

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

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API 47 - 051 - 01834 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 2-5HM  
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 NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,406,707.1 Easting 524,568.1  
Landing Point of Curve Northing 4,406,132.4 Easting 524,369.1  
Bottom hole Northing 4,404,243.9 Easting 525,464.7

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 2/7/2017 Date drilling commenced 7/15/2017 Date drilling ceased 6/19/2018  
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 N  
Coal depth(s) ft Sewickly 974', Pittsburgh 1072' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:   
*Jim Hagedorn*  
6/22/2020

API 47-051 - 01884 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-5HM

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	Y
Surface	17 1/2"	13 3/8"	1,144'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	1,144'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,871'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	15,089'	NEW	20#	N/A	Y
Tubing							
Packer type and depth set							RECEIVED Office of Oil and Gas

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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	1172	15.6	1.19	1407	0	8
Coal	A	1172	15.6	1.19	1407	0	8
Intermediate 1	A	1084	15.6	1.19	1355	0	8
Intermediate 2							
Intermediate 3							
Production	A	2688	1.19	1.17	4300	0	8
Tubing							

Drillers TD (ft) 15,089' Loggers TD (ft) n/a

Deepest formation penetrated Marcellus Plug back to (ft) n/a

Plug back procedure n/a

Kick off depth (ft) 6,550'

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 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 AS OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

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

API 47- 051 - 01884

Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-5HM

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	*See attached				

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Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Rate (gpm)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
			*See attached					

Please insert additional pages as applicable.

API 47- 051 - 01884 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-5HM

PRODUCING FORMATION(S)	DEPTHS
Marcellus	6,812'-6,867' TVD 7,570'-15,089' MD

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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 0 mcpd Oil 0 bpd NGL 0 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, H <sub>2</sub> S, ETC)
	<u>0</u>		<u>0</u>		
*see attached					

Please insert additional pages as applicable.

Drilling Contractor Nabors 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 Hartburton 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 *Amy L. Miller* Title Permitting Specialist Date 3/23/2020

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

**Heaven Hill 2-5HM  
PEFORATION RECORD**

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Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	11/4/2018	14906	14906	2	Marcellus
2	11/5/2018	14656	14656	48	Marcellus
3	11/5/2018	14481	14481	48	Marcellus
4	11/6/2018	14306	14306	48	Marcellus
5	11/6/2018	14131	14131	48	Marcellus
6	11/7/2018	13963	13963	48	Marcellus
7	11/8/2018	13781	13781	48	Marcellus
8	11/8/2018	13606	13606	48	Marcellus
9	11/9/2018	13431	13431	48	Marcellus
10	11/9/2018	13256	13256	48	Marcellus
11	11/9/2018	13074	13074	48	Marcellus
12	11/10/2018	12899	12899	48	Marcellus
13	11/10/2018	12724	12724	48	Marcellus
14	11/10/2018	12549	12549	48	Marcellus
15	11/11/2018	12374	12374	48	Marcellus
16	11/12/2018	12199	12199	48	Marcellus
17	11/12/2018	12024	12024	48	Marcellus
18	11/12/2018	11849	11849	48	Marcellus
19	11/12/2018	11674	11674	48	Marcellus
20	11/13/2018	11499	11499	48	Marcellus
21	11/14/2018	11324	11324	48	Marcellus
22	11/14/2018	11149	11149	48	Marcellus
23	11/15/2018	10974	10974	48	Marcellus
24	11/16/2018	10799	10799	48	Marcellus
25	11/16/2018	10624	10624	48	Marcellus
26	11/17/2018	10449	10449	48	Marcellus
27	11/18/2018	10274	10274	48	Marcellus
28	11/18/2018	10099	10099	48	Marcellus
29	11/19/2018	9924	9924	48	Marcellus
30	11/20/2018	9749	9749	48	Marcellus
31	11/20/2018	9574	9574	48	Marcellus
32	11/21/2018	9399	9399	48	Marcellus
33	11/21/2018	9224	9224	48	Marcellus
34	11/22/2018	9049	9049	48	Marcellus
35	11/23/2018	8874	8874	48	Marcellus
36	11/23/2018	8699	8699	48	Marcellus
37	11/24/2018	8524	8524	48	Marcellus
38	11/25/2018	8349	8349	48	Marcellus
39	11/26/2018	8174	8174	48	Marcellus
40	11/26/2018	7999	7999	48	Marcellus
41	11/27/2018	7824	7824	48	Marcellus

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Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
42	11/27/2013	7655	7655	48	Marcellus

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Heaven Hill 2-5HM

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 (bbls)	Amount of Nitrogen/other (units)
1	78.9	7161	8315	3737	345320	7157	0
2	84.1	7070	5553	4109	442010	7791	0
3	80.3	7277	5495	4399	441580	12970	0
4	85.7	7312	5440	4749	441520	8121	0
5	83.6	7631	7200	4880	440230	7720	0
6	81.8	7116	5575	4872	442880	7701	0
7	86.1	7538	5220	5120	435250	7585	0
8	89.1	7791	5725	4521	437740	7811	0
9	87.4	7286	5299	4383	445750	7860	0
10	88.2	7371	7285	4325	444360	9593	0
11	88.9	7033	5125	4549	436350	7691	0
12	87.8	7092	5250	4304	448180	7644	0
13	89.4	7337	5272	4725	433450	7565	0
14	89.2	7572	5355	4642	433880	7726	0
15	81.2	7371	5055	4978	437830	12127	0
16	84.7	6785	4929	4710	436580	10180	0
17	50.3	8004	4986	4773	10010	6499	0
18	89.5	7159	5021	4795	436260	7552	0
19	84.7	6687	5002	4743	449320	8310	0
20	88.7	6759	5388	4820	435100	8604	0
21	85.3	6728	4950	4821	437510	8049	0
22	89.5	7124	5039	4793	438110	9034	0
23	83.9	7103	4866	4571	439080	86362	0
24	89.3	6984	5323	5021	437000	77175	0
25	88.9	7057	5816	4815	434730	7572	0
26	85.1	6740	5445	4883	442550	7513	0
27	88.7	7423	5633	4804	383640	7408	0
28	86	6691	5051	4815	436870	76233	0
29	89.1	7234	5522	5161	444710	8158	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	84.7	6846	5918	4862	438450	8915	0
31	89.6	6895	5239	4824	438130	7609	0
32	89.7	6832	5409	5078	436990	7430	0
33	83.7	6524	6091	4767	436520	7380	0
34	88.7	6689	5260	4924	434720	7129	0
35	85.8	6562	5462	4701	439530	7122	0
36	88.6	6609	5041	4846	437590	7129	0
37	88.7	6457	5353	5214	439430	7094	0
38	88.9	6642	5011	4926	437370	7001	0
39	87	6640	5560	4406	438880	7337	0
40	84.1	6539	5174	4972	376300	6608	0
41	88.4	6699	4982	5500	311960	6200	0
42	89.6	6719	5591	4570	434770	7724	0

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HEAVEN HILL 2-5HM

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	1909	2081	1909	2081	Sandstone
Big Lime	2081	2213	2081	2213	Limestone
Big Injun	2213	2507	2213	2507	Sandstone
Weir	2507	2705	2507	2705	Sandstone
Berea	2705	2967	2705	2967	Sandstone
Gordon	2967	3052	2967	3052	Sandstone
Fifty Foot	3052	3634	3052	3635	Sandstone
Speechley	3634	5144	3635	5291	Sandstone
Benson	5144	5467	5291	5660	Sandstone
Alexander	5467	6179	5660	6474	Siltstone
Rhinestreet	6179	6605	6474	7081	Black shale
Middlesex	6605	6686	7081	7242	Black shale
Geneseo/Burkett	6686	6708	7242	7291	Black shale
Tully	6708	6745	7291	7380	Limestone
Hamilton	6745	6812	7380	7570	Grey shale
Marcellus	6812	-	7570	-	Black shale

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**Tug Hill Operating LLC**  
**Well: Heaven Hill 2-05 HM (slot G)**  
**Site: Heaven Hill 2**  
**Project: Marshall County, West Virginia**  
**Design: rev12**

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V/Sect	Annotation
1	6427.00	31.14	224.50	6138.30	-758.18	-922.65	0.00	0.00	399.74	Survey @ 6427.00 MD 6138.30 TVD
2	6527.00	31.14	224.50	6233.89	-795.07	-958.90	0.00	0.00	422.12	KOP Begin 3'100' droplum
3	6708.00	29.50	214.23	6380.24	-865.34	-1016.81	3.00	-112.00	468.55	Begin 10'100' buildlum
4	7475.50	89.00	150.00	6783.06	-1442.30	-915.69	10.00	-67.67	1046.12	Begin 89.00° lateral section
5	15151.09	89.00	150.00	6917.00	-8089.43	2921.04	0.00	0.00	8600.66	PBHLTD 15151.09 MD 6917.00 TVD

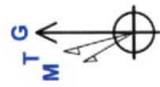
ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V/Sect	Annotation
2924.00	0.97	250.78	2923.72	-1.76	-10.57	-1.93	MWD surveys		
15039.00	89.93	145.61	6866.75	-8040.28	2913.45	8551.85	Survey @ 15039.00 MD 6866.75 TVD		
15089.00	89.93	145.61	6866.81	-8081.54	2941.69	8600.25	Survey projected to 15089.00 MD 6866.81 TVD		

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  
 RKB=1351+33 @ 1364.00' east (Nabors X08)  
 Northing Easing Latitude Longitude  
 14457671.66 1721020.49 39.80998480 -80.71297580

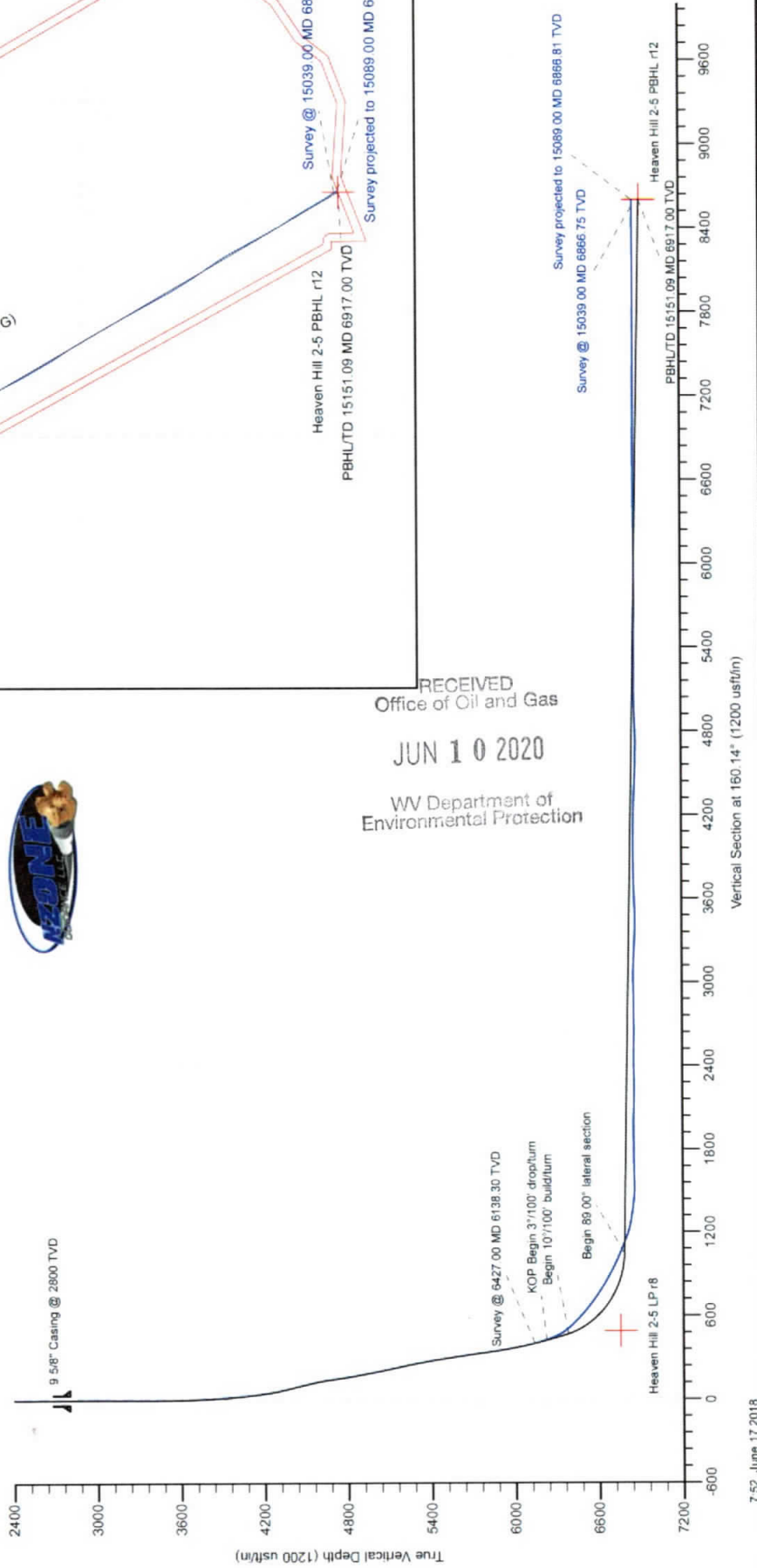
To convert a Magnetic Direction to a Grid Direction, Subtract 8.90°



Asimuths to Grid North  
 True North: -0.18°  
 Magnetic North: -8.90°  
 Magnetic Field  
 Strength: 52094.5anT  
 Dip Angle: 66.91°  
 Date: 3/31/2019  
 Model: IGRF2015



9.5/8" Casing @ 2800 TVD



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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	11/4/2018
Job End Date:	11/27/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01884-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Heaven Hill 2-5HM
Latitude:	39.80998483
Longitude:	-80.71297582
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,899
Total Base Water Volume (gal):	14,468,065
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	86.45069	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.76942	

Product Name	Halliburton	Solvent							
HYDROCHLORIC ACID					Listed Below				
MC MX 5-2402	Halliburton	Biocide							
SAND-PREMIUM WHITE-40/70	Halliburton	Proppant							
SAND-COMMON WHITE-100 MESH	Halliburton	Proppant			Listed Below				
MC MX 8-4543	Halliburton	Biocide							
LD-2850	Halliburton	Friction Reducer			Listed Below				
SAND-PREMIUM WHITE-30/50	Halliburton	Proppant							
OILPERM A	Halliburton	Non-Ionic Surfactant			Listed Below				

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MC MX 2-2822	Halliburton	Scale Inhibitor											
					Listed Below								
FR-A12	Halliburton	Additive											
					Listed Below								
OptiKleen-WF (TM)	Halliburton	Concentrate											
					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					12.67397		
			Hydrochloric acid	7647-01-0		15.00000					0.05444		
			Calcium nitrate	13477-34-4		100.00000					0.03568		
			Ethaniminium, N,N,N-trimethyl-2-[(1-oxo-2-propen-1-yl)oxy]-, polymer chloride (1:1), polymer with 2-propenamide	69418-26-4		30.00000					0.01823		
			Hydrotreated light petroleum distillate	64742-47-8		30.00000					0.01823		
			Proprietary Component	Proprietary		60.00000					0.01533		
			Sodium chloride	7647-14-5		10.00000					0.00978		
			Methanol	67-56-1		100.00000					0.00746		
			Amines, polyethylenepoly-, ethoxylated, phosphonomethylated, sodium salts	70900-16-2		30.00000					0.00687		
			Amonium chloride	12125-02-9		10.00000					0.00608		

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			9-Octadecenamide, n,n-bis-2(hydroxy-ethyl)-,(Z)	93-83-4	5.00000	0.00304	
			Glycerine	56-81-5	5.00000	0.00128	
			Sodium perborate tetrahydrate	10486-00-7	100.00000	0.00121	
			Ethanol	64-17-5	60.00000	0.00037	
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00025	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00019	
			Modified thiourea polymer	Proprietary	30.00000	0.00018	
			Naphthalene	91-20-3	5.00000	0.00003	
			Poly(oxy-1,2-ethanediy), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00003	
			Propargyl alcohol	107-19-7	5.00000	0.00003	
			Ethoxylated alcohols	Proprietary	5.00000	0.00003	
			Formaldehyde	50-00-0	0.09000	0.00002	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
			Contains no hazardous substances	CAS Not Assigned			

\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

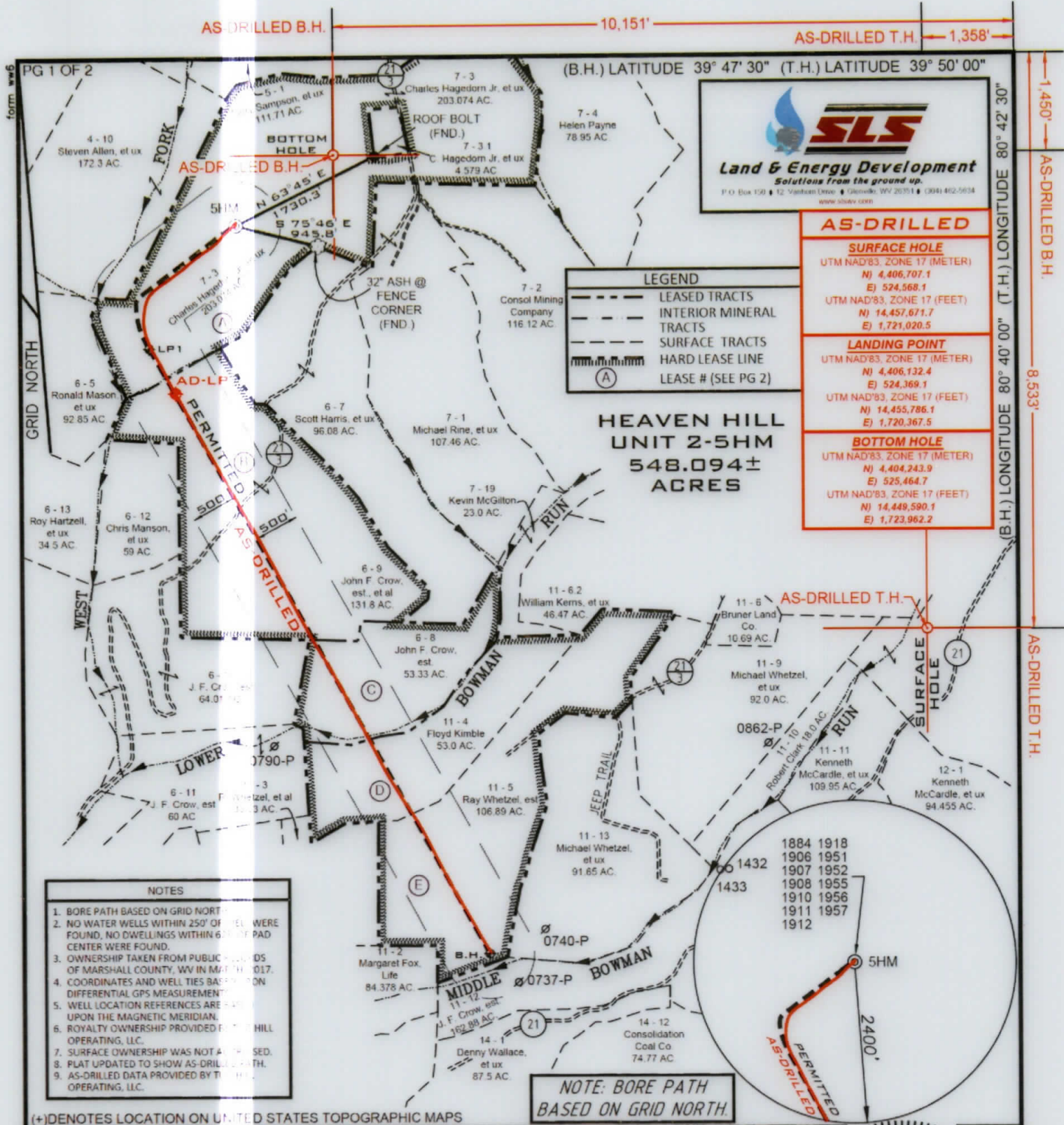
\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

\*\*\* 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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FILE NUMBER **163-697**

DRAWING NUMBER **HHU2\_WP\_5HM REV1**

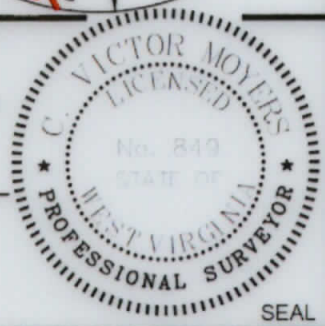
SCALE **1" = 1500'**

MINIMUM DEGREE OF ACCURACY **1/2500**

PROVEN SOURCE OF ELEVATION **SUBMETER MAPPING GRADE GPS**

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

P.S. **C. Victor Moyers**  
849



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 2-5HM As-Drilled**

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
(IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
LOCATION ELEVATION **1331'** WATERSHED (HUC 10) **FISH CREEK**  
DISTRICT **MEADE** COUNTY **MARSHALL**  
QUADRANGLE **GLEN EASTON 7.5'** LEASE NUMBER **SEE ATTACHED PG 2 OF 2**

SURFACE OWNER **CHARLES R. HAGEDORN, JR., ET UX** ACREAGE **203.074**  
OIL & GAS ROYALTY OWNER **CHARLES R. HAGEDORN, JR., ET AL** LEASE ACREAGE **548.094**  
PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
PERFORM NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

TARGET FORMATION **MARCELLUS** ESTIMATED DEPTH **TVD 6,851' TMD:15,084'**  
WELL OPERATOR **TUG HILL OPERATING, LLC** DESIGNATED AGENT **DIANNA STAMPER CT CORPORATION SYSTEM**  
ADDRESS **1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX, 76107** ADDRESS **5400 D BIG TYLER ROAD CHARLESTON WV, 25313**

GRID NORTH  
WEST  
LOWER  
BOWMAN  
MIDDLE  
BOWMAN  
JEEP TRAIL  
SURFACE HOLE  
AS-DRILLED B.H.  
AS-DRILLED T.H.

PG 1 OF 2

30° 42' 30" LONGITUDE  
00° 40' 30" LONGITUDE  
8,533' LONGITUDE  
AS-DRILLED T.H.

COUNTY NAME  
PERMIT

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

DESIGNATED AGENT DIANA STAMPER  
 CT CORPORATION SYSTEM

TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH TVD 6,851' TMD: 15,084'  
 PLUG & ABANDON CLEAN OUT & REPLUG

PERFORM NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY)  
 PROPOSED WORK DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION

OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL  
 LEASE ACREAGE 248.094  
 SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX  
 ACREAGE 203.074

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

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

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

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

MINIMUM DEGREE OF ACCURACY 1/2500  
 SCALE 1" = 150'

DRAWING NUMBER HHU2\_WP\_SHM REV1  
 FILE NUMBER 163-697

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

PROFESSIONAL SURVEYOR  
 WEST VIRGINIA  
 STATE OF  
 NO. 849  
 C. Victor Morgan

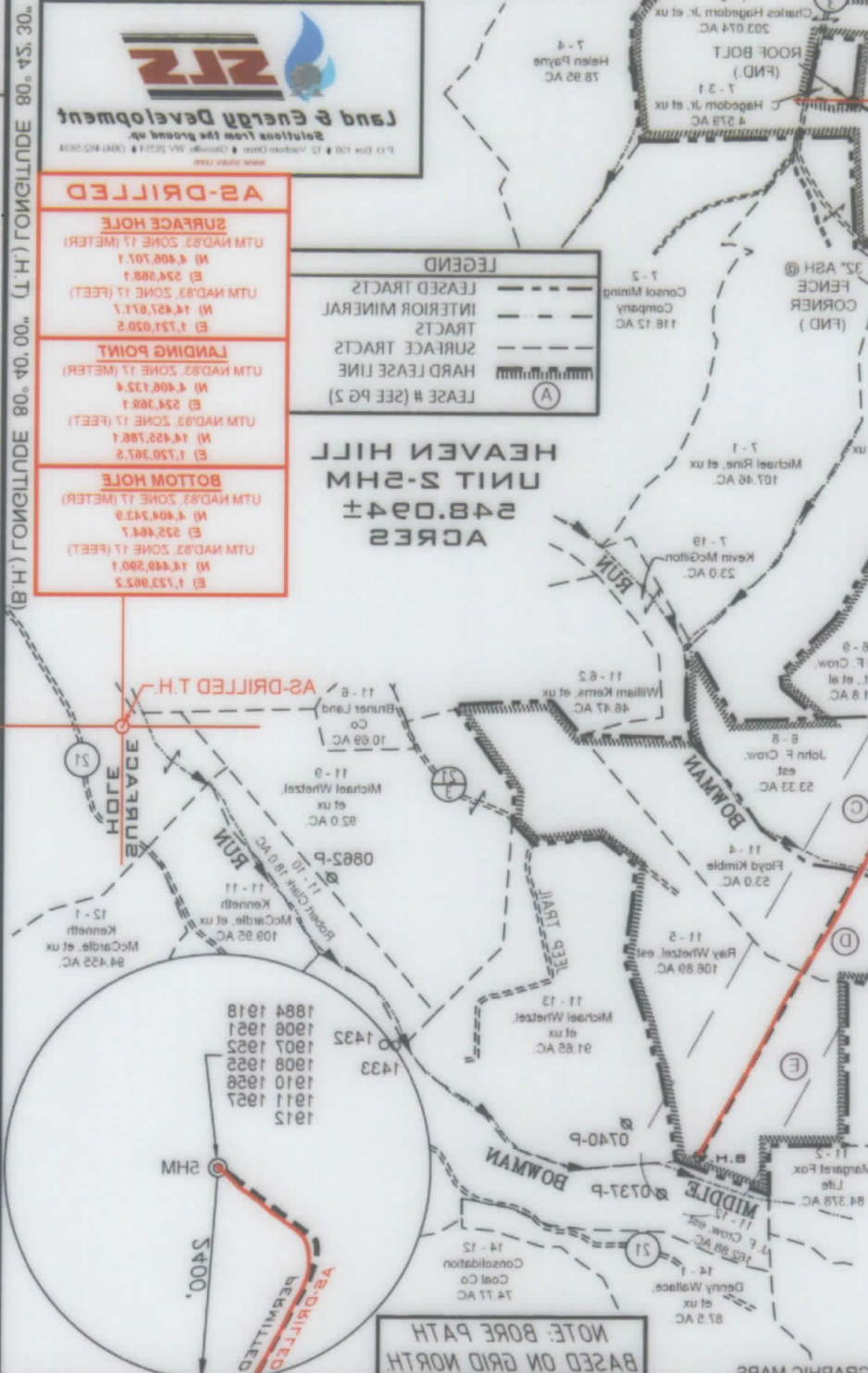
NOTES  
 1. BORE PATH BASED ON GRID NORTH  
 2. SURFACE OWNERSHIP WAS NOT ADDRESSED  
 3. AS-DRIILLED DATA PROVIDED BY TUG HILL OPERATING, LLC  
 4. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS  
 5. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN  
 6. ROYALTY OWNERSHIP PROVIDED BY TUG HILL OPERATING, LLC  
 7. LOCATION REFERENCES ARE BASED UPON DIFFERENTIAL GPS MEASUREMENTS  
 8. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017  
 9. FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND  
 10. NO WATER WELLS WITHIN 150' OF WELL WERE FOUND  
 11. BORE PATH BASED ON GRID NORTH

NOTE: BORE PATH BASED ON GRID NORTH

BASED ON GRID NORTH

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

AS-DRIILLED B.H. 1,358'



AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 8,233'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'



Land & Energy Development  
 Solutions from the Ground Up  
 P.O. Box 100 12, Yorktown, VA 22691  
 www.tho.com

AS-DRIILLED SURFACE HOLE  
 UTM NAD83, ZONE 17 (METERS)  
 (N) 4,406,707.1  
 (E) 524,088.1  
 UTM NAD83, ZONE 17 (FEET)  
 (N) 14,452,021.7  
 (E) 1,731,020.8

AS-DRIILLED LANDING POINT  
 UTM NAD83, ZONE 17 (METERS)  
 (N) 4,406,125.4  
 (E) 524,088.1  
 UTM NAD83, ZONE 17 (FEET)  
 (N) 14,452,788.1  
 (E) 1,730,982.5

AS-DRIILLED BOTTOM HOLE  
 UTM NAD83, ZONE 17 (METERS)  
 (N) 4,404,242.9  
 (E) 522,464.7  
 UTM NAD83, ZONE 17 (FEET)  
 (N) 14,448,200.1  
 (E) 1,733,902.3

HEAVEN HILL UNIT 2-SHM  
 248.094±  
 ACRES

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

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

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AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

AS-DRIILLED T.H. 1,358'

AS-DRIILLED B.H. 1,420'

PG 1 OF 2  
 GRID NORTH  
 TUG HILL OPERATING, LLC  
 1320 SOUTH UNIVERSITY DRIVE, SUITE 500  
 FORT WORTH TX, 76107



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

Lease No.	Tag	Parcel	Oil & Gas Royalty Owner	Deed Book	Deed Page
10*15505	A	9-7-3	RALPH E. WELLMAN	686	412
10*15521	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	722	281
10*15608	A	9-7-3	CHARLES R HAGEDORN JR	816	423
10*47051 123.1	A	9-7-3	VENANGO 21ST CENTURY ENERGY INC	888	618
10*47051 123.2	A	9-7-3	PATRIOT RESTORATIONS LLC	908	541
10*47051 123.3	A	9-7-3	TRIENERGY HOLDINGS, LLC	878	330
10*15510	B	9-6-9	ELAINE PHELPS ET VIR	718	326
10*15511	B	9-6-9	DAVID E CROW	718	376
10*15512	B	9-6-9	FRANCES COFFEY	718	328
10*15513	B	9-6-9	KAY KEYES	718	330
10*15514	B	9-6-9	L PAUL CROW	716	336
10*15515	B	9-6-9	DESIRE L CROW	718	334
10*15516	B	9-6-9	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	B	9-6-9	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	B	9-6-9	JOHN CROW	726	580
10*15520	B	9-6-9	TIMOTHY CROW	726	582
10*47051 123.1	B	9-6-9	LLOYD G BAKER	865	389
10*47051 123.2	B	9-6-9	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143
10*15510	C	9-6-8	ELAINE PHELPS ET VIR	718	326
10*15511	C	9-6-8	DAVID E CROW	718	376
10*15512	C	9-6-8	FRANCES COFFEY	718	328
10*15513	C	9-6-8	KAY KEYES	718	330
10*15514	C	9-6-8	L PAUL CROW	718	336
10*15515	C	9-6-8	DESIRE L CROW	718	334
10*15516	C	9-6-8	ROSE MARIE KIELGCZEWSKI	718	354
10*15517	C	9-6-8	DIANNE GELLNER & GARY GELLNER	718	345
10*15518	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	718	347
10*15519	C	9-6-8	JOHN CROW	726	580
10*15520	C	9-6-8	TIMOTHY CROW	726	582
10*15521	C	9-6-8	CYNTHIA GAY BURNS	782	114
10*15522	C	9-6-8	JOYCE HOPE JARMON	782	329
10*15523	C	9-6-8	FLOY CARLEEN CRADDOCK	782	348
10*15524	C	9-6-8	ANN MADISON	783	176
10*15530	C	9-6-8	JO ANN LITTLEFIELD	783	141
10*15531	C	9-6-8	FLOYDENE S GROVES	783	619
10*15532	C	9-6-8	ALTA BELL KAY	782	89
10*15533	C	9-6-8	LAURA L MORGAN	782	119
10*15534	C	9-6-8	WILLIAM RIAL DENMAN	782	109
10*15535	C	9-6-8	MERRIET E LEWIS	782	125
10*15536	C	9-6-8	JEFFIE HAMAR	792	213
10*15537	C	9-6-8	CHARLOTTE L LOWRY	783	208
10*15538	C	9-6-8	JAMIE C BOREN	797	331
10*15539	C	9-6-8	WILLIAM K HAVINS	800	144
10*15540	C	9-6-8	REBECCA BELL LEVESQUE	800	515
10*15541	C	9-6-8	CHARLOTTE PRICKETT	783	191
10*15542	C	9-6-8	WILLIAM H STURMAN	782	145
10*15543	C	9-6-8	CRAIG STURMAN	782	130
10*15544	C	9-6-8	JOHN FRANK STURMAN	782	135
10*15545	C	9-6-8	JANIE E STURMAN	782	140
10*47051 123.1	C	9-6-8	LLOYD G BAKER	865	389
10*47051 123.2	C	9-6-8	JAMES P HOLLIDAY AND JACQUELINE HOLLIDAY	873	143
10*16547	D	9-11-4	RHDK INVESTMENTS	907	550
10*15546	E	9-11-5	VICKIE MASON	686	239
10*15547	E	9-11-5	SHARON L WHETZAL	687	147
10*15548	E	9-11-5	MARY A SOUTH	690	615
10*15549	E	9-11-5	ROBERT L WHETZAL	690	559
10*15550	E	9-11-5	RAY A WHETZAL JR	693	571
10*15551	E	9-11-5	MARK L WHETZAL	693	576
10*47051 108.1	E	9-11-5	MICHAEL A WHETZEL	885	51
10*47051 108.5	E	9-11-5	BRENDA J WHETZEL	885	55

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