

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

API 47 - 051 - 01918 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 2-1HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 S. University Drive, Suite 215 City Ft. Worth State TX Zip 76107

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As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,406,722.35 Easting 524,579.55  
Landing Point of Curve Northing 4,407,042.2 Easting 524,906.4  
Bottom Hole Northing 4,404,684.3 Easting 526,255.1

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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

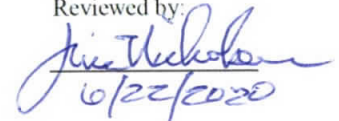
Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

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 5/5/2017 Date drilling commenced 6/25/2017 Date drilling ceased 7/28/2018  
Date completion activities began 9/24/2018 Date completion activities ceased 2/9/2019  
Verbal plugging (Y/N) n/a 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 974' - 980', 1064' - 1072' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
  
6/22/2020

API 47-051 - 01918 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-1HM

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	54.5#	N/A	Y
Surface	17.5"	13 3/8"	1,142'	NEW	54.5#	N/A	Y
Coal	17.5"	13 3/8"	1,142'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,842'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	16,480'	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)	Time (hrs)
Conductor	A		15.6	1.19		0	8
Surface	A	1052	15.6	1.20	1263	0	8
Coal	A	1052	15.6	1.19	1263	0	8
Intermediate 1	A	939	15.6	1.19	1127	0	8
Intermediate 2							
Intermediate 3							
Production	A	4168	14.5	1.17	4856	0	8
Tubing							

Drillers TD (ft) 16,510' 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 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 \_\_\_\_\_

API 47- 051 - 01918 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-1HM

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	<b>*see attached</b>				

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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 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)
			<b>*see attached</b>					

Please insert additional pages as applicable.

API 47- 051 - 01918 Farm name Charles R. Hagedorn, Jr., Et Ux Well number Heaven Hill 2-1HM

PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6,800'-6,887'	TVD 7,374'-16,510' 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 0 mcfpd Oil 0 bpd NGL \_\_\_\_\_ bpd Water 600 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
*see attached					

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Please insert additional pages as applicable.

Drilling Contractor Nabors Drilling USA  
Address 505 West Greens Road, Suite 100 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 Halliburton 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  Title Permitting Specialist - Appalachia Date 3/23/2020

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

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## Heaven Hill 2-1HM 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	16334	16383	12	Marcellus
2	9/28/2018	16095	16248	48	Marcellus
3	9/28/2018	15920	16073	48	Marcellus
4	9/29/2018	15745	15898	48	Marcellus
5	9/30/2018	15570	15723	48	Marcellus
6	10/1/2018	15395	15548	48	Marcellus
7	10/3/2018	15220	15373	48	Marcellus
8	10/4/2018	15045	15198	48	Marcellus
9	10/4/2018	14870	15023	48	Marcellus
10	10/5/2018	14695	14848	48	Marcellus
11	10/6/2018	14520	14673	48	Marcellus
12	10/7/2018	14345	14498	48	Marcellus
13	10/7/2018	14170	14323	48	Marcellus
14	10/8/2018	13995	14148	48	Marcellus
15	10/8/2018	13820	13973	48	Marcellus
16	10/9/2018	13645	13798	48	Marcellus
17	10/9/2018	13470	13623	48	Marcellus
18	10/10/2018	13295	13448	48	Marcellus
19	10/11/2018	13120	13273	48	Marcellus
20	10/11/2018	12945	13098	48	Marcellus
21	10/12/2018	12770	12923	48	Marcellus
22	10/12/2018	12595	12748	48	Marcellus
23	10/13/2018	12420	12573	48	Marcellus
24	10/13/2018	12245	12398	48	Marcellus
25	10/14/2018	12070	12223	48	Marcellus
26	10/14/2018	11895	12048	48	Marcellus
27	10/15/2018	11720	11873	48	Marcellus
28	10/15/2018	11545	11698	48	Marcellus
29	10/16/2018	11370	11523	48	Marcellus
30	10/17/2018	11195	11348	48	Marcellus
31	10/17/2018	11020	11173	48	Marcellus
32	10/18/2018	10845	10998	48	Marcellus
33	10/19/2018	10670	10823	48	Marcellus
34	10/19/2018	10495	10648	48	Marcellus
35	10/20/2018	10320	10473	48	Marcellus
36	10/21/2018	10145	10298	48	Marcellus
37	10/21/2018	9970	10123	48	Marcellus
38	10/22/2018	9795	9948	48	Marcellus
39	10/22/2018	9620	9773	48	Marcellus
40	10/23/2018	9445	9598	48	Marcellus
41	10/24/2018	9270	9423	48	Marcellus

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
42	10/25/2018	9095	9248	48	Marcellus
43	10/25/2018	8920	9073	48	Marcellus
44	10/26/2018	8745	8898	48	Marcellus
45	10/26/2018	8570	8723	48	Marcellus
46	10/27/2018	8395	8548	48	Marcellus
47	10/28/2018	8220	8373	48	Marcellus
48	10/28/2018	8045	8198	48	Marcellus
49	10/29/2018	7870	8023	48	Marcellus
50	10/29/2018	7695	7848	48	Marcellus
51	10/29/2018	7520	7673	48	Marcellus

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Heaven Hill 2-1HM

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	44.1	8199	N/A	5779	9860	2198	0
2	86.1	8178	5463	4570	422405	7197	0
3	80.8	7714	5139	4771	429495	7330	0
4	80.2	7746	5363	4871	433310	7846	0
5	70.2	8535	5486	9183	421940	6913	0
6	2.9	8130	N/A	8737	0	422	0
7	80.7	7325	5127	4780	434420	7426	0
8	80.6	7530	5573	4730	431978	7212	0
9	80.6	7886	5924	4868	435590	7425	0
10	79.5	7855	5228	4353	436620	7753	0
11	80.5	7680	5332	4749	431410	7483	0
12	80.6	7207	5365	4991	442860	9082	0
13	80.8	7344	5575	4781	438570	7505	0
14	80.6	7376	5440	4965	441480	7364	0
15	80.8	7397	5184	4954	442830	7362	0
16	80.8	7570	5240	4553	437690	7366	0
17	80.7	7183	5660	4478	438330	7377	0
18	80.5	7105	5464	4722	440320	7723	0
19	80.7	6993	4896	4863	432700	7390	0
20	80.8	7046	5669	4830	438950	7179	0
21	81	6937	5412	4682	442460	7417	0
22	80.6	7139	5391	4204	438040	7495	0
23	80.1	6688	5874	4839	441560	7498	0
24	80.7	6856	5350	4940	435980	7289	0
25	80.2	6658	5120	4839	432070	7316	0
26	80.7	7051	5269	4309	434380	7733	0
27	80.3	6705	5542	4927	434290	7336	0
28	80.5	6905	5575	4760	406980	6763	0
29	80.5	6595	5298	4883	444490	7416	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	80.8	6763	5491	4888	444730	7583	0
31	80.1	6743	5596	4945	440690	7470	0
32	80.5	6665	5380	5110	443910	8807	0
33	80	6817	5547	5046	440090	7473	0
34	80.7	6849	5411	5169	436830	8124	0
35	80.3	6828	5823	5229	440560	9101	0
36	78.5	7367	5655	4028	439150	8154	0
37	79.8	6871	6169	4623	440060	7424	0
38	80.7	6834	5562	4613	437080	8648	0
39	85.5	6909	5697	4980	439700	7260	0
40	88.4	7132	5577	4533	440090	7693	0
41	88.7	6991	6186	5175	437110	7071	0
42	89.3	7136	5355	4786	437540	174	0
43	89.5	7032	5704	5276	441430	7291	0
44	89.2	7002	5753	5108	436940	7156	0
45	89.8	7159	5930	4697	311360	5825	0
46	89.7	6872	5525	4848	438780	7223	0
47	87.2	7228	6012	4868	437350	7266	0
48	89.6	6934	6400	5057	440060	7147	0
49	89.8	6740	5911	5105	440700	7307	0
50	89.2	6790	5829	5053	439070	7295	0
51	89.7	6862	5932	4953	436750	7079	0

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HEAVEN HILL 2-1HM

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	1896	2068	1898	2071	Sandstone
Big Lime	2068	2200	2071	2203	Limestone
Big Injun	2200	2494	2203	2499	Sandstone
Weir	2494	2692	2499	2697	Sandstone
Berea	2692	2954	2697	2960	Sandstone
Gordon	2954	3039	2960	3045	Sandstone
Fifty Foot	3039	3621	3045	3651	Sandstone
Speechley	3621	5131	3651	5359	Sandstone
Benson	5131	5454	5359	5724	Sandstone
Alexander	5454	6076	5724	6416	Siltstone
Rhinestreet	6076	6591	6416	7003	Black shale
Middlesex	6591	6677	7003	7124	Black shale
Geneseo/Burkett	6677	6688	7124	7142	Black shale
Tully	6688	6722	7142	7199	Limestone
Hamilton	6722	6800	7199	7374	Grey shale
Marcellus	6800	-	7374	-	Black shale

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**Well:** Heaven Hill 2-01 HM (slot B)  
**Site:** Heaven Hill 2  
**Project:** Marshall County, West Virginia  
**Design:** rev10

**SECTION DETAILS**

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	6017.00	26.64	16.41	5714.11	1314.28	432.55	0.00	0.00	-921.92	Survey @ 6017.00 MD 5714.11 TVD
2	6125.00	26.64	16.41	5910.64	1263.73	446.23	0.00	0.00	-955.31	Proj
3	6352.00	26.64	16.41	6013.54	1458.57	474.98	0.00	0.00	-1025.49	KOP Begin 8'100' build/tum
4	7027.07	39.75	126.00	6617.23	1478.07	708.80	8.00	131.68	-925.64	Begin 10'100' build/tum
5	7357.76	89.00	150.00	6843.37	1120.94	1001.35	10.00	30.48	-470.09	Begin 89.00° lateral
6	16568.78	89.00	150.00	7000.86	-6682.32	5506.19	0.00	0.00	8540.16	PBHL/TD 16568.78 MD/7000.86 TVD

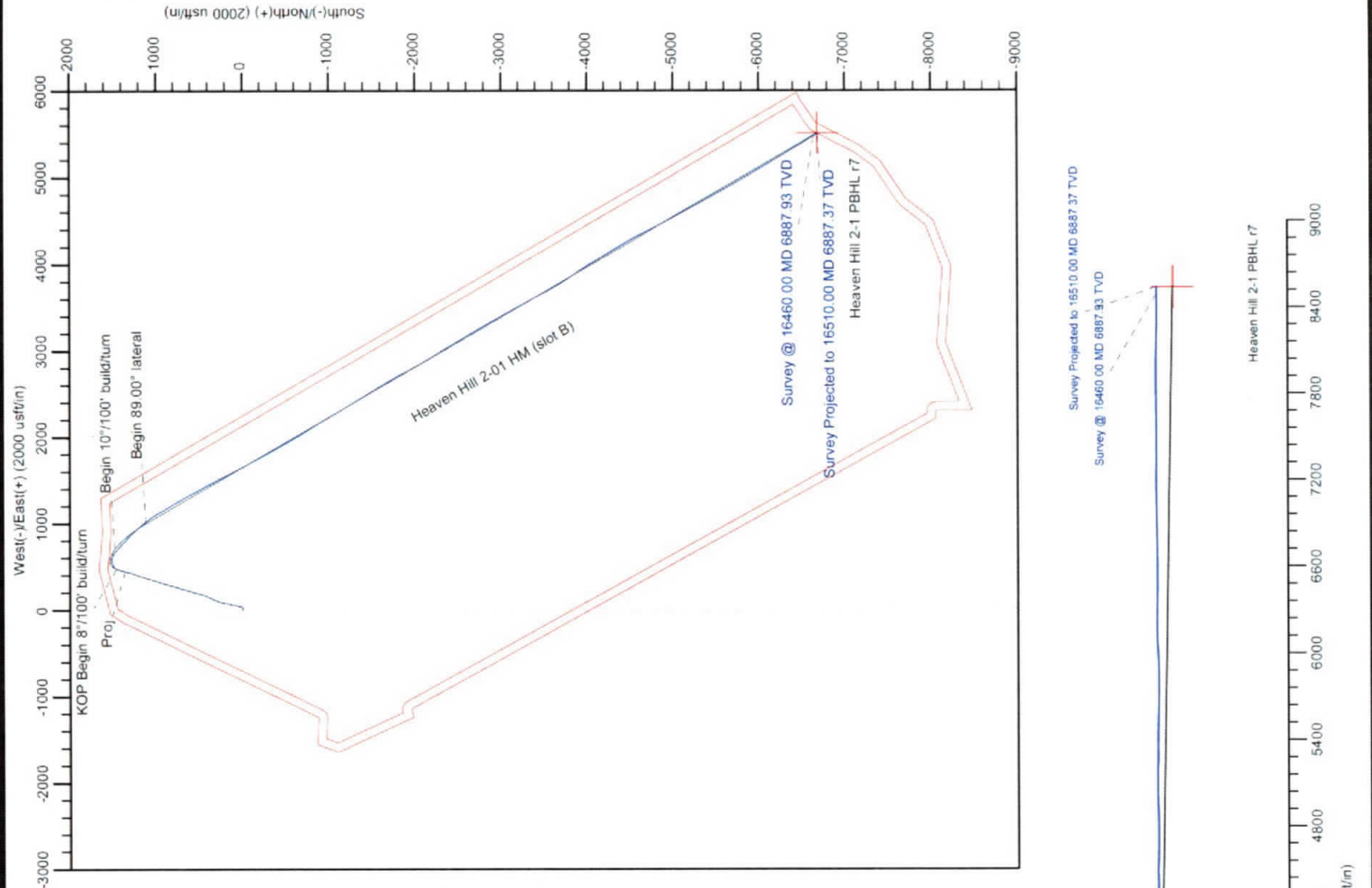
**ANNOTATIONS**

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Annotation
100.00	0.80	110.62	100.00	-0.25	0.65	0.54	Gyro
16460.00	90.64	148.68	6887.93	-6643.86	5471.34	8489.42	Survey @ 16460.00 MD 6887.93 TVD
16510.00	90.64	148.68	6887.37	-6686.57	5497.33	8539.40	Survey Projected to 16510.00 MD 6887.37 TVD

Surface Location: RKB=1331+33 @ 1364.00ust (Nabors X08)  
 Universal Transverse Mercator (US Survey Feet)  
 Zone 17N (64 W to 78 W)  
 Northing 1721058.07  
 Easting 39 81012150 -80 71284140  
 Longitude  
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Subtract 8.91°



Azinuths to Grid North  
 True North: -0.18°  
 Magnetic North: -8.91°  
 Magnetic Field Strength: 52056.8nT  
 Dip Angle: 66.88°  
 Date: 7/19/2018  
 Model: IGRF2015



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Vertical Section at 150.00° (1200 usft/m)

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/27/2018
Job End Date:	10/29/2018
State:	West Virginia
County:	Marshall
API Number:	47-051-01918-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Heaven Hill Unit 2-1HM
Latitude:	39.81012153
Longitude:	-80.71284140
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,899
Total Base Water Volume (gal):	15,945,159
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	86.06380	Density = 8.340
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.14368	

OILPERM A	Halliburton	Non-ionic Surfactant												
MC MX 2-2822	Halliburton	Scale Inhibitor							Listed Below					
FDP-S1296-17	Halliburton	Additive							Listed Below					
SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant							Listed Below					
HYDROCHLORIC ACID	Halliburton	Solvent							Listed Below					
MX 5-2402	Halliburton	Biocide							Listed Below					
SAND-COMMON WHITE-30/50, BULK	Halliburton	Proppant							Listed Below					
MX 8-4543	Halliburton	Biocide							Listed Below					

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LD-2850	Halliburton	Friction Reducer							
					Listed Below				
SAND-COMMON WHITE - 100 MESH, 3307 LB BAG	Halliburton	Proppant							
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	13.68074			
			Sodium chloride	7647-14-5	30.00000	0.02171			
			Sodium Nitrate	7631-99-4	60.00000	0.02113			
			Hydrotreated light Petroleum Distillate	64742-47-8	30.00000	0.02058			
			Hydrochloric acid	7647-01-0	7.50000	0.00945			
			Methanol	67-56-1	100.00000	0.00726			
			Amines, polyethylenepoly-, ethoxylated, phosphonomethylated, sodium salts	70900-16-2	30.00000	0.00678			
			9-Octadecenamide	93-83-4	5.00000	0.00343			
			Alcohols C12-16	68551-12-2	5.00000	0.00343			
			Ammonium Chloride	12125-02-9	5.00000	0.00343			
			Contains no hazardous substances	CAS Not Assigned	100.00000	0.00245			
			Ethanol	64-17-5	60.00000	0.00030			
			Oxyalkylated phenolic resin	Proprietary	30.00000	0.00020			
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00015			
			Modified Thiourea Polymer	Proprietary	30.00000	0.00014			
			Naphthalene	91-20-3	5.00000	0.00003			

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			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)- omega-hydroxy-, branched	127087-87-0	5.00000	0.00003	
			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	0.00001	

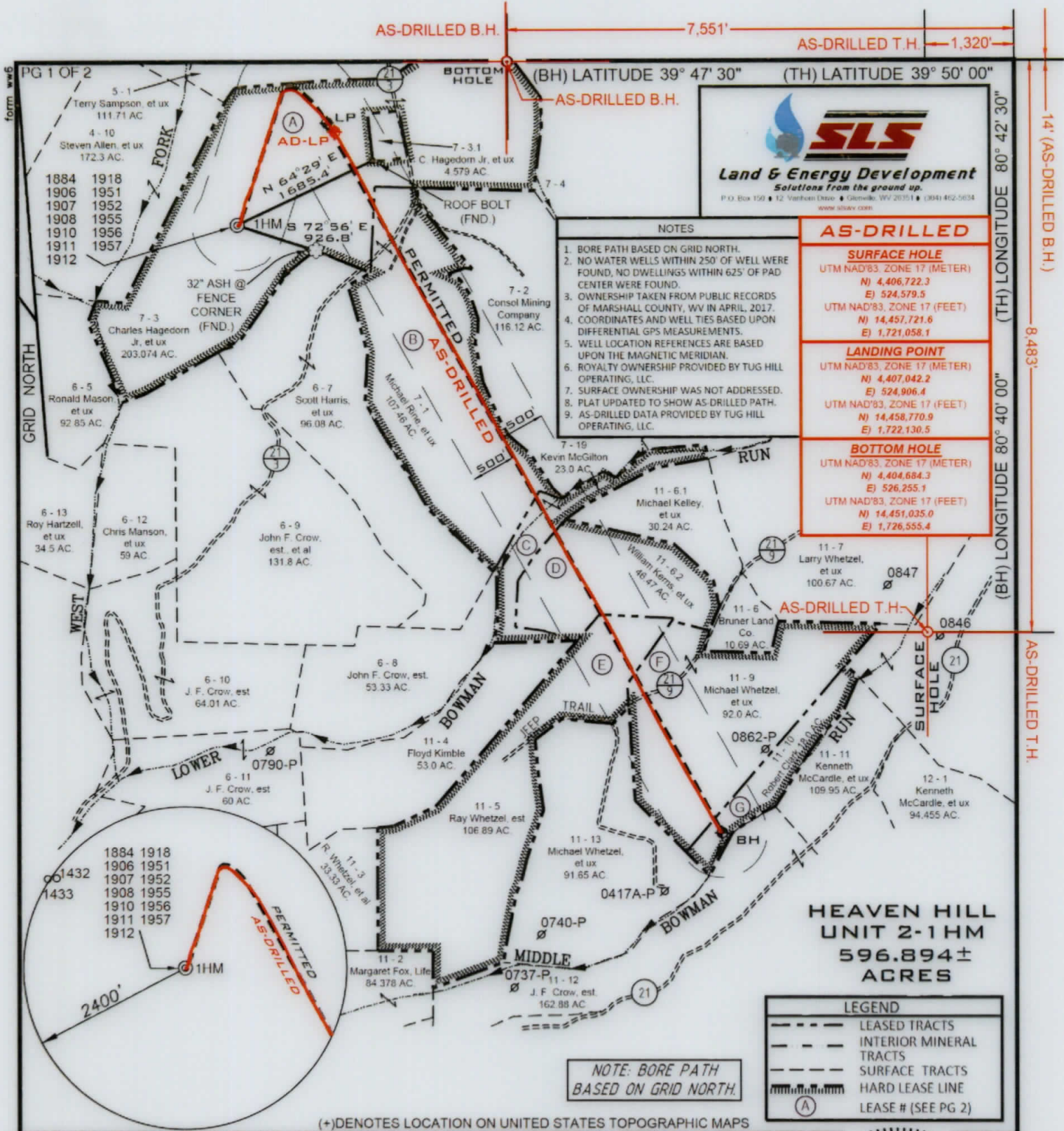
\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

\*\* 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\_1HM\_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 2-1HM As-Drilled

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL   
 (IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW   
 LOCATION ELEVATION 1331' WATERSHED (HUC 10) FISH CREEK  
 API WELL NO. 47-051-01918  
 STATE COUNTY PERMIT

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 596.894  
 PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,879' TMD:16,510'  
 PLUG & ABANDON  CLEAN OUT & REPLUG

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

14' (AS-DRILLED B.H.)  
 8,483'  
 COUNTY NAME  
 PERMIT

WELL OPERATOR TUG HILL OPERATING, LLC  
 DESIGNATED AGENT CT CORPORATION SYSTEM  
 DIANNA STAMPER  
 ESTIMATED DEPTH TVD 6,879', TMD: 16,210'  
 CLEAN OUT & REPLUG  
 PERMIT

ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 200  
 FORT WORTH, TX 76107  
 ADDRESS 5400 D BIG TYLER ROAD  
 CHARLESTON, WV 25213

TARGET FORMATION MARCELLUS  
 PROPOSED WORK DRILL  CONVERT  DRILL DEEPER  REBRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION

OIL & GAS ROYALTY OWNER CHARLES R. HAGEDORN, JR., ET AL  
 LEASE ACRES 506.894  
 SURFACE OWNER CHARLES R. HAGEDORN, JR., ET UX  
 ACRES 203.074

QUADRANGLE GLEN EASTON 7S, 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. 47-051-01918  
 OPERATORS WELL NO. Heaven Hill Unit 2-1HM As-Drilled  
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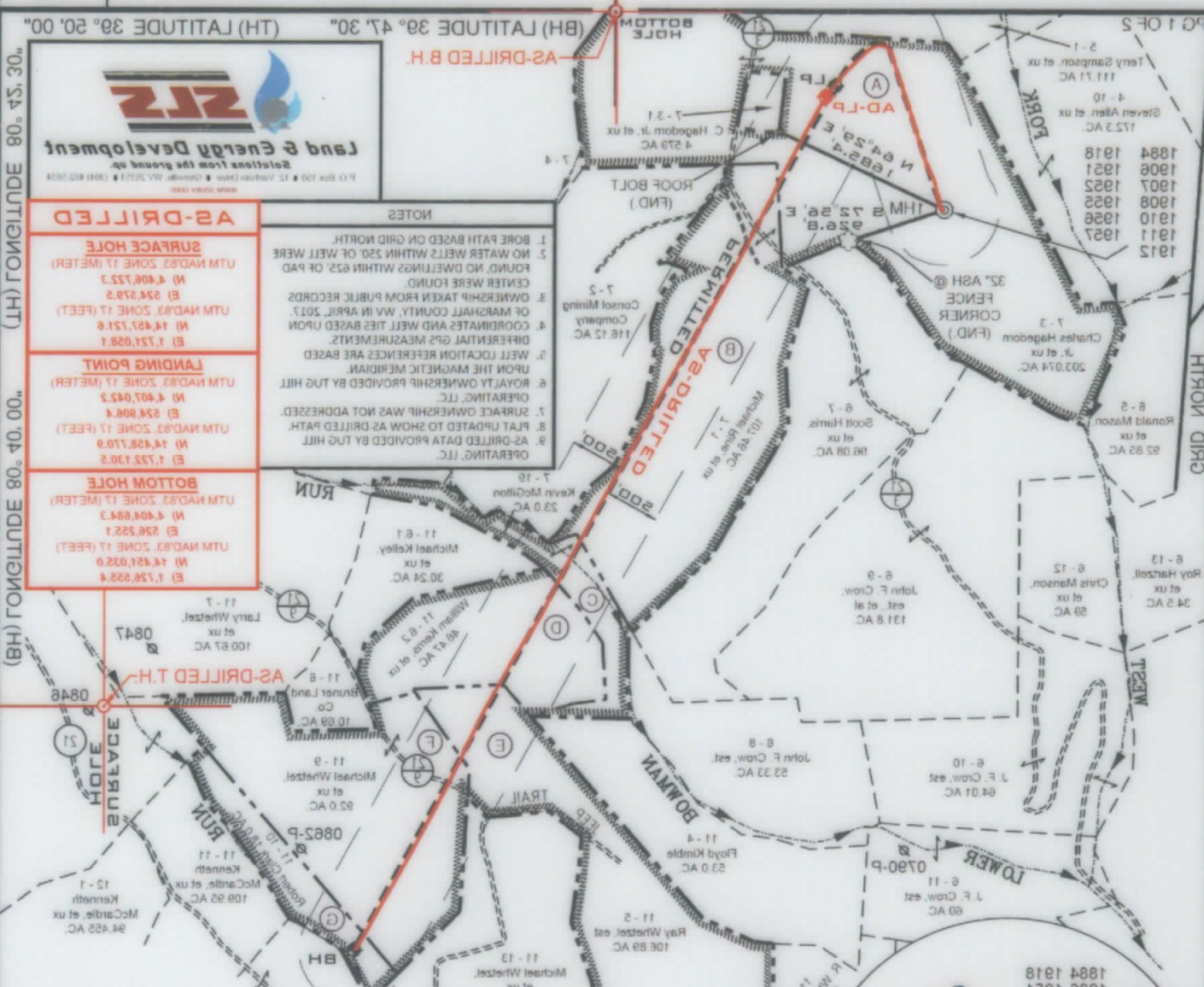
CHARTERED SURVEYOR  
 PROFESSIONAL SURVEYOR  
 WEST VIRGINIA  
 STATE OF  
 No. 849  
 C. Victor Morgan  
 P.S. 849

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

GRADE GPS  
 SUBMITTER MAPPING  
 PROVEN SOURCE  
 OF ACCURACY 1/2500  
 MINIMUM DEGREE  
 SCALE 1" = 1500'  
 DRAWING NUMBER HHU2\_WP\_1HM\_Rev1  
 FILE NUMBER 163-697

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

ACRES  
 226.84 ±  
 UNIT 2-1HM  
 HEAVEN HILL



**AS-DRILLED**  
**BOTTOM HOLE**  
 UTM NAD83 ZONE 17 (FEET)  
 (E) 1,720,224.4  
 (N) 14,421,032.0  
 (E) 526,522.1  
 (N) 4,404,684.3

**AS-DRILLED**  
**SURFACE HOLE**  
 UTM NAD83 ZONE 17 (FEET)  
 (E) 1,721,028.1  
 (N) 14,427,721.6  
 (E) 524,808.4  
 (N) 4,407,042.2

**AS-DRILLED**  
**LANDING POINT**  
 UTM NAD83 ZONE 17 (FEET)  
 (E) 1,721,028.1  
 (N) 14,427,721.6  
 (E) 524,808.4  
 (N) 4,407,042.2

SOLUTIONS FROM THE GROUND UP  
 Land & Energy Development  
 141' (AS-DRILLED B.H.)  
 8'483'  
 (HT) LONGITUDE 80.40.00"  
 (BH) LONGITUDE 80.45.30"  
 (TH) LATITUDE 39.50.00"  
 (BH) LATITUDE 39.47.30"  
 AS-DRILLED B.H. 7.521'  
 AS-DRILLED T.H. 1.330'



HEAVEN HILL UNIT 2-1HM  
WELL PLAT LEASE INFORMATION

Lease No.	Tag	Parcel	Oil & Gas Royalty Owner	Deed	
				Book/Pg	
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*15665	B	9-7-1	MICHAEL J RINE ET UX	668	147
10*15667	C	9-7-19	KEVIN E MCGILTON ET UX	850	351
10*15560	D	9-11-6.2	WILLIAM F KERNS ET UX	677	561
10*15669	D	9-11-6.2	EMMA ANDERSON	861	586
10*15670	D	9-11-6.2	GARY M BONAR	861	577
10*15671	D	9-11-6.2	JUDALENE K COLLUMS	861	571
10*15672	D	9-11-6.2	NAOMI HUPP	861	604
10*47051.256.2	D	9-11-6.2	CAROL JEAN ANDERSON	879	299
10*47051.256.3	D	9-11-6.2	BRENDA S DYKHOUSE	881	148
10*47051.256.4	D	9-11-6.2	GLEN A BONAR	881	151
10*47051.256.5	D	9-11-6.2	JERRY W ZIEN AND KATHLEEN E ZIEN	882	530
10*15560	D	9-11-6.2	WILLIAM F KERNS ET UX	677	561
10*15669	D	9-11-6.2	EMMA ANDERSON	861	586
10*15670	D	9-11-6.2	GARY M BONAR	861	577
10*15671	D	9-11-6.2	JUDALENE K COLLUMS	861	571
10*15672	D	9-11-6.2	NAOMI HUPP	861	604
10*47051.256.2	D	9-11-6.2	CAROL JEAN ANDERSON	879	299
10*47051.256.3	D	9-11-6.2	BRENDA S DYKHOUSE	881	148
10*47051.256.4	D	9-11-6.2	GLEN A BONAR	881	151
10*47051.256.5	D	9-11-6.2	JERRY W ZIEN AND KATHLEEN E ZIEN	882	530
10*15584	E	9-11-5	VICKIE MASON	686	239
10*15585	E	9-11-5	SHARON L WHETZEL	687	147
10*15586	E	9-11-5	MARY A SOUTH	690	615
10*15587	E	9-11-5	ROBERT L WHETZEL	690	559
10*15588	E	9-11-5	RAY A WHETZEL JR	693	571
10*15589	E	9-11-5	MARK L WHETZEL	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
10*47051.108.1	F	9-11-9	MICHAEL A WHETZEL	885	51
10*15582	G	9-11-10	ROBERT L CLARK	685	239

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