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west virginia department of environmental protection

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

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

Thursday, August 2, 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 BLAKE N-5HM  
47-051-02052-00-00

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: BLAKE N-5HM  
Farm Name: BLAKE, RUSSELL, ET AL  
U.S. WELL NUMBER: 47-051-02052-00-00  
Horizontal 6A New Drill  
Date Issued: 8/2/2018

# PERMIT CONDITIONS

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

## CONDITIONS

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

## PERMIT CONDITIONS

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

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

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin Glen Easton 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Blake N-5HM Well Pad Name: Blake

3) Farm Name/Surface Owner: Blake, Russell, et al Public Road Access: Burch Ridge Road - County Route 29

4) Elevation, current ground: 1326' Elevation, proposed post-construction: 1326'

5) Well Type (a) Gas  Oil  Underground Storage

Other \_\_\_\_\_

(b) If Gas Shallow  Deep

Horizontal

*JW*  
*7/24/18*

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Marcellus is the target formation at a depth of 6496 - 6547' thickness of 51' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,647' ✓

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 16,979' ✓

11) Proposed Horizontal Leg Length: 9,815' ✓

12) Approximate Fresh Water Strata Depths: 70', 1042' ✓

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

14) Approximate Saltwater Depths: 2,167' ✓

15) Approximate Coal Seam Depths: Sewickly Coal - 951' and Pittsburgh Coal - 1036'

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

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

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

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120' ✓	259FT^3(CTS)
Fresh Water	13 3/8"	NEW	H40	48#	1,140'	1,140' ✓	1142ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	1,140'	1,140'	1142ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,600'	2,600' ✓	871ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	16,979' ✓	16,979'	4335ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,135'	
Liners							

*JW*  
*7/24/18*

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 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	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	9,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

Kind:	N/A				RECEIVED Office of Oil and Gas
Sizes:	N/A				JUL 26 2018
Depths Set:	N/A				WV Department of Environmental Protection

*J*  
*7/24/18*

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

Drill through the Marcellus and TD Pilot Hole 100' into the Onondaga. Log vertical section and run a solid cement plug back to proposed KOP. Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 24,537,500 lb proppant and 379,368 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 20.72 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.94 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

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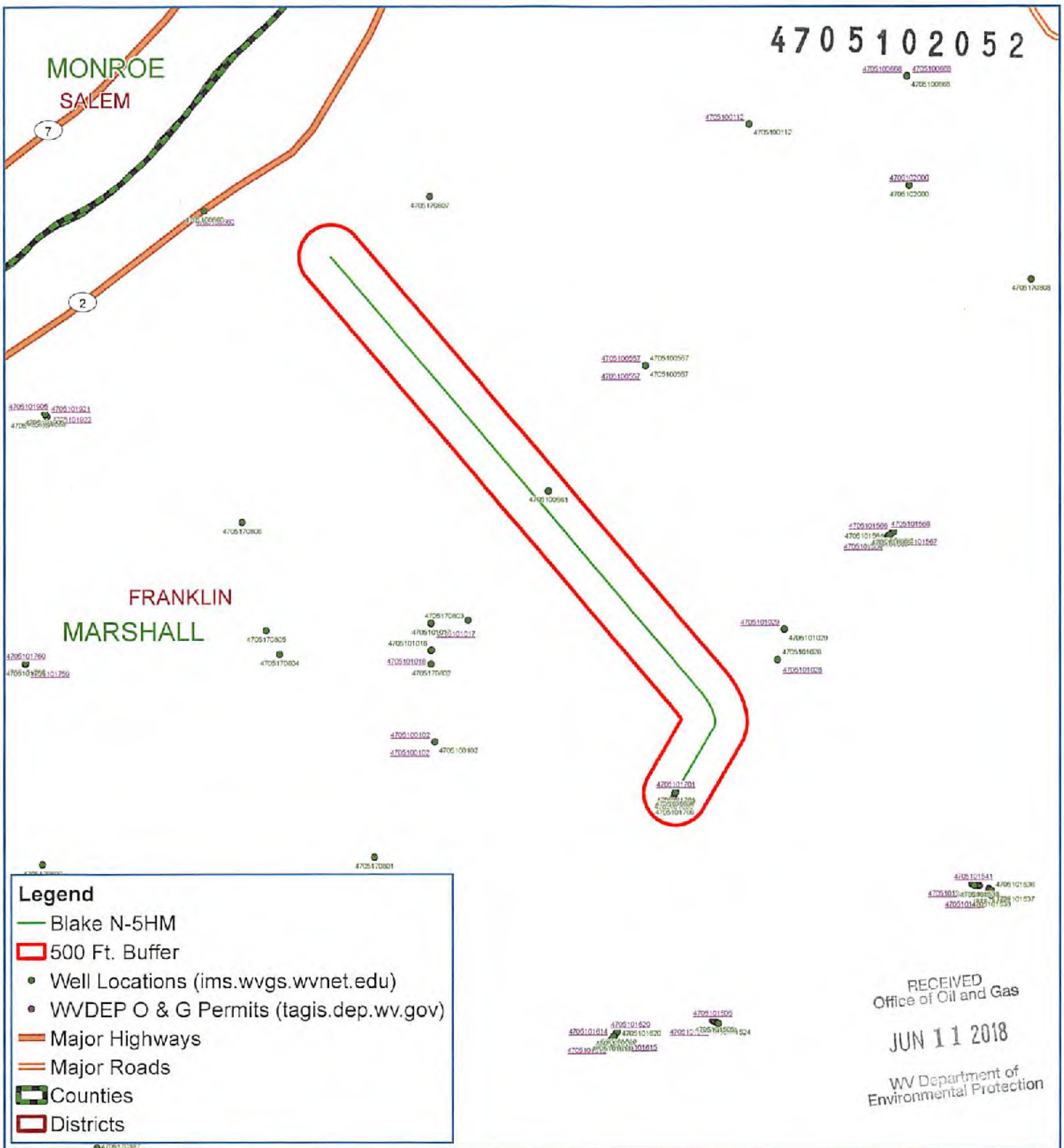
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25) Proposed borehole conditioning procedures:

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

\*Note: Attach additional sheets as needed.



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## Blake N - 5HM Franklin District Marshall County, WV



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



Map Prepared by:  
**PS**  
LAND SERVICES  
**08/03/2018**

### 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 (05/04/2018) 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 - Blake N-5HM

Wells within 500' Buffer

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

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101698	Tug Hill Operating	6,562 TVD 12,673' 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.
4705101701	Tug Hill Operating	6,572 TVD 13,355' 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.
4705101766	Tug Hill Operating	11,066 TVD	Point Pleasant	Unknown	Yes, existing Point Pleasant producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Producing Point Pleasant horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705100561	Mobay Chemical Corp	2017' TVD	Big Lime	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 10/12/1987.

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

Enter Permit #: 01698

Location     Production     Plugging  
 Owner/Completion     Stratigraphy     Sample  
 Pay/ShowWater     Logs     Btm Hole Loc

Get Data    Reset

- Table Descriptions
- County Code Translations
  - County Name/County Seats
  - Maping Notes
  - Location Information
  - Logbook
  - WV Code Book
  - Wellbore Data

WV Geological & Economic Survey    Well: County = 51 Permit = 01698

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4705101698	Marshall	1698	Franklin	Pocharan Point	Clarington	39.764195	-80.504973	516704.6	4401603.9

Bottom Hole Location Information:

API	EP_FLAG	UTME	UTMN	LONG_DD	LAT_DD	
4705101698	1	As Drilled	514952.7	4401603.6	-80.503267	35.757111
4705101698	1	As Proposed	514952.1	4401605.9	-80.525035	35.767759

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
4705101698	6/6/2015	Dtd Orig/Loc	Completed	Wilbert H Ringard et al	5H	Blake	WV16-0022-001WV16-0135-000WV16-0092-001	Russell Blake et al	Gastar Exploration USA, Inc	6511	Marcellus Sh	3000	

Completion Information:

API	CMP_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	YVD	TMD	NEW_FYD	G_BEF	G_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	P_AFT
4705101698	6/6/2015	703.000	1525	Ground Level	Unmanned	Marcellus Sh	Marcellus Sh	Development Well	Development Well	Gas	Rotary	Fractured	6592	12073	12673	1281	165					

Comment: 6/6/2015 KOP 6184; Additional Mineral Owners WV16-0068-000/WV16-0011-001/WV16-0005-000

Pay/ShowWater Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BEF	G_AFT	O_BEF	O_AFT	WATER_QNTY
4705101698	6/6/2015	Water	Fresh Water	Vertical			60	Pennsylvanian System					
4705101698	6/6/2015	Water	Salt Water	Vertical			1418	3rd Salt Sand					
4705101698	6/6/2015	Pay	Gas	Deviated	5965	Marcellus Sh	7142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	7190	Marcellus Sh	7542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	7380	Marcellus Sh	7542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	7590	Marcellus Sh	7742	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	7790	Marcellus Sh	7942	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	7990	Marcellus Sh	8142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	8190	Marcellus Sh	8342	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	8390	Marcellus Sh	8542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	8590	Marcellus Sh	8742	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	8790	Marcellus Sh	8942	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	8990	Marcellus Sh	9142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	9190	Marcellus Sh	9342	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	9390	Marcellus Sh	9542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	9590	Marcellus Sh	9742	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	9790	Marcellus Sh	9942	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	9990	Marcellus Sh	10142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	10190	Marcellus Sh	10342	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	10390	Marcellus Sh	10542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	10590	Marcellus Sh	10742	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	10790	Marcellus Sh	10942	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	10990	Marcellus Sh	11142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	11190	Marcellus Sh	11342	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	11390	Marcellus Sh	11542	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	11590	Marcellus Sh	11742	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	11790	Marcellus Sh	11942	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	11990	Marcellus Sh	12142	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	12190	Marcellus Sh	12342	Marcellus Sh					
4705101698	6/6/2015	Pay	Gas	Deviated	12390	Marcellus Sh	12542	Marcellus Sh					

Production Gas Information (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101698	Gastar Exploration Inc	2015	295.054	0	0	0	0	10.747	37.052	45.542	30.547	42.848	45.302	39.245	35.133
4705101698	Tug Hill Operating, LLC	2016	460.714	48.503	41.512	42.171	37.295	40.593	35.637	33.687	37.930	35.208	35.119	33.223	33.592

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101698	Gastar Exploration Inc	2015	16.907	0	0	0	0	0.924	3.225	3.546	2.047	2.516	2.853	2.262	2.109
4705101698	Tug Hill Operating, LLC	2016	0	0	0	0	0	0	0	0	0	0	0	0	0

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101698	Gastar Exploration Inc	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4705101698	Tug Hill Operating, LLC	2016	13.455	2.161	2.108	2.180	2.720	1.846	1.267	1.268	1.320	1.236	1.515	1.462	1.517

Production Water Information (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101698	Tug Hill Operating, LLC	2016	6.032	0	0	29	500	747	701	818	720	585	595	597	551

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4705101698	Dtd Orig/Loc	Sewittley coal	Other Well (possible)	1170	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Pocharan coal	Other Well (possible)	1175	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	3rd Salt Sand	Other Well (possible)	1415	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Marion	Other Well (possible)	1592	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Big Lime	Other Well (possible)	1632	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Big Limestone (Pike-seed)	Other Well (possible)	2060	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Waver	Other Well (possible)	2280	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Berea Sh	Other Well (possible)	2520	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Gordon	Other Well (possible)	2620	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Bratler	Other Well (possible)	3463	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Rhinesvlet Sh	Other Well (possible)	5962	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Cathlamet Sh	Other Well (possible)	6242	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Midwest Sh	Other Well (possible)	6272	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	West River Sh	Other Well (possible)	6395	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Gardens Sh	Other Well (possible)	6440	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Tully Ls	Other Well (possible)	6474	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Hennico	Other Well (possible)	6500	Reasonable			1326	Ground Level
4705101698	Dtd Orig/Loc	Marcellus Sh	Other Well (possible)	6533	Reasonable			1326	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

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WV Department of Environmental Protection



Select County: (051) Marshall  
 Enter Permit #: 01701  
 Get Data Reset

- Select datatypes: (Check All)
- Location
  - Production
  - Plugging
  - Owner/Completion
  - Stratigraphy
  - Sample
  - Pay/Show/Water
  - Logs
  - Blm Hole Log

WV Geological & Economic Survey

Well: County = 51 Permit = 01701

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX DISTRICT	QUAD 75	QUAD 35	LAT_DD	LONG_DD	UTME	UTAR
4705101701	Marshall	1701	Franklin	Robertson Point	Cameron	39.789248	-80.824894	518711.3	4421620.9

Bottom Hole Location Information:

API	EP	FLAG	UTME	UTAR	LON_DD	LAT_DD
4705101701	1	As Drilled	515111.9	4422311.1	-80.823851	39.770927
4705101701	1	As Proposed	515113.1	4422313.9	-80.823837	39.770922

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	TFM_EST_PR
4705101701	10/23/2014	Plugging	Completed	W H Bungard et ux	6H	6H	Blake	WV16-0022-001WV16-0128-000WV-0135-000	R Blake et al	Gastar Exploration USA, Inc	6321	Marcellus Sh	
4705101701	6/6/2015	Dvts Orig Loc	Completed	Walter H Bungard et ux	6H	6H	Blake	16-0135-000 16-0022-001 16-0128-000 16-0053-000	Russell Blake, et al	Gastar Exploration USA, Inc		Marcellus Sh	
4705101701	J.J.	Dvts Orig Loc	Completed	Walter H Bungard et ux	6H	6H	Blake	WV16-0022-001WV16-0135-000WV16-0128-000	Russell Blake et al	Gastar Exploration USA, Inc	8521	Marcellus Sh	3000

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	Rig	CMP_MTHD	TVD	TMD	NRW_FTO	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	P_AFT
4705101701	J.J.	6/6/2015	10232014	1326	Ground Level	Unnamed	Development Well	Unsuccessful	Development Well	Gas	Rotary	Fractured	5700	6872	13355	12785	2161	185				
4705101701	J.J.	6/6/2015	6/3/2014	1326	Ground Level	Marcellus Sh	Development Well	Unsuccessful	Development Well	Gas	Rotary	Fractured	6754	6754								

Comment: -/- Additional Mineral Owners:WV16-0069-000WV16-0006-000

Comment: 10/23/2014 Additional Lease Numbers:WV16-0058-000WV16-0005-000. Received affidavit for partial plug without other completion information and before original completion.

Comment: 6/6/2015 KOP 5805; addl. lease #: 16-0006-000

Pay/Show/Water Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BEF	G_AFT	O_BEF	O_AFT	WATER_GNTY
4705101701	6/6/2015	Water	Fresh Water	Vertical			60	Marcellus Sh	1418				3rd Salt Sand
4705101701	6/6/2015	Pay	Gas	Deviated	7231	Marcellus Sh	7364	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	7448	Marcellus Sh	7500	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	7626	Marcellus Sh	7769	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	7831	Marcellus Sh	7982	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	8040	Marcellus Sh	8272	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	8315	Marcellus Sh	8485	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	8426	Marcellus Sh	8555	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	8717	Marcellus Sh	8852	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	8926	Marcellus Sh	9059	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	9111	Marcellus Sh	9308	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	9240	Marcellus Sh	9481	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	9518	Marcellus Sh	9670	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	9725	Marcellus Sh	9875	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	9896	Marcellus Sh	10027	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	10095	Marcellus Sh	10296	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	10340	Marcellus Sh	10479	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	10527	Marcellus Sh	10667	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	10724	Marcellus Sh	10847	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	10969	Marcellus Sh	11292	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	11140	Marcellus Sh	11582	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	11422	Marcellus Sh	11814	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	11845	Marcellus Sh	11979	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	11912	Marcellus Sh	12004	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	12146	Marcellus Sh	12256	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	12429	Marcellus Sh	12586	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	12629	Marcellus Sh	12826	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	12878	Marcellus Sh	13030	Marcellus Sh					
4705101701	6/6/2015	Pay	Gas	Deviated	13000	Marcellus Sh	13282	Marcellus Sh					

Production Gas Information: (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101701	Gastar Exploration Inc	2015	279,549	0	0	0	0	6,503	33,603	37,102	29,474	47,603	46,312	36,995	34,447
4705101701	Tug Hill Operating, LLC	2016	591,250	43,322	50,023	47,827	45,429	45,665	42,225	42,148	40,456	37,511	37,617	35,913	34,665

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101701	Gastar Exploration Inc	2015	19,362	0	0	0	0	712	3,062	3,611	2,220	2,655	2,685	2,195	2,024
4705101701	Tug Hill Operating, LLC	2016	0												

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101701	Gastar Exploration Inc	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4705101701	Tug Hill Operating, LLC	2016	17,782	1,513	1,693	1,571	1,253	1,570	1,252	1,413	1,625	1,459	1,443	1,610	1,478

Production Water Information: (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101701	Tug Hill Operating, LLC	2016	6,445,577	24	55	1,207	614	776	705	482	421	387	351	710	

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4705101701	Dvts Orig Loc	Seewickley coal	Offset Well (possible)	970	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Pittsburgh coal	Offset Well (possible)	1175	Reasonable			1305	Ground Level
4705101701	Dvts Orig Loc	3rd Salt Sand	Offset Well (possible)	1418	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Maxton	Offset Well (possible)	1580	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Big Lime	Offset Well (possible)	1922	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Big Iron (PriceSeq)	Offset Well (possible)	2080	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Weir	Offset Well (possible)	2280	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Berea Ss	Offset Well (possible)	2520	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Condon	Offset Well (possible)	2620	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Bralier	Offset Well (possible)	3453	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Rhinestreet Sh	Offset Well (possible)	5962	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Cashaque Sh	Offset Well (possible)	6242	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Middlesex Sh	Offset Well (possible)	6370	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	West River Sh	Offset Well (possible)	6355	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Genesee Sh	Offset Well (possible)	6440	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Tully Ls	Offset Well (possible)	6474	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Hamilton	Offset Well (possible)	6500	Reasonable			1326	Ground Level
4705101701	Dvts Orig Loc	Marcellus Sh	Offset Well (possible)	6553	Reasonable			1326	Ground Level

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

Plugging Information:

API	PLG_DT	DEPTH_FBT
4705101701	10/23/2014	5700

There is no Sample data for this well

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Select County: (051) Marshall Select datatypes: (Check All)
Enter Permit #: 01766
Get Data Reset

- Table Descriptions
Company Code Translations
Parent Numbering Schemes
License Codes
Contact Information
Licenses
WVGES Main
Pipeline:Fluc New

WV Geological & Economic Survey

Well: County = 51 Permit = 01766

Location Information: View Map

Table with columns: API, COUNTY, PERMIT, TAX, DISTRICT, QUAD, QUAD 16, LAT\_DD, LON\_DD, UTMN, UTMW. Row 1: 4705101766, Marshall, 1766, Marion, Poybaker Point, Carlington, 39 753939, -80 625159, 116689, 44015842

Bottom Hole Location Information

Table with columns: API, EP FLAG, UTMN, UTMW, LON\_DD, LAT\_DD. Row 1: 4705101766, 1, As Drilled, 514707.7, 4402354.1, -80 62527, 39 702901

Owner Information:

Table with columns: API, CMP\_DT, SUFFIX, STATUS, SURFACE\_OWNER, WELL\_NUM, CO\_NUM, LEASE\_LEASE\_NUM, MINERAL\_OWN, OPERATOR\_AT\_COMPLETION, PROP\_VO, PROP\_TRGT\_FM, TFM\_EST, PR. Row 1: 4705101766, 6/6/2015, Div Opgr Loc, Completed, Russell Blake et al, U-7H, WV16-0011-001/WV16-0090-000/WV16-0171-000, Russell Blake et al, Gasar Exploration USA, Inc, 11151, Pt Pleasant Fm, 7000

Completion Information:

Table with columns: API, CMP\_DT, STUID, BY, ELEV, DATUM, FIELD, DEEPEST\_FM, DEEPEST\_FTH, INITIAL\_CLASS, FINAL\_CLASS, TYPE, RG, CMP\_MTHD, IVD, TMD, NEW\_FTQ, G\_BEF, G\_AFT, O\_BEF, O\_AFT, NGL\_BEF, NGL\_AFT, P\_B. Row 1: 4705101766, 6/6/2015, 614-0204, Ground Level, Unmanned, Pt Pleasant Fm, Pt Pleasant Fm, Development Well, Development Well, Gas, Rotary, Fractured, 16102, 16102, 37957

Pay/Show/Water Information:

Table with columns: API, CMP\_DT, ACTIVITY, PRODUCT, SECTION, DEPTH\_TOP, FM\_TOP, DEPTH\_BOT, FM\_BOT, G\_BEF, O\_AFT, O\_BEF, O\_AFT, WATER\_QNTY. Multiple rows showing well completion details for various depths and sections.

Production Gas Information: (Volumes in Mcf)

Table with columns: API, PRODUCING\_OPERATOR, PRD\_YEAR, ANN\_GAS, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCM. Row 1: 4705101766, Gasar Exploration Inc, 2015, 2,000,149, 0, 0, 0, 0, 0, 368,421, 546,795, 528,564, 358,122, 297,655, 294,453, 253,416, 273,699

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

Table with columns: API, PRODUCING\_OPERATOR, PRD\_YEAR, ANN\_OIL, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCM. Row 1: 4705101766, Gasar Exploration Inc, 2015, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

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

Table with columns: API, PRODUCING\_OPERATOR, PRD\_YEAR, ANN\_NGL, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCM. Row 1: 4705101766, Gasar Exploration Inc, 2015, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

Production Water Information: (Volumes in Gallons)

Table with columns: API, PRODUCING\_OPERATOR, PRD\_YEAR, ANN\_WTR, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCM. Row 1: 4705101766, Tut Hill Operating, LLC, 2016, 14,730, 0, 0, 194,1815, 2,039,1,051,5,546,1,765,1,534,1,405,1,291,1,205

Stratigraphy Information:

Table with columns: API, SUFFIX, FM, FM\_QUALITY, DEPTH\_TOP, DEPTH\_QUALITY, THICKNESS, THICKNESS\_QUALITY, ELEV, DATUM. Multiple rows listing stratigraphic data for various well sections.

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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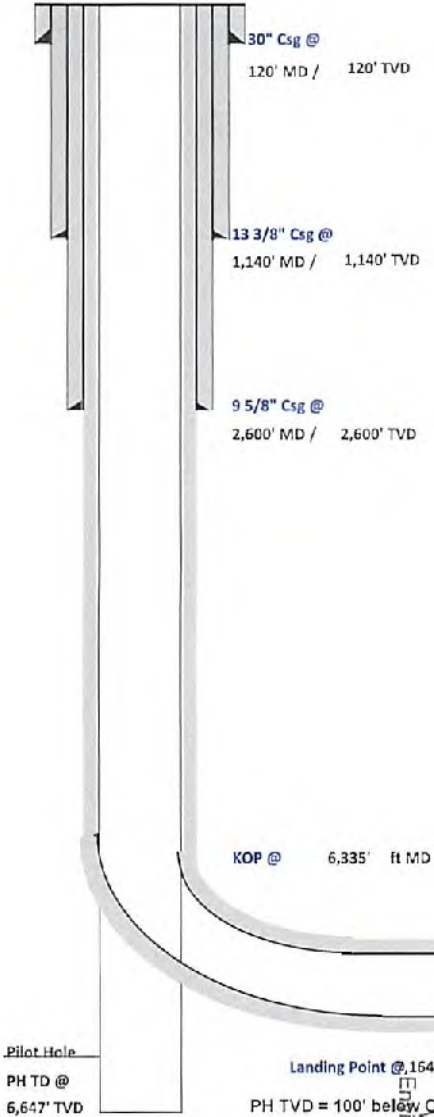


**WELL NAME:** Blake N-5HM  
**STATE:** WV **COUNTY:** Marshall  
**DISTRICT:** Franklin  
**DF Elev:** 1,326' **GL Elev:** 1,326'  
**TD:** 16,979'  
**TH Latitude:** 39.76428724  
**TH Longitude:** -80.80492555  
**BH Latitude:** 39.789213  
**BH Longitude:** -80.826496

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1042
Sewickley Coal	951
Pittsburgh Coal	1036
Big Lime	2042
Weir	2430
Berea	2585
Gordon	2865
Rhinestreet	5905
Genesee/Burkett	6353
Tully	6437
Hamilton	6460
Marcellus	6496
Landing Depth	6531
Onondaga	6547
Pilot Hole Depth	6647

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	1,140'	1,140'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,600'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	16,979'	6,360'	20	CYHP110	Surface

CEMENT SUMMARY			DRILLING DETAILS		
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,158	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	842	A	15	Air	1 Centralizer every other jt
Production	3,826	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



*John 7/24/18*

Pilot Hole  
 PH TD @ 6,647' TVD  
 Landing Point @ 1,164' MD / 6,531' TVD  
 PH TVD = 100' below Onondaga Top

Lateral TD @ 16,979' TVD  
 6,360 ft TVD

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TMD - LP  
 9,815

4705102052



## Tug Hill Operating, LLC Casing and Cement Program

### Blake N-5HM

#### Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	1,140'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,600'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	16,979'	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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Well: Blake 05 HM (slot C)  
 Site: Blake Pad  
 Project: Marshall County, West Virginia.  
 Design: rev1

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

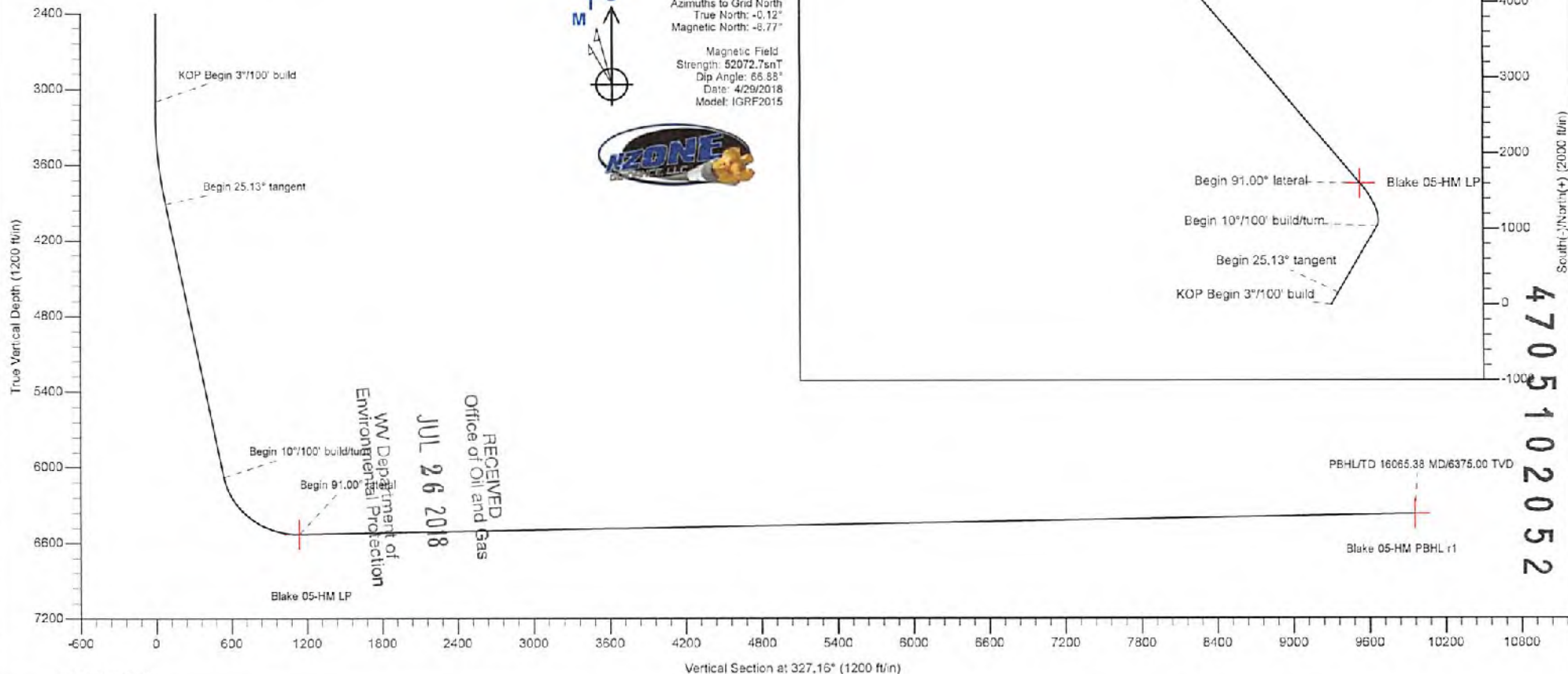
System Datum: Mean Sea Level  
 Depth Reference: GL @ 1326.00ft

Northing 14440862.37 Easting 1695234.85 Latitude 39.76428724 Longitude -80.80492555

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.77°

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	3100.00	0.00	0.00	3100.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 3°/100' build
3	3937.57	25.13	30.24	3910.98	156.14	91.02	3.00	30.24	81.84	Begin 25.13° tangent
4	6335.38	25.13	30.24	6081.88	1035.78	603.77	0.00	0.00	542.92	Begin 10°/100' build/tum
5	7164.19	91.00	319.46	6531.00	1805.73	383.23	10.00	-72.07	1141.40	Begin 91.00° lateral
6	16065.38	91.00	319.46	6375.00	8369.52	-5401.07	0.00	0.00	9960.94	PBHL/TD 16065.38 MD/6375.00 TVD



Azimuths to Grid North  
 True North: -0.12°  
 Magnetic North: -8.77°  
 Magnetic Field  
 Strength: 52072.7nT  
 Dip Angle: 65.88°  
 Date: 4/29/2018  
 Model: IGRF2015



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<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Blake 05 HM (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1326.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1326.00ft
<b>Site:</b>	Blake Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Blake 05 HM (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

<b>Project</b>	Marshall County, West Virginia.		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD83 West Virginia - HARN		
<b>Map Zone:</b>	Zone 17N (84 W to 78 W)		

<b>Site</b>	Blake Pad				
<b>Site Position:</b>		<b>Northing:</b>	14,440,917.72 usft	<b>Latitude:</b>	39.76416471
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,695,217.29 usft	<b>Longitude:</b>	-80.80498839
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.12 °

<b>Well</b>	Blake 05 HM (slot C)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	14,440,962.38 usft	<b>Latitude:</b>	39.76428724
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	1,695,234.85 usft	<b>Longitude:</b>	-80.80492555
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,326.00 ft

<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</b>
			(°)	(°)	(nT)
	IGRF2015	4/29/2018	-8.64	66.88	52,072.71403366

<b>Design</b>	rev1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>
	(ft)	(ft)	(ft)	(°)
	0.00	0.00	0.00	327.16

<b>Plan Survey Tool Program</b>	<b>Date</b>	5/2/2018		
<b>Depth From (ft)</b>	<b>Depth To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	16,065.38 rev1 (Original Hole)	MWD	
			MWD - Standard	

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<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,937.57	25.13	30.24	3,910.98	156.14	91.02	3.00	3.00	0.00	30.24	
6,335.38	25.13	30.24	6,081.88	1,035.78	803.77	0.00	0.00	0.00	0.00	
7,164.19	91.00	319.46	6,531.00	1,605.73	383.23	10.00	7.95	-8.54	-72.07	Blake 05-HM LP
16,065.38	91.00	319.46	6,375.00	8,369.52	-5,401.07	0.00	0.00	0.00	0.00	Blake 05-HM PBHL r1



<b>Database:</b>	DB_Jul2216dt_v14	<b>Local Co-ordinate Reference:</b>	Well Blake 05 HM (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1326.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1326.00ft
<b>Site:</b>	Blake Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Blake 05 HM (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

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Longdale

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
100.00	0.00	0.00	100.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
200.00	0.00	0.00	200.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
300.00	0.00	0.00	300.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
400.00	0.00	0.00	400.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
500.00	0.00	0.00	500.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
600.00	0.00	0.00	600.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
700.00	0.00	0.00	700.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
800.00	0.00	0.00	800.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
900.00	0.00	0.00	900.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,500.01	0.00	0.00	2,500.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,600.01	0.00	0.00	2,600.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,700.01	0.00	0.00	2,700.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,800.01	0.00	0.00	2,800.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
2,900.01	0.00	0.00	2,900.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
3,000.01	0.00	0.00	3,000.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
3,100.00	0.00	0.00	3,100.00	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
<b>KOP Begin 3°/100' build</b>									
3,100.01	0.00	30.24	3,100.01	0.00	0.00	14,440,962.38	1,695,234.85	39.76428724	-80.80492555
3,200.01	3.00	30.24	3,199.96	2.26	1.32	14,440,964.64	1,695,236.17	39.76429344	-80.80492084
3,300.01	6.00	30.24	3,299.64	9.04	5.27	14,440,971.42	1,695,240.12	39.76431204	-80.80490673
3,400.01	9.00	30.24	3,398.77	20.32	11.84	14,440,982.69	1,695,246.69	39.76434296	-80.80488325
3,500.01	12.00	30.24	3,497.09	36.06	21.02	14,440,998.43	1,695,255.87	39.76438614	-80.80485048
3,600.01	15.00	30.24	3,594.31	56.22	32.77	14,441,018.60	1,695,267.62	39.76444145	-80.80480849
3,700.01	18.00	30.24	3,690.19	80.76	47.08	14,441,043.14	1,695,281.92	39.76450875	-80.80475740
3,800.01	21.00	30.24	3,784.44	109.59	63.88	14,441,071.97	1,695,298.73	39.76458784	-80.80469737
3,900.01	24.00	30.24	3,876.82	142.65	83.15	14,441,105.03	1,695,318.00	39.76467851	-80.80462854
3,937.57	25.13	30.24	3,910.98	156.14	91.02	14,441,118.52	1,695,325.87	39.76471551	-80.80460045
<b>Begin 25.13° tangent</b>									
4,000.01	25.13	30.24	3,967.51	179.05	104.37	14,441,141.42	1,695,339.22	39.76477833	-80.80455276
4,100.01	25.13	30.24	4,058.05	215.73	125.75	14,441,178.11	1,695,360.60	39.76487895	-80.80447637
4,200.01	25.13	30.24	4,148.58	252.42	147.14	14,441,214.79	1,695,381.99	39.76497957	-80.80439999
4,300.01	25.13	30.24	4,239.12	289.10	168.52	14,441,251.48	1,695,403.37	39.76508019	-80.80432361
4,400.01	25.13	30.24	4,329.66	325.79	189.91	14,441,288.16	1,695,424.75	39.76518081	-80.80424723
4,500.01	25.13	30.24	4,420.19	362.47	211.29	14,441,324.85	1,695,446.14	39.76528143	-80.80417084
4,600.01	25.13	30.24	4,510.73	399.16	232.68	14,441,361.53	1,695,467.52	39.76538205	-80.80409446
4,700.01	25.13	30.24	4,601.27	435.84	254.06	14,441,398.22	1,695,488.91	39.76548267	-80.80401807
4,800.01	25.13	30.24	4,691.81	472.53	275.44	14,441,434.90	1,695,510.29	39.76558329	-80.80394169
4,900.01	25.13	30.24	4,782.34	509.21	296.83	14,441,471.59	1,695,531.68	39.76568391	-80.80386531

**Database:** DB\_Jul2216dt\_v14  
**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia.  
**Site:** Blake Pad  
**Well:** Blake 05 HM (slot C)  
**Wellbore:** Original Hole  
**Design:** rev1

**Local Co-ordinate Reference:** Well Blake 05 HM (slot C)  
**TVD Reference:** GL @ 1326.00ft  
**MD Reference:** GL @ 1326.00ft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature

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 WV Department of  
 Environmental Protection

**Planned Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,000.01	25.13	30.24	4,872.88	545.90	318.21	14,441,508.27	1,695,553.06	39.76578452	-80.80378892	
5,100.01	25.13	30.24	4,963.42	582.58	339.60	14,441,544.96	1,695,574.44	39.76588514	-80.80371254	
5,200.01	25.13	30.24	5,053.95	619.27	360.98	14,441,581.64	1,695,595.83	39.76598576	-80.80363615	
5,300.01	25.13	30.24	5,144.49	655.95	382.37	14,441,618.33	1,695,617.21	39.76608638	-80.80355977	
5,400.01	25.13	30.24	5,235.03	692.64	403.75	14,441,655.01	1,695,638.60	39.76618700	-80.80348338	
5,500.01	25.13	30.24	5,325.56	729.32	425.13	14,441,691.70	1,695,659.98	39.76628762	-80.80340700	
5,600.01	25.13	30.24	5,416.10	766.01	446.52	14,441,728.38	1,695,681.37	39.76638824	-80.80333061	
5,700.01	25.13	30.24	5,506.64	802.69	467.90	14,441,765.07	1,695,702.75	39.76648886	-80.80325422	
5,800.01	25.13	30.24	5,597.18	839.38	489.29	14,441,801.75	1,695,724.13	39.76658947	-80.80317784	
5,900.01	25.13	30.24	5,687.71	876.06	510.67	14,441,838.44	1,695,745.52	39.76669009	-80.80310145	
6,000.01	25.13	30.24	5,778.25	912.75	532.06	14,441,875.12	1,695,766.90	39.76679071	-80.80302506	
6,100.01	25.13	30.24	5,868.79	949.43	553.44	14,441,911.81	1,695,788.29	39.76689133	-80.80294868	
6,200.01	25.13	30.24	5,959.32	986.12	574.82	14,441,948.49	1,695,809.67	39.76699195	-80.80287229	
6,300.01	25.13	30.24	6,049.86	1,022.80	596.21	14,441,985.18	1,695,831.05	39.76709257	-80.80279590	
6,335.38	25.13	30.24	6,081.88	1,035.78	603.77	14,441,998.15	1,695,838.62	39.76712815	-80.80276889	
<b>Begin 10°/100' build/turn</b>										
6,400.01	27.76	16.95	6,139.80	1,062.06	615.08	14,442,024.44	1,695,849.93	39.76720026	-80.80272843	
6,500.01	33.78	1.23	6,225.82	1,112.26	622.48	14,442,074.63	1,695,857.33	39.76733807	-80.80270169	
6,600.01	41.21	350.19	6,305.20	1,172.67	617.45	14,442,135.04	1,695,852.30	39.76750400	-80.80271913	
6,700.01	49.42	342.13	6,375.51	1,241.45	600.14	14,442,203.82	1,695,834.99	39.76769300	-80.80278020	
6,800.01	58.07	335.88	6,434.62	1,316.52	571.07	14,442,278.89	1,695,805.92	39.76789933	-80.80288306	
6,900.01	66.97	330.73	6,480.75	1,395.59	531.13	14,442,357.96	1,695,765.98	39.76811673	-80.80302458	
7,000.01	76.01	326.22	6,512.47	1,476.26	481.53	14,442,438.63	1,695,716.38	39.76833857	-80.80320046	
7,100.01	85.13	322.06	6,528.84	1,556.08	423.78	14,442,518.45	1,695,658.63	39.76855814	-80.80340536	
7,164.19	91.00	319.46	6,531.00	1,605.73	383.23	14,442,568.11	1,695,618.08	39.76869473	-80.80354928	
<b>Begin 91.00° lateral</b>										
7,200.01	91.00	319.46	6,530.37	1,632.95	359.95	14,442,595.33	1,695,594.80	39.76876963	-80.80363192	
7,300.01	91.00	319.46	6,528.62	1,708.94	294.96	14,442,671.31	1,695,529.81	39.76897871	-80.80386259	
7,400.01	91.00	319.46	6,526.87	1,784.93	229.98	14,442,747.30	1,695,464.83	39.76918778	-80.80409326	
7,500.02	91.00	319.46	6,525.11	1,860.92	165.00	14,442,823.29	1,695,399.85	39.76939686	-80.80432393	
7,600.02	91.00	319.46	6,523.36	1,936.90	100.01	14,442,899.28	1,695,334.86	39.76960593	-80.80455461	
7,700.02	91.00	319.46	6,521.61	2,012.89	35.03	14,442,975.26	1,695,269.88	39.76981500	-80.80478528	
7,800.02	91.00	319.46	6,519.86	2,088.88	-29.95	14,443,051.25	1,695,204.90	39.77002407	-80.80501596	
7,900.02	91.00	319.46	6,518.10	2,164.87	-94.94	14,443,127.24	1,695,139.91	39.77023314	-80.80524664	
8,000.02	91.00	319.46	6,516.35	2,240.85	-159.92	14,443,203.23	1,695,074.93	39.77044222	-80.80547731	
8,100.02	91.00	319.46	6,514.60	2,316.84	-224.90	14,443,279.21	1,695,009.94	39.77065129	-80.80570800	
8,200.02	91.00	319.46	6,512.85	2,392.83	-289.89	14,443,355.20	1,694,944.96	39.77086036	-80.80593868	
8,300.02	91.00	319.46	6,511.09	2,468.82	-354.87	14,443,431.19	1,694,879.98	39.77106943	-80.80616936	
8,400.02	91.00	319.46	6,509.34	2,544.80	-419.85	14,443,507.18	1,694,814.99	39.77127850	-80.80640005	
8,500.02	91.00	319.46	6,507.59	2,620.79	-484.84	14,443,583.16	1,694,750.01	39.77148756	-80.80663073	
8,600.02	91.00	319.46	6,505.84	2,696.78	-549.82	14,443,659.15	1,694,685.03	39.77169663	-80.80686142	
8,700.02	91.00	319.46	6,504.08	2,772.77	-614.80	14,443,735.14	1,694,620.04	39.77190570	-80.80709211	
8,800.02	91.00	319.46	6,502.33	2,848.75	-679.79	14,443,811.13	1,694,555.06	39.77211477	-80.80732280	
8,900.02	91.00	319.46	6,500.58	2,924.74	-744.77	14,443,887.11	1,694,490.08	39.77232383	-80.80755349	
9,000.02	91.00	319.46	6,498.83	3,000.73	-809.75	14,443,963.10	1,694,425.09	39.77253290	-80.80778418	
9,100.02	91.00	319.46	6,497.07	3,076.72	-874.74	14,444,039.09	1,694,360.11	39.77274197	-80.80801488	
9,200.02	91.00	319.46	6,495.32	3,152.71	-939.72	14,444,115.08	1,694,295.13	39.77295103	-80.80824558	
9,300.02	91.00	319.46	6,493.57	3,228.69	-1,004.71	14,444,191.06	1,694,230.14	39.77316010	-80.80847627	
9,400.02	91.00	319.46	6,491.82	3,304.68	-1,069.69	14,444,267.05	1,694,165.16	39.77336916	-80.80870697	
9,500.02	91.00	319.46	6,490.06	3,380.67	-1,134.67	14,444,343.04	1,694,100.18	39.77357823	-80.80893767	
9,600.02	91.00	319.46	6,488.31	3,456.66	-1,199.66	14,444,419.03	1,694,035.19	39.77378729	-80.80916837	
9,700.02	91.00	319.46	6,486.56	3,532.64	-1,264.64	14,444,495.01	1,693,970.21	39.77399635	-80.80939908	
9,800.02	91.00	319.46	6,484.81	3,608.63	-1,329.62	14,444,571.00	1,693,905.23	39.77420542	-80.80962978	
9,900.02	91.00	319.46	6,483.05	3,684.62	-1,394.61	14,444,646.99	1,693,840.24	39.77441448	-80.80986049	



Planning Report - Geographic

4705102052

<b>Database:</b>	DB_Jul2216d_v14	<b>Local Co-ordinate Reference:</b>	Well Blake 05 HM (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1326.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1326.00ft
<b>Site:</b>	Blake Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Blake 05 HM (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
10,000.02	91.00	319.46	6,481.30	3,760.61	-1,459.59	14,444,722.98	1,693,775.26	39.77462354	-80.81009119	
10,100.02	91.00	319.46	6,479.55	3,836.59	-1,524.57	14,444,798.96	1,693,710.28	39.77483260	-80.81032190	
10,200.02	91.00	319.46	6,477.79	3,912.58	-1,589.56	14,444,874.95	1,693,645.29	39.77504166	-80.81055261	
10,300.02	91.00	319.46	6,476.04	3,988.57	-1,654.54	14,444,950.94	1,693,580.31	39.77525072	-80.81078332	
10,400.02	91.00	319.46	6,474.29	4,064.56	-1,719.52	14,445,026.92	1,693,515.33	39.77545978	-80.81101404	
10,500.02	91.00	319.46	6,472.54	4,140.54	-1,784.51	14,445,102.91	1,693,450.34	39.77566884	-80.81124475	
10,600.02	91.00	319.46	6,470.78	4,216.53	-1,849.49	14,445,178.90	1,693,385.36	39.77587790	-80.81147547	
10,700.02	91.00	319.46	6,469.03	4,292.52	-1,914.47	14,445,254.89	1,693,320.38	39.77608696	-80.81170618	
10,800.02	91.00	319.46	6,467.28	4,368.51	-1,979.46	14,445,330.87	1,693,255.39	39.77629602	-80.81193690	
10,900.02	91.00	319.46	6,465.53	4,444.49	-2,044.44	14,445,406.86	1,693,190.41	39.77650508	-80.81216762	
11,000.02	91.00	319.46	6,463.77	4,520.48	-2,109.43	14,445,482.85	1,693,125.43	39.77671413	-80.81239834	
11,100.02	91.00	319.46	6,462.02	4,596.47	-2,174.41	14,445,558.84	1,693,060.44	39.77692319	-80.81262907	
11,200.02	91.00	319.46	6,460.27	4,672.46	-2,239.39	14,445,634.82	1,692,995.46	39.77713225	-80.81285979	
11,300.02	91.00	319.46	6,458.52	4,748.44	-2,304.38	14,445,710.81	1,692,930.48	39.77734130	-80.81309052	
11,400.02	91.00	319.46	6,456.76	4,824.43	-2,369.36	14,445,786.80	1,692,865.49	39.77755036	-80.81332124	
11,500.02	91.00	319.46	6,455.01	4,900.42	-2,434.34	14,445,862.79	1,692,800.51	39.77775941	-80.81355197	
11,600.02	91.00	319.46	6,453.26	4,976.41	-2,499.33	14,445,938.77	1,692,735.53	39.77796847	-80.81378270	
11,700.02	91.00	319.46	6,451.51	5,052.39	-2,564.31	14,446,014.76	1,692,670.54	39.77817752	-80.81401343	
11,800.02	91.00	319.46	6,449.75	5,128.38	-2,629.29	14,446,090.75	1,692,605.56	39.77838657	-80.81424416	
11,900.02	91.00	319.46	6,448.00	5,204.37	-2,694.28	14,446,166.74	1,692,540.58	39.77859563	-80.81447490	
12,000.02	91.00	319.46	6,446.25	5,280.36	-2,759.26	14,446,242.72	1,692,475.59	39.77880468	-80.81470563	
12,100.02	91.00	319.46	6,444.50	5,356.35	-2,824.24	14,446,318.71	1,692,410.61	39.77901373	-80.81493637	
12,200.02	91.00	319.46	6,442.74	5,432.33	-2,889.23	14,446,394.70	1,692,345.63	39.77922278	-80.81516711	
12,300.02	91.00	319.46	6,440.99	5,508.32	-2,954.21	14,446,470.69	1,692,280.64	39.77943183	-80.81539785	
12,400.03	91.00	319.46	6,439.24	5,584.31	-3,019.19	14,446,546.67	1,692,215.66	39.77964089	-80.81562859	
12,500.03	91.00	319.46	6,437.49	5,660.30	-3,084.18	14,446,622.66	1,692,150.68	39.77984994	-80.81585933	
12,600.03	91.00	319.46	6,435.73	5,736.28	-3,149.16	14,446,698.65	1,692,085.69	39.78005899	-80.81609007	
12,700.03	91.00	319.46	6,433.98	5,812.27	-3,214.14	14,446,774.64	1,692,020.71	39.78026803	-80.81632082	
12,800.03	91.00	319.46	6,432.23	5,888.26	-3,279.13	14,446,850.62	1,691,955.73	39.78047708	-80.81655156	
12,900.03	91.00	319.46	6,430.48	5,964.25	-3,344.11	14,446,926.61	1,691,890.74	39.78068613	-80.81678231	
13,000.03	91.00	319.46	6,428.72	6,040.23	-3,409.10	14,447,002.60	1,691,825.76	39.78089518	-80.81701306	
13,100.03	91.00	319.46	6,426.97	6,116.22	-3,474.08	14,447,078.59	1,691,760.78	39.78110423	-80.81724381	
13,200.03	91.00	319.46	6,425.22	6,192.21	-3,539.06	14,447,154.57	1,691,695.79	39.78131327	-80.81747456	
13,300.03	91.00	319.46	6,423.47	6,268.20	-3,604.05	14,447,230.56	1,691,630.81	39.78152232	-80.81770532	
13,400.03	91.00	319.46	6,421.71	6,344.18	-3,669.03	14,447,306.55	1,691,565.83	39.78173137	-80.81793607	
13,500.03	91.00	319.46	6,419.96	6,420.17	-3,734.01	14,447,382.54	1,691,500.84	39.78194041	-80.81816683	
13,600.03	91.00	319.46	6,418.21	6,496.16	-3,799.00	14,447,458.52	1,691,435.86	39.78214946	-80.81839758	
13,700.03	91.00	319.46	6,416.45	6,572.15	-3,863.98	14,447,534.51	1,691,370.88	39.78235850	-80.81862834	
13,800.03	91.00	319.46	6,414.70	6,648.13	-3,928.96	14,447,610.50	1,691,305.89	39.78256755	-80.81885910	
13,900.03	91.00	319.46	6,412.95	6,724.12	-3,993.95	14,447,686.48	1,691,240.91	39.78277659	-80.81908987	
14,000.03	91.00	319.46	6,411.20	6,800.11	-4,058.93	14,447,762.47	1,691,175.93	39.78298563	-80.81932063	
14,100.03	91.00	319.46	6,409.44	6,876.10	-4,123.91	14,447,838.46	1,691,110.94	39.78319468	-80.81955139	
14,200.03	91.00	319.46	6,407.69	6,952.08	-4,188.90	14,447,914.45	1,691,045.96	39.78340372	-80.81978216	
14,300.03	91.00	319.46	6,405.94	7,028.07	-4,253.88	14,447,990.43	1,690,980.98	39.78361276	-80.82001293	
14,400.03	91.00	319.46	6,404.19	7,104.06	-4,318.86	14,448,066.42	1,690,915.99	39.78382180	-80.82024369	
14,500.03	91.00	319.46	6,402.43	7,180.05	-4,383.85	14,448,142.41	1,690,851.01	39.78403084	-80.82047446	
14,600.03	91.00	319.46	6,400.68	7,256.03	-4,448.83	14,448,218.40	1,690,786.03	39.78423988	-80.82070524	
14,700.03	91.00	319.46	6,398.93	7,332.02	-4,513.81	14,448,294.38	1,690,721.04	39.78444892	-80.82093601	
14,800.03	91.00	319.46	6,397.18	7,408.01	-4,578.80	14,448,370.37	1,690,656.06	39.78465796	-80.82116678	
14,900.03	91.00	319.46	6,395.42	7,484.00	-4,643.78	14,448,446.36	1,690,591.07	39.78486700	-80.82139756	
15,000.03	91.00	319.46	6,393.67	7,559.98	-4,708.77	14,448,522.35	1,690,526.09	39.78507604	-80.82162834	
15,100.03	91.00	319.46	6,391.92	7,635.97	-4,773.75	14,448,598.33	1,690,461.11	39.78528508	-80.82185911	
15,200.03	91.00	319.46	6,390.17	7,711.96	-4,838.73	14,448,674.32	1,690,396.12	39.78549412	-80.82208989	
15,300.03	91.00	319.46	6,388.41	7,787.95	-4,903.72	14,448,750.31	1,690,331.14	39.78570315	-80.82232068	
15,400.03	91.00	319.46	6,386.66	7,863.94	-4,968.70	14,448,826.30	1,690,266.16	39.78591219	-80.82255146	

<b>Database:</b>	DB_Jul2218dt_v14	<b>Local Co-ordinate Reference:</b>	Well Blake 05 HM (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	GL @ 1326.00ft
<b>Project:</b>	Marshall County, West Virginia.	<b>MD Reference:</b>	GL @ 1326.00ft
<b>Site:</b>	Blake Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Blake 05 HM (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Original Hole		
<b>Design:</b>	rev1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,500.03	91.00	319.46	6,384.91	7,939.92	-5,033.68	14,448,902.28	1,690,201.17	39.78612123	-80.82278224	
15,600.03	91.00	319.46	6,383.16	8,015.91	-5,098.67	14,448,978.27	1,690,136.19	39.78633026	-80.82301303	
15,700.03	91.00	319.46	6,381.40	8,091.90	-5,163.65	14,449,054.26	1,690,071.21	39.78653930	-80.82324381	
15,800.03	91.00	319.46	6,379.65	8,167.89	-5,228.63	14,449,130.25	1,690,006.22	39.78674833	-80.82347460	
15,900.03	91.00	319.46	6,377.90	8,243.87	-5,293.62	14,449,206.23	1,689,941.24	39.78695737	-80.82370539	
16,000.03	91.00	319.46	6,376.15	8,319.86	-5,358.60	14,449,282.22	1,689,876.26	39.78716640	-80.82393618	
16,065.38	91.00	319.46	6,375.00	8,369.52	-5,401.07	14,449,331.88	1,689,833.79	39.78730300	-80.82408700	
PBHL/TD 16065.38 MD/6375.00 TVD										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Blake 05-HM PBHL r1 - plan hits target center - Point	0.00	0.00	6,375.00	8,369.52	-5,401.07	14,449,331.88	1,689,833.79	39.78730300	-80.82408700	
Blake 05-HM LP - plan hits target center - Point	0.00	0.00	6,531.00	1,605.73	383.23	14,442,568.11	1,695,618.07	39.76869474	-80.80354929	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
3,100.00	3,100.00	0.00	0.00	KOP Begin 3°/100' build	
3,937.57	3,910.98	156.14	91.02	Begin 25.13° tangent	
6,335.38	6,081.88	1,035.78	603.77	Begin 10°/100' build/turn	
7,164.19	6,531.00	1,605.73	383.23	Begin 91.00° lateral	
16,065.38	6,375.00	8,369.52	-5,401.07	PBHL/TD 16065.38 MD/6375.00 TVD	

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 WV Department of  
 Environmental Protection

WW-9  
(4/16)

API Number 47 - 051 -

Operator's Well No. Blaine N 5HM

4705102052

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

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JUN 11 2018

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851 WV Department of Environmental Protection

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

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

Will a pit be used? Yes  No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

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

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426) ✓

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.

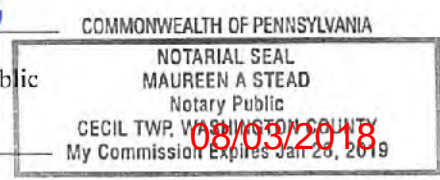
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations 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 Jim Pancake  
Company Official (Typed Name) Jim Pancake  
Company Official Title Vice President Geoscience

Subscribed and sworn before me this 6 day of JUNE, 2018  
Maureen A Stead Notary Public

My commission expires 1/28/19



Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 20.72 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Orchard Grass	12
Spring Oats	96	Ladino	3
		White Clover	2

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Uehler*

Comments:

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JUN 11 2018

WV Department of  
Environmental Protection

Title: Oil and Gas Inspector

Date: 6/6/18

Field Reviewed? (  ) Yes (  ) No

**WW-9**

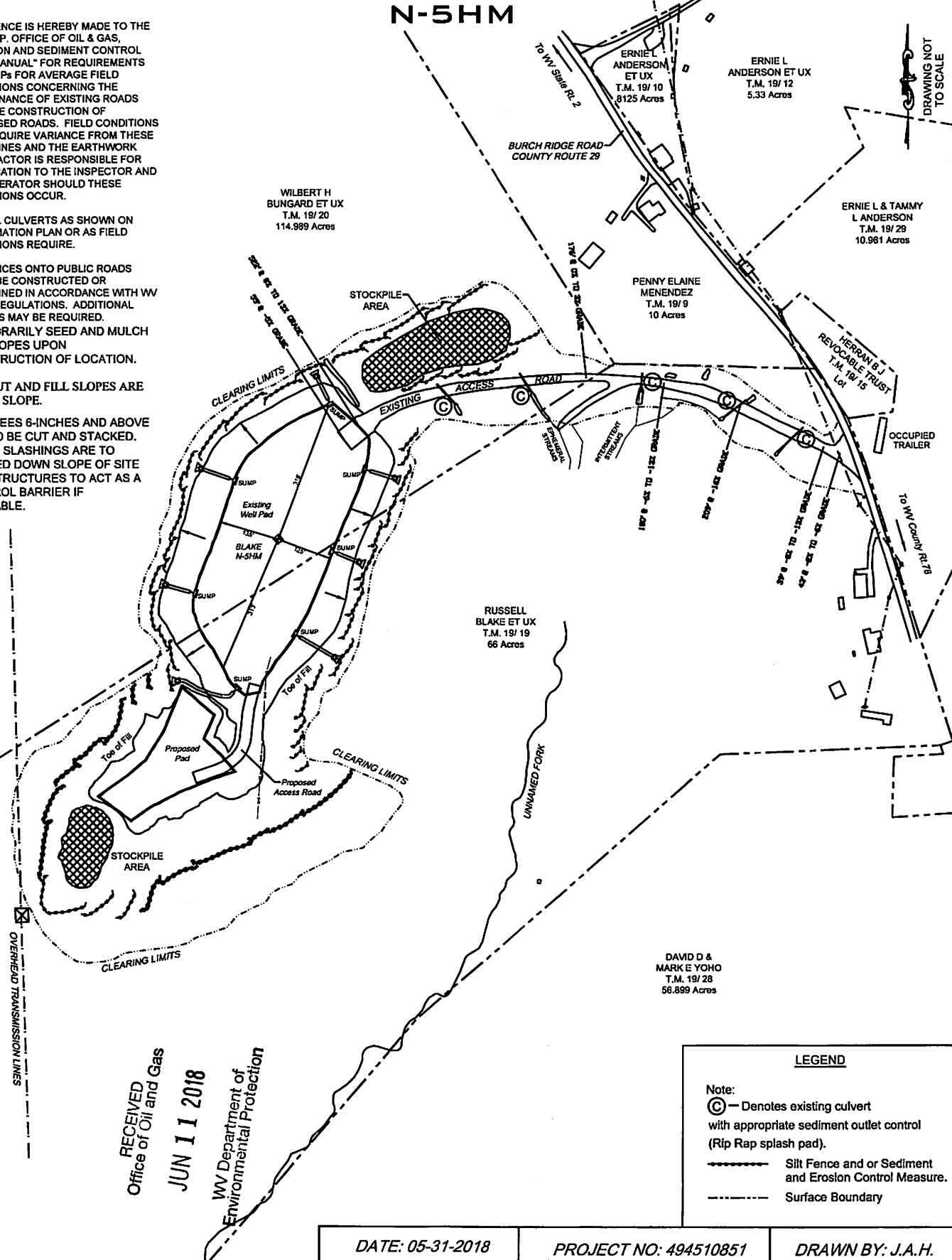
REFERENCE IS HEREBY MADE TO THE WW D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES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



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 Environmental Protection

**LEGEND**

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





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

*AM*  
*7/24/18*

Well Name: Blake N-5HM

Pad Location: Blake Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,401,614.14

Easting: 516,708.62

June 2018  
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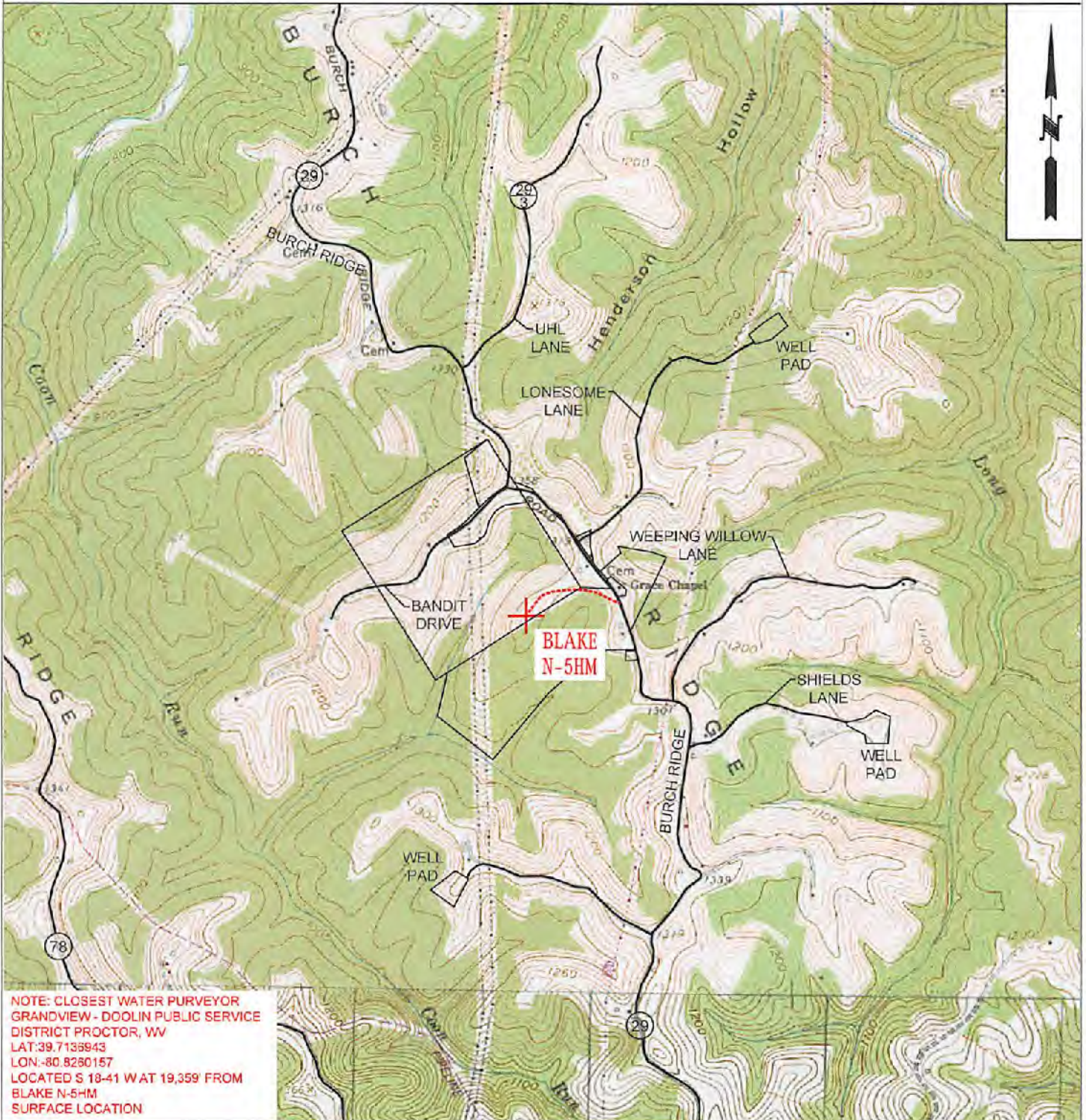
WW-9

JUN 11 2018


SUPPLEMENT PG 2

WV Department of  
Environmental Protection

**PROPOSED**  
**BLAKE N-5HM**



NOTE: CLOSEST WATER PURVEYOR  
GRANDVIEW - DOOLIN PUBLIC SERVICE  
DISTRICT PROCTOR, WV  
LAT: 39.7135943  
LON: -80.8280157  
LOCATED S 18-41 W AT 19,359' FROM  
BLAKE N-5HM  
SURFACE LOCATION

 <b>TUG HILL OPERATING</b>	OPERATOR	494510851	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	BLAKE
			SCALE:	DATE:
			1" = 2000'	DATE: 05-31-2018

08/03/2018

# BLAKE LEASE WELL N-5HM 814.8846± ACRES

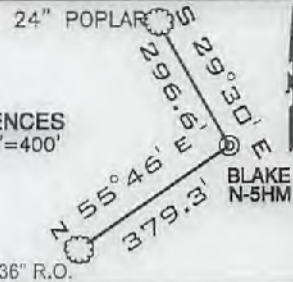
(BH)

U-7H (01786)

DETAIL  
SKETCH "A"  
SCALE 1"=100'

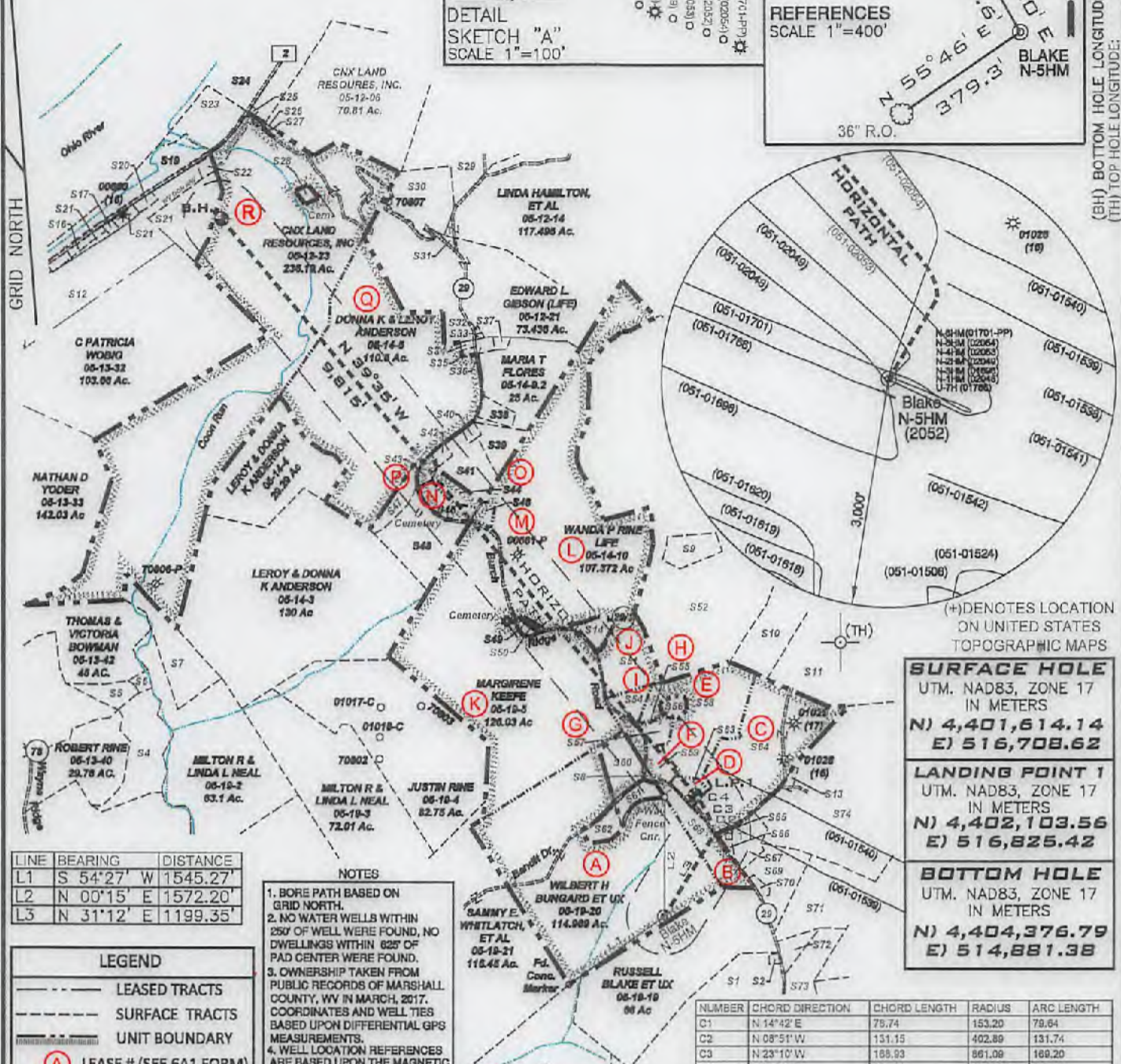
TOP HOLE LATITUDE: 39°47'30"  
BOTTOM HOLE LATITUDE: 39°47'30"

REFERENCES  
SCALE 1"=400'



(BH) BOTTOM HOLE LONGITUDE: 80°47'30"  
(TH) TOP HOLE LONGITUDE: 80°47'30"

(TH) 9,999'



(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

<b>SURFACE HOLE</b>	UTM. NAD83, ZONE 17 IN METERS N) 4,401,614.14 E) 516,708.62
<b>LANDING POINT 1</b>	UTM. NAD83, ZONE 17 IN METERS N) 4,402,103.56 E) 516,825.42
<b>BOTTOM HOLE</b>	UTM. NAD83, ZONE 17 IN METERS N) 4,404,376.79 E) 514,881.38

LINE	BEARING	DISTANCE
L1	S 54°27' W	1545.27'
L2	N 00°15' E	1572.20'
L3	N 31°12' E	1199.35'

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

**LEGEND**

- LEASED TRACTS
- SURFACE TRACTS
- UNIT BOUNDARY
- LEASE # (SEE 6A1 FORM)

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 14°42' E	78.74	153.20	79.64
C2	N 08°51' W	131.15	402.89	131.74
C3	N 23°10' W	188.93	861.08	189.20
C4	N 34°11' W	257.03	1311.80	257.45

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

DRAWING NUMBER BLAKE\_WP\_N-5HM

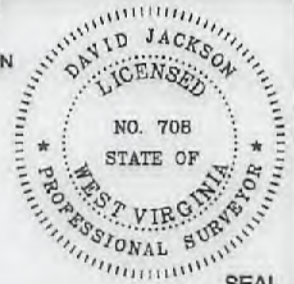
SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING  
GRADE GPS

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

P.S. 708  
*David L Jackson*



JACKSON SURVEYING INC.  
P.O. Box 1460  
Clarksburg, WV 26302  
304-623-5851

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

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

LOCATION ELEVATION 1326.0' WATERSHED (HUC 10) French Creek - Ohio River

DISTRICT Franklin COUNTY Marshall

QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE WW-6A1 Form

SURFACE OWNER WILBERT H. BUNGARD, ET UX ACREAGE 114.989

OIL & GAS ROYALTY OWNER RUSSELL BLAKE, ET AL LEASE ACREAGE 114.989

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: 6,647' TMD: 16,979'

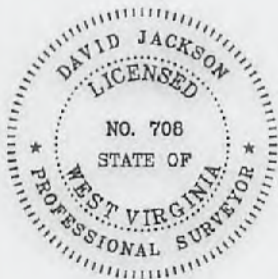
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 78107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

08/03/2018

COUNTY NAME  
PERMIT

**BLAKE LEASE  
WELL N-5HM  
814.8846± ACRES**

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	05-19-28	DAVID D. & MARK E. YOHO	56.899
S2	05-19-32	JASPER N. BURCH ET AL - TRUSTEES	0.397
S3	05-22-04	CNX GAS COMPANY, LLC	159.05
S4	05-13-41A	RODNEY & RHONDA JACKSON	17.05
S5	05-13-41B	LARRY & JUDY DARRAH	4.15
S6	05-13-41C	BENTON DARRAH, LILLIE MAY DUGAN, ALMA BITMER, ALBERTA PALMER & AUDREY HOWARD	1.0
S7	05-14-02	JOHN B. WILLIAMS, ET AL	20.17
S8	05-19-20	WILBERT H. BUNGARD ET UX	114.989
S9	05-14-12.1	HENRY WILSON PLUNKERT, JR.	5.0
S10	05-14-14	ROBERT L. SHIELDS ET AL	29.05
S11	05-14-15	ROBERT L. SHIELDS ET AL	53.0
S12	05-13-31	CNX LAND RESOURCES, INC.	31.723
S13	05-19-13.1	DONALD SHIELDS	0.80
S14	05-14-10.4	ADAM & JESSE ROBINSON	3.343
S16	05-12-28	W.V. DEPT. OF HIGHWAYS	1.1
S17	05-12-24.2	W.V. DEPT. OF HIGHWAYS	0.539
S19	05-12-25	CSX	12.8
S20	05-12-24	W.V. DEPT. OF HIGHWAYS	0.964
S21	05-12-24.3	CNX LAND RESOURCES, INC.	18.523
S22	05-12-24.1	W.V. DEPT. OF HIGHWAYS	0.99
S23	05-12-23.2	CNX LAND RESOURCES, INC.	12.50
S24	05-12-6.2	CONSOLIDATION COAL COMPANY MURRAY ENERGY	25.50
S25	05-12-6.1	W.V. DEPT. OF HIGHWAYS	0.31
S26	05-12-23.3	W.V. DEPT. OF HIGHWAYS	0.111
S27	05-12-23.1	JAMES N. DAUGHERTY	0.28
S28	05-12-22	CNX LAND RESOURCES, INC.	0.944
S29	05-12-07	ROBERT WM. RIGGENBACH, ET UX	104.231
S30	05-12-21.1	ROBERT W. JR. & WENDY L. RIGGENBACH	14.222
S31	05-12-15	WOODLAND HILL CHURCH OF GOD, TRS	0.375
S32	05-12-16	GARY E. GIBSON, ET AL	0.104
S33	05-12-16.1	GARY E. GIBSON, ET AL	0.146
S34	05-12-20	JONI LYN LEON	0.457
S35	05-12-19	JONI LYN LEON	0.457
S36	05-12-18	HILDA DELORIS BAXTER	1.018
S37	05-12-17	HILDA DELORIS BAXTER	0.752
S38	05-14-9.1	MARIA T. FLOREZ	2.882
S39	05-14-9.5	MARIA T. FLOREZ	6.024
S40	05-14-19	BRIAN A. & CHARLOTTE MULL	0.92
S41	05-14-09	WALTER W. STREIGHT JR., ET UX	9.311
S42	05-14-17	JUSTIN & JODY RINE	1.1044
S43	05-14-16	GEORGE A. KNUTH	1.6386
S44	05-14-9.4	VERNIE A. RINE, ET UX	3.404
S45	05-14-9.3	VERNIE A. RINE, ET UX	4.118
S46	05-14-10.3	VERNIE A. & JODY K. RINE	1.54
S47	05-14-07	DONNA K. & LEROY ANDERSON	4.60
S48	05-14-08	LAWRENCE EUGENE ANDERSON	18.29
S49	05-14-10.1	IDA RUTAN (LIFE), RALPH R. HOYT	0.50
S50	05-14-10.2	IDA RUTAN (LIFE), RALPH R. HOYT	0.495
S51	05-14-11	DALE R. GALLAHER, ET AL	12.0
S52	05-14-12	DALE R. GALLAHER, ET AL	135.100
S53	05-19-18.2	PAUL V. & CAROL NEELY	32.672
S54	05-19-06	MARTHA M. RUTAN	5.1099
S55	05-19-7.3	OLAN V. RUTAN, ET UX	0.341
S56	05-19-7.4	OLAN V. RUTAN, ET UX	1.787
S57	05-19-7.2	OLAN RUTAN	2.783
S58	05-19-7	OLAN V. RUTAN, ET UX	32.4801
S59	05-19-7.1	ROBERT L. SHIELD, ET AL	3.399
S60	05-19-20.2	CASANDRA L. HARMON	7.448
S61	05-19-20.1	JOHN J. EBERT, EST.	3.848
S62	05-19-20.3	SIDNEY HARMON	3.715
S63	05-19-7.5	ADAM T. & JESSE L. ROBINSON	2.640
S64	05-19-8	CNX GAS COMPANY, LLC	40.0
S65	05-19-11	ERNIE L. ANDERSON, ET UX	0.08
S66	05-19-10	ERNIE L. ANDERSON, ET UX	0.8125
S67	05-19-12	ERNIE L. ANDERSON, ET UX	5.33
S68	05-19-09	PENNY ELAINE MENENDEZ	10.0
S69	05-19-29	ERNIE L. & TAMMY L. ANDERSON	10.961
S70	05-19-15	B.J. HERRAN REVOCABLE TRUST	0.177
S71	05-19-30	ERNIE & TAMMY ANDERSON	19.037
S72	05-19-30.1	ERIC R.W. & ASHLEY A. HUGGINS	2.911
S73	05-19-31	CHARLES F. & DIANA L. HAYNES	8.779
S74	05-19-13	RONA LEE RICE & CHARLES FRANKLIN MCCARDLE	94.925



P.S.  
708

*David L Jackson*

08/03/2018



**TUG HILL  
OPERATING**

OPERATOR'S  
WELL #: Blake N-5HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV

WELL PLAT  
PAGE 2 OF 2  
DATE: 06/04/2018  
REVISED: 7/31/2018

WW-6A1  
(5/13)

Operator's Well No. Blake N-5HM

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

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

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

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

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

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

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

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, 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.

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Office of Oil and Gas  
JUL 26 2018

WV Department of  
Environmental Protection

Well Operator: Tug Hill Operating, LLC  
 By: Amy L. Miller *Amy L. Miller*  
 Its: Permitting Specialist

RECEIVED  
Office of Oil and Gas  
JUL 26 2018  
West Virginia Department of Environmental Protection

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*14141	A	5-19-20	DAVID TAKACH AND WIFE DEBORAH	GASTAR EXPLORATION USA INC	1/8+	720 233	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*17492	B	5-19-9	DIANA L WELLMAN	TH EXPLORATION LLC	1/8+	940 434	N/A	N/A	N/A	N/A	N/A	N/A
10*17493	B	5-19-9	DENNIS D CALDWELL AND APRIL N CALDWELL	TH EXPLORATION LLC	1/8+	942 409	N/A	N/A	N/A	N/A	N/A	N/A
10*17454	B	5-19-9	MARGARET A BONNETT	TH EXPLORATION LLC	1/8+	940 431	N/A	N/A	N/A	N/A	N/A	N/A
10*14635	B	5-19-9	COMMERCIAL OPTICAL MANUFACTURING INC	GASTAR EXPLORATION USA INC	1/8+	775 21	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14640	B	5-19-9	SHERRI SNYDER	GASTAR EXPLORATION USA INC	1/8+	799 545	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14649	B	5-19-9	DONALD GARY GROVES II	GASTAR EXPLORATION USA INC	1/8+	842 382	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14650	B	5-19-9	TIMOTHY DWIGHT GROVES	GASTAR EXPLORATION INC	1/8+	842 384	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14651	B	5-19-9	DAVID V CALDWELL	GASTAR EXPLORATION INC	1/8+	842 386	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14652	B	5-19-9	CANDICE GUTIERREZ	GASTAR EXPLORATION INC	1/8+	842 388	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14641	B	5-19-9	LORA LANGLEY	GASTAR EXPLORATION USA INC	1/8+	800 621	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14642	B	5-19-9	MARY B. FERRIS BY REBECCA R. F	GASTAR EXPLORATION USA INC	1/8+	808 457	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14643	B	5-19-9	MARTHA RENEE ROBINSON	GASTAR EXPLORATION USA INC	1/8+	809 541	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14644	B	5-19-9	CHERYL HILL	GASTAR EXPLORATION USA INC	1/8+	809 517	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14645	B	5-19-9	RANDY BERISFORD	GASTAR EXPLORATION USA INC	1/8+	810 328	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14647	B	5-19-9	JAMES W ROBINSON III	GASTAR EXPLORATION INC	1/8+	836 102	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14648	B	5-19-9	LORI ANN ROBINSON	GASTAR EXPLORATION INC	1/8+	836 104	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14636	B	5-19-9	WANDA RIDING	GASTAR EXPLORATION USA INC	1/8+	794 503	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14637	B	5-19-9	KIMBERLY S. DENNY	GASTAR EXPLORATION USA INC	1/8+	794 511	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14638	B	5-19-9	HUGH YOHO	GASTAR EXPLORATION USA INC	1/8+	794 478	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14639	B	5-19-9	GARY PARSONS	GASTAR EXPLORATION USA INC	1/8+	794 521	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14653	B	5-19-9	KRISTIN DOUGLAS	GASTAR EXPLORATION INC	1/8+	842 390	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*19854	B	5-19-9	CHRISTOPHER M JENNINGS	TH EXPLORATION LLC	1/8+	946 18	N/A	N/A	N/A	N/A	N/A	N/A
10*19853	B	5-19-9	TIMOTHY B AND MICHELE P JENNINGS	TH EXPLORATION LLC	1/8+	946 20	N/A	N/A	N/A	N/A	N/A	N/A
10*19851	B	5-19-9	PATRICK W JENNINGS AND SUSAN PACKER-JENNINGS	TH EXPLORATION LLC	1/8+	946 24	N/A	N/A	N/A	N/A	N/A	N/A
10*19852	B	5-19-9	JEFFREY A AND SHANNON M JENNINGS	TH EXPLORATION LLC	1/8+	946 22	N/A	N/A	N/A	N/A	N/A	N/A
10*17635	B	5-19-9	SARAH K SCHNEIDER AND DANIEL K SCHEIDER	TH EXPLORATION LLC	1/8+	942 414	N/A	N/A	N/A	N/A	N/A	N/A
10*14646	B	5-19-9	PENNY ELAINE MENENDEZ	GASTAR EXPLORATION INC	1/8+	822 266	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14571	C	5-19-8	MATTHEW S ANDERSON AND BRENDA	GASTAR EXPLORATION INC	1/8+	840 165	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18680	D	5-19-7.5	SAMANTHA A RADER	TH EXPLORATION LLC	1/8+	936 137	N/A	N/A	N/A	N/A	N/A	N/A
10*14423	E	5-19-7	OLAN V RUTAN AND PATRICIA E	GASTAR EXPLORATION USA INC	1/8+	727 1	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9

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Environmental Protection

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*16735	F	5-19-7.1	ROBERT L SHIELDS AND REBECCA A SHIELDS	TH EXPLORATION LLC	1/8+	942 27	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14423	G	5-19-7.2	OLAN V RUTAN AND PATRICIA E	GASTAR EXPLORATION USA INC	1/8+	727 1	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14423	H	5-19-7.3	OLAN V RUTAN AND PATRICIA E	GASTAR EXPLORATION USA INC	1/8+	727 1	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*16994	I	5-19-6	MARTHA M RUTAN	TH EXPLORATION LLC	1/8+	942 31	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14928	J	5-14-11	JOSEPH D PARRIOTT AND NELLIE B	TRIENERGY INC	1/8+	660 517	TriEnergy Inc to AB Resources LLC: 19/623	AB Resources to Chief Exploration & Development LLC: 666/40	AB Resources to Chief Exploration & Development LLC & Radler 2000 LP: 24/319	Chief Exploration, et al to Chevron U.S.A Inc: 25/1	AB Resources LLC to Chevron USA Inc: 756/397	Chevron USA Inc to Gastar Exploration Inc: 32/355	Gastar to TH Exploration II LLC: 36/9 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14925	K	5-19-5	MOUNTAIN TOP PRODUCTIONS LLC	GASTAR EXPLORATION INC	1/8+	840 444	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14925	K	5-19-5	MOUNTAIN TOP PRODUCTIONS LLC	GASTAR EXPLORATION INC	1/8+	840 444	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14420	L	5-14-10	ELLIS V. RINE AND WANDA P. RIN	GASTAR EXPLORATION USA INC	1/8+	725 141	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14553	M	5-14-10.3	VERNIE RINE AND JODY K. RINE	GASTAR EXPLORATION USA INC	1/8+	764 302	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18806	N	5-14-9.3	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	929 576	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21223	N	5-14-9.3	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961 468	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21938	N	5-14-9.3	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960 91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17547	N	5-14-9.3	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942 400	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17548	N	5-14-9.3	RICHARD ARTHUR VAN GROEL AND JEANNE MARIE VAN GROEL	TH EXPLORATION LLC	1/8+	942 389	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21930	N	5-14-9.3	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953 263	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21924	N	5-14-9.3	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953 533	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21926	N	5-14-9.3	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953 360	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14619	N	5-14-9.3	SHIRLEY R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 414	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14620	N	5-14-9.3	ANITA R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 416	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14621	N	5-14-9.3	WILLIAM DALE AND NOREEN G MILL	CHESAPEAKE APPALACHIA LLC	1/8+	715 415	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14622	N	5-14-9.3	KELLY D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	713 606	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14623	N	5-14-9.3	DUANE D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 149	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14624	N	5-14-9.3	DOUGLAS E MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	725 559	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14625	N	5-14-9.3	JACQUELYN J JOHNSON	CHESAPEAKE APPALACHIA LLC	1/8+	715 616	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14626	N	5-14-9.3	STEVEN POND	CHESAPEAKE APPALACHIA LLC	1/8+	715 622	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14627	N	5-14-9.3	BRIAN AND LENA POND	CHESAPEAKE APPALACHIA LLC	1/8+	717 51	N/A	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321 Gastar Exploration Inc. to TH Exploration II LLC: 36/9

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14628	N	5-14-9.3	TEXYN L AND GEORGIA A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 514	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14629	N	5-14-9.3	GERALD R AND LEE A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 1	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14630	N	5-14-9.3	BARBARA K BURLEY	CHESAPEAKE APPALACHIA LLC	1/8+	716 637	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14631	N	5-14-9.3	LISA ANN MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 520	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14898	N	5-14-9.3	SHERLEY RAY STOWE	GASTAR EXPLORATION USA INC	1/8+	813 444	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14899	N	5-14-9.3	SANDRA J HARMON AND WALTER D HARMON	GASTAR EXPLORATION USA INC	1/8+	813 442	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14900	N	5-14-9.3	STANLEY EUGENE STOWE	GASTAR EXPLORATION USA INC	1/8+	813 440	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14901	N	5-14-9.3	MARGARET CLICKNER	GASTAR EXPLORATION USA INC	1/8+	815 244	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14902	N	5-14-9.3	BENNY MILLER	GASTAR EXPLORATION INC	1/8+	836 98	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14903	N	5-14-9.3	SUE PRUITT	GASTAR EXPLORATION INC	1/8+	836 100	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14904	N	5-14-9.3	LEROY MILLER	GASTAR EXPLORATION INC	1/8+	846 398	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14905	N	5-14-9.3	JAMES K MILLER	GASTAR EXPLORATION INC	1/8+	854 610	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14906	N	5-14-9.3	MARY LOU MILLER-HORTON	GASTAR EXPLORATION INC	1/8+	862 417	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18202	N	5-14-9.3	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	929 85	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18209	N	5-14-9.3	CORRINE E VERNA & JONATHAN C VERNA	TH EXPLORATION LLC	1/8+	929 82	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18210	N	5-14-9.3	DAVID F POWDERLY JR AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	929 87	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18211	N	5-14-9.3	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	929 90	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18212	N	5-14-9.3	THOMAS C DAVIS AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	929 92	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18213	N	5-14-9.3	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	929 94	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18214	N	5-14-9.3	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	929 96	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18215	N	5-14-9.3	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	929 103	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18218	N	5-14-9.3	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	929 106	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14553	N	5-14-9.3	VERNIE RINE AND JODY K. RINE	GASTAR EXPLORATION USA INC	1/8+	764 302	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18806	O	5-14-9.4	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	929 576	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21223	O	5-14-9.4	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961 468	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21938	O	5-14-9.4	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960 91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17547	O	5-14-9.4	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942 400	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17548	O	5-14-9.4	RICHARD ARTHUR VAN GROL AND JEANNE MARIE VAN GROL	TH EXPLORATION LLC	1/8+	942 389	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21930	O	5-14-9.4	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953 263	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21924	O	5-14-9.4	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953 533	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21926	O	5-14-9.4	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953 360	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14898	O	5-14-9.4	SHERLEY RAY STOWE	GASTAR EXPLORATION USA INC	1/8+	813 444	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14899	O	5-14-9.4	SANDRA J HARMON AND WALTER D HARMON	GASTAR EXPLORATION USA INC	1/8+	813 442	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14900	O	5-14-9.4	STANLEY EUGENE STOWE	GASTAR EXPLORATION USA INC	1/8+	813 440	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9



Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment		
10*14901	O	5-14-9.4	MARGARET CLICKNER	GASTAR EXPLORATION USA INC	1/8+	815 244	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14902	O	5-14-9.4	BENNY MILLER	GASTAR EXPLORATION INC	1/8+	836 98	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*18202	O	5-14-9.4	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	929 85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*14903	O	5-14-9.4	SUE PRUITT	GASTAR EXPLORATION INC	1/8+	836 100	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14904	O	5-14-9.4	LEROY MILLER	GASTAR EXPLORATION INC	1/8+	846 398	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14905	O	5-14-9.4	JAMES K MILLER	GASTAR EXPLORATION INC	1/8+	854 610	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14906	O	5-14-9.4	MARY LOU MILLER-HORTON	GASTAR EXPLORATION INC	1/8+	862 417	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9	
10*18209	O	5-14-9.4	CORRINE E VERNA & JONATHAN C VERNA	TH EXPLORATION LLC	1/8+	929 82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18210	O	5-14-9.4	DAVID F POWDERLY JR AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	929 87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18211	O	5-14-9.4	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	929 90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18212	O	5-14-9.4	THOMAS C DAVIS AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	929 92	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18213	O	5-14-9.4	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	929 94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18214	O	5-14-9.4	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	929 96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18215	O	5-14-9.4	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	929 103	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*18218	O	5-14-9.4	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	929 106	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*14619	O	5-14-9.4	SHIRLEY R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 414	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14620	O	5-14-9.4	ANITA R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 416	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14621	O	5-14-9.4	WILLIAM DALE AND NOREEN G MILL	CHESAPEAKE APPALACHIA LLC	1/8+	715 415	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14622	O	5-14-9.4	KELLY D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	713 606	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14623	O	5-14-9.4	DUANE D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 149	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14624	O	5-14-9.4	DOUGLAS E MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	725 559	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14625	O	5-14-9.4	JACQUELYN J JOHNSON	CHESAPEAKE APPALACHIA LLC	1/8+	715 616	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14626	O	5-14-9.4	STEVEN POND	CHESAPEAKE APPALACHIA LLC	1/8+	715 622	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14627	O	5-14-9.4	BRIAN AND LENA POND	CHESAPEAKE APPALACHIA LLC	1/8+	717 51	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14628	O	5-14-9.4	TEXYN L AND GEORGIA A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 514	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14629	O	5-14-9.4	GERALD R AND LEE A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 1	N/A	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9

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West Virginia Department of Environmental Protection

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*14630	O	5-14-9.4	BARBARA K BURLEY	CHESAPEAKE APPALACHIA LLC	1/8+	716 637	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14631	O	5-14-9.4	LISA ANN MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 520	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14553	O	5-14-9.4	VERNIE RINE AND JODY K. RINE	GASTAR EXPLORATION USA INC	1/8+	764 302	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18806	P	5-14-16	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	929 576	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21223	P	5-14-16	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961 468	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21938	P	5-14-16	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960 91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17547	P	5-14-16	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942 400	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17548	P	5-14-16	RICHARD ARTHUR VAN GROL AND JEANNE MARIE VAN GROL	TH EXPLORATION LLC	1/8+	942 389	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21930	P	5-14-16	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953 263	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21924	P	5-14-16	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953 533	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21926	P	5-14-16	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953 360	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18209	P	5-14-16	CORRINE E VERNA & JONATHAN C VERNA	TH EXPLORATION LLC	1/8+	929 82	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18210	P	5-14-16	DAVID F POWDERLY JR AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	929 87	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18211	P	5-14-16	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	929 90	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18212	P	5-14-16	THOMAS C DAVIS AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	929 92	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18213	P	5-14-16	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	929 94	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18214	P	5-14-16	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	929 96	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18215	P	5-14-16	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	929 103	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18218	P	5-14-16	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	929 106	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14619	P	5-14-16	SHIRLEY R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 414	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14620	P	5-14-16	ANITA R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 416	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14621	P	5-14-16	WILLIAM DALE AND NOREEN G MILL	CHESAPEAKE APPALACHIA LLC	1/8+	715 415	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14622	P	5-14-16	KELLY D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	713 606	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14623	P	5-14-16	DUANE D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 149	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14624	P	5-14-16	DOUGLAS E MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	725 559	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 25/582	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14625	P	5-14-16	JACQUELYN J JOHNSON	CHESAPEAKE APPALACHIA LLC	1/8+	715 616	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14626	P	5-14-16	STEVEN POND	CHESAPEAKE APPALACHIA LLC	1/8+	715 622	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14627	P	5-14-16	BRIAN AND LENA POND	CHESAPEAKE APPALACHIA LLC	1/8+	717 51	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14628	P	5-14-16	TEXNY L AND GEORGIA A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 514	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*14629	P	5-14-16	GERALD R AND LEE A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 1	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14630	P	5-14-16	BARBARA K BURLEY	CHESAPEAKE APPALACHIA LLC	1/8+	716 637	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14631	P	5-14-16	LISA ANN MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 520	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14898	P	5-14-16	SHERLEY RAY STOWE	GASTAR EXPLORATION USA INC	1/8+	813 444	N/A	N/A	N/A		Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14899	P	5-14-16	SANDRA J HARMON AND WALTER D HARMON	GASTAR EXPLORATION USA INC	1/8+	813 442	N/A	N/A	N/A		Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14900	P	5-14-16	STANLEY EUGENE STOWE	GASTAR EXPLORATION USA INC	1/8+	813 440	N/A	N/A	N/A		Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14901	P	5-14-16	MARGARET CLICKNER	GASTAR EXPLORATION USA INC	1/8+	815 244	N/A	N/A	N/A		Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14902	P	5-14-16	BENNY MILLER	GASTAR EXPLORATION INC	1/8+	836 98	N/A	N/A	N/A		N/A	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14903	P	5-14-16	SUE PRUITT	GASTAR EXPLORATION INC	1/8+	836 100	N/A	N/A	N/A		N/A	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*18202	P	5-14-16	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	929 85	N/A	N/A	N/A		N/A	N/A	
10*14904	P	5-14-16	LEROY MILLER	GASTAR EXPLORATION INC	1/8+	846 398	N/A	N/A	N/A		N/A	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14905	P	5-14-16	JAMES K MILLER	GASTAR EXPLORATION INC	1/8+	854 610	N/A	N/A	N/A		N/A	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14906	P	5-14-16	MARY LOU MILLER-HORTON	GASTAR EXPLORATION INC	1/8+	862 417	N/A	N/A	N/A		N/A	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*18806	Q	5-14-5	E SHIELA PAVLOVICH	TH EXPLORATION LLC	1/8+	929 576	N/A	N/A	N/A		N/A	N/A	
10*21223	Q	5-14-5	EUGENE C GRIEB AND SHIRLEY K GRIEB	TH EXPLORATION LLC	1/8+	961 468	N/A	N/A	N/A		N/A	N/A	
10*21938	Q	5-14-5	SEAN M GRENOBLE AND CHERYL A GRENOBLE	TH EXPLORATION LLC	1/8+	960 91	N/A	N/A	N/A		N/A	N/A	
10*17547	Q	5-14-5	JAMES CONTRERAS AND CATHERINE CONTRERAS	TH EXPLORATION LLC	1/8+	942 400	N/A	N/A	N/A		N/A	N/A	
10*17548	Q	5-14-5	RICHARD ARTHUR VAN GROU AND JEANNE MARIE VAN GROU	TH EXPLORATION LLC	1/8+	942 389	N/A	N/A	N/A		N/A	N/A	
10*21930	Q	5-14-5	JAMES A GRENOBLE AND MARY JANE GRENOBLE	TH EXPLORATION LLC	1/8+	953 263	N/A	N/A	N/A		N/A	N/A	
10*21924	Q	5-14-5	BEVERLY A MILLER	TH EXPLORATION LLC	1/8+	953 533	N/A	N/A	N/A		N/A	N/A	
10*21926	Q	5-14-5	VIOLA JANE BREON AND JAMES RONALD BREON	TH EXPLORATION LLC	1/8+	953 360	N/A	N/A	N/A		N/A	N/A	
10*18209	Q	5-14-5	CORRINE E VERNA & JONATHAN C VERNA	TH EXPLORATION LLC	1/8+	929 82	N/A	N/A	N/A		N/A	N/A	
10*18210	Q	5-14-5	DAVID F POWDERLY JR AND NANCY A POWDERLY	TH EXPLORATION LLC	1/8+	929 87	N/A	N/A	N/A		N/A	N/A	
10*18211	Q	5-14-5	REBECCA LYNN KIER AND ERIC JAMES KIER	TH EXPLORATION LLC	1/8+	929 90	N/A	N/A	N/A		N/A	N/A	
10*18212	Q	5-14-5	THOMAS C DAVIS AND MARY ELLEN DAVIS	TH EXPLORATION LLC	1/8+	929 92	N/A	N/A	N/A		N/A	N/A	
10*18213	Q	5-14-5	THOMAS A POWDERLY	TH EXPLORATION LLC	1/8+	929 94	N/A	N/A	N/A		N/A	N/A	
10*18214	Q	5-14-5	ANNE M AND JOHN LEACH	TH EXPLORATION LLC	1/8+	929 96	N/A	N/A	N/A		N/A	N/A	
10*18215	Q	5-14-5	MARGARET J WHITFORD AND LANCE W WHITFORD	TH EXPLORATION LLC	1/8+	929 103	N/A	N/A	N/A		N/A	N/A	
10*18218	Q	5-14-5	ERIN E SCHOLL	TH EXPLORATION LLC	1/8+	929 106	N/A	N/A	N/A		N/A	N/A	
10*14619	Q	5-14-5	SHIRLEY R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 414	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14621	Q	5-14-5	WILLIAM DALE AND NOREEN G MILL	CHESAPEAKE APPALACHIA LLC	1/8+	715 415	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14620	Q	5-14-5	ANITA R MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 416	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	
10*14622	Q	5-14-5	KELLY D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	713 606	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gasstar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gasstar Exploration USA Inc to Gasstar Exploration Inc: 21/41	Gasstar Exploration Inc. to TH Exploration II LLC: 36/9	

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WW-6A1 Supplement

Operator's Well No. Blake N - 5HM

Lease ID	Tag	Parcel	Grantor, Lessor, etc	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*14623	Q	5-14-5	DUANE D MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 149	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14624	Q	5-14-5	DOUGLAS E MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	725 559	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 25/582	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14625	Q	5-14-5	JACQUELYN J JOHNSON	CHESAPEAKE APPALACHIA LLC	1/8+	715 616	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14626	Q	5-14-5	STEVEN POND	CHESAPEAKE APPALACHIA LLC	1/8+	715 622	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14627	Q	5-14-5	BRIAN AND LENA POND	CHESAPEAKE APPALACHIA LLC	1/8+	717 51	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14628	Q	5-14-5	TEKYN I AND GEORGIA A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 514	N/A	N/A	N/A	N/A	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14629	Q	5-14-5	GERALD R AND LEE A MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	717 1	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14630	Q	5-14-5	BARBARA K BURLEY	CHESAPEAKE APPALACHIA LLC	1/8+	716 637	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14631	Q	5-14-5	LISA ANN MILLER	CHESAPEAKE APPALACHIA LLC	1/8+	715 520	N/A	N/A	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 24/204	Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc & Atinum Marcellus I LLC: 27/321	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14898	Q	5-14-5	SHERLEY RAY STOWE	GASTAR EXPLORATION USA INC	1/8+	813 444	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14899	Q	5-14-5	SANDRA J HARMON AND WALTER D HARMON	GASTAR EXPLORATION USA INC	1/8+	813 442	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14900	Q	5-14-5	STANLEY EUGENE STOWE	GASTAR EXPLORATION USA INC	1/8+	813 440	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14901	Q	5-14-5	MARGARET CLICKNER	GASTAR EXPLORATION USA INC	1/8+	815 244	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14902	Q	5-14-5	BENNY MILLER	GASTAR EXPLORATION INC	1/8+	836 98	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*18202	Q	5-14-5	TERRANCE V POWDERLY SR	TH EXPLORATION LLC	1/8+	929 85	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14903	Q	5-14-5	SUE PRUITT	GASTAR EXPLORATION INC	1/8+	836 100	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14904	Q	5-14-5	LEROY MILLER	GASTAR EXPLORATION INC	1/8+	846 398	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14905	Q	5-14-5	JAMES K MILLER	GASTAR EXPLORATION INC	1/8+	854 610	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14906	Q	5-14-5	MARY LOU MILLER-HORTON	GASTAR EXPLORATION INC	1/8+	862 417	N/A	N/A	N/A	N/A	N/A	N/A	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
10*14568	Q	5-14-5	LEROY ANDERSON & DONNA K ANDE	GASTAR EXPLORATION USA INC	1/8+	772 69	N/A	N/A	N/A	N/A	N/A	Certificate of Merger - Gastar Exploration USA Inc to Gastar Exploration Inc: 21/41	Gastar Exploration Inc. to TH Exploration II LLC: 36/9
041112	R	5-12-23	HG ENERGY II APPALACHIA LLC	TH EXPLORATION LLC	1/8+	988 286	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

**MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT**

This Memorandum of Operating Agreement and Financing Statement (hereinafter referred to as "Memorandum") is executed to be effective concurrently with that certain Operating Agreement (the "Operating Agreement") by and between TH Exploration, LLC, as Operator, and HG Energy II Appalachia, LLC and TH Exploration II, LLC, as Non-Operators, covering, among other things, the development and production of crude oil, natural gas and associated substances from the leases (hereinafter called the "Contract Area") described on Exhibit "A-1" and Exhibit "A-2" attached hereto and owned by Operator and Non-Operator in the respective percentages of shares indicated on Exhibit "A" to the Operating Agreement.

The Operating Agreement contains an Accounting Procedure, along with provisions giving the parties hereto mutual liens and security interests where one or more parties hereto are or may become Debtors to one or more other parties hereto. This Memorandum incorporates by reference all of the terms and conditions of the Operating Agreement, including but not limited to the lien and security interest provisions.

The purpose of this Memorandum is to place third parties on notice of the Operating Agreement, and to secure and perfect the mutual liens and security interests of the parties hereto.

The Operating Agreement specifically provides and the parties do hereby confirm and agree that:

1. The Operator shall conduct and direct and have full control of all operations on the Contract Area as permitted and required by, and within the limits of, the Operating Agreement.
2. The liability of the parties under the Operating Agreement shall be several, not joint or collective. Each party shall be responsible only for its obligations and shall be liable only for its proportionate share of costs.
3. Each Non-Operator grants to Operator a lien upon its oil and gas rights, oil and gas leases and mineral interests in the Contract Area, and a security interest in its share of oil and/or gas when extracted and its interest in all fixtures, inventory, personal property and equipment located on or used on the Contract Area and in all its contract rights and receivables related thereto and arising therefrom to secure payment of its present and future share of costs and expenses, together with interest thereon at the rate provided in the Accounting Procedure referred to above. To the extent that Operator has a security interest under the Uniform Commercial Code ("Code") of the state or states in which the Contract Area is located, Operator without prejudice and in addition to all other legal, equitable and contractual remedies which are expressly reserved, shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the rights or security interests for the payment thereof.
4. The Operator grants to Non-Operator a lien and security interest equivalent to that granted to Operator as described in Paragraph 3 above, to secure payment by Operator of its own share of costs and expenses when due.

As reflected above, either or both Operator and Non-Operator may become Debtors if they default in their payment obligations under the terms of the Operating Agreement. On default, the non-defaulting party(ies) will be considered secured party(ies).

The Operating Agreement contains other provisions which do not conflict but supplement the above-described provisions, including, but not limited to, non-consent provisions which provide that parties who elect not to participate in certain operations shall be deemed to have relinquished their interest until the consenting parties are able to recover their costs of such operations plus a specified amount. Should any person or firm desire additional information regarding the Operating Agreement or wish to inspect a copy of the Operating Agreement, said person or firm should contact the Operator.

For purposes of protecting said liens and security interest, the undersigned parties agree that this Memorandum covers all right, title and interest of the Debtors in:

Property Subject to Security Interests:

- (A) All personal property located upon or used in connection with the Contract Area.
- (B) All fixtures on the Contract Area.
- (C) All oil, gas and associated substances of value in, on or under the Contract Area, or which may be extracted therefrom.
- (D) All accounts and receivables resulting from the sale of the items described in subparagraph (C) at the wellhead of every well located on the Contract Area or on lands pooled therewith.
- (E) All items used, useful, or purchased for the production, treatment, handling, storage, transportation, processing, manufacture, or sale of the items described in subparagraph (C).
- (F) All accounts, contract rights, rights under any gas balancing agreement, general intangibles, equipment, inventory, farmout rights, option farmout rights, acreage and/or cash contributions, and conversions rights, whether now owned or existing or hereafter acquired or arising, including but not limited to all interest in any enterprise that holds, owns, or controls any interest in the Contract Area or in any property encumbered by this Memorandum.
- (G) All severed and extracted oil, gas and associated substances now or hereafter produced from or attributable to the Contract Area, including without limitation, oil, gas and associated substances in tanks or pipelines or otherwise held by any person or entity for treatment, storage, transportation, manufacture, processing or sale.
- (H) All the proceeds and products of the items described in the foregoing paragraphs now existing or hereafter arising, and all substitutions therefore, improvements and enhancements thereto, replacements thereof, or accessions thereto.
- (I) All personal property and fixtures now and hereafter acquired in furtherance of the purposes of this Operating Agreement. Certain of the above-described items are, or are to become, fixtures on the Contract Area.
- (J) The proceeds and products of collateral are also specifically covered.

Property Subject to Liens:

- (A) All real property, within the Contract Area, including all oil, gas and associated substances of value in, on or under the Contract Area, or which may be extracted therefrom.
- (B) All fixtures within the Contract Area.
- (C) All real property and fixtures now and hereafter acquired in furtherance of the purposes of this Operating Agreement.

The above items will be financed at the wellhead of the well or wells located on the Contract Area, and this Memorandum is to be filed for record in the real estate records of the county and in the Uniform Commercial Code records in which the Contract Area is located.

On default of any covenant or condition of the Operating Agreement, in addition to any other remedy afforded by law, each party to the Operating Agreement and any successor to such party by assignment, operation of law, or otherwise, shall have, and is hereby given and vested with, the power and authority to take possession of and sell any interest which the defaulting party has in property identified above securing the obligations provided in the Operating Agreement and to foreclose this lien and security interest in the manner provided by law.

Upon expiration of the Operating Agreement and the satisfaction of all debts and outstanding interest, the Operator shall file of record a release and termination on behalf of all parties concerned. Upon the filing of such release and termination, all benefits and obligations under this Memorandum shall terminate as to all parties who have executed or ratified this Memorandum. In addition, the Operator shall have the right to file a continuation statement on behalf of all parties who have executed or ratified this Memorandum when Operator.

It is understood and agreed by the parties hereto that if any part, term or provision of this Memorandum is held to be illegal or in conflict with any applicable state or federal law or regulation, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Memorandum did not contain the particular part, term or provision held to be invalid.

This Memorandum shall be binding upon and shall inure to the benefit of the parties hereto and to their respective heirs, devisees, legal representatives, successors and assigns.


A party having an interest in the Contract Area can ratify this Memorandum by execution hereof or a separate counterpart hereof or by execution and delivery of an instrument of ratification, adopting the provisions of this Memorandum or agreeing to be bound by the terms hereof. Any such ratification shall have the same effect as if the ratifying party had executed this Memorandum or a counterpart thereof. By execution or ratification of this Memorandum, such party hereby consents to its ratification and adoption by any party who may have or may acquire any interest in the Contract Area.

The parties hereto agree to execute, acknowledge and deliver or cause to be executed, acknowledged and delivered any instrument, or take any action necessary or appropriate to effectuate the terms of the Operating Agreement or any Exhibit, instrument, certificate or other document pursuant thereto.

This Memorandum may be executed or ratified in one or more counterparts and all of the executed or ratified counterparts shall together constitute one instrument. For purpose of recording, only one copy of this Memorandum with individual signature pages attached thereto needs to be filed of record.

Executed this 1st day of July, 2018.

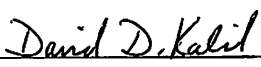
**OPERATOR: TH Exploration, LLC**

By:   
Name: Sean Willis  
Title: Sr. Vice President

**NON-OPERATOR: HG Energy II Appalachia, LLC**

By: \_\_\_\_\_  
Name: Jared Hall  
Title: President

**NON-OPERATOR: TH Exploration II, LLC**

By:   
Name: David Kalish  
Title: Sr. Vice President - Land



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ACKNOWLEDGEMENT

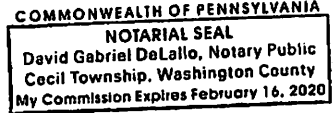
COMMONWEALTH OF PENNSYLVANIA )  
 ) SS:  
COUNTY OF WASHINGTON )

On this the 11th day of July 2018, before me, a notary public, the undersigned authority, personally appeared Sean Willis, who acknowledged his self to be the Sr. Vice President of TH Exploration, LLC, a limited liability company, and that he as such Sr. Vice President being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President.

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

My Commission Expires: 2/16/2020 Signature/Notary Public: [Signature]

Name/Notary Public (print): DAVID G. DELALLO



ACKNOWLEDGEMENT

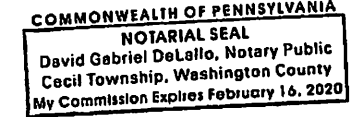
COMMONWEALTH OF PENNSYLVANIA )  
 ) SS:  
COUNTY OF WASHINGTON )

On this the 11th day of July 2018, before me, a notary public, the undersigned authority, personally appeared David D. Kalish, who acknowledged his self to be the Sr. Vice President - Land of TH Exploration II, LLC, a limited liability company, and that he as such Sr. Vice President - Land being authorized to do so, executed the foregoing instrument for the purposed therein contained by signing the name of the limited liability company by his self as Sr. Vice President - Land.

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

My Commission Expires: 2/16/2020 Signature/Notary Public: [Signature]

Name/Notary Public (print): DAVID G. DELALLO



ACKNOWLEDGEMENT

STATE OF WEST VIRGINIA )  
 ) SS:  
COUNTY OF WOOD )

This instrument was acknowledged before me on the \_\_\_ day of \_\_\_\_\_, 2018 by Jared Hall, as President of HG Energy II Appalachia, LLC, a Delaware limited liability company, on behalf of said company.

Given under my hand and seal this the \_\_\_ day of \_\_\_\_\_, 2018.

\_\_\_\_\_  
Notary Public, State of \_\_\_\_\_

Prepared by and please return to:  
TH Exploration, LLC  
380 Southpointe Boulevard, Suite 200  
Canonsburg, PA 15317

The parties hereto agree to execute, acknowledge and deliver or cause to be executed, acknowledged and delivered any instrument, or take any action necessary or appropriate to effectuate the terms of the Operating Agreement or any Exhibit, instrument, certificate or other document pursuant thereto.

This Memorandum may be executed or ratified in one or more counterparts and all of the executed or ratified counterparts shall together constitute one instrument. For purpose of recording, only one copy of this Memorandum with individual signature pages attached thereto needs to be filed of record.

Executed this 1st day of July, 2018.

**OPERATOR: TH Exploration, LLC**

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**NON-OPERATOR: HG Energy II Appalachia, LLC**

By: Jared Hall  
Name: Jared Hall  
Title: President

**NON-OPERATOR: TH Exploration II, LLC**

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_



**COPY**  
WV Department of  
Environmental Protection

AFFIDAVIT

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

JUN 11 2018  
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Office of Oil and Gas

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

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

FURTHER, AFFIANT SAITH NOT.

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

David D. Kalish  
Affiant: David D. Kalish

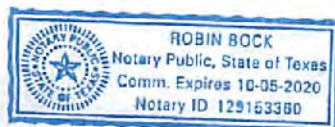
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Jan Post  
MARSHALL County 03:44:28 PM  
Instrument No 1416299  
Date Recorded 10/19/2016  
Document Type NIS  
Pages Recorded 1  
Book-Page 28-62  
Recording Fee \$5.00  
Additional \$6.00

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

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

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



My Commission Expires: 10-05-2020  
Signature/Notary Public: Robin Bock  
Name/Notary Public (Print): Robin Bock



4705102052

May 17, 2018

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

RE: Blake N-5HM

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Blake N-5HM well plat.

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

Sincerely,

Amy L. Miller  
Permitting Specialist – Appalachia Region

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JUN 11 2018  
WV Department of  
Environmental Protection

4705102052

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

Date of Notice Certification: 06/07/2018

API No. 47- 051 -  
Operator's Well No. Blake N-5HM  
Well Pad Name: Blake

**Notice has been given:**

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

State: <u>West Virginia</u>	UTM NAD 83	Easting: <u>516,708.62</u>
County: <u>Marshall</u>		Northing: <u>4,401,614.14</u>
District: <u>Franklin</u>	Public Road Access: <u>Burch Ridge Road - County Route 29</u>	
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>Wibert H. Bungard, et ux</u>	
Watershed: <u>French Creek - Ohio River (HUC 10)</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.

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:  *PLEASE CHECK ALL THAT APPLY  <input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED  <input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED  <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  <input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)  <input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION  <input checked="" type="checkbox"/> 5. PUBLIC NOTICE  <input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION		<b>OOG OFFICE USE ONLY</b>  <input type="checkbox"/> RECEIVED/ NOT REQUIRED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED/ NOT REQUIRED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED  <input type="checkbox"/> RECEIVED
RECEIVED Office of Oil and Gas  <b>JUN 11 2018</b>		

WV Department of  
Environmental Protection

**Required Attachments:**

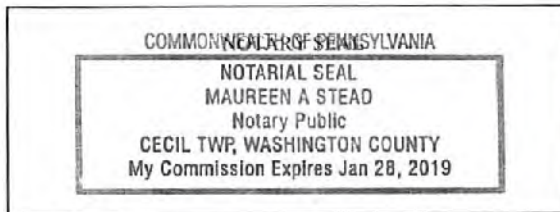
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication 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.

08/03/2018

**Certification of Notice is hereby given:**

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

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



Subscribed and sworn before me this 7 day of JUNE 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 [deprivacyofficer@wv.gov](mailto:deprivacyofficer@wv.gov).

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WV Department of  
Environmental Protection

08/03/2018

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

**4705102052**

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

Date of Notice: 6/7/2018 Date Permit Application Filed: 6/8/2018

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:

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Office of Oil and Gas

**JUN 11 2018**

WV Department of  
Environmental Protection

SURFACE OWNER(s)  
Name: Wilbert H. and Pamela June Bungard (access road and well pad)  
Address: 243 Bandit Drive  
Proctor, WV 26055

Name: Russell and Mary Blake (access road and well pad)  
Address: 3343 Burch Ridge Road  
Proctor, WV 26055

SURFACE OWNER(s) (Road and/or Other Disturbance)

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

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

SURFACE OWNER(s) (Impoundments or Pits)

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

\_\_\_\_\_

COAL OWNER OR LESSEE  
Name: CNX Land Resources, Attn: Casey Saunders  
Address: 1000 Consol Energy Drive  
Canonsburg, PA 15318

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

SURFACE OWNER OF WATER WELL  
AND/OR WATER PURVEYOR(s)  
Name: Wilbert H. Bungard and Pamela June Bungard (\*See attached list)  
Address: 243 Bandit Drive  
Proctor, WV 26055

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

\*Please attach additional forms if necessary



JUN 11 2018

WV Department of  
Environmental Protection

**Notice is hereby given:**

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

**This Notice Shall Include:**

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

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

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

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

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

**Well Location Restrictions**

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

08/03/2018

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

**Water Well Testing:**

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

**Water Testing Laboratories:**

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

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

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

**Written Comment:**

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

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

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Office of Oil and Gas

JUN 11 2018

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

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

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

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

**Comment Requirements**

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

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

**Permit Denial or Condition**

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

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

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

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

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WW-6A  
(8-13)

API NO. 47-05102052  
OPERATOR WELL NO. Blake N-6FM  
Well Pad Name: Blake

**Notice is hereby given by:**

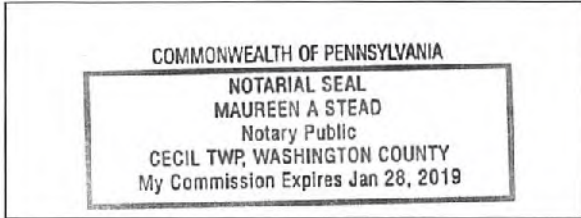
Well Operator: Tug Hill Operating, LLC  
Telephone: 724-749-8388  
Email: amiller@tug-hillop.com *anytime*

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

4705102052

**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 7 day of JUNE 2018.  
Maureen Stead Notary Public  
My Commission Expires 1/28/19

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WW-6A

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

**WATER WELL REPORT**

Well: BLAKE N -5HM  
 District: Franklin  
 County: Marshall  
 State: WV

There appears to be Sixteen ( 16 ) possible water sources within 2,000 feet of the above referenced well location.

Topo Spot # 1 (House) TM 19 Par. 20 Wilbert H. Bungard, et ux 304-476-6494 243 Bandit Drive Proctor, WV 26055	Topo Spot #2 (Abandoned House) TM 19 Par. 20 Wilbert H. Bungard, et ux 304-476-6494 243 Bandit Drive Proctor, WV 26055	Topo Spot # 3 (House) TM 19 Par. 20.2 Casandra L. Harmon 304-639-9837 37 Bandit Drive Proctor, WV 26055
Topo Spot # 4 (House) TM 19 Par. 20.1 John J. Ebert (Life) 304-455-3967 26 Bandit Drive Proctor, WV 26055	Topo Spot # 5 (House) TM 19 Par. 7.1 Robert L. Shields, et ux 304-455-5387 2756 Burch Ridge Rd. Proctor, WV 26055	Topo Spot # 6 (House) TM 19 Par. 7.5 Adam & Jesse Robinson 304-280-9745 2932 Burch Ridge Rd. Proctor, WV 26055
Topo Spot # 7 (House-New) TM 19 Par. 10 Ernie L. Anderson, et ux 304-455-3818 3156 Burch Ridge Rd. Proctor, WV 26055	Topo Spot # 8 (House) TM 19 Par. 10 Ernie L. Anderson, et ux 304-455-3818 3156 Burch Ridge Rd. Proctor, WV 26055	Topo Spot # 9 (House) TM 19 Par. 9 Penny E. Menendez 304-455-5338 3171 Burch Ridge Rd. Proctor, WV 26055
Topo Spot # 10 (Trailer) TM 19 Par. 29 Ernie L. & Tammy L. Anderson 304-455-3818 3156 Burch Ridge Rd. (3298 Burch Ridge Rd.) Proctor, WV 26055	Topo Spot # 11 (House) TM 19 Par. 19 Russell Blake, et al 304-455-1158 3343 Burch Ridge Rd. Proctor, WV 26055	Topo Spot # 12 (Trailer) TM 19 Par. 19 Russell Blake, et al 304-455-1158 3343 Burch Ridge Rd. (3435 Burch Ridge Rd.) Proctor, WV 26055

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Topo Spot # 13 (House) TM 19 Par. 30 Ernie & Tammy Anderson 304-455-3818 3156 Burch Ridge Rd. (3486 Burch Ridge Rd.) Proctor, WV 26055	Topo Spot # 14 (House) TM 19 Par. 31 Charles F. & Diana L. Haynes 304-312-5210 3508 Burch Ridge Rd. Proctor, WV 26055	Topo Spot # 15 (House) TM 19 Par. 28 David D. Yoho & Mark E. Yoho 304-455-3176 3555 Burch Ridge Rd. Proctor, WV 26055
Topo Spot # 16 (House) TM 19 Par. 28 David D. Yoho & Mark E. Yoho 304-455-3176 3555 Burch Ridge Rd. Proctor, WV 26055		

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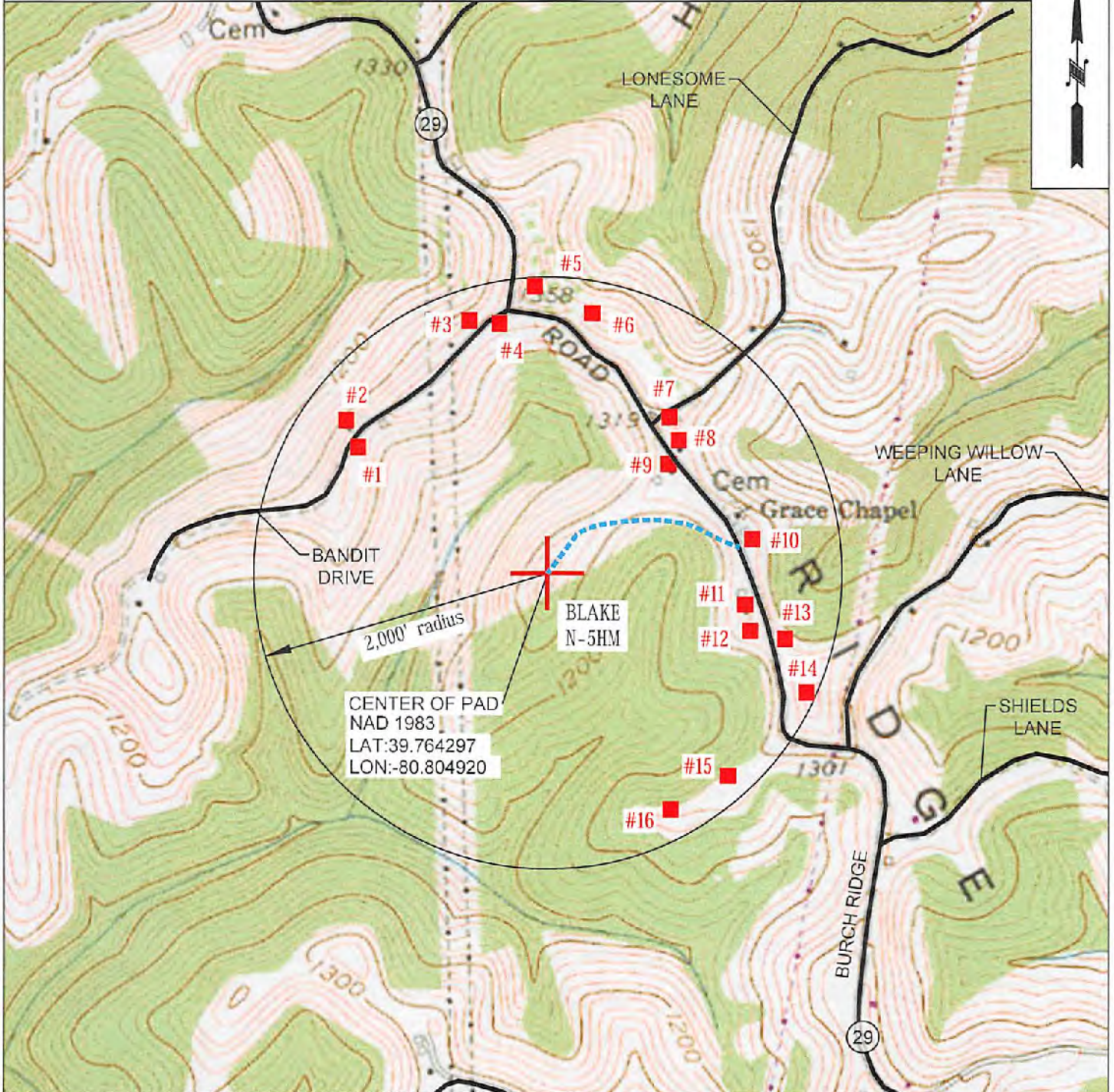
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# PROPOSED BLAKE N-5HM

SUPPLEMENT PG 1

*There appears to be Sixteen ( 16 ) possible water sources within 2,000'.*



<b>OPERATOR</b>	494510851	<b>TOPO SECTION</b>	<b>LEASE NAME</b>
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	BLAKE
		<b>SCALE:</b>	<b>DATE:</b>
		1" = 1000'	DATE: 05-31-2018

08/03/2018

**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:** 4/19/2018      **Date of Planned Entry:** 4/28/2018

**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: Wilbert H. and Pamela June Bungard (access road and well pad)  
Address: 243 Bandit Drive  
Proctor, WV 26055

Name: Russell and Mary Blake (access road and well pad)  
Address: 3343 Burch Ridge Road  
Proctor, WV 26055

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

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COAL OWNER OR LESSEE

Name: CNX Land Resources  
Address: 1000 Consol Energy Drive  
Canonsburg, PA 15318

MINERAL OWNER(s)

Name: David A. and Deborah Takach (\*See Attached List)  
Address: 14 Zilke Terrace  
Glen Dale, WV 26038

\*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>39.76422598; - 80.80495697</u>
County: <u>Marshall</u>	Public Road Access: <u>Burch Ridge Road - CR 29</u>
District: <u>Franklin</u>	Watershed: <u>huc-10: FRENCH CREEK - OHIO RIVER (UNDEFINED)</u>
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>Blake, Russell Et Al</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: <u>Tug Hill Operating, LLC</u>	Address: <u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
Telephone: <u>724-749-8388</u>	<u>Canonsburg, PA 15317</u>
Email: <u>amiller@tug-hill.com</u>	Facsimile: <u>724-338-2030</u>

**Oil and Gas Privacy Notice:**

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



**WW-6A3 Notice Attachment  
Blake N-5HM**

**Mineral Owners**

Russell and Mary Blake  
3343 Burch Ridge Road  
Proctor, WV 26055

Gary L. and Pamela S. Witschey  
2645 Paden Fork Road  
New Martinsville, WV 26155

Gordon L. Witschey  
160 E. Thistle Drive  
New Martinsville, WV 26155

Carl Coffield  
970 Allendale Avenue  
Akron, OH 44306

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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:** 06/07/2018      **Date Permit Application Filed:** 06/09/2018

**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: Wilbert H. and Pamela June Bungard  
Address: 243 Bendit Drive  
Proctor, WV 26055

Name: Russell and Mary Blake  
Address: 3343 Burch Ridge Road  
Proctor, WV 26055

**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>516,708.62</u>
County:	<u>Marshall</u>		Northing:	<u>4,401,614.14</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Burch Ridge Road - County Route 29</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>Blake, Russell, et al</u>	
Watershed:	<u>French 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 200  
Canonsburg, PA 15317  
Facsimile: 724-336-2030

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4705 102052

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

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

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

May 3, 2018

Jill M. Newman  
Deputy Commissioner

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 Blake Well Pad, Marshall County

Blake N-5HM

Dear Mr. Martin,

This well site will be accessed from Permit #06-2013-0426 transferred to Tug Hill Operating for access to the State Road for a well site located off of Marshall County Route 29 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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08/03/2018



TUG HILL

4705102052

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Blake N-5HM

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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**WEST VIRGINIA COUNTY MAP**



**WVDEP OOG  
ACCEPTED AS-BUILT**

*WJ* 6/14/2018

# Blake Well Site

Site Design, Construction Plan, &  
Erosion and Sediment Control Plans  
Tug Hill Operating  
Marshall County  
Franklin District  
Latitude 39.76429745°  
Longitude -80.80492031°  
Stillhouse Run - Ohio River Watershed

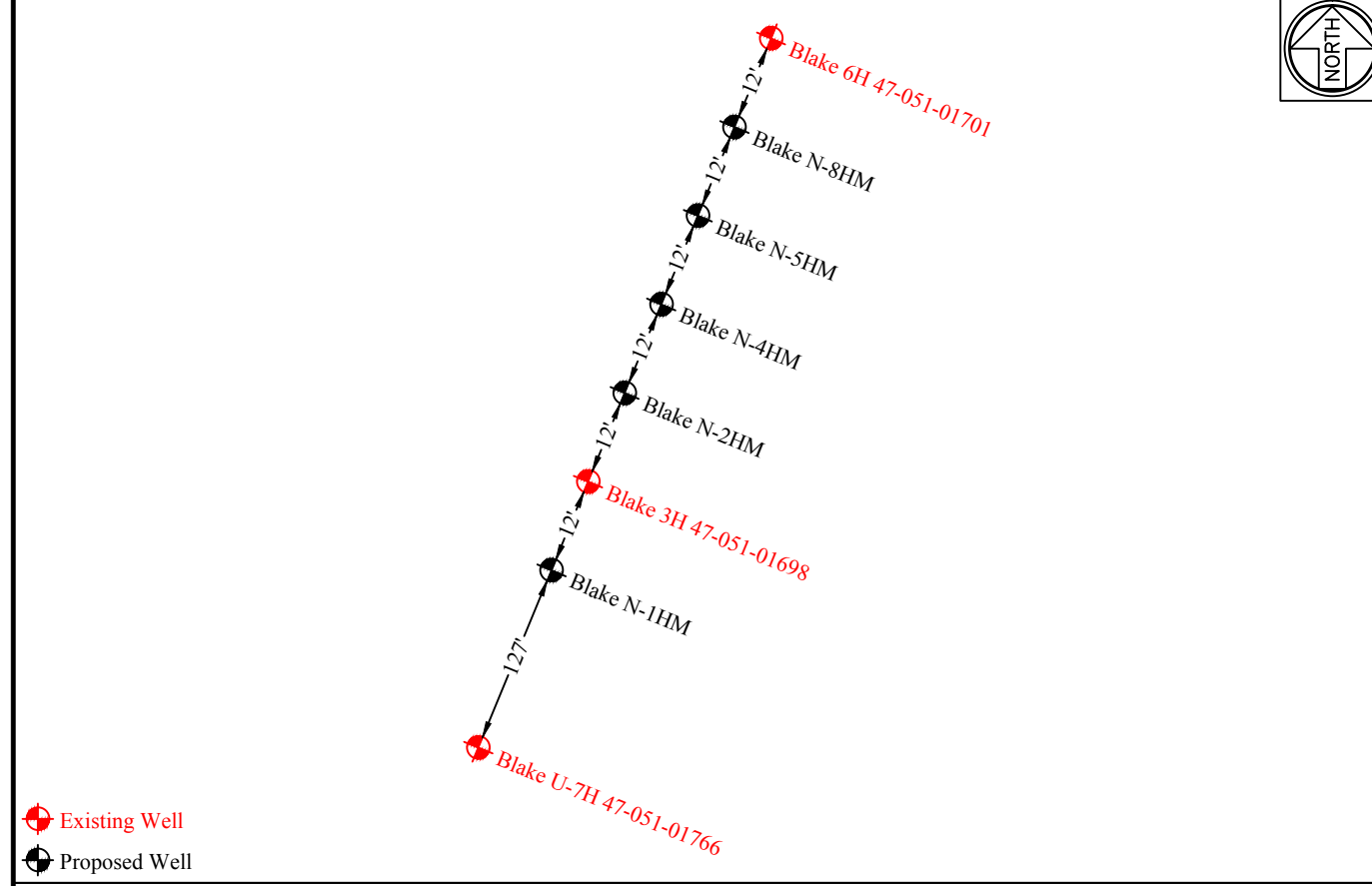
**Pertinent Site Information**  
Blake Well Site  
Emergency Number: 304-845-1920  
Franklin District, Marshall County, WV  
Watershed: Stillhouse Run - Ohio River Watershed  
Site 911 Address:  
Tug Hill Contact Number: 1-817-632-3400

**Property Owner Information - Blake Well Site**

Owner	TM - Parcel	Well Pad	Prod. Pad	Access Road	Topsol/Excess	Add. Clearing	Total Disturbed
Russell Blake et ux	19-29	1.91	1.40	1.38	0.37	7.69	12.75
William Bungard et ux	19-20	4.03	0.00	0.83	0.81	2.30	7.97
<b>Site Totals (Ac)</b>	<b>5.94</b>	<b>1.40</b>	<b>2.21</b>	<b>1.18</b>	<b>9.99</b>	<b>20.72</b>	

## Exhibit A: Final Design: Issue for Permitting

Site Entrance	Center of Well Pad	Center of Production Pad
WV-N NAD 83 N: 463332.84 WV-N NAD 83 E: 1602993.42 WV-N NAD 27 N: 463296.79 WV-N NAD 27 E: 1634451.10 Lat. NAD 83: 39.7642352 Lon. NAD 83: -80.80029039 Lat. NAD 27: 39.76474683 Lon. NAD 27: -80.80047668 UTM 17 NAD 83 N: 4401674.53 UTM 17 NAD 83 E: 517105.50	WV-N NAD 83 N: 463160.11 WV-N NAD 83 E: 1601689.28 WV-N NAD 27 N: 463124.09 WV-N NAD 27 E: 1633126.99 Lat. NAD 83: 39.76429745 Lon. NAD 83: -80.80492031 Lat. NAD 27: 39.76422083 Lon. NAD 27: -80.80510638 UTM 17 NAD 83 N: 4401615.27 UTM 17 NAD 83 E: 516709.06 Pad Elev.: 1326.20'	WV-N NAD 83 N: 462656.71 WV-N NAD 83 E: 1601448.56 WV-N NAD 27 N: 462820.70 WV-N NAD 27 E: 1632886.29 Lat. NAD 83: 39.76290599 Lon. NAD 83: -80.80575050 Lat. NAD 27: 39.76292935 Lon. NAD 27: -80.80593650 UTM 17 NAD 83 N: 4401460.68 UTM 17 NAD 83 E: 516638.29 Pad Elev.: 1292.02'



**Well Table**

Blake 6H	Blake N-5HM	Blake N-5HM	Blake N-5HM	Blake N-2HM	Blake N-2HM	Blake N-1HM	Blake U-7H
WV-N NAD 83 N: 463178.46 WV-N NAD 83 E: 1601697.00 WV-N NAD 27 N: 463142.44 WV-N NAD 27 E: 1633134.72 Lat. NAD 83: 39.76434815 Lon. NAD 83: -80.80489377 Lat. NAD 27: 39.76427153 Lon. NAD 27: -80.80507984 UTM 17 NAD 83 (m) N: 4401620.90 UTM 17 NAD 83 (m) E: 516711.32	WV-N NAD 83 N: 463167.50 WV-N NAD 83 E: 1601692.53 WV-N NAD 27 N: 463131.48 WV-N NAD 27 E: 1633130.04 Lat. NAD 83: 39.76431788 Lon. NAD 83: -80.80498984 Lat. NAD 27: 39.76424124 Lon. NAD 27: -80.80505990 UTM 17 NAD 83 (m) N: 4401617.54 UTM 17 NAD 83 (m) E: 516709.95	WV-N NAD 83 N: 463156.41 WV-N NAD 83 E: 1601687.75 WV-N NAD 27 N: 463120.39 WV-N NAD 27 E: 1633125.46 Lat. NAD 83: 39.76428274 Lon. NAD 83: -80.80492555 Lat. NAD 27: 39.76421061 Lon. NAD 27: -80.80511161 UTM 17 NAD 83 (m) N: 4401614.14 UTM 17 NAD 83 (m) E: 516708.62	WV-N NAD 83 N: 463145.32 WV-N NAD 83 E: 1601683.17 WV-N NAD 27 N: 463109.30 WV-N NAD 27 E: 1633120.89 Lat. NAD 83: 39.76425661 Lon. NAD 83: -80.80494126 Lat. NAD 27: 39.76417998 Lon. NAD 27: -80.80512732 UTM 17 NAD 83 (m) N: 4401610.73 UTM 17 NAD 83 (m) E: 516707.28	WV-N NAD 83 N: 463134.22 WV-N NAD 83 E: 1601678.59 WV-N NAD 27 N: 463098.21 WV-N NAD 27 E: 1633111.73 Lat. NAD 83: 39.76422598 Lon. NAD 83: -80.80495697 Lat. NAD 27: 39.76414935 Lon. NAD 27: -80.80514363 UTM 17 NAD 83 (m) N: 4401607.33 UTM 17 NAD 83 (m) E: 516705.94	WV-N NAD 83 N: 463122.32 WV-N NAD 83 E: 1601674.01 WV-N NAD 27 N: 463086.30 WV-N NAD 27 E: 1633111.73 Lat. NAD 83: 39.76419311 Lon. NAD 83: -80.80497264 Lat. NAD 27: 39.76411648 Lon. NAD 27: -80.80515870 UTM 17 NAD 83 (m) N: 4401603.68 UTM 17 NAD 83 (m) E: 516704.60	WV-N NAD 83 N: 463112.04 WV-N NAD 83 E: 1601669.44 WV-N NAD 27 N: 463076.02 WV-N NAD 27 E: 1633107.15 Lat. NAD 83: 39.76416471 Lon. NAD 83: -80.80498839 Lat. NAD 27: 39.76408808 Lon. NAD 27: -80.80517445 UTM 17 NAD 83 (m) N: 4401600.52 UTM 17 NAD 83 (m) E: 516703.26	WV-N NAD 83 N: 462995.05 WV-N NAD 83 E: 1601619.80 WV-N NAD 27 N: 462959.03 WV-N NAD 27 E: 1633057.54 Lat. NAD 83: 39.76384158 Lon. NAD 83: -80.80515892 Lat. NAD 27: 39.76376495 Lon. NAD 27: -80.80534496 UTM 17 NAD 83 (m) N: 4401564.63 UTM 17 NAD 83 (m) E: 516688.73

**Project Contacts**

**Tug Hill Operating**  
Jonathan White - Regulatory Analyst  
724-485-2000 OIF: 304-689-7676 Cell  
Geoff Radler - V.P. Production  
817-632-5200 OIF.

**Survey and Engineer**  
Kenneth Kelly  
304-338-6985 OIF.  
John P. See  
304-442-0220 OIF.  
Zachary Summerfield  
304-338-6987 OIF.

**Geotechnical Engineer**  
American Geotech. Inc.  
Kam Patel  
304-340-4277 OIF.

**Environmental:**  
Wetland Delineations as provided by Allstar Ecology dated March 30, 2018

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

**MISS UTILITY OF WEST VIRGINIA**  
1-800-245-4848  
West Virginia State Law  
Section XIV, Chapter 24-C, requires that you call two business days before you dig in the state of West Virginia.  
**IT'S THE LAW**  
Know what's below.  
Call before you dig.

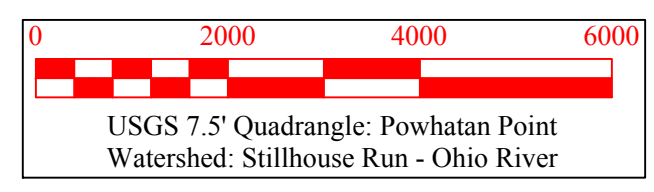
Tug Hill Operating will obtain an Encroachment Permit (Form MM-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities

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

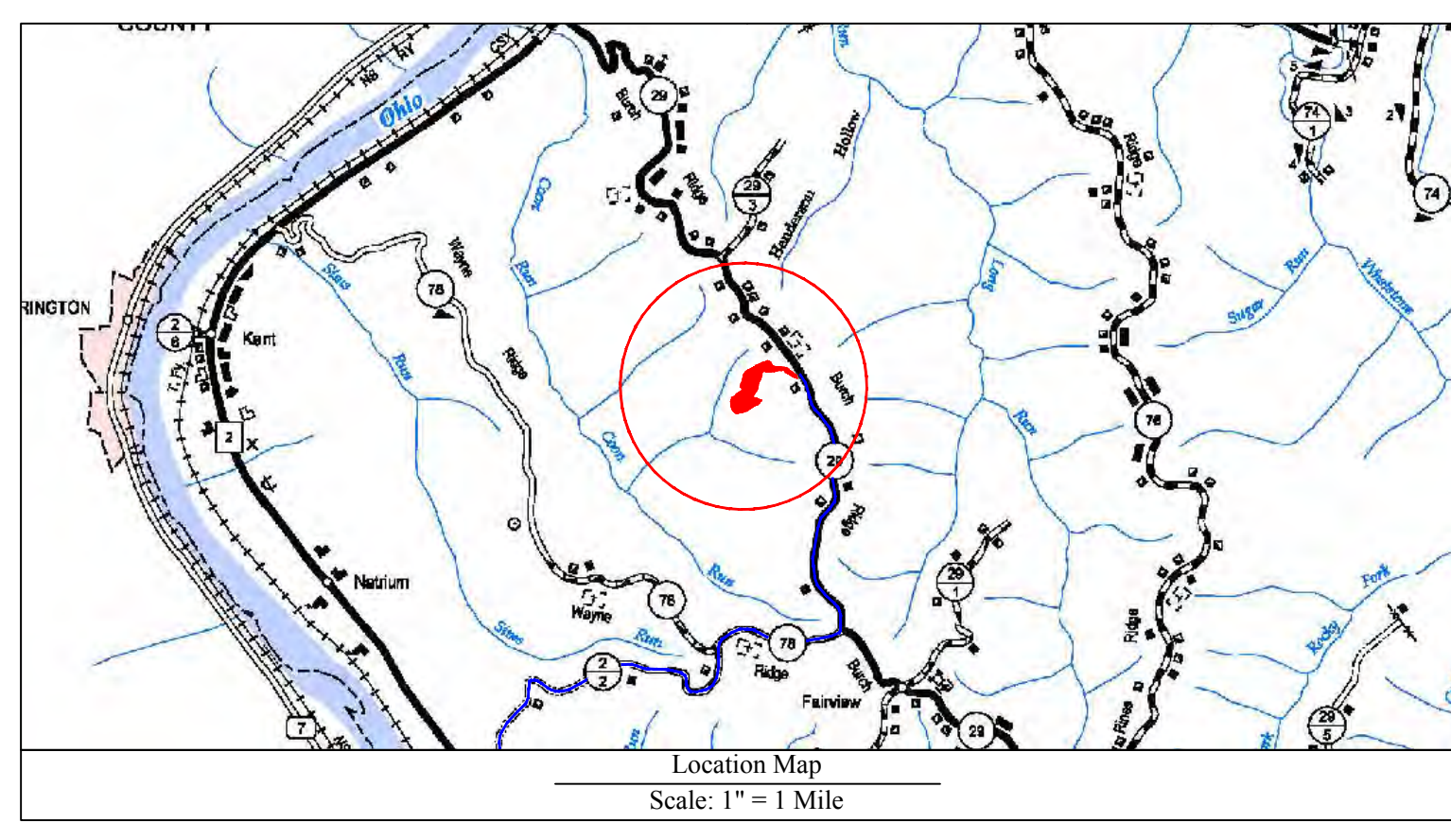
WVDEP Website files show that there are active and/or abandoned gas wells within the AOI

**Floodplain Conditions**

Do site construction activities take place in a floodplain:	NO
Permit needed from county floodplain coordinator:	NO
Flood Hazard Zone:	X
HEC-RAS Study completed:	N/A
Floodplain shown on drawings:	N/A
FIRM Map Number(s) for site:	S405C 0143E
Acres of construction in floodplain:	N/A



Site Locations (NAD 27)			Site Locations (NAD 83)		
Structure	Latitude (DD)	Longitude (DD)	Structure	Latitude (DD)	Longitude (DD)
Site Entrance	39.76474683	-80.80047668	Site Entrance	39.7642352	-80.80029039
Center of Well Pad	39.76422083	-80.80510638	Center of Well Pad	39.76429745	-80.80492031
Center of Production Pad	39.76282935	-80.80593650	Center of Production Pad	39.76290599	-80.80575050

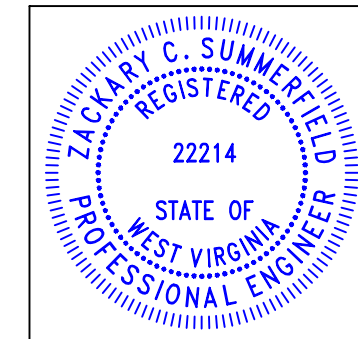


**Well Location Restrictions**

All Pad construction complies with the following restrictions.

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

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



Design Certification

The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas, 304-28308

All Plans, Sheets, and/or Reference Diagrams included in this design constitute a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.

Zachary C. Summerfield  
RPE 22214  
Kelly Surveying PLLC  
COA: C04232-00

Date: 06-13-2018

Sheet	Description
1	Cover Sheet
V1	Schedule of Quantities
N1-N4	Site Notes
2	Pre-Construction Site Conditions
3	Site Soil Map
4	Clearing Exhibit
5	Overall Plan View
6-7	E&S Plan View
8	Toe Key Exhibit
9-10	Plan View
11	Cross Sections - Well Pad
12	Cross Sections - Production Pad
13	Cross Sections - Access Road
G1-G2	Geotechnical Exhibit
L1	Landowner Disturbed Area Exhibit
S1	Site Reclamation
M1-M3	Production Exhibit
D1-D2	Erosion and Sediment Control Details
R1	Access Road Details
P1	Pad Details

Revision  
Design  
Comments  
WVDEP

Date  
05-11-2018  
06-13-2018

**TUG HILL OPERATING**

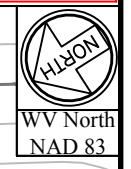
THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

**Kelly Surveying**  
254  
Delaware, WV 26039  
304-338-6985

Cover Sheet  
**Blake Well Site**  
Franklin District  
Marshall County, WV

Date: 05/11/2018  
Scale: As Shown  
Designed By: ZS  
File No.  
Sheet 1 of 13

**Blake Well Site**  
**Tug Hill Operating**  
**Exhibit A: Final Design: Issue for Permitting**

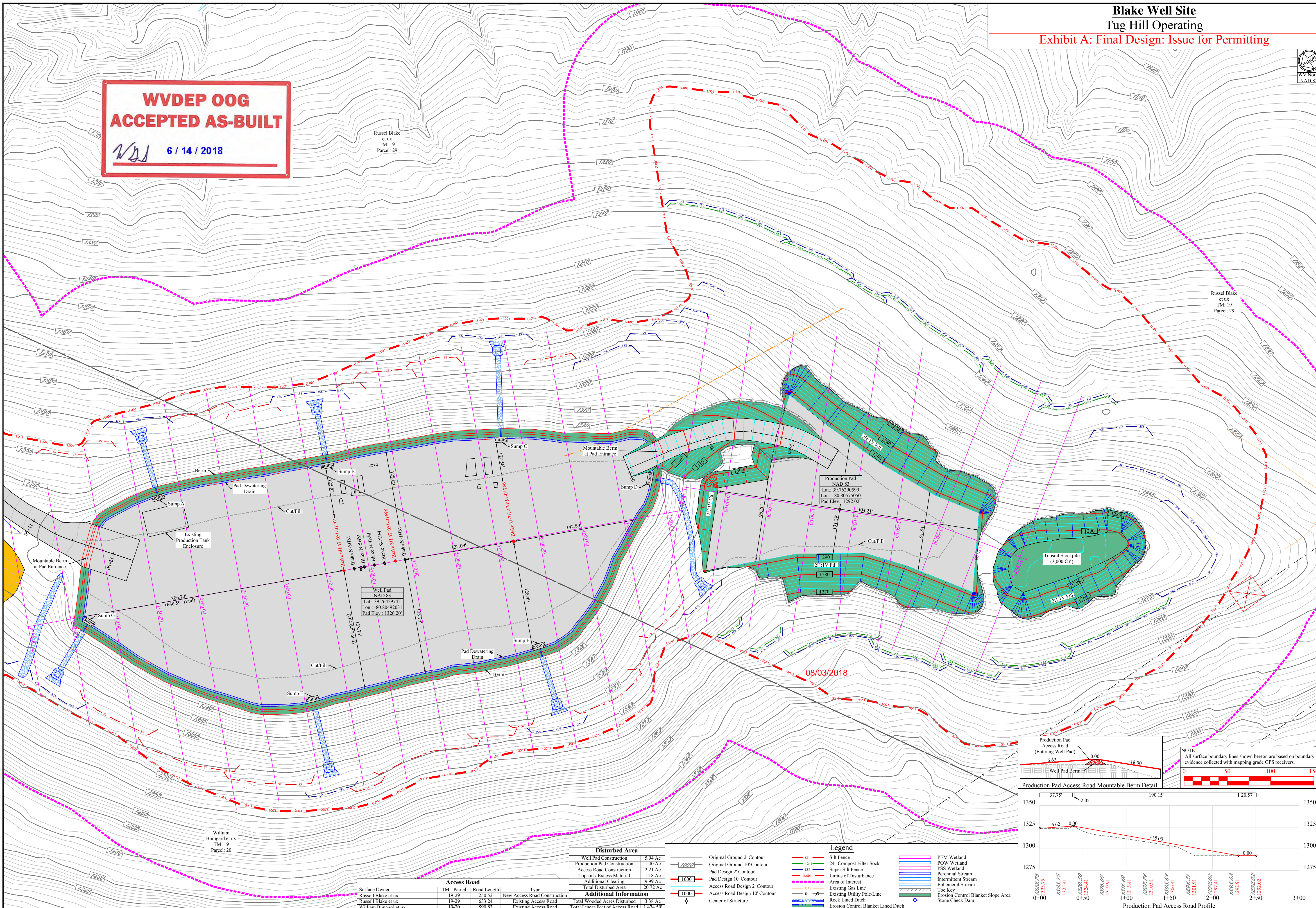


**WVDEP OOG**  
**ACCEPTED AS-BUILT**  
*WJL* 6 / 14 / 2018

Russel Blake et ux  
 TM: 19  
 Parcel: 29

Russel Blake et ux  
 TM: 19  
 Parcel: 29

Date	Revision
05-11-2018 <td>Design</td>	Design
06-13-2018 <td>Design: WVDEP Comments</td>	Design: WVDEP Comments



08/03/2018

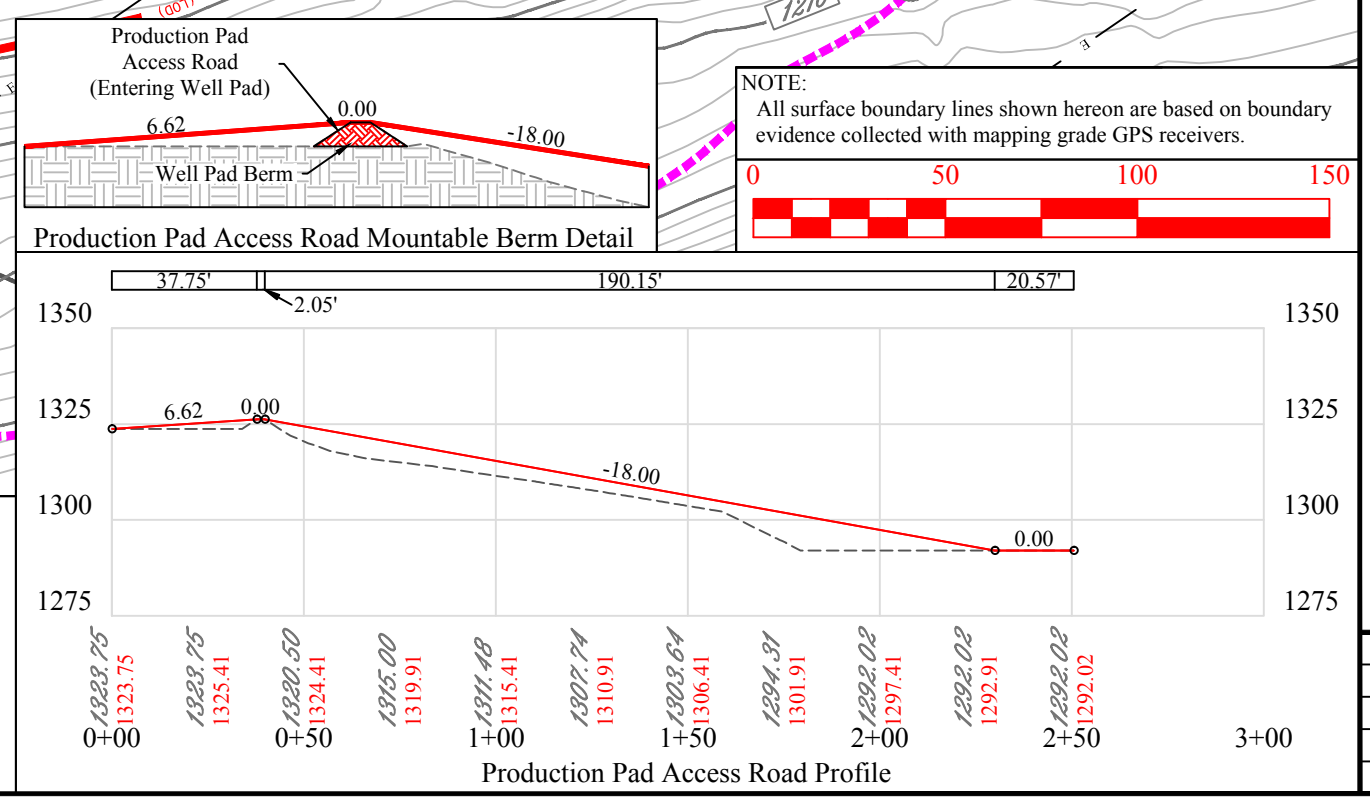
William Bungard et ux  
 TM: 19  
 Parcel: 20

Surface Owner	TM - Parcel	Road Length	Type
Russel Blake et ux	19-29	230.52'	New Access Road Construction
Russel Blake et ux	19-29	633.24'	Existing Access Road
William Bungard et ux	19-20	590.83'	Existing Access Road

Disturbed Area	
Well Pad Construction	5.94 Ac
Production Pad Construction	1.40 Ac
Access Road Construction	2.21 Ac
Topsoil / Excess Material	1.18 Ac
Additional Clearing	9.99 Ac
<b>Total Disturbed Area</b>	<b>20.72 Ac</b>

Additional Information	
Total Wooded Area Disturbed	1.38 Ac
<b>Total Linear Feet of Access Road</b>	<b>1,474.59'</b>

- Legend**
- Original Ground 2' Contour
  - Original Ground 10' Contour
  - Access Road Design 2' Contour
  - Access Road Design 10' Contour
  - Center of Structure
  - Silt Fence
  - 24" Compost Filter Sock
  - Super Silt Fence
  - Limits of Disturbance
  - Area of Interest
  - Existing Gas Line
  - Existing Utility Pole Line
  - Rock Lined Ditch
  - PEM Wetland
  - POW Wetland
  - PSS Wetland
  - Perennial Stream
  - Intermittent Stream
  - Ephemeral Stream
  - Toe Key
  - Erosion Control Blanket Slope Area
  - Stone Check Dam



**TUG HILL**  
**OPERATING**



THIS DOCUMENT  
 PREPARED FOR  
 TUG HILL  
 OPERATING

**Kelly Surveying**  
 125 West 254  
 Street, WV 26239  
 304-538-6985

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