



west virginia department of environmental protection

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

Austin Caperton , Cabinet Secretary
www.dep.wv.gov

Tuesday, February 27, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
1320 SOUTH UNIVERSITY DRIVE, SUITE 500

FORT WORTH , TX 76107

Re: Permit approval for HEAVEN HILL 3-6HU
47-051-01968-00-00

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: HEAVEN HILL 3-6HU
Farm Name: RICKY L WHITLATCH
U.S. WELL NUMBER: 47-051-01968-00-00
Horizontal 6A / New Drill
Date Issued: 2/27/2018

Promoting a healthy environment.

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

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.



west virginia department of environmental protection

Oil and Gas Conservation Commission
601 57th Street, SE Charleston, WV 25304
(304)926-0499, Ext 1656

Barry K. Lay, Chairman
ogcc.wv.gov

February 5, 2018

Department of Environmental Protection
Office of Oil and Gas
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-051-01968

COMPANY: Tug Hill Operating, LLC

FARM: Tug Hill Operating, LLC Heaven Hill 3-6HU

COUNTY: Marshall DISTRICT: Meade QUAD: Glen Easton 7 ½'

The deep well review of the application for the above company is **Approved to drill to Trenton for Point Pleasant completion.**

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Comments to Notice of Deviation filed? No.
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: 47-051-01910.
4. Provided a plat showing that the proposed location is a distance of 400+ feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

Susan Rose
Administrator

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 Meade Glen Easton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Heaven Hill 3-6HU Well Pad Name: Heaven Hill 3

3) Farm Name/Surface Owner: Ricky L. Whitlatch Public Road Access: Yeater Land CR 21/11

4) Elevation, current ground: 1339' Elevation, proposed post-construction: 1326'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow _____ Deep
Horizontal

6) Existing Pad: Yes or No No

JM
1/26/18

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Point Pleasant is the target formation at a depth of 11545' - 11679' thickness of 134' and anticipated pressure of approx. 7500 psi

8) Proposed Total Vertical Depth: 11,829'

9) Formation at Total Vertical Depth: Trenton

10) Proposed Total Measured Depth: 19,376'

11) Proposed Horizontal Leg Length: 7,028'

12) Approximate Fresh Water Strata Depths: 70', 1038'

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

14) Approximate Saltwater Depths: 2,167'

15) Approximate Coal Seam Depths: Sewickly Coal - 946' and Pittsburgh Coal - 1031'

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: Marshall County Coal Co. / Marshall County Mine
Depth: 1031' TVD and 308' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

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	20"	NEW	J55	106.5#	1,088'	1,088'	1746ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2,800'	2,800'	1974ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	47#	10,682'	10,682'	3485ft^3(CTS)
Production	5 1/2"	NEW	HPP110	23#	19,376'	19,376'	4620ft^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		11,419'	
Liners							

pu
1/20/18

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	20"	26"	.5	2,410	1,928	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.472	10,730	6,968	SEE#24	1.99
Production	5 1/2"	8 1/2"	.415	13,580	10,864	SEE#24	1.18
Tubing	2 3/8"			14,530	11,624		
Liners							

PACKERS

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

John
1/26/18

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. 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 17,570,000 lb proppant and 271,645 bbl of water. Max rate = 80 bpm; max psi = 12,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 18.43

22) Area to be disturbed for well pad only, less access road (acres): 7.15

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediates will have 1 centralizer every third joint. Production casing will have one centralizer every third joint in lateral, one centralizer every joint through curve, one centralizer every third joint to surface.

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

*See Attachment

25) Proposed borehole conditioning procedures:

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

*Note: Attach additional sheets as needed.

Conductor and Fresh Water Casing Cement:

Premium NE-1 + 2% CaCl

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

Coal Casing Cement:

Premium NE-1 + 1.5% CaCl + Flake

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

Intermediate Casing Cement:

Lead: *Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170*

Tail: *Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate*

- Premium NE-1 – Class A Portland API spec
- BA-90 – Gas Migration Mitigator
- R-3 – Cement Retarder
- KCl – Potassium Chloride
- FP-13L – Anti-Foaming Agent
- MPA-170 – Gelling Agent
- CD-32 – Dispersant
- FL-52 – Fluid Loss Agent
- ASA-301 – Free Water Control Agent
- Sodium Metasilicate – Extending Agent

Kick Off Plug:

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

- CD-32 – Dispersant
- Sodium Metasilicate – Extending Agent
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent

Production Casing Cement:

Lead: *50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L*

Tail: *25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L*

- R-3 – Cement Retarder
- MPA-250 – Gelling Agent
- FP-13L – Anti-Foaming Agent

SI-01948



Tug Hill Operating, LLC Casing and Cement Program

Heaven Hill 3-6HU

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	1,088'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,800'	CTS
Intermediate 2	9 5/8"	HPP110	12 1/4"	10,682'	CTS
Production	5 1/2"	HCP110	8 1/2"	19,376'	CTS

Cement

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate 1: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.2

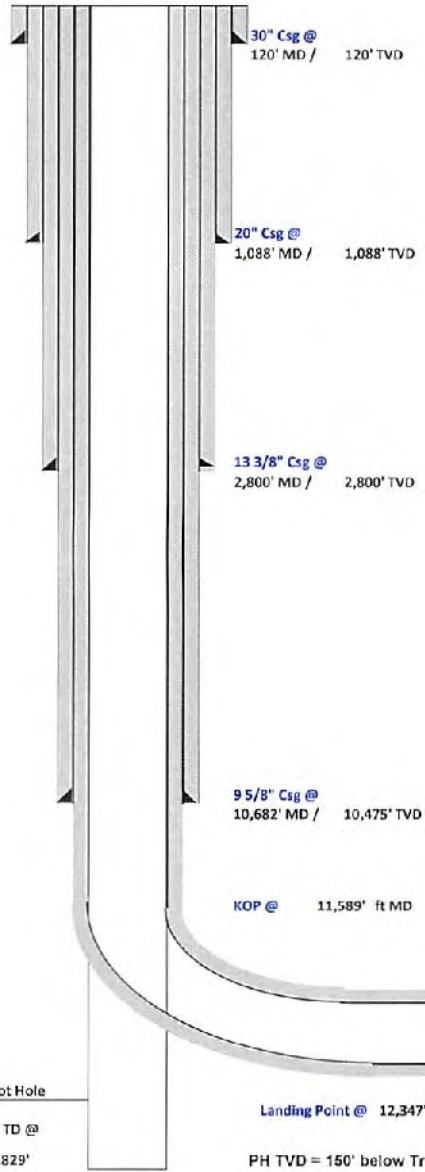
Intermediate 2: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.99

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 = 1.18

8910-13



WELL NAME: Heaven Hill 3-6HU
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Meade
 DF Elev: 1,326' GL Elev: 1,326'
 TD: 19,376'
 TH Latitude: 39.80865589
 TH Longitude: -80.69330431
 BH Latitude: 39.78428312
 BH Longitude: -80.68379952



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1,038'
Sewidley Coal	946'
Pittsburgh Coal	1,031'
Big Line	2,060'
Berea	2,684'
Tully	6,617'
Marcellus	6,724'
Onondaga	6,776'
Salina	7,493'
Lockport	8,553'
Utica	11,374'
Point Pleasant	11,545'
Landing Depth	11,588'
Trenton	11,679'
Pilot Hole TD	11,829'

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	26	20	1,088'	1,088'	106.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,800'	2,800'	54.5	J55	Surface
Intermediate 2	12 1/4	9 5/8	10,682'	10,475'	47	HPP110	Surface
Production	8 1/2	5 1/2	19,376'	11,711'	23	HCP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,883	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	2,140	A	15	Air	1 Centralizer every other jt
Intermediate 2	2,830	A	14.5	Air	1 Centralizer every other jt
Production	3,970	A	15	Air / SOB M	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Joe
1/26/18

Pilot Hole
PH TD @
11,829'

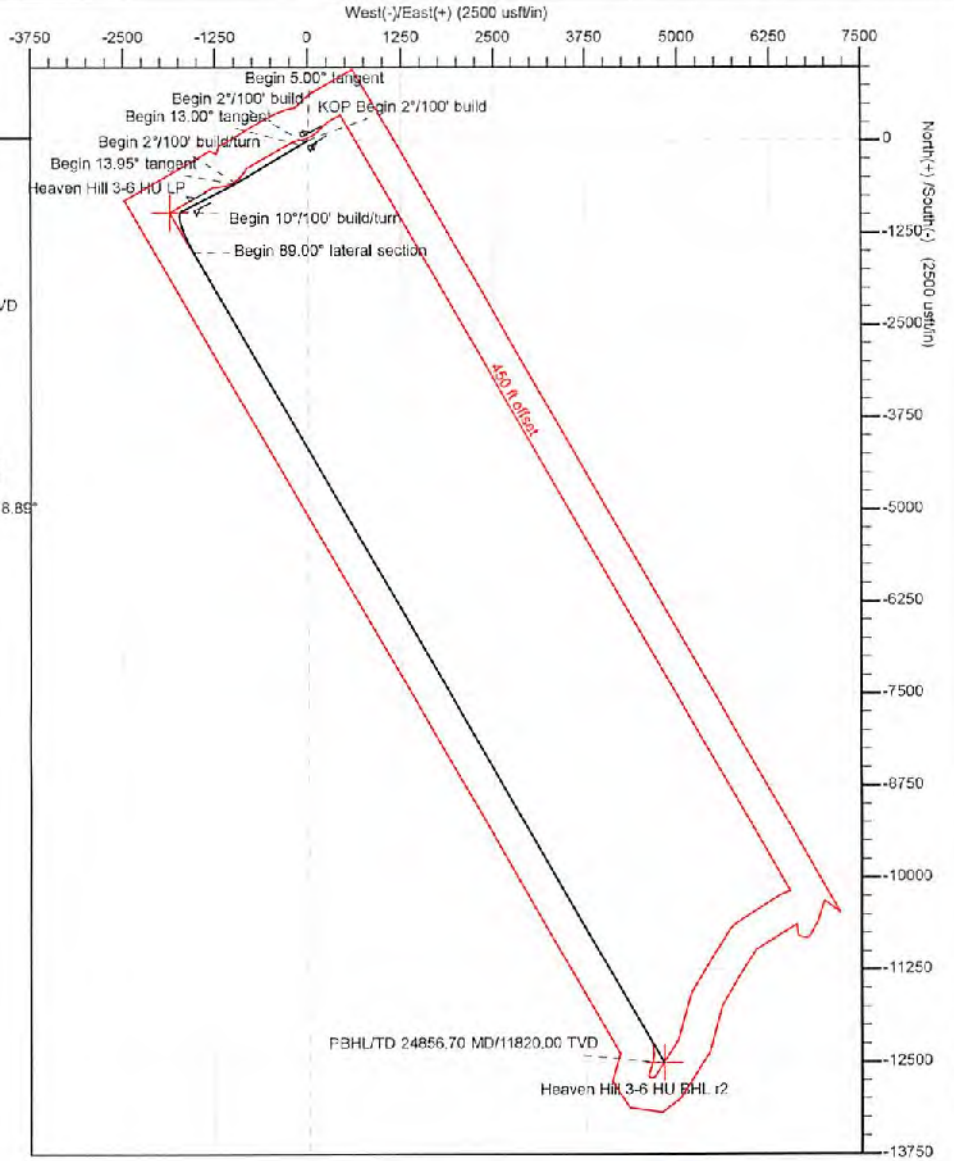
Landing Point @ 12,347' MD / 11,588' TVD
PH TVD = 150' below Trenton Top

Lateral TD @ 19,376' ft MD
11,711' ft TVD

SI-01968



Well: Heaven Hill 3-6 HU
 Site: Heaven Hill 3
 Project: Marshall County, West Virginia
 Design: rev3
 SECTION DETAILS



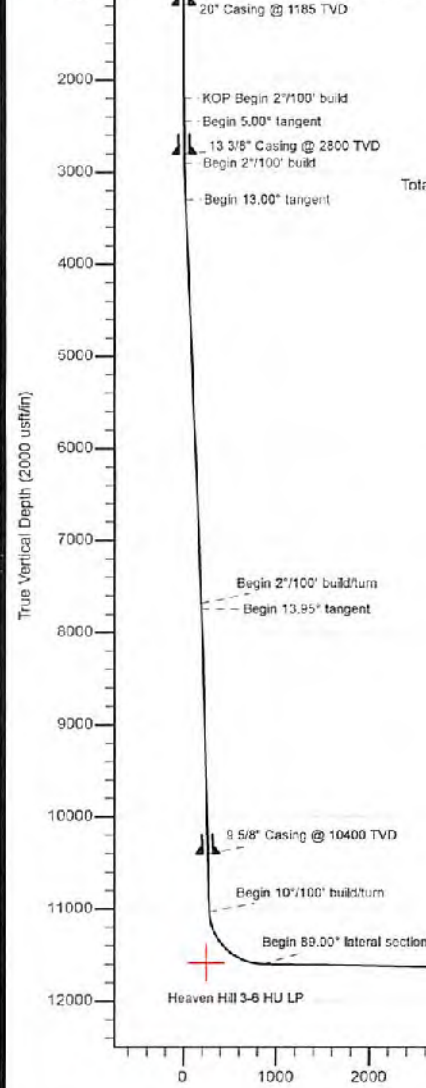
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dip	TFace	V Sect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	0.00	0.00	
3	2450.00	5.00	239.00	2449.68	-3.61	-9.34	2.00	239.00	1.69	KOP Begin 2 1/100' build
4	2902.04	5.00	239.00	2900.00	-25.91	-43.11	0.00	0.00	3.72	Begin 5.00° tangent
5	3302.04	13.00	239.00	3294.75	-58.11	-96.71	2.00	0.00	19.57	Begin 2 1/100' build
6	7002.04	13.00	239.00	7679.42	-578.47	-964.40	0.00	0.00	195.15	Begin 13.00° tangent
7	7969.09	13.95	243.07	7744.63	-587.02	-978.07	2.00	46.93	197.30	Begin 2 1/100' build/turn
8	11259.02	13.95	243.07	11034.53	-957.17	-1706.84	0.00	0.00	231.63	Begin 13.95° tangent
9	12156.70	89.00	150.00	11593.35	-1513.60	-1544.01	10.00	-83.22	859.37	Begin 10 1/100' build/turn
10	24856.70	89.00	150.00	11820.00	-12510.45	4865.03	0.00	0.00	3401.48	Begin 89.00° lateral section

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

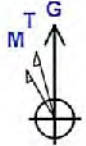
System Datum: Mean Sea Level
 Depth Reference: GL=1326 @ 1326.00usft

Northing	Easting	Latitude	Longitude
14457206.09	1726546.42	39.80865589	-80.69330431

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.89°



Vertical Section at 158.93° (2000 usf/in)



Azimuths to Grid North
 True North: -0.20°
 Magnetic North: -8.88°

Magnetic Field
 Strength: 52225.1snT
 Dip Angle: 67.00°
 Date: 2/3/2017
 Model: IGRF2015



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 DPS GIS (12/19/2016) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

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

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

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

Permit well - Heaven Hill 3-6HU

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
4705101934	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101962	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101963	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101947	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101948	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705170646	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely, Probably an old shallow well that is not penetrating depths within 1000' of the Marcellus	Well records incomplete, part of orphaned well project. A field survey was conducted to locate this well and no evidence of this well was found.
4705100862	Hope Natural Gas	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old shallow producing well that has since been plugged	Old well, records are incomplete. A field survey was conducted to locate this well and this well was found plugged at the location shown on the well plat.
4705100856	Hope Natural Gas	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old shallow producing well that has since been plugged	Old well, records are incomplete. A field survey was conducted to locate this well and this well was found plugged at the location shown on the well plat.



Select County: (051) Marshall
 Enter Permit #: 70646
 Select datatypes: (Check All)
 Location Production Plugging
 Owner/Completion Stratigraphy Sample
 Pay/Show/Water Logs Blm Hole Loc
 [Get Data] [Reset]

- [Title Restrictions](#)
- [County Code Translations](#)
- [Permit Numbering Series](#)
- [Usage Notes](#)
- [Contact Information](#)
- [Disclaimer](#)
- [WVGES Main](#)
- ["Pipeline-Plus" New](#)

WV Geological & Economic Survey:

Well: County

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4705170646	Marshall	70646	Meade	Glen Easton	Cameron	39.927431	-80.026161	528009.7	4408428.4

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION
4705170646	unknown	Prpty Maa. W J Watzel	1				OP=Blackshere	Oper in Min. owner fd. no code assign/Orphan well prc

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_F
4705170646	unclassified	unclassified	not available	unknown	unknown			

There is no Pay data for this well

There is no Production Gas data for this well

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

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


There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

51-01968



Select County: (051) Marshall
 Enter Permit #: 00852
 Select datatypes: (Check All)
 Location Production Plugging
 Owner/Completion Stratigraphy Sample
 Pay/ShowWater Logs Btm Hole Loc

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

WV Geological & Economic Survey: Well: County = 51 Permit = 00862

Well Reassignment Information: Reassigned From

OLD_COUNTY	OLD_PERMIT	NEW_COUNTY	NEW_PERMIT
51	70650	51	862

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705100852	Marshall	862	Meade	Glen Easton	Cameron	39.794224	-80.691968	528397.9	4404963.9

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLET
4705100852	11/14/2001	Plugging	Completed	David A Whetzel		M-242			Consolidation Coal Co	Consolidation Coal Co
4705100862	-/-	Original Les	Prpy Map	M E Cunningham		724				Hope Natural Gas Company

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD
4705100862	11/14/2001	11/11/2001								not available	unknown	unknown	
4705100862	-/-	-/-						unclassified	unclassified	not available	unknown	unknown	

There is no Pay data for this well


There is no Production Gas data for this well

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

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

There is no Stratigraphy data for this well

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



Select County: (051) Marshall
 Enter Permit #: 00856
 Select datatypes: (Check All)
 Location Production Plugging
 Owner/Completion Stratigraphy Sample
 Pay/ShowWater Logs Btm Hole Loc

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

WV Geological & Economic Survey: Well: County = 51 Permit = 00856

Well Reassignment Information: Reassigned From

OLD_COUNTY	OLD_PERMIT	NEW_COUNTY	NEW_PERMIT
51	70789	51	856

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4705100856	Marshall	856	Meade	Glen Easton	Cameron	39.750293	-80.695919	526609.6	4424529.5

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_1
4705100856	12/5/2000	Plugging	Completed	Kenneth & Delores McCordle		M-80			McElroy Coal Co	McElroy Coal Company	
4705100856	-/-	unknown	Prpy Map	Samuel Riggs		571				Hope Natural Gas Company	

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW
4705100856	12/5/2000	11/14/2000								not available	unknown	unknown			
4705100856	-/-	-/-						unclassified	unclassified	not available	unknown	unknown			

There is no Pay data for this well

There is no Production Gas data for this well

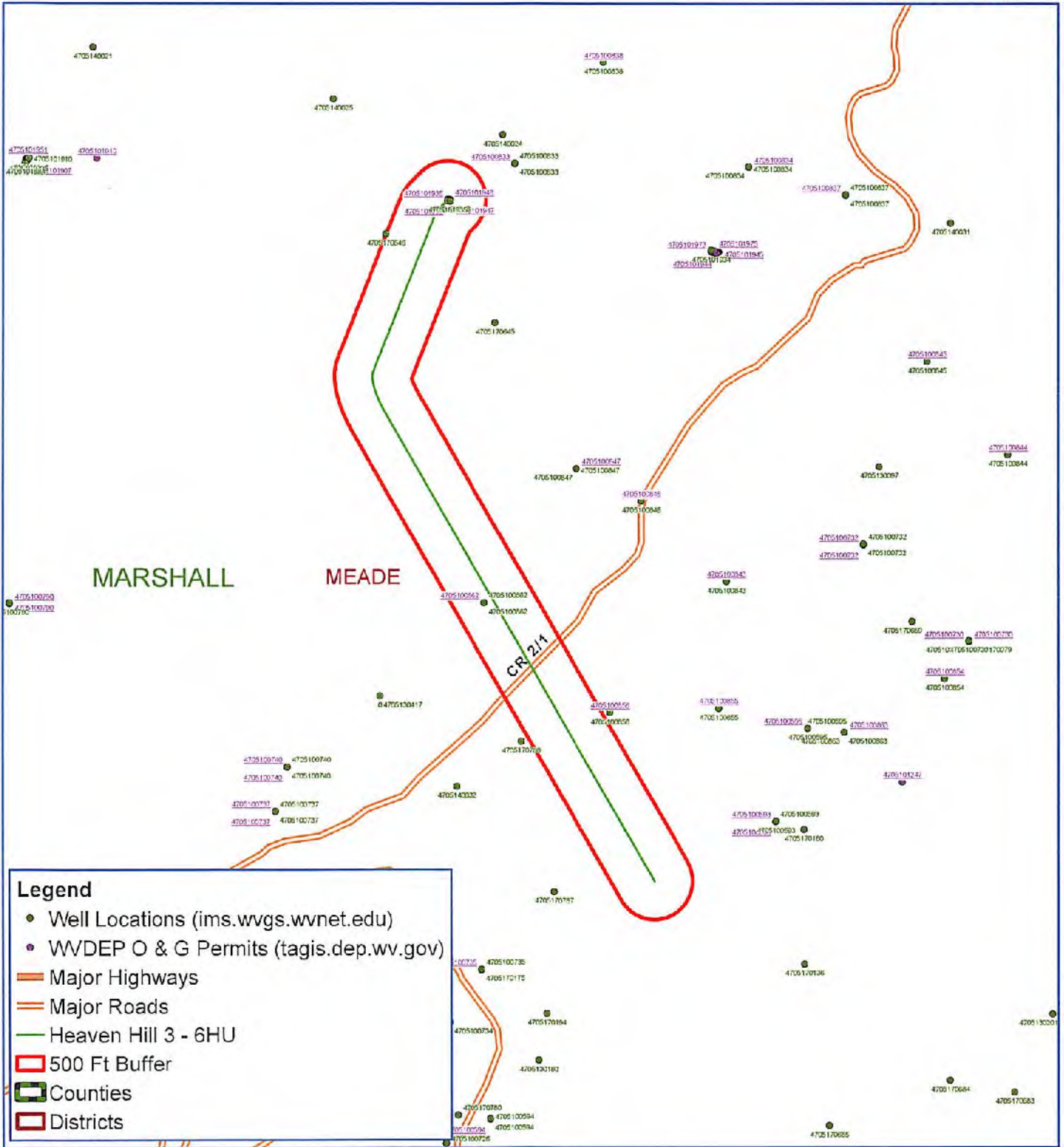
There is no Production Oil data for this well ** some operators may have reported NGL under Oil

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

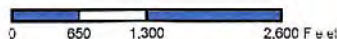


Legend

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Major Highways
- Major Roads
- Heaven Hill 3 - 6HU
- ▭ 500 Ft Buffer
- ▭ Counties
- ▭ Districts



Heaven Hill 3-6HU Meade District Marshall County, WV



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

Map Created: January 20, 2015
Map Query As Of: January 20, 2015



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Project	Marshall County, West Virginia		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (64 W to 78 W)		

Site	Heaven Hill 3				
Site Position:		Northing:	14,457,178.77 usft	Latitude:	39.80858060
From:	Lat/Long	Easting:	1,726,571.98 usft	Longitude:	-80.69321360
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.20 °

Well	Heaven Hill 3-6 HU					
Well Position	+N/-S	0.00 usft	Northing:	14,457,206.09 usft	Latitude:	39.80865589
	+E/-W	0.00 usft	Easting:	1,726,546.42 usft	Longitude:	-80.69330431
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,326.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/3/2017	-8.69	67.00	52,225.11223066

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	158.99

Plan Survey Tool Program	Date	6/27/2017		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	24,856.70 rev3 (Original Hole)	MWD MWD - Standard	



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,450.00	5.00	239.00	2,449.68	-5.61	-9.34	2.00	2.00	0.00	239.00	
2,902.04	5.00	239.00	2,900.00	-25.91	-43.11	0.00	0.00	0.00	0.00	
3,302.04	13.00	239.00	3,294.75	-58.11	-96.71	2.00	2.00	0.00	0.00	
7,802.04	13.00	239.00	7,679.42	-579.47	-964.40	0.00	0.00	0.00	0.00	
7,869.09	13.95	243.07	7,744.63	-587.02	-978.07	2.00	1.42	6.06	46.93	
11,259.02	13.95	243.07	11,034.58	-957.17	-1,706.64	0.00	0.00	0.00	0.00	
12,156.70	89.00	150.00	11,598.35	-1,513.60	-1,544.01	10.00	8.36	-10.37	-93.22	
24,856.70	89.00	150.00	11,820.00	-12,510.45	4,805.03	0.00	0.00	0.00	0.00	Heaven Hill 3-6 HU B



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
100.00	0.00	0.00	100.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
200.00	0.00	0.00	200.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
300.00	0.00	0.00	300.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
400.00	0.00	0.00	400.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
500.00	0.00	0.00	500.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
600.00	0.00	0.00	600.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
700.00	0.00	0.00	700.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
800.00	0.00	0.00	800.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
900.00	0.00	0.00	900.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,457,206.09	1,726,546.42	39.80865589	-80.69330431	
KOP Begin 2°/100' build										
2,300.00	2.00	239.00	2,299.98	-0.90	-1.50	14,457,205.20	1,726,544.92	39.80865344	-80.69330965	
2,400.00	4.00	239.00	2,399.84	-3.59	-5.98	14,457,202.50	1,726,540.43	39.80864608	-80.69332565	
2,450.00	5.00	239.00	2,449.66	-5.61	-9.34	14,457,200.48	1,726,537.07	39.80864056	-80.69333765	
Begin 5.00° tangent										
2,500.00	5.00	239.00	2,499.49	-7.86	-13.08	14,457,198.24	1,726,533.34	39.80863443	-80.69335098	
2,600.00	5.00	239.00	2,599.11	-12.35	-20.55	14,457,193.75	1,726,525.86	39.80862217	-80.69337764	
2,700.00	5.00	239.00	2,698.73	-16.84	-28.02	14,457,189.26	1,726,518.39	39.80860992	-80.69340429	
2,800.00	5.00	239.00	2,798.35	-21.33	-35.49	14,457,184.77	1,726,510.92	39.80859766	-80.69343095	
2,900.00	5.00	239.00	2,897.97	-25.81	-42.96	14,457,180.28	1,726,503.45	39.80858540	-80.69345761	
2,902.04	5.00	239.00	2,900.00	-25.91	-43.11	14,457,180.19	1,726,503.30	39.80858515	-80.69345815	
Begin 2°/100' build										
3,000.00	6.96	239.00	2,997.42	-31.16	-51.86	14,457,174.93	1,726,494.55	39.80857080	-80.69348836	
3,100.00	8.96	239.00	3,096.46	-38.29	-63.73	14,457,167.60	1,726,482.66	39.80855133	-80.69353171	
3,200.00	10.96	239.00	3,194.94	-47.20	-78.55	14,457,158.89	1,726,467.86	39.80852701	-80.69358460	
3,300.00	12.96	239.00	3,292.77	-57.87	-96.32	14,457,148.22	1,726,450.10	39.80849787	-80.69364798	
3,302.04	13.00	239.00	3,294.75	-58.11	-96.71	14,457,147.99	1,726,449.71	39.80849722	-80.69364938	
Begin 13.00° tangent										
3,400.00	13.00	239.00	3,390.21	-69.46	-115.60	14,457,136.64	1,726,430.82	39.80846623	-80.69371677	
3,500.00	13.00	239.00	3,487.64	-81.04	-134.88	14,457,125.05	1,726,411.54	39.80843460	-80.69378557	
3,600.00	13.00	239.00	3,585.08	-92.63	-154.16	14,457,113.47	1,726,392.25	39.80840296	-80.69385436	
3,700.00	13.00	239.00	3,682.52	-104.21	-173.44	14,457,101.88	1,726,372.97	39.80837132	-80.69392318	
3,800.00	13.00	239.00	3,779.95	-115.80	-192.72	14,457,090.29	1,726,353.69	39.80833969	-80.69399198	
3,900.00	13.00	239.00	3,877.39	-127.39	-212.01	14,457,078.71	1,726,334.41	39.80830805	-80.69406078	
4,000.00	13.00	239.00	3,974.83	-138.97	-231.29	14,457,067.12	1,726,315.13	39.80827641	-80.69412958	
4,100.00	13.00	239.00	4,072.27	-150.56	-250.57	14,457,055.54	1,726,295.84	39.80824478	-80.69419838	
4,200.00	13.00	239.00	4,169.70	-162.14	-269.85	14,457,043.95	1,726,276.56	39.80821314	-80.69426718	
4,300.00	13.00	239.00	4,267.14	-173.73	-289.14	14,457,032.36	1,726,257.28	39.80818150	-80.69433598	
4,400.00	13.00	239.00	4,364.58	-185.32	-308.42	14,457,020.78	1,726,238.00	39.80814987	-80.69440478	
4,500.00	13.00	239.00	4,462.01	-196.90	-327.70	14,457,009.19	1,726,218.72	39.80811823	-80.69447358	
4,600.00	13.00	239.00	4,559.45	-208.49	-346.98	14,456,997.61	1,726,199.43	39.80808659	-80.69454238	



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,700.00	13.00	239.00	4,656.89	-220.07	-366.26	14,456,986.02	1,726,180.15	39.80805496	-80.69461118
4,800.00	13.00	239.00	4,754.32	-231.66	-385.55	14,456,974.43	1,726,180.87	39.80802332	-80.69467998
4,900.00	13.00	239.00	4,851.76	-243.24	-404.83	14,456,962.85	1,726,141.59	39.80799168	-80.69474878
5,000.00	13.00	239.00	4,949.20	-254.83	-424.11	14,456,951.26	1,726,122.31	39.80796005	-80.69481758
5,100.00	13.00	239.00	5,046.64	-266.42	-443.39	14,456,939.68	1,726,103.02	39.80792841	-80.69488638
5,200.00	13.00	239.00	5,144.07	-278.00	-462.67	14,456,928.09	1,726,083.74	39.80789677	-80.69495518
5,300.00	13.00	239.00	5,241.51	-289.59	-481.96	14,456,916.51	1,726,064.46	39.80786513	-80.69502398
5,400.00	13.00	239.00	5,338.95	-301.17	-501.24	14,456,904.92	1,726,045.18	39.80783350	-80.69509278
5,500.00	13.00	239.00	5,436.38	-312.76	-520.52	14,456,893.33	1,726,025.90	39.80780186	-80.69516158
5,600.00	13.00	239.00	5,533.82	-324.35	-539.80	14,456,881.75	1,726,006.61	39.80777022	-80.69523038
5,700.00	13.00	239.00	5,631.26	-335.93	-559.08	14,456,870.18	1,725,987.33	39.80773859	-80.69529917
5,800.00	13.00	239.00	5,728.69	-347.52	-578.37	14,456,858.58	1,725,968.05	39.80770695	-80.69536797
5,900.00	13.00	239.00	5,826.13	-359.10	-597.65	14,456,846.99	1,725,948.77	39.80767531	-80.69543677
6,000.00	13.00	239.00	5,923.57	-370.69	-616.93	14,456,835.40	1,725,929.48	39.80764367	-80.69550557
6,100.00	13.00	239.00	6,021.01	-382.27	-636.21	14,456,823.82	1,725,910.20	39.80761204	-80.69557437
6,200.00	13.00	239.00	6,118.44	-393.86	-655.49	14,456,812.23	1,725,890.92	39.80758040	-80.69564317
6,300.00	13.00	239.00	6,215.88	-405.45	-674.78	14,456,800.65	1,725,871.64	39.80754876	-80.69571197
6,400.00	13.00	239.00	6,313.32	-417.03	-694.06	14,456,789.06	1,725,852.36	39.80751712	-80.69578077
6,500.00	13.00	239.00	6,410.75	-428.62	-713.34	14,456,777.48	1,725,833.07	39.80748549	-80.69584957
6,600.00	13.00	239.00	6,508.19	-440.20	-732.62	14,456,765.89	1,725,813.79	39.80745385	-80.69591837
6,700.00	13.00	239.00	6,605.63	-451.79	-751.90	14,456,754.30	1,725,794.51	39.80742221	-80.69598717
6,800.00	13.00	239.00	6,703.06	-463.38	-771.19	14,456,742.72	1,725,775.23	39.80739057	-80.69605596
6,900.00	13.00	239.00	6,800.50	-474.96	-790.47	14,456,731.13	1,725,755.95	39.80735894	-80.69612476
7,000.00	13.00	239.00	6,897.94	-486.55	-809.75	14,456,719.55	1,725,736.66	39.80732730	-80.69619356
7,100.00	13.00	239.00	6,995.38	-498.13	-829.03	14,456,707.96	1,725,717.38	39.80729566	-80.69626236
7,200.00	13.00	239.00	7,092.81	-509.72	-848.32	14,456,696.37	1,725,698.10	39.80726402	-80.69633116
7,300.00	13.00	239.00	7,190.25	-521.31	-867.60	14,456,684.79	1,725,678.82	39.80723238	-80.69639996
7,400.00	13.00	239.00	7,287.69	-532.89	-886.88	14,456,673.20	1,725,659.54	39.80720075	-80.69646875
7,500.00	13.00	239.00	7,385.12	-544.48	-906.16	14,456,661.62	1,725,640.25	39.80716911	-80.69653755
7,600.00	13.00	239.00	7,482.56	-556.06	-925.44	14,456,650.03	1,725,620.97	39.80713747	-80.69660635
7,700.00	13.00	239.00	7,580.00	-567.65	-944.73	14,456,638.45	1,725,601.69	39.80710583	-80.69667515
7,800.00	13.00	239.00	7,677.43	-579.23	-964.01	14,456,626.86	1,725,582.41	39.80707419	-80.69674395
7,802.04	13.00	239.00	7,679.42	-579.47	-964.40	14,456,626.62	1,725,582.01	39.80707355	-80.69674535
Begin 2°/100' build/turn									
7,889.09	13.95	243.07	7,744.63	-587.02	-978.07	14,456,619.06	1,725,568.34	39.80705295	-80.69679412
Begin 13.95° tangent									
7,900.00	13.95	243.07	7,774.63	-590.39	-984.71	14,456,615.70	1,725,561.70	39.80704375	-80.69681781
8,000.00	13.95	243.07	7,871.68	-601.31	-1,006.21	14,456,604.78	1,725,540.21	39.80701396	-80.69689447
8,100.00	13.95	243.07	7,968.73	-612.23	-1,027.70	14,456,593.86	1,725,518.72	39.80698417	-80.69697113
8,200.00	13.95	243.07	8,065.78	-623.15	-1,049.19	14,456,582.95	1,725,497.22	39.80695439	-80.69704779
8,300.00	13.95	243.07	8,162.83	-634.07	-1,070.68	14,456,572.03	1,725,475.73	39.80692460	-80.69712445
8,400.00	13.95	243.07	8,259.88	-644.99	-1,092.18	14,456,561.11	1,725,454.24	39.80689481	-80.69720111
8,500.00	13.95	243.07	8,356.93	-655.91	-1,113.67	14,456,550.19	1,725,432.75	39.80686502	-80.69727777
8,600.00	13.95	243.07	8,453.98	-666.83	-1,135.16	14,456,539.27	1,725,411.25	39.80683524	-80.69735443
8,700.00	13.95	243.07	8,551.03	-677.75	-1,156.65	14,456,528.35	1,725,389.76	39.80680545	-80.69743109
8,800.00	13.95	243.07	8,648.08	-688.66	-1,178.14	14,456,517.43	1,725,368.27	39.80677566	-80.69750775
8,900.00	13.95	243.07	8,745.13	-699.58	-1,199.64	14,456,506.51	1,725,346.78	39.80674587	-80.69758441
9,000.00	13.95	243.07	8,842.18	-710.50	-1,221.13	14,456,495.59	1,725,325.29	39.80671609	-80.69766107
9,100.00	13.95	243.07	8,939.24	-721.42	-1,242.62	14,456,484.67	1,725,303.79	39.80668630	-80.69773772
9,200.00	13.95	243.07	9,036.29	-732.34	-1,264.11	14,456,473.75	1,725,282.30	39.80665651	-80.69781438
9,300.00	13.95	243.07	9,133.34	-743.26	-1,285.61	14,456,462.83	1,725,260.81	39.80662672	-80.69789104
9,400.00	13.95	243.07	9,230.39	-754.18	-1,307.10	14,456,451.91	1,725,239.32	39.80659693	-80.69796770
9,500.00	13.95	243.07	9,327.44	-765.10	-1,328.59	14,456,440.99	1,725,217.82	39.80656715	-80.69804436
9,600.00	13.95	243.07	9,424.49	-776.02	-1,350.08	14,456,430.07	1,725,196.33	39.80653735	-80.69812102



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,700.00	13.95	243.07	9,521.54	-786.94	-1,371.57	14,456,419.16	1,725,174.84	39.80650757	-80.69819768
9,800.00	13.95	243.07	9,618.59	-797.86	-1,393.07	14,456,408.24	1,725,153.35	39.80647778	-80.69827434
9,900.00	13.95	243.07	9,715.64	-808.78	-1,414.58	14,456,397.32	1,725,131.86	39.80644799	-80.69835099
10,000.00	13.95	243.07	9,812.69	-819.70	-1,436.05	14,456,386.40	1,725,110.36	39.80641821	-80.69842765
10,100.00	13.95	243.07	9,909.74	-830.62	-1,457.54	14,456,375.48	1,725,088.87	39.80638842	-80.69850431
10,200.00	13.95	243.07	10,006.79	-841.54	-1,479.04	14,456,364.56	1,725,067.38	39.80635863	-80.69858097
10,300.00	13.95	243.07	10,103.84	-852.45	-1,500.53	14,456,353.64	1,725,045.89	39.80632884	-80.69865763
10,400.00	13.95	243.07	10,200.90	-863.37	-1,522.02	14,456,342.72	1,725,024.39	39.80629905	-80.69873429
10,500.00	13.95	243.07	10,297.95	-874.29	-1,543.51	14,456,331.80	1,725,002.90	39.80626926	-80.69881094
10,600.00	13.95	243.07	10,395.00	-885.21	-1,565.01	14,456,320.88	1,724,981.41	39.80623947	-80.69888760
10,700.00	13.95	243.07	10,492.05	-896.13	-1,586.50	14,456,309.96	1,724,959.92	39.80620969	-80.69896426
10,800.00	13.95	243.07	10,589.10	-907.05	-1,607.99	14,456,299.04	1,724,938.43	39.80617990	-80.69904092
10,900.00	13.95	243.07	10,686.15	-917.97	-1,629.48	14,456,288.12	1,724,916.93	39.80615011	-80.69911757
11,000.00	13.95	243.07	10,783.20	-928.89	-1,650.97	14,456,277.20	1,724,895.44	39.80612032	-80.69919423
11,100.00	13.95	243.07	10,880.25	-939.81	-1,672.47	14,456,266.28	1,724,873.95	39.80609053	-80.69927089
11,200.00	13.95	243.07	10,977.30	-950.73	-1,693.96	14,456,255.37	1,724,852.46	39.80606074	-80.69934755
11,259.02	13.95	243.07	11,034.58	-957.17	-1,706.64	14,456,248.92	1,724,839.77	39.80604316	-80.69939279
Begin 10°/100' build/turn									
11,300.00	14.31	226.28	11,074.34	-962.91	-1,714.71	14,456,243.18	1,724,831.71	39.80602747	-80.69942158
11,400.00	19.17	195.27	11,170.26	-987.35	-1,728.00	14,456,218.75	1,724,818.42	39.80596049	-80.69946918
11,500.00	26.94	178.95	11,262.29	-1,025.93	-1,731.91	14,456,180.16	1,724,814.50	39.80585456	-80.69948360
11,600.00	35.78	169.88	11,347.85	-1,077.50	-1,726.35	14,456,128.60	1,724,820.07	39.80571290	-80.69946439
11,700.00	45.06	164.08	11,423.72	-1,140.47	-1,711.46	14,456,065.62	1,724,834.95	39.80553982	-80.69941214
11,800.00	54.55	159.92	11,488.21	-1,212.94	-1,687.71	14,455,993.15	1,724,858.70	39.80534058	-80.69932845
11,900.00	64.14	156.65	11,539.14	-1,292.71	-1,655.82	14,455,913.38	1,724,890.59	39.80512122	-80.69921584
12,000.00	73.80	153.88	11,574.99	-1,377.35	-1,616.75	14,455,828.74	1,724,929.66	39.80488842	-80.69907775
12,100.00	83.50	151.37	11,594.65	-1,464.29	-1,571.70	14,455,741.81	1,724,974.72	39.80464925	-80.69891838
12,156.70	89.00	150.00	11,598.35	-1,513.60	-1,544.01	14,455,692.49	1,725,002.41	39.80451357	-80.69882037
Begin 89.00° lateral section									
12,200.00	89.00	150.00	11,599.11	-1,551.09	-1,522.36	14,455,655.00	1,725,024.05	39.80441040	-80.69874374
12,300.00	89.00	150.00	11,600.86	-1,637.68	-1,472.37	14,455,568.41	1,725,074.05	39.80417215	-80.69856678
12,400.00	89.00	150.00	11,602.60	-1,724.27	-1,422.38	14,455,481.82	1,725,124.04	39.80393389	-80.69838982
12,500.00	89.00	150.00	11,604.35	-1,810.86	-1,372.38	14,455,395.23	1,725,174.03	39.80369563	-80.69821286
12,600.00	89.00	150.00	11,606.09	-1,897.45	-1,322.39	14,455,308.64	1,725,224.02	39.80345737	-80.69803589
12,700.00	89.00	150.00	11,607.84	-1,984.04	-1,272.40	14,455,222.05	1,725,274.01	39.80321911	-80.69785894
12,800.00	89.00	150.00	11,609.58	-2,070.63	-1,222.41	14,455,135.46	1,725,324.01	39.80298085	-80.69768198
12,900.00	89.00	150.00	11,611.33	-2,157.22	-1,172.42	14,455,048.87	1,725,374.00	39.80274259	-80.69750502
13,000.00	89.00	150.00	11,613.07	-2,243.81	-1,122.42	14,454,962.29	1,725,423.99	39.80250433	-80.69732807
13,100.00	89.00	150.00	11,614.82	-2,330.40	-1,072.43	14,454,875.70	1,725,473.98	39.80226607	-80.69715111
13,200.00	89.00	150.00	11,616.56	-2,416.99	-1,022.44	14,454,789.11	1,725,523.98	39.80202781	-80.69697416
13,300.00	89.00	150.00	11,618.31	-2,503.58	-972.45	14,454,702.52	1,725,573.97	39.80178955	-80.69679721
13,400.00	89.00	150.00	11,620.05	-2,590.17	-922.45	14,454,615.93	1,725,623.96	39.80155129	-80.69662026
13,500.00	89.00	150.00	11,621.80	-2,676.76	-872.46	14,454,529.34	1,725,673.95	39.80131303	-80.69644331
13,600.00	89.00	150.00	11,623.54	-2,763.35	-822.47	14,454,442.75	1,725,723.95	39.80107477	-80.69626636
13,700.00	89.00	150.00	11,625.29	-2,849.93	-772.48	14,454,356.16	1,725,773.94	39.80083650	-80.69608941
13,800.00	89.00	150.00	11,627.03	-2,936.52	-722.48	14,454,269.57	1,725,823.93	39.80059824	-80.69591246
13,900.00	89.00	150.00	11,628.78	-3,023.11	-672.49	14,454,182.98	1,725,873.92	39.80035998	-80.69573552
14,000.00	89.00	150.00	11,630.52	-3,109.70	-622.50	14,454,096.39	1,725,923.92	39.80012172	-80.69555858
14,100.00	89.00	150.00	11,632.27	-3,196.29	-572.51	14,454,009.80	1,725,973.91	39.79988345	-80.69538163
14,200.00	89.00	150.00	11,634.02	-3,282.88	-522.51	14,453,923.21	1,726,023.90	39.79964519	-80.69520469
14,300.00	89.00	150.00	11,635.76	-3,369.47	-472.52	14,453,836.62	1,726,073.89	39.79940693	-80.69502775
14,400.00	89.00	150.00	11,637.51	-3,456.06	-422.53	14,453,750.03	1,726,123.89	39.79916866	-80.69485082
14,500.00	89.00	150.00	11,639.25	-3,542.65	-372.54	14,453,663.44	1,726,173.88	39.79893040	-80.69467388
14,600.00	89.00	150.00	11,641.00	-3,629.24	-322.54	14,453,576.86	1,726,223.87	39.79869213	-80.69449694



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
14,700.00	89.00	150.00	11,642.74	-3,715.83	-272.55	14,453,490.27	1,726,273.86	39.79045367	-80.69432001	
14,800.00	89.00	150.00	11,644.49	-3,802.42	-222.56	14,453,403.68	1,726,323.86	39.79821560	-80.69414307	
14,900.00	89.00	150.00	11,646.23	-3,889.01	-172.57	14,453,317.09	1,726,373.85	39.79797734	-80.69396614	
15,000.00	89.00	150.00	11,647.98	-3,975.60	-122.58	14,453,230.50	1,726,423.84	39.79773907	-80.69378921	
15,100.00	89.00	150.00	11,649.72	-4,062.19	-72.58	14,453,143.91	1,726,473.83	39.79750081	-80.69361228	
15,200.00	89.00	150.00	11,651.47	-4,148.77	-22.59	14,453,057.32	1,726,523.82	39.79726254	-80.69343535	
15,300.00	89.00	150.00	11,653.21	-4,235.36	27.40	14,452,970.73	1,726,573.82	39.79702428	-80.69325842	
15,400.00	89.00	150.00	11,654.96	-4,321.95	77.39	14,452,884.14	1,726,623.81	39.79678601	-80.69308150	
15,500.00	89.00	150.00	11,656.70	-4,408.54	127.39	14,452,797.55	1,726,673.80	39.79654774	-80.69290457	
15,600.00	89.00	150.00	11,658.45	-4,495.13	177.38	14,452,710.96	1,726,723.79	39.79630947	-80.69272765	
15,700.00	89.00	150.00	11,660.19	-4,581.72	227.37	14,452,624.37	1,726,773.79	39.79607121	-80.69255073	
15,800.00	89.00	150.00	11,661.94	-4,668.31	277.36	14,452,537.78	1,726,823.78	39.79583294	-80.69237380	
15,900.00	89.00	150.00	11,663.68	-4,754.90	327.36	14,452,451.19	1,726,873.77	39.79559467	-80.69219688	
16,000.00	89.00	150.00	11,665.43	-4,841.49	377.35	14,452,364.60	1,726,923.76	39.79535640	-80.69201996	
16,100.00	89.00	150.00	11,667.17	-4,928.08	427.34	14,452,278.02	1,726,973.76	39.79511813	-80.69184305	
16,200.00	89.00	150.00	11,668.92	-5,014.67	477.33	14,452,191.43	1,727,023.75	39.79487967	-80.69166613	
16,300.00	89.00	150.00	11,670.67	-5,101.26	527.33	14,452,104.84	1,727,073.74	39.79464160	-80.69148922	
16,400.00	89.00	150.00	11,672.41	-5,187.85	577.32	14,452,018.25	1,727,123.73	39.79440333	-80.69131230	
16,500.00	89.00	150.00	11,674.16	-5,274.44	627.31	14,451,931.66	1,727,173.73	39.79416506	-80.69113539	
16,600.00	89.00	150.00	11,675.90	-5,361.03	677.30	14,451,845.07	1,727,223.72	39.79392679	-80.69095848	
16,700.00	89.00	150.00	11,677.65	-5,447.62	727.30	14,451,758.48	1,727,273.71	39.79368852	-80.69078157	
16,800.00	89.00	150.00	11,679.39	-5,534.20	777.29	14,451,671.89	1,727,323.70	39.79345025	-80.69060466	
16,900.00	89.00	150.00	11,681.14	-5,620.79	827.28	14,451,585.30	1,727,373.70	39.79321198	-80.69042775	
17,000.00	89.00	150.00	11,682.88	-5,707.38	877.27	14,451,498.71	1,727,423.69	39.79297371	-80.69025084	
17,100.00	89.00	150.00	11,684.63	-5,793.97	927.26	14,451,412.12	1,727,473.68	39.79273543	-80.69007394	
17,200.00	89.00	150.00	11,686.37	-5,880.56	977.26	14,451,325.53	1,727,523.67	39.79249716	-80.68989703	
17,300.00	89.00	150.00	11,688.12	-5,967.15	1,027.25	14,451,238.94	1,727,573.66	39.79225889	-80.68972013	
17,400.00	89.00	150.00	11,689.86	-6,053.74	1,077.24	14,451,152.35	1,727,623.66	39.79202062	-80.68954323	
17,500.00	89.00	150.00	11,691.61	-6,140.33	1,127.23	14,451,065.76	1,727,673.65	39.79178235	-80.68936633	
17,600.00	89.00	150.00	11,693.35	-6,226.92	1,177.23	14,450,979.17	1,727,723.64	39.79154407	-80.68918943	
17,700.00	89.00	150.00	11,695.10	-6,313.51	1,227.22	14,450,892.59	1,727,773.63	39.79130580	-80.68901253	
17,800.00	89.00	150.00	11,696.84	-6,400.10	1,277.21	14,450,806.00	1,727,823.63	39.79106753	-80.68883563	
17,900.00	89.00	150.00	11,698.58	-6,486.69	1,327.20	14,450,719.41	1,727,873.62	39.79082925	-80.68865873	
18,000.00	89.00	150.00	11,700.33	-6,573.28	1,377.20	14,450,632.82	1,727,923.61	39.79059098	-80.68848184	
18,100.00	89.00	150.00	11,702.08	-6,659.87	1,427.19	14,450,546.23	1,727,973.60	39.79035271	-80.68830495	
18,200.00	89.00	150.00	11,703.82	-6,746.46	1,477.18	14,450,459.64	1,728,023.60	39.79011443	-80.68812805	
18,300.00	89.00	150.00	11,705.57	-6,833.04	1,527.17	14,450,373.05	1,728,073.59	39.78987616	-80.68795116	
18,400.00	89.00	150.00	11,707.32	-6,919.63	1,577.17	14,450,286.46	1,728,123.58	39.78963788	-80.68777427	
18,500.00	89.00	150.00	11,709.06	-7,006.22	1,627.16	14,450,199.87	1,728,173.57	39.78939961	-80.68759738	
18,600.00	89.00	150.00	11,710.81	-7,092.81	1,677.15	14,450,113.28	1,728,223.57	39.78916133	-80.68742050	
18,700.00	89.00	150.00	11,712.55	-7,179.40	1,727.14	14,450,026.69	1,728,273.56	39.78892306	-80.68724361	
18,800.00	89.00	150.00	11,714.30	-7,265.99	1,777.14	14,449,940.10	1,728,323.55	39.78868478	-80.68706673	
18,900.00	89.00	150.00	11,716.04	-7,352.58	1,827.13	14,449,853.51	1,728,373.54	39.78844650	-80.68688984	
19,000.00	89.00	150.00	11,717.79	-7,439.17	1,877.12	14,449,766.92	1,728,423.54	39.78820823	-80.68671296	
19,100.00	89.00	150.00	11,719.53	-7,525.76	1,927.11	14,449,680.33	1,728,473.53	39.78796995	-80.68653608	
19,200.00	89.00	150.00	11,721.28	-7,612.35	1,977.10	14,449,593.75	1,728,523.52	39.78773167	-80.68635920	
19,300.00	89.00	150.00	11,723.02	-7,698.94	2,027.10	14,449,507.16	1,728,573.51	39.78749340	-80.68618232	
19,400.00	89.00	150.00	11,724.77	-7,785.53	2,077.09	14,449,420.57	1,728,623.50	39.78725512	-80.68600544	
19,500.00	89.00	150.00	11,726.51	-7,872.12	2,127.08	14,449,333.98	1,728,673.50	39.78701684	-80.68582857	
19,600.00	89.00	150.00	11,728.26	-7,958.71	2,177.07	14,449,247.39	1,728,723.49	39.78677856	-80.68565169	
19,700.00	89.00	150.00	11,730.00	-8,045.30	2,227.07	14,449,160.80	1,728,773.48	39.78654028	-80.68547482	
19,800.00	89.00	150.00	11,731.75	-8,131.89	2,277.06	14,449,074.21	1,728,823.47	39.78630200	-80.68529794	
19,900.00	89.00	150.00	11,733.49	-8,218.47	2,327.05	14,448,987.62	1,728,873.47	39.78606373	-80.68512107	
20,000.00	89.00	150.00	11,735.24	-8,305.06	2,377.04	14,448,901.03	1,728,923.46	39.78582545	-80.68494420	
20,100.00	89.00	150.00	11,736.98	-8,391.65	2,427.04	14,448,814.44	1,728,973.45	39.78558717	-80.68476733	



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,200.00	89.00	150.00	11,736.73	-8,478.24	2,477.03	14,448,727.85	1,729,023.44	39.78534889	-80.68459046
20,300.00	89.00	150.00	11,740.47	-8,564.83	2,527.02	14,448,641.26	1,729,073.44	39.78511061	-80.68441360
20,400.00	89.00	150.00	11,742.22	-8,651.42	2,577.01	14,448,554.67	1,729,123.43	39.78487233	-80.68423673
20,500.00	89.00	150.00	11,743.97	-8,738.01	2,627.01	14,448,468.08	1,729,173.42	39.78463405	-80.68405967
20,600.00	89.00	150.00	11,745.71	-8,824.60	2,677.00	14,448,381.49	1,729,223.41	39.78439576	-80.68388301
20,700.00	89.00	150.00	11,747.46	-8,911.19	2,726.99	14,448,294.90	1,729,273.41	39.78415748	-80.68370614
20,800.00	89.00	150.00	11,749.20	-8,997.78	2,776.98	14,448,208.32	1,729,323.40	39.78391920	-80.68352928
20,900.00	89.00	150.00	11,750.95	-9,084.37	2,826.98	14,448,121.73	1,729,373.39	39.78368092	-80.68335242
21,000.00	89.00	150.00	11,752.69	-9,170.96	2,876.97	14,448,035.14	1,729,423.38	39.78344264	-80.68317557
21,100.00	89.00	150.00	11,754.44	-9,257.55	2,926.96	14,447,948.55	1,729,473.38	39.78320436	-80.68299871
21,200.00	89.00	150.00	11,756.18	-9,344.14	2,976.95	14,447,861.96	1,729,523.37	39.78296607	-80.68282185
21,300.00	89.00	150.00	11,757.93	-9,430.73	3,026.95	14,447,775.37	1,729,573.36	39.78272779	-80.68264500
21,400.00	89.00	150.00	11,759.67	-9,517.31	3,076.94	14,447,688.78	1,729,623.35	39.78248951	-80.68246814
21,500.00	89.00	150.00	11,761.42	-9,603.90	3,126.93	14,447,602.19	1,729,673.34	39.78225122	-80.68229129
21,600.00	89.00	150.00	11,763.16	-9,690.49	3,176.92	14,447,515.60	1,729,723.34	39.78201294	-80.68211444
21,700.00	89.00	150.00	11,764.91	-9,777.08	3,226.91	14,447,429.01	1,729,773.33	39.78177466	-80.68193759
21,800.00	89.00	150.00	11,766.65	-9,863.67	3,276.91	14,447,342.42	1,729,823.32	39.78153637	-80.68176074
21,900.00	89.00	150.00	11,768.40	-9,950.26	3,326.90	14,447,255.83	1,729,873.31	39.78129809	-80.68158390
22,000.00	89.00	150.00	11,770.14	-10,036.85	3,376.89	14,447,169.24	1,729,923.31	39.78105980	-80.68140705
22,100.00	89.00	150.00	11,771.89	-10,123.44	3,426.88	14,447,082.65	1,729,973.30	39.78082152	-80.68123021
22,200.00	89.00	150.00	11,773.63	-10,210.03	3,476.88	14,446,996.06	1,730,023.29	39.78058323	-80.68105336
22,300.00	89.00	150.00	11,775.38	-10,296.62	3,526.87	14,446,909.48	1,730,073.28	39.78034495	-80.68087652
22,400.00	89.00	150.00	11,777.12	-10,383.21	3,576.86	14,446,822.89	1,730,123.28	39.78010666	-80.68069968
22,500.00	89.00	150.00	11,778.87	-10,469.80	3,626.85	14,446,736.30	1,730,173.27	39.77986838	-80.68052284
22,600.00	89.00	150.00	11,780.62	-10,556.39	3,676.85	14,446,649.71	1,730,223.26	39.77963009	-80.68034600
22,700.00	89.00	150.00	11,782.36	-10,642.98	3,726.84	14,446,563.12	1,730,273.25	39.77939180	-80.68016916
22,800.00	89.00	150.00	11,784.11	-10,729.57	3,776.83	14,446,476.53	1,730,323.25	39.77915352	-80.67999233
22,900.00	89.00	150.00	11,785.85	-10,816.15	3,826.82	14,446,389.94	1,730,373.24	39.77891523	-80.67981549
23,000.00	89.00	150.00	11,787.60	-10,902.74	3,876.82	14,446,303.35	1,730,423.23	39.77867694	-80.67963866
23,100.00	89.00	150.00	11,789.34	-10,989.33	3,926.81	14,446,216.76	1,730,473.22	39.77843865	-80.67946182
23,200.00	89.00	150.00	11,791.09	-11,075.92	3,976.80	14,446,130.17	1,730,523.22	39.77820036	-80.67928499
23,300.00	89.00	150.00	11,792.83	-11,162.51	4,026.79	14,446,043.58	1,730,573.21	39.77796208	-80.67910816
23,400.00	89.00	150.00	11,794.58	-11,249.10	4,076.79	14,445,956.99	1,730,623.20	39.77772379	-80.67893133
23,500.00	89.00	150.00	11,796.32	-11,335.69	4,126.78	14,445,870.40	1,730,673.19	39.77748550	-80.67875451
23,600.00	89.00	150.00	11,798.07	-11,422.28	4,176.77	14,445,783.81	1,730,723.18	39.77724721	-80.67857768
23,700.00	89.00	150.00	11,799.81	-11,508.87	4,226.76	14,445,697.22	1,730,773.18	39.77700892	-80.67840085
23,800.00	89.00	150.00	11,801.55	-11,595.46	4,276.75	14,445,610.64	1,730,823.17	39.77677063	-80.67822403
23,900.00	89.00	150.00	11,803.30	-11,682.05	4,326.75	14,445,524.05	1,730,873.16	39.77653234	-80.67804721
24,000.00	89.00	150.00	11,805.05	-11,768.64	4,376.74	14,445,437.46	1,730,923.15	39.77629405	-80.67787039
24,100.00	89.00	150.00	11,806.79	-11,855.23	4,426.73	14,445,350.87	1,730,973.15	39.77605576	-80.67769356
24,200.00	89.00	150.00	11,808.54	-11,941.82	4,476.72	14,445,264.28	1,731,023.14	39.77581747	-80.67751675
24,300.00	89.00	150.00	11,810.28	-12,028.41	4,526.72	14,445,177.69	1,731,073.13	39.77557918	-80.67733993
24,400.00	89.00	150.00	11,812.03	-12,115.00	4,576.71	14,445,091.10	1,731,123.12	39.77534089	-80.67716311
24,500.00	89.00	150.00	11,813.77	-12,201.58	4,626.70	14,445,004.51	1,731,173.12	39.77510259	-80.67698630
24,600.00	89.00	150.00	11,815.52	-12,288.17	4,676.69	14,444,917.92	1,731,223.11	39.77486430	-80.67680948
24,700.00	89.00	150.00	11,817.27	-12,374.76	4,726.69	14,444,831.33	1,731,273.10	39.77462601	-80.67663267
24,800.00	89.00	150.00	11,819.01	-12,461.35	4,776.68	14,444,744.74	1,731,323.09	39.77438772	-80.67645586
24,856.70	89.00	150.00	11,820.00	-12,510.45	4,805.03	14,444,658.15	1,731,351.44	39.77425260	-80.67635560

PBHL/TD 24856.70 MD/11820.00 TVD



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-6 HU
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1326 @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1326 @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-6 HU	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Heaven Hill 3-6 HU LP - plan misses target center by 274.67usft at 11700.00usft MD (11423.72 TVD, -1140.47 N, -1711.46 E) - Point	0.00	0.00	11,588.00	-978.95	-1,861.03	14,456,227.14	1,724,685.39	39.80598477	-80.69994276
Heaven Hill 3-6 HU BHL - plan hits target center - Point	0.00	0.00	11,820.00	-12,510.45	4,805.03	14,444,695.64	1,731,351.44	39.77425260	-80.67635560

Casing Points					
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter	
(usft)	(usft)		(")	(")	
120.00	120.00	30" Casing @ 120 TVD	30	36	
1,185.00	1,185.00	20" Casing @ 1185 TVD	20	24	
2,801.66	2,800.00	13 3/8" Casing @ 2800 TVD	13-3/8	17	
10,605.16	10,400.00	9 5/8" Casing @ 10400 TVD	9-5/8	12-1/4	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N-S	+E-W		
		(usft)	(usft)		
2,200.00	2,200.00	0.00	0.00	KOP Begin 2"/100' build	
2,450.00	2,449.68	-5.61	-9.34	Begin 5.00° tangent	
2,902.04	2,900.00	-25.91	-43.11	Begin 2"/100' build	
3,302.04	3,294.75	-58.11	-96.71	Begin 13.00° tangent	
7,802.04	7,679.42	-579.47	-964.40	Begin 2"/100' build/turn	
7,869.09	7,744.63	-587.02	-978.07	Begin 13.95° tangent	
11,259.02	11,034.58	-857.17	-1,706.64	Begin 10"/100' build/turn	
12,156.70	11,598.35	-1,513.60	-1,544.01	Begin 89.00° lateral section	
24,856.70	11,820.00	-12,510.45	4,805.03	PBHL/TD 24856.70 MD/11820.00 TVD	

WW-9
(4/16)

API Number 47 - 051 - 01968
Operator's Well No. Heaven Hill 3-6HU

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

RECEIVED
Office of Oil and Gas

SEP - 6 2017

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851
Watershed (HUC 10) Fish Creek Quadrangle Glen Easton 7.5'

WV Department of Environmental Protection

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 / WV0105185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386428)

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

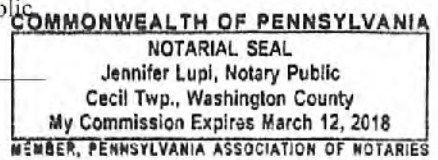
I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations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

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

Company Official Signature _____
Company Official (Typed Name) Sean Gasser
Company Official Title Engineer

Subscribed and sworn before me this 8th day of June, 20 17

Jennifer Lupi Notary Public
My commission expires March 12, 2018



Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 18.43 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

RECEIVED
Office of Oil and Gas
SEP - 6 2017
WV Department of
Environmental Protection

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Jim Anderson

Comments: _____

Title: Oil & Gas Inspector Date: 8/31/17

Field Reviewed? Yes No



Well Site Safety Plan

Tug Hill Operating, LLC

ju
1/26/18

Well Name: Heaven Hill 3-6HU

Pad Location: Heaven Hill Unit 3

Marshall County, West Virginia

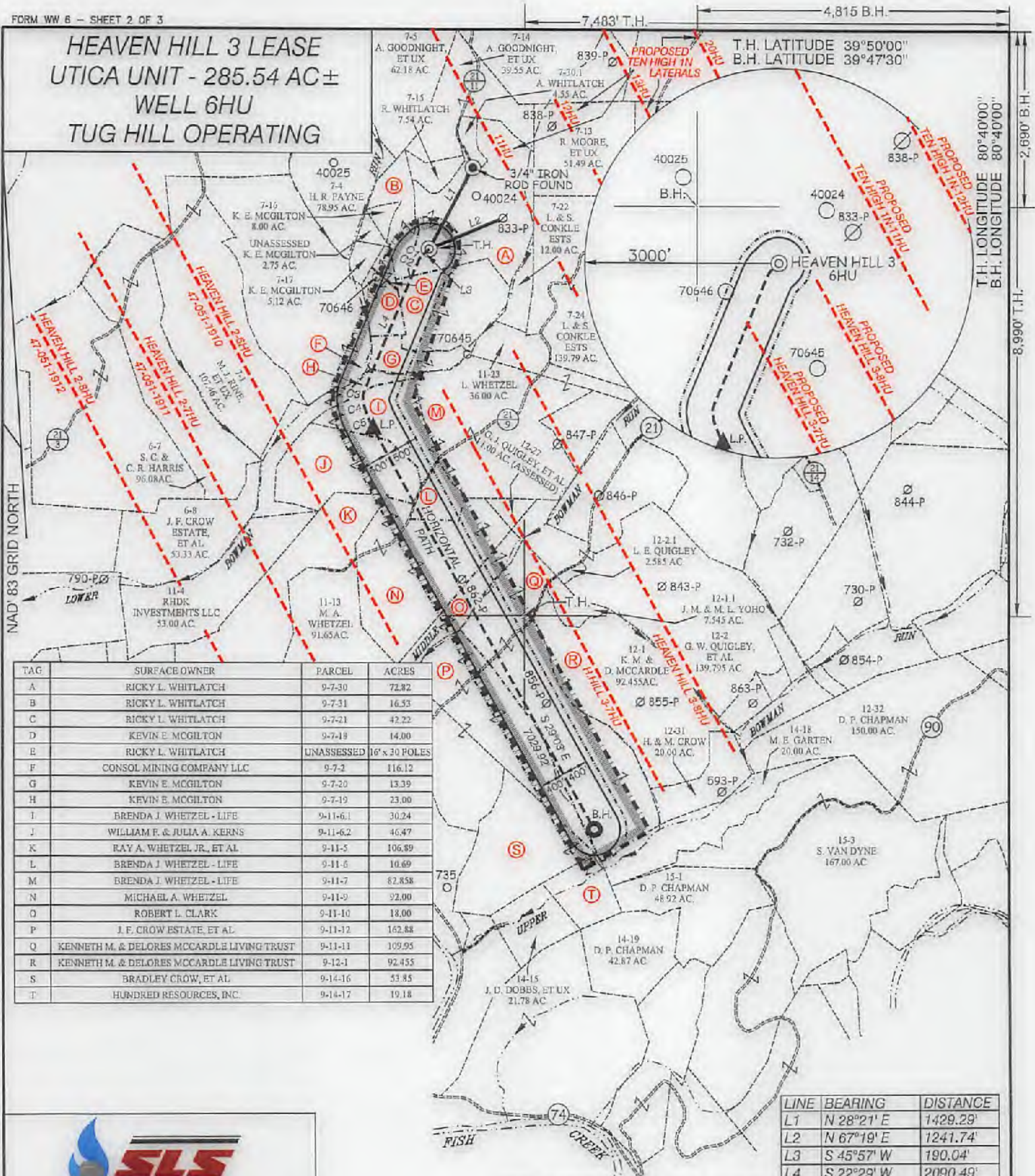
UTM (meters), NAD83, Zone 17:

NORTHING -4,406,565.23

EASTING -526,252.40

August 2017

**HEAVEN HILL 3 LEASE
UTICA UNIT - 285.54 AC±
WELL 6HU
TUG HILL OPERATING**



TAG	SURFACE OWNER	PARCEL	ACRES
A	RICKY L. WHITLATCH	9-7-30	72.82
B	RICKY L. WHITLATCH	9-7-31	16.53
C	RICKY L. WHITLATCH	9-7-21	42.22
D	KEVIN E. MCGILTON	9-7-19	14.00
E	RICKY L. WHITLATCH	UNASSESSED 16' x 30' POLES	
F	CONSOL MINING COMPANY LLC	9-7-2	116.12
G	KEVIN E. MCGILTON	9-7-20	13.39
H	KEVIN E. MCGILTON	9-7-19	23.00
I	BRENDA J. WHETZEL - LIFE	9-11-6.1	30.24
J	WILLIAM F. & JULIA A. KERNS	9-11-6.2	46.47
K	RAY A. WHETZEL JR., ET AL	9-11-5	106.89
L	BRENDA J. WHETZEL - LIFE	9-11-6	10.69
M	BRENDA J. WHETZEL - LIFE	9-11-7	82.858
N	MICHAEL A. WHETZEL	9-11-9	92.00
O	ROBERT L. CLARK	9-11-10	18.00
P	J. F. CROW ESTATE, ET AL	9-11-12	162.88
Q	KENNETH M. & DELORES MCCARDLE LIVING TRUST	9-11-11	109.95
R	KENNETH M. & DELORES MCCARDLE LIVING TRUST	9-12-1	92.455
S	BRADLEY CROW, ET AL	9-14-16	53.85
T	HUNDRED RESOURCES, INC.	9-14-17	19.18

LINE	BEARING	DISTANCE
L1	N 28°21' E	1429.29'
L2	N 67°19' E	1241.74'
L3	S 45°57' W	190.04'
L4	S 22°29' W	2090.49'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	23.10'	112.75'	S 33°36' W	23.06'
C2	158.12'	1854.90'	S 24°28' W	158.07'
C3	71.33'	208.06'	S 07°43' W	70.98'
C4	239.26'	795.37'	S 13°09' E	238.36'
C5	261.93'	1764.93'	S 24°53' E	261.69'

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhook Drive • Glenville, WV 26031 • (304) 482-5634
www.slsurveyors.com

P.S. 677
Gregory A. Smith

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD83 S.P.C.(FT)	N. 478,980.11	E. 1,633,277.01
NAD83 GEO.	LAT-(N) 39.809656	LONG-(W) 80.693304
NAD83 UTM (M)	N. 4,406,565.23	E. 526,252.40

LANDING POINT

NAD83 S.P.C.(FT)	N. 476,113.5	E. 1,632,417.3
NAD83 GEO.	LAT-(N) 39.601030	LONG-(W) 80.696233
NAD83 UTM (M)	N. 4,405,718.0	E. 528,004.6

BOTTOM HOLE

NAD83 S.P.C.(FT)	N. 469,967.5	E. 1,635,630.0
NAD83 GEO.	LAT-(N) 39.784283	LONG-(W) 80.6883799
NAD83 UTM (M)	N. 4,403,863.0	E. 527,075.6



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

LEGEND

- UNIT BOUNDARY
- LEASED TRACTS INSIDE
- UNIT BOUNDARY
- SURFACE LINE
- PROPOSED UTICA
- WELL LATERAL
- 400' OFFSET LINE
- 500' OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE PGS. 1 & 3)

SCALE 1" = 2000' FILE NO. 8654P6HUR3.dwg
DATE AUGUST 25, 20 17
REVISED 10-9-2017, 1-25-2018 & 1-29-2018
OPERATORS WELL NO. HEAVEN HILL 3-6HU
API WELL NO. 47-051-01968 H6A
STATE COUNTY PERMIT

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

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

**HEAVEN HILL 3 LEASE
UTICA UNIT - 285.54 AC±
WELL 6HU
TUG HILL OPERATING**

T.H. LATITUDE 39°50'00"
B.H. LATITUDE 39°47'30"

T.H. LONGITUDE 80°40'00"
B.H. LONGITUDE 80°40'00"

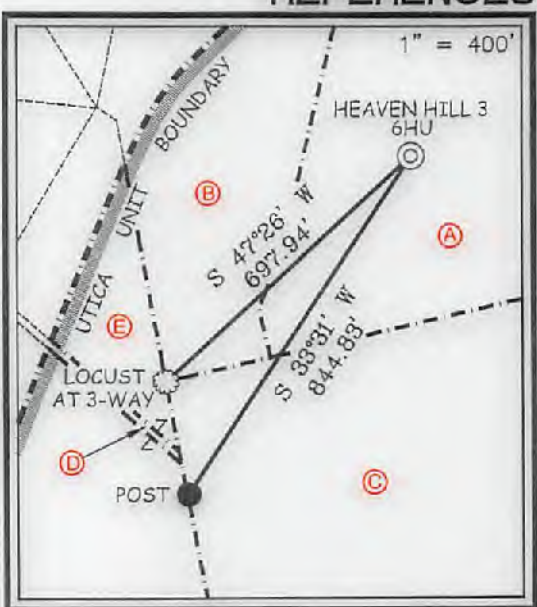
2,690' T.H.

No.	Lease Name or No.	Tag	Partial	Oil & Gas Royalty Owners	Deed Book/Page
1	10*15557	A	9-7-20	RICKY L. WHITLATCH ET AL	760 226
2	10*15557	B	9-7-21	RICKY L. WHITLATCH ET AL	760 226
3	10*15557	C	9-7-21	RICKY L. WHITLATCH ET AL	760 226
4	10*16021	D	9-7-18	BRENDA HINTERMAN WILLIAMSON AND BRIAN K WILLIAMSON	325 468
5	10*16021	D	9-7-18	ELIZABETH ANN BLAZER AND DAVID SNIDER	325 462
6	10*16021	D	9-7-18	GARY O HINTERMAN AND JUDY ANN HINTERMAN	325 451
7	10*15720	D	9-7-18	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	325 458
8	10*15696	D	9-7-18	ROBERT A EDGE AND SHERRIE N EDGE	325 383
9	10*16413	D	9-7-18	RONALD H EDGE JR	325 454
10	10*16028	D	9-7-18	ROSEMARY PARKINS AND STEPHEN PARKINS	325 460
11	10*16028	D	9-7-18	SHARON HINTERMAN MAY & DANIEL G MAY	325 464
12	10*16028	D	9-7-18	TINA L EDGE MONTI AND THOMAS MONTI	325 456
13	10*16421	D	9-7-18	KEVIN E MCGILTON ET LX	325 351
14	10*15557	E	9-7-20	RICKY L WHITLATCH ET AL	760 226
15	10*16471	F	9-7-21	CEX GAS COMPANY LLC	325 335
16	10*16028	G	9-7-20	BRENDA HINTERMAN WILLIAMSON AND BRIAN K WILLIAMSON	325 468
17	10*16028	G	9-7-20	CONNA JEAN SNIDER AND DAVID SNIDER	325 458
18	10*16412	G	9-7-20	ELIZABETH ANN BLAZER AND PAUL R BLAZER	325 452
19	10*16028	G	9-7-20	GARY O HINTERMAN AND JUDY ANN HINTERMAN	325 451
20	10*15720	G	9-7-20	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	325 458
21	10*15696	G	9-7-20	ROBERT A EDGE AND SHERRIE N EDGE	325 383
22	10*16413	G	9-7-20	RONALD H EDGE JR	325 454
23	10*16028	G	9-7-20	ROSEMARY PARKINS AND STEPHEN PARKINS	325 460
24	10*16028	G	9-7-20	SHARON HINTERMAN MAY & DANIEL G MAY	325 464
25	10*15721	G	9-7-20	TINA L EDGE MONTI AND THOMAS MONTI	325 456
26	10*15697	H	9-7-18	KEVIN E MCGILTON ET LX	325 351
27	10*15697	H	9-7-18	KEVIN E MCGILTON ET LX	325 351
28	10*47051.256.1	I	9-11-5.1	BRENDA J WHEITZEL	881 145
29	10*47051.256.3	I	9-11-5.1	BRENDA J WHEITZEL	881 148
30	10*47051.256.2	I	9-11-5.1	CAROL JEAN ANDERSON	879 299
31	10*47051.256.4	I	9-11-5.1	GLEN A BONAR	881 138
32	10*47051.256.5	I	9-11-5.1	JERRY W ZIEN AND KATHLEEN EZIEN	881 530
33	10*15660	I	9-11-5.1	EMMA ANDERSON	861 386
34	10*15670	I	9-11-5.2	GARY M BONAR AND ELLIEN L BONAR	861 377
35	10*15670	I	9-11-5.2	JUDALENE K COLLINS	861 371
36	10*15670	I	9-11-5.2	NAOMIE HURP	861 604
37	10*15670	I	9-11-5.2	NAOMIE HURP	861 604
38	10*47051.256.3	J	9-11-5.2	BRENDA J WHEITZEL	881 148
39	10*47051.256.2	J	9-11-5.2	CAROL JEAN ANDERSON	879 299
40	10*47051.256.4	J	9-11-5.2	GLEN A BONAR	881 138
41	10*47051.256.5	J	9-11-5.2	JERRY W ZIEN AND KATHLEEN EZIEN	881 530
42	10*15660	J	9-11-5.2	EMMA ANDERSON	861 386
43	10*15670	J	9-11-5.2	GARY M BONAR AND ELLIEN L BONAR	861 377
44	10*15670	J	9-11-5.2	JUDALENE K COLLINS	861 371
45	10*15670	J	9-11-5.2	NAOMIE HURP	861 604
46	10*15670	J	9-11-5.2	NAOMIE HURP	861 604
47	10*15581	K	9-11-5	VIKIE MASON	881 239
48	10*15581	K	9-11-5	SHARON L WHEITZEL	881 247
49	10*15581	K	9-11-5	SARAYA SCOTT	881 615
50	10*15581	K	9-11-5	ROBERT L WHEITZEL	881 539
51	10*15581	K	9-11-5	RAY A WHEITZEL JR	881 571
52	10*15581	K	9-11-5	MIKEL WHEITZEL	881 576
53	10*47051.108.1	K	9-11-5	MICHAELA WHEITZEL	881 51
54	10*47051.108.5	K	9-11-5	BRENDA J WHEITZEL	881 55
55	10*47051.108.3	L	9-11-5	BRENDA J WHEITZEL	881 145
56	10*47051.108.2	L	9-11-5	BRENDA J WHEITZEL	881 145
57	10*47051.108.4	L	9-11-5	CAROL JEAN ANDERSON	879 299
58	10*47051.108.5	L	9-11-5	GLEN A BONAR	881 138
59	10*47051.108.3	L	9-11-5	JERRY W ZIEN AND KATHLEEN EZIEN	881 530
60	10*15660	L	9-11-5	EMMA ANDERSON	861 386
61	10*15670	L	9-11-5	GARY M BONAR AND ELLIEN L BONAR	861 377
62	10*15670	L	9-11-5	JUDALENE K COLLINS	861 371
63	10*15670	L	9-11-5	NAOMIE HURP	861 604
64	10*47051.256.22	M	9-11-7	REVERLY HOPSON	925 501
65	10*47051.256.1	M	9-11-7	BRENDA J WHEITZEL	881 145
66	10*15786	M	9-11-7	BRUCE D SCHUBB	921 478
67	10*16247	M	9-11-7	CAROL RIGGLE PARSLEY AND JAMES DENNIS PARSLEY	925 327
68	10*47051.256.34	M	9-11-7	CATHERINE BONAR PETTIT BULL	924 626
69	10*47051.256.56	M	9-11-7	CHARLOTTE B RUMBLE	925 45
70	10*47051.256.15	M	9-11-7	CHARLOTTE B RUMBLE	924 45
71	10*17230	M	9-11-7	CHAGGA F HARRIS AND JAMES HARRIS	929 339
72	10*17237	M	9-11-7	DEBRA METCALP	929 335
73	10*17415	M	9-11-7	DILLON FITZSWANBER	929 241
74	10*16115	M	9-11-7	EARL W HARRIS	925 329
75	10*47051.256.30	M	9-11-7	GRACE LAURA BONAR	929 33
76	10*47051.256.14	M	9-11-7	HUGH B BLIZZARD	925 43
77	10*47051.256.21	M	9-11-7	JACK L MASON AND JEAN M MASON	924 016
78	10*47051.256.30	M	9-11-7	JEFFREY THOMAS PILES AND TERESA A PILES	927 209
79	10*47051.256.41	M	9-11-7	JOHN L MASON	925 37
80	10*47051.256.18	M	9-11-7	JOHN WILLIAM BONAR AND SHIRLEY BONAR	913 912

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'83 S.P.C.(FT) N. 478,880.11 E. 1,633,277.01
 NAD'83 GEO. LAT-(N) 39.808656 LONG-(W) 80.693304
 NAD'83 UTM (M) N. 4,405,565.23 E. 526,252.40
LANDING POINT
 NAD'83 S.P.C.(FT) N. 476,119.5 E. 1,632,417.3
 NAD'83 GEO. LAT-(N) 39.801030 LONG-(W) 80.698233
 NAD'83 UTM (M) N. 4,405,718.0 E. 526,004.6
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 489,967.5 E. 1,635,830.0
 NAD'83 GEO. LAT-(N) 39.784283 LONG-(W) 80.683799
 NAD'83 UTM (M) N. 4,403,863.0 E. 527,075.6

T.H.

REFERENCES



NOTES ON SURVEY

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS > 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'

P.O. Box 150 • 12 Vanhook Drive • Glenview, WV 26031 • (304) 422-5634
www.slsurveys.com

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 REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. Gregory A. Smith
677



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE AUGUST 25, 20 17

REVISED 10-9-2017, 1-25-2018 & 1-29-2018

OPERATORS WELL NO. HEAVEN HILL 3-6HU

API WELL NO. 47-051-01968
STATE COUNTY PERMIT MLA

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8654P6HUR3.dwg
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: GROUND = 1,338.50' PROPOSED = 1,326.35' WATERSHED LOWER BOWMAN RUN OF FISH CREEK (HUC 10)
 DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'
 SURFACE OWNER RICKY L. WHITLATCH ACREAGE 72.82±
 ROYALTY OWNER RICKY L. WHITLATCH, ET AL - SEE PAGES 1 & 3 ACREAGE 72.82±
 PROPOSED WORK: LEASE NO. SEE PAGES 1 & 3
 DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER
 PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION POINT PLEASANT
 ESTIMATED DEPTH TVD: 11,829' / TMD: 19,376'

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

COUNTY NAME PERMIT

HEAVEN HILL 3 LEASE
 UTICA UNIT - 285.54 AC ±
 WELL 6HU
 TUG HILL OPERATING



No.	Lease Name or No.	Tag	Parcel	Oil & Gas Revesty Owner - Continued	Deed Book/Page
81	10*47051.256.7	M	9-11-7	MARILYN SUE BUMER	905 25
82	10*47051.256.17	M	9-11-7	MAXINE G JOHNSON	904 457
83	10*47051.256.39	M	9-11-7	MICHAEL DAVID PYES AND CYNTHIA A PYES	902 207
84	10*47051.256.8	M	9-11-7	PAMELA ANN MASON	905 31
85	10*47051.256.12	M	9-11-7	ROBERT L EGGARD	905 956
86	10*47051.256.13	M	9-11-7	STEVEN S SCHWAB	905 38
87	10*15001	M	9-11-7	TOMMY RONAR AND TANVA S RONAR	905 33
88	10*47051.256.9	M	9-11-7	WANDA MASON SUNSHINE	905 41
89	10*47051.256.13	M	9-11-7	WILLIAM W CRAIG AND GLENDA L CRAIG	885 51
90	10*47051.256.1	N	9-11-9	MICHAELA WHITZEL	685 280
91	10*15502	D	9-11-10	ROBERT L CLARK	718 376
92	10*15511	F	9-11-12	DAVID E CROW	718 334
93	10*15515	F	9-11-12	DESIREE CROW	718 343
94	10*15517	F	9-11-12	DIANE EGGELNER & GARY GELMAN	718 326
95	10*15510	F	9-11-12	ELAINE PHELPS ET WR	718 376
96	10*15513	F	9-11-12	FRANCIS COFFEY	718 342
97	10*15518	F	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	875 148
98	10*47051.256.2	F	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	775 500
99	10*15513	F	9-11-12	JOHN CROW	718 330
100	10*15513	F	9-11-12	KAY KEYS	718 336
101	10*15514	F	9-11-12	L PAUL CROW	865 580
102	10*47051.256.3	F	9-11-12	LLOYD GRABER	718 354
103	10*15516	F	9-11-12	ROSE MARIE KILGUSZEWSKI	725 300
104	10*15520	F	9-11-12	TIMOTHY CROW	816 499
105	10*15531	Q	9-11-11	KENNETH M MCCARDLE ET UX REV LT	904 617
106	10*15244	R	9-11-11	EMILY ANN KUCIPROD	905 556
107	10*15248	R	9-11-11	THOMAS MICHAEL WALLACE	902 220
108	10*47051.256.3	R	9-11-11	THOMAS S RIGGS III	901 273
109	10*47051.256.2	R	9-11-11	WILLIAM MARTIN RIGGS ANRELA RAE MOORE	901 285
110	10*15458	S	9-14-26	JOANN MENCER	901 211
111	10*15460	S	9-14-26	HARRIET J ANDERSON	901 285
112	10*15470	S	9-14-26	BETTY LLOGES	901 208
113	10*15472	S	9-14-26	DONALD B SANDRA GRIZEL	901 260
114	10*15473	S	9-14-26	WILLIAM McDONALD AND SHIRLEY McDONALD	901 226
115	10*15476	S	9-14-26	CURTIS W WEST JR AND DIANE WEST	901 226
116	10*15488	S	9-14-26	NANCY FFEY & STEPHEN M FFEY	901 222
117	10*15495	S	9-14-26	WALTER LEE SARNHART AND BARBARA LINDAH	901 274
118	10*15498	S	9-14-26	GERRARD L MENCER	901 238
119	10*15505	S	9-14-26	JOHN RAND LOIS L GORBY	901 275
120	10*15506	S	9-14-26	JOSEPH JEREMY PALMER	901 642
121	10*15241	S	9-14-26	LOHRNS GOODY	901 29
122	10*15132	S	9-14-26	CORNIE WICKLE	901 13
123	10*15133	S	9-14-26	LARRY JACK EMERY	901 65
124	10*15136	S	9-14-26	DEBORAH KAY COOLEY AND ROBERT T REEK	901 35
125	10*15137	S	9-14-26	PATRICIA D BABLAND JOHN J BABL	901 208
126	10*15191	S	9-14-26	MARILYN E MESSOR	901 76
127	10*15428	S	9-14-26	WILLIAM EGGARD AND CHRISTY E EDGAR	901 61
128	10*15438	S	9-14-26	KATHRYN M WATKINS	901 240
129	10*15440	S	9-14-26	ARLENA B HOPNER AND QUAY ALLEN HOPNER	901 274
130	10*15402	S	9-14-26	JANICE B BROOKOVER	901 180
131	10*15408	S	9-14-26	KATHLEEN J FRANCIS	901 77
132	10*15409	S	9-14-26	JANETTE M HEATH	901 23
133	10*15425	S	9-14-26	WILLIAM A MASON JR AND ROBIN MASON	901 50
134	10*15428	S	9-14-26	BRUCE LWIN JOHNSON AND KIMBERLY A JOHNSON	901 236
135	10*15438	S	9-14-26	ALICE MARLENE PERSINGER	901 57
136	10*15468	S	9-14-26	LARRY W JOHNSON	901 245
137	10*15469	S	9-14-26	JAMES EARLAND MARGARET L SUBERT	901 219
138	10*15470	S	9-14-26	CARDYLN SUE FRANKLIN AND RAYMOND EUGENE FRANKLIN	901 641
139	10*15472	S	9-14-26	LLOYD GREG SUBERT	901 256
140	10*15473	S	9-14-26	LINDA ELINE AND RICHARD LEROY LITTELL	901 386
141	10*15474	S	9-14-26	BARBARA KAYSBERT	901 334
142	10*15475	S	9-14-26	MARY LOUISE GORBY	901 257
143	10*15476	S	9-14-26	ROGER ALAN AND CYNTHIA L JOHNSON	901 228
144	10*15477	S	9-14-26	BRENDA K YORD	901 19
145	10*15478	S	9-14-26	CHARLES LLOYD AND MARTHA G LEACH	901 260
146	10*15481	S	9-14-26	JACK L JR AND VIRGINIA L CROW	901 279
147	10*15486	S	9-14-26	APRIL M WIFE	901 248
148	10*15485	S	9-14-26	VICKIE LYNN RAPE AND JOHN EDWARD RAPE	901 281
149	10*15494	S	9-14-26	DEBORAH A AND LEONARD B BROWERS	901 277
150	10*15496	S	9-14-26	ROGER L WEST	901 216
151	10*15497	S	9-14-26	LEONA ANN BURT	901 242
152	10*15492	S	9-14-26	SCOTT BRADLEY AND SHERRY ANN GRIMM	901 22
153	10*15495	S	9-14-26	NANCY C AND CARLE KESSELING	901 254
154	10*15496	S	9-14-26	KAREN LOUISE AND ROGER L DUNHAM	901 224
155	10*15499	S	9-14-26	TH EXPLORATION LLC	901 76
156	10*15481	S	9-14-26	SHEILA RAMONA CROW	901 251
157	10*15482	S	9-14-26	NILA VIRGINIA AND FREDERICK EUGENE STREIGHT	901 210
158	10*15486	S	9-14-26	SILVIA DEE WOOD	901 39
159	10*15487	S	9-14-26	JERRY HOWELL	901 201
160	10*15488	S	9-14-26	DONALD PAUL CROW AND CRYSTAL LYNN CROW	901 63
161	10*15489	S	9-14-26	DEBORAH A WALLACE	901 204
162	10*15491	S	9-14-26	MACK A AND CAROLA CROW	901 42
163	10*15492	S	9-14-26	DONN E JASON HEDGEPETH AND KAREN L HEDGEPETH	901 45
164	10*15493	S	9-14-26	NILA F HEDGEPETH	901 27
165	10*15494	S	9-14-26	EBBA HOWARD COCHRAN	901 34
166	10*15495	S	9-14-26	DEBORAH BRINE PIERCE AND BARRITT LEE PIERCE	901 268
167	10*15496	S	9-14-26	CINDY AND DARNELL L FUKS	901 147
168	10*15497	S	9-14-26	HELEN WARRIE AND DAVID F MCCRAY	901 39
169	10*15498	S	9-14-26	MEIRA PLEEN RUDOLPHSON	901 210
170	10*15499	S	9-14-26	HAROLD B CROW AND CONNIE SUE CROW	901 55
171	10*15500	S	9-14-26	BETTY L HUFF AND DILLIE C HUGGINS	901 39
172	10*15501	S	9-14-26	BEVERLY KATHRYN GORDOARD	901 117
173	10*15502	S	9-14-26	CHARLES M TURNER AND BESSIE M TURNER	901 130
174	10*15503	S	9-14-26	JUDY LOUISE GLOVER	901 182
175	10*15504	S	9-14-26	PAT DARRYL TURNER AND INA DENISE TURNER	901 68
176	10*15505	S	9-14-26	RONALD EDWARD WATSON AND DIANA L WATSON	901 187
177	10*15401	S	9-14-26	JOHN M HAUGHT JR AND CHERYL A HAUGHT	901 114
178	10*15402	S	9-14-26	DIANA LYNN BURKARDT	901 512
179	10*15403	S	9-14-26	JAMES B AND PENNY G CROW	901 569
180	10*15404	S	9-14-26	BRIAN K CROW	901 567
181	10*15405	S	9-14-26	GRIELLA LAND BARRY L LUFF	901 564
182	10*15406	S	9-14-26	WILLIAM JAMES HEDGEPETH AND ERIN ELIZABETH HEDGEPETH	901 575
183	10*15407	S	9-14-26	LUTY A AND CLYDE E ELLIOT	901 285
184	10*15408	S	9-14-26	LILLIE L GARY	901 63
185	10*15409	S	9-14-26	DAVID LEE AND ANNE F BAKER	901 285
186	10*15410	S	9-14-26	CONNIE SUE DOUGLAS AND BONNIE J DOUGLAS	901 634
187	10*15411	S	9-14-26	THOMAS LEE AND CLARA J HAUGHT	901 215
188	10*15412	S	9-14-26	TERRY LEE PERRY AND STEPHANIE LYNN PETT	901 63
189	10*15413	S	9-14-26	DEBRA J & DARRELL R LANCASTER	901 213
190	10*15414	S	9-14-26	PANSY MASTON AND BERN LASTON	901 632
191	10*15415	S	9-14-26	GREGORY S CROW	901 320
192	10*15416	S	9-14-26	SUSAN LYNN SEVANT	
193	10*15417	S	9-14-26	BOCKY LEE AND TAMMY J WATSON	
194	10*15418	S	9-14-26	SANDRA RAY RICHMOND	
195	10*15419	T	9-14-17	STONE HILL MINERALS HOLDINGS LLC	

FILE NO. 8654P6HUR3.dwg

DATE AUGUST 25, 2017

REVISED 10-9-2017, 1-25-2018 & 1-29-2018

OPERATORS WELL NO. HEAVEN HILL 3-6HU

API WELL NO. 47-051-01968
 STATE COUNTY PERMIT



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



P.S. 677

Gregory A. Smith

WELL OPERATOR TUG HILL OPERATING, LLC
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500
 FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER
 ADDRESS CT CORPORATION SYSTEM
 5400 D BIG TYLER ROAD
 CHARLESTON, WV 26313

COUNTY NAME PERMIT

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 sheets

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

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

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

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

Well Operator: Tug Hill Operating, LLC
 By: Amy L. Miller *Amy Miller*
 Its: Permit Specialist - Appalachia Region

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 6HU

81-0968

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment
10*15557	A	9-7-30	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780 226	N/A	N/A	Chevron to Tug Hill: 36/148
10*15557	B	9-7-31	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780 226	N/A	N/A	Chevron to Tug Hill: 36/148
10*15557	C	9-7-21	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780 226	N/A	N/A	Chevron to Tug Hill: 36/148
10*16289	D	9-7-18	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	TH EXPLORATION LLC	1/8+	905 468	N/A	N/A	N/A
10*16051	D	9-7-18	DONNA JEAN SNIDER AND DAVID SNIDER	TH EXPLORATION LLC	1/8+	905 462	N/A	N/A	N/A
10*16412	D	9-7-18	ELIZABETH ANN BLAZER AND PAUL R BLAZER	TH EXPLORATION LLC	1/8+	905 452	N/A	N/A	N/A
10*16053	D	9-7-18	GARY D HINERMAN AND JUDY ANN HINERMAN	TH EXPLORATION LLC	1/8+	905 466	N/A	N/A	N/A
10*15720	D	9-7-18	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	TH EXPLORATION LLC	1/8+	905 458	N/A	N/A	N/A
10*15698	D	9-7-18	ROBERT A EDGE AND SHERRIE N EDGE	TH EXPLORATION LLC	1/8+	900 363	N/A	N/A	N/A
10*16413	D	9-7-18	RONALD H EDGE JR	TH EXPLORATION LLC	1/8+	905 454	N/A	N/A	N/A
10*16028	D	9-7-18	ROSEMARY PARKINS AND STEPHEN PARKINS	TH EXPLORATION LLC	1/8+	905 460	N/A	N/A	N/A
10*16020	D	9-7-18	SHARON HINERMAN MAY & DANIEL G MAY	TH EXPLORATION LLC	1/8+	905 464	N/A	N/A	N/A
10*15721	D	9-7-18	TINA L EDGE MONTI AND THOMAS MONTI	TH EXPLORATION LLC	1/8+	905 456	N/A	N/A	N/A
10*15667	D	9-7-18	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*15557	E	9-7-Unassessed Parcel	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780 226	N/A	N/A	Chevron to Tug Hill: 36/148
10*16471	F	9-7-2	CNX GAS COMPANY LLC	TH EXPLORATION LLC	1/8+	905 155	N/A	N/A	N/A
10*16289	G	9-7-20	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	TH EXPLORATION LLC	1/8+	905 468	N/A	N/A	N/A
10*16051	G	9-7-20	DONNA JEAN SNIDER AND DAVID SNIDER	TH EXPLORATION LLC	1/8+	905 462	N/A	N/A	N/A
10*16412	G	9-7-20	ELIZABETH ANN BLAZER AND PAUL R BLAZER	TH EXPLORATION LLC	1/8+	905 452	N/A	N/A	N/A
10*16053	G	9-7-20	GARY D HINERMAN AND JUDY ANN HINERMAN	TH EXPLORATION LLC	1/8+	905 466	N/A	N/A	N/A
10*15720	G	9-7-20	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	TH EXPLORATION LLC	1/8+	905 458	N/A	N/A	N/A
10*15698	G	9-7-20	ROBERT A EDGE AND SHERRIE N EDGE	TH EXPLORATION LLC	1/8+	900 363	N/A	N/A	N/A
10*16413	G	9-7-20	RONALD H EDGE JR	TH EXPLORATION LLC	1/8+	905 454	N/A	N/A	N/A
10*16028	G	9-7-20	ROSEMARY PARKINS AND STEPHEN PARKINS	TH EXPLORATION LLC	1/8+	905 460	N/A	N/A	N/A
10*16020	G	9-7-20	SHARON HINERMAN MAY & DANIEL G MAY	TH EXPLORATION LLC	1/8+	905 464	N/A	N/A	N/A
10*15721	G	9-7-20	TINA L EDGE MONTI AND THOMAS MONTI	TH EXPLORATION LLC	1/8+	905 456	N/A	N/A	N/A
10*15667	G	9-7-20	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*15667	H	9-7-19	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.256.1	I	9-11-6.1	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	881 145	N/A	N/A	N/A
10*47051.256.3	I	9-11-6.1	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.2	I	9-11-6.1	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.4	I	9-11-6.1	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*47051.256.5	I	9-11-6.1	JERRY W ZIEN AND KATHLEEN E ZIEN	TH EXPLORATION LLC	1/8+	882 530	N/A	N/A	N/A
10*15669	I	9-11-6.1	EMMA ANDERSON	CHEVRON USA INC	1/8+	861 586	N/A	N/A	Chevron to Tug Hill: 36/148
10*15670	I	9-11-6.1	GARY M BONAR AND ELLEN L BONAR	CHEVRON USA INC	1/8+	861 577	N/A	N/A	Chevron to Tug Hill: 36/148
10*15671	I	9-11-6.1	JUDALENE K COLLUMS	CHEVRON USA INC	1/8+	861 571	N/A	N/A	Chevron to Tug Hill: 36/148
10*15672	I	9-11-6.1	NAOMI HUPP	CHEVRON USA INC	1/8+	861 604	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.256.3	J	9-11-6.2	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.2	J	9-11-6.2	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.4	J	9-11-6.2	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*47051.256.5	J	9-11-6.2	JERRY W ZIEN AND KATHLEEN E ZIEN	TH EXPLORATION LLC	1/8+	882 530	N/A	N/A	N/A
10*15560	J	9-11-6.2	WILLIAM F KERNS ET UX	CHESAPEAKE APPALACHIA LLC	1/8+	677 561	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*15669	J	9-11-6.2	EMMA ANDERSON	CHEVRON USA INC	1/8+	861 586	N/A	N/A	Chevron to Tug Hill: 36/148
10*15670	J	9-11-6.2	GARY M BONAR AND ELLEN L BONAR	CHEVRON USA INC	1/8+	861 577	N/A	N/A	Chevron to Tug Hill: 36/148
10*15671	J	9-11-6.2	JUDALENE K COLLUMS	CHEVRON USA INC	1/8+	861 571	N/A	N/A	Chevron to Tug Hill: 36/148
10*15672	J	9-11-6.2	NAOMI HUPP	CHEVRON USA INC	1/8+	861 604	N/A	N/A	Chevron to Tug Hill: 36/148
10*15584	K	9-11-5	VICKIE MASON	CHEVRON U.S.A. INC.	1/8+	686 239	N/A	N/A	Chevron to Tug Hill: 36/148

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 6HU

SI-01968

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment
10*15585	K	9-11-5	SHARON L WHETZAL	CHESAPEAKE APPALACHIA LLC	1/8+	687 147	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*15586	K	9-11-5	MARY A SOUTH	CHEVRON U.S.A. INC.	1/8+	690 615	N/A	N/A	Chevron to Tug Hill: 36/148
10*15587	K	9-11-5	ROBERT L WHETZAL	CHESAPEAKE APPALACHIA LLC	1/8+	690 559	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*15588	K	9-11-5	RAY A WHETZAL JR	CHESAPEAKE APPALACHIA LLC	1/8+	693 571	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*15589	K	9-11-5	MARK L WHETZAL	CHESAPEAKE APPALACHIA LLC	1/8+	693 576	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*47051.108.1	K	9-11-5	MICHAEL A WHETZEL	TH EXPLORATION LLC	1/8+	885 51	N/A	N/A	N/A
10*47051.108.5	K	9-11-5	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	885 55	N/A	N/A	N/A
10*47051.256.1	L	9-11-6	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	881 145	N/A	N/A	N/A
10*47051.256.3	L	9-11-6	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.2	L	9-11-6	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.4	L	9-11-6	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*47051.256.5	L	9-11-6	JERRY W ZIEN AND KATHLEEN E ZIEN	TH EXPLORATION LLC	1/8+	882 530	N/A	N/A	N/A
10*15669	L	9-11-6	EMMA ANDERSON	CHEVRON USA INC	1/8+	861 586	N/A	N/A	Chevron to Tug Hill: 36/148
10*15670	L	9-11-6	GARY M BONAR AND ELLEN L BONAR	CHEVRON USA INC	1/8+	861 577	N/A	N/A	Chevron to Tug Hill: 36/148
10*15671	L	9-11-6	JUDALENE K COLLUMS	CHEVRON USA INC	1/8+	861 571	N/A	N/A	Chevron to Tug Hill: 36/148
10*15672	L	9-11-6	NAOMI HUPP	CHEVRON USA INC	1/8+	861 604	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.256.22	M	9-11-7	BEVERLY J HOPSON	TH EXPLORATION LLC	1/8+	913 581	N/A	N/A	N/A
10*47051.256.1	M	9-11-7	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	881 145	N/A	N/A	N/A
10*15746	M	9-11-7	BRUCE D SCHURR	TH EXPLORATION LLC	1/8+	921 478	N/A	N/A	N/A
10*16247	M	9-11-7	CAROL RIGGLE PARSLEY AND JAMES DENNIS PARSLEY	TH EXPLORATION LLC	1/8+	925 327	N/A	N/A	N/A
10*47051.256.24	M	9-11-7	CATHERINE BONAR PETTIT BILLIE	TH EXPLORATION LLC	1/8+	904 628	N/A	N/A	N/A
10*47051.256.16	M	9-11-7	CHARLOTTE B HUMMELL	TH EXPLORATION LLC	1/8+	905 45	N/A	N/A	N/A
10*47051.256.15	M	9-11-7	CHARLOTTE J BONAR YOHO	TH EXPLORATION LLC	1/8+	904 455	N/A	N/A	N/A
10*17506	M	9-11-7	CHASKIA F HARRIS AND JAMES M HARRIS	TH EXPLORATION LLC	1/8+	919 239	N/A	N/A	N/A
10*17507	M	9-11-7	DEZRAY METCALF	TH EXPLORATION LLC	1/8+	919 235	N/A	N/A	N/A
10*17415	M	9-11-7	DILLON PITSENBARGER	TH EXPLORATION LLC	1/8+	919 241	N/A	N/A	N/A
10*16115	M	9-11-7	EARL W HARRIS	TH EXPLORATION LLC	1/8+	925 329	N/A	N/A	N/A
10*47051.256.10	M	9-11-7	GRACE LAURA BONAR	TH EXPLORATION LLC	1/8+	905 35	N/A	N/A	N/A
10*47051.256.14	M	9-11-7	HUGH R BUZZARD	TH EXPLORATION LLC	1/8+	905 43	N/A	N/A	N/A
10*47051.256.21	M	9-11-7	JACK L MASON AND JEAN M MASON	TH EXPLORATION LLC	1/8+	904 626	N/A	N/A	N/A
10*47051.256.20	M	9-11-7	JEFFREY THOMAS PYLES AND TERESA A PYLES	TH EXPLORATION LLC	1/8+	907 209	N/A	N/A	N/A
10*47051.256.11	M	9-11-7	JOHN L MASON	TH EXPLORATION LLC	1/8+	905 37	N/A	N/A	N/A
10*47051.256.18	M	9-11-7	JOHN WILLIAM BONAR AND SHIRLEY BONAR	TH EXPLORATION LLC	1/8+	913 522	N/A	N/A	N/A
10*47051.256.7	M	9-11-7	MARILYN SUE BUMER	TH EXPLORATION LLC	1/8+	905 29	N/A	N/A	N/A
10*47051.256.17	M	9-11-7	MAXINE G JOHNSON	TH EXPLORATION LLC	1/8+	904 457	N/A	N/A	N/A
10*47051.256.19	M	9-11-7	MICHAEL DAVID PYLES AND CYNTHIA A PYLES	TH EXPLORATION LLC	1/8+	907 207	N/A	N/A	N/A
10*47051.256.8	M	9-11-7	PAMELA ANN MASON	TH EXPLORATION LLC	1/8+	905 31	N/A	N/A	N/A
10*47051.256.23	M	9-11-7	ROBERT L BONAR	TH EXPLORATION LLC	1/8+	913 556	N/A	N/A	N/A
10*47051.256.12	M	9-11-7	STEVEN A BOHRER	TH EXPLORATION LLC	1/8+	905 39	N/A	N/A	N/A
10*16021	M	9-11-7	TOMMY BONAR AND TANYA S BONAR	TH EXPLORATION LLC	1/8+	925 325	N/A	N/A	N/A
10*47051.256.9	M	9-11-7	WANDA MASON SUNSHINE	TH EXPLORATION LLC	1/8+	905 33	N/A	N/A	N/A
10*47051.256.13	M	9-11-7	WILLIAM W CRAIG AND GLENDA L CRAIG	TH EXPLORATION LLC	1/8+	905 41	N/A	N/A	N/A
10*47051.108.1	N	9-11-9	MICHAEL A WHETZEL	TH EXPLORATION LLC	1/8+	885 51	N/A	N/A	N/A
10*15582	O	9-11-10	ROBERT L CLARK	CHESAPEAKE APPALACHIA LLC	1/8+	685 239	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 36/148
10*15511	P	9-11-12	DAVID E CROW	TRIENERGY HOLDINGS LLC	1/8+	718 376	TriEnergy to NPAR: 25/463	NPAR to Chevron: 26/269	Chevron to Tug Hill: 36/148
10*15515	P	9-11-12	DESIRE L CROW	TRIENERGY HOLDINGS LLC	1/8+	718 334	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15517	P	9-11-12	DIANNE GELLNER & GARY GELLNER	TRIENERGY HOLDINGS LLC	1/8+	718 345	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment
10*15510	P	9-11-12	ELAINE PHELPS ET VIR	TRIENERGY HOLDINGS LLC	1/8+	718 326	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15512	P	9-11-12	FRANCES COFFEY	TRIENERGY HOLDINGS LLC	1/8+	718 378	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15518	P	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TRIENERGY HOLDINGS LLC	1/8+	718 347	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*47051.123.2	P	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TH EXPLORATION LLC	1/8+	873 143	N/A	N/A	N/A
10*15519	P	9-11-12	JOHN CROW	TRIENERGY HOLDINGS LLC	1/8+	726 580	TriEnergy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15513	P	9-11-12	KAY KEYES	TRIENERGY HOLDINGS LLC	1/8+	718 330	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15514	P	9-11-12	L PAUL CROW	TRIENERGY HOLDINGS LLC	1/8+	718 336	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*47051.123.1	P	9-11-12	LLOYD G BAKER	TH EXPLORATION LLC	1/8+	865 389	N/A	N/A	N/A
10*15516	P	9-11-12	ROSE MARIE KIELGCZEWSKI	TRIENERGY HOLDINGS LLC	1/8+	718 354	TriEnergy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15520	P	9-11-12	TIMOTHY CROW	TRIENERGY HOLDINGS LLC	1/8+	726 582	TriEnergy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15559	Q	9-11-11	KENNETH M MCCARDLE ET UX REV LT	CHEVRON USA INC	1/8+	816 499	N/A	N/A	Chevron to Tug Hill: 36/148
10*16244	R	9-12-1	EMILY ANN NICIFOROS	TH EXPLORATION LLC	1/8+	924 617	N/A	N/A	N/A
10*16149	R	9-12-1	THOMAS MICHAEL WALLACE	TH EXPLORATION LLC	1/8+	924 610	N/A	N/A	N/A
10*47051.333.1	R	9-12-1	THOMAS S RIGGS III	TH EXPLORATION LLC	1/8+	904 556	N/A	N/A	N/A
10*47051.333.2	R	9-12-1	WILLIAM MARTIN RIGGS ANGELA RAE MOORE	TH EXPLORATION LLC	1/8+	907 220	N/A	N/A	N/A
10*15458	S	9-14-16	JOANN MERCER	TH EXPLORATION LLC	1/8+	921 273	N/A	N/A	N/A
10*15469	S	9-14-16	HARRIET J ANDERSON	TH EXPLORATION LLC	1/8+	920 11	N/A	N/A	N/A
10*15470	S	9-14-16	BETTY L LOGES	TH EXPLORATION LLC	1/8+	921 286	N/A	N/A	N/A
10*15472	S	9-14-16	DONALD & SANDRA GRIZZEL	TH EXPLORATION LLC	1/8+	920 70	N/A	N/A	N/A
10*15473	S	9-14-16	WILLIAM F MCDONALD AND SHIRLEY MCDONALD	TH EXPLORATION LLC	1/8+	921 198	N/A	N/A	N/A
10*15476	S	9-14-16	CURITS W WEST JR AND DIANE WEST	TH EXPLORATION LLC	1/8+	921 263	N/A	N/A	N/A
10*15488	S	9-14-16	NANCY F FYE & STEPHEN M FYE	TH EXPLORATION LLC	1/8+	921 226	N/A	N/A	N/A
10*15495	S	9-14-16	WALTER LEE BARNHART AND BARBARA L HEATH	TH EXPLORATION LLC	1/8+	921 222	N/A	N/A	N/A
10*15694	S	9-14-16	DEBORAH L MERCER	TH EXPLORATION LLC	1/8+	921 271	N/A	N/A	N/A
10*15695	S	9-14-16	JOHN R AND LOIS L GORBY	TH EXPLORATION LLC	1/8+	929 259	N/A	N/A	N/A
10*15696	S	9-14-16	JOSEPH JEREMY PALMER	TH EXPLORATION LLC	1/8+	921 275	N/A	N/A	N/A
10*15741	S	9-14-16	LOHRN S GORBY	TH EXPLORATION LLC	1/8+	929 641	N/A	N/A	N/A
10*16152	S	9-14-16	CONNIE HECKLE	TH EXPLORATION LLC	1/8+	920 29	N/A	N/A	N/A
10*16153	S	9-14-16	LARRY JACK EMERY	TH EXPLORATION LLC	1/8+	920 13	N/A	N/A	N/A
10*16186	S	9-14-16	DEBORAH KAY COOLEY AND ROBERT T BECK	TH EXPLORATION LLC	1/8+	920 65	N/A	N/A	N/A
10*16187	S	9-14-16	PATRICIA D BABL AND JOHN J BABL	TH EXPLORATION LLC	1/8+	920 31	N/A	N/A	N/A
10*16191	S	9-14-16	MADLYN E MOSSOR	TH EXPLORATION LLC	1/8+	920 76	N/A	N/A	N/A
10*16403	S	9-14-16	WILLIAM C EDGAR AND CHRISTY E EDGAR	TH EXPLORATION LLC	1/8+	920 61	N/A	N/A	N/A
10*16404	S	9-14-16	KATHRYN M WHIPKEY	TH EXPLORATION LLC	1/8+	921 194	N/A	N/A	N/A
10*16406	S	9-14-16	ARLENA B HORNER AND QUAY ALLEN HORNER	TH EXPLORATION LLC	1/8+	921 240	N/A	N/A	N/A
10*16407	S	9-14-16	JANICE F BROOKOVER	TH EXPLORATION LLC	1/8+	920 74	N/A	N/A	N/A
10*16408	S	9-14-16	KATHLEEN I FRANCIS	TH EXPLORATION LLC	1/8+	921 196	N/A	N/A	N/A
10*16409	S	9-14-16	JEANETTE M HEATH	TH EXPLORATION LLC	1/8+	920 72	N/A	N/A	N/A
10*16425	S	9-14-16	WILLIAM A MASON JR AND ROBIN MASON	TH EXPLORATION LLC	1/8+	920 25	N/A	N/A	N/A
10*16428	S	9-14-16	BRUCE LYNN JOHNSON AND KIMBERLY A JOHNSON	TH EXPLORATION LLC	1/8+	920 50	N/A	N/A	N/A
10*16438	S	9-14-16	ALICE MARLENE PERSINGER	TH EXPLORATION LLC	1/8+	921 236	N/A	N/A	N/A
10*16468	S	9-14-16	LARRY W JOHNSON	TH EXPLORATION LLC	1/8+	920 57	N/A	N/A	N/A
10*16469	S	9-14-16	JAMES EARL AND MARGARET L SIBURT	TH EXPLORATION LLC	1/8+	921 245	N/A	N/A	N/A
10*16470	S	9-14-16	CAROLYN SUE FRANKLIN AND RAYMOND EUGENE FRANKLIN	TH EXPLORATION LLC	1/8+	921 219	N/A	N/A	N/A
10*16472	S	9-14-16	JUDY DELORIS SIBURT	TH EXPLORATION LLC	1/8+	929 643	N/A	N/A	N/A
10*16473	S	9-14-16	LINDA ELAINE AND RICHARD LEROY LITTELL	TH EXPLORATION LLC	1/8+	929 256	N/A	N/A	N/A
10*16474	S	9-14-16	BARBARA KAY SIBURT	TH EXPLORATION LLC	1/8+	921 266	N/A	N/A	N/A

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 6HU

81-01968

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment
10*16475	S	9-14-16	MARY LOUISE GORBY	TH EXPLORATION LLC	1/8+	921 234	N/A	N/A	N/A
10*16476	S	9-14-16	ROGER ALLAN AND CYNTHIA L JOHNSON	TH EXPLORATION LLC	1/8+	921 257	N/A	N/A	N/A
10*16477	S	9-14-16	BRENDA K YOHO	TH EXPLORATION LLC	1/8+	921 228	N/A	N/A	N/A
10*16550	S	9-14-16	CHARLES LEROY AND MARTHA G LEACH	TH EXPLORATION LLC	1/8+	920 19	N/A	N/A	N/A
10*16551	S	9-14-16	JACK L JR & VIRGINIA L CROW	TH EXPLORATION LLC	1/8+	921 260	N/A	N/A	N/A
10*16867	S	9-14-16	APRIL M WEED	TH EXPLORATION LLC	1/8+	921 279	N/A	N/A	N/A
10*16883	S	9-14-16	VICKIE LYNN PAPE AND JOHN EDWARD PAPE	TH EXPLORATION LLC	1/8+	921 248	N/A	N/A	N/A
10*16884	S	9-14-16	DELORES A AND LEONARD B BOWERS	TH EXPLORATION LLC	1/8+	921 281	N/A	N/A	N/A
10*16916	S	9-14-16	ROGER LEE WEST	TH EXPLORATION LLC	1/8+	921 277	N/A	N/A	N/A
10*16971	S	9-14-16	LEONA M SIBURT	TH EXPLORATION LLC	1/8+	921 238	N/A	N/A	N/A
10*16972	S	9-14-16	SCOTT BRADLEY AND SHERRY ANN GRIMM	TH EXPLORATION LLC	1/8+	921 242	N/A	N/A	N/A
10*16973	S	9-14-16	NANCY C AND CARL E KESSELRING	TH EXPLORATION LLC	1/8+	920 22	N/A	N/A	N/A
10*17358	S	9-14-16	KAREN LOUISE AND ROGER L DUNHAM	TH EXPLORATION LLC	1/8+	921 254	N/A	N/A	N/A
10*17359	S	9-14-16	TH EXPLORATION LLC	TH EXPLORATION LLC	1/8+	921 224	N/A	N/A	N/A
10*17361	S	9-14-16	SHEILA RAMONA CROW	TH EXPLORATION LLC	1/8+	920 78	N/A	N/A	N/A
10*17362	S	9-14-16	NILA VIRGINIA AND FREDERICK EUGENE STREIGHT	TH EXPLORATION LLC	1/8+	921 251	N/A	N/A	N/A
10*17366	S	9-14-16	SYLVIA DEE WOOD	TH EXPLORATION, LLC	1/8+	921 230	N/A	N/A	N/A
10*17367	S	9-14-16	JERRY HOWELL	TH EXPLORATION LLC	1/8+	920 37	N/A	N/A	N/A
10*17368	S	9-14-16	DONALD PAUL CROW AND CRYSTAL LYNN CROW	TH EXPLORATION LLC	1/8+	921 201	N/A	N/A	N/A
10*17369	S	9-14-16	DELORES A WALLACE	TH EXPLORATION LLC	1/8+	920 63	N/A	N/A	N/A
10*17371	S	9-14-16	MACK A AND CAROL A CROW	TH EXPLORATION LLC	1/8+	921 204	N/A	N/A	N/A
10*17372	S	9-14-16	DONNIE JASON HEDGEPEETH AND KAREN L HEDGEPEETH	TH EXPLORATION LLC	1/8+	920 42	N/A	N/A	N/A
10*17373	S	9-14-16	NILA F HEDGEPEETH	TH EXPLORATION LLC	1/8+	920 45	N/A	N/A	N/A
10*17374	S	9-14-16	EZRA HOWARD COCHRAN	TH EXPLORATION LLC	1/8+	920 27	N/A	N/A	N/A
10*17380	S	9-14-16	DEBORAH IRENE PIERCE AND BARRETT LEE PIERCE	TH EXPLORATION LLC	1/8+	920 34	N/A	N/A	N/A
10*17381	S	9-14-16	CINDY J AND DARNELL L FULKS	TH EXPLORATION LLC	1/8+	921 268	N/A	N/A	N/A
10*17382	S	9-14-16	HELEN MARIE AND DAVID E MCCRAY	TH EXPLORATION LLC	1/8+	920 147	N/A	N/A	N/A
10*17389	S	9-14-16	MELBA EILEEN HUDDLESTUN	TH EXPLORATION, LLC	1/8+	920 53	N/A	N/A	N/A
10*17390	S	9-14-16	HAROLD B CROW AND CONNIE SUE CROW	TH EXPLORATION LLC	1/8+	921 207	N/A	N/A	N/A
10*17391	S	9-14-16	BETTY L HUFF AND OLLIE C HUGGINS	TH EXPLORATION, LLC	1/8+	921 210	N/A	N/A	N/A
10*17392	S	9-14-16	BEVERLY KATHRYN GODDARD	TH EXPLORATION, LLC	1/8+	920 55	N/A	N/A	N/A
10*17393	S	9-14-16	CHARLIE M TURNER AND BESSIE M TURNER	TH EXPLORATION LLC	1/8+	920 39	N/A	N/A	N/A
10*17394	S	9-14-16	JUDY LOUISE GLOVER	TH EXPLORATION LLC	1/8+	921 232	N/A	N/A	N/A
10*17397	S	9-14-16	PAT DARRELL TURNER AND TINA DENISE TURNER	TH EXPLORATION LLC	1/8+	925 117	N/A	N/A	N/A
10*17399	S	9-14-16	RONALD EDWARD WATSON AND DIANA L WATSON	TH EXPLORATION LLC	1/8+	925 120	N/A	N/A	N/A
10*17401	S	9-14-16	JOHN M HAUGHT JR AND CHERYL A HAUGHT	TH EXPLORATION LLC	1/8+	925 182	N/A	N/A	N/A
10*17402	S	9-14-16	DIANA LYNN BUMGARDNER	TH EXPLORATION LLC	1/8+	920 68	N/A	N/A	N/A
10*17403	S	9-14-16	JAMES B AND PENNY G CROW	TH EXPLORATION, LLC	1/8+	925 187	N/A	N/A	N/A
10*17404	S	9-14-16	BRIAN K CROW	TH EXPLORATION LLC	1/8+	925 185	N/A	N/A	N/A
10*17405	S	9-14-16	ORVELLA L AND LARRY L NEFF	TH EXPLORATION, LLC	1/8+	925 114	N/A	N/A	N/A
10*17408	S	9-14-16	WILLIAM JAMES HEDGEPEETH AND ERIN ELIZABETH HEDGEPEETH	TH EXPLORATION LLC	1/8+	924 572	N/A	N/A	N/A
10*17409	S	9-14-16	JUDY A AND CLYDE E ELLZEY	TH EXPLORATION LLC	1/8+	924 569	N/A	N/A	N/A
10*17410	S	9-14-16	LILLIE L GAREY	TH EXPLORATION, LLC	1/8+	924 567	N/A	N/A	N/A
10*17420	S	9-14-16	DAVID LEE AND ANN F BAKER	TH EXPLORATION LLC	1/8+	924 564	N/A	N/A	N/A
10*17490	S	9-14-16	CONNIE SUE DOUGLAS AND RONNIE J DOUGLAS	TH EXPLORATION LLC	1/8+	924 578	N/A	N/A	N/A
10*17491	S	9-14-16	THOMAS LEE AND CLARA J HAUGHT	TH EXPLORATION LLC	1/8+	924 575	N/A	N/A	N/A
10*17598	S	9-14-16	TERRY LEE PETTIT AND STEPHANIE LYNN PETIT	TH EXPLORATION LLC	1/8+	921 288	N/A	N/A	N/A

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 6HU

51-01968

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment
10*17710	S	9-14-16	DEBRA J & DARRELL R LANCASTER	TH EXPLORATION, LLC	1/8+	929	634	N/A	N/A	N/A
10*17811	S	9-14-16	PANSY M ASTON AND ELMER L ASTON	TH EXPLORATION LLC	1/8+	921	216	N/A	N/A	N/A
10*17821	S	9-14-16	GREGORY S CROW	TH EXPLORATION LLC	1/8+	929	639	N/A	N/A	N/A
10*17902	S	9-14-16	SUSAN LYNN SEDGMER	TH EXPLORATION LLC	1/8+	920	59	N/A	N/A	N/A
10*17904	S	9-14-16	RICKY LEE AND TAMMY J WATSON	TH EXPLORATION LLC	1/8+	921	213	N/A	N/A	N/A
10*17958	S	9-14-16	SANDRA KAY RICHMOND	TH EXPLORATION LLC	1/8+	929	632	N/A	N/A	N/A
10*17929	T	9-14-17	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	921	320	N/A	N/A	N/A

COPY

AFFIDAVIT

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

On this 18th 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 18th day of October, 2016.

David D. Kalish
Affiant: David D. Kalish

JURAT

Jan Pest
MARSHALL County 03:44:28 PM
Instrument No 1416299
Date Recorded 10/19/2016
Document Type 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 18th day of October, 2016, by David D. Kalish

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

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WV Department of
Environmental Protection

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



STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Jan Post
MARSHALL County 12:43:01 PM
Instrument No 1404876
Date Recorded 05/20/2016
Document Type ASN
Pages Recorded 20
Book-Page 36-148
Recording Fee \$20.00
Additional \$3.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 17th day of May, 2016 (the "Effective Date"), by and between **CHEVRON U.S.A. INC.** (hereinafter "Assignor") and **TH EXPLORATION, LLC** (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated May 2, 2016 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in **Exhibit "A"**, and as depicted in **Exhibits "A-1"** and **"A-2"**, attached hereto and made a part hereof (hereinafter the "Leases"); and

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

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

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

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

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

#217
for now

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Assignor represents and warrants that Assignor has paid any and all bonuses, rentals, royalties, overriding royalties, and other payments required by the Leases which were due for the period in which Assignor held its interests in the Leases, and that Assignor has fully performed all conditions necessary to maintain the Leases in full force and effect during such period, free and clear of all Encumbrances, except for and subject only to Permitted Encumbrances.

3. Successors and Assigns. The terms of this Assignment shall be binding upon and inure to the benefit of the parties hereto and each of their respective successors and assigns, and such terms shall be covenants running with the land, and with each subsequent transfer or assignment thereof.

4. Further Assurances. Assignor and Assignee hereby agree to take all actions and execute, acknowledge, and deliver all such instruments as are necessary or advisable to effectuate the purposes of this Assignment.

5. Counterparts; Recordation. This Assignment may be executed in any number of counterparts, each of which will be deemed an original instrument, but all of which shall collectively constitute one and the same instrument; provided that none of the parties will be bound to this Assignment unless and until all parties have executed a counterpart. For recording purposes, the signature and/or acknowledgment pages from multiple counterparts may be combined with one or more other counterparts without affecting the effect or validity of this Assignment. Assignee will be responsible for recording this Assignment in the appropriate public record, and will bear any costs associated with such recording.

6. Drafting. Preparation of this Assignment has been a joint effort of the parties and the resulting Assignment must not be construed more severely against any of the parties than against any other.

7. Incorporation. This Assignment is subject to and expressly incorporates the terms of the Acreage Trade Agreement by and between Assignor and Assignee. The Acreage Trade Agreement will govern to the extent of any conflict between the terms of this Assignment and the Acreage Trade Agreement.

(The remainder of this page intentionally left blank, signature pages to follow)

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IN WITNESS WHEREOF, and intending to be legally bound hereby, Assignor and Assignee have caused this Assignment to be duly executed the day and year first above written.

ASSIGNOR:

CHEVRON U.S.A. INC.

By: *Marc Tate*
Name: Marc Tate
Title: Attorney-In-Fact

ASSIGNEE:

TH EXPLORATION, LLC

By: _____
Name: _____
Title: _____

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IN WITNESS WHEREOF, and intending to be legally bound hereby, Assignor and Assignee have caused this Assignment to be duly executed the day and year first above written.

ASSIGNOR:

CHEVRON U.S.A. INC.

By: _____
Name: Marc Tate
Title: Attorney-In-Fact

ASSIGNEE:

TH EXPLORATION, LLC

By: David D. Kalish
Name: David D. Kalish
Title: VP-Land

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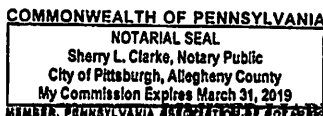
CORPORATE ACKNOWLEDGEMENT

STATE/Commonwealth of PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this the 16th day of May, 2016, before me, SHERRY L. CLARKE the undersigned authority, personally appeared Marc Tate, who acknowledged himself to be the Attorney-In-Fact of CHEVRON U.S.A. INC., a Pennsylvania corporation, and that he as such Attorney-In-Fact, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Attorney-In-Fact.

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

MY COMMISSION EXPIRES: March 31, 2019



Sherry L. Clarke
Notary Public

LIMITED LIABILITY COMPANY ACKNOWLEDGEMENT

STATE/Commonwealth of _____)
) SS:
COUNTY OF _____)

On this the _____ day of _____, 2016, before me, _____ the undersigned authority, personally appeared _____, who acknowledged himself to be a _____, a limited liability company and that he as such _____, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by himself as _____.

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

MY COMMISSION EXPIRES:

Notary Public

Prepared by:

CHEVRON U.S.A. INC.
Attn: Land Department
700 Cherrington Parkway,
Coraopolis, PA 15108

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CORPORATE ACKNOWLEDGEMENT

STATE/Commonwealth of PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this the ____ day of _____, 2016, before me, _____ the undersigned authority, personally appeared Marc Tate, who acknowledged himself to be the Attorney-In-Fact of CHEVRON U.S.A. INC., a Pennsylvania corporation, and that he as such Attorney-In-Fact, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Attorney-In-Fact.

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

MY COMMISSION EXPIRES:

Notary Public

LIMITED LIABILITY COMPANY ACKNOWLEDGEMENT

STATE/Commonwealth of Texas)
) SS:
COUNTY OF Tarrant)

On this the 17th day of May, 2016, before me, Jennifer Mchugh the undersigned authority, personally appeared David A. Kalish, who acknowledged himself to be Vice President Land of TH Exploration, a limited liability company and that he as such Vice President Land, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by himself as Vice President Land.

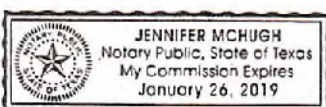
IN WITNESS WHEREOF, I hereto set my hand and official seal.

MY COMMISSION EXPIRES: 1-26-2019

Jennifer Mchugh
Notary Public

Prepared by:

CHEVRON U.S.A. INC.
Attn: Land Department
700 Cherrington Parkway,
Coraopolis, PA 15108



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SI-01968



June 28, 2017

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

RE: Heaven Hill 3-6HU

Subject: Marshall County Route 21/9 and 21 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 21/9 and 21 in the area reflected on the Heaven Hill 3-6HU well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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

Sincerely,

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

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

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

Date of Notice Certification: 08/01/2017

API No. 47- 051 01968
 Operator's Well No. Heaven Hill 3-6HU
 Well Pad Name: Heaven Hill 3

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>526,252.40</u>
County: <u>Marshall</u>		Northing: <u>4,406,565.23</u>
District: <u>Meade</u>	Public Road Access: <u>Yeater Lane CR 21/11</u>	
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>Ricky L. Whitlatch</u>	
Watershed: <u>Lower Bowman Run of Fish Creek (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: (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	OOG OFFICE USE ONLY <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
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Required Attachments:

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

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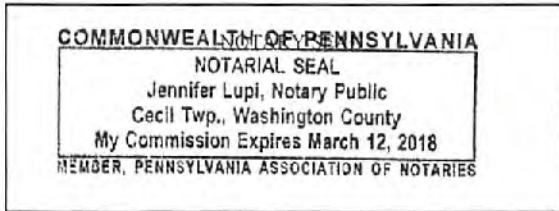
 WV Department of
Environmental Protection

Certification of Notice is hereby given:

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

Well Operator: Tug Hill Operating, LLC
By: Amy L. Miller
Its: Permitting Specialist - Appalachia
Telephone: 304-376-01111

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030
Email: amiller@tug-hillop.com



Subscribed and sworn before me this 18th day of Sept 2017.
Jennifer Lupi Notary Public
My Commission Expires March 12, 2018

Oil and Gas Privacy Notice:

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

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

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

Date of Notice: 8/31/2017 **Date Permit Application Filed:** 9/1/2017

Notice of:

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

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

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

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

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

SURFACE OWNER(s)

Name: Ricky L. Whittlatch
Address: 1044 Yeater Lane
Glen Easton, WV 26039

Name: None
Address: _____

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

Name: Andrew Whittlatch
Address: 942 Yeater Lane
Glen Easton, WV 26039

Name: Arnie Goodnight, et ux
Address: 102 Goodnight Lane
Moundsville, WV 26041

SURFACE OWNER(s) (Impoundments or Pits)

Name: None
Address: _____

COAL OWNER OR LESSEE

Name: Murray Energy Corporation
Address: 46226 National Road
St. Clairsville, OH 43950

COAL OPERATOR
Name: Same as above coal owner
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: *See supplement page 1A attached
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: None
Address: _____

*Please attach additional forms if necessary

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Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting 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

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

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WW-6A
(8-13)

API NO. 47- 051 - 01968
OPERATOR WELL NO. Heaven Hill 3-6HU
Well Pad Name: Heaven Hill 3

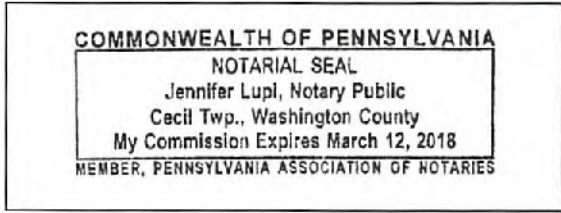
Notice is hereby given by:

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

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

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 31st day of Aug, 2017.
Jennifer Lupi Notary Public
My Commission Expires March 12, 2018

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Exhibit WW-6A**Supplement Pg. 1A**

Tug Hill Operating, LLC
 380 Southpointe Blvd, Suite 200
 Cannonsburg, PA 15137

Residences within Two-Thousand Feet (2,000')

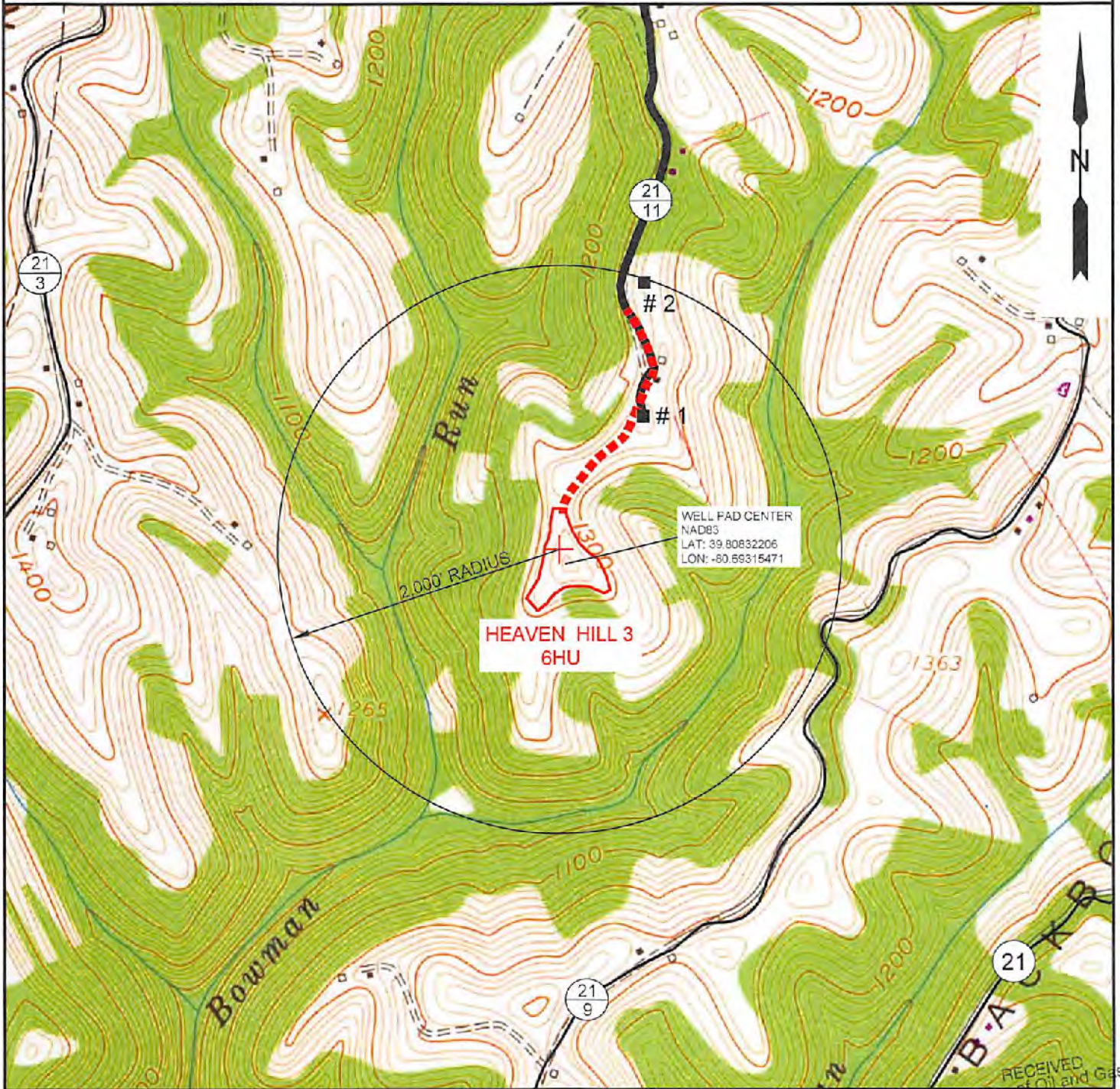
Well: Heaven Hill 3 - 6HU
 District: Meade (House #'s 1 & 2)
 State: WV

There are two (2) residences, no businesses, no churches, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

House 1 TM 7 Pcl. 30 Ricky L. Whitlatch Phone: 304-843-1168 Physical Address: 1044 Yeater Ln. Glen Easton, WV 26039 Tax Address: Same	House 2 TM 7 Pcl. 30.1 Andrew Corey Whitlatch Phone: 304-845-9605 Physical Address: 942 Yeater Ln. Glen Easton, WV 26039 Tax Address: Same
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PROPOSED HEAVEN HILL 3 - 6HU



NOTE: THERE APPEARS TO BE TWO (2) POSSIBLE WATER SOURCES WITHIN 2,000'.

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26035 • (304) 462-5634
www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	MEADE	380 SOUTHPOINTE BLVD	
		SUITE 200	
		CANONSBURG, PA 15317	
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8654	08/25/2017	1" = 1000'

TUG HILL
OPERATING

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: December 5, 2016 **Date of Planned Entry:** December 16, 2016

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: Ricky L. Whillatch
Address: 1044 Yeater Lane
Glen Easton, WV 26039

Name: Andrew Whillatch
Address: 942 Yeater Lane
Glen Easton, WV 26039

Name: Arnie Goodnight ET UX
Address: 102 Goodnight Lane
Moundsville, WV 26041

COAL OWNER OR LESSEE

Name: Murray Energy Corp.
Address: 46226 National Road
St. Clairsville, OH 43950

MINERAL OWNER(S)

Name: Ricky L. Whillatch
Address: 1044 Yeater Lane
Glen Easton, WV 26039 ****SEE SUPPLEMENT PAGE****

*please attach additional forms if necessary

Notice is hereby given:

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

State: West Virginia
County: Marshall
District: Meade
Quadrangle: Glen Easton 7.5'

Approx. Latitude & Longitude: Lat: 39.6083194, Long: -80.6931660
Public Road Access: Yeater Lane (CO. RL 21/11)
Watershed: HUC-10 Fish Creek
Generally used farm name: Ricky L. Whillatch

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 57th 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.

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-0749-8388
Email: jwhite@tug-hill-op.com

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

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Oil and Gas Privacy Notice:

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

Operator Well No. Heaven Hill Unit 3-6HU

WW-6A3 Notice of Entry for Plat Survey Attachment 1 of 1

Mineral Owner(s):

Name: Arnie Goodnight ET UX
Address: 102 Goodnight Lane
Moundsville, WV 26041

Bounty Minerals III Acquisitions, LLC
777 Main Street – Suite 850
Ft. Worth, TX 76102

Andrew Whitlatch
942 Yeater Lane
Glen Easton, WV 26039

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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: 06/29/2017 **Date Permit Application Filed:** 07/07/2017

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

- CERTIFIED MAIL HAND
- RETURN RECEIPT REQUESTED DELIVERY

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

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

Name: Ricky L. Whittlatch
Address: 1044 Yeater Lane
Glen Easton, WV 26039

Name: Andrew Whittlatch
Address: 942 Yeater Lane
Glen Easton, WV 26039 **See Attached**

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>526,252.40</u>
County: <u>Marshall</u>		Northing: <u>4,406,565.23</u>
District: <u>Meade</u>	Public Road Access: <u>Yeater Lane (Co. Rt. 21/11)</u>	
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>Ricky L. Whittlatch</u>	
Watershed: <u>(HUC 10) Fish Creek</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 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

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

Address: 300 Southpointe Blvd, Southpointe Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

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

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WV Department of
Environmental Protection

51-01968

Operator Well No. Heaven Hill Unit 3-6HU

WW-6A5 Notice of Entry for Plat Survey Attachment 1 of 1

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

Name: Arnie Goodnight, et ux
Address: 102 Goodnight Lane
Moundsville, WV 26041

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WV Department of
Environmental Protection

51-01968



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Jim Justice
Governor

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

May 16, 2017

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

Subject: DOH Permit for the Heaven Hills Unit 3 Pad, Marshall County
Heaven Hills Unit 3-6HU Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permits #06-2016-0284 & 0287 which have been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 21/3 SLS.

The operator has signed a STATEWIDE 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,

A handwritten signature in blue ink that reads "Gary K. Clayton".

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

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

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Heaven Hill 3-6HU

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



Table with 2 columns: 'Site Features' and 'County of Each Pad'. Lists various site features and their corresponding county assignments.

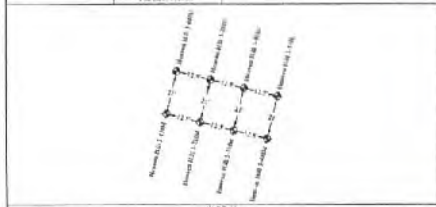
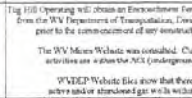


Table with 4 columns: 'Heaven Hill 3A', 'Heaven Hill 3B', 'Heaven Hill 3C', and 'Heaven Hill 3D'. Lists site features and their county assignments for each pad area.

Project Contacts
Tug Hill Operating
Heaven Hill 3 Site
Emergency Number: 304-845-1920

MISS UTILITY OF WEST VIRGINIA
1-800-245-6846
www.missutility.com



APPROVED WVDEP OOG
7/10/2017

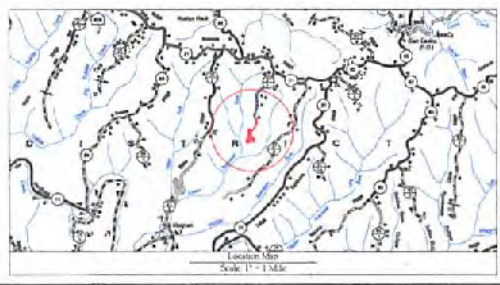
Heaven Hill 3 Site
Site Design, Construction Plan, &
Erosion and Sediment Control Plans

Pertinent Site Information
Heaven Hill 3 Site
Emergency Number: 304-845-1920
Meade District, Marshall County, WV

Exhibit A: Final Design: Issue for Permitting



Table with 3 columns: 'Site Location (PAD 27)', 'Site Location (PAD 48)'. Lists coordinates for various site locations.



WV State Plane Coordinate System
North Zone, NAD83
Elevation Based on NAVD83
Established for use with GPS
and GIS Data Processing

Table: Property Owner Information - Heaven Hill 3 Site. Columns: Owner, Acreage, Total Pads, Access Road, etc.

Table: Access Road. Columns: Section, Width, Length, Area, etc.

Table: Detached Area. Columns: Detached Area, Area, etc.

Table: Heaven Hill 3 Site Statistics. Columns: Description, Quantity, etc.

Accession Routes
From the intersection of 12th Street and WV 30 East,
Marshall, WV. Follow WV 30 East South for 0.9 miles. Turn
Left onto State Rt 27. Follow State Rt 27 for 2.0 miles. Turn
Left onto Co Rd 22 (Richards Ridge Rd). Follow Co Rd 22 for
2.0 miles. Continue straight onto Co Rd 21 (Richards Ridge Rd).
Follow Co Rd 21 for 4.4 miles. Turn Left onto access
road Co Rd 21 (Richards Ridge Rd). Follow Co Rd 21 for 2.3
miles. Turn Right onto Co Rd 21 (Richards Ridge Rd) for 0.5
miles. The site entrance will be at the end of the county road.

Flowchart: Conditions
1. The site is not in a floodplain.
2. The site is not in a wetland.
3. The site is not in a riparian area.
4. The site is not in a stream bed.
5. The site is not in a stream bank.
6. The site is not in a stream channel.
7. The site is not in a stream reach.
8. The site is not in a stream confluence.
9. The site is not in a stream head.
10. The site is not in a stream tail.
11. The site is not in a stream mouth.
12. The site is not in a stream delta.
13. The site is not in a stream estuary.
14. The site is not in a stream plume.
15. The site is not in a stream discharge.
16. The site is not in a stream outfall.
17. The site is not in a stream effluent.
18. The site is not in a stream effluent discharge.
19. The site is not in a stream effluent outfall.
20. The site is not in a stream effluent outfall discharge.

WV Wetland Delineation
All wetland delineations shall be completed by the following individuals:
1. The delineation shall be completed by a professional engineer or a professional geologist.
2. The delineation shall be completed by a professional biologist or a professional ecologist.
3. The delineation shall be completed by a professional chemist or a professional physicist.
4. The delineation shall be completed by a professional geographer or a professional cartographer.
5. The delineation shall be completed by a professional historian or a professional archaeologist.
6. The delineation shall be completed by a professional linguist or a professional philologist.
7. The delineation shall be completed by a professional philosopher or a professional theologian.
8. The delineation shall be completed by a professional mathematician or a professional statistician.
9. The delineation shall be completed by a professional astronomer or a professional physicist.
10. The delineation shall be completed by a professional geologist or a professional geographer.
11. The delineation shall be completed by a professional biologist or a professional ecologist.
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18. The delineation shall be completed by a professional astronomer or a professional physicist.
19. The delineation shall be completed by a professional geologist or a professional geographer.
20. The delineation shall be completed by a professional biologist or a professional ecologist.

Table: Sheet Description. Columns: Sheet, Description.

Professional Engineer/Geologist Seal for Jeffrey C. Swartz, State of West Virginia, License No. 17714.

Vertical sidebar containing 'TUG HILL OPERATING' logo, 'Heaven Hill 3 Site Meade District Marshall County, WV', and 'Lower Sheet' label.

