



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

Thursday, May 03, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOULEVARD, PLAZA II
SUITE 200
CANNONSBURG, PA 15317

Re: Permit Modification Approval for HEAVEN HILL 3-3HM
47-051-01963-00-00

Modified to Extend 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 3-3HM
Farm Name: RICKY L. WHITLATCH
U.S. WELL NUMBER: 47-051-01963-00-00
Horizontal 6A New Drill
Date Modification Issued: May 3, 2018

Promoting a healthy environment.

05/04/2018

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 3-3HM Well Pad Name: Heaven Hill 3

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

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

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

(b) If Gas Shallow x Deep _____
Horizontal X _____

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 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: 18,165'

11) Proposed Horizontal Leg Length: 10,712"

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

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

14) Approximate Saltwater Depths: 2,167'

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

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

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

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine
Depth: 1031' TVD and 312' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

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18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	108'	108'	233ft^3(CTS)
Fresh Water	13 3/8"	NEW	H40	48#	1,120'	1,120'	1093ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	1,120'	1,120'	1093ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,801'	2,801'	917ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	18,165'	18,165'	4638ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,319'	
Liners							

Handwritten signature and date: 3/28/18

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	10,112	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 - 01963 MOD
OPERATOR WELL NO. Heaven Hill 3-3HM
Well Pad Name: Heaven Hill 3
[Signature]
3/28/18

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 26,780,000 lb proppant and 414,038 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 POOH

Checked by
Office of Oil and Gas
APR 3 2018
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*Note: Attach additional sheets as needed.

WW-6B Attachment to #24

Conductor, Coal and Fresh Water Casing Cement:*Premium NE-1 + 2% CaCl*

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

Intermediate Casing:*Premium NE-1 + 2% bwoc CaCl₂ + 46.5% Fresh Water*

- Premium NE-1 – Class A Portland API spec
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Kick Off Plug:*Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L + 38% Fresh Water*

- Class H – Increased Compressive Strength Cement
- Sodium Metasilicate – Free Water Control; Early Strength Additive
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Production Casing Cement:*Lead: 50:50 (Poz:Premium NE-1) + .2% R-3 + .2% MPA-170 + .75 gal/100sk FP-13L**Tail: 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*

- Poz – Fly Ash
- Premium NE-1 – Class A Portland API spec
- R-3 – Cement Retarder
- MPA-170 – Gelling Agent
- FP-13L – Anti-Foaming Agent
- ASA-301 – Free Water Control Agent
- BA-10A – Bonding Agent
- ASCA-1 – Solubility Additive

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Tug Hill Operating, LLC Casing and Cement Program

Heaven Hill 3-3HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	106'	CTS
Surface	13 3/8"	H40	17 1/2"	1,120'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,801'	CTS
Production	5 1/2"	P110	8 7/8 x 8 3/4"	18,165'	CTS

**Cement
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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51-01963 MOD



WELL NAME: Heaven Hill 3-3HM
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Meade
 DEEPEN: 1.325' GLEW: 1.326'
 TD: 18,165'
 TH Latitude: 39.80395277
 TH Longitude: -80.65323444
 BH Latitude: 39.77718792
 BH Longitude: -80.67329518

30" Csg @ 108' MD / 108' TVD

13 3/8" Csg @ 1,120' MD / 1,120' TVD

9 5/8" Csg @ 2,801' MD / 2,800' TVD

KOP @ 6,819' H MD

Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	108'	108'	BW	BW	Surface
Surface	17.5	13 3/8	1,120'	1,120'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,801'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	18,165'	6,837'	20	P110	Surface

Formation	Depth (TVD)
Deepart Fresh Water	1038
Swickley Coal	946
Pittsburgh Coal	1031
Big Lime	2060
WBF	2486
Berea	2684
Gordon	2946
Whitethirt	6068
Genesee/Marlett	6566
Tully	6617
Herrilton	6650
Marcellus	6724
Landing Depth	6750
Onondaga	6776
Pilot Hole Depth	6876

CEMENT SUMMARY		DRILLING DETAILS	
Sacks	Class	Fluid Type	Centralizer/Nozz
310	A	Air	None
1,115	A	Air	3 Centralizers at equal distance
896	A	Air	1 Centralizer every other ft
4,093	A	Air / SOBM	1 every other joint in laterals; 1 per joint in curves; 1 every other ft to stc

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Lateral TD @ 18,165' H MD
 6,837' H TVD

PH TD @ 6,819' TVD

05/04/2018



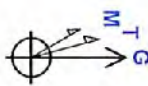
Well: Heaven Hill 3-3 HM (J)
Site: Heaven Hill 3
Project: Marshall County, West Virginia
Design: rev5

SECTION DETAILS

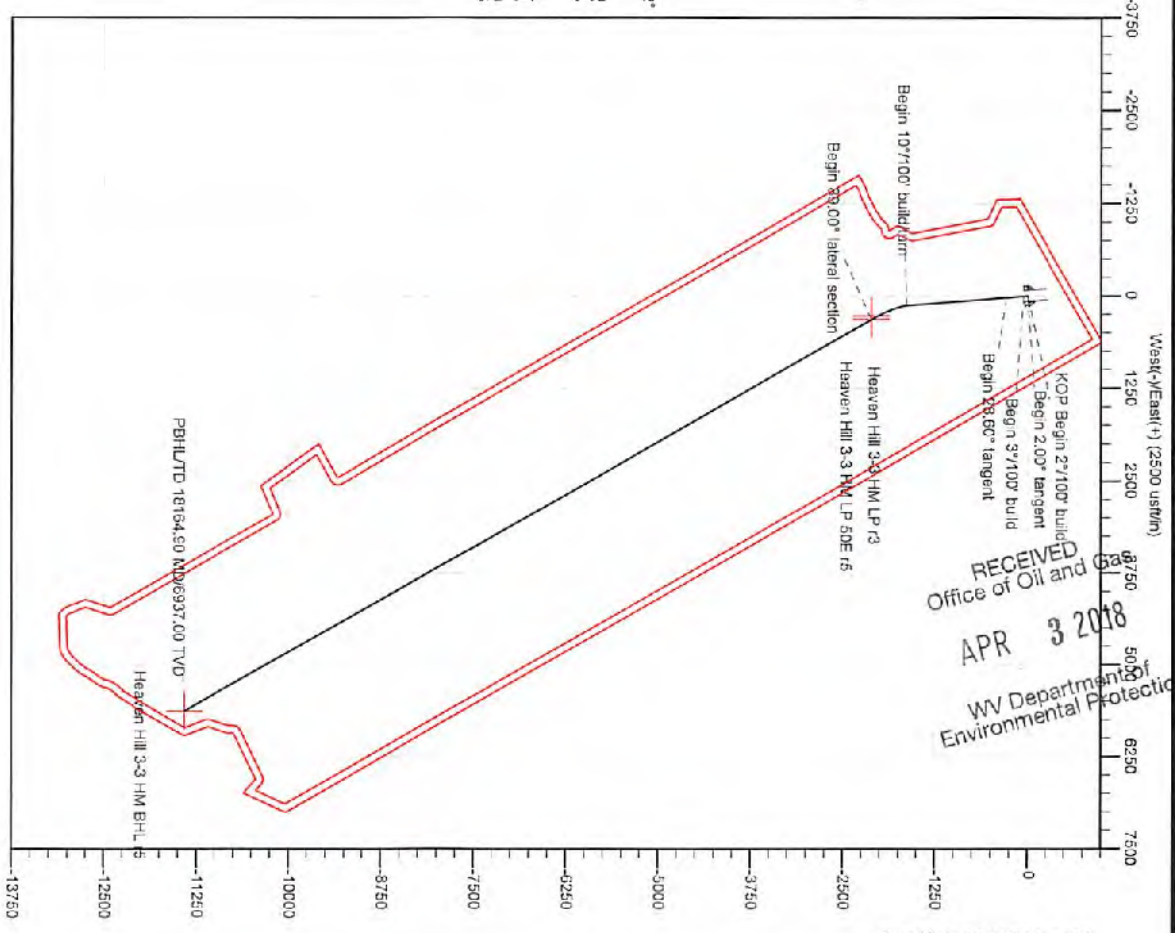
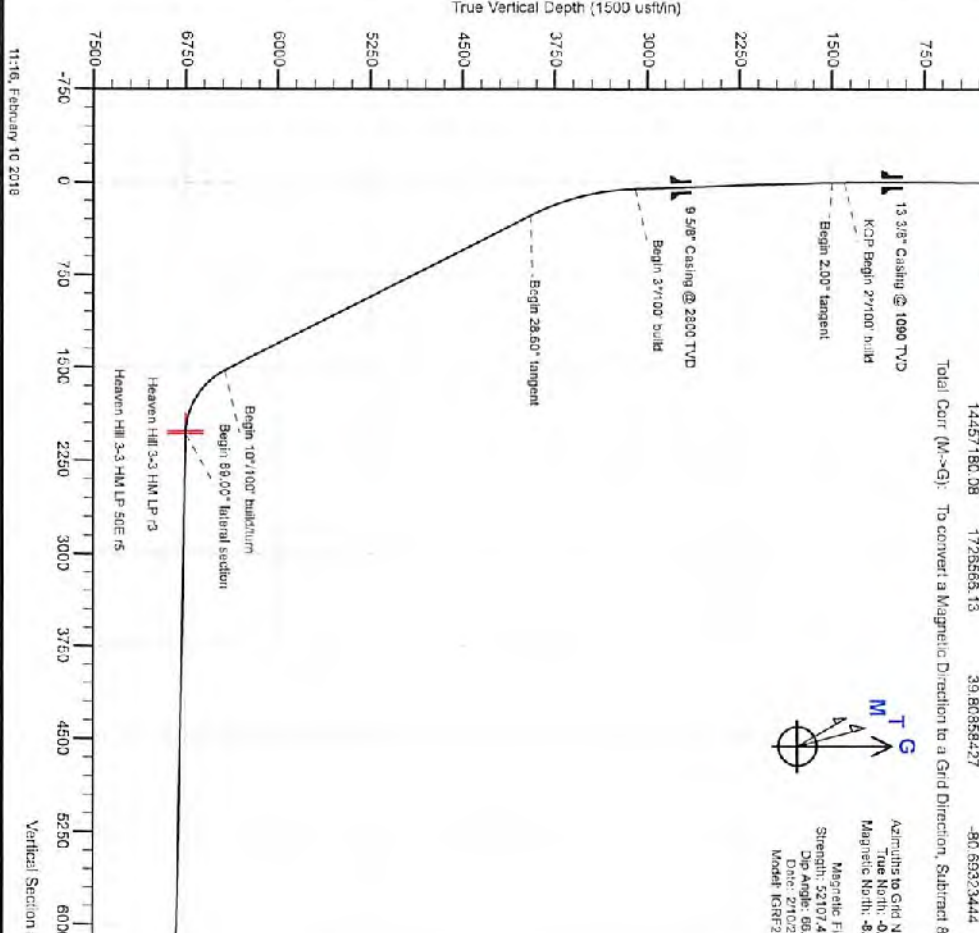
Sec	MD	INC	AZI	TYD	+M/S	+EATV	Dleg	TBase	VBase	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1400.00	0.00	1403.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 27'100' build
3	1500.00	2.00	1499.98	-1.72	0.14	2.00	175.35	1.82	0.00	Begin 28.60° tangent
4	3101.00	28.86	3100.00	-57.43	4.67	0.00	0.00	53.55	0.00	Begin 37'100' build
5	3987.83	28.86	3847.72	-288.62	23.47	3.00	0.00	288.14	0.00	Begin 28.60° tangent
6	6819.24	28.86	6433.54	-1638.74	133.34	3.00	0.00	1528.10	0.00	Begin 107'100' buildturn
7	7452.60	89.00	6750.00	-2115.14	322.50	10.00	-28.38	2038.10	0.00	Begin 88.00° lateral section
8	18164.91	89.00	15023	6937.00-11412.49	5340.18	0.00	0.00	2730.14	0.00	PBH/LTD *8104.50 MD/6937.00 TYD



Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (64 W to 78 W)
 System Datum: Mean Sea Level
 Northing: 14457180.08
 Easting: 1725885.13
 Latitude: 39.80888427
 Longitude: -80.65823444
 Degr/ Reference: G1 @ 1325.00 left
 System Datum: Mean Sea Level



Azimuth to Grid North
 True North: -0.20°
 Magnetic North: -8.92°
 Magnetic Field
 Strength: 52107.45nT
 Dip Angle: 66.92°
 Date: 2/10/2018
 Model: IGRF2015



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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-3 HM (J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1328.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1328.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-3 HM (J)	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 3-3 HM (J)					
Well Position	+N/-S	0.00 usft	Northing:	14,457,180.08 usft	Latitude:	39.80858427
	+E/-W	0.00 usft	Easting:	1,726,566.13 usft	Longitude:	-80.69323444
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,328.00 usft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/10/2018	-8.72	66.92	52,107.39721634

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	153.70

Plan Survey Tool Program	Date	2/10/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,164.91 rev5 (Original Hole)	MWD	MWD - Standard

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 (°)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	2.00	175.35	1,499.98	-1.74	0.14	2.00	2.00	0.00	175.35	0.00
3,101.00	2.00	175.35	3,100.00	-57.43	4.67	0.00	0.00	0.00	0.00	0.00
3,987.83	28.60	175.35	3,947.73	-288.62	23.47	3.00	3.00	0.00	0.00	0.00
6,819.24	28.60	175.35	6,433.54	-1,639.74	133.34	0.00	0.00	0.00	0.00	0.00
7,452.60	89.00	150.23	6,750.00	-2,115.14	322.50	10.00	9.54	-3.97	-28.36	Heaven Hill 3-3 HM L
18,164.91	89.00	150.23	6,937.00	-11,412.49	5,640.18	0.00	0.00	0.00	0.00	Heaven Hill 3-3 HM B

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Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
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 Site: Heaven Hill 3
 Well: Heaven Hill 3-3 HM (J)
 Wellbore: Original Hole
 Design: rev5

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well Heaven Hill 3-3 HM (J)
 GL @ 1326.00usft
 GL @ 1326.00usft
 Grid
 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	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
100.00	0.00	0.00	100.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
200.00	0.00	0.00	200.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
300.00	0.00	0.00	300.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
400.00	0.00	0.00	400.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
500.00	0.00	0.00	500.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
600.00	0.00	0.00	600.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
700.00	0.00	0.00	700.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
800.00	0.00	0.00	800.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
900.00	0.00	0.00	900.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,457,180.08	1,726,566.13	39.80858427	-80.69323444	
KOP Begin 2°/100' build										
1,500.00	2.00	175.35	1,499.98	-1.74	0.14	14,457,178.34	1,726,566.27	39.80857949	-80.69323396	
Begin 2.00° tangent										
1,600.00	2.00	175.35	1,599.92	-5.22	0.42	14,457,174.86	1,726,566.55	39.80856994	-80.69323299	
1,700.00	2.00	175.35	1,699.86	-8.70	0.71	14,457,171.39	1,726,566.83	39.80856038	-80.69323203	
1,800.00	2.00	175.35	1,799.80	-12.17	0.99	14,457,167.91	1,726,567.12	39.80855083	-80.69323106	
1,900.00	2.00	175.35	1,899.74	-15.65	1.27	14,457,164.43	1,726,567.40	39.80854127	-80.69323010	
2,000.00	2.00	175.35	1,999.68	-19.13	1.55	14,457,160.95	1,726,567.68	39.80853172	-80.69322913	
2,100.00	2.00	175.35	2,099.61	-22.61	1.84	14,457,157.47	1,726,567.97	39.80852216	-80.69322817	
2,200.00	2.00	175.35	2,199.55	-26.09	2.12	14,457,153.99	1,726,568.25	39.80851261	-80.69322720	
2,300.00	2.00	175.35	2,299.49	-29.57	2.40	14,457,150.52	1,726,568.53	39.80850305	-80.69322624	
2,400.00	2.00	175.35	2,399.43	-33.05	2.69	14,457,147.04	1,726,568.81	39.80849350	-80.69322527	
2,500.00	2.00	175.35	2,499.37	-36.52	2.97	14,457,143.56	1,726,569.10	39.80848394	-80.69322431	
2,600.00	2.00	175.35	2,599.31	-40.00	3.25	14,457,140.08	1,726,569.38	39.80847438	-80.69322334	
2,700.00	2.00	175.35	2,699.25	-43.48	3.54	14,457,136.60	1,726,569.66	39.80846483	-80.69322238	
2,800.00	2.00	175.35	2,799.19	-46.96	3.82	14,457,133.12	1,726,569.95	39.80845527	-80.69322141	
2,900.00	2.00	175.35	2,899.13	-50.44	4.10	14,457,129.64	1,726,570.23	39.80844572	-80.69322045	
3,000.00	2.00	175.35	2,999.07	-53.92	4.39	14,457,126.17	1,726,570.51	39.80843616	-80.69321948	
3,100.00	2.00	175.35	3,099.01	-57.39	4.67	14,457,122.69	1,726,570.79	39.80842661	-80.69321852	
3,101.00	2.00	175.35	3,100.00	-57.43	4.67	14,457,122.65	1,726,570.80	39.80842651	-80.69321851	
Begin 3°/100' build										
3,200.00	4.97	175.35	3,198.81	-63.43	5.16	14,457,116.66	1,726,571.29	39.80841004	-80.69321684	
3,300.00	7.97	175.35	3,298.16	-74.66	6.07	14,457,105.42	1,726,572.20	39.80837919	-80.69321373	
3,400.00	10.97	175.35	3,396.79	-91.05	7.41	14,457,089.03	1,726,573.53	39.80833414	-80.69320918	
3,500.00	13.97	175.35	3,494.42	-112.57	9.16	14,457,067.51	1,726,575.28	39.80827503	-80.69320321	
3,600.00	16.97	175.35	3,590.78	-139.16	11.32	14,457,040.93	1,726,577.44	39.80820201	-80.69319584	
3,700.00	19.97	175.35	3,685.62	-170.73	13.88	14,457,009.35	1,726,580.01	39.80811527	-80.69318708	
3,800.00	22.97	175.35	3,778.67	-207.21	16.85	14,456,972.88	1,726,582.98	39.80801507	-80.69317897	
3,900.00	25.97	175.35	3,869.68	-248.49	20.21	14,456,931.59	1,726,586.33	39.80790167	-80.69316552	
3,967.83	28.60	175.35	3,947.73	-288.62	23.47	14,456,891.46	1,726,589.60	39.80779143	-80.69315439	
Begin 28.60° tangent										
4,000.00	28.60	175.35	3,958.41	-294.43	23.94	14,456,885.66	1,726,590.07	39.80777548	-80.69315278	
4,100.00	28.60	175.35	4,046.21	-342.15	27.82	14,456,837.94	1,726,593.95	39.80764440	-80.69313954	
4,200.00	28.60	175.35	4,134.00	-389.86	31.70	14,456,790.22	1,726,597.83	39.80751331	-80.69312631	
4,300.00	28.60	175.35	4,221.80	-437.58	35.58	14,456,742.50	1,726,601.71	39.80738223	-80.69311307	
4,400.00	28.60	175.35	4,309.59	-485.30	39.46	14,456,694.78	1,726,605.59	39.80725114	-80.69309984	
4,500.00	28.60	175.35	4,397.38	-533.02	43.35	14,456,647.06	1,726,609.47	39.80712005	-80.69308661	
4,600.00	28.60	175.35	4,485.18	-580.74	47.23	14,456,599.34	1,726,613.35	39.80698897	-80.69307337	
4,700.00	28.60	175.35	4,572.97	-628.46	51.11	14,456,551.62	1,726,617.23	39.80685788	-80.69306014	

SI-01913/103



Planning Report - Geographic

Database:	DB_Jul2218dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-3 HM (J)
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 3-3 HM (J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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WV Department of Environmental Protection

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,800.00	28.60	175.35	4,680.77	-676.18	54.99	14,456,503.90	1,726,621.11	39.80672680	-80.69304890	
4,900.00	28.60	175.35	4,748.56	-723.90	58.87	14,456,456.18	1,726,624.99	39.806659571	-80.69303367	
5,000.00	28.60	175.35	4,836.35	-771.62	62.75	14,456,408.46	1,726,628.87	39.80648463	-80.69302043	
5,100.00	28.60	175.35	4,924.15	-819.34	66.63	14,456,360.75	1,726,632.75	39.80633354	-80.69300720	
5,200.00	28.60	175.35	5,011.94	-867.06	70.51	14,456,313.03	1,726,636.63	39.80620245	-80.69299397	
5,300.00	28.60	175.35	5,099.74	-914.78	74.39	14,456,265.31	1,726,640.51	39.80607137	-80.69298073	
5,400.00	28.60	175.35	5,187.53	-962.49	78.27	14,456,217.59	1,726,644.40	39.80594029	-80.69296750	
5,500.00	28.60	175.35	5,275.33	-1,010.21	82.15	14,456,169.87	1,726,648.28	39.80580920	-80.69295426	
5,600.00	28.60	175.35	5,363.12	-1,057.93	86.03	14,456,122.15	1,726,652.16	39.80567812	-80.69294103	
5,700.00	28.60	175.35	5,450.91	-1,105.65	89.91	14,456,074.43	1,726,656.04	39.80554703	-80.69292780	
5,800.00	28.60	175.35	5,538.71	-1,153.37	93.79	14,456,026.71	1,726,659.92	39.80541595	-80.69291456	
5,900.00	28.60	175.35	5,626.50	-1,201.09	97.67	14,455,978.99	1,726,663.80	39.80528486	-80.69290133	
6,000.00	28.60	175.35	5,714.30	-1,248.81	101.55	14,455,931.27	1,726,667.68	39.80515378	-80.69288810	
6,100.00	28.60	175.35	5,802.09	-1,296.53	105.43	14,455,883.55	1,726,671.56	39.80502269	-80.69287486	
6,200.00	28.60	175.35	5,889.89	-1,344.25	109.31	14,455,835.83	1,726,675.44	39.80489161	-80.69286163	
6,300.00	28.60	175.35	5,977.68	-1,391.97	113.19	14,455,788.11	1,726,679.32	39.80476052	-80.69284840	
6,400.00	28.60	175.35	6,065.47	-1,439.69	117.07	14,455,740.40	1,726,683.20	39.80462943	-80.69283516	
6,500.00	28.60	175.35	6,153.27	-1,487.41	120.95	14,455,692.68	1,726,687.08	39.80449835	-80.69282193	
6,600.00	28.60	175.35	6,241.06	-1,535.13	124.83	14,455,644.96	1,726,690.96	39.80436726	-80.69280869	
6,700.00	28.60	175.35	6,328.86	-1,582.84	128.71	14,455,597.24	1,726,694.84	39.80423618	-80.69279548	
6,800.00	28.60	175.35	6,416.65	-1,630.56	132.59	14,455,549.52	1,726,698.72	39.80410509	-80.69278223	
6,818.24	28.60	175.35	6,433.54	-1,639.75	133.34	14,455,540.34	1,726,699.47	39.80407987	-80.69277968	
Begin 10°/100' build/tum										
6,900.00	35.90	188.82	6,501.82	-1,682.31	139.51	14,455,497.77	1,726,705.64	39.80396291	-80.69275824	
7,000.00	45.26	163.38	6,577.70	-1,745.27	155.40	14,455,434.82	1,726,721.52	39.80378988	-80.69270244	
7,100.00	54.81	159.48	6,641.88	-1,817.75	179.94	14,455,362.33	1,726,746.07	39.80359059	-80.69261593	
7,200.00	64.45	156.41	6,692.39	-1,897.56	212.41	14,455,282.52	1,726,778.53	39.80337111	-80.69250132	
7,300.00	74.15	153.80	6,727.70	-1,982.27	251.80	14,455,197.81	1,726,817.92	39.80313809	-80.69236210	
7,400.00	83.88	151.43	6,746.73	-2,069.31	296.92	14,455,110.77	1,726,863.05	39.80289683	-80.69220251	
7,452.60	89.00	150.23	6,750.00	-2,115.14	322.50	14,455,064.94	1,726,888.62	39.80277254	-80.69211200	
Begin 89.00° lateral section										
7,500.00	89.00	150.23	6,750.83	-2,156.28	346.03	14,455,023.81	1,726,912.15	39.80265934	-80.69202873	
7,600.00	89.00	150.23	6,752.57	-2,243.07	395.67	14,454,937.01	1,726,961.79	39.80242052	-80.69165304	
7,700.00	89.00	150.23	6,754.32	-2,329.86	445.31	14,454,850.22	1,727,011.44	39.80218170	-80.69167738	
7,800.00	89.00	150.23	6,756.06	-2,416.65	494.95	14,454,763.43	1,727,061.08	39.80194288	-80.69150168	
7,900.00	89.00	150.23	6,757.81	-2,503.44	544.59	14,454,676.64	1,727,110.72	39.80170406	-80.69132600	
8,000.00	89.00	150.23	6,759.56	-2,590.23	594.23	14,454,589.85	1,727,160.36	39.80146524	-80.69115033	
8,100.00	89.00	150.23	6,761.30	-2,677.03	643.87	14,454,503.06	1,727,210.00	39.80122642	-80.69097465	
8,200.00	89.00	150.23	6,763.05	-2,763.82	693.51	14,454,416.27	1,727,259.64	39.80098760	-80.69078897	
8,300.00	89.00	150.23	6,764.79	-2,850.61	743.15	14,454,329.47	1,727,309.28	39.80074878	-80.69062330	
8,400.00	89.00	150.23	6,766.54	-2,937.40	792.80	14,454,242.68	1,727,358.92	39.80050995	-80.69044763	
8,500.00	89.00	150.23	6,768.28	-3,024.19	842.44	14,454,155.89	1,727,408.56	39.80027113	-80.69027198	
8,600.00	89.00	150.23	6,770.03	-3,110.98	892.08	14,454,069.10	1,727,458.20	39.80003231	-80.69009629	
8,700.00	89.00	150.23	6,771.78	-3,197.77	941.72	14,453,982.31	1,727,507.84	39.79979349	-80.68992062	
8,800.00	89.00	150.23	6,773.52	-3,284.56	991.36	14,453,895.52	1,727,557.49	39.79955466	-80.68974495	
8,900.00	89.00	150.23	6,775.27	-3,371.36	1,041.00	14,453,808.73	1,727,607.13	39.79931584	-80.68956928	
9,000.00	89.00	150.23	6,777.01	-3,458.15	1,090.64	14,453,721.94	1,727,656.77	39.79907702	-80.68939362	
9,100.00	89.00	150.23	6,778.76	-3,544.94	1,140.28	14,453,635.14	1,727,706.41	39.79883819	-80.68921795	
9,200.00	89.00	150.23	6,780.50	-3,631.73	1,189.92	14,453,548.35	1,727,756.05	39.79859937	-80.68904229	
9,300.00	89.00	150.23	6,782.25	-3,718.52	1,239.56	14,453,461.56	1,727,805.69	39.79836055	-80.68886663	
9,400.00	89.00	150.23	6,783.99	-3,805.31	1,289.20	14,453,374.77	1,727,855.33	39.79812172	-80.68869097	
9,500.00	89.00	150.23	6,785.74	-3,892.10	1,338.85	14,453,287.98	1,727,904.97	39.79788290	-80.68851531	
9,600.00	89.00	150.23	6,787.49	-3,978.89	1,388.49	14,453,201.19	1,727,954.61	39.79764407	-80.68833965	
9,700.00	89.00	150.23	6,789.23	-4,065.69	1,438.13	14,453,114.40	1,728,004.25	39.79740525	-80.68816399	

51-01963MOD



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-3 HM (J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1328.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1328.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-3 HM (J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,800.00	89.00	150.23	6,790.98	-4,152.48	1,487.77	14,453,027.60	1,728,053.89	39.79716642	-80.68799834	
9,900.00	89.00	150.23	6,792.72	-4,239.27	1,537.41	14,452,940.81	1,728,103.54	39.79692759	-80.68781268	
10,000.00	89.00	150.23	6,794.47	-4,326.06	1,587.05	14,452,854.02	1,728,153.18	39.79668877	-80.68763703	
10,100.00	89.00	150.23	6,796.21	-4,412.85	1,636.69	14,452,767.23	1,728,202.82	39.79644994	-80.68746138	
10,200.00	89.00	150.23	6,797.96	-4,499.64	1,686.33	14,452,680.44	1,728,252.46	39.79621111	-80.68728572	
10,300.00	89.00	150.23	6,799.71	-4,586.43	1,735.97	14,452,593.65	1,728,302.10	39.79597229	-80.68711007	
10,400.00	89.00	150.23	6,801.45	-4,673.23	1,785.61	14,452,506.86	1,728,351.74	39.79573346	-80.68693443	
10,500.00	89.00	150.23	6,803.20	-4,760.02	1,835.25	14,452,420.07	1,728,401.38	39.79549463	-80.68675678	
10,600.00	89.00	150.23	6,804.94	-4,846.81	1,884.90	14,452,333.27	1,728,451.02	39.79525581	-80.68658313	
10,700.00	89.00	150.23	6,808.89	-4,933.60	1,934.54	14,452,246.48	1,728,500.66	39.79501698	-80.68640749	
10,800.00	89.00	150.23	6,808.43	-5,020.39	1,984.18	14,452,159.69	1,728,550.30	39.79477815	-80.68623184	
10,900.00	89.00	150.23	6,810.18	-5,107.18	2,033.82	14,452,072.90	1,728,599.94	39.79453932	-80.68605620	
11,000.00	89.00	150.23	6,811.93	-5,193.97	2,083.46	14,451,986.11	1,728,649.59	39.79430049	-80.68588056	
11,100.00	89.00	150.23	6,813.67	-5,280.76	2,133.10	14,451,899.32	1,728,699.23	39.79406166	-80.68570492	
11,200.00	89.00	150.23	6,815.42	-5,367.56	2,182.74	14,451,812.53	1,728,748.87	39.79382283	-80.68552928	
11,300.00	89.00	150.23	6,817.16	-5,454.35	2,232.38	14,451,725.74	1,728,798.51	39.79358400	-80.68535364	
11,400.00	89.00	150.23	6,818.91	-5,541.14	2,282.02	14,451,638.94	1,728,848.15	39.79334517	-80.68517801	
11,500.00	89.00	150.23	6,820.65	-5,627.93	2,331.66	14,451,552.15	1,728,897.79	39.79310634	-80.68500237	
11,600.00	89.00	150.23	6,822.40	-5,714.72	2,381.30	14,451,465.36	1,728,947.43	39.79286751	-80.68482674	
11,700.00	89.00	150.23	6,824.15	-5,801.51	2,430.95	14,451,378.57	1,728,997.07	39.79262868	-80.68465111	
11,800.00	89.00	150.23	6,825.89	-5,888.30	2,480.59	14,451,291.78	1,729,046.71	39.79238985	-80.68447547	
11,900.00	89.00	150.23	6,827.64	-5,975.10	2,530.23	14,451,204.99	1,729,096.35	39.79215102	-80.68429984	
12,000.00	89.00	150.23	6,829.38	-6,061.89	2,579.87	14,451,118.20	1,729,145.99	39.79191219	-80.68412421	
12,100.00	89.00	150.23	6,831.13	-6,148.68	2,629.51	14,451,031.40	1,729,195.64	39.79167336	-80.68394859	
12,200.00	89.00	150.23	6,832.87	-6,235.47	2,679.15	14,450,944.61	1,729,245.28	39.79143452	-80.68377296	
12,300.00	89.00	150.23	6,834.62	-6,322.26	2,728.79	14,450,857.82	1,729,294.92	39.79119569	-80.68359733	
12,400.00	89.00	150.23	6,836.36	-6,409.05	2,778.43	14,450,771.03	1,729,344.56	39.79095686	-80.68342171	
12,500.00	89.00	150.23	6,838.11	-6,495.84	2,828.07	14,450,684.24	1,729,394.20	39.79071803	-80.68324609	
12,600.00	89.00	150.23	6,839.86	-6,582.63	2,877.71	14,450,597.45	1,729,443.84	39.79047919	-80.68307046	
12,700.00	89.00	150.23	6,841.60	-6,669.43	2,927.35	14,450,510.66	1,729,493.48	39.79024036	-80.68289484	
12,800.00	89.00	150.23	6,843.35	-6,756.22	2,977.00	14,450,423.87	1,729,543.12	39.79000153	-80.68271921	
12,900.00	89.00	150.23	6,845.09	-6,843.01	3,026.64	14,450,337.07	1,729,592.76	39.78976269	-80.68254358	
13,000.00	89.00	150.23	6,846.84	-6,929.80	3,076.28	14,450,250.28	1,729,642.40	39.78952386	-80.68236799	
13,100.00	89.00	150.23	6,848.58	-7,016.59	3,125.92	14,450,163.49	1,729,692.04	39.78928502	-80.68219237	
13,200.00	89.00	150.23	6,850.33	-7,103.38	3,175.56	14,450,076.70	1,729,741.68	39.78904619	-80.68201676	
13,300.00	89.00	150.23	6,852.08	-7,190.17	3,225.20	14,449,989.91	1,729,791.33	39.78880735	-80.68184115	
13,400.00	89.00	150.23	6,853.82	-7,276.97	3,274.84	14,449,903.12	1,729,840.97	39.78856852	-80.68166553	
13,500.00	89.00	150.23	6,855.57	-7,363.76	3,324.48	14,449,816.33	1,729,890.61	39.78832968	-80.68148992	
13,600.00	89.00	150.23	6,857.31	-7,450.55	3,374.12	14,449,729.53	1,729,940.25	39.78809085	-80.68131431	
13,700.00	89.00	150.23	6,859.06	-7,537.34	3,423.76	14,449,642.74	1,729,989.89	39.78785201	-80.68113870	
13,800.00	89.00	150.23	6,860.80	-7,624.13	3,473.40	14,449,555.95	1,730,039.53	39.78761317	-80.68096310	
13,900.00	89.00	150.23	6,862.55	-7,710.92	3,523.05	14,449,469.16	1,730,089.17	39.78737434	-80.68078749	
14,000.00	89.00	150.23	6,864.30	-7,797.71	3,572.69	14,449,382.37	1,730,138.81	39.78713550	-80.68061189	
14,100.00	89.00	150.23	6,866.04	-7,884.50	3,622.33	14,449,295.58	1,730,188.45	39.78689666	-80.68043628	
14,200.00	89.00	150.23	6,867.79	-7,971.30	3,671.97	14,449,208.79	1,730,238.09	39.78665782	-80.68026068	
14,300.00	89.00	150.23	6,869.53	-8,058.09	3,721.61	14,449,122.00	1,730,287.73	39.78641899	-80.68008508	
14,400.00	89.00	150.23	6,871.28	-8,144.88	3,771.25	14,449,035.20	1,730,337.38	39.78618015	-80.67990948	
14,500.00	89.00	150.23	6,873.02	-8,231.67	3,820.89	14,448,948.41	1,730,387.02	39.78594131	-80.67973388	
14,600.00	89.00	150.23	6,874.77	-8,318.46	3,870.53	14,448,861.62	1,730,436.66	39.78570247	-80.67955828	
14,700.00	89.00	150.23	6,876.51	-8,405.25	3,920.17	14,448,774.83	1,730,486.30	39.78546363	-80.67938269	
14,800.00	89.00	150.23	6,878.26	-8,492.04	3,969.81	14,448,688.04	1,730,535.94	39.78522479	-80.67920709	
14,900.00	89.00	150.23	6,880.01	-8,578.84	4,019.45	14,448,601.25	1,730,585.58	39.78498595	-80.67903150	
15,000.00	89.00	150.23	6,881.75	-8,665.63	4,069.09	14,448,514.46	1,730,635.22	39.78474711	-80.67885590	
15,100.00	89.00	150.23	6,883.50	-8,752.42	4,118.74	14,448,427.66	1,730,684.86	39.78450827	-80.67868031	
15,200.00	89.00	150.23	6,885.24	-8,839.21	4,168.38	14,448,340.87	1,730,734.50	39.78426943	-80.67850472	

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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-3 HM (J)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1326.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1328.00usft
Site:	Heaven Hill 3	North Reference:	Grid
Well:	Heaven Hill 3-3 HM (J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,300.00	89.00	150.23	6,886.99	-8,926.00	4,218.02	14,448,254.08	1,730,784.14	39.78403059	-80.67832913	
15,400.00	89.00	150.23	6,888.73	-9,012.79	4,267.66	14,448,167.29	1,730,833.78	39.78379175	-80.67815354	
15,500.00	89.00	150.23	6,890.48	-9,099.58	4,317.30	14,448,080.50	1,730,883.43	39.78355291	-80.67797796	
15,600.00	89.00	150.23	6,892.23	-9,186.37	4,366.94	14,447,993.71	1,730,933.07	39.78331407	-80.67780237	
15,700.00	89.00	150.23	6,893.97	-9,273.17	4,416.58	14,447,906.92	1,730,982.71	39.78307523	-80.67762679	
15,800.00	89.00	150.23	6,895.72	-9,359.96	4,466.22	14,447,820.13	1,731,032.35	39.78283639	-80.67745120	
15,900.00	89.00	150.23	6,897.46	-9,446.75	4,515.86	14,447,733.33	1,731,081.99	39.78259754	-80.67727562	
16,000.00	89.00	150.23	6,899.21	-9,533.54	4,565.50	14,447,646.54	1,731,131.63	39.78235870	-80.67710004	
16,100.00	89.00	150.23	6,900.95	-9,620.33	4,615.14	14,447,559.75	1,731,181.27	39.78211986	-80.67692446	
16,200.00	89.00	150.23	6,902.70	-9,707.12	4,664.79	14,447,472.96	1,731,230.91	39.78188102	-80.67674888	
16,300.00	89.00	150.23	6,904.45	-9,793.91	4,714.43	14,447,386.17	1,731,280.55	39.78164217	-80.67657331	
16,400.00	89.00	150.23	6,906.19	-9,880.71	4,764.07	14,447,299.38	1,731,330.19	39.78140333	-80.67639773	
16,500.00	89.00	150.23	6,907.94	-9,967.50	4,813.71	14,447,212.59	1,731,379.83	39.78116449	-80.67622216	
16,600.00	89.00	150.23	6,909.68	-10,054.29	4,863.35	14,447,125.79	1,731,429.48	39.78092564	-80.67604658	
16,700.00	89.00	150.23	6,911.43	-10,141.08	4,912.99	14,447,039.00	1,731,479.12	39.78068680	-80.67587101	
16,800.00	89.00	150.23	6,913.17	-10,227.87	4,962.63	14,446,952.21	1,731,528.76	39.78044795	-80.67569544	
16,900.00	89.00	150.23	6,914.92	-10,314.66	5,012.27	14,446,865.42	1,731,578.40	39.78020911	-80.67551987	
17,000.00	89.00	150.23	6,916.66	-10,401.45	5,061.91	14,446,778.63	1,731,628.04	39.77997028	-80.67534430	
17,100.00	89.00	150.23	6,918.41	-10,488.24	5,111.55	14,446,691.84	1,731,677.68	39.77973142	-80.67516873	
17,200.00	89.00	150.23	6,920.16	-10,575.04	5,161.19	14,446,605.05	1,731,727.32	39.77949257	-80.67499317	
17,300.00	89.00	150.23	6,921.90	-10,661.83	5,210.84	14,446,518.26	1,731,776.96	39.77925373	-80.67481760	
17,400.00	89.00	150.23	6,923.65	-10,748.62	5,260.48	14,446,431.46	1,731,826.60	39.77901488	-80.67464204	
17,500.00	89.00	150.23	6,925.39	-10,835.41	5,310.12	14,446,344.67	1,731,876.24	39.77877603	-80.67446648	
17,600.00	89.00	150.23	6,927.14	-10,922.20	5,359.76	14,446,257.88	1,731,925.88	39.77853719	-80.67429091	
17,700.00	89.00	150.23	6,928.88	-11,008.99	5,409.40	14,446,171.09	1,731,975.53	39.77829834	-80.67411535	
17,800.00	89.00	150.23	6,930.63	-11,095.78	5,459.04	14,446,084.30	1,732,025.17	39.77805949	-80.67393980	
17,900.00	89.00	150.23	6,932.38	-11,182.57	5,508.68	14,445,997.51	1,732,074.81	39.77782064	-80.67376424	
18,000.00	89.00	150.23	6,934.12	-11,269.37	5,558.32	14,445,910.72	1,732,124.45	39.77758180	-80.67358868	
18,100.00	89.00	150.23	6,935.87	-11,356.16	5,607.96	14,445,823.92	1,732,174.09	39.77734295	-80.67341313	
18,164.90	89.00	150.23	6,937.00	-11,412.49	5,640.18	14,445,767.60	1,732,206.31	39.77718794	-80.67329919	
PBHL/TD 18164.90 MD/6937.00 TVD										
18,164.91	89.00	150.23	6,937.00	-11,412.49	5,640.18	14,445,767.59	1,732,206.31	39.77718792	-80.67329918	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Heaven Hill 3-3 HM LP ϵ - hit/miss target - Shape - Point	0.00	0.01	6,750.00	-2,115.14	322.50	14,455,064.94	1,726,888.63	39.80277253	-80.69211199	
Heaven Hill 3-3 HM LP r - plan misses target center by 43.53usft at 7428.28usft MD (6749.07 TVD, -2093.98 N, 310.53 E) - Point	0.00	0.01	6,750.00	-2,115.14	272.50	14,455,064.94	1,726,838.63	39.80277300	-80.69229000	
Heaven Hill 3-3 HM BHL - plan hits target center - Point	0.00	0.01	6,937.00	-11,412.49	5,640.18	14,445,767.59	1,732,206.31	39.77718792	-80.67329918	

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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Heaven Hill 3-3 HM (J)
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 3-3 HM (J)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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	
2,800.81	2,800.00	9 5/8" Casing @ 2800 TVD	9-5/8	12-1/4	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,400.00	1,400.00	0.00	0.00	KOP Begin 2°/100' build	
1,500.00	1,499.98	-1.74	0.14	Begin 2.00° tangent	
3,101.00	3,100.00	-57.43	4.87	Begin 3°/100' build	
3,987.83	3,947.73	-288.62	23.47	Begin 28.60° tangent	
6,819.24	6,433.54	-1,639.75	133.34	Begin 10°/100' build/turn	
7,452.60	6,750.00	-2,115.14	322.50	Begin 89.00° lateral section	
18,164.90	6,937.00	-11,412.49	5,640.18	PBHL/TD 18164.90 MD/6937.00 TVD	

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John
3/28/18

Well Site Safety Plan

Tug Hill Operating, LLC

Well Name: Heaven Hill 3-3HM

Pad Location: Heaven Hill 3

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing-4,406,557.30

Easting -526,258.41

March 2018

05/04/2018

WW-6A1
(5/13)

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

**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 pages

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

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

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

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

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

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WW-6A1 Supplement

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

51-01963 Mon

LEASE Name or No	Tag	Parcel	Grantor, Lessor, etc.	Grantee, Lessee, etc	Royalty	Deed Book/Page	Assignment	Assignment	Assignment
10*15557	A	9-7-30	RICKY L WHITLATCH ET AL	CHEVRON USA INC	1/8+	780	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+	780	N/A	N/A	Chevron to Tug Hill: 36/148
10*15667	C	9-7-20	KEVIN E MCGILTON ET UX	CHEVRON USA INC	1/8+	850	N/A	N/A	Chevron to Tug Hill: 36/148
10*15698	C	9-7-20	ROBERT A EDGE AND SHERRIE N EDGE	TH EXPLORATION LLC	1/8+	900	N/A	N/A	N/A
10*15720	C	9-7-20	KAREN L GREATHOUSE AND FLOYD GREATHOUSE	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*15721	C	9-7-20	TINA L EDGE MONTI AND THOMAS MONTI	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16020	C	9-7-20	SHARON HINERMAN MAY & DANIEL G MAY	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16028	C	9-7-20	ROSEMARY PARKINS AND STEPHEN PARKINS	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16051	C	9-7-20	DONNA JEAN SNIDER AND DAVID SNIDER	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16053	C	9-7-20	GARY D HINERMAN AND JUDY ANN HINERMAN	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16289	C	9-7-20	BRENDA HINERMAN WILLIAMSON AND BRIAN K WILLIAMSON	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16412	C	9-7-20	ELIZABETH ANN BLAZER AND PAUL R BLAZER	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16413	C	9-7-20	RONALD H EDGE JR	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*15746	D	9-11-7	BRUCE D SCHURR	TH EXPLORATION LLC	1/8+	921	N/A	N/A	N/A
10*16021	D	9-11-7	TOMMY BONAR AND TANYA S BONAR	TH EXPLORATION LLC	1/8+	925	N/A	N/A	N/A
10*16115	D	9-11-7	EARL W HARRIS	TH EXPLORATION LLC	1/8+	925	N/A	N/A	N/A
10*16247	D	9-11-7	CAROL RIGGLE PARSLEY AND JAMES DENNIS PARSLEY	TH EXPLORATION LLC	1/8+	925	N/A	N/A	N/A
10*17415	D	9-11-7	DILLON PITSENBARGER	TH EXPLORATION LLC	1/8+	919	N/A	N/A	N/A
10*17506	D	9-11-7	CHASKIA F HARRIS AND JAMES M HARRIS	TH EXPLORATION LLC	1/8+	919	N/A	N/A	N/A
10*17507	D	9-11-7	DEZRAY METCALF	TH EXPLORATION LLC	1/8+	919	N/A	N/A	N/A
10*47051.256.1	D	9-11-7	BRENDA J WHETZEL	TH EXPLORATION LLC	1/8+	881	N/A	N/A	N/A
10*47051.256.10	D	9-11-7	GRACE LAURA BONAR	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.11	D	9-11-7	JOHN L MASON	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.12	D	9-11-7	STEVEN A BOHRER	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.13	D	9-11-7	WILLIAM W CRAIG AND GLENDA L CRAIG	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.14	D	9-11-7	HUGH R BUZZARD	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.15	D	9-11-7	CHARLOTTE J BONAR YOHO	TH EXPLORATION LLC	1/8+	904	N/A	N/A	N/A
10*47051.256.16	D	9-11-7	CHARLOTTE B HUMMELL	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.17	D	9-11-7	MAXINE G JOHNSON	TH EXPLORATION LLC	1/8+	904	N/A	N/A	N/A
10*47051.256.18	D	9-11-7	JOHN WILLIAM BONAR AND SHIRLEY BONAR	TH EXPLORATION LLC	1/8+	913	N/A	N/A	N/A
10*47051.256.19	D	9-11-7	MICHAEL DAVID PYLES AND CYNTHIA A PYLES	TH EXPLORATION LLC	1/8+	907	N/A	N/A	N/A
10*47051.256.20	D	9-11-7	JEFFREY THOMAS PYLES AND TERESA A PYLES	TH EXPLORATION LLC	1/8+	907	N/A	N/A	N/A
10*47051.256.21	D	9-11-7	JACK L MASON AND JEAN M MASON	TH EXPLORATION LLC	1/8+	904	N/A	N/A	N/A
10*47051.256.22	D	9-11-7	BEVERLY J HOPSON	TH EXPLORATION LLC	1/8+	913	N/A	N/A	N/A
10*47051.256.23	D	9-11-7	ROBERT L BONAR	TH EXPLORATION LLC	1/8+	913	N/A	N/A	N/A
10*47051.256.24	D	9-11-7	CATHERINE BONAR PETTIT BILLIE	TH EXPLORATION LLC	1/8+	904	N/A	N/A	N/A
10*47051.256.7	D	9-11-7	MARILYN SUE BUMER	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.8	D	9-11-7	PAMELA ANN MASON	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.256.9	D	9-11-7	WANDA MASON SUNSHINE	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*16238	E	9-12-27	SUSAN MARIE JOHNSON AKA SUSAN MARIE HUBER	TH EXPLORATION LLC	1/8+	924	N/A	N/A	N/A
10*47051.309.1	E	9-12-27	LESLIE E QUIGLEY	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*47051.309.2	E	9-12-27	LEWIS M QUIGLEY AND MAXINE V QUIGLEY	TH EXPLORATION LLC	1/8+	907	N/A	N/A	N/A
10*47051.309.3	E	9-12-27	GERALD W QUIGLEY AND VICKI L QUIGLEY	TH EXPLORATION LLC	1/8+	905	N/A	N/A	N/A
10*15606	F	9-12-27	CHK-MAC LLC	CHESAPEAKE APPALACHIA LLC	1/8+	798	N/A	N/A	Chevron to Tug Hill: 36/148
10*16238	F	9-12-27	SUSAN MARIE JOHNSON AKA SUSAN MARIE HUBER	TH EXPLORATION LLC	1/8+	924	N/A	N/A	Chesapeake to Chevron: 30/461

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

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10*16932	F	9-12-2	HAYMAKER PROPERTIES LP	CHEVRON U.S.A. INC.	1/8+	902	447	N/A	N/A	Chevron to Tug Hill: 37/437
10*47051.309.1	F	9-12-2	LESLIE E QUIGLEY	TH EXPLORATION LLC	1/8+	905	8	N/A	N/A	N/A
10*47051.309.2	F	9-12-2	LEWIS M QUIGLEY AND MAXINE V QUIGLEY	TH EXPLORATION LLC	1/8+	907	217	N/A	N/A	N/A
10*47051.309.3	F	9-12-2	GERALD W QUIGLEY AND VICKI L QUIGLEY	TH EXPLORATION LLC	1/8+	905	12	N/A	N/A	N/A
10*15559	G	9-11-11	KENNETH M MCCARDLE ET UX REV LT	CHEVRON USA INC	1/8+	816	499	N/A	N/A	Chevron to Tug Hill: 36/148
10*16149	H	9-12-1.1	THOMAS MICHAEL WALLACE	TH EXPLORATION LLC	1/8+	924	610	N/A	N/A	N/A
10*16244	H	9-12-1.1	EMILY ANN NICIFOROS	TH EXPLORATION LLC	1/8+	924	617	N/A	N/A	N/A
10*47051.333.1	H	9-12-1.1	THOMAS S RIGGS III	TH EXPLORATION LLC	1/8+	904	556	N/A	N/A	N/A
10*47051.333.2	H	9-12-1.1	WILLIAM MARTIN RIGGS ANGELA RAE MOORE	TH EXPLORATION LLC	1/8+	907	220	N/A	N/A	N/A
10*16149	I	9-12-1	THOMAS MICHAEL WALLACE	TH EXPLORATION LLC	1/8+	924	610	N/A	N/A	N/A
10*16244	I	9-12-1	EMILY ANN NICIFOROS	TH EXPLORATION LLC	1/8+	924	617	N/A	N/A	N/A
10*47051.333.1	I	9-12-1	THOMAS S RIGGS III	TH EXPLORATION LLC	1/8+	904	556	N/A	N/A	N/A
10*47051.333.2	I	9-12-1	WILLIAM MARTIN RIGGS ANGELA RAE MOORE	TH EXPLORATION LLC	1/8+	907	220	N/A	N/A	N/A
10*16244	J	9-12-31	EMILY ANN NICIFOROS	TH EXPLORATION LLC	1/8+	924	617	N/A	N/A	N/A
10*15477	K	9-14-18	RONALD A WYCINSKI	TH EXPLORATION LLC	1/8+	906	241	N/A	N/A	N/A
10*15730	K	9-14-18	FRANCES V CARPENTER	TH EXPLORATION LLC	1/8+	906	256	N/A	N/A	N/A
10*15752	K	9-14-18	KIM O CHAMBERS AND DEBRA CHAMBERS	TH EXPLORATION LLC	1/8+	906	258	N/A	N/A	N/A
10*16017	K	9-14-18	FLOYD A MCFADDEN	TH EXPLORATION LLC	1/8+	906	260	N/A	N/A	N/A
10*16018	K	9-14-18	BARBARA MCFADDEN ALBRIGHT	TH EXPLORATION LLC	1/8+	906	262	N/A	N/A	N/A
10*16030	K	9-14-18	JOSEPH F CHMIELEWSKI AND SANDRA CHMIELEWSKI	TH EXPLORATION LLC	1/8+	906	264	N/A	N/A	N/A
10*16031	K	9-14-18	CARL J CHMIELEWSKI AND KATHLEEN A CHMIELEWSKI	TH EXPLORATION LLC	1/8+	906	266	N/A	N/A	N/A
10*16083	K	9-14-18	CECIL HARRY LILLY, III AND PAMELA KAY KNIGHT LILLY	TH EXPLORATION LLC	1/8+	912	47	N/A	N/A	N/A
10*16085	K	9-14-18	KATHARYN ANNETTE LILLY LAING AND FREDDIE JOE LAING	TH EXPLORATION LLC	1/8+	912	43	N/A	N/A	N/A
10*16086	K	9-14-18	KATHARYN DAY LILLY	TH EXPLORATION LLC	1/8+	906	272	N/A	N/A	N/A
10*16087	K	9-14-18	MARY PENELOPE LILLY MURPHY	TH EXPLORATION LLC	1/8+	912	41	N/A	N/A	N/A
10*16131	K	9-14-18	ERIC S DOBBS	TH EXPLORATION LLC	1/8+	902	68	N/A	N/A	N/A
10*16144	K	9-14-18	PATTIE S MADRID	TH EXPLORATION LLC	1/8+	906	278	N/A	N/A	N/A
10*16180	K	9-14-18	LARRY L CHAMBERS	TH EXPLORATION LLC	1/8+	906	280	N/A	N/A	N/A
10*16181	K	9-14-18	NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK	TH EXPLORATION LLC	1/8+	906	281	N/A	N/A	N/A
			FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND ROBERT ALBERT TRUSTEES							
10*16182	K	9-14-18	ALBERT TRUSTEES	TH EXPLORATION LLC	1/8+	906	283	N/A	N/A	N/A
10*16183	K	9-14-18	ALLEN R L DAVIS AND DIANA LEE PATTERSON	TH EXPLORATION LLC	1/8+	906	285	N/A	N/A	N/A
10*16239	K	9-14-18	ANGELA L OLDFIELD AND KENNETH W OLDFIELD	TH EXPLORATION LLC	1/8+	906	287	N/A	N/A	N/A
10*16240	K	9-14-18	BONNIE SUE PATTERSON SWISHER	TH EXPLORATION LLC	1/8+	906	289	N/A	N/A	N/A
10*16285	K	9-14-18	JOHN A SHUTZ AND CYNTHIA J SHUTZ	TH EXPLORATION LLC	1/8+	906	291	N/A	N/A	N/A
10*16441	K	9-14-18	GEORGE FRANKLIN AND NANCY ANN REED	TH EXPLORATION LLC	1/8+	924	619	N/A	N/A	N/A
10*16442	K	9-14-18	FRED T AND JERRY L CHAMBERS	TH EXPLORATION LLC	1/8+	924	174	N/A	N/A	N/A
10*16443	K	9-14-18	BARBARA BROWN CHAMBERS	TH EXPLORATION LLC	1/8+	924	621	N/A	N/A	N/A
10*16444	K	9-14-18	CATHERINE ELLEN CHAMBERS	TH EXPLORATION LLC	1/8+	924	623	N/A	N/A	N/A
10*16445	K	9-14-18	DOUGLAS C AND GWENDLYN D LEWTON	TH EXPLORATION LLC	1/8+	925	123	N/A	N/A	N/A
10*16483	K	9-14-18	JOHN C AND BARBARA H WINTER	TH EXPLORATION LLC	1/8+	924	178	N/A	N/A	N/A
10*16486	K	9-14-18	DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON	TH EXPLORATION LLC	1/8+	924	180	N/A	N/A	N/A
10*16490	K	9-14-18	WILLIAM H AND MERRY C COTTON	TH EXPLORATION LLC	1/8+	924	176	N/A	N/A	N/A
10*16511	K	9-14-18	DOUGLAS R BOWEN	TH EXPLORATION LLC	1/8+	906	475	N/A	N/A	N/A
10*16531	K	9-14-18	KATHY DOBBS WELLS	TH EXPLORATION LLC	1/8+	906	472	N/A	N/A	N/A

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05/04/2018

WW-6A1 Supplement

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

SI-01963
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10*16532	K	9-14-18	JEAN ANN MCFADDEN	TH EXPLORATION LLC	1/8+	906	459	N/A	N/A
10*16533	K	9-14-18	SHIRLEY ANN DOBBS	TH EXPLORATION LLC	1/8+	906	469	N/A	N/A
10*16534	K	9-14-18	TERRY LEE LASAVAGE	TH EXPLORATION LLC	1/8+	906	443	N/A	N/A
10*16535	K	9-14-18	CHARLES E CARSON AND MARY KAY CARSON	TH EXPLORATION LLC	1/8+	907	420	N/A	N/A
10*16537	K	9-14-18	KIM D BOWEN AND MADONNA M BOWEN	TH EXPLORATION LLC	1/8+	907	415	N/A	N/A
10*16540	K	9-14-18	JAMES A WINTER AND CONNIE G WINTER	TH EXPLORATION LLC	1/8+	924	184	N/A	N/A
10*16569	K	9-14-18	JANICE C BALE	TH EXPLORATION LLC	1/8+	907	425	N/A	N/A
10*16570	K	9-14-18	ROBERT D BOWEN AND MARCIA M R BOWEN	TH EXPLORATION LLC	1/8+	907	420	N/A	N/A
10*16576	K	9-14-18	LINDA A MINER AND MICHAEL W MINER	TH EXPLORATION LLC	1/8+	907	484	N/A	N/A
10*16580	K	9-14-18	HAROLD C MCFADDEN	TH EXPLORATION LLC	1/8+	907	480	N/A	N/A
10*16581	K	9-14-18	HELEN L SCHILLING	TH EXPLORATION LLC	1/8+	907	489	N/A	N/A
10*16582	K	9-14-18	DORA BROCK BRAMMER	TH EXPLORATION LLC	1/8+	907	429	N/A	N/A
10*16680	K	9-14-18	RONALD J AND JENNIFER CHAMBERS FICCA	TH EXPLORATION LLC	1/8+	924	186	N/A	N/A
10*16726	K	9-14-18	LESLY K WHITE	TH EXPLORATION LLC	1/8+	924	182	N/A	N/A
10*16733	K	9-14-18	SARAH L BISHOP	TH EXPLORATION LLC	1/8+	924	172	N/A	N/A
10*16835	K	9-14-18	ERNEST CARL AUGUSTINE JR	TH EXPLORATION LLC	1/8+	924	188	N/A	N/A
10*16882	K	9-14-18	JAMES LEROY AND DARLENE DOBBS OWENS	TH EXPLORATION LLC	1/8+	924	190	N/A	N/A
10*16948	K	9-14-18	FREDERICK M LEWTON	TH EXPLORATION LLC	1/8+	924	136	N/A	N/A
10*16949	K	9-14-18	STEVEN R AND BRIANNE L LUTT	TH EXPLORATION LLC	1/8+	924	138	N/A	N/A
10*16950	K	9-14-18	JAY E AND CECILIA E LEWTON	TH EXPLORATION LLC	1/8+	924	134	N/A	N/A
10*16952	K	9-14-18	RUSSELL D HERVEY	TH EXPLORATION LLC	1/8+	924	132	N/A	N/A
10*16953	K	9-14-18	DONALD T AND JEAN K HOGAN	TH EXPLORATION LLC	1/8+	924	140	N/A	N/A
10*16965	K	9-14-18	WILLIAM L WRIGHT AND CAROLINA WRIGHT	TH EXPLORATION LLC	1/8+	914	524	N/A	N/A
10*16966	K	9-14-18	JOHN GILLETTE AND BARBARA GILLETTE	TH EXPLORATION LLC	1/8+	913	377	N/A	N/A
10*16967	K	9-14-18	TARA JEANNE MINOR AND JENNIFER A KNAPP	TH EXPLORATION LLC	1/8+	914	612	N/A	N/A
10*16990	K	9-14-18	ROSEMARY H BEAVERS	TH EXPLORATION LLC	1/8+	924	152	N/A	N/A
10*16992	K	9-14-18	LINDA C ABRAHAM	TH EXPLORATION LLC	1/8+	924	148	N/A	N/A
10*16993	K	9-14-18	JULIA HOOVER	TH EXPLORATION LLC	1/8+	924	150	N/A	N/A
10*16995	K	9-14-18	DIANE ELSIE RAMSEY	TH EXPLORATION LLC	1/8+	924	146	N/A	N/A
10*17129	K	9-14-18	ROBERTA JANE PARKINSON	TH EXPLORATION LLC	1/8+	924	142	N/A	N/A
10*17131	K	9-14-18	LAURA E TOTTEN AND LONNIE R TOTTEN	TH EXPLORATION LLC	1/8+	924	154	N/A	N/A
10*17134	K	9-14-18	UNITED CHRISTIAN MISSIONARY SOCIETY	TH EXPLORATION LLC	1/8+	924	144	N/A	N/A
10*17139	K	9-14-18	ALICE G WEINER AND GERALD S WEINER	TH EXPLORATION LLC	1/8+	915	131	N/A	N/A
10*17209	K	9-14-18	GAYLE S SHANNON	TH EXPLORATION LLC	1/8+	924	168	N/A	N/A
10*17289	K	9-14-18	HAROLD R HUNT JR AND ELIZABETH A HUNT	TH EXPLORATION LLC	1/8+	924	170	N/A	N/A
10*17396	K	9-14-18	CHRISTINE L KIDD	TH EXPLORATION LLC	1/8+	924	158	N/A	N/A
10*17413	K	9-14-18	ROBERT M CHAMBERS AND CHARLOTTE A CHAMBERS	TH EXPLORATION LLC	1/8+	924	160	N/A	N/A
10*17436	K	9-14-18	ANDREW M HOOVER AND DINAH R HOOVER	TH EXPLORATION LLC	1/8+	924	156	N/A	N/A
10*17448	K	9-14-18	FREDERICK L HERVEY AND CATHY J HERVEY	TH EXPLORATION LLC	1/8+	924	162	N/A	N/A
10*17452	K	9-14-18	ALAN H & MARY K DEGARMO	TH EXPLORATION, LLC	1/8+	924	164	N/A	N/A
10*17487	K	9-14-18	DEBORAH R MOKOSH	TH EXPLORATION LLC	1/8+	924	166	N/A	N/A
10*17503	K	9-14-18	JANICE L KUHN	TH EXPLORATION LLC	1/8+	924	122	N/A	N/A
10*17504	K	9-14-18	GREGG ALAN MILLER AND BETH ANN MILLER	TH EXPLORATION LLC	1/8+	924	118	N/A	N/A
10*17505	K	9-14-18	MICHAEL R & LEANNE DOBBS	TH EXPLORATION, LLC	1/8+	924	116	N/A	N/A
10*17515	K	9-14-18	GLADYS E DOBBS	TH EXPLORATION LLC	1/8+	923	541	N/A	N/A
10*17516	K	9-14-18	MARY V DOBBS	TH EXPLORATION LLC	1/8+	923	539	N/A	N/A

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05/04/2018

WW-6A1 Supplement

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

51-01963
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10*17517	K	9-14-18	JULIO ENRIQUE & DEBRA K TORRES	TH EXPLORATION, LLC	1/8+	923	537	N/A	N/A
10*17520	K	9-14-18	LUCY P SULLIVAN	TH EXPLORATION LLC	1/8+	923	533	N/A	N/A
10*17528	K	9-14-18	DEAN E GARRISON	TH EXPLORATION LLC	1/8+	923	535	N/A	N/A
10*17555	K	9-14-18	AARON AND JANA K PARRY	TH EXPLORATION LLC	1/8+	924	113	N/A	N/A
10*17559	K	9-14-18	MARVIN JERRY BLAKE AND LINDA D BLAKE	TH EXPLORATION LLC	1/8+	923	528	N/A	N/A
10*17560	K	9-14-18	TREVOR HOOKS	TH EXPLORATION LLC	1/8+	924	110	N/A	N/A
10*17563	K	9-14-18	DONALD L WOOD	TH EXPLORATION LLC	1/8+	923	523	N/A	N/A
10*17579	K	9-14-18	DON COFFIELD & GLENDA DOBBS	TH EXPLORATION, LLC	1/8+	923	525	N/A	N/A
10*17580	K	9-14-18	PAUL CRAIG CUNNINGHAM	TH EXPLORATION LLC	1/8+	923	530	N/A	N/A
10*17581	K	9-14-18	PAULA WEIRES	TH EXPLORATION LLC	1/8+	923	486	N/A	N/A
10*17582	K	9-14-18	JOHN THOMAS ERAZMUS AND JEAN R ERAZMUS	TH EXPLORATION LLC	1/8+	924	124	N/A	N/A
10*17612	K	9-14-18	BEVERLY A LEDBETTER	TH EXPLORATION, LLC	1/8+	923	480	N/A	N/A
10*17613	K	9-14-18	CARLTON DOBBS JR AND MIKHAIL PROKOPENKO	TH EXPLORATION LLC	1/8+	924	120	N/A	N/A
10*17614	K	9-14-18	DAVID DOBBS	TH EXPLORATION, LLC	1/8+	923	489	N/A	N/A
10*17615	K	9-14-18	PAULA JO WRIGHT	TH EXPLORATION, LLC	1/8+	923	482	N/A	N/A
10*17616	K	9-14-18	RONALD & ELIZABETH DOBBS	TH EXPLORATION, LLC	1/8+	924	107	N/A	N/A
10*17617	K	9-14-18	UNITED DISCIPLES OF CHRIST CHURCH	TH EXPLORATION LLC	1/8+	924	129	N/A	N/A
10*17664	K	9-14-18	RUODOLPH H PARSONS	TH EXPLORATION, LLC	1/8+	923	511	N/A	N/A
10*17667	K	9-14-18	THOMAS BRIAN WARRICK	TH EXPLORATION, LLC	1/8+	923	509	N/A	N/A
10*17668	K	9-14-18	KENNETH R DOBBS	TH EXPLORATION, LLC	1/8+	923	503	N/A	N/A
10*17671	K	9-14-18	JAMES L STOUT	TH EXPLORATION LLC	1/8+	923	484	N/A	N/A
10*17674	K	9-14-18	HOWARD L & BETH E WOOD	TH EXPLORATION, LLC	1/8+	923	505	N/A	N/A
10*17675	K	9-14-18	GREGORY D & CAROLYN J WIBLE	TH EXPLORATION, LLC	1/8+	923	507	N/A	N/A
10*17676	K	9-14-18	JAMES C & DEIDRE G DORIA	TH EXPLORATION, LLC	1/8+	923	513	N/A	N/A
10*17700	K	9-14-18	ROGER L & MARILYN L GARRISON	TH EXPLORATION, LLC	1/8+	923	472	N/A	N/A
10*17701	K	9-14-18	SUE ANN WORD	TH EXPLORATION, LLC	1/8+	923	470	N/A	N/A
10*17702	K	9-14-18	TAMMY BETH RAMSEY	TH EXPLORATION, LLC	1/8+	925	500	N/A	N/A
10*17703	K	9-14-18	SHIRLEY N COX	TH EXPLORATION, LLC	1/8+	923	498	N/A	N/A
10*17708	K	9-14-18	BETTY LOU NOBLE	TH EXPLORATION LLC	1/8+	923	127	N/A	N/A
10*17711	K	9-14-18	DEBRA A WENNEMAN AND KURT J WENNEMAN	TH EXPLORATION LLC	1/8+	923	520	N/A	N/A
10*17731	K	9-14-18	JAMES J MCGHEE AND JEANNINE CHAMBERS MCGHEE	TH EXPLORATION LLC	1/8+	914	519	N/A	N/A
10*17766	K	9-14-18	EDWARD S & NANCY A ROSENTHAL	TH EXPLORATION, LLC	1/8+	923	495	N/A	N/A
10*17767	K	9-14-18	WILLIAM K & LINDA J MERRITT	TH EXPLORATION, LLC	1/8+	923	474	N/A	N/A
10*17769	K	9-14-18	GLADYS FRAZIER KING	TH EXPLORATION, LLC	1/8+	923	492	N/A	N/A
10*17771	K	9-14-18	CHARLES AND LISA WARRICK	TH EXPLORATION, LLC	1/8+	923	477	N/A	N/A
10*17830	K	9-14-18	BRIAN AND MELINDA MASTERS	TH EXPLORATION LLC	1/8+	925	319	N/A	N/A
10*17878	K	9-14-18	ROBERT E & SARAH M ROUSH	TH EXPLORATION, LLC	1/8+	924	590	N/A	N/A
10*17879	K	9-14-18	HARRY R WRIGHT JR	TH EXPLORATION, LLC	1/8+	924	588	N/A	N/A
10*17880	K	9-14-18	ANNA M WRIGHT	TH EXPLORATION, LLC	1/8+	924	586	N/A	N/A
10*17881	K	9-14-18	WAYLON L & ANGELA J MURPHEE	TH EXPLORATION, LLC	1/8+	924	555	N/A	N/A
10*17885	K	9-14-18	JOHN RUSSELL BECKER	TH EXPLORATION, LLC	1/8+	924	540	N/A	N/A
10*47051.325.1	K	9-14-18	JUDITH A LEWANDOSKY AND ALAN E LEWANDOSKY	TH EXPLORATION LLC	1/8+	906	225	N/A	N/A
10*47051.325.2	K	9-14-18	TIMMY LEE STOUT AND DOROTHY MARIE STOUT	TH EXPLORATION LLC	1/8+	906	222	N/A	N/A
10*47051.325.3	K	9-14-18	NICHOLAS D PAVLUK AND GLORIA K PAVLUK	TH EXPLORATION LLC	1/8+	906	228	N/A	N/A
10*47051.325.4	K	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	K	9-14-18	SAMUEL ALAN MCCORD AND WINIFRED A MCKEE	TH EXPLORATION LLC	1/8+	906	232	N/A	N/A

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05/04/2018

WW-6A1 Supplement

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

51-01963
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10*47051.325.6	K	9-14-18	THOMAS O MCCORD	TH EXPLORATION LLC	1/8+	906	235	N/A	N/A
10*47051.325.7	K	9-14-18	SHERON JONES	TH EXPLORATION LLC	1/8+	906	237	N/A	N/A
10*47051.325.8	K	9-14-18	RICK PAVLIK	TH EXPLORATION LLC	1/8+	906	239	N/A	N/A
10*15752	L	9-15-3	KIM O CHAMBERS AND DEBRA CHAMBERS	TH EXPLORATION LLC	1/8+	906	258	N/A	N/A
10*16017	L	9-15-3	FLOYD A MCFADDEN	TH EXPLORATION LLC	1/8+	906	260	N/A	N/A
10*16018	L	9-15-3	BARBARA MCFADDEN ALBRIGHT	TH EXPLORATION LLC	1/8+	906	262	N/A	N/A
10*16144	L	9-15-3	PATTIE S MADRID	TH EXPLORATION LLC	1/8+	906	278	N/A	N/A
10*16180	L	9-15-3	LARRY L CHAMBERS	TH EXPLORATION LLC	1/8+	906	280	N/A	N/A
10*16181	L	9-15-3	NORMA CHRISTINE WHIPP AND GERALD WAYNE BLACK	TH EXPLORATION LLC	1/8+	906	281	N/A	N/A
			FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND ROBERT						
10*16182	L	9-15-3	ALBERT TRUSTEES	TH EXPLORATION LLC	1/8+	906	283	N/A	N/A
10*16239	L	9-15-3	ANGELA L OLDFIELD AND KENNETH W OLDFIELD	TH EXPLORATION LLC	1/8+	906	287	N/A	N/A
10*16285	L	9-15-3	JOHN A SHUTZ AND CYNTHIA J SHUTZ	TH EXPLORATION LLC	1/8+	906	291	N/A	N/A
10*16441	L	9-15-3	GEORGE FRANKLIN AND NANCY ANN REED	TH EXPLORATION LLC	1/8+	924	619	N/A	N/A
10*16442	L	9-15-3	FRED T AND JERRY L CHAMBERS	TH EXPLORATION LLC	1/8+	924	174	N/A	N/A
10*16443	L	9-15-3	BARBARA BROWN CHAMBERS	TH EXPLORATION LLC	1/8+	924	621	N/A	N/A
10*16444	L	9-15-3	CATHERINE ELLEN CHAMBERS	TH EXPLORATION LLC	1/8+	924	623	N/A	N/A
10*16445	L	9-15-3	DOUGLAS C AND GWENDLYN D LEWTON	TH EXPLORATION LLC	1/8+	925	123	N/A	N/A
10*16483	L	9-15-3	JOHN C AND BARBARA H WINTER	TH EXPLORATION LLC	1/8+	924	178	N/A	N/A
10*16486	L	9-15-3	DAVID ALAN WILKINSON AND PATRICIA LYNN WILKINSON	TH EXPLORATION LLC	1/8+	924	180	N/A	N/A
10*16490	L	9-15-3	WILLIAM H AND MERRY C COTTON	TH EXPLORATION LLC	1/8+	924	176	N/A	N/A
10*16498	L	9-15-3	SHELLY YEATER	TH EXPLORATION LLC	1/8+	925	283	N/A	N/A
10*16511	L	9-15-3	DOUGLAS R BOWEN	TH EXPLORATION LLC	1/8+	906	475	N/A	N/A
10*16532	L	9-15-3	JEAN ANN MCFADDEN	TH EXPLORATION LLC	1/8+	906	459	N/A	N/A
10*16534	L	9-15-3	TERRY LEE LASAVAGE	TH EXPLORATION LLC	1/8+	906	443	N/A	N/A
10*16535	L	9-15-3	CHARLES E CARSON AND MARY KAY CARSON	TH EXPLORATION LLC	1/8+	906	420	N/A	N/A
10*16537	L	9-15-3	KIM D BOWEN AND MADONNA M BOWEN	TH EXPLORATION LLC	1/8+	907	415	N/A	N/A
10*16540	L	9-15-3	JAMES A WINTER AND CONNIE G WINTER	TH EXPLORATION LLC	1/8+	924	184	N/A	N/A
10*16569	L	9-15-3	JANICE C BALE	TH EXPLORATION LLC	1/8+	907	425	N/A	N/A
10*16570	L	9-15-3	ROBERT D BOWEN AND MARCIA M R BOWEN	TH EXPLORATION LLC	1/8+	907	420	N/A	N/A
10*16576	L	9-15-3	LINDA A MINER AND MICHAEL W MINER	TH EXPLORATION LLC	1/8+	907	484	N/A	N/A
10*16580	L	9-15-3	HAROLD C MCFADDEN	TH EXPLORATION LLC	1/8+	907	480	N/A	N/A
10*16581	L	9-15-3	HELEN L SCHILLING	TH EXPLORATION LLC	1/8+	907	489	N/A	N/A
10*16582	L	9-15-3	DORA BROCK BRAMMER	TH EXPLORATION LLC	1/8+	907	429	N/A	N/A
10*16680	L	9-15-3	RONALD J AND JENNIFER CHAMBERS FICCA	TH EXPLORATION LLC	1/8+	924	186	N/A	N/A
10*16726	L	9-15-3	LESLEY K WHITE	TH EXPLORATION LLC	1/8+	924	182	N/A	N/A
10*16733	L	9-15-3	SARAH L BISHOP	TH EXPLORATION LLC	1/8+	924	172	N/A	N/A
10*16835	L	9-15-3	ERNEST CARL AUGUSTINE JR	TH EXPLORATION LLC	1/8+	924	188	N/A	N/A
10*16948	L	9-15-3	FREDERICK M LEWTON	TH EXPLORATION LLC	1/8+	924	136	N/A	N/A
10*16949	L	9-15-3	STEVEN R AND BRIANNE L LUTT	TH EXPLORATION LLC	1/8+	924	138	N/A	N/A
10*16950	L	9-15-3	JAY E AND CECILIA E LEWTON	TH EXPLORATION LLC	1/8+	924	134	N/A	N/A
10*16952	L	9-15-3	RUSSELL D HERVEY	TH EXPLORATION LLC	1/8+	924	132	N/A	N/A
10*16953	L	9-15-3	DONALD T AND JEAN K HOGAN	TH EXPLORATION LLC	1/8+	924	140	N/A	N/A
10*16990	L	9-15-3	ROSEMARY H BEAVERS	TH EXPLORATION LLC	1/8+	924	152	N/A	N/A
10*16992	L	9-15-3	LINDA C ABRAHAM	TH EXPLORATION LLC	1/8+	924	148	N/A	N/A
10*16993	L	9-15-3	JULIA HOOVER	TH EXPLORATION LLC	1/8+	924	150	N/A	N/A

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WW-6A1 Supplement

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

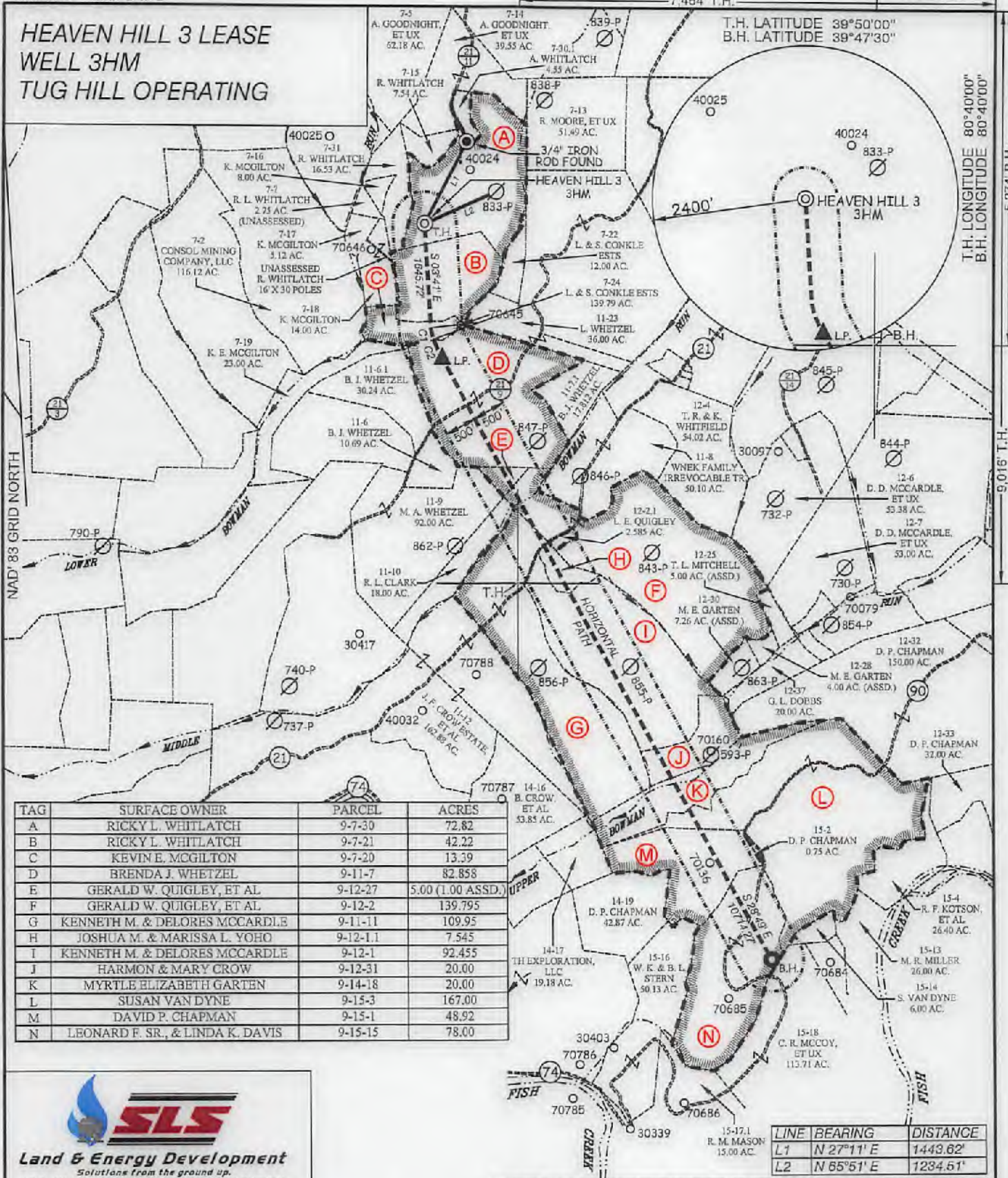
10*16995	L	9-15-3	DIANE ELSIE RAMSEY	TH EXPLORATION LLC	1/8+	924	146	N/A	N/A
10*17129	L	9-15-3	ROBERTA JANE PARKINSON	TH EXPLORATION LLC	1/8+	924	142	N/A	N/A
10*17131	L	9-15-3	LAURA E TOTTEN AND LONNIE R TOTTEN	TH EXPLORATION LLC	1/8+	924	154	N/A	N/A
10*17134	L	9-15-3	UNITED CHRISTIAN MISSIONARY SOCIETY	TH EXPLORATION LLC	1/8+	924	144	N/A	N/A
10*17209	L	9-15-3	GAYLE S SHANNON	TH EXPLORATION LLC	1/8+	924	168	N/A	N/A
10*17289	L	9-15-3	HAROLD R HUNT JR AND ELIZABETH A HUNT	TH EXPLORATION LLC	1/8+	924	170	N/A	N/A
10*17396	L	9-15-3	CHRISTINE L KIDD	TH EXPLORATION LLC	1/8+	924	158	N/A	N/A
10*17413	L	9-15-3	ROBERT M CHAMBERS AND CHARLOTTE A CHAMBERS	TH EXPLORATION LLC	1/8+	924	160	N/A	N/A
10*17436	L	9-15-3	ANDREW M HOOVER AND DINAH R HOOVER	TH EXPLORATION LLC	1/8+	924	156	N/A	N/A
10*17448	L	9-15-3	FREDERICK L HERVEY AND CATHY J HERVEY	TH EXPLORATION LLC	1/8+	924	162	N/A	N/A
10*17452	L	9-15-3	ALAN H & MARY K DEGARMO	TH EXPLORATION, LLC	1/8+	924	164	N/A	N/A
10*17486	L	9-15-3	JOSELYN M KEELY	TH EXPLORATION LLC	1/8+	929	364	N/A	N/A
10*17487	L	9-15-3	DEBORAH R MOKOSH	TH EXPLORATION LLC	1/8+	924	166	N/A	N/A
10*17563	L	9-15-3	DONALD L WOOD	TH EXPLORATION LLC	1/8+	923	523	N/A	N/A
10*17617	L	9-15-3	UNITED DISCIPLES OF CHRIST CHURCH	TH EXPLORATION LLC	1/8+	924	129	N/A	N/A
10*17674	L	9-15-3	HOWARD L & BETH E WOOD	TH EXPLORATION, LLC	1/8+	923	505	N/A	N/A
10*17675	L	9-15-3	GREGORY D & CAROLYN J WIBLE	TH EXPLORATION, LLC	1/8+	923	507	N/A	N/A
10*17701	L	9-15-3	SUE ANN WORD	TH EXPLORATION, LLC	1/8+	923	470	N/A	N/A
10*17702	L	9-15-3	TAMIMY BETH RAMSEY	TH EXPLORATION, LLC	1/8+	925	500	N/A	N/A
10*47051.325.1	L	9-15-3	JUDITH A LEWANDOSKY AND ALAN E LEWANDOSKY	TH EXPLORATION LLC	1/8+	906	705	N/A	N/A
10*47051.325.3	L	9-15-3	NICHOLAS D PAVLIK AND GLORIA K PAVLIK	TH EXPLORATION LLC	1/8+	906	228	N/A	N/A
10*47051.325.4	L	9-15-3	JAMES H WHITE AND RITA FRANKS WHITE	TH EXPLORATION LLC	1/8+	906	230	N/A	N/A
10*47051.325.5	L	9-15-3	SAMUEL ALAN MCCORD AND WINIFRED A MCKEE	TH EXPLORATION LLC	1/8+	906	232	N/A	N/A
10*47051.325.6	L	9-15-3	THOMAS O MCCORD	TH EXPLORATION LLC	1/8+	906	235	N/A	N/A
10*47051.325.7	L	9-15-3	SHERON JONES	TH EXPLORATION LLC	1/8+	906	237	N/A	N/A
10*47051.325.8	L	9-15-3	RICK PAVLIK	TH EXPLORATION LLC	1/8+	906	239	N/A	N/A
10*16246	M	9-15-1	R RICK HYRE	TH EXPLORATION LLC	1/8+	925	162	N/A	N/A
10*16480	M	9-15-1	JOHN D HAYES AND LYNDA SIGMON HAYES	TH EXPLORATION LLC	1/8+	925	164	N/A	N/A
10*16482	M	9-15-1	SAMUEL J RICKEY	TH EXPLORATION LLC	1/8+	925	143	N/A	N/A
10*16518	M	9-15-1	JOHN P AND ROSE HOWELL RICKEY	TH EXPLORATION LLC	1/8+	925	146	N/A	N/A
10*16519	M	9-15-1	NORMAN B AND JO ELLEN KAUBLE	TH EXPLORATION LLC	1/8+	925	156	N/A	N/A
10*16739	M	9-15-1	MARK M BASSETT	TH EXPLORATION LLC	1/8+	911	78	N/A	N/A
10*16848	M	9-15-1	RICHARD W DOUTHITT	TH EXPLORATION LLC	1/8+	925	128	N/A	N/A
10*16897	M	9-15-1	WILLIAM W AND NOREEN M HYRE	TH EXPLORATION LLC	1/8+	925	159	N/A	N/A
10*17132	M	9-15-1	OTTO J N AND LAUREL ANN KUNST	TH EXPLORATION LLC	1/8+	925	153	N/A	N/A
10*17163	M	9-15-1	HOLLY JILL COHAGAN	TH EXPLORATION LLC	1/8+	925	130	N/A	N/A
10*17164	M	9-15-1	BETTY D VEST	TH EXPLORATION LLC	1/8+	925	141	N/A	N/A
10*17165	M	9-15-1	LAURA A PETTIGREW	TH EXPLORATION LLC	1/8+	925	151	N/A	N/A
10*17168	M	9-15-1	RANDY K AND ALICE E BOWER	TH EXPLORATION LLC	1/8+	925	135	N/A	N/A
10*17293	M	9-15-1	JANICE L PIETERSE	TH EXPLORATION LLC	1/8+	925	149	N/A	N/A
10*17332	M	9-15-1	TODD W BULLARD AND BETH H BULLARD	TH EXPLORATION LLC	1/8+	925	132	N/A	N/A
10*17621	M	9-15-1	WILLIAM M BECKER AND KATHARINE B BECKER	TH EXPLORATION LLC	1/8+	925	138	N/A	N/A
10*17768	M	9-15-1	SHERI L EVRAETS	TH EXPLORATION, LLC	1/8+	925	125	N/A	N/A
10*19533	N	9-15-1	LEONARD F DAVIS SR AND LINDA K DAVIS	TH EXPLORATION LLC	1/8+	937	308	N/A	N/A

51-01963
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05/04/2018

**HEAVEN HILL 3 LEASE
WELL 3HM
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	9-7-20	13.39
D	BRENDA J. WHETZEL	9-11-7	82.858
E	GERALD W. QUIGLEY, ET AL	9-12-27	5.00 (1.00 ASSD.)
F	GERALD W. QUIGLEY, ET AL	9-12-2	139.795
G	KENNETH M. & DELORES MCCARDLE	9-11-11	109.95
H	JOSHUA M. & MARISSA L. YOHO	9-12-11	7.545
I	KENNETH M. & DELORES MCCARDLE	9-12-1	92.455
J	HARMON & MARY CROW	9-12-31	20.00
K	MYRTLE ELIZABETH GARTEN	9-14-18	20.00
L	SUSAN VAN DYNE	9-15-3	167.00
M	DAVID P. CHAPMAN	9-15-1	48.92
N	LEONARD F. SR., & LINDA K. DAVIS	9-15-15	78.00

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Solutions from the ground up.
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www.slsurveys.com

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	184.52'	758.84'	S 13°43' E	184.00'
C2	330.22'	2157.44'	S 24°39' E	329.90'

P.S. 677
Gregory A. Smith



(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'83 S.P.C.(FT) N. 476,953.76 E. 1,693,296.29
 NAD'83 GEO. LAT-(N) 39.908584 LONG-(W) 80.693234
 NAD'83 UTM (M) N. 4,406,557.30 E. 526,256.41
LANDING POINT
 NAD'83 S.P.C.(FT) N. 476,782.8 E. 1,633,583.5
 NAD'83 GEO. LAT-(N) 39.902773 LONG-(W) 80.692112
 NAD'83 UTM (M) N. 4,406,912.8 E. 526,359.7
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 467,344.8 E. 1,698,748.6
 NAD'83 GEO. LAT-(N) 39.777168 LONG-(W) 80.673209
 NAD'83 UTM (M) N. 4,403,078.8 E. 527,977.5

SCALE 1" = 2000' FILE NO. 8654P3HMR2.dwg
 DATE JUNE 30, 20 17
 REVISED FEBRUARY 2, 2018 & MARCH 22, 2018
 OPERATORS WELL NO. HEAVEN HILL 3-3HM
 API WELL NO. 47 - 051 - 01963
 NO. STATE COUNTY PERMIT

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

(+) 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-8A1)
- SURFACE OWNER (SEE TABLE)

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

COUNTY NAME PERMIT

05/04/2018

HEAVEN HILL 3 LEASE
WELL 3HM
TUG HILL OPERATING

7,464' T.H. 1,864 B.H.

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

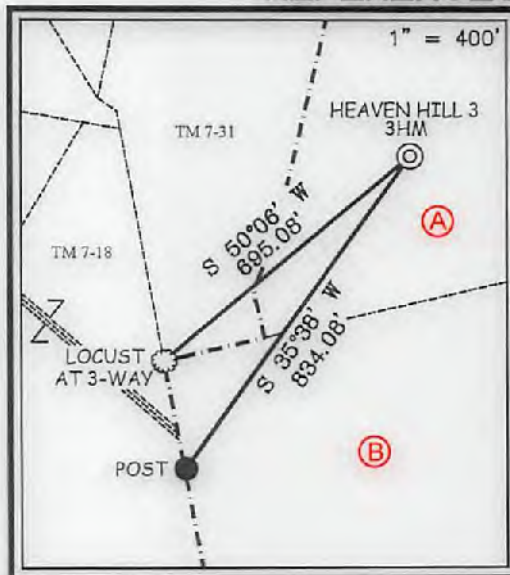
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)			
NAD'83 S.P.C.(FT)	N. 476,853.76	E. 1,633,296.29	
NAD'83 GEO.	LAT-(N) 39.808584	LONG-(W) 80.693234	
NAD'83 UTM (M)	N. 4,406,557.30	E. 526,258.41	
LANDING POINT			
NAD'83 S.P.C.(FT)	N. 476,732.8	E. 1,633,583.5	
NAD'83 GEO.	LAT-(N) 39.802773	LONG-(W) 80.692112	
NAD'83 UTM (M)	N. 4,405,912.6	E. 526,356.7	
BOTTOM HOLE			
NAD'83 S.P.C.(FT)	N. 467,344.8	E. 1,638,746.8	
NAD'83 GEO.	LAT-(N) 39.777188	LONG-(W) 80.673299	
NAD'83 UTM (M)	N. 4,403,078.8	E. 527,977.5	

T.H. LONGITUDE 80°40'00"
B.H. LONGITUDE 80°40'00"
5,274' B.H.
9,016' T.H.

B.H.

T.H.

REFERENCES



NOTES ON SURVEY

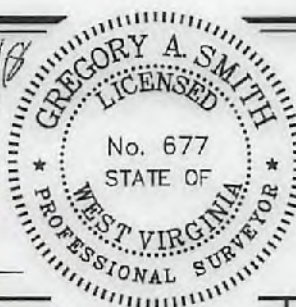
1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'



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 JUNE 30, 20 17

REVISED FEBRUARY 2, 2018 & MARCH 22, 2018

OPERATORS WELL NO. HEAVEN HILL 3-3HM

API WELL NO. 47-051-01963
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)
FILE NO. 8654P3HMR2.dwg
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 = 1,343.0' 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: LEASE NO. SEE WW-6A1 05/04/2018

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: 18,165'

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

COUNTY NAME PERMIT



April 2, 2018

WVDEP Office of Oil & Gas
Attn: Laura Adkins
601 5th Street, SE
Charleston, WV 25304-2345

VIA: US MAIL

RE: Permit Application Modification Request for Heaven Hill 3-3HM (API # 47-051-01963)
Revised Directional Drilling Plan

Dear Laura:

Tug Hill Operating, LLC would like to submit the enclosed permit application modification request to our approved permit for the Heaven Hill 3-3HM.

Please find the following enclosed revisions for extending the bottom hole location of the well:

- Revised WW-6B with inspector signature
- Revised WW-6A1
- Revised Mylar Well Plat
- Revised Site Safety Plan

If you have any questions or concerns, please feel free to call me at 304-376-0111. Thank you for your consideration in this matter.

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia

Alm
Enclosures