

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

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WV Department of  
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API 47-051-0906 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 2-2HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 S. University Drive, Suite 215 City Ft. Worth State TX Zip 76107

As Drilled location NAD83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top Hole Northing 4,406,719.3 Easting 524,577.3  
Landing Point of Curve Northing 4,406,929.4 Easting 524,694.2  
Bottom Hole Northing 4,404,471.9 Easting 526,119.5

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  Complete  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 Additives 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 2/14/2017 Date drilling commenced 6/22/2017 Date drilling ceased 7/20/2018  
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 1,595' Void(s) encountered (Y/N) depths N  
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:  
*Jim Nicholson*  
6/22/2020

API 47-051 - 01906

Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-2HM

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	26"	20"	120'	NEW	94.5#	N/A	Y
Surface	17 1/2"	13 3/8"	1,142'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	1,142'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,754'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/5"	16,736'	NEW	20#	N/A	Y
Tubing							
Packer type and depth set							

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Comment Details

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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	1171	15.6	1.19	1405	0	8
Coal	A	1171	15.6	1.19	1405	0	8
Intermediate 1	A	954	15.6	1.19	1192	0	8
Intermediate 2							
Intermediate 3							
Production	A	4237	14.5	1.17	4936	0	8
Tubing							

Drillers TD (ft) 16,779'

Loggers TD (ft) n/a

Deepest formation penetrated Marcellus

Plug back to (ft) n/a

Plug back procedure n/a

Kick off depth (ft) 6,125'

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

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

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

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



API 47- 051 - 01906 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-2HM

PRODUCING FORMATION(S)	DEPTHS
Marcellus	6,799'-6,897' TVD 7,237'-16,779' MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1132 psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas \_\_\_\_\_ bpd Oil 0 bpd NGL \_\_\_\_\_ bpd Water 600 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN 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 (FRESHWATER, BRINE, OIL, GAS, U.S. ETC)
*see attached	0		0		

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Please insert additional pages as applicable.

Drilling Contractor Nabor Drilling USA  
Address 505 West Greens Road, Suite 1000 City Houston State TX Zip 77067

Logging Company n/a  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company C&J Well Services  
Address 380 Southpointe Boulevard, Suite 210 City Canonsburg State PA Zip 15317

Stimulating Company Horton Energy Services, Inc.  
Address 121 Champion Way, Suite 200 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Amy L. Miller Telephone 304-376-0111  
Signature [Signature] Title Permitting Specialist Date 3/23/2020

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

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Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	9/27/2018	16591	16639	12	Marcellus
2	9/27/2018	16348	16494	48	Marcellus
3	9/27/2018	16173	16319	48	Marcellus
4	9/28/2018	15998	16144	48	Marcellus
5	9/28/2018	15823	15969	48	Marcellus
6	9/29/2018	15648	15794	48	Marcellus
7	9/30/2018	15473	15619	48	Marcellus
8	10/1/2018	15298	15444	48	Marcellus
9	10/1/2018	15123	15269	48	Marcellus
10	10/2/2018	14948	15094	48	Marcellus
11	10/3/2018	14773	14919	48	Marcellus
12	10/3/2018	14598	14744	48	Marcellus
13	10/4/2018	14423	14569	48	Marcellus
14	10/4/2018	14248	14394	48	Marcellus
15	10/5/2018	14073	14219	48	Marcellus
16	10/6/2018	13898	14044	48	Marcellus
17	10/7/2018	13723	13869	48	Marcellus
18	10/8/2018	13548	13694	48	Marcellus
19	10/8/2018	13373	13519	48	Marcellus
20	10/9/2018	13198	13344	48	Marcellus
21	10/9/2018	13023	13169	48	Marcellus
22	10/10/2018	12848	12994	48	Marcellus
23	10/11/2018	12673	12819	48	Marcellus
24	10/11/2018	12498	12644	48	Marcellus
25	10/12/2018	12323	12469	48	Marcellus
26	10/12/2018	12148	12294	48	Marcellus
27	10/13/2018	11973	12119	48	Marcellus
28	10/13/2018	11798	11944	48	Marcellus
29	10/14/2018	11623	11769	48	Marcellus
30	10/14/2018	11448	11594	48	Marcellus
31	10/15/2018	11273	11419	48	Marcellus
32	10/15/2018	11098	11244	48	Marcellus
33	10/16/2018	10923	11069	48	Marcellus
34	10/17/2018	10748	10894	48	Marcellus
35	10/17/2018	10573	10719	48	Marcellus
36	10/18/2018	10398	10544	48	Marcellus
37	10/19/2018	10223	10369	48	Marcellus
38	10/19/2018	10048	10194	48	Marcellus
39	10/20/2018	9873	10019	48	Marcellus
40	10/20/2018	9698	9844	48	Marcellus
41	10/21/2018	9523	9669	48	Marcellus

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Marcellus

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
42	10/22/2018	9348	9494	48	Marcellus
43	10/22/2018	9173	9319	48	Marcellus
44	10/23/2018	8998	9144	48	Marcellus
45	10/24/2018	8823	8969	48	Marcellus
46	10/24/2018	8648	8794	48	Marcellus
47	10/25/2018	8473	8619	48	Marcellus
48	10/25/2018	8298	8444	48	Marcellus
49	10/26/2018	8123	8269	48	Marcellus
50	10/27/2018	7948	8094	48	Marcellus
51	10/27/2018	7773	7919	48	Marcellus
52	10/28/2018	7598	7744	48	Marcellus
53	10/29/2018	7423	7569	48	Marcellus

Heaven Hill 2-2HM

STIMULATION INFORMATION PER STAGE

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/other (units)
1	79.9	7553	0	4523	290040	8133	0
2	86.2	8222	5178	3998	431205	7494	0
3	87.8	8196	5296	4592	447480	7882	0
4	83.7	8105	5062	4797	448855	7887	0
5	80.6	7872	5077	4859	435950	7644	0
6	81.9	7709	5321	4858	446315	7420	0
7	80.7	8032	5585	4813	436540	7353	0
8	78.5	7870	5201	4613	398700	6893	0
9	80.6	7592	5184	4972	438560	7445	0
10	80.2	7609	5177	4690	445025	7409	0
11	80.5	7475	5206	4615	441280	7588	0
12	79.8	7548	5250	4922	434580	7346	0
13	80.4	7646	5120	4716	437700	7361	0
14	80.6	7566	5234	4861	436000	7561	0
15	80.8	7509	5217	4636	442140	7390	0
16	80.2	7515	5230	4779	444580	7428	0
17	80.7	7516	5178	4617	439580	7506	0
18	80.8	7425	5354	4564	437380	7296	0
19	80.7	7515	5294	4819	429400	7348	0
20	80.6	7318	8179	4664	431680	7171	0
21	80.3	7411	5495	4505	440540	7235	0
22	80.5	7303	5314	4669	434220	7328	0
23	80.4	7214	5796	4661	440660	8213	0
24	80.7	6927	4938	4701	434480	7272	0
25	80.9	6821	5638	4654	437980	7158	0
26	80.8	7003	5260	4766	438280	7269	0
27	80.6	6596	5078	4654	436420	7326	0
28	80.7	6598	5270	4713	445640	7208	0
29	80.5	6460	5164	4688	447040	7448	0

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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	80.7	6671	4933	4668	436580	7461	0
31	80.3	6607	5156	4873	438980	7479	0
32	80.7	6741	5943	4825	439120	7495	0
33	80.6	6517	5052	4914	439780	7359	0
34	80.8	6861	5160	4971	434200	7439	0
35	80.5	6713	5521	4718	436800	7322	0
36	80.4	6665	5731	4752	443220	7381	0
37	80.7	6794	5521	4782	444360	7628	0
38	80.7	6739	5784	4852	436420	7279	0
39	80.8	6674	5670	4861	443260	7650	0
40	80.7	6559	5025	4694	438880	7540	0
41	80.7	6520	6100	4802	443020	7391	0
42	80.8	6524	5108	4543	437980	7635	0
43	86.3	6761	5118	4747	440060	7274	0
44	89.1	7055	5900	4798	440100	7493	0
45	89.3	6730	5208	4721	437640	7907	0
46	89.3	6824	4252	4437	437360	7307	0
47	89.2	6732	5316	4656	439260	7135	0
48	89.3	6770	4510	4857	434050	7364	0
49	89.5	6703	5858	4695	443700	7122	0
50	89.7	6746	4442	4648	440720	7137	0
51	89.3	6842	5164	4741	440160	7139	0
52	89.6	6549	4054	4659	439060	7036	0
53	89.8	6736	5491	4489	435420	7111	0

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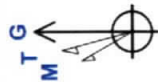


**Well:** Heaven Hill 2-02 HM (slot C)  
**Site:** Heaven Hill 2  
**Project:** Marshall County, West Virginia  
**Design:** rev 8  
**Rig:** Nabors X08

**SECTION DETAILS**

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V/Sect	Annotation
1	6047.00	21.68	358.06	5838.12	1175.73	-68.38	0.00	0.00	-1052.41	Ve in survey @ 6047 MD
2	6197.00	21.68	358.06	5977.51	1231.12	-70.26	0.00	0.00	-1101.31	KOP Begin 8'100' build
3	6789.17	29.30	135.50	6543.47	1237.45	-33.58	8.00	153.27	-1054.87	Begin 10'100' build
4	7396.49	89.00	150.00	6842.06	829.59	-316.54	10.00	16.66	-560.18	Begin 85.00' lateral
5	16873.53	89.00	150.00	7007.00	-7376.70	5054.03	0.00	0.00	8915.43	PBHLTD 16873.52 MD/7007.00 TVD

MD	Inc	Azi	IUV	+N/-S	+E/-W	V/Sect	Annotation
100.00	0.52	350.04	100.00	0.45	-0.08	-0.43	Gyro
955.00	0.41	286.27	954.99	2.08	-2.22	-2.91	MWD surveys
6047.00	21.68	358.06	5838.12	1175.73	-68.38	-1052.41	Survey @ 6047.00 MD 5838.12 TVD
16731.00	90.73	149.23	6897.97	-7332.09	5035.44	8867.50	Survey @ 16731.00 MD 6897.97 TVD
16779.00	90.73	149.23	6897.36	-7373.33	5060.00	8915.49	Survey projected to 16779.00 MD 6897.36 TVD



Azimuths to Grid North  
 True North: -0.18°  
 Magnetic North: -8.89°

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)

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



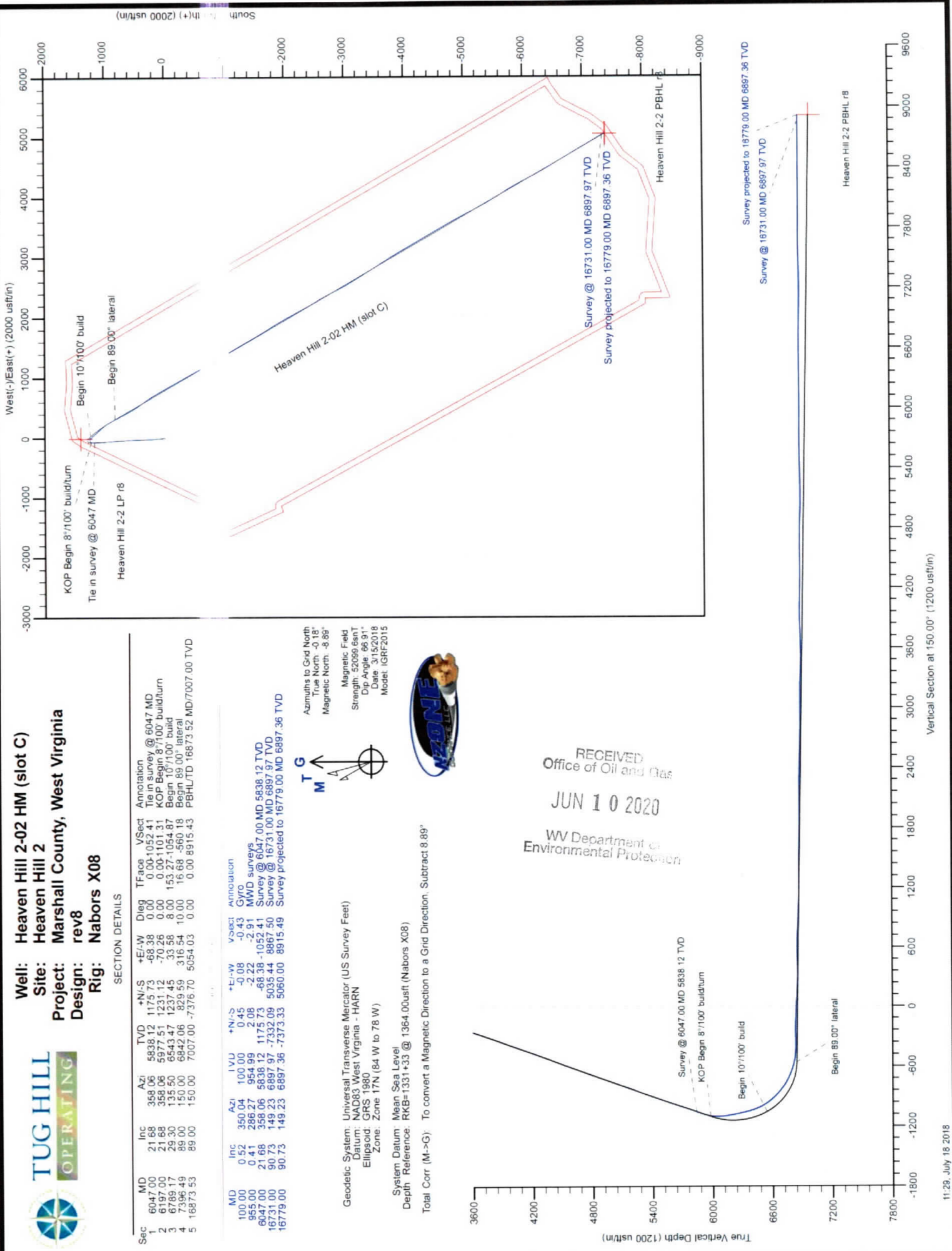
Heaven Hill 2-02 HM (slot C)

Survey @ 16731.00 MD 6897.97 TVD  
 Survey projected to 16779.00 MD 6897.36 TVD

Heaven Hill 2-2 PBHL rB

Survey projected to 16779.00 MD 6897.36 TVD  
 Survey @ 16731.00 MD 6897.97 TVD

Heaven Hill 2-2 PBHL rB



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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/27/2018
Job End Date:	10/31/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01906-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Heaven Hill 2-2HM
Latitude:	39.81009419
Longitude:	-80.71286829
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,903
Total Base Water Volume (gal):	16,964,757
Total Base Non Water Volume:	0



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## 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	81.33164	Density = 8.400
Recycled Water	Operator	Base Fluid					
			Water	7732-18-5	100.00000	4.54125	Density = 8.800

Ingredients	Listed Above	Listed Above	Water	7732-18-5	100.00000	0.13877
FDP-S1296-17	Halliburton	Corrosion Inhibitor		Listed Below		
MC MX 2-2822	Halliburton	Scale Inhibitor		Listed Below		
SAND-COMMON WHITE-100 MESH, SSA-2, BULK (100003676)	Halliburton	Proppant		Listed Below		
HYDROCHLORIC ACID	Halliburton	Solvent		Listed Below		
MX 8-4543	Halliburton	Biocide		Listed Below		
OILPERM A	Halliburton	Non-ionic Surfactant		Listed Below		
LD-2850	Halliburton	Friction Reducer		Listed Below		

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	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	0.00014	
	Glycerine	56-81-5	5.00000	0.00003	
	Poly(oxy-1,2-ethanediyl)-alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00002	
	Naphthalene	91-20-3	5.00000	0.00002	
	Propargyl Alcohol	107-19-7	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
	Formaldehyde	50-00-0	0.09000	0.00002	
	1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00000	

\* 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

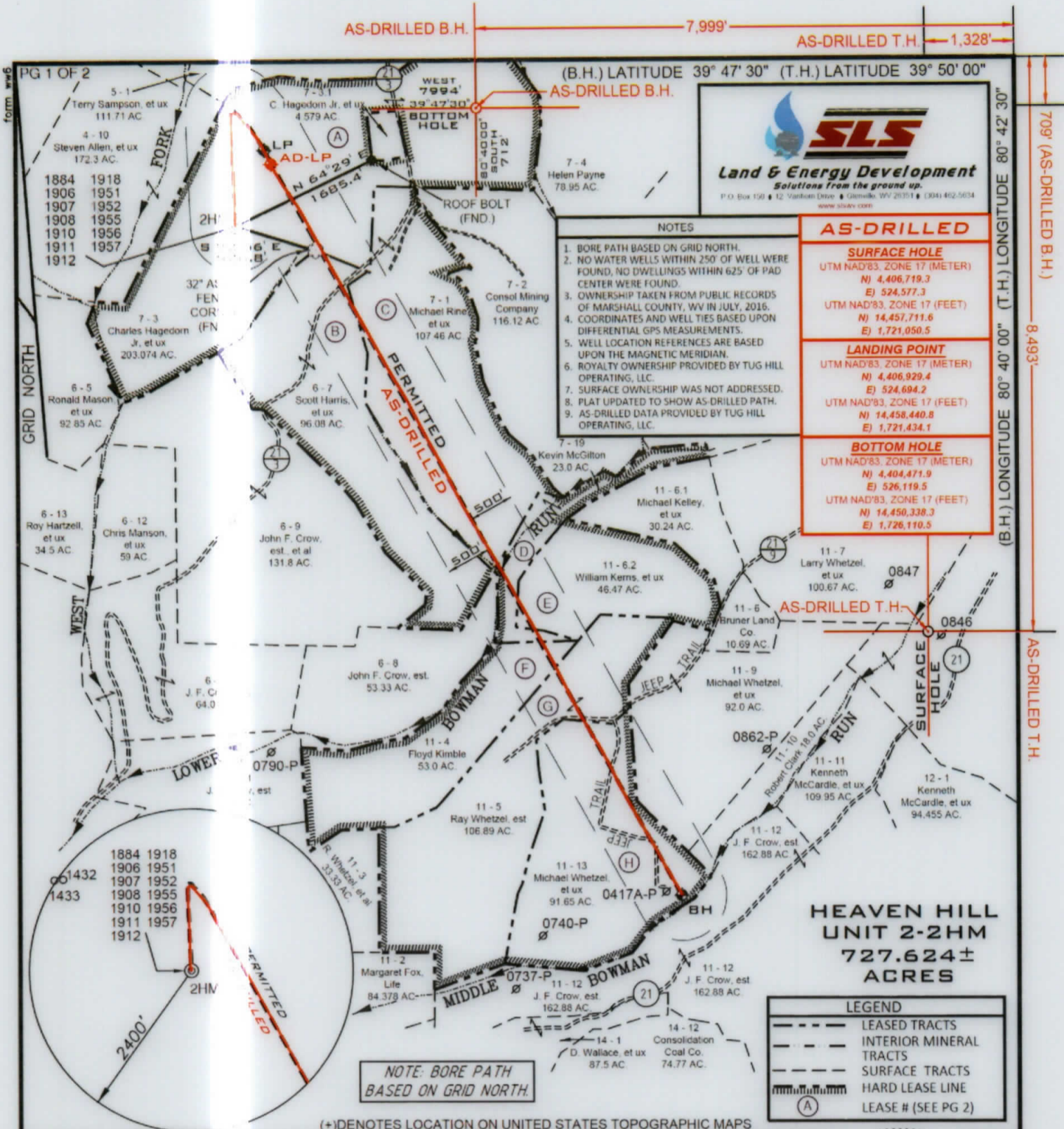
Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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HEAVEN HILL 2-2HM

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	1895	2067	1895	2068	Sandstone
Big Lime	2067	2199	2068	2200	Limestone
Big Injun	2199	2493	2200	2494	Sandstone
Weir	2493	2691	2494	2692	Sandstone
Berea	2691	2953	2692	2956	Sandstone
Gordon	2953	3038	2956	3042	Sandstone
Fifty Foot	3038	3620	3042	3660	Sandstone
Speechley	3620	5130	3660	5287	Sandstone
Benson	5130	5453	5287	5635	Sandstone
Alexander	5453	6075	5635	6297	Siltstone
Rhinestreet	6075	6590	6297	6852	Black shale
Middlesex	6590	6676	6852	6973	Black shale
Geneseo/Burkett	6676	6688	6973	6996	Black shale
Tully	6688	6723	6996	7056	Limestone
Hamilton	6723	6799	7056	7237	Grey shale
Marcellus	6799	-	7237	-	Black shale

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**Land & Energy Development**  
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 www.sls.com

- NOTES**
1. BORE PATH BASED ON GRID NORTH.
  2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
  3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN JULY, 2016.
  4. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
  5. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
  6. ROYALTY OWNERSHIP PROVIDED BY TUG HILL OPERATING, LLC.
  7. SURFACE OWNERSHIP WAS NOT ADDRESSED.
  8. PLAT UPDATED TO SHOW AS-DRILLED PATH.
  9. AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.

AS-DRILLED	
<b>SURFACE HOLE</b>	
UTM NAD'83, ZONE 17 (METER)	
N) 4,406,719.3	E) 524,577.3
UTM NAD'83, ZONE 17 (FEET)	
N) 14,457,711.6	E) 1,721,050.5
<b>LANDING POINT</b>	
UTM NAD'83, ZONE 17 (METER)	
N) 4,406,929.4	E) 524,694.2
UTM NAD'83, ZONE 17 (FEET)	
N) 14,458,440.8	E) 1,721,434.1
<b>BOTTOM HOLE</b>	
UTM NAD'83, ZONE 17 (METER)	
N) 4,404,471.9	E) 526,119.5
UTM NAD'83, ZONE 17 (FEET)	
N) 14,450,338.3	E) 1,726,110.5

**HEAVEN HILL UNIT 2-2HM**  
**727.624± ACRES**

**LEGEND**

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

FILE NUMBER	163-697
DRAWING NUMBER	HHU-2HM-WP-2HM
SCALE	1" = 500'
MINIMUM DEGREE OF ACCURACY	1/50
PROVEN SOURCE OF ELEVATION	SUBMETER MAPPING
	GRADE GP

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

P.S. 849 *C. Victor Moyers*



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



DATE: OCTOBER 17, 2018  
 DATE REVISED: OCTOBER 17, 2019  
 OPERATORS WELL NO. Heaven Hill Unit 2-2HM As-Drilled

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION ELEVATION 2351' WATERSHED (HUC 10) FISH CREEK  
 DISTRICT MEADE COUNTY MARSHALL  
 QUADRANGLE GREEN EASTON 7.5' LEASE NUMBER SEE ATTACHED PG 2 OF 2

SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX ACREAGE 203.074  
 OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL LEASE ACREAGE 727.624  
 PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORMANCE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_  
 TARGET FORMATION MICELLUS ESTIMATED DEPTH TVD 6,929' TMD:16,804'  
 WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT CT CORPORATION SYSTEM  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME  
 PERMIT

ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500  
 FORT WORTH, TX 76102  
 WELL OPERATOR TUG HILL OPERATING, LLC  
 DESIGNATED AGENT CT CORPORATION SYSTEM  
 DIANNA STAMPER  
 ESTIMATED DEPTH TVD 6,929, TMD: 16,804'  
 PLUG & ABANDON CLEAN OUT & REPLUG  
 PERMIT

TARGET FORMATION MARCELLUS  
 PROPOSED WORK DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL  
 SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX  
 QUADRANGLE GLEN EASTON 7.5, LEASE NUMBER SEE ATTACHED PG 2 OF 2  
 DISTRICT MEADE COUNTY MARSHALL  
 LOCATION ELEVATION 1331' WATERSHED (HUC 10) FISH CREEK  
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 API WELL NO. 47-051-01906  
 OPERATORS WELL NO. Heaven Hill Unit 2-SHM As-Drilled  
 DATE REVISED: OCTOBER 17, 2019  
 DATE: OCTOBER 17, 2018

CHARLESTON, WV 25304  
 OFFICE OF OIL & GAS  
 801 5TH STREET, SE  
 WVDEP

GRADE GPS  
 SUBMETER MAPPING  
 PROVEN SOURCE  
 OF ELEVATION  
 MINIMUM DEGREE 1/2500  
 SCALE 1" = 1500'  
 DRAWING NUMBER HHUS\_WP\_2HM  
 FILE NUMBER 163-697

P. S. 849  
 C. Victor Moyer

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

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

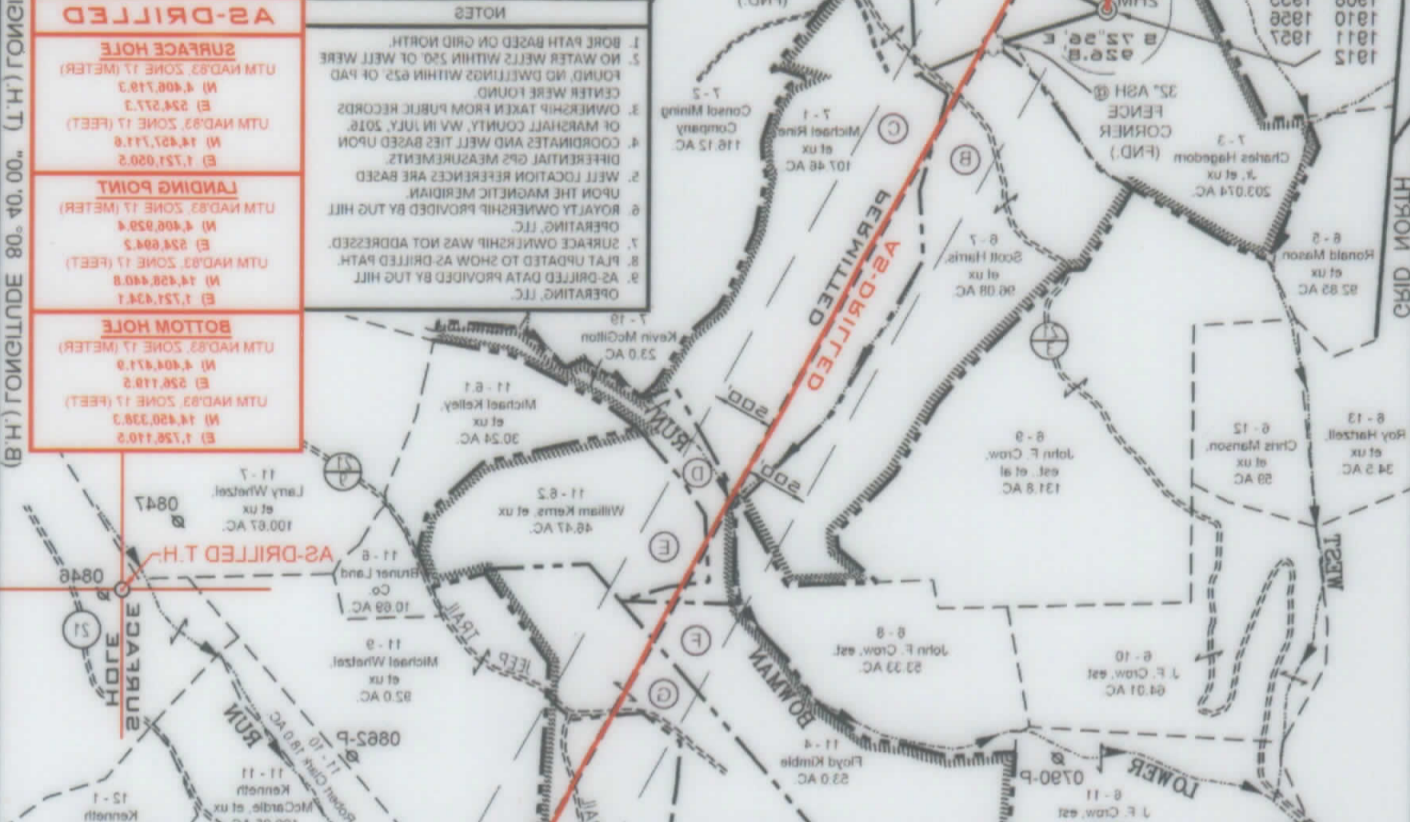


LEGEND

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

ACRES 727.624±  
 UNIT 2-SHM  
 HEAVEN HILL

NOTE: BORE PATH BASED ON GRID NORTH



AS-DRILLED

BOTTOM HOLE	UTM NAD83 ZONE 17 (METER)	(E) 1,751,110.8
	(N) 4,404,471.0	
	(E) 526,119.3	
	(N) 14,420,328.3	
LANDING POINT	UTM NAD83 ZONE 17 (METER)	(E) 1,751,134.1
	(N) 4,406,928.4	
	(E) 524,604.3	
	(N) 14,420,440.8	
SURFACE HOLE	UTM NAD83 ZONE 17 (METER)	(E) 1,751,134.1
	(N) 4,406,928.4	
	(E) 524,604.3	
	(N) 14,420,328.3	

NOTES

1. BORE PATH BASED ON GRID NORTH.
2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN JULY, 2018.
4. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
5. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
6. ROYALTY OWNERSHIP PROVIDED BY TUG HILL OPERATING, LLC.
7. SURFACE OWNERSHIP WAS NOT ADDRESSED.
8. PLAT UPDATED TO SHOW AS-DRILLED PATH.
9. AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.

(B.H.) LATITUDE 39° 47' 30" (T.H.) LATITUDE 39° 50' 00"  
 AS-DRILLED B.H. 7,999'  
 AS-DRILLED T.H. 1,338'  
 8,493'  
 108.9 (AS-DRILLED B.H.)  
 PG 1 OF 2





HEAVEN HILL UNIT 2-2HM  
WELL PLAT LEASE INFORMATION

Lease No.	Tract	Parcel	OIL & GAS ROYALTY OWNER	DEED BOOK	DEED PAGE
10*15505	A	9-7-3	RALPH E. WELLMAN	686	412
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	722	281
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	816	423
10*47051.073.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	888	618
10*47051.073.2	A	9-7-3	PATRIOT RESTORATIONS LLC	908	541
10*47051.073.3	A	9-7-3	TRIENERGY HOLDINGS, LLC	878	330
10*47051.255.0	B	9-6-7	SCOTT C & CAROLYN R HARRIS	879	296
10*15665	C	9-7-1	MICHAEL J RINE ET UX	668	147
10*15667	D	9-7-19	KEVIN E MCGILTON ET UX	850	351
10*15560	E	9-11-6.2	WILLIAM F KERNS ET UX	677	561
10*47051.256.2	E	9-11-6.2	CAROL JEAN ANDERSON	879	299
10*47051.256.3	E	9-11-6.2	BRENDA S DYKHOUSE	881	148
10*47051.256.4	E	9-11-6.2	GLEN A BONAR	881	151
10*16517	F	9-11-4	RHDK INVESTMENTS	907	550
10*15584	G	9-11-5	VICKIE MASON	686	239
10*15585	G	9-11-5	SHARON L WHETZAL	687	147
10*15586	G	9-11-5	MARY A SOUTH	690	615
10*15587	G	9-11-5	ROBERT L WHETZAL	690	559
10*15588	G	9-11-5	RAY A WHETZAL JR	693	571
10*15589	G	9-11-5	MARK L WHETZAL	693	576
10*47051.108.1	G	9-11-5	MICHAEL A WHETZEL	885	51
10*47051.108.5	G	9-11-5	BRENDA J WHETZEL	885	55
10*15604	H	9-11-13	HAYHURST COMPANY A FLORIDA PARTNERSHIP	724	8

WELL OPERATOR TUC 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