

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

RECEIVED
Office of Oil and Gas

SEP 30 2022

WV Department of
Environmental Protection

API 47 - 051 - 02265 County Marshall District Mead
Quad Glen Easton 7.5' Pad Name Keith Stern Field/Pool Name _____
Farm name TH Exploration, LLC Well Number Keith Stern N-13HU
Operator (as registered with the OOG) Tug Hill Operating, LLC
Address 380 Southpointe Boulevard, Plaza II, Suite 200 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,402,804.35 Easting 526,359.50
Landing Point of Curve Northing 4,402,377.9 Easting 526,155.1
Bottom Hole Northing 4,404,137.5 Easting 525,147.3

Elevation (ft) 744.65' 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 2/5/2020 Date drilling commenced conductor: 4/17/2020 blg rig: 4/25/2020 5/24/2020 Date drilling ceased 5/24/2020
Date completion activities began 8/2/2021 Date completion activities ceased 8/16/2021
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 426' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 922' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 340-346', 433-439' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

APPROVED
Reviewed by: SG 10-11-22
STRADER

API 47-051 - 02265 Farm name TH Exploration, LLC Well number Keith Stern N-13HU

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	26"	20"	506'	NEW	106.5#	N/A	Y
Coal							
Intermediate 1	17 1/2"	13 3/8"	2,241'	NEW	54.5#	N/A	Y
Intermediate 2	12 1/4"	9 5/8"	10,336'	NEW	47#	N/A	Y
Intermediate 3							
Production	8 1/2"	5 1/2"	18,689'	NEW	23#	N/A	Y
Tubing		2 7/8"	9,345'	NEW	4.7#	N/A	Y
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	A	385	15.6	1.2	455	0	8
Surface	A	950	15.6	1.2	1,121	0	8
Coal							
Intermediate 1	A	1,799	15.6	1.19	2,122	0	8
Intermediate 2	A	4,515	14.5	1.19	5,219	0	8
Intermediate 3							
Production	A	4,524	16.5	1.17	4,659	0	8
Tubing							

Drillers TD (ft) 18,727' Loggers TD (ft) n/a
 Deepest formation penetrated Trenton Plug back to (ft) n/a
 Plug back procedure n/a

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Kick off depth (ft) 10,438'

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

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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 _____

10/21/2022

API 47- 051 - 02265 Farm name TH Exploration, LLC Well number Keith Stern N-13HU

PRODUCING FORMATION(S)	DEPTHS	
<u>POINT PLEASANT</u>	<u>11,251'-11,130'</u> TVD	<u>11,907'-18,727'</u> 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 8024 psi Bottom Hole _____ psi DURATION OF TEST 4 hrs

OPEN FLOW Gas 13,745 mcfpd Oil 0 bpd NGL 0 bpd Water 288 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 ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
<u>*see attached</u>	<u>0</u>		<u>0</u>		

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

Stimulating Company PRO-FRAC
Address 333 Shops Boulevard City Willow Park State TX Zip 76087

Please insert additional pages as applicable.

Completed by Amy L. Morris Telephone 304-376-0111
Signature *Amy L. Morris* Title Permitting Specialist - Appalachia Region Date 9-29-2022

**Keith Stern N-13HU
PEFORATION RECORD**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	8/2/2021	18,506	18,553	12	Utica
2	8/3/2021	18,279	18,454	48	Utica
3	8/3/2021	18,080	18,254	48	Utica
4	8/3/2021	17,880	18,055	48	Utica
5	8/4/2021	17,681	17,855	48	Utica
6	8/4/2021	17,482	17,656	48	Utica
7	8/4/2021	17,282	17,457	48	Utica
8	8/5/2021	17,083	17,257	48	Utica
9	8/5/2021	16,884	17,058	48	Utica
10	8/5/2021	16,684	16,859	48	Utica
11	8/6/2021	16,485	16,659	48	Utica
12	8/6/2021	16,286	16,460	48	Utica
13	8/7/2021	16,086	16,261	48	Utica
14	8/9/2021	15,887	16,061	48	Utica
15	8/9/2021	15,688	15,862	48	Utica
16	8/9/2021	15,488	15,663	48	Utica
17	8/9/2021	15,289	15,463	48	Utica
18	8/10/2021	15,090	15,264	48	Utica
19	8/10/2021	14,890	15,064	48	Utica
20	8/11/2021	14,691	14,865	48	Utica
21	8/11/2021	14,491	14,666	48	Utica
22	8/12/2021	14,292	14,467	48	Utica
23	8/12/2021	14,093	14,267	48	Utica
24	8/12/2021	13,893	14,068	48	Utica
25	8/13/2021	13,694	13,868	48	Utica
26	8/13/2021	13,495	13,669	48	Utica
27	8/13/2021	13,295	13,470	48	Utica
28	8/14/2021	13,096	13,270	48	Utica
29	8/14/2021	12,897	13,071	48	Utica
30	8/14/2021	12,697	12,872	48	Utica
31	8/15/2021	12,498	12,672	48	Utica
32	8/15/2021	12,299	12,473	48	Utica
33	8/15/2021	12,099	12,274	48	Utica
34	8/16/2021	11,900	12,074	48	Utica

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10/21/2022

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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 (bbls)	Amount of Nitrogen/other (units)
1	86.00	12,067	10485	8001	246130	6,630	0
2	84.00	11,554	9485	8371	509420	8,037	0
3	89.00	11,310	10255	7704	508050	7,998	0
4	89.00	11,025	8902	8090	501240	7,877	0
5	89.00	10,812	8651	8281	498820	7,904	0
6	90.00	10,806	9263	8291	500688	7,872	0
7	90.00	10,755	8763	8083	507940	7,928	0
8	89.00	10,712	8408	8043	501780	7,731	0
9	90.00	10,606	9393	8490	502360	7,791	0
10	88.00	10,655	8612	8006	509580	7,916	0
11	90.00	10,765	8289	7724	504460	8,033	0
12	90.00	10,992	8649	7417	508560	7,629	0
13	86.00	10,865	8205	8027	506660	7,902	0
14	89.00	10,682	8690	7577	505540	7,831	0
15	89.00	10,860	8608	8445	508420	7,789	0
16	90.00	10,897	8753	7971	504100	7,774	0
17	89.00	10,587	8740	8178	507660	7,827	0
18	90.00	10,779	9016	8351	500840	7,766	0
19	89.00	10,918	8748	8206	506880	7,889	0
20	90.00	11,088	9136	7858	504460	7,824	0
21	90.00	11,067	9788	8242	502060	7,828	0
22	89.00	11,101	10081	7623	509380	8,945	0
23	90.00	11,119	9804	7981	504200	7,669	0
24	89.00	10,828	9650	8096	503280	7,671	0
25	90.00	10,811	8821	7931	500640	7,699	0
26	90.00	10,804	9676	7883	506280	7,730	0
27	89.00	10,654	9332	7953	503960	7,752	0
28	89.00	10,551	9325	8307	503960	7,689	0
29	89.00	10,382	9714	7966	505800	7,793	0
30	89.00	10,203	9148	8085	509680	7,677	0
31	89.00	10,151	9152	8433	509860	7,687	0
32	90.00	9,952	9153	8204	503060	7,767	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)
33	89.00	10,115	8951	7880	509060	7,688	0
34	89.00	10,123	9030	8123	504280	7,678	0

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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	1503	1647	1504	1648	Sandstone
Big Lime	1647	1701	1648	1702	Limestone
Big Injun	1701	1960	1702	1961	Sandstone
Weir	1960	2152	1961	2153	Sandstone
Berea	2152	2417	2153	2418	Sandstone
Gordon	2417	2512	2418	2513	Sandstone
Fifty Foot	2512	3148	2513	3149	Sandstone
Speechley	3148	4597	3149	4613	Sandstone
Benson	4597	4990	4613	5024	Sandstone
Alexander	4990	5628	5024	5699	Siltstone
Rhinestreet	5628	6068	5699	6172	Black shale
Middlesex	6068	6142	6172	6251	Black shale
Geneseo/Burkett	6142	6173	6251	6285	Black shale
Tully	6173	6208	6285	6323	Limestone
Hamilton	6208	6282	6323	6403	Grey shale
Marcellus	6282	6347	6403	6472	Black shale
Onondaga	6347	6543	6472	6681	Limestone
Oriskany	6543	6661	6681	6806	Sandstone
Helderberg	6661	7039	6806	7204	Limestone
Salina	7039	8109	7204	8321	Salt/Anhydrite/LS
Lockport	8109	8477	8321	8712	Dolomite
Rose Hill	8477	8755	8712	9011	Shale
Packer Shell	8755	8979	9011	9251	Limestone
Clinton/Tuscarora	8979	9084	9251	9363	Sandstone
Juniata/Queenston	9084	9889	9363	10220	Red Shale
Reedsville	9889	10932	10220	11328	Grey Shale
Utica	10932	11210	11328	11770	Black Shale
Point Pleasant	11210	-	11770	-	Shale/Limestone

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/2/2021
Job End Date:	8/16/2021
State:	West Virginia
County:	Marshall
API Number:	47-051-02265-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Keith Stern N 13HU
Latitude:	39.77476702
Longitude:	-80.69204240
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	11,190
Total Base Water Volume (gal):	11,139,282
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
Water	Tug Hill Operating	Carrier/Base Fluid	Water	7732-18-5	100.00000	84.25748	None
Sand (40/70 White Proppant)	ProFrac	Proppant	Silica Substrate	14808-60-7	100.00000	11.99608	None
Sand (100 Mesh Proppant)	ProFrac	Proppant	Silica Substrate	14808-60-7	100.00000	3.33956	None
Hydrochloric Acid (7.5%)	CNR	Acidizing	Water	7732-18-5	85.00000	0.24775	None
			Hydrochloric Acid (Hydrogen Chloride)	7647-01-0	37.00000	0.10784	None
StimStream FR 9800	Chemstream	Friction Reducer	Alkanes, C16-20-iso-	90622-59-6	25.00000	0.01735	None
			Butene, homopolymer	9003-29-6	25.00000	0.01735	None
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00208	None
MC MX 9-4743	Multi-Chem	Biocide	Sodium Nitrate	7631-99-4	60.00000	0.02146	None
LD-7750W	Multi-Chem	Scale Inhibitor					

			Methanol	67-56-1	60.00000	0.00492	None
			Phosphonic Acid Salt	Proprietary	5.00000	0.00041	None
ProHib 100	CNR	Acid Inhibitor					
			2-Butoxyethanol	111-76-2	60.00000	0.00056	None
			Proprietary material	Proprietary	30.00000	0.00028	None
			Proprietary non-ionic surfactant	Proprietary	20.00000	0.00019	None
			Proprietary corrosion inhibitor	Proprietary	10.00000	0.00009	None
			Proprietary ethoxylated alcohol	Proprietary	10.00000	0.00009	None
ProFE 105	CNR	Iron Control					
			Citric Acid	77-92-9	20.00000	0.00022	None
			Acetic Acid	64-19-7	5.00000	0.00006	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Water	7732-18-5	85.00000	0.24775	
			Butene, homopolymer	9003-29-6	25.00000	0.01735	
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00208	
			Phosphonic Acid Salt	Proprietary	5.00000	0.00041	
			Proprietary material	Proprietary	30.00000	0.00028	
			Proprietary non-ionic surfactant	Proprietary	20.00000	0.00019	
			Proprietary ethoxylated alcohol	Proprietary	10.00000	0.00009	
			Proprietary corrosion inhibitor	Proprietary	10.00000	0.00009	
			Acetic Acid	64-19-7	5.00000	0.00006	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

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

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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KEITH STERN N LEASE
UTICA UNIT - 266.15 AC±
WELL 13HU
TUG HILL OPERATING

B.H.
A.D.

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

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

NAD'83 S.P.C.(FT)	N. 466,532.98	E. 1,633,422.22
NAD'83 GEO.	LAT-(N) 39.774767	LONG-(W) 80.692204
NAD'83 UTM (M)	N. 4,402,804.35	E. 526,359.50

LANDING POINT

NAD'83 S.P.C.(FT)	N. 465,117.3	E. 1,632,725.0
NAD'83 GEO.	LAT-(N) 39.770855	LONG-(W) 80.694618
NAD'83 UTM (M)	N. 4,402,369.5	E. 526,154.3

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 470,982.3	E. 1,629,526.2
NAD'83 GEO.	LAT-(N) 39.786838	LONG-(W) 80.706277
NAD'83 UTM (M)	N. 4,404,140.0	E. 525,149.9

T.H. LONGITUDE 80°40'00"
B.H. LONGITUDE 80°40'00"
1,767' T.H. A.D.
6,156' T.H. A.D.

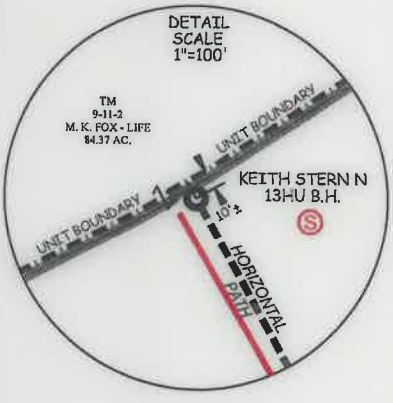
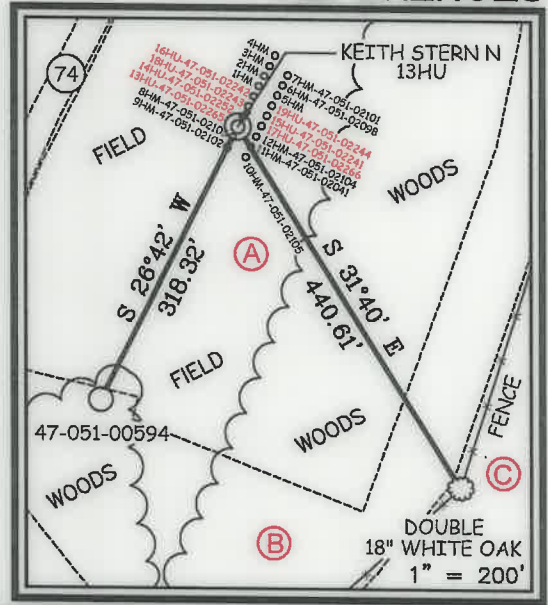
MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
9-10-12	RAY A. WHETZAL, JR., ET AL	36.31
9-11-3	RAY A. WHETZAL, JR., ET AL	33.33
9-13-14	MARGARET K. FOX - LIFE	3.00
9-13-22	TRICYCLE LLC	47.25
9-14-1.2	KENNETH N. & TERESA A. SMERTNECK	1.02
9-14-2	MICHAEL L. ALVAREZ	0.75
9-14-3	MICHAEL L. ALVAREZ	NORTH P/O 3 PCLS
9-14-4	MICHAEL L. ALVAREZ	3 PCLS & 1/8 AC.
9-14-5	MICHAEL L. ALVAREZ	209 X 60 PCL
9-14-6	MICHAEL L. ALVAREZ	120 X 200 PCL
9-14-7	JOHN T. ERAZMUS, III	0.25
9-14-8	JOHNNY C. HOLCOMB & JOHNNY C. HOLCOMB, II	2/5 AC.
9-14-9	JOHN E. DUFFY ET UX	2/5 AC.
9-14-10	ROBERT I. DUFFY - LIFE	25/100 AC.
9-14-20.1	WILLIAM K. STERN, ET UX	1.321
9-14-20.2	WILLIAM K. STERN, ET UX	1.525
9-14-20.3	WILLIAM K. STERN, ET UX	0.831
9-14-28	CHARLES R. SCHELLHASE ET UX	3.029
9-14-43	GEORGE R. TAYLOR, ET UX	10.98
9-14-46.1	MARHA JANE FAZZARO	1.512

T.H.
A.D.

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 & TOPO MARK SCALE ARE 1"=2000'
- PROPOSED LATERAL OR TOP HOLE OF KEITH STERN N-13HU IS WITHIN 3000' OF THE TOP HOLES OR LATERALS OF THE FOLLOWING: KEITH STERN N-14HU (47-051-02252), KEITH STERN N-15HU (47-051-02241), KEITH STERN N-16HU (47-051-02242), PROPOSED KEITH STERN S-17HU, KEITH STERN S-18HU (47-051-02243), KEITH STERN S-19HU (47-051-02244), PROPOSED KNOB CREEK N-12HU & 13HU, PROPOSED KNOB CREEK S-15HU & 16HU, HEAVEN HILL 2W-12HU (47-051-01952), HEAVEN HILL 2W-13HU (47-051-01957), HEAVEN HILL 2-7HU (47-051-01911), HEAVEN HILL 2-8HU (47-051-01912).
- AS-DRILLED DATA PROVIDED BY TUG HILL OPERATING, LLC.
- PLAT UPDATED TO SHOW AS-DRILLED PATH.

REFERENCES



AS DRILLED COORDINATES FOR WELL NO. 13HU

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

NAD'83 S.P.C.(FT)	N. 466,532.98	E. 1,633,422.22
NAD'83 GEO.	LAT-(N) 39.774767	LONG-(W) 80.692204
NAD'83 UTM (M)	N. 4,402,804.35	E. 526,359.50

LANDING POINT

NAD'83 S.P.C.(FT)	N. 465,144.7	E. 1,632,726.0
NAD'83 GEO.	LAT-(N) 39.770931	LONG-(W) 80.694608
NAD'83 UTM (M)	N. 4,402,377.9	E. 526,155.1

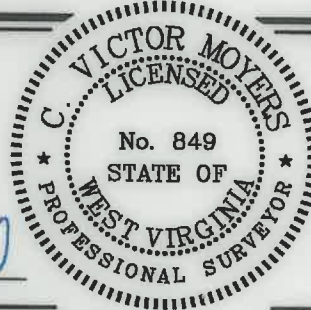
BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 470,974.0	E. 1,629,517.7
NAD'83 GEO.	LAT-(N) 39.786815	LONG-(W) 80.706307
NAD'83 UTM (M)	N. 4,404,137.5	E. 525,147.3



12 Yashorn Drive | P.O. Box 150 | Glenville, WV 26031 | 304.462.5034
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3922
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296
slsw.com

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



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JULY 9, 20 20
REVISED

OPERATORS WELL NO. KEITH STERN N-13HU
API WELL NO. 47 - 051 - 2265
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500
FILE NO. 8811P13HUAD.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 X INJECTION ___ WASTE DISPOSAL ___ IF "GAS" PRODUCTION X STORAGE ___ DEEP X SHALLOW ___

LOCATION: ELEVATION 744.65' WATERSHED FISH CREEK (HUC 10)
DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER TH EXPLORATION, LLC ACREAGE 10.05±
ROYALTY OWNER ISAAC CROW, ET AL - SEE WW-6A1 ACREAGE 10.05±

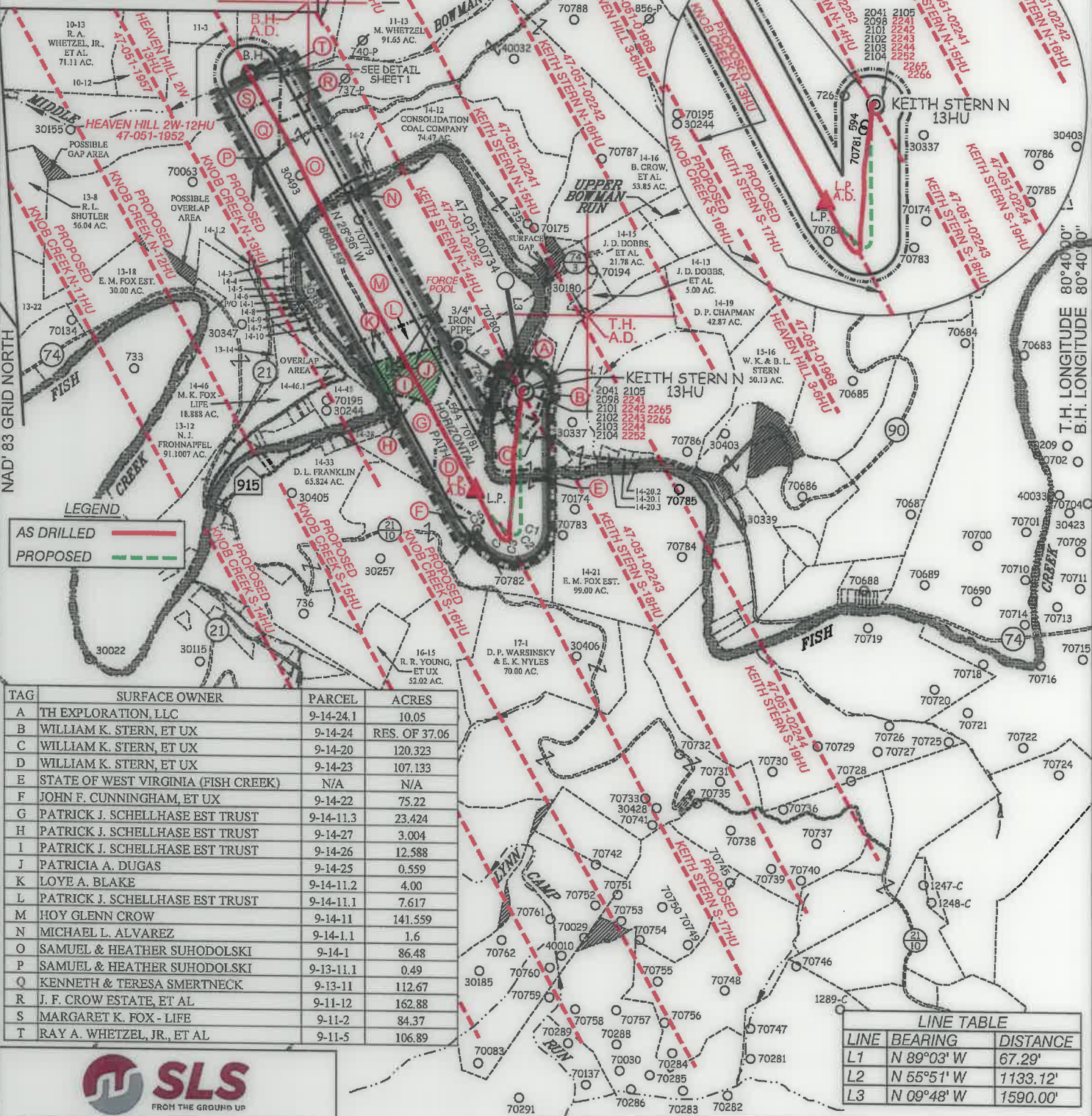
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD
FORMATION ___ PERFORATE NEW FORMATION ___ PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___ OTHER ___
PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION POINT PLEASANT
ESTIMATED DEPTH TVD: 11,368' / TMD: 18,800'

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

10/21/2022

**KEITH STERN N LEASE
UTICA UNIT - 266.15 AC ±
WELL 13HU
TUG HILL OPERATING**



TAG	SURFACE OWNER	PARCEL	ACRES
A	TH EXPLORATION LLC	9-14-24.1	10.05
B	WILLIAM K. STERN, ET UX	9-14-24	RES. OF 37.06
C	WILLIAM K. STERN, ET UX	9-14-20	120.323
D	WILLIAM K. STERN, ET UX	9-14-23	107.133
E	STATE OF WEST VIRGINIA (FISH CREEK)	N/A	N/A
F	JOHN F. CUNNINGHAM, ET UX	9-14-22	75.22
G	PATRICK J. SCHELLHASE EST TRUST	9-14-11.3	23.424
H	PATRICK J. SCHELLHASE EST TRUST	9-14-27	3.004
I	PATRICK J. SCHELLHASE EST TRUST	9-14-26	12.588
J	PATRICIA A. DUGAS	9-14-25	0.559
K	LOYE A. BLAKE	9-14-11.2	4.00
L	PATRICK J. SCHELLHASE EST TRUST	9-14-11.1	7.617
M	HOY GLENN CROW	9-14-11	141.559
N	MICHAEL L. ALVAREZ	9-14-1.1	1.6
O	SAMUEL & HEATHER SUHODOLSKI	9-14-1	86.48
P	SAMUEL & HEATHER SUHODOLSKI	9-13-11.1	0.49
Q	KENNETH & TERESA SMERTNECK	9-13-11	112.67
R	J. F. CROW ESTATE, ET AL	9-11-12	162.88
S	MARGARET K. FOX - LIFE	9-11-2	84.37
T	RAY A. WHETZEL, JR., ET AL	9-11-5	106.89

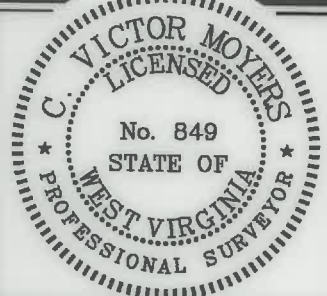
LINE	BEARING	DISTANCE
L1	N 89°03' W	67.29'
L2	N 55°51' W	1133.12'
L3	N 09°48' W	1590.00'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	93.99'	238.95'	S 09°15' W	93.39'
C2	68.32'	74.68'	S 48°09' W	65.96'
C3	82.33'	134.59'	N 80°41' W	81.05'
C4	157.53'	555.74'	N 55°11' W	157.00'
C5	624.15'	1908.94'	N 36°47' W	621.38'

SLS
FROM THE GROUND UP

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
slswv.com

P.S. 849 *C. Victor Moyers*



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

LEGEND

- UNIT BOUNDARY
- LEASED TRACTS INSIDE
- UNIT BOUNDARY
- SURFACE LINE
- PROPOSED UTICA
- WELL LATERAL
- 400' OFFSET LINE
- 500' OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE ADDITIONAL SHEETS)

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
NAD'83 S.P.C.(FT) N. 466,532.98 E. 1,633,422.22
NAD'83 GEO. LAT-(N) 39.774767 LONG-(W) 80.692204
NAD'83 UTM (M) N. 4,402,804.35 E. 526,359.50

LANDING POINT
NAD'83 S.P.C.(FT) N. 465,117.3 E. 1,632,725.0
NAD'83 GEO. LAT-(N) 39.770855 LONG-(W) 80.694618
NAD'83 UTM (M) N. 4,402,369.5 E. 526,154.3

BOTTOM HOLE
NAD'83 S.P.C.(FT) N. 470,982.3 E. 1,629,526.2
NAD'83 GEO. LAT-(N) 39.786838 LONG-(W) 80.706277
NAD'83 UTM (M) N. 4,404,140.0 E. 525,149.9

SCALE 1" = 2000' FILE NO. 8811P13HUAD.dwg
KEITH STERN N-13HU-REV2

DATE JULY 9, 2020
REVISED _____
OPERATORS WELL NO. KEITH STERN N-13HU
API WELL NO. 47-051-2265
STATE COUNTY PERMIT

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

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

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

1,767 B.H. A.D. 6,156 T.H. A.D. 80°40'00" T.H. LONGITUDE 80°40'00" PERMIT

**KEITH STERN N LEASE
UTICA UNIT - 266.15 AC±
WELL 13HU
TUG HILL OPERATING**



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254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296
sleww.com

NO.	Lease ID	Tag	Parcel	Grantor, Lessor, Etc.	Deed Book/Page	
1	10*15605	A	9-14-24.1	ISAAC CROW ET UX	74	394
2	10*15605	B	9-14-24	ISAAC CROW ET UX	74	394
3	10*15509	C	9-14-20	WILLIAM K STERN AND BETTY L STERN	718	320
4	10*15812	D	9-14-23	WILLIAM K STERN AND BETTY L STERN, ET AL	687	220
5	10*23458	E	WV - FISH CREEK	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	1019	373
6	10*16479	F	9-14-22	JOHN F CUNNINGHAM AND BERNEICE K CUNNINGHAM	826	88
7	10*23053	G	9-14-11.3	CE YOUNG	63	146
8	10*23053	H	9-14-27	CE YOUNG	63	146
9	10*23053	I	9-14-26	*FORCE POOL* CE YOUNG	63	146
10	10*23053	J	9-14-25	*FORCE POOL* CE YOUNG	63	146
11	10*23053	K	9-14-11.2	CE YOUNG	63	146
12	10*23053	L	9-14-11.1	CE YOUNG	63	146
13	10*23053	M	9-14-11	CE YOUNG	63	146
14	10*19621	N	9-14-1.1	MARY RUTH FROHNAPFEL, ET AL	938	595
15	10*19621	O	9-14-1	MARY RUTH FROHNAPFEL, ET AL	938	595
16	10*18265	P	9-13-11.1	KENNETH NELSON SMERTNECK AND TERESA ANN SMERTNECK	933	103
17	10*18265	Q	9-13-11	KENNETH NELSON SMERTNECK AND TERESA ANN SMERTNECK	933	103
18	10*15510	R	9-11-12	ELAINE PHELPS ET AL	718	326
19	10*47051.243.1	S	9-11-2	MARY A FOX, ET AL	879	332
20	10*15584	T	9-11-5	VICKIE MASON, ET AL	686	239

RECEIVED
Office of Oil and Gas

SEP 30 2022

WV Department of
Environmental Protection

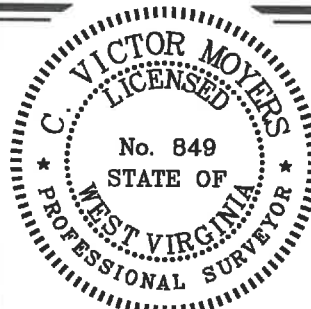
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DATE JULY 9, 20 20

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OPERATORS WELL NO. KEITH STERN N-13HU

API WELL NO. 47 — 051 — 2265
NO. STATE COUNTY PERMIT



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



10/21/2022

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ADDRESS CT CORPORATION SYSTEM
5400 D BIG TYLER ROAD
CHARLESTON, WV 25313

COUNTY NAME PERMIT