91	6,357.49	-466.67	-3,228.43	14,437,815.07	1,683,168.56	39.75570802	-80.84788316	
9,100.00	91.00	329.91	6,355.75	-380.15	-3,278.56	14,437,901.58	1,683,118.43	39.75594584	-80.84806101	
9,200.00	91.00	329.91	6,354.00	-293.64	-3,328.69	14,437,988.09	1,683,068.30	39.75618366	-80.84823885	
9,300.00	91.00	329.91	6,352.26	-207.13	-3,378.81	14,438,074.60	1,683,018.17	39.75642148	-80.84841669	
9,400.00	91.00	329.91	6,350.51	-120.62	-3,428.94	14,438,161.11	1,682,968.04	39.75665929	-80.84859453	





Planning Report - Geographic

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<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Site:</b>	Greer Unit N	<b>North Reference:</b>	Grid
<b>Well:</b>	Greer 1W-13HM	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,500.00	91.00	329.91	6,348.77	-34.11	-3,479.07	14,438,247.62	1,682,917.92	39.75689711	-80.84877238	
9,600.00	91.00	329.91	6,347.02	52.40	-3,529.20	14,438,334.13	1,682,867.79	39.75713493	-80.84895023	
9,700.00	91.00	329.91	6,345.28	138.91	-3,579.33	14,438,420.64	1,682,817.66	39.75737274	-80.84912807	
9,800.00	91.00	329.91	6,343.53	225.42	-3,629.46	14,438,507.16	1,682,767.53	39.75761056	-80.84930592	
9,900.00	91.00	329.91	6,341.79	311.93	-3,679.58	14,438,593.67	1,682,717.40	39.75784837	-80.84948377	
10,000.00	91.00	329.91	6,340.04	398.44	-3,729.71	14,438,680.18	1,682,667.27	39.75808619	-80.84966163	
10,100.00	91.00	329.91	6,338.30	484.95	-3,779.84	14,438,766.69	1,682,617.15	39.75832400	-80.84983948	
10,200.00	91.00	329.91	6,336.55	571.46	-3,829.97	14,438,853.20	1,682,567.02	39.75856182	-80.85001733	
10,300.00	91.00	329.91	6,334.80	657.97	-3,880.10	14,438,939.71	1,682,516.89	39.75879963	-80.85019519	
10,400.00	91.00	329.91	6,333.06	744.48	-3,930.23	14,439,026.22	1,682,466.76	39.75903745	-80.85037304	
10,500.00	91.00	329.91	6,331.31	831.00	-3,980.35	14,439,112.73	1,682,416.63	39.75927526	-80.85055090	
10,600.00	91.00	329.91	6,329.57	917.51	-4,030.48	14,439,199.24	1,682,366.50	39.75951308	-80.85072876	
10,700.00	91.00	329.91	6,327.82	1,004.02	-4,080.61	14,439,285.75	1,682,316.38	39.75975089	-80.85090662	
10,800.00	91.00	329.91	6,326.08	1,090.53	-4,130.74	14,439,372.26	1,682,266.25	39.75998870	-80.85108448	
10,900.00	91.00	329.91	6,324.33	1,177.04	-4,180.87	14,439,458.77	1,682,216.12	39.76022652	-80.85126234	
11,000.00	91.00	329.91	6,322.59	1,263.55	-4,231.00	14,439,545.28	1,682,165.99	39.76046433	-80.85144021	
11,100.00	91.00	329.91	6,320.84	1,350.06	-4,281.12	14,439,631.79	1,682,115.86	39.76070214	-80.85161807	
11,200.00	91.00	329.91	6,319.10	1,436.57	-4,331.25	14,439,718.31	1,682,065.73	39.76093995	-80.85179594	
11,300.00	91.00	329.91	6,317.35	1,523.08	-4,381.38	14,439,804.82	1,682,015.61	39.76117776	-80.85197381	
11,400.00	91.00	329.91	6,315.61	1,609.59	-4,431.51	14,439,891.33	1,681,965.48	39.76141558	-80.85215168	
11,500.00	91.00	329.91	6,313.86	1,696.10	-4,481.64	14,439,977.84	1,681,915.35	39.76165339	-80.85232955	
11,600.00	91.00	329.91	6,312.12	1,782.61	-4,531.77	14,440,064.35	1,681,865.22	39.76189120	-80.85250742	
11,700.00	91.00	329.91	6,310.37	1,869.12	-4,581.89	14,440,150.86	1,681,815.09	39.76212901	-80.85268529	
11,800.00	91.00	329.91	6,308.63	1,955.63	-4,632.02	14,440,237.37	1,681,764.96	39.76236682	-80.85286316	
11,900.00	91.00	329.91	6,306.88	2,042.15	-4,682.15	14,440,323.88	1,681,714.84	39.76260463	-80.85304104	
12,000.00	91.00	329.91	6,305.14	2,128.66	-4,732.28	14,440,410.39	1,681,664.71	39.76284244	-80.85321891	
12,100.00	91.00	329.91	6,303.39	2,215.17	-4,782.41	14,440,496.90	1,681,614.58	39.76308025	-80.85339679	
12,200.00	91.00	329.91	6,301.65	2,301.68	-4,832.54	14,440,583.41	1,681,564.45	39.76331806	-80.85357467	
12,300.00	91.00	329.91	6,299.90	2,388.19	-4,882.66	14,440,669.92	1,681,514.32	39.76355587	-80.85375255	
12,400.00	91.00	329.91	6,298.15	2,474.70	-4,932.79	14,440,756.43	1,681,464.19	39.76379368	-80.85393043	
12,500.00	91.00	329.91	6,296.41	2,561.21	-4,982.92	14,440,842.94	1,681,414.07	39.76403148	-80.85410831	
12,600.00	91.00	329.91	6,294.66	2,647.72	-5,033.05	14,440,929.46	1,681,363.94	39.76426929	-80.85428620	
12,700.00	91.00	329.91	6,292.92	2,734.23	-5,083.18	14,441,015.97	1,681,313.81	39.76450710	-80.85446408	
12,800.00	91.00	329.91	6,291.17	2,820.74	-5,133.31	14,441,102.48	1,681,263.68	39.76474491	-80.85464197	
12,900.00	91.00	329.91	6,289.43	2,907.25	-5,183.43	14,441,188.99	1,681,213.55	39.76498272	-80.85481985	
13,000.00	91.00	329.91	6,287.68	2,993.76	-5,233.56	14,441,275.50	1,681,163.42	39.76522052	-80.85499774	
13,100.00	91.00	329.91	6,285.94	3,080.27	-5,283.69	14,441,362.01	1,681,113.30	39.76545833	-80.85517563	
13,200.00	91.00	329.91	6,284.19	3,166.78	-5,333.82	14,441,448.52	1,681,063.17	39.76569614	-80.85535352	
13,300.00	91.00	329.91	6,282.45	3,253.30	-5,383.95	14,441,535.03	1,681,013.04	39.76593394	-80.85553141	
13,400.00	91.00	329.91	6,280.70	3,339.81	-5,434.08	14,441,621.54	1,680,962.91	39.76617175	-80.85570931	
13,500.00	91.00	329.91	6,278.96	3,426.32	-5,484.20	14,441,708.05	1,680,912.78	39.76640955	-80.85588720	
13,600.00	91.00	329.91	6,277.21	3,512.83	-5,534.33	14,441,794.56	1,680,862.65	39.76664736	-80.85606510	
13,700.00	91.00	329.91	6,275.47	3,599.34	-5,584.46	14,441,881.07	1,680,812.53	39.76688516	-80.85624299	
13,800.00	91.00	329.91	6,273.72	3,685.85	-5,634.59	14,441,967.58	1,680,762.40	39.76712297	-80.85642089	
13,900.00	91.00	329.91	6,271.98	3,772.36	-5,684.72	14,442,054.09	1,680,712.27	39.76736077	-80.85659879	
14,000.00	91.00	329.91	6,270.23	3,858.87	-5,734.85	14,442,140.61	1,680,662.14	39.76759858	-80.85677669	
14,100.00	91.00	329.91	6,268.49	3,945.38	-5,784.97	14,442,227.12	1,680,612.01	39.76783638	-80.85695459	
14,200.00	91.00	329.91	6,266.74	4,031.89	-5,835.10	14,442,313.63	1,680,561.88	39.76807418	-80.85713249	
14,300.00	91.00	329.91	6,265.00	4,118.40	-5,885.23	14,442,400.14	1,680,511.76	39.76831199	-80.85731040	
14,400.00	91.00	329.91	6,263.25	4,204.91	-5,935.36	14,442,486.65	1,680,461.63	39.76854979	-80.85748830	
14,500.00	91.00	329.91	6,261.50	4,291.42	-5,985.49	14,442,573.16	1,680,411.50	39.76878759	-80.85766621	
14,600.00	91.00	329.91	6,259.76	4,377.93	-6,035.62	14,442,659.67	1,680,361.37	39.76902540	-80.85784412	
14,700.00	91.00	329.91	6,258.01	4,464.45	-6,085.74	14,442,746.18	1,680,311.24	39.76926320	-80.85802203	
14,800.00	91.00	329.91	6,256.27	4,550.96	-6,135.87	14,442,832.69	1,680,261.11	39.76950100	-80.85819994	
14,900.00	91.00	329.91	6,254.52	4,637.47	-6,186.00	14,442,919.20	1,680,210.99	39.76973880	-80.85837785	





Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Site Greer Unit N
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1251+26 @ 1277.00usft (Nabors B28)
<b>Site:</b>	Greer Unit N	<b>North Reference:</b>	Grid
<b>Well:</b>	Greer 1W-13HM	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,000.00	91.00	329.91	6,252.78	4,723.98	-6,236.13	14,443,005.71	1,680,160.86	39.76997660	-80.85855576	
15,100.00	91.00	329.91	6,251.03	4,810.49	-6,286.26	14,443,092.22	1,680,110.73	39.77021441	-80.85873368	
15,159.20	91.00	329.91	6,250.00	4,861.70	-6,315.93	14,443,143.44	1,680,081.05	39.77035518	-80.85883900	
<b>PBHL/TD 15159.20 MD/6250.00 TVD</b>										
15,159.21	91.00	329.91	6,250.00	4,861.71	-6,315.94	14,443,143.44	1,680,081.05	39.77035520	-80.85883901	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
PBHL Greer 1W-13HM r - hit/miss target - Shape - Point	0.00	0.00	6,250.00	4,861.71	-6,315.94	14,443,143.44	1,680,081.05	39.77035520	-80.85883901	
LP Greer 1W-13HM r1 - plan misses target center by 130.28usft at 7400.00usft MD (6299.82 TVD, -1798.11 N, -2378.43 E) - Point	0.00	0.00	6,386.00	-1,892.73	-2,402.81	14,436,389.00	1,683,994.18	39.75178773	-80.84495428	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,200.00	1,200.00	46.12	74.21	KOP Begin 3°/100' build	
1,533.33	1,531.64	17.21	71.68	Begin 3°/100' build/turn	
1,833.33	1,822.34	-53.42	53.70	Begin 18.35° tangent	
2,758.01	2,700.00	-328.01	-42.93	Begin 6°/100' build/turn	
3,177.72	3,068.87	-472.08	-171.45	Begin 38.72° tangent	
6,806.77	5,900.19	-1,845.65	-1,978.91	Begin 10°/100' build/turn	
7,759.21	6,379.15	-1,540.08	-2,606.44	Begin 91.00° lateral section	
15,159.20	6,250.00	4,861.70	-6,315.93	PBHL/TD 15159.20 MD/6250.00 TVD	



WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_  
Operator's Well No. Greer 1W-14HM

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

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

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

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

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfil (SWF-1021 / WW0109185)

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

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

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

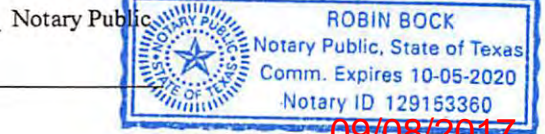
Company Official Signature \_\_\_\_\_

Company Official (Typed Name) Sean Gasser

Company Official Title Engineer

Subscribed and sworn before me this 25<sup>th</sup> day of July, 20 17

Robin Bock



My commission expires 10-05-2020

09/08/2017

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 17.78 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Rye Grain	140	Tall Fescue	40
		Ladino Clover	5

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Anderson*

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title: *Oil & Gas Inspector* Date: *7/27/17*

Field Reviewed? (  ) Yes (  ) No





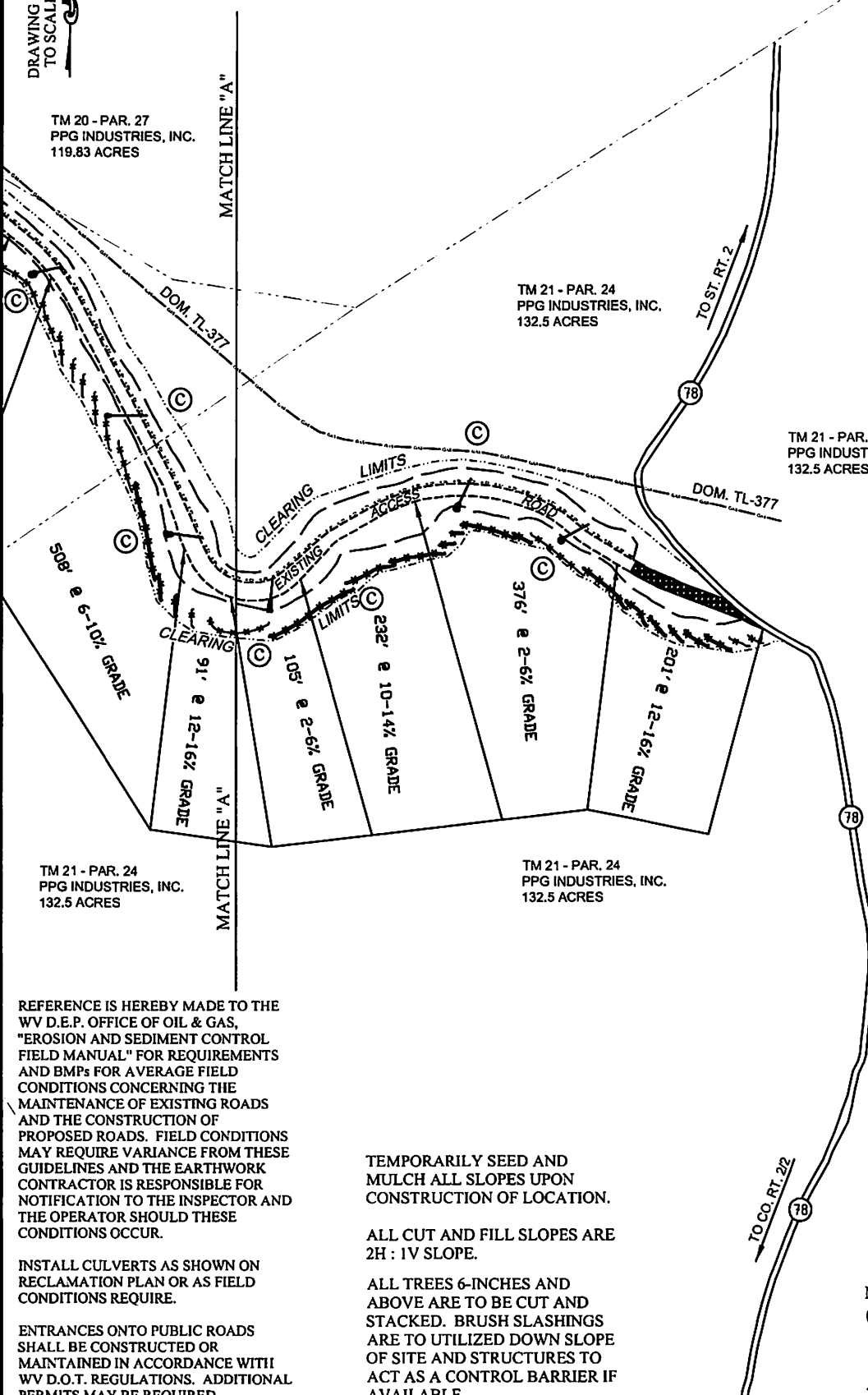
TM 20 - PAR. 27  
PPG INDUSTRIES, INC.  
119.83 ACRES

TM 21 - PAR. 24  
PPG INDUSTRIES, INC.  
132.5 ACRES

TM 21 - PAR. 24  
PPG INDUSTRIES, INC.  
132.5 ACRES

TM 21 - PAR. 24  
PPG INDUSTRIES, INC.  
132.5 ACRES

TM 21 - PAR. 24  
PPG INDUSTRIES, INC.  
132.5 ACRES



REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

Note:  
⊙ - Denotes existing 18" PVC culvert with appropriate sediment outlet control (Rip Rap splash pad).

----- Existing Silt Fence and or Sediment and Erosion Control Measure.  
(Note Site has achieved 70% Vegetation and E&S can be Removed)

DATE: 07-19-17

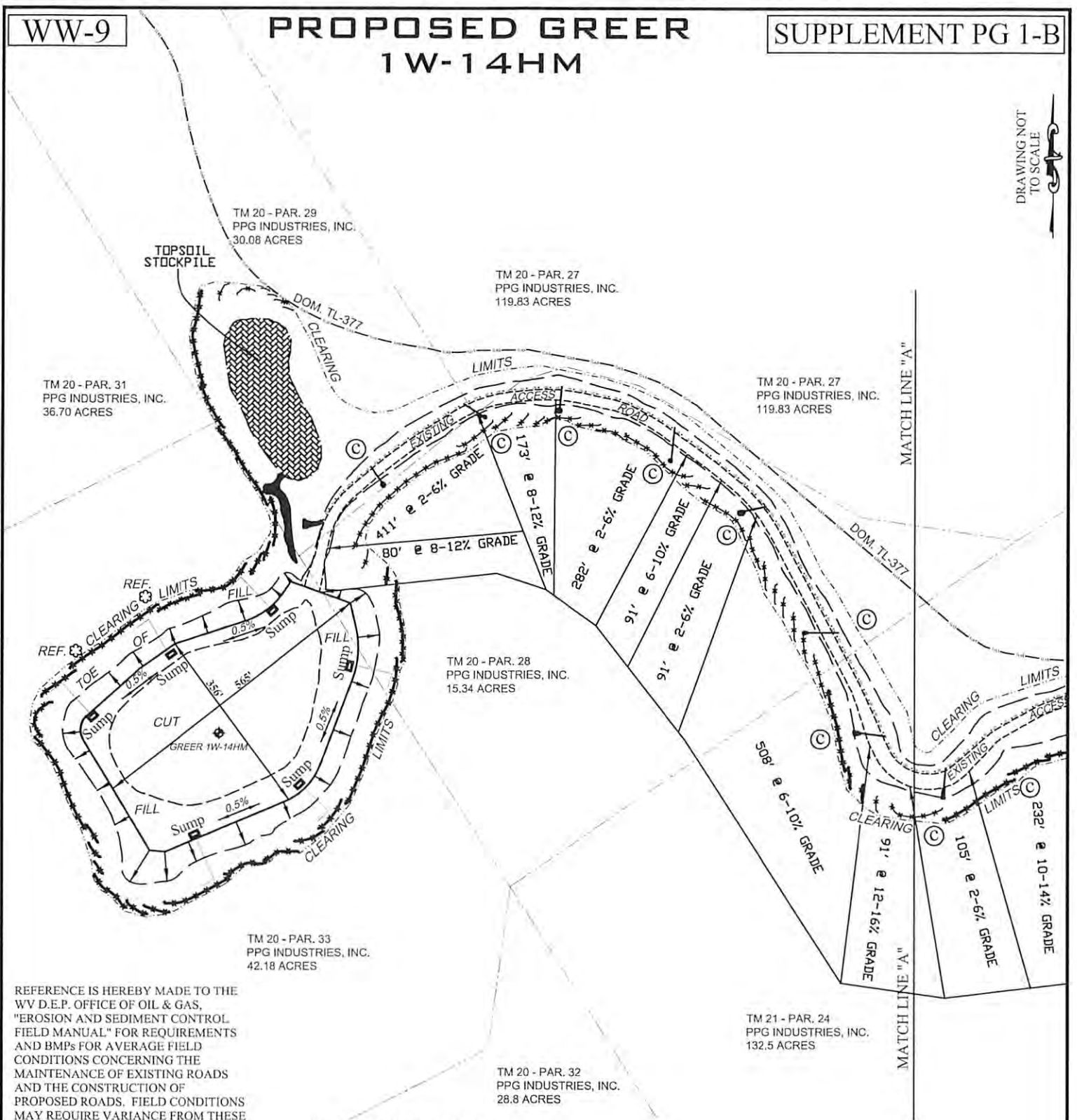
PROJECT NO: W0120319

DRAWN BY: J.N.W.

09/08/2017

# PROPOSED GREER 1W-14HM

DRAWING NOT  
TO SCALE



REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

TM 21 - PAR. 24  
PPG INDUSTRIES, INC.  
132.5 ACRES

TM 20 - PAR. 32  
PPG INDUSTRIES, INC.  
28.8 ACRES

*JN*  
*7/17/17*

Note:  
⊙ - Denotes existing 18" PVC culvert with appropriate sediment outlet control (Rip Rap splash pad).

----- Existing Silt Fence and or Sediment and Erosion Control Measure.  
(Note Site has 10% slope. 70% Vegetation and Trees can be Removed)



# Well Site Safety Plan

## Tug Hill Operating, LLC

*J-B 7/27/17*

Well Name: Greer 1W-14HM

Pad Location: Greer Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,400,809.12

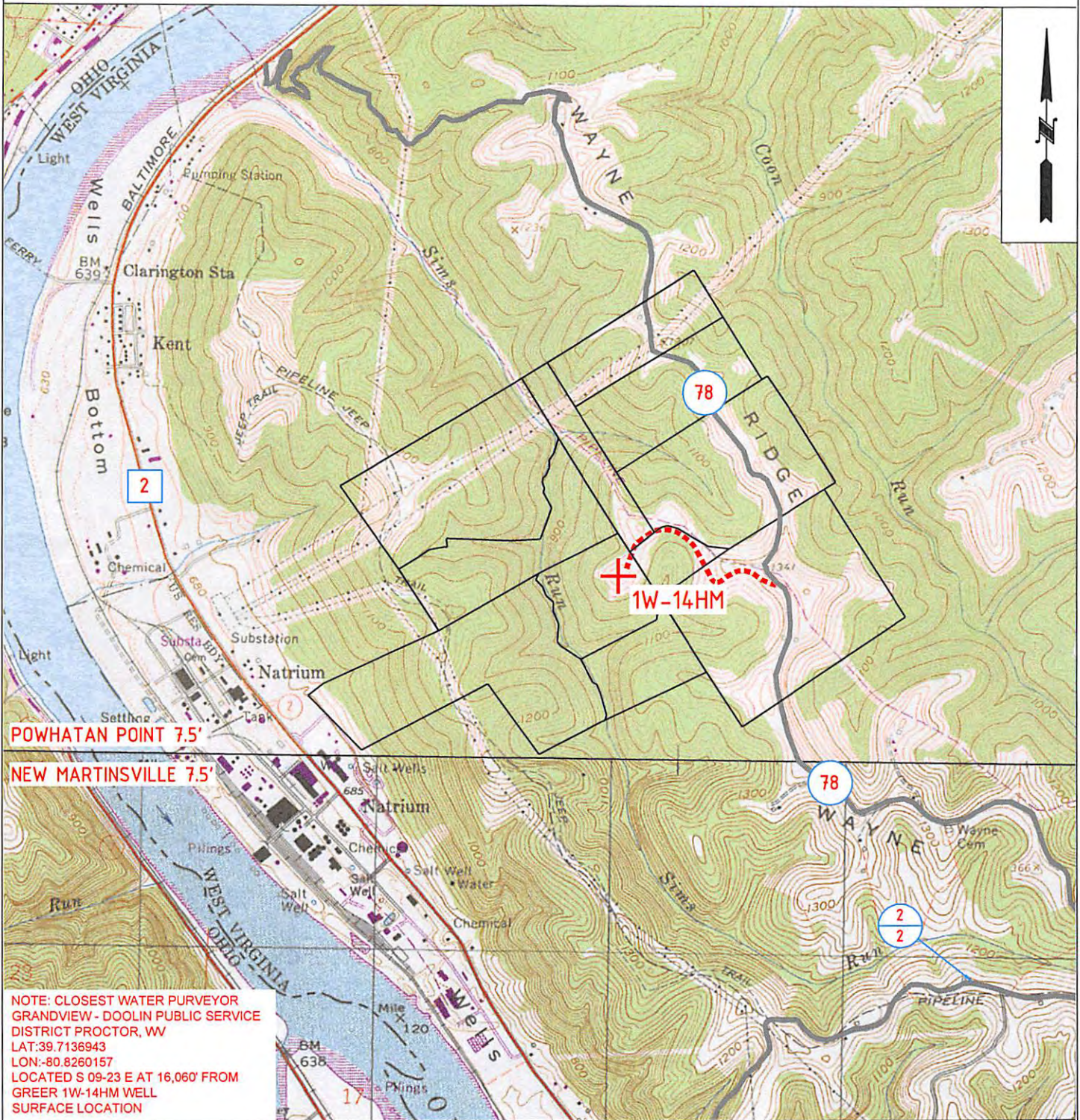
Easting: 514,034.22

July 2017

09/08/2017



# PROPOSED GREER 1W-14HM



POWHATAN POINT 7.5'

NEW MARTINSVILLE 7.5'

NOTE: CLOSEST WATER PURVEYOR  
 GRANDVIEW - DOOLIN PUBLIC SERVICE  
 DISTRICT PROCTOR, WV  
 LAT: 39.7136943  
 LON: -80.8260157  
 LOCATED S 09-23 E AT 16,060' FROM  
 GREER 1W-14HM WELL  
 SURFACE LOCATION



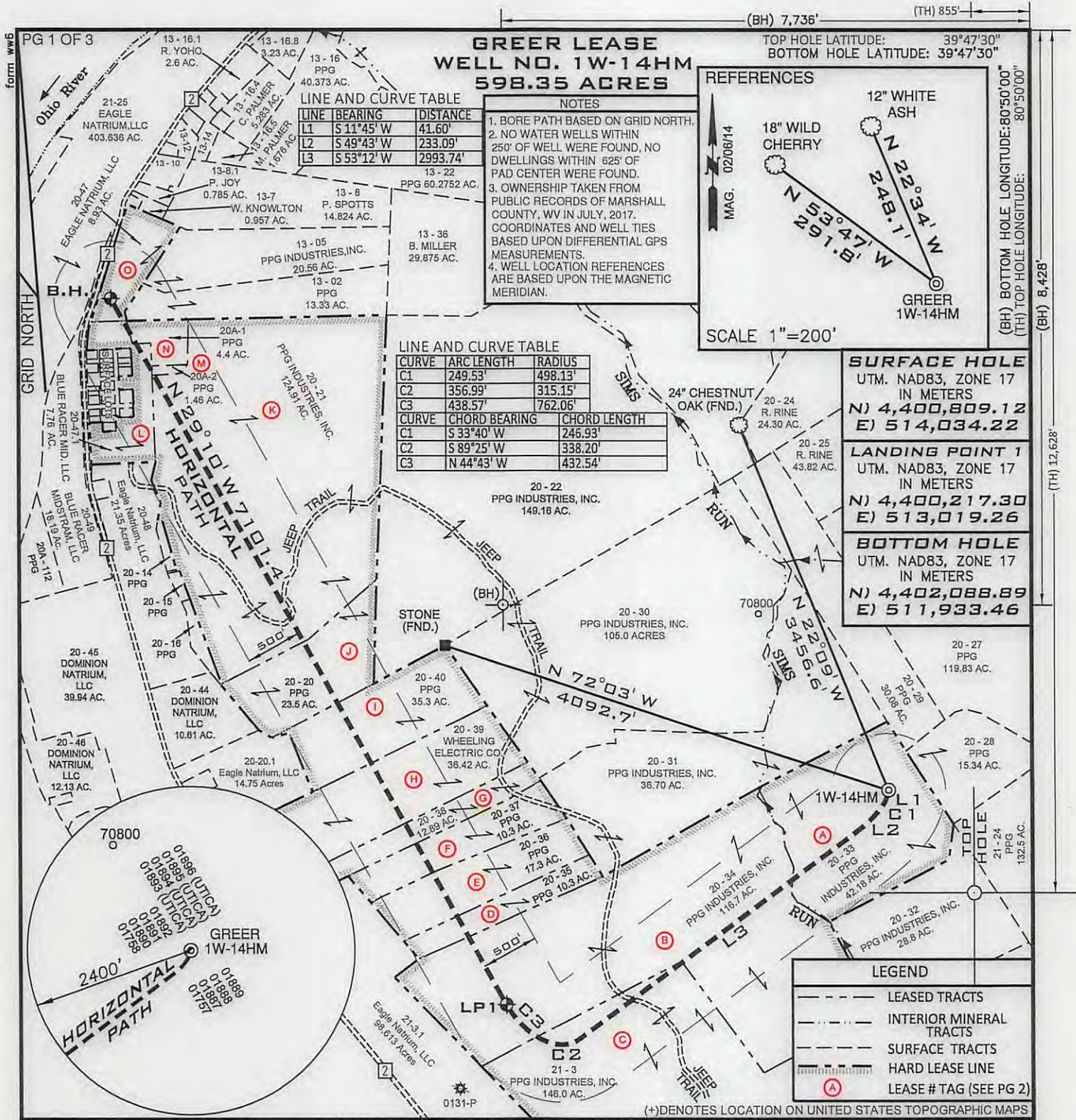
OPERATOR **163-697(CEC)**  
 TUG HILL OPERATING, LLC  
 380 SOUTHPOINTE BLVD  
 SUITE 200  
 CANONSBURG, PA 15317

TOPO SECTION  
 POWHATAN POINT 7.5'  
 SCALE:  
 1" = 2000'

LEASE NAME  
 GREER  
 DATE:  
 DATE: 07/19/17

09/08/2017





FILE NUMBER W0120319 (WB1-76)

DRAWING NUMBER GREER\_WP\_1W-14HM

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. 2122 *Jonathan N. White*

**Jonathan N. White**  
LICENSED  
NO. 2122  
STATE OF WEST VIRGINIA  
PROFESSIONAL SURVEYOR

SEAL



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

DATE: JULY 21, 2017

OPERATORS WELL NO. GREER 1W-14HM

API WELL NO. 47-051-01954 HGA

STATE WV COUNTY MARSHALL PERMIT 09/08/2017

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

LOCATION ELEVATION 1254' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER (UNDEFINED)

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE POWHATAN POINT 7.5' LEASE NUMBER SEE ATTACHED PG 2 THROUGH 3

SURFACE OWNER PPG INDUSTRIES, INC. ACREAGE 42.18

OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC., ET AL LEASE ACREAGE 598.35

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

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,527' TMD: 15,223'

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

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



**GREER WELL NO. 1W-14HM  
WELL PLAT LEASE INFORMATION**

LEASE NO.	TAG	PARCEL	OIL & GAS ROYALTY OWNER	BOOK	PAGE
10*14300	A	5-20-33	PPG INDUSTRIES, INC.	725	123
10*14312	A	5-20-33	JAMIE LU BENSON	790	531
10*14313	A	5-20-33	TERRI JEAN GODDARD	790	585
10*14314	A	5-20-33	RALPH BLACHLY	790	529
10*14315	A	5-20-33	MARGARET ROSS	790	527
10*14316	A	5-20-33	ANDREW GERST	791	645
10*14317	A	5-20-33	HAROLD BLACHLY	791	643
10*14318	A	5-20-33	MARTHA BLACHLY-CROSS	792	112
10*14319	A	5-20-33	JACK J. PFALZGRAF	792	118
10*14320	A	5-20-33	SANDRA CHEYNEY	792	91
10*14321	A	5-20-33	HERBERT BLACHLY	792	102
10*14322	A	5-20-33	LOIS KAY MORFORD	792	110
10*14327	A	5-20-33	ROBERT D. OKEY	792	646
10*14328	A	5-20-33	RAE ELLEN STUART	796	38
10*14329	A	5-20-33	TONDA ROTHENBUHLER	796	40
10*14331	A	5-20-33	CHRISTINA JEAN RIOUX	796	70
10*14332	A	5-20-33	MICHAEL EDWARD BARTH	796	68
10*14333	A	5-20-33	DEAN ROTHENBUHLER	796	42
10*14355	A	5-20-33	DEWAYNE STARKEY	815	228
10*14356	A	5-20-33	FREDRIC RICHTER & BETTY RICHTER	822	270
10*14362	A	5-20-33	CAROLYN STARKEY	827	226
10*14368	A	5-20-33	JOSEPH LONG	836	106
10*14371	A	5-20-33	THOMAS F LONG AND JENNIFER LONG	842	398
10*14372	A	5-20-33	UNITED CHURCH HOMES INC	846	408
10*14377	A	5-20-33	JOSEPH A LONG	849	519
10*14387	A	5-20-33	JOHN F LONG AND PAM LONG	849	542
10*14388	A	5-20-33	IMMANUEL CHURCH OF THE UNITED CHURCH OF CHRIST OF SALEM TOWNSHIP, MONROE COUNTY, OHIO	849	513
10*14398	A	5-20-33	JAN KAFFENBERGER	860	434
10*14399	A	5-20-33	RITA ANN DOEBERT AND RONALD DOLBERT	860	437
10*14400	A	5-20-33	COLEEN SLAGLE AND FRANKLIN SLAGLE	860	440
10*14401	A	5-20-33	IMELDA J SCURLOCK	860	443
10*14402	A	5-20-33	CAROL F WILSON AND RICHARD WILSON	860	446
10*14403	A	5-20-33	SUE WHITE	862	429
10*14404	A	5-20-33	DON FORGRAVES	862	426
10*14405	A	5-20-33	JOHN WHITE	862	423
10*14406	A	5-20-33	WILLIAM V BUCKNOR	862	421
10*14407	A	5-20-33	LESLIE F BUCKNOR	862	419
10*14408	A	5-20-33	LORNA M LONG MORGAN	864	323
10*14409	A	5-20-33	JAMES C LONG AND PATTI LONG	864	326
10*14410	A	5-20-33	HENRY T LONG	867	385
10*14411	A	5-20-33	THOMAS WHITE, ESQ., SPECIAL COMMISSIONER	870	34
10*14412	A	5-20-33	THE VILLAGE NETWORK, F/K/A BOYS VILLAGE OF SMITHVILLE, OHIO	872	203
10*14413	A	5-20-33	JUANITA SANDIFER	872	206
10*14416	A	5-20-33	KATHERINE ANN WILLIAMS COTHRAN	879	1
10*14419	A	5-20-33	CROSSROAD CHILD AND FAMILY SERVICES, INC	887	105
10*15734	A	5-20-33	GENEVIEVE L LONG	904	13
10*15760	A	5-20-33	DEIRDRE L WINGER AND DANIEL W WINGER	903	645

09/08/2017

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



**GREER WELL NO. 1W-14HM  
WELL PLAT LEASE INFORMATION**

LEASE NO.	TAG	PARCEL	OIL & GAS ROYALTY OWNER	BOOK	PAGE
10*15761	A	5-20-33	CAMERON CEMETARY ASSOCIATION INC	903	642
10*15762	A	5-20-33	DAWN PETROVICH	904	4
10*15763	A	5-20-33	BONNIE J SELDERS	904	34
10*15764	A	5-20-33	JAMES E BUCKNOR	904	28
10*15765	A	5-20-33	JOHN A BUCKNOR AND RHONDA BUCKNOR	904	16
10*15766	A	5-20-33	JOHN J POZENEL	904	7
10*16220	A	5-20-33	WILLIAM LONG	792	95
10*16230	A	5-20-33	JAMES BRIAN YOHO	900	134
10*16355	A	5-20-33	JAMES P LONG AND LINDA L LONG	904	10
10*16356	A	5-20-33	DARYLS BUCKNOR AND JOYCE T BUCKNOR	904	31
10*16357	A	5-20-33	DEANNA M CAMPBELL	904	1
10*16358	A	5-20-33	ANNE MARIE KRAMER AND CHRISTOPHER E CUEVAS	903	648
10*16454	A	5-20-33	CHURCH OF CHRIST OF CAMERON OHIO	900	128
10*14300	B	5-20-34	PPG INDUSTRIES, INC.	725	123
10*14300	B	5-20-34	PPG INDUSTRIES, INC.	725	123
10*14300	C	5-21-3	PPG INDUSTRIES, INC.	725	123
10*14300	C	5-21-3	PPG INDUSTRIES, INC.	725	123
10*14300	D	5-20-35	PPG INDUSTRIES, INC.	725	123
10*14300	E	5-20-36	PPG INDUSTRIES, INC.	725	123
10*14300	F	5-20-37	PPG INDUSTRIES, INC.	725	123
10*14703	G	5-20-38	WHEELING POWER COMPANY AKA WHEELING ELECTRIC COMPANY	786	383
10*14703	H	5-20-39	WHEELING POWER COMPANY AKA WHEELING ELECTRIC COMPANY	786	383
10*14300	I	5-20-40	PPG INDUSTRIES, INC.	725	123
10*14300	J	5-20-20	PPG INDUSTRIES, INC.	725	123
10*14300	K	5-20-21	PPG INDUSTRIES, INC.	725	123
10*14300	L	5-20-47.1	PPG INDUSTRIES, INC.	725	123
10*14300	M	5-20A-2	PPG INDUSTRIES, INC.	725	123
10*14300	N	5-20A-1	PPG INDUSTRIES, INC.	725	123
10*14300	O	5-20-47	PPG INDUSTRIES, INC.	725	123

09/08/2017

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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

**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. Miller *Amy L. Miller*  
 Its: Permitting Specialist - Appalachia Region



**WW-6A1 Supplement**

**Operator's Well No. Greer 1W-14HM**

Lease #	TAG	Tax Map/ Parcel	LESSOR	ROYALTY	LESSEE	BOOK	PAGE	ASSIGNMENT	ASSIGNMENT
10*14300	A	5-20-33	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14312	A	5-20-33	JAMIE LU BENSON	1/8+	GASTAR EXPLORATION USA INC	790	531	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14313	A	5-20-33	TERRI JEAN GODDARD	1/8+	GASTAR EXPLORATION USA INC	790	585	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14314	A	5-20-33	RALPH BLACHLY	1/8+	GASTAR EXPLORATION USA INC	790	529	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14315	A	5-20-33	MARGARET ROSS	1/8+	GASTAR EXPLORATION USA INC	790	527	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14316	A	5-20-33	ANDREW GERST	1/8+	GASTAR EXPLORATION USA INC	791	645	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14317	A	5-20-33	HAROLD BLACHLY	1/8+	GASTAR EXPLORATION USA INC	791	643	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14318	A	5-20-33	MARTHA BLACHLY-CROSS	1/8+	GASTAR EXPLORATION USA INC	792	112	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14319	A	5-20-33	JACK J. PFALZGRAF	1/8+	GASTAR EXPLORATION USA INC	792	118	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14320	A	5-20-33	SANDRA CHEYNEY	1/8+	GASTAR EXPLORATION USA INC	792	91	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14321	A	5-20-33	HERBERT BLACHLY	1/8+	GASTAR EXPLORATION USA INC	792	102	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14322	A	5-20-33	LOIS KAY MORFORD	1/8+	GASTAR EXPLORATION USA INC	792	110	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14327	A	5-20-33	ROBERT D. OKEY	1/8+	GASTAR EXPLORATION USA INC	792	646	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14328	A	5-20-33	RAE ELLEN STUART	1/8+	GASTAR EXPLORATION USA INC	796	38	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14329	A	5-20-33	TONDA ROTHENBUHLER	1/8+	GASTAR EXPLORATON USA INC	796	40	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14331	A	5-20-33	CHRISTINA JEAN RIOUX	1/8+	GASTAR EXPLORATION USA	796	70	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14332	A	5-20-33	MICHAEL EDWARD BARTH	1/8+	GASTAR EXPLORATION USA INC	796	68	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14333	A	5-20-33	DEAN ROTHENBUHLER	1/8+	GASTAR EXPLORATION USA INC	796	42	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14355	A	5-20-33	DEWAYNE STARKEY	1/8+	GASTAR EXPLORATION USA INC	815	228	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14356	A	5-20-33	FREDRIC RICHTER & BETTY RICHTER	1/8+	GASTAR EXPLORATION USA INC	822	270	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14362	A	5-20-33	CAROLYN STARKEY	1/8+	GASTAR EXPLORATION INC	827	226	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC

**WW-6A1 Supplement**

**Operator's Well No. Greer 1W-14HM**

Lease #	TAG	Tax Map/ Parcel	LESSOR	ROYALTY	LESSEE	BOOK	PAGE	ASSIGNMENT	ASSIGNMENT
10*14368	A	5-20-33	JOSEPH LONG	1/8+	GASTAR EXPLORATION INC	836	106	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14371	A	5-20-33	THOMAS F LONG AND JENNIFER LONG	1/8+	GASTAR EXPLORATION INC	842	398	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14372	A	5-20-33	UNITED CHURCH HOMES INC	1/8+	GASTAR EXPLORATION INC	846	408	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14377	A	5-20-33	JOSEPH A LONG	1/8+	GASTAR EXPLORATION INC	849	519	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14387	A	5-20-33	JOHN F LONG AND PAM LONG	1/8+	GASTAR EXPLORATION INC	849	542	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14388	A	5-20-33	IMMANUEL CHURCH OF THE UNITED CHURCH OF CHRIST OF SALEM TOWNSHIP, MONROE COUNTY, OHIO	1/8+	GASTAR EXPLORATION INC	849	513	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14398	A	5-20-33	JAN KAFFENBERGER	1/8+	GASTAR EXPLORATION INC	860	434	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14399	A	5-20-33	RITA ANN DOEBERT AND RONALD DOLBERT	1/8+	GASTAR EXPLORATION INC	860	437	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14400	A	5-20-33	COLEEN SLAGLE AND FRANKLIN SLAGLE	1/8+	GASTAR EXPLORATION INC	860	440	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14401	A	5-20-33	IMELDA J SCURLOCK	1/8+	GASTAR EXPLORATION INC	860	443	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14402	A	5-20-33	CAROL F WILSON AND RICHARD WILSON	1/8+	GASTAR EXPLORATION INC	860	446	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14403	A	5-20-33	SUE WHITE	1/8+	GASTAR EXPLORATION INC	862	429	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14404	A	5-20-33	DON FORGRAVES	1/8+	GASTAR EXPLORATION INC	862	426	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14405	A	5-20-33	JOHN WHITE	1/8+	GASTAR EXPLORATION INC	862	423	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14406	A	5-20-33	WILLIAM V BUCKNOR	1/8+	GASTAR EXPLORATION INC	862	421	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14407	A	5-20-33	LESLIE F BUCKNOR	1/8+	GASTAR EXPLORATION INC	862	419	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14408	A	5-20-33	LORNA M LONG MORGAN	1/8+	GASTAR EXPLORATION INC	864	323	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14409	A	5-20-33	JAMES C LONG AND PATTI LONG	1/8+	GASTAR EXPLORATION INC	864	326	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14410	A	5-20-33	HENRY T LONG	1/8+	GASTAR EXPLORATION INC	867	385	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14411	A	5-20-33	THOMAS WHITE, ESQ., SPECIAL COMMISSIONER	1/8+	GASTAR EXPLORATION INC	870	34	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14412	A	5-20-33	THE VILLAGE NETWORK, F/K/A BOYS VILLAGE OF SMITHVILLE, OHIO	1/8+	GASTAR EXPLORATION INC	872	203	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC



WW-6A1 Supplement

Operator's Well No. Greer 1W-14HM

Lease #	TAG	Tax Map/ Parcel	LESSOR	ROYALTY	LESSEE	BOOK	PAGE	ASSIGNMENT	ASSIGNMENT
10*14413	A	5-20-33	JUANITA SANDIFER	1/8+	GASTAR EXPLORATION INC	872	206	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14416	A	5-20-33	KATHERINE ANN WILLIAMS COTHRAN	1/8+	GASTAR EXPLORATION INC	879	1	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14419	A	5-20-33	CROSSROAD CHILD AND FAMILY SERVICES, INC	1/8+	GASTAR EXPLORATION INC	887	105	N/A	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*15734	A	5-20-33	GENEVIEVE L LONG	1/8+	TH EXPLORATION LLC	904	13	N/A	N/A
10*15760	A	5-20-33	DEIRDRE L WINGER AND DANIEL W WINGER	1/8+	TH EXPLORATION LLC	903	645	N/A	N/A
10*15761	A	5-20-33	CAMERON CEMETARY ASSOCIATION INC	1/8+	TH EXPLORATION LLC	903	642	N/A	N/A
10*15762	A	5-20-33	DAWN PETROVICH	1/8+	TH EXPLORATION LLC	904	4	N/A	N/A
10*15763	A	5-20-33	BONNIE J SELDERS	1/8+	TH EXPLORATION LLC	904	34	N/A	N/A
10*15764	A	5-20-33	JAMES E BUCKNOR	1/8+	TH EXPLORATION LLC	904	28	N/A	N/A
10*15765	A	5-20-33	JOHN A BUCKNOR AND RHONDA BUCKNOR	1/8+	TH EXPLORATION LLC	904	16	N/A	N/A
10*15766	A	5-20-33	JOHN J POZENEL	1/8+	TH EXPLORATION LLC	904	7	N/A	N/A
10*16220	A	5-20-33	WILLIAM LONG	1/8+	GASTAR EXPLORATION USA INC	792	95	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*16230	A	5-20-33	JAMES BRIAN YOHO	1/8+	TH EXPLORATION LLC	900	134	N/A	N/A
10*16355	A	5-20-33	JAMES P LONG AND LINDA L LONG	1/8+	TH EXPLORATION LLC	904	10	N/A	N/A
10*16356	A	5-20-33	DARYL S BUCKNOR AND JOYCE T BUCKNOR	1/8+	TH EXPLORATION LLC	904	31	N/A	N/A
10*16357	A	5-20-33	DEANNA M CAMPBELL	1/8+	TH EXPLORATION LLC	904	1	N/A	N/A
10*16358	A	5-20-33	ANNE MARIE KRAMER AND CHRISTOPHER E CUEVAS	1/8+	TH EXPLORATION LLC	903	648	N/A	N/A
10*16454	A	5-20-33	CHURCH OF CHRIST OF CAMERON OHIO	1/8+	TH EXPLORATION LLC	900	128	N/A	N/A
10*14300	B	5-20-34	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	B	5-20-34	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	C	5-21-3	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	C	5-21-3	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	D	5-20-35	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	E	5-20-36	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	F	5-20-37	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14703	G	5-20-38	WHEELING POWER COMPANY AKA WHEELING ELECTRIC COMPANY	1/8+	GASTAR EXPLORATION USA INC	786	383	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC

**WW-6A1 Supplement**

**Operator's Well No. Greer 1W-14HM**

Lease #	TAG	Tax Map/ Parcel	LESSOR	ROYALTY	LESSEE	BOOK	PAGE	ASSIGNMENT	ASSIGNMENT
10*14703	H	5-20-39	WHEELING POWER COMPANY AKA WHEELING ELECTRIC COMPANY	1/8+	GASTAR EXPLORATION USA INC	786	383	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	I	5-20-40	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	J	5-20-20	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	K	5-20-21	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	L	5-20-47.1	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	M	5-20A-2	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	N	5-20A-1	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC
10*14300	O	5-20-47	PPG INDUSTRIES, INC.	1/8+	GASTAR EXPLORATION USA, INC.	725	123	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/009 Gastar Exploration Inc to TH Exploration II, LLC



AFFIDAVIT

**COPY**

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

On this 18<sup>th</sup> day of October, 2016, before me, the undersigned authority, personally appeared David D. Kalish ("Affiant") who being first duly sworn under oath, deposes and saith:

1. TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC are wholly owned subsidiaries of THQ Appalachia I, LLC.
2. Tug Hill Operating, LLC provides oil and gas operations services to THQ Appalachia I, LLC under an Operating Services Agreement dated July 23, 2014.
3. David D. Kalish, the Affiant, is the Vice President of Tug Hill Operating, LLC, THQ Appalachia I, LLC, TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC, and;
3. Tug Hill Operating, LLC is authorized to operate and maintain the assets owned by THQ Appalachia I, LLC, including, as referenced above, TH Exploration, LLC, TH Exploration II, LLC, and TH Exploration III, LLC, including oil and gas leases, wells, pipelines, surface facilities, and other all other assets that support the business of THQ Appalachia I, LLC, and;
4. Specifically, Tug Hill Operating, LLC is authorized to submit and obtain well work permits and carry out all activities pursuant to such work permits for assets owned by TH Exploration, LLC, TH Exploration II, LLC, TH Exploration III, LLC.

FURTHER, AFFIANT SAITH NOT.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 18<sup>th</sup> day of October, 2016.

David D. Kalish  
Affiant: David D. Kalish

JURAT

Jan Pest  
MARSHALL County 03:44:28 PM  
Instrument No 1416299  
Date Recorded 10/19/2016  
Document Type HIS  
Pages Recorded 1  
Book-Page 28-62  
Recording Fee \$5.00  
Additional \$6.00

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

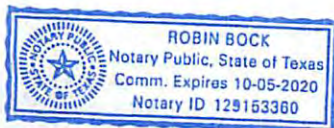
Sworn and subscribed to (or affirmed) before me on this, the 18<sup>th</sup> day of October, 2016, by David D. Kalish

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock



09/08/2017



July 25, 2017

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

RE: Greer 1W-14HM

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Greer 1W-14HM well plat.

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

Sincerely,

A handwritten signature in blue ink that reads "Amy L. Miller".

Amy L. Miller  
Permitting Specialist – Appalachia Region



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

**Date of Notice Certification:** 07/27/2017

**API No. 47-** \_\_\_\_\_ - \_\_\_\_\_  
**Operator's Well No.** Greer 1W-14HM  
**Well Pad Name:** Greer

**Notice has been given:**

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

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>514,034.22</u>
County: <u>Marshall</u>		Northing: <u>4,400,809.12</u>
District: <u>Franklin</u>	Public Road Access: <u>Waynes Ridge Road - County Route 78</u>	
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>PPG Industries, Inc.</u>	
Watershed: <u>(HUC-10): French Creek - Ohio River (undefined)</u>		

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

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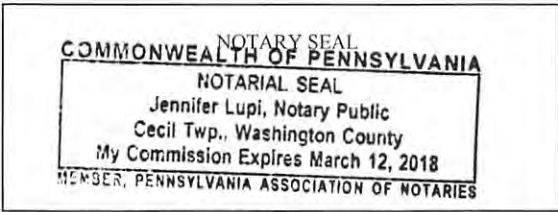
**Required Attachments:**

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

**Certification of Notice is hereby given:**

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

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



Subscribed and sworn before me this 24<sup>th</sup> day of July 2017.  
Jennifer Lupi Notary Public  
 My Commission Expires March 12, 2018

**Oil and Gas Privacy Notice:**

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



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

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

**Date of Notice:** 7/27/2017 **Date Permit Application Filed:** 7/28/2017

**Notice of:**

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

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

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

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

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

SURFACE OWNER(s)  
Name: PPG INDUSTRIES, INC.  
Address: 1 PPG PLACE  
PITTSBURGH, PA 15272

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: Same as above surface owner  
Address: \_\_\_\_\_

Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER(s) (Impoundments or Pits)  
Name: None  
Address: \_\_\_\_\_

COAL OWNER OR LESSEE  
Name: CNX Gas Co.  
Address: 1000 Consol Energy Dr.  
Canonsburg, PA 15317 \*See supplement page

COAL OPERATOR  
Name: None  
Address: \_\_\_\_\_

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)  
Name: None  
Address: \_\_\_\_\_

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: None  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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



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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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

### **Time Limits and Methods for Filing Comments.**

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

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

### **Comment Requirements**

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

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

### **Permit Denial or Condition**

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

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

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

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



WW-6A  
(8-13)

API NO. 47- 051 -  
OPERATOR WELL NO. Greer 1W-14HM  
Well Pad Name: Greer

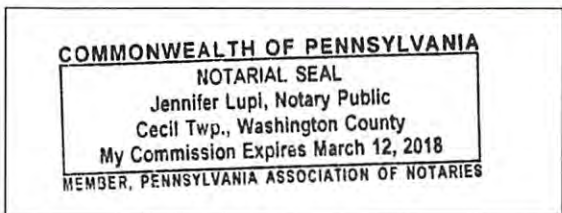
**Notice is hereby given by:**

Well Operator: Tug Hill Operating, LLC *Amy Miller*  
Telephone: 724-338-2026  
Email: amiller@tug-hilltop.com

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

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 26<sup>th</sup> day of July, 2017.  
*Jennifer Lupi* Notary Public  
My Commission Expires March 12, 2018

**WW-6A Notice of Application**

**Supplement Page**

**Coal Owner(s):**

**Name:** PPG Industries, Inc.  
**Address:** 1 PPG Place  
Pittsburgh, PA 15272

**Name:** Appalachian Power Co.  
**Address:** 1 Riverside Place  
Columbus, OH 43215

**Name:** Harry W. Moore, Sr.  
**Address:** 1300 Fifth Street  
Moundsville, WV 26041-1917

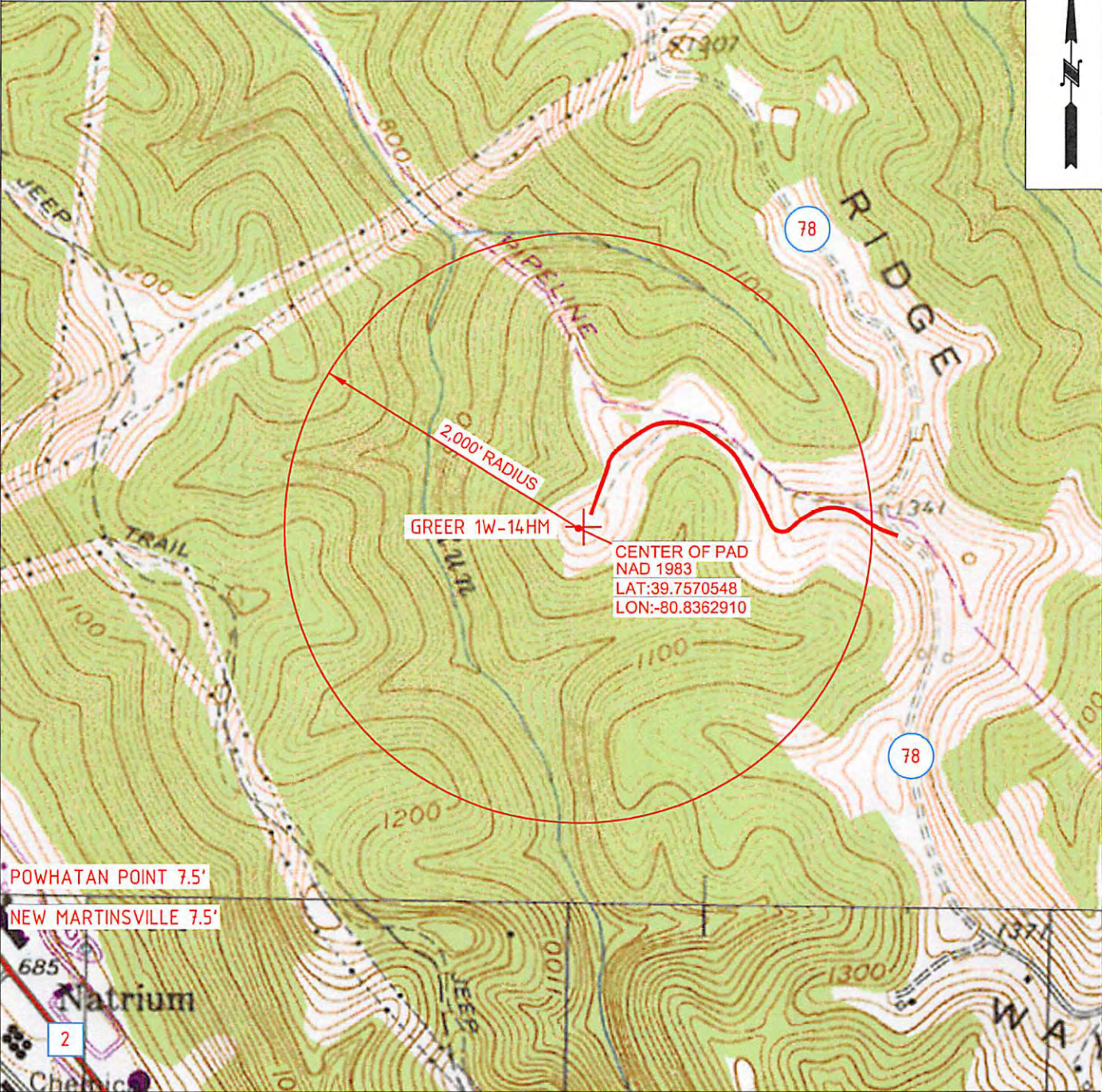
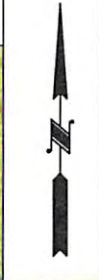


WW-6A

# PROPOSED GREER 1W-14HM

SUPPLEMENT PG 1B

*There appears to be NO ( 0 ) possible water sources within 2,000'.*



 <b>TUG HILL OPERATING</b>	OPERATOR	163-697(CEC)	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	GREER
			SCALE:	DATE:
			1" = 1000'	DATE: 07/19/17

09/08/2017

WW-6A

Supplement Pg. 1A

July 19, 2017  
Tug Hill Operating, LLC  
380 Southpointe Blvd.,  
Southpointe Plaza II, Suite 200  
Canonsburg, PA 15317

## **WATER WELL REPORT**

Well: Greer 1W-13HM  
District: Franklin  
County: Marshall  
State: WV

There appears to be No ( 0 ) possible water sources within 2,000 feet of the above referenced well location.

09/08/2017



**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF INTENT TO DRILL**

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

**Notice Time Requirement:** Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

**Date of Notice:** 07/18/2017      **Date Permit Application Filed:** 07/28/2017

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

HAND DELIVERY       CERTIFIED MAIL RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

**Notice is hereby provided to the SURFACE OWNER(s):**

Name: PPG INDUSTRIES, INC.      Name: \_\_\_\_\_  
Address: 1 PPG PLACE      Address: \_\_\_\_\_  
PITTSBURGH, PA 15272      \_\_\_\_\_

**Notice is hereby given:**

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

State: WEST VIRGINIA      UTM NAD 83      Easting: 514,034.22  
County: MARSHALL      Northing: 4,400,809.12  
District: FRANKLIN      Public Road Access: WAYNE RIDGE ROAD (COUNTY ROUTE 78)  
Quadrangle: POWHATAN POINT      Generally used farm name: PPG INDUSTRIES, INC.  
Watershed: (HUC 10) FRENCH CREEK-OHIO RIVER (UNDEFINED)

**This Notice Shall Include:**

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

**Notice is hereby given by:**

Well Operator: TUG HILL OPERATING, LLC.      Authorized Representative: AMY L. MILLER - PERMIT SPECIALIST  
Address: 380 SOUTHPOINTE BLVD., PLAZA II, SUITE 200      Address: 380 SOUTHPOINTE BLVD., PLAZA II, SUITE 200  
CANONSBURG, PA 15317      CANONSBURG, PA 15317  
Telephone: 724-749-8388      Telephone: 304-376-0111  
Email: amiller@tug-hillop.com      Email: amiller@tug-hillop.com  
Facsimile: 724-338-2030      Facsimile: 724-338-2030

**Oil and Gas Privacy Notice:**

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



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

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

**Date of Notice:** 07/24/2017      **Date Permit Application Filed:** 07/28/2017

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

- CERTIFIED MAIL                                       HAND  
RETURN RECEIPT REQUESTED                                      DELIVERY

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

**Notice is hereby provided to the SURFACE OWNER(s)**  
(at the address listed in the records of the sheriff at the time of notice):

Name: <u>PPG Industries, Inc.</u>	Name: <u>None</u>
Address: <u>One PPG Place</u>	Address: _____
<u>Pittsburgh, PA 15272</u>	_____

**Notice is hereby given:**

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

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>514,034.22</u>
County: <u>Marshall</u>		Northing: <u>4,400,809.12</u>
District: <u>Franklin</u>	Public Road Access: <u>Wayne Ridge Road (County Route 78)</u>	
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>PPG Industries, Inc.</u>	
Watershed: <u>(HUC 10) French Creek - Ohio River (UNDEFINDED)</u>		

**This Notice Shall Include:**

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

Well Operator: <u>Tug Hill Operating, LLC</u>	Address: <u>380 Southpointe Blvd, Southpointe Plaza II, Suite 200</u>
Telephone: <u>724-338-2026</u>	<u>Canonsburg, PA 15317</u>
Email: <u>amiller@tug-hillop.com</u>	Facsimile: <u>724-338-2030</u>

**Oil and Gas Privacy Notice:**

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





WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
**Division of Highways**

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

Jim Justice  
Governor

Thomas J. Smith, P. E.  
Secretary of Transportation/  
Commissioner of Highways

July 24, 2017

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

Subject: DOH Permits for the Greer Well Pad, Marshall County

Greer 1S-2HM Well	Greer 1S-3HM Well	Greer 1S-4HM Well
Greer 1N-5HU Well	Greer 1N-7HM Well	Greer 1N-8HM Well
Greer 1N-9HM Well	Greer 1N-10HU Well	Greer 1N-11HU Well
Greer 1N-12HU Well	Greer 1W-13HM Well	Greer 1W-14HM Well

47-051-01954

Dear Mr. Martin,

This well site will be accessed from Permit #06-2014-0151 transferred to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 78 SLS.

The operator has signed a DISTRICT WIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

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

Cc: Jonathan White  
Tug Hill Operating  
CH, OM, D-6  
File

09/08/2017



**PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION**

**Well No. Greer 1W-14HM**

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





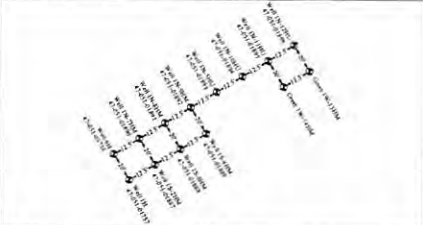
# Greer Site As-Built

Site Design, Construction Plan, &  
Erosion and Sediment Control Plans  
Tug Hill Operating  
Marshall County  
Franklin District  
Latitude 39.757055°  
Longitude -80.836291°  
Stillhouse Run - Ohio River Watershed

**Pertinent Site Information**  
Greer Well Site  
Emergency Number: 304-845-1920  
Marshall County Emergency 911 (Moundsville)  
Watershed: Stillhouse Run - Ohio River Watershed  
Tug Hill Contact Number: 1-817-632-3400

Exhibit A: Site As-Built

Well Pad Location	Center of Well Pad
WV-NAD 83 E 110826.00	WV-NAD 83 E 110826.00
WV-NAD 27 N 48068.21	WV-NAD 27 N 48068.21
WV-NAD 27 E 162476.07	WV-NAD 27 E 162476.07
WV-NAD 83 W 397042.01	WV-NAD 83 W 397042.01
UTM 17 NAD 83 E 110826.00	UTM 17 NAD 83 E 110826.00
UTM 17 NAD 83 N 48068.21	UTM 17 NAD 83 N 48068.21
UTM 17 NAD 83 E 162476.07	UTM 17 NAD 83 E 162476.07
UTM 17 NAD 83 W 397042.01	UTM 17 NAD 83 W 397042.01



Well (N-100)	Well (N-1100)	Well (N-1200)	Well (N-1300)
WV-NAD 83 E 110826.00	WV-NAD 83 E 110826.00	WV-NAD 83 E 110826.00	WV-NAD 83 E 110826.00
WV-NAD 27 N 48068.21	WV-NAD 27 N 48068.21	WV-NAD 27 N 48068.21	WV-NAD 27 N 48068.21
WV-NAD 27 E 162476.07	WV-NAD 27 E 162476.07	WV-NAD 27 E 162476.07	WV-NAD 27 E 162476.07
WV-NAD 83 W 397042.01	WV-NAD 83 W 397042.01	WV-NAD 83 W 397042.01	WV-NAD 83 W 397042.01
UTM 17 NAD 83 E 110826.00	UTM 17 NAD 83 E 110826.00	UTM 17 NAD 83 E 110826.00	UTM 17 NAD 83 E 110826.00
UTM 17 NAD 83 N 48068.21	UTM 17 NAD 83 N 48068.21	UTM 17 NAD 83 N 48068.21	UTM 17 NAD 83 N 48068.21
UTM 17 NAD 83 E 162476.07	UTM 17 NAD 83 E 162476.07	UTM 17 NAD 83 E 162476.07	UTM 17 NAD 83 E 162476.07
UTM 17 NAD 83 W 397042.01	UTM 17 NAD 83 W 397042.01	UTM 17 NAD 83 W 397042.01	UTM 17 NAD 83 W 397042.01



WV State Plane Coordinate System  
North Zone, NAD 83  
Elevation Based on NAVD83  
Established by Survey Grade GPS  
and GPS Realtime Streaming

Owner	T.M. Parcel	Acres	Front Length	Depth	Cont. Area	Cont. Area	Total Acreage
PPD Industrial, Inc	2614	2.24	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2615	2.25	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2616	2.26	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2617	2.27	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2618	2.28	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2619	2.29	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2620	2.30	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2621	2.31	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2622	2.32	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2623	2.33	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2624	2.34	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2625	2.35	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2626	2.36	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2627	2.37	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2628	2.38	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2629	2.39	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2630	2.40	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2631	2.41	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2632	2.42	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2633	2.43	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2634	2.44	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2635	2.45	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2636	2.46	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2637	2.47	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2638	2.48	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2639	2.49	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2640	2.50	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2641	2.51	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2642	2.52	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2643	2.53	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2644	2.54	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2645	2.55	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2646	2.56	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2647	2.57	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2648	2.58	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2649	2.59	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2650	2.60	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2651	2.61	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2652	2.62	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2653	2.63	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2654	2.64	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2655	2.65	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2656	2.66	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2657	2.67	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2658	2.68	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2659	2.69	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2660	2.70	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2661	2.71	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2662	2.72	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2663	2.73	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2664	2.74	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2665	2.75	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2666	2.76	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2667	2.77	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2668	2.78	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2669	2.79	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2670	2.80	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2671	2.81	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2672	2.82	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2673	2.83	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2674	2.84	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2675	2.85	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2676	2.86	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2677	2.87	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2678	2.88	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2679	2.89	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2680	2.90	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2681	2.91	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2682	2.92	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2683	2.93	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2684	2.94	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2685	2.95	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2686	2.96	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2687	2.97	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2688	2.98	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2689	2.99	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2690	3.00	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2691	3.01	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2692	3.02	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2693	3.03	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2694	3.04	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2695	3.05	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2696	3.06	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2697	3.07	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2698	3.08	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2699	3.09	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2700	3.10	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2701	3.11	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2702	3.12	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2703	3.13	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2704	3.14	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2705	3.15	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2706	3.16	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2707	3.17	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2708	3.18	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2709	3.19	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2710	3.20	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2711	3.21	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2712	3.22	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2713	3.23	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2714	3.24	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2715	3.25	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2716	3.26	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2717	3.27	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2718	3.28	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2719	3.29	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2720	3.30	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2721	3.31	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2722	3.32	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2723	3.33	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2724	3.34	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2725	3.35	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2726	3.36	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2727	3.37	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2728	3.38	0.00	2.00	2.00	2.00	2.00
PPD Industrial, Inc	2729	3.39	0.00	2.00	2.00		

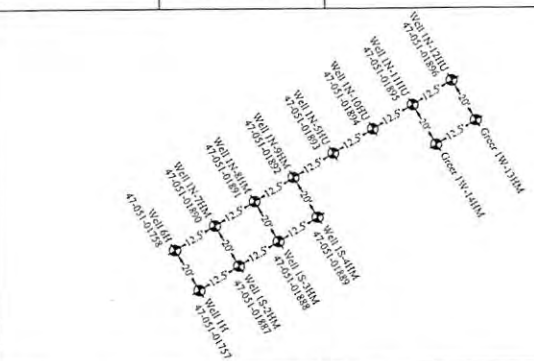




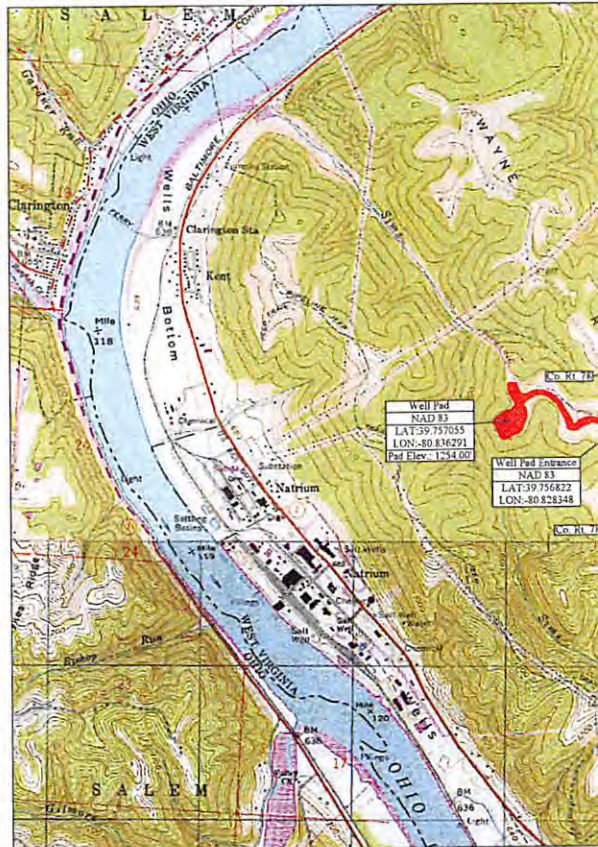
**WEST VIRGINIA COUNTY MAP**



Well Pad Entrance	Center of Well Pad
WV-NAD 83 N: 460534.10 WV-NAD 83 E: 1592064.00 WV-NAD 27 N: 460498.23 WV-NAD 27 E: 1625051.88 Lat. NAD 83: 39.756822 Lon. NAD 83: -80.828348 UTM 17 NAD 83 N: 4400781.53 UTM 17 NAD 83 E: 514704.01	WV-NAD 83 N: 460651.90 WV-NAD 83 E: 159232.45 WV-NAD 27 N: 460615.09 WV-NAD 27 E: 1624270.37 Lat. NAD 83: 39.757055 Lon. NAD 83: -80.836291 UTM 17 NAD 83 N: 4400806.06 UTM 17 NAD 83 E: 514023.55 Pad Elev.: 1254.00'



Well Table			
<b>Well IN-101U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-102U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-103U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-104U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76
<b>Well IN-105U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-106U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-107U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-108U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76
<b>Well IN-109U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-110U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-111U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76	<b>Well IN-112U</b> WV-NAD 83 N: 460672.06 WV-NAD 83 E: 159284.59 WV-NAD 27 N: 460624.24 WV-NAD 27 E: 1624284.52 Lat. NAD 83: 39.75711074 Lon. NAD 83: -80.83624172 Lat. NAD 27: 39.7570551 Lon. NAD 27: -80.83642616 UTM 17 NAD 83 N: 4400812.27 UTM 17 NAD 83 E: 514027.76



Well Pad	Well Pad Entrance
NAD 83 LAT: 39.757055 LON: -80.836291 Pad Elev.: 1254.00'	NAD 83 LAT: 39.756822 LON: -80.828348



**Project Contacts**

**Tug Hill Operating**  
Jonathan White - Regulatory Analyst  
724-485-2000 O/E 304-693-7676 Cell  
Geoff Radler - V.P. Production  
817-632-5200 O/E

**Tug Hill Operating, LLC**  
380 Southpointe Blvd  
Southpointe Plaza II, Suite 200  
Cantonburg, PA 15317

**Environmental:**  
An environmental study was not provided for the purpose of this design

**Topographic Information:**  
The topographic information shown herein is based on aerial photography by Blue Mountain Aerial Mapping, Burton, WV

**Survey and Engineers**  
Kenneth Kelly  
304-538-4953 O/E  
John P. See  
304-442-0220 O/E  
Zackary Summerfield  
304-338-6987 O/E

**Geotechnical Engineer:**  
American Geotech, Inc.  
Kamli Patel  
304-340-4277 O/E

**Well Location Restrictions**

All Pad construction complies with the following restrictions.

- \*250' from an existing well or developed spring used for human or domestic animals.
- \*625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad.
- \*100' from the edge of disturbance to wetlands, perennial streams, natural or artificial lake, pond or reservoir.
- \*300' from the edge of disturbance to a naturally reproducing trout stream.
- \*1,000' of a surface or ground water intake to a public water supply.

(Well Location Restrictions of WV Code 22-6A-12)

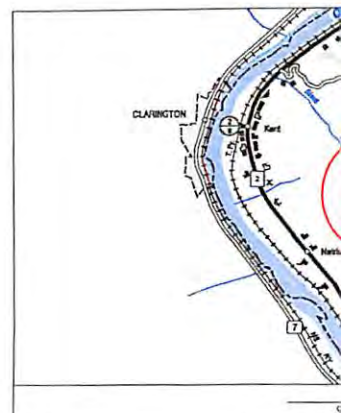
Tug Hill Operating will obtain an Encroachment Permit (Form MM-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities

The WV Mines Website was consulted. Previous (Current) mining activities are not within the AOI.

WVDEP Website files show that there are active and/or abandoned gas wells within the AOI

**Approach Routes:**

From the intersection of WV Rt 2 and OH Rt 7 in New Martinsville, WV, travel North on WV Rt 2 for 6.0 mi. Turn right onto Co Rt 2/2 (Wells Hill Road). Follow Co Rt 2/2 for 2.4 mi. Turn Left onto Co Rt 78 (Waynes Ridge Road). Follow Co Rt 78 for 1.8 mi. The site entrance will be on the Left (West) side of the road.



Floodplain Conditions	
Do site construction activities take place in a floodplain	NO
Permit needed from county floodplain coordinator	NO
Flood Hazard Zone	X
HEC-RAS Study completed:	N/A
Floodplain shown on drawings:	N/A
FIRM Map Number(s) for site:	54051C 0140E
Acres of construction in floodplain:	N/A

**MISS UTILITY OF WEST VIRGINIA**  
1-800-245-4848  
West Virginia State Law  
Section 21c, Chapter 24-C requires  
that you call before you dig in the state of West Virginia.  
**IT'S THE LAW**

**811**  
Know what's below.  
Call before you dig.

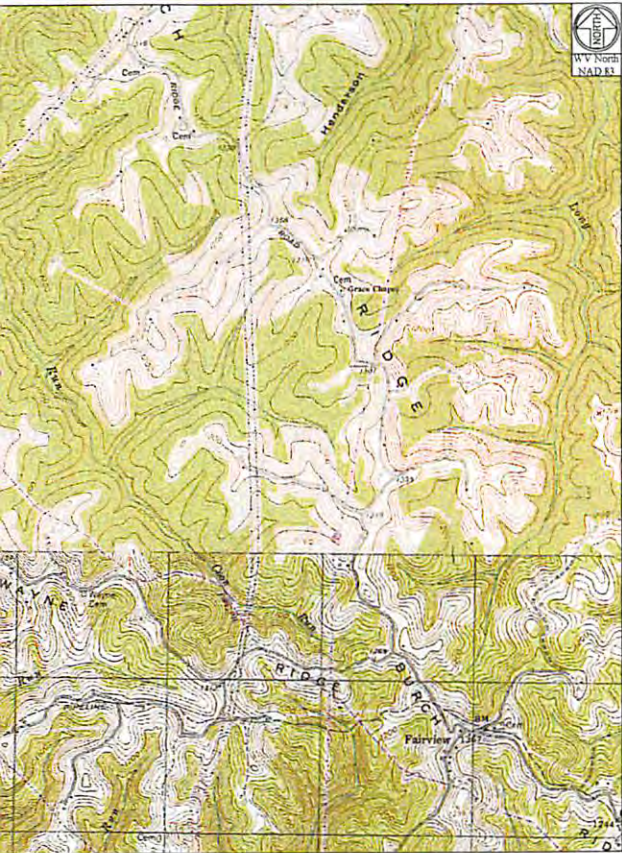


# Site As-Built

Construction Plan, &  
 Erosion Control Plans  
 Operating  
 County  
 District  
 39.757055°  
 80.836291°  
 Ohio River Watershed

**Pertinent Site Information**  
 Greer Well Site  
 Emergency Number: 304-845-1920  
 Marshall County Emergency 911 (Moundsville)  
 Watershed: Stillhouse Run - Ohio River Watershed  
 Tug Hill Contact Number: 1-817-632-3400

## Site As-Built



WV State Plane Coordinate System  
 North Zone, NAD 83  
 Elevations Based on NAV88  
 Established By Survey Grade GPS  
 and OPUS Post-Processing

Property Owner Information - Greer Site As-Built						
Franklin District - Marshall County						
Owner	TM - Parcel	Well Pad	Access Road	Topsoil/Excess	Add. Clearing	Total Disturbed
PPG Industries, Inc	21-24	0.00	1.81	0.00	2.03	3.84
PPG Industries, Inc	20-28	0.20	0.99	0.00	2.12	3.31
PPG Industries, Inc	20-27	0.00	0.07	0.00	0.09	0.16
PPG Industries, Inc	20-29	0.00	0.40	0.81	1.85	3.06
PPG Industries, Inc	20-33	5.18	0.01	0.00	2.22	7.41
<b>Site Totals (Ac)</b>		5.38	3.28	0.81	8.31	17.78

Access Road			
Surface Owner	TM - Parcel	Road Length	Type
PPG Industries, Inc	21-24	1,210.38'	New Access Road Construction
PPG Industries, Inc	20-28	1,009.88'	New Access Road Construction
PPG Industries, Inc	20-27	47.39'	New Access Road Construction
PPG Industries, Inc	20-29	382.14'	New Access Road Construction
PPG Industries, Inc	20-33	58.43'	New Access Road Construction

Disturbed Area	
Well Pad Construction	5.38 Ac
Access Road Construction	3.28 Ac
Topsoil / Excess Material	0.81 Ac
Additional Clearing	8.31 Ac
<b>Total Disturbed Area</b>	<b>17.78 Ac</b>
Additional Information	
Total Wooded Acres Disturbed	17.50 Ac
Total Linear Feet of Access Road	2,708.24'

Revision	Date
Design	08-22-2016
Design	10-10-2016
Design	10-24-2016
Design	01-09-2017
As-Built	07-19-2017

Date	Revision
08-22-2016	Design
10-10-2016	Design
10-24-2016	Design
01-09-2017	Design
07-19-2017	As-Built



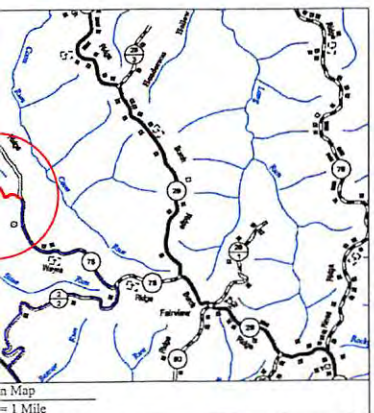
THIS DOCUMENT  
 PREPARED FOR  
 TUG HILL  
 OPERATING



**Cover Sheet**  
**Greer Site As-Built**  
 Franklin District  
 Marshall County, WV

*Handwritten signature and date: JS 7/21/17*

Scale: 1" = 1 Mile  
 Point: Powhatan Point  
 Run - Ohio River



**As-Built Certification**  
 This as-built certification certifies that the gas well drilling pad was constructed in accordance with the design drawings. It is recommended that a gas well drilling pad is included in the existing comprehensive maintenance and inspection program for gas well drilling pads or that a comprehensive maintenance and inspection program be developed to monitor the pads condition to ensure the continued safe operation.

John P. See RJE 6011  
 Kelly Surveying LLC  
 CCA C4423-00

Date: 07-19-2017

Sheet	Description
1	Cover Sheet
V1	Schedule of Quantities
N1-N3	Site Notes
2	Pre-Construction Site Conditions
3	Clearing Exhibit
4	Overall Plan View
5-7	E&S Plan View
8	Toe Key Exhibit
9-11	Plan View
12	Cross Sections - Well Pad
13	Cross Sections - Access Road
G1-G2	Geotechnical Details
L1	Landowner Disturbed Area Exhibit
S1	Site Reclamation
M1-M2	Production Details
D1-D2	Erosion and Sediment Control Details
R1	Access Road Details
P1	Pad Details

Date:	07/19/2017
Scale:	As Shown
Designed By:	ZS
File No.	
Sheet 1 of 13	

**09/08/2017**