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west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Thursday, June 14, 2018  
WELL WORK PERMIT  
Horizontal 6A / New Drill

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

Re: Permit approval for WELLER 5HM  
47-051-02037-00-00

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: WELLER 5HM  
Farm Name: ULA F. NELSON  
U.S. WELL NUMBER: 47-051-02037-00-00  
Horizontal 6A New Drill  
Date Issued: 6/14/2018

# 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    New Martinsville 7  
Operator ID    County    District    Quadrangle

2) Operator's Well Number: Weller 5HM    Well Pad Name: Lily

3) Farm Name/Surface Owner: Ula F. Nelson    Public Road Access: Route 2/2

4) Elevation, current ground: 1273'    Elevation, proposed post-construction: 1273'

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

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

6) Existing Pad: Yes or No    Yes

*JN 6/13/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6469' - 6522', thickness of 53' and an anticipated approx. pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6622'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 13,463'

11) Proposed Horizontal Leg Length: 5,970'

12) Approximate Fresh Water Strata Depths: 70', 871'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 778' and Pittsburgh Coal - 866'

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

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

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

WW-6B  
(04/15)

API NO. 47-051 - 02037  
 OPERATOR WELL NO. Weller 5HM  
 Well Pad Name: Lily

18)

**CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	216ft <sup>3</sup> (CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	971'	971'	966ft <sup>3</sup> (CTS)
Coal	13 3/8"	NEW	J55	54.5#	971'	971'	966ft <sup>3</sup> (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2632'	2632'	872ft <sup>3</sup> (CTS)
Production	5 1/2"	NEW	P110	20#	13,463'	13,463'	3454ft <sup>3</sup> (CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,411'		
Liners							

*JW 6/13/18*

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 - 02037  
OPERATOR WELL NO. Weller 5HM  
Well Pad Name: Lily

*JW* 6/13/18

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 Onondata 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 14,925,000 lb. proppant and 230,751 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 11.08 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.96 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.

**Conductor, Coal and Fresh Water Casing Cement:**

*Premium NE-1 + 2% CaCl*

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

4705102037

**Intermediate Casing:**

*Premium NE-1 + 2% bwoc CaCl<sub>2</sub> + 46.5% Fresh Water*

- Premium NE-1 – Class A Portland API spec
- CaCl<sub>2</sub> – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

**Kick Off Plug:**

*Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L + 38% Fresh Water*

- Class H – Increased Compressive Strength Cement
- Sodium Metasilicate – Free Water Control; Early Strength Additive
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent
- CaCl<sub>2</sub> – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

**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 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L*

- 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

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WV Department of  
Environmental Protection

4705 102037



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

#### Weller-5HM

#### Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	100'	CTS
Surface	13 3/8"	J55	17 1/2"	971'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,632'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	13,463'	CTS

#### Cement

- Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2
- Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
- Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19
- Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug
- Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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April 10, 2018

Mr. James Martin, Chief – Office of Oil and Gas  
 WV Department of Environmental Protection  
 601 57<sup>th</sup> Street SE  
 Charleston, WV 25304-2345

RE: Lily Well Pad

Mr. Martin:

As a result of conversations with the DEP earlier this month, we are submitting this letter upon your request to explain the existing wetlands on Tug Hill's Lily pad.

Gastar Exploration constructed the Lily Pad in 2012. Tug Hill obtained the pad in 2016 with the acquisition of Gastar's Appalachia assets. When the pad was obtained, the Lily pad had existing wetlands as a direct result of oil and gas operations.

In February of 2018, Tug Hill began submitting permit applications to add more wells to the existing Lily pad. No pad expansion has been proposed or constructed with the submittal of the new permit applications. The proposed wells for the Lily Pad are as follows:

Well Name	API#
Weller 1HM	(contained in this submission)
Weller 2HM	(contained in this submission)
Weller 3HM	(contained in this submission)
Weller 4HM	47-051-02020
Weller 5HM	(contained in this submission)
Weller 6HM	(contained in this submission)
Weller 7HM	(contained in this submission)

These are all the wells that are planned at this time. If we decide to add more wells in the future, this letter will be updated to reflect those changes. If you have any questions, please let me know.

Thank you for your consideration.

Sincerely,

Jonathan White  
 Regulatory Analyst

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## 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 - Weller-5HM

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
4705101551	Tug Hill Operating	6508' TVD 12497' MD	Marcellus	Unknown	Yes, existing Marcellus producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Producing Marcellus horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705101552	Tug Hill Operating	6508' TVD 12544' MD	Marcellus	Unknown	Yes, existing Marcellus producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Producing Marcellus horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705101553	Tug Hill Operating	6503' TVD 12434' MD	Marcellus	Unknown	Yes, existing Marcellus producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Producing Marcellus horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705101554	Tug Hill Operating	6512' TVD 12142' MD	Marcellus	Unknown	Yes, existing Marcellus producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Producing Marcellus horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705100213	Elored Linigen	2894' TVD	Hampshire Group	Unknown	No, the well is not deep enough to be within the expected fracture propagation from a Marcellus stimulation. The well is plugged	Well was plugged on 7/20/1950. A field survey was conducted to locate this well and no evidence of this well was found.
4710371600	Manufacturers Light & Heat	3500' TVD	Unknown	Unknown	Unknown but unlikely. Well is likely an old shallow oil or gas well, or a coal test bore.	State records are incomplete. A field survey was conducted to locate this well and no evidence of this well was found.

**WV Geological & Economic Survey**

Well: County = 51 Permit = 01551

Record Date: Friday, January 12, 2018 12:51

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX DISTRICT	OSRD_75	OSRD_15	LAT_00	LONG_00	UTMR	UTMN
4705101551	Marshall	01551	Franklin	New Martinsville	New Martinsville	29.737203	-80.026526	514521	4750817.9

Bottom Hole Location Information:

API	EP	FLAG	UTMR	UTMN	CON_00	LAT_00
4705101551	1	34	Completed	122	Ground Level	29.737203

Owner Information:

API	CMP_ID	SUFFID	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LF&P_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VT	PROP_TRGTS_FIS	TYPE_EST_FIS
4705101551	12172012	01551	Completed	Lea-Schub	14	14	14	14	USA Petroleum Co. (USA Petroleum Co.)	USA Petroleum Co. (USA Petroleum Co.)	000	000	000

Completion Information:

API	CMP_ID	SPUD BY	FIELD	DESIGN	FM	DIRECT	FRY	INITIAL_CLASS	FINAL_CLASS	TYPE	HP	CMP_MING	TVD	TMO	NEW_FRG	O_REF	O_API	O_REF	O_API	NO_REF	NO_API
4705101551	12172012	02/02/02	122	Ground Level	Complete	Marcellus	Marcellus	Development	Development	Oil and Gas	Horizontal	000	12018	2519	1530	2025	95	121			

Comment: 12/17/2012 Additional Lease Numbers: 1266205-001

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WV Geological & Economic Survey **Well: County = 51 Permit = 01552** Report Time: Friday, January 12, 2018 12:30

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_76	QUAD_76	LAT_DD	LON_DD	UTME	UTMN
470510552	Marshall	1152	Franklin	New Marlensville	New Marlensville	39.73911	-80.05012	415999.4	4705021.1

Bottom Hole Location Information:

API	EP	FLAG	UTME	UTMN	LON_DD	LAT_DD
470510552	1	As Drilled	4151022	4705022	-80.02001	39.73919

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PM
470510552	7/11/2012	041	Original Loc	Completed	Uia-Boam	1	Uia-Boam	WV-16-0205-0000WV-16-0076-001WV-16-0205-0001	U.A.F. Nelson et al.	Geata Exploration USA, Inc.	0700	Marshall Co.	

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	EVD	TMO	NEW_FIG	G_BEF	O_APT	O_BEF	O_APT	NGL_BEF	NGL_APT	
470510552	7/11/2012	8/27/12	1242	Ground Level	Unnamed	Hemphire-Gp	Hemphire-Gp	Chaparral (Extension)	Test	Usp/Cess4.2	Dry	Unknown	Nat/Conch	2084							

WV Geological & Economic Survey **Well: County = 51 Permit = 01553** Report Time: Friday, January 12, 2018 12:34

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_76	QUAD_76	LAT_DD	LON_DD	UTME	UTMN
470510553	Marshall	1153	Franklin	New Marlensville	New Marlensville	39.73749	-80.05049	416531.1	4705013.2

Bottom Hole Location Information:

API	EP	FLAG	UTME	UTMN	LON_DD	LAT_DD
470510553	1	As Drilled	4151042	4705042	-80.02002	39.73749

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PM
470510553	5/11/2012	041	Original Loc	Completed	Uia-Boam	1	Uia-Boam	WV-16-0205-0000WV-16-0076-001WV-16-0205-0001	U.A.F. Nelson et al.	Geata Exploration USA, Inc.	0700	Marshall Co.	

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	EVD	TMO	NEW_FIG	G_BEF	O_APT	O_BEF	O_APT	NGL_BEF	NGL_APT
470510553	5/11/2012	8/20/12	1242	Ground Level	Unnamed	Hemphire-Gp	Hemphire-Gp	Chaparral (Extension)	Test	Usp/Cess4.2	Dry	Unknown	Nat/Conch	2084						

WV Geological & Economic Survey **Well: County = 51 Permit = 01654** Report Time: Friday, January 12, 2018 12:37

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_76	QUAD_76	LAT_DD	LON_DD	UTME	UTMN
470510654	Marshall	1154	Franklin	New Marlensville	New Marlensville	39.73749	-80.05049	416531.1	4705013.2

Bottom Hole Location Information:

API	EP	FLAG	UTME	UTMN	LON_DD	LAT_DD
470510654	1	As Drilled	4151042	4705042	-80.02002	39.73749

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PM
470510654	12/17/2012	041	Original Loc	Completed	Uia-Boam	1	Uia-Boam	WV-16-0205-0000WV-16-0076-001WV-16-0205-0001	U.A.F. Nelson et al.	Geata Exploration USA, Inc.	0700	Marshall Co.	

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	EVD	TMO	NEW_FIG	G_BEF	O_APT	O_BEF	O_APT	NGL_BEF	NGL_APT
470510654	12/17/2012	1/27/13	Ground Level	Unnamed	Hemphire-Gp	Hemphire-Gp	Chaparral (Extension)	Test	Usp/Cess4.2	Dry	Unknown	Nat/Conch	2084							

WV Geological & Economic Survey **Well: County = 51 Permit = 00213** Report Time: Friday, January 12, 2018 12:37

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_76	QUAD_76	LAT_DD	LON_DD	UTME	UTMN
4705100213	Marshall	213	Franklin	New Marlensville	New Marlensville	39.738105	-80.507445	516499	4369716.5

There is no Bottom Hole Location data for this well.

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TYM_EST_PM
4705100213	7/11/1960	041	Original Loc	Completed	Uia-McHenry	1	Uia-McHenry			Litton Etsick			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	EVD	TMO	NEW_FIG	G_BEF	O_APT	O_BEF	O_APT	NGL_BEF	NGL_APT
4705100213	7/11/1960	8/16/1960	1242	Ground Level	Unnamed	Hemphire-Gp	Hemphire-Gp	Chaparral (Extension)	Test	Usp/Cess4.2	Dry	Unknown	Nat/Conch	2084						

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well \*\* some operators may have reported NGL under Oil.

There is no Production NGL data for this well \*\* some operators may have reported NGL under Oil.

There is no Production Water data for this well.

Stratigraphy Information:

API	SUFFIX	FIM	FIM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV DATUM
4705100213	Original Loc	Pittsburgh coal	CB&I Drillers Pick	750	Reasonable	2	Reasonable	1242 Ground Level
4705100213	Original Loc	Unidentified coal	Well Record	750	Reasonable	2	Reasonable	1242 Ground Level
4705100213	Original Loc	1st Cow Run/Moundville	Well Record	1335	Reasonable	49	Reasonable	1242 Ground Level
4705100213	Original Loc	Horned S&OZ Cow Run	Well Record	1420	Reasonable	40	Reasonable	1242 Ground Level
4705100213	Original Loc	S&S Gales (unref)	Well Record	1530	Reasonable	114	Reasonable	1242 Ground Level
4705100213	Original Loc	Maiden	Well Record	1888	Reasonable	50	Reasonable	1242 Ground Level
4705100213	Original Loc	Big Lime	Well Record	1873	Reasonable	87	Reasonable	1242 Ground Level
4705100213	Original Loc	Greenbrier Group	Well Record	1870	Reasonable	122	Reasonable	1242 Ground Level
4705100213	Original Loc	Keener	Well Record	1060	Reasonable	12	Reasonable	1242 Ground Level
4705100213	Original Loc	Big Linn (PipeSeal)	Well Record	1872	Reasonable	235	Reasonable	1242 Ground Level

There is no Wireline (E-Log) data for this well.

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705100213	7/20/1960	0

There is no Sample data for this well.

WV Geological & Economic Survey **Well: County = 103 Permit = 71660** Report Time: Friday, January 12, 2018 12:37

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_76	QUAD_76	LAT_DD	LON_DD	UTME	UTMN
4710371660	Wayne	71660	Franklin	New Marlensville	New Marlensville	39.715275	-80.251659	517450.0	4706237.2

There is no Bottom Hole Location data for this well.

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Owner Information:

API	CLD_ID	Surface	STATUS	SURFACE_ORDER	WELL_NAME	CO_NAME	LEASE	LEASE_NAME	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_UID	PROP_NAME	TRM_EST_PR
4710371600	24	Surface	Open	180	George Smith					Manufacturers Light & Heat Co			

Completion Information:

API	CMP_ID	PROP_ID	ELEV DATUM	FIELD	DEEPEST_FTH	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	BSG	CMP_DEPTH	TVD	SMB	REV_FTH	O_DEP	O_AFT	O_DEP	O_AFT	NGL_DEP	NGL_AFT	P_DEP	P_AFT	T_AFT	BRP_DEP	BRP_AFT	G_MSDO_BY
4710371600	440	24					UNCLASSIFIED	UNCLASSIFIED	NEUTRAL	UNCLASSIFIED																

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well \*\* some operators may have reported NGL under Oil

There is no Production NGL data for this well \*\* some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wellbore (C-Log) data for this well

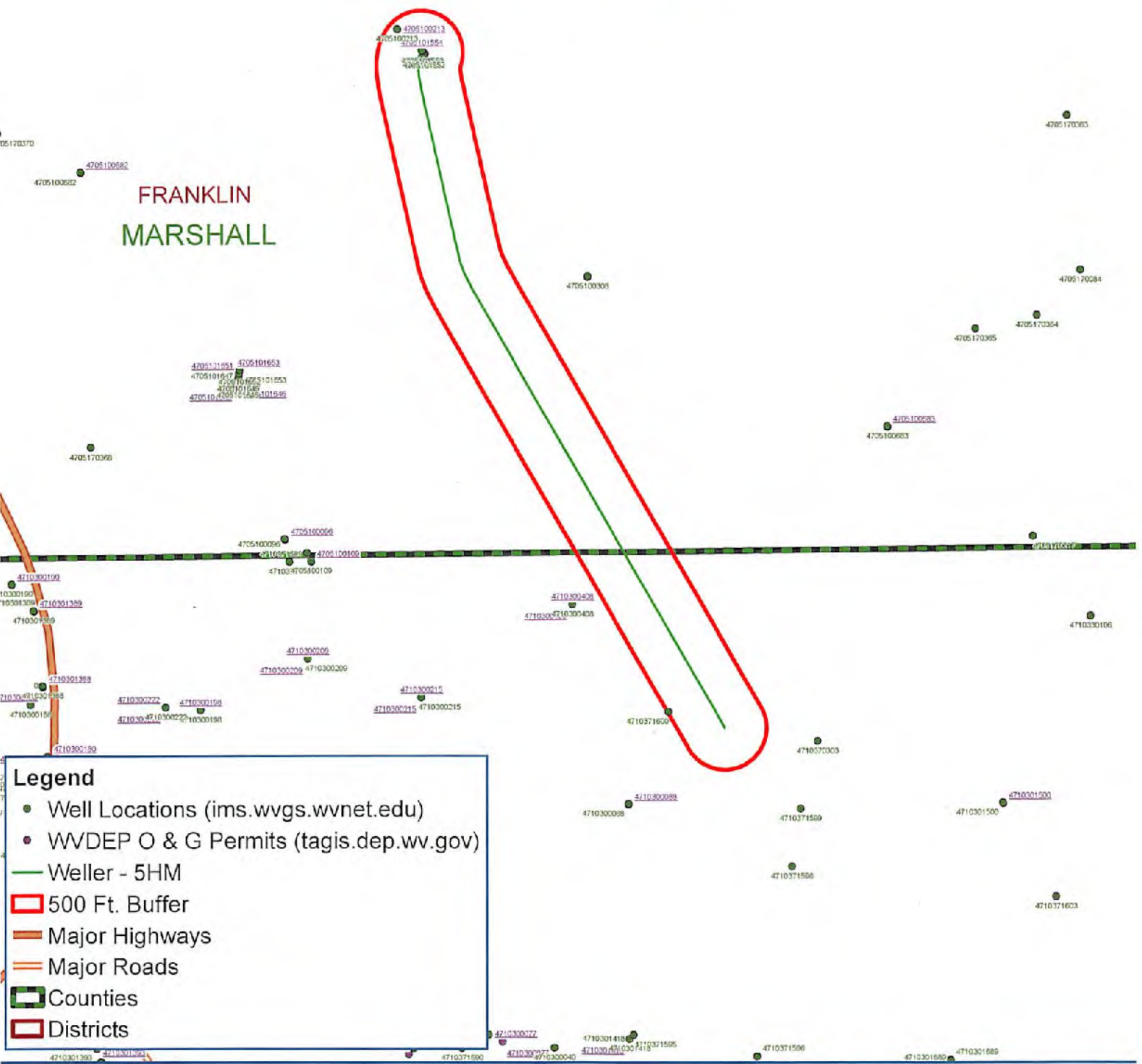
There is no Plugging data for this well

There is no Sample data for this well

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# FRANKLIN MARSHALL



**Legend**

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Weller - 5HM
- 500 Ft. Buffer
- Major Highways
- Major Roads
- Counties
- Districts



## Weller - 5HM Franklin District Marshall County, WV



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Map prepared by:  
**DPS**  
LAND SERVICES

Map Created: March 8, 2018  
Map Content As Of: March 8, 2018

Notes:  
All locations are approximate and are for visualization purposes only.

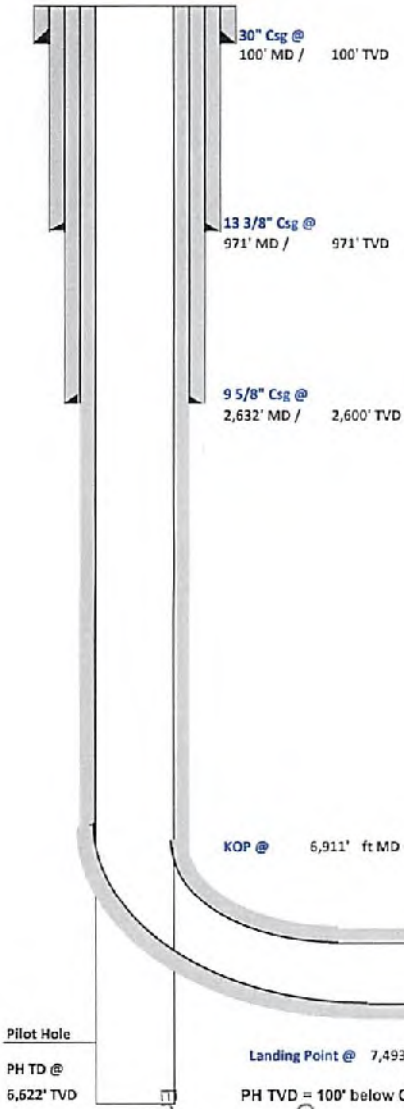


**WELL NAME:** Weller-5HM  
**STATE:** West Virginia    **COUNTY:** Marshall  
**DISTRICT:** Franklin  
**OF Elev:** 1,273'    **GL Elev:** 1,273'  
**TD:** 13,463'  
**TH Latitude:** 39.73742745  
**TH Longitude:** -80.80642285  
**BH Latitude:** 39.71371958  
**BH Longitude:** -80.79548673

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	871
Sewickley Coal	778
Pittsburgh Coal	856
Dig Line	2013
Weir	2369
Berea	2553
Gordon	2863
Rhinesstreet	5857
Genesee/Burkett	6365
Tully	6388
Hamilton	6417
Marcelus	6469
Landing Depth	6508
Onondaga	6522
Pilot Hole Depth	6622

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	100'	100'	BW	BW	Surface
Surface	17.5	13 3/8	971'	971'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,632'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	13,463'	6,612'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	291	A	15.6	Air	None
Surface	985	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	856	A	15	Air	1 Centralizer every other jt
Production	3,050	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



*Handwritten signature and date: 3/28/18*

4705-02037

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Well: Weller 5 HM (B)  
 Site: Lily/Weller  
 Project: Marshall County, West Virginia  
 Design: rev0

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Diep	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1900.00	10.00	205.00	1867.47	-39.44	-18.39	2.00	205.00	28.40	Begin 2°/100' build/turn
4	3159.85	32.45	167.42	3068.30	-475.55	9.46	2.00	-50.24	437.44	Begin 32.45° tangent
5	6910.56	32.45	167.42	6233.22	-2439.94	447.88	0.00	0.00	2408.49	Begin 10°/100' build/turn
6	7482.77	89.00	150.00	6508.00	-2883.29	644.67	10.00	-20.62	2883.55	Begin 89.00° lateral section
7	13462.62	89.00	150.00	6612.00	-8052.54	3629.14	0.00	0.00	8832.56	PBHL/TD 13462.62 MD/6612.00 TVD

Azimuths to Grid North  
 True North: -0.12°  
 Magnetic North: -8.75°

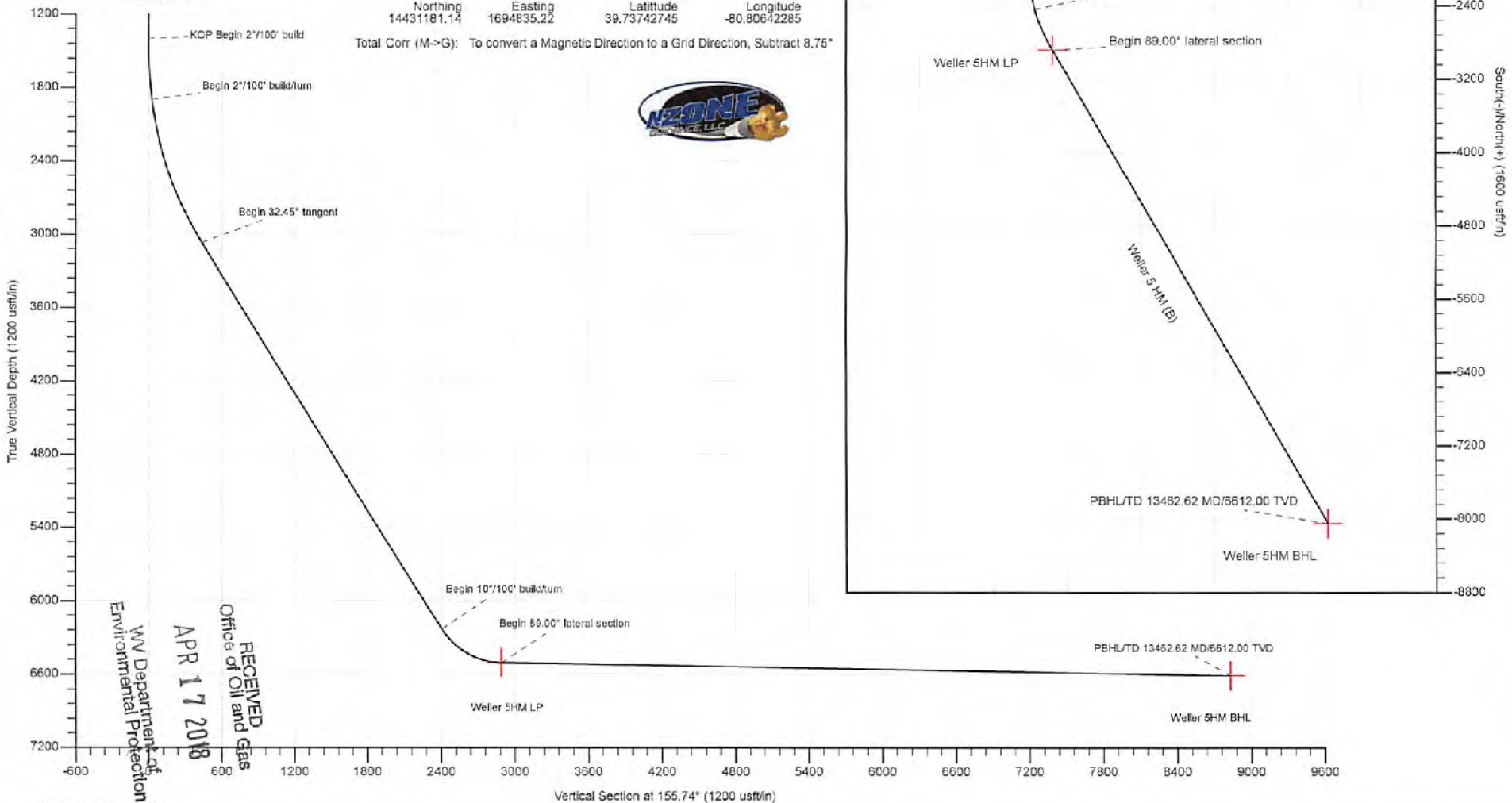
Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level  
 Depth Reference: GL @ 1273.00usft

Northing: 14431181.14    Easting: 1694835.22    Latitude: 39.73742745    Longitude: -80.80642285

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.75°

Magnetic Field  
 Strength: 52102.15nT  
 Dip Angle: 68.89°  
 Date: 12/16/2017  
 Model: IGRF2015



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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Weller 5 HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1273.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 1273.00usft
<b>Site:</b>	Lily/Weller	<b>North Reference:</b>	Grid
<b>Well:</b>	Weller 5 HM (B)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev0		

<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>	Lily/Weller				
<b>Site Position:</b>		<b>Northing:</b>	14,431,189.55 usft	<b>Latitude:</b>	39.73745061
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,694,826.67 usft	<b>Longitude:</b>	-80.80645320
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.12 °

<b>Well</b>	Weller 5 HM (B)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,431,181.14 usft	<b>Latitude:</b>	39.73742745
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,694,835.22 usft	<b>Longitude:</b>	-80.80642285
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,273.00 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	12/16/2017	-8.62	66.89	52,102.10074437

<b>Design</b>	rev0			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	155.74

<b>Plan Survey Tool Program</b>	<b>Date</b>	12/17/2017		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	13,462.62 rev0 (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	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	10.00	205.00	1,897.47	-39.44	-18.39	2.00	2.00	0.00	205.00	0.00
3,159.85	32.45	187.42	3,068.30	-475.55	9.46	2.00	1.78	-2.98	-50.24	0.00
6,910.56	32.45	187.42	6,233.23	-2,439.94	447.88	0.00	0.00	0.00	0.00	0.00
7,492.77	89.00	150.00	6,508.00	-2,883.29	644.67	10.00	9.71	-2.99	-20.62	0.00
13,462.62	89.00	150.00	6,612.00	-8,052.54	3,629.14	0.00	0.00	0.00	0.00	0.00

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Weller 5 HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1273.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 1273.00usft
<b>Site:</b>	Lily/Weller	<b>North Reference:</b>	Grid
<b>Well:</b>	Weller 5 HM (B)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
100.00	0.00	0.00	100.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
200.00	0.00	0.00	200.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
300.00	0.00	0.00	300.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
400.00	0.00	0.00	400.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
500.00	0.00	0.00	500.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
600.00	0.00	0.00	600.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
700.00	0.00	0.00	700.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
800.00	0.00	0.00	800.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
900.00	0.00	0.00	900.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,431,181.14	1,694,835.22	39.73742745	-80.80642285	
<b>KOP Begin 2°/100' build</b>										
1,500.00	2.00	205.00	1,499.98	-1.58	-0.74	14,431,179.58	1,694,834.48	39.73742311	-80.80642549	
1,600.00	4.00	205.00	1,599.84	-6.32	-2.95	14,431,174.82	1,694,832.27	39.73741010	-80.80643339	
1,700.00	6.00	205.00	1,699.45	-14.22	-6.63	14,431,166.92	1,694,828.59	39.73738843	-80.80644655	
1,800.00	8.00	205.00	1,799.70	-25.27	-11.76	14,431,155.87	1,694,823.44	39.73735813	-80.80646496	
1,900.00	10.00	205.00	1,897.47	-39.44	-18.39	14,431,141.70	1,694,816.82	39.73731923	-80.80648858	
<b>Begin 2°/100' build/turn</b>										
2,000.00	11.38	197.19	1,995.73	-56.74	-24.98	14,431,124.40	1,694,810.24	39.73727177	-80.80651214	
2,100.00	12.93	191.13	2,093.49	-77.15	-30.05	14,431,103.99	1,694,805.16	39.73721576	-80.80653035	
2,200.00	14.58	186.38	2,190.63	-100.63	-33.61	14,431,080.51	1,694,801.61	39.73715129	-80.80654319	
2,300.00	16.31	182.60	2,287.01	-127.16	-35.65	14,431,053.98	1,694,799.57	39.73707843	-80.80655084	
2,400.00	18.09	179.54	2,382.54	-156.72	-36.16	14,431,024.42	1,694,799.08	39.73699727	-80.80655269	
2,500.00	19.92	177.02	2,477.09	-189.26	-35.15	14,430,991.88	1,694,800.07	39.73690790	-80.80654934	
2,600.00	21.77	174.90	2,570.54	-224.74	-32.62	14,430,956.40	1,694,802.60	39.73681044	-80.80654080	
2,700.00	23.65	173.11	2,662.79	-263.12	-28.56	14,430,918.02	1,694,806.66	39.73670501	-80.80652648	
2,800.00	25.54	171.56	2,753.71	-304.36	-22.99	14,430,876.78	1,694,812.22	39.73659173	-80.80650698	
2,900.00	27.45	170.22	2,843.21	-348.40	-15.92	14,430,832.74	1,694,819.30	39.73647074	-80.80648214	
3,000.00	29.37	169.04	2,931.16	-395.19	-7.34	14,430,785.95	1,694,827.88	39.73634219	-80.80645199	
3,100.00	31.30	167.99	3,017.47	-444.67	2.73	14,430,736.47	1,694,837.95	39.73620624	-80.80641656	
3,159.85	32.45	167.42	3,068.30	-475.55	9.46	14,430,705.59	1,694,844.68	39.73612140	-80.80639285	
<b>Begin 32.45° tangent</b>										
3,200.00	32.45	167.42	3,102.18	-496.58	14.15	14,430,684.56	1,694,849.37	39.73806382	-80.80637632	
3,300.00	32.45	167.42	3,186.56	-548.95	25.84	14,430,632.19	1,694,861.06	39.73591971	-80.80633514	
3,400.00	32.45	167.42	3,270.94	-601.32	37.53	14,430,579.82	1,694,872.75	39.73577581	-80.80629397	
3,500.00	32.45	167.42	3,355.32	-653.70	49.22	14,430,527.44	1,694,884.44	39.73563191	-80.80625279	
3,600.00	32.45	167.42	3,439.70	-706.07	60.91	14,430,475.07	1,694,896.13	39.73548800	-80.80621162	
3,700.00	32.45	167.42	3,524.09	-758.45	72.60	14,430,422.69	1,694,907.82	39.73534410	-80.80617044	
3,800.00	32.45	167.42	3,608.47	-810.82	84.29	14,430,370.32	1,694,919.51	39.73520020	-80.80612927	
3,900.00	32.45	167.42	3,692.85	-863.19	95.98	14,430,317.95	1,694,931.19	39.73505629	-80.80608809	
4,000.00	32.45	167.42	3,777.23	-915.57	107.68	14,430,265.57	1,694,942.88	39.73491239	-80.80604692	
4,100.00	32.45	167.42	3,861.61	-967.94	119.35	14,430,213.20	1,694,954.57	39.73476848	-80.80600574	
4,200.00	32.45	167.42	3,946.00	-1,020.31	131.04	14,430,160.83	1,694,966.26	39.73462458	-80.80596457	
4,300.00	32.45	167.42	4,030.38	-1,072.69	142.73	14,430,108.45	1,694,977.95	39.73448068	-80.80592339	
4,400.00	32.45	167.42	4,114.76	-1,125.06	154.42	14,430,056.08	1,694,989.64	39.73433677	-80.80588222	
4,500.00	32.45	167.42	4,199.14	-1,177.44	166.11	14,430,003.70	1,695,001.33	39.73419287	-80.80584104	
4,600.00	32.45	167.42	4,283.53	-1,229.81	177.80	14,429,951.33	1,695,013.02	39.73404896	-80.80579987	
4,700.00	32.45	167.42	4,367.91	-1,282.18	189.49	14,429,898.96	1,695,024.71	39.73390506	-80.80575870	
4,800.00	32.45	167.42	4,452.29	-1,334.56	201.18	14,429,846.58	1,695,036.39	39.73376116	-80.80571752	
4,900.00	32.45	167.42	4,536.67	-1,386.93	212.87	14,429,794.21	1,695,048.08	39.73361725	-80.80567635	

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Planning Report - Geographic

Database:	DB_Jul2218dt_V14	Local Co-ordinate Reference:	Well Weller 5 HM (B)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1273.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1273.00usft
Site:	Lily/Weller	North Reference:	Grid
Well:	Weller 5 HM (B)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,000.00	32.45	167.42	4,621.05	-1,439.30	224.55	14,429,741.83	1,695,059.77	39.73347335	-80.80563518	
5,100.00	32.45	167.42	4,705.44	-1,491.68	236.24	14,429,689.46	1,695,071.46	39.73332945	-80.80559400	
5,200.00	32.45	167.42	4,789.82	-1,544.05	247.93	14,429,637.09	1,695,083.15	39.73318554	-80.80555283	
5,300.00	32.45	167.42	4,874.20	-1,596.43	259.62	14,429,584.71	1,695,094.84	39.73304164	-80.80551166	
5,400.00	32.45	167.42	4,958.58	-1,648.80	271.31	14,429,532.34	1,695,106.53	39.73289773	-80.80547048	
5,500.00	32.45	167.42	5,042.97	-1,701.17	283.00	14,429,479.97	1,695,118.22	39.73275383	-80.80542931	
5,600.00	32.45	167.42	5,127.35	-1,753.55	294.69	14,429,427.59	1,695,129.91	39.73260993	-80.80538814	
5,700.00	32.45	167.42	5,211.73	-1,805.92	306.38	14,429,375.22	1,695,141.60	39.73246602	-80.80534697	
5,800.00	32.45	167.42	5,296.11	-1,858.30	318.07	14,429,322.84	1,695,153.28	39.73232212	-80.80530579	
5,900.00	32.45	167.42	5,380.49	-1,910.67	329.75	14,429,270.47	1,695,164.97	39.73217821	-80.80526462	
6,000.00	32.45	167.42	5,464.88	-1,963.04	341.44	14,429,218.10	1,695,176.66	39.73203431	-80.80522345	
6,100.00	32.45	167.42	5,549.26	-2,015.42	353.13	14,429,165.72	1,695,188.35	39.73189040	-80.80518228	
6,200.00	32.45	167.42	5,633.64	-2,067.79	364.82	14,429,113.35	1,695,200.04	39.73174650	-80.80514111	
6,300.00	32.45	167.42	5,718.02	-2,120.16	376.51	14,429,060.98	1,695,211.73	39.73160260	-80.80509994	
6,400.00	32.45	167.42	5,802.41	-2,172.54	388.20	14,429,008.60	1,695,223.42	39.73145869	-80.80505877	
6,500.00	32.45	167.42	5,886.79	-2,224.91	399.89	14,428,956.23	1,695,235.11	39.73131479	-80.80501760	
6,600.00	32.45	167.42	5,971.17	-2,277.28	411.58	14,428,903.85	1,695,246.80	39.73117088	-80.80497643	
6,700.00	32.45	167.42	6,055.55	-2,329.66	423.27	14,428,851.48	1,695,258.48	39.73102698	-80.80493525	
6,800.00	32.45	167.42	6,139.93	-2,382.03	434.96	14,428,799.11	1,695,270.17	39.73088307	-80.80489408	
6,900.00	32.45	167.42	6,224.32	-2,434.41	446.64	14,428,746.73	1,695,281.86	39.73073917	-80.80485291	
6,910.56	32.45	167.42	6,233.23	-2,439.94	447.88	14,428,741.20	1,695,283.10	39.73072398	-80.80484657	
<b>Begin 10°/100' build/turn</b>										
7,000.00	40.93	162.63	6,304.89	-2,491.43	461.88	14,428,689.71	1,695,297.10	39.73058248	-80.80479915	
7,100.00	50.58	158.91	6,374.60	-2,556.90	485.62	14,428,622.24	1,695,320.84	39.73039705	-80.80471523	
7,200.00	60.31	156.11	6,431.26	-2,634.84	517.20	14,428,546.30	1,695,352.41	39.73018830	-80.80460353	
7,300.00	70.09	153.80	6,473.16	-2,716.94	555.64	14,428,464.20	1,695,390.86	39.72996259	-80.80446743	
7,400.00	79.89	151.77	6,499.03	-2,802.71	599.78	14,428,378.43	1,695,435.00	39.72972677	-80.80431108	
7,492.77	89.00	150.00	6,508.00	-2,883.28	644.67	14,428,297.85	1,695,479.89	39.72950521	-80.80415206	
<b>Begin 89.00° lateral section</b>										
7,500.00	89.00	150.00	6,508.13	-2,889.55	648.28	14,428,291.59	1,695,483.50	39.72948800	-80.80413926	
7,600.00	89.00	150.00	6,509.87	-2,976.14	698.28	14,428,205.00	1,695,533.49	39.72924990	-80.80396212	
7,700.00	89.00	150.00	6,511.61	-3,062.73	748.27	14,428,118.41	1,695,583.49	39.72901180	-80.80378498	
7,800.00	89.00	150.00	6,513.35	-3,149.32	798.26	14,428,031.82	1,695,633.48	39.72877370	-80.80360785	
7,900.00	89.00	150.00	6,515.09	-3,235.91	848.25	14,427,945.23	1,695,683.47	39.72853560	-80.80343071	
8,000.00	89.00	150.00	6,516.84	-3,322.50	898.25	14,427,858.64	1,695,733.46	39.72829749	-80.80325358	
8,100.00	89.00	150.00	6,518.58	-3,409.09	948.24	14,427,772.05	1,695,783.46	39.72805939	-80.80307645	
8,200.00	89.00	150.00	6,520.32	-3,495.68	998.23	14,427,685.46	1,695,833.45	39.72782129	-80.80289932	
8,300.00	89.00	150.00	6,522.06	-3,582.28	1,048.22	14,427,598.88	1,695,883.44	39.72758319	-80.80272219	
8,400.00	89.00	150.00	6,523.80	-3,668.85	1,098.21	14,427,512.29	1,695,933.43	39.72734508	-80.80254506	
8,500.00	89.00	150.00	6,525.55	-3,755.44	1,148.21	14,427,425.70	1,695,983.43	39.72710698	-80.80236794	
8,600.00	89.00	150.00	6,527.29	-3,842.03	1,198.20	14,427,339.11	1,696,033.42	39.72686887	-80.80219081	
8,700.00	89.00	150.00	6,529.03	-3,928.62	1,248.19	14,427,252.52	1,696,083.41	39.72663077	-80.80201369	
8,800.00	89.00	150.00	6,530.77	-4,015.21	1,298.18	14,427,165.93	1,696,133.40	39.72639267	-80.80183656	
8,900.00	89.00	150.00	6,532.52	-4,101.80	1,348.18	14,427,079.34	1,696,183.40	39.72615456	-80.80165944	
9,000.00	89.00	150.00	6,534.26	-4,188.39	1,398.17	14,426,992.75	1,696,233.39	39.72591646	-80.80148232	
9,100.00	89.00	150.00	6,536.00	-4,274.98	1,448.16	14,426,906.16	1,696,283.38	39.72567835	-80.80130520	
9,200.00	89.00	150.00	6,537.74	-4,361.57	1,498.15	14,426,819.57	1,696,333.37	39.72544025	-80.80112808	
9,300.00	89.00	150.00	6,539.48	-4,448.16	1,548.15	14,426,732.98	1,696,383.36	39.72520214	-80.80095097	
9,400.00	89.00	150.00	6,541.23	-4,534.75	1,598.14	14,426,646.39	1,696,433.36	39.72496403	-80.80077385	
9,500.00	89.00	150.00	6,542.97	-4,621.34	1,648.13	14,426,559.80	1,696,483.35	39.72472593	-80.80059674	
9,600.00	89.00	150.00	6,544.71	-4,707.93	1,698.12	14,426,473.21	1,696,533.34	39.72448782	-80.80041962	
9,700.00	89.00	150.00	6,546.45	-4,794.52	1,748.12	14,426,386.62	1,696,583.33	39.72424971	-80.80024251	
9,800.00	89.00	150.00	6,548.19	-4,881.11	1,798.11	14,426,300.03	1,696,633.33	39.72401161	-80.80006540	
9,900.00	89.00	150.00	6,549.94	-4,967.70	1,848.10	14,426,213.44	1,696,683.32	39.72377350	-80.79988829	

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_V14	<b>Local Co-ordinate Reference:</b>	Well Weller 5 HM (B)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1273.00usft
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	GL @ 1273.00usft
<b>Site:</b>	Lily/Weller	<b>North Reference:</b>	Grid
<b>Well:</b>	Weller 5 HM (B)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
10,000.00	89.00	150.00	6,551.68	-5,054.28	1,898.09	14,426,126.86	1,696,733.31	39.72353539	-80.79971118	
10,100.00	89.00	150.00	6,553.42	-5,140.87	1,948.09	14,426,040.27	1,696,783.30	39.72329728	-80.79953407	
10,200.00	89.00	150.00	6,555.16	-5,227.46	1,998.08	14,425,953.68	1,696,833.30	39.72305918	-80.79935897	
10,300.00	89.00	150.00	6,556.90	-5,314.05	2,048.07	14,425,867.09	1,696,883.29	39.72282107	-80.79917986	
10,400.00	89.00	150.00	6,558.65	-5,400.64	2,098.06	14,425,780.50	1,696,933.28	39.72258296	-80.79900276	
10,500.00	89.00	150.00	6,560.39	-5,487.23	2,148.06	14,425,693.91	1,696,983.27	39.72234485	-80.79882566	
10,600.00	89.00	150.00	6,562.13	-5,573.82	2,198.05	14,425,607.32	1,697,033.27	39.72210674	-80.79864856	
10,700.00	89.00	150.00	6,563.87	-5,660.41	2,248.04	14,425,520.73	1,697,083.26	39.72186863	-80.79847146	
10,800.00	89.00	150.00	6,565.61	-5,747.00	2,298.03	14,425,434.14	1,697,133.25	39.72163052	-80.79829436	
10,900.00	89.00	150.00	6,567.36	-5,833.59	2,348.03	14,425,347.55	1,697,183.24	39.72139241	-80.79811726	
11,000.00	89.00	150.00	6,569.10	-5,920.18	2,398.02	14,425,260.96	1,697,233.24	39.72115430	-80.79794016	
11,100.00	89.00	150.00	6,570.84	-6,006.77	2,448.01	14,425,174.37	1,697,283.23	39.72091619	-80.79776307	
11,200.00	89.00	150.00	6,572.58	-6,093.36	2,498.00	14,425,087.78	1,697,333.22	39.72067808	-80.79758597	
11,300.00	89.00	150.00	6,574.33	-6,179.95	2,548.00	14,425,001.19	1,697,383.21	39.72043997	-80.79740888	
11,400.00	89.00	150.00	6,576.07	-6,266.54	2,597.99	14,424,914.60	1,697,433.21	39.72020186	-80.79723179	
11,500.00	89.00	150.00	6,577.81	-6,353.13	2,647.98	14,424,828.01	1,697,483.20	39.71996374	-80.79705470	
11,600.00	89.00	150.00	6,579.55	-6,439.71	2,697.97	14,424,741.43	1,697,533.19	39.71972563	-80.79687761	
11,700.00	89.00	150.00	6,581.29	-6,526.30	2,747.96	14,424,654.84	1,697,583.18	39.71948752	-80.79670052	
11,800.00	89.00	150.00	6,583.04	-6,612.89	2,797.96	14,424,568.25	1,697,633.18	39.71924941	-80.79652344	
11,900.00	89.00	150.00	6,584.78	-6,699.48	2,847.95	14,424,481.66	1,697,683.17	39.71901129	-80.79634635	
12,000.00	89.00	150.00	6,586.52	-6,786.07	2,897.94	14,424,395.07	1,697,733.16	39.71877318	-80.79616927	
12,100.00	89.00	150.00	6,588.26	-6,872.66	2,947.93	14,424,308.48	1,697,783.15	39.71853507	-80.79599218	
12,200.00	89.00	150.00	6,590.00	-6,959.25	2,997.93	14,424,221.89	1,697,833.15	39.71829695	-80.79581510	
12,300.00	89.00	150.00	6,591.75	-7,045.84	3,047.92	14,424,135.30	1,697,883.14	39.71805884	-80.79563802	
12,400.00	89.00	150.00	6,593.49	-7,132.43	3,097.91	14,424,048.71	1,697,933.13	39.71782072	-80.79546094	
12,500.00	89.00	150.00	6,595.23	-7,219.02	3,147.90	14,423,962.12	1,697,983.12	39.71758261	-80.79528386	
12,600.00	89.00	150.00	6,596.97	-7,305.61	3,197.90	14,423,875.53	1,698,033.12	39.71734449	-80.79510679	
12,700.00	89.00	150.00	6,598.71	-7,392.20	3,247.89	14,423,788.94	1,698,083.11	39.71710638	-80.79492971	
12,800.00	89.00	150.00	6,600.46	-7,478.79	3,297.88	14,423,702.35	1,698,133.10	39.71686826	-80.79475264	
12,900.00	89.00	150.00	6,602.20	-7,565.38	3,347.87	14,423,615.76	1,698,183.09	39.71663015	-80.79457556	
13,000.00	89.00	150.00	6,603.94	-7,651.97	3,397.87	14,423,529.17	1,698,233.08	39.71639203	-80.79439849	
13,100.00	89.00	150.00	6,605.68	-7,738.56	3,447.86	14,423,442.58	1,698,283.08	39.71615392	-80.79422142	
13,200.00	89.00	150.00	6,607.43	-7,825.15	3,497.85	14,423,355.99	1,698,333.07	39.71591580	-80.79404435	
13,300.00	89.00	150.00	6,609.17	-7,911.73	3,547.84	14,423,269.41	1,698,383.06	39.71567768	-80.79386728	
13,400.00	89.00	150.00	6,610.91	-7,998.32	3,597.84	14,423,182.82	1,698,433.05	39.71543957	-80.79369022	
13,462.62	89.00	150.00	6,612.00	-8,052.54	3,629.14	14,423,128.60	1,698,464.36	39.71529046	-80.79357934	

PBHL/TD 13462.62 MD/6612.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Weller 5HM LP - hit/miss target - Shape - Point	0.00	0.00	6,508.00	-2,883.29	644.67	14,428,297.85	1,695,479.89	39.72950521	-80.80415206	
Weller 5HM BHL - plan hits target center - Point	0.00	0.00	6,612.00	-8,052.54	3,629.14	14,423,128.60	1,698,464.36	39.71529046	-80.79357934	

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Planning Report - Geographic

47 051 02037

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Weller 5 HM (B)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1273.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1273.00usft
Site:	Lily/Weller	North Reference:	Grid
Well:	Weller 5 HM (B)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev0		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,400.00	1,400.00	0.00	0.00	KOP Begin 2°/100' build
1,900.00	1,897.47	-39.44	-18.39	Begin 2°/100' build/turn
3,159.85	3,068.30	-475.55	9.46	Begin 32.45° tangent
6,910.56	6,233.23	-2,439.94	447.88	Begin 10°/100' build/turn
7,492.77	6,508.00	-2,883.29	644.67	Begin 89.00° lateral section
13,482.62	6,812.00	-8,052.54	3,629.14	PBHL/TD 13462.62 MD/6612.00 TVD

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Environmental Protection

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WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_  
Operator's Well No. Weller 5HM

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) French Creek - Ohio River Quadrangle New Martinsville 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 containment

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection ( UIC Permit Number UIC 2459, UIC 985, UIC 359, UIC 2D0732540, UIC 2D0732523 )
- Reuse (at API Number \_\_\_\_\_)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain \_\_\_\_\_)

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

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

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

Additives to be used in drilling medium? Barite for weight

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

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWP-1021 / WVD0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP ECR1386420)

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) Seara Gasser

Company Official Title Engineer

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Subscribed and sworn before me this 27th day of March, 2018

Kaitlin McCawley Kaitlin McCawley  
Notary Public

WV Department of  
Environmental Protection

My commission expires 5/8/2021



47 051 02037

Form WW-9

Operator's Well No. Weller 6HM

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 11.08 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
Annual Ryegrass	40	Orchard Grass	12
Spring Oats	96	Ladino	3
		White Clover	2

**Attach:**

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Anderson*

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

Title: Oil & Gas Inspector Date: 3/28/18

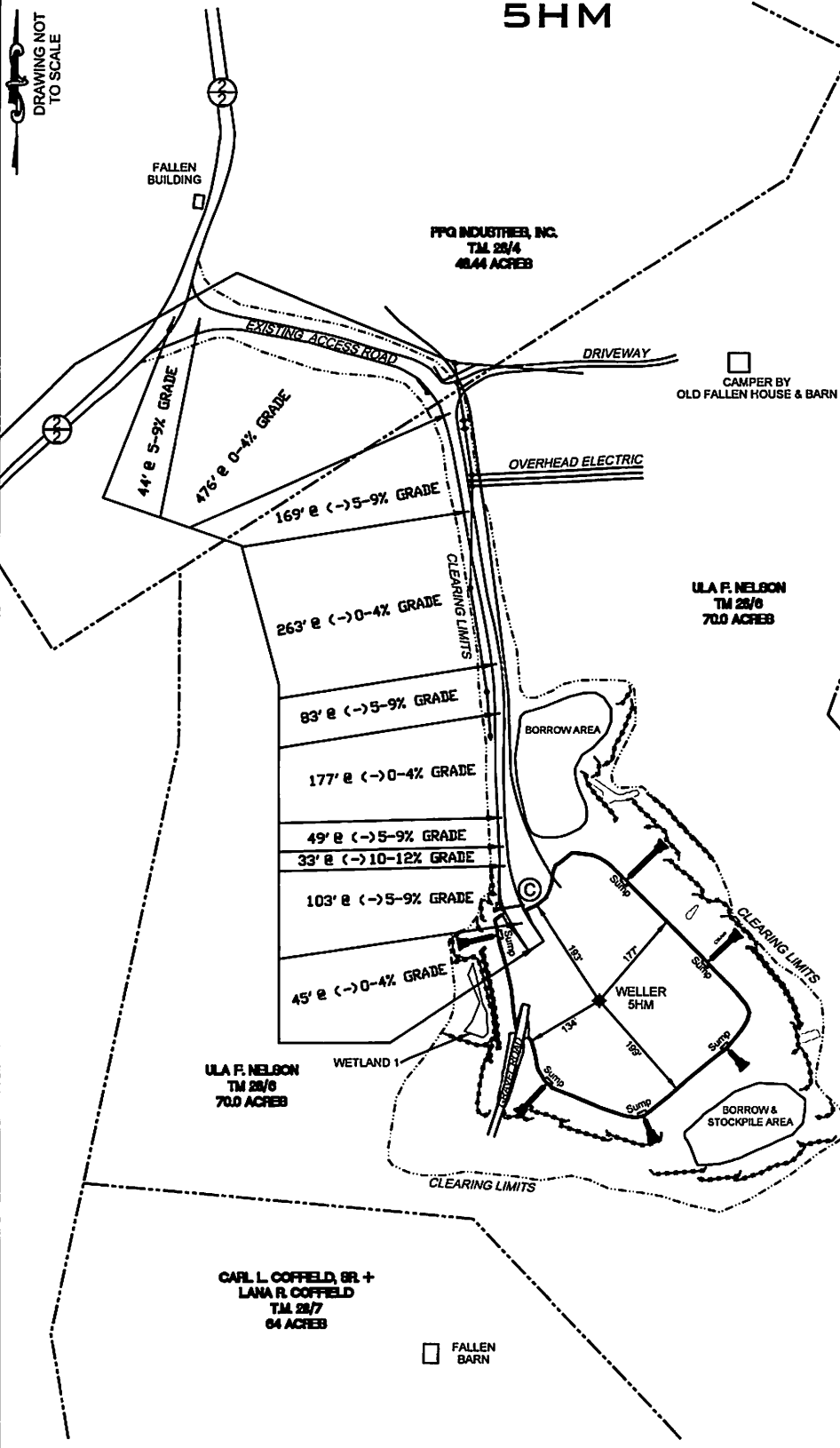
Field Reviewed?  Yes  No

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WW-9

**PROPOSED WELLER  
5HM**

**SUPPLEMENT PG 1**



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.

FPO INDUSTRIES, INC.  
T.M. 28/5  
106.9 ACRES

ULA F. NELSON  
T.M. 28/6  
70.0 ACRES

CARL L. COFFIELD, GR. +  
LANA R. COFFIELD  
T.M. 28/7  
84 ACRES

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**LEGEND**

- Note:
- ⊙ — Denotes existing culvert with appropriate sediment outlet control (Rip Rap splash pad).
  - Silt Fence and or Sediment and Erosion Control Measure.
  - Surface Boundary

DATE: 03/12/2018

PROJECT NO: 494510851

DRAWN BY: J.A.H.





**Well Site Safety Plan**  
Tug Hill Operating, LLC

*JW*  
3/28/18

Well Name:Weller 5HM

Pad Location: Weller Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing:

4,398,632.81 Easting:

516,586.81

March 2018

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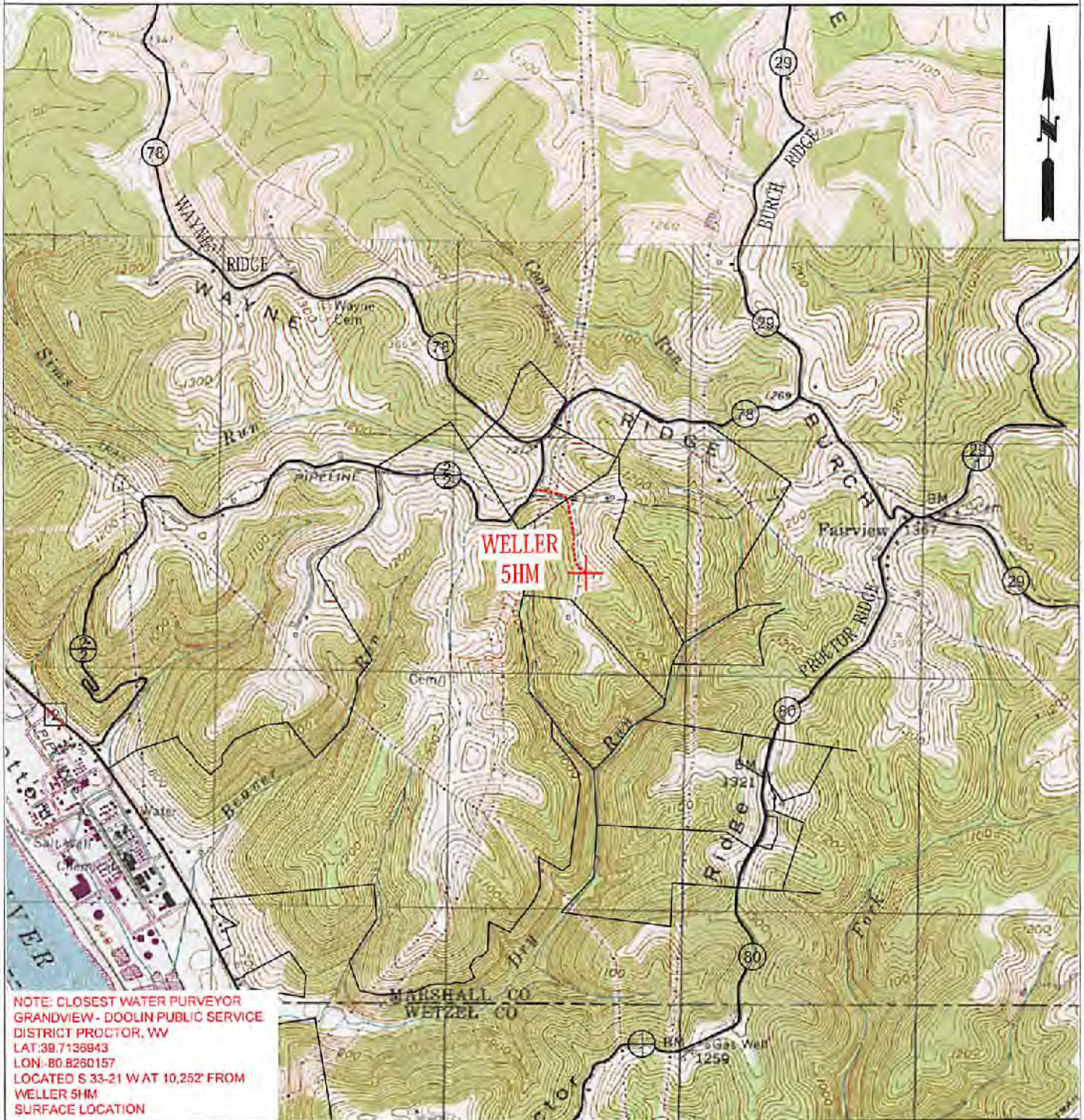
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# PROPOSED WELLER 5HM

SUPPLEMENT PG 2



 <b>TUG HILL OPERATING</b>	<b>OPERATOR</b>	494510851	<b>TOPO SECTION</b>	<b>LEASE NAME</b>
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		NEW MARTINSVILLE 7.5'	WELLER
			<b>SCALE:</b> 1" = 2000'	<b>DATE:</b> DATE: 03/12/2018

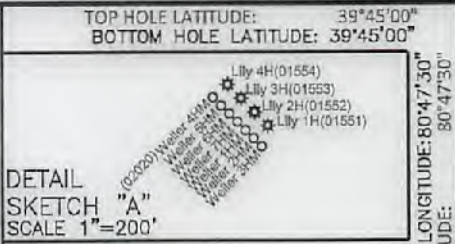
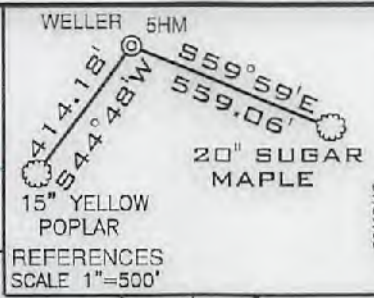
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DATE: 03/12/2018 and Gas

APR 17 2018

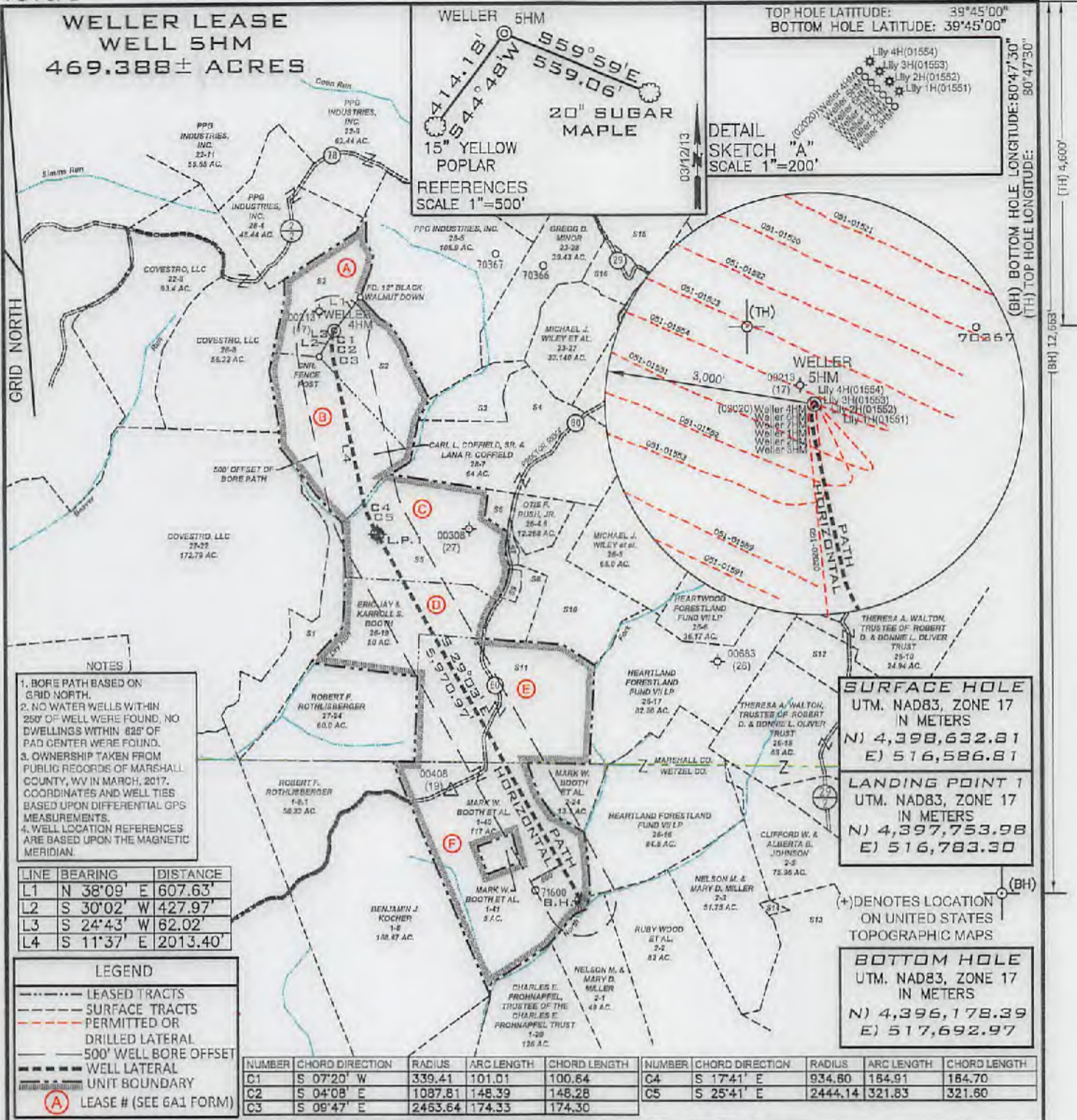
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(TH) 4,195' (BH) 584'

# WELLER LEASE WELL 5HM 469.388± ACRES



GRID NORTH



- NOTES**
1. BORE PATH BASED ON GRID NORTH.
  2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 825' OF PAD CENTER WERE FOUND.
  3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
  4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

LINE	BEARING	DISTANCE
L1	N 38°09' E	607.63'
L2	S 30°02' W	427.97'
L3	S 24°43' W	62.02'
L4	S 11°37' E	2013.40'

**LEGEND**

- LEASED TRACTS
- SURFACE TRACTS
- - - PERMITTED OR DRILLED LATERAL
- - - 500' WELL BORE OFFSET
- WELL LATERAL
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

NUMBER	CHORD DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH	NUMBER	CHORD DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH
C1	S 07°20' W	339.41	101.01	100.64	C4	S 17°41' E	934.80	164.91	164.70
C2	S 04°08' E	1087.81	148.39	148.28	C5	S 25°41' E	2444.14	321.83	321.60
C3	S 09°47' E	2463.64	174.33	174.30					

**SURFACE HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,398,632.81  
E) 516,586.81

**LANDING POINT 1**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,397,753.98  
E) 516,783.30

**BOTTOM HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,396,178.39  
E) 517,692.97

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

DRAWING NUMBER WELLER\_WP\_5HM

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

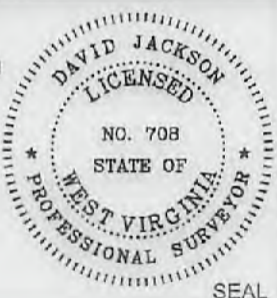
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING  
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708

*David L Jackson*

JACKSON SURVEYING INC.  
P.O. Box 1480  
Clarksburg, WV 26302  
304-823-5851



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

DATE: March 21, 2018

OPERATORS WELL NO. WELLER 5HM

API WELL NO. 47-051-02037 H6A

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

STATE WV COUNTY Marshall PERMIT 47-051-02037 H6A

LOCATION ELEVATION 1273.0' WATERSHED (HUC 10) French Creek - Ohio River

DISTRICT Franklin COUNTY Marshall

QUADRANGLE New Martinsville 7 1/2' LEASE NUMBER SEE WW-6A1 Royalty Owners

SURFACE OWNER Ula F. Nelson ACREAGE 70.0

OIL & GAS ROYALTY OWNER Ula F. Nelson - See WW-6A1 Royalty Owners LEASE ACREAGE 70.0

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

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,622' TMD: 13,473'

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

COUNTY NAME PERMIT

**WELLER LEASE  
WELL N-5HM  
469.388± ACRES**

Number	TAX MAP-PARCEL	SURFACE OWNERS	ACRES
S1	27-23	ROBERT F. ROTHLSBERGER	35.77
S2	28-6	ULA F. NELSON	70.00
S3	26-1	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	12.94
S4	26-2	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	67.50
S5	26-4.5	ERIC JAY BOOTH	74.388
S6	26-4	JAMES R. & MELODY A. ANDERSON	3.887
S7	26-4.2	OTIS S. & GLENDA RUSH	1.58
S8	26-4.1	OTIS S. RUSH ET UX.	12.188
S9	26-4.3	CRYSTAL & RANDOPH F. MATASK	2.253
S10	26-4.4	OTIS F. & GLENDA M. RUSH	39.436
S11	26-18	ERIC JAY BOOTH	94.00
S12	26-14	THERESA A. WALTON, TRUSTEE OF ROBERT D. & BONNIE L. OLIVER TRUST	27.56
S13	2-4	EDITH SALEM & LISA G. LARSON	56.25
S14	2-4.1	TYRONE SULTZBACH & RICHARD WOLF	1.00
S15	23-1	PATRICIA ACCETTOLO ET AL.	146.66
S16	23-28.2	MARK W. TENNANT ET AL.	10.80



P.S. 708 *David L Jackson*



**TUG HILL  
OPERATING**

OPERATOR'S  
WELL #: Weller 5HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV

WELL PLAT  
PAGE 2 OF 2  
DATE: 03/21/2018

47 051 02037

WW-6A1  
(5/13)

Operator's Well No. Weller 5HM

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE  
Chapter 22, Article 6A, Section 5(a)(5)  
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

(1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;

(2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
----------------------	-----------------------	-----------------------	---------	-----------

\*See attached pages

**Acknowledgement of Possible Permitting/Approval  
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC

By: Amy L. Miller *Amy Miller*

Its: Permitting Specialist - Appalachia Region

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14572	A	5-28-6	VICKI LYNN WOOD	CHESAPEAKE APPALACHIA LLC	1/8+	681	326	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A
10*14573	A	5-28-6	AARON D LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	317	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A
10*14574	A	5-28-6	KLOVA ANN MORRIS	CHESAPEAKE APPALACHIA LLC	1/8+	681	320	22/200 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc 32.5%	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC
10*14575	A	5-28-6	REVA JUNE ICARD	CHESAPEAKE APPALACHIA LLC	1/8+	681	323	22/200 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc 32.5%	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC
10*14576	A	5-28-6	WILLIAM L LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	329	22/200 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc 32.5%	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC
10*14577	A	5-28-6	ULA NELSON	CHESAPEAKE APPALACHIA LLC	1/8+	681	332	22/200 Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc 32.5%	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA, Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC
10*14578	A	5-28-6	BETTY KNOWLES	GASTAR EXPLORATION USA INC	1/8+	767	36	27/639 Gastar to Atinum Marcellus I LLC (partial assign 50%)	21/41 Gastar Exploration USA, Inc merger Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A

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Operator's Well No. Weller - 5HM  
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Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14065	B	5-28-7	CARL L COFFIELD SR	GASTAR EXPLORATION USA, INC.	1/8+	665	363	21/41 Gatar Exploration USA, Inc merger Gatar Exploration Inc	36/9 Gatar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A	N/A
10*17137	C	5-26-4.5	MARK E AND VALERIE J SMITH	CHESAPEAKE APPALACHIA LLC	1/8+	685	521	22/235 Chesapeake Appalachia, LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia, LLC to SWN Production Company, LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merge SWN Production Company, LLC	41/256 SWN Production Company, LLC to TH Exploration, LLC
10*17153	C	5-26-4.5	ALLEN J AND BARBARA A SMITH	CHESAPEAKE APPALACHIA LLC	1/8+	687	46	23/16 Chesapeake Appalachia, LLC to Statoil USA Onshore Properties Inc	33/110 Chesapeake Appalachia, LLC to SWN Production Company, LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC merge SWN Production Company, LLC	41/256 SWN Production Company, LLC to TH Exploration, LLC
10*17187	C	5-26-4.5	MARK E AND VALERIE SMITH	CHESAPEAKE APPALACHIA LLC	1/8+	710	107	33/110 Chesapeake Appalachia, LLC to SWN Production Company, LLC	850/396 Statoil USA Onshore Properties Inc and SWN Production Company LLC	33/424 Statoil USA Onshore Properties Inc to SWN Exchange Titleholder LLC	19/624 SWN Exchange Titleholder LLC and SWN Production Company, LLC (merger)	41/256 SWN Production Company, LLC to TH Exploration, LLC
10*21935	D	5-26-19	KARROLL S & LOIS E BOOTH	AMERICAN PETROLEUM PARTNERS OPERATING, LLC	1/8+	940	493	41/224 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
10*22015	D	5-26-19	ERIC JAY BOOTH	AMERICAN PETROLEUM PARTNERS OPERATING, LLC	1/8+	942	217	41/224 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
10*19908	D	5-26-19	GOLDA K ANDERSON	TH EXPLORATION LLC	1/8+	945	434	N/A	N/A	N/A	N/A	N/A

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Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*19733	E	5-26-18	GEORGE E BOOTH SR AND MARGARET E BOOTH	TH EXPLORATION LLC	1/8+	944	575	N/A	N/A	N/A	N/A	N/A
10*19910	E	5-26-18	GOLDA KATHLEEN BOOTH ANDERSON	TH EXPLORATION LLC	1/8+	945	440	N/A	N/A	N/A	N/A	N/A
10*21450	E	5-26-18	ERIC JAY BOOTH	TH EXPLORATION LLC	1/8+	953	258	N/A	N/A	N/A	N/A	N/A
10*21151	F	12-1-40	RICHARD KEITH AND SHIRLEY REYN	TH EXPLORATION LLC	1/8+	198A	347	N/A	N/A	N/A	N/A	N/A
10*21165	F	12-1-40	GARNET IRENE ROBINSON	TH EXPLORATION LLC	1/8+	198A	349	N/A	N/A	N/A	N/A	N/A
10*15088	F	12-1-40	MARK W BOOTH	GASTAR EXPLORATION INC	1/8+	154A	122	173A/431 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A	N/A	N/A
10*15089	F	12-1-40	MAGGIE ANN ROCKWELL	GASTAR EXPLORATION INC	1/8+	152A	437	173A/431 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A	N/A	N/A

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Operator's Well No. Weller - 5HM

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*15090	F	12-1-40	GEORGE E BOOTH JR	GASTAR EXPLORATION INC	1/8+	152A	440	173A/431 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC to TH Exploration, LLC	N/A	N/A	N/A

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Environmental Protection

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ASSIGNMENT OF OIL AND GAS LEASES

This ASSIGNMENT OF OIL AND GAS LEASES (the "Assignment") is made and entered into this 29th day of November, 2017 (the "Effective Date"), from TH Exploration II, LLC, a Texas limited liability company, having an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (hereinafter "Assignor"), and TH Exploration, LLC, a Texas limited liability company, having an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (hereinafter "Assignee").

WITNESSETH:

WHEREAS, Assignor is the owner of the right, title, and interest in those certain Oil and Gas Leases situated in Marshall County, West Virginia, which are described in Exhibit "A" and Exhibit "A-1" attached hereto and made a part hereof (hereinafter the "Leases"); and

WHEREAS, subject to the exceptions and reservations herein contained, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases.

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, subject to the terms, reservations, waivers and provisions as hereinafter set forth, an undivided interest of all of Assignor's right, title and interest in and to the Leases and all oil, natural gas, natural gas liquids, condensate, casinghead gas and other liquefied or gaseous hydrocarbons or products ("Hydrocarbons") thereby held, in any and all depths and formations ("Assigned Formations"), together with any and all other rights that are reasonably necessary or convenient to explore for and produce Hydrocarbons from the Assigned Formations, including, but not limited to, the right of surface access, use and occupancy, the right of ingress and egress, the right to conduct geophysical and other exploratory activities, the right to lay pipeline, the right to drill through, but not perforate or stimulate, all other depths and formations necessary for the purpose of reaching the Assigned Formations and to conduct operations therein.

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

2. Representations and Warranties. Assignor represents and warrants that such Assignor has not conveyed or otherwise encumbered its interest in the Leases since the time that Assignor obtained its interests in the Leases.

Assignor represents and warrants that, as to its interests in the Leases, Assignor has paid all royalties, overriding royalties, and other payments required by the Leases which were due for the period in which Assignor held its interests in the Leases, including, but not limited to, the interests assigned hereunder, and that Assignor has fully performed all conditions necessary to maintain the Leases in full force and effect during such period.

Assignor represents and warrants that, as to its interests in the Leases, Assignor shall not, by virtue of this Assignment or otherwise, retain any interest in the Assigned Formations, including, without limitation, any overriding royalty interest or working interest therein or with respect thereto.

3. Successors and Assigns. The terms of this Assignment shall be binding upon and inure to the benefit of the parties hereto and each of their respective successors

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Environmental Protection

STATE OF WEST VIRGINIA §  
  §  
COUNTY OF MARSHALL           §

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

**ASSIGNMENT AND CONVEYANCE**

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

**WITNESSETH:**

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

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

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

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

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

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

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STATE OF WEST VIRGINIA §  
  §  
COUNTY OF MARSHALL     §

Marshall County  
Jan Pest, Clerk  
Instrument 1438635  
04/06/2018 @ 12:17:52 PM  
ASSIGNMENTS  
Book 41 @ Page 380  
Pages Recorded 7  
Recording Cost \$           13.00

ASSIGNMENT AND CONVEYANCE

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

WITNESSETH:

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

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

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

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

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

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

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STATE OF WEST VIRGINIA §  
  §  
COUNTY OF MARSHALL §

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 7th day of February, 2018 (the "Effective Date"), by and between CHEVRON U.S.A. INC. (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 1, 2018 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

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

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

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, and that Assignor excepts and reserves from this Assignment the Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia.

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

2. Special Warranty. Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the Leases since the time that Assignor obtained its interests in the Leases. Assignor does covenant, promise and agree, to and with the Assignee, its respective successors and assigns, to forever specially warrant and defend the title to the Leases or portions thereof included under this Assignment, unto the Assignee and its respective successors and assigns, against the lawful claims of Assignor, and all persons claiming, or to claim, the same or any part thereof, by, through or under Assignor.

J.K

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ASSIGNMENT OF OIL AND GAS LEASES

This ASSIGNMENT OF OIL AND GAS LEASES (the "Assignment") is made and entered into this 29th day of November, 2017 (the "Effective Date"), from TH Exploration II, LLC, a Texas limited liability company, having an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (hereinafter "Assignor"), and TH Exploration, LLC, a Texas limited liability company, having an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (hereinafter "Assignee").

WITNESSETH:

WHEREAS, Assignor is the owner of the right, title, and interest in those certain Oil and Gas Leases situated in Marshall County, West Virginia, which are described in Exhibit "A" and Exhibit "A-1" attached hereto and made a part hereof (hereinafter the "Leases"); and

WHEREAS, subject to the exceptions and reservations herein contained, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases.

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, subject to the terms, reservations, waivers and provisions as hereinafter set forth, an undivided interest of all of Assignor's right, title and interest in and to the Leases and all oil, natural gas, natural gas liquids, condensate, casinghead gas and other liquefied or gaseous hydrocarbons or products ("Hydrocarbons") thereby held, in any and all depths and formations ("Assigned Formations"), together with any and all other rights that are reasonably necessary or convenient to explore for and produce Hydrocarbons from the Assigned Formations, including, but not limited to, the right of surface access, use and occupancy, the right of ingress and egress, the right to conduct geophysical and other exploratory activities, the right to lay pipeline, the right to drill through, but not perforate or stimulate, all other depths and formations necessary for the purpose of reaching the Assigned Formations and to conduct operations therein.

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

2. Representations and Warranties. Assignor represents and warrants that such Assignor has not conveyed or otherwise encumbered its interest in the Leases since the time that Assignor obtained its interests in the Leases.

Assignor represents and warrants that, as to its interests in the Leases, Assignor has paid all royalties, overriding royalties, and other payments required by the Leases which were due for the period in which Assignor held its interests in the Leases, including, but not limited to, the interests assigned hereunder, and that Assignor has fully performed all conditions necessary to maintain the Leases in full force and effect during such period.

Assignor represents and warrants that, as to its interests in the Leases, Assignor shall not, by virtue of this Assignment or otherwise, retain any interest in the Assigned Formations, including, without limitation, any overriding royalty interest or working interest therein or with respect thereto.

3. Successors and Assigns. The terms of this Assignment shall be binding upon and inure to the benefit of the parties hereto and each of their respective successors

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## ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from SWN PRODUCTION COMPANY, LLC, a Texas limited liability company ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on December 18, 2017 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 24, 2017 (the "*Acreage Trade Agreement*").

### ARTICLE 1 ASSIGNMENT OF ASSETS

**Section 1.1 Assignment.** For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") INsofar AND ONLY INsofar as they cover those lands described on Exhibit A (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*").

TO HAVE AND TO HOLD the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

**Section 1.2 Assignment Subject to Acreage Trade Agreement.** This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

### ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

**Section 2.1 Special Warranty of Title.** Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

**Section 2.2 Disclaimers of Warranties and Representations.**

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR



## ASSIGNMENT AND CONVEYANCE

This Assignment and Conveyance (this "*Assignment*") is from SWN PRODUCTION COMPANY, LLC, a Texas limited liability company ("*Assignor*"), to TH Exploration, LLC, a Texas limited liability company ("*Assignee*"), and is executed on December 18, 2017 (the "*Effective Date*"). Assignor and Assignee may be referred to herein collectively as the "*Parties*," or individually as a "*Party*." Capitalized terms used herein but not otherwise defined herein (including in Section 3.7) shall have the meanings given such terms in that certain Acreage Trade Agreement between the Assignor and the Assignee dated August 24, 2017 (the "*Acreage Trade Agreement*").

### ARTICLE 1 ASSIGNMENT OF ASSETS

**Section 1.1 Assignment.** For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby GRANTS, BARGAINS, ASSIGNS, CONVEYS AND TRANSFERS unto Assignee all of Assignor's right, title and interest in and to (i) the oil and gas leases described in more detail on Exhibit A attached hereto (the "*Leases*") INsofar AND ONLY INsofar as they cover those lands described on Exhibit A (the "*Leasehold Rights*") and (ii) any surface use agreements that relate to such Leasehold Rights (collectively with the Leasehold Rights, the "*Conveyed Assets*").

TO HAVE AND TO HOLD the Conveyed Assets, together with all and singular the rights, privileges, contracts and appurtenances, in any way appertaining or belonging thereto, unto Assignee, its successors and assigns, forever, subject, to the terms and conditions of this Assignment.

**Section 1.2 Assignment Subject to Acreage Trade Agreement.** This Assignment is made in accordance with and is subject to the terms, covenants and conditions contained in that certain Acreage Trade Agreement. In the event of a conflict between the provisions of the Acreage Trade Agreement and this Assignment, the provisions of the Acreage Trade Agreement shall control. The execution and delivery of this Assignment by Assignor, and the execution and acceptance of this Assignment by Assignee, shall not operate to release or impair any surviving rights or obligations of either Party with respect to the other under the Acreage Trade Agreement.

### ARTICLE 2 SPECIAL WARRANTY OF TITLE AND DISCLAIMERS

**Section 2.1 Special Warranty of Title.** Assignor hereby agrees to warrant and defend Defensible Title to the Leases unto Assignee, its successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Assignor or any of its Affiliates, but not otherwise.

**Section 2.2 Disclaimers of Warranties and Representations.**

(a) EXCEPT AS EXPRESSLY REPRESENTED OTHERWISE IN SECTION VI OF THE ACREAGE TRADE AGREEMENT OR THIS ASSIGNMENT, ASSIGNOR MAKES NO, AND HEREBY EXPRESSLY DISCLAIMS, ANY REPRESENTATION OR

47 05 102037



TUG HILL

April 13, 2018

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

RE: Weller 5HM

Subject: Marshall County Route 80 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 80 in the area reflected on the Weller 5HM well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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

Sincerely,

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

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

Date of Notice Certification: 04/13/2018

API No. 47- 051 - 02037  
Operator's Well No. Weller 5HM  
Well Pad Name: Lily

**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>516,586.81</u>
County: <u>Marshall</u>		Northing: <u>4,398,632.81</u>
District: <u>Franklin</u>	Public Road Access: <u>Route 2/2</u>	
Quadrangle: <u>New Martinsville 7.5'</u>	Generally used farm name: <u>Ula F. Nelson</u>	
Watershed: <u>French Creek (Ohio River)</u>		

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><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.

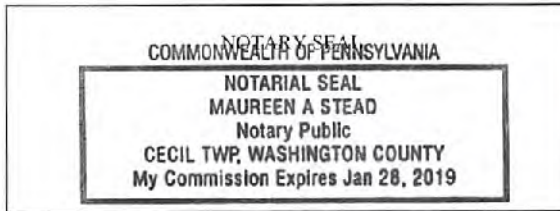
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WW-6AC  
(1/12)

**Certification of Notice is hereby given:**

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller</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 13 day of APRIL 2018  
Maureen A Stead Notary Public  
 My Commission Expires 1/28/19

**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).

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

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

**Date of Notice:** 4/10/2018 **Date Permit Application Filed:** 4/13/2018

**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: Ula F. Nelson  
Address: 7101 W. Yale Avenue, Unit # 3703  
Denver, CO 80227

Name: Carl L. Coffield, Sr. and Lana R. Coffield  
Address: 970 Allendale Avenue  
Akron, OH 44036

SURFACE OWNER(s) (Road and/or Other Disturbance)  
Name: PPG Industries, Inc.  
Address: One PPG Place  
Pittsburgh, PA 15272  
Name: Ula F. Nelson  
Address: 7101 W. Yale Avenue, Unit # 3703  
Denver, CO 80227 \*See attached list

SURFACE OWNER(s) (Impoundments or Pits)  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

COAL OWNER OR LESSEE  
Name: PPG Industries, Inc.  
Address: One PPG Place  
Pittsburgh, PA 15272 \*See attached list

COAL OPERATOR  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)  
Name: Ula F. Nelson  
Address: 7101 W. Yale Avenue, Unit #3703  
Denver, CO 80227

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

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**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 1.5 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).

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**Well Location Restrictions**

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

WV Department of  
Environmental Protection

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

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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WW-6A  
(8-13)

API NO. 47-051-02037  
OPERATOR WELL NO. Weller 5HM  
Well Pad Name: Lily

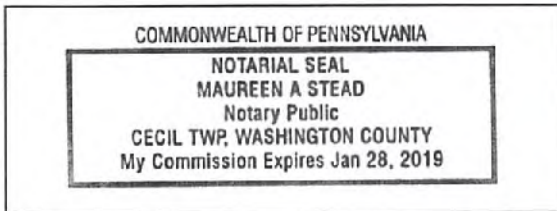
**Notice is hereby given by:**

Well Operator: Tug Hill Operating, LLC  
Telephone: 724-749-8388  
Email: amillar@tug-hillcp.com *Amy Miller*

Address: 360 Southpointe Boulevard, Plaza II, Suite 200  
Canonsburg, PA 15317  
Facsimile: 724-338-2030

**Oil and Gas Privacy Notice:**

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



Subscribed and sworn before me this 10 day of APRIL 2018.  
Maureen A Stead Notary Public  
My Commission Expires 1/28/19

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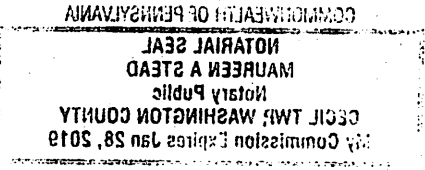
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**WW-6A Notice of Application Attachment**

**Weller 5HM**

**Surface Owner(s) Access Road**

PPG Industries, LLC  
One PPG Place  
Pittsburgh, PA 15272

**Coal Owner or Lessee (Well Pad)**

Appalachian Power Company  
P.O. Box 16428  
Columbus, OH 43216-6428

Betty Knowles  
1230 Elm Street  
Mountain Home, ID 83647

William L. Litman  
15 Linden Avenue  
Wheeling, WV 26003

Vicki Lynn Wood  
1204 Center Street  
Moundsville, WV 26041

Aaron D. Litman  
67 Olive Street  
Moundsville, WV 26041

Klova Morris  
1681 Rivermont Road  
Columbus, OH 43223

Reva Junne Icard  
319 7<sup>th</sup> Street  
Moundsville, WV 26041

Professional Land Resources, LLC  
P.O. Box 965  
Dellslow, WV 26531

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WW-6A

Supplement Pg. 1A

Tug Hill Operating, LLC  
380 Southpointe BLVD, Suite 200  
Canonsburg, PA 15317

**WATER WELL REPORT**

Well: WELLER No. 5HM  
District: Franklin  
County: Marshall  
State: WV

There appears to be one ( 1 ) possible water source within 2,000 feet of the above referenced well location.

Topo spot #1 TM 28 Par.6 Ula F. Nelson 303-502-7711(C) 7101 W. Yale Ave. Unit #3703 Denver, CO 80227		
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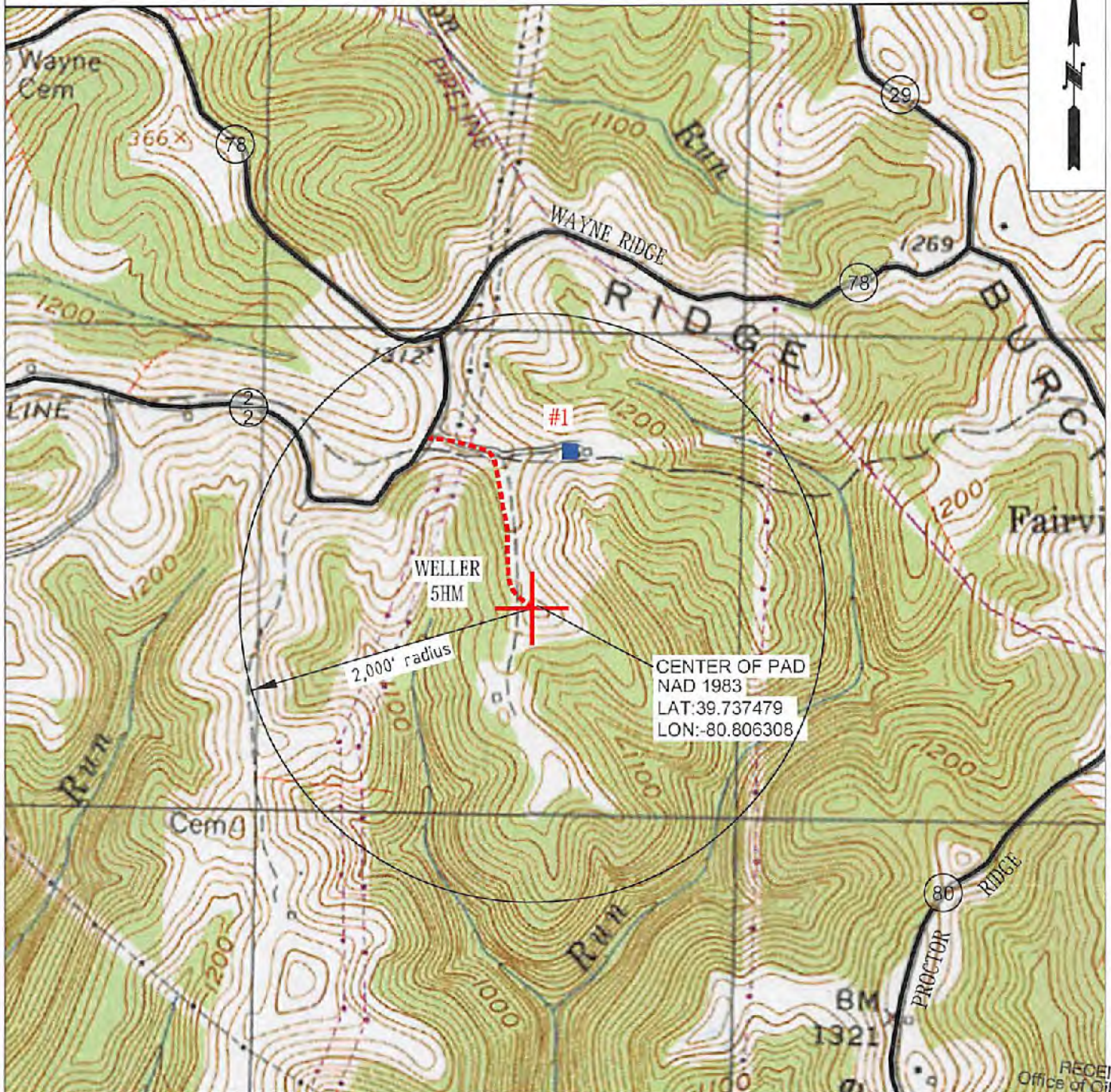
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WW-6A

# PROPOSED WELLER 5HM

SUPPLEMENT PG 1

There appears to be One ( 1 ) possible water sources within 2,000'.



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

**TOPO SECTION**  
NEW MARTINSVILLE 7.5'  
**SCALE:**  
1" = 1000'

**LEASE NAME** APR 17 2018  
WELLER  
**DATE:** WV Department of Environmental Protection  
DATE: 03/12/2018

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

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

**Date of Notice:** 12/5/2017      **Date of Planned Entry:** 12/12/2017

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

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

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

**Notice is hereby provided to:**

SURFACE OWNER(s)  
Name: Ula F. Nelson (Pad and Access Road)  
Address: P.O. Box 27439  
Denver, CO 80227  
Name: Carl L. Coffield, Sr. and Lana R. Coffield (Pad and Access Road)  
Address: 970 Allendale Avenue  
Akron, OH 44306  
Name: PPG Industries, Inc. (Access Road)  
Address: One PPG Place  
Pittsburgh, PA 15272

COAL OWNER OR LESSEE  
Name: \*See attached list  
Address: \_\_\_\_\_

MINERAL OWNER(s)  
Name: \*See attached list  
Address: \_\_\_\_\_

\*please attach additional forms if necessary

**Notice is hereby given:**

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

State:	<u>West Virginia</u>	Approx. Latitude & Longitude:	<u>39.7374508; -80.8064532</u>
County:	<u>Marshall</u>	Public Road Access:	<u>Wells Hill Road - County Route 2/2</u>
District:	<u>Franklin</u>	Watershed:	<u>HUC-10: French Creek - Ohio River</u>
Quadrangle:	<u>New Martinsville 7.5'</u>	Generally used farm name:	<u>Nelson, Ula F.</u>

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

**Notice is hereby given by:**

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

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

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**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 ENTRY FOR PLAT SURVEY**

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

**Date of Notice:** 12/19/2017      **Date of Planned Entry:** 12/26/2017

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

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

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

**Notice is hereby provided to:**

SURFACE OWNER(s)

**Name:** Ula F. Nelson (Pad and Access Road)  
**Address:** P.O. Box 27439  
Denver, CO 80227

**Name:** Carl L. Coffield, Sr. and Lana R. Coffield (Pad and Access Road)  
**Address:** 970 Allendale Avenue  
Akron, OH 44335

**Name:** PPG Industries, Inc. (Access Road)  
**Address:** One PPG Place  
Pittsburgh, PA 15272

COAL OWNER OR LESSEE

**Name:** \*See attached list  
**Address:** \_\_\_\_\_

MINERAL OWNER(s)

**Name:** \*See attached list  
**Address:** \_\_\_\_\_

\*please attach additional forms if necessary

**Notice is hereby given:**

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

**State:** West Virginia  
**County:** Marshall  
**District:** Franklin  
**Quadrangle:** New Martinsville 7.5'

**Approx. Latitude & Longitude:** 39.7374506; -80.8064532  
**Public Road Access:** Wells Hill Road - County Route 2/2  
**Watershed:** HUC-10: French Creek - Ohio River  
**Generally used farm name:** Nelson, Ula F.

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

**Notice is hereby given by:**

**Well Operator:** Tug Hill Operating, LLC  
**Telephone:** 724-749-0388  
**Email:** amiller@tug-hill-op.com

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

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**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).

47 051 02037

**WW-6A3 Attachment**

**Weller 5HM**

**Mineral Owner (s) Well Pad**

Ula F. Nelson  
P.O. Box 27439  
Denver, CO 80227

Aaron D. Litman  
67 Olive Street  
Moundsville, WV 26041

Betty Knowles  
1230 Elm Street  
Mountain Home, ID 83647

Reva June Icard  
379 7<sup>th</sup> Street  
Moundsville, WV 26041

William L. Litman  
15 Linden Avenue  
Wheeling, WV 26003

Klova Ann Morris  
1681 Rivermont Road  
Columbus, OH 43223

Vicki Lynn Wood  
1204 Center Street  
Moundsville, WV 26041

Professional Land Resources, LLC  
P.O. Box 965  
Dellslow, WV 26531

**Coal Owner or Lessee(s) Well Pad**

Appalachian Power Company  
P.O. Box 16428  
Columbus, OH 43216-6428

Aaron D. Litman  
67 Olive Street  
Moundsville, WV 26041

Ula F. Nelson  
P.O. Box 27439  
Denver, CO 80227

Reva June Icard  
379 7<sup>th</sup> Street  
Moundsville, WV 26041

Betty Knowles  
1230 Elm Street  
Mountain Home, ID 83647

Klova Ann Morris  
1581 Wyandotte Road  
Columbus, OH 43212

William L. Litman  
15 Linden Avenue  
Wheeling, WV 26003

Professional Land Resources, LLC  
P.O. Box 965  
Dellslow, WV 26531

Vicki Lynn Wood  
1204 Center Street  
Moundsville, WV 26041

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**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:** 04/10/2018      **Date Permit Application Filed:** 04/13/2018

**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:** Ula F. Nelson  
**Address:** 7101 Yale Avenue, Unit # 3703  
Denver, CO 80227

**Name:** Carl L. Coffield, Sr. and Lana R. Coffield  
**Address:** 970 Allendale Avenue  
Akron, OH 44038

**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>516,586.81</u>
County:	<u>Marshall</u>		Northing:	<u>4,358,632.81</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Route 2/2</u>	
Quadrangle:	<u>New Martinsville 7.5'</u>	Generally used farm name:	<u>Ula F. Nelson</u>	
Watershed:	<u>Fish Creek (Ohio River)</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:** Tug Hill Operating, LLC  
**Telephone:** 724-749-8388  
**Email:** amiller@tug-hill-op.com

**Address:** 380 Southpointe Boulevard, Plaza II, Suite 300  
Canonsburg, PA 15317  
**Facsimile:** 724-338-2030

**Oil and Gas Privacy Notice:**

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

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WV Department of  
Environmental Protection

47 051 02037



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

December 7, 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 Lily Well Pad, Marshall County

Weller 5HM Well Site

Dear Mr. Martin,

This well site will be accessed from Permit #06-2012-0131 transferred to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 2/2 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

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WV Department of  
Environmental Protection



**TUG HILL** 47 05 1 02 037

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

Well No. Weller 5HM

<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

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WV Department of  
Environmental Protection

**WEST VIRGINIA  
COUNTY MAP**



Site Reference	County of West Virginia
WV-N-MAD-01-N-425814-07	WV-N-MAD-01-N-425814-07
WV-N-MAD-01-N-425814-08	WV-N-MAD-01-N-425814-08
WV-N-MAD-01-N-425814-09	WV-N-MAD-01-N-425814-09
WV-N-MAD-01-N-425814-10	WV-N-MAD-01-N-425814-10
WV-N-MAD-01-N-425814-11	WV-N-MAD-01-N-425814-11
WV-N-MAD-01-N-425814-12	WV-N-MAD-01-N-425814-12
WV-N-MAD-01-N-425814-13	WV-N-MAD-01-N-425814-13
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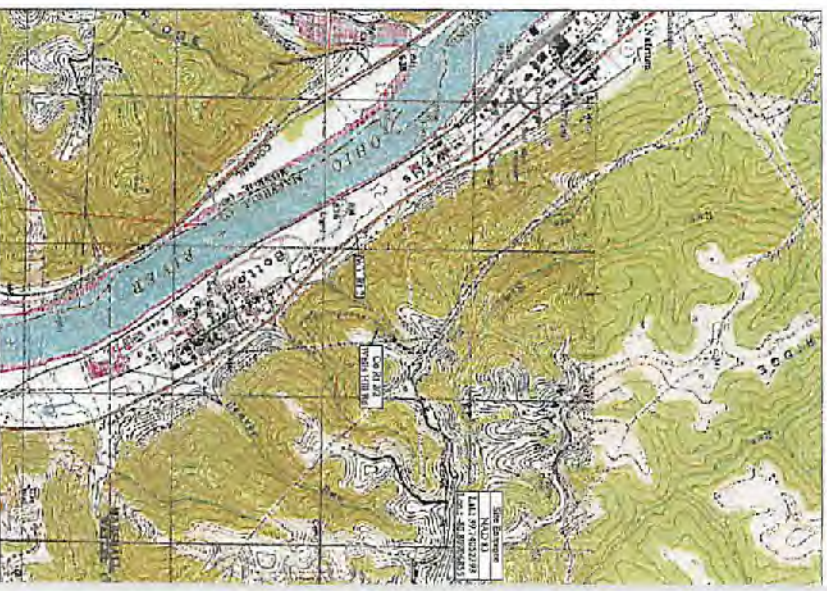


**WVDEP 00G  
ACCEPTED AS-BUILT**

3 / 19 / 2018

**Lily V**  
Site Design, C  
Erosion and Se  
Tug Hi  
Marst  
Frank  
Latitude  
Longitude  
Haynes Run - C

**Exhibit A: Final Des**



Station	Latitude (DD)	Longitude (DD)
Center of West End	39 19 33.845 N	-80 03 53.807 W

**Approach Route:**  
From the intersection of OH Rt 7 and WV Rt 2 near New Martinsville, WV, Travel North on WV Rt 2 for 6.1 mi. Turn Right onto Co Rt 27 (Wells Hill Rd). Follow Co Rt 27 for 2.3 mi. The site entrance will be on the Right (East) side of the road.

**WV Location Requirements**  
All P&I construction complies with the following restrictions:  
1) 20' from an existing well or developed spring used for human or domestic animals.  
2) 40' from an existing dwelling or from ground less than 2,500 SF used for poultry or dairy treatment from the center of the pad.  
3) 200' from the edge of disturbance to a water-protecting head stream.  
4) 1,000' of a surface or ground water intake to a public water supply.  
5) 100' from the edge of disturbance to a water-protecting head stream.  
6) 100' from the edge of disturbance to a water-protecting head stream.  
7) 100' from the edge of disturbance to a water-protecting head stream.  
8) 100' from the edge of disturbance to a water-protecting head stream.  
9) 100' from the edge of disturbance to a water-protecting head stream.  
10) 100' from the edge of disturbance to a water-protecting head stream.

Project Contacts	Survey and Elevation
<b>Top Bill Contractor:</b> Tug Hill Operating LLC 248 Southgate Blvd Sissonville, WV 26041 304-425-2028 ext. 2017	<b>Survey and Elevation:</b> Garrett Kelly 304-318-8811 ext. 2017
<b>Owner/Client:</b> Miss Utility of West Virginia 1-800-2-43-8448 3000 Market Street, Suite 200 Martinsville, WV 26151	<b>Additional Contacts:</b> Kathy Summersfield 304-318-8811 ext. 2017
<b>Environmental Consultant:</b> American Geotech, Inc. 304-425-2028 ext. 2017	

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

Geographic Coordinates	North	South	East	West
Latitude (DD)	39 19 33.845	39 19 33.845	80 03 53.807	80 03 53.807
Longitude (DD)				



**Well Site**

Construction Plan, &  
 Permit Control Plans  
 All Operating  
 Marshall County  
 Franklin District  
 39.73743325°  
 -80.80632501°  
 Ohio River Watershed

**Ign: Issue for Permitting**

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

Property Owner Information - Lily Well Site

Owner	Y14 - Total	Y14 - Forest	Y14 - Pasture	Y14 - Water	Y14 - Other	Y14 - Total	Y15 - Total	Y15 - Forest	Y15 - Pasture	Y15 - Water	Y15 - Other	Y15 - Total
Y14 - Forest	21.4	6.00	0.00	0.00	0.00	21.4	21.4	6.00	0.00	0.00	0.00	21.4
Y14 - Pasture	4.96	0.00	0.00	0.00	0.00	4.96	4.96	0.00	0.00	0.00	4.96	
Y14 - Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Y14 - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<b>Total</b>	<b>26.36</b>	<b>6.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>26.36</b>	<b>26.36</b>	<b>6.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>26.36</b>

Access Road

Section	Y14 - Total	Y14 - Forest	Y14 - Pasture	Y14 - Water	Y14 - Other	Y14 - Total	Y15 - Total	Y15 - Forest	Y15 - Pasture	Y15 - Water	Y15 - Other	Y15 - Total
Section 1	24.4	0.00	0.00	0.00	0.00	24.4	24.4	0.00	0.00	0.00	0.00	24.4
Section 2	1.96	0.00	0.00	0.00	0.00	1.96	1.96	0.00	0.00	0.00	0.00	1.96
<b>Total</b>	<b>26.36</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>26.36</b>	<b>26.36</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>26.36</b>

Disturbed Area

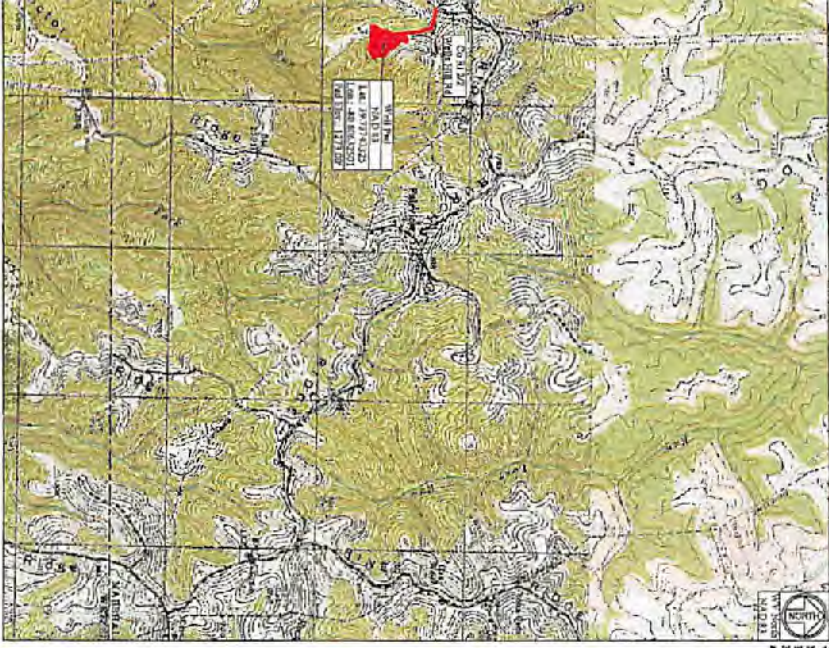
Well Pad Construction	4.96 AC
Access Road Construction	1.96 AC
Clearing Area	0.00 AC
Other Disturbed Area	0.00 AC
<b>Total Disturbed Area</b>	<b>6.92 AC</b>

Additional Information:  
 Total Wooded Area: 11.38 AC  
 Total Wetland Area: 1.96 AC  
 Total Wetland Area: 1.96 AC

**Note:**  
 The landowner will take steps within the next 1 month of publication for the Lily Well Site. No additional construction will take place outside of the existing LCO. Additional construction and restoration work will be identified within the LCO. All work not otherwise listed will be done within the existing LCO. The existing LCO is located on the site and will be used as the basis for the LCO. All work not otherwise listed will be done within the existing LCO.

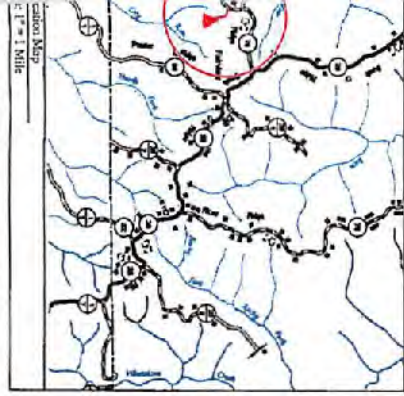
Lily Well Site Quantities

Description	Quantity	Unit	Notes
Well Pad Area	4.96	AC	
Access Road Area	1.96	AC	
Clearing Area	0.00	AC	
Other Disturbed Area	0.00	AC	
<b>Total Disturbed Area</b>	<b>6.92</b>	<b>AC</b>	



Site Location (NAD 83)

System	Latitude (DD)	Longitude (DD)
Site Location	39.73743325	-80.80632501
Center of Well Pad	39.73743325	-80.80632501



*Signature*  
 2/15/18



**ZACKERY C. STARNES**  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF WEST VIRGINIA  
 LICENSE NO. 22214

The following construction plans and drawings were prepared by me or under my direct supervision and I am a duly Licensed Professional Engineer in the State of West Virginia. I am not providing any services in any other state. I am not providing any services in any other state. I am not providing any services in any other state.

DATE: 2/15/2018  
 DRAWN BY: [Signature]

Sheet	Description
1	Cover Sheet
VI-1	Schedule of Quantities
VI-2	Site Plan
VI-3	Original Ground Site Conditions
VI-4	Proposed Ground Site Conditions
VI-5	Site Soil Map
VI-6	Clearing Exhibit
VI-7	Overall Plan View
VI-8	EKAS Plan View
VI-9	Top Key Exhibit
VI-10	Plan View
VI-11	Cross Sections - Well Pad
VI-12	Cross Sections - Access Road
VI-13	Cross Sections - Easement
VI-14	Site Reclamation
VI-15	Production Exhibit
VI-16	Site Reclamation
VI-17	Production and Sediment Control Details
VI-18	Access Road Details
VI-19	Pad Details

**COVER SHEET**

**Lily Well Site**  
 Franklin District  
 Marshall County, WV

**APR 17 2018**

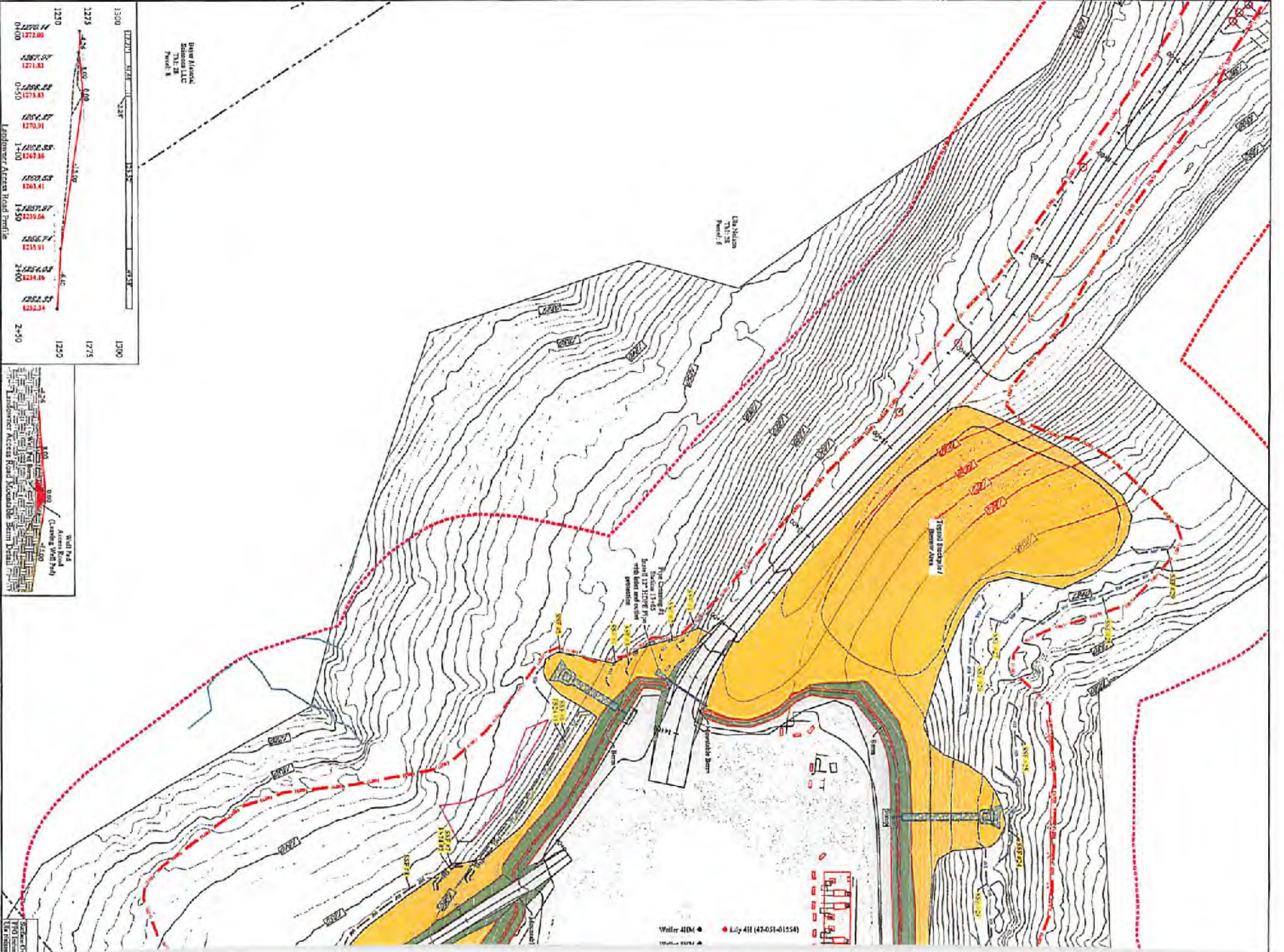
WV Department of Environmental Protection

DATE: 12/28/2017  
 SCALE: AS SHOWN  
 DESIGNED BY: JS  
 FILE NO:  
 SHEET 1 OF 11

**TUG HILL OPERATING**

THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

**Kyle S. Starnes**  
 Registered Professional Engineer  
 State of West Virginia  
 License No. 22214



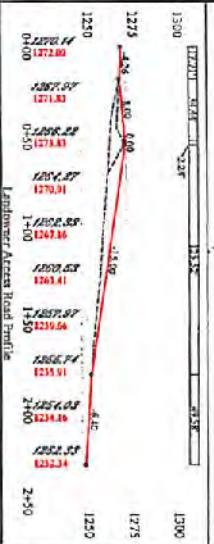
Brye Island,  
Sitka, Alaska  
Parcel 8

Uta Nelson  
Parcel 8

Trough Structure /  
Access Area

The Crossing of  
Road 177 (200' Pipe)  
over the  
road  
provision  
150' x 150'

Water 4104 ●  
Lily 4H (47-051-01554) ●



Scale 1:50,000  
North Arrow

Lily Well Site

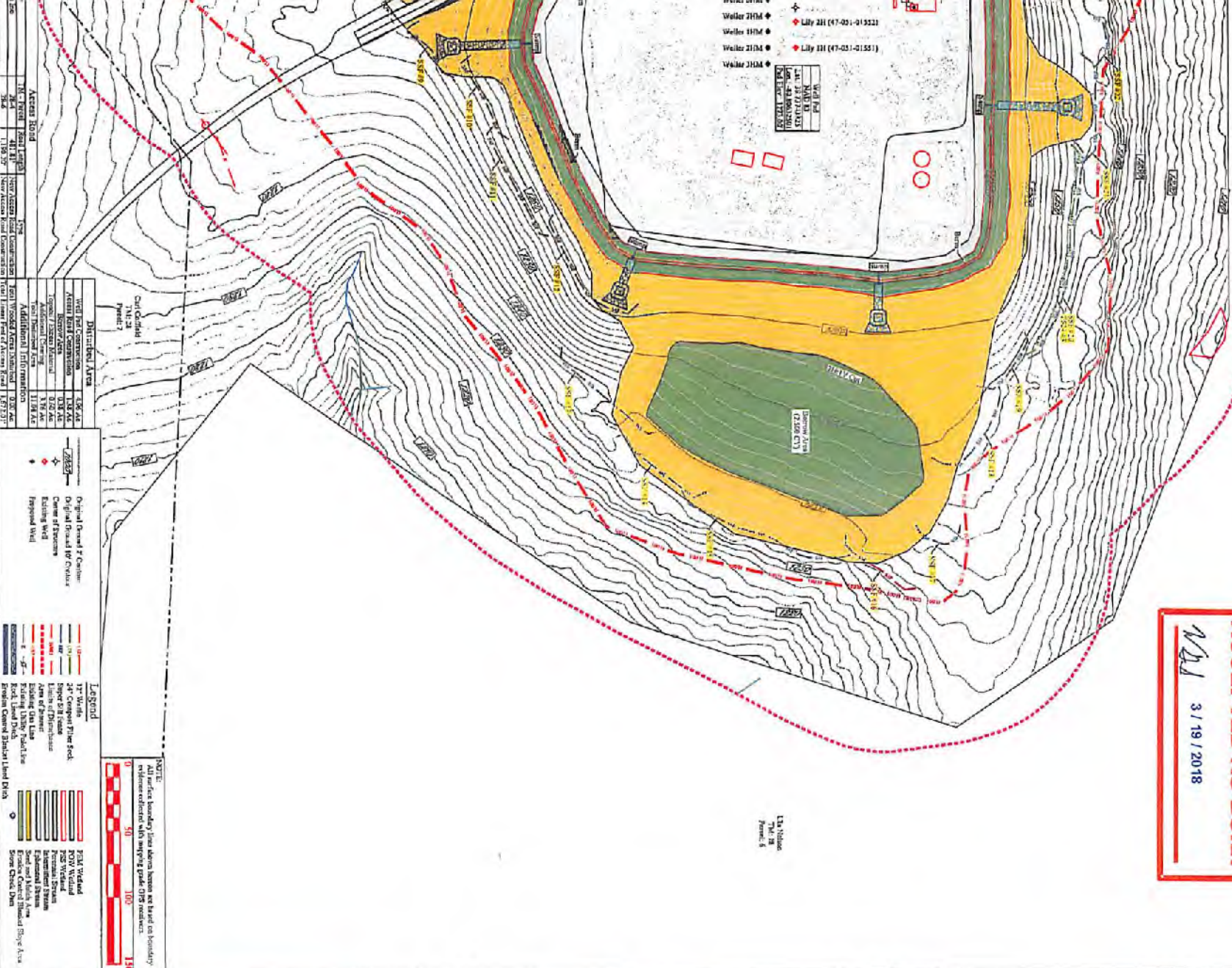
Tug Hill Operating

Exhibit A: Final Design: Issue for Permitting

U.S. Nation  
T.M. 28  
Zone 18  
Datum: NAD 83



**WVDEP 006**  
**ACCEPTED AS-BUILT**  
*MSJ*  
 3/19/2018



Area	Acres	Approx. Area
Well Pad Construction	4.36 AC	
Access Road Construction	1.34 AC	
Original Area	1.34 AC	
Original Area	3.02 AC	
Original Area	3.02 AC	
Original Area	11.88 AC	
Original Area	11.88 AC	
Original Area	11.88 AC	
Original Area	11.88 AC	
Original Area	11.88 AC	

Original Road 7' Center	Proposed Road
Original Road 7' Center	Proposed Road
Original Road 7' Center	Proposed Road
Original Road 7' Center	Proposed Road
Original Road 7' Center	Proposed Road

Legend
12" Water
24" Concrete Pile Foot
36" Concrete Pile Foot
48" Concrete Pile Foot
60" Concrete Pile Foot
72" Concrete Pile Foot
84" Concrete Pile Foot
96" Concrete Pile Foot
108" Concrete Pile Foot
120" Concrete Pile Foot
132" Concrete Pile Foot
144" Concrete Pile Foot
156" Concrete Pile Foot
168" Concrete Pile Foot
180" Concrete Pile Foot
192" Concrete Pile Foot
204" Concrete Pile Foot
216" Concrete Pile Foot
228" Concrete Pile Foot
240" Concrete Pile Foot
252" Concrete Pile Foot
264" Concrete Pile Foot
276" Concrete Pile Foot
288" Concrete Pile Foot
300" Concrete Pile Foot

Scale
0
50
100
150
200

Date	Revision
12-26-2017	Design

**WV Department of Environmental Protection**  
 RECEIVED  
 Office of Oil and Gas  
 APR 17 2018  
 SHEET 8 OF 13

**Erosion and Sediment Control Plan**  
**Lily Well Site**  
 Franklin District  
 Marshall County, WV



**TUG HILL OPERATING**  
 THIS DOCUMENT PREPARED FOR TUG HILL OPERATING