



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

Jim Justice , Governor
Austin Caperton , Cabinet Secretary
www.dep.wv.gov

Tuesday, February 07, 2017
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC (A)
1320 SOUTH UNIVERSITY DRIVE, SUITE 500

FORT WORTH , TX 76107

Re: Permit approval for HEAVEN HILL UNIT 2-5 HM
47-051-01884-00-00

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 UNIT 2-5 HM
Farm Name: CHARLES R. HAGEDORN, JR., ET AL
U.S. WELL NUMBER: 47-051-01884-00-00
Horizontal 6A / New Drill
Date Issued: 2/7/2017

Promoting a healthy environment.

02/10/2017

PERMIT CONDITIONS

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

CONDITIONS

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

PERMIT CONDITIONS

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

WW-6B
(04/15)

API NO. 47-051 - 01884
OPERATOR WELL NO. Heaven Hill Unit 2-5HM
Well Pad Name: Heaven Hill Unit 2

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

- 1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Meade Glen Easton 7.5'
Operator ID County District Quadrangle
- 2) Operator's Well Number: Heaven Hill Unit 2-5HM Well Pad Name: Heaven Hill Unit 2
- 3) Farm Name/Surface Owner: Charles R. Hagedorn, Jr., et ux Public Road Access: Blake Ridge Rd (Co. Rt. 21/3)
- 4) Elevation, current ground: 1350' Elevation, proposed post-construction: 1331'
- 5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____
(b) If Gas Shallow Deep _____
Horizontal
- 6) Existing Pad: Yes or No No
- 7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6727' - 6779', thickness of 52' and anticipated pressure of approx. 3800 psi
- 8) Proposed Total Vertical Depth: 6,879'
- 9) Formation at Total Vertical Depth: Onondoga
- 10) Proposed Total Measured Depth: 12,239'
- 11) Proposed Horizontal Leg Length: 4,898'
- 12) Approximate Fresh Water Strata Depths: 70', 1066'
- 13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping
- 14) Approximate Saltwater Depths: 2167'
- 15) Approximate Coal Seam Depths: Sewickly Coal - 969' and Pittsburgh Coal - 1059'
- 16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated
- 17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No _____
- (a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine
Depth: 1059' TVD and 300' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

WW-6B
(04/15)

API NO. 47-051 - 01884
 OPERATOR WELL NO. Heaven Hill Unit 2-6HM
 Well Pad Name: Heaven Hill Unit 2

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	125'	120'	259FT^3(CTS)
Fresh Water	13 3/8"	NEW	H40	48#	1,110'	1,100'	1114ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	1,110'	1,100'	1114ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,815'	2,805'	918ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	12,249'	12,239'	3137ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		6,536'	
Liners	N/A						

per 1/22/17

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE#24	1.33
Production	5 1/2"	8 7/8_8 3/4	.361	12,640	10,112	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8960		
Liners	N/A						

PACKERS

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

WW-6B
(10/14)

API NO. 47-051 - 01884
OPERATOR WELL NO. Heaven Hill Unit 2-5HM
Well Pad Name: Heaven Hill Unit 2

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

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

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

Well to be completed with approximately 7,425,000 lb proppant and 114,796 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 32.98

22) Area to be disturbed for well pad only, less access road (acres): 4.57

23) Describe centralizer placement for each casing string:

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

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

Sfc - Premium NE-1 + 2% CaCl; Int1 - Premium NE-1 + 1.5% CaCL + Flake; Int2 - Lead: Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170 Tail: Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate; Kick Plug - Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L; Prod - 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
*See Attachment

Handwritten signature and date: 11/22/17

25) Proposed borehole conditioning procedures:

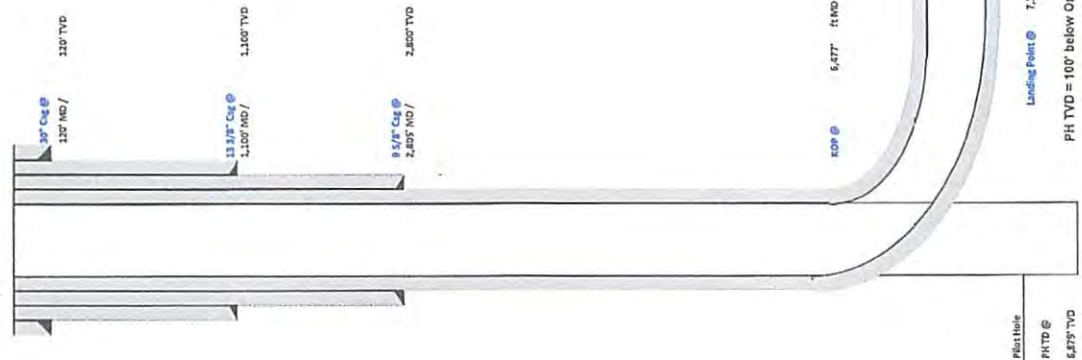
Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH

*Note: Attach additional sheets as needed.

51-01884



WELL NAME: Heaven Hill 2_SHM
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,350' GS Elev: 1,331'
 TD: 12,239'
 TH EstDate: 30/09/05
 BH Longitude: -80.712576
 BH Latitude: 39.787743
 BH Longitude: -80.70267



FORMATION TOPS	Depth TYD
Formation	1066
Deepest Fresh Water	969
Sewickley Coal	3009
Pittsburgh Coal	2063
Big Lime	2469
Well	2527
Berea	2949
Gordon	6071
Rhinestreet	6515
Genesee/Bunkett	6620
Tully	6653
Hamilton	6727
Mitcheilus	6755
Landing Depth	6778
Onondaga	6879
Pilot Hole Depth	6879

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TYD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	1,100'	1,100'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,805'	2,800'	36	H65	Surface
Production	8 7/8 x 8 3/4	5 1/2	12,239'	6,841'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Socks	Csg	Density	Fluid Type	Centralizer Notes	
Conductor	A	15.6	Air	None	
Surface	A	15.6	Air	3 Centralizers at equal distance	
Intermediate 1	A	15	Air	1 Centralizer every other ft	
Production	A	14.5	Air / SOBIM	1 every other joint in lateral; 1 per joint in curve; 1 every other ft in HC	

See 1/27/17

Pilot Hole
 PH TD @ 6,879' TYD
 Landing Point @ 7,333' MD / 6,755' TYD
 PH TYD = 100' below Onondaga Top
 Lateral TD @ 12,239' ft MD
 5,841' ft TYD

02/10/2017

51-01884

HEAVEN HILL UNIT 2-5HM WW6B Attachment to #24. (REV 01/27/17)

Conductor and Surface Casing Cement:

Premium NE-1 + 2% CaCl

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

Intermediate Casing:

Premium NE-1 + 1.5% CaCL + Flake

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

Intermediate Casing 2:

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

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

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

Kick Off Plug:

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

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

*Re
1/27/17*

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*

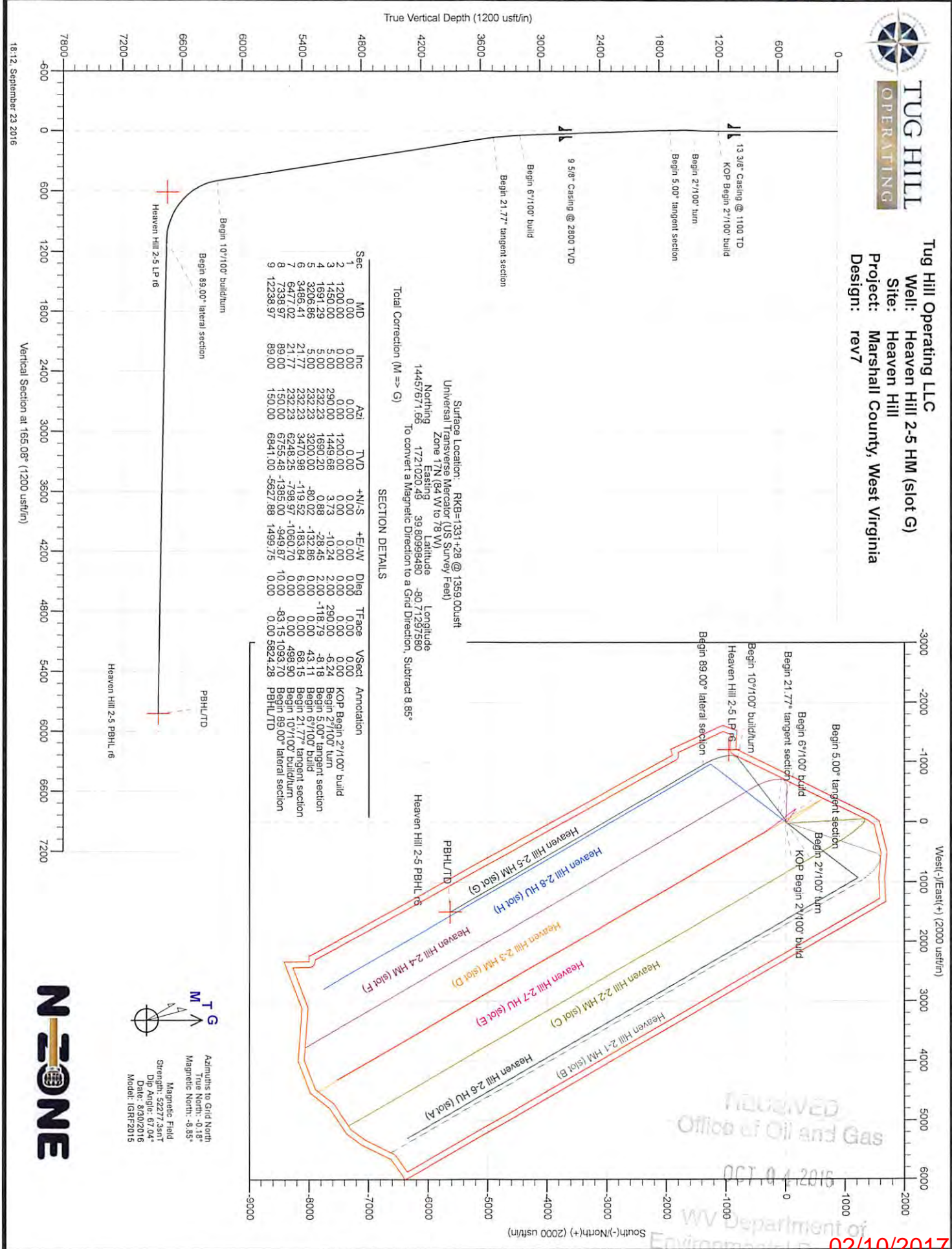
- R-3 – Cement Retarder
- MPA-250 – Gelling Agent
- FP-13L – Anti-Foaming Agent

02/10/2017

51-01884



Tug Hill Operating LLC
 Well: Heaven Hill 2-5 HM (slot G)
 Site: Heaven Hill
 Project: Marshall County, West Virginia
 Design: rev7



Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Diag	Tface	Vsect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00	Begin 2'100" build
3	1450.00	5.00	290.00	1449.68	3.73	-10.24	2.00	290.00	-6.24	Begin 2'100" turn
4	1691.29	5.00	232.23	1690.20	0.88	-28.45	2.00	-118.79	-8.18	Begin 5.00" tangent section
5	3205.86	5.00	232.23	3200.00	-80.02	-132.86	0.00	0.00	43.11	Begin 6'7100" build
6	3485.41	21.77	232.23	3470.98	-119.52	-183.84	6.00	0.00	68.15	Begin 21.77" tangent section
7	6477.02	21.77	232.23	6248.25	-798.97	-1060.70	0.00	0.00	488.90	Begin 10'7100" buildturn
8	7338.97	89.00	150.00	6755.48	-1385.00	-949.57	10.00	-83.15	1093.70	Begin 89.00" lateral section
9	12238.97	89.00	150.00	6841.00	-5927.88	-1499.75	0.00	0.00	5824.28	PBHLTD

Surface Location: RKB=1331+28 @ 1359.00usft
 Universal Transverse Mercator (US Survey Feet)
 Zone 17N (84 W to 78 W) Latitude 39.80999480 Longitude -80.71287560
 Northing 14457671.65 Easting 1721020.48
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Subtract 8.85°

SECTION DETAILS

RECEIVED
 Office of Oil and Gas

OCT 04 2015

WV Department of Environmental Protection

02/10/2017



18:12, September 23 2016

Vertical Section at 185.08° (1200 usf/in)

Permit well - Heaven Hill Unit 2-5HM

Wells within 500' Buffer

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

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

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Comments
4705100740	McElroy Coal Co	2780	Unknown	Unknown	Unknown but unlikely, Appears to be an old, shallow well. Old well, records are incomplete. Plugged in 1993
4705100737	McElroy Coal Co	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old, shallow well. Old well, records are incomplete. Plugged in 1992



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

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

Enter Permit #: 00740

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

WV Geological & Economic Survey **Well: County = 51 Permit = 00740**

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4705100740	Marshall	740	Meade	Glen Easton	Cameron	39.750409	-80.70007	525612.3	4404316

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRG
4705100740	11/15/1904	Original Loc	Completed	WC Gamble (J N Neely)	1	L-1230	-2896			Manufacturers Light & Heat Co.		
4705100740	1/4/1993	Plugging	Completed	Ray A Whetzel	M20					McElroy Coal Company		

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BEF	G_AFY	O_BEF
4705100740	11/15/1904	10/13/1904	1113	Spirit Level				unclassified	unclassified	Dry	unknown	unknown	2780					

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Stratigraphy data for this well

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

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705100740	1/4/1993	0

There is no Sample data for this well

WV Geological & Economic Survey **Well: County = 51 Permit = 00737**

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTME	UTMN
4705100737	Marshall	737	Meade	Glen Easton	Cameron	39.766814	-80.701433	525564.7	4404136.6

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705100737	7/23/1992	Plugging	Completed	J F Crow Heirs	M27	565				McElroy Coal Company			
4705100737	-/-	Worked Over	Completed	J F Crow	565/M-27					McElroy Coal Company			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BEF	G_AFY	O_BEF
4705100737	7/23/1992	6/26/1992	1049	Ground Level				unclassified	unclassified	not available	unknown	unknown						
4705100737	-/-	-/-						unclassified	unclassified	not available	unknown	unknown						

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Stratigraphy data for this well

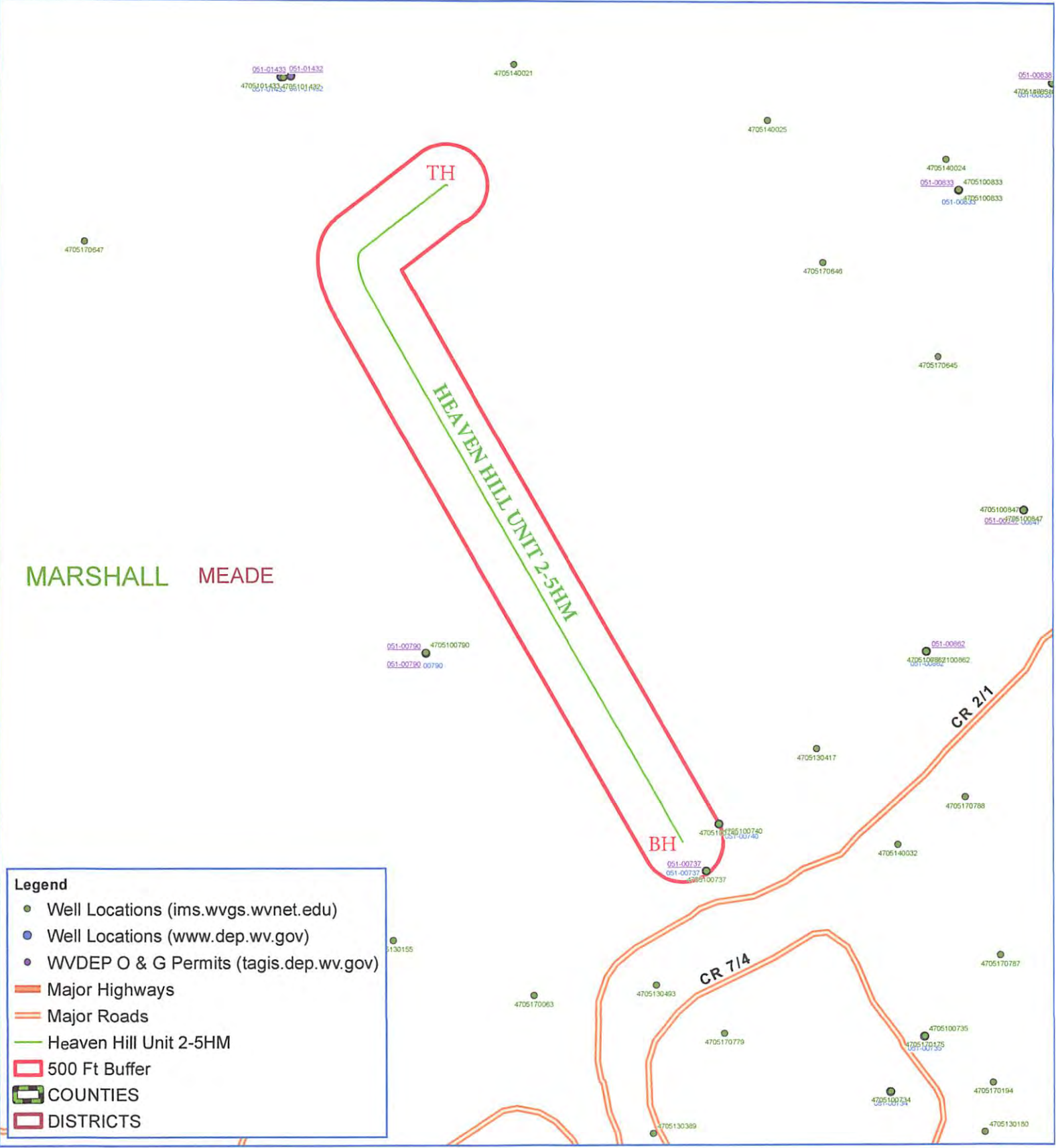
There is no Wireline (E-Log) data for this well

Plugging Information:

API	PLG_DT	DEPTH_PBT
4705100737	7/23/1992	0

There is no Sample data for this well

5.11. Area of Review-- The permittee shall review the area surrounding the proposed well pad so as to identify and evaluate potential conduits for unintended fracture propagation, a report of which the permittee shall provide to the Office with the application for well work. All existing active, plugged, abandoned, and undocumented wells within a five hundred feet (500') radius of the surface location of the well that is the subject of the new application and within a five hundred feet (500') radius of the lateral section of the wellbore shall be considered for the potential of unintended fracture propagation. The report shall detail those wells that are known or reasonably expected to penetrate a depth that could be within the range of the fracture propagation. The detail shall include at a minimum the API number, operator name, total depth, perforated formation(s) and producing zones not perforated.



MARSHALL MEADE

Legend

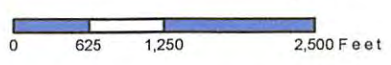
- Well Locations (ims.wvgs.wvnet.edu)
- Well Locations (www.dep.wv.gov)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Major Highways
- Major Roads
- Heaven Hill Unit 2-5HM
- 500 Ft Buffer
- COUNTIES
- DISTRICTS



Heaven Hill Unit 2-5HM

Meade District

Marshall County, WV



Map Created: December 19, 2016
Map Current As Of: December 19, 2016

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

Map Prepared by:

02/10/2017



WELL NAME: Heaven Hill 2_SHM
STATE: West Virginia **COUNTY:** Marshall
DISTRICT: Franklin
DF Elev: 1,350' **GL Elev:** 1,331'
TD: 12,239'
TH Latitude: 39.809985
BH Latitude: 39.787743
BH Longitude: -80.70267



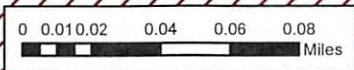
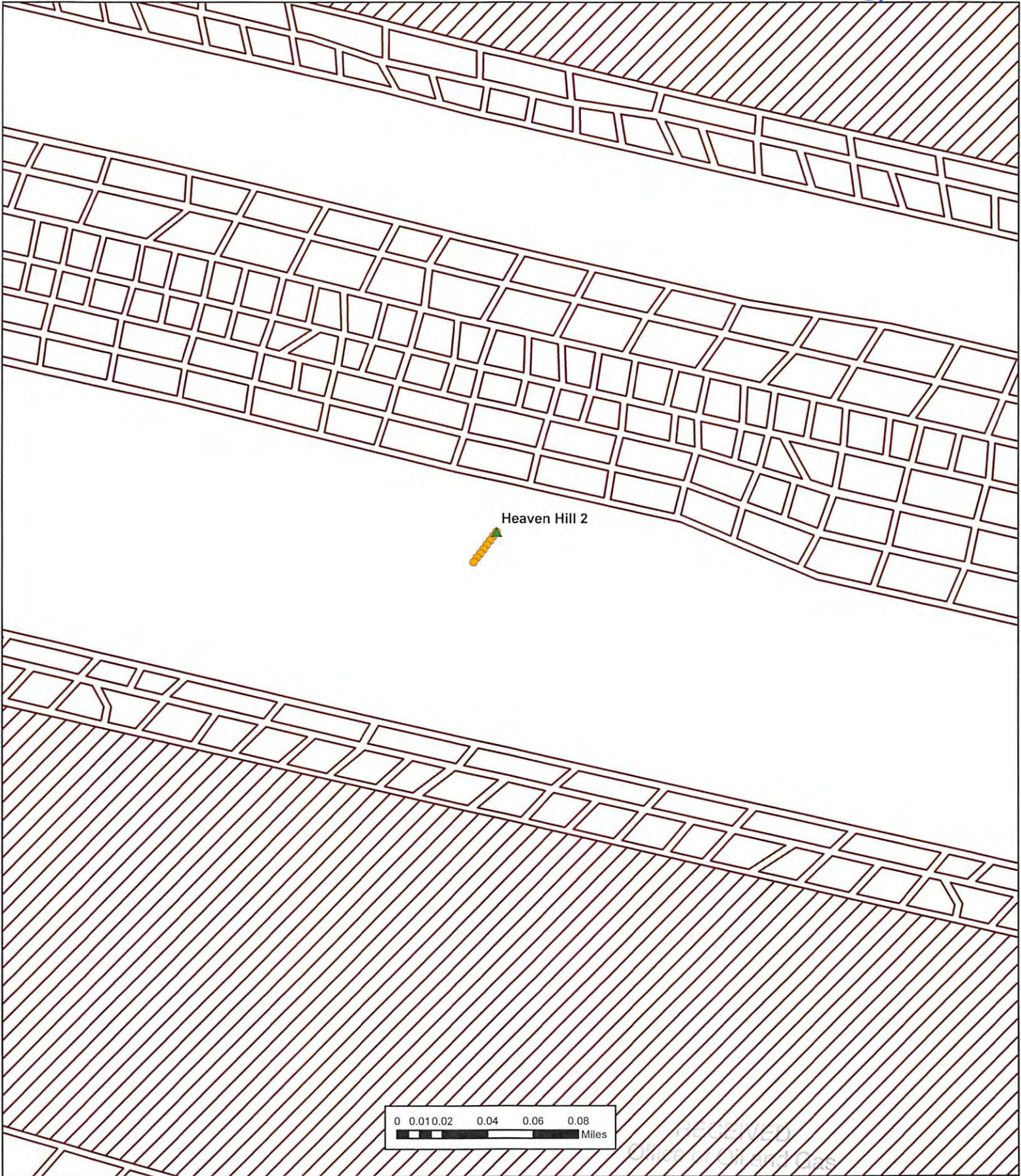
FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1066
Sewickley Coal	969
Pittsburgh Coal	1059
Big Lime	2063
Weir	2469
Berea	2667
Gordon	2949
Rhinestreet	6071
Genesee/Berkett	6615
Tully	6620
Hamilton	6653
Marcellus	6727
Landing Depth	6755
Onondaga	6779
Pilot Hole Depth	6879

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	1,100'	1,100'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,800'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	12,239'	6,441'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centralizer	Notes
338	A	15.6	Alr		None
1,127	A	15.6	Alr		3 Centralizers at equal distance
898	A	15	Alr		1 Centralizer every other ft
2,767	A	14.5	Alr / 508M		1 every other joint in lateral; 1 per joint in curve; 1 every other ft to 4ft

Lateral TD @ 12,239' ft MD
 6,851 ft TVD

02/10/2017



CONFIDENTIAL



Development Sites

Category

- ▲ Pad
- Surface Location
- Murray Mines

RECEIVED
Office of Land Use

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WV Department of
Environmental Protection

Coordinate System: NAD 1983 UTM Zone 17N
 Projection: Transverse Mercator
 Datum: North American 1983
 Spheroid: GRS 1980
 Semi-Major Axis: 6378137.000
 Semi-Minor Axis: 6378137.000
 Scale Factor: 0.9996
 False Easting: 500000.000
 False Northing: 0.000
 Units: Feet US



02/10/2017

SI-01884



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Heaven Hill 2-5 HM (slot G)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1331+28 @ 1359.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1331+28 @ 1359.00usft
Site:	Heaven Hill	North Reference:	Grid
Well:	Heaven Hill 2-5 HM (slot G)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev7		

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

Site	Heaven Hill				
Site Position:		Northing:	14,457,660.30 usft	Latitude:	39.80995400
From:	Lat/Long	Easting:	1,720,974.97 usft	Longitude:	-80.71313800
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.18 °

Well	Heaven Hill 2-5 HM (slot G)					
Well Position	+N/-S	0.00 usft	Northing:	14,457,671.66 usft	Latitude:	39.80998480
	+E/-W	0.00 usft	Easting:	1,721,020.48 usft	Longitude:	-80.71297580
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	1,331.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/30/2016	-8.66	67.04	52,277

Design	rev7			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	165.08

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,450.00	5.00	290.00	1,449.68	3.73	-10.24	2.00	2.00	0.00	290.00	
1,691.29	5.00	232.23	1,690.20	0.88	-28.45	2.00	0.00	-23.94	-118.79	
3,206.86	5.00	232.23	3,200.00	-80.02	-132.86	0.00	0.00	0.00	0.00	
3,486.41	21.77	232.23	3,470.98	-119.52	-183.84	6.00	6.00	0.00	0.00	
6,477.02	21.77	232.23	6,248.25	-798.97	-1,060.70	0.00	0.00	0.00	0.00	
7,338.97	89.00	150.00	6,755.48	-1,385.00	-949.87	10.00	7.80	-9.54	-83.15	
12,238.97	89.00	150.00	6,841.00	-5,627.88	1,499.75	0.00	0.00	0.00	0.00	Heaven Hill 2-5 PBHL

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51-01884



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Heaven Hill 2-5 HM (slot G)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1331+28 @ 1359.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1331+28 @ 1359.00usft
Site:	Heaven Hill	North Reference:	Grid
Well:	Heaven Hill 2-5 HM (slot G)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev7		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
100.00	0.00	0.00	100.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
200.00	0.00	0.00	200.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
300.00	0.00	0.00	300.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
400.00	0.00	0.00	400.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
500.00	0.00	0.00	500.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
600.00	0.00	0.00	600.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
700.00	0.00	0.00	700.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
800.00	0.00	0.00	800.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
900.00	0.00	0.00	900.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,671.66	1,721,020.48	39.80998480	-80.71297580	
KOP Begin 2°/100' build										
1,300.00	2.00	290.00	1,299.98	0.60	-1.64	14,457,672.26	1,721,018.84	39.80998646	-80.71298163	
1,400.00	4.00	290.00	1,399.84	2.39	-6.56	14,457,674.05	1,721,013.93	39.80999141	-80.71299912	
1,450.00	5.00	290.00	1,449.68	3.73	-10.24	14,457,675.39	1,721,010.24	39.80999513	-80.71301224	
Begin 2°/100' turn										
1,500.00	4.60	279.01	1,499.51	4.79	-14.27	14,457,676.45	1,721,006.21	39.80999808	-80.71302657	
1,600.00	4.42	253.47	1,599.21	4.32	-21.93	14,457,675.98	1,720,998.55	39.80999686	-80.71305384	
1,691.29	5.00	232.23	1,690.20	0.88	-28.45	14,457,672.55	1,720,992.04	39.80998748	-80.71307709	
Begin 5.00° tangent section										
1,700.00	5.00	232.23	1,698.87	0.42	-29.05	14,457,672.08	1,720,991.44	39.80998621	-80.71307923	
1,800.00	5.00	232.23	1,798.49	-4.92	-35.94	14,457,666.74	1,720,984.55	39.80997161	-80.71310382	
1,900.00	5.00	232.23	1,898.11	-10.26	-42.83	14,457,661.41	1,720,977.66	39.80995701	-80.71312842	
2,000.00	5.00	232.23	1,997.73	-15.60	-49.72	14,457,656.07	1,720,970.77	39.80994241	-80.71315301	
2,100.00	5.00	232.23	2,097.35	-20.94	-56.61	14,457,650.73	1,720,963.88	39.80992781	-80.71317760	
2,200.00	5.00	232.23	2,196.97	-26.27	-63.49	14,457,645.39	1,720,956.99	39.80991321	-80.71320220	
2,300.00	5.00	232.23	2,296.59	-31.61	-70.38	14,457,640.05	1,720,950.10	39.80989861	-80.71322679	
2,400.00	5.00	232.23	2,396.21	-36.95	-77.27	14,457,634.71	1,720,943.21	39.80988401	-80.71325138	
2,500.00	5.00	232.23	2,495.83	-42.29	-84.16	14,457,629.38	1,720,936.32	39.80986941	-80.71327598	
2,600.00	5.00	232.23	2,595.45	-47.63	-91.05	14,457,624.04	1,720,929.43	39.80985481	-80.71330057	
2,700.00	5.00	232.23	2,695.07	-52.96	-97.94	14,457,618.70	1,720,922.54	39.80984021	-80.71332516	
2,800.00	5.00	232.23	2,794.69	-58.30	-104.83	14,457,613.36	1,720,915.65	39.80982561	-80.71334976	
2,900.00	5.00	232.23	2,894.31	-63.64	-111.72	14,457,608.02	1,720,908.76	39.80981101	-80.71337435	
3,000.00	5.00	232.23	2,993.93	-68.98	-118.61	14,457,602.68	1,720,901.87	39.80979641	-80.71339894	
3,100.00	5.00	232.23	3,093.55	-74.32	-125.50	14,457,597.35	1,720,894.98	39.80978181	-80.71342354	
3,200.00	5.00	232.23	3,193.17	-79.66	-132.39	14,457,592.01	1,720,888.09	39.80976721	-80.71344813	
3,206.86	5.00	232.23	3,200.00	-80.02	-132.86	14,457,591.64	1,720,887.62	39.80976621	-80.71344982	
Begin 6°/100' build										
3,300.00	10.59	232.23	3,292.24	-87.76	-142.84	14,457,583.91	1,720,877.64	39.80974506	-80.71348545	
3,400.00	16.59	232.23	3,389.40	-102.14	-161.41	14,457,569.52	1,720,859.08	39.80970572	-80.71355171	
3,486.41	21.77	232.23	3,470.98	-119.52	-183.84	14,457,552.14	1,720,836.65	39.80965818	-80.71363179	
Begin 21.77° tangent section										
3,500.00	21.77	232.23	3,483.60	-122.61	-187.82	14,457,549.05	1,720,832.66	39.80964974	-80.71364602	
3,600.00	21.77	232.23	3,576.47	-145.33	-217.14	14,457,526.33	1,720,803.34	39.80958760	-80.71375068	
3,700.00	21.77	232.23	3,669.34	-168.05	-246.46	14,457,503.62	1,720,774.02	39.80952547	-80.71385535	
3,800.00	21.77	232.23	3,762.20	-190.77	-275.79	14,457,480.90	1,720,744.70	39.80946333	-80.71396001	
3,900.00	21.77	232.23	3,855.07	-213.49	-305.11	14,457,458.18	1,720,715.38	39.80940119	-80.71406468	
4,000.00	21.77	232.23	3,947.94	-236.21	-334.43	14,457,435.46	1,720,686.06	39.80933906	-80.71416934	
4,100.00	21.77	232.23	4,040.80	-258.93	-363.75	14,457,412.74	1,720,656.74	39.80927692	-80.71427400	
4,200.00	21.77	232.23	4,133.67	-281.65	-393.07	14,457,390.02	1,720,627.42	39.80921479	-80.71437867	
4,300.00	21.77	232.23	4,226.53	-304.37	-422.39	14,457,367.30	1,720,598.10	39.80915265	-80.71448333	
4,400.00	21.77	232.23	4,319.40	-327.08	-451.71	14,457,344.58	1,720,568.78	39.80909051	-80.71458799	

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Project:	Marshall County, West Virginia	MD Reference:	RKB=1331+28 @ 1359.00usft
Site:	Heaven Hill	North Reference:	Grid
Well:	Heaven Hill 2-5 HM (slot G)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev7		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,500.00	21.77	232.23	4,412.27	-349.80	-481.03	14,457,321.86	1,720,539.46	39.80902838	-80.71469266	
4,600.00	21.77	232.23	4,505.13	-372.52	-510.35	14,457,299.14	1,720,510.14	39.80896624	-80.71479732	
4,700.00	21.77	232.23	4,598.00	-395.24	-539.67	14,457,276.42	1,720,480.81	39.80890410	-80.71490198	
4,800.00	21.77	232.23	4,690.87	-417.96	-568.99	14,457,253.70	1,720,451.49	39.80884197	-80.71500665	
4,900.00	21.77	232.23	4,783.73	-440.68	-598.31	14,457,230.98	1,720,422.17	39.80877983	-80.71511131	
5,000.00	21.77	232.23	4,876.60	-463.40	-627.63	14,457,208.26	1,720,392.85	39.80871769	-80.71521597	
5,100.00	21.77	232.23	4,969.46	-486.12	-656.95	14,457,185.54	1,720,363.53	39.80865556	-80.71532063	
5,200.00	21.77	232.23	5,062.33	-508.84	-686.27	14,457,162.82	1,720,334.21	39.80859342	-80.71542530	
5,300.00	21.77	232.23	5,155.20	-531.56	-715.59	14,457,140.10	1,720,304.89	39.80853128	-80.71552996	
5,400.00	21.77	232.23	5,248.06	-554.28	-744.91	14,457,117.39	1,720,275.57	39.80846914	-80.71563462	
5,500.00	21.77	232.23	5,340.93	-577.00	-774.23	14,457,094.67	1,720,246.25	39.80840701	-80.71573928	
5,600.00	21.77	232.23	5,433.80	-599.72	-803.55	14,457,071.95	1,720,216.93	39.80834487	-80.71584394	
5,700.00	21.77	232.23	5,526.66	-622.44	-832.87	14,457,049.23	1,720,187.61	39.80828273	-80.71594860	
5,800.00	21.77	232.23	5,619.53	-645.16	-862.19	14,457,026.51	1,720,158.29	39.80822059	-80.71605326	
5,900.00	21.77	232.23	5,712.39	-667.88	-891.51	14,457,003.79	1,720,128.97	39.80815846	-80.71615793	
6,000.00	21.77	232.23	5,805.26	-690.60	-920.84	14,456,981.07	1,720,099.65	39.80809632	-80.71626259	
6,100.00	21.77	232.23	5,898.13	-713.31	-950.16	14,456,958.35	1,720,070.33	39.80803418	-80.71636725	
6,200.00	21.77	232.23	5,990.99	-736.03	-979.48	14,456,935.63	1,720,041.01	39.80797204	-80.71647191	
6,300.00	21.77	232.23	6,083.86	-758.75	-1,008.80	14,456,912.91	1,720,011.69	39.80790990	-80.71657657	
6,400.00	21.77	232.23	6,176.73	-781.47	-1,038.12	14,456,890.19	1,719,982.37	39.80784777	-80.71668123	
6,477.02	21.77	232.23	6,248.25	-798.97	-1,060.70	14,456,872.69	1,719,959.78	39.80779991	-80.71676183	
Begin 10°/100' build/turn										
6,500.00	22.16	226.17	6,269.57	-804.58	-1,067.20	14,456,867.08	1,719,953.29	39.80778455	-80.71678503	
6,600.00	26.11	203.51	6,361.00	-837.91	-1,089.64	14,456,833.75	1,719,930.85	39.80769323	-80.71686532	
6,700.00	32.60	187.87	6,448.24	-884.90	-1,102.14	14,456,786.77	1,719,918.34	39.80756430	-80.71691036	
6,800.00	40.42	177.32	6,528.63	-944.12	-1,104.32	14,456,727.55	1,719,916.16	39.80740168	-80.71691879	
6,900.00	48.92	169.80	6,599.73	-1,013.77	-1,096.11	14,456,657.89	1,719,924.37	39.80721032	-80.71689035	
7,000.00	57.80	164.05	6,659.39	-1,091.74	-1,077.77	14,456,579.92	1,719,942.72	39.80699603	-80.71682591	
7,100.00	66.89	159.34	6,705.77	-1,175.67	-1,049.84	14,456,496.00	1,719,970.64	39.80676532	-80.71672742	
7,200.00	76.10	155.23	6,737.49	-1,262.99	-1,013.18	14,456,408.68	1,720,007.30	39.80652519	-80.71659787	
7,300.00	85.38	151.44	6,753.57	-1,351.05	-968.91	14,456,320.61	1,720,051.58	39.80628295	-80.71644122	
7,338.97	89.00	150.00	6,755.48	-1,385.00	-949.87	14,456,286.66	1,720,070.61	39.80618956	-80.71637382	
Begin 89.00° lateral section										
7,400.00	89.00	150.00	6,756.55	-1,437.84	-919.36	14,456,233.82	1,720,101.12	39.80604418	-80.71626578	
7,500.00	89.00	150.00	6,758.29	-1,524.43	-869.37	14,456,147.23	1,720,151.11	39.80580595	-80.71608876	
7,600.00	89.00	150.00	6,760.04	-1,611.02	-819.38	14,456,060.64	1,720,201.10	39.80556772	-80.71591173	
7,700.00	89.00	150.00	6,761.78	-1,697.61	-769.39	14,455,974.05	1,720,251.10	39.80532948	-80.71573470	
7,800.00	89.00	150.00	6,763.53	-1,784.20	-719.40	14,455,887.46	1,720,301.09	39.80509125	-80.71555768	
7,900.00	89.00	150.00	6,765.27	-1,870.79	-669.40	14,455,800.88	1,720,351.08	39.80485302	-80.71538065	
8,000.00	89.00	150.00	6,767.02	-1,957.38	-619.41	14,455,714.29	1,720,401.07	39.80461479	-80.71520363	
8,100.00	89.00	150.00	6,768.77	-2,043.97	-569.42	14,455,627.70	1,720,451.07	39.80437655	-80.71502661	
8,200.00	89.00	150.00	6,770.51	-2,130.56	-519.43	14,455,541.11	1,720,501.06	39.80413832	-80.71484959	
8,300.00	89.00	150.00	6,772.26	-2,217.15	-469.43	14,455,454.52	1,720,551.05	39.80390009	-80.71467257	
8,400.00	89.00	150.00	6,774.00	-2,303.74	-419.44	14,455,367.93	1,720,601.04	39.80366185	-80.71449555	
8,500.00	89.00	150.00	6,775.75	-2,390.32	-369.45	14,455,281.34	1,720,651.04	39.80342362	-80.71431853	
8,600.00	89.00	150.00	6,777.49	-2,476.91	-319.46	14,455,194.75	1,720,701.03	39.80318538	-80.71414152	
8,700.00	89.00	150.00	6,779.24	-2,563.50	-269.46	14,455,108.16	1,720,751.02	39.80294715	-80.71396450	
8,800.00	89.00	150.00	6,780.98	-2,650.09	-219.47	14,455,021.57	1,720,801.01	39.80270891	-80.71378749	
8,900.00	89.00	150.00	6,782.73	-2,736.68	-169.48	14,454,934.98	1,720,851.01	39.80247068	-80.71361048	
9,000.00	89.00	150.00	6,784.47	-2,823.27	-119.49	14,454,848.39	1,720,901.00	39.80223244	-80.71343347	
9,100.00	89.00	150.00	6,786.22	-2,909.86	-69.49	14,454,761.80	1,720,950.99	39.80199421	-80.71325646	
9,200.00	89.00	150.00	6,787.96	-2,996.45	-19.50	14,454,675.21	1,721,000.98	39.80175597	-80.71307945	
9,300.00	89.00	150.00	6,789.71	-3,083.04	30.49	14,454,588.62	1,721,050.97	39.80151773	-80.71290244	
9,400.00	89.00	150.00	6,791.45	-3,169.63	80.48	14,454,502.04	1,721,100.97	39.80127950	-80.71272544	

02/10/2017
 Environmental Protection
 COMPASS 5000.1 Build 81B

51-01884



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Heaven Hill 2-5 HM (slot G)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1331+28 @ 1359.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1331+28 @ 1359.00usft
Site:	Heaven Hill	North Reference:	Grid
Well:	Heaven Hill 2-5 HM (slot G)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev7		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,500.00	89.00	150.00	6,793.20	-3,256.22	130.48	14,454,415.45	1,721,150.96	39.80104126	-80.71254843	
9,600.00	89.00	150.00	6,794.94	-3,342.81	180.47	14,454,328.86	1,721,200.95	39.80080302	-80.71237143	
9,700.00	89.00	150.00	6,796.69	-3,429.40	230.46	14,454,242.27	1,721,250.94	39.80056478	-80.71219443	
9,800.00	89.00	150.00	6,798.43	-3,515.99	280.45	14,454,155.68	1,721,300.94	39.80032655	-80.71201743	
9,900.00	89.00	150.00	6,800.18	-3,602.58	330.45	14,454,069.09	1,721,350.93	39.80008831	-80.71184043	
10,000.00	89.00	150.00	6,801.92	-3,689.16	380.44	14,453,982.50	1,721,400.92	39.79985007	-80.71166343	
10,100.00	89.00	150.00	6,803.67	-3,775.75	430.43	14,453,895.91	1,721,450.91	39.79961183	-80.71148643	
10,200.00	89.00	150.00	6,805.42	-3,862.34	480.42	14,453,809.32	1,721,500.91	39.79937359	-80.71130944	
10,300.00	89.00	150.00	6,807.16	-3,948.93	530.41	14,453,722.73	1,721,550.90	39.79913535	-80.71113244	
10,400.00	89.00	150.00	6,808.91	-4,035.52	580.41	14,453,636.14	1,721,600.89	39.79889711	-80.71095545	
10,500.00	89.00	150.00	6,810.65	-4,122.11	630.40	14,453,549.55	1,721,650.88	39.79865887	-80.71077846	
10,600.00	89.00	150.00	6,812.40	-4,208.70	680.39	14,453,462.96	1,721,700.88	39.79842063	-80.71060146	
10,700.00	89.00	150.00	6,814.14	-4,295.29	730.38	14,453,376.37	1,721,750.87	39.79818239	-80.71042447	
10,800.00	89.00	150.00	6,815.89	-4,381.88	780.38	14,453,289.78	1,721,800.86	39.79794415	-80.71024749	
10,900.00	89.00	150.00	6,817.63	-4,468.47	830.37	14,453,203.19	1,721,850.85	39.79770591	-80.71007050	
11,000.00	89.00	150.00	6,819.38	-4,555.06	880.36	14,453,116.61	1,721,900.85	39.79746767	-80.70989351	
11,100.00	89.00	150.00	6,821.12	-4,641.65	930.35	14,453,030.02	1,721,950.84	39.79722943	-80.70971653	
11,200.00	89.00	150.00	6,822.87	-4,728.24	980.35	14,452,943.43	1,722,000.83	39.79699119	-80.70953954	
11,300.00	89.00	150.00	6,824.61	-4,814.83	1,030.34	14,452,856.84	1,722,050.82	39.79675294	-80.70936256	
11,400.00	89.00	150.00	6,826.36	-4,901.42	1,080.33	14,452,770.25	1,722,100.81	39.79651470	-80.70918558	
11,500.00	89.00	150.00	6,828.10	-4,988.01	1,130.32	14,452,683.66	1,722,150.81	39.79627646	-80.70900860	
11,600.00	89.00	150.00	6,829.85	-5,074.59	1,180.32	14,452,597.07	1,722,200.80	39.79603822	-80.70883162	
11,700.00	89.00	150.00	6,831.59	-5,161.18	1,230.31	14,452,510.48	1,722,250.79	39.79579997	-80.70865464	
11,800.00	89.00	150.00	6,833.34	-5,247.77	1,280.30	14,452,423.89	1,722,300.78	39.79556173	-80.70847767	
11,900.00	89.00	150.00	6,835.08	-5,334.36	1,330.29	14,452,337.30	1,722,350.78	39.79532349	-80.70830069	
12,000.00	89.00	150.00	6,836.83	-5,420.95	1,380.29	14,452,250.71	1,722,400.77	39.79508524	-80.70812372	
12,100.00	89.00	150.00	6,838.57	-5,507.54	1,430.28	14,452,164.12	1,722,450.76	39.79484700	-80.70794674	
12,200.00	89.00	150.00	6,840.32	-5,594.13	1,480.27	14,452,077.53	1,722,500.75	39.79460875	-80.70776977	
12,238.97	89.00	150.00	6,841.00	-5,627.88	1,499.75	14,452,043.79	1,722,520.24	39.79451590	-80.70770080	

PBHL/TD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Heaven Hill 2-5 LP r6 - hit/miss target - Shape - Point	0.00	0.00	6,747.00	-953.76	-1,198.43	14,456,717.90	1,719,822.05	39.80737600	-80.71725400	
- plan misses target center by 186.26usft at 6922.34usft MD (6614.13 TVD, -1030.55 N, -1092.88 E)										
Heaven Hill 2-5 PBHL r6 - plan hits target center - Point	0.00	0.00	6,841.00	-5,627.88	1,499.75	14,452,043.79	1,722,520.24	39.79451590	-80.70770080	

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,100.00	1,100.00	13 3/8" Casing @ 1100 TD	13-3/8	17-1/2	
2,805.33	2,800.00	9 5/8" Casing @ 2800 TVD	9-5/8	12-1/4	



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Heaven Hill 2-5 HM (slot G)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1331+28 @ 1359.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1331+28 @ 1359.00usft
Site:	Heaven Hill	North Reference:	Grid
Well:	Heaven Hill 2-5 HM (slot G)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev7		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,200.00	1,200.00	0.00	0.00	KOP Begin 2°/100' build
1,450.00	1,449.68	3.73	-10.24	Begin 2°/100' turn
1,691.29	1,690.20	0.88	-28.45	Begin 5.00° tangent section
3,206.86	3,200.00	-80.02	-132.86	Begin 6°/100' build
3,486.41	3,470.98	-119.52	-183.84	Begin 21.77° tangent section
6,477.02	6,248.25	-798.97	-1,060.70	Begin 10°/100' build/turn
7,338.97	6,755.48	-1,385.00	-949.87	Begin 89.00° lateral section
12,238.97	6,841.00	-5,627.88	1,499.75	PBHL/TD

WW-9
(4/16)

API Number 47 - 051 - 01884
Operator's Well No. Heaven Hill Unit 2-5HM

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek Quadrangle Glen Easton 7.5'

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

Will a pit be used? Yes No

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

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

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

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

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfil (SWF-1021 / WV0109185)

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

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

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

Company Official Signature [Signature]

Company Official (Typed Name) David Patterson

Company Official Title Senior Vice President, Operations

RECEIVED
Office of Oil and Gas

Subscribed and sworn before me this 26th day of September, 20 16

OCT 04 2016

Sara Beth Benavidez

Notary Public
Sara Beth Benavidez
Notary Public
State of Texas
My Comm. Exp. 02-01-2018

My commission expires 2-4-18

02/01/2017

51-01884

Form WW-9

Operator's Well No. Heaven Hill Unit 2-5HM

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 32.98 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40

Seed Type	lbs/acre
Orchard Grass	10
Ladino Clover	3

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Unkeles*

Comments: _____

Title: Oil & Gas Inspector

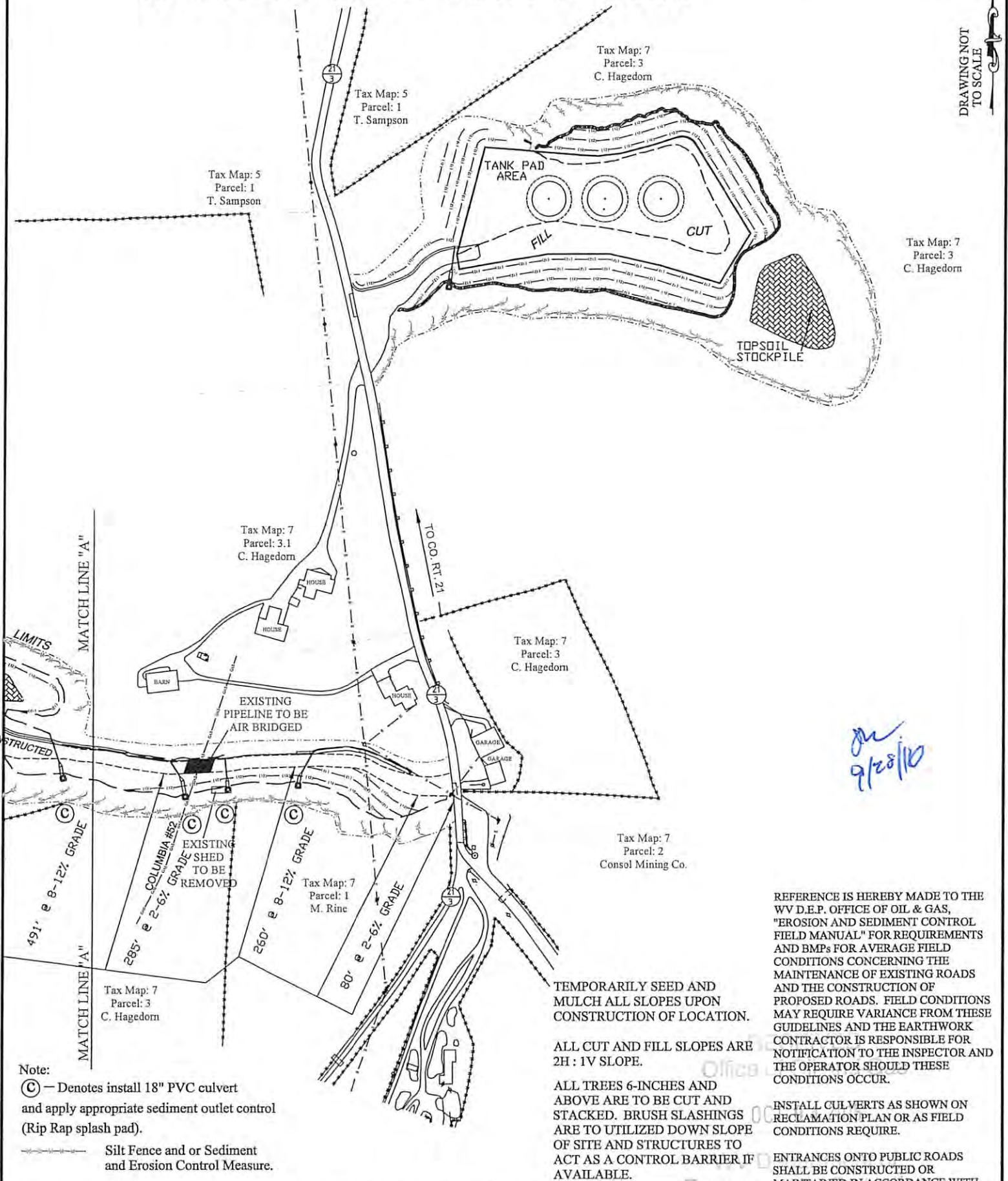
Date: 9/28/16

Field Reviewed? Yes No

RECEIVED
Office of Oil and Gas
OCT 04 2016
WV Department of
Environmental Protection
02/10/2017

PROPOSED HEAVEN HILL UNIT 2-5HM

DRAWING NOT TO SCALE



Handwritten signature and date: 9/28/16

Note:
 (C) — Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).
 --- Silt Fence and or Sediment and Erosion Control Measure.

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

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

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

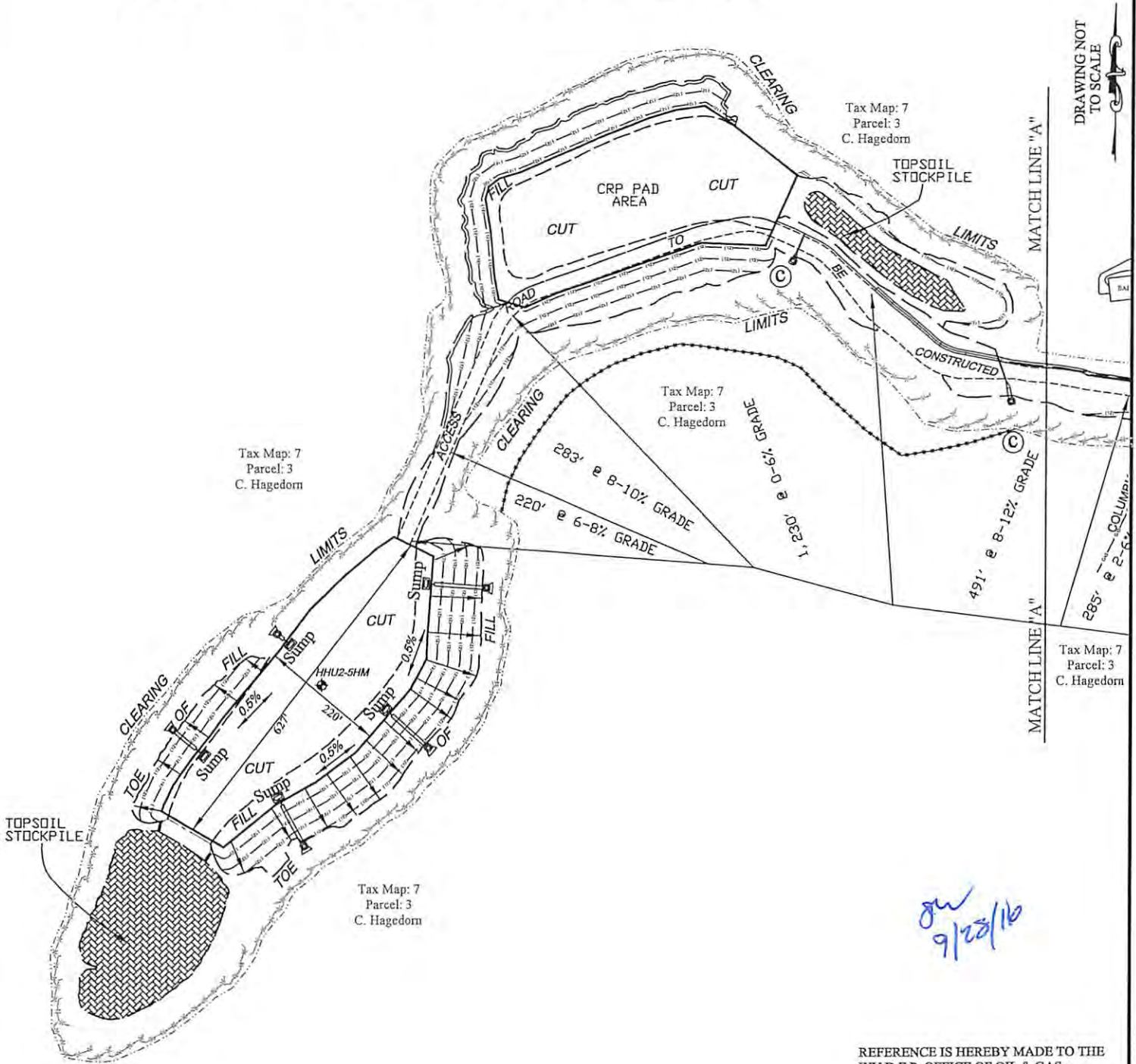
ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REG. 02/06/2017 PERMITS MAY BE REQUIRED.

51-01884

WW-9

PROPOSED HEAVEN HILL UNIT 2-5HM

SUPPLEMENT PG 1-B



DRAWING NOT TO SCALE

Note:
 (C) — Denotes install 18" PVC culvert and apply appropriate sediment outlet control (Rip Rap splash pad).
 --- Silt Fence and or Sediment and Erosion Control Measure.

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.

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

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

DATE: 09/09/16

PROJECT NO: W0160328

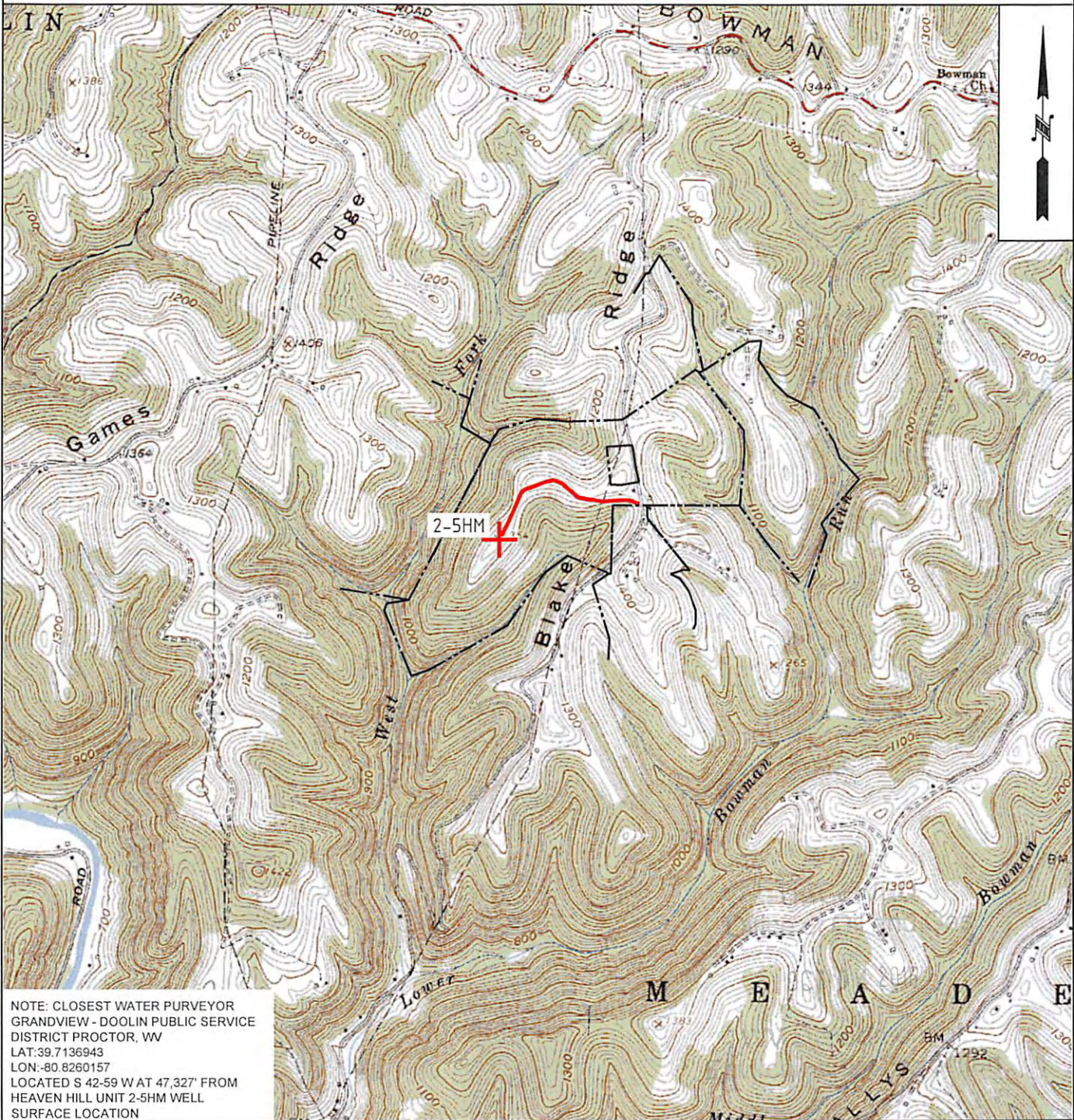
DRAWN BY: J.N.W.

02/10/2017

WW-9

PROPOSED HEAVEN HILL UNIT 2-5HM

SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE
DISTRICT PROCTOR, WV
LAT: 39.7136943
LON: -80.6260157
LOCATED S 42-59 W AT 47,327' FROM
HEAVEN HILL UNIT 2-5HM WELL
SURFACE LOCATION



OPERATOR	163-697(CEC)	TOPO SECTION	LEASE NAME
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		GLEN EASTON 7.5'	HEAVEN HILL UNIT 2
		SCALE:	DATE:
		1" = 2000'	DATE: 09/23/16

51-01884



global environmental solutions

Well Site Safety Plan

Tug Hill Operating, LLC

SLR
9/28/16

Well Name: Heaven Hill Unit 2-5HM

Pad Location: Heaven Hill Unit 2 Pad
Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:
Northing – 4,406,707.1
Easting – 524,568.1

SLR Ref: 116.01631.00003

Office of Oil and Gas

September 2016

OCT 04 2016

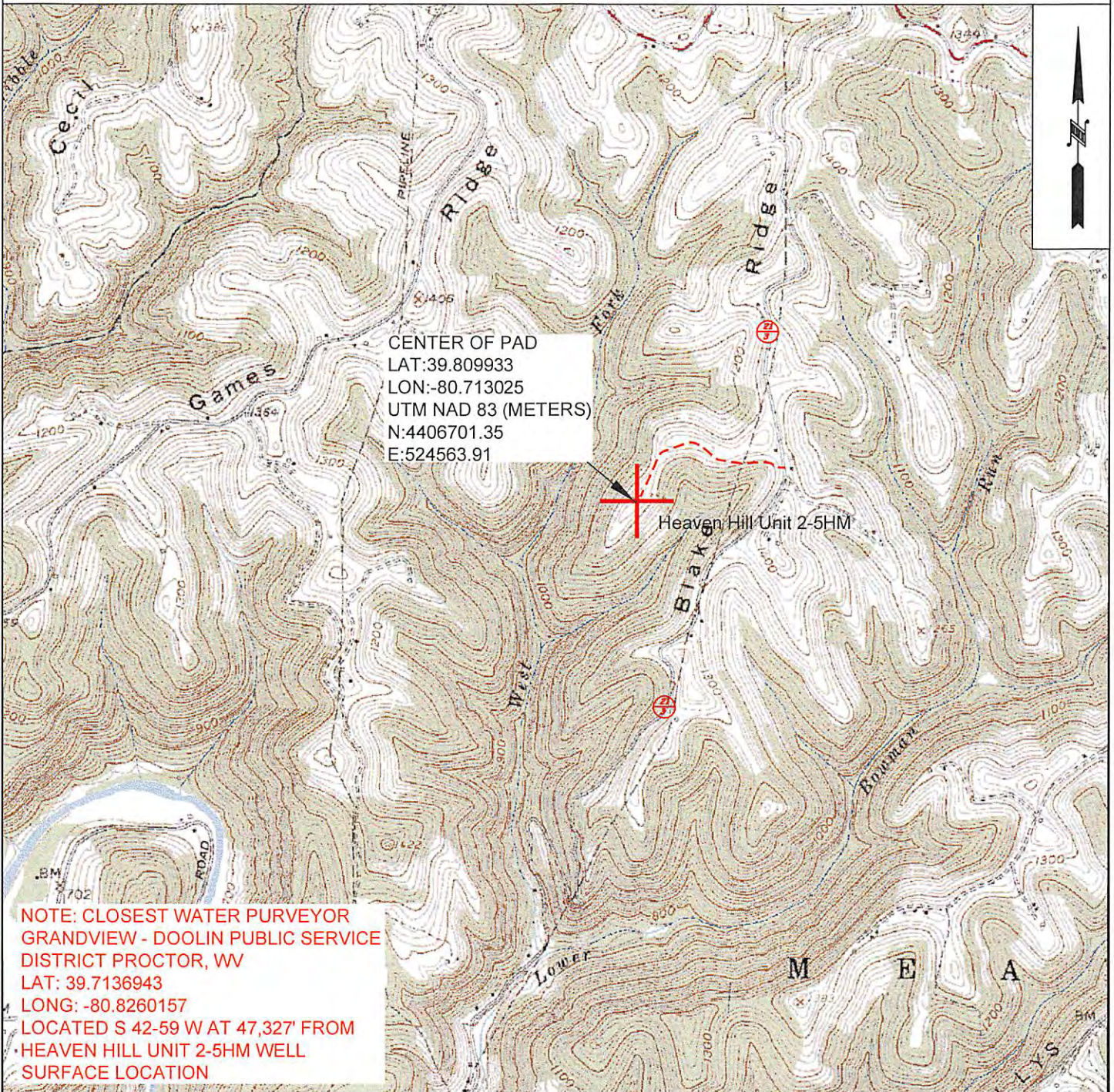



WV Department of
Environmental Protection

02/10/2017

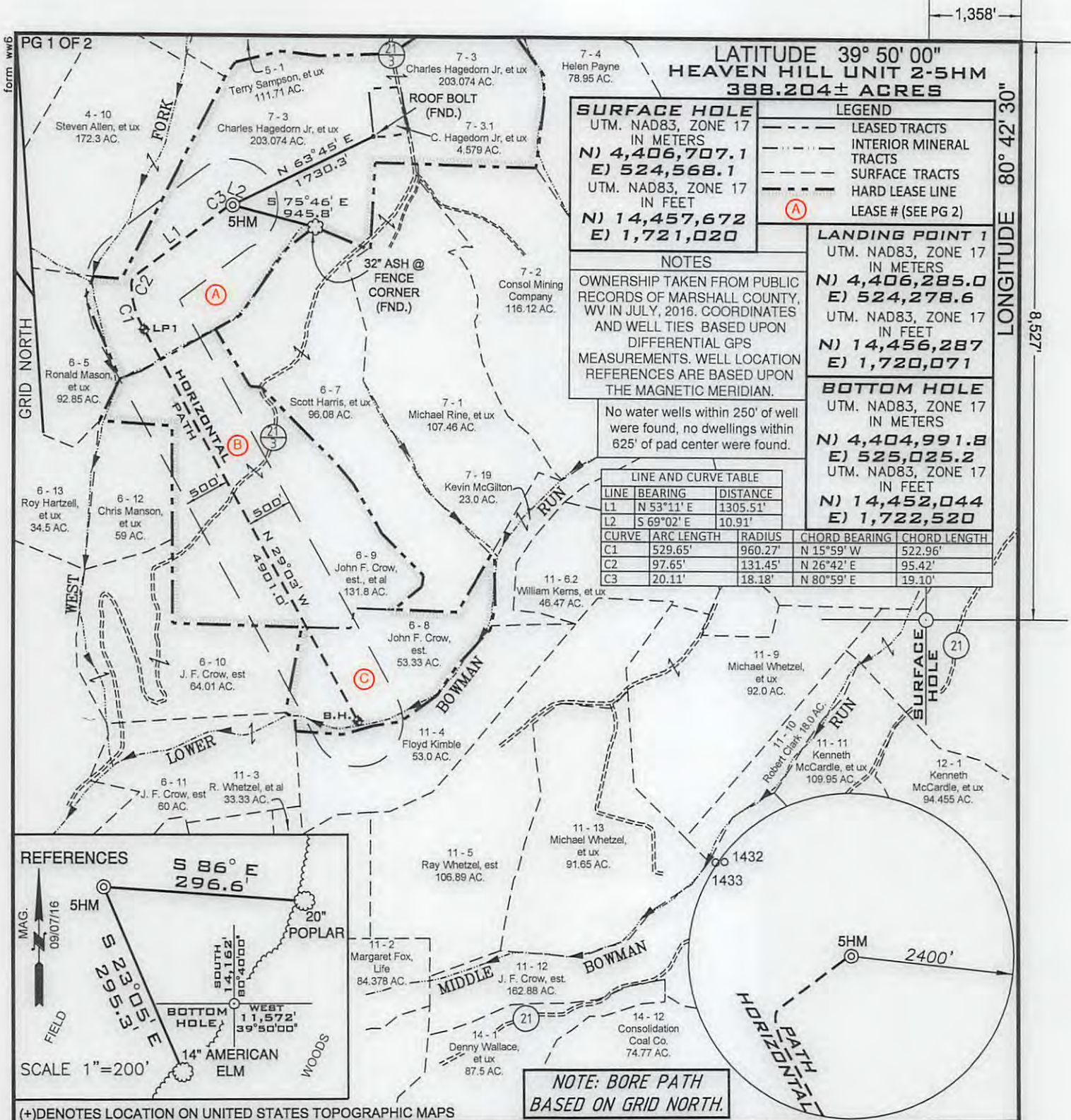
51-01884

PROPOSED HEAVEN HILL UNIT 2-5HM



 TUG HILL OPERATING	OPERATOR	TOPO SECTION	UNIT NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	GLEN EASTON 7.5'	HEAVEN HILL UNIT 2
		SCALE: 1" = 2000'	DATE: DATE: 09/23/16

02/10/2017



LATITUDE 39° 50' 00"
HEAVEN HILL UNIT 2-5HM
388.204± ACRES

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,707.1
E) 524,568.1
UTM. NAD83, ZONE 17
IN FEET
N) 14,457,672
E) 1,721,020

LEGEND

- LEASED TRACTS
- INTERIOR MINERAL TRACTS
- SURFACE TRACTS
- HARD LEASE LINE
- LEASE # (SEE PG 2)

NOTES

OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN JULY, 2016. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,285.0
E) 524,278.6
UTM. NAD83, ZONE 17
IN FEET
N) 14,456,287
E) 1,720,071

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,404,991.8
E) 525,025.2
UTM. NAD83, ZONE 17
IN FEET
N) 14,452,044
E) 1,722,520

No water wells within 250' of well were found, no dwellings within 625' of pad center were found.

FILE NUMBER 163-697
DRAWING NUMBER HHU2_WP_5HM
SCALE 1" = 1500'
MINIMUM DEGREE OF ACCURACY 1/2500
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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

P.S. 2122 Jonathan N. White



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



DATE: SEPTEMBER 24, 2016
OPERATORS WELL NO. Heaven Hill Unit 2-5HM

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

API WELL NO. 47-051-01884 H6A
STATE COUNTY PERMIT

LOCATION ELEVATION 1331' WATERSHED (HUC 10) FISH CREEK
DISTRICT MEADE COUNTY MARSHALL
QUADRANGLE GLEN EASTON 7.5' LEASE NUMBER SEE ATTACHED PG 2 OF 2

SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX ACREAGE 203.074
OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL LEASE ACREAGE 388.204
PROPOSED WORK: DRILL CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) ___
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,929' TMD:12,239'
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH TX, 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON WV, 25313

02/10/2017

COUNTY NAME PERMIT

**HEAVEN HILL UNIT 2-5HM
WELL PLAT LEASE INFORMATION**

LEASE NO.	TAG	PARCEL	OIL & GAS ROYALTY OWNER	DEED BOOK	DEED PAGE
10*15505	A	9-7-3	RALPH E. WELLMAN	686	412
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	722	281
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	816	423
10*47051.073.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	888	618
10*47051.073.2	A	9-7-3	PATRIOT RESTORATIONS LLC		
10*47051.073.3	A	9-7-3	TRIENERGY HOLDINGS, LLC	878	330
10*15510	B	9-6-9	ELAINE PHELPS ET VIR	718	326
10*15511	B	9-6-9	DAVID E CROW	718	376
10*15512	B	9-6-9	FRANCES COFFEY	718	328
10*15513	B	9-6-9	KAY KEYES	718	330
10*15514	B	9-6-9	L PAUL CROW	716	336
10*15515	B	9-6-9	DESIRE L CROW	718	334
10*15516	B	9-6-9	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	B	9-6-9	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	B	9-6-9	JOHN CROW	726	580
10*15520	B	9-6-9	TIMOTHY CROW	726	582
10*47051.123.1	B	9-6-9	LLOYD G BAKER	865	389
10*47051.123.2	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143
10*15510	C	9-6-8	ELAINE PHELPS ET VIR	718	326
10*15511	C	9-6-8	DAVID E CROW	718	376
10*15512	C	9-6-8	FRANCES COFFEY	718	328
10*15513	C	9-6-8	KAY KEYES	718	330
10*15514	C	9-6-8	L PAUL CROW	718	336
10*15515	C	9-6-8	DESIRE L CROW	718	334
10*15516	C	9-6-8	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	C	9-6-8	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	C	9-6-8	JOHN CROW	726	580
10*15520	C	9-6-8	TIMOTHY CROW	726	582
10*15526	C	9-6-8	CYNTHIA GAY BURNS	782	114
10*15527	C	9-6-8	JOYCE HOPE JARMON	782	329
10*15528	C	9-6-8	FLOY CARLEEN CRADDOCK	782	348
10*15529	C	9-6-8	ANN MADISON	783	176
10*15530	C	9-6-8	JO ANN LITTLEFIELD	783	141
10*15531	C	9-6-8	FLOYDENE S GROVES	783	619
10*15532	C	9-6-8	ALTA BELL KAY	782	89
10*15533	C	9-6-8	LAURA L MORGAN	782	119
10*15534	C	9-6-8	WILLIAM RIAL DENMAN	782	109
10*15535	C	9-6-8	MERRIET E LEWIS	782	125
10*15536	C	9-6-8	JEFFIE HAMAR	792	213
10*15537	C	9-6-8	CHARLOTTE L LOWRY	783	208
10*15538	C	9-6-8	JAMIE C BOREN	797	331
10*15539	C	9-6-8	WILLIAM K HAVINS	800	144
10*15540	C	9-6-8	REBECCA BELL LEVESQUE	800	515
10*15548	C	9-6-8	CHARLOTTE PRICKETT	783	191
10*15549	C	9-6-8	WILLIAM H STURMAN	782	145
10*15550	C	9-6-8	CRAIG STURMAN	782	130
10*15551	C	9-6-8	JOHN FRANK STURMAN	782	135
10*15552	C	9-6-8	JANIE E STURMAN	782	140
10*47051.123.1	C	9-6-8	LLOYD G BAKER	865	389
10*47051.123.2	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143

02/10/2017

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

1,358'

LONGITUDE 80° 42' 30"

8,527'

LATITUDE 39° 50' 00"
HEAVEN HILL UNIT 2-5HM
388.204± ACRES

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,707.1
E) 524,568.1
UTM. NAD83, ZONE 17
IN FEET
N) 14,457,672
E) 1,721,020

LEGEND
--- LEASE TRACTS
--- INTERIOR MINERAL TRACTS
--- SURFACE TRACTS
--- HARD LEASE LINE
--- LEASE # (SEE PG 2)

NOTES
OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN JULY, 2016. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

No water wells within 250' of well were found, no dwellings within 625' of pad center were found.

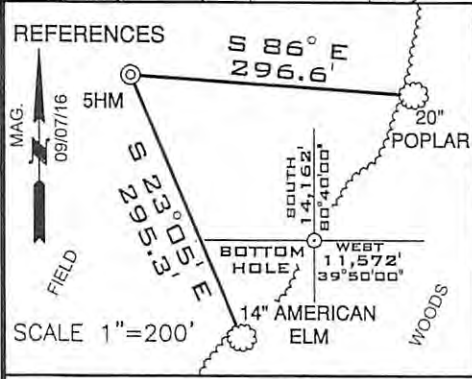
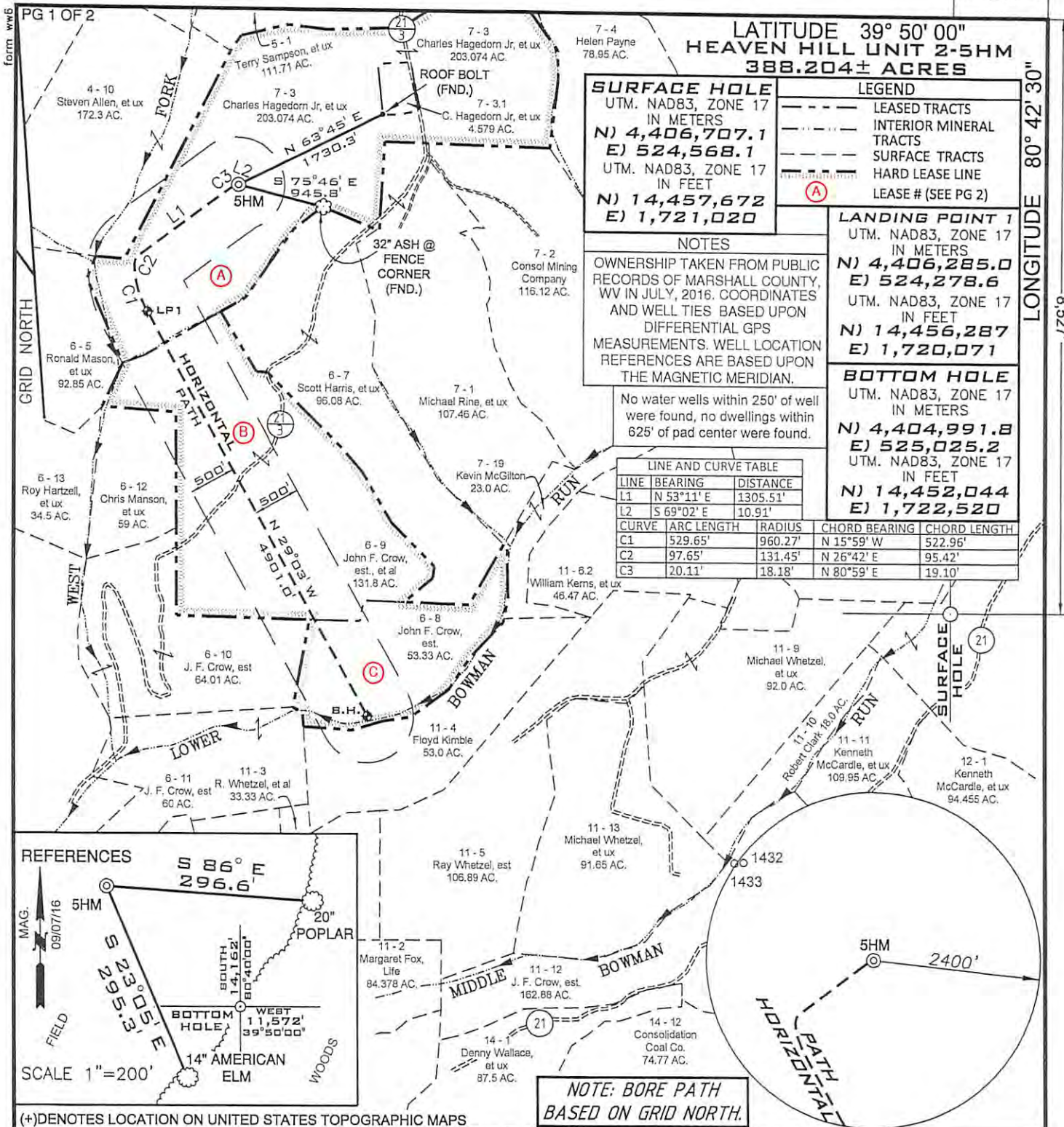
LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,285.0
E) 524,278.6
UTM. NAD83, ZONE 17
IN FEET
N) 14,456,287
E) 1,720,071

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,404,991.8
E) 525,025.2
UTM. NAD83, ZONE 17
IN FEET
N) 14,452,044
E) 1,722,520

LINE AND CURVE TABLE

LINE	BEARING	DISTANCE
L1	N 53°11' E	1305.51'
L2	S 69°02' E	10.91'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	529.65'	960.27'	N 15°59' W	522.96'
C2	97.65'	131.45'	N 26°42' E	95.42'
C3	20.11'	18.18'	N 80°59' E	19.10'



NOTE: BORE PATH BASED ON GRID NORTH.

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

FILE NUMBER 163-697

DRAWING NUMBER HHU2-WP_5HM

SCALE 1" = 1500'

MINIMUM DEGREE OF ACCURACY 1/2500

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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

P.S. 2122 Jonathan N. White



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

DATE: SEPTEMBER 24, 2016
OPERATORS WELL NO. Heaven Hill Unit 2-5HM

WELL TYPE: OIL ___ GAS LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION STORAGE ___ DEEP ___ SHALLOW
API WELL NO. 47-051-01884H6A
STATE COUNTY PERMIT

LOCATION ELEVATION 1331' WATERSHED (HUC 10) FISH CREEK
DISTRICT MEADE COUNTY MARSHALL
QUADRANGLE GLEN EASTON 7.5' LEASE NUMBER SEE ATTACHED PG 2 OF 2

SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX ACREAGE 203.074

OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL LEASE ACREAGE 388.204

PROPOSED WORK: DRILL CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) ___
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,929' TMD:12,239'

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

02/10/2017

COUNTY NAME PERMIT

**HEAVEN HILL UNIT 2-5HM
WELL PLAT LEASE INFORMATION**

LEASE NO.	TAG	PARCEL	OIL & GAS ROYALTY OWNER	DEED BOOK	DEED PAGE
10*15505	A	9-7-3	RALPH E. WELLMAN	686	412
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	722	281
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	816	423
10*47051.073.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	888	618
10*47051.073.2	A	9-7-3	PATRIOT RESTORATIONS LLC		
10*47051.073.3	A	9-7-3	TRIENERGY HOLDINGS, LLC	878	330
10*15510	B	9-6-9	ELAINE PHELPS ET VIR	718	326
10*15511	B	9-6-9	DAVID E CROW	718	376
10*15512	B	9-6-9	FRANCES COFFEY	718	328
10*15513	B	9-6-9	KAY KEYES	718	330
10*15514	B	9-6-9	L PAUL CROW	716	336
10*15515	B	9-6-9	DESIRE L CROW	718	334
10*15516	B	9-6-9	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	B	9-6-9	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	B	9-6-9	JOHN CROW	726	580
10*15520	B	9-6-9	TIMOTHY CROW	726	582
10*47051.123.1	B	9-6-9	LLOYD G BAKER	865	389
10*47051.123.2	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143
10*15510	C	9-6-8	ELAINE PHELPS ET VIR	718	326
10*15511	C	9-6-8	DAVID E CROW	718	376
10*15512	C	9-6-8	FRANCES COFFEY	718	328
10*15513	C	9-6-8	KAY KEYES	718	330
10*15514	C	9-6-8	L PAUL CROW	718	336
10*15515	C	9-6-8	DESIRE L CROW	718	334
10*15516	C	9-6-8	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	C	9-6-8	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	C	9-6-8	JOHN CROW	726	580
10*15520	C	9-6-8	TIMOTHY CROW	726	582
10*15526	C	9-6-8	CYNTHIA GAY BURNS	782	114
10*15527	C	9-6-8	JOYCE HOPE JARMON	782	329
10*15528	C	9-6-8	FLOY CARLEEN CRADDOCK	782	348
10*15529	C	9-6-8	ANN MADISON	783	176
10*15530	C	9-6-8	JO ANN LITTLEFIELD	783	141
10*15531	C	9-6-8	FLOYDENE S GROVES	783	619
10*15532	C	9-6-8	ALTA BELL KAY	782	89
10*15533	C	9-6-8	LAURA L MORGAN	782	119
10*15534	C	9-6-8	WILLIAM RIAL DENMAN	782	109
10*15535	C	9-6-8	MERRIET E LEWIS	782	125
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10*15537	C	9-6-8	CHARLOTTE L LOWRY	783	208
10*15538	C	9-6-8	JAMIE C BOREN	797	331
10*15539	C	9-6-8	WILLIAM K HAVINS	800	144
10*15540	C	9-6-8	REBECCA BELL LEVESQUE	800-D	515
10*15548	C	9-6-8	CHARLOTTE PRICKETT	783	191
10*15549	C	9-6-8	WILLIAM H STURMAN	782	145
10*15550	C	9-6-8	CRAIG STURMAN	782	130
10*15551	C	9-6-8	JOHN FRANK STURMAN	782	135
10*15552	C	9-6-8	JANIE E STURMAN	782	149
10*47051.123.1	C	9-6-8	LLOYD G BAKER	865	389
10*47051.123.2	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143

02/10/2017

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

51-01884

WW-6A1
(5/13)

Operator's Well No. Heaven Hill Unit 2-5HM

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

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

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

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

*See attached

**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: Jonathan White *Jonathan White*
 Its: Regulatory Analyst - Appalachia Region

RECEIVED
Office of Oil and Gas

06/08/2016

WV Department of Environmental Protection

51-01884

Lease Name or No.	Tag	Parcel	Grantor, Lessor, ect.	Grantee, Lessee, ect.	Royalty	Deed Book/Pg		Assignment	Assignment	Assignment
10*15505	A	9-7-3	RALPH E. WELLMAN	TH EXPLORATION LLC	1/8+	686	412	N/A	N/A	N/A
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	TRIENERGY HOLDINGS, LLC	1/8+	722	281	Tri Energy to NPAR: 24/196	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	CHEVRON USA INC	1/8+	816	423	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.073.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	TH EXPLORATION LLC	1/8+	888	618	N/A	N/A	N/A
10*47051.073.2	A	9-7-3	PATRIOT RESTORATIONS LLC	TH EXPLORATION LLC	1/8+			N/A	N/A	N/A
10*47051.073.3	A	9-7-3	TRIENERGY HOLDINGS, LLC	TH EXPLORATION LLC	1/8+	878	330	N/A	N/A	N/A
10*15510	B	9-6-9	ELAINE PHELPS ET VIR	TRIENERGY HOLDINGS, LLC	1/8+	718	326	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15511	B	9-6-9	DAVID E CROW	TRIENERGY HOLDINGS, LLC	1/8+	718	376	Tri Energy to NPAR: 25/463	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15512	B	9-6-9	FRANCES COFFEY	TRIENERGY HOLDINGS, LLC	1/8+	718	328	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15513	B	9-6-9	KAY KEYES	TRIENERGY HOLDINGS, LLC	1/8+	718	330	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15514	B	9-6-9	L PAUL CROW	TRIENERGY HOLDINGS, LLC	1/8+	716	336	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15515	B	9-6-9	DESIRE L CROW	TRIENERGY HOLDINGS, LLC	1/8+	718	334	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15516	B	9-6-9	ROSE MARIE KIELGCZEWSKI	TRIENERGY HOLDINGS, LLC	1/8+	718	354	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15517	B	9-6-9	DIANNE GELLNER & GARY GELLNER	TRIENERGY HOLDINGS, LLC	1/8+	718	345	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15518	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TRIENERGY HOLDINGS, LLC	1/8+	718	347	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15519	B	9-6-9	JOHN CROW	TRIENERGY HOLDINGS, LLC	1/8+	726	580	Tri Energy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15520	B	9-6-9	TIMOTHY CROW	TRIENERGY HOLDINGS, LLC	1/8+	726	582	Tri Energy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*47051.123.1	B	9-6-9	LLOYD G BAKER	TH EXPLORATION LLC	1/8+	865	389	N/A	N/A	N/A
10*47051.123.2	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TH EXPLORATION LLC	1/8+	873	143	N/A	N/A	N/A
10*15510	C	9-6-8	ELAINE PHELPS ET VIR	TRIENERGY HOLDINGS, LLC	1/8+	718	326	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15511	C	9-6-8	DAVID E CROW	TRIENERGY HOLDINGS, LLC	1/8+	718	376	Tri Energy to NPAR: 25/463	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15512	C	9-6-8	FRANCES COFFEY	TRIENERGY HOLDINGS, LLC	1/8+	718	328	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15513	C	9-6-8	KAY KEYES	TRIENERGY HOLDINGS, LLC	1/8+	718	330	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15514	C	9-6-8	L PAUL CROW	TRIENERGY HOLDINGS, LLC	1/8+	718	336	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15515	C	9-6-8	DESIRE L CROW	TRIENERGY HOLDINGS, LLC	1/8+	718	334	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15516	C	9-6-8	ROSE MARIE KIELGCZEWSKI	TRIENERGY HOLDINGS, LLC	1/8+	718	354	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15517	C	9-6-8	DIANNE GELLNER & GARY GELLNER	TRIENERGY HOLDINGS, LLC	1/8+	718	345	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15518	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TRIENERGY HOLDINGS, LLC	1/8+	718	347	Tri Energy to NPAR: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15519	C	9-6-8	JOHN CROW	TRIENERGY HOLDINGS, LLC	1/8+	726	580	Tri Energy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15520	C	9-6-8	TIMOTHY CROW	TRIENERGY HOLDINGS, LLC	1/8+	726	582	Tri Energy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15526	C	9-6-8	CYNTHIA GAY BURNS	CHEVRON USA INC	1/8+	782	114	N/A	N/A	Chevron to Tug Hill: 36/148
10*15527	C	9-6-8	JOYCE HOPE JARMON	CHEVRON USA INC	1/8+	782	329	N/A	N/A	Chevron to Tug Hill: 36/148
10*15528	C	9-6-8	FLOY CARLEEN CRADDOCK	CHEVRON USA INC	1/8+	782	348	N/A	N/A	Chevron to Tug Hill: 36/148
10*15529	C	9-6-8	ANN MADISON	CHEVRON USA INC	1/8+	783	176	N/A	N/A	Chevron to Tug Hill: 36/148
10*15530	C	9-6-8	JO ANN LITTLEFIELD	CHEVRON USA INC	1/8+	783	141	N/A	N/A	Chevron to Tug Hill: 36/148
10*15531	C	9-6-8	FLOYDENE S GROVES	CHEVRON USA INC	1/8+	783	619	N/A	N/A	Chevron to Tug Hill: 36/148
10*15532	C	9-6-8	ALTA BELL KAY	CHEVRON USA INC	1/8+	782	89	N/A	N/A	Chevron to Tug Hill: 36/148
10*15533	C	9-6-8	LAURA L MORGAN	CHEVRON USA INC	1/8+	782	119	N/A	N/A	Chevron to Tug Hill: 36/148
10*15534	C	9-6-8	WILLIAM RIAL DENMAN	CHEVRON USA INC	1/8+	782	109	N/A	N/A	Chevron to Tug Hill: 36/148
10*15535	C	9-6-8	MERRIET E LEWIS	CHEVRON USA INC	1/8+	782	125	N/A	N/A	Chevron to Tug Hill: 36/148
10*15536	C	9-6-8	JEFFIE HAMAR	CHEVRON USA INC	1/8+	792	213	N/A	N/A	Chevron to Tug Hill: 36/148
10*15537	C	9-6-8	CHARLOTTE L LOWRY	CHEVRON USA INC	1/8+	783	208	N/A	N/A	Chevron to Tug Hill: 36/148
10*15538	C	9-6-8	JAMIE C BOREN	CHEVRON USA INC	1/8+	797	331	N/A	N/A	Chevron to Tug Hill: 36/148
10*15539	C	9-6-8	WILLIAM K HAVINS	CHEVRON USA INC	1/8+	800	144	N/A	N/A	Chevron to Tug Hill: 36/148
10*15540	C	9-6-8	REBECCA BELL LEVESQUE	CHEVRON USA INC	1/8+	800	515	N/A	N/A	Chevron to Tug Hill: 36/148
10*15548	C	9-6-8	CHARLOTTE PRICKETT	CHEVRON USA INC	1/8+	783	191	N/A	N/A	Chevron to Tug Hill: 36/148
										Page 2 of 3

51-01884

Lease Name or No.	Tag	Parcel	Grantor, Lessor, ect.	Grantee, Lessee, ect.	Royalty	Deed Book/Pg		Assignment	Assignment	Assignment
10*15549	C	9-6-8	WILLIAM H STURMAN	CHEVRON USA INC	1/8+	782	145	N/A	N/A	Chevron to Tug Hill: 36/148
10*15550	C	9-6-8	CRAIG STURMAN	CHEVRON USA INC	1/8+	782	130	N/A	N/A	Chevron to Tug Hill: 36/148
10*15551	C	9-6-8	JOHN FRANK STURMAN	CHEVRON USA INC	1/8+	782	135	N/A	N/A	Chevron to Tug Hill: 36/148
10*15552	C	9-6-8	JANIE E STURMAN	CHEVRON USA INC	1/8+	782	140	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.123.1	C	9-6-8	LLOYD G BAKER	TH EXPLORATION LLC	1/8+	865	389	N/A	N/A	N/A
10*47051.123.2	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TH EXPLORATION LLC	1/8+	873	143	N/A	N/A	N/A

RECEIVED
Office of Oil and Gas

OCT 04 2016

WV Department of
Environmental Protection

AFFIDAVIT

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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

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

FURTHER, AFFIANT SAITH NOT.

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

David D. Kalish
Affiant: David D. Kalish

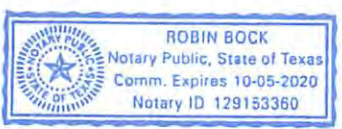
JURAT

Carroll S. Haupt
WETZEL County 10:29:27 AM
Instrument No 212093
Date Recorded 10/20/2016
Document Type AFFID
Pages Recorded 1
Book-Page 119-291
Recording Fee \$5.00
Additional \$6.00

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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

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



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



September 16, 2016

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

RE: Heaven Hill Unit 2-5HM

Subject: County Route 21/3 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 21/3 in the area reflected on the Heaven Hill Unit 2-5HM well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Route 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 304-689-7676, or by email at jwhite@tug-hilop.com.

Sincerely,

A handwritten signature in blue ink that reads "Jonathan White".

Jonathan White
Regulatory Analyst – Appalachia Region
Cell 304-689-7676
Email: jwhite@tug-hilop.com

RECEIVED
Office of Oil and Gas

OCT 04 2016

WV Department of
Environmental Protection

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

Date of Notice Certification: 09/30/2016

API No. 47- 051 - 01884

Operator's Well No. Heaven Hill Unit 2-5HM

Well Pad Name: Heaven Hill Unit 2

Notice has been given:

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

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>524,568.1</u>
County: <u>Marshall</u>	Northing: <u>4,406,707.1</u>
District: <u>Meade</u>	Public Road Access: <u>Blake Ridge Road (Co. Rt. 21/3)</u>
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>Charles R. Hagedorn, Jr., et ux</u>
Watershed: <u>(HUC 10) Fish Creek</u>	

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

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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Required Attachments:

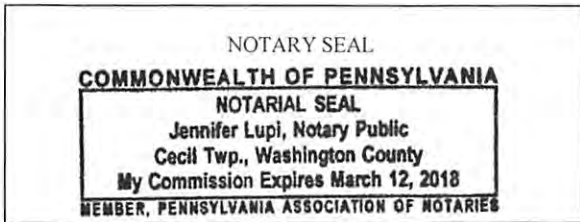
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication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

02/10/2017

Certification of Notice is hereby given:

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Blvd, Southpointe Plaza II, Suite 200</u>
By:	<u>Jonathan White</u> <i>Jonathan White</i>		<u>Canonsburg, PA 15317</u>
Its:	<u>Regulatory Analyst - Appalachia</u>	Facsimile:	<u>724-338-2030</u>
Telephone:	<u>724-338-2026</u>	Email:	<u>jwhite@tug-hilop.com</u>



Subscribed and sworn before me this 30th day of September 2016
Jennifer Lupi Notary Public
 My Commission Expires March 12, 2018

Oil and Gas Privacy Notice:

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

RECEIVED
Office of Oil and Gas

OCT 04 2016

WV Department of
Environmental Protection

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: 09/30/2016 Date Permit Application Filed: 10/03/2016

Notice of:

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

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

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

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

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

SURFACE OWNER(s)

Name: Charles R. Hagedorn, Jr., ex ux
Address: 78 Hagedorn Drive
Glen Easton, WV 26039

Name: _____
Address: _____

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

Name: Michael J. Rine, et ux
Address: 1466 Blake Ridge Road
Glen Easton, WV 26039

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

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

COAL OPERATOR

Name: _____
Address: _____

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

Name: _____
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

*Please attach additional forms if necessary

Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

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

Well Location Restrictions

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

02/10/2017

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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Office of Oil and Gas

OCT 04 2016

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.**

Department of
Environmental Protection

02/10/2017

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

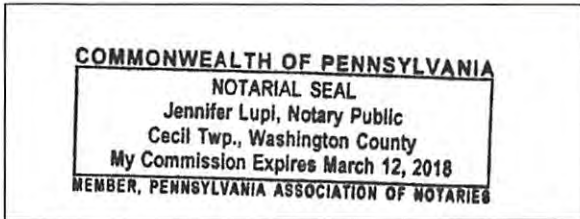
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC *Jonathan White*
Telephone: 724-338-2026
Email: jwhite@tug-hilltop.com

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

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 30th day of Sept, 2016.
Jennifer Lupi Notary Public
My Commission Expires March 12, 2018

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Office of Oil and Gas
OCT 04 2016
WV Department of
Environmental Protection **02/10/2017**

WW-6A

Supplement Pg. 1A

September 23, 2016
 Tug Hill Operating, LLC
 380 Southpointe BLVD
 Suite 200
 Canonsburg, PA 15317

WATER WELL REPORT

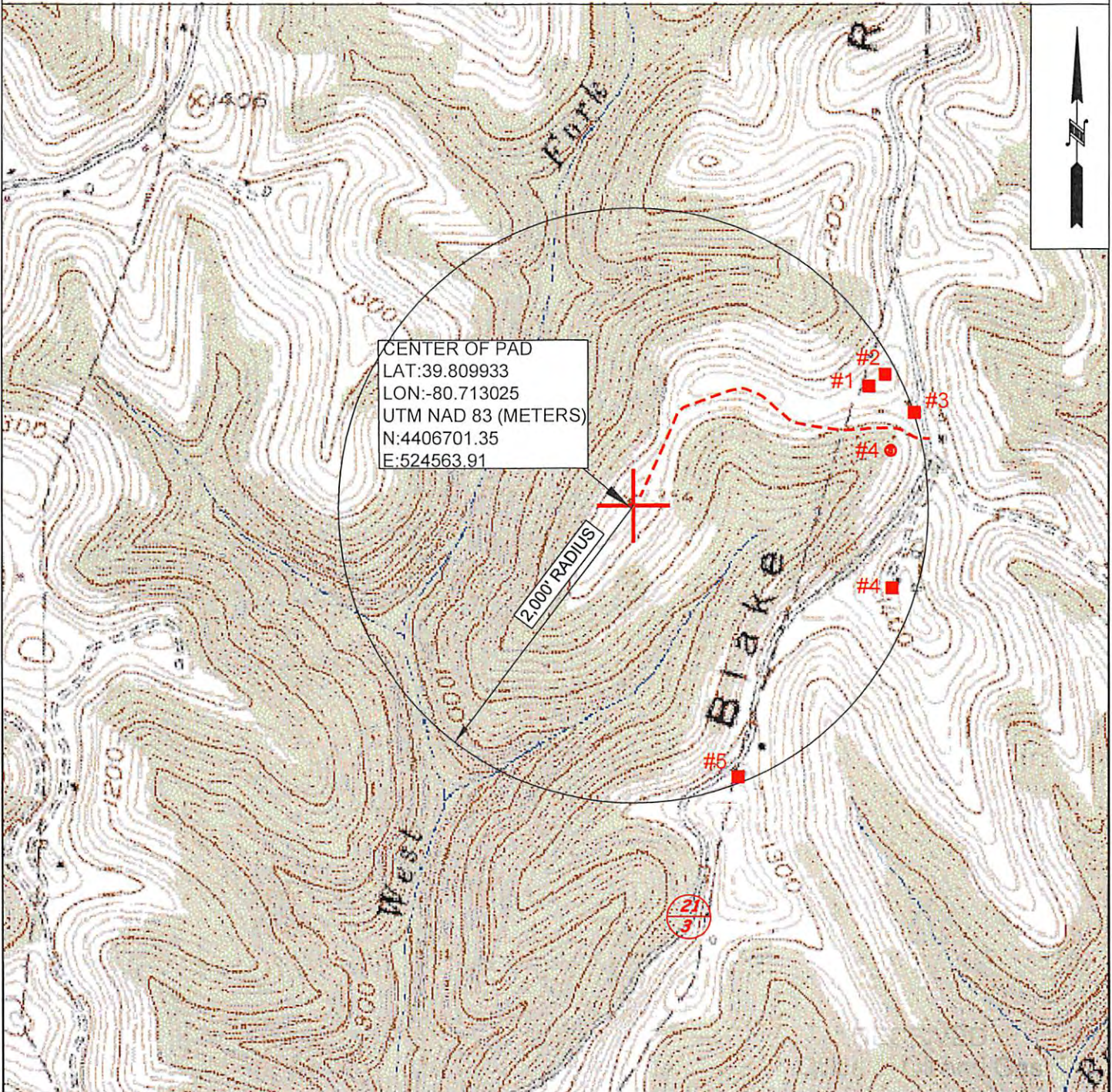
Well: Heaven Hill Unit 2-5HM
 District: Meade
 County: Marshall
 State: WV

There appears to be No (6) possible water sources within 2,000 feet of the above referenced well location.

House 1 TM 07 Par. 3.1 Charles R. Hagedorn Jr., et ux Phone 304-845-7332 78 Hagedorn Rd. Glen Easton, WV 26039	House 2 TM 07 Par. 3.1 Charles R. Hagedorn Jr., et ux Phone 304-845-7332 78 Hagedorn Rd. Glen Easton, WV 26039	House 3 TM 07 Par. 3 Charles R. Hagedorn Jr., et ux Phone 304-845-7332 78 Hagedorn Rd. Glen Easton, WV 26039
House 4 TM 07 Par. 1 Michael Rine, et ux Phone 304-845-4437 1466 Blake Ridge Road Glen Easton, WV 26039	Spring with House 4 TM 07 Par. 1 Michael Rine, et ux Phone 304-845-4437 1466 Blake Ridge Road Glen Easton, WV 26039	House 5 TM 06 Par. 07 Scott & Carolyn Harris Phone 304-845-0747 1944 Blake Ridge Road Glen Easton, WV 26039

PROPOSED HEAVEN HILL UNIT 2-5HM

There appear to be (6) possible water sources within 2,000'.



TUG HILL
OPERATING

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

TOPO SECTION
 GLEN EASTON 7.5'
 SCALE:
 1" = 2000'

UNIT NAME
 HEAVEN HILL UNIT 2
 DATE:
 DATE: 09/23/16

02/10/2017

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

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

Date of Notice: April 14, 2016 **Date of Planned Entry:** April 25, 2016

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

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

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

Notice is hereby provided to:

SURFACE OWNER(s)

Name: Charles R. Hagedorn, Jr., et ux

Address: 78 Hagedorn Drive
Glen Easton, WV 26039

Name: Michael J. Rine, et ux

Address: 1466 Blake Ridge Road
Glen Easton, WV 26039

Name: _____

Address: _____

COAL OWNER OR LESSEE

Name: Murray Energy Corporation

Address: 46226 National Road
St. Clairsville, OH 43950

MINERAL OWNER(s)

Name: JMK Irrevocable Trust

Address: 600 Texas Street, Suite 101
Fort Worth, TX 76102

*please attach additional forms if necessary

Notice is hereby given:

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

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>Lat: 39.8097831, Long: -80.7132669</u>
County: <u>Marshall</u>	Public Road Access: <u>Blake Ridge Road (Co. Rt. 21/3)</u>
District: <u>Meade</u>	Watershed: <u>West Fork / HUC-10 Fish Creek</u>
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>Charles R. Hagedorn</u>

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

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC

Telephone: 724-338-2026

Email: jwhite@tug-hilltop.com

Address: 380 Southpointe Blvd, Suite 200
Canonsburg, PA 15317

Facsimile: 724-338-2030

OCT 04 2016

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.

WW-6A3 Notice of Entry for Plat Survey

Attachment 1 of 1

Mineral Owner(s):

Name: Marcellus TX Minerals Partners, LTD
Address: 5111 Broadway Street
San Antonio, TX 78209

Name: Purpleburgh Ventures, LLC
Address: 600 Texas Street, Suite 101
Fort Worth, TX 76102

Name: Charles R. Hagedorn, Jr., et ux
Address: 78 Hagedorn Drive
Glen Easton, WV 26039

Name: Venango 21st Century
Address: 301 Moon Clinton Road
Moon Township, PA 15108

Name: TriEnergy Holdings, LLC
Address: 412 Beaver Street, 2nd Floor
Sewickley, PA 15143

Name: Patriot Restoration
Address: 713 Sycamore Road Extension
Sewickley, PA 15143

Name: Ralph E. Wellman
Address: 1824 4th Street
Moundsville, WV 26041



WV Department of Environmental Protection
Office of Oil and Gas
OCT 11 2016

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

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

Date of Notice: April 25, 2016 **Date of Planned Entry:** May 4, 2016

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

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

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

Notice is hereby provided to:

SURFACE OWNER(s)

Name: Charles R. Hagedorn, Jr., et ux
Address: 78 Hagedorn Drive
Glen Easton, WV 26039

Name: Michael J. Rine, et ux
Address: 1466 Blake Ridge Road
Glen Easton, WV 26039

Name: _____
Address: _____

COAL OWNER OR LESSEE

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

MINERAL OWNER(s)

Name: JMK Irrevocable Trust
Address: 600 Texas Street, Suite 101
Fort Worth, TX 76102

*please attach additional forms if necessary

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District: <u>Meade</u>	Watershed: <u>West Fork / HUC-10 Fish Creek</u>
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>Charles R. Hagedorn</u>

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Notice is hereby given by:

Well Operator: <u>Tug Hill Operating, LLC</u>	Address: <u>380 Southpointe Blvd, Suite 200</u>
Telephone: <u>724-338-2026</u>	<u>Canonsburg, PA 15317</u>
Email: <u>jwhite@tug-hill-op.com</u>	Facsimile: <u>724-338-2030</u>

Oil and Gas Privacy Notice:

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

02/10/2017
WV Department of Environmental Protection

WW-6A3 Notice of Entry for Plat Survey**Attachment 1 of 1****Mineral Owner(s):**

Name: Marcellus TX Minerals Partners, LTD
Address: 307 W 7th St.
Fort Worth, TX 76102

Name: Purpleburgh Ventures, LLC
Address: 306 W 7th St.
Fort Worth, TX 76102

Name: Charles R. Hagedorn, Jr., et ux
Address: 78 Hagedorn Drive
Glen Easton, WV 26039

Name: Venango 21st Century
Address: 301 Moon Clinton Road
Moon Township, PA 15108

Name: TriEnergy Holdings, LLC
Address: 412 Beaver Street, 2nd Floor
Sewickley, PA 15143

Name: Patriot Restoration
Address: 713 Sycamore Road Extension
Sewickley, PA 15143

Name: Ralph E. Wellman
Address: 2209 Bowman Ridge Rd.
Glen Easton, WV 26039

51-01884



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Earl Ray Tomblin
Governor

Paul A. Mattox, Jr., P. E.
Secretary of Transportation/
Commissioner of Highways

September 16, 2016

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 2 Pad, Marshall County
Heaven Hills Unit 2 5HM Well site

Dear Mr. Martin,

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

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

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

RECEIVED
Oil and Gas

OCT 04 2016

WV Department of
Transportation

02/10/2017



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Heaven Hill Unit 2-5HM

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

APPROVED
Timothy Trend Gas

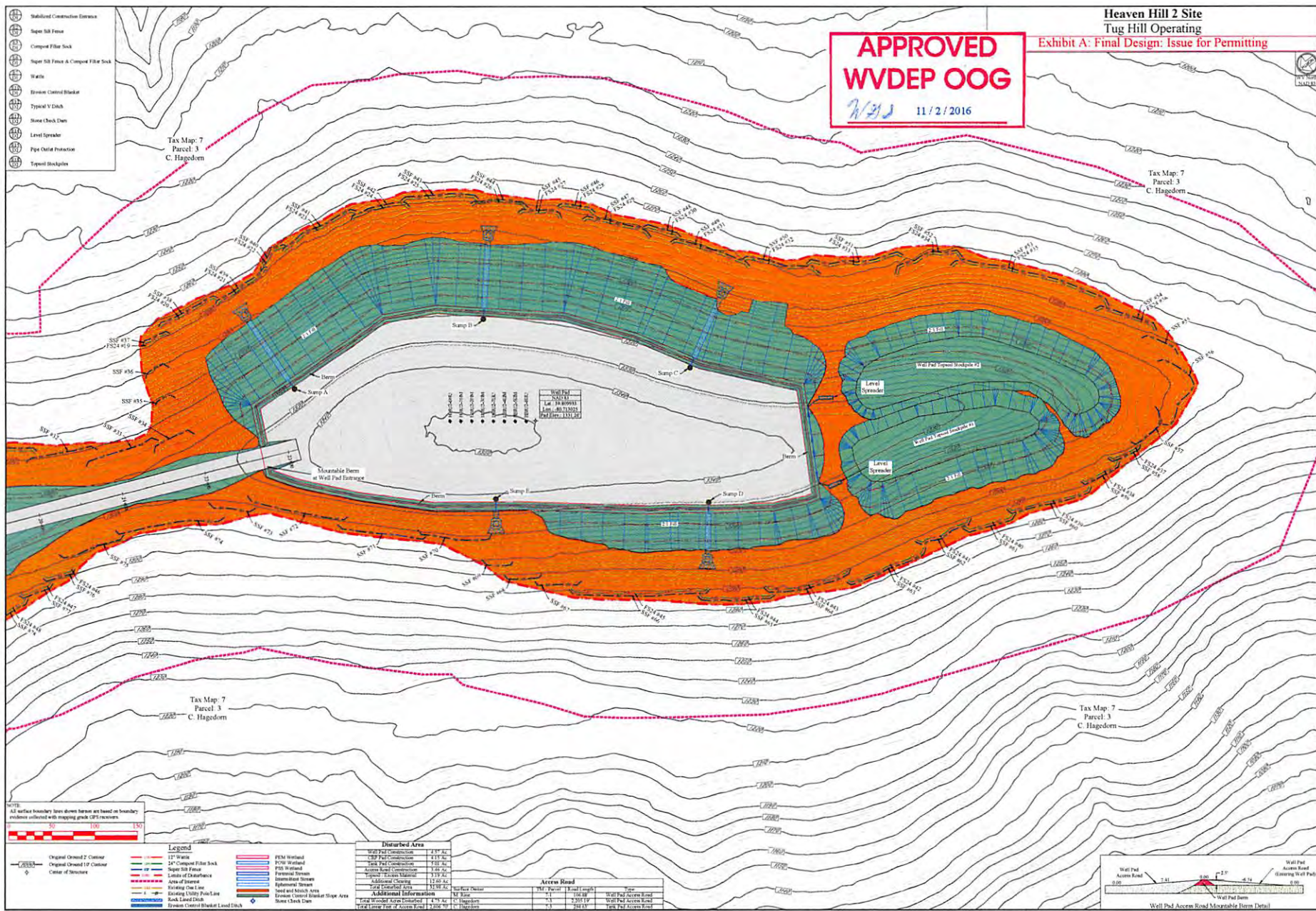
OCT 04 2016

Department of
Environmental Protection

Heaven Hill 2 Site
Tug Hill Operating

Exhibit A: Final Design: Issue for Permitting

APPROVED
WVDEP OOG
11/2/2016



- Standard Construction Entrance
- Super 500 Fence
- Compost Filter Sock
- Super 500 Fence & Compost Filter Sock
- Walls
- Erosion Control Blanket
- Typical V Check
- Stone Check Dam
- Level Spreader
- Pipe Outlet Protection
- Tripnet Blankets

Tax Map 7
Parcel 3
C. Hagedorn

Tax Map 7
Parcel 3
C. Hagedorn

Tax Map 7
Parcel 3
C. Hagedorn

Tax Map 7
Parcel 3
C. Hagedorn

NOTE: All surface boundaries shown herein are based on boundary evidence collected with mapping grade GPS receivers.



Legend

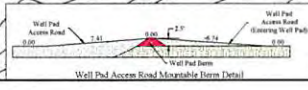
Original Graded 2' Contour	18" Wattle	50% Wattle
Original Graded 10' Contour	24" Compost Filter Sock	80% Wattle
Center of Structure	Super 500 Fence	95% Wattle
	Level of Clearance	Formal Stream
	Formal Erosion Structure	Informal Stream
	Area of Interest	Equivalent Stream
	Existing Utility Pole Line	Head and Tailcut Area
	Rock Load Check	Erosion Control Blanket Slope Area
	Erosion Control Blanket Load Check	Stone Check Dam

Disturbed Area

Well Pad Construction	2.97 Ac.
WSP Pad Construction	2.18 Ac.
Rock Pad Construction	1.01 Ac.
Access Road Construction	1.88 Ac.
Formal Erosion Structure	1.73 Ac.
Additional Clearing	17.60 Ac.
Total Disturbed Area	29.47 Ac.

Access Road

Surface Details	MP	Station	Width (Feet)	Area
MP Base	1.1	100+00	20	Well Pad Access Road
MP Base	1.5	200+00	20	Well Pad Access Road
MP Base	1.3	300+00	20	Well Pad Access Road
Total Linear Feet of Access Road: 2,025' 00"				



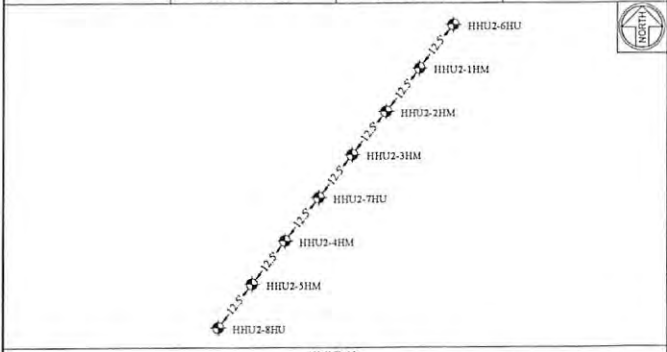
Revision: 11/2/2016
 Design: WV DEP, P. Reynolds
 Date: 10/21/2016
TUG HILL OPERATING

 THIS DOCUMENT PREPARED FOR TUG HILL OPERATING
Kelly Surveys
 Erosion and Sediment Control Plan
Heaven Hill 2 Site
 Meigs District
 Marshall County, WV
 Date: 09/23/2016
 Scale: As Shown
 Drawn By: ZS
 File No:
 Sheet 8 of 22

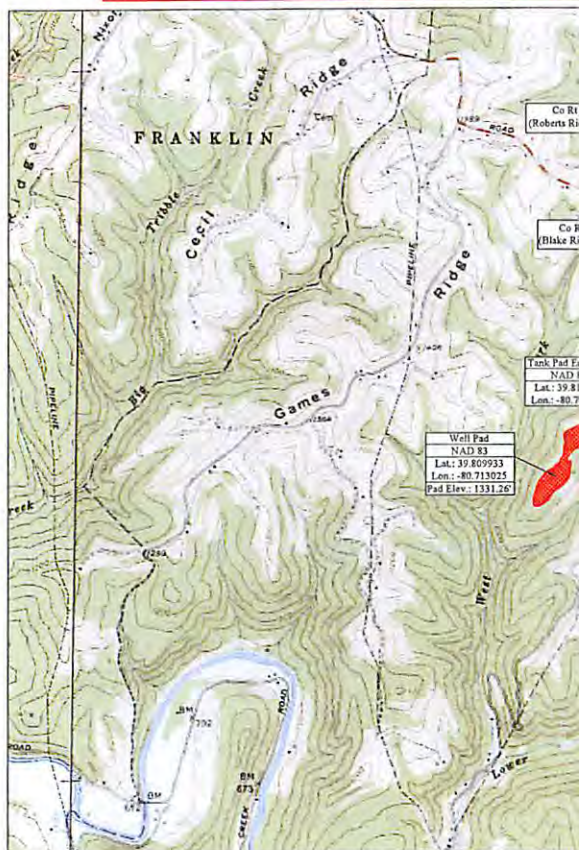


Exhibit A: Final De

Well Pad Site Entrance WV-N NAD 83 N: 479905.89 WV-N NAD 83 E: 1629790.37 WV-N NAD 27 N: 479869.23 WV-N NAD 27 E: 1661227.19 Lat. NAD 83: 39.811344 Lon. NAD 83: -80.705763 Lat. NAD 27: 39.811265 Lon. NAD 27: -80.705955 UTM 17 NAD 83 N: 4406839.59 UTM 17 NAD 83 E: 525184.95	Center of CRP Pad WV-N NAD 83 N: 480282.56 WV-N NAD 83 E: 1628301.63 WV-N NAD 27 N: 480245.93 WV-N NAD 27 E: 1659738.49 Lat. NAD 83: 39.812323 Lon. NAD 83: -80.711080 Lat. NAD 27: 39.812246 Lon. NAD 27: -80.711272 UTM 17 NAD 83 N: 4406967.16 UTM 17 NAD 83 E: 524729.49 Pad Elev.: 1348.32'	Center of Well Pad WV-N NAD 83 N: 479419.37 WV-N NAD 83 E: 1627743.73 WV-N NAD 27 N: 479382.76 WV-N NAD 27 E: 1659180.61 Lat. NAD 83: 39.809933 Lon. NAD 83: -80.713025 Lat. NAD 27: 39.809855 Lon. NAD 27: -80.713217 UTM 17 NAD 83 N: 4406701.35 UTM 17 NAD 83 E: 524553.91 Pad Elev.: 1331.26'	Tank Pad Site Entrance WV-N NAD 83 N: 480909.64 WV-N NAD 83 E: 1629565.88 WV-N NAD 27 N: 480872.99 WV-N NAD 27 E: 1661002.69 Lat. NAD 83: 39.814091 Lon. NAD 83: -80.706610 Lat. NAD 27: 39.814014 Lon. NAD 27: -80.706802 UTM 17 NAD 83 N: 4407164.64 UTM 17 NAD 83 E: 525111.45	Center of Tank Pad WV-N NAD 83 N: 481104.59 WV-N NAD 83 E: 1630088.18 WV-N NAD 27 N: 481067.92 WV-N NAD 27 E: 1661524.98 Lat. NAD 83: 39.814645 Lon. NAD 83: -80.704761 Lat. NAD 27: 39.814568 Lon. NAD 27: -80.704953 UTM 17 NAD 83 N: 4407226.69 UTM 17 NAD 83 E: 525269.58 Pad Elev.: 1326.53'
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Well Table			
HHIU2-6HU WV-N NAD 83 N: 479497.28 WV-N NAD 83 E: 1627803.89 WV-N NAD 27 N: 479460.67 WV-N NAD 27 E: 1659240.76 Lat. NAD 83: 39.810169 Lon. NAD 83: -80.712814 Lat. NAD 27: 39.810072 Lon. NAD 27: -80.713006 UTM 17 NAD 83 (m) N: 4406725.39 UTM 17 NAD 83 (m) E: 524581.84	HHIU2-1HM WV-N NAD 83 N: 479487.43 WV-N NAD 83 E: 1627796.20 WV-N NAD 27 N: 479450.81 WV-N NAD 27 E: 1659233.08 Lat. NAD 83: 39.810122 Lon. NAD 83: -80.712841 Lat. NAD 27: 39.810044 Lon. NAD 27: -80.713033 UTM 17 NAD 83 (m) N: 4406722.35 UTM 17 NAD 83 (m) E: 524579.55	HHIU2-2HM WV-N NAD 83 N: 479477.57 WV-N NAD 83 E: 1627788.51 WV-N NAD 27 N: 479440.96 WV-N NAD 27 E: 1659223.39 Lat. NAD 83: 39.810094 Lon. NAD 83: -80.712868 Lat. NAD 27: 39.810017 Lon. NAD 27: -80.713060 UTM 17 NAD 83 (m) N: 4406719.31 UTM 17 NAD 83 (m) E: 524577.26	HHIU2-3HM WV-N NAD 83 N: 479467.71 WV-N NAD 83 E: 1627780.82 WV-N NAD 27 N: 479431.10 WV-N NAD 27 E: 1659217.70 Lat. NAD 83: 39.810057 Lon. NAD 83: -80.712895 Lat. NAD 27: 39.809990 Lon. NAD 27: -80.713087 UTM 17 NAD 83 (m) N: 4406716.27 UTM 17 NAD 83 (m) E: 524574.97
HHIU2-7HU WV-N NAD 83 N: 479457.86 WV-N NAD 83 E: 1627773.13 WV-N NAD 27 N: 479421.25 WV-N NAD 27 E: 1659216.01 Lat. NAD 83: 39.810046 Lon. NAD 83: -80.712922 Lat. NAD 27: 39.809992 Lon. NAD 27: -80.713114 UTM 17 NAD 83 (m) N: 4406713.22 UTM 17 NAD 83 (m) E: 524572.67	HHIU2-4HM WV-N NAD 83 N: 479448.00 WV-N NAD 83 E: 1627765.45 WV-N NAD 27 N: 479411.39 WV-N NAD 27 E: 1659202.33 Lat. NAD 83: 39.810012 Lon. NAD 83: -80.712949 Lat. NAD 27: 39.809935 Lon. NAD 27: -80.713141 UTM 17 NAD 83 (m) N: 4406710.18 UTM 17 NAD 83 (m) E: 524570.38	HHIU2-5HM WV-N NAD 83 N: 479438.15 WV-N NAD 83 E: 1627757.76 WV-N NAD 27 N: 479401.53 WV-N NAD 27 E: 1659194.64 Lat. NAD 83: 39.809985 Lon. NAD 83: -80.712976 Lat. NAD 27: 39.809908 Lon. NAD 27: -80.713167 UTM 17 NAD 83 (m) N: 4406707.14 UTM 17 NAD 83 (m) E: 524568.09	HHIU2-8EU WV-N NAD 83 N: 479428.29 WV-N NAD 83 E: 1627750.07 WV-N NAD 27 N: 479391.68 WV-N NAD 27 E: 1659186.95 Lat. NAD 83: 39.809957 Lon. NAD 83: -80.713003 Lat. NAD 27: 39.809880 Lon. NAD 27: -80.713194 UTM 17 NAD 83 (m) N: 4406704.10 UTM 17 NAD 83 (m) E: 524565.80



Approach Routes:

From Moundsville, WV
Head South on State Rt 2. Turn Left onto State Rt 2 Alt (Round Bottom Hill Road) approximately 4 miles south of Moundsville, WV. Follow State Rt 2 Alt for 1.5 mi. Turn Right onto Co Rt 21 (Lindsey Lane). Follow Co Rt 21 for 1.8 mi. Turn Right onto Co Rt 21 (Roberts Ridge Rd). Follow Co Rt 21 for 1.4 mi. Co Rt 21 (Roberts Ridge Rd) becomes Co Rt 21 (Roberts Ridge St Joseph Rd). Follow Co Rt 21 for 4.4 mi. Turn Left onto Co Rt 21 (Roberts Ridge Rd). Follow Co Rt 21 for 1.1 mi. Turn Right onto Co Rt 21 (Blake Ridge Rd). Follow Co Rt 21 for 1.4 mi. The site entrance will be on the Right (West) side of the road.

Project Contacts

Tug Hill Operating
Jonathan White - Regulatory Analyst
724-485-2000 OFF. 304-685-7676 Cell

Geoff Radler - V.P. Production
817-632-5200 OFF.

Tug Hill Operating, LLC
380 Southpoints Blvd
Southpointe Plaza II, Suite 200
Cannonsburg, PA 15317

Survey and Engineer
Kenneth Kelly
304-339-6983 OFF.

John P. See
304-442-0220 OFF.

Zackary Summerfield
304-339-6987 OFF.

Geotechnical Engineer
American Geotech, Inc.
Kanti Patel
304-340-4277 OFF.

Environmental:
Wetland Delineations as provided by Allstar Ecology dated June 21, 2016

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

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

811
Know what's below.
Call before you dig.

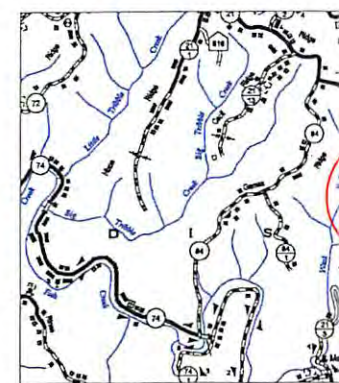
Tug Hill Operating will obtain an Encroachment Permit (Form MM-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities

The WV Mines Website was consulted. Previous (Current) mining activities are within the AOI (McElroy Mine, U-0033-83, McElroy Coal Co.)

WVDEP Website files show that there are no active md/or abandoned gas wells within the AOI

Floodplain Conditions	
Do site construction activities take place in a floodplain:	NO
Permit needed from county floodplain coordinator:	NO
Flood Hazard Zone:	X
HEC-RAS Study completed:	N/A
Floodplain shown on drawings:	N/A
FIRM Map Number(s) for site:	5405IC 9175E
Areas of construction in floodplain:	N/A

Site Locations (NAD 27)		
Structure	Latitude (DD)	Longitude (DD)
Well Pad Site Entrance	39.811267	-80.705955
Center of Well Pad	39.809855	-80.713215
Tank Pad Site Entrance	39.814014	-80.706810
Center of Tank Pad	39.814568	-80.704953

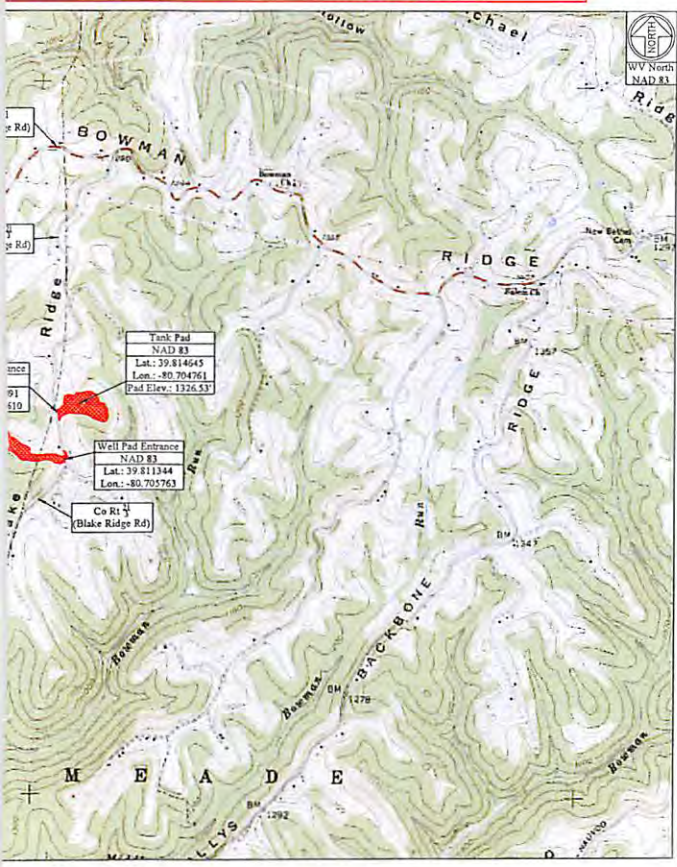


02/10/2017

Heaven Hill 2 Site
 Construction Plan, &
 Sediment Control Plans
 Well Operating
 Marshall County
 Meade District
 E 39.809933°
 W -80.713025°
 Middle Fish Creek Watershed

Pertinent Site Information
 Heaven Hill 2 Site
 Emergency Number: 304-845-1920
 Marshall County Emergency 911 (Moundsville, WV)
 Meade District, Marshall County, WV
 Watershed: Middle Fish Creek

Design: Issue for Permitting



WV State Plane Coordinate System
 North Zone, NAD 83
 Elevations Based on NAV88
 Established By Survey Grade GPS
 and OPLIS Post-Processing

Property Owner Information - Heaven Hill 2 Site

Meade District - Marshall County								
Owner	TM - Parcel	Well Pad	CRP Pad	Tank Pad	Access Road	Topsoil/Excess	Add. Clearing	Total Disturbed
M. Rine	7-1	0.00	0.00	0.00	0.21	0.00	0.47	0.68
C. Hagedorn	7-3	4.59	4.13	5.01	3.25	3.19	12.13	32.30
Site Totals (Ac)		4.57	4.13	5.01	3.46	3.19	12.60	32.98

Access Road

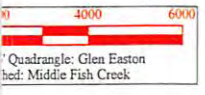
Surface Owner	TM - Parcel	Road Length	Type
M. Rine	7-1	106.88'	Well Pad Access Road
C. Hagedorn	7-3	2,293.19'	Well Pad Access Road
C. Hagedorn	7-3	294.63'	Tank Pad Access Road

Disturbed Area

Well Pad Construction	4.57 Ac
CRP Pad Construction	4.13 Ac
Tank Pad Construction	5.01 Ac
Access Road Construction	3.46 Ac
Topsoil / Excess Material	3.19 Ac
Additional Clearing	12.60 Ac
Total Disturbed Area	32.98 Ac
Additional Information	
Total Wooded Acres Disturbed	4.75 Ac
Total Linear Feet of Access Road	2,606.70'

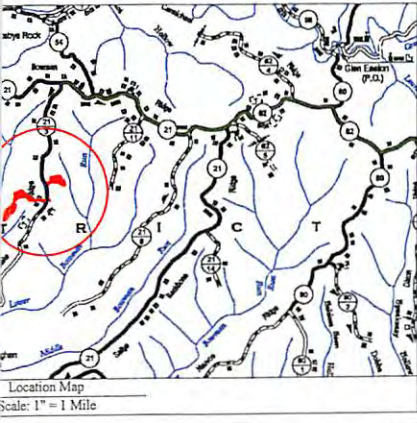
Heaven Hill 2 Site Quantities

Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope	Length of Slope
Well Pad	36,542.98	21,043.07	15,499.91		N/A	N/A
CRP Pad	29,711.44	15,711.44	14,000.00		N/A	N/A
Tank Pad	36,755.05	28,755.30	9,996.75		N/A	N/A
Well Pad Access Road	2,962.46	17,045.22		14,082.76	10.00%	579.50'
Tank Pad Access Road	1,198.90	830.39	368.51		8.00%	48.29'
Topsoil/Excess Material Stockpile	0.00	30,527.37		30,527.37	N/A	N/A
Totals	107,170.83	111,915.79	39,865.17	44,610.13		
			Total Spoil (CY) =	-4,744.96	(Excess Spoil Capacity)	



Site Locations (NAD 83)

Structure	Latitude (DD)	Longitude (DD)
Well Pad Site Entrance	39.811344	-80.705763
Center of Well Pad	39.809933	-80.713025
Tank Pad Site Entrance	39.814091	-80.706610
Center of Tank Pad	39.814645	-80.704761



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

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

Seal	Design Certification
	The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas §265808. All Plans, Sheets, and/or Reference Diagrams included in this design constitute a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design. John P. See RPE 6051 Kelly Surveying, PLLC COA: CD432-00 Date: 06/28/2016
Seal	As-Built Certification
	This as-built certification certifies that the gas well drilling and was constructed in reasonable close conformance with the design drawings. It is recommended that gas well drilling pad is included in the existing comprehensive maintenance and inspection program for gas well drilling pads or that a comprehensive maintenance and inspection program be developed to monitor the pads conditions to ensure the continued safe operation. John P. See RPE 6051 Date: _____

Sheet	Description
1	Cover Sheet
VI	Schedule of Quantities
N1-N3	Site Notes
2	Pre-Construction Site Conditions
3	Site Soil Map
4	Clearing Exhibit
5	Overall Plan View
6-9	E&S Plan View
10	Toe Key Exhibit
11-14	Plan View
15-16	Cross Sections - Well Pad
17	Cross Sections - Central Receiving Pad
18-19	Cross Sections - Tank Pad
20-21	Cross Sections - Well Pad Access Road
22	Cross Sections - Tank Pad Access Road
G1-G2	Geotechnical Details
L1	Landowner Disturbed Area Exhibit
S1-S2	Site Reclamation
M1-M2	Production Details
D1-D2	Erosion and Sediment Control Details
R1	Access Road Details
P1	Pad Details

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 Office of Oil and Gas
 OCT 04 2016

WV Department of Environmental Protection

TUG HILL OPERATING

THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

Kelly Surveying
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 Boone, WV 25809
 304-338-6945

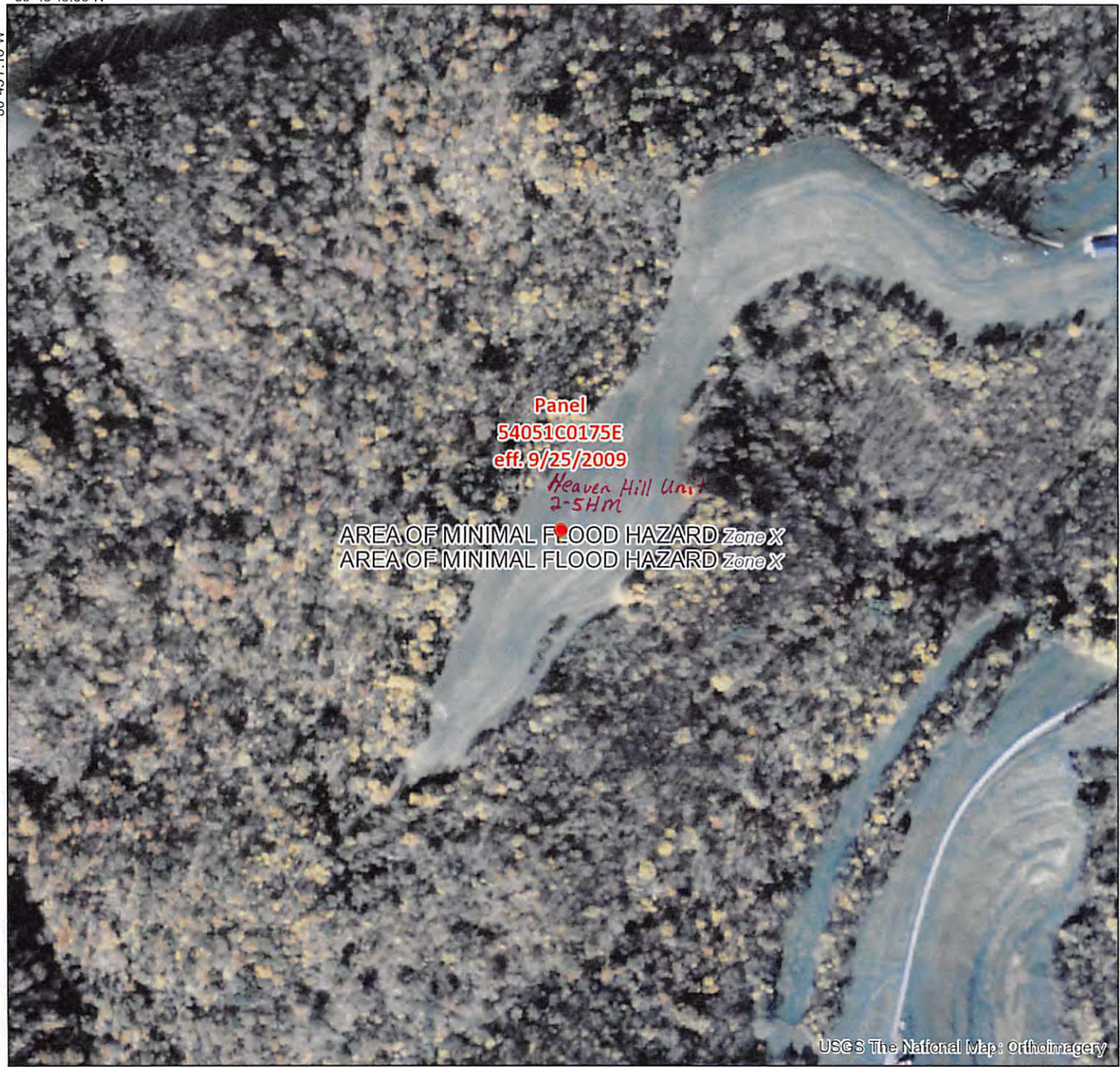
Cover Sheet
 Heaven Hill 2 Site
 Meade District
 Marshall County, WV

Date: 06/28/2016
 Scale: As Shown
 Designed By: ZS
02/10/2017

National Flood Hazard Layer FIRMette

39°48'49.69"N

80°43'7.18"W



Legend

- Cross-Sections
- ~ Base Flood Elevations
- Flood Hazard Zones**
- 1% Annual Chance Flood
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee



LOMRs

- Effective

Map Panels

- Digital Data
- Unmodernized Maps
- Unmapped

This map complies with FEMA's standards for the use of digital flood maps. The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. The base map shown complies with FEMA's base map accuracy standards.

The NFHL is a living database, updated daily, and this map represents a snapshot of information at a specific time.

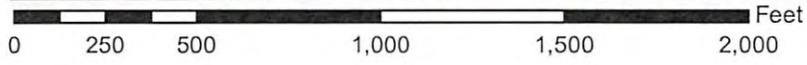
Flood risks are dynamic and can change frequently due to a variety of factors, including weather patterns, erosion, and new development. FEMA flood maps are continually updated through a variety of processes. Users should always verify through the Map Service Center (<http://msc.fema.gov>) or the Community Map Repository that they have the current effective information.

NFHL maps should not be created for unmapped or unmodernized areas.



FEMA

18810-15



39°48'20.87"N

80°42'28.10"W