

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47 - 051 - 01951 County Marshall District Meade  
Quad Glen Easton 7.5' Pad Name Heaven Hill 2 Field/Pool Name \_\_\_\_\_  
Farm name Charles R. Hagedorn, Jr., Et Ux Well Number Heaven Hill 2W-9HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 S. University Drive, Suite 215 City Ft. Worth State TX Zip 76107

RECEIVED  
Office of Oil and Gas

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,406,729.2 Easting 524,576.7  
Landing Point of Curve Northing 4,406,306.1 Easting 524,003.8  
Bottom Hole Northing 4,404,144.0 Easting 525,253.7  
JUN 10 2020  
WV Department of Environmental Protection

Elevation (ft) 1331' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

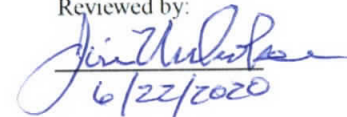
Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additive(s)  
SOBM; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; Specific additives per WSSP and Permit.

Date permit issued 5/9/2017 Date drilling commenced 11/5/2017 Date drilling ceased 8/6/2018  
Date completion activities began 9/24/2018 Date completion activities ceased 2/9/2019  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 70' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 2,167' Void(s) encountered (Y/N) depths \_\_\_\_\_  
Coal depth(s) ft Sewickley - 974', Pittsburgh - 1064' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
  
6/22/2020

API 47-051 - 01951 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2W-9HM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	36"	30"	120'	NEW	94.5#	N/A	YES
Surface	17 1/2"	13 3/8"	1,099'	NEW	54.5#	N/A	YES
Coal	17 1/2"	13 3/8"	1,099'	NEW	54.5#	N/A	YES
Intermediate 1	12 1/4"	9 5/5"	2,801'	NEW	36#	N/A	YES
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	16,832'	NEW	20#	N/A	YES
Tubing		2 3/8"	8,416'	NEW	4.7#	N/A	
Packer type and depth set							

RECEIVED  
Office of Oil and Gas  
JUN 10 2020

Comment Details

WV Department of  
Environmental Protection

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	A		15.6	1.19		0	8
Surface	A	1053	15.6	1.19	1264	0	8
Coal	A	1053	15.6	1.19	1264	0	8
Intermediate 1	A	930	15.6	1.19	1162	0	8
Intermediate 2							
Intermediate 3	A	3017	14.5	1.17	4827	0	8
Production							
Tubing							

Drillers TD (ft) 16,404' Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated Marcellus Plug back to (ft) n/a  
 Plug back procedure n/a

Kick off depth (ft) 6,407'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 3 centralizers on surface casing at equal distance.  
Intermediate - 1 centralizer every other joint.  
 Production - one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_





JUN 10 2020

**Heaven Hill 2W-9HM  
PEFORATION RECORD**

WV Department of  
Environmental Protection

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	11/2/2018	16237	16286	2	Marcellus
2	11/2/2018	15994	16140	48	Marcellus
3	11/3/2018	15819	15965	48	Marcellus
4	11/3/2018	15644	15790	48	Marcellus
5	11/3/2018	15469	15615	48	Marcellus
6	11/4/2018	15294	15440	48	Marcellus
7	11/5/2018	15119	15265	48	Marcellus
8	11/6/2018	14944	15090	48	Marcellus
9	11/6/2018	14769	14915	48	Marcellus
10	11/7/2018	14594	14740	48	Marcellus
11	11/7/2018	14419	14565	48	Marcellus
12	11/7/2018	14244	14390	48	Marcellus
13	11/8/2018	14069	14215	48	Marcellus
14	11/9/2018	13894	14040	48	Marcellus
15	11/10/2018	13719	13865	48	Marcellus
16	11/11/2018	13544	13690	48	Marcellus
17	11/12/2018	13369	13515	48	Marcellus
18	11/13/2018	13194	13340	48	Marcellus
19	11/13/2018	13019	13165	48	Marcellus
20	11/14/2018	12844	12990	48	Marcellus
21	11/15/2018	12669	12815	48	Marcellus
22	11/16/2018	12494	12640	48	Marcellus
23	11/16/2018	12319	12465	48	Marcellus
24	11/17/2018	12144	12290	48	Marcellus
25	11/17/2018	11969	12115	48	Marcellus
26	11/18/2018	11794	11940	48	Marcellus
27	11/19/2018	11619	11765	48	Marcellus
28	11/19/2018	11444	11590	48	Marcellus
29	11/20/2018	11269	11415	48	Marcellus
30	11/20/2018	11094	11240	48	Marcellus
31	11/21/2018	10919	11065	48	Marcellus
32	11/22/2018	10744	10890	48	Marcellus
33	11/22/2018	10569	10715	48	Marcellus
34	11/23/2018	10394	10540	48	Marcellus
35	11/23/2018	10219	10365	48	Marcellus
36	11/25/2018	10044	10190	48	Marcellus
37	11/25/2018	9869	10015	48	Marcellus
38	11/26/2018	9694	9840	48	Marcellus
39	11/27/2018	9519	9665	48	Marcellus
40	11/27/2018	9344	9490	48	Marcellus
41	11/29/2018	9169	9315	48	Marcellus

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
42	11/29/2018	8994	9140	48	Marcellus
43	11/30/2018	8819	8965	48	Marcellus
44	11/30/2018	8644	8790	48	Marcellus
45	11/30/2018	8469	8615	48	Marcellus
46	12/1/2018	8294	8440	48	Marcellus
47	12/1/2018	8119	8265	48	Marcellus

RECEIVED  
Office of Oil and Gas

JUN 10 2020

WV Department of  
Environmental Protection

Heaven Hill 2W-9HM

STIMULATION INFORMATION PER STAGE

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	(SIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	88.3	7486	5007	3571	351125	7815	0
2	87.9	7772	5257	4239	435045	7402	0
3	84	7422	5156	4094	442020	7452	0
4	86.2	7666	5122	4544	440620	7415	0
5	89	7760	5067	4225	438325	7489	0
6	86.4	7472	5128	4699	438775	7471	0
7	85.1	7624	5005	4707	435350	7516	0
8	89.5	7606	5266	4583	446280	7552	0
9	89.5	7847	5016	4849	436530	7565	0
10	86.9	7492	5143	4766	434430	7495	0
11	83.2	7822	5421	4236	437630	7679	0
12	85.3	7091	4885	4586	437960	7543	0
13	89.5	7681	5442	4681	441560	7778	0
14	89.5	7203	4855	4597	438590	111	0
15	89.5	7413	5677	4458	434240	7839	0
16	88.1	7560	5856	4361	438130	7590	0
17	89.4	7723	6044	4699	436580	7634	0
18	88.8	7293	5204	4535	436410	7781	0
19	89	7333	5538	4802	434620	7582	0
20	88.8	7430	5460	4835	438460	7747	0
21	88.7	7420	5269	4812	437490	7675	0
22	84	7206	5502	4673	442360	8335	0
23	89.3	7734	5568	5239	433660	7569	0
24	86.9	7448	5708	4896	438960	7676	0
25	86.4	7257	1462	4867	442670	7554	0
26	89.4	7433	5769	4847	436130	637	0
27	88.4	7227	5399	4883	438330	7600	0
28	85.3	7271	8774	4923	434210	7533	0
29	85	7032	5496	5056	441150	7475	0

RECEIVED  
Office of Oil and Gas  
JUN 10 2020  
WV Department of Environmental Protection

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
30	89.6	7133	5440	4692	436950	7504	0
31	89.4	7204	5204	4804	439380	7502	0
32	87.8	6898	5221	4725	438100	7310	0
33	88.9	6898	5123	4480	441110	7251	0
34	89.3	6999	5162	4708	439950	7234	0
35	83.9	6531	5315	4754	445520	7242	0
36	88.8	6787	5264	4735	434790	7040	0
37	86.1	6580	5107	4708	437800	7126	0
38	89	6765	5503	4842	439260	7197	0
39	86.6	6483	4932	4806	442420	7304	0
40	86.9	6669	5403	4666	440020	7732	0
41	85.8	7045	5332	4824	440520	10300	0
42	88.7	6681	5446	4348	435560	8013	0
43	88.6	6630	6018	4740	436220	8006	0
44	88.2	6672	6001	4763	431830	7974	0
45	87.9	6863	5940	4905	437670	7932	0
46	88.9	6821	5889	4468	439600	7783	0
47	89.2	6534	6263	4736	443050	7812	0

RECEIVED  
Office of Oil and Gas

JUN 10 2020

WV Department of  
Environmental Protection



HEAVEN HILL 2W-9HM

LITHOLOGY/FORMATION	TOP DEPTH IN FT/ Name TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID
Maxton	1905	2077	1906	2079	Sandstone
Big Lime	2077	2209	2079	2212	Limestone
Big Injun	2209	2503	2212	2507	Sandstone
Weir	2503	2701	2507	2706	Sandstone
Berea	2701	2963	2706	2969	Sandstone
Gordon	2963	3048	2969	3057	Sandstone
Fifty Foot	3048	3630	3057	3716	Sandstone
Speechley	3630	5140	3716	5580	Sandstone
Benson	5140	5463	5580	5928	Sandstone
Alexander	5463	6079	5928	6673	Siltstone
Rhinestreet	6079	6589	6673	7395	Black shale
Middlesex	6589	6681	7395	7553	Black shale
Geneseo/Burkett	6681	6700	7553	7590	Black shale
Tully	6700	6733	7590	7656	Limestone
Hamilton	6733	6808	7656	7855	Grey shale
Marcellus	6808	-	7855	-	Black shale

RECEIVED  
Office of Oil and Gas

JUN 10 2020

WV Department of  
Environmental Protection



**Well:** Heaven Hill 2W-09HM (slot 1)  
**Site:** Heaven Hill 2  
**Project:** Marshall County, West Virginia  
**Design:** rev5

**SECTION DETAILS**

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VFace	VSECT	Annotation
1	6280.00	32.61	263.81	5756.14	-207.78	-1865.98	0.00	0.00	-269.37	Survey @ 6280.00 MD 5756.14 TVD
2	6430.00	32.61	263.81	5882.50	-216.49	-1946.35	0.00	0.00	-281.20	Proj. Begin 6°/100' build/turn
3	5970.00	42.67	214.15	6313.51	-394.01	-2204.46	6.00	-90.00	-174.48	Begin 8°/100' build/turn
4	6003.72	58.50	150.05	6732.08	-842.07	-2193.91	8.00	-97.60	261.76	Begin 10°/100' build/turn
5	7908.64	89.00	150.05	6816.41	-1092.74	-2049.48	10.00	0.00	540.74	Begin 89.00° lateral section
6	16443.41	89.00	150.05	6966.00	-8486.54	2210.98	0.00	0.00	8769.83	PBHL/TD 16443.41 MD 6966.00 TVD

**ANNOTATIONS**

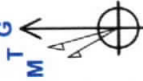
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSECT	Annotation
6000	0.45	336.11	6000	0.22	-0.10	-0.23	Gyro
9310.00	0.31	2.71	930.99	4.67	-0.14	-4.56	MWD surveys
16354.00	90.99	149.38	6869.62	-8438.70	2195.58	8719.65	Survey @ 16354.00 MD 6869.62 TVD
16404.00	90.99	149.38	6868.76	-8481.72	2221.04	8767.70	Survey Projected to 16404.00 MD 6868.76 TVD

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

System Datum: Mean Sea Level  
 Depth Reference: RKB=1331+33 @ 1364.00usft (Nabors X08)

Northing: 14457744.18  
 Easting: 1721048.83  
 Latitude: 39.81018372  
 Longitude: -80.71287405

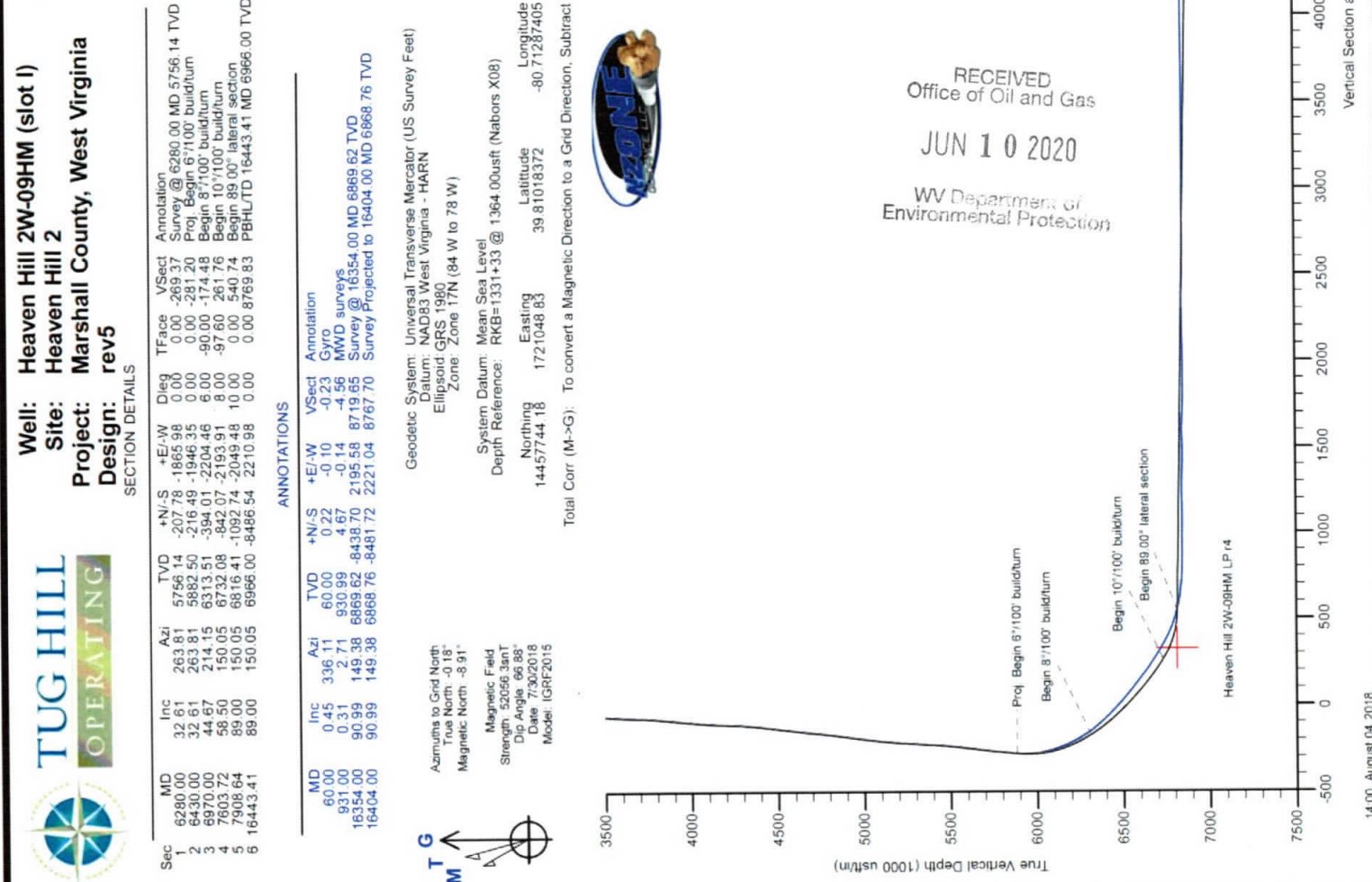
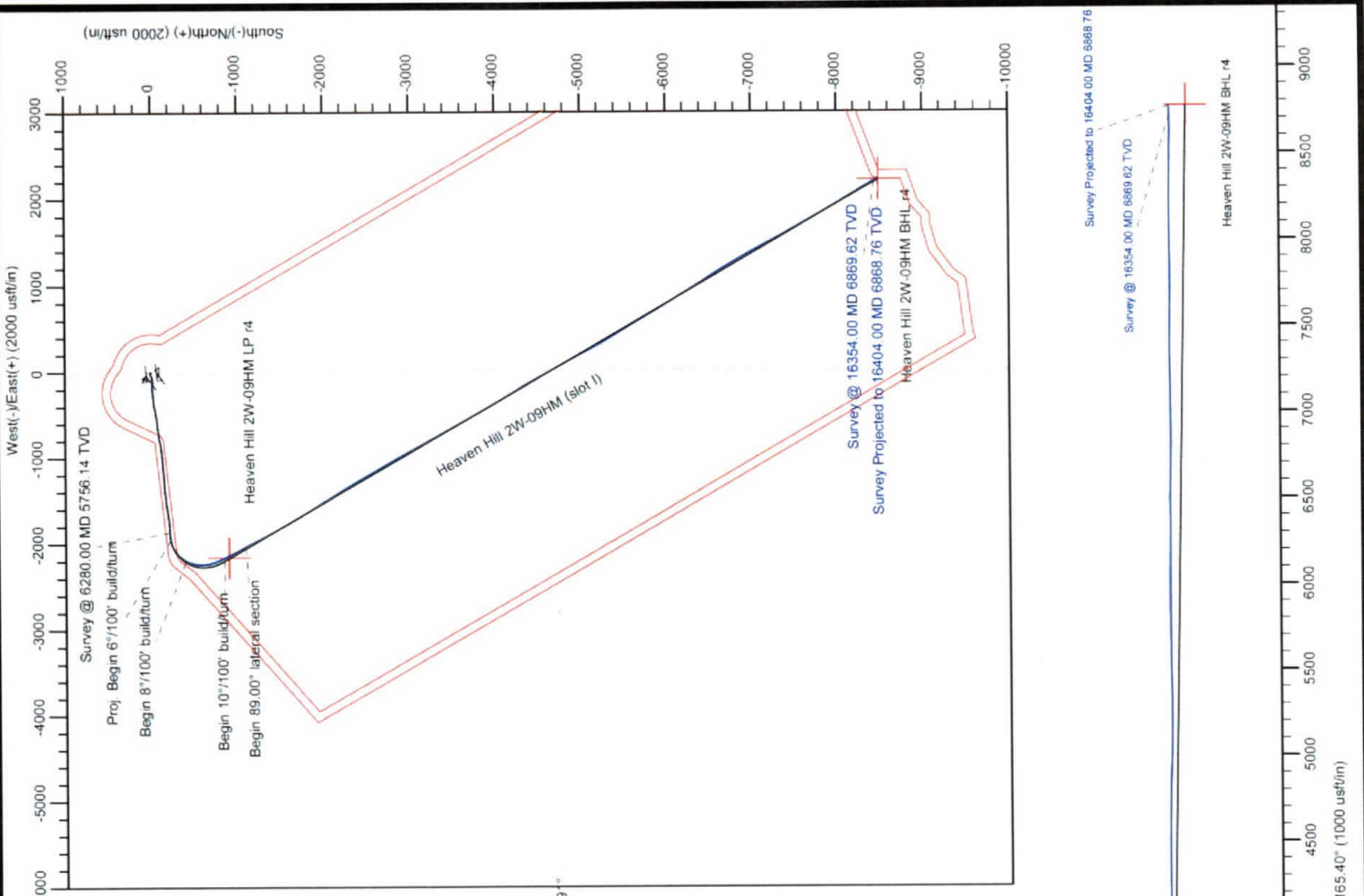
Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.9°



Azimuths to Grid North  
 True North: -0.18°  
 Magnetic North: -8.91°  
 Magnetic Field  
 Strength: 52056.3anT  
 Dip Angle: 66.88°  
 Date: 7/30/2018  
 Model: IGRF2015



RECEIVED  
 Office of Oil and Gas  
 JUN 10 2020  
 WV Department of  
 Environmental Protection



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Heaven Hill 2W-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Site:</b>	Heaven Hill 2	<b>MD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Well:</b>	Heaven Hill 2W-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug0116_LT_v14

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

RECEIVED  
Office of Oil and Gas

<b>Site</b>	Heaven Hill 2		
<b>Site Position:</b>		<b>Northing:</b>	14,457,660.30 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,720,974.97 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.80995400
		<b>Longitude:</b>	-80.71313800
		<b>Grid Convergence:</b>	0.18 °

JUN 10 2020

WV Department of  
Environmental Protection

<b>Well</b>	Heaven Hill 2W-09HM (slot I)		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 14,457,744.19 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 1,721,048.83 usft
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	39.81018372
		<b>Longitude:</b>	-80.71287405
		<b>Ground Level:</b>	1,331.00 usft

<b>Wellbore</b>	Original Hole		
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>
	IGRF2015	7/30/2018	-8.72
			<b>Dip Angle (°)</b>
			66.88
			<b>Field Strength (nT)</b>
			52,056.34994672

<b>Design</b>	Surveys Original Hole		
<b>Audit Notes:</b>			
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL
		<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>
	0.00	0.00	0.00
			<b>Direction (°)</b>
			165.40

<b>Survey Program</b>	<b>Date</b>	8/4/2018		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
60.00	894.00	Gyro (Original Hole)	NS-GYRO-MS	North sensing gyrocompassing m/s
931.00	6,280.00	MWD (Original Hole)	MWD	MWD - Standard
6,350.00	16,354.00	MWD lat (Original Hole)	MWD	MWD - Standard
16,404.00	16,404.00	Projection (Original Hole)	MWD	MWD - Standard

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>	
0.00	0.00	0.00	0.00	0.00	0.00	14,457,744.19	1,721,048.83	39.81018372	-80.71287405	
60.00	0.45	336.11	60.00	0.22	-0.10	14,457,744.40	1,721,048.73	39.81018431	-80.71287439	
<b>Gyro</b>										
90.00	0.24	302.79	90.00	0.36	-0.20	14,457,744.55	1,721,048.63	39.81018470	-80.71287474	
120.00	0.28	328.89	120.00	0.45	-0.29	14,457,744.64	1,721,048.54	39.81018497	-80.71287507	
150.00	0.28	350.05	150.00	0.59	-0.34	14,457,744.78	1,721,048.49	39.81018534	-80.71287524	
180.00	0.35	12.86	180.00	0.75	-0.33	14,457,744.94	1,721,048.50	39.81018579	-80.71287522	
210.00	0.35	4.76	210.00	0.93	-0.30	14,457,745.12	1,721,048.52	39.81018628	-80.71287511	
240.00	0.36	359.99	240.00	1.12	-0.29	14,457,745.30	1,721,048.53	39.81018679	-80.71287508	



**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia  
**Site:** Heaven Hill 2  
**Well:** Heaven Hill 2W-09HM (slot I)  
**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

**Local Co-ordinate Reference:** Well Heaven Hill 2W-09HM (slot I)  
**TVD Reference:** RKB=1331+33 @ 1364.00usft (Nabors X08)  
**MD Reference:** RKB=1331+33 @ 1364.00usft (Nabors X08)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** DB\_Aug0116\_LT\_v14

RECEIVED  
 Office of Oil and Gas  
 JUN 10 2020

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
270.00	0.41	2.78	270.00	1.32	-0.29	14,457,745.51	1,721,048.54	39.81018734	-80.71287506
300.00	0.43	13.54	300.00	1.53	-0.26	14,457,745.72	1,721,048.57	39.81018794	-80.71287495
330.00	0.53	2.61	329.99	1.78	-0.22	14,457,745.97	1,721,048.60	39.81018862	-80.71287483
360.00	0.38	359.57	359.99	2.02	-0.22	14,457,746.21	1,721,048.61	39.81018927	-80.71287481
390.00	0.35	353.82	389.99	2.21	-0.23	14,457,746.40	1,721,048.60	39.81018980	-80.71287484
420.00	0.34	8.99	419.99	2.39	-0.23	14,457,746.58	1,721,048.60	39.81019029	-80.71287483
450.00	0.32	358.09	449.99	2.56	-0.21	14,457,746.75	1,721,048.61	39.81019076	-80.71287478
480.00	0.33	3.96	479.99	2.73	-0.21	14,457,746.92	1,721,048.61	39.81019123	-80.71287477
510.00	0.36	8.55	509.99	2.91	-0.19	14,457,747.10	1,721,048.63	39.81019172	-80.71287470
540.00	0.34	351.82	539.99	3.09	-0.19	14,457,747.28	1,721,048.64	39.81019222	-80.71287469
570.00	0.34	2.31	569.99	3.27	-0.20	14,457,747.46	1,721,048.63	39.81019270	-80.71287472
600.00	0.34	358.91	599.99	3.45	-0.20	14,457,747.64	1,721,048.63	39.81019319	-80.71287471
630.00	0.35	359.80	629.99	3.63	-0.20	14,457,747.82	1,721,048.63	39.81019369	-80.71287472
660.00	0.18	6.80	659.99	3.77	-0.19	14,457,747.95	1,721,048.63	39.81019407	-80.71287470
690.00	0.16	17.51	689.99	3.85	-0.18	14,457,748.04	1,721,048.65	39.81019431	-80.71287463
720.00	0.10	21.28	719.99	3.92	-0.15	14,457,748.11	1,721,048.67	39.81019448	-80.71287455
750.00	0.19	6.74	749.99	3.99	-0.14	14,457,748.18	1,721,048.69	39.81019469	-80.71287450
780.00	0.14	23.28	779.99	4.07	-0.12	14,457,748.26	1,721,048.71	39.81019491	-80.71287442
810.00	0.24	13.63	809.99	4.17	-0.09	14,457,748.36	1,721,048.74	39.81019517	-80.71287432
840.00	0.28	13.07	839.99	4.30	-0.06	14,457,748.49	1,721,048.77	39.81019554	-80.71287420
870.00	0.26	351.90	869.99	4.44	-0.05	14,457,748.63	1,721,048.78	39.81019592	-80.71287418
894.00	0.22	312.95	893.99	4.53	-0.09	14,457,748.71	1,721,048.73	39.81019615	-80.71287432
931.00	0.31	2.71	930.99	4.67	-0.14	14,457,748.86	1,721,048.69	39.81019656	-80.71287449
<b>MWD surveys</b>									
962.00	0.31	354.12	961.99	4.84	-0.14	14,457,749.03	1,721,048.68	39.81019702	-80.71287451
994.00	0.22	36.51	993.99	4.98	-0.12	14,457,749.17	1,721,048.71	39.81019739	-80.71287441
1,025.00	0.22	350.49	1,024.99	5.08	-0.09	14,457,749.27	1,721,048.74	39.81019768	-80.71287431
1,057.00	0.40	319.51	1,056.98	5.23	-0.17	14,457,749.42	1,721,048.65	39.81019808	-80.71287461
1,088.00	0.09	319.51	1,087.98	5.33	-0.26	14,457,749.52	1,721,048.57	39.81019836	-80.71287491
1,120.00	0.22	67.01	1,119.98	5.37	-0.22	14,457,749.56	1,721,048.61	39.81019848	-80.71287477
1,138.00	0.31	31.80	1,137.98	5.43	-0.16	14,457,749.62	1,721,048.66	39.81019863	-80.71287456
1,176.00	0.22	4.08	1,175.98	5.59	-0.10	14,457,749.78	1,721,048.72	39.81019907	-80.71287435
1,271.00	0.31	26.69	1,270.98	6.00	0.03	14,457,750.19	1,721,048.85	39.81020020	-80.71287389
1,365.00	0.31	16.82	1,364.98	6.47	0.21	14,457,750.66	1,721,049.04	39.81020149	-80.71287321
1,460.00	0.40	35.81	1,459.98	6.99	0.48	14,457,751.17	1,721,049.31	39.81020290	-80.71287225
1,555.00	0.62	352.31	1,554.98	7.76	0.61	14,457,751.95	1,721,049.43	39.81020504	-80.71287180
1,649.00	1.90	285.49	1,648.95	8.68	-0.96	14,457,752.87	1,721,047.86	39.81020758	-80.71287758
1,743.00	4.02	273.29	1,742.82	9.29	-5.75	14,457,753.48	1,721,043.07	39.81020928	-80.71289443
1,838.00	5.92	262.58	1,837.47	8.85	-13.94	14,457,753.04	1,721,034.89	39.81020814	-80.71292358
1,932.00	7.38	258.30	1,930.83	7.00	-24.66	14,457,751.19	1,721,024.17	39.81020315	-80.71296177
2,027.00	6.98	249.40	2,025.09	3.73	-36.03	14,457,747.92	1,721,012.79	39.81019428	-80.71300232
2,122.00	5.79	235.92	2,119.50	-0.99	-45.41	14,457,743.20	1,721,003.42	39.81018141	-80.71303575
2,216.00	4.68	236.01	2,213.11	-5.79	-52.51	14,457,738.40	1,720,996.31	39.81016829	-80.71306112
2,311.00	4.29	255.70	2,307.82	-8.83	-59.17	14,457,735.36	1,720,989.65	39.81015999	-80.71308486
2,406.00	4.42	264.91	2,402.55	-10.04	-66.26	14,457,734.15	1,720,982.56	39.81015675	-80.71311011
2,500.00	4.60	259.32	2,496.26	-11.06	-73.57	14,457,733.13	1,720,975.25	39.81015401	-80.71313616
2,595.00	5.21	256.59	2,590.91	-12.76	-81.51	14,457,731.43	1,720,967.31	39.81014939	-80.71316445
2,690.00	4.82	262.01	2,685.55	-14.32	-89.66	14,457,729.87	1,720,959.17	39.81014519	-80.71319349
2,769.00	4.29	263.81	2,764.30	-15.10	-95.88	14,457,729.09	1,720,952.94	39.81014311	-80.71321566
2,838.00	4.60	262.58	2,833.09	-15.73	-101.19	14,457,728.46	1,720,947.63	39.81014141	-80.71323457
2,870.00	4.68	262.71	2,864.99	-16.06	-103.76	14,457,728.12	1,720,945.06	39.81014052	-80.71324372
2,964.00	10.69	271.61	2,958.10	-16.31	-116.29	14,457,727.88	1,720,932.53	39.81013997	-80.71328834
3,059.00	18.91	272.80	3,049.87	-15.30	-140.52	14,457,728.88	1,720,908.31	39.81014293	-80.71337459
3,154.00	24.08	269.10	3,138.24	-14.86	-175.30	14,457,729.33	1,720,873.53	39.81014447	-80.71349843
3,248.00	27.09	267.78	3,223.01	-15.99	-215.87	14,457,728.20	1,720,832.96	39.81014172	-80.71364291



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Heaven Hill 2W-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Site:</b>	Heaven Hill 2	<b>MD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Well:</b>	Heaven Hill 2W-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug0116_LT_v14

 RECEIVED  
 Office of Oil and Gas

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,343.00	28.59	265.88	3,307.02	-18.46	-260.16	14,457,725.73	1,720,788.67	39.81013532	-80.71380065
3,437.00	30.09	264.39	3,388.96	-22.38	-306.04	14,457,721.81	1,720,742.78	39.81012496	-80.71396410
3,532.00	29.70	262.80	3,471.32	-27.66	-353.09	14,457,716.53	1,720,695.73	39.81011088	-80.71413170
3,627.00	30.80	261.21	3,553.38	-34.32	-400.48	14,457,709.87	1,720,648.34	39.81009298	-80.71430051
3,721.00	31.20	258.70	3,633.96	-42.77	-448.14	14,457,701.42	1,720,600.68	39.81007020	-80.71447033
3,816.00	32.21	259.71	3,714.78	-52.12	-497.19	14,457,692.07	1,720,551.64	39.81004497	-80.71464507
3,911.00	33.98	261.52	3,794.37	-60.55	-548.36	14,457,683.63	1,720,500.47	39.81002224	-80.71482739
4,005.00	34.29	263.68	3,872.18	-67.34	-600.66	14,457,676.85	1,720,448.16	39.81000405	-80.71501370
4,100.00	34.20	263.59	3,950.71	-73.27	-653.79	14,457,670.92	1,720,395.03	39.80998824	-80.71520296
4,194.00	35.09	262.89	4,028.04	-79.56	-706.86	14,457,664.62	1,720,341.97	39.80997142	-80.71539199
4,289.00	34.51	261.52	4,106.05	-86.91	-760.57	14,457,657.28	1,720,288.26	39.80995171	-80.71558334
4,384.00	32.48	257.82	4,185.28	-96.26	-812.13	14,457,647.92	1,720,236.69	39.80992648	-80.71576705
4,478.00	32.30	259.10	4,264.65	-106.34	-861.46	14,457,637.85	1,720,187.36	39.80989924	-80.71594284
4,573.00	34.69	263.68	4,343.88	-114.12	-913.27	14,457,630.07	1,720,135.55	39.80987833	-80.71612741
4,668.00	35.40	265.80	4,421.66	-119.11	-967.59	14,457,625.08	1,720,081.24	39.80986510	-80.71632087
4,762.00	34.69	264.21	4,498.62	-123.80	-1,021.36	14,457,620.39	1,720,027.47	39.80985268	-80.71651239
4,857.00	33.72	265.71	4,577.19	-128.50	-1,074.55	14,457,615.69	1,719,974.28	39.80984023	-80.71670186
4,955.00	32.48	264.91	4,659.29	-132.87	-1,127.89	14,457,611.32	1,719,920.94	39.80982870	-80.71689183
5,049.00	33.41	265.40	4,738.17	-137.18	-1,178.82	14,457,607.00	1,719,870.00	39.80981729	-80.71707326
5,144.00	33.89	266.10	4,817.25	-141.08	-1,231.32	14,457,603.10	1,719,817.51	39.80980704	-80.71726024
5,238.00	35.31	266.19	4,894.62	-144.67	-1,284.57	14,457,599.52	1,719,764.25	39.80979765	-80.71744991
5,333.00	37.78	265.31	4,970.94	-148.88	-1,340.98	14,457,595.31	1,719,707.85	39.80978659	-80.71765081
5,428.00	37.38	264.78	5,046.23	-153.88	-1,398.70	14,457,590.31	1,719,650.12	39.80977335	-80.71785641
5,523.00	34.69	263.42	5,123.05	-159.60	-1,454.29	14,457,584.59	1,719,594.54	39.80975812	-80.71805440
5,617.00	33.50	262.31	5,200.89	-166.14	-1,506.57	14,457,578.05	1,719,542.26	39.80974062	-80.71824065
5,712.00	32.21	260.42	5,280.69	-173.86	-1,557.52	14,457,570.33	1,719,491.31	39.80971985	-80.71842216
5,807.00	32.79	261.08	5,360.81	-182.06	-1,607.90	14,457,562.13	1,719,440.93	39.80969776	-80.71860165
5,901.00	31.82	262.31	5,440.26	-189.33	-1,657.60	14,457,554.86	1,719,391.22	39.80967824	-80.71877872
5,996.00	31.90	263.11	5,520.95	-195.69	-1,707.34	14,457,548.50	1,719,341.48	39.80966120	-80.71895591
6,091.00	35.00	266.41	5,600.21	-200.41	-1,759.47	14,457,543.78	1,719,289.35	39.80964869	-80.71914158
6,186.00	35.00	266.90	5,678.03	-203.59	-1,813.87	14,457,540.60	1,719,234.96	39.80964043	-80.71933532
6,280.00	32.61	263.81	5,756.14	-207.78	-1,865.98	14,457,536.41	1,719,182.85	39.80962937	-80.71952092
6,350.00	31.52	264.08	5,815.46	-211.70	-1,902.93	14,457,532.49	1,719,145.89	39.80961892	-80.71965256
6,412.00	33.85	265.48	5,867.64	-214.73	-1,936.27	14,457,529.46	1,719,112.55	39.80961088	-80.71977131
6,507.00	36.00	254.76	5,945.60	-224.16	-1,989.64	14,457,520.02	1,719,059.18	39.80958543	-80.71996146
6,600.00	36.79	242.55	6,020.56	-244.21	-2,040.80	14,457,499.97	1,719,008.03	39.80953081	-80.72014383
6,695.00	37.54	232.17	6,096.34	-275.11	-2,088.95	14,457,469.08	1,718,959.88	39.80944637	-80.72031564
6,790.00	39.12	223.74	6,170.91	-314.54	-2,132.56	14,457,429.65	1,718,916.26	39.80933845	-80.72047138
6,885.00	41.05	216.09	6,243.64	-361.44	-2,171.69	14,457,382.75	1,718,877.14	39.80921000	-80.72061121
6,980.00	44.53	205.63	6,313.43	-416.77	-2,204.52	14,457,327.42	1,718,844.30	39.80905834	-80.72072875
7,074.00	46.33	194.82	6,379.50	-479.45	-2,227.51	14,457,264.74	1,718,821.32	39.80888640	-80.72081131
7,169.00	48.22	184.71	6,444.04	-548.07	-2,239.22	14,457,196.12	1,718,809.60	39.80869805	-80.72085378
7,264.00	49.76	174.52	6,506.47	-619.57	-2,238.67	14,457,124.62	1,718,810.16	39.80850167	-80.72085260
7,358.00	51.16	164.50	6,566.40	-690.67	-2,225.44	14,457,053.51	1,718,823.39	39.80830630	-80.72080628
7,452.00	53.54	157.82	6,623.86	-761.01	-2,201.37	14,456,983.17	1,718,847.46	39.80811292	-80.72072134
7,547.00	57.19	153.78	6,677.86	-832.25	-2,169.29	14,456,911.94	1,718,879.54	39.80791701	-80.72060790
7,641.00	60.09	153.69	6,726.77	-904.22	-2,133.77	14,456,839.97	1,718,915.06	39.80771905	-80.72048223
7,735.00	66.24	153.16	6,769.18	-979.20	-2,096.25	14,456,764.99	1,718,952.57	39.80751283	-80.72034948
7,830.00	72.88	152.55	6,802.34	-1,058.36	-2,055.65	14,456,685.83	1,718,993.17	39.80729508	-80.72020579
7,925.00	78.95	152.37	6,825.45	-1,140.02	-2,013.07	14,456,604.16	1,719,035.76	39.80707045	-80.72005507
8,019.00	84.88	151.84	6,838.66	-1,222.24	-1,969.54	14,456,521.95	1,719,079.28	39.80684429	-80.71990100
8,114.00	87.47	151.67	6,845.00	-1,305.73	-1,924.69	14,456,438.46	1,719,124.14	39.80661461	-80.71974222
8,208.00	89.58	150.96	6,847.42	-1,388.16	-1,879.59	14,456,356.02	1,719,169.24	39.80638784	-80.71958255
8,303.00	90.20	151.40	6,847.60	-1,471.40	-1,833.79	14,456,272.79	1,719,215.04	39.80615887	-80.71942041
8,398.00	89.27	150.26	6,848.04	-1,554.34	-1,787.49	14,456,189.84	1,719,261.34	39.80593068	-80.71925647

JUN 10 2020

 WV Department of  
 Environmental Protection



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Heaven Hill 2W-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Site:</b>	Heaven Hill 2	<b>MD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Well:</b>	Heaven Hill 2W-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug0116_LT_v14

RECEIVED  
Office of Oil and Gas  
JUN 10 2020

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,493.00	90.20	149.91	6,848.48	-1,636.69	-1,740.11	14,456,107.50	1,719,308.71	39.80570414	-80.71908870
8,588.00	90.46	149.29	6,847.93	-1,718.62	-1,692.04	14,456,025.57	1,719,356.79	39.80547871	-80.71891845
8,683.00	88.75	148.77	6,848.59	-1,800.07	-1,643.16	14,455,944.11	1,719,405.67	39.80525460	-80.71874530
8,777.00	89.36	148.68	6,850.14	-1,880.40	-1,594.36	14,455,863.79	1,719,454.46	39.80503357	-80.71857247
8,872.00	90.68	148.68	6,850.11	-1,961.56	-1,544.98	14,455,782.63	1,719,503.84	39.80481028	-80.71839755
8,966.00	90.68	149.64	6,848.99	-2,042.26	-1,496.80	14,455,701.93	1,719,552.03	39.80458823	-80.71822689
9,061.00	86.81	147.36	6,851.07	-2,123.22	-1,447.19	14,455,620.97	1,719,601.64	39.80436546	-80.71805115
9,156.00	88.35	148.94	6,855.08	-2,203.84	-1,397.10	14,455,540.35	1,719,651.72	39.80414363	-80.71787373
9,250.00	89.41	149.12	6,856.92	-2,284.42	-1,348.74	14,455,459.77	1,719,700.08	39.80392191	-80.71770244
9,345.00	90.81	149.29	6,856.74	-2,366.03	-1,300.11	14,455,378.16	1,719,748.72	39.80369738	-80.71753019
9,439.00	91.30	150.17	6,855.01	-2,447.20	-1,252.73	14,455,296.99	1,719,796.09	39.80347406	-80.71736242
9,534.00	90.20	149.64	6,853.76	-2,529.38	-1,205.10	14,455,214.81	1,719,843.72	39.80324795	-80.71719375
9,629.00	91.30	150.35	6,852.52	-2,611.64	-1,157.60	14,455,132.55	1,719,891.23	39.80302163	-80.71702554
9,723.00	90.68	150.96	6,850.90	-2,693.56	-1,111.54	14,455,050.62	1,719,937.29	39.80279624	-80.71686247
9,818.00	87.69	149.47	6,852.25	-2,775.99	-1,064.36	14,454,968.19	1,719,984.47	39.80256946	-80.71669542
9,912.00	88.40	150.00	6,855.45	-2,857.14	-1,017.01	14,454,887.05	1,720,031.81	39.80234621	-80.71652775
10,006.00	89.10	150.88	6,857.50	-2,938.88	-970.65	14,454,805.31	1,720,078.17	39.80212132	-80.71636360
10,101.00	90.46	150.52	6,857.87	-3,021.72	-924.16	14,454,722.46	1,720,124.66	39.80189341	-80.71619901
10,196.00	90.59	151.31	6,857.00	-3,104.74	-877.98	14,454,639.45	1,720,170.84	39.80166502	-80.71603554
10,290.00	89.67	151.31	6,856.79	-3,187.20	-832.86	14,454,556.99	1,720,215.97	39.80143817	-80.71587580
10,385.00	90.07	151.31	6,857.00	-3,270.53	-787.25	14,454,473.65	1,720,261.57	39.80120891	-80.71571436
10,478.00	89.89	151.67	6,857.03	-3,352.26	-742.86	14,454,391.93	1,720,305.96	39.80098410	-80.71555724
10,573.00	89.49	151.14	6,857.55	-3,435.67	-697.39	14,454,308.52	1,720,351.43	39.80075463	-80.71539630
10,667.00	90.07	150.79	6,857.91	-3,517.85	-651.77	14,454,226.34	1,720,397.05	39.80052853	-80.71523480
10,762.00	90.37	150.79	6,857.54	-3,600.77	-605.41	14,454,143.42	1,720,443.41	39.80030041	-80.71507068
10,856.00	89.01	150.08	6,858.05	-3,682.53	-559.03	14,454,061.66	1,720,489.79	39.80007548	-80.71490648
10,951.00	89.98	150.52	6,858.89	-3,765.04	-511.97	14,453,979.14	1,720,536.86	39.79984846	-80.71473984
11,045.00	90.51	150.17	6,858.49	-3,846.73	-465.46	14,453,897.46	1,720,583.37	39.79962372	-80.71457518
11,140.00	91.52	149.73	6,856.80	-3,928.95	-417.89	14,453,815.24	1,720,630.93	39.79939751	-80.71440677
11,235.00	90.24	148.85	6,855.35	-4,010.61	-369.39	14,453,733.58	1,720,679.44	39.79917282	-80.71423499
11,329.00	91.30	149.12	6,854.08	-4,091.17	-320.96	14,453,653.02	1,720,727.87	39.79895117	-80.71406349
11,424.00	89.49	149.12	6,853.43	-4,172.69	-272.20	14,453,571.49	1,720,776.62	39.79872685	-80.71389083
11,518.00	90.51	149.03	6,853.43	-4,253.33	-223.89	14,453,490.86	1,720,824.93	39.79850498	-80.71371976
11,613.00	89.67	149.91	6,853.28	-4,335.16	-175.64	14,453,409.03	1,720,873.19	39.79827983	-80.71354888
11,708.00	90.68	150.17	6,852.99	-4,417.46	-128.19	14,453,326.73	1,720,920.63	39.79805339	-80.71338091
11,802.00	89.58	150.79	6,852.77	-4,499.26	-81.88	14,453,244.93	1,720,966.95	39.79782835	-80.71321695
11,897.00	90.59	151.49	6,852.63	-4,582.46	-36.03	14,453,161.73	1,721,012.80	39.79759946	-80.71305465
11,992.00	89.71	151.49	6,852.39	-4,665.93	9.32	14,453,078.25	1,721,058.14	39.79736981	-80.71289417
12,087.00	89.10	150.70	6,853.37	-4,749.09	55.23	14,452,995.09	1,721,104.06	39.79714102	-80.71273165
12,181.00	88.40	150.44	6,855.42	-4,830.94	101.41	14,452,913.24	1,721,150.24	39.79691584	-80.71256818
12,276.00	89.67	151.75	6,857.02	-4,914.09	147.32	14,452,830.09	1,721,196.15	39.79668708	-80.71240569
12,371.00	87.56	152.63	6,859.32	-4,998.09	191.63	14,452,746.10	1,721,240.45	39.79645601	-80.71224891
12,465.00	87.87	151.40	6,863.07	-5,081.03	235.70	14,452,663.16	1,721,284.52	39.79622785	-80.71209295
12,560.00	88.62	151.40	6,865.98	-5,164.40	281.15	14,452,579.79	1,721,329.98	39.79599849	-80.71193208
12,655.00	89.80	150.70	6,867.29	-5,247.52	327.13	14,452,496.67	1,721,375.96	39.79576982	-80.71176934
12,749.00	89.93	148.77	6,867.51	-5,328.70	374.51	14,452,415.48	1,721,423.33	39.79554645	-80.71160162
12,844.00	90.59	148.68	6,867.08	-5,409.90	423.82	14,452,334.29	1,721,472.65	39.79532303	-80.71142697
12,938.00	92.31	149.12	6,864.70	-5,490.36	472.36	14,452,253.83	1,721,521.19	39.79510164	-80.71125510
13,033.00	89.98	149.12	6,862.80	-5,571.87	521.11	14,452,172.32	1,721,569.93	39.79487736	-80.71108250
13,127.00	90.20	149.12	6,862.65	-5,652.54	569.35	14,452,091.64	1,721,618.18	39.79465538	-80.71091167
13,222.00	90.81	149.73	6,861.81	-5,734.33	617.67	14,452,009.86	1,721,666.50	39.79443034	-80.71074058
13,317.00	89.80	149.29	6,861.31	-5,816.19	665.87	14,451,928.00	1,721,714.70	39.79420510	-80.71056993
13,411.00	90.77	149.47	6,860.84	-5,897.08	713.75	14,451,847.10	1,721,762.57	39.79398253	-80.71040041
13,506.00	89.36	148.50	6,860.73	-5,978.50	762.70	14,451,765.69	1,721,811.52	39.79375851	-80.71022709
13,601.00	90.42	149.29	6,860.92	-6,059.84	811.77	14,451,684.35	1,721,860.60	39.79353469	-80.71005332

WV Department of Environmental Protection



<b>Company:</b>	Tug Hill Operating LLC	<b>Local Co-ordinate Reference:</b>	Well Heaven Hill 2W-09HM (slot I)
<b>Project:</b>	Marshall County, West Virginia	<b>TVD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Site:</b>	Heaven Hill 2	<b>MD Reference:</b>	RKB=1331+33 @ 1364.00usft (Nabors X08)
<b>Well:</b>	Heaven Hill 2W-09HM (slot I)	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys Original Hole	<b>Database:</b>	DB_Aug0116_LT_v14

RECEIVED  
Office of Oil and Gas  
JUN 10 2020

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
13,695.00	88.66	148.68	6,861.67	-6,140.39	860.20	14,451,603.80	1,721,909.03	39.79331304	-80.70988183
13,790.00	89.41	148.85	6,863.27	-6,221.61	909.46	14,451,522.58	1,721,958.28	39.79308955	-80.70970742
13,884.00	90.29	149.12	6,863.52	-6,302.17	957.89	14,451,442.02	1,722,006.72	39.79286788	-80.70953592
13,979.00	91.43	149.03	6,862.09	-6,383.65	1,006.71	14,451,360.53	1,722,055.53	39.79264367	-80.70936308
14,074.00	88.18	146.22	6,862.41	-6,463.87	1,057.56	14,451,280.32	1,722,106.39	39.79242293	-80.70918296
14,169.00	88.84	147.97	6,864.88	-6,543.60	1,109.15	14,451,200.59	1,722,157.98	39.79220351	-80.70900023
14,263.00	88.92	148.59	6,866.72	-6,623.54	1,158.57	14,451,120.65	1,722,207.39	39.79198353	-80.70882525
14,358.00	89.14	149.38	6,868.33	-6,704.95	1,207.51	14,451,039.24	1,722,256.33	39.79175953	-80.70865196
14,451.00	90.24	149.73	6,868.83	-6,785.12	1,254.63	14,450,959.07	1,722,303.46	39.79153893	-80.70848513
14,547.00	91.16	150.17	6,867.66	-6,868.21	1,302.70	14,450,875.98	1,722,351.53	39.79131031	-80.70831498
14,641.00	89.98	150.61	6,866.72	-6,949.93	1,349.14	14,450,794.26	1,722,397.97	39.79108548	-80.70815060
14,736.00	90.64	151.67	6,866.21	-7,033.13	1,394.99	14,450,711.06	1,722,443.82	39.79085658	-80.70798833
14,831.00	91.08	151.67	6,864.79	-7,116.74	1,440.07	14,450,627.45	1,722,488.90	39.79062656	-80.70782884
14,925.00	89.89	152.19	6,863.99	-7,199.68	1,484.30	14,450,544.51	1,722,533.12	39.79039839	-80.70767235
15,020.00	90.15	152.11	6,863.96	-7,283.67	1,528.68	14,450,460.51	1,722,577.50	39.79016732	-80.70751534
15,114.00	88.75	150.70	6,864.86	-7,366.20	1,573.66	14,450,377.99	1,722,622.49	39.78994027	-80.70735616
15,207.00	88.97	150.35	6,866.71	-7,447.15	1,619.42	14,450,297.04	1,722,668.24	39.78971756	-80.70719423
15,301.00	89.36	150.35	6,868.08	-7,528.83	1,665.91	14,450,215.36	1,722,714.74	39.78949282	-80.70702967
15,396.00	90.24	150.44	6,868.41	-7,611.43	1,712.84	14,450,132.76	1,722,761.67	39.78926557	-80.70686356
15,490.00	91.38	151.14	6,867.08	-7,693.46	1,758.71	14,450,050.72	1,722,807.54	39.78903986	-80.70670124
15,585.00	90.11	150.52	6,865.85	-7,776.41	1,805.01	14,449,967.78	1,722,853.83	39.78881166	-80.70653739
15,679.00	91.16	150.52	6,864.80	-7,858.23	1,851.26	14,449,885.96	1,722,900.09	39.78858654	-80.70637369
15,774.00	89.89	150.00	6,863.93	-7,940.71	1,898.39	14,449,803.48	1,722,947.21	39.78835960	-80.70620690
15,868.00	89.14	149.64	6,864.73	-8,021.97	1,945.64	14,449,722.22	1,722,994.47	39.78813603	-80.70603964
15,962.00	88.79	149.38	6,866.43	-8,102.95	1,993.33	14,449,641.23	1,723,042.15	39.78791318	-80.70587084
16,057.00	89.98	148.85	6,867.45	-8,184.48	2,042.09	14,449,559.71	1,723,090.91	39.78768886	-80.70569821
16,152.00	88.53	148.68	6,868.68	-8,265.70	2,091.35	14,449,478.49	1,723,140.17	39.78746536	-80.70552382
16,246.00	89.58	148.77	6,870.23	-8,346.03	2,140.14	14,449,398.16	1,723,188.96	39.78724432	-80.70535108
16,341.00	90.90	149.38	6,869.83	-8,427.52	2,188.96	14,449,316.67	1,723,237.78	39.78702008	-80.70517825
16,354.00	90.99	149.38	6,869.62	-8,438.70	2,195.58	14,449,305.48	1,723,244.40	39.78698930	-80.70515481
<b>Survey @ 16354.00 MD 6869.62 TVD</b>									
16,404.00	90.99	149.38	6,868.76	-8,481.72	2,221.04	14,449,262.46	1,723,269.87	39.78687092	-80.70506467
<b>Survey Projected to 16404.00 MD 6868.76 TVD</b>									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
60.00	60.00	0.22	-0.10	Gyro
931.00	930.99	4.67	-0.14	MWD surveys
16,354.00	6,869.62	-8,438.70	2,195.58	Survey @ 16354.00 MD 6869.62 TVD
16,404.00	6,868.76	-8,481.72	2,221.04	Survey Projected to 16404.00 MD 6868.76 TVD

# Hydraulic Fracturing Fluid Product Component Information Disclosure

RECEIVED  
Office of Oil and Gas  
JUN 10 2020  
WV Department of  
Environmental Protection



Job Start Date:	11/2/2018
Job End Date:	12/1/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01951-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Heaven Hill 2W-9HM
Latitude:	39.81007436
Longitude:	-80.71298161
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,870
Total Base Water Volume (gal):	15,474,731
Total Base Non Water Volume:	0

## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Fresh Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	76.85665	Density = 8.340
Produced Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	8.89539	Density = 9.000



Ingredients	Listed Above	Listed Above							
			Water		7732-18-5	100.00000	0.61846		
MC MX 2-2822	Halliburton	Scale Inhibitor			Listed Below				
FR-A12	Halliburton	Additive			Listed Below				
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant			Listed Below				
SAND- PREMIUM WHITE-30/50, BULK	Halliburton	Proppant			Listed Below				
OptiKleen-WF (TM)	Halliburton	Concentrate			Listed Below				
MX 8-4543	Halliburton	Biocide			Listed Below				
MURIATIC ACID	Halliburton	Solvent			Listed Below				

RECEIVED  
Office of Oil and Gas  
JUN 10 2020  
WV Department of Environmental Protection

LD-2850	Halliburton	Friction Reducer				Listed Below				
SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant				Listed Below				
OILPERM A	Halliburton	Non-ionic Surfactant				Listed Below				
MX 5-2402	Halliburton	Biocide				Listed Below				
FDP-S1296-17	Halliburton	Surfactant				Listed Below				
Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients.										
			Crystalline silica, quartz	14808-60-7	100.00000		13.52890			
			Hydrochloric acid	7647-01-0	7.50000		0.04503			
			Calcium nitrate	13477-34-4	100.00000		0.03506			
			Ethaniminium, N,N,N-trimethyl 1-2-[(1-oxo-2-propen-1-yl)oxy]-, polymer chlorine (1:1), polymer with 2-propenamide	69418-26-4	30.00000		0.01730			
			Hydrotreated light petroleum distillate	64742-47-8	30.00000		0.01730			
			Methanol	67-56-1	100.00000		0.00720			
			Sodium chloride	7647-14-5	10.00000		0.00694			

RECEIVED  
Office of Oil and Gas  
JUN 10 2020  
WV Department of  
Environmental Protection

					70900-16-2	30.00000	0.00675	
		Amines, polyethylenepoly-, ethoxylated, phosphonomethylated, sodium salts						
		Amonium chloride		12125-02-9	10.00000	0.00577		
		9-Octadecenamide, n,n-bis-2(hydroxy-ethyl)-, (Z)		93-83-4	5.00000	0.00288		
		Ethanol		64-17-5	60.00000	0.00028		
		Proprietary Component		Proprietary	60.00000	0.00028		
		Oxyalkylated phenolic resin		Proprietary	30.00000	0.00019		
		Heavy aromatic petroleum naphtha		64742-94-5	30.00000	0.00014		
		Modified thiourea polymer		Proprietary	30.00000	0.00013		
		Sodium perborate tetrahydrate		10486-00-7	100.00000	0.00003		
		Naphthalene		91-20-3	5.00000	0.00002		
		Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched		127087-87-0	5.00000	0.00002		
		Glycerine		56-81-5	5.00000	0.00002		
		Ethoxylated alcohols		Proprietary	5.00000	0.00002		Denise Tuck, Halliburton, 3000 N. Sam Houston Pkwy E., Houston, TX 77032, 281-871-6226
		Propargyl alcohol		107-19-7	5.00000	0.00002		
		Formaldehyde		50-00-0	0.09000	0.00002		
		1,2,4 Trimethylbenzene		95-63-6	1.00000	0.00000		
		Contains no hazardous substances		CAS Not Assigned				

RECEIVED  
Office of Oil and Gas  
JUN 10 2020  
WV Department of  
Environmental Protection

\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water  
\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%  
\*\*\* If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.  
Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

RECEIVED  
Office of Oil and Gas

JUN 10

W  
Envir

RECEIVED  
Office of Oil and Gas

JUN 10 2020

WV Department of  
Environmental Protection



**HEAVEN HILL 2W LEASE  
WELL 9HM  
TUG HILL OPERATING**

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

B.H.

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

NAD'83 S.P.C.(FT) N. 479,510.20 E. 1,627,787.33  
NAD'83 GEO. LAT (N) 39.810184 LONG (W) 80.712874  
NAD'83 UTM (M) N. 4,406,729.24 E. 524,576.73

**LANDING POINT**

NAD'83 S.P.C.(FT) N. 478,648.5 E. 1,625,610.3  
NAD'83 GEO. LAT (N) 39.807737 LONG (W) 80.720581  
NAD'83 UTM (M) N. 4,406,455.6 E. 523,917.9

**BOTTOM HOLE**

NAD'83 S.P.C.(FT) N. 470,985.0 E. 1,629,856.9  
NAD'83 GEO. LAT (N) 39.786858 LONG (W) 80.705101  
NAD'83 UTM (M) N. 4,404,142.5 E. 525,250.6

**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'
3. ROYALTY OWNERSHIP PROVIDED BY TUG HILL OPERATING, LLC.
4. SURFACE OWNERSHIP PROVIDED WAS NOT ADDRESSED
5. AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.
6. PLAT UPDATED TO SHOW AS-DRILLED PATH.

Lease Name or No.	Tag	Parcel	Grantor, lessor, etc.	Deed Book/Page
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	727 281
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	816 423
10*47051.073.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	888 618
10*47051.073.2	A	9-7-3	PATRIOT RESTORATIONS LLC	908 541
10*47051.073.3	A	9-7-3	TRIENBERG HOLDINGS, LLC	878 330
10*17229	B	9-4-10	STEPHEN MENENDEZ	913 56
10*15661	C	9-6-5	CHRISTOPHER HOLDINGS LLC	839 170
10*15507	D	9-6-13	RAY C. HARTZELL AND CAROL J. HARTZELL, HUSBAND	689 162
10*15510	E	9-6-9	ELAINE PHELPS ET VIR	718 326
10*15511	E	9-6-9	DAVID E CROW	718 376
10*15512	E	9-6-9	FRANCES COFFEY	718 378
10*15513	E	9-6-9	KAY KEYES	718 330
10*15514	E	9-6-9	L PAUL CROW	718 336
10*15515	E	9-6-9	DESIRE L CROW	718 334
10*15516	E	9-6-9	ROSE MARIE KIELGCZEWSKI	718 354
10*15517	E	9-6-9	DIANNE GELLNER & GARY GELLNER	718 345
10*15518	E	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718 347
10*15519	E	9-6-9	JOHN CROW	726 580
10*15520	E	9-6-9	TIMOTHY CROW	726 582
10*47051.123.1	E	9-6-9	LLOYD G BAKER	865 389
10*47051.123.2	E	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873 143
10*15525	F	9-6-12	RONALD KEITH MASON ET UX	772 445
10*15541	F	9-6-12	MARY RUTH FROMMAPP	781 312
10*15542	F	9-6-12	KEITH D SIBURT	781 218
10*15543	F	9-6-12	SANDRA FROWEN	781 307
10*15544	F	9-6-12	VICKI J CHERRY A/K/A VICKIE L CHERRY	793 318
10*15545	F	9-6-12	JAMES B SIBURT ET UX	793 322
10*15546	F	9-6-12	ALAN K SIBURT ET UX	793 325
10*15547	F	9-6-12	RODNEY L SIBURT	793 346
10*15510	G	9-6-10	ELAINE PHELPS ET VIR	718 326
10*15511	G	9-6-10	DAVID E CROW	718 376
10*15512	G	9-6-10	FRANCES COFFEY	718 378
10*15513	G	9-6-10	KAY KEYES	718 330
10*15514	G	9-6-10	L PAUL CROW	718 336
10*15515	G	9-6-10	DESIRE L CROW	718 334
10*15516	G	9-6-10	ROSE MARIE KIELGCZEWSKI	718 354
10*15517	G	9-6-10	DIANNE GELLNER & GARY GELLNER	718 345
10*15518	G	9-6-10	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718 347
10*15519	G	9-6-10	JOHN CROW	726 580
10*15520	G	9-6-10	TIMOTHY CROW	726 582
10*47051.123.1	G	9-6-10	LLOYD G BAKER	865 389
10*47051.123.2	G	9-6-10	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873 143
10*15510	H	9-10-11	ELAINE PHELPS ET VIR	718 326
10*15511	H	9-10-11	DAVID E CROW	718 376
10*15512	H	9-10-11	FRANCES COFFEY	718 378
10*15513	H	9-10-11	KAY KEYES	718 330
10*15514	H	9-10-11	L PAUL CROW	718 336
10*15515	H	9-10-11	DESIRE L CROW	718 334
10*15516	H	9-10-11	ROSE MARIE KIELGCZEWSKI	718 354
10*15517	H	9-10-11	DIANNE GELLNER & GARY GELLNER	718 345
10*15518	H	9-10-11	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718 347
10*15519	H	9-10-11	JOHN CROW	726 580
10*15520	H	9-10-11	TIMOTHY CROW	726 582
10*47051.123.1	H	9-10-11	LLOYD G BAKER	865 389
10*47051.123.2	H	9-10-11	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873 143
10*15517	I	9-11-4	RHOK INVESTMENTS LLC KEITH B KIMBLE	907 550
10*15561	J	9-11-3	VICKIE MASON	680 413
10*15562	J	9-11-3	MARY A SOUTH	682 231
10*15563	J	9-11-3	MARK L WHETZEL	682 544
10*15564	J	9-11-3	RAY A WHETZEL JR	682 548
10*15565	J	9-11-3	ROBERT L WHETZEL	682 552
10*15566	J	9-11-3	SHARON L WHETZEL	682 556
10*47051.108.1	J	9-11-3	MICHAEL A WHETZEL	885 51
10*47051.108.5	J	9-11-3	BRENDA J WHETZEL	885 55
10*47051.108.6	J	9-11-3	TERRI MCCARDLE	895 23
10*47051.108.7	J	9-11-3	GARY FRANCIS WHETZEL	895 26
10*15564	K	9-11-5	VICKIE MASON	686 239
10*15565	K	9-11-5	SHARON L WHETZEL	687 147
10*15566	K	9-11-5	MARY A SOUTH	690 615
10*15567	K	9-11-5	ROBERT L WHETZEL	690 519
10*15568	K	9-11-5	RAY A WHETZEL JR	693 571
10*15569	K	9-11-5	MARK L WHETZEL	693 576
10*47051.108.1	K	9-11-5	MICHAEL A WHETZEL	885 51
10*47051.108.5	K	9-11-5	BRENDA J WHETZEL	885 55
10*47051.243.1	L	9-11-2	MARY A FOX	879 332
10*47051.243.2	L	9-11-2	PAUL G FOX	879 335
10*47051.243.3	L	9-11-2	MARK H FOX	879 338
10*47051.243.4	L	9-11-2	DAVID E FOX	876 55
10*47051.243.5	L	9-11-2	LOUIS T FOX	876 58
10*47051.243.6	L	9-11-2	THOMAS J FOX	876 61

T.H. LONGITUDE 80°42'30"  
B.H. LONGITUDE 80°40'00"

1,752' B.H.

T.H.



**SLS**  
Land & Energy Development  
Solutions from the ground up.  
P.O. Box 150 • 12 Vanhook Drive • Greenville, WV 26351 • (304) 452-5534  
www.slsurvey.com

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

P.S. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE OCTOBER 17, 20 18  
REVISED \_\_\_\_\_, 20 \_\_\_\_\_  
OPERATORS WELL NO. HEAVEN HILL 2W-9HM  
API WELL NO. 47 - 51 - 01951  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8703AD9HM.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: GROUND = 1,350.0' PROPOSED = 1,331.26' WATERSHED WEST FORK OF LOWER BOWMAN RUN OF FISH CREEK (HUC 10)  
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER C.R. JR. & A.H. HAGEDORN ACREAGE 203.07±  
ROYALTY OWNER C.R. JR. & A.H. HAGEDORN ET AL (SEE ABOVE) ACREAGE 203.07±

PROPOSED WORK: LEASE NO. SEE ABOVE  
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: 6,879' / TMD: 16,535'

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

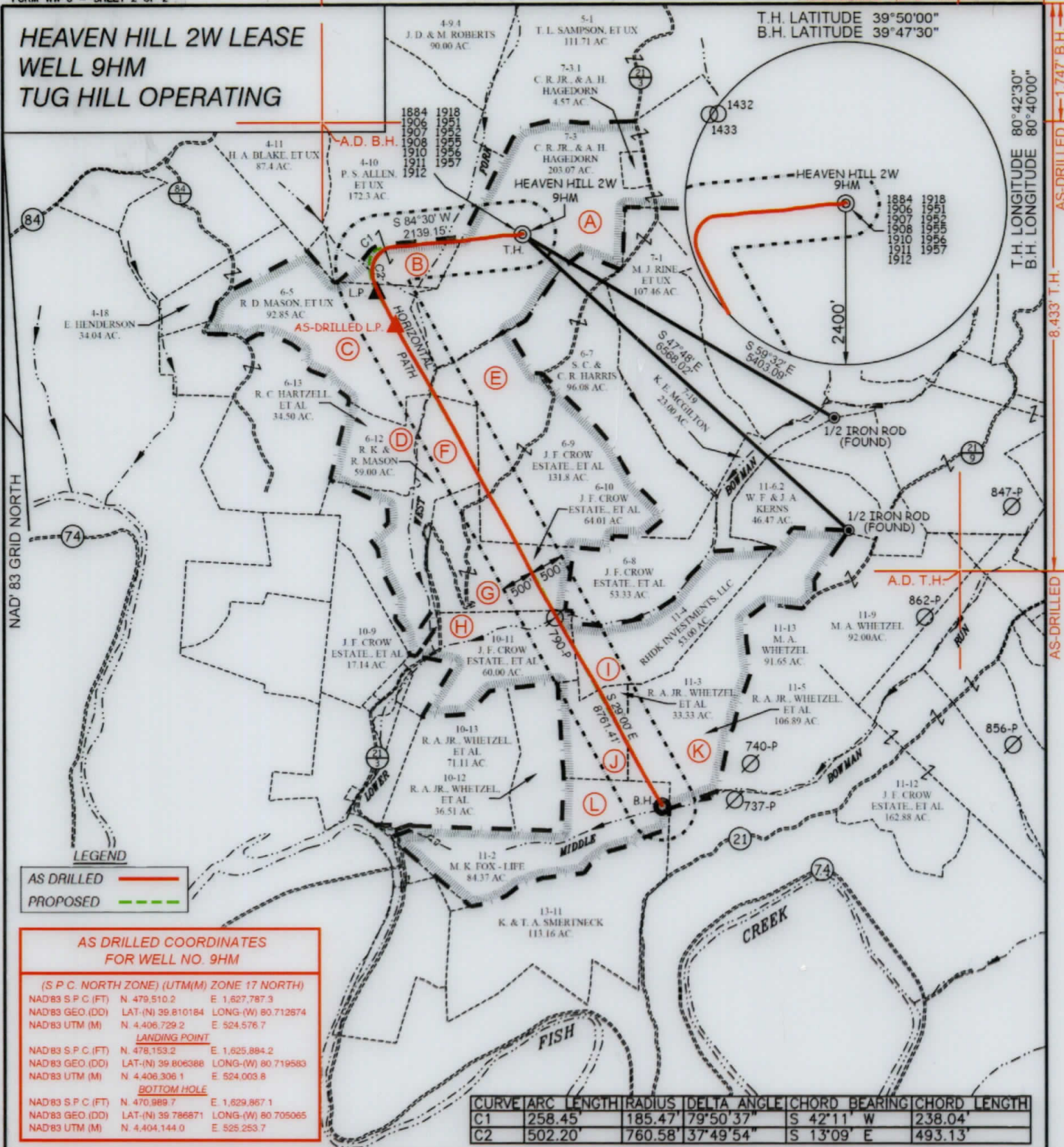
COUNTY NAME PERMIT







**HEAVEN HILL 2W LEASE  
WELL 9HM  
TUG HILL OPERATING**



**LEGEND**  
AS DRILLED ———  
PROPOSED - - - - -

**AS DRILLED COORDINATES FOR WELL NO. 9HM**

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

NAD83 S.P.C. (FT)	N. 479,510.2	E. 1,627,787.3
NAD83 GEO. (DD)	LAT.-(N) 39.810184	LONG.-(W) 80.712874
NAD83 UTM (M)	N. 4,406,729.2	E. 524,576.7

**LANDING POINT**

NAD83 S.P.C. (FT)	N. 478,153.2	E. 1,625,884.2
NAD83 GEO. (DD)	LAT.-(N) 39.806388	LONG.-(W) 80.719583
NAD83 UTM (M)	N. 4,406,306.1	E. 524,003.8

**BOTTOM HOLE**

NAD83 S.P.C. (FT)	N. 470,989.7	E. 1,629,867.1
NAD83 GEO. (DD)	LAT.-(N) 39.786871	LONG.-(W) 80.705065
NAD83 UTM (M)	N. 4,404,144.0	E. 525,253.7

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	258.45'	185.47'	79°50'37"	S 42°11' W	238.04'
C2	502.20'	760.58'	37°49'54"	S 13°09' E	493.13'



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

FILE NO. 8703AD9HMR.dwg SCALE 1" = 2000'

DATE OCTOBER 17, 20 18

REVISED OCTOBER 17, 20 19

OPERATORS WELL NO. HEAVEN HILL 2W-9HM

API WELL NO. 47 - 051 - 01951

STATE COUNTY PERMIT

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. 849 *C. Victor Moyers*

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

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

NAD83 S.P.C. (FT)	N. 479,510.20	E. 1,627,787.33
NAD83 GEO.	LAT.-(N) 39.810184	LONG.-(W) 80.712874
NAD83 UTM (M)	N. 4,406,729.24	E. 524,576.73

**LANDING POINT**

NAD83 S.P.C. (FT)	N. 478,648.5	E. 1,625,610.3
NAD83 GEO.	LAT.-(N) 39.807737	LONG.-(W) 80.720581
NAD83 UTM (M)	N. 4,406,455.6	E. 523,917.9

**BOTTOM HOLE**

NAD83 S.P.C. (FT)	N. 470,985.0	E. 1,629,856.9
NAD83 GEO.	LAT.-(N) 39.786858	LONG.-(W) 80.705101
NAD83 UTM (M)	N. 4,404,142.5	E. 525,250.6

**LEGEND**

LEASE LINE	— — — — —	COUNTY ROUTE	⊙
SURFACE LINE	— — — — —	PROPOSED WELL	⊙
WELL LATERAL	— — — — —	EXISTING WELL	⊙
OFFSET LINE	— — — — —	PERMITTED WELL	⊙
TIE LINE	— — — — —	TAX MAP—PARCEL	00—00
CREEK	— — — — —	LEASE # (SEE PG. 1)	⊙
ROAD	— — — — —	SURFACE OWNER (SEE TABLE)	⊙

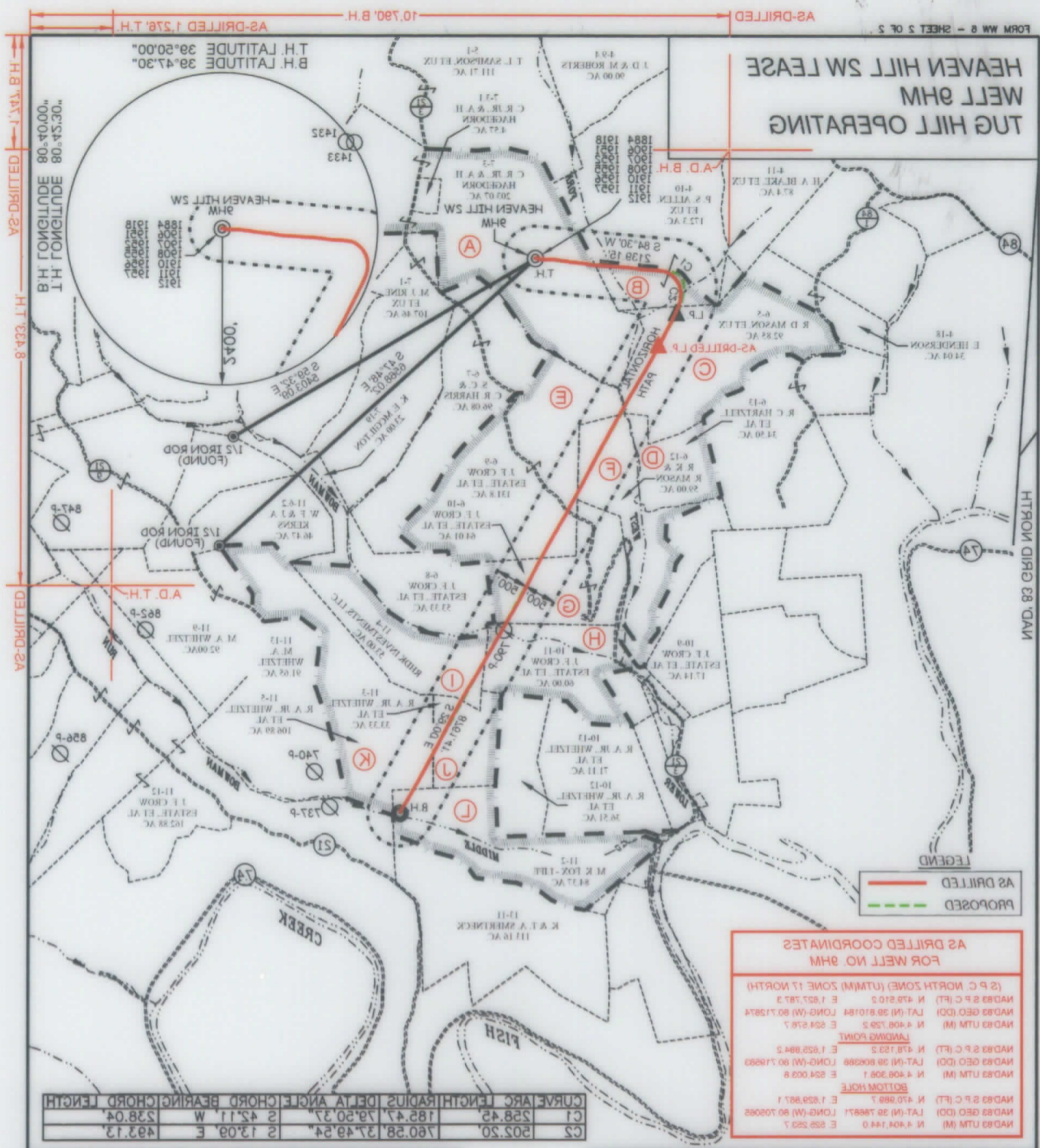
WELL OPERATOR TUG HILL OPERATING, LLC ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME PERMIT



**HEAVEN HILL SW LEASE  
WELL 9HM  
TUG HILL OPERATING**



**AS DRILLED COORDINATES FOR WELL NO. 9HM**

AS DRILLED	PROPOSED
------------	----------

AS DRILLED	PROPOSED
AS DRILLED	PROPOSED

CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	258.45	185.47	79.50	S 42.11 W	238.04
C2	505.20	760.58	37.49	S 13.09 E	493.13

FILE NO. 8703AD9MR dwg SCALE 1" = 2000'  
 DATE OCTOBER 17 20 18  
 REVISED OCTOBER 17 20 19  
 OPERATORS WELL NO. HEAVEN HILL SW-9HM  
 API NO. 47 - 051 - 01951  
 COUNTY STATE PERMIT



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

**LEGEND**

ROAD	CRICK	TIE LINE	OFFSET LINE	WELL LATERAL	SURFACE LINE	LEASE LINE
ROAD	CRICK	TIE LINE	OFFSET LINE	WELL LATERAL	SURFACE LINE	LEASE LINE
ROAD	CRICK	TIE LINE	OFFSET LINE	WELL LATERAL	SURFACE LINE	LEASE LINE

DESIGNATED AGENT  
 DIANNA STAMPER  
 CT CORPORATION SYSTEM  
 ADDRESS  
 5400 D BIG TYLER ROAD  
 CHARLESTON, WV 25313

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS  
 PLAN 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

*C. Victor Moyers*  
 849 P. S.

AS DRILLED	PROPOSED
AS DRILLED	PROPOSED

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

AS-DRILLED 1.578, T.H. 10.730, B.H. 10.730, H. 10.730, T.H. 39.47, 30.00, B.H. 39.47, 30.00, T.H. 80.45, 30.00, B.H. 80.45, 30.00, T.H. 84.33, B.H. 84.33, T.H. 84.33, B.H. 84.33, T.H. 84.33, B.H. 84.33