

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

Wednesday, February 28, 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 3-7HU

47-051-01969-00-00

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 3-7HU

Farm Name: RICKY L WHITLATCH U.S. WELL NUMBER: 47-051-01969-00-00

Horizontal 6A / New Drill

Date Issued: 2/28/2018

Promoting a healthy environment.

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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.

03/02/2018

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ADTAT .							
API Number	•						
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	_			_			

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 #47-051-01969

COMPANY: Tug Hill Operating, LLC

FARM: Tug Hill Operating, LLC Heaven Hill 3-7HU

COUNTY: Marshall DISTRICT: Meade QUAD: Glen Easton 7 1/2

The deep well review of the application for the above company is <u>Approved to drill to Trenton for Point Pleasant completion.</u>

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.
- Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
- 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 <u>400+</u> 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,

Administrator

API NO. 47-051	-01969
OPERATOR V	VELL NO. Heaven Hill 3-7HU
Well Dad Na	ma: Heaven Hill 3

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

1) Well Operator: Tug Hill Oper	ating, LLC	494510851	Marshall	Meade	Glen Easton 7.5'
		Operator ID	County	District	Quadrangle
2) Operator's Well Number: Hear	ven Hill 3-7HU	Well P	ad Name: Hea	ven Hill 3	
3) Farm Name/Surface Owner: R	icky L. Whitlat	ch Public Re	oad Access: Ye	ater Land (CR 21/11
4) Elevation, current ground: 13	340' E	levation, propose	d post-construc	tion: 1326'	
5) Well Type (a) Gas X Other	Oil	Un	derground Stora	nge	
(b)If Gas Shallo	ow	Deep	х		
Horiz	ontal X			De Ja	118
6) Existing Pad: Yes or No No			<u> </u>	0 1/40	
Proposed Target Formation(s), Point Pleasant is the target formation				The Art of	ure of approx. 7500 psi
8) Proposed Total Vertical Depth:	11,829'				
9) Formation at Total Vertical Dep	oth: Trenton				
10) Proposed Total Measured Dep	th: 19,282'				
11) Proposed Horizontal Leg Leng	gth: 7,037'				
12) Approximate Fresh Water Stra	ata Depths:	70', 1038'			
13) Method to Determine Fresh W	ater Depths:	Offset well reports or	noticeable flow at t	he flowline or w	hen need to start soaping
14) Approximate Saltwater Depth	s: 2,167'				
15) Approximate Coal Seam Dept	hs: Sewickly	Coal - 946' and	Pittsburgh Coa	I - 1031'	
16) Approximate Depth to Possibl	e Void (coal m	ine, karst, other):	None anticipa	ated	
17) Does Proposed well location of directly overlying or adjacent to a		yes X	N	o	
(a) If Yes, provide Mine Info:	Name: Mars	shall County Coa	al Co. / Marsha	II County M	line
		1' TVD and 309'	subsea level		
		burgh #8			
	Owner: Murr	ray Energy / Cor	solidated Coa	I Co.	

OPERATOR WELL NO. Heaven Hill 3-7HU

Well Pad Name: Heaven Hill 3

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#	1,120'	1,120'	1794ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2,875'	2,875'	2033ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	47#	10,515'	10,515'	3436ft^3(CTS)
Production	5 1/2"	NEW	HPP110	23#	19,282'	19,282'	4596ft^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		11,255'	
Liners							

Me /26/18

ТҮРЕ	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	

Well Pad Name: Heaven Hill 3

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 17,592,500 lb proppant and 271,993 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 other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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

*See Attachment

25) Proposed borehole conditioning procedures:

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

*Note: Attach additional sheets as needed.

Conductor 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:

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

<u>Tail</u>: 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



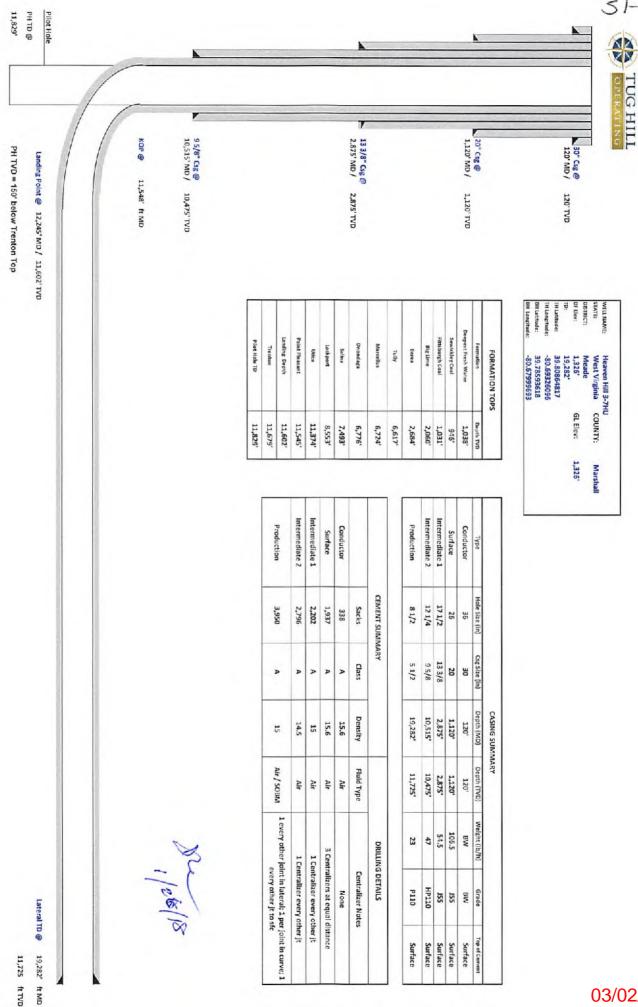
Tug Hill Operating, LLC Casing and Cement Program

Heaven Hill 3-7HU

		(Casing		
	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	1,120'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,875'	CTS
Intermediate 2	9 5/8"	HP110	12 1/4"	10,515'	CTS
Production	5 1/2"	P110	8 1/2"	19,282'	CTS

Cement

	Comone
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



Operator's Well No. Heaven Hill 3-7HU

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, <u>dducoeur@dpslandservices.com</u> 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)

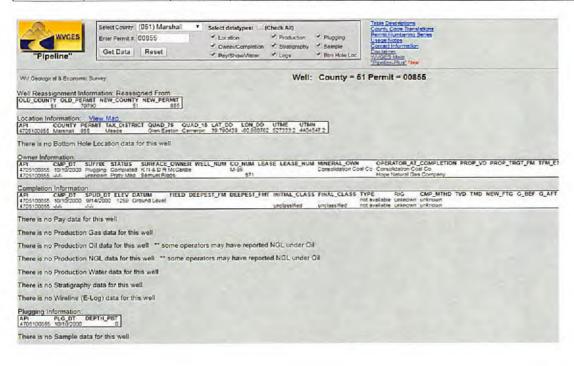
- WVGES has plotted every well spot they have access to and are aware of with that contains a
 coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some
 locations aren't great due to vintage and manipulation of maps through time
- 30000 series any well drilled prior 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

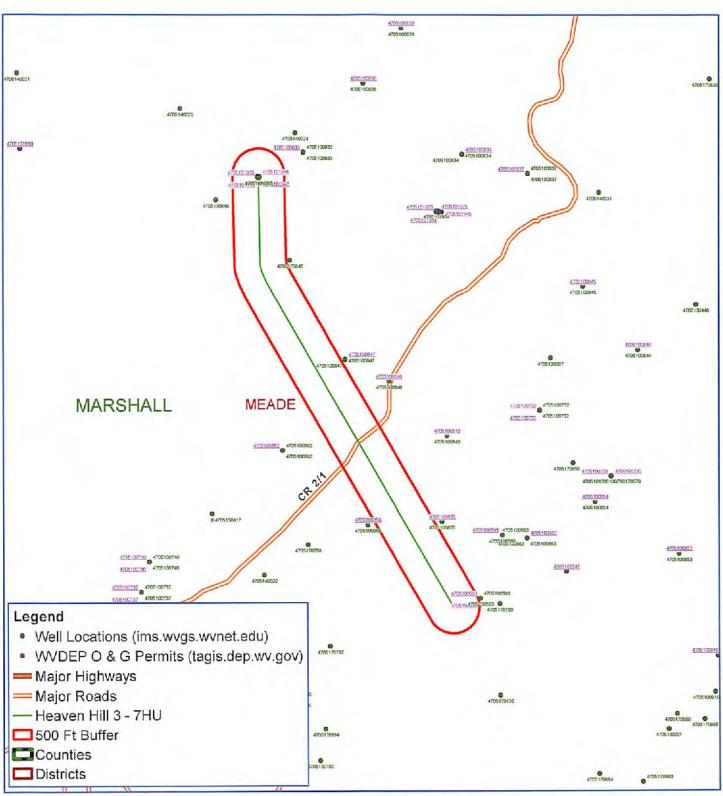
Permit well - Heaven Hill 3-7HU

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

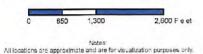
API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	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		6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705100855	Consolidation Coal	Unknown	Unknown	Unknown	Unknown but unlikely. Probably an old shallow well that is is too shallow to be within Range of potential Fracture propagation from Marcellus wells. Well has been plugged	Plug date 10/10/2000. A field survey was conducted to locate this well and this well was found plugged at the location shown on the well plat.





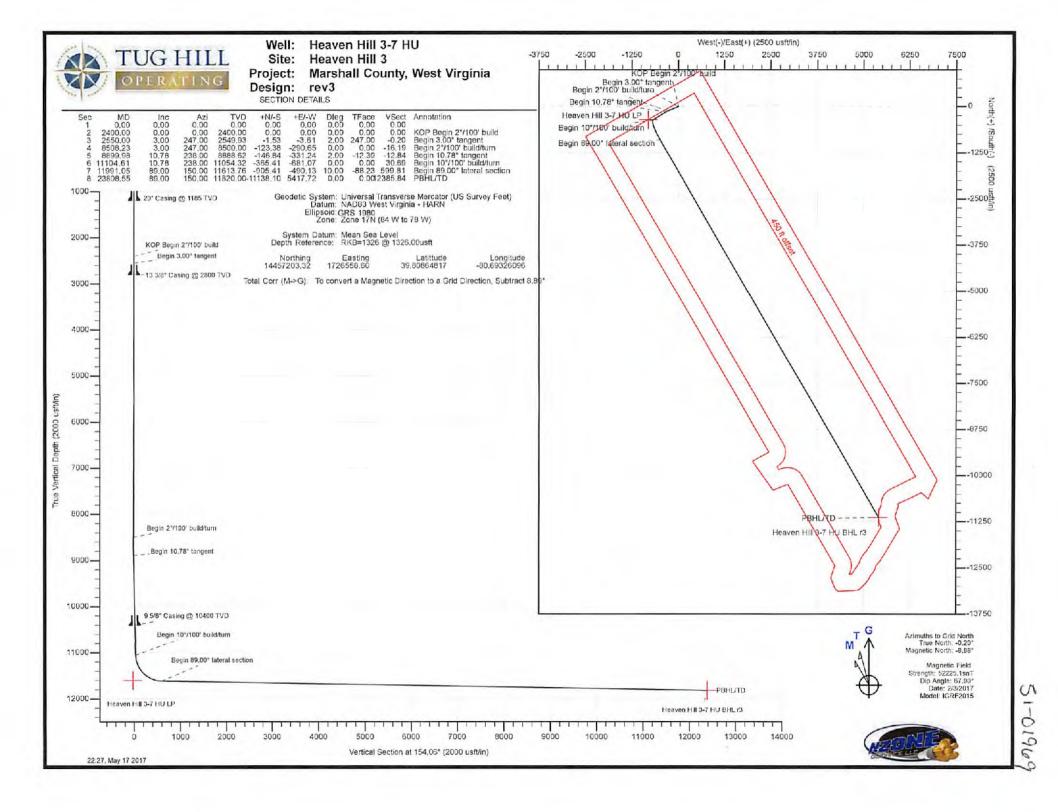


Map Created January 26, 2016 Map Current As Of January 26, 2018 Heaven Hill 3-7HU Meade District Marshall County, WV



Page 3 of 3







Database: Company: DB_Jul2216dt_v14 Tug Hill Operating LLC

Project: Site:

Marshall County, West Virginia Heaven Hill 3

Heaven Hill 3-7 HU Well: Wellbore: Original Hole Design: rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU

RKB=1326 @ 1326.00usft RKB=1326 @ 1326,00usft Grid

Minimum Curvature

Project

Marshall County, West Virginia

Map System:

Universal Transverse Mercator (US Survey Feet)

System Datum:

Mean Sea Level

Geo Datum: Map Zone:

Site

NAD83 West Virginia - HARN

Zone 17N (84 W to 78 W)

Heaven Hill 3

Site Position: From:

Lat/Long

Northing: Easting:

14,457,178.77 usft 1,726,571,98 usft

Latitude: Longitude:

39.80858060 -80.69321360

Position Uncertainty:

0.00 usft Slot Radius: 13-3/16

Grid Convergence:

0.20

Well Well Position Heaven Hill 3-7 HU

+N/-S +E/-W 0.00 usft 0.00 usft

Northing: Easting:

14,457,203.32 usft 1,726,558.60 usft Latitude: Longitude:

39.80864817 -80.69326096

Position Uncertainty

0.00 usft

Wellhead Elevation:

2/3/2017

0.00 usft

Ground Level:

67.00

0.00

Direction

(°)

154.06

1,326.00 usft

Wellbore

Original Hole

Magnetics

Model Name

Sample Date

Phase:

PLAN

Declination -8.69 Dip Angle

Field Strength (nT)

52,225.10345639

Design

rev3

Audit Notes:

Version:

Vertical Section: Depth From (TVD) (usft)

0.00

Date 5/17/2017

Depth To (usft) Survey (Wellbore)

IGRF2015

Tool Name

Remarks

Tie On Depth:

+E/-W

(usft)

0.00

1

Plan Survey Tool Program Depth From

(usft)

0.00

23,808.55 rev3 (Original Hole)

MWD

MWD - Standard

+N/-S

(usft)

0.00

lan 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	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,550.00	3.00	247.00	2,549.93	-1.53	-3.61	2.00	2.00	0.00	247.00	
8,508,23	3.00	247.00	8,500.00	-123.38	-290.65	0.00	0.00	0.00	0.00	
8,899.98	10.78	238.00	8,888.62	-146.84	-331.24	2.00	1.99	-2.30	-12.39	
11,104.61	10.78	238.00	11,054.32	-365.41	-681.07	0.00	0.00	0.00	0.00	
11,991.05	89.00	150.00	11,613.76	-905.41	-490.13	10.00	8.82	-9.93	-88.23	
23,808.55	89.00	150.00	11,820.00	-11,138,10	5,417.72	0.00	0.00	0.00	0.00	Heaven Hill 3-7 HU



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellbore: Original Hole

Local Co-ordinate Reference:

Survey Calculation Method:

TVD Reference: MD Reference: North Reference: Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

sign:	rev3								
anned Survey									
Measured			Vertical			Мар	Map		
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Northing	Easting		
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	Latitude	Longitude
1,000.00	1010		1000	20000					
0.00	0,00	0.00	0.00	0,00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80,693260
100,00	0,00	0.00	100.00	0,00	0.00	14,457,203.32	1,726,558,60	39.80864817	-80.693260
200.00	0.00	0.00	200.00	0.00	0.00	14,457,203,32	1,726,558.60	39.80864817	-80,693260
300.00	0.00	0.00	300.00	0.00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80.693260
400.00	0.00	0.00	400.00	0.00	0.00	14,457,203,32	1,726,558,60	39.80864817	-80,693260
500.00	0.00	0.00	500.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
600.00	0.00	0.00	600.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
700.00	0.00	0.00	700.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
800.00	0.00	0.00	800.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
900.00	0.00	0.00	900.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,693260
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,693260
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80.693260
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,693260
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,693260
1,900.00	0.00	0.00	1,900,00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,457,203.32	1,726,558,60	39.80864817	-80.693260
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80.693260
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.693260
KOP Bed	in 2°/100' bui	ld							
2,500.00	2.00	247.00	2,499.98	-0.68	-1,61	14,457,202.64	1,726,556,99	39.80864631	-80,693266
2,550.00	3.00	247.00	2,549.93	-1.53	-3.61	14,457,201.79	1,726,554.98	39.80864399	-80.693273
	00° tangent		-	1199	9,01		1,720,00,100	00.0000.000	00.0002.0
2,600.00	3.00	247.00	2,599.86	-2.56	-6.02	14,457,200.77	1,726,552,58	39.80864121	-80.693282
2,700.00	3.00	247.00	2,699.73	-4.60	-10.84	14,457,198.72	1,726,547.76	39.80863564	-80.693299
2,800.00	3.00	247.00	2,799.59	-6.65	-15.66	14,457,196.68	1,726,542.94	39.80863007	-80.693316
2,900.00	3.00	247.00	2,899,45	-8.69	-20.48	14,457,194.63	1,726,538.12	39.80862450	-80.693333
3,000.00	3.00	247.00	2,999,31	-10.74	-25.29	14,457,192.59	1,726,533.31	39.80861893	-80.693351
3,100.00	3.00	247.00	3,099.18	-12.78	-30.11	14,457,190.54	1,726,528.49	39.80861336	-80.693368
3,200.00	3.00	247.00	3,199.04	-14.83	-34.93	14,457,188.50	1,726,523.67	39.80860778	-80.693385
3,300.00	3.00	247.00	3,298.90	-16.87	-39.75	14,457,186.45	1,726,523.67	39.80860221	-80.693402
3,400.00	3.00	247.00	3,398.77	-18.92	-44.56	14,457,184.41	1,726,514.04	39.80859664	-80.693419
3,500.00	3.00	247.00	3,498.63	-20.96	-49.38		1,726,509.22	39.80859107	-80.693437
Laborate State Sta	3.00	247.00	3,598.49	-23.01	-54.20	14,457,182.36	1,726,504.40	39.80858550	-80.693454
3,600.00						14,457,180.32 14,457,178.27			
3,700.00	3.00	247.00	3,698.36	-25.05	-59.02		1,726,499.58	39.80857993	-80.693471
	3.00	247.00	3,798.22	-27.10	-63.83	14,457,176.23	1,726,494.77	39.80857436	-80.693488
3,900.00	3.00	247.00	3,898.08	-29.14	-68.65	14,457,174.18	1,726,489.95	39.80856879	-80.693505
4,000.00	3.00	247.00	3,997.94	-31.19	-73.47	14,457,172.14	1,726,485.13	39.80856322	-80.693522
4,100.00	3.00	247.00	4,097.81	-33.23	-78,29	14,457,170.09	1,726,480.31	39,80855765	-80,693540
4,200.00	3.00	247.00	4,197.67	-35.28	-83.10	14,457,168.05	1,726,475.50	39.80855208	-80.693557
4,300.00	3.00	247.00	4,297.53	-37.32	-87.92	14,457,166.00	1,726,470.68	39.80854551	-80.693574
4,400.00	3.00	247.00	4,397.40	-39.37	-92.74	14,457,163.96	1,726,465.86	39.80854094	-80.69359
4,500.00	3,00	247.00	4,497.26	-41.41	-97.56	14,457,161.91	1,726,461.04	39.80853537	-80.693608
4,600.00	3.00	247.00	4,597.12	-43.46	-102.37	14,457,159.87	1,726,456.23	39.80852980	-80,693626
4,700.00	3.00	247.00	4,696.99	-45.50	-107.19	14,457,157.82	1,726,451.41	39.80852423	-80.693643
4,800.00	3.00	247.00	4,796.85	-47.54	-112.01	14,457,155.78	1,726,446.59	39.80851866	-80,693660
4,900.00	3.00	247.00	4,896.71	-49.59	-116.83	14,457,153.73	1,726,441.77	39.80851308	-80.693677
5,000.00	3.00	247.00	4,996.57	-51.63	-121.64	14,457,151.69	1,726,436.95	39.80850751	-80.693694



Database: Company: Project:

DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Heaven Hill 3 Well: Heaven Hill 3-7 HU Wellbore: Original Hole Design: rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft Grid Survey Calculation Method:

Minimum Curvature

Well Heaven Hill 3-7 HU

nned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,100.00	3.00	247.00	5,096.44	-53.68	-126.46	14,457,149,65	1,726,432.14	39,80850194	-80,693711
5,200.00	3.00	247.00	5,196.30	-55.72	-131.28	14,457,147.60	1,726,427,32	39,80849637	-80,693729
5,300.00	3.00	247.00	5,296.16	-57.77	-136.10	14,457,145.56	1,726,422.50	39.80849080	-80.693746
5,400.00	3.00	247.00	5,396.03	-59.81	-140.91	14,457,143,51	1,726,417.68	39.80848523	-80.693763
5,500.00	3.00	247.00	5,495.89	-61,86	-145.73	14,457,141,47	1,726,412.87	39.80847966	-80.693780
5,600.00	3.00	247.00	5,595.75	-63.90	-150.55	14,457,139.42	1,726,408.05	39.80847409	-80.693797
5,700.00	3.00	247.00	5,695.61	-65.95	-155.37	14,457,137.38	1,726,403.23	39.80846852	-80.693815
5,800.00	3.00	247.00	5,795.48	-67.99	-160.18	14,457,135.33	1,726,398.41	39.80846295	-80.693832
5,900.00	3.00	247.00	5,895.34	-70.04	-165.00	14,457,133,29	1,726,393.60	39.80845738	-80.693849
6,000.00	3.00	247.00	5,995.20	-72.08	-169.82	14,457,131.24	1,726,388.78	39.80845181	-80.693866
6,100.00	3.00	247.00	6,095.07	-74.13	-174.64	14,457,129.20	1,726,383.96	39.80844624	-80,693883
6,200.00	3.00	247.00	6,194.93	-78.17	-179.45	14,457,127.15	1,726,379.14	39.80844067	-80,693900
6,300.00	3.00	247.00	6,294.79	-78.22	-184.27	14,457,125.11	1,726,374.33	39.80843510	-80.693918
6,400.00	3.00	247.00	6,394.66	-80.26	-189.09	14,457,123.06	1,726,369.51	39.80842953	-80,693938
6,500.00	3.00	247.00	6,494.52	-82.31	-193.91	14,457,121.02	1,726,364.69	39.80842396	-80.693952
6,600.00	3.00	247.00	6,594.38	-84.35	-198.72	14,457,118.97	1,726,359.87	39.80841838	-80.693969
6,700.00	3.00	247.00	6,694.24	-86.40	-203.54	14,457,116.93	1,726,355.06	39.80841281	-80.693986
6,800.00	3.00	247.00	6,794.11	-88.44	-208.36	14,457,114.88	1,726,350.24	39.80840724	-80,69400
6,900.00	3.00	247.00	6,893.97	-90.49	-213.18	14,457,112.84	1,726,345.42	39.80840167	-80.69402
7,000.00	3.00	247.00	6,993.83	-92.53	-217.99	14,457,110.79	1,726,340.60	39.80839610	-80.694038
7,100.00	3.00	247.00	7,093.70	-94.58	-222,81	14,457,108.75	1,726,335.79	39.80839053	-80.69405
7,200.00	3.00	247.00	7,193.56	-96,62	-227.63	14,457,106.70	1,726,330,97	39.80838496	-80,69407
7,300.00	3.00	247.00	7,293.42	-98.67	-232.45	14,457,104.66	1,726,326.15	39.80837939	-80,69408
7,400.00	3.00	247.00	7,393.28	-100.71	-237.27	14,457,102.61	1,726,321.33	39.80837382	-80.69410
7,500.00	3.00	247.00	7,493.15	-102.76	-242.08	14,457,100.57	1,726,316.52	39.80836825	-80.694124
7,600.00	3.00	247.00	7,593.01	-104.80	-246.90	14,457,098.52	1,726,311.70	39.80836268	-80.69414
7,700.00	3.00	247.00	7,692.87	-106.85	-251.72	14,457,096.48	1,726,306.88	39,80835711	-80,694158
7,800.00	3.00	247.00	7,792.74	-108.89	-256.54	14,457,094.43	1,726,302.06	39.80835154	-80.694175
7,900.00	3.00	247.00	7,892.60	-110.94	-261.35	14,457,092.39	1,726,297.25	39.80834597	-80.69419
8,000.00	3.00	247.00	7,992.46	-112.98	-266.17	14,457,090.34	1,726,292.43	39.80834040	-80.69421
8,100.00	3,00	247.00	8,092,33	-115.03	-270.99	14,457,088.30	1,726,287.61	39,80833482	-80.69422
8,200.00	3.00	247.00	8,192.19	-117.07	-275.81	14,457,086.25	1,726,282.79	39.80832925	-80.69424
8,300.00	3.00	247.00	8,292.05	-119,12	-280.62	14,457,084.21	1,726,277.98	39.80832358	-80,69426
8,400.00	3,00	247.00	8,391,91	-121.16	-285.44	14,457,082.16	1,726,273.16	39.80831811	-80.69427
8,500.00	3.00	247.00	8,491.78	-123,21	-290.26	14,457,080.12	1,726,268.34	39.80831254	-80,69429
8,508.23	3,00	247.00	8,500.00	-123.38	-290.65	14,457,079.95	1,726,267.94	39.80831208	-80.69429
Begin 2°	/100' build/tur	n							
8,600.00	4.81	242,30	8,591.55	-126.10	-296.27	14,457,077.22	1,726,262.33	39.80830465	-80.69431
8,700.00	6.80	240.03	8,691.03	-131.01	-305.11	14,457,072,32	1,726,253.49	39,80829126	-80,694348
8,800.00	8,79	238,79	8,790.10	-137.92	-316.77	14,457,065.40	1,726,241.83	39.80827238	-80.69439
8,899.98	10.78	238.00	8,888.62	-146.84	-331.24	14,457,056.49	1,726,227.36	39.80824803	-80,694442
Begin 10	.78° tangent								
8,900.00	10.78	238.00	8,888.64	-146.84	-331,24	14,457,056,49	1,726,227.36	39.80824803	-80.69444
9,000.00	10.78	238.00	8,986.88	-156.75	-347.11	14,457,046.57	1,726,211.49	39,80822095	-80,69449
9,100.00	10,78	238.00	9,085,11	-166.67	-362,98	14,457,036.66	1,726,195.62	39.80819387	-80.69455
9,200.00	10.78	238.00	9,183.35	-176.58	-378.84	14,457,026.74	1,726,179.75	39,80816679	-80.69461
9,300.00	10.78	238.00	9,281.58	-186.50	-394.71	14,457,016.83	1,726,163.89	39.80813971	-80.69466
9,400.00	10.78	238.00	9,379.81	-196.41	-410.58	14,457,006.91	1,726,148.02	39.80811263	-80,69472
9,500.00	10.78	238.00	9,478,05	-206.33	-426,45	14,456,997.00	1,726,132.15	39,80808556	-80.6947B
9,600.00	10.78	238.00	9,576.28	-216.24	-442.32	14,456,987.08	1,726,116.28	39.80805848	-80.69483
9,700.00	10.78	238.00	9,674.52	-226.15	-458.18	14,456,977.17	1,726,100.41	39.80803140	-80.69489
9,800.00	10.78	238.00	9,772.75	-236.07	-474.05	14,456,967.26	1,726,084.55	39.80800432	-80.69495
9,900.00	10,78	238.00	9,870.98	-245.98	-489.92	14,456,957.34	1,726,068.68	39.80797724	-80.69500
10,000.00	10.78	238.00	9,969.22	-255.90	-505.79	14,456,947.43	1,726,052.81	39,80795016	-80.69506



Database: Company: Project: DB_Jul2216dt_v14
Tug Hill Operating LLC
Marshall County, West Virginia

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellbore: Original Hole
Design: rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference: Survey Calculation Method: Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

nned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,100.00	10.78	238.00	10,067.45	-265.81	-521.66	14,456,937,51	1,726,035.94	39,80792308	-80,69512
10,200.00	10.78	238.00	10,165.68	-275.73	-537.53	14,456,927.60	1,726,021.07	39.80789600	-80.69517
10,300.00	10.78	238.00	10,263.92	-285.64	-553,39	14,456,917.68	1,726,005.20	39,80786892	-80,69523
10,400.00	10.78	238,00	10,362,15	-295,56	-569.26	14.456,907.77	1,725,989.34	39.80784185	-80.69529
10,500.00	10.78	238.00	10,460.39	-305.47	-585,13	14,456,897,86	1,725,973,47	39.80781477	-80.69534
10,600.00	10.78	238.00	10,558.62	-315.38	-601.00	14,456,887.94	1,725,957.60	39.80778769	-80.69540
10,700.00	10.78	238.00	10,656.85	-325.30	-616.87	14,456,878.03	1,725,941.73	39.80776061	-80.69546
10,800.00	10.78	238.00	10,755.09	-335.21	-632.74	14,456,868.11	1,725,925.86	39.80773353	-80.69551
10,900.00	10.78	238,00	10,853.32	-345.13	-648.60	14,456,858.20	1,725,910.00	39.80770645	-80.69557
11,000.00	10.78	238.00	10,951.56	-355.04	-664.47	14,456,848.28	1,725,894.13	39.80767937	-80.69563
11,100.00	10.78	238.00	11,049.79	-364.96	-680.34	14,456,838.37	1,725,878.26	39.80765229	-80.69568
11,104.61	10.78	238.00	11,054.32	-365.41	-681.07	14,456,837.91	1,725,877.53	39.80765104	-80.69569
	°/100' build/tu		3.164.059		941,140	1.11 15 5) 5 5 1 1 2 1	11. 2010. 1.00	00.00100101	04.0000
11,200.00	14.58	196.86	11,147.55	-381.67	-692.15	14,456,821.65	1,725,866.45	39,80760650	-80.69573
11,300.00	22.51	177.16	11,242.37	-412.91	-694.86	14,456,790.41	1,725,863,74	39.80752073	-80,69574
11,400.00	31.59	167.84	11,331.38	-457.75	-688.37	14,456,745.58	1,725,870.22	39.80739754	-80.69571
11,500.00	41.07	162.43	11,411.86	-514.82	-672.90	14,456,688.51	1,725,885.70	39.80724067	-80,69566
11,600.00	50.72	158.77	11,481.39	-582.38	-648.90	14,456,620.94	1,725,909.70	39.80705489	-80.69557
11,700.00	60.46	156.00	11,537.83	-658.40	-617.11	14,456,544.93	1,725,941.49	39.80684584	-80.69546
11,800.00	70.25	153.73	11,579.49	-740.54	-578.49	14,456,462.78	1,725,980.10	39.80661988	-80.69532
11,900.00	80.06	151.72	11,605.08	-826,33	-534.22	14,456,376,99	1,726,024.38	39.80638388	-80.69517
11,991.05	89.00	150,00	11,613.76	-905.41	-490.13	14,456,297,92	1,726,068.47	39.80616630	-80.69501
			11,013.10	-905,41	-450.15	14,450,257.52	1,720,000.47	38,000 10030	-60.0950
12,000.00	0.00° lateral se 89.00	150.00	11,613.91	-913.16	-485.65	14,456,290.17	1,726,072.95	39.80614498	-80.69500
12,100.00	89.00	150.00	11,615.66	-999.75	-435.66	14,456,203.58	1,726,122.94	39.80590671	-80.69482
12,200.00	89.00	150.00	11,617.40	-1,086.34	-385.67	14,456,116.99	1,726,172.93	39.80586845	-80.69464
12,300.00	89.00	150.00	11,619.15	-1,172.92	-335.67		1,726,222.92	39.80543019	-80.69447
		150.00				14,456,030.40			-80.69429
12,400.00	89.00	150.00	11,620.89	-1,259.51	-285.68	14,455,943.81	1,726,272.92	39.80519192	
12,500.00	89.00		11,622.64	-1,346.10	-235.69	14,455,857.22	1,726,322.91	39.80495366	-80.69411
12,600.00	89.00 89.00	150.00 150.00	11,624.38	-1,432.69	-185.70	14,455,770,63	1,726,372.90	39.80471539	-80.69393 -80.69376
12,700.00	89.00	150.00	11,626.13	-1,519.28	-135.71	14,455,684.04	1,726,422.89	39.80447713 39.80423886	-80.69376
12,800.00		150.00	11,627.87	-1,605.87	-85.71	14,455,597.45	1,726,472.89		
12,900.00	89.00		11,629.62	-1,692.46	-35.72	14,455,510.86	1,726,522.88	39.80400059	-80,69340
13,000.00	89.00	150.00	11,631.37	-1,779.05	14.27	14,455,424.27	1,726,572.87	39,80376233	-80,69323
13,100.00	89.00	150.00	11,633.11	-1,865.64	64.26	14,455,337.69	1,726,622.86	39,80352406	-80,69305
13,200.00	89.00	150.00	11,634.86	-1,952.23	114.26	14,455,251.10	1,726,672.86	39,80328579	-80.69287
13,300.00	89.00	150.00	11,636.60	-2,038.82	164.25	14,455,164.51	1,726,722.85	39.80304753	-80,69270
13,400.00	89.00	150.00	11,638.35	-2,125.41	214.24	14,455,077.92	1,726,772.84	39.80280926	-80.69252
13,500.00	89.00	150.00	11,640.09	-2,212.00	264.23	14,454,991.33	1,726,822.83	39.80257099	-80.69234
13,600.00	89.00	150.00	11,641.84	-2,298.59	314.23	14,454,904.74	1,726,872.83	39.80233272	-80.69217
13,700.00	89.00	150.00	11,643.58	-2,385.18	364.22	14,454,818.15	1,726,922.82	39,80209446	-80,69199
13,800.00	89.00	150.00	11,645.33	-2,471.77	414.21	14,454,731.56	1,726,972.81	39.80185619	-80,69181
13,900.00	89.00	150.00	11,647.07	-2,558.35	464.20	14,454,644,97	1,727,022,80	39.80161792	-80,69163
14,000.00	89.00	150.00	11,648.82	-2,644.94	514.20	14,454,558.38	1,727,072,79	39,80137965	-80,69146
14,100.00	89.00	150.00	11,650.56	-2,731.53	554.19	14,454,471.79	1,727,122.79	39,80114138	-80,69128
14,200.00	89.00	150.00	11,652.31	-2,818.12	614.18	14,454,385,20	1,727,172.78	39,80090311	-80.69110
14,300.00	89,00	150.00	11,654.05	-2,904.71	664.17	14,454,298,61	1,727,222.77	39.80066484	-80,69093
14,400.00	89.00	150.00	11,655.80	-2,991.30	714.17	14,454,212.02	1,727,272.76	39.80042657	-80.69075
14,500.00	89.00	150.00	11,657.54	-3,077.89	764.16	14,454,125.43	1,727,322.76	39.80018830	-80,69057
14,600.00	89.00	150.00	11,659.29	-3,164.48	814.15	14,454,038.84	1,727,372.75	39.79995003	-80,69040
14,700.00	89.00	150.00	11,661.03	-3,251.07	864.14	14,453,952,26	1,727,422.74	39.79971176	-80,69022
14,800.00	89.00	150.00	11,662.78	-3,337.66	914.14	14,453,865.67	1,727,472.73	39.79947349	-80.69004
14,900.00	89.00	150.00	11,664.52	-3,424.25	954.13	14,453,779.08	1,727,522.73	39.79923522	-80.68987
15,000.00	89.00	150.00	11,666.27	-3,510.84	1,014.12	14,453,692.49	1,727,572.72	39.79899695	-80,68969



Database: DB_Jul2216dt_v14
Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellbore: Original Hole
Design: rev3

Local Co-ordinate Reference: TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft Grid

ned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,100.00	89.00	150.00	11,668,02	-3,597,43	1,064,11	14,453,605.90	1,727,622,71	39,79875867	-80,689516
15,200.00	89.00	150.00	11,669.76	-3,684.02	1,114.10	14,453,519.31	1,727,672.70	39,79852040	-80.689339
15,300.00	89.00	150.00	11,671.51	-3,770.61	1,164.10	14,453,432,72	1,727,722,70	39,79828213	-80,689162
15,400.00	89.00	150.00	11,673.25	-3,857.19	1,214.09	14,453,346.13	1,727,772.69	39,79804386	-80,688985
15,500.00	89,00	150.00	11.675.00	-3,943.78	1,264.08	14,453,259.54	1,727,822,68	39.79780558	-80,688808
15,600,00	89,00	150,00	11,676.74	-4,030,37	1,314.07	14,453,172.95	1,727,872,67	39,79756731	-80.68863
15,700.00	89.00	150.00	11,678.49	-4,116.96	1,364.07	14,453,086.36	1,727,922,67	39,79732904	-80.688454
15,800.00	89.00	150.00	11,680.23	-4,203.55	1,414.06	14,452,999.77	1,727,972.66	39.79709076	-80.688277
15,900.00	89.00	150.00	11,681.98	-4,290.14	1,464.05	14,452,913.18	1,728,022,65	39.79685249	-80,688100
16,000.00	89.00	150.00	11,683.72	-4,376.73	1,514.04	14,452,826.59	1,728,072.64	39.79661421	-80.687924
15,100.00	89.00	150.00	11,685.47	-4,463,32	1,564.04	14,452,740.00	1,728,122.63	39.79637594	-80.687747
16,200.00	89.00	150.00	11,687.21	-4,549,91	1,614.03	14,452,653.42	1,728,172.63	39,79613768	-80.687570
16,300.00	89.00	150.00	11,688.96	-4,636.50	1,664.02	14,452,566.83	1,728,222.62	39.79589939	-80.687393
16,400.00	89.00	150.00	11,690.70	-4,723.09	1,714.01	14,452,480.24	1,728,272.61	39,79566111	-80,68721
16,500.00	89.00	150.00	11,692.45	-4,809.68	1,764.01	14,452,393.65	1,728,322.60	39.79542284	-80.68703
16,600.00	89.00	150.00	11,694.19	-4,896,27	1,814.00	14,452,307.06	1,728,372.60	39.79518456	-80,68686
16,700.00	89.00	150.00	11,695,94	-4,982,86	1,863.99	14,452,220.47	1,728,422.59	39.78494629	-80.68668
16,800.00	89.00	150.00	11,697.68	-5,069.45	1,913.98	14,452,133.88	1,728,472,58	39,79470801	-80.68650
2 3 - 2 - 2 - 2 - 2	89.00	150.00	2 4 4 5 5 6 8 2 5 6 7	-5,059.45	1,963,98	14,452,047.29	1,728,522.57	39.79446973	-80.68633
16,900.00			11,699.43	-5,242.62			1,728,572.57	39.79423145	-80.68615
17,000.00	89.00	150.00	11,701.17		2,013,97	14,451,960.70		39.79399318	-80.68597
17,100.00	89.00	150.00	11,702.92	-5,329,21	2,063.96	14,451,874.11	1,728,622,56		-80.68580
17,200.00	89.00	150.00	11,704.67	-5,415.80	2,113.95	14,451,787.52	1,728,672,55	39,79375490	-80.68562
17,300.00	89.00	150.00	11,706.41	-5,502.39	2,163.94	14,451,700.93	1,728,722.54	39.79351662	
17,400.00	89.00	150.00	11,708.16	-5,588.98	2,213.94	14,451,614.34	1,728,772.54	39.79327834	-80.68544
17,500.00	89.00	150.00	11,709.90	-5,675.57	2,263.93	14,451,527.75	1,728,822.53	39.79304006	-80.68527
17,600.00	89.00	150.00	11,711.65	-5,762.16	2,313.92	14,451,441.16	1,728,872.52	39.79280179	-80.68509
17,700.00	89.00	150.00	11,713.39	-5,848.75	2,363,91	14,451,354.57	1,728,922.51	39.79256351	-80.68491
17,800.00	89.00	150.00	11,715.14	-5,935.34	2,413,91	14,451,267.99	1,728,972.51	39.79232523	-80.68473
17,900.00	89.00	150.00	11,716.88	-6,021.93	2,463,90	14,451,181.40	1,729,022.50	39.79208695	-80.68456
18,000.00	89.00	150.00	11,718.63	-6,108.52	2,513.89	14,451,094.81	1,729,072.49	39.79184867	-80.68438
18,100.00	89.00	150.00	11,720.37	-6,195.11	2,563.88	14,451,008.22	1,729,122.48	39.79161039	-80,68420
18,200.00	89,00	150.00	11,722,12	-6,281.70	2,613.88	14,450,921.63	1,729,172.47	39,79137211	-80.68403
18,300.00	89.00	150.00	11,723.86	-6,368.29	2,663.87	14,450,835.04	1,729,222.47	39,79113383	-80,68385
18,400.00	89.00	150.00	11,725.61	-6,454.88	2,713.86	14,450,748.45	1,729,272.46	39.79089555	-80.68367
18,500.00	89.00	150.00	11,727.35	-6,541.46	2,763.85	14,450,661.86	1,729,322.45	39.79065726	-80.68350
18,600.00	89.00	150.00	11,729.10	-6,628.05	2,813.85	14,450,575.27	1,729,372.44	39,79041898	-80.68332
18,700.00	89,00	150.00	11,730.84	-6,714.64	2,863.84	14,450,488.68	1,729,422.44	39.79018070	-80.68314
18,800.00	89.00	150.00	11,732.59	-6,801.23	2,913,83	14,450,402.09	1.729,472.43	39.78994242	-80.68297
18,900.00	89.00	150.00	11,734.33	-6,887.82	2,963,82	14,450,315.50	1,729,522.42	39.78970414	-80.68279
19,000.00	89.00	150.00	11,736.08	-6,974.41	3,013.82	14,450,228,91	1,729,572.41	39.78946585	-80.68261
19,100.00	89.00	150.00	11,737.82	-7,061.00	3,063.81	14,450,142.32	1,729,622.41	39.78922757	-80.68244
19,200.00	89.00	150.00	11,739.57	-7,147.59	3,113.80	14,450,055.73	1,729,672.40	39.78898929	-80.68226
19,300.00	89.00	150.00	11,741.32	-7,234.18	3,163.79	14,449,969.15	1,729,722.39	39.78875100	-80,68208
19,400.00	89.00	150.00	11,743.06	-7,320.77	3,213.78	14,449,882.56	1,729,772.38	39.78851272	-80,68190
19,500.00	89.00	150.00	11,744.81	-7,407.36	3,263.78	14,449,795.97	1,729,822.38	39.78827444	-80,68173
19,600.00		150.00	11,746.55	-7,493.95	3,313.77	14,449,709.38	1,729,872.37	39.78803615	-80.68155
19,700.00		150.00	11,748.30	-7,580.54	3,363.76	14,449,622.79	1,729,922.36	39.78779787	-80,68137
19,800.00		150.00	11,750,04	-7,667.13	3,413.75	14,449,536.20	1,729,972.35	39,78755958	-80.68120
19,900.00		150.00	11,751.79	-7,753.72	3,463.75	14,449,449.61	1,730,022.35	39.78732130	-80,68102
20,000.00		150.00	11,753.53	-7,840.30	3,513.74	14,449,363.02	1,730,072.34	39.78708301	-80.68084
20,100.00		150.00	11,755.28	-7,926.89	3,563.73	14,449,276.43	1,730,122.33	39.78684473	-80,68067
20,200.00		150.00	11,757.02	-8,013.48	3,613.72	14,449,189,84	1,730,172.32	39,78660644	-80.68049
20,300.00		150.00	11,758.77	-8,100.07	3,663.72	14,449,103.25	1,730,222.32	39,78636815	-80,68031
20,400.00		150.00	11,760.51	-8,186,66	3,713.71	14,449,016.66	1,730,272.31	39.78612987	-80.68014
20,500.00		150.00	11,762.26	-8,273.25	3,763.70	14,448,930.07	1,730,322.30	39.78589158	-80.67996



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellbore: Original Hole
Design: rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

nned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,600.00	89.00	150.00	11,764.00	-8,359.84	3,813,69	14,448,843,48	1,730,372.29	39.78565329	-80.679787
20,700.00	89.00	150.00	11,765.75	-8,446.43	3,863,69	14,448,756.89	1,730,422,28	39.78541501	-80.67961
20,800.00	89.00	150.00	11,767.49	-8,533,02	3,913.68	14,448,670.30	1,730,472,28	39.78517672	-80.67943
20,900.00	89.00	150.00	11,769.24	-8,619.61	3,963,67	14,448,583.72	1,730,522.27	39.78493843	-80.67925
21,000.00	89.00	150.00	11,770.98	-8,706.20	4,013.66	14,448,497.13	1,730,572.26	39.78470014	-80.67908
21,100.00	89.00	150.00	11,772.73	-8,792.79	4,063.66	14,448,410.54	1,730,622.25	39,78446185	-80.67890
21,200.00	89.00	150.00	11,774.47	-8,879.38	4,113.65	14,448,323.95	1,730,672.25	39.78422356	-80.67872
21,300.00	89.00	150.00	11,776.22	-8,965.97	4,163.64	14,448,237.36	1,730,722.24	39.78398528	-80.67854
21,400.00	89.00	150.00	11,777.97	-9,052.56	4,213.63	14,448,150.77	1,730,772.23	39.78374699	-80.67837
21,500.00	89.00	150.00	11,779.71	-9,139.15	4,263,62	14,448,064.18	1,730,822.22	39.78350870	-80.67819
21,600.00	89.00	150.00	11,781.46	-9,225.73	4,313.62	14,447,977.59	1,730,872.22	39.78327041	-80.67801
21,700.00	89.00	150.00	11,783.20	-9,312.32	4,363.61	14,447,891.00	1,730,922.21	39.78303212	-80.67784
21,800.00	89.00	150.00	11,784.95	-9,398.91	4,413.60	14,447,804.41	1,730,972.20	39.78279383	-80.67766
21,900.00	89.00	150.00	11,786.69	-9,485.50	4,463.59	14,447,717.82	1,731,022.19	39.78255554	-80.67746
22,000.00	89.00	150.00	11,788.44	-9,572.09	4,513.59	14,447,631.23	1,731,072.19	39,78231725	-80,67731
22,100.00	89.00	150.00	11,790.18	-9,658.68	4,563.58	14,447,544.64	1,731,122.18	39.78207895	-80.67713
22,200.00	89.00	150.00	11,791.93	-9,745.27	4,613,57	14,447,458.05	1,731,172,17	39.78184066	-80.67695
22,300.00	89.00	150.00	11,793.67	-9,831.86	4,663.56	14,447,371.46	1,731,222.16	39,78160237	-80.67678
22,400.00	89.00	150.00	11,795.42	-9,918,45	4,713.56	14,447,284,88	1,731,272,16	39,78136408	-80,67660
22,500.00	89.00	150.00	11,797.16	-10,005.04	4,763.55	14,447,198.29	1,731,322.15	39.78112579	-80.67642
22,600.00	89.00	150,00	11,798.91	-10,091.63	4,813,54	14,447,111.70	1,731,372,14	39,78088749	-80,67625
22,700.00	89.00	150.00	11,800.65	-10,178.22	4,863,53	14,447,025.11	1,731,422,13	39,78064920	-80.67607
22,800.00	89.00	150.00	11,802.40	-10,254.81	4,913,53	14,446,938.52	1,731,472,12	39.78041091	-80.67589
22,900.00	89.00	150.00	11,804,14	-10,351,40	4,963.52	14,446,851.93	1,731,522.12	39.78017261	-80.67572
23,000.00	89.00	150.00	11,805,89	-10,437.99	5,013,51	14,446,765.34	1,731,572,11	39.77993432	-80.67554
23,100.00	89.00	150.00	11,807.63	-10,524.57	5,063.50	14,446,678.75	1,731,622,10	39.77969603	-80.67536
23,200.00	89.00	150.00	11,809.38	-10,611.16	5,113.50	14,446,592,16	1,731,672.09	39.77945773	-80.67518
23,300.00	89.00	150.00	11,811,12	-10,697.75	5,163.49	14,446,505,57	1,731,722.09	39.77921944	-80.67501
23,400.00	89.00	150.00	11,812.87	-10,784.34	5,213.48	14,446,418.98	1,731,772.08	39.77898114	-80.67483
23,500.00	89.00	150.00	11,814.62	-10,870.93	5,263.47	14,446,332.39	1,731,822.07	39.77874285	-80,67465
23,600,00	89.00	150.00	11,816.36	-10,957.52	5,313,46	14,446,245.80	1,731,872,06	39,77850455	-80.67448
23,700.00	89.00	150.00	11,818,11	-11,044,11	5,363,46	14,446,159,21	1,731,922.06	39,77826626	-80.67430
23,800.00	89.00	150,00	11,819,85	-11,130.70	5,413,45	14,446,072.62	1,731,972.05	39,77802796	-80.67412
23,808.54	89.00	150.00	11,820.00	-11,138,10	5,417.72	14,446,065.23	1,731,976.32	39,77800761	-80,67411
PBHL/TD			11,517			~44.5155555	2012 2022 21275	240.4557.5	
23,808,55	89.00	150.00	11,820.00	-11,138,10	5,417.72	14,446,065,22	1,731,976,32	39,77800759	-80.67411

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle	Dip Dir.	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Heaven Hill 3-7 HU LP - plan misses target - Point	0.00 center by 279	0.01 .15usft at 11	11,602.00 500.00usft N	-359.33 MD (11411.86	-805.56 TVD, -514.82	14,456,844.00 N, -672.90 E)	1,725,753.04	39.80766891	-80.69613375
Heaven Hill 3-7 HU BHL - plan hits target cen - Point	0.00 ter	0.00	11,820.00	-11,138.10	5,417.72	14,446,065.22	1,731,976.32	39.77800759	-80,67411389



Database: Company: Project: DB_Jul2216dt_v14
Tug Hill Operating LLC

Marshall County, West Virginia Heaven Hill 3

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellbore: Original Hole
Design: rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

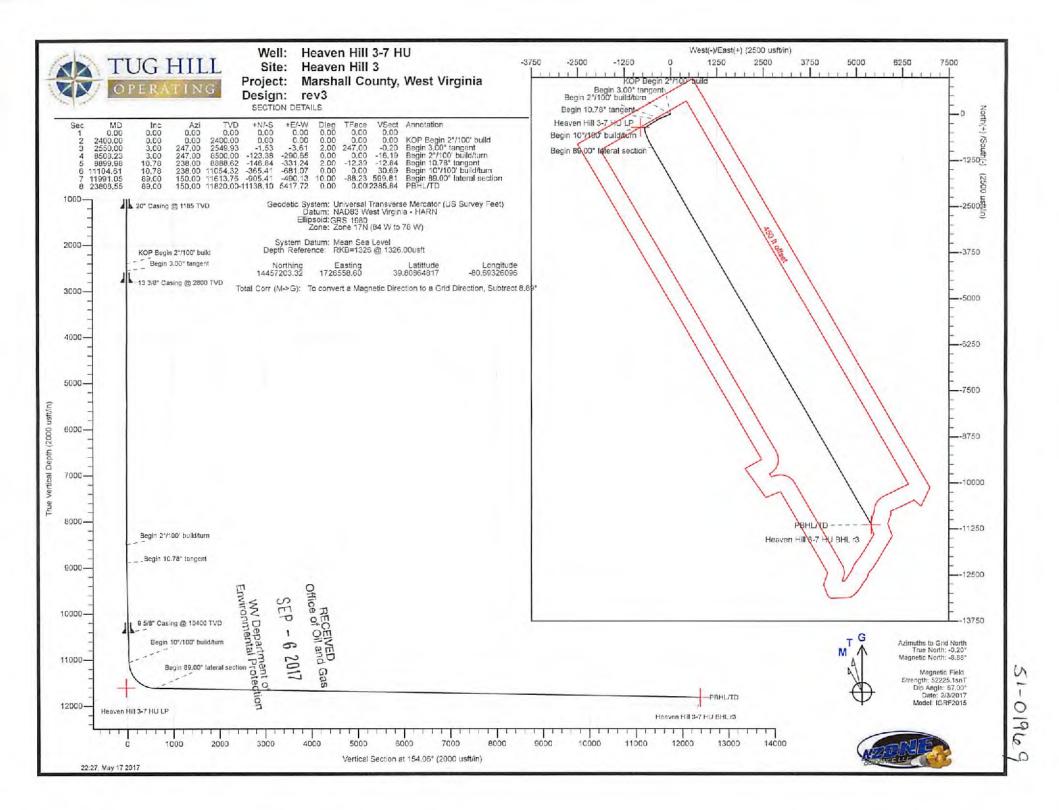
Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	120.00	120.00	30" Casing @ 120 TVD	30	36
	1,185.00	1,185.00	20" Casing @ 1185 TVD	20	24
	2,800.41	2,800.00	13 3/8" Casing @ 2800 TVD	13-3/8	17
	10,438.53	10,400.00	9 5/8" Casing @ 10400 TVD	9-5/8	12-1/4

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coor +N/-S (usft)	dinates +E/-W (usft)	Comment	
2,400,00	2,400,00	0.00	0.00	KOP Begin 2°/100' build	
2,550.00	2,549.93	-1.53	-3.61	Begin 3.00° tangent	
8,508.23	8,500.00	-123,38	-290.65	Begin 2°/100' build/turn	
8,899.98	8,888.62	-146.84	-331.24	Begin 10,78° tangent	
11,104.61	11,054,32	-365.41	-681.07	Begin 10°/100' build/turn	
11,991.05	11,613,76	-905.41	-490.13	Begin 89.00° lateral section	
23,808.54	11,820.00	-11,138.10	5,417.72	PBHL/TD	





51-01969

Database: Company: Project:

DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Well: Wellbore: Design:

Heaven Hill 3 Heaven Hill 3-7 HU Original Hole rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Minimum Curvature

Project

Marshall County, West Virginia

Map System: Geo Datum:

Universal Transverse Mercator (US Survey Feet)

NAD83 West Virginia - HARN

System Datum:

Mean Sea Level

Map Zone:

Site

Zone 17N (84 W to 78 W)

Site Position:

Heaven Hill 3

From:

Lat/Long

Northing: Easting:

14,457,178.77 usft 1,726,571,98 usft

Latitude:

Longitude:

39.80858060

Position Uncertainty:

Heaven Hill 3-7 HU

0.00 usft Slot Radius: 13-3/16"

Grid Convergence:

-80.69321360 0.20

Well Well Position

+N/-S +E/-W 0.00 usft 0.00 usft

Northing: Easting:

14,457,203,32 usft 1,726,558,60 usft Latitude: Longitude:

39.80864817 -80.69326096

Position Uncertainty

0.00 usft

IGRF2015

Wellhead Elevation:

2/3/2017

0.00 usft

Ground Level:

1,326.00 usft

Wellbore

Original Hole

Magnetics Model Name

rev3

Sample Date

Declination (°)

Dip Angle

Field Strength (nT)

52,225.10345639

Design

Audit Notes:

Version:

Phase:

PLAN

Tie On Depth:

-8.69

0.00

67.00

Vertical Section:

Depth From (TVD) (usft) 0.00

+N/-S (usft) 0.00

+E/-W (usft) 0.00

Direction (°) 154.06

Plan Survey Tool Program

Depth From

(usft)

Date 5/17/2017

Depth To (usft)

Survey (Wellbore)

Tool Name

Remarks

0.00

23,808.55 rev3 (Original Hole)

MIND MWD - Standard

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	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	RECEIVED Office of Oil and G
2,550.00	3.00	247.00	2,549.93	-1.53	-3.61	2.00	2.00	0.00	247.00	Office of On
8,508.23	3.00	247.00	8,500.00	-123.38	-290.65	0.00	0.00	0,00	0.00	SEP - 6 201
8,899.98	10.78	238.00	8,888.62	-146.84	-331.24	2.00	1.99	-2.30	-12.39	1161
11,104.61	10.78	238.00	11,054.32	-365,41	-681.07	0.00	0.00	0.00	0.00	- I panartment
11,991.05	89.00	150.00	11,613.76	-905.41	-490.13	10.00	8.82	-9.93	-88.23	WV Department Protestal Protestal Protestal 3-7 HU B
23,808,55	89.00	150.00	11,820.00	-11,138.10	5,417.72	0.00	0.00	0.00	0.00 He	aven Hill 3-7 HU B





Database: Company: Project:

Design:

DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Heaven Hill 3
Well: Heaven Hill 3-7 HU
Wellibore: Original Hole

rev3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326,00usft RKB=1326 @ 1326,00usft

Grid

asured			Vertical			Мар	Map		- 1
Depth		********	Depth			Northing	Easting		
(usft)	Inclination (°)	Azimuth (°)	(usft)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,457,203.32	1,726,558,60	39.80864817	-80,69326096
100.00	0.00	0.00	100.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
200.00	0.00	0.00	200.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,69326096
300.00	0.00	0.00	300,00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80,69326096
400.00	0.00	0.00	400.00	0.00	0.00	14,457,203.32		39.80864817	-80.69326096
500.00	0.00	0.00	500,00	0.00	0.00		1,726,558.60 1,726,558.60	39.80864817	-80.69326096
600.00	0.00	0.00	600.00		0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
700.00	0.00	0.00	700.00	0.00	0.00	14,457,203.32 14,457,203.32	1,726,558.60	39.80864817	-80.69326096
800.00	0.00	0.00	800.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
900.00		0.00	900.00	0.00	0.00		200 CO 20 CO		-80.69326096
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817 39.80864817	-80.69326096
						14,457,203.32	1,726,558.60		
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,203.32	1,726,558,60	39.80864817	-80.69326096 -80.69326096
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817 39.80864817	-80.69326096
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,457,203.32	1,726,558.60		-80.69326096
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,457,203.32	1,726,558,60	39,80864817	-80.69326096
1,600.00	0.00	0.00	1,600,00	0.00	0,00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80,69326096
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,457,203.32	1,726,558.60	39,80864817	-80.69326096
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,457,203.32	1,726,558,60	39,80864817	-80.69326096
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,457,203.32	1,726,558.60	39.80864817	-80.69326096
Charles and the same	jin 2°/100' bui								
2,500.00	2.00	247.00	2,499.98	-0.68	-1.61	14,457,202.64	1,726,556.99	39,80864631	-80.69326669
2,550.00	3.00	247.00	2,549.93	-1.53	-3.61	14,457,201.79	1,726,554.98	39.80864399	-80.69327385
Begin 3.	00° tangent								
2,600.00	3.00	247.00	2,599.86	-2.56	-6.02	14,457,200.77	1,726,552.58	39.80864121	-80.69328244
2,700.00	3.00	247.00	2,699.73	-4.60	-10.84	14,457,198.72	1,726,547.76	39,80863564	-80.69329962
2,800.00	3.00	247.00	2,799.59	-6.65	-15.66	14,457,196.68	1,726,542.94	39.80863007	-80.69331680
2,900.00	3.00	247.00	2,899.45	-8.69	-20.48	14,457,194.63	1,726,538.12	39,80862450	-80,69333398
3,000.00	3.00	247.00	2,999.31	-10.74	-25.29	14,457,192.59	1,726,533.31	39.80861893	-80.69335115
3,100.00	3.00	247.00	3,099.18	-12.78	-30.11	14,457,190.54	1,726,528.49	39.80861336	-80.69336833
3,200.00	3.00	247.00	3,199.04	-14.83	-34.93	14,457,188.50	1,726,523.67	39.80860778	-80.69338551
3,300.00	3.00	247.00	3,298.90	-16.87	-39.75	14,457,186.45	1,726,518.85	39,80860221	-80.69340269
3,400.00	3.00	247.00	3,398.77	-18.92	-44.56	14,457,184.41	1,726,514.04	39.80859664	-80.69341987
3,500.00	3.00	247.00	3,498.63	-20.96	-49.38	14,457,182.36	1,726,509,22	39.80859107	-80.69343705
3,600.00	3.00	247.00	3,598.49	-23.01	-54.20	14,457,180.32	1,726,504.40	39.80858550	-80.69345423
3,700.00	3.00	247.00	3,698.36	-25.05	-59.02	14,457,178.27	1,726,499.58	39,80857993	-80.69347141
3,800.00	3.00	247.00	3,798.22	-27.10	-63.83	14,457,176.23	1,726,494.77	39.80857436	-80.69348859
3,900.00	3.00	247.00	3,898.08	-29.14	-68.65	14,457,174.18	1,726,489,95	39,80856879	-80,69350577
4,000.00	3.00	247.00	3,997.94	-31.19	-73.47	14,457,172.14	1,726,485.13	39.80856322	-80.69352295
4,100.00	3.00	247.00	4,097.81	-33.23	-78.29	14,457,170.09	1,726,480.31	39,80855765	-80,69354013
4,200.00	3.00	247.00	4,197.67	-35.28	-83.10	14,457,168.05	1,726,475.50	39.80855208	-80.69355731
4,300.00	3.00	247.00	4,297.53	-37.32	-87.92	14,457,166.00	1,726,470.68	39.80854651	-80,69357449
4,400.00	3.00	247.00	4,397.40	-39.37	-92.74	14,457,163.96	1,726,465.86	39.80854094	-80.69359166
4,500.00	3.00	247.00	4,497.26	-41.41	-97.56	14,457,161.91	1,726,461.04	39.80853537	-80,69360884
4,600.00	3.00	247.00	4,597.12	-43.46	-102.37	14,457,159.87	1,726,456,23	39.80852980	-80.69362602
4,700.00	3.00	247.00	4,696.99	-45.50	-107.19	14,457,157.82	1,726,451.41	39.80852423	-80.69364320
4,800.00	3.00	247.00	4,796.85	-47.54	-112.01	14,457,155.78	1,726,446.59	39.80851866	-80.69366038
4,900.00	3.00	247.00	4,896.71	-49.59	-116.83	14,457,153.73	1,726,441.77	39,80851308	-80.69367756
5,000.00	3.00	247.00	4,996.57	-51.63	-121.64	14,457,151.69	1,726,436.95	39.80850751	office of Oil



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Well: Wellbore: Design:

Heaven Hill 3-7 HU Original Hole rev3

Heaven Hill 3

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference: Survey Calculation Method:

ce: Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Minimum Curvature

ned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,100,00	3.00	247.00	5,096,44	-53.68	-126,46	14,457,149.65	1,726,432.14	39.80850194	-80,693711
5,200.00	3.00	247.00	5,196,30	-55.72	-131,28	14,457,147.60	1,726,427.32	39.80849637	-80.693729
5,300,00	3.00	247.00	5,296.16	-57.77	-136.10	14,457,145.56	1,726,422.50	39.80849080	-80,69374
5,400.00	3.00	247.00	5,396.03	-59.81	-140.91	14,457,143.51	1,726,417.68	39.80848523	-80.69376
	3.00	247.00		-61.86	-145.73	14,457,141.47	1,726,412.87	39.80847966	-80.69378
5,500.00			5,495.89				And the second of the second o		-80.69379
5,600.00	3.00	247.00	5,595.75	-63.90	-150,55	14,457,139.42	1,726,408.05	39.80847409	
5,700.00	3.00	247.00	5,695,61	-65.95	-155.37	14,457,137.38	1,726,403.23	39.80846852	-80.69381
5,800.00	3.00	247.00	5,795.48	-67.99	-160,18	14,457,135.33	1,726,398.41	39.80846295	-80.69383
5,900.00	3.00	247.00	5,895.34	-70.04	-165.00	14,457,133.29	1,726,393.60	39.80845738	-80.69384
6,000.00	3.00	247.00	5,995.20	-72.08	-169.82	14,457,131.24	1,726,388.78	39.80845181	-80,69386
6,100.00	3.00	247.00	6,095.07	-74.13	-174.64	14,457,129.20	1,726,383.96	39.80844624	-80,69388
6,200.00	3.00	247.00	6,194.93	-76.17	-179.45	14,457,127.15	1,726,379.14	39.80844067	-80.69390
6,300.00	3.00	247.00	6,294.79	-78.22	-184.27	14,457,125.11	1,726,374.33	39.80843510	-80.69391
6,400.00	3.00	247.00	6,394,66	-80.26	-189.09	14,457,123.06	1,726,369.51	39.80842953	-80.69393
6,500.00	3.00	247.00	6,494.52	-82.31	-193.91	14,457,121.02	1,726,364.69	39.80842396	-80.69395
6,600,00	3,00	247.00	6,594.38	-84,35	-198.72	14,457,118.97	1,726,359.87	39.80841838	-80.69396
6,700.00	3.00	247.00	6,694.24	-86.40	-203.54	14,457,116,93	1,726,355.06	39.80841281	-80,69398
6,800,00	3,00	247.00	6,794.11	-88.44	-208,36	14,457,114,88	1,726,350.24	39.80840724	-80,69400
6,900.00	3.00	247.00	6,893,97	-90.49	-213,18	14,457,112.84	1,726,345.42	39.80840167	-80.69402
7.000.00	3.00	247.00	6,993,83	-92,53	-217,99	14,457,110.79	1,726,340.60	39.80839610	-80.69403
7,100.00	3.00	247.00	7,093.70	-94.58	-222.81	14,457,108.75	1,726,335.79	39.80839053	-80.69405
7,200.00	3.00	247.00	7,193.56	-96.62	-227.63	14,457,106.70	1,726,330.97	39.80838496	-80.69407
7,300.00	3.00	247.00	7,293.42	-98.67	-232.45	14,457,104.66	1,726,326.15	39.80837939	-80.69408
					-237.27		1,726,321.33	39.80837382	-80.69410
7,400.00	3.00	247.00	7,393.28	-100.71		14,457,102.61			-80.69412
7,500.00	3.00	247.00	7,493,15	-102.76	-242.08	14,457,100.57	1,726,316.52	39.80836825	-80.69414
7,600.00	3.00	247.00	7,593.01	-104.80	-246,90	14,457,098.52	1,726,311.70	39.80836268	
7,700.00	3.00	247.00	7,692.87	-106.85	-251.72	14,457,096.48	1,726,306.88	39.80835711	-80.69415
7,800.00	3.00	247.00	7,792.74	-108.89	-256,54	14,457,094,43	1,726,302.06	39.80835154	-80.69417
7,900.00	3.00	247.00	7,892.60	-110.94	-261.35	14,457,092.39	1,726,297.25	39.80834597	-80.69419
8,000.00	3.00	247.00	7,992.46	-112.98	-266.17	14,457,090.34	1,726,292.43	39.80834040	-80,69421
8,100,00	3.00	247.00	8,092,33	-115.03	-270,99	14,457,088.30	1,726,287.61	39.80833482	-80,69422
8,200.00	3.00	247.00	8,192.19	-117.07	-275.81	14,457,086.25	1,726,282.79	39,80832925	-80,69424
8,300,00	3.00	247.00	8,292.05	-119.12	-280,62	14,457,084.21	1,726,277.98	39.80832368	-80.69426
8,400.00	3.00	247.00	8,391.91	-121.16	-285.44	14,457,082.16	1,726,273.16	39,80831811	-80.69427
8,500.00	3.00	247.00	8,491.78	-123.21	-290.26	14,457,080,12	1,726,268.34	39,80831254	-80,69429
8,508.23	3.00	247.00	8,500.00	-123.38	-290.65	14,457,079.95	1,726,267.94	39.80831208	-80.69429
Begin 2°	/100' build/tur	m							
8,600,00	4.81	242.30	8,591.55	-126.10	-296.27	14,457,077.22	1,726,262,33	39,80830465	-80,6943
8,700.00	6.80	240.03	8,691,03	-131.01	-305.11	14,457,072.32	1,726,253.49	39.80829126	-80.69434
00,008,8	8.79	238.79	8,790.10	-137.92	-316.77	14,457,065.40	1,726,241.83	39.80827238	-80,69439
8,899.98	10.78	238.00	8,888.62	-146.84	-331.24	14,457,056.49	1,726,227.36	39.80824803	-80,69444
		200,00	0,000.02	-140.04		1-1,101,000.10	1,720,227.00	34.4442.1444	
	.78° tangent	200.00	0.000.01	440.04	204.24	14 457 050 40	1 706 207 20	39,80824803	-80.69444
8,900.00	10.78	238.00	8,888.64	-146.84	-331.24	14,457,056.49	1,726,227.36		-80.69449
9,000.00	10.78	238.00	8,986.88	-156.75	-347.11	14,457,046.57	1,726,211,49	39,80822095	-80.6945
9,100.00	10.78	238.00	9,085.11	-166.67	-362.98	14,457,036.66	1,726,195.62	39.80819387	
9,200.00	10.78	238.00	9,183.35	-176.58	-378.84	14,457,026.74	1,726,179.75	39,80816679	-80.69461
9,300.00	10.78	238.00	9,281.58	-186.50	-394.71	14,457,016.83	1,726,163.89	39.80813971	-80,69466
9,400.00	10.78	238.00	9,379.81	-196.41	-410.58	14,457,006.91	1,726,148.02	39.80811263	-80,69472
9,500.00	10.78	238.00	9,478.05	-206.33	-426.45	14,456,997.00	1,726,132.15	39.80808556	-80.69478
9,600.00	10.78	238.00	9,576,28	-216.24	-442.32	14,456,987.08	1,726,116.28	39.80805848	-80,6948
9,700.00	10.78	238.00	9,674.52	-226.15	-458.18	14,456,977.17	1,726,100.41	39.80803140	-80.69489
9,800.00	10.78	238.00	9,772.75	-236.07	-474.05	14,456,967.26	1,726,084.55	39.80800432	-80.6949
9,900.00	10.78	238.00	9,870.98	-245.98	-489.92	14,456,957.34	1,726,068.68	EIVED39,89797724 Dil an 39.80795016	-80.69500
10,000.00	10.78	238.00	9,969.22	-255,90	-505.79	14,456,947.43	1 728 052 85	Sil al 99 80795016	-80.69506

SEP - 6 2017

COMPASS 5000.14 Build 85



Database: Company: Project:

DB_Jul2216dt_v14 Tug Hill Operating LLC

Marshall County, West Virginia Heaven Hill 3

Site: Well: Heaven Hill 3-7 HU Wellbore: Original Hole

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference: Survey Calculation Method: Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Minimum Curvature

sign:	rev3							0	
anned Survey									
Measured			Vertical			Мар	Мар		
Depth (usft)	Inclination (°)	Azimuth (°)	Depth (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
10,100.00	10.78	238.00	10,067.45	-265.81	-521.66	14,456,937,51	1,726,036.94	39.80792308	-80.695121
10,200.00	10.78	238.00	10,165.68	-275.73	-537.53	14,456,927.60	1,726,021.07	39.80789600	-80.695178
10,300.00	10.78	238.00	10,263.92	-285,64	-553.39	14,456,917.68	1,726,005.20	39.80786892	-80.695234
10,400.00	10.78	238,00	10,362.15	-295.56	-569.26	14,456,907.77	1,725,989.34	39.80784185	-80.695291
10,500.00	10,78	238.00	10,460.39	-305.47	-585.13	14,456,897.86	1,725,973.47	39.80781477	-80,695348
10,600.00	10.78	238.00	10,558.62	-315.38	-601.00	14,456,887.94	1,725,957.60	39.80778769	-80.695404
10,700.00	10.78	238.00	10,656.85	-325.30	-616.87	14,456,878.03	1,725,941.73	39.80776061	-80,69546
10,800.00	10.78	238.00	10,755.09	-335.21	-632.74	14,456,868.11	1,725,925.86	39.80773353	-80.69551
10,900.00	10.78	238.00	10,853.32	-345.13	-648.60	14,456,858.20	1,725,910.00	39.80770645	-80.69557
11,000.00	10.78	238.00	10,951.56	-355.04	-664.47	14,456,848.28	1,725,894.13	39.80767937	-80.69563
11,100.00	10.78	238.00	11,049.79	-364.96	-680.34	14,456,838.37	1,725,878.26	39.80765229	-80.69568
11,104.61	10.78	238.00	11,054.32	-365.41	-681.07	14,456,837.91	1,725,877.53	39.80765104	-80.695690
Begin 10	100' build/tu	irn							
11,200.00	14.58	196.86	11,147.55	-381.67	-692.15	14,456,821.65	1,725,866.45	39.80760650	-80.69573
11,300.00	22.51	177.16	11,242.37	-412.91	-694.86	14,456,790.41	1,725,863.74	39.80752073	-80.69574
11,400.00	31.59	167.84	11,331.38	-457.75	-688.37	14,456,745.58	1,725,870.22	39.80739754	-80.69571
11,500.00	41.07	162.43	11,411.86	-514.82	-672.90	14,456,688.51	1,725,885.70	39.80724067	-80.69566
11,600.00	50.72	158.77	11,481.39	-582.38	-648.90	14,456,620.94	1,725,909.70	39.80705489	-80.69557
11,700.00	60.46	156.00	11,537.83	-658.40	-617.11	14,456,544.93	1,725,941,49	39,80684584	-80,69546
11,800.00	70.25	153.73	11,579.49	-740.54	-578.49	14,456,482.78	1,725,980.10	39.80661988	-80.69532
11,900.00	80.06	151.72	11,605.08	-826.33	-534.22	14,456,376.99	1,726,024.38	39,80638388	-80.69517
11,991.05	89.00	150,00	11,613,76	-905.41	-490,13	14,456,297,92	1,726,068.47	39.80616630	-80.69501
	.00° lateral se		11,010110		144114	100 10000000000000000000000000000000000	.10.00100000	77177517750	
12,000.00	89.00	150.00	11,613.91	-913.16	-485.65	14,456,290.17	1,726,072.95	39.80614498	-80.69500
	89.00	150.00	11,615.66	-999.75	-435.66	14,456,203.58	1,726,122.94	39.80590671	-80.69482
12,100.00		150.00	11,617.40	-1,086.34	-385.67	14,456,116.99	1,726,172.93	39.80566845	-80.69464
12,200.00	89.00			-1,172.92	-335.67	14,456,030.40	1,726,222.92	39,80543019	-80.69447
12,300.00	89.00	150.00	11,619.15					39.80519192	-80.69429
12,400.00	89.00	150.00	11,620.89	-1,259.51	-285.68	14,455,943,81	1,726,272.92	39.80495366	-80.69411
12,500.00	89.00	150.00	11,622,64	-1,348.10	-235.69	14,455,857.22	1,726,322.91	39,80471539	-80.69393
12,600.00	89.00	150.00	11,624,38	-1,432.69	-185,70	14,455,770.63	1,726,372.90	39,80447713	-80.69376
12,700.00	89.00	150.00	11,626.13	-1,519.28	-135.71	14,455,684.04	1,726,422.89		-80,69358
12,800.00	89.00	150.00	11,627.87	-1,605.87	-85.71	14,455,597.45	1,726,472.89	39.80423886	-80,69340
12,900.00	89.00	150.00	11,629,62	-1,692.46	-35.72	14,455,510.86	1,726,522.88	39,80400059	
13,000.00	89.00	150.00	11,631.37	-1,779.05	14.27	14,455,424.27	1,726,572.87	39.80376233	-80,69323
13,100.00	89.00	150.00	11,633.11	-1,865.64	64.26	14,455,337.69	1,726,622.86	39,80352406	-80.69305
13,200.00	89.00	150.00	11,634.86	-1,952.23	114.26	14,455,251.10	1,726,672.86	39.80328579	-80.69287
13,300.00	89.00	150.00	11,636.60	-2,038.82	164.25	14,455,164.51	1,726,722.85	39.80304753	-80.69270
13,400.00	89.00	150.00	11,638.35	-2,125.41	214.24	14,455,077.92	1,726,772.84	39,80280926	-80.69252
13,500.00	89.00	150.00	11,640.09	-2,212.00	264.23	14,454,991.33	1,726,822.83	39.80257099	-80.69234
13,600.00	89.00	150.00	11,841.84	-2,298.59	314.23	14,454,904.74	1,726,872.83	39.80233272	-80,69217
13,700.00	89.00	150.00	11,643.58	-2,385.18	364.22	14,454,818.15	1,726,922.82	39.80209446	-80.69199
13,800.00	89.00	150.00	11,645.33	-2,471.77	414.21	14,454,731.56	1,726,972.81	39.80185619	-80.69181
13,900.00	89.00	150.00	11,647.07	-2,558.35	464.20	14,454,644.97	1,727,022.80	39.80161792	-80.69163
14,000.00	89.00	150.00	11,648.82	-2,644.94	514.20	14,454,558,38	1,727,072.79	39.80137965	-80.69146
14,100,00	89.00	150,00	11,650.56	-2,731.53	564.19	14,454,471,79	1,727,122.79	39.80114138	-80.69128
14,200.00	89.00	150.00	11,652.31	-2,818.12	614.18	14,454,385.20	1,727,172.78	39.80090311	-80,69110
14,300,00	89.00	150,00	11,654.05	-2,904,71	664.17	14,454,298.61	1,727,222.77	39.80066484	-80.69093
14,400.00	89.00	150.00	11,655.80	-2,991.30	714.17	14,454,212.02	1,727,272.76	39.80042657	-80.69075
14,500,00	89.00	150,00	11,657.54	-3,077.89	764.16	14,454,125.43	1,727,322.76	39.80018830	-80.69057
14,600.00	89.00	150.00	11,659.29	-3,164.48	814.15	14,454,038.84	1,727,372.75	39,79995003	-80,69040
14,700.00	89.00	150.00	11,661.03	-3,251,07	864.14	14,453,952.26	1,727,422.74	39.79971176	-80.69022
14,800.00	89.00	150.00	11,662.78	-3,337.66	914.14	14,453,865.67	1,727,472.73	39.79947349	-80,69004
14,900.00	89.00	150.00	11,664.52	-3,424.25	964.13	14,453,779.08	1,727,522,73	ECEIVE 78923522 of Oil 20979899695	-80.68987
15,000.00	89.00	150.00	11,666.27	-3,510.84	1,014.12	14,453,692.49	1 727 572 72	A ON 29979899695	-80.68969

SEP - 6 2017

COMPASS 5000.14 Build 85



Database: Company: Project:

DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Well: Heaven Hill 3 Heaven Hill 3-7 HU Original Hole

Wellbore: rev3 Design:

Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326,00usft

RKB=1326 @ 1326,00usft Grid

Minimum Curvature

Planned Survey		
Measured Depth (usft)	Inclination (°)	A
15,100.00	89.00	
15,200.00	89.00	
15,300,00	89.00	
15,400.00	89.00	
15,500.00	89.00	
15,600,00	89.00	
15,700.00	89.00	
	F-2-2-2-2-2-	

Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,100,00	89.00	150.00	11,668.02	-3,597.43	1,064.11	14,453,605.90	1,727,622.71	39.79875867	-80,689516
15,200.00	89.00	150.00	11,669.76	-3,684.02	1,114.10	14,453,519.31	1,727,672.70	39.79852040	-80.68933
15,300,00	89.00	150.00	11,671.51	-3,770,61	1,164.10	14,453,432,72	1,727,722.70	39,79828213	-80,68916
15,400.00	89.00	150.00	11,673.25	-3,857,19	1,214.09	14,453,346,13	1,727,772.69	39,79804386	-80.68898
15,500.00	89.00	150.00	11,675.00	-3,943.78	1,264.08	14,453,259.54	1,727,822.68	39.79780558	-80,68880
15,600.00	89.00	150.00	11,676.74	-4,030.37	1,314.07	14,453,172.95	1,727,872.67	39,79756731	-80,68863
15,700.00	89.00	150.00	11,678.49	-4,116.96	1,364.07	14,453,086.36	1,727,922.67	39.79732904	-80.68845
15,800.00	89.00	150,00	11,680.23	-4,203.55	1,414.06	14,452,999.77	1,727,972.66	39.79709076	-80.68827
15,900.00	89.00	150.00	11,681.98	-4,290.14	1,464.05	14,452,913.18	1,728,022.65	39.79685249	-80.68810
16,000.00	89.00	150.00	11,683.72	-4,376.73	1,514.04	14,452,826.59	1,728,072.64	39.79661421	-80.68792
16,100.00	89.00	150.00	11,685.47	-4,463.32	1,564.04	14,452,740.00	1,728,122.63	39.79637594	-80.68774
16,200.00	89.00	150.00	11,687,21	-4,549.91	1,614.03	14,452,653.42	1,728,172.63	39.79613766	-80.68757
16,300.00	89.00	150.00	11,688.96	-4,636.50	1,664.02	14,452,566.83	1,728,222.62	39.79589939	-80.68739
16,400.00	89.00	150.00	11,690.70	-4,723.09	1,714.01	14,452,480,24	1,728,272.61	39.79566111	-80,68721
16,500.00	89.00	150.00	11,692.45	-4,809.68	1,764.01	14,452,393.65	1,728,322.60	39,79542284	-80.68703
16,600,00	89.00	150.00	11,694,19	-4,896.27	1,814.00	14,452,307.06	1,728,372.60	39.79518456	-80,68686
16,700.00	89.00	150.00	11,695,94	-4,982,86	1,863.99	14,452,220,47	1,728,422.59	39,79494629	-80,68668
16,800.00	89.00	150.00	11,697,68	-5,069.45	1,913.98	14,452,133.88	1,728,472.58	39.79470801	-80,68650
16,900,00	89.00	150.00	11,699,43	-5,156.04	1,963.98	14,452,047.29	1,728,522.57	39.79446973	-80,68633
17,000.00	89.00	150.00	11,701.17	-5,242.62	2,013.97	14,451,960.70	1,728,572.57	39.79423145	-80.68615
17.100.00	89.00	150.00	11,702.92	-5,329.21	2,063.96	14,451,874.11	1,728,622.56	39,79399318	-80,68597
17,200.00	89.00	150.00	11,704.67	-5,415.80	2,113.95	14,451,787,52	1,728,672.55	39.79375490	-80,68580
17,300.00	89.00	150.00	11,706.41	-5,502.39	2,163.94	14,451,700.93	1,728,722.54	39,79351662	-80.68562
17,400.00	89.00	150.00	11,708.16	-5,588.98	2,213.94	14,451,614.34	1,728,772.54	39.79327834	-80.68544
17,500.00	89.00	150.00	11,709.90	-5,675,57	2,263.93	14,451,527.75	1,728,822.53	39.79304006	-80.68527
17,600.00	89.00	150.00	11,711.65	-5,762.16	2,313.92	14,451,441.16	1,728,872.52	39.79280179	-80.68509
17,700.00	89.00	150.00	11,713.39	-5,848.75	2,363.91	14,451,354.57	1,728,922.51	39.79256351	-80.68491
17,800,00	89.00	150.00	11,715.14	-5,935.34	2,413.91	14,451,267.99	1,728,972.51	39.79232523	-80.68473
17,900.00	89.00	150.00	11,716.88	-6,021.93	2,463.90	14,451,181.40	1,729,022.50	39.79208695	-80.68456
18,000.00	89.00	150.00	11,718.63	-6,108.52	2,513.89	14,451,094.81	1,729,072.49	39.79184867	-80.68438
18,100.00	89.00	150.00	11,720.37	-6,195.11	2,563.88	14,451,008.22	1,729,122.48	39,79161039	-80.68420
18,200.00	89.00	150.00	11,722.12	-6,281.70	2,613.88	14,450,921.63	1,729,172.47	39,79137211	-80.68403
18,300.00	89.00	150.00	11,723.86	-6,368.29	2,663.87	14,450,835.04	1,729,222.47	39.79113383	-80,68385
18,400,00	89.00	150.00	11,725,61	-6.454.88	2,713.86	14,450,748.45	1,729,272.46	39,79089555	-80.68367
18,500.00	89.00	150.00	11,727.35	-6,541.46	2,763.85	14,450,661.86	1,729,322.45	39.79065726	-80,68350
18,600,00	89.00	150.00	11,729.10	-6,628.05	2,813.85	14,450,575.27	1,729,372.44	39,79041898	-80.68332
18,700.00	89.00	150.00	11,730.84	-6,714.64	2,863.84	14,450,488.68	1,729,422.44	39.79018070	-80.68314
18,800.00	89.00	150.00	11,732.59	-6,801.23	2,913.83	14,450,402.09	1,729,472.43	39.78994242	-80.68297
18,900.00	89.00	150.00	11,734.33	-6,887.82	2,963.82	14,450,315.50	1,729,522.42	39.78970414	-80.68279
19,000.00	89.00	150.00	11,736.08	-6,974.41	3,013.82	14,450,228.91	1,729,572.41	39.78946585	-80.68261
19,100.00	89.00	150.00	11,737.82	-7,061.00	3,063.81	14,450,142.32	1,729,622.41	39.78922757	-80.68244
19,200.00	89.00	150.00	11,739.57	-7,147.59	3,113,80	14,450,055.73	1,729,672.40	39.78898929	-80.68228
19,300,00	89.00	150.00	11,741.32	-7,234.18	3,163.79	14,449,969.15	1,729,722.39	39.78875100	-80.68208
19,400,00	89.00	150.00	11,743.06	-7,320.77	3,213.78	14,449,882.56	1,729,772.38	39.78851272	-80.68190
19,500.00	89.00	150.00	11,744.81	-7,407.36	3,263.78	14,449,795.97	1,729,822.38	39.78827444	-80.68173
19,600.00	89.00	150.00	11,746.55	-7,493.95	3,313.77	14,449,709.38	1,729,872.37	39.78803615	-80.68155
19,700.00	89.00	150.00	11,748.30	-7,580.54	3,363.76	14,449,622.79	1,729,922.36	39.78779787	-80.68137
19,800.00	89.00	150.00	11,750.04	-7,667.13	3,413.75	14,449,536.20	1,729,972,35	39,78755958	-80.68120
19,900.00	89.00	150.00	11,751.79	-7.753.72	3,463.75	14,449,449.51	1,730,022,35	39.78732130	-80.68102
20,000.00	89.00	150,00	11,753.53	-7,840,30	3,513.74	14,449,363.02	1,730,072.34	39,78708301	-80.68084
20,100.00	89.00	150.00	11,755.28	-7,926.89	3,563.73	14,449,276.43	1,730,122.33	39.78684473	-80,68067
20,200.00	89,00	150.00	11,757.02	-8,013.48	3,613.72	14,449,189.84	1.730 172 32	39,78660644	-80,68049
20,300.00	89.00	150.00	11,758.77	-8,100.07	3,663.72	14,449,103.25	1,730,222,32	39.78636815 EIVE 39.78636815 Oil arii 39.78589158	-80.68031
20,400.00	89.00	150.00	11,760.51	-8,186.66	3,713.71	14,449,016.86	1,730,272.34FC	EIVE 39. 2987	-80.68014
20,500.00	89.00	150.00	11,762.26	-8,273.25	3,763.70	14,448,930.07	4 700 000 00 of	OII 21 20 70500150	-80.67996

SEP - 6 2017

COMPASS 5000.14 Build 85

W Department of Environmental Protection



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Heaven Hill 3

Site: Well: Wellbore: Design:

Heaven Hill 3-7 HU Original Hole rev3 Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Minimum Curvature

nned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,600.00	89.00	150.00	11,764.00	-8,359.84	3,813,69	14,448,843.48	1,730,372.29	39.78565329	-80.6797876
20,700.00	89.00	150.00	11,765,75	-8,446.43	3,863,69	14,448,756.89	1,730,422.28	39,78541501	-80.6796107
20,800.00	89.00	150.00	11,767,49	-8,533.02	3,913.68	14,448,670.30	1,730,472.28	39.78517672	-80.679433
20,900.00	89.00	150.00	11,769,24	-8,619.61	3,963.67	14,448,583.72	1,730,522.27	39.78493843	-80.679257
21,000.00	89.00	150.00	11,770,98	-8,706.20	4,013.66	14,448,497,13	1,730,572.26	39.78470014	-80,679080
21,100.00	89.00	150,00	11,772,73	-8,792.79	4,063.66	14,448,410.54	1,730,622.25	39.78446185	-80.678903
21,200.00	89.00	150.00	11,774.47	-8,879.38	4,113.65	14,448,323.95	1,730,672.25	39.78422356	-80.678726
21,300.00	89.00	150.00	11,776.22	-8,965.97	4,163.64	14,448,237.36	1,730,722.24	39.78398528	-80.678549
21,400.00	89.00	150.00	11,777.97	-9,052.56	4,213.63	14,448,150.77	1,730,772.23	39.78374699	-80.678372
21,500.00	89.00	150.00	11,779.71	-9,139.15	4,263.62	14,448,064.18	1,730,822.22	39.78350870	-80.678196
21,600.00	89.00	150.00	11,781.46	-9,225.73	4,313.62	14,447,977.59	1,730,872.22	39.78327041	-80.678019
21,700.00	89.00	150.00	11,783.20	-9,312.32	4,363.61	14,447,891.00	1,730,922.21	39.78303212	-80.677842
21,800.00	89.00	150.00	11,784.95	-9,398.91	4,413.60	14,447,804.41	1,730,972.20	39.78279383	-80.677665
21,900.00	89.00	150.00	11,786.69	-9,485.50	4,463.59	14,447,717.82	1,731,022.19	39.78255554	-80.677488
22,000.00	89,00	150,00	11,788.44	-9,572.09	4,513.59	14,447,631.23	1,731,072.19	39.78231725	-80,677311
22,100.00	89.00	150.00	11,790.18	-9,658,68	4,563,58	14,447,544.64	1,731,122.18	39.78207895	-80.677134
22,200.00	89.00	150,00	11,791,93	-9,745,27	4,613,57	14,447,458.05	1,731,172.17	39.78184066	-80,676958
22,300.00	89.00	150.00	11,793,67	-9,831.86	4,663,56	14,447,371.46	1,731,222.16	39.78160237	-80,676781
22,400.00	89.00	150,00	11,795,42	-9,918.45	4,713.56	14,447,284.88	1,731,272.16	39.78136408	-80.676604
22,500.00	89.00	150.00	11,797.16	-10,005.04	4,763.55	14,447,198.29	1,731,322.15	39.78112579	-80,676427
22,600.00	89.00	150.00	11,798,91	-10,091.63	4,813.54	14,447,111.70	1,731,372.14	39,78088749	-80.676250
22,700.00	89.00	150.00	11,800.65	-10,178.22	4,863.53	14,447,025.11	1,731,422.13	39.78064920	-80.676074
22,800.00	89.00	150.00	11,802,40	-10,264.81	4,913.53	14,446,938.52	1,731,472.12	39.78041091	-80.675897
22,900.00	89.00	150.00	11,804.14	-10,351.40	4,963.52	14,446,851.93	1,731,522.12	39.78017261	-80.675720
23,000.00	89.00	150.00	11,805.89	-10,437.99	5,013.51	14,446,765.34	1,731,572.11	39.77993432	-80.675543
23,100.00	89.00	150.00	11,807.63	-10,524.57	5,063.50	14,446,678.75	1,731,622.10	39.77969603	-80,675356
23,200.00	89.00	150.00	11,809.38	-10,611.16	5,113.50	14,446,592.16	1,731,672.09	39.77945773	-80.675189
23,300.00	89.00	150.00	11,811.12	-10,697.75	5,163.49	14,446,505.57	1,731,722.09	39.77921944	-80.675013
23,400.00	89.00	150.00	11,812.87	-10,784.34	5,213.48	14,446,418.98	1,731,772.08	39.77898114	-80.674836
23,500.00	89.00	150.00	11,814.62	-10,870.93	5,263.47	14,446,332.39	1,731,822.07	39.77874285	-80.674659
23,600.00	89.00	150.00	11,816.36	-10,957.52	5,313.46	14,446,245.80	1,731,872.06	39.77850455	-80.674482
23,700,00	89.00	150.00	11,818.11	-11,044.11	5,363.46	14,446,159.21	1,731,922.06	39.77826626	-80,674305
23,800,00	89.00	150.00	11,819.85	-11,130.70	5,413.45	14,446,072.62	1,731,972.05	39,77802796	-80.674129
23,808.54	89.00	150.00	11,820.00	-11,138.10	5,417.72	14,446,065.23	1,731,976.32	39,77800761	-80.674113
PBHL/TD			1,21,		4.000	4000410077	well of salar o D. S.		
23,808.55	89.00	150.00	11,820,00	-11.138.10	5.417.72	14,446,065,22	1,731,976.32	39,77800759	-80.674113

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle	Dip Dir.	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Heaven Hill 3-7 HU LP - plan misses target - Point	0.00 center by 279	0.01 .15usft at 11	11,602.00 1500.00usft N	-359.33 MD (11411.86	-805.56 TVD, -514.82	14,456,844.00 N, -672.90 E)	1,725,753.04	39.80766891	-80.69613375
Heaven Hill 3-7 HU BHL - plan hits target cer - Point		0.00	11,820.00	-11,138.10	5,417.72	14,446,065.22	1,731,976.32	39.77800759	-80.67411389

RECEIVED Gas Office of Oil and Gas



Database: Company: Project: DB_Jul2216dt_v14 Tug Hill Operating LLC Marshall County, West Virginia

Site: Well: Wellbore:

Design:

Heaven Hill 3 Heaven Hill 3-7 HU Original Hole rev3 Local Co-ordinate Reference:

TVD Reference: MD Reference: North Reference:

Survey Calculation Method:

Well Heaven Hill 3-7 HU RKB=1326 @ 1326.00usft RKB=1326 @ 1326.00usft

Grid

Minimum Curvature

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	120.00	120.00	30" Casing @ 120 TVD	30	36
	1,185.00	1,185.00	20" Casing @ 1185 TVD	20	24
	2,800.41	2,800.00	13 3/6" Casing @ 2800 TVD	13-3/8	17
	10,438.53	10,400.00	9 5/8" Casing @ 10400 TVD	9-5/8	12-1/4

Plan Annotations						
Meas	easured Vertical		Vertical Local Coordinates			
Dej (us		Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
2,4	00.00	2,400.00	0.00	0.00	KOP Begin 2°/100' build	
2,5	550.00	2,549.93	-1.53	-3.61	Begin 3.00° tangent	
8,5	608.23	8,500.00	-123.38	-290.65	Begin 2°/100' build/turn	
8,8	89.98	8.888.62	-146.84	-331.24	Begin 10.78° tangent	
11,1	04.61	11,054.32	-365,41	-681.07	Begin 10°/100' build/turn	
11,9	91.05	11,613.76	-905.41	-490.13	Begin 89.00° lateral section	
23,8	308.54	11,820.00	-11,138.10	5,417.72	PBHL/TD	

RECEIVED Office of Oil and Gas

SEP - 6 2017

WV Department of Environmental Protection

API Number 47 - 051		0	1969
Oncombanda Wall	XI		

Operator's Well No. Heaven Hill 3-7HU

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

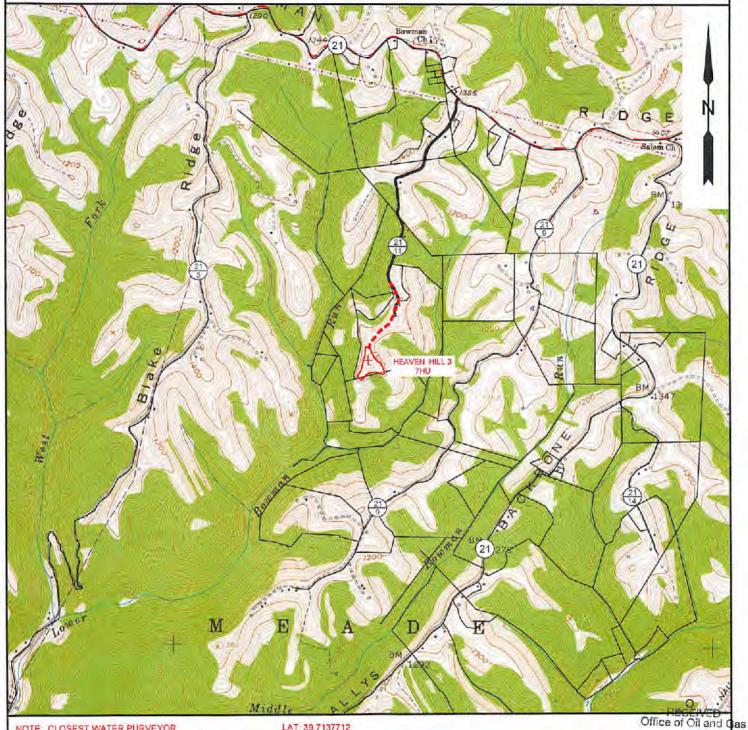
FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC	OP Code 494510851
Watershed (HUC 10) Fish Creek	Quadrangle Glen Easton 7.5'
Do you anticipate using more than 5,000 bbls of water to com	nplete the proposed well work? Yes V No
Will a pit be used? Yes No V	
If so, please describe anticipated pit waste:AST Tank	nks 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 Tarks will be used with proper contains.
Proposed Disposal Method For Treated Pit Wastes:	
Land Application	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Reuse (at API Number	mit Number_UIC 2459, UIC 985, UIC 359, UIC 2D0732540, UIC 2D0732523)
Off Site Disposal (Supply form W Other (Explain	VW-9 for disposal location)
Will closed loop system be used? If so, describe: Yes - For V	Vertical and Horizontal Drilling
Drilling medium anticipated for this well (vertical and horizon	ontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal
-If oil based, what type? Synthetic, petroleum, etc. 5	Synthetic Oil Base
Additives to be used in drilling medium? Barite for weight	
Drill cuttings disposal method? Leave in pit, landfill, remove	ed offsite, etc. All drill cuttings to be disposed of in a Landfill
-If left in pit and plan to solidify what medium will b	be used? (cement, lime, sawdust) N/A
-Landfill or offsite name/permit number? Wetzel County Sa	Sanitary Landfil (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfil, LLC (SAN1405 / PA DEP EC#1386426)
Permittee shall provide written notice to the Office of Oil and West Virginia solid waste facility. The notice shall be provide where it was properly disposed.	d Gas of any load of drill cuttings or associated waste rejected at any led within 24 hours of rejection and the permittee shall also disclose
on August 1, 2005, by the Office of Oil and Gas of the West V provisions of the permit are enforceable by law. Violations law or regulation can lead to enforcement action. I certify under penalty of law that I have personal application form and all attachments thereto and that, bas	of conditions of the GENERAL WATER POLLUTION PERMIT issued Virginia Department of Environmental Protection. I understand that the sof any term or condition of the general permit and/or other applicable ally examined and am familiar with the information submitted on this used on my inquiry of those individuals immediately responsible for strue, accurate, and complete. I am aware that there are significant sibility of fine or imprisonment.
Company Official Signature	
Company Official (Typed Name) Sean Gasser	RECEIVED Office of Oil and Gas
Company Official Title Engineer	SEP - 6 2017
0	
Subscribed and sworn before me this day of	. June , 20 17 WV Department of Environmental Protect
My commission expires Haven 12, 20	Notary Public MMONWEALTH OF PENNSYLVANIA NOTARIAL SEAL Jennifer Lupi, Notary Public Cacil Twp., Washington Chang 1 8 My Commission Expires March 12, 2018 MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Operator's Well No. Heaven Hill 3-7HU

Tug Hill Operating, LL	_C		
Proposed Revegetation Treatme	nt: Acres Disturbed 1	Prevegetation p	H 6.0
Lime 3	_ Tons/acre or to correc	ct to pH 6.5	
Fertilizer type 10-20-	20		
Fertilizer amount 500		lbs/acre	
Mulch 2.5		_Tons/acre	
		Seed Mixtures	
Тетр	oorary	Perma	nent
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Orchard Grass	12
Spring Oats	96	Ladino	3
		White Clover	2
Plan Approved by:	er Turbula	De_	
Title: Oil + Gas	Sugrector	Date: 3/31/17	RECEIN Office of Oil
Field Reviewed?	Yes () No	SEP -
			WV Dep? Environmen
			Environ

PROPOSED HEAVEN HILL 3 - 7HU



NOTE: CLOSEST WATER PURVEYOR GRANDVIEW - DOOLIN PUBLIC SERVICE DISTRICT LAT: 39.7137712

LON: -80.8258327 LOCATED: S 47*57'55" W AT 50,802' FROM HEAVEN HILL 3 - 7HU SURFACE LOCATIONS EP - 6 2017



	TOPO SI	ECTION:	OPERATOR:				
	GLEN EAS	STON 7.5'	PREPARED FOR: TUG HILL OPERATING, LLC				
1	COUNTY	DISTRICT	380 SOUTHPOIL	NTE BLVD			
	MARSHALL	MEADE	SUITE 200 CANONSBURG,	PA 15317			
	DRAWN BY	JOB NO.	DATE	SCALE			
	K.G.M.	8654	08/25/2017	1" - 2000'			





Well Site Safety Plan

Tug Hill Operating, LLC

1/26/18

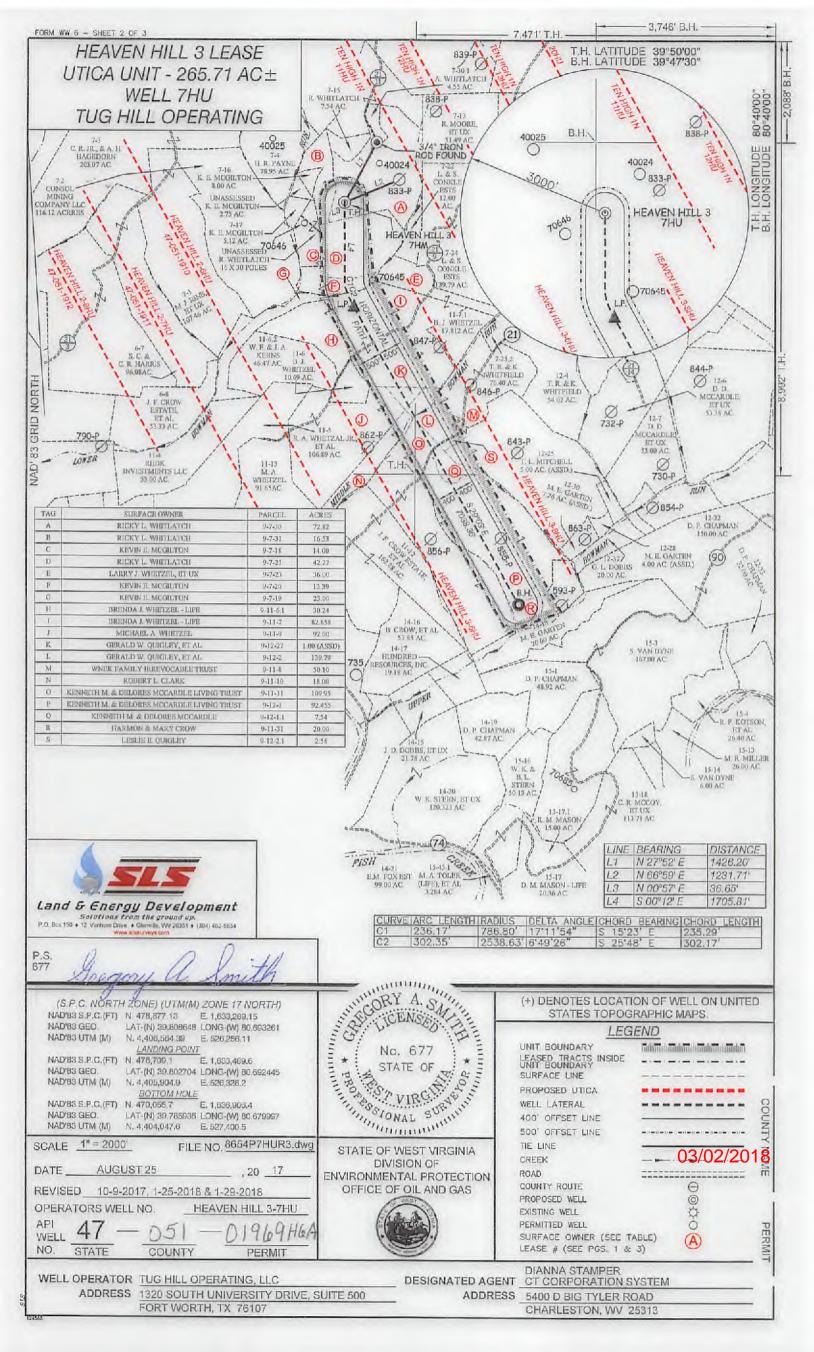
Well Name: Heaven Hill 3-7HU

Pad Location: Heaven Hill Unit 3

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17: NORTHING -4,406,564.39 EASTING -526,256.11

January 2018



HEAVEN HILL 3 LEASE UTICA UNIT - 265.71 AC± WELL 7HU TUG HILL OPERATING

No.	Teraso Hame or No.	Tog	Parcel	Oil & Gas Rayalty Owner - Continued	Deed Boo	ak Phone
81	10*47051.256.19	1		MICHAEL DAVID PILES AND CYNTIGA A PYLES	907	207
82	10*47051.256.8	1	3-11-7	PAMELA ANN MASON	905	31
83	10*47051,256.23	1		ROBERTLBOHAR	913	\$55
84	30*16021	1	9-11-7	STEVEN A BOHREN TO LINKY BONAR AND TANYA'S BONAR	905	39
85	10*47051.2569	4	9-11-7	WANDA MASON SUNSHINE	905	325
27	30*47051,256.13	1		WILLIAM W CRAIG AND GLENDA E CRAIG	905	41
- 88	10*47051.108.1	1	9-11-9	MICHAEL A WHETZIL	285	51
90	30,16738	K	9-12-27	SUSAN MARIEJOHNSON AKA SUSAN MARIE HURER	824	614
91	10*47051,309.1	K		TESTIGE CURGLEY AND MAXIME V QUIGLEY	505	8
- 52	10*47051.3093	K		GERALD WOUSELY AND VICIDLE QUIGLEY	907	12
93	20*25606	L		CHK-MACHE	793	150
94	10*47051,309.3	L		CENTER MORIETA VID AICKE FOR BEACH	905	12
95	10*47051.309.1	1		LESULE CHICLEY LEWIS M. CHICLEY AND MAXINE V. CHICLEY	905	8
97	10*16238	1		SUSAN LARIDE JOHNSON AKA SUSAN MARIE HUBER	907	514
98	20*26524	M	9-11-8	ALEX RUSSELL AND JOYCE A CAMPORIL	908	248
99	10*47051.729.17	M	9-11-8	ALICE GORRY MARTIN	508	52
101	10*17416 10*16515	M		ANDREW M. ORTIZ ANNA MARIE IACKSON	921	346
102	10147051.223.20	M		EARDAIA A BUZZARO	908	251
103	10*17276	M		BERTHA EZEL WYATE	921	526
104	10*47051.223.16	M		BETTY LOUSTERN AND WILLIAM KEITH STERM	908	64
105	10*16880 10*16980	M		REVERLY ANN STORES BRITTANY RICHARDSON	921	498 376
107	10*47051.723.18	M		BRITINEYMENEAR	508	57
108	10*15463	M	9-11-8	CHARLES A RINE	908	274
109	10*16667	M	9-11-8	CHARLES FAND GAIL ANN FYLE CHERYLE M TRACEY	900	266
111	10*16802	M	9-11-8	CHRISTOPHIELAND SAMMY RICHARDSON	927	475
112	10*17130	M		CINDYLBARGER	921	137
113	10*16416	M	9-11-8	CYNTHIA HUDSON	908	219
114	10*17274 10*47051.2218	M		DAVID H WILSON DAVID M WILSON	921	474
116	10,16401	M		DAVID MUNICIPAL AND SUSAN STORTS TRILLER	907	513
117	10*15481	2.4	9-11-8	DEAN PRIGRYAND SUSAN RIGHY	508	197
118	10*47051.723.35	M	9-11-8	DEBRA L CIAFFAGUONE	908	192
119	10*17438 10*16962	M		DENNIS MANUSCH DENNIS PAND BARDARA EZELL FLORY	921	476
121	10*16720	M	9-11-8	DONNA ELAINE BRASKETT	921	152
122	10140051,323.11	M	9-11-8	RIZABEINISRP	908	39
123	10*47051,223.21	M	9-11-8	GARYT WARD AND SHARON D WARD	908	19
124	10*16298	M		GEDFREY A SHIFFER AND STEPHANIE L SCHIEFER GEDRGE M GONTA JR	900	238
126	30*47051.223.5	M	9.11-8	HARDLD S BROWN B AND MARIA A BROWN	907	541
127	10116a15	M	9-11-8	HAROLD W PYLE	921	357
129	10*17356 10*16668	AA AA		HENRI NELL JACKSON KENT BARNES	921	139
129	10*16668 10*47051,223.7	M		IACK I AND MERRITE PYCE IACK I WILSON DI AND JANE A WILSON	908	257
131	10*47051.223.13	M	9-11-8	IAMES A GORBY	906	42
132	10*16839	М	9-11-8	IAMES IS FOUNDS AND LYNN MINOWERY	921	73
133	10*16900 10*17588	M		JAMES KEHLIETH JACKSON AND JULIE JACKSON DAMES M JACKSON	921	325
135	10*1/527	M		IAMES MICHAEL CZELL AND LUCHLE O CZELL	921	111
136	10*17157	М		JAMES IN REEVES JR AND RITA IN REEVES	921	367
137	30*17564	M	9-11-8	IAMES R & TRACEY E NICKOLSON	921	340
138	30*47051.223.31 30*47051.223.39	M		IANICE M GONTA GAVALIK IASON RINE AND HEATHER RINE	906	180 629
140	10*47051,223.1	M		IEAN ANNE GORBY STORCH	8.77	216
141	20*17526	M		DEFFREY LIRCEVES AND IDDY'L REEVES	521	370
142	30136977	M		IEREMY COCHENOUR	921	303
141	10*17565 10*17155	M		IESSE ALLEN JACKSON AND FLITABETH D JACKSON IESSE LEON JR AND TERESA GAIL EZELLE:	921	327
145	10*47051.223.24	M		IO DEEK DAVIS	908	136
146	10*47051.223.25	M		MANNEWELCH	908	141
148	10*17552 10*16689	M		ICHN EEVACOUA AND PATRICIA A HEVACOUA ICHN EFEUNES	921	144 478
149	10*47051.223.34	M		IOHN CLAFFAGLIONE	908	170
110	10*15686	M		SOHN CIMER ROLTZ	908	160
151	10*17775	М		SOHN R REEVES AND MONA IS REEVES	971	373
152	10*1GE8 10*47051.223.32	M		JOHN S AND PATRICIA S DADO JOSEPH GORBY DAKAN	908	175
154	30*17339	M	9-11-8	JOSEPH W FOLINDS	921	76
155	10*47051.223.5	M	5-11-8	JOSHNIA KINE AND REBECCA RIME	907	634
156	10*47051.223.14	M		JUSTIN RINE AND RECKY RINE	907	639
157	10*47051.223.28 10*17561	M	9-11-8	KAREN S GAST EATHERIN LE ROGERLE TYRELL	908	519
359	30*17444	M	9-11-8	EATHRIN LA ROGER LYREIL ELLYFOUNDS CAMPBELL	921	59
160	10*17440	M	9-11-8	KENDRA WALISA	927	484
161	10*47051.723.15	M		LARRY D TAUNT AND NANCYL TAUNT	508	165
163	10°47051.223.30 30°16987	M		LAURIE DRIGGERS MANDERSON LAURIE EZSLE PERKY	90E 931	355
164	10*15976	M	9-11-8	LESTER GAND CONSTANCE & MICKOLSON	921	343
165	36*47051,223.3	M	9-11-8	LINDA DELBERT	908	52
165	10*17485 10*16478	M		MARGIE ANN JACKSON ROREINS GRAHAM MARION LAND EMILY CAMPIELL	921 908	91 245
168	30*16879	M		MARKE AND LESLEY A STORTS	921	501
168	10*16902	м	9-11-8	MARY BARCAW DURE	521	105
170	10*17589	1.6	9-11-6	MARY CIRESTINE MCKENNA MARY CIRZAPETH DRIGGERS	921 908	337
172	10*16991	84	9-11-8	MARYELLEN FOUNDS AND LAUREN FOUNDS	921	208 79
178	10*16058	M	9-11-8	MATTLE RUTH LACKSON PRESCOTT	908	231
174	10*17278 10*16169	M		MIGHTLEFOIL	921	121
175	10*16808 10*16668	M		MICHAEL LORTIZ MICHAEL P PVLE	901	319 255
177	10117554	M	9-11-8	MCHALLTAANON	621	361
175	30*16968	M	9-11-8	MICHAEL WEIGHTS AND JESSICA MISTORIS	921	504
179	10*17443 10*17377	M	9-11-8	MICHELLE MORROW BACK MICTON HOWARD (ZELLE IR AND DEZARCTH A (ZELLE	921	337
181	10*47051.223.33	M	9-11-8	HANCY CIAFFAGLIONE HOUSLEY	508	185
182	10*17556	М	9-11-8	NATHAN P & HARBARA T ERDOSSY	921	108
183	20*17434 20415.200	M		HICLER'S DACKSON	921	350
185	30*15/98 30*17208	M		PATRICK A BANKIN AND ROBIN A RANKIN PATRICK'S GALLAGHER AND JOYCE ANN FOUNDS	921	364 86
156	30*47051,723.29	M	9-11-8	PATSY JO RAJU	508	155
187	30*36742	M		FAIR CWILION	577	490
188	30*17449	M	9-11-8	PHYLIS I MAKE FAIPH E HUNTER IR AND CHARLOTTE HUNTER	921	9
190	30*17411	M		RAIPH I WILSON	121	522
191	30*16448	M	9-11-8	EALPH LAND JUANITA LCRIM	908	584
193	30*166(0) 30*17483	M		RICHARD LEVLE	921 921	252 359
193	10*16662	M		RICHARD THOMAS AND VICKU J MINIS	908	FEB.
195	30*1606	M	9-11-8	RICE A AND LENGRE A STORTS	921	507
196	30*36297	M	5-11-8	ROBERT A LEADIETTER AND MIRCHECEA LEADIETTER	908	235
198	20*42051,221.10 10*16545	M		HOMERT & GORRY ROBERT & B. ELLIN FOUNDS	508 508	250
399	10*16838	M	9-11-8	BORERT G FUNARI	521	82
200	10*16424	M	9-11-8	HOBERT J RIGHT	000	241
201	10*47051.273.23	M	9-11-8	ROBERT STEPHEN DRIGGERS ROHALD'S CRIM	908	224
202	10*47051.273.23	24		NUM NICOLE JACKSON	908	233
704	10*47051.273.22	M	9-11-8	SALLYCOLE	908	74
205	20*17744	M	5-11-8	SAMPRESLIV EZELL	521	116
206	10*17705 10*15750	M	9-11-8 P-11-8	SANDRA JEAN WILSON SANDRA KTHILL	921 NON	57/1
208	10*17412	M	9-11-8	STANE ALLEN AND MENDY HAN ALLEN	921	134
200	10*16871			SHIRLA BRASETT WIE HIY	101	516



No.	Lease Name or No.	Tag	Parcel	Dif-& Gas Reyally Dwner - Continued		Deed Book/Page	
231	30*15492	M	9-11-8	SUSAN NEISON	908	203	
232	30*36435	M	9-11-8	TERENCE J & NANCY J ANDERSON	505	213	
213	30*17482	M	9-11-8	TERFSA EZELLE RALVA AND DA VIDE RALVA	927	437	
234	20*26829	M	9-11-8	TENESA ORITZ RIGGS	921	347	
215	10'16337	M	9-11-8	TERRY LAND THELMA A POFF	927	472	
216	10*17198	M	9-11-8	THOMAS GAND DIANEW BAYLESS	921	341	
217	10*16995	M	9-11-8	THOBAS RANGN	917	75	
218	10*47051,723,37	M	5-11-5	TIME \$1100AS	908	277	
219	10*16#(3:	M	9-11-8	TINA MOORE	021	334	
220	10*16806	M	5-11-8	VIRGINIA I WHITMAN	921	571	
221	10*47051,223,26	M	9-11-8	WENDYLSMARKEL	908	673	
222	10*16747	M	5-11-8	WILLIAM DALEBRASKETT	921	96	
223	10*16804	M	9-11-8	WILLIAM N AND SHERRY D TAYLOR	921	536	
224	10*16516	M	9-11-8	WILSON ANDREW JACKSON	908	251	
2.25	10*15532	N	9-11-10	ROBERT L CLARK	685	239	
226	10*15559	.0	9-11-11	KENNETH MINCCARDLE ETUCREV LY	816	499	
227	10*16344	P	9-17-1	ELBLY ANN NICIFOROS	924	61	
228	10*16149	Op?	9-12-1	THOMAS MICHAEL WALLACT	924	611	
229	10*47051,333.1	P	9-12-1	THOMAS S RIGGS III	904	55	
230	10*47051.333.2	P	5-12-1	WILLIAM MARTIN RIGGS ANGELA RAE MOORE	907	- 221	
231	10*16244	n	3-13-1.1	EMILY ANN HICITOROS	924	617	
232	10*16149	Q	9-12-1.1	THOMAS MICHAEL WALLACE	924	616	
233	10*47051,333.1	Q	9-12-1.1	THOMAS S PIGGS III	904	554	
234	10*47051.333.2	Q	9-12-1.1	WILLIAM MARTIN RIGGS ANGELA RAE MOORE	907	220	
235	10°1E344	R	9-12-31	EMILYANN NICITORDS	934	613	
236	10*15603	R	9-12-31	HAYHURST COMPANY A FEORIDA PARTNERSHIP	727	251	
237	10*16149	R	9-12-31	THOMAS MICHAIL WALLACE	924	630	
2.18	10547051.333.1	R	9-12-31	THOMAS 5 NIGGS III	904	554	
239	30*47/51,333.2	R	9-12-31	WIELIAM MARTIN RIGGS ANGELA RAE MOORE	907	220	
240	10*16932	5	9-12-2.1	HAYMAKEN PROPERTIES, LP	902	447	
241	47051,309.1	. 5	9-12-2.1	USUEE, ONIGLEY	905	8	
242	10*16238	5	9-12-7.1	SUSAN MARIE CHINSON AKA SUSAN MARIE HUBER	924	614	
243	10*16145	4	9.13.21	CHARLES STERMEN ICURSON AVA CHARLES STEVEN MUNSON AND SHIPLEVIOLESS MUNSON	934	511	

200 10*1003 M. 5-11-8 SHENA BRASKETT WEICHEY
210 10*16/88 M. 5-11-8 SHENKYL PYLE BAJR. No. 677
STATE OF VIRCHARD FILE NO. _8654P7HUR3.dwg AUGUST 25 , 20 _17 REVISED 10-9-2017, 1-25-2018 & 1-29-2018 OPERATORS WELL NO. HEAVEN HILL 3-7HU WELL 47 STATE NO. 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 CT CORPORATION SYSTEM ADDRESS 5400 D BIG TYLER ROAD

CHARLESTON, WV 25313

WW-6A	
(5/13)	

perator's Well No	Heaven Hill 3-7HU
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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		2		20.00
Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page

*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 any Stulle	
Its:	Permit Specialist - Appalachia Region	

Page 1 of

N/A	N/A	N/A	466	905	1/8+	TH EXPLORATION LLC	GARY D HINERMAN AND JUDY ANN HINERMAN	9-7-20	П	10*16053
N/A	N/A	N/A	452	905	1/8+	TH EXPLORATION LLC	ELIZABETH ANN BLAZER AND PAUL R BLAZER	9-7-20	TI	10*16412
N/A	N/A	N/A	462	905	1/8+	TH EXPLORATION LLC	DONNA JEAN SNIDER AND DAVID SNIDER	9-7-20	71	10*16051
: /A	N/A	N/A	468	905	1/8+	TH EXPLORATION LLC	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON		· Tn	10*16289
N/A	N/A	N/A	41	905	1/8+	TH EXPLORATION LLC	WILLIAM W CRAIG AND GLENDA L CRAIG	9-7-23		10*47051.256.13
N/A	N/A	N/A	33	905	1/8+	TH EXPLORATION LLC	WANDA MASON SUNSHINE	9-7-23		10*47051.256.9
N/A	N/A	N/A	325	925	1/8+	TH EXPLORATION LLC	TOMMY BONAR AND TANYA S BONAR	9-7-23	ш	10*16021
N/A	N/A	N/A	39	905	1/8+	TH EXPLORATION LLC	STEVEN A BOHRER	9-7-23	•-	10*47051.256.12
N/A	N/A	N/A	556	913	1/8+	TH EXPLORATION LLC	ROBERT L BONAR	9-7-23		10*47051.256.23
N/A	N/A	N/A	31	905	1/8+	TH EXPLORATION LLC	PAMELA ANN MASON	9-7-23		10*47051.256.8
N/A	N/A	N/A	207	907	1/8+	TH EXPLORATION LLC	MICHAEL DAVID PYLES AND CYNTHIA A PYLES	9-7-23	19 E	10*47051.256.19
N/A	N/A	N/A	457	904	1/8+	TH EXPLORATION LLC	MAXINE G JOHNSON	9-7-23		10*47051.256.17
N/A	N/A	N/A	29	905	1/8+	TH EXPLORATION LLC	MARILYN SUE BUMER	9-7-23		10*47051.256.7
N/A	N/A	N/A	522	913	1/8+	TH EXPLORATION LLC	JOHN WILLIAM BONAR AND SHIRLEY BONAR	9-7-23	18 E	10*47051.256.18
N/A	N/A	N/A	37	905	1/8+	TH EXPLORATION LLC	JOHN L MASON	9-7-23		10*47051.256.11
N/A	N/A	N/A	209	907	1/8+	TH EXPLORATION LLC	JEFFREY THOMAS PYLES AND TERESA A PYLES	9-7-23		10*47051.256.20
N/A	N/A	N/A	626	904	1/8+	TH EXPLORATION LLC	JACK L MASON AND JEAN M MASON	9-7-23		10*47051.256.21
N/A	N/A	N/A	43	905	1/8+	TH EXPLORATION LLC	HUGH R BUZZARD			10*47051.256.14
N/A	N/A	N/A	35	905	1/8+	TH EXPLORATION LLC	GRACE LAURA BONAR	9-7-23		10*47051.256.10
N/A	N/A	N/A	329	925	1/8+	TH EXPLORATION LLC	EARL W HARRIS	9-7-23	ш	10*16115
N/A	N/A	N/A	241	919	1/8+	TH EXPLORATION LLC	DILLON PITSENBARGER	9-7-23	т	10*17415
N/A	N/A	N/A	235	919	1/8+	TH EXPLORATION LLC	DEZRAY METCALF	9-7-23	т	10*17507
N/A	N/A	N/A	239	919	1/8+	TH EXPLORATION LLC	CHASKIA F HARRIS AND JAMES M HARRIS	9-7-23		10*17506
N/A	N/A	N/A	455	904	1/8+	TH EXPLORATION LLC	CHARLOTTE J BONAR YOHO	9-7-23		10*47051.256.15
N/A	N/A	N/A	45	905	1/8+	TH EXPLORATION LLC	CHARLOTTE B HUMMELL	9-7-23		10*47051.256.16
N/A	N/A	N/A	628	904	1/8+	TH EXPLORATION LLC	CATHERINE BONAR PETTIT BILLIE	9-7-23		10*47051.256.24
N/A	N/A	N/A	327	925	1/8+	TH EXPLORATION LLC	CAROL RIGGLE PARSLEY AND JAMES DENNIS PARSLEY		m	10*16247
N/A	N/A	N/A	478	921	1/8+	TH EXPLORATION LLC	BRUCE D SCHURR			10*15746
N/A	N/A	N/A	145	881	1/8+	TH EXPLORATION LLC	BRENDA J WHETZEL	9-7-23		10*47051.256.1
N/A	N/A	N/A	581	913	1/8+	TH EXPLORATION LLC	BEVERLY J HOPSON	9-7-23		10*47051.256.22
Chevron to Tug Hill: 36/148	N/A	N/A	226	780	1/8+	CHEVRON USA INC	RICKY L WHITLATCH ET AL	9-7-21	0	10*15557
Chevron to Tug Hill: 36/148	N/A	N/A	351	850	1/8+	CHEVRON USA INC	KEVIN E MCGILTON ET UX	9-7-18	n	10*15667
N/A	N/A	N/A	456	905	1/8+	TH EXPLORATION LLC	TINA LEDGE MONTI AND THOMAS MONTI	9-7-18	C	10*15721
N/A	N/A	N/A	464	905	1/8+	TH EXPLORATION LLC	SHARON HINERMAN MAY & DANIEL G MAY	9-7-18	n	10*16020
N/A	N/A	N/A	460	905	1/8+	TH EXPLORATION LLC	ROSEMARY PARKINS AND STEPHEN PARKINS		C	10*16028
N/A	N/A	N/A	454	905	1/8+	TH EXPLORATION LLC	RONALD H EDGE JR	9-7-18	C	10*16413
N/A	N/A	N/A	363	900	1/8+	TH EXPLORATION LLC	ROBERT A EDGE AND SHERRIE N EDGE	9-7-18	C	10*15698
N/A	N/A	N/A	458	905	1/8+	TH EXPLORATION LLC	KAREN L GREATHOUSE AND FLOYD GREATHOUSE		C	10*15720
N/A	N/A	N/A	466	905	1/8+	TH EXPLORATION LLC	GARY D HINERMAN AND JUDY ANN HINERMAN	9-7-18	C	10*16053
N/A	N/A	N/A	452	905	1/8+	TH EXPLORATION LLC	ELIZABETH ANN BLAZER AND PAUL R BLAZER	9-7-18	C	V)10*16412
N/A	N/A	N/A	462	905	1/8+	TH EXPLORATION LLC	DONNA JEAN SNIDER AND DAVID SNIDER	9-7-18	C	10*16051
	N/A	N/A	468	905	1/8+	TH EXPLORATION LLC	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	9-7-18	C	10*16289
Chevron to Tug Hill: 36/148	N/A	N/A	226	780	1/8+	CHEVRON USA INC	RICKY L WHITLATCH ET AL	9-7-31	В	O10*15557
	N/A	N/A	226	780	1/8+	CHEVRON USA INC	RICKY L WHITLATCH ET AL	9-7-30	>	9 10*15557
2/2 Assignment	Assignment	Assignment		Deed Book/Page	Royalty	Grantee, Lessee, etc.	Grantor, Lessor, etc.	g Parcel	No. Tag	G Lease Name or No.
		(7							ייטקקק	
Wo. Heaven Hill 3 - 7HU	Operator's Well No.	Ope						Jomant	7.15.7	WW-601 Supplement

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	2.5	Σ	288	1/84	ULI NOLLY BOUND HE	MICHAEL A MARKETZEI	0110	10*47061 100 1
	N/A	41	905	1/8+	TH EXPLORATION LLC	WILLIAM W CRAIG AND GLENDA L CRAIG	9-11-7	10*47051 256 13
N/A	N/A	33	905	1/8+	TH EXPLORATION LLC	WANDA MASON SUNSHINE	1 9-11-7	10*47051.256.9
N/A	N/A	325	925	1/8+	TH EXPLORATION LLC	TOMMY BONAR AND TANYA S BONAR	1 9-11-7	10*16021
	N/A	39	905	1/8+	TH EXPLORATION LLC	STEVEN A BOHRER	1 9-11-7	10*47051.256.12
	N/A	556	913	1/8+	TH EXPLORATION LLC	ROBERT L BONAR	1 9-11-7	10*47051.256.23
	N/A	31	905	1/8+	TH EXPLORATION LLC	PAMELA ANN MASON	1 9-11-7	10*47051.256.8
	N/A	207	907	1/8+	TH EXPLORATION LLC	MICHAEL DAVID PYLES AND CYNTHIA A PYLES	1 9-11-7	10*47051.256.19
N/A	N/A	457	904	1/8+	TH EXPLORATION LLC	MAXINE G JOHNSON	1 9-11-7	10*47051.256.17
	N/A	29	905	1/8+	TH EXPLORATION LLC	MARILYN SUE BUMER	1 9-11-7	10*47051.256.7
	N/A	522	913	1/8+	TH EXPLORATION LLC	JOHN WILLIAM BONAR AND SHIRLEY BONAR	1 9-11-7	10*47051.256.18
	N/A	37	206	1/8+	TH EXPLORATION LLC	JOHN L MASON	1 9-11-7	10*47051.256.11
	N/A	209	907	1/8+	TH EXPLORATION LLC	JEFFREY THOMAS PYLES AND TERESA A PYLES	1 9-11-7	10*47051.256.20
N/A	N/A	626	904	1/8+	TH EXPLORATION LLC	JACK L MASON AND JEAN M MASON	1 9-11-7	10*47051.256.21
	N/A	43	905	1/8+	TH EXPLORATION LLC	HUGH R BUZZARD	1 9-11-7	10*47051.256.14
	N/A	35	905	1/8+	TH EXPLORATION LLC	GRACE LAURA BONAR	1 9-11-7	10*47051.256.10
	N/A	329	925	1/8+	TH EXPLORATION LLC	EARL W HARRIS	1 9-11-7	10*16115
	N/A	241	919	1/8+	TH EXPLORATION LLC	DILLON PITSENBARGER	9-11-7	10*17415
	N/A	235	919	1/8+	TH EXPLORATION LLC	DEZRAY METCALF	9-11-7	10*17507
	N/A	239	919	1/8+	TH EXPLORATION LLC	CHASKIA F HARRIS AND JAMES M HARRIS	1 9-11-7	10*17506
	N/A	455	904	1/8+	TH EXPLORATION LLC	CHARLOTTE J BONAR YOHO	9-11-7	10*47051.256.15
	N/A	÷ ÷	905	1/8+	TH EXPLORATION CLC	CHARLOTTE B HOMMELL	1 9-11-7	10+4/051.256.16
	N/A	828	904	1/8+	TH EXPLORATION LLC	CATHERINE BONAR PETITI BILLIE	911-/	10+4/051.256.24
	N/A	32/	925	1/8+	TH EXPLORATION LLC	CAROL RIGGLE PARSLEY AND JAMES DENNIS PARSLEY	9-11-7	10*16247
	N/A	4/8	176	1/8+	IH EXPLORATION LLC	BRUCE D SCHURR	9-11-7	10*15/46
	N/A	i 4	881	1/8+	THEXPLORATION LLC	BRENCA J WHEIZEL	9-11-/	10*4/051.256.1
	N/A	101	913	1/0-	TH EXPLORATION LLC	BEVERLY J HOPSON	9-11-7	10*47051.256.22
	N/A	, q	001	1/0+	CHEVRON USA INC	NACON HORE	H 9-11-0.1	10*13051 355 33
N/A Chevron to Tug Hill: 36/148	N/A	60,1	961	1/0+	CHEVRON USA INC	NACAN HIBB		10*15671
	2/2	5	001	1/01	CHEVRON USA INC	GANT MI BOWAN AND CLIEN E BOWAN		10*15C71
	N/A	577	861 861	1/8+	CHEVRON LISA INC	GARY M BONAR AND FILEN I BONAR		10*15670
	N/A	586	861	1/8+	CHEVRON USA INC	EMMA ANDERSON		10*15669
	N/A	530	882	1/8+	TH EXPLORATION LLC	JERRY W ZIEN AND KATHLEEN E ZIEN		10*47051.256.5
	N/A	151	881	1/8+	TH EXPLORATION LLC	GLEN A BONAR		10*47051.256.4
N/A N/A	N/A	299	879	1/8+	TH EXPLORATION LLC	CAROL JEAN ANDERSON	H 9-11-6.1	10*47051.256.2
N/A N/A	N/A	148	881	1/8+	TH EXPLORATION LLC	BRENDA S DYKHOUSE	Н 9-11-6.1	10*47051.256.3
	N/A	145	881	1/8+	TH EXPLORATION LLC	BRENDA J WHETZEL	Н 9-11-6.1	10*47051.256.1
N/A Chevron to Tug Hill: 36/148	N/A	351	850	1/8+	CHEVRON USA INC	KEVIN E MCGILTON ET UX	G 9-7-19	10*15667
N/A Chevron to Tug Hill: 36/148	N/A	351	850	1/8+	CHEVRON USA INC	KEVIN E MCGILTON ET UX	F 9-7-20	10*15667
N/A N/A	N/A	456	905	1/8+	TH EXPLORATION LLC	TINA LEDGE MONTI AND THOMAS MONTI	F 9-7-20	5 10*15721
N/A	N/A	464	905	1/8+	TH EXPLORATION LLC	SHARON HINERMAN MAY & DANIEL G MAY	F 9-7-20	10*16020
N/A (N/A	N/A	460	905	1/8+	TH EXPLORATION LLC	ROSEMARY PARKINS AND STEPHEN PARKINS	F 9-7-20	O 10*16028
N/A N/A	N/A	454	905	1/8+	TH EXPLORATION LLC	RONALD H EDGE JR	F 9-7-20	10*16413
N/A N/A	N/A	363	900	1/8+	TH EXPLORATION LLC	ROBERT A EDGE AND SHERRIE N EDGE	F 9-7-20	10*15698
N/A N/A	N/A	458	905	1/8+	TH EXPLORATION LLC	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	F 9-7-20	G 10*15720
Assignment Assignment	Assignment Assi		Deed Book/Page	Royalty	Grantee, Lessee, etc.	Grantor, Lessor, etc.	Tag Parcel	Lease Name or No.
201								
Operator a well the meaver mile a - / mo	Operator						piement	AV VV-oAT Supplement
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N/A	N/A	2/2	ו נג	921	1/8+	TH EXPLORATION II.C	IAMES B EDITING AND LANK WOMERA	0.11-8	·	10*16930
N/A	N/A	N/N	43	SQ2	1/8+	TH EXPLORATION II C	IAMES A GORRY	0_11_8	~ S :	10*47051 223 13
N/A	N/A	N/A	4	908	1/8+	TH EXPLORATION LLC	JACK R WILSON JR AND JANE A WILSON		S	10*47051.223.7
N/A	N/A	N/A	257	908	1/8+	TH EXPLORATION LLC	JACK I AND MERRILEE PYLE	9-11-8	Z	10*16668
N/A	N/A	N/A	139	921	1/8+	TH EXPLORATION LLC	HENRI NELL JACKSON KENT BARNES	9-11-8	3	10*17156
N/A	N/A	N/A	357	921	1/8+	TH EXPLORATION LLC	HAROLD W PYLE	9-11-8	3	10*16815
N/A	N/A	N/A	641	907	1/8+	TH EXPLORATION LLC	HAROLD S BROWN II AND MARIA A BROWN	9-11-8	Z	10*47051.223.5
N/A	N/A	N/A	89	921	1/8+	TH EXPLORATION, LLC	GEORGE M GONTA JR	9-11-8	3	10*17677
N/A	N/A	N/A	238	908	1/8+	TH EXPLORATION LLC	GEOFFREY A SHIEFER AND STEPHANIE L SCHIEFER	9-11-8	Z	10*16298
N/A	N/A	N/A	19	908	1/8+	TH EXPLORATION LLC	GARY T WARD AND SHARON D WARD	9-11-8	_ 	10*47051.223.21
N/A	N/A	N/A	39	908	1/8+	TH EXPLORATION LLC	ELIZABETH ESTEP	9-11-8	_ 	10*47051.223.11
N/A	N/A	N/A	152	921	1/8+	TH EXPLORATION LLC	DONNA ELAINE BRASKETT	9-11-8	3	10*16720
N/A	N/A	N/A	70	921	1/8+	TH EXPLORATION LLC	DENNIS P AND BARBARA EZELL FLORY	9-11-8	3	10*16962
N/A	N/A	N/A	476	921	1/8+	TH EXPLORATION LLC	DENNIS M WILSON	9-11-8	Z	10*17438
N/A	N/A	N/A	192	908	1/8+	TH EXPLORATION LLC	DEBRA L CIAFFAGLIONE	9-11-8	3.	10*47051.223.35
N/A	N/A	N/A	197	908	1/8+	TH EXPLORATION LLC	DEAN P RIGBY AND SUSAN RIGBY	9-11-8	3	10*15481
N/A	N/A	N/A	513	921	1/8+	TH EXPLORATION LLC	DAVID TULLER AND SUSAN STORTS TULLER	9-11-8	3	10*16807
N/A	N/A	N/A	649	907	1/8+	TH EXPLORATION LLC	DAVID M WILSON	9-11-8	3	10*47051.223.8
N/A	N/A	N/A	474	921	1/8+	TH EXPLORATION LLC	DAVID H WILSON	9-11-8	3	10*17274
N/A	N/A	N/A	219	908	1/8+	TH EXPLORATION, LCC	CYNTHIA HUDSON	9-11-8	3	10*16416
N/A	N/A	N/A	137	921	1/8+	TH EXPLORATION LLC	CINDY L BARGER	9-11-8	Z	10*17130
N/A	N/A	N/A	495	921	1/8+	TH EXPLORATION LLC	CHRISTOPHER AND TAMMY RICHARDSON		3	10*16802
N/A	N/A	N/A	475	927	1/8+	TH EXPLORATION LLC	CHERYLE M TRACEY	9-11-8	S	10*16686
N/A	N/A	N/A	266	908	1/8+	TH EXPLORATION LLC	CHARLES F AND GAIL ANN PYLE		3	10*16667
N/A	N/A	N/A	274	908	1/8+	TH EXPLORATION LLC	CHARLES A RINE	9-11-8	Z	10*15463
N/A	N/A	N/A	57	908	1/8+	TH EXPLORATION LLC	BRITTNEY MENEAR	9-11-8	∝ ≤	10*47051.223.18
N/A	N/A	N/A	376	921	1/8+	TH EXPLORATION LLC	BRITTANY RICHARDSON	9-11-8	3	10*16989
N/A	N/A	N/A	498	921	1/8+	TH EXPLORATION LLC	BEVERLY ANN STORTS	9-11-8	3	10*16880
N/A	N/A	N/A	64	908	1/8+	TH EXPLORATION LLC	BETTY LOU STERN AND WILLIAM KEITH STERN	9-11-8	3 <i>.</i> ≤	10*47051.223.16
N/A	N/A	N/A	526	921	1/8+	TH EXPLORATION LLC	BERTHA EZELL WYATT	9-11-8	3	10*17276
N/A	N/A	N/A	24	908	1/8+	TH EXPLORATION LLC	BARBARA A BUZZARD	9-11-8	≥	10*47051.223.20
N/A	N/A	N/A	251	908	1/8+	TH EXPLORATION LLC	ANNA MARIE JACKSON	9-11-8	3	10*16515
N/A	N/A	N/A	346	921	1/8+	TH EXPLORATION, LLC	ANDREW M. ORTIZ	9-11-8	z	10*17416
N/A	N/A	N/A	52	908	1/8+	TH EXPLORATION LLC	ALICE GORBY MARTIN	9-11-8	Z	10*47051.223.12
N/A	N/A	N/A	248	908	1/8+	TH EXPLORATION LLC	ALEX RUSSELL AND JOYCE A CAMPBELL	9-11-8	3	10*16514
N/A	N/A	N/A	614	924	1/8+	TH EXPLORATION LLC	SUSAN MARIE JOHNSON AKA SUSAN MARIE HUBER	9-12-2	_	10*16238
N/A	N/A	N/A	217	907	1/8+	TH EXPLORATION LLC	LEWIS M QUIGLEY AND MAXINE V QUIGLEY	9-12-2	_	10*47051.309.2
N/A	N/A	N/A	00	905	1/8+	TH EXPLORATION LLC	LESLIE E QUIGLEY	9-12-2	_	10*47051.309.1
N/A	N/A	N/A	12	905	1/8+	TH EXPLORATION LLC	GERALD W QUIGLEY AND VICKI L QUIGLEY	9-12-2	_	10*47051.309.3
Chevron to Tug Hill: 36/148	Chesapeake to Chevron: 30/461	N/A	150	798	1/8+	. CHESAPEAKE APPALACHIA LLC	CHK-MAC LLC	9-12-2	_	\ 010*15606
N/A	N/A	N/A	12	905	1/8+	TH EXPLORATION LLC	GERALD W QUIGLEY AND VICKI L QUIGLEY	9-12-27	_	10*47051.309.3
N/A	× 03	N/A	217	907	1/8+	TH EXPLORATION LLC	LEWIS M QUIGLEY AND MAXINE V QUIGLEY	9-12-27	~	10*47051.309.2
N/A	N/A	N/A	∞	905	1/8+	TH EXPLORATION LLC	LESLIE E QUIGLEY	9-12-27	~	10*47051.309.1
N/A	N N	N/A	614	924	1/8+	TH EXPLORATION LLC	SUSAN MARIE JOHNSON AKA SUSAN MARIE HUBER	9-12-27	~	9 10*16238
Assignment	Assignment /2	Assignment		Deed Book/Page	Royalty	Grantee, Lessee, etc.	Grantor, Lessor, etc.	g Parcel	lo. Tag	Lease Name or No.
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N/A	N/A	N/A	255	806	1/8+	TH EXPLORATION LLC	MICHAEL P PYLE	M 9-11-8	10+16666
N/A	N/A	N/A	349	921	1/8+	TH EXPLORATION LLC	MICHAEL LORTIZ	M 9-11-8	10*16808
N/A	N/A	N/A	121	921	1/8+	TH EXPLORATION LLC	MICHAEL L EZELLE	M 9-11-8	10*17278
N/A	N/A	N/A	231	908	1/8+	TH EXPLORATION LLC	MATTIE RUTH JACKSON PRESCOTT		10*16058
N/A	N/A	N/A	79	921	1/8+	TH EXPLORATION LLC	MARYELLEN FOUNDS AND LAUREN FOUNDS	M 9-11-8	10*16991
N/A	N/A	N/A	208	908	1/8+	TH EXPLORATION, LCC	MARY ELIZABETH DRIGGERS	M 9-11-8	10*16414
N/A	N/A	N/A	332	921	1/8+	TH EXPLORATION, LLC	MARY CHRISTINE MCKENNA	M 9-11-8	10*17589
N/A	N/A	N/A	105	921	1/8+	TH EXPLORATION LLC	MARY BARCAW DUKE	M 9-11-8	10*16902
N/A	N/A	N/A	501	921	1/8+	TH EXPLORATION LLC	MARK E AND LESLEY A STORTS	M 9-11-8	10*16879
N/A	N/A	N/A	245	908	1/8+	TH EXPLORATION LLC	MARION L AND EMILY CAMPBELL	M 9-11-8	10*16478
N/A	N/A	N/A	91	921	1/8+	TH EXPLORATION LLC	MARGIE ANN JACKSON ROBBINS GRAHAM	M 9-11-8	10*17485
N/A	N/A	N/A	32	908	1/8+	TH EXPLORATION LLC	LINDA DELBERT	M 9-11-8	10*47051.223.9
N/A	N/A	N/A	343	921	1/8+	TH EXPLORATION LLC	LESTER G AND CONSTANCE B NICKOLSON	M 9-11-8	10*16976
N/A	N/A	N/A	355	921	1/8+	TH EXPLORATION LLC	LAURIE EZELL PERRY	M 9-11-8	10*16987
N/A	N/A	N/A	165	908	1/8+	TH EXPLORATION LLC	LAURIE DRIGGERS MANDERSON	M 9-11-8	10*47051.223.30
N/A	N/A	N/A	14	908	1/8+	TH EXPLORATION LLC	LARRY D TAUNT AND NANCY L TAUNT	M 9-11-8	10*47051.223.15
N/A	N/A	N/A	484	927	1/8+	TH EXPLORATION LLC	KENDRA WALISA	M 9-11-8	10*17440
N/A	N/A	N/A	99	921	1/8+	TH EXPLORATION LLC	KELLY FOUNDS CAMPBELL	M 9-11-8	10*17444
N/A	N/A	N/A	519	921	1/8+	TH EXPLORATION, LLC	KATHRYN L & ROGER L TYRELL		10*17561
N/A	N/A	N/A	150	908	1/8+	TH EXPLORATION LLC	KAREN S GAST	M 9-11-8	10*47051.223.28
N/A	N/A	N/A	639	907	1/8+	TH EXPLORATION LLC	JUSTIN RINE AND BECKY RINE		10*47051.223.14
N/A	N/A	N/A	634	907	1/8+	TH EXPLORATION LLC	JOSHUA RINE AND REBECCA RINE	M 9-11-8	10*47051.223.6
N/A	N/A	N/A	76	921	1/8+	TH EXPLORATION LLC	JOSEPH W FOUNDS		10*17339
N/A	N/A	N/A	175	908	1/8+	TH EXPLORATION LLC	JOSEPH GORBY DAKAN	M 9-11-8	10*47051.223.32
N/A	N/A	N/A	269	908	1/8+	TH EXPLORATION LLC	JOHN S AND PATRICIA S DADO	M 9-11-8	10*16669
N/A	N/A	N/A	373	921	1/8+	TH EXPLORATION LLC	JOHN R REEVES AND MONA G REEVES	M 9-11-8	10*17275
N/A	N/A	N/A	160	908	1/8+	TH EXPLORATION LLC	JOHN OMER BOLTZ	M 9-11-8	10*15686
N/A	N/A	N/A	170	908	1/8+	TH EXPLORATION LLC	JOHN CIAFFAGLIONE	M 9-11-8	10*47051.223.34
N/A	N/A	N/A	478	927	1/8+	TH EXPLORATION LLC	JOHN C FOUNDS	M 9-11-8	10*16689
N/A	N/A	N/A	144	921	1/8+	TH EXPLORATION LLC	JOHN BEVACQUA AND PATRICIA A BEVACQUA	M 9-11-8	10*17552
N/A	N/A	N/A	141	908	1/8+	TH EXPLORATION LLC	JOANNE WELCH	M 9-11-8	10*47051.223.25
N/A	N/A	N/A	136	908	1/8+	TH EXPLORATION LLC	JO DEE K DAVIS	M 9-11-8	10*47051.223.24
N/A	N/A	N/A	118	921	1/8+	TH EXPLORATION LLC	JESSE LEON JR AND TERESA GAIL EZELLE	M 9-11-8	10*17155
N/A	N/A	N/A	327	921	1/8+	TH EXPLORATION LLC	JESSE ALLEN JACKSON AND ELIZABETH D JACKSON	M 9-11-8	10*17565
N/A	N/A	N/A	102	921	1/8+	TH EXPLORATION LLC	JEREMY COCHENOUR	M 9-11-8	10*16977
N/A	N/A	N/A	370	921	1/8+	TH EXPLORATION LLC	JEFFREY L REEVES AND JODY L REEVES	M 9-11-8	10*17526
N/A	N/A	N/A	216	877	1/8+	TH EXPLORATION LLC	JEAN ANNE GORBY STORCH	M 9-11-8	V) 10*47051.223.1
N/A	N/A	N/A	629	907	1/8+	TH EXPLORATION LLC	JASON RINE AND HEATHER RINE	M 9-11-8	10*47051.223.19
N/A	N/A	N/A	180	908	1/8+	TH EXPLORATION LLC	JANICE M GONTA GAVALIK	M 9-11-8	10*47051.223.31
N/A	N/A	N/A	340	921	1/8+	TH EXPLORATION, LLC	JAMES R & TRACEY E NICKOLSON	M 9-11-8	O 10*17564
	N/A	N/A	367	921	1/8+	TH EXPLORATION LLC	JAMES N REEVES JR AND RITA M REEVES	M 9-11-8	10*17157
	N/A	N/A	111	921	1/8+	TH EXPLORATION LLC	JAMES MICHAEL EZELL AND LUCILLE D EZELL	M 9-11-8	9 10*17527
	N/A	N/A	325	921	1/8+	TH EXPLORATION LLC	JAMES M JACKSON	M 9-11-8	Q 10*17588
)2 _{N/A}	N/A	N/A	93	921	1/8+	TH EXPLORATION LLC	JAMES KENNETH JACKSON AND JULIE JACKSON	M 9-11-8	7 10*16800
2/2 Assignment	Assignment	Assignment		Deed Book/Page	Royalty	Grantee, Lessee, etc.	Grantor, Lessor, etc.	Tag Parcel	Lease Name or No.
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10. Heaven Hill 3 - /HU	Operator's Well 🐿.	Cp						plement	WW-6A1 Supplement
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	N/A	N/A	N/A	610	924	1/8+	TH EXPLORATION LLC	THOMAS MICHAEL WALLACE	9-12-1	10*16149 F	
	N/A	× ×	Š	617	924	1/8+	TH EXPLORATION LLC	EMILY ANN NICIFOROS	9-12-1	10*16244 P	
10/148	Chevron to fug Hill: 36/146	N/A	ŊĄ	459	816	1/8+	CHEVRON USA INC	KENNETH M MCCARDLE ET UX REV LT	9-11-11	10*15559 C	
6/440	Chargon to Jug mil: 36/146	Chesapeake to Chevron: 30/461	N/A	239	986	1/8+	CHESAPEAKE APPALACHIA LLC	ROBERT L CLARK	9-11-10	10*15582 N	
200	N/A	A/VA	N/A	259	908	1/8+	TH EXPLORATION LLC	WILSON ANDREW JACKSON	9-11-8	10°16516 N	
			N/A	510	921	+B/I	TH EXPLORATION LLC	WILLIAM N AND SHERRY D TAYLOR	9-11-8	10*16804 N	
	N/A	Z.	N/A	96	921	1/8+	TH EXPLORATION LLC	WILLIAM DALE BRASKETT	9-11-8	10*16747 N	
	N/A	NA.	N/A	8	806	1/8+	TH EXPLORATION LLC	WENDYLSMARKEL	9-11-8	10°47'051.223.26 N	
	N/A	N/A	N/A	528	921	1/8+	TH EXPLORATION LLC	VIRGINIA I WHITMAN	9-11-8	10*16806 N	
	N/A	NA	N/A	354	921	1/8+	TH EXPLORATION LLC	TINA MCORE	9-11-8	10*16869 N	
	N/A	N/A	N/A	277	908	1/8+	TH EXPLORATION LLC	TIMI J HOBBS	9-11-8	10*47051.223.27 N	
	N/A	N/A	N/A	75	917	1/8+	TH EXPLORATION LLC	THOMAS RANKIN	9-11-8	10*16956 N	
	N/A	N/A	N/A	141	921	1/8+	TH EXPLORATION LLC	THOMAS G AND DIANE W BAYLESS	9-11-8	10*17198 N	
	N/A	N/A	N/A	472	927	1/8+	TH EXPLORATION LLC	TERRY L AND THELMA A POFF	9-11-8	10*16837 N	
	N/A	N/A	××	147	921	1/8+	TH EXPLORATION LLC	TERESA ORTIZ BIGGS	9-11-8	10*16819 N	
	N/A	N/A	N/A	487	927	1/8+	TH EXPLORATION LLC	TERESA EZELLE RALYA AND DAVID L RALYA	9-11-8	10*17482 A	
	N/A	N/A	N/A	213	908	1	TH EXPLORATION, LCC	TERENCE J & NANCY J ANDERSON	9-11-8	10°16415	
	NA.	N/A	X	203	908	1/8+	TH EXPLORATION LLC	SUSAN NEISON	9-11-8	10+15482	
	NA:	N/A	N S	481	927	1	TH EXPLORATION LIC	SHEERY DATE BAIR	0.11-9	10\$16690 N	
	N/A	N/A	X	516	921	1/8+	TH EXPLORATION LLC	SHEILA BRASKETT WEICHEY	P11-8	10416931	
	×.	N/A	Z	15	921	1/8+	TH EXPLORATION LLC	SHANE ALLEN AND MENDY JEAN ALLEN	9-11-8	10°17442	
	N/A	N/A	N S	27	9	1	TH EXPLORATION I C	SANDRA FIRM	9-11-0	COZ/1:01	
	N/S	V/S	2 3	5 4	9 2	1/01	THE ACTION TO THE CONTRACT OF	SANDRA IGAN IZII CON	9-11-8	10*17744	
	8 /S	× × ×	2 2	i 3	908	1/8+	TH EXPLORATION CCC	SALLY COLE	_	10*47051.223.22 M	
	2 2	N/A	3	į į	808	1/8+	IH EXPLORATION LLC	RUBY RIDDLE JACKSON	-		
			2) p	2 2	1/8+	III EXPLORAINON LLC	KONALD'S CRIM	_	.223.29	
	2 3		2 2	2 \$	8 8	1/8+	THE EXPLORATION LIC	ROBERT STEPHEN DRIGGERS	_		
	N/A	× ×	2 2 3	241	8 8	; ¥	TH EXPLORATION, LLC	ROBERT J RIGBY	_		
	N/A	N/A	N/A	82	921	1/8+	TH EXPLORATION LLC	ROBERT G FUNARI	9-11-8	10*16838 A	
	N/A	N/A	×,	260	802	₩.	TH EXPLORATION LLC	ROBERT G & ELLEN FOUNDS	9-11-8	10°16545 N	
	N/A	N/A	N/A	47	808	1/8+	TH EXPLORATION LLC	ROBERT E GORBY	8-11-6	10*47051.223.10 M	
	N/A	N/A	N/A	295	806	1/8+	TH EXPLORATION LLC	ROBERT A LEADBETTER AND M REBECCA LEADBETTER	9-11-8	10°16297 M	
	N/A	N/A	N/A	507	921	1/8+	TH EXPLORATION ILC	RICK A AND LENORE A STORTS	9-11-8	10*16896 M	
	N/A	N/A	N/A	863	908	1/8+	TH EXPLORATION LLC	RICHARD THOMAS AND VICKI J MIMS	9-11-8	10°16662 M	
	N/A	N/A	N/A	359	921	1/8+	TH EXPLORATION LLC	RICHARD I PYLE			
	N/A	N/A	N/A	352	921	1/8+	TH EXPLORATION LLC	RICARDO ORTIZ	_		
	N/A	N/A	N/A	584	908	1/8+	TH EXPLORATION LLC	RALPH LAND JUANITA L CRIM			
	N/A	N/A	N/A	522	921	1/8+	TH EXPLORATION LLC	RALPH J WILSON			
	N/A	N/A	NA.	9	908	1/8+	TH EXPLORATION LLC	RALPH E HUNTER IR AND CHARLOTTE HUNTER		223.17	
	N/A	N/A	N S	150	126 1	1/8	TH EXPLORATION LLC	PHYLLIS I BLAKE	9-11-8	10°17442 M	
	NA.	N/A	N .	2 1	9 7	•	TH KYDITARDIQY HT	SVIII CIMII SON		22.632	
	S &	Z (2)	2/4	ž 8	972	100	THE EYEL CRAFTON ITC	PATRICK S GALLAGRER AND JOYCE ANN HOUNDS			
	N/A	V/A	, N/A	200	921	#	TH EXPLORATION LLC	PATRICK A RANKIN AND ROBIN A RANKIN			
	N/A	N/A	N/A	330	921	1/8+	TH EXPLORATION LLC	NELDA S JACKSON			
	N/A	N/A	N/A	108	921	1/8+	TH EXPLORATION, LLC	NATHAN P & BARBARA T ERDOSSY	4 9-11-8	10*17566 M	
	N/A	N/A	N/A	281	908	1/8+	TH EXPLORATION LLC	NANCY CIAFFAGLIONE HOUSLEY	9-11-8	10*47051.223.99 M	
	NA	N/A	N/A	123	921	1/8+	TH EXPLORATION LLC	MILTON HOWARD EZELLE JR AND ELIZABETH A EZELLE			
	N/A	N/A	N/A	337	921	1/8+	TH EXPLORATION LLC	MICHELLE MORROW-BACK		-	
	N/A	N/A	N/A	504	921	1/8+	TH EXPLORATION LLC	MICHAEL W STORTS AND JESSICA M STORTS			
	N/A	N/A	N/A	361	921	1/8 +	TH EXPLORATION LLC	MICHAEL TRANKIN			
C	N/A	N/A	×,	255	806	1/9 +	TH EXPLORATION LLC	MICHAEL P PYLE			
)3	N/A	N/A	Z :	349	921	1/8+	TH EXPLORATION LC	MICHAEL DRIIZ		10*16808 M	
3/(N/A	N/A	S	121	921	1/8+	TH EXPLORATION I.C.	MICHAEL FEEL F	4 9.11-9	10417378	
)2	NA.	N/A	2 3 2 3	231	908	1/8+	TH EXPLORATION LLC	MATTIE BLITH IACKSON PRESCRIPT		10*1605E M	
	A/N	N/A Kasaganani	W/N Waliushieu	or.	ueed book/rage	1/g	Grantee, tessee, etc.	Grantor, Lossor, etc.	•	ne or No.	
- 20	Assignmen				David Bank						
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THE COUNTY OF THE PROPERTY OF	SUSAN MARIE JOHNSON AKA SUSAN MARIE HUBER	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 924	TH EXPLORATION LLC 1/8+ 924 614	TH EXPLORATION LLC 1/8+ 924 614
	TH EXPLORATION LLC		1/8+ 905	1/8+ 905 8	1/8+ 905 8
	CHEVRON USA INC		1/8+ 902	1/8+ 902 447	1/8+ 902 447
WILLIAM MARTIN RIGGS ANGELA RAE MOORE	RAE MOORE TH EXPLORATION LLC	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 907	TH EXPLORATION LLC 1/8+ 907 220	TH EXPLORATION LLC 1/8+ 907 220
	TH EXPLORATION LLC		1/8+ 904	1/8+ 904 556	1/8+ 904 556
THOMAS MICHAEL WALLACE	E TH EXPLORATION LLC	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 924	TH EXPLORATION LLC 1/8+ 924 610	TH EXPLORATION LLC 1/8+ 924 610
HAYHURST COMPANY A FLORIDA PARTNERSHIP	IDA PARTNERSHIP CHESAPEAKE APPALACHIA LLC	P CHESAPEAKE APPALACHIA LLC	P CHESAPEAKE APPALACHIA LLC 1/8+ 727	P CHESAPEAKE APPALACHIA LLC 1/8+ 727 253	P CHESAPEAKE APPALACHIA LLC 1/8+ 727 253
	TH EXPLORATION LLC		1/8+ 924	1/8+ 924 617	1/8+ 924 617
WILLIAM MARTIN RIGGS ANGELA RAE MOORE	SELA RAE MOORE TH EXPLORATION LLC	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 907	TH EXPLORATION LLC 1/8+ 907 220	TH EXPLORATION LLC 1/8+ 907 220
	TH EXPLORATION LLC		1/8+ 904	1/8+ 904 556	1/8+ 904 556
THOMAS MICHAEL WALLACE	ICE TH EXPLORATION LLC	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 924	TH EXPLORATION LLC 1/8+ 924 610	TH EXPLORATION LLC 1/8+ 924 610
	TH EXPLORATION LLC		1/8+ 924	1/8+ 924 617	1/8+ 924 617
WILLIAM MARTIN RIGGS ANGELA RAE MOORE	INGELA RAE MOORE TH EXPLORATION LLC	TH EXPLORATION LLC	TH EXPLORATION LLC 1/8+ 907	TH EXPLORATION LLC 1/8+ 907 220	TH EXPLORATION LLC 1/8+ 907 220
	TH EXPLORATION LLC		1/8+ 904	1/8+ 904 556	1/8+ 904 556
	Grantee, Lessee, etc.	_	Royalty Deed Book/Pe	Royalty Deed Book/Page	Royalty Deed Book/Page
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STATE OF WEST VIRGINIA
COUNTY OF MARSHALL

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Date Recorded 05/20/2016
Document Type ASN
Pages Recorded 20
Book-Page 36-148
Recording Fee \$20.00
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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.

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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 3-7HU

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 3-7HU 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-hillop.com.

Sincerely,

Amy Miller

Permit Specialist - Appalachia Region

Cell 304-376-0111

any Miller

Email: amiller@tug-hillop.com

Office of Oil and Gas

SEP - 6 2017

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

Date of Notic	e Certification: 09/01/2017	API	No. 47- 051- 0	1969
		Oper	rator's Well No. Heav	en Hill 3-7HU
		Well	Pad Name:	
Notice has b	peen given:			
	e provisions in West Virginia Code §	22-6A, the Operator has provided	the required parties v	with the Notice Forms listed
below for the	tract of land as follows:			
State:	West Virginia	UTM NAD 83		
County:	Marshall	Nort	hing: 4,406,564.393	
District:	Meade	Public Road Access:	Yeater Lane CR	21/11
Quadrangle:	Glen Easton 7.5'	Generally used farm n	ame: Ricky L. Whitlatch	h
Watershed:	Lower Bowman Run of Fish Creek (HUC 10)			
information re of giving the requirements Virginia Code	ed the owners of the surface describe equired by subsections (b) and (c), sec surface owner notice of entry to sur of subsection (b), section sixteen of e § 22-6A-11(b), the applicant shall te have been completed by the applicant	tion sixteen of this article; (ii) that vey pursuant to subsection (a), so this article were waived in writinder proof of and certify to the sec	the requirement was ection ten of this arting by the surface ov	deemed satisfied as a result cle six-a; or (iii) the notice vner; and Pursuant to West
that the Ope	West Virginia Code § 22-6A, the Operator has properly served the required		otice Certification	OOG OFFICE USE
*PLEASE CHE	ECK ALL THAT APPLY			ONLY
☐ 1. NO1	TICE OF SEISMIC ACTIVITY or	■ NOTICE NOT REQUIRED I SEISMIC ACTIVITY WAS CO		☐ RECEIVED/ NOT REQUIRED
■ 2. NO	FICE OF ENTRY FOR PLAT SURVI	EY or \square NO PLAT SURVEY W	AS CONDUCTED	☐ RECEIVED
☐ 3. NO		NOTICE NOT REQUIRED IN NOTICE OF ENTRY FOR PLATWAS CONDUCTED or		☐ RECEIVED/ NOT REQUIRED
		☐ WRITTEN WAIVER BY S (PLEASE ATTACH) Office	URFACE OWNER RECEIVED of Oil and Gas	
■ 4. NO	TICE OF PLANNED OPERATION		P - 6 2017	RECEIVED
■ 5. PUE	BLIC NOTICE		Department of mental Protection	☐ RECEIVED
■ 6. NO	FICE OF APPLICATION	CHVIPON	nental Protection	☐ RECEIVED

Required Attachments:

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

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller My L

 Well Operator:
 Tug Hill Operating, LLC
 Address:
 380 Southpointe Boulevard, Plaza II, Suite 200

 By:
 Amy L. Miller
 Canonsburg, PA 15317

 Its:
 Permitting Specialist - Appalachia
 Facsimile:
 724-338-2030

 Telephone:
 304-376-01111
 Email:
 amiller@tug-hillop.com

COMMONWEALTH OF RENNSYLVANIA

NOTARIAL SEAL
Jennifer Lupi, Notary Public
Cecil Twp., Washington County
My Commission Expires March 12, 2018
WEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

	18+	C 111
Subscribed and sworn before me this	day of_	Scot wit
Val del		

__ Notary Public

My Commission Expires

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.

RECEIVED
Office of Oil and Gas

SEP - 6 2017

WW-6A (9-13)

API NO. 47-051 - 01969 OPERATOR WELL NO. Heaven Hill 3-7HU Well Pad Name: Heaven Hill 3

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 ☐ CERTIFICATE OF APPROVAL FOR THE WELL WORK CONSTRUCTION OF AN IMPOUNDMENT OR PIT Delivery method pursuant to West Virginia Code § 22-6A-10(b) ☑ REGISTERED ☐ METHOD OF DELIVERY THAT REQUIRES A **PERSONAL SERVICE** MAIL 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) COAL OWNER OR LESSEE Name: Ricky L. Whitlatch Name: Murray Energy Corporation Address: 1044 Yeater Lane Address: 46226 National Road Glen Easton, WV 26039 St. Clairsville, OH 43950 Name: COAL OPERATOR Address: Name: Same as above coal owner Address: ☑ SURFACE OWNER(s) (Road and/or Other Disturbance) Name: Andrew Whitlatch ☑ SURFACE OWNER OF WATER WELL Address: 942 Yeater Lane AND/OR WATER PURVEYOR(s) Glen Easton, WV 26039 Name: *See supplement page 1A attached Arnie Goodnight, et ux Address: Name: Address: 102 Goodnight Lane Moundsville, WV 26041 ☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD ☐ SURFACE OWNER(s) (Impoundments or Pits) Name: None Name: None Address: Address: *Please attach additional forms if necessary

WW-6A (8-13)

RECEIVED Office of Oil and Gas API NO. 47-051

OPERATOR WELL NO. Well Pad Name: Heaven Hill 3

WV Department of Environmental Protection

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

This Notice Shall Include:

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

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

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

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

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

API NO. 47-051 - 0 19 (29 OPERATOR WELL NO. Heaven Hill 3-7HU

Well Pad Name: Heaven Hill 3

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 with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments with the secretary at the application 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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WW Department of Environmental Protection

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.

WW-6A (8-13) API NO. 47-051 - 01969
OPERATOR WELL NO. Heaven Hill 3-7HU
Well Pad Name: Heaven Hill 3

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 scam 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 crosion 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.

Office of Oil and Gas

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WV Department of Environmental Protection

WW-6A (8-13)

API NO. 47-051 - 01969 OPERATOR WELL NO. Heaven Hill 3-7HU Well Pad Name: Heaven Hill 3

Notice	is	here	by	given	by:

Well Operator: Tug Hill Operating, LLC

Telephone: 724-749-8388

Email: amiller@tug-hillop.com

Address: 380 Southepointe 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.

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL Jennifer Lupi, Notary Public Cecil Twp., Washington County My Commission Expires March 12, 2018

MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Subscribed and sworn before me this 318 day of Aug. 2017.

My Commission Expires March 12, 2018

My Commission Expires

RECEIVED Office of Oil and Gas WV Department of Environmental Protection

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 - 7HU

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

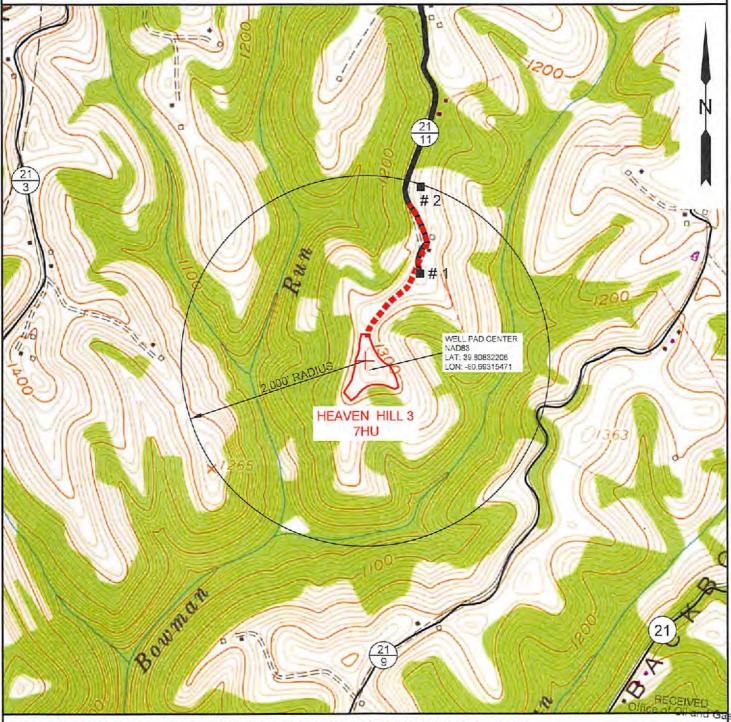
Tax Address:

Same

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PROPOSED HEAVEN HILL 3 - 7HU

SUPPLEMENT PG. 1B



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

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TOPO S	ECTION:	OPERA	ATOR:
GLEN EAS	STON 7.5'	PREPARED FOR	
COUNTY	DISTRICT	380 SOUTHPOIL	NTE BLVD
MARSHALL	MEADE	SUITE 200 CANONSBURG,	PA 15317
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8654	08/25/2017	1" - 1000'



03/02/2018

Operator Well No. Heaven Hill Unit 3-7HU

WW-6A3 (1/12)

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

entry	Requirement: Notice shall be prov	ided at least SEVEN (7) day	s but no more than	n FORTY-FIVE (45)	days prior to
	e: December 5, 2016 Date of Plan	nned Entry: December 16, 2016			
Delivery met	hod pursuant to West Virginia Co	ode § 22-6A-10a			
☐ PERSON	NAL REGISTERED	■ METHOD OF DELI	VERY THAT RE	COUIRES A	
SERVIC		RECEIPT OR SIGN.			
on to the surfa but no more the beneath such to owner of mine and Sediment Secretary, when able the sur	Test Virginia Code § 22-6A-10(a), Pace tract to conduct any plat surveys han forty-five days prior to such entitract that has filed a declaration purerals underlying such tract in the co-Control Manual and the statutes an ich statement shall include contact if face owner to obtain copies from the	required pursuant to this art ry to: (1) The surface owner suant to section thirty-six, art unty tax records. The notice d rules related to oil and gas information, including the ad	icle. Such notice s of such tract; (2) ticle six, chapter to shall include a sta exploration and p	shall be provided at least to any owner or lessee of wenty-two of this code; atement that copies of the roduction may be obtain	st seven days of coal seams ; and (3) any he state Erosion ned from the
	eby provided to:				
	CE OWNER(s)		OWNER OR LE	SSEE	
Name: Ricky L.			ay Energy Corp.		
Address: 1044		-	6226 National Road		
Glen Easton, WV 2		St. Clairsville, C	DH 43950		
Name: Andrew Address: 942		■ MINE	RAL OWNER(s)		
Glen Easton, WV 2					
Name: Amie Go		Name: Ricks	044 Yeater Lane		
Address: 102		Glen Easlon, W		UPPLEMENT PAGE**	
Moundsville, WV 2			additional forms if ne	cessary	
	reby given: Vest Virginia Code § 22-6A-10(a), non the tract of land as follows: West Virginia Marshall Meade Glen Easton 7.5'		ide & Longitude: .ccess:	Lat: 39.8083194, Long: -80.68 Yester Lane (CO. Rt. 21/11) HUC-10 Fish Creek Ricky L. Whillatch	
may be obtain Charleston, W	state Erosion and Sediment Controlled from the Secretary, at the WV IVV 25304 (304-926-0450). Copies the Secretary by visiting www.dep	Department of Environmental of such documents or additi-	l Protection headq onal information r	uarters, located at 601:	57 th Street, SE, Iling may be RECEIVED Office of Oil and Gas
**	reby given by:		ADD Caraba State DI	Soutpointe Plaza II, Suite 200	SEP - 6 2017
Notice is he		O damage.		Soumainte Pieza II. Suite 200	
Well Operato	Tug Hill Operating, LLC	Address:			
		Facsimile:	Canonsburg, PA 15317 724-338-2030		WV Department of nvironmental Protection

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. <u>Heaven Hill Unit 3-7HU</u>

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

Mineral Owner(s):

Name: Address:

Arnie Goodnight ET UX 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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Office of Oil and Gas

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WW-6A5 (1/12)

Operator Well No. Heaven Hill 3-7HU

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

Deliv	ery meth	od pursuant to West Virginia Co	ode §	22-6A-16(c)		
	CERTIE	IED MAIL	П	HAND		
		N RECEIPT REQUESTED		DELIVERY		
return the p required dama (d) The of notice (at the	n receipt r lanned op red to be p ng of a he ges to the he notices tice.	requested or hand delivery, give the peration. The notice required by provided by subsection (b), section prizontal well; and (3) A proposed surface affected by oil and gas op	e surfa this so ten o d surfa eration given t	ace owner whose lan ubsection shall include if this article to a sur- ace use and compen- ns to the extent the do- to the surface owner.	d will be used for ide: (1) A copy face owner whose sation agreement amages are come at the address list	cation, an operator shall, by certified mail or the drilling of a horizontal well notice of of this code section; (2) The information se land will be used in conjunction with the at containing an offer of compensation for pensable under article six-b of this chapter, sted in the records of the sheriff at the time
Name			-			
	ess: 1044 Y	eater Lane		Addres	S: 942 Teater Lane	
Addro Notic Pursu opera	ce is herel ant to We	by given: est Virginia Code § 22-6A-16(c), no es surface owner's land for the pur		is hereby given that	he undersigned al well on the tra	
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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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Operator Well No. Heaven Hill Unit 3-7HU

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

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

Name: Address:

Arnie Goodnight, et ux 102 Goodnight Lane

Moundsville, WV 26041

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Office of Oil and Gas

SEP - 6 2017



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

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

May 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 3-7HU Well site

Dear Mr. Martin,

Jim Justice

Governor

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,

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 3-7HU

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quatemary 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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Heaven Hill 3 Site

Site Design, Construction Plan, & Erosion and Sediment Control Plans Tug Hill Operating Marshall County Meade District Latitude 39.80832206° Longitude -80.69315471° Middle Fish Creek Watershed

Pertinent Site Information Heiwen Hill 3 Site Emergency Number: 304-845-1920 Mende District, Marshell County, WV Watershed: Middle Fish Creek Watershed Tug Hill Contact Number: 1-817-632-3400

Exhibit A: Final Design: Issue for Permitting





Arrent Road						
Sy Ince I want		The Paris	Filed Leeds	Title		
Andrew William		7.50 [111111	The Asian Loui Committee		
RGSV Willach		7.80	1,615.75	New American Controller		
		Disturbed	Area			
	76		Area	Ac		
	W.C.		Area 711	AE AE		

Hervin Hill J Size Quaeriries							
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West Paul Assess Krad	3,47976	7,847.75	547.00		16 15%	15.24	
Existing Our Hall Road Tit.	34.18	47.78		6.44	1 E40"	31.14	
Expression Tie #1	37.57	1.45	21/92		4.364,	78.35	
Delevery Va 27	61.41	4.11	14.85		331%	11.58	
Parent Course Meterial Street policy	3.00	TERMINA.		EE-000 54	10%	10.4	
Totals	11,190,91	75.728.54	15,462.74	18.5(*4)			
	Control Service	CYLE	27.344.37	2.00	en hand Corn	1.61	

Site Locations (NAD 27)			Site Locations (NADES)		
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Não Drizaco		- 41 4H 48573	Sky Stateout	59.83777831	
Cheffer of Wall Paul	26 3/9/24/04	20.6551753	Cortor of Wall Pad	19.90432204	86,090,19479



Description

Cover Short
Schedule of Quantities
Site Notes

Ky S

Heaven Hill 3 Site

Project Contacts

Owiff Rails - V.J. Projects

Bert women Inpographic Information:

MISS UTILITY OF WEST VIRSINIA 1-800-245-4846



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Inte F. See Inte ACHICAL CIT Serveduled Engineer Special Golph, Inc. Cart Food Inc. 80-4277 Off

perior leave grabers it is at cartin are search activities

WMDEP Website files done that there are no active and/or abandoned gas wells within the AC

