



west virginia department of environmental protection

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

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

March 1, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

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

FORT WORTH , TX 76107

Re: Permit Modification Approval for HEAVEN HILL 3-1HM
47-051-01935-00-00

Modifying Bottom Hole Coordinates thereby Shortening Lateral

TUG HILL OPERATING, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: HEAVEN HILL 3-1HM
Farm Name: WHITLATCH, RICKY L.
U.S. WELL NUMBER: 47-051-01935-00-00
Horizontal 6A / New Drill
Date Issued: March 1, 2018

Promoting a healthy environment.

03/02/2018

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

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

2) Operator's Well Number: Heaven Hill 3-1HM Well Pad Name: Heaven Hill 3

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

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

5) Well Type (a) Gas Oil Underground Storage

Other _____

(b) If Gas Shallow Deep

Horizontal

JW
2/5/18

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 6724 - 6776' thickness of 52' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,876'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 15,640'

11) Proposed Horizontal Leg Length: 7,618'

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

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

14) Approximate Saltwater Depths: 2,167'

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

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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 WV Department of Environmental Protection

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine
Depth: 1031' TVD and 308' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	338FT^3(CTS)
Fresh Water	13 3/8"	NEW	H40	48#	1,120'	1,120'	1142ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	1,120'	1,120'	1142ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,805'	2,805'	897ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	15,640'	15,640'	3538ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,841'	
Liners							

J
2/5/18

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE#24	1.19
Production	5 1/2"	8 7/8_8 3/4	.361	12,640	9,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

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

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WW-6B
(10/14)

API NO. 47-051 - 01935 **MOD**
OPERATOR WELL NO. Heaven Hill 3-1HM
Well Pad Name: Heaven Hill 3

John
2/5/18

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

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

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

Well to be completed with approximately 28,740,000 lb proppant and 444,341 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

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

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

23) Describe centralizer placement for each casing string:

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

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

*See Attachment

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.



Tug Hill Operating, LLC Casing and Cement Program

Heaven Hill 3-1HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	H40	17 1/2"	1,120'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,805'	CTS
Production	5 1/2"	P110	8 7/8 x 8 3/4"	15,640'	CTS

Cement

Conductor:	Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2
Surface:	Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
Intermediate:	Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19
Kick Off Plug:	Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L – KOP Plug
Production:	50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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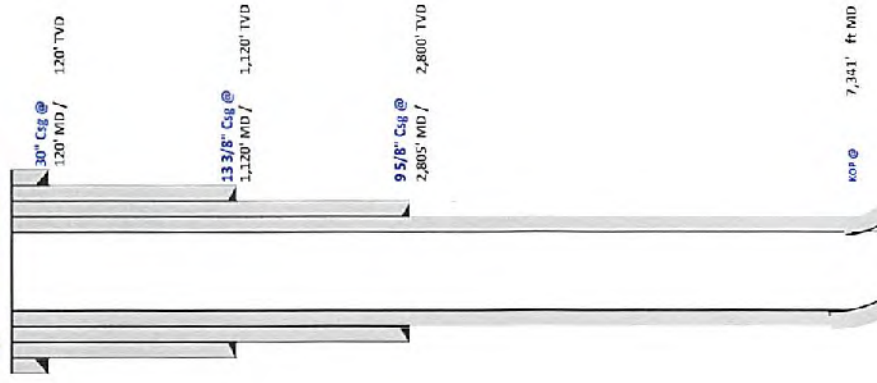
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Environmental Protection

03/02/2018

61-01935MOD



WELL NAME: Heaven Hill 3-11M
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Meade
 DEPTH: 1,326'
 RI Elev: 1,326'
 TD: 15,640'
 RI Location: 39.80859972
 TH Longitude: -80.69332114
 BH Longitude: 39.782086
 BH Longitude: -80.683101



Formation	Depth, TVD
Deepest Fresh Water	1038
Sandstone / Coal	946
Pitchfork / Coal	1031
Big Blaw	2060
Webb	2486
Berea	2684
Gordon	2946
Rhinestreet	6068
Genesee/Burgett	6586
Tully	6617
Harrison	6650
Marcellus	6724
Landing Depth	6759
Onondaga	6776
Pilot Hole Depth	6876

CASING SUMMARY						
Type	Hole Size (in)	Csg Size (in)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	BW	BW	Surface
Surface	17.5	13 3/8	1,120'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	15,640'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Seals	Class	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 to stc	

8/15/18

PH ID @ 6676' TVD

WV Department of Environmental Protection

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PH TD @ 100' below Onondaga Top

Landing Point @ 8,022' MD / 6,769' TVD

PH TD @ 6676' TVD

Latent TD @ 15,640' RI MD 6,202' RI TVD

03/02/2018

Well: Heaven Hill 3-1 HM
 Site: Heaven Hill 3
 Project: Marshall County, West Virginia
 Design: rev5



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+M/S	+E/W	Dleg	T/Face	V/Sect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 27'100' build
3	1450.00	5.00	0.00	1449.68	-10.24	-3.73	2.00	203.00	8.73	Begin 5.00° tangent
4	2505.86	5.00	200.00	2500.00	-129.48	-47.13	3.00	0.00	110.39	Begin 37'100' tangent
5	4072.52	40.00	200.00	3951.18	-542.52	-197.46	3.00	0.00	452.54	Begin 40.00° tangent
6	5172.52	40.00	200.00	5556.87	-1510.97	-359.14	3.00	0.00	1543.99	Begin 37'100' turn
7	6302.24	39.58	205.05	5656.30	-1897.51	-631.71	3.00	0.00	1607.98	Begin 39.98° tangent
8	7340.57	39.58	205.05	6456.29	-2487.12	-964.86	3.00	0.00	2097.50	Begin 107'100' build/turn
9	8022.38	89.00	150.03	6766.00	-3046.38	-900.86	10.00	-83.31	2657.29	Begin 89.00° lateral section
10	15640.08	89.00	150.03	6902.00	-5544.40	2904.32	0.00	0.00	00072.22	PBHLTD 15640.08 MD/6902.00 TVD

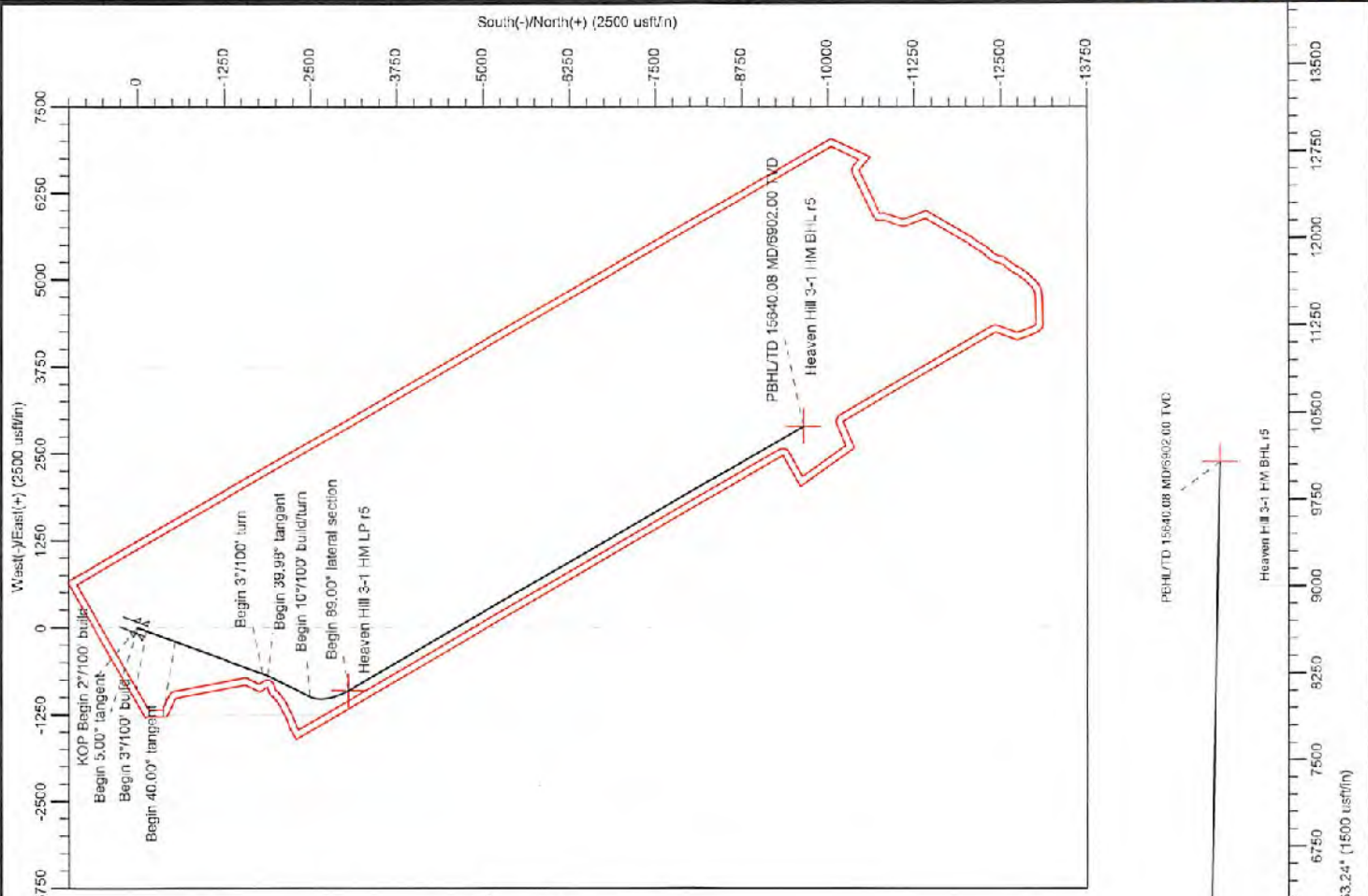
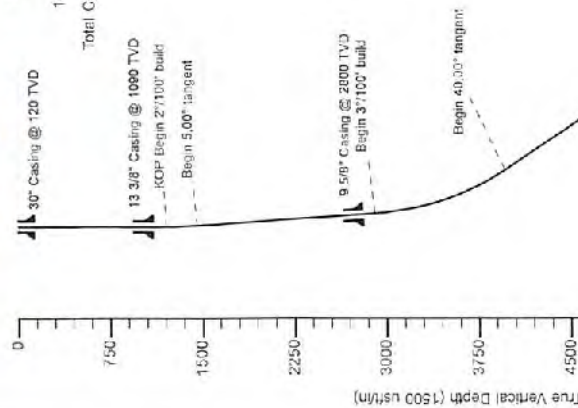
Geocentric System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83, West Virginia - HARR
 Ellipsoid: GRS 1990
 Zone: Zone 17N (84 W to 78 W)

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

Northing 14457165.62 Easting 1726541.75
 Latitude 39.80859972 Longitude -80.69332114

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

Accumulates to Grid North
 True North: -0.20°
 Magnetic North: -8.89°
 Magnetic Field
 Strength: 50225.1usT
 Dip Angle: 67.00°
 Date: 2/9/2017
 Model: IGRF2015



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Area of Review**Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.**

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (12/19/2016) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

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

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

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

Permit well - Heaven Hill 3-1HM

Wells within 500' Buffer

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

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101962	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101963	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101947	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101948	Tug Hill	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705100862	Hope Natural Gas	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old shallow producing well that has since been plugged	Old well, records are incomplete. A field survey was conducted to locate this well and it was found plugged at the location shown on the well plat.
4705170788	Hope Natural Gas	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old shallow producing well	Old well, records are incomplete. A field survey was conducted to locate this well and no evidence of this well was found.

WV Geological & Economic Survey

Well: County = 51 Permit = 00862

Well Reassignment Information: Reassigned From
 OLD_COUNTY OLD_PERMIT NEW_COUNTY NEW_PERMIT
 51 0000 51 855

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_78	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
4705100862	Marshall	852	Meade	Old Easton	Cameron	39°54'24"	-80°59'55"	823979.8	4424053.9

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION
4705100862	11/14/2001		Plugging	Consolidated David A Wheeler			MC42		Consolidation Coal Co	Consolidation Coal Co
4705100862				Original Les Prop Mfg M E Givingsham			MC42		Hope Natural Gas Company	Hope Natural Gas Company

Completion Information:

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

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Stratigraphy data for this well

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

Plugging Information:

API	PLG_DT	DEPTH_PFT
4705100862	11/14/2001	0

WV Geological & Economic Survey

Well: County = 51 Permit = 70788

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_78	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
4705170788	Marshall	70788	Meade	Old Easton	Cameron	39°78'27"	-80°29'27"	826544.7	4424415.4

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION
4705170788				Original Les Prop Mfg M E Givingsham			518		Hope Natural Gas Company	Hope Natural Gas Company

Completion Information:

API	CMP_DT	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD
4705170788							unclassified	unclassified		not available	unknown	unknown

There is no Pay data for this well

There is no Production Gas data for this well

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

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

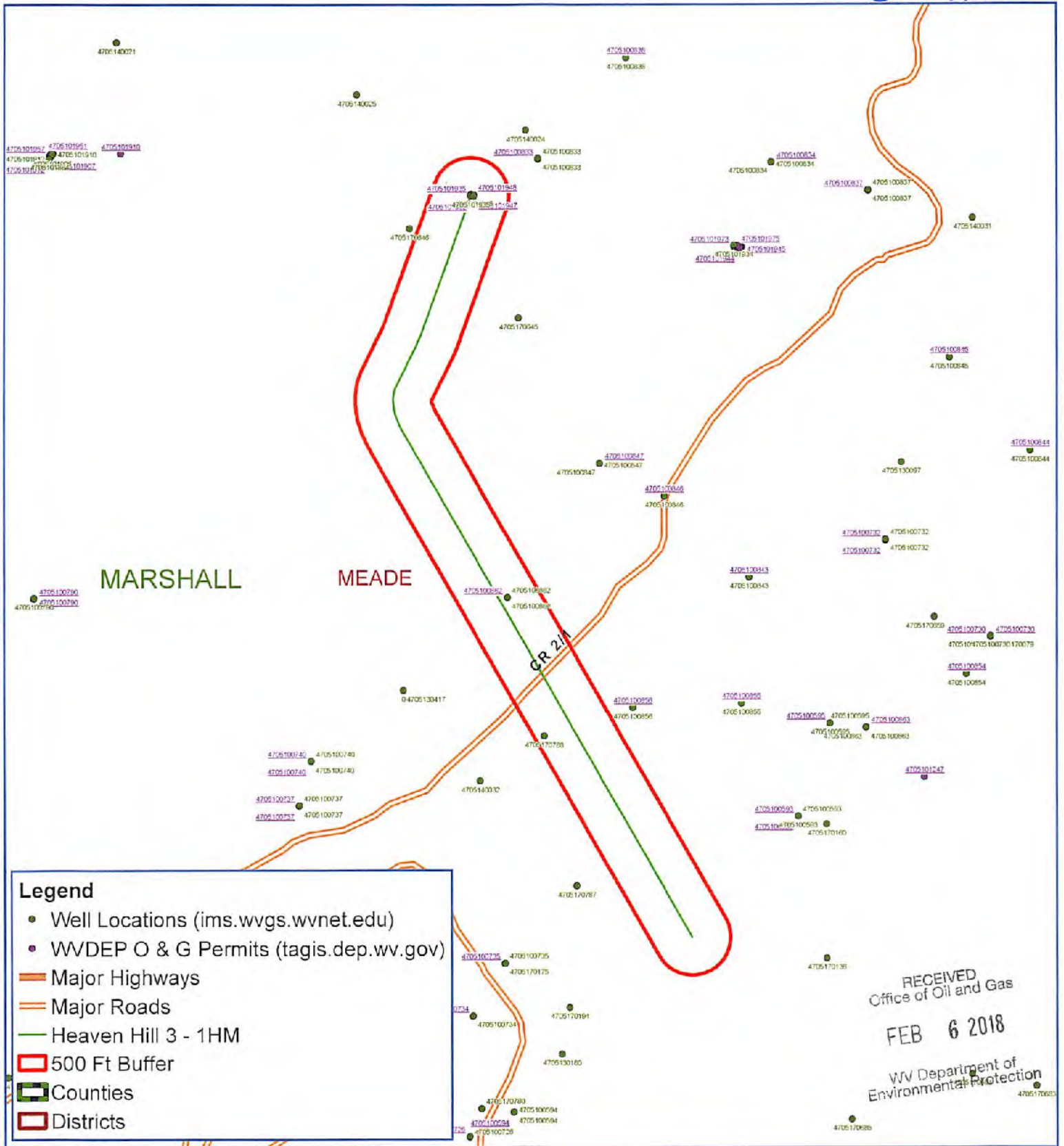
There is no Stratigraphy data for this well

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

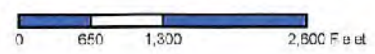
There is no Plugging data for this well

There is no Sample data for this well

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Heaven Hill 3-1HM Meade District Marshall County, WV



Map Prepared by:
PS
 LAND SERVICES
 03/02/2018

Map Created: February 5, 2018
 Map Current As Of: February 5, 2018

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



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-1 HM
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-1 HM	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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

Well	Heaven Hill 3-1 HM					
Well Position	+N/-S	0.00 usft	Northing:	14,457,185.62 usft	Latitude:	39.80858972
	+E/-W	0.00 usft	Easting:	1,726,541.76 usft	Longitude:	-80.69332114
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,326.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/3/2017	-8.69	67.00	52,225.06573543

Design	rev5			
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	163.24

Plan Survey Tool Program	Date	1/25/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	15,640.08 rev5 (Original Hole)	MWD MWD - Standard	

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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-1 HM
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-1 HM	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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	200.00	1,449.68	-10.24	-3.73	2.00	2.00	0.00	200.00		
2,905.86	5.00	200.00	2,900.00	-129.48	-47.13	0.00	0.00	0.00	0.00		
4,072.52	40.00	200.00	3,961.18	-542.52	-197.46	3.00	3.00	0.00	0.00		
6,172.52	40.00	200.00	5,569.87	-1,810.97	-659.14	0.00	0.00	0.00	0.00		
6,302.24	39.98	206.06	5,669.30	-1,887.61	-691.71	3.00	-0.02	4.67	92.66		
7,340.97	39.98	206.06	6,465.29	-2,487.12	-984.86	0.00	0.00	0.00	0.00		
8,022.38	89.00	150.03	6,769.00	-3,046.39	-900.66	10.00	7.19	-8.22	-63.31	Heaven Hill 3-1 HM LI	
15,640.08	89.00	150.03	6,902.00	-9,644.40	2,904.32	0.00	0.00	0.00	0.00	Heaven Hill 3-1 HM B	

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Planning Report - Geographic

Database: DB_Jul2215dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Heaven Hill 3
 Well: Heaven Hill 3-1 HM
 Wellbore: Original Hole
 Design: rev5

Local Co-ordinate Reference: Well Heaven Hill 3-1 HM
 TVD Reference: GL @ 1326.00usft
 MD Reference: GL @ 1326.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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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	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
100.00	0.00	0.00	100.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
200.00	0.00	0.00	200.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
300.00	0.00	0.00	300.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
400.00	0.00	0.00	400.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
500.00	0.00	0.00	500.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
600.00	0.00	0.00	600.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
700.00	0.00	0.00	700.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
800.00	0.00	0.00	800.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
900.00	0.00	0.00	900.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,185.62	1,726,541.76	39.80859972	-80.69332114
KOP Begin 2°/100' build									
1,300.00	2.00	200.00	1,299.98	-1.64	-0.60	14,457,183.98	1,726,541.16	39.80859522	-80.69332329
1,400.00	4.00	200.00	1,399.84	-6.56	-2.39	14,457,179.07	1,726,539.37	39.80858174	-80.69332972
1,450.00	5.00	200.00	1,449.68	-10.24	-3.73	14,457,175.38	1,726,538.03	39.80857162	-80.69333454
Begin 5.00° tangent									
1,500.00	5.00	200.00	1,499.49	-14.34	-5.22	14,457,171.29	1,726,536.54	39.80856039	-80.69333990
1,600.00	5.00	200.00	1,589.11	-22.53	-8.20	14,457,163.10	1,726,533.56	39.80853793	-80.69335061
1,700.00	5.00	200.00	1,696.73	-30.72	-11.18	14,457,154.91	1,726,530.58	39.80851547	-80.69336133
1,800.00	5.00	200.00	1,798.35	-38.91	-14.16	14,457,146.72	1,726,527.60	39.80849300	-80.69337204
1,900.00	5.00	200.00	1,897.97	-47.10	-17.14	14,457,138.53	1,726,524.62	39.80847054	-80.69338276
2,000.00	5.00	200.00	1,997.59	-55.29	-20.12	14,457,130.34	1,726,521.64	39.80844807	-80.69339347
2,100.00	5.00	200.00	2,097.21	-63.48	-23.10	14,457,122.15	1,726,518.66	39.80842561	-80.69340418
2,200.00	5.00	200.00	2,196.83	-71.67	-26.09	14,457,113.96	1,726,515.67	39.80840315	-80.69341490
2,300.00	5.00	200.00	2,296.45	-79.86	-29.07	14,457,105.77	1,726,512.69	39.80838068	-80.69342561
2,400.00	5.00	200.00	2,396.07	-88.05	-32.05	14,457,097.58	1,726,509.71	39.80835822	-80.69343633
2,500.00	5.00	200.00	2,495.69	-96.24	-35.03	14,457,089.39	1,726,506.73	39.80833576	-80.69344704
2,600.00	5.00	200.00	2,595.31	-104.43	-38.01	14,457,081.20	1,726,503.75	39.80831329	-80.69345776
2,700.00	5.00	200.00	2,694.93	-112.62	-40.99	14,457,073.01	1,726,500.77	39.80829083	-80.69346847
2,800.00	5.00	200.00	2,794.55	-120.81	-43.97	14,457,064.82	1,726,497.79	39.80826837	-80.69347918
2,900.00	5.00	200.00	2,894.17	-129.00	-46.95	14,457,056.63	1,726,494.81	39.80824590	-80.69348990
2,905.86	5.00	200.00	2,900.00	-129.48	-47.13	14,457,056.15	1,726,494.63	39.80824459	-80.69349053
Begin 3°/100' build									
3,000.00	7.82	200.00	2,993.54	-139.36	-50.72	14,457,046.27	1,726,491.04	39.80821749	-80.69350345
3,100.00	10.82	200.00	3,092.21	-154.58	-56.26	14,457,031.04	1,726,485.50	39.80817574	-80.69352337
3,200.00	13.82	200.00	3,189.90	-174.64	-63.56	14,457,010.99	1,726,478.20	39.80812073	-80.69354960
3,300.00	16.82	200.00	3,286.33	-199.47	-72.60	14,456,986.16	1,726,469.16	39.80805262	-80.69358209
3,400.00	19.82	200.00	3,381.25	-229.01	-83.35	14,456,956.62	1,726,458.41	39.80797160	-80.69362073
3,500.00	22.82	200.00	3,474.39	-263.17	-95.79	14,456,922.45	1,726,445.97	39.80787788	-80.69366543
3,600.00	25.82	200.00	3,565.50	-301.88	-109.87	14,456,883.75	1,726,431.88	39.80777173	-80.69371606
3,700.00	28.82	200.00	3,654.34	-345.01	-125.57	14,456,840.62	1,726,416.19	39.80765343	-80.69377248
3,800.00	31.82	200.00	3,740.64	-392.44	-142.84	14,456,793.18	1,726,398.92	39.80752332	-80.69383454
3,900.00	34.82	200.00	3,824.19	-444.06	-161.83	14,456,741.56	1,726,380.13	39.80738174	-80.69390207
4,000.00	37.82	200.00	3,904.75	-499.72	-181.88	14,456,685.90	1,726,359.68	39.80722908	-80.69397488
4,072.52	40.00	200.00	3,961.18	-542.52	-197.46	14,456,643.10	1,726,344.30	39.80711167	-80.69403087
Begin 40.00° tangent									
4,100.00	40.00	200.00	3,982.23	-559.12	-203.50	14,456,626.50	1,726,338.26	39.80706615	-80.69405258
4,200.00	40.00	200.00	4,058.83	-619.52	-225.49	14,456,566.10	1,726,316.27	39.80690048	-80.69413160
4,300.00	40.00	200.00	4,135.44	-679.93	-247.47	14,456,505.70	1,726,294.29	39.80673461	-80.69421061
4,400.00	40.00	200.00	4,212.04	-740.33	-269.46	14,456,445.30	1,726,272.30	39.80656913	-80.69428963
4,500.00	40.00	200.00	4,288.64	-800.73	-291.44	14,456,384.90	1,726,250.32	39.80640346	-80.69436865
4,600.00	40.00	200.00	4,365.25	-861.13	-313.43	14,456,324.49	1,726,228.33	39.80623779	-80.69444766



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-1 HM
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-1 HM	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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Planned Survey									WV Department of Environmental Protection	
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)		Latitude	Longitude
4,700.00	40.00	200.00	4,441.85	-921.53	-335.41	14,456,264.09	1,726,206.35		39.80607211	-80.69452667
4,800.00	40.00	200.00	4,518.46	-931.94	-357.40	14,456,203.69	1,726,184.36		39.80590644	-80.69460569
4,900.00	40.00	200.00	4,595.06	-1,042.34	-379.38	14,456,143.29	1,726,162.38		39.80574077	-80.69468470
5,000.00	40.00	200.00	4,671.67	-1,102.74	-401.36	14,456,082.88	1,726,140.39		39.80557509	-80.69476372
5,100.00	40.00	200.00	4,748.27	-1,163.14	-423.35	14,456,022.48	1,726,118.41		39.80540942	-80.69484273
5,200.00	40.00	200.00	4,824.88	-1,223.55	-445.33	14,455,962.08	1,726,096.42		39.80524374	-80.69492174
5,300.00	40.00	200.00	4,901.48	-1,283.95	-467.32	14,455,901.68	1,726,074.44		39.80507807	-80.69500075
5,400.00	40.00	200.00	4,978.08	-1,344.35	-489.30	14,455,841.27	1,726,052.46		39.80491240	-80.69507976
5,500.00	40.00	200.00	5,054.69	-1,404.75	-511.29	14,455,780.87	1,726,030.47		39.80474672	-80.69515878
5,600.00	40.00	200.00	5,131.29	-1,465.15	-533.27	14,455,720.47	1,726,008.49		39.80458105	-80.69523779
5,700.00	40.00	200.00	5,207.90	-1,525.56	-555.26	14,455,660.07	1,725,986.50		39.80441538	-80.69531680
5,800.00	40.00	200.00	5,284.50	-1,585.96	-577.24	14,455,599.67	1,725,964.52		39.80424970	-80.69539581
5,900.00	40.00	200.00	5,361.11	-1,646.36	-599.23	14,455,539.26	1,725,942.53		39.80408403	-80.69547482
6,000.00	40.00	200.00	5,437.71	-1,706.76	-621.21	14,455,478.86	1,725,920.55		39.80391835	-80.69555383
6,100.00	40.00	200.00	5,514.32	-1,767.17	-643.20	14,455,418.46	1,725,898.56		39.80375268	-80.69563284
6,172.52	40.00	200.00	5,569.87	-1,810.97	-659.14	14,455,374.65	1,725,882.62		39.80363253	-80.69569014
Begin 3°/100' turn										
6,200.00	39.97	201.26	5,590.93	-1,827.49	-665.36	14,455,358.13	1,725,876.40		39.80358721	-80.69571250
6,300.00	39.97	205.95	5,667.58	-1,886.32	-691.08	14,455,299.31	1,725,850.67		39.80342591	-80.69580479
6,302.24	39.96	205.06	5,669.30	-1,887.61	-691.71	14,455,298.01	1,725,850.04		39.80342235	-80.69580705
Begin 39.98° tangent										
6,400.00	39.98	206.06	5,744.21	-1,944.03	-719.30	14,455,241.59	1,725,822.45		39.80326767	-80.69590596
6,500.00	39.98	206.06	5,820.84	-2,001.75	-747.53	14,455,183.87	1,725,794.23		39.80310943	-80.69600714
6,600.00	39.98	206.06	5,897.46	-2,059.47	-775.75	14,455,126.16	1,725,766.01		39.80295119	-80.69610932
6,700.00	39.98	206.06	5,974.11	-2,117.18	-803.97	14,455,068.44	1,725,737.79		39.80279295	-80.69620950
6,800.00	39.98	206.06	6,050.74	-2,174.90	-832.19	14,455,010.73	1,725,709.57		39.80263471	-80.69631068
6,900.00	39.98	206.06	6,127.37	-2,232.61	-860.41	14,454,953.01	1,725,681.35		39.80247647	-80.69641186
7,000.00	39.98	206.06	6,204.00	-2,290.33	-888.63	14,454,895.29	1,725,653.13		39.80231823	-80.69651304
7,100.00	39.98	206.06	6,280.63	-2,348.05	-916.85	14,454,837.58	1,725,624.91		39.80215999	-80.69661422
7,200.00	39.98	206.06	6,357.27	-2,405.76	-945.07	14,454,779.86	1,725,596.68		39.80200175	-80.69671539
7,300.00	39.98	206.06	6,433.90	-2,463.48	-973.30	14,454,722.15	1,725,568.46		39.80184351	-80.69681657
7,340.97	39.98	206.06	6,465.29	-2,487.12	-984.86	14,454,698.50	1,725,556.90		39.80177868	-80.69685802
Begin 10°/100' build/turn										
7,400.00	42.90	198.30	6,509.57	-2,523.27	-999.51	14,454,662.36	1,725,542.25		39.80167956	-80.69691062
7,500.00	48.86	167.09	6,579.27	-2,593.12	-1,014.88	14,454,592.50	1,725,526.88		39.80148785	-80.69696619
7,600.00	55.72	177.87	6,640.49	-2,671.98	-1,018.00	14,454,513.65	1,725,523.76		39.80127133	-80.69697825
7,700.00	63.16	170.10	6,691.35	-2,757.43	-1,008.77	14,454,428.19	1,725,532.99		39.80103657	-80.69694542
7,800.00	70.97	163.31	6,730.32	-2,846.89	-987.47	14,454,338.74	1,725,554.29		39.80079071	-80.69687168
7,900.00	79.01	157.15	6,756.22	-2,937.63	-954.76	14,454,248.00	1,725,587.00		39.80054121	-80.69675529
8,000.00	87.17	151.31	6,788.25	-3,026.89	-911.62	14,454,158.73	1,725,630.14		39.80029566	-80.69660377
8,022.38	89.00	150.03	6,769.00	-3,046.39	-900.65	14,454,139.23	1,725,641.10		39.80024200	-80.69656500
Begin 89.00° lateral section										
8,100.00	89.00	150.03	6,770.36	-3,113.62	-861.89	14,454,072.00	1,725,679.87		39.80005701	-80.69642778
8,200.00	89.00	150.03	6,772.10	-3,200.24	-811.94	14,453,985.39	1,725,729.82		39.79981868	-80.69625096
8,300.00	89.00	150.03	6,773.85	-3,286.85	-761.99	14,453,898.77	1,725,779.77		39.79958035	-80.69607419
8,400.00	89.00	150.03	6,775.59	-3,373.47	-712.04	14,453,812.16	1,725,829.71		39.79934202	-80.69589741
8,500.00	89.00	150.03	6,777.34	-3,460.08	-662.09	14,453,725.54	1,725,879.66		39.79910369	-80.69572082
8,600.00	89.00	150.03	6,779.09	-3,546.69	-612.15	14,453,638.93	1,725,929.61		39.79886536	-80.69554383
8,700.00	89.00	150.03	6,780.83	-3,633.31	-562.20	14,453,552.32	1,725,979.56		39.79862703	-80.69536705
8,800.00	89.00	150.03	6,782.58	-3,719.92	-512.25	14,453,465.70	1,726,029.51		39.79838870	-80.69519026
8,900.00	89.00	150.03	6,784.32	-3,806.54	-462.30	14,453,379.09	1,726,079.46		39.79815037	-80.69501348
9,000.00	88.00	150.03	6,786.07	-3,893.15	-412.35	14,453,292.47	1,726,129.41		39.79791204	-80.69483670
9,100.00	89.00	150.03	6,787.81	-3,979.77	-362.40	14,453,205.86	1,726,179.36		39.79767370	-80.69465992
9,200.00	89.00	150.03	6,789.56	-4,066.38	-312.45	14,453,119.25	1,726,229.31		39.79743537	-80.69448314



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Heaven Hill 3
 Well: Heaven Hill 3-1 HM
 Wellbore: Original Hole
 Design: rev5

Local Co-ordinate Reference: Well Heaven Hill 3-1 HM
 TVD Reference: GL @ 1326.00usft
 MD Reference: GL @ 1326.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

WV Department of Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,300.00	89.00	150.03	6,791.31	-4,152.99	-262.50	14,453,032.63	1,726,279.26	39.79719704	-80.69430636
9,400.00	89.00	150.03	6,793.05	-4,239.81	-212.55	14,452,946.02	1,726,329.21	39.79695871	-80.69412959
9,500.00	89.00	150.03	6,794.80	-4,326.22	-162.60	14,452,859.40	1,726,379.16	39.79672037	-80.69395281
9,600.00	89.00	150.03	6,796.54	-4,412.84	-112.65	14,452,772.79	1,726,429.11	39.79648204	-80.69377604
9,700.00	89.00	150.03	6,798.29	-4,499.45	-62.70	14,452,686.17	1,726,479.06	39.79624370	-80.69359926
9,800.00	89.00	150.03	6,800.04	-4,586.06	-12.75	14,452,599.56	1,726,529.00	39.79600537	-80.69342249
9,900.00	89.00	150.03	6,801.78	-4,672.68	37.19	14,452,512.95	1,726,578.95	39.79576704	-80.69324572
10,000.00	89.00	150.03	6,803.53	-4,759.29	87.14	14,452,426.33	1,726,628.90	39.79552870	-80.69306885
10,100.00	89.00	150.03	6,805.27	-4,845.91	137.09	14,452,339.72	1,726,678.85	39.79529037	-80.69289218
10,200.00	89.00	150.03	6,807.02	-4,932.52	187.04	14,452,253.10	1,726,728.80	39.79505203	-80.69271542
10,300.00	89.00	150.03	6,808.77	-5,019.14	236.99	14,452,166.49	1,726,778.75	39.79481370	-80.69253865
10,400.00	89.00	150.03	6,810.51	-5,105.75	286.94	14,452,079.87	1,726,828.70	39.79457536	-80.69236189
10,500.00	89.00	150.03	6,812.26	-5,192.36	336.89	14,451,993.26	1,726,878.65	39.79433702	-80.69218512
10,600.00	89.00	150.03	6,814.00	-5,278.98	386.84	14,451,906.65	1,726,928.60	39.79409869	-80.69200836
10,700.00	89.00	150.03	6,815.75	-5,365.59	436.79	14,451,820.03	1,726,978.55	39.79386035	-80.69183160
10,800.00	89.00	150.03	6,817.50	-5,452.21	486.74	14,451,733.42	1,727,028.50	39.79362202	-80.69165484
10,900.00	89.00	150.03	6,819.24	-5,538.82	536.69	14,451,646.80	1,727,078.45	39.79338368	-80.69147808
11,000.00	89.00	150.03	6,820.99	-5,625.44	586.64	14,451,560.19	1,727,128.40	39.79314534	-80.69130133
11,100.00	89.00	150.03	6,822.73	-5,712.05	636.59	14,451,473.57	1,727,178.34	39.79290700	-80.69112457
11,200.00	89.00	150.03	6,824.48	-5,798.66	686.54	14,451,386.96	1,727,228.29	39.79266867	-80.69094782
11,300.00	89.00	150.03	6,826.23	-5,885.28	736.48	14,451,300.35	1,727,278.24	39.79243033	-80.69077106
11,400.00	89.00	150.03	6,827.97	-5,971.89	786.43	14,451,213.73	1,727,328.19	39.79219199	-80.69059431
11,500.00	89.00	150.03	6,829.72	-6,058.51	836.38	14,451,127.12	1,727,378.14	39.79195365	-80.69041756
11,600.00	89.00	150.03	6,831.46	-6,145.12	886.33	14,451,040.50	1,727,428.09	39.79171531	-80.69024081
11,700.00	89.00	150.03	6,833.21	-6,231.74	936.28	14,450,953.89	1,727,478.04	39.79147697	-80.69006406
11,800.00	89.00	150.03	6,834.95	-6,318.35	986.23	14,450,867.28	1,727,527.99	39.79123863	-80.68988731
11,900.00	89.00	150.03	6,836.70	-6,404.96	1,036.18	14,450,780.66	1,727,577.94	39.79100029	-80.68971057
12,000.00	89.00	150.03	6,838.45	-6,491.58	1,086.13	14,450,694.05	1,727,627.89	39.79076195	-80.68953382
12,100.00	89.00	150.03	6,840.19	-6,578.19	1,136.08	14,450,607.43	1,727,677.84	39.79052361	-80.68935708
12,200.00	89.00	150.03	6,841.94	-6,664.81	1,186.03	14,450,520.82	1,727,727.79	39.79028527	-80.68918034
12,300.00	89.00	150.03	6,843.68	-6,751.42	1,235.98	14,450,434.20	1,727,777.74	39.79004693	-80.68900360
12,400.00	89.00	150.03	6,845.43	-6,838.03	1,285.93	14,450,347.59	1,727,827.68	39.78980859	-80.68882686
12,500.00	89.00	150.03	6,847.18	-6,924.65	1,335.88	14,450,260.98	1,727,877.63	39.78957025	-80.68865012
12,600.00	89.00	150.03	6,848.92	-7,011.26	1,385.82	14,450,174.36	1,727,927.58	39.78933191	-80.68847338
12,700.00	89.00	150.03	6,850.67	-7,097.88	1,435.77	14,450,087.75	1,727,977.53	39.78909356	-80.68829664
12,800.00	89.00	150.03	6,852.41	-7,184.49	1,485.72	14,450,001.13	1,728,027.48	39.78885522	-80.68811991
12,900.00	89.00	150.03	6,854.16	-7,271.11	1,535.67	14,449,914.52	1,728,077.43	39.78861688	-80.68794317
13,000.00	89.00	150.03	6,855.91	-7,357.72	1,585.62	14,449,827.90	1,728,127.38	39.78837854	-80.68776644
13,100.00	89.00	150.03	6,857.65	-7,444.33	1,635.57	14,449,741.29	1,728,177.33	39.78814019	-80.68758971
13,200.00	89.00	150.03	6,859.40	-7,530.95	1,685.52	14,449,654.68	1,728,227.28	39.78790185	-80.68741298
13,300.00	89.00	150.03	6,861.14	-7,617.56	1,735.47	14,449,568.06	1,728,277.23	39.78766351	-80.68723625
13,400.00	89.00	150.03	6,862.89	-7,704.18	1,785.42	14,449,481.45	1,728,327.18	39.78742516	-80.68705952
13,500.00	89.00	150.03	6,864.64	-7,790.79	1,835.37	14,449,394.83	1,728,377.13	39.78718682	-80.68688280
13,600.00	89.00	150.03	6,866.38	-7,877.41	1,885.32	14,449,308.22	1,728,427.08	39.78694847	-80.68670607
13,700.00	89.00	150.03	6,868.13	-7,964.02	1,935.27	14,449,221.60	1,728,477.03	39.78671013	-80.68652935
13,800.00	89.00	150.03	6,869.87	-8,050.63	1,985.22	14,449,134.99	1,728,526.97	39.78647178	-80.68635262
13,900.00	89.00	150.03	6,871.62	-8,137.25	2,035.16	14,449,048.38	1,728,576.92	39.78623344	-80.68617590
14,000.00	89.00	150.03	6,873.37	-8,223.86	2,085.11	14,448,961.76	1,728,626.87	39.78599509	-80.68599918
14,100.00	89.00	150.03	6,875.11	-8,310.48	2,135.06	14,448,875.15	1,728,676.82	39.78575675	-80.68582246
14,200.00	89.00	150.03	6,876.86	-8,397.09	2,185.01	14,448,788.53	1,728,726.77	39.78551840	-80.68564574
14,300.00	89.00	150.03	6,878.60	-8,483.71	2,234.96	14,448,701.92	1,728,776.72	39.78528005	-80.68546903
14,400.00	89.00	150.03	6,880.35	-8,570.32	2,284.91	14,448,615.31	1,728,826.67	39.78504171	-80.68529231
14,500.00	89.00	150.03	6,882.10	-8,656.93	2,334.86	14,448,528.69	1,728,876.62	39.78480336	-80.68511560
14,600.00	89.00	150.03	6,883.84	-8,743.55	2,384.81	14,448,442.08	1,728,926.57	39.78456501	-80.68493888
14,700.00	89.00	150.03	6,885.59	-8,830.16	2,434.76	14,448,355.46	1,728,976.52	39.78432667	-80.68476217



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-1 HM
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1326.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-1 HM	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,800.00	89.00	150.03	6,887.33	-8,916.78	2,484.71	14,448,268.85	1,729,026.47	39.78408832	-80.68458546
14,900.00	89.00	150.03	6,889.08	-9,003.39	2,534.66	14,448,182.23	1,729,076.42	39.78384997	-80.68440875
15,000.00	89.00	150.03	6,890.82	-9,090.00	2,584.61	14,448,095.62	1,729,126.37	39.78361162	-80.68423204
15,100.00	89.00	150.03	6,892.57	-9,176.62	2,634.56	14,448,009.01	1,729,176.31	39.78337327	-80.68405533
15,200.00	89.00	150.03	6,894.32	-9,263.23	2,684.51	14,447,922.39	1,729,226.26	39.78313492	-80.68387863
15,300.00	89.00	150.03	6,896.06	-9,349.85	2,734.45	14,447,835.78	1,729,276.21	39.78289658	-80.68370192
15,400.00	89.00	150.03	6,897.81	-9,436.46	2,784.40	14,447,749.16	1,729,326.16	39.78265823	-80.68352522
15,500.00	89.00	150.03	6,899.55	-9,523.08	2,834.35	14,447,662.55	1,729,376.11	39.78241988	-80.68334852
15,600.00	89.00	150.03	6,901.30	-9,609.69	2,884.30	14,447,575.93	1,729,426.06	39.78218153	-80.68317182
15,640.08	89.00	150.03	6,902.00	-9,644.40	2,904.32	14,447,541.22	1,729,446.08	39.78208600	-80.68310100

PBHL/TD 15640.08 MD/6902.00 TVD

WV Department of Environmental Protection

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Heaven Hill 3-1 HM LP r - plan hits target center - Point	0.00	0.01	6,769.00	-3,046.39	-900.66	14,454,139.23	1,725,641.10	39.80024200	-80.69656500
Heaven Hill 3-1 HM BHL - plan hits target center - Point	0.00	0.01	6,902.00	-9,644.40	2,904.32	14,447,541.22	1,729,446.08	39.78208600	-80.68310100

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
120.00	120.00	30" Casing @ 120 TVD	30	36	
1,090.00	1,090.00	13 3/8" Casing @ 1090 TVD	13-3/8	17	
2,805.48	2,800.00	9 5/8" Casing @ 2800 TVD	9-5/8	12-1/4	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
1,200.00	1,200.00	0.00	0.00	KOP Begin 2°/100' build	
1,450.00	1,449.68	-10.24	-3.73	Begin 5.00° tangent	
2,905.86	2,900.00	-129.48	-47.13	Begin 3°/100' build	
4,072.52	3,961.18	-542.52	-197.46	Begin 40.00° tangent	
6,172.52	5,569.87	-1,810.97	-659.14	Begin 3°/100' turn	
6,302.24	5,669.30	-1,887.61	-691.71	Begin 39.98° tangent	
7,340.87	6,485.29	-2,487.12	-984.66	Begin 10°/100' build/turn	
8,022.38	6,769.00	-3,046.39	-900.66	Begin 89.00° lateral section	
15,640.08	6,902.00	-9,644.40	2,904.32	PBHL/TD 15640.08 MD/6902.00 TVD	



Well Site Safety Plan

Tug Hill Operating, LLC

JL
2/5/18

Well Name: Heaven Hill 3-1HM

Pad Location: Heaven Hill 3

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:
Northing-4,406,558.99
Easting -526,250.98

February 2018

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WV Department of
Environmental Protection

03/02/2018

WW-6A1
(5/13)

Operator's Well No. Heaven Hill Unit 3-1HM

**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				RECEIVED Office of Oil and Gas FEB 6 2018 WV Department of Environmental Protection

**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

Its: Regulatory Analyst - Appalachia Region

WW-6A1 Supplement

Operator's Well No. Heaven Hill 3 - 1HM

51-01935

Oil and Gas
FEB 6 2018
WV Department of Environmental Protection

03/02/2018

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	seed Book/Pa	Assignment	Assignment	Assignment
10*15557	A	9-7-30	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780 226	N/A	N/A	Chevron to Tug Hill: 36/148
10*15557	B	9-7-21	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*15698	C	9-7-18	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	900 363	N/A	N/A	Chevron to Tug Hill: 36/148
10*15720	C	9-7-18	ROBERT A EDGE AND SHERIE N EDGE	TH EXPLORATION LLC	1/8+	905 458	N/A	N/A	N/A
10*15721	C	9-7-18	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	TH EXPLORATION LLC	1/8+	905 456	N/A	N/A	N/A
10*16020	C	9-7-18	TINA L EDGE MONTI AND THOMAS MONTI	TH EXPLORATION LLC	1/8+	905 464	N/A	N/A	N/A
10*16028	C	9-7-18	SHARON HINERMAN MAY & DANIEL G MAY	TH EXPLORATION LLC	1/8+	905 460	N/A	N/A	N/A
10*16051	C	9-7-18	ROSEMARY PARKINS AND STEPHEN PARKINS	TH EXPLORATION LLC	1/8+	905 462	N/A	N/A	N/A
10*16053	C	9-7-18	GARY D HINERMAN AND JUDY ANN HINERMAN	TH EXPLORATION LLC	1/8+	905 466	N/A	N/A	N/A
10*16289	C	9-7-18	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	TH EXPLORATION LLC	1/8+	905 452	N/A	N/A	N/A
10*16412	C	9-7-18	ELIZABETH ANN BLAZER AND PAUL R BLAZER	TH EXPLORATION LLC	1/8+	905 454	N/A	N/A	N/A
10*16413	C	9-7-18	RONALD H EDGE JR	TH EXPLORATION LLC	1/8+	905 454	N/A	N/A	N/A
10*15667	D	9-7-20	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*15698	D	9-7-20	ROBERT A EDGE AND SHERIE N EDGE	TH EXPLORATION LLC	1/8+	900 363	N/A	N/A	N/A
10*15720	D	9-7-20	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	TH EXPLORATION LLC	1/8+	905 458	N/A	N/A	N/A
10*15721	D	9-7-20	TINA L EDGE MONTI AND THOMAS MONTI	TH EXPLORATION LLC	1/8+	905 456	N/A	N/A	N/A
10*16020	D	9-7-20	SHARON HINERMAN MAY & DANIEL G MAY	TH EXPLORATION LLC	1/8+	905 460	N/A	N/A	N/A
10*16028	D	9-7-20	ROSEMARY PARKINS AND STEPHEN PARKINS	TH EXPLORATION LLC	1/8+	905 462	N/A	N/A	N/A
10*16051	D	9-7-20	DONNA JEAN SNIDER AND DAVID SNIDER	TH EXPLORATION LLC	1/8+	905 466	N/A	N/A	N/A
10*16053	D	9-7-20	GARY D HINERMAN AND JUDY ANN HINERMAN	TH EXPLORATION LLC	1/8+	905 466	N/A	N/A	N/A
10*16289	D	9-7-20	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	TH EXPLORATION LLC	1/8+	905 468	N/A	N/A	N/A
10*16412	D	9-7-20	ELIZABETH ANN BLAZER AND PAUL R BLAZER	TH EXPLORATION LLC	1/8+	905 452	N/A	N/A	N/A
10*16413	D	9-7-20	RONALD H EDGE JR	TH EXPLORATION LLC	1/8+	905 454	N/A	N/A	N/A
10*15667	E	9-7-19	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850 351	N/A	N/A	Chevron to Tug Hill: 36/148
10*47051.256.1	F	9-11-6.1	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	881 145	N/A	N/A	N/A
10*47051.256.2	F	9-11-6.1	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.3	F	9-11-6.1	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.4	F	9-11-6.1	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*15560	G	9-11-6.2	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*47051.256.2	G	9-11-6.2	WILLIAM F KERNS ET UX	CHESSAPEAKE APPALACHIA LLC	1/8+	677 561	N/A	N/A	Chevsapeake to Chevron: 30/461
10*47051.256.3	G	9-11-6.2	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.4	G	9-11-6.2	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.1	H	9-11-6	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 145	N/A	N/A	N/A
10*47051.256.2	H	9-11-6	CAROL JEAN ANDERSON	TH EXPLORATION LLC	1/8+	879 299	N/A	N/A	N/A
10*47051.256.3	H	9-11-6	BRENDA S DYKHOUSE	TH EXPLORATION LLC	1/8+	881 148	N/A	N/A	N/A
10*47051.256.4	H	9-11-6	GLEN A BONAR	TH EXPLORATION LLC	1/8+	881 151	N/A	N/A	N/A
10*47051.108.1	I	9-11-9	MICHAEL A WHETZEL	TH EXPLORATION LLC	1/8+	885 51	N/A	N/A	N/A
10*15882	J	9-11-30	ROBERT L CLARK	CHESSAPEAKE APPALACHIA LLC	1/8+	685 239	N/A	N/A	Chevsapeake to Chevron: 30/461
10*15559	K	9-11-31	KENNETH M MCCARDLE ET UX REV LT	CHEVRON USA INC	1/8+	816 499	N/A	N/A	N/A
10*15510	L	9-11-12	ELAINE PHELPS ET VIR	TRIENERGY HOLDINGS LLC	1/8+	718 326	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15511	L	9-11-12	DAVID E CROW	TRIENERGY HOLDINGS LLC	1/8+	718 376	NPAR to Chevron: 25/463	NPAR to Chevron: 26/269	Chevron to Tug Hill: 36/148
10*15512	L	9-11-12	FRANCES COFFEY	TRIENERGY HOLDINGS LLC	1/8+	718 378	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15513	L	9-11-12	KAY KERES	TRIENERGY HOLDINGS LLC	1/8+	718 330	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15514	L	9-11-12	L PAUL CROW	TRIENERGY HOLDINGS LLC	1/8+	718 336	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15515	L	9-11-12	DESIRE L CROW	TRIENERGY HOLDINGS LLC	1/8+	718 334	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15516	L	9-11-12	ROSE MARIE KIELGECZEWSKI	TRIENERGY HOLDINGS LLC	1/8+	718 354	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15517	L	9-11-12	DIANNE GELLNER & GARY GELLNER	TRIENERGY HOLDINGS LLC	1/8+	718 345	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15518	L	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TRIENERGY HOLDINGS LLC	1/8+	718 347	NPAR to Chevron: 24/430	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15519	L	9-11-12	JOHN CROW	TRIENERGY HOLDINGS LLC	1/8+	726 580	NPAR to Chevron: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148
10*15520	L	9-11-12	TIMOTHY CROW	TRIENERGY HOLDINGS LLC	1/8+	726 582	NPAR to Chevron: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Seed Book/Pg.	Assignment	Assignment
10*47051.123.1	L	9-11-12	LLOYD G BAKER	TH EXPLORATION LLC	1/8+	865 389	N/A	N/A
10*47051.123.2	L	9-11-12	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	TH EXPLORATION LLC	1/8+	873 143	N/A	N/A
10*15458	M	9-14-16	JOANN MERCER	TH EXPLORATION LLC	1/8+	921 273	N/A	N/A
10*15469	M	9-14-16	HARRIET J ANDERSON	TH EXPLORATION LLC	1/8+	920 11	N/A	N/A
10*15470	M	9-14-16	BETTY L LOGES	TH EXPLORATION LLC	1/8+	921 286	N/A	N/A
10*15472	M	9-14-16	DONALD & SANDRA GRIZZEL	TH EXPLORATION LLC	1/8+	920 70	N/A	N/A
10*15473	M	9-14-16	WILLIAM F McDONALD AND SHIRLEY McDONALD	TH EXPLORATION LLC	1/8+	921 198	N/A	N/A
10*15476	M	9-14-16	CURRITS W WEST JR AND DIANE WEST	TH EXPLORATION LLC	1/8+	921 263	N/A	N/A
10*15488	M	9-14-16	MANCF F PFE & STEPHEN M PFE	TH EXPLORATION LLC	1/8+	921 226	N/A	N/A
10*15495	M	9-14-16	WALTER LEE BARNHART AND BARBARA L HEATH	TH EXPLORATION LLC	1/8+	921 222	N/A	N/A
10*15694	M	9-14-16	DEBORAH L MERCER	TH EXPLORATION LLC	1/8+	921 271	N/A	N/A
10*15695	M	9-14-16	JOHN R AND LOIS L GORBY	TH EXPLORATION LLC	1/8+	929 259	N/A	N/A
10*15696	M	9-14-16	JOSEPH JEREMY PALMER	TH EXPLORATION LLC	1/8+	921 275	N/A	N/A
10*15741	M	9-14-16	LOHRN S GORBY	TH EXPLORATION LLC	1/8+	929 641	N/A	N/A
10*16152	M	9-14-16	CONNIE HECKLE	TH EXPLORATION LLC	1/8+	920 29	N/A	N/A
10*16153	M	9-14-16	LARRY JACK EMERY	TH EXPLORATION LLC	1/8+	920 13	N/A	N/A
10*16186	M	9-14-16	DEBORAH KAY COOLEY AND ROBERT T BECK	TH EXPLORATION LLC	1/8+	920 65	N/A	N/A
10*16187	M	9-14-16	PATRICIA D BABL AND JOHN J BABL	TH EXPLORATION LLC	1/8+	920 31	N/A	N/A
10*16191	M	9-14-16	MADELYN E MOSSOR	TH EXPLORATION LLC	1/8+	920 76	N/A	N/A
10*16403	M	9-14-16	WILLIAM C EDGAR AND CHRISTY E EDGAR	TH EXPLORATION LLC	1/8+	920 61	N/A	N/A
10*16404	M	9-14-16	KATHRYN M WHIPKEY	TH EXPLORATION LLC	1/8+	921 194	N/A	N/A
10*16406	M	9-14-16	ARLENA B HORNER AND QUAY ALLEN HORNER	TH EXPLORATION LLC	1/8+	921 240	N/A	N/A
10*16407	M	9-14-16	JANICE F BROOKOVER	TH EXPLORATION LLC	1/8+	920 74	N/A	N/A
10*16408	M	9-14-16	KATHLEEN I FRANCES	TH EXPLORATION LLC	1/8+	921 196	N/A	N/A
10*16409	M	9-14-16	JEANETTE M HEATH	TH EXPLORATION LLC	1/8+	920 72	N/A	N/A
10*16425	M	9-14-16	WILLIAM A MASON JR AND ROBIN MASON	TH EXPLORATION LLC	1/8+	920 25	N/A	N/A
10*16428	M	9-14-16	BRUCE LYNN JOHNSON AND KIMBERLY A JOHNSON	TH EXPLORATION LLC	1/8+	920 50	N/A	N/A
10*16438	M	9-14-16	ALICE MARLENE PERSINGER	TH EXPLORATION LLC	1/8+	921 236	N/A	N/A
10*16468	M	9-14-16	LARRY W JOHNSON	TH EXPLORATION LLC	1/8+	920 57	N/A	N/A
10*16469	M	9-14-16	JAMES EARL AND MARGARET L SIBURT	TH EXPLORATION LLC	1/8+	921 245	N/A	N/A
10*16470	M	9-14-16	CAROLYN SUE FRANKLIN AND RAYMOND EUGENE FRANKLIN	TH EXPLORATION LLC	1/8+	921 219	N/A	N/A
10*16472	M	9-14-16	JUDY DELORES SIBURT	TH EXPLORATION LLC	1/8+	929 643	N/A	N/A
10*16473	M	9-14-16	LUNDA ELAINE AND RICHARD LEROY LITTELL	TH EXPLORATION LLC	1/8+	929 256	N/A	N/A
10*16474	M	9-14-16	BARBARA KAY SIBURT	TH EXPLORATION LLC	1/8+	921 266	N/A	N/A
10*16475	M	9-14-16	MARY LOUISE GORBY	TH EXPLORATION LLC	1/8+	921 234	N/A	N/A
10*16476	M	9-14-16	ROGER ALLAN AND CYNTHIA L JOHNSON	TH EXPLORATION LLC	1/8+	921 257	N/A	N/A
10*16477	M	9-14-16	BRENDA K YOHO	TH EXPLORATION LLC	1/8+	921 228	N/A	N/A
10*16550	M	9-14-16	CHARLES LEROY AND MARTHA G LEACH	TH EXPLORATION LLC	1/8+	920 19	N/A	N/A
10*16551	M	9-14-16	JACK L JR & VIRGINIA L CROW	TH EXPLORATION LLC	1/8+	921 260	N/A	N/A
10*16867	M	9-14-16	APRIL M WEED	TH EXPLORATION LLC	1/8+	921 279	N/A	N/A
10*16883	M	9-14-16	VICKIE LYNN PAPE AND JOHN EDWARD PAPE	TH EXPLORATION LLC	1/8+	921 248	N/A	N/A
10*16884	M	9-14-16	DELORES A AND LEONARD B BOWERS	TH EXPLORATION LLC	1/8+	921 281	N/A	N/A
10*16916	M	9-14-16	ROGER LEE WEST	TH EXPLORATION LLC	1/8+	921 277	N/A	N/A
10*16971	M	9-14-16	LEONA W SIBURT	TH EXPLORATION LLC	1/8+	921 238	N/A	N/A
10*16972	M	9-14-16	SCOTT BRADLEY AND SHERRY ANN GRIMM	TH EXPLORATION LLC	1/8+	921 242	N/A	N/A
10*16973	M	9-14-16	NANCY C AND CARL E KESSELING	TH EXPLORATION LLC	1/8+	920 22	N/A	N/A
10*17358	M	9-14-16	KAREN LOUISE AND ROGER L DUNHAM	TH EXPLORATION LLC	1/8+	921 254	N/A	N/A
10*17359	M	9-14-16	TH EXPLORATION LLC	TH EXPLORATION LLC	1/8+	921 224	N/A	N/A
10*17361	M	9-14-16	SHEILA RAMONA CROW	TH EXPLORATION LLC	1/8+	920 78	N/A	N/A
10*17362	M	9-14-16	NILA VIRGINIA AND FREDERICK EUGENE STREIGHT	TH EXPLORATION LLC	1/8+	921 251	N/A	N/A
10*17366	M	9-14-16	SYLVIA DEE WOOD	TH EXPLORATION LLC	1/8+	921 230	N/A	N/A
10*17367	M	9-14-16	JERRY HOWELL	TH EXPLORATION LLC	1/8+	920 37	N/A	N/A
10*17368	M	9-14-16	DONALD PAUL CROW AND CRYSTAL LYNN CROW	TH EXPLORATION LLC	1/8+	921 201	N/A	N/A
10*17369	M	9-14-16	DELORES A WALLACE	TH EXPLORATION LLC	1/8+	920 63	N/A	N/A

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Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	3rd Book/Pa	Assignment	Assignment
10*17371	M	9-14-16	MACK A AND CAROL A CROW	TH EXPLORATION LLC	1/8+	921 204	N/A	N/A
10*17372	M	9-14-16	DONNIE JASON HEDGEPEETH AND KAREN L HEDGEPEETH	TH EXPLORATION LLC	1/8+	920 42	N/A	N/A
10*17373	M	9-14-16	NILA F HEDGEPEETH	TH EXPLORATION LLC	1/8+	920 25	N/A	N/A
10*17374	M	9-14-16	EZRA HOWARD COCHRAN	TH EXPLORATION LLC	1/8+	920 27	N/A	N/A
10*17380	M	9-14-16	DEBORAH IRENE PIERCE AND BARRETT LEE PIERCE	TH EXPLORATION LLC	1/8+	920 34	N/A	N/A
10*17381	M	9-14-16	CINDY J AND DARNELL L FULKS	TH EXPLORATION LLC	1/8+	921 268	N/A	N/A
10*17382	M	9-14-16	HELEN MARIE AND DAVID E MCCRAY	TH EXPLORATION LLC	1/8+	920 147	N/A	N/A
10*17389	M	9-14-16	MELOBA EILEEN HUDDLESTUN	TH EXPLORATION LLC	1/8+	920 53	N/A	N/A
10*17390	M	9-14-16	HAROLD B CROW AND CONNIE SUE CROW	TH EXPLORATION LLC	1/8+	921 207	N/A	N/A
10*17391	M	9-14-16	BETTY L HUFF AND OLLIE C HUGGINS	TH EXPLORATION LLC	1/8+	921 210	N/A	N/A
10*17392	M	9-14-16	BEVERLY KATHRYN GODDARD	TH EXPLORATION LLC	1/8+	920 55	N/A	N/A
10*17393	M	9-14-16	CHARLE M TURNER AND BESSIE M TURNER	TH EXPLORATION LLC	1/8+	920 39	N/A	N/A
10*17394	M	9-14-16	JUDY LOUISE GLOVER	TH EXPLORATION LLC	1/8+	921 232	N/A	N/A
10*17397	M	9-14-16	PAT DARELL TURNER AND TINA DENISE TURNER	TH EXPLORATION LLC	1/8+	925 117	N/A	N/A
10*17399	M	9-14-16	RONALD EDWARD WATSON AND DIANA L WATSON	TH EXPLORATION LLC	1/8+	925 120	N/A	N/A
10*17401	M	9-14-16	JOHN M HAUGHT JR AND CHERYL A HAUGHT	TH EXPLORATION LLC	1/8+	925 182	N/A	N/A
10*17402	M	9-14-16	DIANA LYNN BUMGARDNER	TH EXPLORATION LLC	1/8+	920 68	N/A	N/A
10*17403	M	9-14-16	JAMES B AND PENNY G CROW	TH EXPLORATION LLC	1/8+	925 187	N/A	N/A
10*17404	M	9-14-16	BRIAN K CROW	TH EXPLORATION LLC	1/8+	925 185	N/A	N/A
10*17405	M	9-14-16	ORVELLA L AND LARRY L NEFF	TH EXPLORATION LLC	1/8+	925 114	N/A	N/A
10*17408	M	9-14-16	WILLIAM JAMES HEDGEPEETH AND ERIN ELIZABETH HEDGEPEETH	TH EXPLORATION LLC	1/8+	924 572	N/A	N/A
10*17409	M	9-14-16	JUDY A AND CLYDE E ELZETZ	TH EXPLORATION LLC	1/8+	924 569	N/A	N/A
10*17410	M	9-14-16	LILLIE L GAREY	TH EXPLORATION LLC	1/8+	924 567	N/A	N/A
10*17420	M	9-14-16	DAVID LEE AND ANN F BAKER	TH EXPLORATION LLC	1/8+	924 564	N/A	N/A
10*17490	M	9-14-16	CONNIE SUE DOUGLAS AND RONNIE J DOUGLAS	TH EXPLORATION LLC	1/8+	924 578	N/A	N/A
10*17491	M	9-14-16	THOMAS LEE AND CLARA J HAUGHT	TH EXPLORATION LLC	1/8+	924 575	N/A	N/A
10*17598	M	9-14-16	TERRY LEE PETTIT AND STEPHANIE LYNN PETTIT	TH EXPLORATION LLC	1/8+	921 288	N/A	N/A
10*17710	M	9-14-16	DEBRA J & DARELL R LANCASTER	TH EXPLORATION LLC	1/8+	929 634	N/A	N/A
10*17811	M	9-14-16	PANSY M ASTON AND ELMER L ASTON	TH EXPLORATION LLC	1/8+	921 216	N/A	N/A
10*17821	M	9-14-16	GREGORY S CROW	TH EXPLORATION LLC	1/8+	929 639	N/A	N/A
10*17902	M	9-14-16	SUSAN LYNN SEDGEMER	TH EXPLORATION LLC	1/8+	920 59	N/A	N/A
10*17904	M	9-14-16	RICKY LEE AND TAMMY J WATSON	TH EXPLORATION LLC	1/8+	921 213	N/A	N/A
10*17958	M	9-14-16	SANDRA KAY RICHMOND	TH EXPLORATION LLC	1/8+	929 632	N/A	N/A
10*17929	N	9-14-17	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	921 320	N/A	N/A
10*15477	O	9-14-18	RONALD A WYCINSKI	TH EXPLORATION LLC	1/8+	906 241	N/A	N/A
10*15730	O	9-14-18	FRANCES V CARPENTER	TH EXPLORATION LLC	1/8+	906 256	N/A	N/A
10*15752	O	9-14-18	KIM O CHAMBERS AND DEBRA CHAMBERS	TH EXPLORATION LLC	1/8+	906 258	N/A	N/A
10*16017	O	9-14-18	FLOYD A MCFADDEN	TH EXPLORATION LLC	1/8+	906 260	N/A	N/A
10*16018	O	9-14-18	BARBARA MCFADDEN ALBRIGHT	TH EXPLORATION LLC	1/8+	906 262	N/A	N/A
10*16030	O	9-14-18	JOSEPH F CHMIELEWSKI AND SANDRA CHMIELEWSKI	TH EXPLORATION LLC	1/8+	906 264	N/A	N/A
10*16031	O	9-14-18	CARL J CHMIELEWSKI AND KATHLEEN A CHMIELEWSKI	TH EXPLORATION LLC	1/8+	906 266	N/A	N/A
10*16083	O	9-14-18	CECIL HARRY LILLY, III AND PAMELA KAY KNIGHT LILLY	TH EXPLORATION LLC	1/8+	912 47	N/A	N/A
10*16085	O	9-14-18	KATHARIN ANNETTE LILLY LAING AND FREDIE JOE LAING	TH EXPLORATION LLC	1/8+	912 45	N/A	N/A
10*16086	O	9-14-18	KATHARIN DAY LILLY	TH EXPLORATION LLC	1/8+	906 272	N/A	N/A
10*16087	O	9-14-18	MARY PENELOPE LILLY MURPHY	TH EXPLORATION LLC	1/8+	912 41	N/A	N/A
10*16131	O	9-14-18	ERIC S DOBBS	TH EXPLORATION LLC	1/8+	902 68	N/A	N/A
10*16144	O	9-14-18	PATTIE S MADRID	TH EXPLORATION LLC	1/8+	906 278	N/A	N/A
10*16180	O	9-14-18	LARRY L CHAMBERS	TH EXPLORATION LLC	1/8+	906 280	N/A	N/A
10*16181	O	9-14-18	NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK	TH EXPLORATION LLC	1/8+	906 281	N/A	N/A
10*16182	O	9-14-18	FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND ROBERT ALBERT TRUSTEES	TH EXPLORATION LLC	1/8+	906 283	N/A	N/A
10*16183	O	9-14-18	ALLEN R L DAVIS AND DIANA LEE PATTERSON	TH EXPLORATION LLC	1/8+	906 285	N/A	N/A
10*16239	O	9-14-18	ANGELA L OLDFIELD AND KENNETH W OLDFIELD	TH EXPLORATION LLC	1/8+	906 287	N/A	N/A
10*16240	O	9-14-18	BONNIE SUE PATTERSON SMISHER	TH EXPLORATION LLC	1/8+	906 289	N/A	N/A
10*16285	O	9-14-18	JOHN A SHUTZ AND CYNTHIA J SHUTZ	TH EXPLORATION LLC	1/8+	906 291	N/A	N/A

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 Assignment

WW-6A1 Supplement

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Seed Book/Pa.	Assignment	Assignment
10*16441	0	9-14-18	GEORGE FRANKLIN AND NANCY ANN REED	TH EXPLORATION LLC	1/8+	924 619	N/A	N/A
10*16442	0	9-14-18	FRED T AND JERRY L CHAMBERS	TH EXPLORATION LLC	1/8+	924 174	N/A	N/A
10*16443	0	9-14-18	BARBARA BROWN CHAMBERS	TH EXPLORATION LLC	1/8+	924 621	N/A	N/A
10*16444	0	9-14-18	CATHERINE ELLEN CHAMBERS	TH EXPLORATION LLC	1/8+	924 623	N/A	N/A
10*16445	0	9-14-18	DOUGLAS C AND GWENDLYN D LEWTON	TH EXPLORATION LLC	1/8+	925 123	N/A	N/A
10*16483	0	9-14-18	JOHN C AND BARBARA H WINTER	TH EXPLORATION LLC	1/8+	924 178	N/A	N/A
10*16486	0	9-14-18	DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON	TH EXPLORATION LLC	1/8+	924 180	N/A	N/A
10*16490	0	9-14-18	WILLIAM H AND MERRY C COTTON	TH EXPLORATION LLC	1/8+	924 176	N/A	N/A
10*16498	0	9-14-18	SHELLY YEATER	TH EXPLORATION LLC	1/8+	925 283	N/A	N/A
10*16511	0	9-14-18	DOUGLAS R BOWEN	TH EXPLORATION LLC	1/8+	906 475	N/A	N/A
10*16531	0	9-14-18	KATHY DOBBS WELLS	TH EXPLORATION LLC	1/8+	906 472	N/A	N/A
10*16532	0	9-14-18	JEAN ANN MCFADDEN	TH EXPLORATION LLC	1/8+	906 459	N/A	N/A
10*16533	0	9-14-18	SHIRLEY ANN DOBBS	TH EXPLORATION LLC	1/8+	906 469	N/A	N/A
10*16534	0	9-14-18	TERRY LEE LASAVAGE	TH EXPLORATION LLC	1/8+	906 443	N/A	N/A
10*16535	0	9-14-18	CHARLES E CARSON AND MARY KAY CARSON	TH EXPLORATION LLC	1/8+	906 420	N/A	N/A
10*16537	0	9-14-18	KIM D BOWEN AND MADONNA M BOWEN	TH EXPLORATION LLC	1/8+	907 415	N/A	N/A
10*16540	0	9-14-18	JAMES A WINTER AND CONNIE G WINTER	TH EXPLORATION LLC	1/8+	924 184	N/A	N/A
10*16569	0	9-14-18	JANICE C BALE	TH EXPLORATION LLC	1/8+	907 425	N/A	N/A
10*16570	0	9-14-18	ROBERT D BOWEN AND MARGA M R BOWEN	TH EXPLORATION LLC	1/8+	907 420	N/A	N/A
10*16576	0	9-14-18	LINDA A MINER AND MICHAEL W MINER	TH EXPLORATION LLC	1/8+	907 484	N/A	N/A
10*16580	0	9-14-18	HAROLD C MCFADDEN	TH EXPLORATION LLC	1/8+	907 480	N/A	N/A
10*16581	0	9-14-18	HELEN L SCHILLING	TH EXPLORATION LLC	1/8+	907 489	N/A	N/A
10*16582	0	9-14-18	DORA BROCK BRAMMER	TH EXPLORATION LLC	1/8+	907 429	N/A	N/A
10*16680	0	9-14-18	RONALD J AND JENNIFER CHAMBERS FICCA	TH EXPLORATION LLC	1/8+	924 186	N/A	N/A
10*16726	0	9-14-18	LESLY K WHITE	TH EXPLORATION LLC	1/8+	924 182	N/A	N/A
10*16733	0	9-14-18	SARAH L BISHOP	TH EXPLORATION LLC	1/8+	924 172	N/A	N/A
10*16835	0	9-14-18	ERNEST CARL AUGUSTINE JR	TH EXPLORATION LLC	1/8+	924 188	N/A	N/A
10*16882	0	9-14-18	JAMES LEROY AND DARLENE DOBBS OWENS	TH EXPLORATION LLC	1/8+	924 190	N/A	N/A
10*16949	0	9-14-18	FREDERICK M LEWTON	TH EXPLORATION LLC	1/8+	924 136	N/A	N/A
10*16950	0	9-14-18	STEVEN R AND BRIANNE L UTT	TH EXPLORATION LLC	1/8+	924 138	N/A	N/A
10*16952	0	9-14-18	JAY E AND CECILIA E LEWTON	TH EXPLORATION LLC	1/8+	924 134	N/A	N/A
10*16953	0	9-14-18	RUSSELL D HERVEY	TH EXPLORATION LLC	1/8+	924 132	N/A	N/A
10*16965	0	9-14-18	DONALD T AND JEAN K HOGAN	TH EXPLORATION LLC	1/8+	924 140	N/A	N/A
10*16966	0	9-14-18	WILLIAM L WRIGHT AND CAROLINA WRIGHT	TH EXPLORATION LLC	1/8+	914 524	N/A	N/A
10*16967	0	9-14-18	JOHN GILLETTE AND BARBARA GILLETTE	TH EXPLORATION LLC	1/8+	913 377	N/A	N/A
10*16990	0	9-14-18	TARA JEANNE MINOR AND JENNIFER A KNAPP	TH EXPLORATION LLC	1/8+	914 612	N/A	N/A
10*16992	0	9-14-18	ROSEMARY H BEAVERS	TH EXPLORATION LLC	1/8+	924 152	N/A	N/A
10*16993	0	9-14-18	LINDA C ABRAHAM	TH EXPLORATION LLC	1/8+	924 148	N/A	N/A
10*16995	0	9-14-18	JULIA HOOVER	TH EXPLORATION LLC	1/8+	924 150	N/A	N/A
10*17129	0	9-14-18	DIANE ELISE RAMSEY	TH EXPLORATION LLC	1/8+	924 146	N/A	N/A
10*17131	0	9-14-18	ROBERTA JANE PARKINSON	TH EXPLORATION LLC	1/8+	924 142	N/A	N/A
10*17134	0	9-14-18	LAURA E TOTTEN AND LONNIE R TOTTEN	TH EXPLORATION LLC	1/8+	924 154	N/A	N/A
10*17139	0	9-14-18	UNITED CHRISTIAN MISSIONARY SOCIETY	TH EXPLORATION LLC	1/8+	924 144	N/A	N/A
10*17209	0	9-14-18	ALICE G WEINER AND GERALD S WEINER	TH EXPLORATION LLC	1/8+	915 131	N/A	N/A
10*17289	0	9-14-18	GAYLE S SHANNON	TH EXPLORATION LLC	1/8+	924 168	N/A	N/A
10*17396	0	9-14-18	HAROLD R HUNT JR AND ELIZABETH A HUNT	TH EXPLORATION LLC	1/8+	924 170	N/A	N/A
10*17413	0	9-14-18	CHRISTINE L KIDD	TH EXPLORATION LLC	1/8+	924 158	N/A	N/A
10*17436	0	9-14-18	ROBERT M CHAMBERS AND CHARLOTTE A CHAMBERS	TH EXPLORATION LLC	1/8+	924 160	N/A	N/A
10*17448	0	9-14-18	ANDREW M HOOVER AND DINAH R HOOVER	TH EXPLORATION LLC	1/8+	924 156	N/A	N/A
10*17452	0	9-14-18	FREDERICK L HERVEY AND CATHY J HERVEY	TH EXPLORATION LLC	1/8+	924 162	N/A	N/A
10*17486	0	9-14-18	ALAN H & MARY K DEGAMMO	TH EXPLORATION LLC	1/8+	924 164	N/A	N/A
10*17487	0	9-14-18	JOSELYN M KEELY	TH EXPLORATION LLC	1/8+	929 364	N/A	N/A
10*17503	0	9-14-18	DEBORAH R MOKOSH	TH EXPLORATION LLC	1/8+	924 166	N/A	N/A
			JANICE L KUHN	TH EXPLORATION LLC	1/8+	924 122	N/A	N/A

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10*17504	0	9-14-18	GREGG ALAN MILLER AND BETH ANN MILLER	TH EXPLORATION LLC	1/8+	924 118	N/A	N/A
10*17505	0	9-14-18	MICHAEL R & LEANNE DOBBS	TH EXPLORATION LLC	1/8+	924 116	N/A	N/A
10*17515	0	9-14-18	GLADYS E DOBBS	TH EXPLORATION LLC	1/8+	923 541	N/A	N/A
10*17516	0	9-14-18	MARY V DOBBS	TH EXPLORATION LLC	1/8+	923 539	N/A	N/A
10*17517	0	9-14-18	JULIO ENRIQUE & DEBRA K TORRES	TH EXPLORATION LLC	1/8+	923 537	N/A	N/A
10*17520	0	9-14-18	LUCY P SULLIVAN	TH EXPLORATION LLC	1/8+	923 533	N/A	N/A
10*17528	0	9-14-18	DEAN E GARRISON	TH EXPLORATION LLC	1/8+	923 535	N/A	N/A
10*17555	0	9-14-18	AARON AND JANA K PARRY	TH EXPLORATION LLC	1/8+	923 528	N/A	N/A
10*17559	0	9-14-18	MARVIN JERRY BLAKE AND LINDA D BLAKE	TH EXPLORATION LLC	1/8+	924 110	N/A	N/A
10*17560	0	9-14-18	TREVOR HOOKS	TH EXPLORATION LLC	1/8+	923 523	N/A	N/A
10*17563	0	9-14-18	DONALD L WOOD	TH EXPLORATION LLC	1/8+	923 525	N/A	N/A
10*17579	0	9-14-18	DON COFFIELD & GLENDA DOBBS	TH EXPLORATION LLC	1/8+	923 520	N/A	N/A
10*17580	0	9-14-18	PAUL CRAIG CUNNINGHAM	TH EXPLORATION LLC	1/8+	923 530	N/A	N/A
10*17581	0	9-14-18	PAULA WEIRRS	TH EXPLORATION LLC	1/8+	923 486	N/A	N/A
10*17582	0	9-14-18	JOHN THOMAS ERAZMUS AND JEAN R ERAZMUS	TH EXPLORATION LLC	1/8+	924 124	N/A	N/A
10*17612	0	9-14-18	BEVERLY A LEDBETTER	TH EXPLORATION LLC	1/8+	923 480	N/A	N/A
10*17613	0	9-14-18	CARLTON DOBBS JR AND MIKHAIL PROKOPEKO	TH EXPLORATION LLC	1/8+	924 120	N/A	N/A
10*17614	0	9-14-18	DAVID DOBBS	TH EXPLORATION LLC	1/8+	923 489	N/A	N/A
10*17615	0	9-14-18	PAULA JO WRIGHT	TH EXPLORATION LLC	1/8+	923 482	N/A	N/A
10*17616	0	9-14-18	RONALD & ELIZABETH DOBBS	TH EXPLORATION LLC	1/8+	924 107	N/A	N/A
10*17617	0	9-14-18	UNITED DISCIPLES OF CHRIST CHURCH	TH EXPLORATION LLC	1/8+	924 129	N/A	N/A
10*17664	0	9-14-18	RUDOLPH H PARSONS	TH EXPLORATION LLC	1/8+	923 511	N/A	N/A
10*17667	0	9-14-18	THOMAS BRIAN WARRICK	TH EXPLORATION LLC	1/8+	923 509	N/A	N/A
10*17668	0	9-14-18	KENNETH R DOBBS	TH EXPLORATION LLC	1/8+	923 503	N/A	N/A
10*17671	0	9-14-18	JAMES L STOUT	TH EXPLORATION LLC	1/8+	923 484	N/A	N/A
10*17674	0	9-14-18	HOWARD L & BETH E WOOD	TH EXPLORATION LLC	1/8+	923 505	N/A	N/A
10*17675	0	9-14-18	GREGORY D & CAROLYN J WIBLE	TH EXPLORATION LLC	1/8+	923 507	N/A	N/A
10*17676	0	9-14-18	JAMES C & DEIDRE G DORIA	TH EXPLORATION LLC	1/8+	923 513	N/A	N/A
10*17700	0	9-14-18	ROGER L & MARILYN L GARRISON	TH EXPLORATION LLC	1/8+	923 472	N/A	N/A
10*17701	0	9-14-18	SUE ANN WORD	TH EXPLORATION LLC	1/8+	923 470	N/A	N/A
10*17702	0	9-14-18	TAMMY BETH RAMSEY	TH EXPLORATION LLC	1/8+	925 500	N/A	N/A
10*17703	0	9-14-18	SHIRLEY N COX	TH EXPLORATION LLC	1/8+	923 498	N/A	N/A
10*17708	0	9-14-18	BETTY LOU NOBLE	TH EXPLORATION LLC	1/8+	924 127	N/A	N/A
10*17711	0	9-14-18	DEBRA A WENNEMAN AND KURT J WENNEMAN	TH EXPLORATION LLC	1/8+	923 520	N/A	N/A
10*17731	0	9-14-18	JAMES J MCGHEE AND JEANNINE CHAMBERS MCGHEE	TH EXPLORATION LLC	1/8+	914 519	N/A	N/A
10*17766	0	9-14-18	EDWARD S & NANCY A ROSENTHAL	TH EXPLORATION LLC	1/8+	923 495	N/A	N/A
10*17767	0	9-14-18	WILLIAM R & LINDA J MERRITT	TH EXPLORATION LLC	1/8+	923 474	N/A	N/A
10*17769	0	9-14-18	GLADYS FRAZIER KING	TH EXPLORATION LLC	1/8+	923 492	N/A	N/A
10*17830	0	9-14-18	CHARLES AND LISA WARRICK	TH EXPLORATION LLC	1/8+	923 477	N/A	N/A
10*17833	0	9-14-18	BRIAN AND MELINDA MASTERS	TH EXPLORATION LLC	1/8+	929 296	N/A	N/A
10*17836	0	9-14-18	KEVIN W & BONNIE J RANDOLPH	TH EXPLORATION LLC	1/8+	925 319	N/A	N/A
10*17837	0	9-14-18	CAREY J & HAZEL M KENDALL	TH EXPLORATION LLC	1/8+	929 301	N/A	N/A
10*17838	0	9-14-18	RONALD L & GLENDA F CROW	TH EXPLORATION LLC	1/8+	929 309	N/A	N/A
10*17839	0	9-14-18	CHARLOTTE E MARRINER	TH EXPLORATION LLC	1/8+	929 299	N/A	N/A
10*17841	0	9-14-18	EDDA JO DOBBS	TH EXPLORATION LLC	1/8+	930 15	N/A	N/A
10*17842	0	9-14-18	BARBARA DOBBS GORBY	TH EXPLORATION LLC	1/8+	929 304	N/A	N/A
10*17878	0	9-14-18	GARI JO STACKHOUSE	TH EXPLORATION LLC	1/8+	929 294	N/A	N/A
10*17879	0	9-14-18	ROBERT E & SARAH M ROUSH	TH EXPLORATION LLC	1/8+	924 590	N/A	N/A
10*17880	0	9-14-18	HARRY R WRIGHT JR	TH EXPLORATION LLC	1/8+	924 588	N/A	N/A
10*17881	0	9-14-18	ANNA M WRIGHT	TH EXPLORATION LLC	1/8+	924 586	N/A	N/A
10*17885	0	9-14-18	WANYON L & ANGELA J MURPHEE	TH EXPLORATION LLC	1/8+	924 555	N/A	N/A
10*47051.325.1	0	9-14-18	JOHN RUSSELL BECKER	TH EXPLORATION LLC	1/8+	924 540	N/A	N/A
10*47051.325.2	0	9-14-18	JUDITH A LEWMANDOSKY AND ALAN E LEWMANDOSKY	TH EXPLORATION LLC	1/8+	906 225	N/A	N/A
			TIMMY LEE STOUT AND DOROTHY MARIE STOUT	TH EXPLORATION LLC	1/8+	906 222	N/A	N/A

03/02/2018

Operator's Well No. Heaven Hill 3 - 1HM
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 Office of Oil and Gas
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 WV Department of Environmental Protection

201935560
 WV-6A1 Supplement

Lease Name or No.	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Lease Book/Pa.	Assignment	Assignment
10*47051.325.3	O	9-14-18	NICHOLAS D PAVLIK AND GLORIA K PAVLIK	TH EXPLORATION LLC	1/8+	906 228	N/A	N/A
10*47051.325.4	O	9-14-18	JAMES H WHITE AND RITA FRANKS WHITE	TH EXPLORATION LLC	1/8+	906 230	N/A	N/A
10*47051.325.5	O	9-14-18	SAMUEL ALAN MCCORD AND WINIFRED A MCKEE	TH EXPLORATION LLC	1/8+	906 232	N/A	N/A
10*47051.325.6	O	9-14-18	THOMAS O MCCORD	TH EXPLORATION LLC	1/8+	906 235	N/A	N/A
10*47051.325.7	O	9-14-18	SHERON JONES	TH EXPLORATION LLC	1/8+	906 237	N/A	N/A
10*47051.325.8	O	9-14-18	RICK PAVLIK	TH EXPLORATION LLC	1/8+	906 239	N/A	N/A

Operator's Well No. Heaven Hill 3 - 1HM

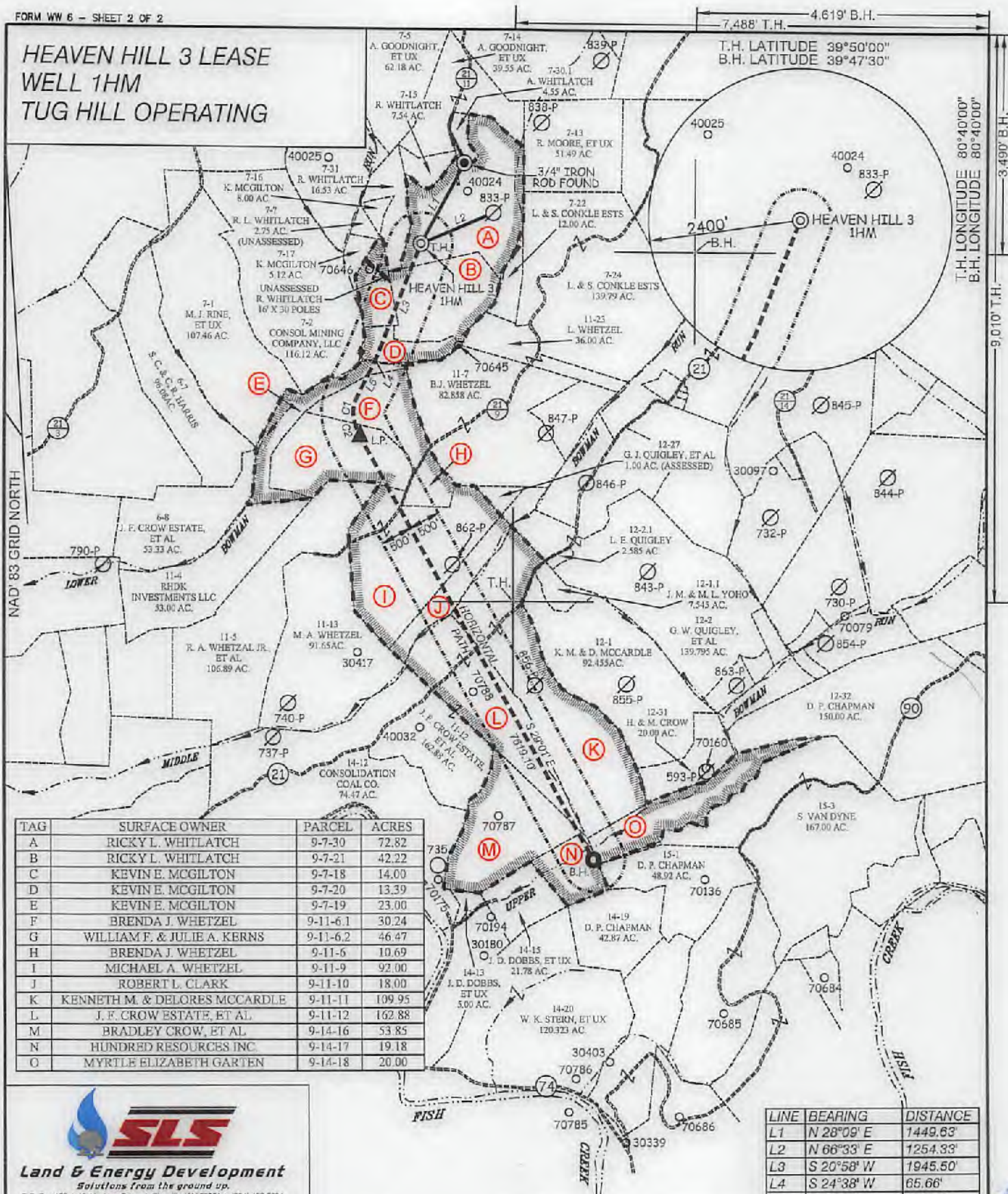
03/02/2018

RECEIVED
 Office of Oil and Gas

FEB 6 2018

WV Department of Environmental Protection

**HEAVEN HILL 3 LEASE
WELL 1HM
TUG HILL OPERATING**



TAG	SURFACE OWNER	PARCEL	ACRES
A	RICKY L. WHITLATCH	9-7-30	72.82
B	RICKY L. WHITLATCH	9-7-21	42.22
C	KEVIN E. MCGILTON	9-7-18	14.00
D	KEVIN E. MCGILTON	9-7-20	13.39
E	KEVIN E. MCGILTON	9-7-19	23.00
F	BRENDA J. WHETZEL	9-11-6-1	30.24
G	WILLIAM F. & JULIE A. KERNS	9-11-6-2	46.47
H	BRENDA J. WHETZEL	9-11-6	10.69
I	MICHAEL A. WHETZEL	9-11-9	92.00
J	ROBERT L. CLARK	9-11-10	18.00
K	KENNETH M. & DELORES MCCARDLE	9-11-11	109.95
L	J. F. CROW ESTATE, ET AL	9-11-12	162.88
M	BRADLEY CROW, ET AL	9-14-16	53.85
N	HUNDRED RESOURCES INC.	9-14-17	19.18
O	MYRTLE ELIZABETH GARTEN	9-14-18	20.00

LINE	BEARING	DISTANCE
L1	N 28°09' E	1449.63'
L2	N 66°33' E	1254.33'
L3	S 20°58' W	1945.50'
L4	S 24°38' W	65.66'
L5	S 27°01' W	670.48'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	272.62'	464.82'	S 05°48' W	268.73'
C2	310.09'	919.14'	S 19°33' E	308.62'

P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26031 • (304) 452-5634
www.slsurveys.com

P.S. 677
Gregory A. Smith



(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'83 S.P.C.(FT) N. 478,869.71 E. 1,633,272.01
 NAD'83 GEO. LAT-(N) 39.806800 LONG-(W) 80.693321
 NAD'83 UTM (M) N. 4,406,568.99 E. 526,250.98
LANDING POINT
 NAD'83 S.P.C.(FT) N. 478,827.8 E. 1,632,320.3
 NAD'83 GEO. LAT-(N) 39.800242 LONG-(W) 80.698565
 NAD'83 UTM (M) N. 4,406,630.4 E. 525,976.5
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 469,164.8 E. 1,638,015.7
 NAD'83 GEO. LAT-(N) 39.782008 LONG-(W) 80.683101
 NAD'83 UTM (M) N. 4,403,619.4 E. 527,138.2

SCALE 1" = 2000' FILE NO. 8654P1HMR3.dwg
 DATE APRIL 20, 2017
 REVISED AUGUST 30, 2017 & FEBRUARY 2, 2018
 OPERATORS WELL NO. HEAVEN HILL 3-1HM
 API WELL NO. 47 - 051 - 01935 MOD
 STATE COUNTY PERMIT

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

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

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL
- LEASE # (SEE WW-6A1)
- SURFACE OWNER (SEE TABLE)

03/02/2018

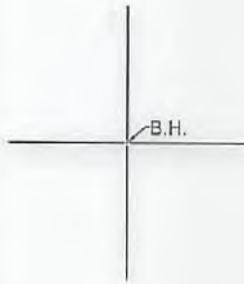
WELL OPERATOR TUG HILL OPERATING, LLC ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107
 DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

**HEAVEN HILL 3 LEASE
WELL 1HM
TUG HILL OPERATING**

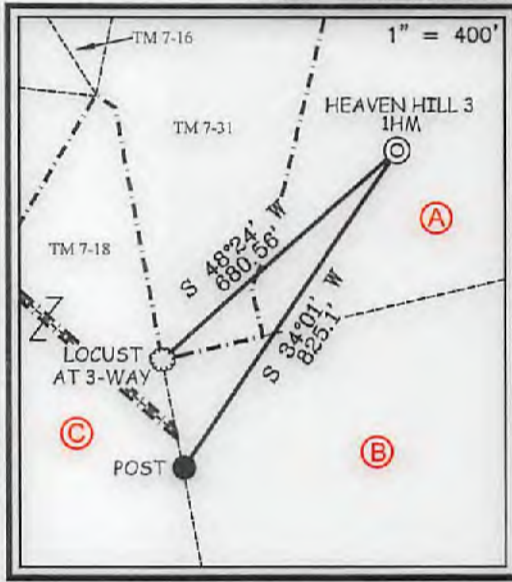
7,488' T.H. 4,619' B.H.
T.H. LATITUDE 39°50'00"
B.H. LATITUDE 39°47'30"

T.H. LONGITUDE 80°40'00"
B.H. LONGITUDE 80°40'00"
3,490' B.H.
T.H. 010.6

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 478,859.71	E. 1,633,272.01
NAD'83 GEO.	LAT-(N) 39.906600	LONG-(W) 80.693321
NAD'83 UTM (M)	N. 4,406,558.89	E. 526,250.98
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 475,827.8	E. 1,632,320.3
NAD'83 GEO.	LAT-(N) 39.900242	LONG-(W) 80.696565
NAD'83 UTM (M)	N. 4,405,630.4	E. 525,978.5
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 469,164.9	E. 1,638,015.7
NAD'83 GEO.	LAT-(N) 39.782086	LONG-(W) 80.663101
NAD'83 UTM (M)	N. 4,403,819.4	E. 527,136.2



REFERENCES



NOTES ON SURVEY

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



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

P.S. 677 *Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE APRIL 20, 20 17
REVISED AUGUST 30, 2017 & FEBRUARY 2, 2018
OPERATORS WELL NO. HEAVEN HILL 3-1HM
API WELL NO. 47-051-01935 MOD
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8654P1HMR3.dwg
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: ELEVATION GROUND = 1,339.40' PROPOSED = 1,326.35' WATERSHED LOWER BOWMAN RUN OF FISH CREEK (HUC 10)
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER RICKY L. WHITLATCH ACREAGE 72.82±
ROYALTY OWNER RICKY L. WHITLATCH, ET AL - SEE WW-6A1 ACREAGE 72.82±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS
ESTIMATED DEPTH TVD: 6,876' / TMD: 15,640'

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

COUNTY NAME PERMIT

03/02/2018