



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Harold D. Ward, Cabinet Secretary
www.dep.wv.gov

Monday, April 5, 2021
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOULEVARD, PLAZA II
SUITE 200
CANONSBURG, PA 15317

Re: Permit Modification Approval for KEITH STERN S-9HM
47-051-02102-00-00

Casing Modification

TUG HILL OPERATING, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

A handwritten signature in blue ink, appearing to read 'James A. Martin'.

James A. Martin
Chief

Operator's Well Number: KEITH STERN S-9HM
Farm Name: TH EXPLORATION LLC
U.S. WELL NUMBER: 47-051-02102-00-00
Horizontal 6A New Drill
Date Modification Issued: 4/5/2021

Promoting a healthy environment.

04/09/2021



March 3, 2021

WADE STANSBERRY
WV DEP OFFICE OF OIL & GAS
601 57TH STREET SE
CHARLESTON, WV 25304-2345

VIA USPS

**RE: Keith Stern S-9HM API #47-051-02102 (H6A Permit Modification)
Meade District, Marshall County, WV**

Dear Wade:

Tug Hill Operating, LLC is submitting a permit modification for its permitted well, Keith Stern S-9HM to update the freshwater depth as well as freshwater/coal casing string. Therefore, enclosed please find the following:

- Modified WW-6B with changes highlighted in yellow.
- WW-6A with certified mail receipts to notice appropriate parties of freshwater and coal string changes.

If you have any questions or need any additional information, please do not hesitate to call me at (304) 376-0111. Thank you for attention to this matter, it is greatly appreciated.

Sincerely,

AMY MORRIS
PERMIT SPECIALIST-APPALACHIA REGION
TUG HILL OPERATING, LLC

Enclosures

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Meade Glen Easton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Keith Stern S-9HM Well Pad Name: Keith Stern

3) Farm Name/Surface Owner: TH Exploration, LLC Public Road Access: Fish Creek Road (County Route 74)

4) Elevation, current ground: 747' Elevation, proposed post-construction: 747'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____
(b) If Gas Shallow Deep _____
Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6251' - 6302', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6405'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 14,241'

11) Proposed Horizontal Leg Length: 7,429.76'

12) Approximate Fresh Water Strata Depths: 70'; 406'

13) Method to Determine Fresh Water Depths: Use shallow offset wells to determine deepest freshwater, or determine using pre-drill tests, testing while drilling or petrophysical evaluation of resistivity.

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 307' and Pittsburgh Coal - 400'

16) Approximate Depth to Possible Void (coal mine, karst, other): None

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No

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(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259ft^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	490'	490'	690ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	490'	490'	690ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,203'	2,203'	714ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	14,241'	14,241'	3645ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	6,594'		
Liners							

du
10/16/2020

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17.5"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17.5"	.33	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE #24	1.19
Production	5 1/2"	8 7/8" _ 8 3/4"	.361	12,640	10,112	SEE #24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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JK
10/16/2020

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill through the Marcellus tagging less than 100' from the top of the Onondaga to get depths and log data. Plug back to proposed kick off point. Drill the horizontal section to planned and proposed TD. Run casing and cement to surface. Run Bond Log from app. 60 deg to surface. Make clean out run and stimulate.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well to completed with approximately 18,570,000 lb. proppant and 287,106 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 10.35 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.32 acres

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediate will have 1 centralizer every other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

24) Describe all cement additives associated with each cement type:

Sfc - Premium NE-1 + 2% CaCl; Int1 - Premium NE-1 + 1.5% CaCL + Flake; Int2 - Lead: Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170 Tail: Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate; Kick Plug - Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L; Prod - Lead: 50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L Tail: 25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L

25) Proposed borehole conditioning procedures:

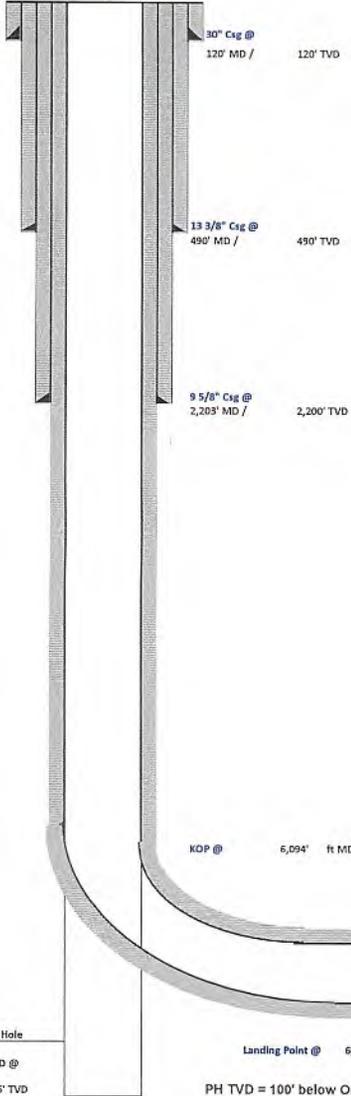
Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH.

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*Note: Attach additional sheets as needed.



WELL NAME: Keith Stern 5-9HM
 STATE: WV COUNTY: Marshall
 DISTRICT: Meade
 DF Elev: 747' GL Elev: 747'
 TD: 14,241'
 TH Latitude: 39.77470796
 TH Longitude: -80.6922421
 BH Latitude: 39.75238
 BH Longitude: -80.679299



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	406
Sewickley Coal	307
Pittsburgh Coal	400
Big Lime	1614
Weir	1927
Berea	2119
Gordon	2384
Rhinestraet	5395
Genesee/Burkett	6109
Tully	6140
Hamilton	6175
Marcellus	6254
Landing Depth	6291
Onondaga	6305
Pilot Hole Depth	6405

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	8W	8W	Surface
Surface	17.5	13 3/8	490'	490'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,203'	2,200'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	14,241'	6,420'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	669	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	727	A	15	Air	1 Centralizer every other jt
Production	3,221	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

MW 10/16/2020

Pilot Hole
PH TD @
6,405' TVD

Landing Point @ 6,812' MD / 6,291' TVD
PH TVD = 100' below Onondaga Top

Lateral TD @ 14,241' R MD
6,420' R TVD

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Tug Hill Operating, LLC Casing and Cement Program

Keith Stern S-9HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	490'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,203'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	14,241'	CTS

Cement

Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19

Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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Well: Keith Stern S-09 HM (slot A)
 Site: Keith Stern
 Project: Marshall County, West Virginia
 Design: rev1

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	5.00	200.00	1549.68	-10.24	-3.73	2.00	200.00	7.80	Begin 5.00° tangent
4	3106.24	5.00	200.00	3100.00	-137.70	-50.12	0.00	0.00	104.87	Begin 3°/100' build
5	3406.24	14.00	200.00	3395.58	-184.18	-67.04	3.00	0.00	140.27	Begin 3°/100' build/turn
6	3694.10	21.75	187.29	3669.44	-269.97	-85.75	3.00	-32.89	210.76	Begin 21.75° tangent
7	6094.06	21.75	187.29	5898.50	-1152.22	-198.64	0.00	0.00	968.36	Begin 10°/100' build/turn
8	6812.18	89.00	150.31	6291.00	-1665.05	-12.73	10.00	-39.28	1512.26	Begin 89.00° lateral section
9	14240.57	89.00	150.31	6420.00	-8117.44	3665.73	0.00	0.00	8906.76	PBHL/TD 14240.57 MD/6420.00 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: GL @ 744.00usft

Northing	Easting	Latitude	Longitude
14444845.71	1726887.21	39.77470796	-80.69224210

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.91°

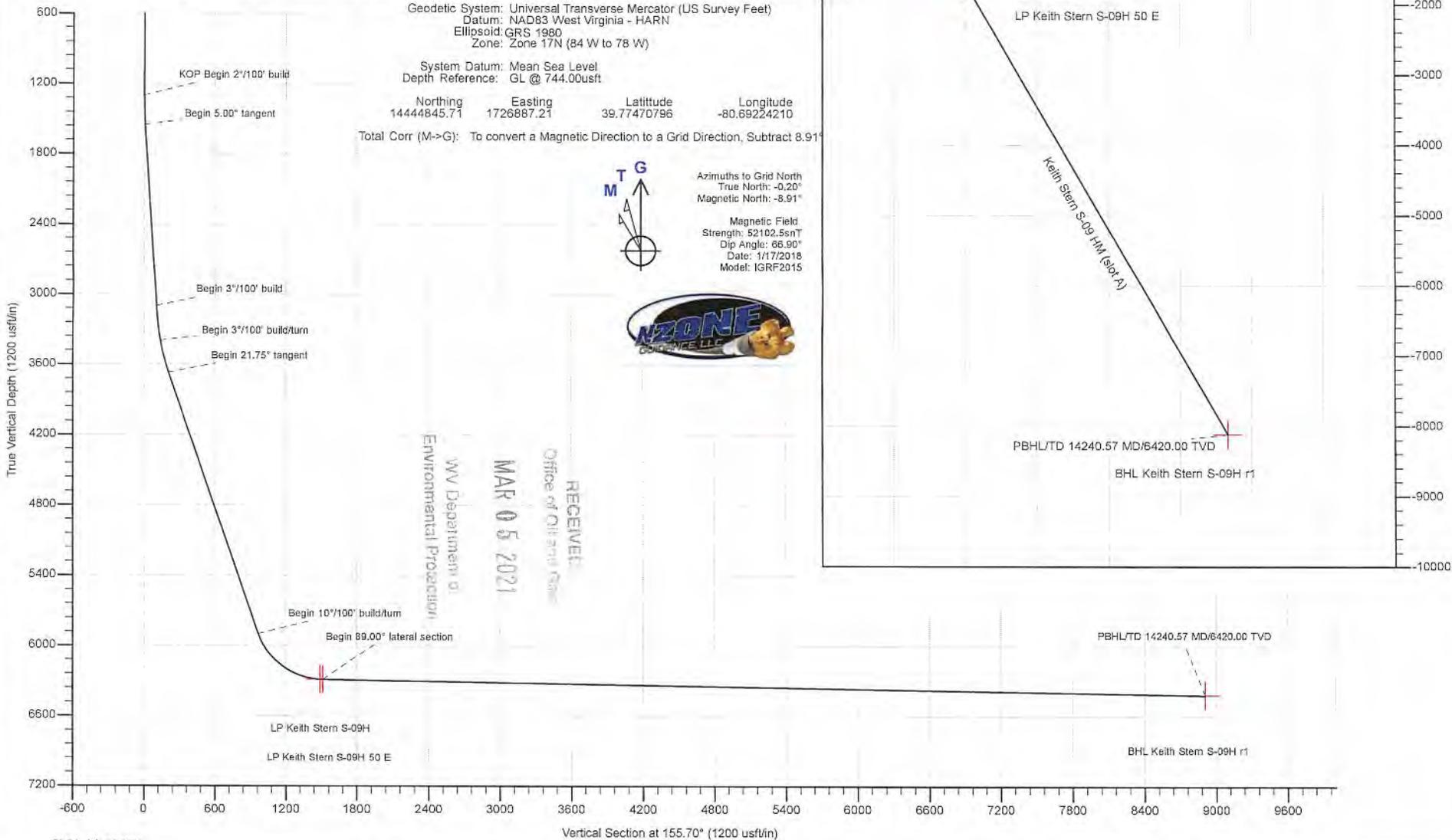


Azimuths to Grid North
 True North: -0.20°
 Magnetic North: -8.91°

Magnetic Field
 Strength: 52102.5nT
 Dip Angle: 66.90°
 Date: 1/17/2018
 Model: IGRF2015



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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Keith Stern S-09 HM (slot A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 744.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 744.00usft
Site:	Keith Stern	North Reference:	Grid
Well:	Keith Stern S-09 HM (slot A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Project	Marshall County, West Virginia		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Keith Stern				
Site Position:		Northing:	14,444,890.33 usft	Latitude:	39.77483004
From:	Lat/Long	Easting:	1,726,932.47 usft	Longitude:	-80.69208048
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.20 °

Well	Keith Stern S-09 HM (slot A)					
Well Position	+N/-S	0.00 usft	Northing:	14,444,845.72 usft	Latitude:	39.77470796
	+E/-W	0.00 usft	Easting:	1,726,887.21 usft	Longitude:	-80.69224210
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	744.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/17/2018	-8.71	66.90	52,102.46383429

Design	rev1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	155.70

Plan Survey Tool Program	Date	7/21/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	14,240.57 rev1 (Original Hole)	MWD	MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,550.00	5.00	200.00	1,549.68	-10.24	-3.73	2.00	2.00	0.00	200.00	
3,106.24	5.00	200.00	3,100.00	-137.70	-50.12	0.00	0.00	0.00	0.00	
3,406.24	14.00	200.00	3,395.58	-184.18	-67.04	3.00	3.00	0.00	0.00	
3,694.10	21.75	187.29	3,669.44	-269.97	-85.75	3.00	2.69	-4.41	-32.89	
6,094.06	21.75	187.29	5,898.50	-1,152.22	-198.64	0.00	0.00	0.00	0.00	
6,812.18	89.00	150.31	6,291.00	-1,665.05	-12.73	10.00	9.37	-5.15	-39.28	LP Keith Stern S-09H
14,240.57	89.00	150.31	6,420.00	-8,117.44	3,665.73	0.00	0.00	0.00	0.00	BHL Keith Stern S-09

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Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Keith Stern
 Well: Keith Stern S-09 HM (slot A)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Keith Stern S-09 HM (slot A)
 TVD Reference: GL @ 744.00usft
 MD Reference: GL @ 744.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
100.00	0.00	0.00	100.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
200.00	0.00	0.00	200.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
300.00	0.00	0.00	300.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
400.00	0.00	0.00	400.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
500.00	0.00	0.00	500.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
600.00	0.00	0.00	600.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
700.00	0.00	0.00	700.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
800.00	0.00	0.00	800.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
900.00	0.00	0.00	900.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,444,845.72	1,726,887.21	39.77470796	-80.69224210
KOP Begin 2°/100' build									
1,400.00	2.00	200.00	1,399.98	-1.64	-0.60	14,444,844.08	1,726,886.62	39.77470346	-80.69224424
1,500.00	4.00	200.00	1,499.83	-6.56	-2.39	14,444,839.16	1,726,884.83	39.77468998	-80.69225068
1,550.00	5.00	200.00	1,549.68	-10.24	-3.73	14,444,835.47	1,726,883.48	39.77467966	-80.69225550
Begin 5.00° tangent									
1,600.00	5.00	200.00	1,599.49	-14.34	-5.22	14,444,831.38	1,726,881.99	39.77466863	-80.69226085
1,700.00	5.00	200.00	1,699.11	-22.53	-8.20	14,444,823.19	1,726,879.01	39.77464617	-80.69227156
1,800.00	5.00	200.00	1,798.73	-30.72	-11.18	14,444,815.00	1,726,876.03	39.77462371	-80.69228227
1,900.00	5.00	200.00	1,898.35	-38.91	-14.16	14,444,806.81	1,726,873.05	39.77460124	-80.69229298
2,000.00	5.00	200.00	1,997.97	-47.10	-17.14	14,444,798.62	1,726,870.07	39.77457878	-80.69230369
2,100.00	5.00	200.00	2,097.59	-55.29	-20.12	14,444,790.43	1,726,867.09	39.77455632	-80.69231440
2,200.00	5.00	200.00	2,197.21	-63.48	-23.10	14,444,782.24	1,726,864.11	39.77453385	-80.69232511
2,300.00	5.00	200.00	2,296.82	-71.67	-26.09	14,444,774.05	1,726,861.13	39.77451139	-80.69233582
2,400.00	5.00	200.00	2,396.44	-79.86	-29.07	14,444,765.86	1,726,858.15	39.77448892	-80.69234652
2,500.00	5.00	200.00	2,496.06	-88.05	-32.05	14,444,757.67	1,726,855.17	39.77446646	-80.69235723
2,599.99	5.00	200.00	2,595.68	-96.24	-35.03	14,444,749.48	1,726,852.18	39.77444400	-80.69236794
2,699.99	5.00	200.00	2,695.30	-104.43	-38.01	14,444,741.29	1,726,849.20	39.77442153	-80.69237865
2,799.99	5.00	200.00	2,794.92	-112.62	-40.99	14,444,733.10	1,726,846.22	39.77439907	-80.69238936
2,899.99	5.00	200.00	2,894.54	-120.81	-43.97	14,444,724.91	1,726,843.24	39.77437661	-80.69240007
2,999.99	5.00	200.00	2,994.16	-129.00	-46.95	14,444,716.72	1,726,840.26	39.77435414	-80.69241078
3,099.99	5.00	200.00	3,093.78	-137.19	-49.93	14,444,708.53	1,726,837.28	39.77433168	-80.69242149
3,106.24	5.00	200.00	3,100.00	-137.70	-50.12	14,444,708.02	1,726,837.09	39.77433028	-80.69242216
Begin 3°/100' build									
3,199.99	7.81	200.00	3,193.16	-147.53	-53.70	14,444,698.19	1,726,833.52	39.77430332	-80.69243501
3,299.99	10.81	200.00	3,291.83	-162.73	-59.23	14,444,682.98	1,726,827.98	39.77426161	-80.69245489
3,399.99	13.81	200.00	3,389.52	-182.77	-66.52	14,444,662.95	1,726,820.69	39.77420666	-80.69248109
3,406.24	14.00	200.00	3,395.58	-184.18	-67.04	14,444,661.54	1,726,820.18	39.77420279	-80.69248294
Begin 3°/100' build/tum									
3,499.99	16.43	194.60	3,486.05	-207.67	-74.26	14,444,638.04	1,726,812.95	39.77413834	-80.69250893
3,599.99	19.14	190.34	3,581.26	-237.49	-80.77	14,444,608.22	1,726,806.45	39.77405651	-80.69253245
3,694.10	21.75	187.29	3,669.44	-269.97	-85.75	14,444,575.75	1,726,801.46	39.77396736	-80.69255059
Begin 21.75° tangent									
3,699.99	21.75	187.29	3,674.91	-272.14	-86.03	14,444,573.58	1,726,801.18	39.77396141	-80.69255160
3,799.99	21.75	187.29	3,767.79	-308.90	-90.73	14,444,536.82	1,726,796.48	39.77386050	-80.69256879
3,899.99	21.75	187.29	3,860.67	-345.66	-95.44	14,444,500.06	1,726,791.78	39.77375959	-80.69258598
3,999.99	21.75	187.29	3,953.55	-382.42	-100.14	14,444,463.30	1,726,787.07	39.77365868	-80.69260317
4,099.99	21.75	187.29	4,046.42	-419.18	-104.84	14,444,426.54	1,726,782.37	39.77355777	-80.69262036
4,199.99	21.75	187.29	4,139.30	-455.94	-109.55	14,444,389.77	1,726,777.67	39.77345686	-80.69263755
4,299.99	21.75	187.29	4,232.18	-492.70	-114.25	14,444,353.01	1,726,772.96	39.77335595	-80.69265474
4,399.99	21.75	187.29	4,325.06	-529.46	-118.95	14,444,316.25	1,726,768.26	39.77325504	-80.69267193



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Keith Stern
 Well: Keith Stern S-09 HM (slot A)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Keith Stern S-09 HM (slot A)
 TVD Reference: GL @ 744.00usft
 MD Reference: GL @ 744.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,499.99	21.75	187.29	4,417.94	-566.23	-123.66	14,444,279.49	1,726,763.55	39.77315413	-80.69268912
4,599.99	21.75	187.29	4,510.82	-602.99	-128.36	14,444,242.73	1,726,758.85	39.77305322	-80.69270631
4,699.99	21.75	187.29	4,603.70	-639.75	-133.07	14,444,205.97	1,726,754.15	39.77295230	-80.69272350
4,799.99	21.75	187.29	4,696.58	-676.51	-137.77	14,444,169.21	1,726,749.44	39.77285139	-80.69274069
4,899.99	21.75	187.29	4,789.46	-713.27	-142.47	14,444,132.45	1,726,744.74	39.77275048	-80.69275788
4,999.99	21.75	187.29	4,882.33	-750.03	-147.18	14,444,095.69	1,726,740.03	39.77264957	-80.69277507
5,099.99	21.75	187.29	4,975.21	-786.79	-151.88	14,444,058.93	1,726,735.33	39.77254866	-80.69279226
5,199.99	21.75	187.29	5,068.09	-823.55	-156.58	14,444,022.17	1,726,730.63	39.77244775	-80.69280945
5,299.99	21.75	187.29	5,160.97	-860.31	-161.29	14,443,985.41	1,726,725.92	39.77234684	-80.69282664
5,399.99	21.75	187.29	5,253.85	-897.07	-165.99	14,443,948.64	1,726,721.22	39.77224593	-80.69284383
5,499.99	21.75	187.29	5,346.73	-933.83	-170.70	14,443,911.88	1,726,716.52	39.77214502	-80.69286102
5,599.99	21.75	187.29	5,439.61	-970.59	-175.40	14,443,875.12	1,726,711.81	39.77204411	-80.69287821
5,699.99	21.75	187.29	5,532.49	-1,007.36	-180.10	14,443,838.36	1,726,707.11	39.77194320	-80.69289540
5,799.99	21.75	187.29	5,625.36	-1,044.12	-184.81	14,443,801.60	1,726,702.40	39.77184229	-80.69291258
5,899.99	21.75	187.29	5,718.24	-1,080.88	-189.51	14,443,764.84	1,726,697.70	39.77174138	-80.69292977
5,999.99	21.75	187.29	5,811.12	-1,117.64	-194.22	14,443,728.08	1,726,693.00	39.77164047	-80.69294696
6,094.06	21.75	187.29	5,898.50	-1,152.22	-198.64	14,443,693.50	1,726,688.57	39.77154554	-80.69296313
Begin 10°/100' build/turn									
6,099.99	22.21	186.30	5,903.99	-1,154.42	-198.90	14,443,691.29	1,726,688.31	39.77153949	-80.69296409
6,199.99	30.66	174.10	5,993.52	-1,198.69	-198.35	14,443,647.03	1,726,688.86	39.77141793	-80.69296268
6,299.99	39.78	166.93	6,075.17	-1,255.35	-188.47	14,443,590.37	1,726,698.74	39.77126222	-80.69292820
6,399.99	49.19	162.10	6,146.45	-1,322.70	-169.56	14,443,523.02	1,726,717.66	39.77107709	-80.69286170
6,499.99	58.76	158.49	6,205.20	-1,398.68	-142.18	14,443,447.04	1,726,745.03	39.77086817	-80.69276520
6,599.99	68.41	155.55	6,249.65	-1,480.98	-107.18	14,443,364.73	1,726,780.04	39.77064181	-80.69264163
6,699.99	78.10	152.99	6,278.42	-1,567.11	-65.61	14,443,278.60	1,726,821.61	39.77040488	-80.69249475
6,799.99	87.82	150.60	6,290.66	-1,654.45	-18.74	14,443,191.27	1,726,868.47	39.77016458	-80.69232902
6,812.18	89.00	150.31	6,291.00	-1,665.06	-12.73	14,443,180.66	1,726,874.48	39.77013540	-80.69230776
Begin 89.00° lateral section									
6,899.99	89.00	150.31	6,292.53	-1,741.33	30.75	14,443,104.39	1,726,917.96	39.76992553	-80.69215395
6,999.99	89.00	150.31	6,294.26	-1,828.19	80.27	14,443,017.53	1,726,967.48	39.76986652	-80.69197879
7,099.99	89.00	150.31	6,296.00	-1,915.05	129.79	14,442,930.67	1,727,017.00	39.76944751	-80.69180362
7,199.99	89.00	150.31	6,297.73	-2,001.91	179.31	14,442,843.81	1,727,066.52	39.76920850	-80.69162846
7,299.99	89.00	150.31	6,299.47	-2,088.77	228.83	14,442,756.95	1,727,116.04	39.76896949	-80.69145330
7,399.99	89.00	150.31	6,301.21	-2,175.63	278.35	14,442,670.09	1,727,165.56	39.76873048	-80.69127814
7,499.99	89.00	150.31	6,302.94	-2,262.49	327.87	14,442,583.23	1,727,215.08	39.76849147	-80.69110298
7,599.98	89.00	150.31	6,304.68	-2,349.35	377.38	14,442,496.36	1,727,264.60	39.76825245	-80.69092782
7,699.98	89.00	150.31	6,306.42	-2,436.21	426.90	14,442,409.50	1,727,314.12	39.76801344	-80.69075267
7,799.98	89.00	150.31	6,308.15	-2,523.07	476.42	14,442,322.64	1,727,363.63	39.76777443	-80.69057751
7,899.98	89.00	150.31	6,309.89	-2,609.94	525.94	14,442,235.78	1,727,413.15	39.76753542	-80.69040236
7,999.98	89.00	150.31	6,311.63	-2,696.80	575.46	14,442,148.92	1,727,462.67	39.76729640	-80.69022720
8,099.98	89.00	150.31	6,313.36	-2,783.66	624.98	14,442,062.06	1,727,512.19	39.76705739	-80.69005205
8,199.98	89.00	150.31	6,315.10	-2,870.52	674.50	14,441,975.20	1,727,561.71	39.76681837	-80.68987690
8,299.98	89.00	150.31	6,316.84	-2,957.38	724.02	14,441,888.34	1,727,611.23	39.76657936	-80.68970175
8,399.98	89.00	150.31	6,318.57	-3,044.24	773.53	14,441,801.48	1,727,660.75	39.76634035	-80.68952660
8,499.98	89.00	150.31	6,320.31	-3,131.10	823.05	14,441,714.62	1,727,710.27	39.76610133	-80.68935146
8,599.98	89.00	150.31	6,322.05	-3,217.96	872.57	14,441,627.75	1,727,759.78	39.76586232	-80.68917631
8,699.98	89.00	150.31	6,323.78	-3,304.82	922.09	14,441,540.89	1,727,809.30	39.76562330	-80.68900117
8,799.98	89.00	150.31	6,325.52	-3,391.68	971.61	14,441,454.03	1,727,858.82	39.76538429	-80.68882602
8,899.98	89.00	150.31	6,327.26	-3,478.55	1,021.13	14,441,367.17	1,727,908.34	39.76514527	-80.68865088
8,999.98	89.00	150.31	6,328.99	-3,565.41	1,070.65	14,441,280.31	1,727,957.86	39.76490625	-80.68847574
9,099.98	89.00	150.31	6,330.73	-3,652.27	1,120.17	14,441,193.45	1,728,007.38	39.76466724	-80.68830060
9,199.98	89.00	150.31	6,332.47	-3,739.13	1,169.68	14,441,106.59	1,728,056.90	39.76442822	-80.68812546
9,299.98	89.00	150.31	6,334.20	-3,825.99	1,219.20	14,441,019.73	1,728,106.42	39.76418920	-80.68795033
9,399.98	89.00	150.31	6,335.94	-3,912.85	1,268.72	14,440,932.87	1,728,155.93	39.76395019	-80.68777519



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MAR 05 2021

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,499.98	89.00	150.31	6,337.68	-3,999.71	1,318.24	14,440,846.01	1,728,205.45	39.76371117	-80.68760006
9,599.98	89.00	150.31	6,339.41	-4,086.57	1,367.76	14,440,759.14	1,728,254.97	39.76347215	-80.68742492
9,699.98	89.00	150.31	6,341.15	-4,173.43	1,417.28	14,440,672.28	1,728,304.49	39.76323313	-80.68724979
9,799.98	89.00	150.31	6,342.89	-4,260.29	1,466.80	14,440,585.42	1,728,354.01	39.76299412	-80.68707466
9,899.98	89.00	150.31	6,344.62	-4,347.16	1,516.32	14,440,498.56	1,728,403.53	39.76275510	-80.68689953
9,999.98	89.00	150.31	6,346.36	-4,434.02	1,565.84	14,440,411.70	1,728,453.05	39.76251608	-80.68672440
10,099.98	89.00	150.31	6,348.10	-4,520.88	1,615.35	14,440,324.84	1,728,502.57	39.76227706	-80.68654927
10,199.98	89.00	150.31	6,349.83	-4,607.74	1,664.87	14,440,237.98	1,728,552.09	39.76203804	-80.68637415
10,299.98	89.00	150.31	6,351.57	-4,694.60	1,714.39	14,440,151.12	1,728,601.60	39.76179902	-80.68619902
10,399.98	89.00	150.31	6,353.31	-4,781.46	1,763.91	14,440,064.26	1,728,651.12	39.76156000	-80.68602390
10,499.98	89.00	150.31	6,355.04	-4,868.32	1,813.43	14,439,977.40	1,728,700.64	39.76132098	-80.68584877
10,599.98	89.00	150.31	6,356.78	-4,955.18	1,862.95	14,439,890.53	1,728,750.16	39.76108196	-80.68567365
10,699.98	89.00	150.31	6,358.51	-5,042.04	1,912.47	14,439,803.67	1,728,799.68	39.76084294	-80.68549853
10,799.98	89.00	150.31	6,360.25	-5,128.90	1,961.99	14,439,716.81	1,728,849.20	39.76060392	-80.68532341
10,899.98	89.00	150.31	6,361.99	-5,215.77	2,011.50	14,439,629.95	1,728,898.72	39.76036490	-80.68514829
10,999.98	89.00	150.31	6,363.72	-5,302.63	2,061.02	14,439,543.09	1,728,948.24	39.76012588	-80.68497318
11,099.98	89.00	150.31	6,365.46	-5,389.49	2,110.54	14,439,456.23	1,728,997.75	39.75988685	-80.68479806
11,199.98	89.00	150.31	6,367.20	-5,476.35	2,160.06	14,439,369.37	1,729,047.27	39.75964783	-80.68462295
11,299.98	89.00	150.31	6,368.93	-5,563.21	2,209.58	14,439,282.51	1,729,096.79	39.75940881	-80.68444783
11,399.98	89.00	150.31	6,370.67	-5,650.07	2,259.10	14,439,195.65	1,729,146.31	39.75916979	-80.68427272
11,499.98	89.00	150.31	6,372.41	-5,736.93	2,308.62	14,439,108.79	1,729,195.83	39.75893076	-80.68409761
11,599.98	89.00	150.31	6,374.14	-5,823.79	2,358.14	14,439,021.92	1,729,245.35	39.75869174	-80.68392250
11,699.98	89.00	150.31	6,375.88	-5,910.65	2,407.66	14,438,935.06	1,729,294.87	39.75845272	-80.68374739
11,799.98	89.00	150.31	6,377.62	-5,997.51	2,457.17	14,438,848.20	1,729,344.39	39.75821369	-80.68357229
11,899.98	89.00	150.31	6,379.35	-6,084.38	2,506.69	14,438,761.34	1,729,393.90	39.75797467	-80.68339718
11,999.98	89.00	150.31	6,381.09	-6,171.24	2,556.21	14,438,674.48	1,729,443.42	39.75773565	-80.68322208
12,099.98	89.00	150.31	6,382.83	-6,258.10	2,605.73	14,438,587.62	1,729,492.94	39.75749662	-80.68304697
12,199.98	89.00	150.31	6,384.56	-6,344.96	2,655.25	14,438,500.76	1,729,542.46	39.75725760	-80.68287187
12,299.98	89.00	150.31	6,386.30	-6,431.82	2,704.77	14,438,413.90	1,729,591.98	39.75701857	-80.68269677
12,399.98	89.00	150.31	6,388.04	-6,518.68	2,754.29	14,438,327.04	1,729,641.50	39.75677955	-80.68252167
12,499.98	89.00	150.31	6,389.77	-6,605.54	2,803.81	14,438,240.18	1,729,691.02	39.75654052	-80.68234657
12,599.98	89.00	150.31	6,391.51	-6,692.40	2,853.32	14,438,153.31	1,729,740.54	39.75630150	-80.68217147
12,699.97	89.00	150.31	6,393.25	-6,779.26	2,902.84	14,438,066.45	1,729,790.06	39.75606247	-80.68199638
12,799.97	89.00	150.31	6,394.98	-6,866.12	2,952.36	14,437,979.59	1,729,839.57	39.75582344	-80.68182128
12,899.97	89.00	150.31	6,396.72	-6,952.99	3,001.88	14,437,892.73	1,729,889.09	39.75558442	-80.68164619
12,999.97	89.00	150.31	6,398.46	-7,039.85	3,051.40	14,437,805.87	1,729,938.61	39.75534539	-80.68147110
13,099.97	89.00	150.31	6,400.19	-7,126.71	3,100.92	14,437,719.01	1,729,988.13	39.75510636	-80.68129601
13,199.97	89.00	150.31	6,401.93	-7,213.57	3,150.44	14,437,632.15	1,730,037.65	39.75486733	-80.68112092
13,299.97	89.00	150.31	6,403.67	-7,300.43	3,199.96	14,437,545.29	1,730,087.17	39.75462831	-80.68094583
13,399.97	89.00	150.31	6,405.40	-7,387.29	3,249.47	14,437,458.43	1,730,136.69	39.75438928	-80.68077074
13,499.97	89.00	150.31	6,407.14	-7,474.15	3,298.99	14,437,371.57	1,730,186.21	39.75415025	-80.68059565
13,599.97	89.00	150.31	6,408.88	-7,561.01	3,348.51	14,437,284.70	1,730,235.72	39.75391122	-80.68042057
13,699.97	89.00	150.31	6,410.61	-7,647.87	3,398.03	14,437,197.84	1,730,285.24	39.75367219	-80.68024548
13,799.97	89.00	150.31	6,412.35	-7,734.73	3,447.55	14,437,110.98	1,730,334.76	39.75343316	-80.68007040
13,899.97	89.00	150.31	6,414.09	-7,821.60	3,497.07	14,437,024.12	1,730,384.28	39.75319414	-80.67989532
13,999.97	89.00	150.31	6,415.82	-7,908.46	3,546.59	14,436,937.26	1,730,433.80	39.75295511	-80.67972024
14,099.97	89.00	150.31	6,417.56	-7,995.32	3,596.11	14,436,850.40	1,730,483.32	39.75271608	-80.67954516
14,199.97	89.00	150.31	6,419.30	-8,082.18	3,645.63	14,436,763.54	1,730,532.84	39.75247705	-80.67937008
14,240.57	89.00	150.31	6,420.00	-8,117.44	3,665.73	14,436,728.27	1,730,552.94	39.75238000	-80.67929900

PBHL/TD 14240.57 MD/6420.00 TVD



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Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LP Keith Stern S-09H - hit/miss target - Shape - Point	0.00	0.00	6,291.00	-1,665.05	-62.73	14,443,180.66	1,726,824.48	39.77013588	-80.69248570
- plan misses target center by 43.58usft at 6788.64usft MD (6290.12 TVD, -1644.57 N, -24.28 E)									
LP Keith Stern S-09H 5C - plan hits target center - Point	0.00	0.01	6,291.00	-1,665.05	-12.73	14,443,180.66	1,726,874.48	39.77013541	-80.69230777
BHL Keith Stern S-09H r - plan hits target center - Point	0.00	0.00	6,420.00	-8,117.44	3,665.73	14,436,728.27	1,730,552.94	39.75238000	-80.67929900

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build
1,550.00	1,549.68	-10.24	-3.73	Begin 5.00° tangent
3,106.24	3,100.00	-137.70	-50.12	Begin 3°/100' build
3,406.24	3,395.58	-184.18	-67.04	Begin 3°/100' build/turn
3,694.10	3,669.44	-269.97	-85.75	Begin 21.75° tangent
6,094.06	5,898.50	-1,152.22	-198.64	Begin 10°/100' build/turn
6,812.18	6,291.00	-1,665.06	-12.73	Begin 89.00° lateral section
14,240.57	6,420.00	-8,117.44	3,665.73	PBHL/TD 14240.57 MD/6420.00 TVD

**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION**

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

RECEIVED
Office of Oil and Gas

Date of Notice: 2/24/2021 **Date Permit Application Filed:** 2/25/2021

MAR 05 2021

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

WV Department of
Environmental Protection

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)

Name: TH Exploration, LLC (Access Road and Well Pad)
Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15318

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: _____
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: CONSOL Energy, Inc. Attn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

COAL OPERATOR
Name: _____
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: *See attached list
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

*Please attach additional forms if necessary

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

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Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

04/09/2021

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

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WV Department of
Environmental Protection

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

04/09/2021

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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MAR 05 2021
WV Department of
Environmental Protection

04/09/2021

WW-6A
(8-13)

API NO. 47-051 -
OPERATOR WELL NO. see attached list
Well Pad Name: Keith Stern

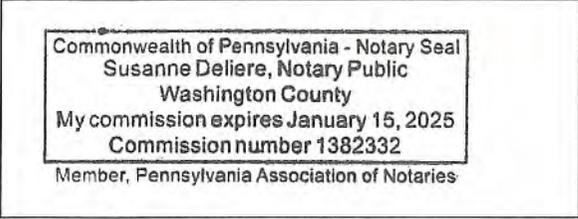
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilltop.com *amiller*

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 23rd day of February, 2021
Susanne Deliere Notary Public
My Commission Expires 1/15/2025

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WV Department of
Environmental Protection

04/09/2021

**WW-6A Notice of Application
Well Number Attachment**

Keith Stern N-1HM
Keith Stern N-2HM
Keith Stern N-3HM
Keith Stern N-4HM
Keith Stern N-5HM
Keith Stern N-6HM (47-051-02098)
Keith Stern N-7HM (47-051-02101)
Keith Stern S-8HM (47-051-02103)
Keith Stern S-9HM (47-051-02102)
Keith Stern S-10HM (47-051-02105)
Keith Stern S-12HM (47-051-02104)

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04/09/2021

Tug Hill Operating, LLC
 380 Southpointe Blvd, Suite 200
 Cannonsburg, PA 15137

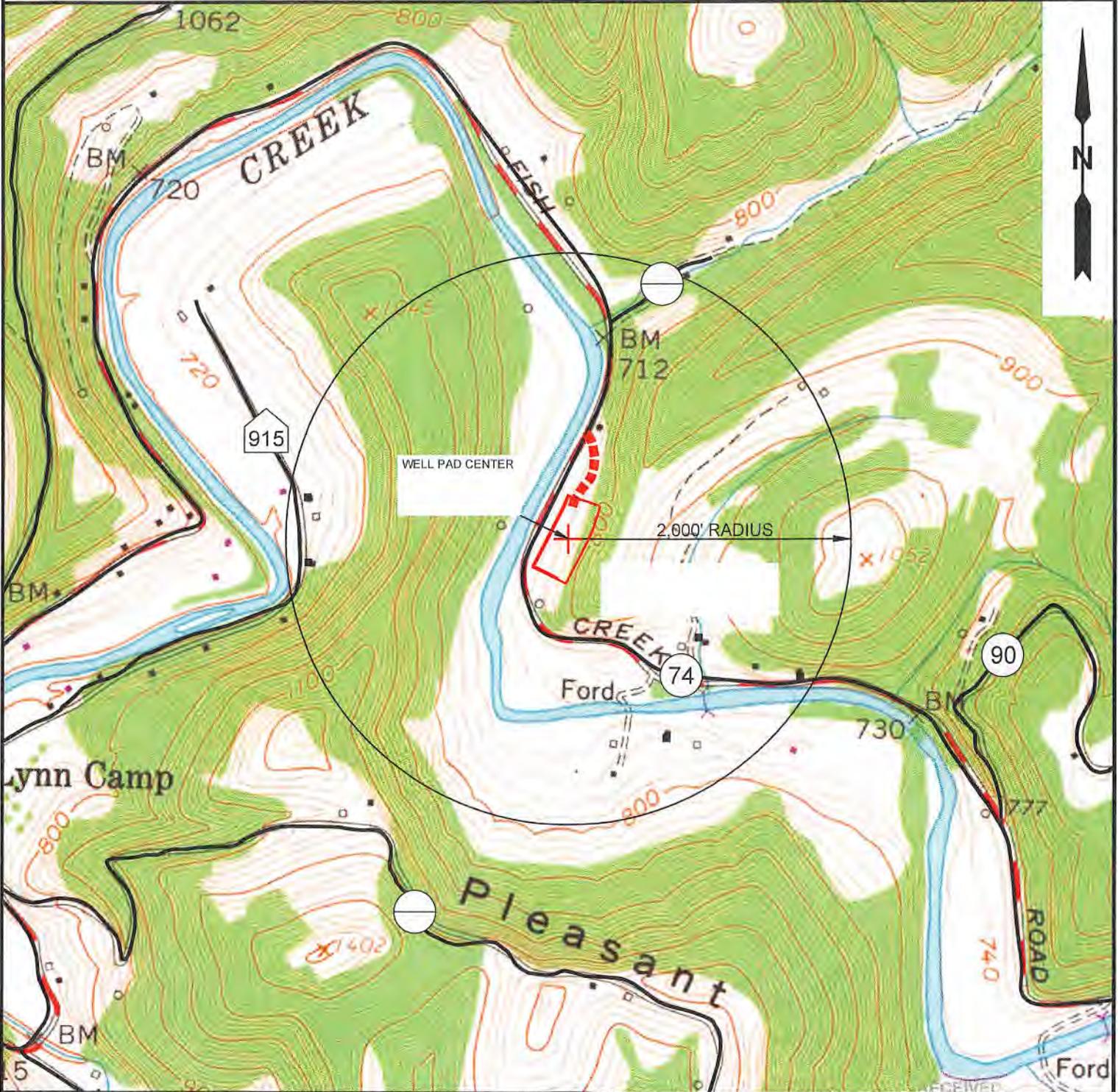
Residences within Two-Thousand Feet (2,000')

Well: KEITH STERN S – 9HM
 District: Meade (House #'s 1-5)
 State: WV

There are five (5) residences, no businesses, no churches, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

<p>House 1 TM 14 Pcl. 20 William K. Stern, Et Ux Phone: 304-843-1478 (Per Address – Keith, Betty & Ginger Sue Stern) Physical Address: 14912 Fish Creek Rd. ✓ Glen Easton, WV 26039 Tax Address: Same</p>	<p>House 2 TM 14 Pcl. 20.1 William K. Stern, Et Ux Phone: 304-843-1478 (Per Address – Keith, Betty & Ginger Sue Stern) Physical Address: 15056 Fish Creek Rd. ✓ Glen Easton, WV 26039 Tax Address: 14912 Fish Creek Rd. Glen Easton, WV 26039</p>	<p>House 3 TM 14 Pcl. 21 Eleanore M. Fox Est. Phone: 304-845-6016 (Per Tax Address – Thomas Fox) Physical Address: None Found – Appears to be an old home. ✓ Tax Address: 100 Lynn Camp Ln. Glen Easton, WV 26039-9707</p>
<p>House 4 TM 14 Pcl. 27 ✓ Patrick J. Shellhase Phone: 304-845-0742; 304-810-0258 Physical Address: 593 Crow Dr. Glen Easton, WV 26039 Tax Address: 2300 7th St. Moundsville, WV 26041</p>	<p>House 5 TM 14 Pcl. 25 ✓ Patricia A. Dugas Phone: None Found ✓ Physical Address: 681 Crow Dr. Glen Easton, WV 26039 Tax Address: Same</p>	<p style="text-align: center;">RECEIVED Office of Oil and Gas MAR 05 2021 WV Department of Environmental Protection</p>

PROPOSED KEITH STERN S - 9HM



NOTE: THERE APPEARS TO BE FIVE (5) POSSIBLE WATER SOURCES WITHIN 2,000'.

Office of Oil and Gas
MAR 05 2021

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5634
www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR: TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	
COUNTY	DISTRICT		
MARSHALL	MEADE		
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8811	07/31/2018	1" = 1000'

WV Department of Environmental Protection
TUG HILL OPERATING
04/09/2021

7019 1640 0002 2948 7572

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OFFICIAL USE

Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ TH Exploration, LLC
Sent To 1320 S. University Drive
Suite 500
Fort Worth, TX 76107

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7530

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OFFICIAL USE

Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ CONSOL Energy, Inc.
Sent To Attn: Casey Saunders
1000 CONSOL Energy Drive
Canonsburg, PA 15317

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7527

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OFFICIAL USE

Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ William K. Stern, Et Ux
Sent To 14912 Fish Creek Road
Glen Easton, WV 26039

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7534

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Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ William K. Stern, Et Ux
Sent To 15056 Fish Creek Road
Glen Easton, WV 26039

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7541

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Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ Eleanore M. Fox Est.
Sent To 100 Lynn Camp Lane
Glen Easton, WV 26039-9707

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7558

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Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ Patrick J. Shellhase
Sent To 593 Crow Drive
Glen Easton, WV 26039

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



7019 1640 0002 2948 7565

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For delivery information, visit our website at www.usps.com™.

OFFICIAL USE

Certified Mail Fee
\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage
\$

Total \$ Patricia A. Dugas
Sent To 681 Crow Drive
Glen Easton, WV 26039

PS Form 3800, April 2010 PSN 7530-01-000-9000 See Reverse for Instructions



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