

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

API 47 - 051 - 02373 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-2HM  
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 4,402,820.76 Easting 526,367.55  
Landing Point of Curve Northing 4,402,436.3 Easting 526,235.6  
Bottom Hole Northing 4,404,144.1 Easting 525,267.6

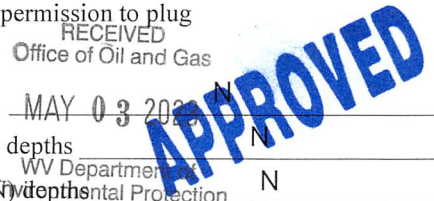
Elevation (ft) 742.10' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  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 4/13/2021 Date drilling commenced spud:2/12/2022 big rig: 4/29/2022 Date drilling ceased 5/11/2022  
Date completion activities began 1/16/2023 Date completion activities ceased 1/27/2023  
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 440' Open mine(s) (Y/N) depths MAY 03 2023  N  
Salt water depth(s) ft 933' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 341-347', 434-440' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) \_\_\_\_\_



Reviewed by: [Signature]  
10/27/2023

API 47- 051 - 02373 Farm name TH Exploration, LLC Well number Keith Stern N-2HM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	36"	30"	110'	NEW	94.5#	N/A	Y
Surface	17 1/2"	13 3/8"	550'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	550'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,250'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	13,671'	NEW	20#	N/A	Y
Tubing		2 7/8"		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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	A	65	15.6	1.21	78	0	8
Surface	A	800	15.6	1.2	960	0	8
Coal	A	800	15.6	1.2	860	0	8
Intermediate 1	A	708	15	1.38	997.04	0	8
Intermediate 2							
Intermediate 3							
Production	A	3290	14.5	1.157	3806.53	0	8
Tubing							

Drillers TD (ft) 13,722' Loggers TD (ft) N/A  
 Deepest formation penetrated MARCELLUS Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,723'

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 \_\_\_\_\_

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**KEITH STERN N-2HM  
PEFORATION RECORD**

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	1/16/2023	13,489	13,536	36	MARCELLUS
2	1/17/2023	13,290	13,435	44	MARCELLUS
3	1/17/2023	13,116	13,261	44	MARCELLUS
4	1/18/2023	12,942	13,087	44	MARCELLUS
5	1/18/2023	12,767	12,912	44	MARCELLUS
6	1/18/2023	12,592	12,737	44	MARCELLUS
7	1/18/2023	12,417	12,562	44	MARCELLUS
8	1/19/2023	12,242	12,387	44	MARCELLUS
9	1/19/2023	12,067	12,212	44	MARCELLUS
10	1/19/2023	11,892	12,037	44	MARCELLUS
11	1/20/2023	11,717	11,862	44	MARCELLUS
12	1/20/2023	11,542	11,687	44	MARCELLUS
13	1/20/2023	11,367	11,512	44	MARCELLUS
14	1/20/2023	11,192	11,337	44	MARCELLUS
15	1/20/2023	11,017	11,162	44	MARCELLUS
16	1/21/2023	10,842	10,987	44	MARCELLUS
17	1/21/2023	10,667	10,812	44	MARCELLUS
18	1/21/2023	10,492	10,637	44	MARCELLUS
19	1/22/2023	10,317	10,462	44	MARCELLUS
20	1/22/2023	10,142	10,287	44	MARCELLUS
21	1/22/2023	9,967	10,112	44	MARCELLUS
22	1/23/2023	9,792	9,937	44	MARCELLUS
23	1/23/2023	9,617	9,762	44	MARCELLUS
24	1/23/2023	9,442	9,587	44	MARCELLUS
25	1/23/2023	9,267	9,412	44	MARCELLUS
26	1/24/2023	9,092	9,237	44	MARCELLUS
27	1/24/2023	8,917	9,062	44	MARCELLUS
28	1/24/2023	8,742	8,887	44	MARCELLUS
29	1/25/2023	8,567	8,712	44	MARCELLUS
30	1/25/2023	8,392	8,537	44	MARCELLUS
31	1/25/2023	8,217	8,362	44	MARCELLUS
32	1/26/2023	8,042	8,187	44	MARCELLUS
33	1/26/2023	7,867	8,012	44	MARCELLUS
34	1/26/2023	7,692	7,837	44	MARCELLUS
35	1/26/2023	7,517	7,662	44	MARCELLUS
36	1/27/2023	7,342	7,487	44	MARCELLUS
37	1/27/2023	7,167	7,312	44	MARCELLUS

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**KEITH STERN N-2HM  
STIMULATION INFORMATION PER STAGE**

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1		7039	N/A	3759	250980	6,080	0
2	88.00	6715	4923	4906	440470	7,730	0
3	89.00	6771	4905	4945	437020	8,533	0
4	89.00	6780	4754	4788	437530	8,506	0
5	89.00	6697	4929	4934	446300	8,608	0
6	89.00	6803	4967	5056	440900	8,562	0
7	89.00	6958	5017	5005	446780	8,415	0
8	90.00	6958	5167	5255	439960	8,302	0
9	91.00	6687	5116	5175	442000	8,162	0
10	89.00	6644	4874	4969	445900	8,460	0
11	90.00	6539	4763	4875	450880	8,611	0
12	89.00	6579	4942	4983	443540	8,416	0
13	89.00	6659	5519	5173	440800	8,306	0
14	90.00	6408	5384	5044	446200	8,304	0
15	90.00	6560	5248	5102	441690	8,137	0
16	89.00	6367	5147	5267	443100	7,534	0
17	89.00	6598	5032	1	444200	8,204	0
18	90.00	6641	5208	5099	448620	8,141	0
19	90.00	6730	5052	4916	448410	8,421	0
20	90.00	6572	5276	4800	438400	8,456	0
21	89.00	6560	4966	4931	439900	8,314	0
22	90.00	6393	4966	4896	440040	8,298	0
23	90.00	6680	5254	5185	344700	8,078	0
24	91.00	6665	4979	4953	443800	8,098	0
25	90.00	6635	5049	4712	439600	8,150	0
26	87.00	6373	5009	4863	443390	9,653	0
27	90.00	6498	4885	4896	440500	8,274	0
28	89.00	6538	5106	5128	441100	8,291	0
29	90.00	6634	5258	4742	441800	8,168	0
30	88.00	6374	5083	4666	442500	8,060	0
31	89.00	6291	5068	4897	440500	7,955	0
32	90.00	6476	5199	5218	448720	8,306	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	6427	4972	4707	446300	7,941	0
34	81.00	6145	5162	4932	442600	8,709	0
35	89.00	6405	4992	4966	447780	8,441	0
36	90.00	6215	5113	4970	448580	8,389	0
37	88.00	6315	5319	5127	436100	8,375	0

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KEITH STERN N-2HM

LITHOLOGY/FORMATION	TOP DEPTH IN FT/ Name TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID
Maxton	1514	1688	1514	1688	Sandstone
Big Lime	1688	1754	1688	1754	Limestone
Big Injun	1754	1972	1754	1972	Sandstone
Weir	1972	2175	1972	2176	Sandstone
Berea	2175	2438	2176	2440	Sandstone
Gordon	2438	2518	2440	2520	Sandstone
Fifty Foot	2518	3100	2520	3105	Sandstone
Speechley	3100	4581	3105	4834	Sandstone
Benson	4581	4956	4834	5354	Sandstone
Alexander	4956	5584	5354	6105	Siltstone
Rhinestreet	5584	6041	6105	6647	Black Shale
Middlesex	6041	6122	6647	6762	Black Shale
Geneseo/Burkett	6122	6147	6762	6802	Black Shale
Tully	6147	6176	6802	6857	Limestone
Hamilton	6176	6257	6857	7079	Gray Shale
Marcellus	6257	-	7079	-	Black Shale

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# Hydraulic Fracturing Fluid Product Component Information Disclosure



Job Start Date:	1/16/2023
Job End Date:	1/27/2023
State:	West Virginia
County:	Marshall
API Number:	47-051-02373-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Keith Stern N-2HM
Latitude:	39.77492200
Longitude:	-80.69211300
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,257
Total Base Water Volume (gal):	13,436,892
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
Water	Tug Hill Operating	Carrier/Base Fluid	Water	7732-18-5	100.00000	88.17500	None
Sand (Proppant)	Tug Hill Operating	Proppant	Silica Substrate	14808-60-7	100.00000	11.46677	None
Hydrochloric Acid (7.5%)	Producers Service Corp.	Acidizing	Water	7732-18-5	85.00000	0.23148	None
			Hydrochloric Acid (Hydrogen Chloride)	7647-01-0	37.00000	0.10076	None
StimStream FR 9800	Chemstream	Friction Reducer	Butene, homopolymer	9003-29-6	25.00000	0.01918	None
			Alkanes, C16-20-iso-	90622-59-6	25.00000	0.01918	None
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00230	None
LD-7750W	Multi-Chem	Scale Inhibitor	Methanol	67-56-1	60.00000	0.00519	None
			Phosphonic Acid Salt	Proprietary	5.00000	0.00043	None
4-N-1	Producers Service Corp.	Corrosion Inhibitor	Acetic acid	64-19-7	90.00000	0.00048	None

			Methanol	67-56-1	10.00000	0.00005	None
			2-Ethylhexanol	104-76-7	10.00000	0.00005	None
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00003	None
			Diethanolamine	111-42-2	1.00000	0.00001	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					
			Hydrochloric Acid (Hydrogen Chloride)	7647-01-0	37.00000	0.10076	
			Alkanes, C16-20-iso-	90622-59-6	25.00000	0.01918	
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00230	
			Phosphonic Acid Salt	Proprietary	5.00000	0.00043	
			2-Ethylhexanol	104-76-7	10.00000	0.00005	
			Methanol	67-56-1	10.00000	0.00005	
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00003	
			Diethanolamine	111-42-2	1.00000	0.00001	

\* 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)

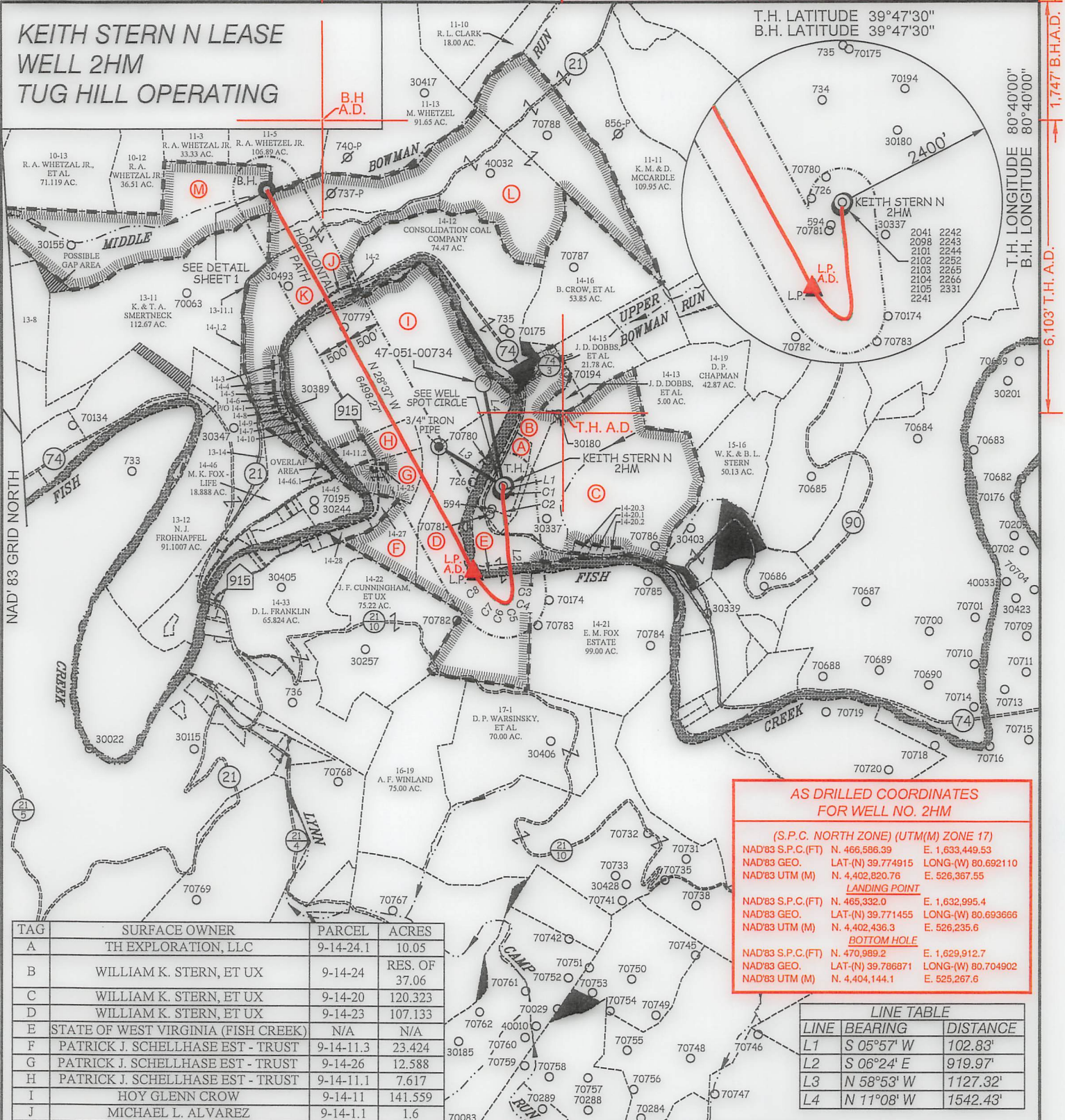


10,745' B.H. A.D.

7,151' T.H. A.D.

**KEITH STERN N LEASE  
WELL 2HM  
TUG HILL OPERATING**

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



**AS DRILLED COORDINATES FOR WELL NO. 2HM**

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

NAD'83 S.P.C.(FT)	N. 466,586.39	E. 1,633,449.53
NAD'83 GEO.	LAT-(N) 39.774915	LONG-(W) 80.692110
NAD'83 UTM (M)	N. 4,402,820.76	E. 526,367.55

**LANDING POINT**

NAD'83 S.P.C.(FT)	N. 465,332.0	E. 1,632,995.4
NAD'83 GEO.	LAT-(N) 39.771455	LONG-(W) 80.693666
NAD'83 UTM (M)	N. 4,402,436.3	E. 526,235.6

**BOTTOM HOLE**

NAD'83 S.P.C.(FT)	N. 470,989.2	E. 1,629,912.7
NAD'83 GEO.	LAT-(N) 39.786871	LONG-(W) 80.704902
NAD'83 UTM (M)	N. 4,404,144.1	E. 525,267.6

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	PATRICK J. SCHELLHASE EST - TRUST	9-14-11.3	23.424
G	PATRICK J. SCHELLHASE EST - TRUST	9-14-26	12.588
H	PATRICK J. SCHELLHASE EST - TRUST	9-14-11.1	7.617
I	HOY GLENN CROW	9-14-11	141.559
J	MICHAEL L. ALVAREZ	9-14-1.1	1.6
K	SAMUEL & HEATHER SUHODOLSKI	9-14-1	86.48
L	J. F. CROW ESTATE, ET AL	9-11-12	162.88
M	MARGARET K. FOX (LIFE)	9-11-2	84.378

**LINE TABLE**

LINE	BEARING	DISTANCE
L1	S 05°57' W	102.83'
L2	S 06°24' E	919.97'
L3	N 58°53' W	1127.32'
L4	N 11°08' W	1542.43'

**CURVE TABLE**

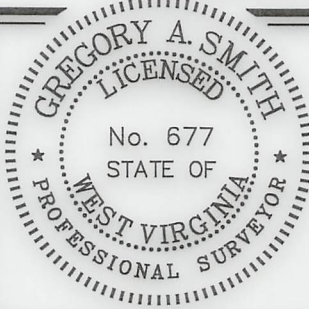
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	48.12'	447.92'	S 00°29' E	48.10'
C2	463.66'	10425.20'	S 05°29' E	463.62'
C3	132.05'	445.69'	S 01°13' W	131.57'
C4	80.75'	144.71'	S 26°18' W	79.71'
C5	69.45'	87.98'	S 69°25' W	67.66'
C6	90.92'	208.18'	N 73°26' W	90.20'
C7	165.91'	581.99'	N 52°50' W	165.35'
C8	405.60'	1418.52'	N 36°12' W	404.22'



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 25651 | 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

**LEGEND**

AS DRILLED	
PROPOSED	



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

P.S. 677 *Gregory A. Smith*

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

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**LANDING POINT**

NAD'83 S.P.C.(FT)	N. 465,285.3	E. 1,633,027.8
NAD'83 GEO.	LAT-(N) 39.771328	LONG-(W) 80.693549
NAD'83 UTM (M)	N. 4,402,422.2	E. 526,245.7

**BOTTOM HOLE**

NAD'83 S.P.C.(FT)	N. 470,989.4	E. 1,629,914.7
NAD'83 GEO.	LAT-(N) 39.786872	LONG-(W) 80.704895
NAD'83 UTM (M)	N. 4,404,144.2	E. 525,268.2

**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
LEASE # (SEE WW-6A1)	
SURFACE OWNER (SEE TABLE)	

SCALE 1" = 2000' FILE NO. 8811P2HMR-AD.dwg  
 KEITH STERN N-2HM-REV1  
 DATE FEBRUARY 15, 20 23  
 REVISED \_\_\_\_\_, 20 \_\_\_\_  
 OPERATORS WELL NO. KEITH STERN N-2HM  
 API WELL NO. 47 - 051 - 02373  
 NO. STATE COUNTY PERMIT

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

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DARREN BROWN - CT CORPORATION  
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5098 WASHINGTON ST. W, STE 407  
 FORT WORTH, TX 76107 CHARLESTON, WV 25313-1561

COUNTY NAME PERMIT



10,745' B.H. A.D.

7,151' T.H. A.D.

**KEITH STERN N LEASE  
WELL 2HM  
TUG HILL OPERATING**

B.H.  
A.D.

T.H. LATITUDE 39°47'30"  
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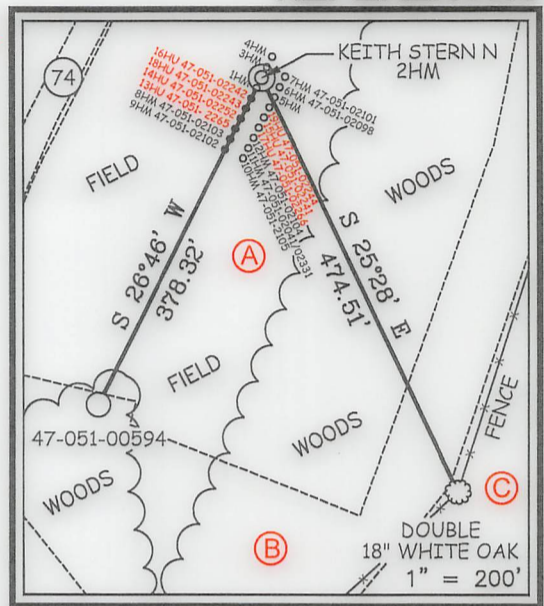
T.H. LONGITUDE 80°40'00"  
B.H. LONGITUDE 80°40'00"

1,747' B.H.A.D.  
6,103' T.H. A.D.

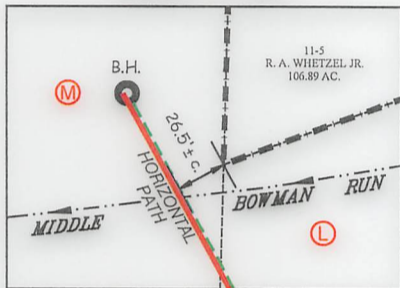
MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
9-13-11.1	SAMUEL & HEATHER SUHODOLSKI	0.49
9-13-14	MARGARET K. FOX - LIFE	3.00
9-14-1.2	KENNETH N. & TERESA A. SMERTNECK	1.02
9-14-2	MICHAEL L. ALVAREZ	0.75
9-14-3	MICHAEL L. ALVAREZ	NORTH P/O 3 PCLS
9-14-4	MICHAEL L. ALVAREZ	3 PCLS & 1/8 AC.
9-14-5	MICHAEL L. ALVAREZ	200 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.
9-14-11.2	LOYE A. BLAKE	4.00
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
9-14-25	PATRICIA A. DUGAS	0.559
9-14-27	PATRICK J. SCHELLHASE EST - TRUST	3.004
9-14-28	CHARLES R. SCHELLHASE, ET UX	3.029
9-14-45	GEORGE R. TAYLOR, ET UX	10.98
9-14-46.1	MARHA JANE FAZZARO	1.512

T.H. A.D.

**REFERENCES**



DETAIL  
SCALE: 1" = 100'



**NOTES ON SURVEY**

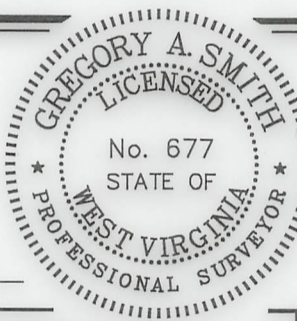
- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS OR DWELLINGS > 2500 SQ. FT. WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- BASED ON WV DOT COUNTY ROUTE 74 IS A 40' STRIP OF LAND ACQUIRED IN NUMEROUS DEEDS.
- PLAT UPDATED TO SHOW AS-DRILLED PATH.
- AS DRILLED DATA PROVIDED BY TUG HILL OPERATING.



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  
slsvv.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.

P.S. 677 Gregory A. Smith



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE FEBRUARY 15, 20 23  
REVISED \_\_\_\_\_, 20 \_\_\_\_  
OPERATORS WELL NO. KEITH STERN N-2HM  
API WELL NO. 47 - 051 - 02373  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8811P2HMR-AD.dwg  
KEITH STERN N-2HM-REV1  
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 \_\_\_\_\_ SHALLOW X  
LOCATION: GROUND = 742.10' ELEVATION PROPOSED = 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 MARCELLUS ESTIMATED DEPTH TVD: 6,401' / TMD: 13,740'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DARREN BROWN - CT CORPORATION  
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5098 WASHINGTON ST. W, STE 407  
FORT WORTH, TX 76107 CHARLESTON, WV 25313-1561

COUNTY NAME  
PERMIT