



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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Wednesday, May 30, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

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

Re: Permit approval for TEN HIGH 1N-18HM
47-051-02019-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

A blue ink signature of James A. Martin, written in a cursive style.

Operator's Well Number: TEN HIGH 1N-18HM
Farm Name: LAWRENCE & SHIRLEY CON.
U.S. WELL NUMBER: 47-051-02019-00-00
Horizontal 6A New Drill
Date Issued: 5/30/2018

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

API Number: 47-051-02019

PERMIT CONDITIONS

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

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: Ten High 1N-18HM Well Pad Name: Ten High

3) Farm Name/Surface Owner: Lawrence & Shirley Conkle, ests Public Road Access: Shepherd Ridge Lane CR 21/9

4) Elevation, current ground: 1310' Elevation, proposed post-construction: 1310'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow Deep _____
Horizontal _____

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2/21/18

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 6747' - 6798', thickness of 51' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,898'

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 19,738'

11) Proposed Horizontal Leg Length: 12,234'

12) Approximate Fresh Water Strata Depths: 70', 1026' ✓

13) Method to Determine Fresh Water Depths: Offset well reports or noticeable flow at the flowline or when need to start soaping

14) Approximate Saltwater Depths: 2180' ✓

15) Approximate Coal Seam Depths: Sewickly Coal - 935' and Pittsburgh Coal - 1020' ✓

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

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

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co. / Marshall County Mine
Depth: 1020' TVD and 297' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

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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	H40	48#	1,076'	1,076' ✓	1098ft^3(CTS)
Coal	13 3/8"	NEW	H40	48#	1,076'	1,076' ✓	1098ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,804'	2,804' ✓	917ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	19,738'	19,738'	5032ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,044'	
Liners	N/A						

J 2/21/18

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 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	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	8960		
Liners	N/A						

PACKERS

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

[Signature]
2/21/18

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

Drill through the Marcellus and TD Pilot Hole 100' into the Onondaga. Log vertical section and run a solid cement plug back to proposed KOP. Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 30,585,000 lb proppant and 472,866 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.2

22) Area to be disturbed for well pad only, less access road (acres): 5.92

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:

*See Attached

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.

Area of Review

Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (12/19/2016) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits

47 051 02019

Permit well - Ten High 1N-18HM

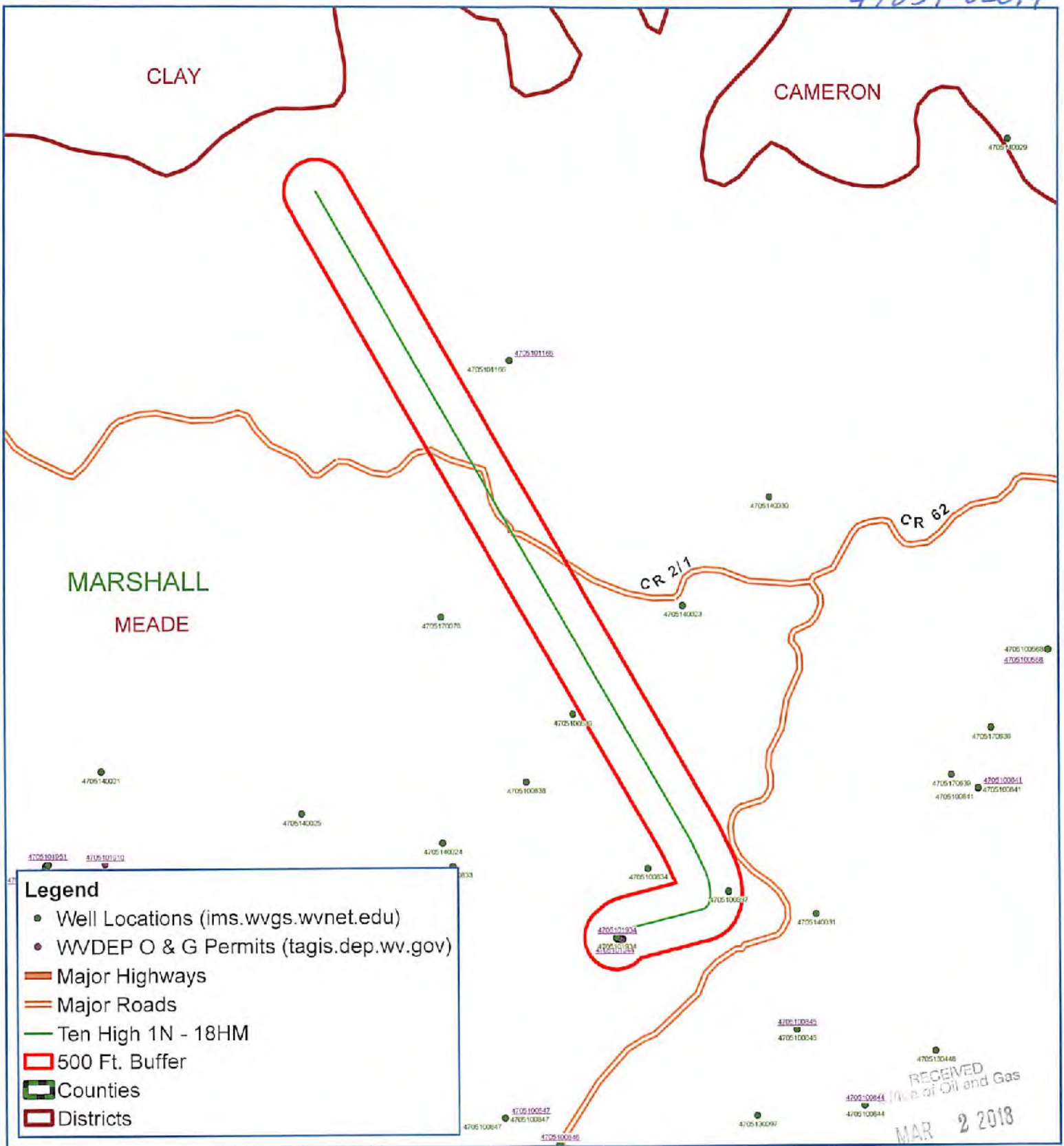
Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705101934	Tug Hill Operating	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101944	Tug Hill Operating	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101945	Tug Hill Operating	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101943	Tug Hill Operating	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101964	Tug Hill Operating	6737' TVD planned	None	None	No, Permitted Marcellus well	Permitted Marcellus well. Not yet drilled
4705101973	Tug Hill Operating	6737' TVD planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101974	Tug Hill Operating	6737' TVD planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101975	Tug Hill Operating	6737' TVD planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101976	Tug Hill Operating	6737' TVD planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101960	Tug Hill Operating	11878' TVD planned	None	None	No, Permit submitted Utica well	Permit submitted Utica well. Not yet drilled
4705101961	Tug Hill Operating	11878' TVD planned	None	None	No, Permit submitted Utica well	Permit submitted Utica well. Not yet drilled
4705101965	Tug Hill Operating	11878' TVD planned	None	None	No, Permit submitted Utica well	Permit submitted Utica well. Not yet drilled
4705101966	Tug Hill Operating	11878' TVD planned	None	None	No, Permit submitted Utica well	Permit submitted Utica well. Not yet drilled
4705100837	McElroy Coal Co.	Unknown	Unknown	Unknown	Unknown but unlikely, Appears to be an old shallow well, now plugged	Well records are incomplete. Well plugged 9/16/1998. A field survey was conducted to locate this well and no evidence of this well was found.

The screenshot shows the WV Geological & Economic Survey website interface. At the top, there is a search bar with '00837' entered and a 'Get Data' button. Below the search bar, the well information is displayed for API 4705100837, including the operator name 'McElroy Coal Company' and the status 'Plugging Completed'. The completion information shows a depth of 516.1993. The page also includes a 'RECEIVED' stamp from the Office of Oil and Gas dated MAR 2 2018, and a footer indicating it is Page 2 of 3.

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Page 2 of 3



Legend

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Major Highways
- Major Roads
- Ten High 1N - 18HM
- 500 Ft. Buffer
- Counties
- Districts

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Ten High 1N-18HM Meade District Marshall County, WV



Notes:
All locations are approximate and are for visualization purposes only.



Map Prepared by:
DPS
LAND SERVICES

47051 02019

Amy Miller

From: Simmons, Walter G <Walter.G.Simmons@wv.gov>
Sent: Tuesday, January 09, 2018 9:25 AM
To: Amy Miller
Cc: Brewer, Charles T; Kees, Kelly L; Adkins, Laura L; Nicholson, James I; McCourt, Joseph A
Subject: Tug Hill Operating, Ten High Well Site As-built, Meade District, Marshall County WV
Attachments: 2018- 1- 9 Approved Ten High Well Pad As-built Pages 1 & 7.pdf

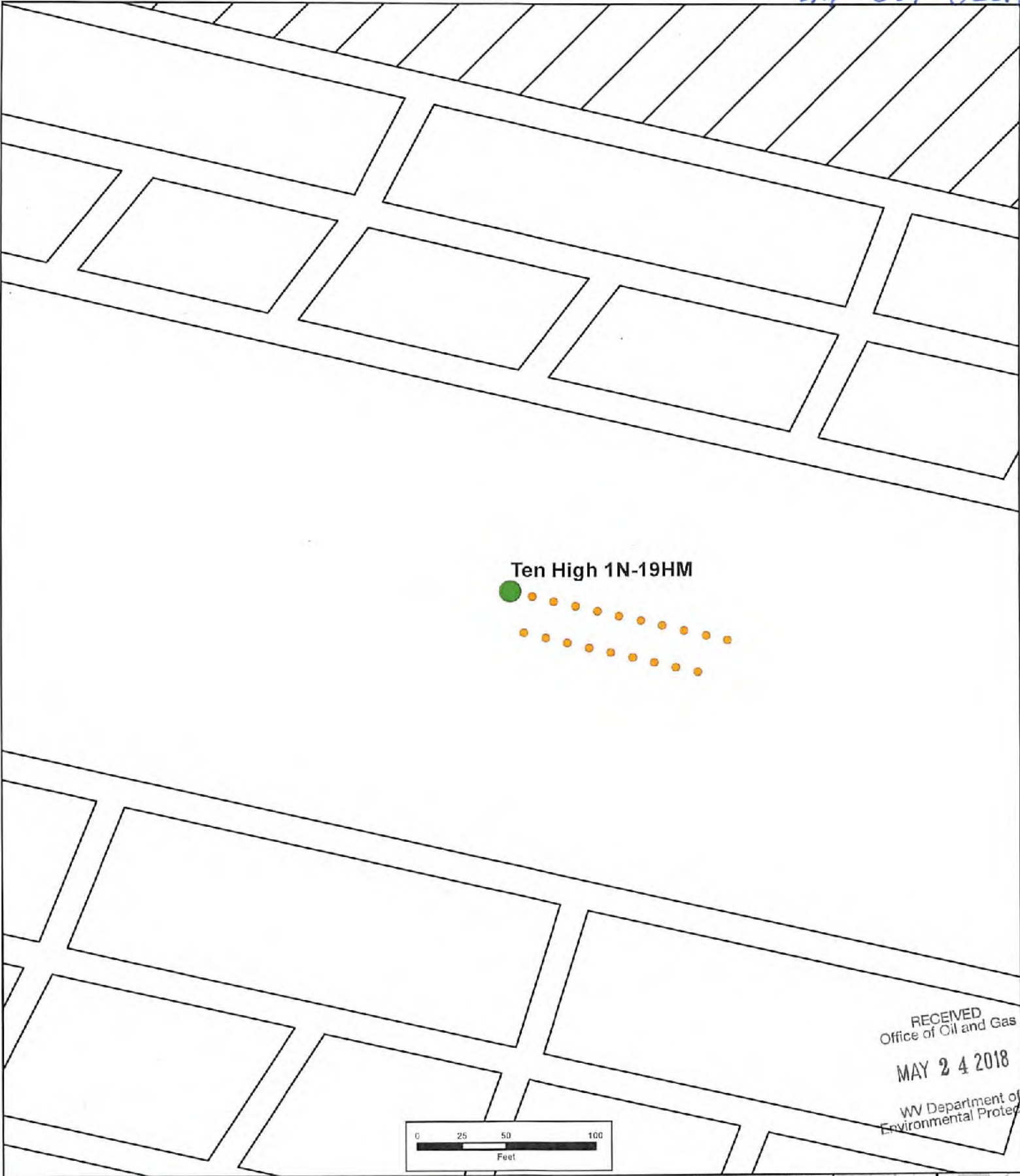
ATTENTION -- This message contains an attachment. If you are not expecting this message and/or attachment, please exercise extreme caution before opening the file

Amy,

I have reviewed the revised as-built plans for the above referenced well pad as prepared by Kelly Surveying and received by the WVDEP-Office of Oil & Gas on December 21, 2017 and I am accepting these plans. Pages 1 and 7 of these approved plans are to be submitted with additional well work applications for this pad prior to its construction. If you have any questions, please do not hesitate to contact me.

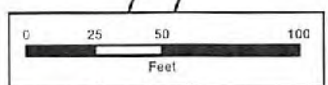
Walter Simmons, PE
W.Va. Department of Environmental Protection
Office of Oil & Gas
601 57th St. S.E.
Charleston, WV 25304
Phone#: 304-926-0499 ext: 1636
Email: Walter.G.Simmons@wv.gov

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Ten High 1N-19HM

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Coordinate System: NAD 1983 UTM Zone 17N - Units: Foot US

CONFIDENTIAL



**Ten High Pad
Ten High 1N-19HM Well Location**

- Surface Location
- Coal Mined Area



470515064

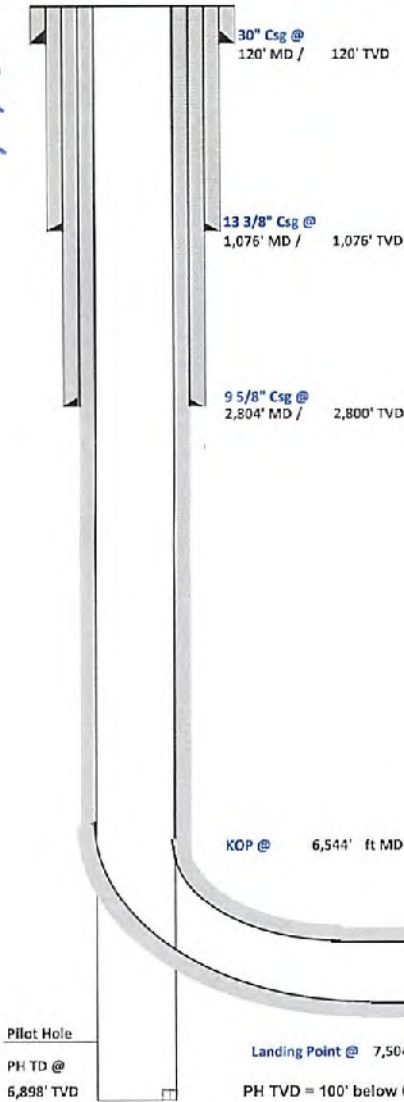


WELL NAME: **Ten High 1N-18HM**
 STATE: **West Virginia** country: **Marshall**
 DISTRICT: **Meade**
 DF Elev: **1,310'** GL Elev: **1,310'**
 TD: **19,738'**
 TH Latitude: **39.80681659**
 TH Longitude: **-80.68105346**
 BH Latitude: **39.839999**
 BH Longitude: **-80.697645**

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1026
Sewickley Coal	935
Pittsburgh Coal	1020
Big Lime	2135
Webb	2511
Berea	2698
Gordon	2974
Rhinestreet	6088
Genesee/Burkett	6607
Tully	6636
Hamilton	6668
Marcellus	6747
Landing Depth	6784
Onondaga	6798
Pilot Hole Depth	6898

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'	BW	BW	Surface
Surface	17.5	13 3/8	1,076'	1,076'	48	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,804'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	19,738'	6,570'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,109	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	898	A	15	Air	1 Centralizer every other jt
Production	4,440	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



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Landing Point @ 7,504' MD / 6,784' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 19,738' ft MD
 6,570' ft TVD

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TUG HILL
OPERATING

Well: Ten High 1N-18HM (S)
Site: Ten High
Project: Marshall County, West Virginia
Design: rev2

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VFace	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1637.50	4.75	15.00	1637.23	9.50	2.55	2.00	15.00	7.87	Begin 2°/100' build/turn
4	1780.19	4.75	50.00	1779.25	19.01	0.60	2.00	107.44	14.43	Begin 4.75° tangent
5	3506.66	4.75	50.00	3500.00	110.91	118.12	0.00	0.00	58.89	Begin 3°/100' build/turn
6	4307.10	28.20	75.95	4262.75	179.12	330.10	3.00	30.54	43.17	Begin 28.20° tangent
7	6543.84	28.20	75.95	6233.97	435.69	1355.50	0.00	0.00	-100.94	Begin 10°/100' build/turn
8	7504.21	91.00	335.00	6784.00	1085.75	1378.35	10.00	-99.21	493.75	Begin 91.00° lateral section
9	7874.21	91.00	335.00	6777.53	1421.03	1222.01	0.00	0.00	863.15	Begin 2°/100' turn
10	8124.15	91.00	330.00	6773.15	1642.52	1106.65	2.00	-89.96	1111.77	Begin 91.00° lateral section
11	19737.71	91.00	330.00	6570.00	11698.77	-4699.15	0.00	0.00	2507.27	PBHL/TD 19737.71 MD:6570.00 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 @ 1310.00usft

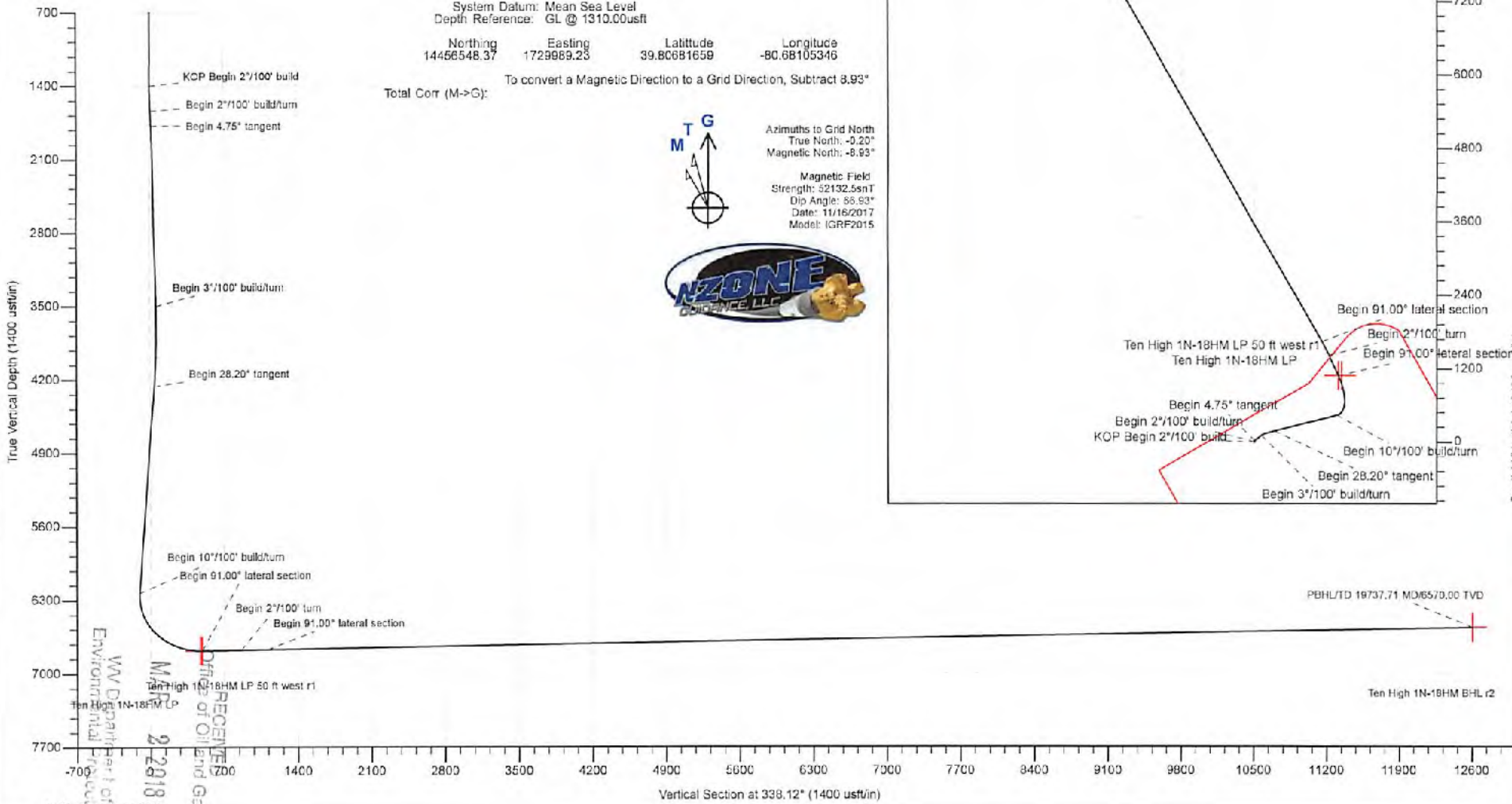
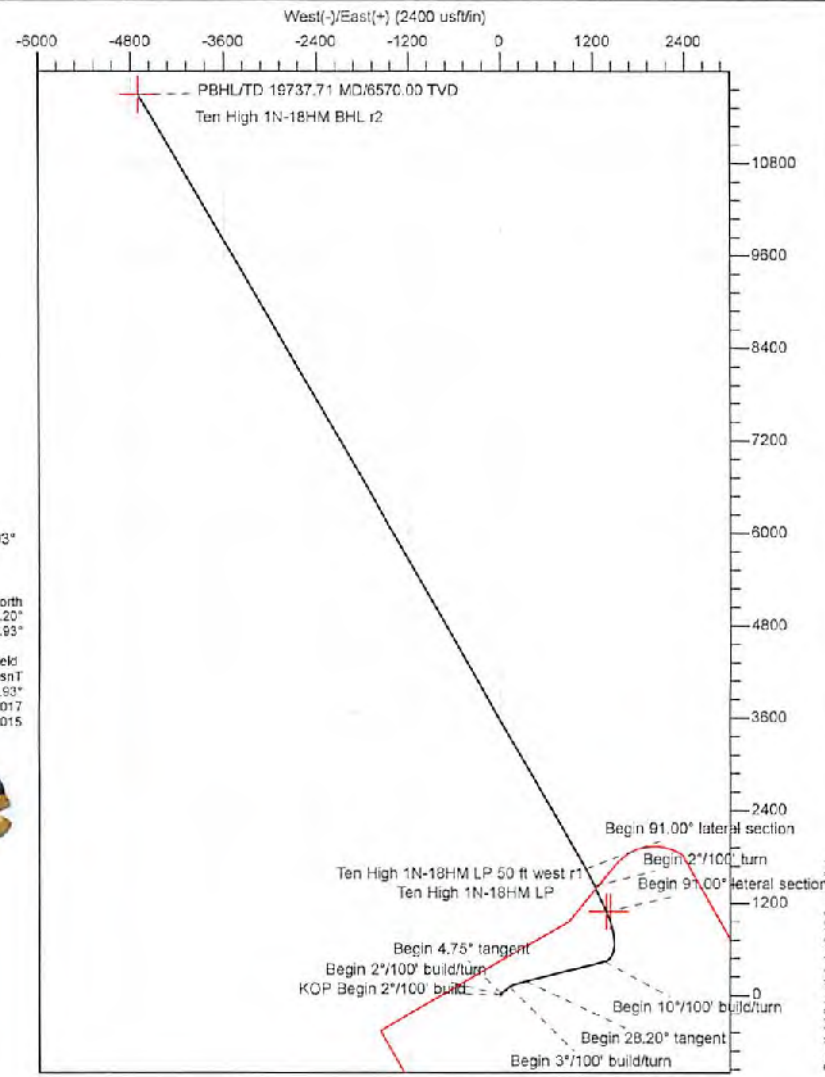
Northing 14456548.37 Easting 1729869.25 Latitude 39.80681659 Longitude -80.68105346

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.93°



Azimuths to Grid North
True North: -0.20°
Magnetic North: -8.93°

Magnetic Field
Strength: 52132.5snT
Dip Angle: 66.93°
Date: 11/16/2017
Model: IGRF2015



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Planning Report - Geographic



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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	Ten High				
Site Position:		Northing:	14,456,545.60 usft	Latitude:	39.80680885
From:	Lat/Long	Easting:	1,730,001.41 usft	Longitude:	-80.68101011
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.20 °

Well	Ten High 1N-18HM (S)					
Well Position	+N/-S	0.00 usft	Northing:	14,456,548.38 usft	Latitude:	39.80681659
	+E/-W	0.00 usft	Easting:	1,729,989.23 usft	Longitude:	-80.68105346
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	1,310.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/16/2017	-8.72	68.93	52,132.46365166

Design	rev2			
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	338.12

Plan Survey Tool Program	Date	2/14/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	19,737.71 rev2 (Original Hole)	MWD MWD - Standard	

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4705102019



Planning Report - Geographic



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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		
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00		
1,637.50	4.75	15.00	1,637.23	9.50	2.55	2.00	2.00	0.00	15.00		
1,780.19	4.75	50.00	1,779.45	19.01	8.60	2.00	0.00	24.53	107.44		
3,506.66	4.75	50.00	3,500.00	110.91	118.12	0.00	0.00	0.00	0.00		
4,307.10	28.20	75.95	4,262.75	179.12	330.10	3.00	2.93	3.24	30.54		
6,543.84	28.20	75.95	6,233.97	435.69	1,355.50	0.00	0.00	0.00	0.00		
7,504.22	91.00	335.00	6,784.00	1,085.75	1,378.35	10.00	6.54	-10.51	-99.21	Ten High 1N-18HM LF	
7,874.22	91.00	335.00	6,777.53	1,421.03	1,222.01	0.00	0.00	0.00	0.00		
8,124.15	91.00	330.00	6,773.15	1,642.62	1,106.65	2.00	0.00	-2.00	-89.96		
19,737.71	91.00	330.00	6,570.00	11,698.77	-4,699.15	0.00	0.00	0.00	0.00	Ten High 1N-18HM BI	

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Planning Report - Geographic



Database:	DB_Jul2218dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
100.00	0.00	0.00	100.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
200.00	0.00	0.00	200.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
300.00	0.00	0.00	300.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
400.00	0.00	0.00	400.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
500.00	0.00	0.00	500.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
600.00	0.00	0.00	600.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
700.00	0.00	0.00	700.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
800.00	0.00	0.00	800.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
900.00	0.00	0.00	900.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,456,548.38	1,729,989.23	39.80681659	-80.68105346	
KOP Begin 2°/100' build										
1,500.00	2.00	15.00	1,499.98	1.69	0.45	14,456,550.06	1,729,989.68	39.80682122	-80.68105183	
1,500.00	4.00	15.00	1,599.84	6.74	1.81	14,456,555.12	1,729,991.04	39.80683509	-80.68104694	
1,637.50	4.75	15.00	1,637.23	9.50	2.55	14,456,557.88	1,729,991.78	39.80684287	-80.68104427	
Begin 2°/100' build/turn										
1,700.00	4.53	30.26	1,699.53	14.14	4.46	14,456,562.51	1,729,993.69	39.80685537	-80.68103739	
1,780.19	4.75	50.00	1,779.45	19.01	8.60	14,456,567.39	1,729,997.83	39.80686871	-80.68102259	
Begin 4.75° tangent										
1,800.00	4.75	50.00	1,799.20	20.06	9.86	14,456,568.44	1,729,999.09	39.80687160	-80.68101810	
1,900.00	4.75	50.00	1,898.86	25.39	16.20	14,456,573.76	1,730,005.43	39.80688615	-80.68099544	
2,000.00	4.75	50.00	1,998.51	30.71	22.55	14,456,579.09	1,730,011.78	39.80690071	-80.68097279	
2,100.00	4.75	50.00	2,098.17	36.03	28.89	14,456,584.41	1,730,018.12	39.80691526	-80.68095013	
2,200.00	4.75	50.00	2,197.83	41.36	35.23	14,456,589.73	1,730,024.46	39.80692982	-80.68092748	
2,300.00	4.75	50.00	2,297.48	46.68	41.58	14,456,595.06	1,730,030.81	39.80694438	-80.68090483	
2,400.00	4.75	50.00	2,397.14	52.00	47.92	14,456,600.38	1,730,037.15	39.80695893	-80.68088217	
2,500.00	4.75	50.00	2,496.80	57.32	54.26	14,456,605.70	1,730,043.49	39.80697349	-80.68085952	
2,600.00	4.75	50.00	2,596.45	62.65	60.61	14,456,611.02	1,730,049.84	39.80698804	-80.68083686	
2,700.00	4.75	50.00	2,696.11	67.97	66.95	14,456,616.35	1,730,056.18	39.80700260	-80.68081421	
2,800.00	4.75	50.00	2,795.76	73.29	73.29	14,456,621.67	1,730,062.52	39.80701715	-80.68079155	
2,900.00	4.75	50.00	2,895.42	78.62	79.64	14,456,626.99	1,730,068.87	39.80703171	-80.68076880	
3,000.00	4.75	50.00	2,995.08	83.94	85.98	14,456,632.32	1,730,075.21	39.80704626	-80.68074624	
3,100.00	4.75	50.00	3,094.73	89.26	92.32	14,456,637.64	1,730,081.56	39.80706082	-80.68072359	
3,200.00	4.75	50.00	3,194.39	94.58	98.67	14,456,642.96	1,730,087.90	39.80707538	-80.68070093	
3,300.00	4.75	50.00	3,294.05	99.91	105.01	14,456,648.28	1,730,094.24	39.80708993	-80.68067828	
3,400.00	4.75	50.00	3,393.70	105.23	111.35	14,456,653.61	1,730,100.59	39.80710449	-80.68065562	
3,500.00	4.75	50.00	3,493.36	110.55	117.70	14,456,658.93	1,730,106.93	39.80711904	-80.68063297	
3,506.68	4.75	50.00	3,500.00	110.91	118.12	14,456,659.28	1,730,107.35	39.80712001	-80.68063146	
Begin 3°/100' build/turn										
3,600.00	7.30	61.27	3,582.82	116.24	126.28	14,456,664.62	1,730,115.51	39.80713459	-80.68060232	
3,700.00	10.18	66.89	3,691.65	122.77	139.99	14,456,671.15	1,730,129.22	39.80715237	-80.68055345	
3,800.00	13.11	70.04	3,789.58	130.11	158.78	14,456,678.49	1,730,148.01	39.80717235	-80.68048643	
3,900.00	16.07	72.05	3,886.34	138.25	182.62	14,456,686.63	1,730,171.85	39.80719447	-80.68040145	
4,000.00	19.04	73.45	3,981.68	147.17	211.43	14,456,695.54	1,730,200.66	39.80721867	-80.68029675	
4,100.00	22.02	74.48	4,075.31	156.83	245.13	14,456,705.21	1,730,234.37	39.80724489	-80.68017861	
4,200.00	25.00	75.28	4,167.00	167.22	283.64	14,456,715.60	1,730,272.88	39.80727304	-80.68004135	
4,300.00	27.99	75.91	4,258.49	178.31	326.85	14,456,726.68	1,730,316.08	39.80730306	-80.67988738	
4,307.10	28.20	75.95	4,262.75	179.12	330.10	14,456,727.50	1,730,319.33	39.80730526	-80.67987580	
Begin 28.20° tangent										
4,400.00	28.20	75.95	4,344.62	189.78	372.69	14,456,738.15	1,730,361.92	39.80733411	-80.67972402	

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Planning Report - Geographic



Database:	DB_Jul2218dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,500.00	28.20	75.95	4,432.75	201.25	418.53	14,456,749.62	1,730,407.76	39.80736516	-80.67956063
4,800.00	28.20	75.95	4,520.88	212.72	464.37	14,456,761.10	1,730,453.60	39.80739621	-80.67939725
4,700.00	28.20	75.95	4,609.01	224.19	510.22	14,456,772.57	1,730,499.45	39.80742726	-80.67923387
4,800.00	28.20	75.95	4,697.14	235.66	556.06	14,456,784.04	1,730,545.29	39.80745831	-80.67907048
4,900.00	28.20	75.95	4,785.27	247.13	601.90	14,456,795.51	1,730,591.13	39.80748936	-80.67890710
5,000.00	28.20	75.95	4,873.40	258.60	647.75	14,456,806.98	1,730,636.98	39.80752041	-80.67874371
5,100.00	28.20	75.95	4,961.53	270.07	693.59	14,456,818.45	1,730,682.82	39.80755146	-80.67858033
5,200.00	28.20	75.95	5,049.66	281.54	739.44	14,456,829.92	1,730,728.67	39.80758251	-80.67841694
5,300.00	28.20	75.95	5,137.79	293.01	785.28	14,456,841.39	1,730,774.51	39.80761356	-80.67825356
5,400.00	28.20	75.95	5,225.92	304.49	831.12	14,456,852.86	1,730,820.35	39.80764461	-80.67809017
5,500.00	28.20	75.95	5,314.05	315.96	876.97	14,456,864.33	1,730,866.20	39.80767566	-80.67792679
5,600.00	28.20	75.95	5,402.18	327.43	922.81	14,456,875.80	1,730,912.04	39.80770671	-80.67776340
5,700.00	28.20	75.95	5,490.30	338.90	968.65	14,456,887.28	1,730,957.89	39.80773776	-80.67760002
5,800.00	28.20	75.95	5,578.43	350.37	1,014.50	14,456,898.75	1,731,003.73	39.80776881	-80.67743663
5,900.00	28.20	75.95	5,666.56	361.84	1,060.34	14,456,910.22	1,731,049.57	39.80779985	-80.67727325
6,000.00	28.20	75.95	5,754.69	373.31	1,106.19	14,456,921.69	1,731,095.42	39.80783090	-80.67710986
6,100.00	28.20	75.95	5,842.82	384.78	1,152.03	14,456,933.16	1,731,141.26	39.80786195	-80.67694647
6,200.00	28.20	75.95	5,930.95	396.25	1,197.87	14,456,944.63	1,731,187.10	39.80789300	-80.67678309
6,300.00	28.20	75.95	6,019.08	407.72	1,243.72	14,456,956.10	1,731,232.95	39.80792404	-80.67661970
6,400.00	28.20	75.95	6,107.21	419.19	1,289.56	14,456,967.57	1,731,278.79	39.80795509	-80.67645631
6,500.00	28.20	75.95	6,195.34	430.67	1,335.40	14,456,979.04	1,731,324.64	39.80798614	-80.67629293
6,543.84	28.20	75.95	6,233.97	435.69	1,355.50	14,456,984.07	1,731,344.73	39.80799875	-80.67622130
Begin 10°/100' build/turn									
6,800.00	27.81	64.00	6,283.60	444.67	1,380.17	14,456,993.04	1,731,369.40	39.80802414	-80.67613334
6,700.00	29.84	43.46	6,371.50	472.92	1,418.25	14,457,021.29	1,731,407.48	39.80810134	-80.67599740
6,800.00	34.17	26.50	6,456.54	516.11	1,447.66	14,457,064.49	1,731,437.09	39.80821987	-80.67589138
6,900.00	40.49	13.67	6,538.13	572.94	1,468.12	14,457,121.31	1,731,457.35	39.80837552	-80.67581852
7,000.00	47.90	3.99	6,607.86	641.67	1,478.40	14,457,190.04	1,731,467.63	39.80856417	-80.67578103
7,100.00	55.94	358.42	6,689.55	720.21	1,478.40	14,457,268.59	1,731,467.63	39.80877988	-80.67578003
7,200.00	64.36	350.19	6,719.32	806.19	1,468.10	14,457,354.56	1,731,457.33	39.80901609	-80.67581558
7,300.00	73.01	344.80	6,755.65	896.98	1,447.84	14,457,445.36	1,731,437.07	39.80926563	-80.67588657
7,400.00	81.79	339.89	6,777.45	989.03	1,418.21	14,457,538.21	1,731,407.44	39.80952092	-80.67599087
7,500.00	90.63	335.20	6,784.06	1,081.92	1,380.12	14,457,630.30	1,731,369.36	39.80977420	-80.67612530
7,504.21	91.00	335.00	6,784.00	1,085.74	1,378.35	14,457,634.12	1,731,367.58	39.80978471	-80.67613156
Begin 91.00° lateral section									
7,800.00	91.00	335.00	6,782.32	1,172.54	1,337.88	14,457,720.92	1,731,327.11	39.81002349	-80.67627457
7,700.00	91.00	335.00	6,780.57	1,263.16	1,295.82	14,457,811.54	1,731,284.85	39.81027276	-80.67642387
7,800.00	91.00	335.00	6,778.83	1,353.78	1,253.36	14,457,902.15	1,731,242.60	39.81052204	-80.67657317
7,874.21	91.00	335.00	6,777.53	1,421.02	1,222.01	14,457,969.40	1,731,211.24	39.81070703	-80.67668397
Begin 2°/100' turn									
7,900.00	91.00	334.48	6,777.08	1,444.35	1,211.00	14,457,992.72	1,731,200.24	39.81077116	-80.67672285
8,000.00	91.00	332.48	6,775.32	1,533.81	1,166.37	14,458,082.19	1,731,155.60	39.81101731	-80.67688064
8,100.00	91.00	330.48	6,773.57	1,621.66	1,118.64	14,458,170.04	1,731,107.87	39.81125904	-80.67704948
8,124.15	91.00	330.00	6,773.15	1,642.62	1,106.65	14,458,191.00	1,731,095.88	39.81131672	-80.67709189
Begin 91.00° lateral section									
8,200.00	91.00	330.00	6,771.82	1,708.30	1,068.73	14,458,256.68	1,731,057.97	39.81149747	-80.67722607
8,300.00	91.00	330.00	6,770.06	1,794.89	1,018.74	14,458,343.27	1,731,007.97	39.81173576	-80.67740297
8,400.00	91.00	330.00	6,768.33	1,881.48	968.75	14,458,429.86	1,730,957.98	39.81197405	-80.67757988
8,500.00	91.00	330.00	6,766.56	1,968.07	918.76	14,458,516.45	1,730,907.99	39.81221234	-80.67775679
8,600.00	91.00	330.00	6,764.83	2,054.66	868.77	14,458,603.03	1,730,858.00	39.81245063	-80.67793370
8,700.00	91.00	330.00	6,763.08	2,141.25	818.78	14,458,689.62	1,730,808.01	39.81268892	-80.67811081
8,800.00	91.00	330.00	6,761.33	2,227.84	768.79	14,458,776.21	1,730,758.02	39.81292721	-80.67828752
8,900.00	91.00	330.00	6,759.58	2,314.43	718.79	14,458,862.80	1,730,708.02	39.81316550	-80.67846444
9,000.00	91.00	330.00	6,757.83	2,401.02	668.80	14,458,949.39	1,730,658.03	39.81340378	-80.67864135

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Planning Report - Geographic



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,100.00	91.00	330.00	6,756.08	2,467.61	618.81	14,459,035.98	1,730,608.04	39.81384208	-80.67881827	
9,200.00	91.00	330.00	6,754.33	2,574.20	568.82	14,459,122.57	1,730,558.05	39.81389037	-80.67899518	
9,300.00	91.00	330.00	6,752.58	2,660.79	518.83	14,459,209.16	1,730,508.06	39.81411866	-80.67917210	
9,400.00	91.00	330.00	6,750.83	2,747.38	468.84	14,459,295.75	1,730,458.07	39.81435695	-80.67934902	
9,500.00	91.00	330.00	6,749.08	2,833.97	418.84	14,459,382.34	1,730,408.07	39.81459523	-80.67952594	
9,600.00	91.00	330.00	6,747.34	2,920.56	368.85	14,459,468.93	1,730,358.08	39.81483352	-80.67970286	
9,700.00	91.00	330.00	6,745.59	3,007.14	318.86	14,459,555.52	1,730,308.09	39.81507181	-80.67987979	
9,800.00	91.00	330.00	6,743.84	3,093.73	268.87	14,459,642.11	1,730,258.10	39.81531010	-80.68005671	
9,900.00	91.00	330.00	6,742.09	3,180.32	218.86	14,459,728.70	1,730,208.11	39.81554838	-80.68023363	
10,000.00	91.00	330.00	6,740.34	3,266.91	168.89	14,459,815.29	1,730,158.12	39.81578667	-80.68041056	
10,100.00	91.00	330.00	6,738.59	3,353.50	118.89	14,459,901.88	1,730,108.13	39.81602495	-80.68058749	
10,200.00	91.00	330.00	6,736.84	3,440.09	68.90	14,459,988.47	1,730,058.13	39.81626324	-80.68076442	
10,300.00	91.00	330.00	6,735.09	3,526.68	18.91	14,460,075.06	1,730,008.14	39.81650153	-80.68094135	
10,400.00	91.00	330.00	6,733.34	3,613.27	-31.08	14,460,161.65	1,729,958.15	39.81673981	-80.68111828	
10,500.00	91.00	330.00	6,731.59	3,699.86	-81.07	14,460,248.24	1,729,908.16	39.81697810	-80.68129521	
10,600.00	91.00	330.00	6,729.84	3,786.45	-131.06	14,460,334.83	1,729,858.17	39.81721638	-80.68147215	
10,700.00	91.00	330.00	6,728.09	3,873.04	-181.05	14,460,421.42	1,729,808.18	39.81745467	-80.68164908	
10,800.00	91.00	330.00	6,726.34	3,959.63	-231.05	14,460,508.01	1,729,758.18	39.81769295	-80.68182602	
10,900.00	91.00	330.00	6,724.59	4,046.22	-281.04	14,460,594.60	1,729,708.19	39.81793123	-80.68200296	
11,000.00	91.00	330.00	6,722.85	4,132.81	-331.03	14,460,681.19	1,729,658.20	39.81816952	-80.68217989	
11,100.00	91.00	330.00	6,721.10	4,219.40	-381.02	14,460,767.78	1,729,608.21	39.81840780	-80.68235683	
11,200.00	91.00	330.00	6,719.35	4,305.99	-431.01	14,460,854.37	1,729,558.22	39.81864609	-80.68253376	
11,300.00	91.00	330.00	6,717.60	4,392.58	-481.00	14,460,940.96	1,729,508.23	39.81888437	-80.68271072	
11,400.00	91.00	330.00	6,715.85	4,479.17	-531.00	14,461,027.55	1,729,458.23	39.81912265	-80.68288766	
11,500.00	91.00	330.00	6,714.10	4,565.76	-580.99	14,461,114.14	1,729,408.24	39.81936093	-80.68306461	
11,600.00	91.00	330.00	6,712.35	4,652.35	-630.98	14,461,200.73	1,729,358.25	39.81959922	-80.68324155	
11,700.00	91.00	330.00	6,710.60	4,738.94	-680.97	14,461,287.32	1,729,308.26	39.81983750	-80.68341850	
11,800.00	91.00	330.00	6,708.85	4,825.53	-730.96	14,461,373.91	1,729,258.27	39.82007578	-80.68359545	
11,900.00	91.00	330.00	6,707.10	4,912.12	-780.95	14,461,460.50	1,729,208.28	39.82031406	-80.68377240	
12,000.00	91.00	330.00	6,705.35	4,998.71	-830.95	14,461,547.09	1,729,158.29	39.82055234	-80.68394935	
12,100.00	91.00	330.00	6,703.60	5,085.30	-880.94	14,461,633.68	1,729,108.29	39.82079062	-80.68412630	
12,200.00	91.00	330.00	6,701.85	5,171.89	-930.93	14,461,720.27	1,729,058.30	39.82102890	-80.68430326	
12,300.00	91.00	330.00	6,700.11	5,258.48	-980.92	14,461,806.86	1,729,008.31	39.82126718	-80.68448021	
12,400.00	91.00	330.00	6,698.36	5,345.07	-1,030.91	14,461,893.45	1,728,958.32	39.82150546	-80.68465717	
12,500.00	91.00	330.00	6,696.61	5,431.66	-1,080.90	14,461,980.03	1,728,908.33	39.82174374	-80.68483412	
12,600.00	91.00	330.00	6,694.86	5,518.25	-1,130.89	14,462,066.62	1,728,858.34	39.82198202	-80.68501108	
12,700.00	91.00	330.00	6,693.11	5,604.84	-1,180.89	14,462,153.21	1,728,808.34	39.82222030	-80.68518804	
12,800.00	91.00	330.00	6,691.36	5,691.43	-1,230.88	14,462,239.80	1,728,758.35	39.82245858	-80.68536500	
12,900.00	91.00	330.00	6,689.61	5,778.02	-1,280.87	14,462,326.39	1,728,708.36	39.82269686	-80.68554196	
13,000.00	91.00	330.00	6,687.86	5,864.61	-1,330.86	14,462,412.98	1,728,658.37	39.82293514	-80.68571893	
13,100.00	91.00	330.00	6,686.11	5,951.20	-1,380.85	14,462,499.57	1,728,608.38	39.82317341	-80.68589589	
13,200.00	91.00	330.00	6,684.36	6,037.79	-1,430.84	14,462,586.16	1,728,558.39	39.82341169	-80.68607286	
13,300.00	91.00	330.00	6,682.61	6,124.38	-1,480.84	14,462,672.75	1,728,508.40	39.82364997	-80.68624982	
13,400.00	91.00	330.00	6,680.86	6,210.97	-1,530.83	14,462,759.34	1,728,458.41	39.82388825	-80.68642679	
13,500.00	91.00	330.00	6,679.11	6,297.56	-1,580.82	14,462,845.93	1,728,408.41	39.82412652	-80.68660376	
13,600.00	91.00	330.00	6,677.36	6,384.14	-1,630.81	14,462,932.52	1,728,358.42	39.82436480	-80.68678073	
13,700.00	91.00	330.00	6,675.62	6,470.73	-1,680.80	14,463,019.11	1,728,308.43	39.82460308	-80.68695770	
13,800.00	91.00	330.00	6,673.87	6,557.32	-1,730.79	14,463,105.70	1,728,258.44	39.82484135	-80.68713468	
13,900.00	91.00	330.00	6,672.12	6,643.91	-1,780.78	14,463,192.29	1,728,208.45	39.82507962	-80.68731165	
14,000.00	91.00	330.00	6,670.37	6,730.50	-1,830.78	14,463,278.88	1,728,158.45	39.82531790	-80.68748863	
14,100.00	91.00	330.00	6,668.62	6,817.09	-1,880.77	14,463,365.47	1,728,108.46	39.82555618	-80.68766560	
14,200.00	91.00	330.00	6,666.87	6,903.68	-1,930.76	14,463,452.06	1,728,058.47	39.82579445	-80.68784258	
14,300.00	91.00	330.00	6,665.12	6,990.27	-1,980.75	14,463,538.65	1,728,008.48	39.82603273	-80.68801958	
14,400.00	91.00	330.00	6,663.37	7,076.86	-2,030.74	14,463,625.24	1,727,958.49	39.82627100	-80.68819654	
14,500.00	91.00	330.00	6,661.62	7,163.45	-2,080.73	14,463,711.83	1,727,908.50	39.82650928	-80.68837352	

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Planning Report - Geographic



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,600.00	91.00	330.00	6,659.67	7,250.04	-2,130.73	14,463,798.42	1,727,856.50	39.82674755	-80.88855050
14,700.00	91.00	330.00	6,658.12	7,336.63	-2,180.72	14,463,885.01	1,727,808.51	39.82698583	-80.88872749
14,800.00	91.00	330.00	6,656.37	7,423.22	-2,230.71	14,463,971.60	1,727,756.52	39.82722410	-80.88890447
14,900.00	91.00	330.00	6,654.62	7,509.81	-2,280.70	14,464,058.19	1,727,708.53	39.82746237	-80.88908146
15,000.00	91.00	330.00	6,652.88	7,596.40	-2,330.69	14,464,144.78	1,727,656.54	39.82770064	-80.88925845
15,100.00	91.00	330.00	6,651.13	7,682.99	-2,380.68	14,464,231.37	1,727,608.55	39.82793892	-80.88943543
15,200.00	91.00	330.00	6,649.38	7,769.58	-2,430.68	14,464,317.96	1,727,558.56	39.82817719	-80.88961242
15,300.00	91.00	330.00	6,647.63	7,856.17	-2,480.67	14,464,404.55	1,727,508.56	39.82841548	-80.88978942
15,400.00	91.00	330.00	6,645.88	7,942.76	-2,530.66	14,464,491.14	1,727,458.57	39.82865373	-80.88996641
15,500.00	91.00	330.00	6,644.13	8,029.35	-2,580.65	14,464,577.73	1,727,408.58	39.82889200	-80.89014340
15,600.00	91.00	330.00	6,642.38	8,115.94	-2,630.64	14,464,664.32	1,727,358.59	39.82913028	-80.89032040
15,700.00	91.00	330.00	6,640.63	8,202.53	-2,680.63	14,464,750.91	1,727,308.60	39.82936855	-80.89049739
15,800.00	91.00	330.00	6,638.88	8,289.12	-2,730.62	14,464,837.50	1,727,258.61	39.82960682	-80.89067439
15,900.00	91.00	330.00	6,637.13	8,375.71	-2,780.62	14,464,924.09	1,727,208.61	39.82984509	-80.89085139
16,000.00	91.00	330.00	6,635.38	8,462.30	-2,830.61	14,465,010.68	1,727,158.62	39.83008338	-80.89102839
16,100.00	91.00	330.00	6,633.63	8,548.89	-2,880.60	14,465,097.27	1,727,108.63	39.83032163	-80.89120539
16,200.00	91.00	330.00	6,631.88	8,635.48	-2,930.59	14,465,183.86	1,727,058.64	39.83055990	-80.89138239
16,300.00	91.00	330.00	6,630.13	8,722.07	-2,980.58	14,465,270.44	1,727,008.65	39.83079817	-80.89155940
16,400.00	91.00	330.00	6,628.39	8,808.66	-3,030.57	14,465,357.03	1,726,958.66	39.83103643	-80.89173640
16,500.00	91.00	330.00	6,626.64	8,895.25	-3,080.57	14,465,443.62	1,726,908.66	39.83127470	-80.89191341
16,600.00	91.00	330.00	6,624.89	8,981.84	-3,130.56	14,465,530.21	1,726,858.67	39.83151297	-80.89209041
16,700.00	91.00	330.00	6,623.14	9,068.43	-3,180.55	14,465,616.80	1,726,808.68	39.83175124	-80.89226742
16,800.00	91.00	330.00	6,621.39	9,155.02	-3,230.54	14,465,703.39	1,726,758.69	39.83198951	-80.89244443
16,900.00	91.00	330.00	6,619.64	9,241.61	-3,280.53	14,465,789.98	1,726,708.70	39.83222778	-80.89262144
17,000.00	91.00	330.00	6,617.89	9,328.20	-3,330.52	14,465,876.57	1,726,658.71	39.83246604	-80.89279845
17,100.00	91.00	330.00	6,616.14	9,414.79	-3,380.52	14,465,963.16	1,726,608.72	39.83270431	-80.89297547
17,200.00	91.00	330.00	6,614.39	9,501.38	-3,430.51	14,466,049.75	1,726,558.72	39.83294258	-80.89315248
17,300.00	91.00	330.00	6,612.64	9,587.97	-3,480.50	14,466,136.34	1,726,508.73	39.83318084	-80.89332950
17,400.00	91.00	330.00	6,610.89	9,674.55	-3,530.49	14,466,222.93	1,726,458.74	39.83341911	-80.89350651
17,500.00	91.00	330.00	6,609.14	9,761.14	-3,580.48	14,466,309.52	1,726,408.75	39.83365737	-80.89368353
17,600.00	91.00	330.00	6,607.39	9,847.73	-3,630.47	14,466,396.11	1,726,358.76	39.83389564	-80.89386055
17,700.00	91.00	330.00	6,605.65	9,934.32	-3,680.46	14,466,482.70	1,726,308.77	39.83413391	-80.89403757
17,800.00	91.00	330.00	6,603.90	10,020.91	-3,730.46	14,466,569.29	1,726,258.77	39.83437217	-80.89421459
17,900.00	91.00	330.00	6,602.15	10,107.50	-3,780.45	14,466,655.88	1,726,208.78	39.83461044	-80.89439162
18,000.00	91.00	330.00	6,600.40	10,194.09	-3,830.44	14,466,742.47	1,726,158.79	39.83484870	-80.89456864
18,100.00	91.00	330.00	6,598.65	10,280.68	-3,880.43	14,466,829.06	1,726,108.80	39.83508696	-80.89474567
18,200.00	91.00	330.00	6,596.90	10,367.27	-3,930.42	14,466,915.65	1,726,058.81	39.83532523	-80.89492269
18,300.00	91.00	330.00	6,595.15	10,453.86	-3,980.41	14,467,002.24	1,726,008.82	39.83556349	-80.89509972
18,400.00	91.00	330.00	6,593.40	10,540.45	-4,030.41	14,467,088.83	1,725,958.82	39.83580176	-80.89527675
18,500.00	91.00	330.00	6,591.65	10,627.04	-4,080.40	14,467,175.42	1,725,908.83	39.83604002	-80.89545378
18,600.00	91.00	330.00	6,589.90	10,713.63	-4,130.39	14,467,262.01	1,725,858.84	39.83627828	-80.89563081
18,700.00	91.00	330.00	6,588.15	10,800.22	-4,180.38	14,467,348.60	1,725,808.85	39.83651654	-80.89580784
18,800.00	91.00	330.00	6,586.40	10,886.81	-4,230.37	14,467,435.19	1,725,758.86	39.83675481	-80.89598488
18,900.00	91.00	330.00	6,584.65	10,973.40	-4,280.36	14,467,521.78	1,725,708.87	39.83699307	-80.89616191
19,000.00	91.00	330.00	6,582.90	11,059.99	-4,330.36	14,467,608.37	1,725,658.88	39.83723133	-80.89633895
19,100.00	91.00	330.00	6,581.15	11,146.58	-4,380.35	14,467,694.96	1,725,608.89	39.83746959	-80.89651599
19,200.00	91.00	330.00	6,579.41	11,233.17	-4,430.34	14,467,781.55	1,725,558.90	39.83770785	-80.89669302
19,300.00	91.00	330.00	6,577.66	11,319.76	-4,480.33	14,467,868.14	1,725,508.91	39.83794611	-80.89687006
19,400.00	91.00	330.00	6,575.91	11,406.35	-4,530.32	14,467,954.73	1,725,458.92	39.83818437	-80.89704711
19,500.00	91.00	330.00	6,574.16	11,492.94	-4,580.31	14,468,041.32	1,725,408.93	39.83842264	-80.89722415
19,600.00	91.00	330.00	6,572.41	11,579.53	-4,630.30	14,468,127.91	1,725,358.94	39.83866090	-80.89740119
19,700.00	91.00	330.00	6,570.66	11,666.12	-4,680.30	14,468,214.50	1,725,308.95	39.83889916	-80.89757824
19,737.71	91.00	330.00	6,570.00	11,698.77	-4,699.15	14,468,247.15	1,725,290.08	39.83898900	-80.89764500

PBHL/TD 19737.71 MD/6570.00 TVD

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Planning Report - Geographic



Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Ten High 1N-18HM (S)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1310.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1310.00usft
Site:	Ten High	North Reference:	Grid
Well:	Ten High 1N-18HM (S)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Ten High 1N-18HM BHL - plan hits target center - Point	0.00	0.00	6,570.00	11,696.77	-4,699.15	14,468,247.15	1,725,290.08	39.83698900	-80.69764500
Ten High 1N-18HM LP - plan misses target center by 45.51usft at 7485.11usft MD (6784.05 TVD, 1068.37 N, 1386.29 E) - Point	0.00	0.00	6,784.00	1,085.75	1,428.35	14,457,634.12	1,731,417.58	39.80978422	-80.67595351
Ten High 1N-18HM LP 5 - plan hits target center - Point	0.00	0.00	6,784.00	1,085.75	1,378.35	14,457,634.12	1,731,367.58	39.80978472	-80.67613157

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,400.00	1,400.00	0.00	0.00	KOP Begin 2"/100' build
1,637.50	1,637.23	9.50	2.55	Begin 2"/100' build/turn
1,780.19	1,779.45	19.01	8.60	Begin 4.75° tangent
3,508.86	3,500.00	110.91	118.12	Begin 3"/100' build/turn
4,307.10	4,282.75	179.12	330.10	Begin 28.20° tangent
6,543.84	6,233.97	435.69	1,355.50	Begin 10"/100' build/turn
7,504.21	6,784.00	1,085.74	1,378.35	Begin 91.00° lateral section
7,874.21	6,777.53	1,421.02	1,222.01	Begin 2"/100' turn
8,124.15	6,773.15	1,642.62	1,106.65	Begin 91.00° lateral section
19,737.71	6,570.00	11,698.77	-4,699.15	PBHL/TD 19737.71 MD/6570.00 TVD

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John
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Tug Hill Operating, LLC Casing and Cement Program

Ten High 1N-18HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	H40	17 1/2"	1,076'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,804'	CTS
Production	5 1/2"	P110	8 7/8 x 8 3/4"	19,736'	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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(4/16)

API Number 47 - 051 - 02019
Operator's Well No. Ten High 1N-18HM

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek Quadrangle Glen Easton 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper venting

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in a Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) and Westmoreland Sanitary Landfill, LLC (BAN1405 / PA DEP EC#1385426)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature _____

Company Official (Typed Name) Sean Gasser

Company Official Title Engineer

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Office of Oil and Gas

MAR 2 2018

WV Department of
Environmental Protection

Subscribed and sworn before me this 20 day of February, 2018

[Signature] Notary Public

My commission expires 8-31-21



47 051 02019

Form WW-9

Operator's Well No. Ten High 1N-18HM

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 16.20 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass	40	Orchard Grass	12
Spring Oats	96	Ladino	3
		White Clover	2

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim [Signature]*

Comments: _____

Title: Oil & Gas Inspector

Date: 2/21/18

Field Reviewed? Yes No

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MAR 2 2018

WV Department of
Environmental Protection

47 051 02019

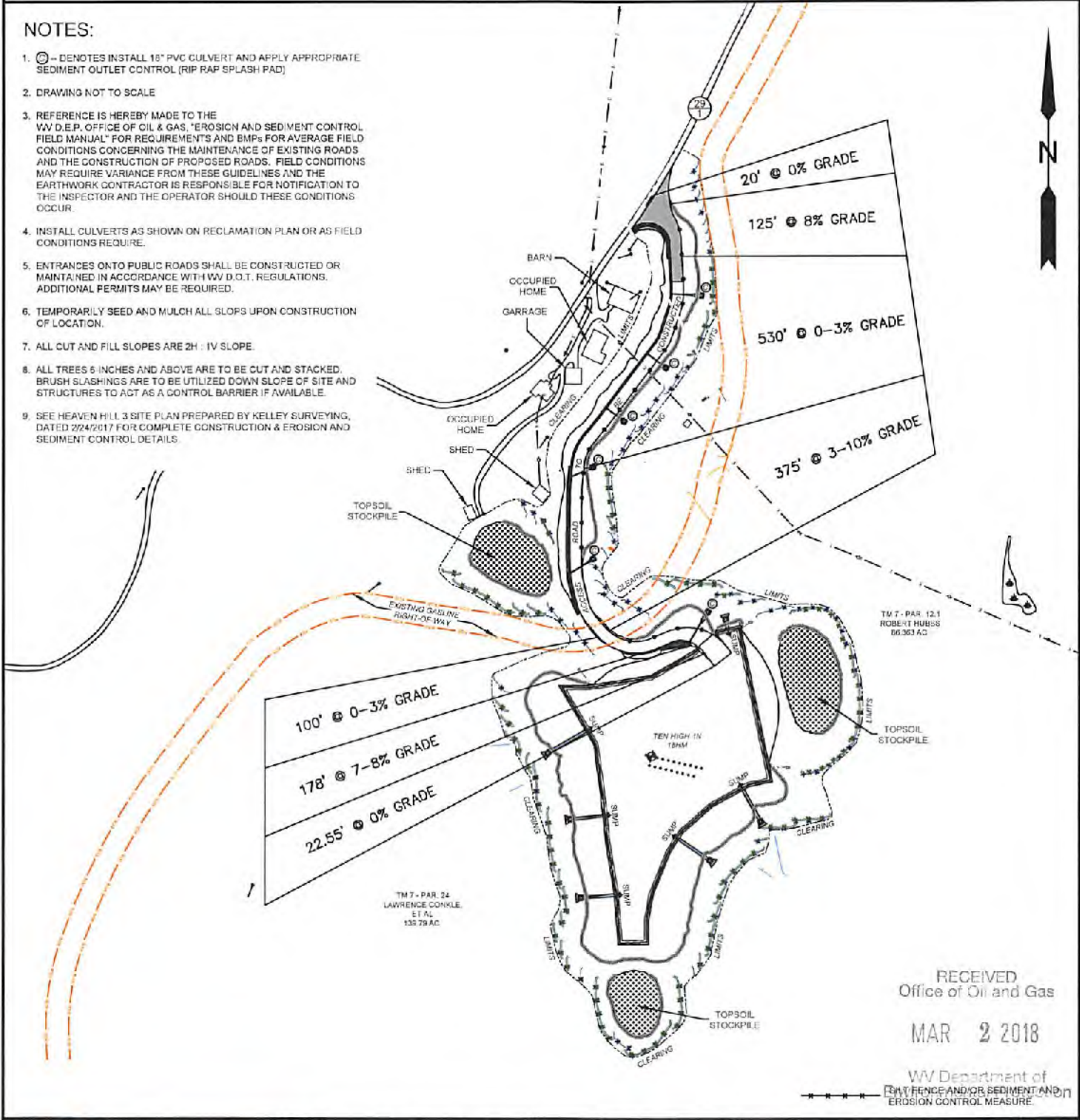
WW-9

PROPOSED TEN HIGH 1N - 18HM

SUPPLEMENT PG. 1

NOTES:

1. - DENOTES INSTALL 18" PVC CULVERT AND APPLY APPROPRIATE SEDIMENT OUTLET CONTROL (RIP RAP SPLASH PAD)
2. DRAWING NOT TO SCALE
3. REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.
4. INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.
5. ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.
6. TEMPORARILY SEED AND MULCH ALL SLOPS UPON CONSTRUCTION OF LOCATION.
7. ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.
8. ALL TREES 6 INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO BE UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.
9. SEE HEAVEN HILL 3 SITE PLAN PREPARED BY KELLEY SURVEYING, DATED 2/24/2017 FOR COMPLETE CONSTRUCTION & EROSION AND SEDIMENT CONTROL DETAILS.



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MAR 2 2018

WV Department of
ENVIRONMENT AND NATURAL RESOURCES
EROSION CONTROL MEASURE

SLS
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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.	8655	01-08-18	NONE

TUG HILL
OPERATING

47 051 02019



Well Site Safety Plan
Tug Hill Operating, LLC

John
2/21/18

Well Name: Ten High 1N-18HM

Pad Location: Ten High

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing-4,406,364.76

Easting -527,301.77

February 2018

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Office of Oil and Gas

MAR 2 2018

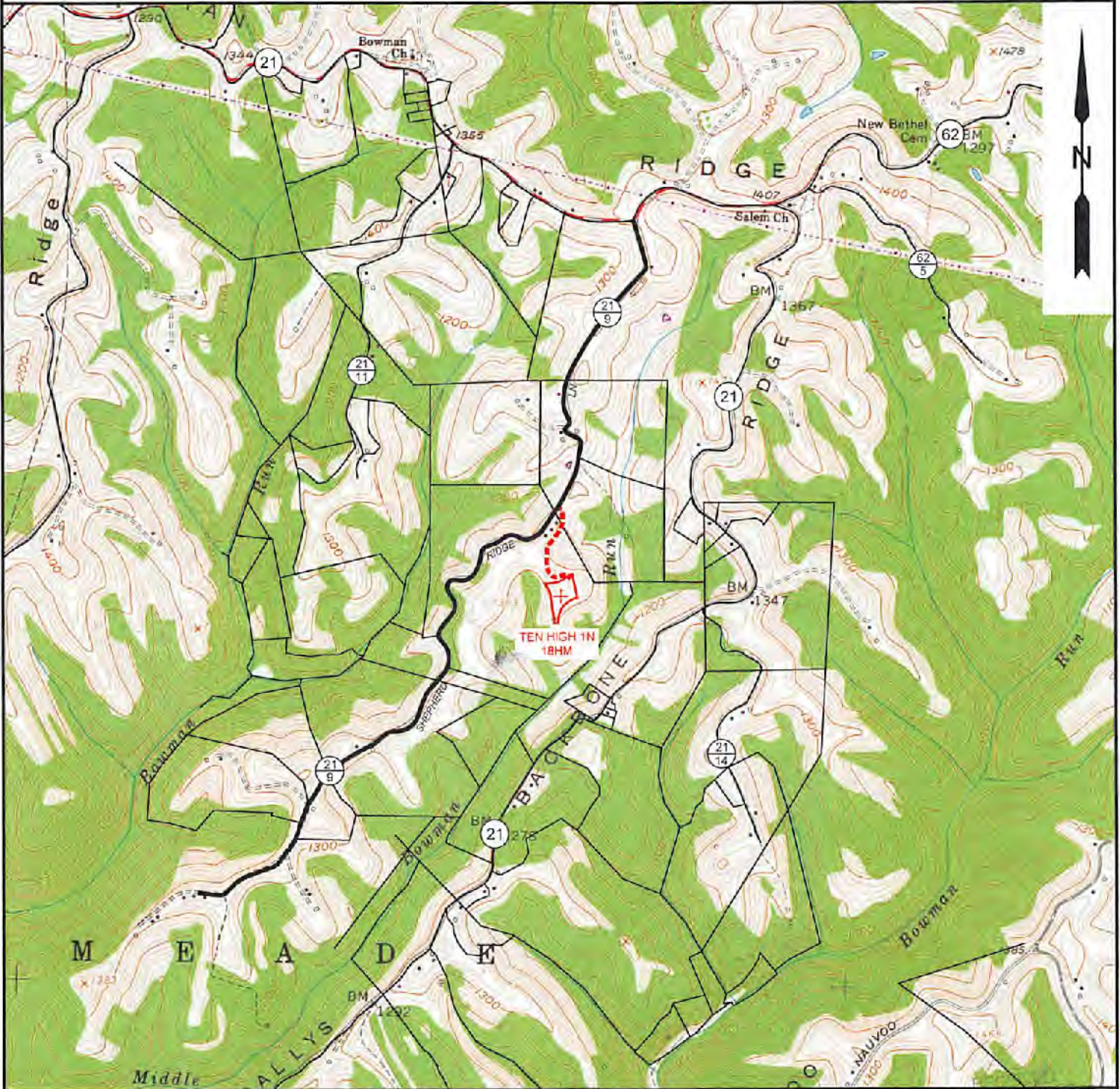
WV Department of
Environmental Protection

47 051 02019

WW-9

PROPOSED TEN HIGH 1N - 18HM

SUPPLEMENT PG. 2



NOTE: CLOSEST WATER PURVEYOR
 GRANDVIEW - DOOLIN PUBLIC SERVICE DISTRICT
 PROCTOR, WV

LAT 39.7137712
 LON: -80.8250327
 LOCATED: S 51°03'40" W AT 52.970' FROM TEN HIGH 1N - 18HM SURFACE LOCATION

Office of Oil and Gas
 2 2018

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 www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	MEADE	380 SOUTHPOINTE BLVD	
		SUITE 200	
		CANONSBURG, PA 15317	
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8655	01-08-18	1" = 2000'

WV Department of Environmental Protection
TUG HILL
 OPERATING

**TEN HIGH 1N LEASE
WELL 18HM
TUG HILL OPERATING**

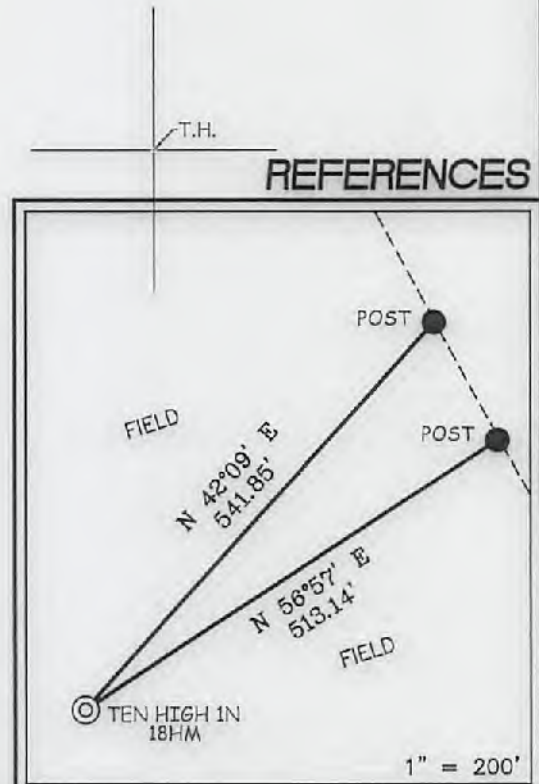
T.H. LATITUDE 39°50'00"
B.H. LATITUDE 39°52'30"

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD'83 S.P.C.(FT) N. 478,164.71 E. 1,636,709.52
 NAD'83 GEO. LAT-(N) 39.806817 LONG-(W) 80.687092
 NAD'83 UTM (M) N. 4,406,364.76 E. 527,301.77
LANDING POINT
 NAD'83 S.P.C.(FT) N. 479,769.1 E. 1,637,843.9
 NAD'83 GEO. LAT-(N) 39.811317 LONG-(W) 80.677092
 NAD'83 UTM (M) N. 4,406,865.4 E. 527,889.1
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 489,944.4 E. 1,632,205.0
 NAD'83 GEO. LAT-(N) 39.836989 LONG-(W) 80.697645
 NAD'83 UTM (M) N. 4,409,930.6 E. 525,889.5

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

TAG	SURFACE OWNER	PARCEL	ACRES
A	LAWRENCE & SHIRLEY CONKLE ESTS	9-7-24	139.79
B	ROBERT G. & SCARLETT HUBBS	9-7-12.1	86.363
C	MARK H. FOX	9-7-11	75.37
D	ROBERT GLENN HUBBS, ET AL.	9-7-7	108.61
E	DAVID L. HOLMES, ET UX	9-5-14	37.345
F	DAVID L. HOLMES, ET UX	9-5-14.2	4.995
G	DAVID L. HOLMES, ET UX	9-5-14.5	1.66
H	BETTY R. OTT	9-5-14.4	10.501
I	LARRY L. CONKLE, JR	9-5-16	2.365
J	MARK H. FOX, ET UX	9-5-15	36.533
K	SCOTT A. HOSTUTLER	9-5-16.1	0.142
L	SCOTT A. HOSTUTLER	9-5-8	26.752
N	MISTY CROW WITH ROBERT & ELSIE WHETZEL (LIFE ESTATE)	9-5-8.2	1.973
O	RALPH E. WELLMAN, ET UX	9-5-22	0.5
P	RALPH E. WELLMAN, ET UX	9-5-23	1.00
Q	ALVIE & MARCELLA DARRAH	9-5-24	1.985
R	TRUSTEES OF M E CHURCH	NOT ASSD	1.00
S	M E CHURCH FROM THE MAP OF THE ESTATE OF EZEKIAL GORBY SHOWING PARTITION TO HIS LAST WILL - PLAT BK 2	NOT ASSD	NOT ASSD
T	JON B. CRAWFORD	9-5-6.1	4.679
U	NANCY L. SNYDER (LIFE ESTATE)	9-5-6	82.858
V	CNX LAND LLC	9-5-6.9	22.392
W	CLARA I. CROW	9-2-1	106.00

MAP/PARCEL	ADJOINING SURFACE OWNER LIST (SEE SHEET 2)	ACRES
9-1-14.1	ALICE J. & DOUGLAS J. MARTIN	0.905
9-5-5.1	DAVID M. TOLER, ET UX	0.985
9-5-6.2	MICHAEL JOSEPH SNYDER	2.82
9-5-6.3	DEUTSCHE BANK NATIONAL TRUST CO.	1.391
9-5-6.4	NANCY L. SNYDER	0.694
9-5-6.5	LINDA GORBY DELBERT	1.087
9-5-6.6	NANCY L. SNYDER	0.420
9-5-6.7	NANCY L. SNYDER	0.678
9-5-6.8	NANCY L. SNYDER	0.091
9-5-7	M E CHURCH	81.5 POLES 6 AC. (ASSD)
9-5-8.1	ISACC MCKINNEY, ET UX	2.875
9-5-11.2	LARRY WHETZEL JR.	2.355
9-5-12	LARRY WHETZEL JR.	1.00
9-5-13	SHELLY ANN JORDAN - GEORGIA JORDAN LIFE ESTATE	5.51
9-5-14.1	SAVANNA WEST, ET AL.	2.819
9-5-14.3	MARK FOX, ET UX	10.714
9-5-17	CARLA SUE CROW	6.341
9-5-19	BETTY R. OTT	0.933
9-5-20	KEITH WILSON - DONALD E. LEACH (LIFE ESTATE)	6.924
9-5-21	RALPH E. WELLMAN, ET UX	1.00
9-7-11.1	WEST VIRGINIA DEPARTMENT OF HIGHWAYS	3.63
9-7-27	CAROL J. ANDERSON - LIFE	1.005
9-7-28	VICTOR & CLAIRE CAMERON	1.983
9-7-28.1	NATHAN WILLIAMS	2.768
9-7-29.1	CAROL J. ANDERSON - LIFE	5.004



NOTES ON SURVEY

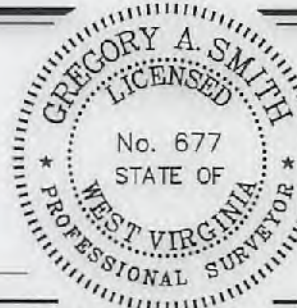
- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'

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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 JANUARY 19, 20 18

REVISED FEBRUARY 19 & MAY 23, 20 18

OPERATORS WELL NO. TEN HIGH 1N-18HM

API WELL NO. 47 - 051 - 02019 *H6A*
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8655P18HMR2.dwg
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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



WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: GROUND = 1,322.10' ELEVATION PROPOSED = 1,310.06' WATERSHED MIDDLE BOWMAN RUN OF FISH CREEK (HUC 10)

DISTRICT MEADE COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER LAWRENCE & SHIRLEY CONKLE ESTS ACREAGE 139.79±

ROYALTY OWNER ANDY PAUL & JACKIE KUHN, ET AL - WW-6A1 ACREAGE 139.79±

PROPOSED WORK: LEASE NO. SEE WW-6A1

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,865' / TMD: 19,738'

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

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

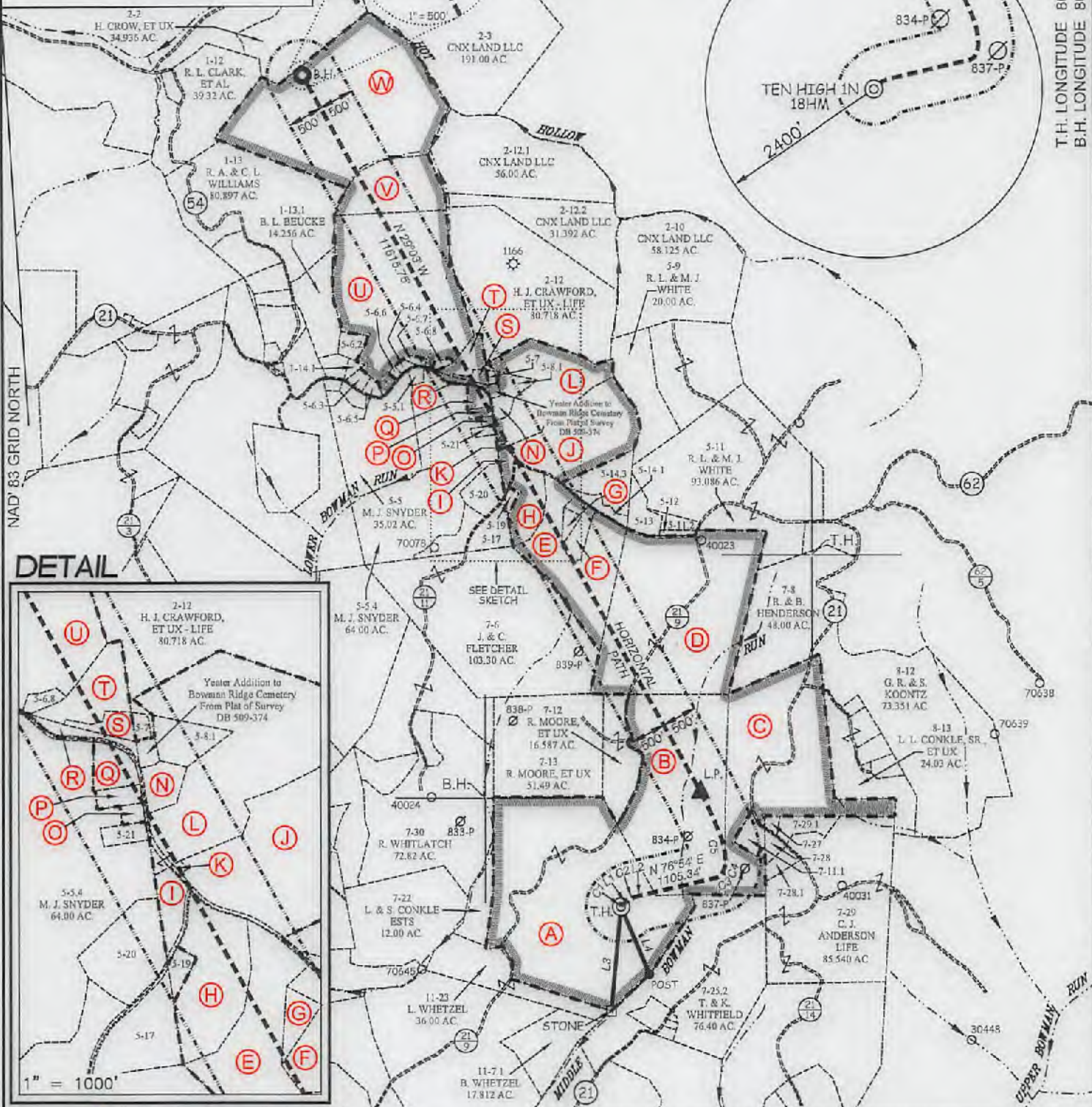
COUNTY NAME PERMIT

**TEN HIGH 1N LEASE
WELL 18HM
TUG HILL OPERATING**

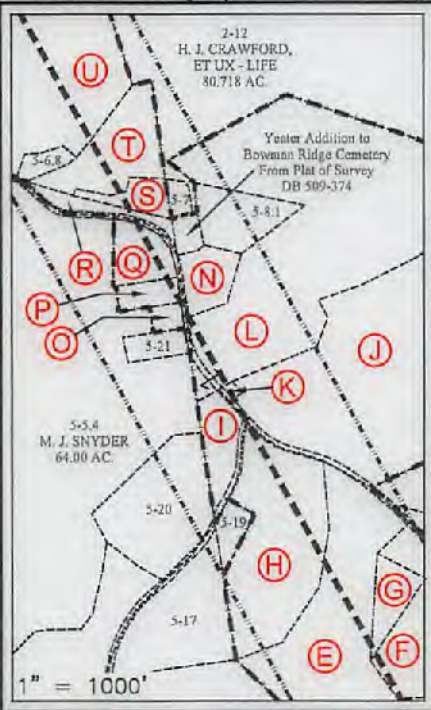
LINE	BEARING	DISTANCE
L1	N 50°57' E	137.23'
L2	N 74°57' E	105.13'
L3	S 05°28' W	1485.22'
L4	S 22°52' E	1039.74'

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

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



DETAIL



CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	27.08'	30.69'	N 30°47' E	26.21'
C2	70.25'	294.72'	N 67°59' E	70.08'
C3	98.42'	135.54'	N 55°01' E	97.20'
C4	176.18'	321.30'	N 15°54' E	173.98'
C5	440.47'	994.55'	N 12°22' W	436.88'
C6	619.92'	8821.01'	N 25°03' W	619.79'

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

NAD'83 S.P.C.(FT)	N. 476,164.71	E. 1,636,709.52
NAD'83 GEO.	LAT-(N) 39.806817	LONG-(W) 80.681053
NAD'83 UTM (M)	N. 4,406,364.76	E. 627,301.77

LANDING POINT

NAD'83 S.P.C.(FT)	N. 479,769.1	E. 1,637,843.9
NAD'83 GEO.	LAT-(N) 39.811317	LONG-(W) 80.677092
NAD'83 UTM (M)	N. 4,406,865.4	E. 627,639.1

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 489,944.4	E. 1,632,205.0
NAD'83 GEO.	LAT-(N) 39.838989	LONG-(W) 80.697645
NAD'83 UTM (M)	N. 4,409,930.6	E. 525,659.5



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

P.S. 677 *Gregory A. Smith*

SCALE 1" = 2000' FILE NO. 3655P16HMR2.dwg

DATE JANUARY 19, 20 18

REVISED FEBRUARY 19 & MAY 23, 20 18

OPERATORS WELL NO. TEN HIGH 1N-18HM

API WELL NO. 47

NO. STATE COUNTY PERMIT

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

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE WW-6A1)

COUNTY NAME PERMIT

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

47 051 02019

WW-6A1
(5/13)

Operator's Well No. Ten High 1N-18HM

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
----------------------	-----------------------	-----------------------	---------	-----------

*See attached pages

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC
 By: Amy L. Miller *Amy Miller*
 Its: Permitting Specialist

Lease ID	Tag	Parcel	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Dead Book/Page	Assignment	Assignment	Assignment	Assignment
10*15664	A	9-7-24	THERESA ANNE HUGHES	CHEVRON USA INC	1/8+	863 343	N/A	N/A	N/A	Chevron to Tug Hill: 36/148
10*15666	A	9-7-24	BRENDA J WHETZEL	CHEVRON USA INC	1/8+	863 635	N/A	N/A	N/A	Chevron to Tug Hill: 36/148
10*15662	A	9-7-24	LARRY LEE CONKLE	CHEVRON U.S.A. INC.	1/8+	863 354	N/A	N/A	N/A	Chevron to Tug Hill: 36/148
10*15663	A	9-7-24	ROY A CONKLE SR AND LORIE A CONKLE	CHEVRON USA INC	1/8+	863 311	N/A	N/A	N/A	Chevron to Tug Hill: 36/148
10*15501	B	9-7-12.1	RONALD AND EDNA MOORE	TRIENERGY INC	1/8+	661 449	TriEnergy to AB Resources: 20/252	AB Resources to Chevron: 756/379	Chevron to Tug Hill: 36/148	Chevron to Tug Hill: 40/127
	B	9-7-12.1	RONALD AND EDNA MOORE	TRIENERGY INC	1/8+	661 449	N/A	TriEnergy to AB Resources: 20/252	AB Resources to Chevron: 756/379	Chevron to Tug Hill: 960/409
10*47051.094.0	C	9-7-11	MARK H FOX	TH EXPLORATION LLC	1/8+	864 163	N/A	N/A	N/A	N/A
10*19117	C	9-7-11	MARK H. FOX AND RETTA J. FOX, HIS WIFE	TH EXPLORATION LLC	1/8+	864 163	N/A	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 40/127
	C	9-7-11	MARK H. FOX AND RETTA J. FOX, HIS WIFE	TH EXPLORATION LLC	1/8+	864 163	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 40/127	Chevron to Tug Hill: 960/409
10*19031	D	9-7-7	ROBERT G HUBBS SCARLETT E OTTE HUBBS	CHIEF EXPLORATION & DEVELOPMENT	1/8+	677 521	N/A	N/A	Chief Expl. to Chevron: 25/1	Chevron to Tug Hill: 36/148
	D	9-7-7	ROBERT G HUBBS SCARLETT E OTTE HUBBS	CHIEF EXPLORATION & DEVELOPMENT	1/8+	677 521	N/A	N/A	Chief Expl. to Chevron: 25/1	Chevron to Tug Hill: 960/409
10*47051.075.0	E	9-5-14	DAVID L HOLMES AND TERRI L HOLMES	TH EXPLORATION LLC	1/8+	869 204	N/A	N/A	N/A	N/A
10*19118	E	9-5-14	DAVID L HOLMES AND TERRI L HOLMES	TH EXPLORATION LLC	1/8+	869 204	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 40/127	Chevron to Tug Hill: 960/409
10*19118	F	9-5-14.2	DAVID L HOLMES AND TERRI L HOLMES	TH EXPLORATION LLC	1/8+	869 204	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 40/127	Chevron to Tug Hill: 960/409
10*19118	G	9-5-14.5	DAVID L HOLMES AND TERRI L HOLMES	TH EXPLORATION LLC	1/8+	869 204	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 40/127	Chevron to Tug Hill: 960/409
10*15506	H	9-5-14.4	BETTY R. OTT	TRIENERGY HOLDINGS LLC	1/8+	687 604	TriEnergy to NPAR: 23/74	NPAR to Chevron: 756/332	Chevron to Tug Hill: 36/148	Chevron to Tug Hill: 40/127
	H	9-5-14.4	BETTY R. OTT	TRIENERGY HOLDINGS LLC	1/8+	687 604	N/A	TriEnergy to NPAR: 23/74	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
10*19133	I	9-5-16	JERRY L RUSH, JR. AND JILL RUSH, HIS WIFE	TRIENERGY HOLDINGS, LLC	1/8+	700 239	N/A	TriEnergy to NPAR: 24/180	NPAR to Chevron: 756/332	Chevron to Tug Hill: 40/127
10*19005	J	9-5-15	MARK H. FOX AND RETTA J. FOX, HIS WIFE	TRIENERGY HOLDINGS, LLC	1/8+	687 598	TriEnergy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 40/127	Chevron to Tug Hill: 960/409
10*19220	K	9-5-16.1	HOSTUTLER SCOTT A	TRIENERGY HOLDINGS, LLC	1/8+	731 353	N/A	TriEnergy to NPAR: 23/75	NPAR to Chevron: 756/332	Chevron to Tug Hill: 40/127
10*19206	L	9-5-8	SCOTT A HUSTUTLER	TRIENERGY HOLDINGS, LLC	1/8+	724 208	TriEnergy to NPAR: 25/463	NPAR to Chevron: 26/269	NPAR to Chevron: 756/307	Chevron to Tug Hill: 40/127
	L	9-5-8	SCOTT A HUSTUTLER	TRIENERGY HOLDINGS, LLC	1/8+	724 208	TriEnergy to NPAR: 25/463	NPAR to Chevron: 26/269	NPAR to Chevron: 756/307	Chevron to Tug Hill: 960/409
10*15481	M	9-5-21	DEAN P RIGBY AND SUSAN RIGBY	TH EXPLORATION LLC	1/8+	908 197	N/A	N/A	N/A	N/A
10*15482	M	9-5-21	SUSAN NELSON	TH EXPLORATION LLC	1/8+	908 203	N/A	N/A	N/A	N/A
10*15686	M	9-5-21	JOHN OMER BOLTZ	TH EXPLORATION LLC	1/8+	908 160	N/A	N/A	N/A	N/A
10*15750	M	9-5-21	SANDRA K TRULL	TH EXPLORATION LLC	1/8+	908 229	N/A	N/A	N/A	N/A
10*16058	M	9-5-21	MATTIE RUTH JACKSON PRESCOTT	TH EXPLORATION LLC	1/8+	908 231	N/A	N/A	N/A	N/A
10*16118	M	9-5-21	RUBY RIDDLE JACKSON	TH EXPLORATION LLC	1/8+	908 233	N/A	N/A	N/A	N/A
10*16383	M	9-5-21	ROBERT STEPHEN DRIGGERS	TH EXPLORATION LLC	1/8+	908 224	N/A	N/A	N/A	N/A
10*16414	M	9-5-21	MARY ELIZABETH DRIGGERS	TH EXPLORATION LLC	1/8+	908 208	N/A	N/A	N/A	N/A
10*16416	M	9-5-21	CYNTHIA HUDSON	TH EXPLORATION LLC	1/8+	908 219	N/A	N/A	N/A	N/A
10*16424	M	9-5-21	ROBERT J RIGBY	TH EXPLORATION LLC	1/8+	908 241	N/A	N/A	N/A	N/A
10*16448	M	9-5-21	RALPH L AND JUANITA L CRIM	TH EXPLORATION LLC	1/8+	908 584	N/A	N/A	N/A	N/A
10*16478	M	9-5-21	MARION L AND EMILY CAMPBELL	TH EXPLORATION LLC	1/8+	908 245	N/A	N/A	N/A	N/A
10*16514	M	9-5-21	ALEX R CAMPBELL & JOYCE A CAMPBELL	TH EXPLORATION LLC	1/8+	908 248	N/A	N/A	N/A	N/A
10*16515	M	9-5-21	ANNA MARIE JACKSON	TH EXPLORATION LLC	1/8+	908 251	N/A	N/A	N/A	N/A
10*16516	M	9-5-21	WILSON ANDREW JACKSON	TH EXPLORATION LLC	1/8+	908 253	N/A	N/A	N/A	N/A
10*16662	M	9-5-21	RICHARD THOMAS MIMS & VICKIE J MIMS	TH EXPLORATION LLC	1/8+	908 263	N/A	N/A	N/A	N/A
10*16738	M	9-5-21	CHARLES A RINE AND RUTH K RINE	TH EXPLORATION LLC	1/8+	908 274	N/A	N/A	N/A	N/A
10*16787	M	9-5-21	HERBERT B CAMPBEL & DONNA D CAMPBELL	TH EXPLORATION LLC	1/8+	942 451	N/A	N/A	N/A	N/A
10*16800	M	9-5-21	JAMES KENNETH JACKSON AND JULIE JACKSON	TH EXPLORATION LLC	1/8+	921 93	N/A	N/A	N/A	N/A
10*16806	M	9-5-21	VIRGINIA WHITMAN TRUST DTD 7-25-1984 JON WHITMAN TRUSTEE	TH EXPLORATION LLC	1/8+	921 528	N/A	N/A	N/A	N/A
10*16962	M	9-5-21	DENNIS P FLORY AND BARBARA EZELL FLORY	TH EXPLORATION LLC	1/8+	921 70	N/A	N/A	N/A	N/A
10*16976	M	9-5-21	LESTER G AND CONSTANCE B NICKOLSON	TH EXPLORATION LLC	1/8+	921 343	N/A	N/A	N/A	N/A
10*16987	M	9-5-21	LAURIE EZELL PERRY	TH EXPLORATION LLC	1/8+	921 355	N/A	N/A	N/A	N/A
10*17130	M	9-5-21	CINDY L BARGER	TH EXPLORATION LLC	1/8+	921 137	N/A	N/A	N/A	N/A
10*17155	M	9-5-21	JESSE LEON JR AND TERESA GAIL EZELLE	TH EXPLORATION LLC	1/8+	921 118	N/A	N/A	N/A	N/A
10*17156	M	9-5-21	HENRI NELL JACKSON KENT BARNES	TH EXPLORATION LLC	1/8+	921 139	N/A	N/A	N/A	N/A
10*17157	M	9-5-21	JAMES N REEVES JR AND RITA M REEVES	TH EXPLORATION LLC	1/8+	921 367	N/A	N/A	N/A	N/A
10*17198	M	9-5-21	THOMAS G AND DIANE W BAYLESS	TH EXPLORATION LLC	1/8+	921 141	N/A	N/A	N/A	N/A
10*17205	M	9-5-21	SANDRA JEAN WILSON	TH EXPLORATION LLC	1/8+	921 524	N/A	N/A	N/A	N/A
10*17274	M	9-5-21	DAVID H WILSON	TH EXPLORATION LLC	1/8+	921 474	N/A	N/A	N/A	N/A
10*17275	M	9-5-21	JOHN R REEVES AND MONA G REEVES	TH EXPLORATION LLC	1/8+	921 373	N/A	N/A	N/A	N/A
10*17276	M	9-5-21	BERTHA EZELL WYATT	TH EXPLORATION LLC	1/8+	921 526	N/A	N/A	N/A	N/A
10*17278	M	9-5-21	MICHAEL L EZELLE	TH EXPLORATION LLC	1/8+	921 121	N/A	N/A	N/A	N/A
10*17377	M	9-5-21	MILTON HOWARD EZELLE JR AND ELIZABETH A EZELLE	TH EXPLORATION LLC	1/8+	921 123	N/A	N/A	N/A	N/A

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Lease ID	Tag	Parcel	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment
10*17438	M	9-5-21	DENNIS M WILSON	TH EXPLORATION LLC	1/8+	921 476	N/A	N/A	N/A	N/A
10*17441	M	9-5-21	RALPH J WILSON	TH EXPLORATION LLC	1/8+	921 522	N/A	N/A	N/A	N/A
10*17449	M	9-5-21	PHYLLIS J BLAKE	TH EXPLORATION LLC	1/8+	921 150	N/A	N/A	N/A	N/A
10*17482	M	9-5-21	TERESA EZELLE RALYA AND DAVID L RALYA	TH EXPLORATION LLC	1/8+	927 487	N/A	N/A	N/A	N/A
10*17484	M	9-5-21	NELDA S JACKSON	TH EXPLORATION LLC	1/8+	921 330	N/A	N/A	N/A	N/A
10*17485	M	9-5-21	MARGIE ANN JACKSON ROBBINS GRAHAM	TH EXPLORATION LLC	1/8+	921 91	N/A	N/A	N/A	N/A
10*17526	M	9-5-21	JEFFREY L REEVES AND JODY L REEVES	TH EXPLORATION LLC	1/8+	921 370	N/A	N/A	N/A	N/A
10*17527	M	9-5-21	JAMES MICHAEL EZELL AND LUCILLE D EZELL	TH EXPLORATION LLC	1/8+	921 111	N/A	N/A	N/A	N/A
10*17561	M	9-5-21	ROGER L TYRELL AND KATHRYN L TYRELL	TH EXPLORATION LLC	1/8+	921 519	N/A	N/A	N/A	N/A
10*17564	M	9-5-21	JAMES RONALD NICKOLSON AND TRACEY E NICKOLSON	TH EXPLORATION LLC	1/8+	921 340	N/A	N/A	N/A	N/A
10*17565	M	9-5-21	JESSE ALLEN JACKSON AND ELIZABETH D JACKSON	TH EXPLORATION LLC	1/8+	921 327	N/A	N/A	N/A	N/A
10*17566	M	9-5-21	NATHAN P ERDOSSY AND BARBARA T ERDOSSY	TH EXPLORATION LLC	1/8+	921 108	N/A	N/A	N/A	N/A
10*17588	M	9-5-21	JAMES M JACKSON	TH EXPLORATION LLC	1/8+	921 325	N/A	N/A	N/A	N/A
10*17589	M	9-5-21	MARY CHRISTINE MCKENNA	TH EXPLORATION LLC	1/8+	921 332	N/A	N/A	N/A	N/A
10*17744	M	9-5-21	SAM PRESLEY EZELL	TH EXPLORATION LLC	1/8+	921 116	N/A	N/A	N/A	N/A
10*17983	M	9-5-21	HOLLY SUE CUTHBERT	TH EXPLORATION LLC	1/8+	925 380	N/A	N/A	N/A	N/A
10*18021	M	9-5-21	CHRISTOPHER A HANIFAN AND JACKIE F HANIFAN	TH EXPLORATION LLC	1/8+	927 267	N/A	N/A	N/A	N/A
10*18022	M	9-5-21	DALE P WARD AND CYNTHIA J WARD	TH EXPLORATION LLC	1/8+	927 264	N/A	N/A	N/A	N/A
10*19524	M	9-5-21	THE ESTATE OF AGNES IRENE EZELL CLARK BY DAVID M EDWARDS, EXECUTOR	TH EXPLORATION LLC	1/8+	942 633	N/A	N/A	N/A	N/A
10*19695	M	9-5-21	VIRGINIA P FOUNDS KASSERMAN ET	TH EXPLORATION, LLC	1/8+	944 333	N/A	N/A	N/A	N/A
10*19939	M	9-5-21	ROBERT J MILLS & SHERRA SUE MILLS	TH EXPLORATION LLC	1/8+	949 212	N/A	N/A	N/A	N/A
10*47051.223.1	M	9-5-21	JEAN ANNE GORBY STORCH	TH EXPLORATION LLC	1/8+	877 216	N/A	N/A	N/A	N/A
10*47051.223.15	M	9-5-21	LARRY D TAUNT AND NANCY L TAUNT	TH EXPLORATION LLC	1/8+	908 14	N/A	N/A	N/A	N/A
10*47051.223.2	M	9-5-21	STEPHANIE SCHIEFER AND GEOFFREY SCHIEFER	TH EXPLORATION LLC	1/8+	885 321	N/A	N/A	N/A	N/A
10*47051.223.20	M	9-5-21	BARBARA A BUZZARD	TH EXPLORATION LLC	1/8+	908 24	N/A	N/A	N/A	N/A
10*47051.223.21	M	9-5-21	GARY T WARD AND SHARON D WARD	TH EXPLORATION LLC	1/8+	908 19	N/A	N/A	N/A	N/A
10*47051.223.24	M	9-5-21	JO DEE K DAVIS	TH EXPLORATION LLC	1/8+	908 136	N/A	N/A	N/A	N/A
10*47051.223.25	M	9-5-21	JOANNE WELCH	TH EXPLORATION LLC	1/8+	908 141	N/A	N/A	N/A	N/A
10*47051.223.26	M	9-5-21	WENDY L SMARKEL	TH EXPLORATION LLC	1/8+	908 69	N/A	N/A	N/A	N/A
10*47051.223.27	M	9-5-21	TIMI J HOBBS	TH EXPLORATION LLC	1/8+	908 277	N/A	N/A	N/A	N/A
10*47051.223.29	M	9-5-21	PATSY JO RAJU	TH EXPLORATION LLC	1/8+	908 155	N/A	N/A	N/A	N/A
10*47051.223.3	M	9-5-21	ROBERT A LEADBETTER AND M REBECCA LEADBETTER	TH EXPLORATION LLC	1/8+	885 324	N/A	N/A	N/A	N/A
10*47051.223.30	M	9-5-21	LAURIE DRIGGERS MANDERSON	TH EXPLORATION LLC	1/8+	908 165	N/A	N/A	N/A	N/A
10*47051.223.33	M	9-5-21	NANCY CIAFFAGLIONE HOUSLEY	TH EXPLORATION LLC	1/8+	908 187	N/A	N/A	N/A	N/A
10*47051.223.35	M	9-5-21	DEBRA L CIAFFAGLIONE	TH EXPLORATION LLC	1/8+	908 192	N/A	N/A	N/A	N/A
10*47051.223.6	M	9-5-21	JOSHUA RINE AND REBECCA RINE	TH EXPLORATION LLC	1/8+	907 634	N/A	N/A	N/A	N/A
	M	9-5-21	RALPH WELLMAN E ET UX	TRIENERGY HOLDINGS LLC	1/8+	705 480	N/A	TriEnergy to NPAR: 24/180	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
	N	9-5-8-2	WHETZEL ROBERT L ET UX	CHEVRON USA INC	1/8+	772 523	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
10*47051.223.1	O	9-5-22	JEAN ANNE GORBY STORCH	TH EXPLORATION LLC	1/8+	877 216	N/A	N/A	N/A	N/A
10*47051.223.2	O	9-5-22	STEPHANIE SCHIEFER AND GEOFFREY SCHIEFER	TH EXPLORATION LLC	1/8+	885 321	N/A	N/A	N/A	N/A
10*47051.223.3	O	9-5-22	ROBERT A LEADBETTER AND M REBECCA LEADBETTER	TH EXPLORATION LLC	1/8+	885 324	N/A	N/A	N/A	N/A
	O	9-5-22	RALPH WELLMAN E ET UX	TRIENERGY HOLDINGS LLC	1/8+	705 482	N/A	TriEnergy to NPAR: 24/180	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
	O	9-5-23	RALPH WELLMAN E ET UX	TRIENERGY HOLDINGS LLC	1/8+	705 482	N/A	TriEnergy to NPAR: 24/180	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
10*17441	P	9-5-23	RALPH J WILSON	TH EXPLORATION LLC	1/8+	921 522	N/A	N/A	N/A	N/A
10*17449	P	9-5-23	PHYLLIS J BLAKE	TH EXPLORATION LLC	1/8+	921 150	N/A	N/A	N/A	N/A
10*17438	P	9-5-23	DENNIS M WILSON	TH EXPLORATION LLC	1/8+	921 476	N/A	N/A	N/A	N/A
10*17377	P	9-5-23	MILTON HOWARD EZELLE JR AND ELIZABETH A EZELLE	TH EXPLORATION LLC	1/8+	921 123	N/A	N/A	N/A	N/A
10*17565	P	9-5-23	JESSE ALLEN JACKSON AND ELIZABETH D JACKSON	TH EXPLORATION LLC	1/8+	921 327	N/A	N/A	N/A	N/A
10*17278	P	9-5-23	MICHAEL L EZELLE	TH EXPLORATION LLC	1/8+	921 121	N/A	N/A	N/A	N/A
10*17198	P	9-5-23	THOMAS G AND DIANE W BAYLESS	TH EXPLORATION LLC	1/8+	921 141	N/A	N/A	N/A	N/A
10*17205	P	9-5-23	SANDRA JEAN WILSON	TH EXPLORATION LLC	1/8+	921 524	N/A	N/A	N/A	N/A
10*17274	P	9-5-23	DAVID H WILSON	TH EXPLORATION LLC	1/8+	921 474	N/A	N/A	N/A	N/A
10*17275	P	9-5-23	JOHN R REEVES AND MONA G REEVES	TH EXPLORATION LLC	1/8+	921 373	N/A	N/A	N/A	N/A
10*17276	P	9-5-23	BERTHA EZELL WYATT	TH EXPLORATION LLC	1/8+	921 526	N/A	N/A	N/A	N/A
10*17155	P	9-5-23	JESSE LEON JR AND TERESA GAIL EZELLE	TH EXPLORATION LLC	1/8+	921 118	N/A	N/A	N/A	N/A
10*17156	P	9-5-23	HENRI NELL JACKSON KENT BARNES	TH EXPLORATION LLC	1/8+	921 139	N/A	N/A	N/A	N/A

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Lease ID	Tag	Parcel	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment
10*17157	P	9-5-23	JAMES N REEVES JR AND RITA M REEVES	TH EXPLORATION LLC	1/8+	921 367	N/A	N/A	N/A	N/A
10*17130	P	9-5-23	CINDY L BARGER	TH EXPLORATION LLC	1/8+	921 137	N/A	N/A	N/A	N/A
10*16976	P	9-5-23	LESTER G AND CONSTANCE B NICKOLSON	TH EXPLORATION LLC	1/8+	921 343	N/A	N/A	N/A	N/A
10*16987	P	9-5-23	LAURIE EZELL PERRY	TH EXPLORATION LLC	1/8+	921 355	N/A	N/A	N/A	N/A
10*16982	P	9-5-23	DENNIS P FLORY AND BARBARA EZELL FLORY	TH EXPLORATION LLC	1/8+	921 70	N/A	N/A	N/A	N/A
10*19524	P	9-5-23	THE ESTATE OF AGNES IRENE EZELL CLARK BY DAVID M EDWARDS, EXECUTOR	TH EXPLORATION LLC	1/8+	942 633	N/A	N/A	N/A	N/A
10*47051.223.1	P	9-5-23	JEAN ANNE GORBY STORCH	TH EXPLORATION LLC	1/8+	877 216	N/A	N/A	N/A	N/A
10*47051.223.2	P	9-5-23	STEPHANIE SCHIEFER AND GEOFFREY SCHIEFER	TH EXPLORATION LLC	1/8+	885 321	N/A	N/A	N/A	N/A
10*47051.223.3	P	9-5-23	ROBERT A LEADBETTER AND M REBECCA LEADBETTER	TH EXPLORATION LLC	1/8+	885 324	N/A	N/A	N/A	N/A
10*16787	P	9-5-23	HERBERT B CAMPBELL & DONNA D CAMPBELL	TH EXPLORATION LLC	1/8+	942 451	N/A	N/A	N/A	N/A
10*16800	P	9-5-23	JAMES KENNETH JACKSON AND JULIE JACKSON	TH EXPLORATION LLC	1/8+	921 93	N/A	N/A	N/A	N/A
10*16806	P	9-5-23	VIRGINIA WHITMAN TRUST DTD 7-25-1984 JON WHITMAN TRUSTEE	TH EXPLORATION LLC	1/8+	921 528	N/A	N/A	N/A	N/A
10*16738	P	9-5-23	CHARLES A RINE AND RUTH K RINE	TH EXPLORATION LLC	1/8+	908 274	N/A	N/A	N/A	N/A
10*16662	P	9-5-23	RICHARD THOMAS MIMS & VICKIE J MIMS	TH EXPLORATION LLC	1/8+	908 263	N/A	N/A	N/A	N/A
10*19939	P	9-5-23	ROBERT J MILLS & SHERRA SUE MILLS	TH EXPLORATION LLC	1/8+	949 212	N/A	N/A	N/A	N/A
10*16118	P	9-5-23	RUBY RIDDLE JACKSON	TH EXPLORATION LLC	1/8+	908 233	N/A	N/A	N/A	N/A
10*16414	P	9-5-23	MARY ELIZABETH DRIGGERS	TH EXPLORATION LLC	1/8+	908 208	N/A	N/A	N/A	N/A
10*16515	P	9-5-23	ANNA MARIE JACKSON	TH EXPLORATION LLC	1/8+	908 251	N/A	N/A	N/A	N/A
10*16516	P	9-5-23	WILSON ANDREW JACKSON	TH EXPLORATION LLC	1/8+	908 253	N/A	N/A	N/A	N/A
10*16514	P	9-5-23	ALEX R CAMPBELL & JOYCE A CAMPBELL	TH EXPLORATION LLC	1/8+	908 248	N/A	N/A	N/A	N/A
10*16478	P	9-5-23	MARION L AND EMILY CAMPBELL	TH EXPLORATION LLC	1/8+	908 245	N/A	N/A	N/A	N/A
10*16448	P	9-5-23	RALPH L AND JUANITA L CRIM	TH EXPLORATION LLC	1/8+	908 584	N/A	N/A	N/A	N/A
10*16424	P	9-5-23	ROBERT J RIGBY	TH EXPLORATION LLC	1/8+	908 241	N/A	N/A	N/A	N/A
10*16416	P	9-5-23	CYNTHIA HUDSON	TH EXPLORATION LLC	1/8+	908 219	N/A	N/A	N/A	N/A
10*16058	P	9-5-23	MATTIE RUTH JACKSON PRESCOTT	TH EXPLORATION LLC	1/8+	908 231	N/A	N/A	N/A	N/A
10*17744	P	9-5-23	SAM PRESLEY EZELL	TH EXPLORATION LLC	1/8+	921 116	N/A	N/A	N/A	N/A
10*18021	P	9-5-23	CHRISTOPHER A HANIFAN AND JACKIE F HANIFAN	TH EXPLORATION LLC	1/8+	927 267	N/A	N/A	N/A	N/A
10*18022	P	9-5-23	DALE P WARD AND CYNTHIA J WARD	TH EXPLORATION LLC	1/8+	927 264	N/A	N/A	N/A	N/A
10*17983	P	9-5-23	HOLLY SUE CUTHBERT	TH EXPLORATION LLC	1/8+	925 380	N/A	N/A	N/A	N/A
10*47051.223.29	P	9-5-23	PATSY JO RAJU	TH EXPLORATION LLC	1/8+	908 155	N/A	N/A	N/A	N/A
10*47051.223.30	P	9-5-23	LAURIE DRIGGERS MANDERSON	TH EXPLORATION LLC	1/8+	908 165	N/A	N/A	N/A	N/A
10*47051.223.33	P	9-5-23	NANCY CIAFFAGLIONE HOUSLEY	TH EXPLORATION LLC	1/8+	908 187	N/A	N/A	N/A	N/A
10*47051.223.35	P	9-5-23	DEBRA L CIAFFAGLIONE	TH EXPLORATION LLC	1/8+	908 192	N/A	N/A	N/A	N/A
10*47051.223.6	P	9-5-23	JOSHUA RINE AND REBECCA RINE	TH EXPLORATION LLC	1/8+	907 634	N/A	N/A	N/A	N/A
10*17566	P	9-5-23	NATHAN P ERDOSSY AND BARBARA T ERDOSSY	TH EXPLORATION LLC	1/8+	921 108	N/A	N/A	N/A	N/A
10*17588	P	9-5-23	JAMES M JACKSON	TH EXPLORATION LLC	1/8+	921 325	N/A	N/A	N/A	N/A
10*17589	P	9-5-23	MARY CHRISTINE MCKENNA	TH EXPLORATION LLC	1/8+	921 332	N/A	N/A	N/A	N/A
10*47051.223.15	P	9-5-23	LARRY D TAUNT AND NANCY L TAUNT	TH EXPLORATION LLC	1/8+	908 14	N/A	N/A	N/A	N/A
10*47051.223.20	P	9-5-23	BARBARA A BUZZARD	TH EXPLORATION LLC	1/8+	908 24	N/A	N/A	N/A	N/A
10*47051.223.21	P	9-5-23	GARY T WARD AND SHARON D WARD	TH EXPLORATION LLC	1/8+	908 19	N/A	N/A	N/A	N/A
10*47051.223.24	P	9-5-23	JO DEE K DAVIS	TH EXPLORATION LLC	1/8+	908 136	N/A	N/A	N/A	N/A
10*47051.223.25	P	9-5-23	JOANNE WELCH	TH EXPLORATION LLC	1/8+	908 141	N/A	N/A	N/A	N/A
10*47051.223.26	P	9-5-23	WENDY L SMARKEL	TH EXPLORATION LLC	1/8+	908 69	N/A	N/A	N/A	N/A
10*47051.223.27	P	9-5-23	TIMI J HOBBS	TH EXPLORATION LLC	1/8+	908 277	N/A	N/A	N/A	N/A
10*19695	P	9-5-23	VIRGINIA P FOUNDS KASSERMAN ET	TH EXPLORATION, LLC	1/8+	944 333	N/A	N/A	N/A	N/A
10*16383	P	9-5-23	ROBERT STEPHEN DRIGGERS	TH EXPLORATION LLC	1/8+	908 224	N/A	N/A	N/A	N/A
10*15481	P	9-5-23	DEAN P RIGBY AND SUSAN RIGBY	TH EXPLORATION LLC	1/8+	908 197	N/A	N/A	N/A	N/A
10*15482	P	9-5-23	SUSAN NELSON	TH EXPLORATION LLC	1/8+	908 203	N/A	N/A	N/A	N/A
10*15686	P	9-5-23	JOHN QMER BOLTZ	TH EXPLORATION LLC	1/8+	908 160	N/A	N/A	N/A	N/A
10*15750	P	9-5-23	SANDRA K TRULL	TH EXPLORATION LLC	1/8+	908 229	N/A	N/A	N/A	N/A
10*17482	P	9-5-23	TERESA EZELLE RALYA AND DAVID L RALYA	TH EXPLORATION LLC	1/8+	927 487	N/A	N/A	N/A	N/A
10*17484	P	9-5-23	NELDA S JACKSON	TH EXPLORATION LLC	1/8+	921 330	N/A	N/A	N/A	N/A
10*17485	P	9-5-23	MARGIE ANN JACKSON ROBBINS GRAHAM	TH EXPLORATION LLC	1/8+	921 91	N/A	N/A	N/A	N/A
10*17526	P	9-5-23	JEFFREY L REEVES AND JODY L REEVES	TH EXPLORATION LLC	1/8+	921 370	N/A	N/A	N/A	N/A
10*17527	P	9-5-23	JAMES MICHAEL EZELL AND LUCILLE D EZELL	TH EXPLORATION LLC	1/8+	921 111	N/A	N/A	N/A	N/A
10*17561	P	9-5-23	ROGER L TYRELL AND KATHRYN L TYRELL	TH EXPLORATION LLC	1/8+	921 519	N/A	N/A	N/A	N/A

47 051 02019

WW-6A1 Supplement

Operator's Well No. Ten High 1N - 18HM

Lease ID	Tag	Parcel	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment
10*17564	P	9-5-23	JAMES RONALD NICKOLSON AND TRACEY E NICKOLSON	TH EXPLORATION LLC	1/8+	921 340	N/A	N/A	N/A	N/A
10*47051.223.1	Q	9-5-24	JEAN ANNE GORBY STORCH	TH EXPLORATION LLC	1/8+	877 216	N/A	N/A	N/A	N/A
10*47051.223.2	Q	9-5-24	STEPHANIE SCHIEFER AND GEOFFREY SCHIEFER	TH EXPLORATION LLC	1/8+	885 321	N/A	N/A	N/A	N/A
10*47051.223.3	Q	9-5-24	ROBERT A LEADBETTER AND M REBECCA LEADBETTER	TH EXPLORATION LLC	1/8+	885 324	N/A	N/A	N/A	N/A
	Q	9-5-24	ALVIE B DARRAH ET UX	TRIENERGY HOLDINGS, LLC	1/8+	702 111	N/A	TriEnergy to NPAR: 24/180	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
	R	ASSESSED	TRUSTEES OF M E CHURCH	CHEVRON USA INC	1/8+	867 110	N/A		N/A	Chevron to Tug Hill: 960/409
	S	9-5-7	BOWMAN UNITED METHODIST CHURCH	CHEVRON USA INC	1/8+	867 110	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	T	9-5-6.1	DAKAN JOSEPH D	CHESAPEAKE APPALACHIA LLC	1/8+	694 71	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	T	9-5-6.1	RAJU PATSY JO AKA GORBY PATSY JO	CHESAPEAKE APPALACHIA LLC	1/8+	695 175	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	U	9-5-6	NANCY L SNYDER	CHEVRON USA INC	1/8+	865 191	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	U	9-5-6	DAKAN JOSEPH D	CHESAPEAKE APPALACHIA LLC	1/8+	694 71	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	U	9-5-6	RAJU PATSY JO AKA GORBY PATSY JO	CHESAPEAKE APPALACHIA LLC	1/8+	695 175	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	V	9-5-6.9	DAKAN JOSEPH D	CHESAPEAKE APPALACHIA LLC	1/8+	694 71	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	V	9-5-6.9	RAJU PATSY JO AKA GORBY PATSY JO	CHESAPEAKE APPALACHIA LLC	1/8+	695 175	N/A	N/A	Chesapeake to Chevron: 30/461	Chevron to Tug Hill: 960/409
	W	9-2-1	SISTERS OF ST FRANCIS	CHEVRON USA INC	1/8+	886 595	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	DIOCESE OF WHEELING-CHARLESTON	TRIENERGY HOLDINGS, LLC	1/8+	739 569	N/A	TriEnergy to NPAR: 25/449	NPAR to Chevron: 756/332	Chevron to Tug Hill: 960/409
	W	9-2-1	MARKEY VICKIE L IRREVOCABLE TRST	TH EXPLORATION LLC	1/8+	877 201	N/A	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 960/409
	W	9-2-1	ZIDAR SUSAN ET VIR	TH EXPLORATION LLC	1/8+	873 162	N/A	N/A	Tug Hill to Chevron: 36/168	Chevron to Tug Hill: 960/409
	W	9-2-1	WUERTHELE MARK K	CHEVRON USA INC	1/8+	853 27	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	WUERTHELE JEFFREY A	CHEVRON USA INC	1/8+	853 34	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	WUERTHELE MICHAEL D ET UX	CHEVRON USA INC	1/8+	853 41	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	WUERTHELE ROBERT S	CHEVRON USA INC	1/8+	853 48	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	CROW CLARA I	CHEVRON USA INC	1/8+	863 308	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	CROW GEORGE BARNARD JR ET UX	CHEVRON USA INC	1/8+	835 351	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	BAKER MARY ANN	CHEVRON USA INC	1/8+	808 518	N/A	N/A	N/A	Chevron to Tug Hill: 960/409
	W	9-2-1	ULMAN TRUST MARY ANN BAKER TRSTE	CHEVRON USA INC	1/8+	808 550	N/A	N/A	N/A	Chevron to Tug Hill: 960/409

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Jan Post
MARSHALL County 12:43:01 PM
Instrument No 1404876
Date Recorded 05/26/2015
Document Type ABN
Pages Recorded 20
Book-Page 36-148
Recording Fee \$20.00
Additional \$9.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "**Assignment**") is made and entered into this 17th day of May, 2016 (the "**Effective Date**"), by and between **CHEVRON U.S.A. INC.** (hereinafter "**Assignor**") and **TH EXPLORATION, LLC** (hereinafter "**Assignee**") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated May 2, 2016 (the "**Acreage Trade Agreement**"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in Exhibit "A", and as depicted in Exhibits "A-1" and "A-2", attached hereto and made a part hereof (hereinafter the "**Leases**"); and

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and subject to the limited warranties, restrictions and conditions hereinafter mentioned, the parties hereto, intending to be legally bound, do covenant and agree as follows:

1. **Assignment.** Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon, except that Assignor accepts and reserves from this Assignment the Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia.

TO HAVE AND TO HOLD such right, title and interest in and to the Leases unto Assignee or its designee, and their respective successors and assigns, forever, in accordance with the provisions of this Assignment.

2. **Special Warranty.** Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the Conveyed Interests since the time that Assignor obtained its interests in the Leases. Assignor does covenant, promise and agree, to and with the Assignee, its respective successors and assigns, to forever specially warrant and defend the title to the Leases or portions thereof included under this Assignment, unto the Assignee and its respective successors and assigns, against the lawful claims of Assignor, and all persons claiming, or to claim, the same or any part thereof, by, through or under Assignor.

#217
for now

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MAY 24 2018

WV Department of
Environmental Protection

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement is entered into this 14th day of February, 2018, between TUG HILL OPERATING, LLC (THQ), a Texas limited liability company, whose address is 1320 S. University Blvd., Suite 500, Fort Worth, TX 76107 and CHEVRON U.S.A., INC. (Chevron), a Pennsylvania corporation, whose address is 700 Cherrington Parkway, Coraopolis, PA 15108.

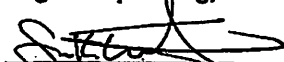
PARTIES AND AGREEMENT REFERENCE: THQ and Chevron entered into a letter agreement ("Letter Agreement") dated February 14th, 2018 (the "Commencement Date") outlining pursuit of definitive agreements to allow THQ the right to permit, drill, extract, produce and market oil and gas from those certain oil and gas interests controlled by Chevron in the Meade District of Marshall County, West Virginia, as more fully described in Exhibit A attached hereto, made a part hereof, and incorporated herein by reference.

1. **TERM:** The rights granted in the Letter Agreement will terminate upon the earlier of (i) one hundred eighty (180) days from the Commencement Date, (ii) Chevron's revocation of the rights granted in the Letter Agreement, or (iii) the parties entering into the definitive agreement described in the Letter Agreement. Upon termination of the Letter Agreement under subsection (i) or (ii) of the immediately preceding sentence, THQ will record a surrender of this Memorandum and withdraw any related well work permit requests.


2. **MEMORANDUM FOR RECORDING PURPOSES ONLY:** This Memorandum is for recording purposes only and does not supplement or supersede the parties' respective rights set forth in the Letter Agreement or other agreements.

IN WITNESS WHEREOF, the parties have signed their names hereto as of the date first above written.

Tug Hill Operating, LLC


By: Sean Willis
Its: VP, Engineering &
Development Manager - Appalachia

Chevron U.S.A., Inc.


By: William E. Kerns
Its: Attorney-in-Fact

Marshall County
Jan Pest, Clerk
Instrument 1437069
02/27/2018 @ 03:43:58 PM
AGREEMENT
Book 961 @ Page 303
Pages Recorded 8
Recording Cost \$ 14.00

Marshall County
Jan Pest, Clerk
Instrument 1436705
02/16/2018 @ 02:16:57 PM
AGREEMENT
Book 960 @ Page 409
Pages Recorded 2
Recording Cost \$ 11.00

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WV Department of
Environmental Protection

47 051 02019



February 28, 2018

WV Department of Environmental Protection
Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304
Attention: Laura Adkins

RE: Ten High 1N-18HM

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 21/9 and 21/11 in the area reflected on the Ten High 1N-18HM well plat. THO has conducted a full title search in the relevant Court House to confirm its' ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me at 304-376-0111 or by email at amiller@tug-hilop.com.

Sincerely,

A handwritten signature in blue ink that reads "Amy L. Miller".

Amy L. Miller
Permit Specialist – Appalachia

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MAR 2 2018
WV Department of
Environmental Protection

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

Date of Notice Certification: 02/27/2018

API No. 47- 051 - 02019
Operator's Well No. Ten High 1N-18HM
Well Pad Name: Ten High

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>527,301.77</u>
County: <u>Marshall</u>	Northing: <u>4,406,364.76</u>
District: <u>Meade</u>	Public Road Access: <u>Shepherd Ridge Lane (Co. Rt. 21/9)</u>
Quadrangle: <u>Glen Easton 7.5'</u>	Generally used farm name: <u>LAWRENCE & SHIRLEY CONKLE, ESTS</u>
Watershed: <u>(HUC 10) Fish Creek</u>	

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:

*PLEASE CHECK ALL THAT APPLY

- 1. NOTICE OF SEISMIC ACTIVITY or NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED
- 2. NOTICE OF ENTRY FOR PLAT SURVEY or NO PLAT SURVEY WAS CONDUCTED
- 3. NOTICE OF INTENT TO DRILL or NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or
 WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)
- 4. NOTICE OF PLANNED OPERATION
- 5. PUBLIC NOTICE
- 6. NOTICE OF APPLICATION

OOG OFFICE USE ONLY

- RECEIVED/
NOT REQUIRED
- RECEIVED
- RECEIVED/
NOT REQUIRED
- RECEIVED
- RECEIVED
- RECEIVED

Required Attachments:

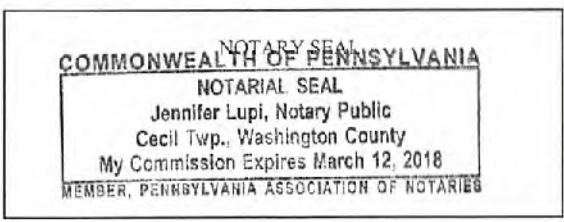
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

MAR 2 2018
Office of Oil and Gas
WV Department of
Environmental Protection

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Blvd, Southpointe Plaza II, Suite 200</u>
By:	Amy L. Miller <u><i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia</u>	Facsimile:	<u>724-338-2030</u>
Telephone:	<u>724-749-8388</u>	Email:	<u>amiller@tug-hillop.com</u>



Subscribed and sworn before me this 28th day of Feb. 2018
Jennifer Lupi Notary Public
 My Commission Expires March 12, 2018

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.

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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.

Date of Notice: 2/26/2018 **Date Permit Application Filed:** 2/27/2018

Notice of:

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

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: Estate of Lawrence & Shirley Mae Conkle c/o Roy Conkle
Address: 75 Arlington Avenue
Moundsville, WV 26041

Name: Roy A. Conkle, Sr., and Lorie A.
Address: 75 Arlington Avenue
Moundsville, WV 26041 *See Attached*

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

Name: Robert G. Hubbs and Scarlett E. Otte
Address: 132 Shepherds Ridge Lane
Glen Easton, WV 26036

Name: None
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: None
Address: _____

COAL OWNER OR LESSEE

Name: Murray Energy Corporation
Address: 46226 National Road
St. Clairsville, OH 43950

COAL OPERATOR

Name: Same as above coal owner
Address: _____

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

Name: *See supplement page 1A attached
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: None
Address: _____

*Please attach additional forms if necessary

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MAR 2 2018

WV Department of
Environmental Protection

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.

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

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Office of Oil and Gas
WV Department of Environmental Protection

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

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.**

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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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WW-6A
(8-13)

API NO. 47-051 - 02019
OPERATOR WELL NO. Ten High 1N-18HM
Well Pad Name: Ten High

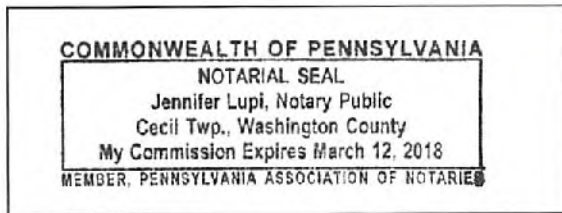
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-0368
Email: amiller@tug-hilltop.com *amiller*

Address: 380 Southpointe Blvd, Southpointe 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 26th day of Feb, 2018.
Jennifer Lupi Notary Public
My Commission Expires March 12, 2018

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47 051 02019

Operator Well Nos. TEN HIGH 1S-18HM

WW-6A Notice of Application Attachment 1 of 1

Surface Owner(s):

Name: Teresa Anne Hughes and Michael J.
Address: 252 Conkle Drive
Glen Easton, WV 26039

Brenda Joyce Whetzel
1863 Shepherds Ridge Lane
Glen Easton, WV 26039

Larry Lee Conkle and Donna D.
154 Conkle Drive
Glen Easton, WV 26039

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Exhibit WW-6A

Supplement Pg. 1A

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

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

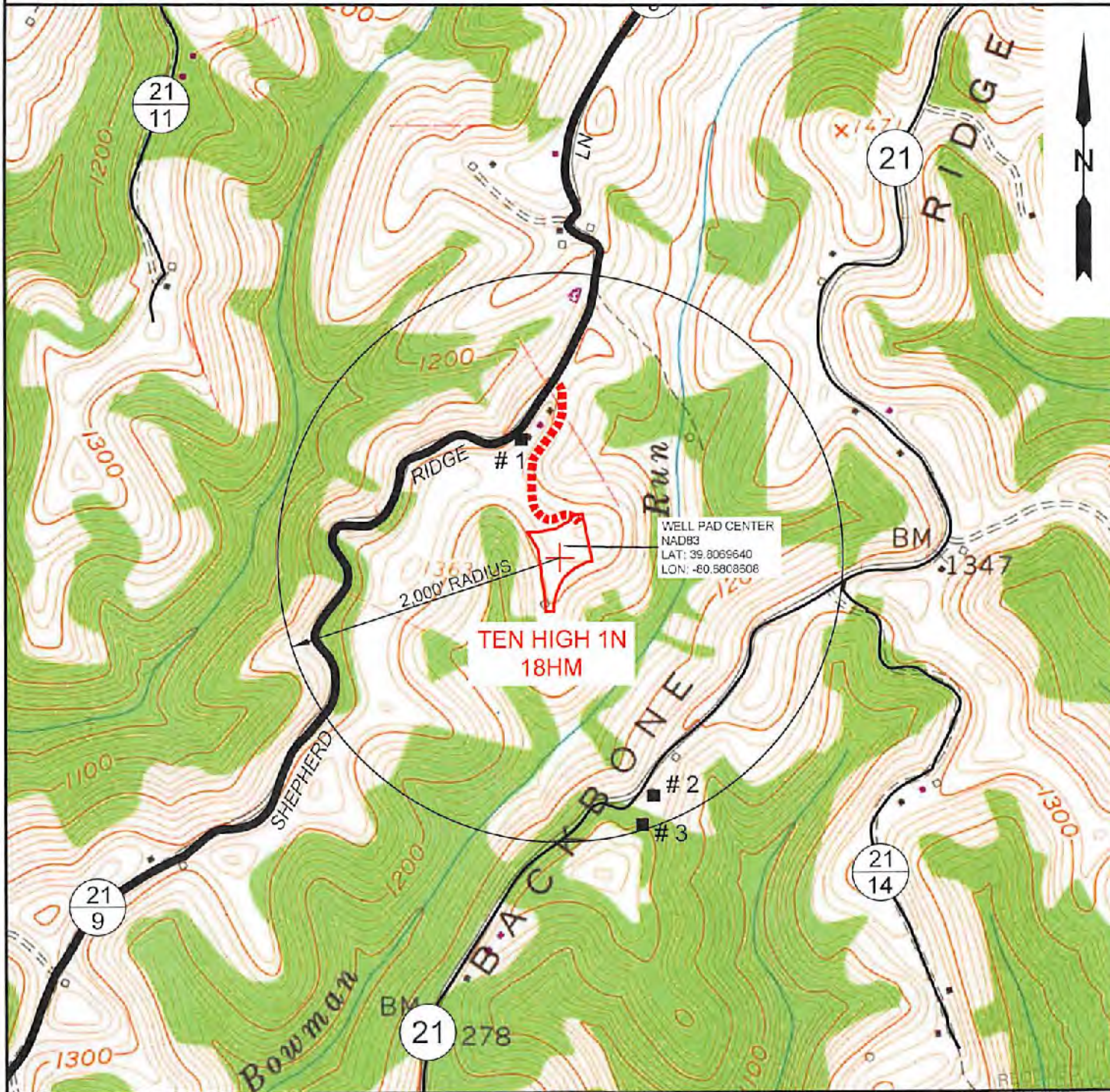
Well: Ten High 1N – 18HM
 District: Meade (House #'s 1-3)
 State: WV

There are three (3) 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 7 Pcl. 24 Lawrence & Shirley Conkle Ests Phone: 304-845-1808; 304-848-1808 Physical Address: 77B Shepards Lane 932 Shepherd Ridge Ln. Glen Easton, WV 26039 Tax Address: 75 Arlington Ave. Moundsville, WV 26041</p>	<p>House 2 TM 7 Pcl. 25 Thomas R. & Kimberly Whitfield Phone: 304-843-1753 Physical Address: 53 Sallys Backbone Rd. 1834 Sally's Backbone Rd. Glen Easton, WV 26039 Tax Address: 1838 Sallys Backbone Rd. Glen Easton, WV 26039</p>	<p>House 3 TM 7 Pcl. 25 Thomas R. & Kimberly Whitfield Phone: 304-843-1753 Physical Address: 53 Sallys Backbone Rd. 1838 Sally's Backbone Rd. Glen Easton, WV 26039 Tax Address: Same</p>
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PROPOSED TEN HIGH 1N - 18HM



NOTE: THERE APPEARS TO BE THREE (3) POSSIBLE WATER SOURCES WITHIN 2,000'.

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SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5834
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.	B655	01-08-18	1" - 1000'



**TUG HILL
OPERATING**

47 051 02019

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least SEVEN (7) days but no more than FORTY-FIVE (45) days prior to entry

Date of Notice: November 29, 2017 Date of Planned Entry: 12/6/2017

Delivery method pursuant to West Virginia Code § 22-6A-10a

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

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(s)
Name: Estate of Lawrence & Shirley Mae Conkle c/o Roy Conkle
Address: 75 Arlington Avenue, Moundsville, WV 26041
Name: Roy A. Conkle, Sr., and Lorie A.
Address: 75 Arlington Avenue, Moundsville, WV 26041
Name: Larry Lee Conkle and Donna D.
Address: 154 Conkle Drive, Glen Eason, WV 28039

COAL OWNER OR LESSEE
Name: Murray Energy Corporation
Address: 46225 National Road, St. Clairsville, OH 43950

MINERAL OWNER(s)
Name: Estate of Lawrence & Shirley Mae Conkle c/o Roy Conkle
Address: 75 Arlington Avenue, Glen Easton, WV 26039

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State: WEST VIRGINIA
County: MARSHALL
District: MEADE
Quadrangle: GLEN EASTON 7.5'
Approx. Latitude & Longitude: LAT 39.8067775 LONG -80.6809192
Public Road Access: SHEPHERD RIDGE LANE (Co. RT. 21/9)
Watershed: HUC-10 FISH CREEK
Generally used farm name: LAWRENCE & SHIRLEY CONKLE, ESTS

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production 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). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: TUG HILL OPERATING, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilltop.com

Address: 380 SOUTHPOINTE BLVD, SOUTHPOINTE PLAZA II, SUITE 200, CANONSBURG, PA 15317
Facsimile: 724-338-2030

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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.

WV Department of Environmental Protection

WW-6A3 Notice of Entry for Plat Survey Attachment 1 of 1

Surface Owner(s):

Name: Teresa Anne Hughes and Michael J. ✓
Address: 252 Conkle Drive
Glen Easton, WV 26039

Brenda Joyce Whetzel ✓
1863 Shepherds Ridge Lane
Glen Easton, WV 26039

Robert G. Hubbs and Scarlett E. Otte ✓
132 Shepherds Ridge Lane
Glen Easton, WV 26039

Mineral Owner(s):

Name: Roy A. Conkle, Sr. and Lorie A. ✓
75 Arlington Avenue
Moundsville, WV 26041

Larry Lee Conkle and Donna D. ✓
154 Conkle Drive
Glen Easton, WV 26039

Teresa Anne Hughes and Michael J. ✓
252 Conkle Drive
Glen Easton, WV 26039

Brenda Joyce Whetzel ✓
1863 Shepherds Ridge Lane
Glen Easton, WV 26039

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Environmental Protection

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WW-6A5
(1/12)

Operator Well No. Tan High 1N-18HM

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

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

Date of Notice: 02/26/2018 **Date Permit Application Filed:** 02/27/2018

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)
(at the address listed in the records of the sheriff at the time of notice):

Name: Estate of Lawrence & Shirley Mae Conkle c/o Roy Conkle
Address: 75 Arlington Avenue
Moundsville, WV 26041

Name: Roy A. Conkle, Sr., and Lorie A.
Address: 75 Arlington Avenue
Moundsville, WV 26041 ****See Attached****

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>527,301.77</u>
County:	<u>Marshall</u>		Northing:	<u>4,406,364.76</u>
District:	<u>Meade</u>	Public Road Access:	<u>Shepherd Ridge Lane (Co. Rt. 21/9)</u>	
Quadrangle:	<u>Glen Easton 7.5'</u>	Generally used farm name:	<u>LAWRENCE & SHIRLEY CONKLE, ESTS</u>	
Watershed:	<u>(HUC 10) Fish Creek</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by W. Va. Code § 22-6A-10(b) to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. 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.

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

Address: 380 Southpointe Blvd, Southpointe 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.

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Operator Well Nos. TEN HIGH 1N-18HM

WW-6A5 Notice of Planned Operation..... Attachment 1 of 1

Surface Owner(s):

Name: Teresa Anne Hughes and Michael J.
Address: 252 Conkle Drive
Glen Easton, WV 26039

Brenda Joyce Whetzel
1863 Shepherds Ridge Lane
Glen Easton, WV 26039

Larry Lee Conkle and Donna D.
154 Conkle Drive
Glen Easton, WV 26039

Robert G. Hubbs and Scarlett E. Otte
132 Shepherds Ridge Lane
Glen Easton, WV 26039

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Jim Justice
Governor

Thomas J. Smith, P. E.
Secretary of Transportation/
Commissioner of Highways

December 7, 2017

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Ten High 1N Pad, Marshall County
Ten High 1N Unit-18HM Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2017-0127 which has been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 21/9 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G Coordinator

Cc: Jonathan White
Tug Hill Operating, LLC
CH, OM, D-6
File

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Ten High 1N-18HM

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

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