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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)

Tuesday, June 12, 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 3HM  
47-051-02036-00-00

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 3HM  
Farm Name: ULA F. NELSON  
U.S. WELL NUMBER: 47-051-02036-00-00  
Horizontal 6A New Drill  
Date Issued: 6/12/2018

# 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).

**4705102036**

**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 3HM 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

*JW*  
*3/28/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6471' - 6524', thickness of 53' and an anticipated approx. pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6,624'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 15,572'

11) Proposed Horizontal Leg Length: 7,927

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 prodrill 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: \_\_\_\_\_

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18)

**CASING AND TUBING PROGRAM**

**47 05 102036**

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	100'	100' ✓	216ft^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	971'	971' ✓	966ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	971'	971'	966ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2629'	2646' ✓	877ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	14,267'	15,572' ✓	3985ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,045'		
Liners							

*JW*  
*3/28/18*

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			

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WW-6B  
(10/14)

API NO. 47-051 - 02034  
OPERATOR WELL NO. Weller 3HM  
Well Pad Name: Lily

*JW*  
*3/28/18*

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 19,817,500 lb. proppant and 306,393 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.

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\*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

**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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06/15/2018

47 051 02036



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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47 051 02036

**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

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Permit well - Weller-3HM

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.
4705100683	PPG Industries Incorporated	3661' TVD	Benson Sd	Unknown	No, the well is not deep enough to be within the expected fracture propagation from a Marcellus stimulation.	Dry hole completed 1981/12/01. A field survey was conducted to locate this well and no evidence of this well was found.
4705170366	Unknown	Unknown	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.
4705170367	Unknown	Unknown	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 = 01651

Report Time: Friday, January 12, 2018 12:2

Location Information: View Map

API: COUNTY PERMIT TAX DISTRICT QUAD\_18 QUAD\_18 LAY\_06 LON\_05 WBM UTM

4705101551 Marshall 101 01651 101 01651 101 01651 101 01651 101 01651 101 01651

Bottom Hole Location Information:

API	EP FLAG	UTM	UTM	LON_DD	LAT_DD
4705101551	1	101 01651	101 01651	101 01651	101 01651

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NAME	CO_NAME	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_OR_COMPLETED	PROP_VS	PROP_TITL_FM	TITLEST_FR
4705101551	12175002		Completed	Leasehold	101 01651	101 01651	101 01651	101 01651	101 01651	101 01651	101 01651	101 01651	101 01651

Operational Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FTH	DEEPEST_FTH	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_METHOD	TVD	TMD	NEED_FTH	U_BOP	O_AFF	C_BOP	O_AFF	NEED_REF	NEED
4705101551	12175002	12/17/2012	2200.0	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002	12175002

Comment: 12/17/2012 Additional Lease Numbers: 12175002

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47 051 02036

**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\_75 QUAD\_16 LAT\_DD LON\_DD UTM\_E UTM\_N  
 4705101552 Marshall 1152 Franklin New Martinsville New Martinsville 39.73731 -90.60302 416554 4306523.1

**Bottom Hole Location Information:**  
 API EP FLAG UTM\_E UTM\_N LON\_DD LAT\_DD  
 4705101552 1 As Proposed 416552.2 -90.60299 39.73744

**Owner Information:**  
 API CMP\_DT SUFFIX STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_AT\_COMPLETION PROP\_VO PROP\_TRGT\_FM TRM\_EST\_FR  
 4705101552 12/17/2012 001 Original Loc. Completed Life Support Lly.Sydn WV18-0276-001WV18-0076-001 WV18-0013-000 U.S.A. P. Nelson et al. Geacm Production USA, Inc. 0700 Marshall 51

**Completion Information:**  
 API CMP\_DT SPUD\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FMT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMD NEW\_FTG G\_BEF G\_AFT O\_BEF O\_AFT NGL\_BEF NGL\_A  
 4705101552 12/17/2012 8/10/15 8170.0 117.3 Ground Level Unnamed Hampshire Gap Hampshire Gap Outpost (Extension) Test Unsuccessful Dry unknown 1485 Open H 2854 2994  
 Comment: 12/17/2012: Additional Lease Numbers: 255403-001

**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\_75 QUAD\_16 LAT\_DD LON\_DD UTM\_E UTM\_N  
 4705101553 Marshall 1152 Franklin New Martinsville New Martinsville 39.73749 -90.60299 416553.1 4306523.2

**Bottom Hole Location Information:**  
 API EP FLAG UTM\_E UTM\_N LON\_DD LAT\_DD  
 4705101553 1 As Proposed 416553.1 4306523.2 -90.60299 39.73749

**Owner Information:**  
 API CMP\_DT SUFFIX STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_AT\_COMPLETION PROP\_VO PROP\_TRGT\_FM TRM\_EST\_FR  
 4705101553 12/17/2012 001 Original Loc. Completed Life Support Lly.Sydn WV18-0276-001WV18-0076-001 WV18-0013-000 U.S.A. P. Nelson et al. Geacm Production USA, Inc. 0700 Marshall 51

**Completion Information:**  
 API CMP\_DT SPUD\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FMT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMD NEW\_FTG G\_BEF G\_AFT O\_BEF O\_AFT NGL\_BEF NGL\_A  
 4705101553 12/17/2012 8/10/15 8170.0 117.3 Ground Level Unnamed Hampshire Gap Hampshire Gap Outpost (Extension) Test Unsuccessful Dry unknown 1485 Open H 2854 2994  
 Comment: 12/17/2012: Additional Lease Numbers: 255403-001

**WV Geological & Economic Survey** Well: County = 51 Permit = 01554 Report Time: Friday, January 12, 2018 12

**Location Information:** [View Map](#)  
 API: COUNTY PERMIT TAX\_DISTRICT QUAD\_75 QUAD\_16 LAT\_DD LON\_DD UTM\_E UTM\_N  
 4705101554 Marshall 1154 Franklin New Martinsville New Martinsville 39.73749 -90.60309 416553.8 4306523.5

**Bottom Hole Location Information:**  
 API EP FLAG UTM\_E UTM\_N LON\_DD LAT\_DD  
 4705101554 1 As Proposed 416553.8 4306523.4 -90.60299 39.73749

**Owner Information:**  
 API CMP\_DT SUFFIX STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_AT\_COMPLETION PROP\_VO PROP\_TRGT\_FM TRM\_EST\_FR  
 4705101554 12/17/2012 001 Original Loc. Completed Life Support Lly.Sydn WV18-0276-001WV18-0076-001 WV18-0013-000 U.S.A. P. Nelson et al. Geacm Production USA, Inc. 0700 Marshall 51

**Completion Information:**  
 API CMP\_DT SPUD\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FMT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMD NEW\_FTG G\_BEF G\_AFT O\_BEF O\_AFT NGL\_BEF NGL\_A  
 4705101554 12/17/2012 8/10/15 8170.0 117.3 Ground Level Unnamed Hampshire Gap Hampshire Gap Outpost (Extension) Test Unsuccessful Dry unknown 1485 Open H 2854 2994  
 Comment: 12/17/2012: Additional Lease Numbers: 255403-001

**WV Geological & Economic Survey** Well: County = 51 Permit = 00213 Report Time: Friday, January 12, 2018 12:30

**Location Information:** [View Map](#)  
 API: COUNTY PERMIT TAX\_DISTRICT QUAD\_75 QUAD\_16 LAT\_DD LON\_DD UTM\_E UTM\_N  
 4705100213 Marshall 213 Franklin New Martinsville New Martinsville 39.73818 -90.60746 416495 4306710.8

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\_VO PROP\_TRGT\_FM TRM\_EST\_FR  
 4705100213 7/11/1950 Original Loc. Completed Life McHenry Ula McHenry Linden Eldred

**Completion Information:**  
 API CMP\_DT SPUD\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FMT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMD NEW\_FTG G\_BEF G\_AFT O\_BEF O\_AFT NGL\_BEF NGL\_A  
 4705100213 7/11/1950 5/16/1950 1242 Ground Level Unnamed Hampshire Gap Hampshire Gap Outpost (Extension) Test Unsuccessful Dry unknown 1485 Open H 2854 2994

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	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV DATUM
4705100213	Original Loc.	Pittsburgh coal	CBM: Drifts Fick	750	Reasonable	2	Reasonable	1242 Ground Level
4705100213	Original Loc.	unidentified coal	Well Record	826	Reasonable	2	Reasonable	1242 Ground Level
4705100213	Original Loc.	fat Cow Redband shale	Well Record	1336	Reasonable	49	Reasonable	1242 Ground Level
4705100213	Original Loc.	Hampers Ss/2n Cow Run	Well Record	1420	Reasonable	40	Reasonable	1242 Ground Level
4705100213	Original Loc.	Salt Sence (undif)	Well Record	1536	Reasonable	114	Reasonable	1242 Ground Level
4705100213	Original Loc.	Mason	Well Record	1626	Reasonable	50	Reasonable	1242 Ground Level
4705100213	Original Loc.	Big Line	Well Record	1673	Reasonable	57	Reasonable	1242 Ground Level
4705100213	Original Loc.	Greentier Group	Well Record	1873	Reasonable	122	Reasonable	1242 Ground Level
4705100213	Original Loc.	Kelner	Well Record	1960	Reasonable	12	Reasonable	1242 Ground Level
4705100213	Original Loc.	Big Ingot (PriceSec)	Well Record	1972	Reasonable	236	Reasonable	1242 Ground Level

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

**Plugging Information:**  
 API PLG\_DT DEPTH\_PBT  
 4705100213 7/20/1950 0

There is no Sample data for this well

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**WVGES Pipeline**

Select County: (051) Marshall | Select datatypes:  (Check All)

Enter Permit #: 683 |  Location  Production  Plugging  
 Owner/Completion  Stratigraphy  Sample  
 Pay/Show/Water  Logs  Stem Hole Log

Table Descriptions: County Code Transitions, Permit Numbers Series, Lease Notes, Contact Information, Disclaimer, WVGIS Map, Pipeline-Plus: New

WV Geological & Economic Survey: Well: County = 051 Permit = 683

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LOH_DD	UTME	UTMN
470510083	Marshall	683	Franklin	New Martinsville	New Martinsville	39.725126	-80.70082	510200.9	-437272.5

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_OVR	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
470510083	12/1/1981		Original Loc	Completed	Stephen S Chastene	Roussak		FRD-132	Letcher	S. Edna Wilson & David Kelly	FRD Industrial, Inc.		

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BEF	G_AFT	O_BEF	O_AFT	RGA_REF	RGA_AFT	P_REF	T_REF	PLAFT	TLAFT	SHA_P_REF	SHA_AFT	O_MSD_BY	
470510083	12/1/1981	11/23/1985	1282	Ground Level	Proctor	Riley		Riley	New-gol	Vertical	Shank	3061	3061	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no Pay data for this well

Production Gas Information: (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANR	GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510083	FRD Industrial, Inc.	1984		0	0	0	0	0	0	0	0	0	0	0	0	0

Production Oil Information: (Volumes in Bbl) \*\* some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANR	OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510083	FRD Industrial, Inc.	1984		0	0	0	0	0	0	0	0	0	0	0	0	0

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	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV DATUM
470510083	Original Loc	underlined coal	Well Record	1335	Reasonable	3	Reasonable	1282 Ground Level
470510083	Original Loc	Altopeony coal (soft)	CDM Drifts Pick	1555	Reasonable	2	Reasonable	1282 Ground Level
470510083	Original Loc	Altopeony coal (soft)	CDM Drifts Pick	1605	Reasonable	5	Reasonable	1282 Ground Level
470510083	Original Loc	1st Sat Sand	Well Record	1725	Reasonable	6	Reasonable	1282 Ground Level
470510083	Original Loc	2nd Sat Sand	Well Record	1835	Reasonable	10	Reasonable	1282 Ground Level
470510083	Original Loc	Rg Lime	Well Record	1945	Reasonable	55	Reasonable	1282 Ground Level
470510083	Original Loc	Quartziferous Onab	Well Record	1985	Reasonable	55	Reasonable	1282 Ground Level
470510083	Original Loc	Big Spur (Prusse)	Well Record	2000	Reasonable	240	Reasonable	1322 Ground Level
470510083	Original Loc	Yar	Well Record	2400	Reasonable	85	Reasonable	1282 Ground Level
470510083	Original Loc	Onab	Well Record	2600	Reasonable	145	Reasonable	1282 Ground Level
470510083	Original Loc	Riley	Well Record	2245	Reasonable	0	Complete Pick	1282 Ground Level

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

There is no Plugging data for this well

There is no Sample data for this well

**WVGES Pipeline**

Select County: (051) Marshall | Select datatypes:  (Check All)

Enter Permit #: 70366 |  Location  Production  Plugging  
 Owner/Completion  Stratigraphy  Sample  
 Pay/Show/Water  Logs  Stem Hole Log

Table Descriptions: County Code Transitions, Permit Numbers Series, Lease Notes, Contact Information, Disclaimer, WVGIS Map, Pipeline-Plus: New

WV Geological & Economic Survey: Well: County = 051 Permit = 70366

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LOH_DD	UTME	UTMN
4705170366	Marshall	70366	Franklin	New Martinsville	New Martinsville	39.740268	-80.76561	517512.6	-4398543.4

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_OVR	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705170366	J-J		unknown	Prppy Map	Vesta M Babe					unknown			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BEF	G_AFT	O_BEF	O_AFT	RGA_REF	RGA_AFT	P_REF	T_REF	PLAFT	TLAFT	SHA_P_REF	SHA_AFT	O_MSD_BY
4705170366	J-J	J-J					unclassified	unclassified			not available	unknown	unknown														

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 Wireline (E-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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Select County: (051) Marshall  (Check All)

Enter Permit #: 70367

Get Data    Reset

Select datatypes:  Location     Production     Plugging  
 Owner/Completion     Stratigraphy     Sample  
 Pay/Show/Water     Logs     Bottom Hole Log

[Table Descriptions](#)  
[County Code Transitions](#)  
[Permit Numbering Series](#)  
[Usage Notes](#)  
[Contact Information](#)  
[Disclaimer](#)  
[WVGES Main](#)  
["Pipeline-Plus" View](#)

WV Geological & Economic Survey: Well: County = 051 Permit = 70367

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4785170367	Marshall	70367	Franklin	New Martinsville	New Martinsville	39.740495	-80.750217	517287.4	4398975.1

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	TFM_EST_PR
4785170367	--		unknown	Prdy Lipp	George McHenry Hrs						unknown		

Completion Information:

API	CLIP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FRIAL_CLASS	TYPE	RIG	CLIP_MTHD	IVD	TMD	HEW_FTG	G_BEF	G_AFT	O_BEF
4785170367	--	--						unclassified	unclassified	not available	unknown	unknown						

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 Wireline (E-Log) data for this well

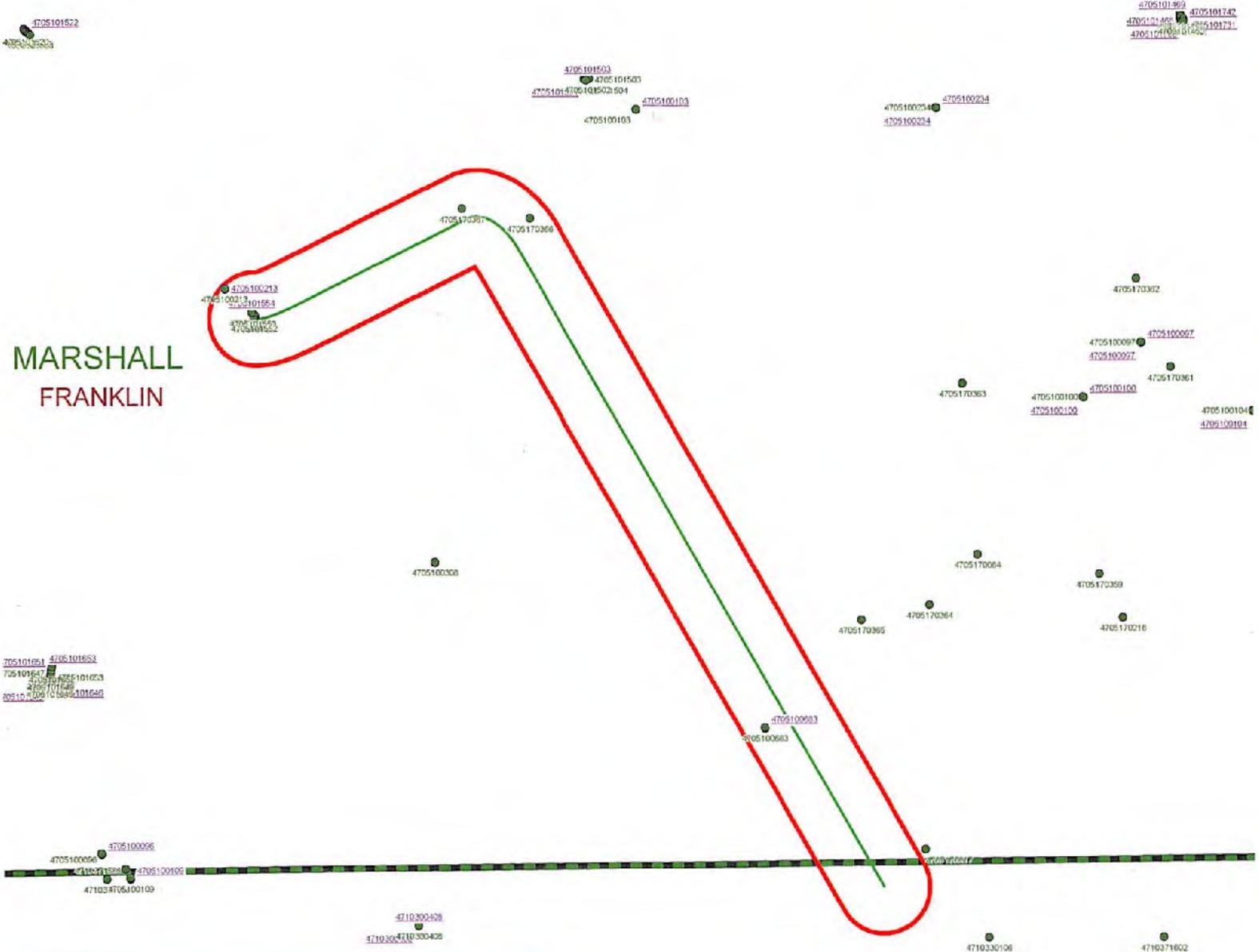
There is no Plugging data for this well

There is no Sample data for this well

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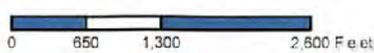
MARSHALL  
FRANKLIN

**Legend**

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Weller - 3HM
- 500 Ft. Buffer
- Major Highways
- Major Roads
- Counties
- Districts



# Weller - 3HM Franklin District Marshall County, WV



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

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Map Prepared by:  
**EPS**  
LAND SERVICES  
06/15/2018

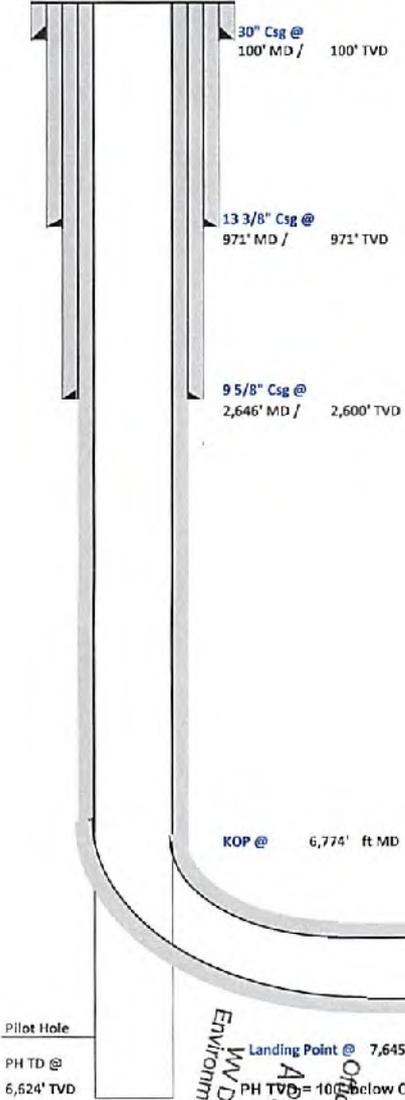


**WELL NAME:** Weller-3HM  
**STATE:** West Virginia **COUNTY:** Marshall  
**DISTRICT:** Franklin  
**DF Elev:** 1,273' **GL Elev:** 1,273'  
**TD:** 15,572'  
**TH Latitude:** 39.73731167  
**TH Longitude:** -80.80627108  
**BH Latitude:** 39.71371958  
**BH Longitude:** -80.79548673

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	871
Sewickley Coal	778
Pittsburgh Coal	866
Big Lime	2013
Weir	2369
Berea	2553
Gordon	2863
Rhinestreet	5857
Genesee/Burkett	6365
Tully	6388
Hamilton	6417
Marcellus	6471
Landing Depth	6510
Onondaga	6524
Pilot Hole Depth	6624

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	2,646'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	15,572'	6,648'	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	861	A	15	Air	1 Centralizer every other jt
Production	3,518	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to slc



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**Lateral TD @** 15,572' ft MD  
 6,648 ft TVD

4705102036

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

**Weller-3HM**

**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"	2,646'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	15,572'	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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**TUG HILL**  
OPERATING

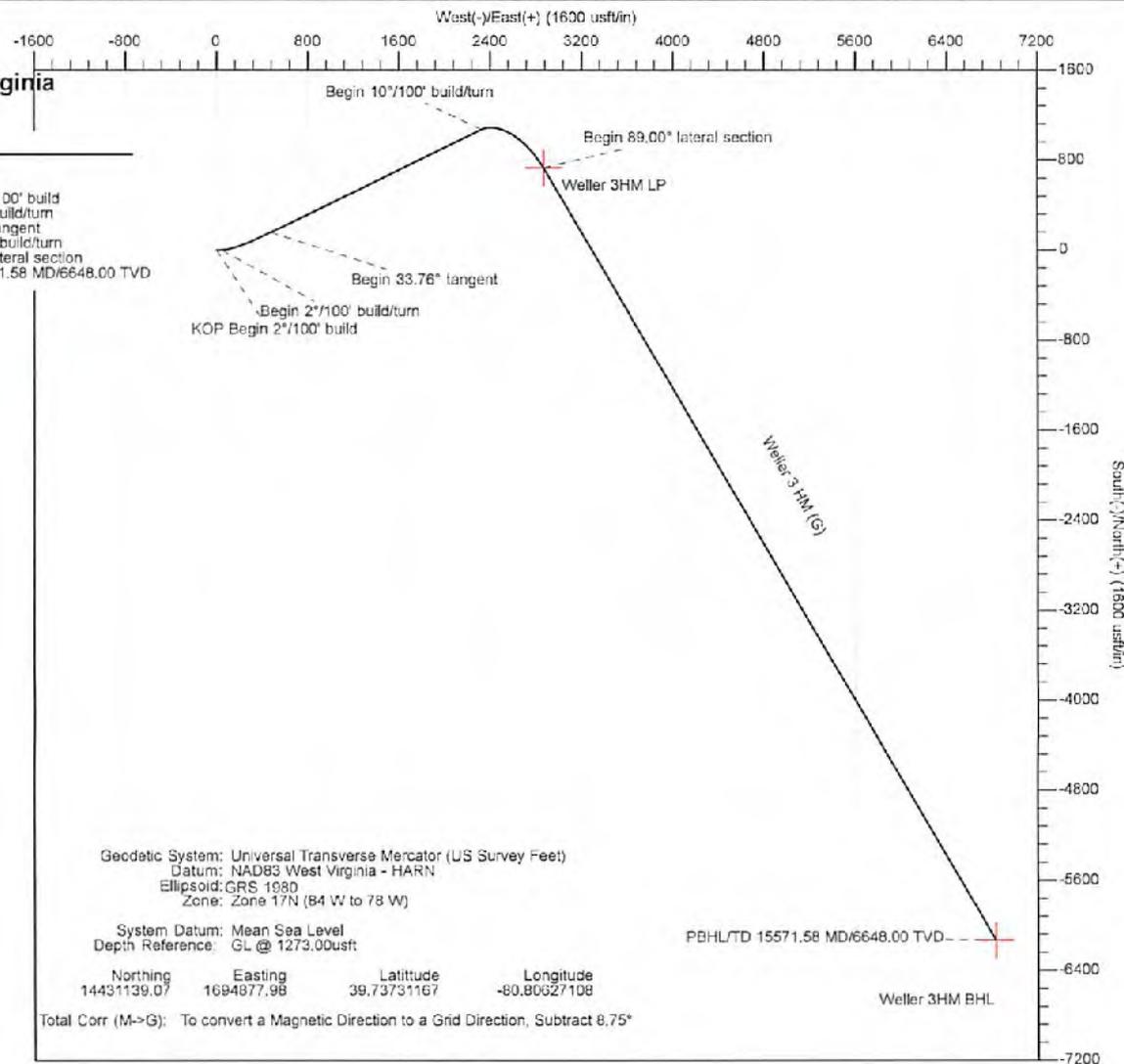
**Well: Weller 3 HM (G)**  
**Site: Lily/Weller**  
**Project: Marshall County, West Virginia**  
**Design: rev0**

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1800.00	10.00	90.00	1797.47	0.00	43.52	2.00	50.00	32.39	Begin 2°/100' build/turn
4	3056.61	33.76	63.77	2957.26	156.85	472.69	2.00	-35.33	246.95	Begin 33.76° tangent
5	6773.84	33.76	63.77	6047.81	1069.89	2325.44	0.00	0.00	1015.71	Begin 10°/100' build/turn
6	7644.67	89.00	150.01	6510.00	732.10	2868.98	10.00	87.43	1645.82	Begin 89.00° lateral section
7	15571.58	89.00	150.01	6648.00	-5132.33	5830.85	0.00	0.00	9179.65	PBHL/TD 15571.58 MD/6648.00 TVD

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

Magnetic Field  
Strength: 52102.5nT  
Dip Angle: 66.89°  
Date: 12/16/2017  
Model: IGRF2015

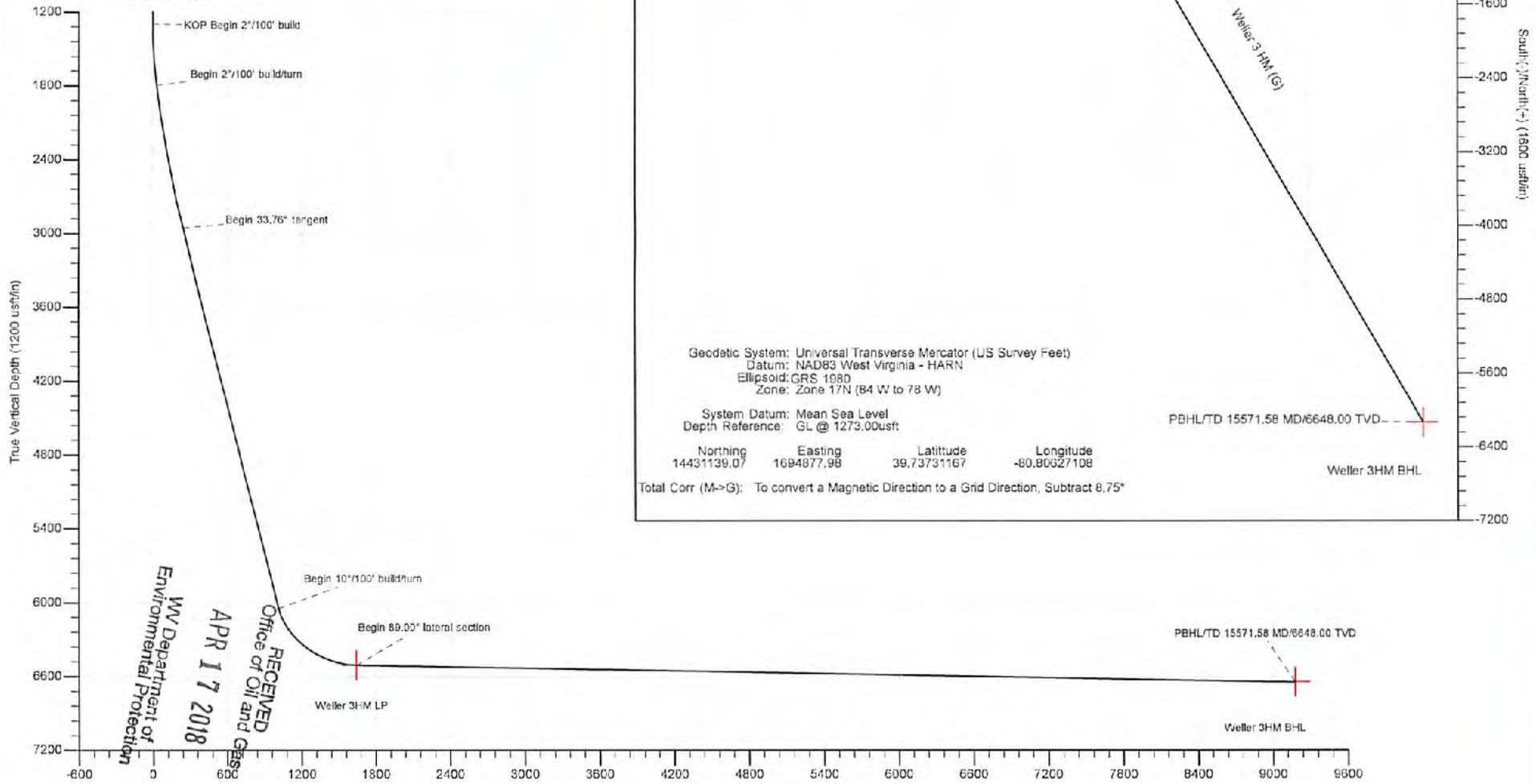


Geodetic System: Universal Transverse Mercator (US Survey Feet)  
Datum: NAD83 West Virginia - HARN  
Ellipsoid: GRS 1980  
Zone: Zone 17N (84 W to 78 W)

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

Northing: 14431139.07 Easting: 1694877.98 Latitude: 39.73731167 Longitude: -80.80627108

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



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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Weller 3 HM (G)
<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 3 HM (G)	<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>	39.73745081
<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 3 HM (G)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	14,431,139.07 usft	<b>Latitude:</b>	39.73731167
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	1,694,877.98 usft	<b>Longitude:</b>	-80.80627108
<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	66.88	52,102.02521145

<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	131.92	

<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	15,571.58 rev0 (Original Hole)	MWD	MWD - Standard	

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	<b>TFO (°)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	10.00	90.00	1,797.47	0.00	43.52	2.00	2.00	0.00	90.00	
3,056.61	33.76	63.77	2,957.26	156.85	472.69	2.00	1.89	-2.09	-35.33	
6,773.84	33.76	83.77	6,047.81	1,069.89	2,325.44	0.00	0.00	0.00	0.00	
7,844.67	89.00	150.01	6,510.00	732.10	2,868.98	10.00	6.34	9.90	87.43	Weller 3HM LP
15,571.58	89.00	150.01	6,648.00	-6,132.33	6,830.85	0.00	0.00	0.00	0.00	Weller 3HM BHL

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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Weller 3 HM (G)
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 3 HM (G)	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	
0.00	0.00	0.00	0.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
100.00	0.00	0.00	100.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
200.00	0.00	0.00	200.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
300.00	0.00	0.00	300.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
400.00	0.00	0.00	400.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
500.00	0.00	0.00	500.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
600.00	0.00	0.00	600.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
700.00	0.00	0.00	700.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
800.00	0.00	0.00	800.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
900.00	0.00	0.00	900.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,431,139.07	1,694,877.98	39.73731167	-80.80627108	
<b>KOP Begin 2°/100' build</b>										
1,400.00	2.00	90.00	1,399.98	0.00	1.75	14,431,139.07	1,694,879.72	39.73731166	-80.80626487	
1,500.00	4.00	90.00	1,499.84	0.00	6.98	14,431,139.07	1,694,884.95	39.73731163	-80.80624626	
1,500.00	6.00	90.00	1,599.45	0.00	15.69	14,431,139.07	1,694,893.67	39.73731158	-80.80621526	
1,700.00	8.00	90.00	1,698.70	0.00	27.88	14,431,139.07	1,694,905.86	39.73731151	-80.80617191	
1,800.00	10.00	90.00	1,797.47	0.00	43.52	14,431,139.07	1,694,921.50	39.73731141	-80.80611626	
<b>Begin 2°/100' build/turn</b>										
1,900.00	11.69	84.28	1,895.68	1.01	62.29	14,431,140.08	1,694,940.26	39.73731407	-80.80604951	
2,000.00	13.46	80.02	1,993.26	4.04	83.83	14,431,143.11	1,694,961.61	39.73732226	-80.80597285	
2,100.00	15.29	76.75	2,090.14	9.08	108.13	14,431,148.15	1,694,986.11	39.73733595	-80.80588637	
2,200.00	17.16	74.16	2,186.16	16.12	135.16	14,431,155.20	1,695,013.13	39.73735515	-80.80579019	
2,300.00	19.05	72.08	2,281.21	25.17	164.87	14,431,164.24	1,695,042.85	39.73737982	-80.80568441	
2,400.00	20.96	70.36	2,375.17	36.21	197.25	14,431,175.28	1,695,075.22	39.73740993	-80.80556916	
2,500.00	22.89	68.91	2,467.94	49.21	232.24	14,431,188.29	1,695,110.21	39.73744545	-80.80544459	
2,600.00	24.82	67.68	2,559.39	64.18	268.80	14,431,203.26	1,695,147.78	39.73748633	-80.80531085	
2,700.00	26.77	66.62	2,649.42	81.09	309.90	14,431,220.16	1,695,187.87	39.73753252	-80.80516810	
2,800.00	28.72	65.69	2,737.92	99.92	352.47	14,431,238.99	1,695,230.44	39.73758398	-80.80501652	
2,900.00	30.68	64.87	2,824.78	120.64	397.47	14,431,259.72	1,695,275.44	39.73764062	-80.80485628	
3,000.00	32.64	64.15	2,909.89	143.24	444.84	14,431,282.31	1,695,322.82	39.73770240	-80.80468759	
3,056.61	33.76	63.77	2,957.26	156.65	472.69	14,431,295.92	1,695,350.66	39.73773961	-80.80458843	
<b>Begin 33.76° tangent</b>										
3,100.00	33.76	63.77	2,993.34	167.51	494.32	14,431,306.58	1,695,372.29	39.73776875	-80.80451141	
3,200.00	33.76	63.77	3,076.48	192.07	544.16	14,431,331.14	1,695,422.13	39.73783591	-80.80433392	
3,300.00	33.76	63.77	3,159.62	216.63	594.00	14,431,355.71	1,695,471.96	39.73790306	-80.80415644	
3,400.00	33.76	63.77	3,242.76	241.19	643.84	14,431,380.27	1,695,521.82	39.73797022	-80.80397895	
3,500.00	33.76	63.77	3,325.90	265.76	693.69	14,431,404.83	1,695,571.66	39.73803737	-80.80380146	
3,500.00	33.76	63.77	3,409.04	290.32	743.53	14,431,429.39	1,695,621.50	39.73810453	-80.80362397	
3,700.00	33.76	63.77	3,492.18	314.88	793.37	14,431,453.95	1,695,671.35	39.73817169	-80.80344648	
3,800.00	33.76	63.77	3,575.32	339.44	843.21	14,431,478.52	1,695,721.19	39.73823884	-80.80326899	
3,900.00	33.76	63.77	3,658.47	364.01	893.05	14,431,503.08	1,695,771.03	39.73830600	-80.80309149	
4,000.00	33.76	63.77	3,741.61	388.57	942.90	14,431,527.64	1,695,820.87	39.73837315	-80.80291400	
4,100.00	33.76	63.77	3,824.75	413.13	992.74	14,431,552.20	1,695,870.71	39.73844030	-80.80273651	
4,200.00	33.76	63.77	3,907.89	437.69	1,042.58	14,431,576.77	1,695,920.56	39.73850746	-80.80255902	
4,300.00	33.76	63.77	3,991.03	462.25	1,092.42	14,431,601.33	1,695,970.40	39.73857461	-80.80238153	
4,400.00	33.76	63.77	4,074.17	486.82	1,142.27	14,431,625.89	1,696,020.24	39.73864177	-80.80220403	
4,500.00	33.76	63.77	4,157.31	511.38	1,192.11	14,431,650.45	1,696,070.08	39.73870892	-80.80202654	
4,600.00	33.76	63.77	4,240.45	535.94	1,241.95	14,431,675.02	1,696,119.92	39.73877607	-80.80184905	
4,700.00	33.76	63.77	4,323.59	560.50	1,291.79	14,431,699.58	1,696,169.77	39.73884322	-80.80167155	
4,800.00	33.76	63.77	4,406.74	585.07	1,341.63	14,431,724.14	1,696,219.61	39.73891038	-80.80149406	
4,900.00	33.76	63.77	4,489.88	609.63	1,391.48	14,431,748.70	1,696,269.45	39.73897754	-80.80131657	

REGULATORY Office of Oil and Gas

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Wall Weller 3 HM (G)
<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 3 HM (G)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rav0		

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	33.76	63.77	4,573.02	634.19	1,441.32	14,431,773.26	1,696,319.29	39.73904468	-80.80113907	
5,100.00	33.76	63.77	4,656.16	658.75	1,491.16	14,431,797.83	1,696,369.14	39.73911183	-80.80096158	
5,200.00	33.76	63.77	4,739.30	683.32	1,541.00	14,431,822.39	1,696,418.98	39.73917898	-80.80078408	
5,300.00	33.76	63.77	4,822.44	707.88	1,590.84	14,431,846.95	1,696,468.82	39.73924613	-80.80060658	
5,400.00	33.76	63.77	4,905.58	732.44	1,640.69	14,431,871.51	1,696,518.66	39.73931329	-80.80042909	
5,500.00	33.76	63.77	4,988.72	757.00	1,690.53	14,431,896.08	1,696,568.50	39.73938044	-80.80025159	
5,600.00	33.76	63.77	5,071.87	781.56	1,740.37	14,431,920.64	1,696,618.35	39.73944759	-80.80007410	
5,700.00	33.76	63.77	5,155.01	806.13	1,790.21	14,431,945.20	1,696,668.19	39.73951474	-80.79989660	
5,800.00	33.76	63.77	5,238.15	830.69	1,840.05	14,431,969.76	1,696,718.03	39.73958189	-80.79971910	
5,900.00	33.76	63.77	5,321.29	855.25	1,889.90	14,431,994.33	1,696,767.87	39.73964904	-80.79954160	
6,000.00	33.76	63.77	5,404.43	879.81	1,939.74	14,432,018.89	1,696,817.71	39.73971618	-80.79936410	
6,100.00	33.76	63.77	5,487.57	904.38	1,989.58	14,432,043.45	1,696,867.56	39.73978333	-80.79918661	
6,200.00	33.76	63.77	5,570.71	928.94	2,039.42	14,432,068.01	1,696,917.40	39.73985048	-80.79900911	
6,300.00	33.76	63.77	5,653.85	953.50	2,089.27	14,432,092.57	1,696,967.24	39.73991763	-80.79883161	
6,400.00	33.76	63.77	5,736.99	978.06	2,139.11	14,432,117.14	1,697,017.08	39.73998478	-80.79865411	
6,500.00	33.76	63.77	5,820.14	1,002.63	2,188.95	14,432,141.70	1,697,066.93	39.74005193	-80.79847661	
6,600.00	33.76	63.77	5,903.28	1,027.19	2,238.79	14,432,166.26	1,697,116.77	39.74011907	-80.79829911	
6,700.00	33.76	63.77	5,986.42	1,051.75	2,288.63	14,432,190.82	1,697,166.61	39.74018622	-80.79812161	
6,773.84	33.76	63.77	6,047.81	1,069.89	2,325.44	14,432,208.96	1,697,203.41	39.74023560	-80.79799054	
<b>Begin 10°/100' build/turn</b>										
6,800.00	33.96	68.45	6,069.54	1,075.78	2,338.76	14,432,214.86	1,697,216.73	39.74025192	-80.79794312	
6,900.00	36.30	85.39	6,151.51	1,088.46	2,394.38	14,432,227.53	1,697,272.38	39.74028637	-80.79774513	
7,000.00	40.72	99.84	6,229.90	1,085.25	2,456.19	14,432,224.32	1,697,334.16	39.74027719	-80.79752530	
7,100.00	46.62	111.57	6,302.32	1,066.27	2,522.29	14,432,205.34	1,697,400.26	39.74022464	-80.79729031	
7,200.00	53.49	121.07	6,366.57	1,032.08	2,590.88	14,432,171.15	1,697,468.65	39.74013032	-80.79704731	
7,300.00	60.99	128.95	6,420.71	983.73	2,659.28	14,432,122.80	1,697,537.25	39.73999710	-80.79680366	
7,400.00	68.88	135.74	6,463.08	922.88	2,726.00	14,432,061.75	1,697,603.98	39.73982903	-80.79656679	
7,500.00	77.02	141.83	6,492.40	850.79	2,788.83	14,431,989.86	1,697,666.81	39.73963122	-80.79634387	
7,600.00	85.29	147.52	6,507.78	770.25	2,845.85	14,431,909.32	1,697,723.82	39.73940965	-80.79614170	
7,644.67	89.00	150.01	6,510.00	732.10	2,868.98	14,431,871.18	1,697,746.95	39.73930477	-80.79605973	
<b>Begin 89.00° lateral section</b>										
7,700.00	89.00	150.01	6,510.96	684.19	2,896.63	14,431,823.27	1,697,774.61	39.73917302	-80.79596175	
7,800.00	89.00	150.01	6,512.70	597.60	2,946.61	14,431,736.67	1,697,824.59	39.73893489	-80.79578466	
7,900.00	89.00	150.01	6,514.45	511.00	2,996.59	14,431,650.07	1,697,874.57	39.73869675	-80.79560757	
8,000.00	89.00	150.01	6,516.19	424.40	3,046.57	14,431,563.48	1,697,924.55	39.73845862	-80.79543049	
8,100.00	89.00	150.01	6,517.93	337.81	3,096.55	14,431,476.88	1,697,974.53	39.73822049	-80.79525340	
8,200.00	89.00	150.01	6,519.67	251.21	3,146.53	14,431,390.28	1,698,024.51	39.73798235	-80.79507631	
8,300.00	89.00	150.01	6,521.41	164.61	3,196.51	14,431,303.69	1,698,074.49	39.73774422	-80.79489923	
8,400.00	89.00	150.01	6,523.15	78.02	3,246.49	14,431,217.09	1,698,124.47	39.73750609	-80.79472215	
8,500.00	89.00	150.01	6,524.89	-8.58	3,296.47	14,431,130.49	1,698,174.45	39.73726795	-80.79454507	
8,600.00	89.00	150.01	6,526.63	-95.18	3,346.45	14,431,043.90	1,698,224.43	39.73702982	-80.79436799	
8,700.00	89.00	150.01	6,528.37	-181.77	3,396.43	14,430,957.30	1,698,274.41	39.73679168	-80.79419091	
8,800.00	89.00	150.01	6,530.11	-268.37	3,446.41	14,430,870.71	1,698,324.39	39.73655355	-80.79401383	
8,900.00	89.00	150.01	6,531.85	-354.97	3,496.39	14,430,784.11	1,698,374.37	39.73631541	-80.79383675	
9,000.00	89.00	150.01	6,533.60	-441.56	3,546.37	14,430,697.51	1,698,424.35	39.73607727	-80.79365968	
9,100.00	89.00	150.01	6,535.34	-528.16	3,596.35	14,430,610.92	1,698,474.33	39.73583914	-80.79348260	
9,200.00	89.00	150.01	6,537.08	-614.75	3,646.33	14,430,524.32	1,698,524.31	39.73560100	-80.79330553	
9,300.00	89.00	150.01	6,538.82	-701.35	3,696.31	14,430,437.72	1,698,574.29	39.73536286	-80.79312846	
9,400.00	89.00	150.01	6,540.56	-787.95	3,746.29	14,430,351.13	1,698,624.27	39.73512473	-80.79295139	
9,500.00	89.00	150.01	6,542.30	-874.54	3,796.27	14,430,264.53	1,698,674.25	39.73488659	-80.79277432	
9,600.00	89.00	150.01	6,544.04	-961.14	3,846.25	14,430,177.93	1,698,724.23	39.73464845	-80.79259725	
9,700.00	89.00	150.01	6,545.78	-1,047.74	3,896.23	14,430,091.34	1,698,774.21	39.73441031	-80.79242018	
9,800.00	89.00	150.01	6,547.52	-1,134.33	3,946.21	14,430,004.74	1,698,824.19	39.73417217	-80.79224312	
9,900.00	89.00	150.01	6,549.26	-1,220.93	3,996.19	14,429,918.14	1,698,874.17	39.73393403	-80.79206605	

Office of Oil and Gas

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Weller 3 HM (G)
<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 3 HM (G)	<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	150.01	6,551.00	-1,307.53	4,046.17	14,429,831.55	1,698,924.15	39.73369590	-80.79188899	
10,100.00	89.00	150.01	6,552.75	-1,394.12	4,096.15	14,429,744.95	1,698,974.13	39.73345776	-80.79171193	
10,200.00	89.00	150.01	6,554.49	-1,480.72	4,146.13	14,429,658.35	1,699,024.11	39.73321952	-80.79153487	
10,300.00	89.00	150.01	6,556.23	-1,567.32	4,196.11	14,429,571.76	1,699,074.09	39.73298148	-80.79135781	
10,400.00	89.00	150.01	6,557.97	-1,653.91	4,246.09	14,429,485.16	1,699,124.07	39.73274334	-80.79118075	
10,500.00	89.00	150.01	6,559.71	-1,740.51	4,296.07	14,429,398.56	1,699,174.05	39.73250520	-80.79100369	
10,600.00	89.00	150.01	6,561.45	-1,827.11	4,346.05	14,429,311.97	1,699,224.03	39.73226706	-80.79082663	
10,700.00	89.00	150.01	6,563.19	-1,913.70	4,396.03	14,429,225.37	1,699,274.01	39.73202892	-80.79064958	
10,800.00	89.00	150.01	6,564.93	-2,000.30	4,446.01	14,429,138.77	1,699,323.99	39.73179078	-80.79047253	
10,900.00	89.00	150.01	6,566.67	-2,086.90	4,495.99	14,429,052.18	1,699,373.97	39.73155264	-80.79029547	
11,000.00	89.00	150.01	6,568.41	-2,173.49	4,545.97	14,428,965.58	1,699,423.95	39.73131449	-80.79011842	
11,100.00	89.00	150.01	6,570.15	-2,260.09	4,595.95	14,428,878.98	1,699,473.93	39.73107635	-80.78994137	
11,200.00	89.00	150.01	6,571.90	-2,346.69	4,645.93	14,428,792.39	1,699,523.91	39.73083821	-80.78976432	
11,300.00	89.00	150.01	6,573.64	-2,433.28	4,695.91	14,428,705.79	1,699,573.89	39.73060007	-80.78958728	
11,400.00	89.00	150.01	6,575.38	-2,519.88	4,745.89	14,428,619.19	1,699,623.87	39.73036193	-80.78941023	
11,500.00	89.00	150.01	6,577.12	-2,606.46	4,795.87	14,428,532.60	1,699,673.85	39.73012378	-80.78923318	
11,600.00	89.00	150.01	6,578.86	-2,693.07	4,845.85	14,428,446.00	1,699,723.83	39.72988564	-80.78905614	
11,700.00	89.00	150.01	6,580.60	-2,779.67	4,895.83	14,428,359.41	1,699,773.81	39.72964750	-80.78887910	
11,800.00	89.00	150.01	6,582.34	-2,866.27	4,945.81	14,428,272.81	1,699,823.79	39.72940935	-80.78870206	
11,900.00	89.00	150.01	6,584.08	-2,952.86	4,995.79	14,428,186.21	1,699,873.77	39.72917121	-80.78852502	
12,000.00	89.00	150.01	6,585.82	-3,039.46	5,045.77	14,428,099.62	1,699,923.75	39.72893306	-80.78834798	
12,100.00	89.00	150.01	6,587.56	-3,126.05	5,095.75	14,428,013.02	1,699,973.73	39.72869492	-80.78817094	
12,200.00	89.00	150.01	6,589.30	-3,212.65	5,145.73	14,427,926.42	1,700,023.71	39.72845677	-80.78799390	
12,300.00	89.00	150.01	6,591.04	-3,299.25	5,195.71	14,427,839.83	1,700,073.69	39.72821863	-80.78781687	
12,400.00	89.00	150.01	6,592.79	-3,385.84	5,245.69	14,427,753.23	1,700,123.67	39.72798048	-80.78763983	
12,500.00	89.00	150.01	6,594.53	-3,472.44	5,295.67	14,427,666.63	1,700,173.65	39.72774234	-80.78746280	
12,600.00	89.00	150.01	6,596.27	-3,559.04	5,345.65	14,427,580.04	1,700,223.63	39.72750419	-80.78728577	
12,700.00	89.00	150.01	6,598.01	-3,645.63	5,395.63	14,427,493.44	1,700,273.61	39.72726604	-80.78710874	
12,800.00	89.00	150.01	6,599.75	-3,732.23	5,445.61	14,427,406.84	1,700,323.59	39.72702790	-80.78693171	
12,900.00	89.00	150.01	6,601.49	-3,818.83	5,495.59	14,427,320.25	1,700,373.57	39.72678975	-80.78675468	
13,000.00	89.00	150.01	6,603.23	-3,905.42	5,545.57	14,427,233.65	1,700,423.55	39.72655160	-80.78657765	
13,100.00	89.00	150.01	6,604.97	-3,992.02	5,595.55	14,427,147.05	1,700,473.53	39.72631346	-80.78640063	
13,200.00	89.00	150.01	6,606.71	-4,078.62	5,645.53	14,427,060.46	1,700,523.51	39.72607531	-80.78622360	
13,300.00	89.00	150.01	6,608.45	-4,165.21	5,695.51	14,426,973.86	1,700,573.49	39.72583716	-80.78604658	
13,400.00	89.00	150.01	6,610.19	-4,251.81	5,745.49	14,426,887.26	1,700,623.47	39.72559901	-80.78586956	
13,500.00	89.00	150.01	6,611.94	-4,338.41	5,795.47	14,426,800.67	1,700,673.45	39.72536086	-80.78569254	
13,600.00	89.00	150.01	6,613.68	-4,425.00	5,845.45	14,426,714.07	1,700,723.43	39.72512272	-80.78551552	
13,700.00	89.00	150.01	6,615.42	-4,511.60	5,895.43	14,426,627.47	1,700,773.41	39.72488457	-80.78533850	
13,800.00	89.00	150.01	6,617.16	-4,598.20	5,945.41	14,426,540.88	1,700,823.39	39.72464642	-80.78516148	
13,900.00	89.00	150.01	6,618.90	-4,684.79	5,995.39	14,426,454.28	1,700,873.37	39.72440827	-80.78498447	
14,000.00	89.00	150.01	6,620.64	-4,771.39	6,045.37	14,426,367.68	1,700,923.35	39.72417012	-80.78480745	
14,100.00	89.00	150.01	6,622.38	-4,857.99	6,095.35	14,426,281.09	1,700,973.33	39.72393197	-80.78463044	
14,200.00	89.00	150.01	6,624.12	-4,944.58	6,145.33	14,426,194.49	1,701,023.31	39.72369382	-80.78445343	
14,300.00	89.00	150.01	6,625.86	-5,031.18	6,195.31	14,426,107.89	1,701,073.29	39.72345567	-80.78427642	
14,400.00	89.00	150.01	6,627.60	-5,117.78	6,245.29	14,426,021.30	1,701,123.27	39.72321752	-80.78409941	
14,500.00	89.00	150.01	6,629.34	-5,204.37	6,295.27	14,425,934.70	1,701,173.25	39.72297936	-80.78392240	
14,600.00	89.00	150.01	6,631.09	-5,290.97	6,345.25	14,425,848.11	1,701,223.23	39.72274121	-80.78374539	
14,700.00	89.00	150.01	6,632.83	-5,377.57	6,395.23	14,425,761.51	1,701,273.21	39.72250306	-80.78356838	
14,800.00	89.00	150.01	6,634.57	-5,464.16	6,445.21	14,425,674.91	1,701,323.19	39.72226491	-80.78339138	
14,900.00	89.00	150.01	6,636.31	-5,550.76	6,495.19	14,425,588.32	1,701,373.17	39.72202676	-80.78321437	
15,000.00	89.00	150.01	6,638.05	-5,637.35	6,545.17	14,425,501.72	1,701,423.15	39.72178860	-80.78303737	
15,100.00	89.00	150.01	6,639.79	-5,723.95	6,595.15	14,425,415.12	1,701,473.13	39.72155045	-80.78286037	
15,200.00	89.00	150.01	6,641.53	-5,810.55	6,645.13	14,425,328.53	1,701,523.11	39.72131230	-80.78268337	
15,300.00	89.00	150.01	6,643.27	-5,897.14	6,695.11	14,425,241.93	1,701,573.09	39.72107414	-80.78250637	
15,400.00	89.00	150.01	6,645.01	-5,983.74	6,745.10	14,425,155.33	1,701,623.07	39.72083599	-80.78232937	

APR 17 2018

06/15/2018

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Planning Report - Geographic

<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Weller 3 HM (G)
<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 3 HM (G)	<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
15,500.00	89.00	150.01	6,646.75	-6,070.34	6,795.08	14,425,066.74	1,701,673.05	39.72059784	-80.78215238
15,571.58	89.00	150.01	6,648.00	-6,132.33	6,830.85	14,425,006.75	1,701,708.83	39.72042736	-80.78202568
PBHL/TD 15571.58 MD/6648.00 TVD									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Weller 3HM LP - hit/miss target - Shape - Point	0.00	0.00	6,510.00	732.10	2,868.98	14,431,871.18	1,697,746.95	39.73930477	-80.79605973
Weller 3HM BHL - plan hits target center - Point	0.00	0.00	6,648.00	-6,132.33	6,830.85	14,425,006.75	1,701,708.83	39.72042736	-80.76202566

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build	
1,800.00	1,797.47	0.00	43.52	Begin 2°/100' build/turn	
3,056.61	2,957.26	156.65	472.69	Begin 33.76° tangent	
6,773.84	6,047.81	1,069.69	2,325.44	Begin 10°/100' build/turn	
7,644.67	6,510.00	732.10	2,868.98	Begin 89.00° lateral section	
15,571.58	6,648.00	-6,132.33	6,830.85	PBHL/TD 15571.58 MD/6648.00 TVD	

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WV Department of  
Environmental Protection

470510203

WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_  
Operator's Well No. Weller 3HM

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 containm

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in 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? Weazel County Sanitary Landfill (BWP-1021 / WV0105185) and Westmoreland Sanitary Landfill, LLC (SN11405 / PA DEP ECR1363425)

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

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

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

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

Company Official (Typed Name) Sean Gasser

Company Official Title Engineer

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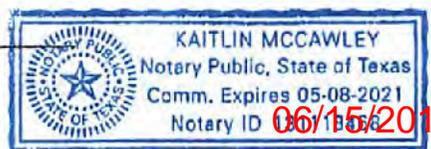
APR 17 2018

WV Department of  
Environmental Protection

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

Kaitlin McCawley Kaitlin McCawley  
Notary Public

My commission expires 5/8/2021



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Form WW-9

Operator's Well No. Weller 3HM

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: *Juan V. [Signature]*

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

Title: Oil + Gas Inspector

Date: 3/28/18

Field Reviewed?  Yes  No

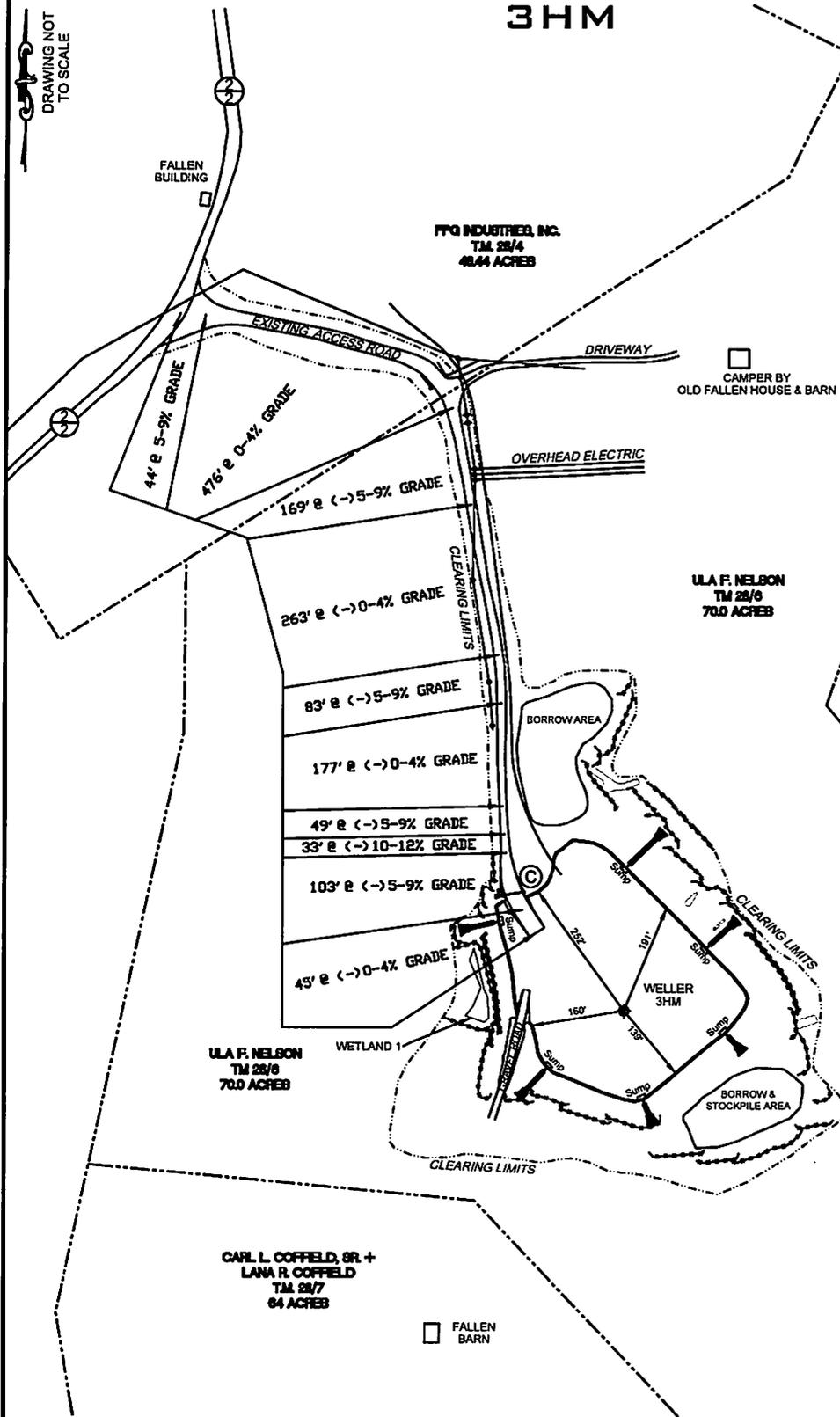
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06/15/2018

WW-9

**PROPOSED WELLER  
3HM**

**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.

FPG INDUSTRIES, INC.  
TM 28/5  
103.9 ACRES

ULA F. NELSON  
TM 28/6  
70.0 ACRES

CARL L. COFFIELD, SR. +  
LANA R. COFFIELD  
TM 28/7  
64 ACRES

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Environmental Protection

**LEGEND**

- Note:  
 (C) — 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

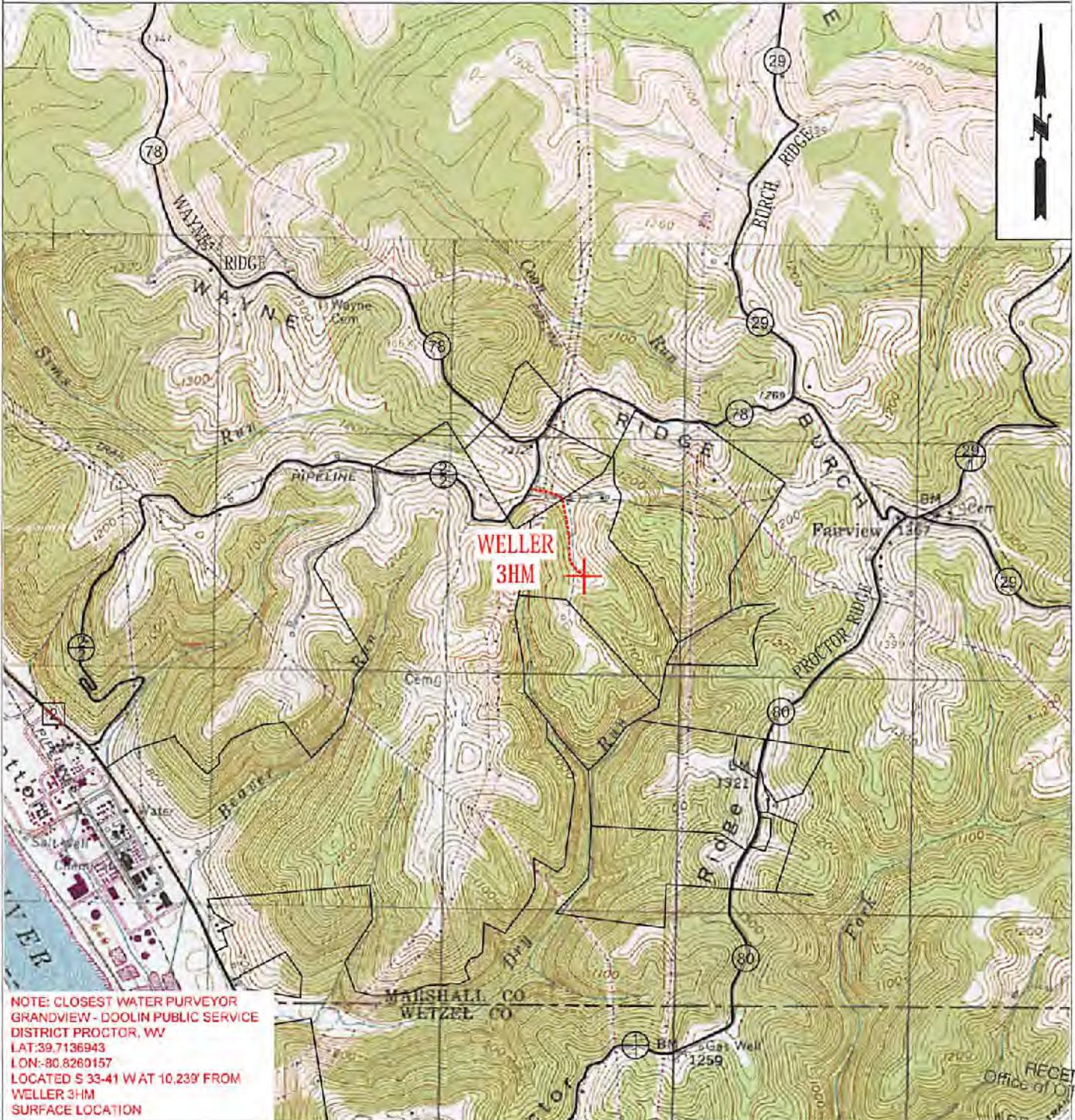
PROJECT NO: 494510851

DRAWN BY: J.A.H.

WW-9

# PROPOSED WELLER 3HM

SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR  
GRANDVIEW - DOOLIN PUBLIC SERVICE  
DISTRICT PROCTOR, WV  
LAT: 39.7136943  
LON: -80.8260157  
LOCATED S 33-41 W AT 10,239' FROM  
WELLER 3HM  
SURFACE LOCATION

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APR 17 2018



**TUG HILL**  
OPERATING

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

06/15/2018

47 05 102036

47 05 10207 -



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

*JV*  
*3/28/18*

Well Name:Weller 3HM

Pad Location: Lily Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,398,619.99

Easting: 516,599.84

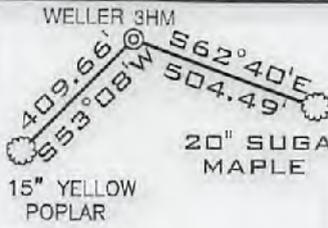
March 2018

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APR 17 2018  
WV Department of  
Environmental Protection

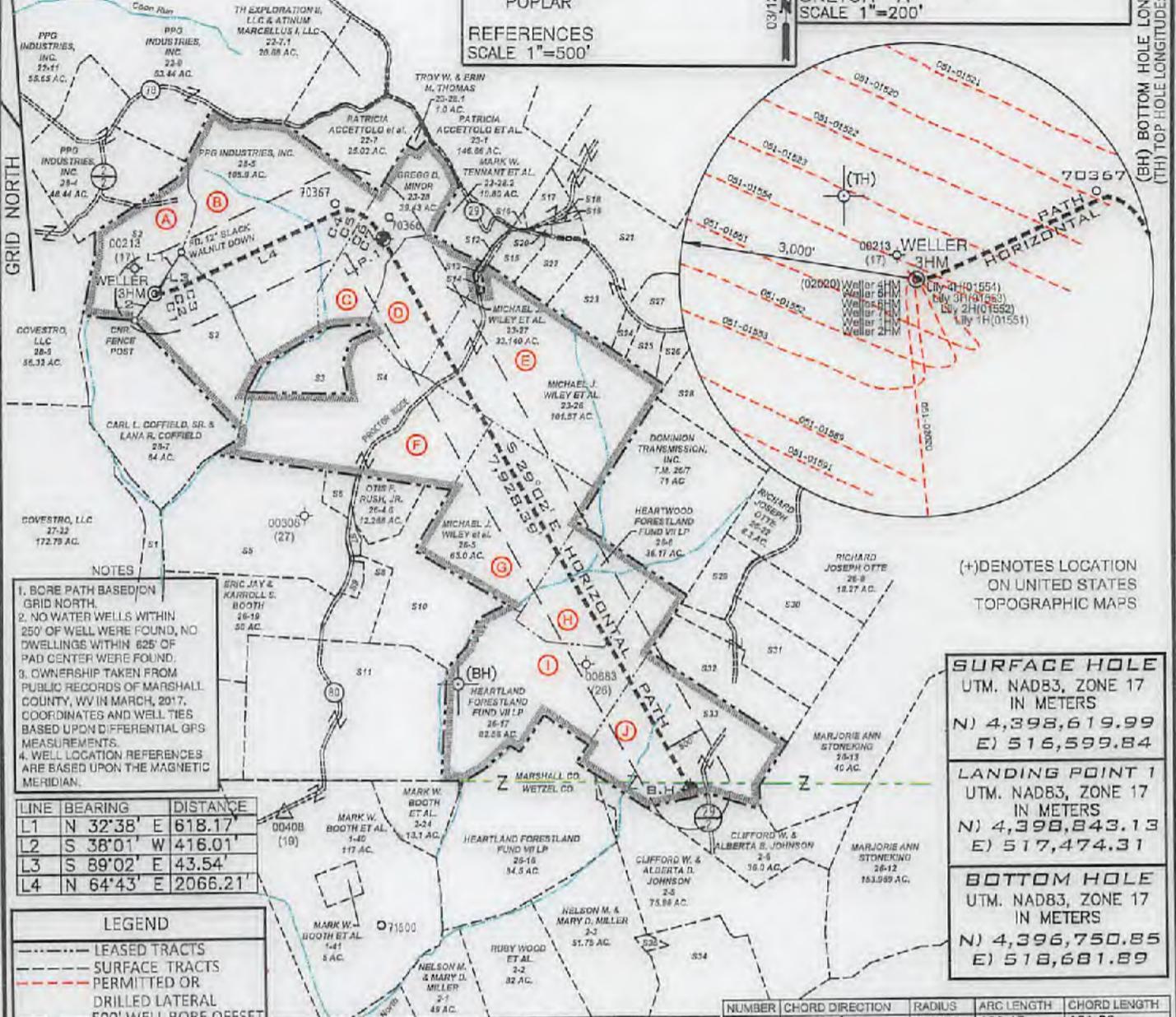
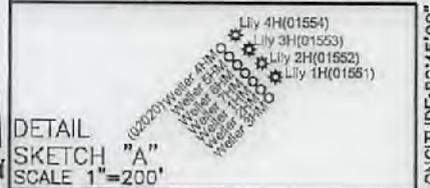
06/15/2018

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# WELLER LEASE WELL 3HM 670.27± ACRES



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



- NOTES
1. BORE PATH BASED ON GRID NORTH.
  2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
  3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
  4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

LINE	BEARING	DISTANCE
L1	N 32°38' E	618.17'
L2	S 38°01' W	416.01'
L3	S 89°02' E	43.54'
L4	N 64°43' E	2066.21'

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
C1	N 80°58' E	355.07	93.34	93.07
C2	N 71°19' E	1296.86	143.08	143.01
C3	N 66°24' E	3263.34	223.17	223.13

NUMBER	CHORD DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH
C4	N 80°08' E	197.52	102.15	101.02
C5	S 73°01' E	337.17	139.03	137.07
C6	S 83°52' E	609.90	167.80	167.28
C7	S 37°22' E	925.97	284.95	283.83

**SURFACE HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,398,619.99  
E) 516,599.84

**LANDING POINT 1**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,398,843.13  
E) 517,474.31

**BOTTOM HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,396,750.85  
E) 518,681.89

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

DRAWING NUMBER WELLER\_WP\_3HM

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 1460  
Clarksburg, WV 26302  
304-623-5851

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

DATE: March 21, 2018

OPERATORS WELL NO. WELLER 3HM

API WELL NO. 47-051-02036

STATE WV COUNTY Marshall PERMIT 06/15/2018

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

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: 6,624' TMD: 15,582'

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

**WELLER LEASE  
WELL N-3HM  
670.27± 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	23-23	MICHAEL J. WILEY ET AL	1.00
S13	23-24	MICHAEL J. WILEY ET AL	0.25
S14	23-25	ARTHUR A. WILEY	0.43
S15	23-22	DANIEL D. RHYAND & LAUREL R. GREENE	6.25
S16	23-29	JAMES WILEY	0.25
S17	23-18.1	MARK A. YOHO	7.80
S18	23-20	CHRISTIAN CHURCH	0.20
S19	23-19	DOTY CEMETERY	1.00
S20	23-21	MARK A. YOHO & MARK E. YOHO	0.588
S21	23-18	ABE J. HOCHSTETLER	35.38
S22	23-17.1	CURTIS E. HALL, ET UX	10.051
S23	23-17.2	DICK JR. & CAROL J. ROWAN	14.920
S24	23-17.4	TAMMY D. MEADOWS	2.605
S25	23-17	TAMMY & THOMAS E. BROWN	4.62
S26	23-17.3	WILLIAM & KATHERINE FLEWELLING	5.018
S27	23-16	ROY FRIEND YOHO SR.	18.03
S28	23-14	DOMINION TRANSMISSION INC.	59.50
S29	26-23	RICHARD JOSEPH OTTE	11.34
S30	26-09	THERESA A. WALTON, TRUSTEE OF ROBERT D. & BONNIE L. OLIVER TRUST	21.75
S31	26-10	THERESA A. WALTON, TRUSTEE OF ROBERT D. & BONNIE L. OLIVER TRUST	24.94
S32	26-14	THERESA A. WALTON, TRUSTEE OF ROBERT D. & BONNIE L. OLIVER TRUST	27.56
S33	26-15	THERESA A. WALTON, TRUSTEE OF ROBERT D. & BONNIE L. OLIVER TRUST	69.00
S34	2-4	EDITH SALEM & LISA G. LARSON	56.25
S35	2-4.1	TYRONE SULTZBACH & RICHARD WOLF	1.00



P.S. 708 *David L Jackson*

06/15/2018



**TUG HILL**  
**OPERATING**

OPERATOR'S  
WELL #: Weller 3HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV

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

47 051 02036

WW-6A1  
(5/13)

Operator's Well No. Weller 3HM

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

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

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
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\*See attached pages

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

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

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

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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  
 Its: Permitting Specialist - Appalachia Region

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Lease No.	Tags	Parcel	Lessor	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14572	A	5-28-6	VICKI LYNN WOOD	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	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	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	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	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	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	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
10*14300	B	5-28-5	PPG INDUSTRIES, INC.	1/8+	725	123	36/9 Gastar Exploration Inc to TH Exploration II, LLC	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*14304	B	5-28-5	RUTH MAE DULANEY	GASTAR EXPLORATION USA INC	1/8+	749	530	36/9 Gastar Exploration Inc to TH Exploration II, LLC	40/552 TH Exploration II, LLC TH Exploration, LLC	N/A	N/A	N/A
10*14305	B	5-28-5	HELEN BOWMAN	GASTAR EXPLORATION USA INC	1/8+	749	362	36/9 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*14306	B	5-28-5	RANDY GODDARD	GASTAR EXPLORATION USA INC	1/8+	759	248	36/9 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*21218	C	5-23-28	GREGG D MINOR	TH EXPLORATION, LLC	1/8+	952	647	N/A	N/A	N/A	N/A	N/A
10*14707	D	5-23-27	MICHELLE BAKER	TH EXPLORATION, LLC	1/8+	963	642	N/A	N/A	N/A	N/A	N/A
10*14708	D	5-23-27	MICHAEL WILEY	TH EXPLORATION, LLC	1/8+	963	640	N/A	N/A	N/A	N/A	N/A
10*14709	D	5-23-27	JOLINE FRIEDLY REINHART	GASTAR EXPLORATION USA INC	1/8+	797	191	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14710	D	5-23-27	ROBERT L FRIEDLY	GASTAR EXPLORATION USA INC	1/8+	800	408	36/9 Gastar Exploration Inc to TH Exploration II, LLC	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*19421	D	5-23-27	CAYCE DAVENPORT FRIEDLY	TH EXPLORATION LLC	1/8+	940	262	N/A	N/A	N/A	N/A	N/A
10*19721	D	5-23-27	MARK FRIEDLY AND ANNA FRIEDLY	TH EXPLORATION LLC	1/8+	944	579	N/A	N/A	N/A	N/A	N/A
10*22019	D	5-23-27	BARBARIE HILL	TH EXPLORATION, LLC	1/8+	960	548	N/A	N/A	N/A	N/A	N/A
10*14742	E	5-23-26	SUSAN GORE	GASTAR EXPLORATION USA INC	1/8+	790	505	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14744	E	5-23-26	THE SAMUEL MILTON SHEETS TRUST	GASTAR EXPLORATION USA INC	1/8+	791	637	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14745	E	5-23-26	RALPH B. TAYLOR	GASTAR EXPLORATION USA INC	1/8+	794	485	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14746	E	5-23-26	CHESTNUT HOLDINGS INC	GASTAR EXPLORATION INC	1/8+	827	542	36/9 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*17716	E	5-23-26	MICHAEL J AND BARBARA L WILEY	TH EXPLORATION LLC	1/8+	919	638	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*17777	E	5-23-26	MICHELLE E AND ROBERT T BAKER	TH EXPLORATION LLC	1/8+	921	128	N/A	N/A	N/A	N/A	N/A
10*21420	E	5-23-26	DAVID D BURKETT	TH EXPLORATION, LLC	1/8+	957	3	N/A	N/A	N/A	N/A	N/A
10*21421	E	5-23-26	BRYANNA FLYNN RANKIN	TH EXPLORATION LLC	1/8+	957	5	N/A	N/A	N/A	N/A	N/A
10*21437	E	5-23-26	REBECCA AND ROBERT MCMILLAN	TH EXPLORATION, LLC	1/8+	957	1	N/A	N/A	N/A	N/A	N/A
10*21821	E	5-23-26	LINDA K TAYLOR AND RAY P MAGEE	TH EXPLORATION LLC	1/8+	951	631	N/A	N/A	N/A	N/A	N/A
10*14916	F	5-26-2	MARK W BOOTH	GASTAR EXPLORATION INC	1/8+	836	110	36/9 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*14917	F	5-26-2	EDWIN BOOTH ANDERSON	GASTAR EXPLORATION INC	1/8+	836	108	36/9 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*14742	G	5-26-5	SUSAN GORE	GASTAR EXPLORATION USA INC	1/8+	790	505	36/9 Gastar Exploration Inc to TH Exploration II, LLC	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*14744	G	5-26-5	THE SAMUEL MILTON SHEETS TRUST	GASTAR EXPLORATION USA INC	1/8+	791	637	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14745	G	5-26-5	RALPH B. TAYLOR	GASTAR EXPLORATION USA INC	1/8+	794	485	36/9 Gastar Exploration Inc to TH Exploration II, LLC	N/A	N/A	N/A	N/A
10*14746	G	5-26-5	CHESTNUT HOLDINGS INC	GASTAR EXPLORATION INC	1/8+	827	542	36/9 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*17716	G	5-26-5	MICHAEL J AND BARBARA L WILEY	TH EXPLORATION LLC	1/8+	919	638	N/A	N/A	N/A	N/A	N/A
10*17777	G	5-26-5	MICHELLE E AND ROBERT T BAKER	TH EXPLORATION LLC	1/8+	921	128	N/A	N/A	N/A	N/A	N/A
10*21420	G	5-26-5	DAVID D BURKETT	TH EXPLORATION, LLC	1/8+	957	3	N/A	N/A	N/A	N/A	N/A
10*21421	G	5-26-5	BRYANNA FLYNN RANKIN	TH EXPLORATION LLC	1/8+	957	5	N/A	N/A	N/A	N/A	N/A
10*21437	G	5-26-5	REBECCA AND ROBERT MCMILLAN	TH EXPLORATION, LLC	1/8+	957	1	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*21821	G	5-26-5	LINDA K TAYLOR AND RAY P MAGEE	TH EXPLORATION LLC	1/8+	951	631	N/A	N/A	N/A	N/A	N/A
WV-MAR-0287	H	5-26-6	VENABLE ROYALTY, LTD	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	923	572	41/380 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
WV-MAR-0287	H	5-26-6	VENRO, LTD	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	923	572	41/380 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
953928	I	5-26-17	APPALACHIAN BASIN MINERALS, LP	CHEVRON USA INC	1/8+	950	128	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	N/A	N/A	N/A	N/A
953931	I	5-26-17	MARCELLUS TX MINERAL PARTNERS LTD	CHEVRON USA INC	1/8+	950	131	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	N/A	N/A	N/A	N/A
953930	I	5-26-17	MCCROW ENERGY PARTNERS II LLC	CHEVRON USA INC	1/8+	950	122	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	N/A	N/A	N/A	N/A
953929	I	5-26-17	PENN MARC RESOURCES II LP	CHEVRON USA INC	1/8+	950	137	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	N/A	N/A	N/A	N/A
953913	I	5-26-17	PURPLEBURGH VENTURES LLC	CHEVRON USA INC	1/8+	950	125	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	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
WV-MAR-0287	I	5-26-17	VENABLE ROYALTY, LTD	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	923	572	41/380 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
WV-MAR-0287	I	5-26-17	VENRO, LTD	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	923	572	41/380 American Petroleum Partners Operating, LLC to TH Exploration, LLC	N/A	N/A	N/A	N/A
953927	I	5-26-17	WILDES MINERAL INTERESTS, LLC	CHEVRON USA INC	1/8+	950	134	41/411 Chevron U.S.A. Inc. to TH Exploration, LLC	N/A	N/A	N/A	N/A
10*22341	J	5-26-15	ROBERT DANIEL & BONNIE OLIVER	TH EXPLORATION, LLC	1/8+	965	488	N/A	N/A	N/A	N/A	N/A

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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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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.

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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

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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

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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 3HM

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 3HM 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,

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

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 - 02036  
 Operator's Well No. Weller 3HM  
 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	Eastings:	<u>516,599.84</u>
County:	<u>Marshall</u>		Northing:	<u>4,398,619.99</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: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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**Required Attachments:**

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

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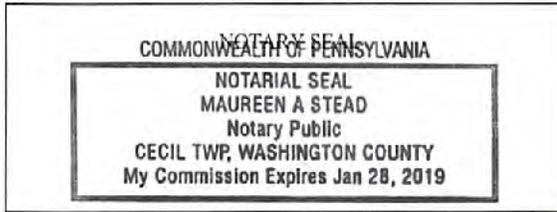
47 051 02036

WW-6AC  
(1/12)

**Certification of Notice is hereby given:**

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe 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 15 of this rule.

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

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

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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 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

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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

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**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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API NO. 47-051-02036  
OPERATOR WELL NO. Weller 3HM  
Well Pad Name: Lily

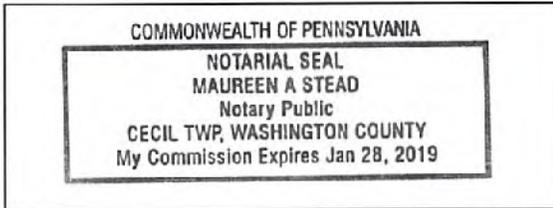
**Notice is hereby given by:**

Well Operator: Tug Hill Operating, LLC  
Telephone: 724-749-8388  
Email: amiller@tug-hilltop.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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06/15/2018

47 051 02036

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

**Weller 3HM**

**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. 3HM  
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		
--	--	--

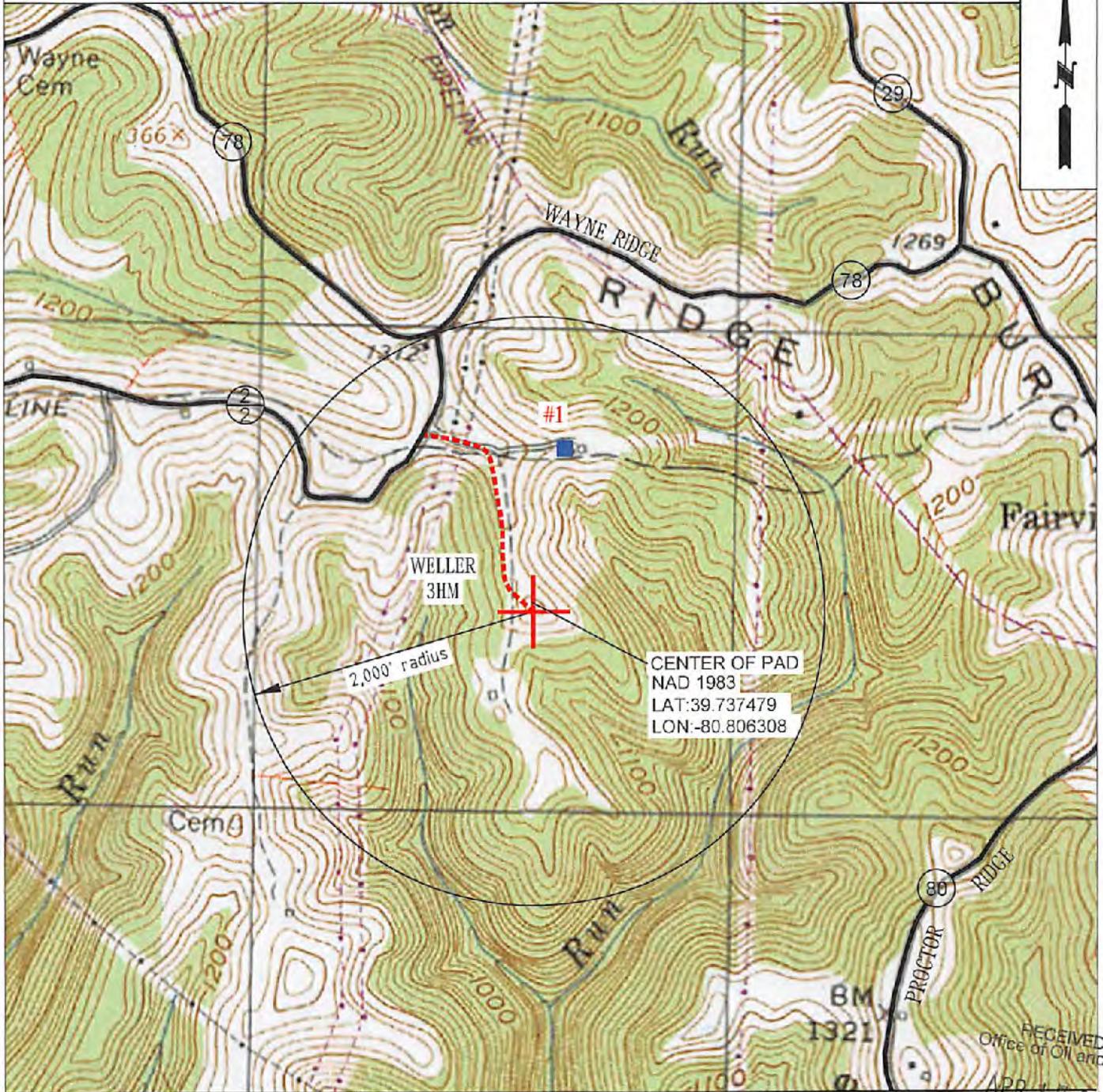
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WW-6A

# PROPOSED WELLER 3HM

SUPPLEMENT PG 1

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



CENTER OF PAD  
NAD 1983  
LAT:39.737479  
LON:-80.806308

2,000' radius

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OPERATOR	494510851	TOPO SECTION	LEASE NAME
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		NEW MARTINSVILLE 7.5'	WELLER
SCALE:		DATE:	
1" = 1000'		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 44036  
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>39.7374506; -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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Environmental Protection

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**06/15/2018**

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:** 12/19/2017      **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 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>39.7374506; -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: 724-749-8383  
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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47051 02036

**WW-6A3 Attachment**

**Weller 3HM**

**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 44036

**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>516,599.84</u>
County: <u>Marshall</u>	Northing: <u>4,398,619.99</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-hillop.com

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

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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 3HM 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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TUG HILL

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

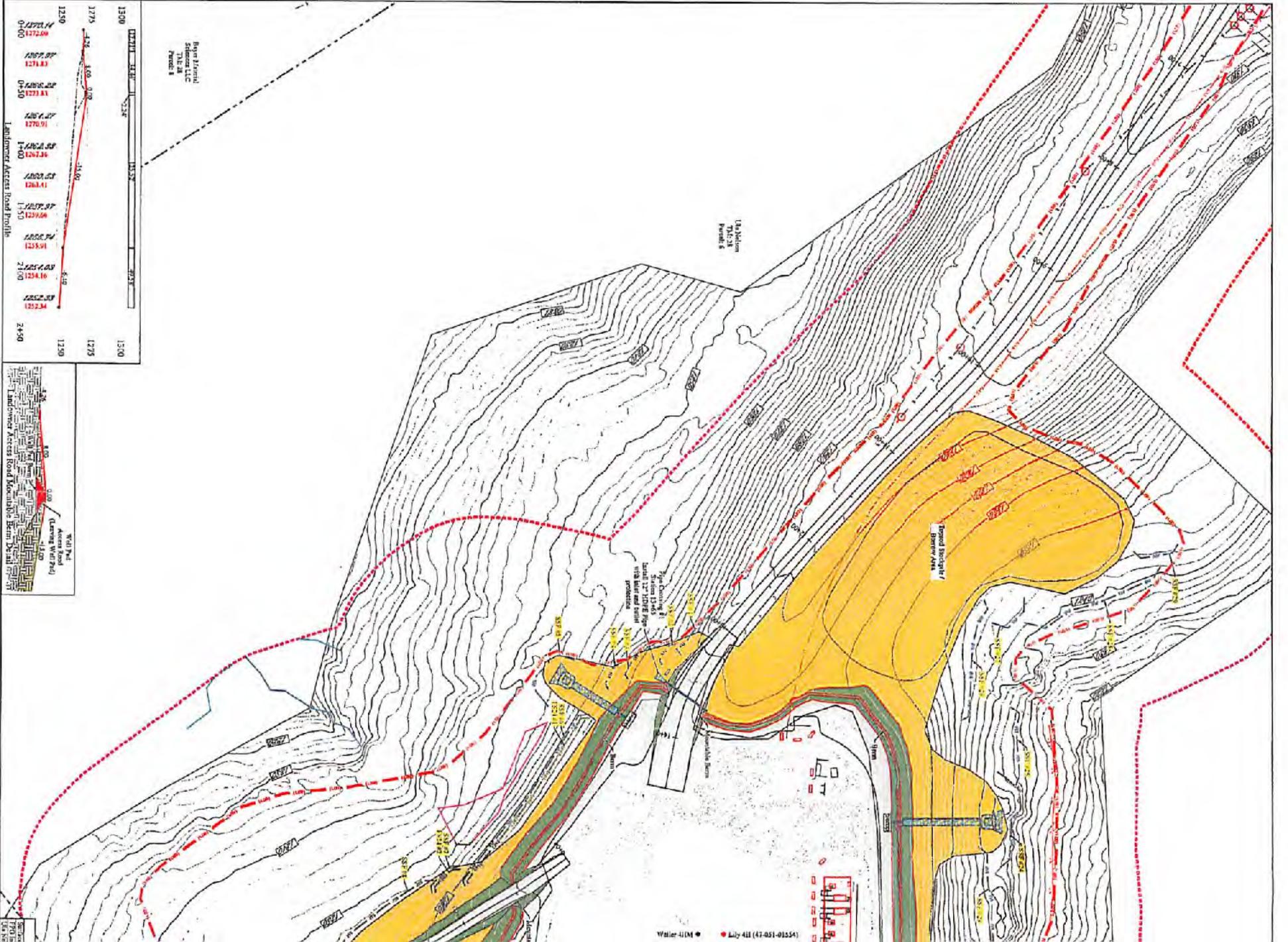
Well No. Weller 3HM

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
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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Water 11M • July 4th (41-051-01554)

Bayou Plaquemine  
Zachry LLC  
Project #

Topobium  
TAC-21  
Project #

Proposed Access Road  
Project #

Proposed Access Road  
Project #

