

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

API 47 - 051 - 01945 County Marshall District Meade  
Quad Glen Easton 7.5' Pad Name Ten High Field/Pool Name \_\_\_\_\_  
Farm name Lawrence & Shirley Conkle, ests. Well Number Ten High 1N-4HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 S. University Drive, Suite 500 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 4,406,363.91 Easting 527,305.49  
Landing Point of Curve Northing 4,406,666.4 Easting 527,495.6  
Bottom Hole Northing 4,409,480.5 Easting 525,872.0

Elevation (ft) 1310' 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 9/18/2017 Date drilling commenced 9/13/2018 Date drilling ceased 11/17/2018  
Date completion activities began 12/15/2018 Date completion activities ceased 2/9/2019  
Verbal plugging (Y/N) n Date permission granted n/a Granted by n/a RECEIVED Office of Oil and Gas

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

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Freshwater depth(s) ft 70' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1595' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft Sewickely Coal - 968-974' and Pittsburgh Coal - 1053-1058 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by: Jim Thelbore  
6/23/2020

API 47-051 - 01945 Farm name Lawrence & Shirley Conkle, ests. Well number Ten High 1N-4HM

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"	1,140'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	1,140'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,906'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	18,268'	NEW	20#	N/A	Y
Tubing		2 3/8"	9,134'	NEW	4.7#	N/A	
Packer type and depth set							

Comment Details

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	1169	15.6	1.19	1403	0	8
Coal	A	1169	15.6	1.19	1403	0	8
Intermediate 1	A	954	15.6	1.19	1297	0	8
Intermediate 2							
Intermediate 3							
Production	A	4479	14.5	1.17	5012	0	8
Tubing							

Drillers TD (ft) 18,297' Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated Marcellus Plug back to (ft) n/a  
 Plug back procedure n/a

Kick off depth (ft) 6,167'

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.

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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 - 01945 Farm name Lawrence & Shirley Conkle, ests. Well number Ten High 1N-4HM

**PERFORATION RECORD**

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

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)
	*attached							

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Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS	
Marcellus	6906' - 6682'	TVD 7507' - 18297' 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 0 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		
*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

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

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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 [Signature] Title Permitting Specialist Date 3-23-2020

TEN HIGH 1N-4HM

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	2035	2207	2036	2208	Sandstone
Big Lime	2207	2338	2208	2339	Limestone
Big Injun	2338	2633	2339	2634	Sandstone
Weir	2633	2831	2634	2833	Sandstone
Berea	2831	3093	2833	3095	Sandstone
Gordon	3093	3178	3095	3180	Sandstone
Fifty Foot	3178	3760	3180	3762	Sandstone
Speechley	3760	5221	3762	5256	Sandstone
Benson	5221	5593	5256	5673	Sandstone
Alexander	5593	6215	5673	6373	Siltstone
Rhonestreet	6215	6681	6373	6943	Black shale
Middlesex	6681	6756	6943	7051	Black shale
Geneseo/Burkett	6756	6780	7051	7093	Black shale
Tully	6780	6807	7093	7142	Limestone
Hamilton	6807	6884	7142	7357	Grey shale
Marcellus	6884	-	7357	-	Black shale

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**Ten High 1N-4HM  
PEFORATION RECORD**

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Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s) WV Department of Environmental Protection
1	1/15/2019	18,122	18172	2	Marcellus
2	1/15/2019	17,895	18040	48	Marcellus
3	1/15/2019	17,721	17866	48	Marcellus
4	1/16/2019	17,547	17692	48	Marcellus
5	1/16/2019	17,373	17518	48	Marcellus
6	1/17/2019	17,199	17344	48	Marcellus
7	1/18/2019	17,025	17170	48	Marcellus
8	1/18/2019	16,851	16996	48	Marcellus
9	1/20/2019	16,677	16822	48	Marcellus
10	1/21/2019	16,503	16648	48	Marcellus
11	1/21/2019	16,329	16474	48	Marcellus
12	1/22/2019	16,155	16300	48	Marcellus
13	1/22/2019	15,981	16126	48	Marcellus
14	1/23/2019	15,807	15952	48	Marcellus
15	1/23/2019	15,633	15778	48	Marcellus
16	1/23/2019	15,459	15604	48	Marcellus
17	1/24/2019	15,285	15430	48	Marcellus
18	1/25/2019	15,111	15256	48	Marcellus
19	1/25/2019	14,937	15082	48	Marcellus
20	1/26/2019	14,763	14908	48	Marcellus
21	1/26/2019	14,589	14734	48	Marcellus
22	1/27/2019	14,415	14560	48	Marcellus
23	1/27/2019	14,241	14386	48	Marcellus
24	1/28/2019	14,067	14212	48	Marcellus
25	1/28/2019	13,893	14038	48	Marcellus
26	1/29/2019	13,719	13864	48	Marcellus
27	1/30/2019	13,545	13690	48	Marcellus
28	1/30/2019	13,371	13516	48	Marcellus
29	1/30/2019	13,197	13342	48	Marcellus
30	1/31/2019	13,023	13168	48	Marcellus
31	2/1/2019	12,849	12994	48	Marcellus
32	2/1/2019	12,675	12820	48	Marcellus
33	2/1/2019	12,501	12646	48	Marcellus
34	2/2/2019	12,327	12472	48	Marcellus
35	2/2/2019	12,153	12298	48	Marcellus
36	2/2/2019	11,979	12124	48	Marcellus
37	2/3/2019	11,805	11950	48	Marcellus
38	2/3/2019	11,631	11776	48	Marcellus
39	2/4/2019	11,457	11602	48	Marcellus
40	2/5/2019	11,283	11428	48	Marcellus
41	2/6/2019	11,109	11254	48	Marcellus
42	2/6/2019	10,935	11080	48	Marcellus
43	2/6/2019	10,761	10906	48	Marcellus
44	2/7/2019	10,587	10732	48	Marcellus
45	2/7/2019	10,413	10558	48	Marcellus
46	2/8/2019	10,239	10384	48	Marcellus

47	2/9/2019	10,065	10210	48	Marcellus
48	2/9/2019	9,891	10036	48	Marcellus
49	2/10/2019	9,717	9862	48	Marcellus
50	2/10/2019	9,543	9688	48	Marcellus
51	2/10/2019	9,369	9514	48	Marcellus
52	2/11/2019	9,195	9340	48	Marcellus
53	2/11/2019	9,021	9166	48	Marcellus
54	2/11/2019	8,847	8992	48	Marcellus
55	2/11/2019	8,673	8818	48	Marcellus
56	2/12/2019	8,499	8644	48	Marcellus
57	2/12/2019	8,325	8470	48	Marcellus
58	2/13/2019	8,151	8296	48	Marcellus
59	2/14/2019	7,977	8122	48	Marcellus
60	2/14/2019	7,803	7948	48	Marcellus
61	2/14/2019	7,629	7774	48	Marcellus
62	2/15/2019	7,455	7600	48	Marcellus

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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	78.9	7587	8132	3353	299350	8281	0
2	83.8	7600	5634	3723	406645	10004	0
3	83.2	7626	5598	3579	440780	10391	0
4	81.1	7827	5605	3284	442120	8628	0
5	81.3	7877	6051	3864	438040	8617	0
6	82.6	7654	5881	3608	441540	9154	0
7	86.5	7945	6144	3671	439740	6920	0
8	81.4	7749	5789	3874	445020	8169	0
9	76.8	7801	5731	3840	434300	7916	0
10	78	7875	5639	3643	441440	9589	0
11	80.5	7846	5824	3897	361520	7503	0
12	82	7645	5289	3834	440860	7821	0
13	82.1	8017	5730	3371	433700	8173	0
14	82.6	7784	5597	3049	397520	7729	0
15	85	8039	5764	3849	437660	7917	0
16	79.2	7908	5827	3281	445040	9234	0
17	85.9	8086	6022	3821	440800	8214	0
18	83.3	7747	6009	3896	442300	8171	0
19	79.2	7933	5679	3670	440760	8452	0
20	84.1	7862	6024	4053	435600	8827	0
21	85	7970	5675	3878	438180	8238	0
22	81.9	7865	5903	4365	434320	8120	0
23	84.5	7910	5645	4069	437080	7326	0
24	85.1	7938	5844	4185	443100	7722	0
25	85	7791	5941	3966	441380	7863	0
26	84.1	7618	5516	3374	438570	8160	0
27	82.8	7701	5869	3322	440440	8017	0
28	84.7	7842	5432	3907	438040	8068	0
29	80.2	7407	5392	4960	435860	8038	0
30	80.1	7281	5598	4686	439840	7768	0
31	80.1	7488	5713	5027	433330	7601	0
32	79	7518	5630	4535	440780	9474	0
33	80	7362	5973	5003	435830	8364	0

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34	79.9	7228	5785	4185	447190	10143	0
35	79.7	7401	5932	4103	439520	7480	0
36	79	7414	6282	4326	443260	7523	0
37	80.2	7239	7432	5154	441860	8752	0
38	75.8	7452	6028	4992	439620	9248	0
39	80	7367	5981	5122	440440	8141	0
40	80.5	7455	6019	5234	437100	7648	0
41	80.3	7448	5691	5269	441180	8903	0
42	78.9	7506	5917	5051	441340	8257	0
43	77	7424	5846	5076	440120	10785	0
44	80.7	7350	5803	5116	442740	7663	0
45	77.6	7165	5982	5100	443420	7707	0
46	78.3	7356	5906	5296	441520	7784	0
47	80.4	7304	5658	5336	437380	7601	0
48	80.1	7330	5896	5211	399420	7110	0
49	80.1	7385	5862	5022	441020	8492	0
50	79.9	7257	5908	4953	438500	7483	0
51	80.3	7374	5934	4937	439440	7640	0
52	80.3	7323	5890	4969	440280	7729	0
53	80.2	7280	5971	5056	441880	7500	0
54	80.8	7182	5987	5128	440340	7576	0
55	80.8	7448	5951	5055	437800	7691	0
56	80.7	7344	5846	5052	441860	7424	0
57	80.1	7265	5444	5166	436620	7152	0
58	80.1	7307	5584	5239	436700	7238	0
59	80.5	7197	5737	5133	439060	7559	0
60	79.9	7168	6120	4927	434600	7251	0
61	80.3	7339	6241	4793	438040	7479	0
62	81.2	7067	5733	4638	437140	7504	0

**Well: Ten High 1N-04HM (A)**  
**Site: Ten High**  
**Project: Marshall County, West Virginia.**  
**Design: rev10**  
**Rig: Nabors X08**

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V-Sect	Annotation
1	6096.00	27.79	88.93	5966.96	59.39	696.59	0.00	0.00	-232.05	Survey @ 6096.00 MD 5966.96 TVD
2	6280.29	27.79	88.93	6130.00	60.99	772.50	0.00	0.00	-266.39	KOP Begin 8°/100' drop/turm
3	6301.66	26.39	86.70	6149.28	61.36	782.35	8.00	-145.18	-270.15	Begin 26.39° tangent
4	6332.09	26.39	86.70	6176.28	62.13	795.72	0.00	0.00	-275.02	Begin 8°/100' drop build/turm
5	7037.97	50.00	352.75	6768.02	364.22	929.17	8.00	-113.54	-56.00	Begin 10°/100' build/turm
6	7497.66	91.00	329.98	6920.00	759.29	784.12	10.00	-32.56	363.59	Begin 91.00° lateral
7	18439.90	91.00	329.98	6729.46	10232.34	-4689.24	0.00	0.00	1255.65	PBHL/TD 18439.90 MD/6729.46 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V-Sect	Annotation
183.00	1.07	143.54	182.99	-1.37	1.02	-1.67	MWD surveys
18237.00	93.76	330.40	6685.54	10172.84	-4673.32	11194.93	Survey @ 18237.00 MD 6685.57 TVD
18297.00	93.76	330.40	6681.60	10224.90	-4702.90	11254.58	Survey Projected to 18297.00 MD 6681.63 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)

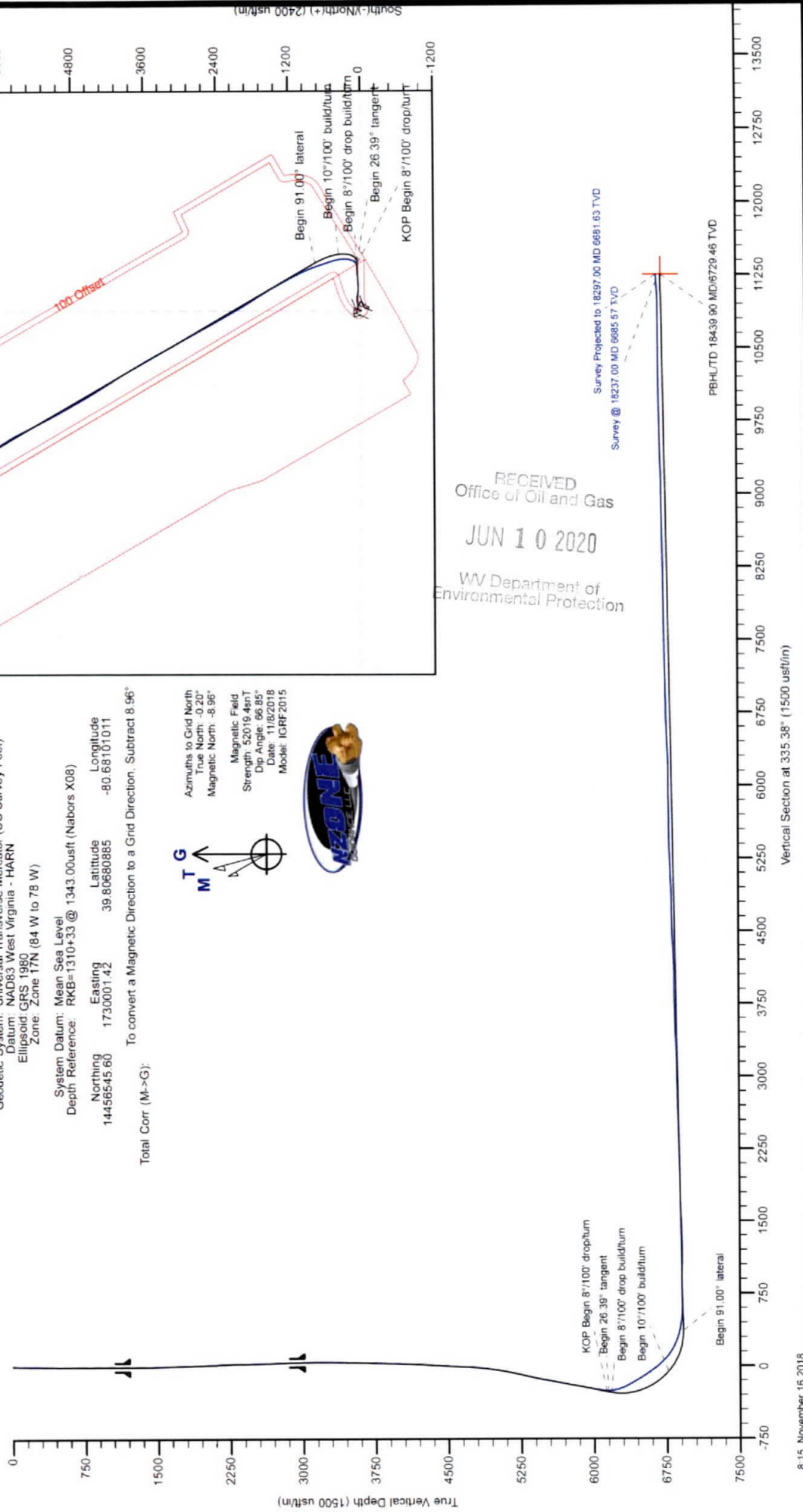
System Datum: Mean Sea Level  
 Depth Reference: RKB=1310+33 @ 1343.00usft (Nabors X08)

Northing 14456545.60 Easting 1730001.42  
 Latitude 39.80680885 Longitude -80.68101011

Total Corr. (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.96°



Azimuths to Grid North  
 True North: -0.20°  
 Magnetic North: -8.96°  
 Magnetic Field  
 Strength: 52019.4nT  
 Dip Angle: 96.85°  
 Date: 11/6/2018  
 Model: IGRF2015



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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	12/14/2018
Job End Date:	2/18/2019
State:	West Virginia
County:	Marshall
API Number:	47-051-01945-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Ten High 1N-4HM
Latitude:	39.80680885
Longitude:	-80.68101011
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,913
Total Base Water Volume (gal):	21,931,496
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	86.98345	Density = 8.330
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.12421	

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SAND-COMMON WHITE-100 MESH, SSA-2, 100 LB SACK (100002158)	Halliburton	Proppant		Listed Below					
CALCIUM CHLORIDE - FLAKE	Halliburton	Additive							
FDP-S1296-17	Halliburton	Corrosion Inhibitor		Listed Below					
LD-2850	Multi-Chem	Friction Reducer							
OILPERM A	Halliburton	Non-ionic Surfactant		Listed Below					
SAND- PREMIUM WHITE-40/70, BULK	Halliburton	Proppant		Listed Below					
HYDROCHLORI C ACID	Halliburton	Solvent		Listed Below					
LD-2115	Multi-Chem	Friction Reducer		Listed Below					

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Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.						
			Listed Below			
		Crystalline silica, quartz	14808-60-7	100.00000	12.81782	
		Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02170	
		Sodium chloride	7647-14-5	30.00000	0.01374	
		Hydrochloric acid	7647-01-0	7.50000	0.00927	
		Inorganic salt	Proprietary	30.00000	0.00800	
		Alcohols, C 12-16, ethoxylated	68551-12-2	5.00000	0.00228	
		9-Octadecenamide,n,n-bis-2(hydroxy-ethyl)-,(Z)	93-83-4	5.00000	0.00228	
		Ammonium chloride	12125-02-9	5.00000	0.00228	
		Calcium chloride	10043-52-4	100.00000	0.00186	
		Methanol	67-56-1	100.00000	0.00043	
		Ethanol	64-17-5	60.00000	0.00027	
		Oxyalkylated phenolic resin	Proprietary	30.00000	0.00018	
		Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00014	
		Modified thiourea polymer	Proprietary	30.00000	0.00013	
		Potassium chloride	7447-40-7	5.00000	0.00009	
		Strontium chloride	10476-85-4	5.00000	0.00009	
		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	
		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
		1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00000	

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\* 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 2020  
WV Department of  
Environmental Protection

8,696' B.H. AS DRILLED

4,030' T.H. AS DRILLED

**TEN HIGH 1N LEASE  
WELL 4HM  
TUG HILL OPERATING**

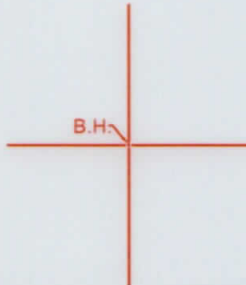
T.H. LATITUDE 39°50'00"  
B.H. LATITUDE 39°52'30"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
 NAD'83 S.P.C.(FT) N. 478,161.74 E. 1,636,721.66  
 NAD'83 GEO. LAT-(N) 39.806809 LONG-(W) 80.681010  
 NAD'83 UTM (M) N. 4,406,363.91 E. 527,305.49  
**LANDING POINT**  
 NAD'83 S.P.C.(FT) N. 478,856.9 E. 1,637,548.1  
 NAD'83 GEO. LAT-(N) 39.808747 LONG-(W) 80.678101  
 NAD'83 UTM (M) N. 4,406,579.9 E. 527,553.7  
**BOTTOM HOLE**  
 NAD'83 S.P.C.(FT) N. 488,474.5 E. 1,632,202.6  
 NAD'83 GEO. LAT-(N) 39.834954 LONG-(W) 80.697584  
 NAD'83 UTM (M) N. 4,409,482.7 E. 525,876.2

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

TAG	SURFACE OWNER	PARCEL	ACRES
A	LAWRENCE & SHIRLEY CONKLE ESTS	9-7-24	139.79
B	THOMAS R & KIMBERLY WHITEFIELD	9-7-25 2	76.40
C	ROBERT G & SCARLETT HUBBS	9-7-12 1	86.364
D	RONALD MOORE, ET UX	9-7-12	16.587
E	RONALD MOORE, ET UX	9-7-13	51.49
F	ROBERT GLENN HUBBS, ET AL	9-7-7	108.61
G	TERESA L. HORNER WITH JERRY G & CAROLYN K. FLETCHER (LIFE ESTATE)	9-7-6	103.30
H	CARLA SUE CROW	9-5-17	6.341
I	KELLY WILSON WITH DONLD E. LEACH (LIFE ESTATE)	9-5-18	5.807
J	KELLY WILSON WITH DONLD E. LEACH (LIFE ESTATE)	9-5-20	6.924
K	MICHAEL JOSEPH SNYDER	9-5-5 4	64.00
L	DAVID M. TOLER	9-5-5 1	0.985
M	MICHAEL JOSEPH SNYDER	9-5-5	35.02
N	NANCY L. SNYDER	9-5-6 4	0.694
O	NANCY L. SNYDER	9-5-6 7	0.678
P	NANCY L. SNYDER (LIFE ESTATE)	9-5-6	82.858
Q	ROBERT A & CHERYL I. WILLIAMS	9-1-13	80.897

MAP PARCEL	ADJOINING SURFACE OWNER LIST (SEE SHEET 2)	ACRES
9-1-13 1	BURDETTE L. BEUCKE	14.256
9-1-13 4	MACK I. CROW	4.273
9-1-14 1	ALICE J & DOUGLAS J. MARTIN	0.905
9-5-5 2	PETER PARKER	0.873
9-5-5 3	MICHAEL JOSEPH BAUM, ET AL	1.870
9-5-6 1	JON B. CRAWFORD	4.679
9-5-6 2	MICHAEL JOSEPH SNYDER	2.82
9-5-6 3	DEUTSCHE BANK NATL TR CO	1.391
9-5-6 5	LINDA GORBY DELBERT	1.087
9-5-6 6	NANCY L. SNYDER	0.420
9-5-6 8	NANCY L. SNYDER	0.691
9-5-14 4	BETTY R. OTT	10.501
9-5-19	BETTY R. OTT	0.933
9-5-21	RALPH E. WELLMAN, ET UX	1.00
9-5-22	RALPH E. WELLMAN, ET UX	0.5
9-5-23	RALPH E. WELLMAN, ET UX	1.00
9-5-24	ALVIE & MARCELLA DARRAH	1.986



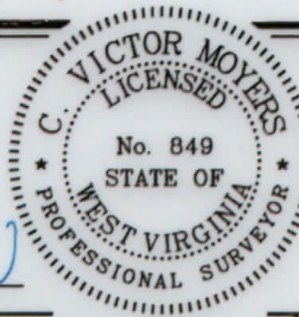
12 Vinhorn Drive | P.O. Box 150 | Glenville, WV 26031 | 304.462.5634  
 1402 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3932  
 254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
 slsw.com

**NOTES ON SURVEY**

- 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.
- WELL SPOT CIRCLE & TOPD MARK SCALE IS 1"=2000'
- AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.
- PLAT UPDATED TO SHOW AS-DRILLED PATH.

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 JANUARY 17, 20 19  
 REVISED MARCH 24, 20 20  
 OPERATORS WELL NO. TEN HIGH 1N-4HM  
 API WELL NO. 47 - 051 - 1945  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8655P4HMADR.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 = 1,322.70' ELEVATION PROPOSED = 1,310.06' WATERSHED MIDDLE BOWMAN RUN OF FISH CREEK (HUC-10)  
 DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'  
 SURFACE OWNER LAWRENCE & SHIRLEY CONKLE ESTS ACREAGE 139.79±  
 ROYALTY OWNER ANDY PAUL & JACKIE KUHN, ET AL - SEE WW-6A1 ACREAGE 139.79±  
 PROPOSED WORK: LEASE NO. SEE WW-6A1  
 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: 6,865' / TMD: 18,304'

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

COUNTY NAME PERMIT

9,662' T.H. AS DRILLED  
14,595' B.H. AS DRILLED

# TUG HILL OPERATING WELL 4HM TEN HIGH 1N LEASE

TAG	SURFACE OWNER	PARCEL	ACRES
Q	ROBERT A & CHERYL L WILLIAMS	0-1-13	80.807
P	NANCY L SNYDER (HE ESTATE)	0-2-6	82.828
O	NANCY L SNYDER	0-2-6-7	0.078
N	NANCY L SNYDER	0-2-6-4	0.694
M	MICHAEL JOSEPH SNYDER	0-2-2	32.02
L	DANIEL M JOLTER	0-2-2-1	0.982
K	MICHAEL JOSEPH SNYDER	0-2-2-4	64.00
J	KELLY WILSON WITH DONALD E LEACH (THE ESTATE)	0-2-20	6.234
I	KELLY WILSON WITH DONALD E LEACH (THE ESTATE)	0-2-18	2.807
H	CARLA SUE CROW	0-2-17	6.241
G	TERESA L HORNER WITH BERRY G & CAROLYN R FLETCHER (THE ESTATE)	0-2-6	103.30
F	ROBERT CLAY HUBBS ET AL	0-2-7	108.61
E	RONALD MOORE ET AL	0-2-13	21.46
D	RONALD MOORE ET AL	0-2-12	16.287
C	ROBERT G & S CARLETT HUBBS	0-2-12-1	86.304
B	THOMAS R & KIMBERLY WHITEFIELD	0-2-25-2	26.40
A	LAWRENCE & SHIRLEY CONKLE ESTS	0-2-24	139.20

T.H. LATITUDE 39°25'30"  
B.H. LATITUDE 39°20'00"

(2 P.C. NORTH ZONE) (UTM) (ZONE 17 NORTH)

NAD83 S.P.C. (FT) N 478,161.74 E 1,898,721.66  
 NAD83 GEO. LAT (N) 39.808809 LONG (W) 80.681070  
 NAD83 UTM (M) N 4,408,363.91 E 257,302.49

**LANDING POINT**

NAD83 S.P.C. (FT) N 478,826.9 E 1,837,848.1  
 NAD83 GEO. LAT (N) 39.808747 LONG (W) 80.678101  
 NAD83 UTM (M) N 4,408,273.9 E 257,253.7

**BOTTOM HOLE**

NAD83 S.P.C. (FT) N 488,474.2 E 1,837,502.9  
 NAD83 GEO. LAT (N) 39.834924 LONG (W) 80.692284  
 NAD83 UTM (M) N 4,409,482.7 E 252,878.2

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

0.0000, B.H. AS DRILLED

0.0000, B.H. AS DRILLED

MAP PARCEL	ADJOINING SURFACE OWNER LIST (SEE SHEET 2)	ACRES
0-1-13	BURDETTE L BECKER	142.66
0-1-14	MACEL CROW	4.273
0-1-14	ALICE & DOUGLAS J MARTIN	0.902
0-2-2	PETER PARKER	0.872
0-2-2	MICHAEL JOSEPH BACAL ET AL	1.870
0-2-1	RON B CRAWFORD	4.070
0-2-2	MICHAEL JOSEPH SNYDER	2.82
0-2-3	DEUTSHE BANK NAL TR CO	1.291
0-2-3	LINDA GORNY DEIBERT	1.087
0-2-6	NANCY L SNYDER	0.420
0-2-8	NANCY L SNYDER	0.691
0-2-14	BETTY R OTT	10.207
0-2-19	BETTY R OTT	0.927
0-2-21	RALPH E WELLMAN ET AL	1.00
0-2-22	RALPH E WELLMAN ET AL	0.7
0-2-23	RALPH E WELLMAN ET AL	1.00
0-2-24	ALICE & MARCELTA DARRAH	1.969



### NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 200' 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 & TOP MARK SCALE IS 1"=2000'.
3. AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.
4. PLAT UPDATED TO SHOW AS-DRILLED PATH.



124 East Backley Street | Beverly, WV 26031 | 304.222.2298  
 1715 Kanawha Boulevard, East | Charleston, WV 25301 | 304.248.2822  
 12 Victoria Drive | P.O. Box 100 | Glenville, WV 26031 | 304.462.2824

BY THE DIVISION OF ENVIRONMENTAL PROTECTION THE INFORMATION REQUIRED BY LAW AND THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE UNDERSIGNED, HEREBY CERTIFY THAT

P.S. 849  
*C. Victor Moyers*

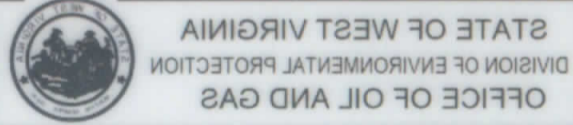


CONTROL DETERMINED BY HORIZONTAL & VERTICAL OF ACCURACY 1 : 2500  
 SCALE 1" = 2000'  
 FILE NO. 8852P4HMADR.dwg

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

APR 1945 - 051 - 47 - 1945  
 COUNTY STATE WELL NO. PERMIT

OPERATORS WELL NO. TEN HIGH 1N-4HM  
 REVISOR MARCH 24, 2020  
 DATE JANUARY 17, 2019  
 (+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.



PROPOSED WORK :  
 SURFACE OWNER ANDY PAUL & JACKIE KUHN, ET AL - SEE WW-6A1  
 SURFACE OWNER LAWRENCE & SHIRLEY CONKLE ESTS  
 DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GREEN EASTON T.S.  
 ELEVATION PROPOSED = 1,310.06', WATERSHED MIDDLE BOWMAN RUN OF FISH CREEK (HUC-10)  
 LOCATION : PROPOSED = 1,322.70', GROUND = 1,322.70'  
 TYPE: OIL GAS X INJECTION WASTE DISPOSAL "GAS" PRODUCTION X STORAGE DEEP SHALLOW X

PHYSICAL CHANGE IN WELL (SPECIFY)  
 FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER  
 DRILL X CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE X PLUG OFF OLD

LEASE NO. SEE WW-6A1  
 ACREAGE 139.79±  
 ACREAGE 139.79±  
 COUNTY MARSHALL  
 QUADRANGLE GREEN EASTON T.S.  
 WATERSHED MIDDLE BOWMAN RUN OF FISH CREEK (HUC-10)

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 2400 D BIG TYLER ROAD CHARLESTON, WV 25313

PERMIT TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH TVD: 8,865' \ TMD: 18,304'

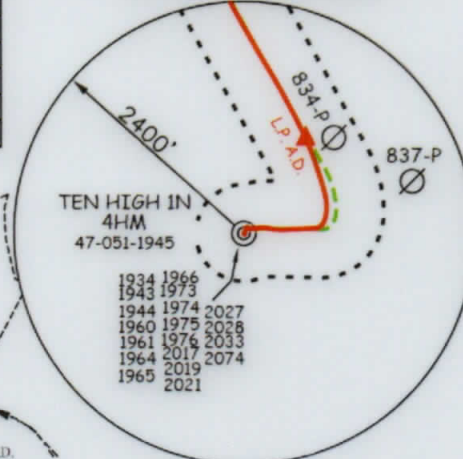


8,696' B.H. AS DRILLED 4,030' T.H. AS DRILLED

**TEN HIGH 1N LEASE  
WELL 4HM  
TUG HILL OPERATING**

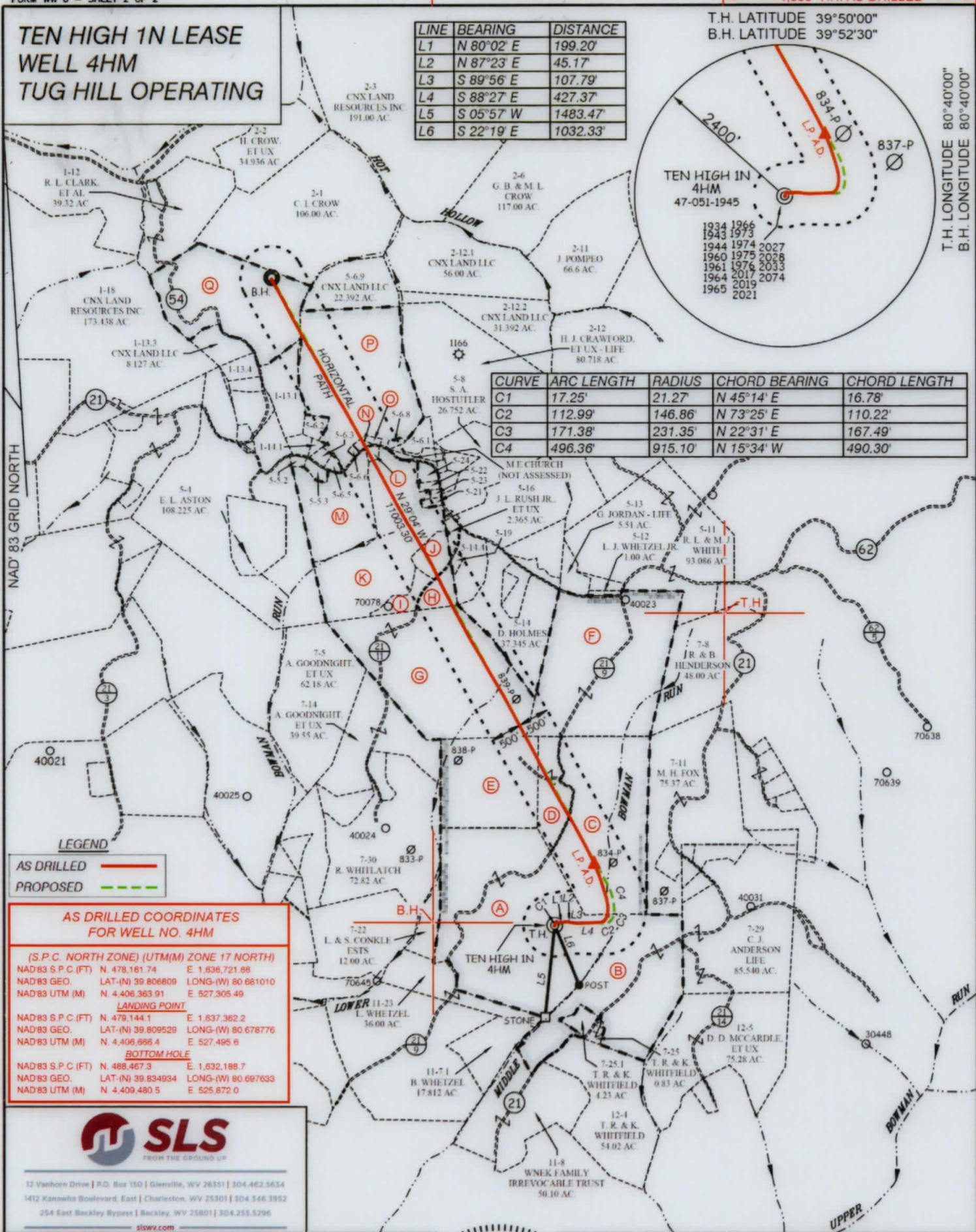
LINE	BEARING	DISTANCE
L1	N 80°02' E	199.20'
L2	N 87°23' E	45.17'
L3	S 89°56' E	107.79'
L4	S 88°27' E	427.37'
L5	S 05°57' W	1483.47'
L6	S 22°19' E	1032.33'

T.H. LATITUDE 39°50'00"  
B.H. LATITUDE 39°52'30"



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

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	17.25'	21.27'	N 45°14' E	16.78'
C2	112.99'	146.86'	N 73°25' E	110.22'
C3	171.38'	231.35'	N 22°31' E	167.49'
C4	496.36'	915.10'	N 15°34' W	490.30'



**LEGEND**

- AS DRILLED (Red line)
- PROPOSED (Green dashed line)

**AS DRILLED COORDINATES FOR WELL NO. 4HM**

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

NAD83 S.P.C.(FT)	N. 478,161.74	E. 1,636,721.66
NAD83 GEO.	LAT-(N) 39.806809	LONG-(W) 80.681010
NAD83 UTM (M)	N. 4,406,363.91	E. 527,305.49

**LANDING POINT**

NAD83 S.P.C.(FT)	N. 478,144.1	E. 1,637,362.2
NAD83 GEO.	LAT-(N) 39.809529	LONG-(W) 80.678776
NAD83 UTM (M)	N. 4,406,666.4	E. 527,495.6

**BOTTOM HOLE**

NAD83 S.P.C.(FT)	N. 488,467.3	E. 1,632,198.7
NAD83 GEO.	LAT-(N) 39.834934	LONG-(W) 80.697633
NAD83 UTM (M)	N. 4,409,480.5	E. 525,872.0



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.5634  
 1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
 254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
 slsvw.com

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

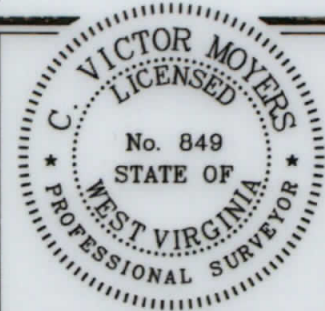
NAD83 S.P.C.(FT)	N. 478,161.74	E. 1,636,721.66
NAD83 GEO.	LAT-(N) 39.806809	LONG-(W) 80.681010
NAD83 UTM (M)	N. 4,406,363.91	E. 527,305.49

**LANDING POINT**

NAD83 S.P.C.(FT)	N. 478,856.9	E. 1,637,548.1
NAD83 GEO.	LAT-(N) 39.808747	LONG-(W) 80.678101
NAD83 UTM (M)	N. 4,406,579.9	E. 527,553.7

**BOTTOM HOLE**

NAD83 S.P.C.(FT)	N. 488,474.5	E. 1,632,202.6
NAD83 GEO.	LAT-(N) 39.834954	LONG-(W) 80.697584
NAD83 UTM (M)	N. 4,409,482.7	E. 525,876.2



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

P.S. 849 *C. Victor Moyers*

SCALE 1" = 2000' FILE NO. 8655P4HMADR.dwg  
 DATE JANUARY 17, 20 19  
 REVISED MARCH 24, 20 20  
 OPERATORS WELL NO. TEN HIGH 1N-4HM  
 API WELL NO. 47 - 051 - 1945  
 STATE COUNTY PERMIT

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

**LEGEND**

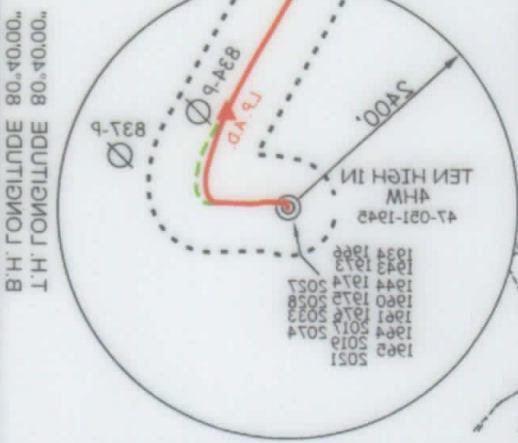
- LEASE LINE (Dashed line)
- SURFACE LINE (Dotted line)
- WELL LATERAL (Dashed line with dots)
- OFFSET LINE (Dashed line)
- TIE LINE (Dashed line)
- CREEK (Wavy line)
- ROAD (Solid line)
- COUNTY ROUTE (Dashed line with 'R')
- PROPOSED WELL (Red circle with cross)
- EXISTING WELL (Black circle with cross)
- PERMITTED WELL (Black circle with dot)
- TAX MAP-PARCEL (Circle with number)
- SURFACE OWNER (SEE TABLE) (Circle with 'A')
- LEASE # (SEE WW-6A1) (Circle with number)

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

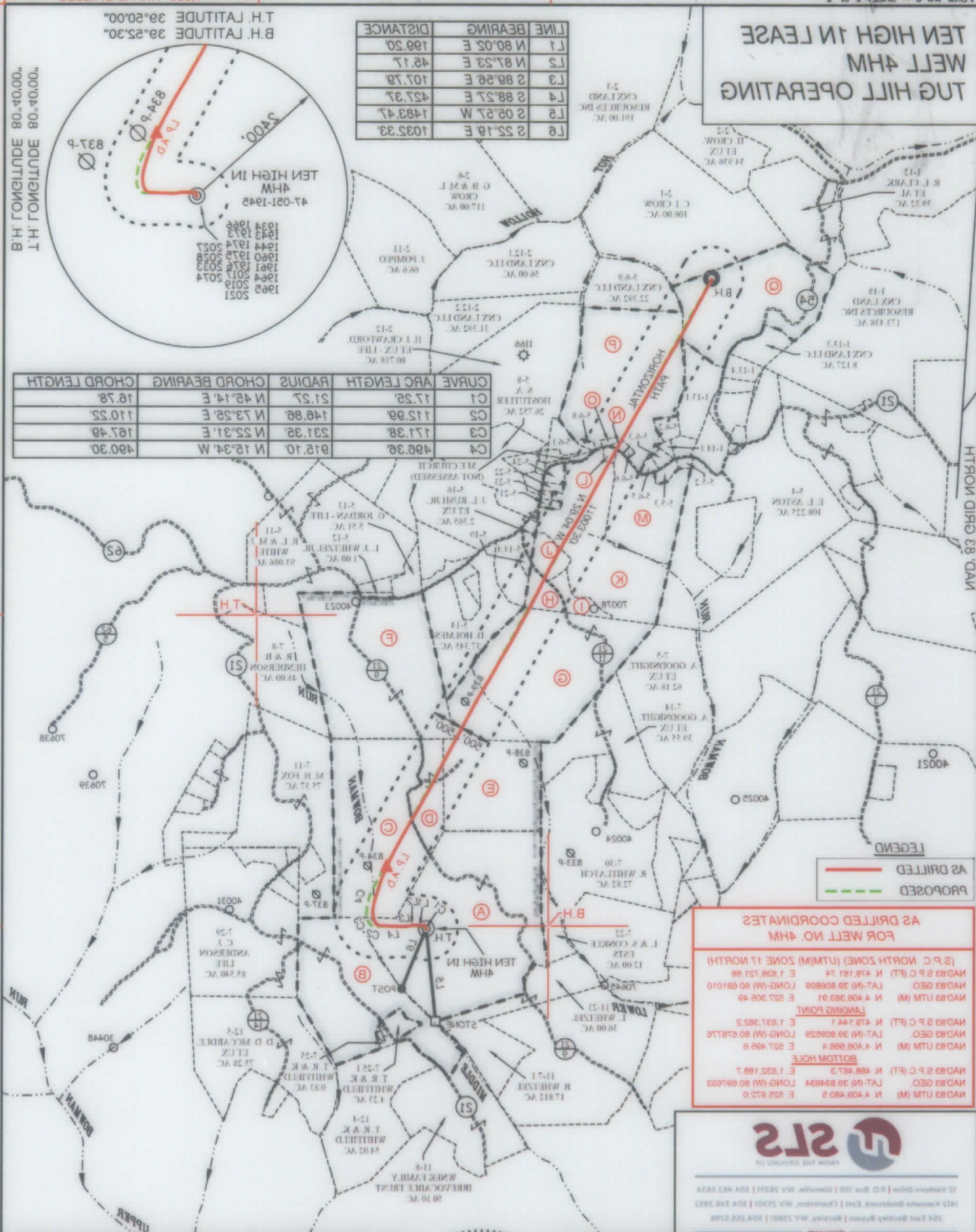
COUNTY NAME PERMIT

# TEN HIGH IN LEASE WELL 4HM TUG HILL OPERATING

LINE	BEARING	DISTANCE
L1	N 80.05° E	199.20
L2	N 87.23° E	48.17
L3	S 89.58° E	107.78
L4	S 88.27° E	427.37
L5	S 05.27° W	1483.47
L6	S 22.18° E	1035.33



CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	17.25	21.27	N 45.14° E	18.78
C2	115.98	148.88	N 73.25° E	110.22
C3	171.38	231.38	N 22.31° E	187.48
C4	498.38	912.10	N 15.34° W	490.30



**AS DRILLED COORDINATES FOR WELL NO. 4HM**

LANDING POINT	
NAD83 2 P.C. (FT)	N 418.781 74 E 1.898 721.88
NAD83 GEO	LAT. (N) 39.808809 LONG. (W) 80.681010
NAD83 UTM (M)	N 4408.203 91 E 227.208 48
BOTTOM HOLE	
NAD83 2 P.C. (FT)	N 488.474 2 E 1.932 505.8
NAD83 GEO	LAT. (N) 39.834924 LONG. (W) 80.692293
NAD83 UTM (M)	N 4408.482 2 E 227.872 0
(2 P.C. NORTH ZONE) (UTM) ZONE 17 NORTH	
NAD83 2 P.C. (FT)	N 478.781 74 E 1.898 721.88
NAD83 GEO	LAT. (N) 39.808809 LONG. (W) 80.681010
NAD83 UTM (M)	N 4408.203 91 E 227.208 48



324 East Buckley Avenue | Buckley, WV 25801 | 304.252.2288  
 1475 Kennedy Boulevard, East Charleston, WV 25301 | 304.248.2823  
 17 Vestment Drive | P.O. Box 700 | Glenville, WV 26031 | 304.483.2824

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP - PARCEL
- 00-00
- (A)

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

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

PROFESSIONAL SURVEYOR  
 STATE OF WEST VIRGINIA  
 LICENSED  
 VICTOR MOYERS  
 No. 848

NO. STATE COUNTY PERMIT

WELL NO. 47-051-1945

OPERATORS WELL NO. TEN HIGH IN-4HM

REVISED MARCH 24 20 20

DATE JANUARY 17 20 18

SCALE 1" = 2000'

FILE NO. 8825P4HMADR.dwg

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

4,030' T.H. AS DRILLED  
 8,898' B.H. AS DRILLED  
 B.H. LONGITUDE 80.40.00, T.H. LONGITUDE 80.40.00, 14' 288' B.H. AS DRILLED