



 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

Friday, April 12, 2019
 WELL WORK PERMIT
 Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
 380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for OLD CROW N-1HM
 47-051-02189-00-00

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

Operator's Well Number: OLD CROW N-1HM
 Farm Name: DONNA VIVIAN YOHO (TOP)
 U.S. WELL NUMBER: 47-051-02189-00-00
 Horizontal 6A New Drill
 Date Issued: 4/12/2019

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.

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.

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 (12/10/2018) 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

Permit well - Old Crow N-1HM

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
4705102040	Tug Hill Operating	6689' TVD	None	None	No, existing Marcellus permit. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Currently a permit.
4705102023	Tug Hill Operating	6681' TVD	None	None	No, existing Marcellus permit. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Currently a permit.
4705102042	Tug Hill Operating	6693' TVD	None	None	No, existing Marcellus permit. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Currently a permit.
4705102043	Tug Hill Operating	6699' TVD	None	None	No, existing Marcellus permit. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	Currently a permit.

WV Geological & Economic Survey Well: County = 51 Permit = 02040

Location Information: [View Map](#)
 API: COUNTY PERMID MAX DISTRICT SHAQCT# SHAQCT# LAY DE# LON DE# UTM# UTM#
 (4705102) 102040 5104 District 5104000000 0000000000 0000000000 0000000000

Bottom Hole Location Information:
 API: EP F LWD UTM# UTM# LON DE# LAY DE#
 (4705102) 5104000000 0000000000 0000000000 0000000000

Owner Information:
 API: COMP OFF SURF# STATUS SURFACE OWNER WELL_NBR CO_NBR LEASE LEASE_NBR MINERAL_OWN OPERATOR AT COMPLETION PROP_UID PROP_PROD_CFM TRIPLET_CFM
 (4705102) 5104000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000

Completion Information:
 API: COMP OFF SURF# FLD# CASH# FIELD DEEPEN_CFM DEEPEN_CFM INITIAL_CASH# FINAL_CASH# TYPE_NGL_CFM NGL_CFM UVC TRIP_NGL_CFM ROD_NGL_CFM UAPF UAPF_NGL_CFM
 (4705102) 5104000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000

There is no Pay data for this well
 There is no Production Gas data for this well
 There is no Production Oil data for this well ** some operators may have reported NGL Under Oil
 There is no Production NGL data for this well ** some operators may have reported NGL Under Oil
 There is no Production Water data for this well
 There is no Stratigraphy data for this well
 There is no Wireline (E-Log) data for this well
 There is no Plugging data for this well
 There is no Sample data for this well

WV Geological & Economic Survey Well: County = 51 Permit = 02023

Location Information: [View Map](#)
 API: COUNTY PERMID MAX DISTRICT SHAQCT# SHAQCT# LAY DE# LON DE# UTM# UTM#
 (4705102) 102023 5104 District 5104000000 0000000000 0000000000 0000000000

Bottom Hole Location Information:
 API: EP F LWD UTM# UTM# LON DE# LAY DE#
 (4705102) 5104000000 0000000000 0000000000 0000000000

Owner Information:
 API: COMP OFF SURF# STATUS SURFACE OWNER WELL_NBR CO_NBR LEASE LEASE_NBR MINERAL_OWN OPERATOR AT COMPLETION PROP_UID PROP_PROD_CFM TRIPLET_CFM
 (4705102) 5104000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000

Completion Information:
 API: COMP OFF SURF# FLD# CASH# FIELD DEEPEN_CFM DEEPEN_CFM INITIAL_CASH# FINAL_CASH# TYPE_NGL_CFM NGL_CFM UVC TRIP_NGL_CFM ROD_NGL_CFM UAPF UAPF_NGL_CFM
 (4705102) 5104000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000

There is no Pay data for this well
 There is no Production Gas data for this well
 There is no Production Oil data for this well ** some operators may have reported NGL Under Oil
 There is no Production NGL data for this well ** some operators may have reported NGL Under Oil
 There is no Production Water data for this well
 There is no Stratigraphy data for this well
 There is no Wireline (E-Log) data for this well
 There is no Plugging data for this well
 There is no Sample data for this well

RECEIVED
 Office of Oil and Gas
 FEB 26 2019
 WV Department of
 Environmental Protection

WV Department of Environmental Protection **Well: County = 51 Permit = 02042**

Location Information: View Map
 WEL COUNTY PERMID HAZDISTRICT QUAD N QUAD E LAT OF LOW DE UTM UTM
 6204242 51 42 51000 42000 51000 42000 51000 42000 4978120 4800000

Basin Hole Location Information:
 WEL SP FIELD UTM UTM LOW DE LAT DE
 6204242 1 42 51000 42000 4978120 4800000

Owner Information:
 WEL WEL CO LEASE LEASE NO OPERATOR AT COMPLETION PROP TO PROP FROM THE WEL
 6204242 1 42 51000 42000 4978120 4800000 1 51000 42000 1 51000 42000

Completion Information:
 WEL WEL CO LEASE LEASE NO OPERATOR AT COMPLETION PROP TO PROP FROM THE WEL
 6204242 1 42 51000 42000 4978120 4800000 1 51000 42000 1 51000 42000

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

There is no Wireline (E-Log) data for this well

There is no Flugging data for this well

There is no Sample data for this well

WV Department of Environmental Protection **Well: County = 51 Permit = 02043**

Location Information: View Map
 WEL COUNTY PERMID HAZDISTRICT QUAD N QUAD E LAT OF LOW DE UTM UTM
 6204343 51 43 51000 43000 51000 43000 4978120 4800000

Basin Hole Location Information:
 WEL SP FIELD UTM UTM LOW DE LAT DE
 6204343 1 43 51000 43000 4978120 4800000

Owner Information:
 WEL WEL CO LEASE LEASE NO OPERATOR AT COMPLETION PROP TO PROP FROM THE WEL
 6204343 1 43 51000 43000 4978120 4800000 1 51000 43000 1 51000 43000

Completion Information:
 WEL WEL CO LEASE LEASE NO OPERATOR AT COMPLETION PROP TO PROP FROM THE WEL
 6204343 1 43 51000 43000 4978120 4800000 1 51000 43000 1 51000 43000

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

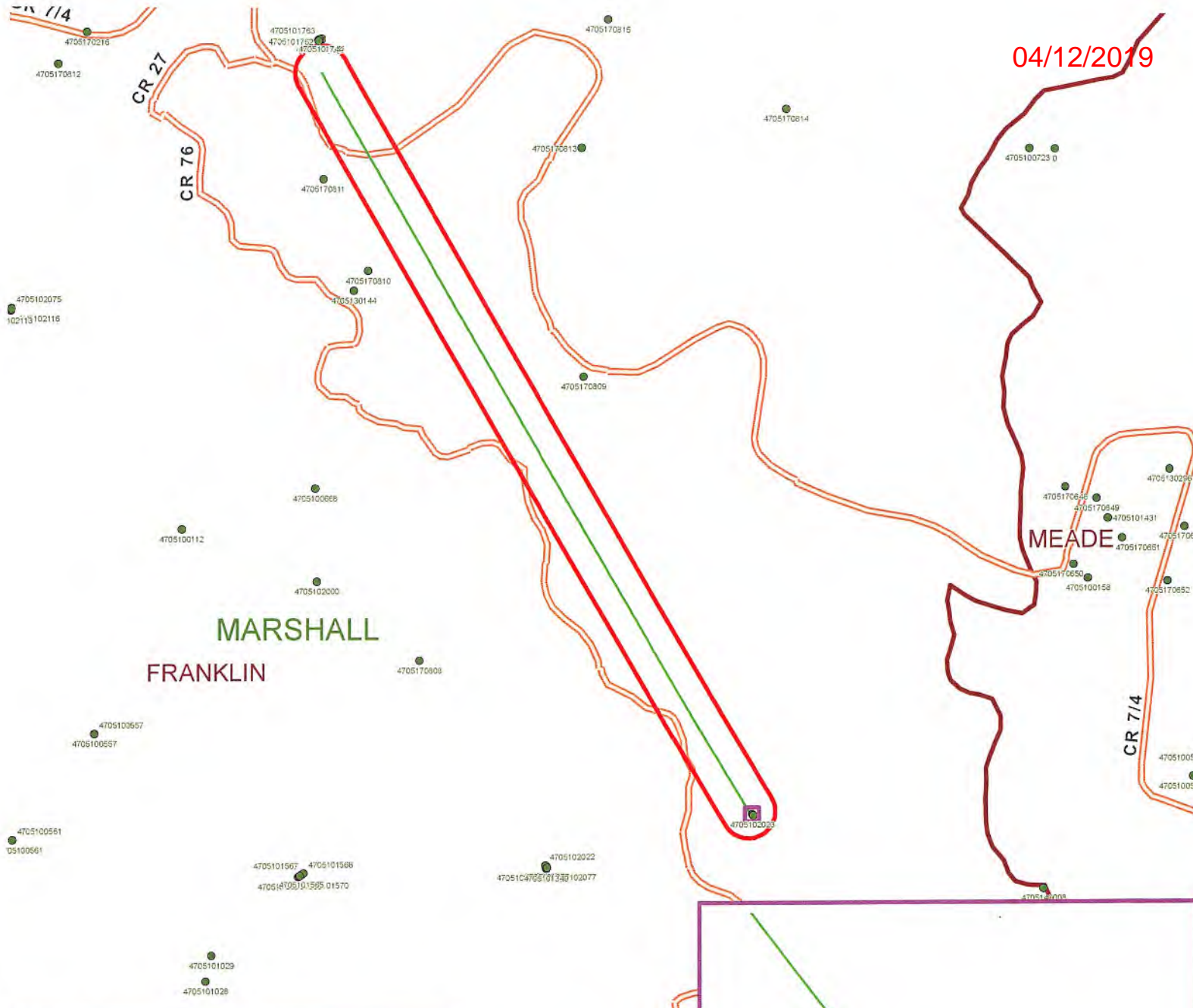
There is no Wireline (E-Log) data for this well

There is no Flugging data for this well

There is no Sample data for this well

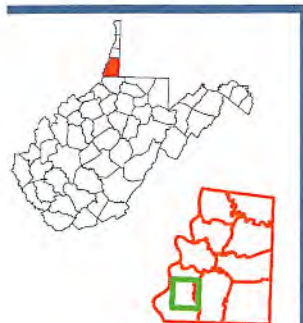
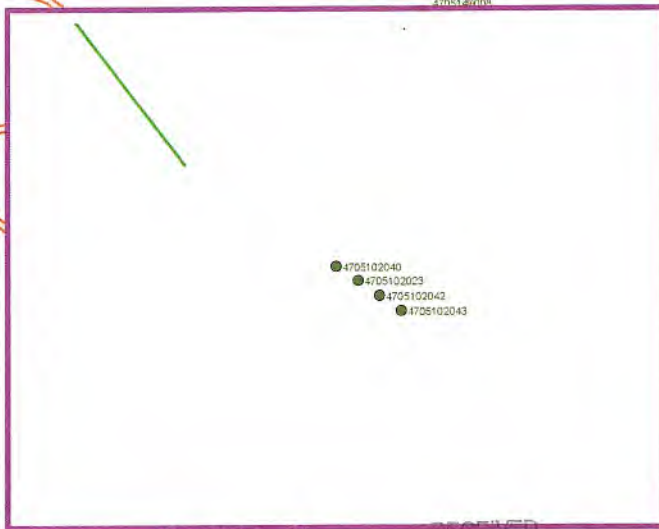
RECEIVED
 Office of Oil and Gas
 FEB 26 2019
 WV Department of
 Environmental Protection

04/12/2019



Legend

- Well Locations (ims.wvgs.wvnet.edu)
- Major Highways
- Major Roads
- Old Crow N-1HM
- 500 Ft. Buffer
- ▭ Counties
- ▭ Districts



Old Crow N - 1HM

Franklin District

Marshall County, WV



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

RECEIVED
Office of Oil and Gas
FEB 26 2019
WV Department of
Environmental Protection



WW-6B
(04/15)

4705102189
API NO. 47-051 - 04/12/2019
OPERATOR WELL NO. Old Crow N-1HM
Well Pad Name: Old Crow

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

1) Well Operator: Tug Hill Operating, LLC

<u>494510851</u>	<u>Marshall</u>	<u>Franklin</u>	<u>Powhatan Point 7</u>
------------------	-----------------	-----------------	-------------------------

Operator ID County District Quadrangle

2) Operator's Well Number: Old Crow N-1HM Well Pad Name: Old Crow

3) Farm Name/Surface Owner: Donna Yoho Public Road Access: Rines Ridge Road (County Route 76)

4) Elevation, current ground: 1286' Elevation, proposed post-construction: 1264.99'

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

(b) If Gas Shallow Deep _____
Horizontal _____

Dec 1/23/19

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6528' - 6579', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6679'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 20,814'

11) Proposed Horizontal Leg Length: 13,445.81'

12) Approximate Fresh Water Strata Depths: 70'; 981'

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

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 788' and Pittsburgh Coal - 880'

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

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

(a) If Yes, provide Mine Info: Name: _____ RECEIVED
Office of Oil and Gas
Depth: _____ FEB 26 2019
Seam: _____
Owner: _____ WV Department of Environmental Protection

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259ft^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	976'	976'	1028ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	976'	976'	1028ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,805'	2,805'	927ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	20,814'	20,814'	5307ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	8,099'		
Liners							

Handwritten signature
11/23/19

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

PACKERS

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

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

JL
1/23/19

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

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

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

Well to completed with approximately 33,607,500 lb. proppant and 519,596 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.18 acres

22) Area to be disturbed for well pad only, less access road (acres): 6.64 acres

23) Describe centralizer placement for each casing string:

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

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

*See attachment

25) Proposed borehole conditioning procedures:

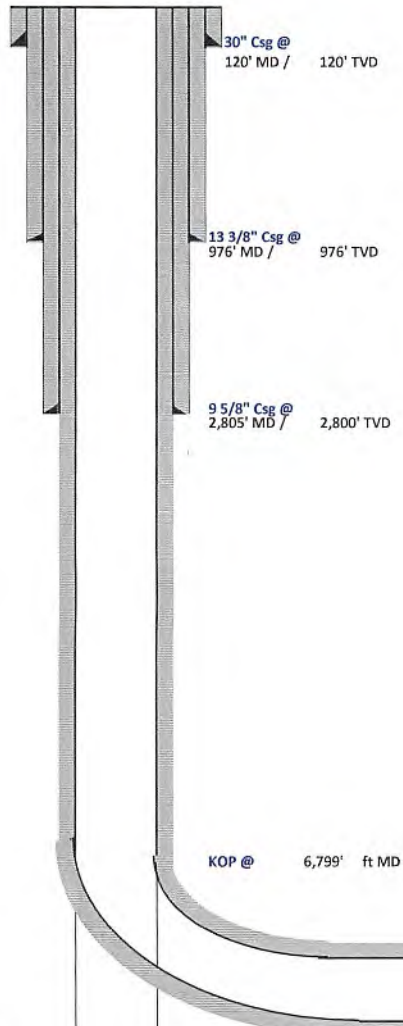
Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH.

RECEIVED
Gas
FEB 26 2019
WV Department of
Environmental Protection

*Note: Attach additional sheets as needed.



WELL NAME: Old Crow N-1HM
 STATE: WV COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,265' GL Elev: 1,265'
 TD: 20,814'
 TH Latitude: 39.77851632
 TH Longitude: -80.7631964
 BH Latitude: 39.816023
 BH Longitude: -80.791501



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	886
Sewickley Coal	788
Pittsburgh Coal	880
Big Lime	2077
Weir	2431
Berea	2626
Gordon	2971
Rhinestreet	5944
Geneseo/Burkett	6434
Tully	6469
Hamilton	6504
Marcellus	6528
Landing Depth	6568
Onondaga	6579
Pilot Hole Depth	6679

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	976'	976'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,805'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	20,814'	6,333'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,034	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	913	A	15	Air	1 Centralizer every other jt
Production	4,877	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Handwritten signature and date: 1/23/19

Pilot Hole
 PH TD @ 6,679' TVD
 Landing Point @ 7,371' MD / 6,568' TVD
 PH TD @ 100' below Onondaga Top

Lateral TD @ 20,814' ft MD
 6,333' ft TVD

WV Department of Environmental Protection

RECEIVED
 Office of Oil and Gas
 FEB 26 2019



Tug Hill Operating, LLC Casing and Cement Program

Old Crow N-1HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	976'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,805'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	20,814'	CTS

Cement

Handwritten signature and date: 1/23/19

- 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

RECEIVED
Office of Oil and Gas
FEB 26 2019
WV Department of
Environmental Protection



Well: Old Crow N-01 HM (slot K)
 Site: Old Crow Pad
 Project: Marshall County, West Virginia
 Design: rev1
 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	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	5.00	329.08	1549.68	9.35	-5.60	2.00	329.08	10.90	Begin 5.00° tangent
4	3106.24	5.00	329.08	3100.00	125.71	-75.30	0.00	0.00	146.53	Begin 2°/100' build
5	4550.33	33.88	329.08	4447.38	533.71	-319.64	2.00	0.00	622.07	Begin 33.88° tangent
6	6799.39	33.88	329.08	6314.53	1609.36	-963.85	0.00	0.00	1875.82	Begin 10°/100' build/turn
7	7370.61	91.00	329.74	6568.00	2027.87	-1210.33	10.00	0.78	2361.51	Begin 91.00° lateral section
8	20813.90	91.00	329.74	6333.00	13637.46	-7984.10	0.00	0.00	5802.73	PBHL/TD 20813.90 MD 6333.00 TVD



Azimuths to Grid North
 True North: -0.15°
 Magnetic North: -8.82°

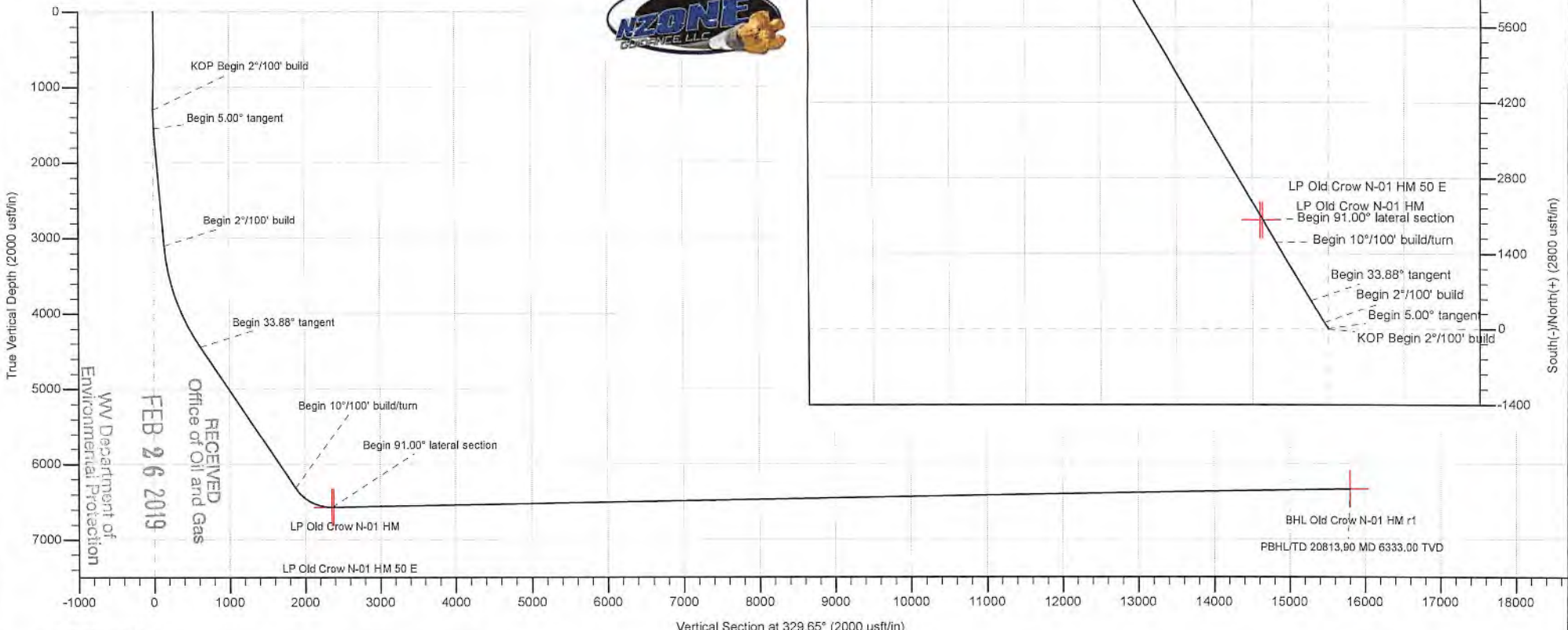
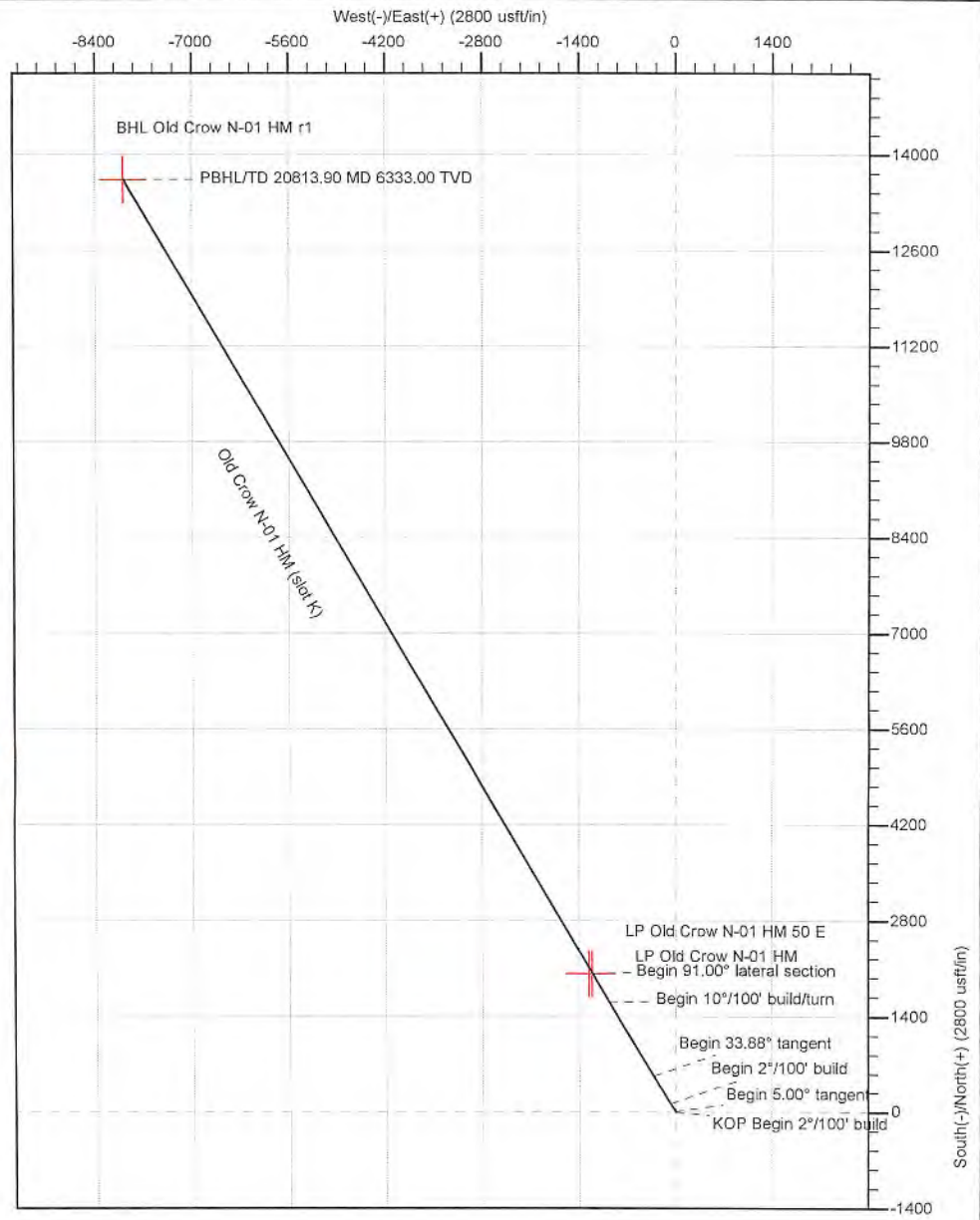
Magnetic Field
 Strength: 52107.1nT
 Dip Angle: 86.91°
 Date: 1/20/2018
 Model: IGRF2015

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 @ 1265.00usft

Northing: 14446171.83 Easting: 1706947.54 Latitude: 39.77851632 Longitude: -80.76319640

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.82°





Planning Report - Geographic

04/12/2019

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-01 HM (slot K)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1265.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1265.00usft
Site:	Old Crow Pad	North Reference:	Grid
Well:	Old Crow N-01 HM (slot K)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

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

Site	Old Crow Pad				
Site Position:	Northing:	14,446,179.89 usft	Latitude:	39.77853828	
From: Lat/Long	Easting:	1,706,970.33 usft	Longitude:	-80.76311519	
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.15 °

Well	Old Crow N-01 HM (slot K)					
Well Position	+N/-S	0.00 usft	Northing:	14,446,171.83 usft	Latitude:	39.77851632
	+E/-W	0.00 usft	Easting:	1,706,947.54 usft	Longitude:	-80.76319640
Position Uncertainty	0.00 usft	Wellhead Elevation:		Ground Level:	1,265.00 usft	

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/20/2018	-8.67	66.91	52,107.11036124

Design	rev1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	329.65

Plan Survey Tool Program	Date	8/3/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	20,813.90 rev1 (Original Hole)	MWD	MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,550.00	5.00	329.08	1,549.68	9.35	-5.60	2.00	2.00	0.00	329.08	0.00
3,106.24	5.00	329.08	3,100.00	125.71	-75.30	0.00	0.00	0.00	0.00	0.00
4,550.33	33.88	329.08	4,447.38	533.71	-319.64	2.00	2.00	0.00	0.00	0.00
6,799.39	33.88	329.08	6,314.53	1,609.36	-963.85	0.00	0.00	0.00	0.00	0.00
7,370.61	91.00	329.74	6,568.00	2,027.87	-1,210.33	10.00	10.00	0.11	0.78	0.78 LP Old Crow N-01 HM
20,813.90	91.00	329.74	6,333.00	13,637.46	-7,984.10	0.00	0.00	0.00	0.00	0.00 BHL Old Crow N-01 H

RECEIVED
Office of Oil and Gas
FEB 26 2019
WV Department of Environmental Protection



Planning Report - Geographic

04/12/2019

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Old Crow Pad
 Well: Old Crow N-01 HM (slot K)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Old Crow N-01 HM (slot K)
 TVD Reference: GL @ 1265.00usft
 MD Reference: GL @ 1265.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
 Office of Oil and Gas

FEB 26 2019

WV Department of
 Environmental Protection

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	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
100.00	0.00	0.00	100.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
200.00	0.00	0.00	200.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
300.00	0.00	0.00	300.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
400.00	0.00	0.00	400.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
500.00	0.00	0.00	500.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
600.00	0.00	0.00	600.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
700.00	0.00	0.00	700.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
800.00	0.00	0.00	800.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
900.00	0.00	0.00	900.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,446,171.83	1,706,947.54	39.77851632	-80.76319640
KOP Begin 2°/100' build									
1,400.00	2.00	329.08	1,399.98	1.50	-0.90	14,446,173.33	1,706,946.64	39.77852044	-80.76319958
1,500.00	4.00	329.08	1,499.83	5.99	-3.59	14,446,177.82	1,706,943.95	39.77853279	-80.76320911
1,550.00	5.00	329.08	1,549.68	9.35	-5.60	14,446,181.18	1,706,941.93	39.77854205	-80.76321625
Begin 5.00° tangent									
1,600.00	5.00	329.08	1,599.49	13.09	-7.84	14,446,184.92	1,706,939.69	39.77855233	-80.76322418
1,700.00	5.00	329.08	1,699.11	20.57	-12.32	14,446,192.40	1,706,935.22	39.77857289	-80.76324005
1,800.00	5.00	329.08	1,798.73	28.04	-16.80	14,446,199.88	1,706,930.74	39.77859346	-80.76325592
1,900.00	5.00	329.08	1,898.35	35.52	-21.28	14,446,207.35	1,706,926.26	39.77861403	-80.76327179
2,000.00	5.00	329.08	1,997.97	43.00	-25.75	14,446,214.83	1,706,921.78	39.77863459	-80.76328766
2,100.00	5.00	329.08	2,097.59	50.48	-30.23	14,446,222.31	1,706,917.30	39.77865516	-80.76330353
2,200.00	5.00	329.08	2,197.21	57.95	-34.71	14,446,229.78	1,706,912.82	39.77867573	-80.76331940
2,300.00	5.00	329.08	2,296.82	65.43	-39.19	14,446,237.26	1,706,908.35	39.77869629	-80.76333527
2,400.00	5.00	329.08	2,396.44	72.91	-43.67	14,446,244.74	1,706,903.87	39.77871686	-80.76335114
2,500.00	5.00	329.08	2,496.06	80.38	-48.15	14,446,252.21	1,706,899.39	39.77873742	-80.76336701
2,599.99	5.00	329.08	2,595.68	87.86	-52.62	14,446,259.69	1,706,894.91	39.77875799	-80.76338288
2,699.99	5.00	329.08	2,695.30	95.34	-57.10	14,446,267.17	1,706,890.43	39.77877856	-80.76339875
2,799.99	5.00	329.08	2,794.92	102.81	-61.58	14,446,274.65	1,706,885.95	39.77879912	-80.76341462
2,899.99	5.00	329.08	2,894.54	110.29	-66.06	14,446,282.12	1,706,881.48	39.77881969	-80.76343049
2,999.99	5.00	329.08	2,994.16	117.77	-70.54	14,446,289.60	1,706,877.00	39.77884026	-80.76344636
3,099.99	5.00	329.08	3,093.78	125.24	-75.02	14,446,297.08	1,706,872.52	39.77886082	-80.76346223
3,106.24	5.00	329.08	3,100.00	125.71	-75.30	14,446,297.54	1,706,872.24	39.77886211	-80.76346322
Begin 2°/100' build									
3,199.99	6.88	329.08	3,193.25	134.03	-80.28	14,446,305.86	1,706,867.26	39.77888499	-80.76348088
3,299.99	8.88	329.08	3,292.30	145.79	-87.32	14,446,317.62	1,706,860.22	39.77891732	-80.76350582
3,399.99	10.88	329.08	3,390.81	160.50	-96.13	14,446,332.33	1,706,851.40	39.77895779	-80.76353705
3,499.99	12.88	329.08	3,488.67	178.15	-106.70	14,446,349.98	1,706,840.83	39.77900635	-80.76357451
3,599.99	14.88	329.08	3,585.74	198.72	-119.02	14,446,370.55	1,706,828.51	39.77906293	-80.76361817
3,699.99	16.88	329.08	3,681.92	222.19	-133.08	14,446,394.02	1,706,814.46	39.77912748	-80.76366798
3,799.99	18.88	329.08	3,777.09	248.52	-148.85	14,446,420.35	1,706,798.69	39.77919991	-80.76372386
3,899.99	20.88	329.08	3,871.13	277.68	-166.31	14,446,449.52	1,706,781.22	39.77928013	-80.76378575
3,999.99	22.88	329.08	3,963.93	309.65	-185.46	14,446,481.48	1,706,762.08	39.77936804	-80.76385359
4,099.99	24.88	329.08	4,055.36	344.37	-206.25	14,446,516.20	1,706,741.28	39.77946355	-80.76392728
4,199.99	26.88	329.08	4,145.33	381.81	-228.67	14,446,553.64	1,706,718.86	39.77956653	-80.76400673
4,299.99	28.88	329.08	4,233.73	421.92	-252.69	14,446,593.75	1,706,694.84	39.77967685	-80.76409185
4,399.99	30.88	329.08	4,320.43	464.65	-278.29	14,446,636.48	1,706,669.25	39.77979439	-80.76418254
4,499.99	32.88	329.08	4,405.35	509.95	-305.42	14,446,681.78	1,706,642.12	39.77991899	-80.76427868
4,550.33	33.88	329.08	4,447.38	533.71	-319.65	14,446,705.54	1,706,627.89	39.77998435	-80.76432911
Begin 33.88° tangent									
4,599.99	33.88	329.08	4,488.61	557.46	-333.87	14,446,729.29	1,706,613.67	39.78004968	-80.76437952



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Old Crow Pad
 Well: Old Crow N-01 HM (slot K)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Old Crow N-01 HM (slot K)
 TVD Reference: GL @ 1265.00usft
 MD Reference: GL @ 1265.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
 Office of Oil and Gas
 FEB 26 2019

Planned Survey

WV Department of
 Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,699.99	33.88	329.08	4,571.63	605.29	-362.51	14,446,777.12	1,706,585.02	39.78018123	-80.76448102
4,799.99	33.88	329.08	4,654.65	653.11	-391.16	14,446,824.94	1,706,556.38	39.78031278	-80.76458252
4,899.99	33.88	329.08	4,737.67	700.94	-419.80	14,446,872.77	1,706,527.74	39.78044433	-80.76468403
4,999.99	33.88	329.08	4,820.69	748.77	-448.44	14,446,920.60	1,706,499.09	39.78057589	-80.76478553
5,099.99	33.88	329.08	4,903.71	796.59	-477.09	14,446,968.42	1,706,470.45	39.78070744	-80.76488703
5,199.99	33.88	329.08	4,986.73	844.42	-505.73	14,447,016.25	1,706,441.81	39.78083899	-80.76498854
5,299.99	33.88	329.08	5,069.74	892.25	-534.37	14,447,064.08	1,706,413.16	39.78097054	-80.76509005
5,399.99	33.88	329.08	5,152.76	940.07	-563.01	14,447,111.91	1,706,384.52	39.78110209	-80.76519155
5,499.99	33.88	329.08	5,235.78	987.90	-591.66	14,447,159.73	1,706,355.88	39.78123365	-80.76529306
5,599.99	33.88	329.08	5,318.80	1,035.73	-620.30	14,447,207.56	1,706,327.23	39.78136520	-80.76539456
5,699.99	33.88	329.08	5,401.82	1,083.55	-648.94	14,447,255.39	1,706,298.59	39.78149675	-80.76549607
5,799.99	33.88	329.08	5,484.84	1,131.38	-677.59	14,447,303.21	1,706,269.95	39.78162830	-80.76559758
5,899.99	33.88	329.08	5,567.86	1,179.21	-706.23	14,447,351.04	1,706,241.31	39.78175985	-80.76569909
5,999.99	33.88	329.08	5,650.88	1,227.03	-734.87	14,447,398.87	1,706,212.66	39.78189140	-80.76580059
6,099.99	33.88	329.08	5,733.90	1,274.86	-763.52	14,447,446.69	1,706,184.02	39.78202295	-80.76590210
6,199.99	33.88	329.08	5,816.91	1,322.69	-792.16	14,447,494.52	1,706,155.38	39.78215451	-80.76600361
6,299.99	33.88	329.08	5,899.93	1,370.51	-820.80	14,447,542.35	1,706,126.73	39.78228606	-80.76610512
6,399.99	33.88	329.08	5,982.95	1,418.34	-849.45	14,447,590.17	1,706,098.09	39.78241761	-80.76620663
6,499.99	33.88	329.08	6,065.97	1,466.17	-878.09	14,447,638.00	1,706,069.45	39.78254916	-80.76630814
6,599.99	33.88	329.08	6,148.99	1,514.00	-906.73	14,447,685.83	1,706,040.80	39.78268071	-80.76640965
6,699.99	33.88	329.08	6,232.01	1,561.82	-935.37	14,447,733.65	1,706,012.16	39.78281226	-80.76651116
6,799.99	33.88	329.08	6,314.53	1,609.36	-963.85	14,447,781.20	1,705,983.69	39.78294303	-80.76661207
Begin 10°/100' build/turn									
6,799.99	33.94	329.08	6,315.03	1,609.65	-964.02	14,447,781.48	1,705,983.52	39.78294381	-80.76661267
6,899.99	43.94	329.28	6,392.71	1,663.56	-996.17	14,447,835.40	1,705,951.37	39.78309211	-80.76672661
6,999.99	53.94	329.41	6,458.31	1,728.35	-1,034.56	14,447,900.18	1,705,912.98	39.78327031	-80.76686265
7,099.99	63.94	329.52	6,509.84	1,802.04	-1,078.02	14,447,973.88	1,705,869.52	39.78347299	-80.76701668
7,199.99	73.94	329.61	6,545.72	1,882.40	-1,125.23	14,448,054.23	1,705,822.30	39.78369401	-80.76718400
7,299.99	83.94	329.68	6,564.89	1,966.98	-1,174.77	14,448,138.81	1,705,772.77	39.78392665	-80.76735953
7,370.61	91.00	329.74	6,568.00	2,027.87	-1,210.33	14,448,199.70	1,705,737.21	39.78409411	-80.76748556
Begin 91.00° lateral section									
7,399.99	91.00	329.74	6,567.49	2,053.24	-1,225.13	14,448,225.07	1,705,722.40	39.78416389	-80.76753801
7,499.99	91.00	329.74	6,565.74	2,139.60	-1,275.52	14,448,311.43	1,705,672.02	39.78440141	-80.76771657
7,599.99	91.00	329.74	6,563.99	2,225.96	-1,325.91	14,448,397.79	1,705,621.63	39.78463894	-80.76789513
7,699.99	91.00	329.74	6,562.24	2,312.32	-1,376.29	14,448,484.15	1,705,571.24	39.78487647	-80.76807370
7,799.99	91.00	329.74	6,560.49	2,398.67	-1,426.68	14,448,570.51	1,705,520.85	39.78511399	-80.76825226
7,899.99	91.00	329.74	6,558.75	2,485.03	-1,477.07	14,448,656.87	1,705,470.47	39.78535152	-80.76843083
7,999.99	91.00	329.74	6,557.00	2,571.39	-1,527.46	14,448,743.23	1,705,420.08	39.78558904	-80.76860939
8,099.99	91.00	329.74	6,555.25	2,657.75	-1,577.84	14,448,829.59	1,705,369.69	39.78582657	-80.76878796
8,199.99	91.00	329.74	6,553.50	2,744.11	-1,628.23	14,448,915.95	1,705,319.30	39.78606409	-80.76896653
8,299.99	91.00	329.74	6,551.75	2,830.47	-1,678.62	14,449,002.30	1,705,268.91	39.78630161	-80.76914510
8,399.99	91.00	329.74	6,550.01	2,916.83	-1,729.01	14,449,088.66	1,705,218.53	39.78653914	-80.76932367
8,499.99	91.00	329.74	6,548.26	3,003.19	-1,779.40	14,449,175.02	1,705,168.14	39.78677666	-80.76950225
8,599.99	91.00	329.74	6,546.51	3,089.55	-1,829.78	14,449,261.38	1,705,117.75	39.78701418	-80.76968082
8,699.99	91.00	329.74	6,544.76	3,175.91	-1,880.17	14,449,347.74	1,705,067.36	39.78725171	-80.76985940
8,799.99	91.00	329.74	6,543.01	3,262.27	-1,930.56	14,449,434.10	1,705,016.98	39.78748923	-80.77003797
8,899.99	91.00	329.74	6,541.27	3,348.63	-1,980.95	14,449,520.46	1,704,966.59	39.78772675	-80.77021655
8,999.99	91.00	329.74	6,539.52	3,434.99	-2,031.33	14,449,606.82	1,704,916.20	39.78796427	-80.77039513
9,099.99	91.00	329.74	6,537.77	3,521.35	-2,081.72	14,449,693.18	1,704,865.81	39.78820180	-80.77057371
9,199.99	91.00	329.74	6,536.02	3,607.71	-2,132.11	14,449,779.54	1,704,815.43	39.78843932	-80.77075229
9,299.99	91.00	329.74	6,534.27	3,694.07	-2,182.50	14,449,865.90	1,704,765.04	39.78867684	-80.77093088
9,399.99	91.00	329.74	6,532.53	3,780.43	-2,232.88	14,449,952.26	1,704,714.65	39.78891436	-80.77110946
9,499.99	91.00	329.74	6,530.78	3,866.79	-2,283.27	14,450,038.62	1,704,664.26	39.78915188	-80.77128804
9,599.99	91.00	329.74	6,529.03	3,953.15	-2,333.66	14,450,124.98	1,704,613.88	39.78938940	-80.77146663



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Old Crow Pad
 Well: Old Crow N-01 HM (slot K)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Old Crow N-01 HM (slot K)
 TVD Reference: GL @ 1265.00usft
 MD Reference: GL @ 1265.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
 Office of Oil and Gas
 FEB 26 2019

Planned Survey

WV Department of Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,699.98	91.00	329.74	6,527.28	4,039.51	-2,384.05	14,450,211.34	1,704,563.49	39.78962692	-80.77164522
9,799.98	91.00	329.74	6,525.53	4,125.87	-2,434.44	14,450,297.70	1,704,513.10	39.78986444	-80.77182381
9,899.98	91.00	329.74	6,523.78	4,212.23	-2,484.82	14,450,384.06	1,704,462.71	39.79010196	-80.77200240
9,999.98	91.00	329.74	6,522.04	4,298.59	-2,535.21	14,450,470.42	1,704,412.32	39.79033948	-80.77218099
10,099.98	91.00	329.74	6,520.29	4,384.95	-2,585.60	14,450,556.78	1,704,361.94	39.79057700	-80.77235958
10,199.98	91.00	329.74	6,518.54	4,471.31	-2,635.99	14,450,643.14	1,704,311.55	39.79081452	-80.77253818
10,299.98	91.00	329.74	6,516.79	4,557.67	-2,686.37	14,450,729.50	1,704,261.16	39.79105204	-80.77271677
10,399.98	91.00	329.74	6,515.04	4,644.03	-2,736.76	14,450,815.86	1,704,210.77	39.79128955	-80.77289537
10,499.98	91.00	329.74	6,513.30	4,730.39	-2,787.15	14,450,902.22	1,704,160.39	39.79152707	-80.77307397
10,599.98	91.00	329.74	6,511.55	4,816.74	-2,837.54	14,450,988.58	1,704,110.00	39.79176459	-80.77325256
10,699.98	91.00	329.74	6,509.80	4,903.10	-2,887.92	14,451,074.94	1,704,059.61	39.79200211	-80.77343116
10,799.98	91.00	329.74	6,508.05	4,989.46	-2,938.31	14,451,161.30	1,704,009.22	39.79223962	-80.77360977
10,899.98	91.00	329.74	6,506.30	5,075.82	-2,988.70	14,451,247.66	1,703,958.84	39.79247714	-80.77378837
10,999.98	91.00	329.74	6,504.56	5,162.18	-3,039.09	14,451,334.01	1,703,908.45	39.79271466	-80.77396697
11,099.98	91.00	329.74	6,502.81	5,248.54	-3,089.48	14,451,420.37	1,703,858.06	39.79295217	-80.77414558
11,199.98	91.00	329.74	6,501.06	5,334.90	-3,139.86	14,451,506.73	1,703,807.67	39.79318969	-80.77432418
11,299.98	91.00	329.74	6,499.31	5,421.26	-3,190.25	14,451,593.09	1,703,757.28	39.79342720	-80.77450279
11,399.98	91.00	329.74	6,497.56	5,507.62	-3,240.64	14,451,679.45	1,703,706.90	39.79366472	-80.77468140
11,499.98	91.00	329.74	6,495.82	5,593.98	-3,291.03	14,451,765.81	1,703,656.51	39.79390223	-80.77486001
11,599.98	91.00	329.74	6,494.07	5,680.34	-3,341.41	14,451,852.17	1,703,606.12	39.79413975	-80.77503862
11,699.98	91.00	329.74	6,492.32	5,766.70	-3,391.80	14,451,938.53	1,703,555.73	39.79437726	-80.77521723
11,799.98	91.00	329.74	6,490.57	5,853.06	-3,442.19	14,452,024.89	1,703,505.35	39.79461478	-80.77539585
11,899.98	91.00	329.74	6,488.82	5,939.42	-3,492.58	14,452,111.25	1,703,454.96	39.79485229	-80.77557446
11,999.98	91.00	329.74	6,487.07	6,025.78	-3,542.96	14,452,197.61	1,703,404.57	39.79508981	-80.77575308
12,099.98	91.00	329.74	6,485.33	6,112.14	-3,593.35	14,452,283.97	1,703,354.18	39.79532732	-80.77593169
12,199.98	91.00	329.74	6,483.58	6,198.50	-3,643.74	14,452,370.33	1,703,303.80	39.79556483	-80.77611031
12,299.98	91.00	329.74	6,481.83	6,284.86	-3,694.13	14,452,456.69	1,703,253.41	39.79580234	-80.77628893
12,399.98	91.00	329.74	6,480.08	6,371.22	-3,744.52	14,452,543.05	1,703,203.02	39.79603986	-80.77646755
12,499.98	91.00	329.74	6,478.33	6,457.58	-3,794.90	14,452,629.41	1,703,152.63	39.79627737	-80.77664618
12,599.98	91.00	329.74	6,476.59	6,543.94	-3,845.29	14,452,715.77	1,703,102.24	39.79651488	-80.77682480
12,699.97	91.00	329.74	6,474.84	6,630.30	-3,895.68	14,452,802.13	1,703,051.86	39.79675239	-80.77700342
12,799.97	91.00	329.74	6,473.09	6,716.66	-3,946.07	14,452,888.49	1,703,001.47	39.79698990	-80.77718205
12,899.97	91.00	329.74	6,471.34	6,803.02	-3,996.45	14,452,974.85	1,702,951.08	39.79722742	-80.77736068
12,999.97	91.00	329.74	6,469.59	6,889.38	-4,046.84	14,453,061.21	1,702,900.69	39.79746493	-80.77753931
13,099.97	91.00	329.74	6,467.85	6,975.74	-4,097.23	14,453,147.57	1,702,850.31	39.79770244	-80.77771793
13,199.97	91.00	329.74	6,466.10	7,062.10	-4,147.62	14,453,233.93	1,702,799.92	39.79793995	-80.77789657
13,299.97	91.00	329.74	6,464.35	7,148.45	-4,198.00	14,453,320.29	1,702,749.53	39.79817746	-80.77807520
13,399.97	91.00	329.74	6,462.60	7,234.81	-4,248.39	14,453,406.65	1,702,699.14	39.79841497	-80.77825383
13,499.97	91.00	329.74	6,460.85	7,321.17	-4,298.78	14,453,493.01	1,702,648.76	39.79865248	-80.77843247
13,599.97	91.00	329.74	6,459.11	7,407.53	-4,349.17	14,453,579.37	1,702,598.37	39.79888999	-80.77861110
13,699.97	91.00	329.74	6,457.36	7,493.89	-4,399.55	14,453,665.73	1,702,547.98	39.79912749	-80.77878974
13,799.97	91.00	329.74	6,455.61	7,580.25	-4,449.94	14,453,752.08	1,702,497.59	39.79936500	-80.77896838
13,899.97	91.00	329.74	6,453.86	7,666.61	-4,500.33	14,453,838.44	1,702,447.20	39.79960251	-80.77914702
13,999.97	91.00	329.74	6,452.11	7,752.97	-4,550.72	14,453,924.80	1,702,396.82	39.79984002	-80.77932566
14,099.97	91.00	329.74	6,450.37	7,839.33	-4,601.11	14,454,011.16	1,702,346.43	39.80007753	-80.77950430
14,199.97	91.00	329.74	6,448.62	7,925.69	-4,651.49	14,454,097.52	1,702,296.04	39.80031503	-80.77968294
14,299.97	91.00	329.74	6,446.87	8,012.05	-4,701.88	14,454,183.88	1,702,245.65	39.80055254	-80.77986158
14,399.97	91.00	329.74	6,445.12	8,098.41	-4,752.27	14,454,270.24	1,702,195.27	39.80079005	-80.78004023
14,499.97	91.00	329.74	6,443.37	8,184.77	-4,802.66	14,454,356.60	1,702,144.88	39.80102755	-80.78021888
14,599.97	91.00	329.74	6,441.62	8,271.13	-4,853.04	14,454,442.96	1,702,094.49	39.80126506	-80.78039752
14,699.97	91.00	329.74	6,439.88	8,357.49	-4,903.43	14,454,529.32	1,702,044.10	39.80150257	-80.78057617
14,799.97	91.00	329.74	6,438.13	8,443.85	-4,953.82	14,454,615.68	1,701,993.72	39.80174007	-80.78075482
14,899.97	91.00	329.74	6,436.38	8,530.21	-5,004.21	14,454,702.04	1,701,943.33	39.80197758	-80.78093348
14,999.97	91.00	329.74	6,434.63	8,616.57	-5,054.59	14,454,788.40	1,701,892.94	39.80221508	-80.78111213
15,099.97	91.00	329.74	6,432.88	8,702.93	-5,104.98	14,454,874.76	1,701,842.55	39.80245259	-80.78129078



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Old Crow Pad
 Well: Old Crow N-01 HM (slot K)
 Wellbore: Original Hole
 Design: rev1

Local Co-ordinate Reference: Well Old Crow N-01 HM (slot K)
 TVD Reference: GL @ 1265.00usft
 MD Reference: GL @ 1265.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

RECEIVED
 Office of Oil and Gas
 FEB 26 2019

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,199.97	91.00	329.74	6,431.14	8,789.29	-5,155.37	14,454,961.12	1,701,792.17	39.80269009	-80.78146944	
15,299.97	91.00	329.74	6,429.39	8,875.65	-5,205.76	14,455,047.48	1,701,741.78	39.80292760	-80.78164809	
15,399.97	91.00	329.74	6,427.64	8,962.01	-5,256.15	14,455,133.84	1,701,691.39	39.80316510	-80.78182675	
15,499.97	91.00	329.74	6,425.89	9,048.37	-5,306.53	14,455,220.20	1,701,641.00	39.80340261	-80.78200541	
15,599.97	91.00	329.74	6,424.14	9,134.73	-5,356.92	14,455,306.56	1,701,590.61	39.80364011	-80.78218407	
15,699.97	91.00	329.74	6,422.40	9,221.09	-5,407.31	14,455,392.92	1,701,540.23	39.80387761	-80.78236273	
15,799.97	91.00	329.74	6,420.65	9,307.45	-5,457.70	14,455,479.28	1,701,489.84	39.80411512	-80.78254140	
15,899.97	91.00	329.74	6,418.90	9,393.81	-5,508.08	14,455,565.64	1,701,439.45	39.80435262	-80.78272006	
15,999.97	91.00	329.74	6,417.15	9,480.16	-5,558.47	14,455,652.00	1,701,389.06	39.80459012	-80.78289872	
16,099.97	91.00	329.74	6,415.40	9,566.52	-5,608.86	14,455,738.36	1,701,338.68	39.80482762	-80.78307739	
16,199.97	91.00	329.74	6,413.66	9,652.88	-5,659.25	14,455,824.72	1,701,288.29	39.80506512	-80.78325606	
16,299.97	91.00	329.74	6,411.91	9,739.24	-5,709.63	14,455,911.08	1,701,237.90	39.80530263	-80.78343473	
16,399.97	91.00	329.74	6,410.16	9,825.60	-5,760.02	14,455,997.44	1,701,187.51	39.80554013	-80.78361340	
16,499.97	91.00	329.74	6,408.41	9,911.96	-5,810.41	14,456,083.79	1,701,137.13	39.80577763	-80.78379207	
16,599.97	91.00	329.74	6,406.66	9,998.32	-5,860.80	14,456,170.15	1,701,086.74	39.80601513	-80.78397074	
16,699.97	91.00	329.74	6,404.92	10,084.68	-5,911.19	14,456,256.51	1,701,036.35	39.80625263	-80.78414941	
16,799.97	91.00	329.74	6,403.17	10,171.04	-5,961.57	14,456,342.87	1,700,985.96	39.80649013	-80.78432809	
16,899.97	91.00	329.74	6,401.42	10,257.40	-6,011.96	14,456,429.23	1,700,935.57	39.80672763	-80.78450677	
16,999.97	91.00	329.74	6,399.67	10,343.76	-6,062.35	14,456,515.59	1,700,885.19	39.80696513	-80.78468544	
17,099.97	91.00	329.74	6,397.92	10,430.12	-6,112.74	14,456,601.95	1,700,834.80	39.80720263	-80.78486412	
17,199.97	91.00	329.74	6,396.17	10,516.48	-6,163.12	14,456,688.31	1,700,784.41	39.80744013	-80.78504280	
17,299.97	91.00	329.74	6,394.43	10,602.84	-6,213.51	14,456,774.67	1,700,734.02	39.80767763	-80.78522148	
17,399.97	91.00	329.74	6,392.68	10,689.20	-6,263.90	14,456,861.03	1,700,683.64	39.80791512	-80.78540016	
17,499.97	91.00	329.74	6,390.93	10,775.56	-6,314.29	14,456,947.39	1,700,633.25	39.80815262	-80.78557885	
17,599.97	91.00	329.74	6,389.18	10,861.92	-6,364.67	14,457,033.75	1,700,582.86	39.80839012	-80.78575753	
17,699.96	91.00	329.74	6,387.43	10,948.28	-6,415.06	14,457,120.11	1,700,532.47	39.80862762	-80.78593622	
17,799.96	91.00	329.74	6,385.69	11,034.64	-6,465.45	14,457,206.47	1,700,482.09	39.80886511	-80.78611491	
17,899.96	91.00	329.74	6,383.94	11,121.00	-6,515.84	14,457,292.83	1,700,431.70	39.80910261	-80.78629359	
17,999.96	91.00	329.74	6,382.19	11,207.36	-6,566.23	14,457,379.19	1,700,381.31	39.80934011	-80.78647228	
18,099.96	91.00	329.74	6,380.44	11,293.72	-6,616.61	14,457,465.55	1,700,330.92	39.80957760	-80.78665097	
18,199.96	91.00	329.74	6,378.69	11,380.08	-6,667.00	14,457,551.91	1,700,280.53	39.80981510	-80.78682967	
18,299.96	91.00	329.74	6,376.95	11,466.44	-6,717.39	14,457,638.27	1,700,230.15	39.81005260	-80.78700836	
18,399.96	91.00	329.74	6,375.20	11,552.80	-6,767.78	14,457,724.63	1,700,179.76	39.81029009	-80.78718705	
18,499.96	91.00	329.74	6,373.45	11,639.16	-6,818.16	14,457,810.99	1,700,129.37	39.81052759	-80.78736575	
18,599.96	91.00	329.74	6,371.70	11,725.52	-6,868.55	14,457,897.35	1,700,078.98	39.81076508	-80.78754445	
18,699.96	91.00	329.74	6,369.95	11,811.88	-6,918.94	14,457,983.71	1,700,028.60	39.81100258	-80.78772315	
18,799.96	91.00	329.74	6,368.21	11,898.23	-6,969.33	14,458,070.07	1,699,978.21	39.81124007	-80.78790184	
18,899.96	91.00	329.74	6,366.46	11,984.59	-7,019.71	14,458,156.43	1,699,927.82	39.81147757	-80.78808055	
18,999.96	91.00	329.74	6,364.71	12,070.95	-7,070.10	14,458,242.79	1,699,877.43	39.81171506	-80.78825925	
19,099.96	91.00	329.74	6,362.96	12,157.31	-7,120.49	14,458,329.15	1,699,827.05	39.81195255	-80.78843795	
19,199.96	91.00	329.74	6,361.21	12,243.67	-7,170.88	14,458,415.50	1,699,776.66	39.81219005	-80.78861666	
19,299.96	91.00	329.74	6,359.46	12,330.03	-7,221.26	14,458,501.86	1,699,726.27	39.81242754	-80.78879536	
19,399.96	91.00	329.74	6,357.72	12,416.39	-7,271.65	14,458,588.22	1,699,675.88	39.81266503	-80.78897407	
19,499.96	91.00	329.74	6,355.97	12,502.75	-7,322.04	14,458,674.58	1,699,625.49	39.81290253	-80.78915278	
19,599.96	91.00	329.74	6,354.22	12,589.11	-7,372.43	14,458,760.94	1,699,575.11	39.81314002	-80.78933148	
19,699.96	91.00	329.74	6,352.47	12,675.47	-7,422.82	14,458,847.30	1,699,524.72	39.81337751	-80.78951020	
19,799.96	91.00	329.74	6,350.72	12,761.83	-7,473.20	14,458,933.66	1,699,474.33	39.81361500	-80.78968891	
19,899.96	91.00	329.74	6,348.98	12,848.19	-7,523.59	14,459,020.02	1,699,423.94	39.81385249	-80.78986762	
19,999.96	91.00	329.74	6,347.23	12,934.55	-7,573.98	14,459,106.38	1,699,373.56	39.81408998	-80.79004633	
20,099.96	91.00	329.74	6,345.48	13,020.91	-7,624.37	14,459,192.74	1,699,323.17	39.81432747	-80.79022505	
20,199.96	91.00	329.74	6,343.73	13,107.27	-7,674.75	14,459,279.10	1,699,272.78	39.81456497	-80.79040377	
20,299.96	91.00	329.74	6,341.98	13,193.63	-7,725.14	14,459,365.46	1,699,222.39	39.81480246	-80.79058248	
20,399.96	91.00	329.74	6,340.24	13,279.99	-7,775.53	14,459,451.82	1,699,172.01	39.81503995	-80.79076120	
20,499.96	91.00	329.74	6,338.49	13,366.35	-7,825.92	14,459,538.18	1,699,121.62	39.81527744	-80.79093992	
20,599.96	91.00	329.74	6,336.74	13,452.71	-7,876.30	14,459,624.54	1,699,071.23	39.81551492	-80.79111865	

WV Department of Environmental Protection



Planning Report - Geographic

04/12/2019

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-01 HM (slot K)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1265.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1265.00usft
Site:	Old Crow Pad	North Reference:	Grid
Well:	Old Crow N-01 HM (slot K)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
20,699.96	91.00	329.74	6,334.99	13,539.07	-7,926.69	14,459,710.90	1,699,020.84	39.81575241	-80.79129737	
20,799.96	91.00	329.74	6,333.24	13,625.43	-7,977.08	14,459,797.26	1,698,970.46	39.81598990	-80.79147609	
20,813.90	91.00	329.74	6,333.00	13,637.46	-7,984.10	14,459,809.30	1,698,963.43	39.81602300	-80.79150100	
PBHL/TD 20813.90 MD 6333.00 TVD										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
BHL Old Crow N-01 HM - hit/miss target - Shape - Point	0.00	0.01	6,333.00	13,637.46	-7,984.10	14,459,809.30	1,698,963.43	39.81602300	-80.79150100	
LP Old Crow N-01 HM - plan misses target center by 43.19usft at 7395.81usft MD (6567.56 TVD, 2049.63 N, -1223.02 E) - Point	0.00	0.00	6,568.00	2,027.87	-1,260.33	14,448,199.70	1,705,687.20	39.78409447	-80.76766354	
LP Old Crow N-01 HM 5 - plan hits target center - Point	0.00	0.00	6,568.00	2,027.87	-1,210.33	14,448,199.70	1,705,737.21	39.78409412	-80.76748556	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,300.00	1,300.00	0.00	0.00	KOP Begin 2°/100' build	
1,550.00	1,549.68	9.35	-5.60	Begin 5.00° tangent	
3,106.24	3,100.00	125.71	-75.30	Begin 2°/100' build	
4,550.33	4,447.38	533.71	-319.65	Begin 33.88° tangent	
6,799.39	6,314.53	1,609.36	-963.85	Begin 10°/100' build/turn	
7,370.61	6,568.00	2,027.87	-1,210.33	Begin 91.00° lateral section	
20,813.90	6,333.00	13,637.46	-7,984.10	PBHL/TD 20813.90 MD 6333.00 TVD	

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

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 Powhatan Point 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 contain +

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 (SAN1405 / PA DEP ECH1386426)

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 James Pancake

Company Official (Typed Name) James Pancake

Company Official Title Vice President - Geoscience

RECEIVED
Office of Oil and Gas

FEB 26 2019

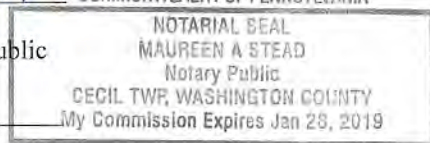
WV Department of
Environmental Protection

Subscribed and sworn before me this 23 day of JANUARY, 20 19

COMMONWEALTH OF PENNSYLVANIA

Maureen A Stead

Notary Public



My commission expires 1/28/19

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 19.18 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
Annual Ryegrass	40
Spring Oats	96

Seed Type	lbs/acre
Orchard Grass	12
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 Unsholme*

Comments: _____

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

Title: Oil and Gas Inspector

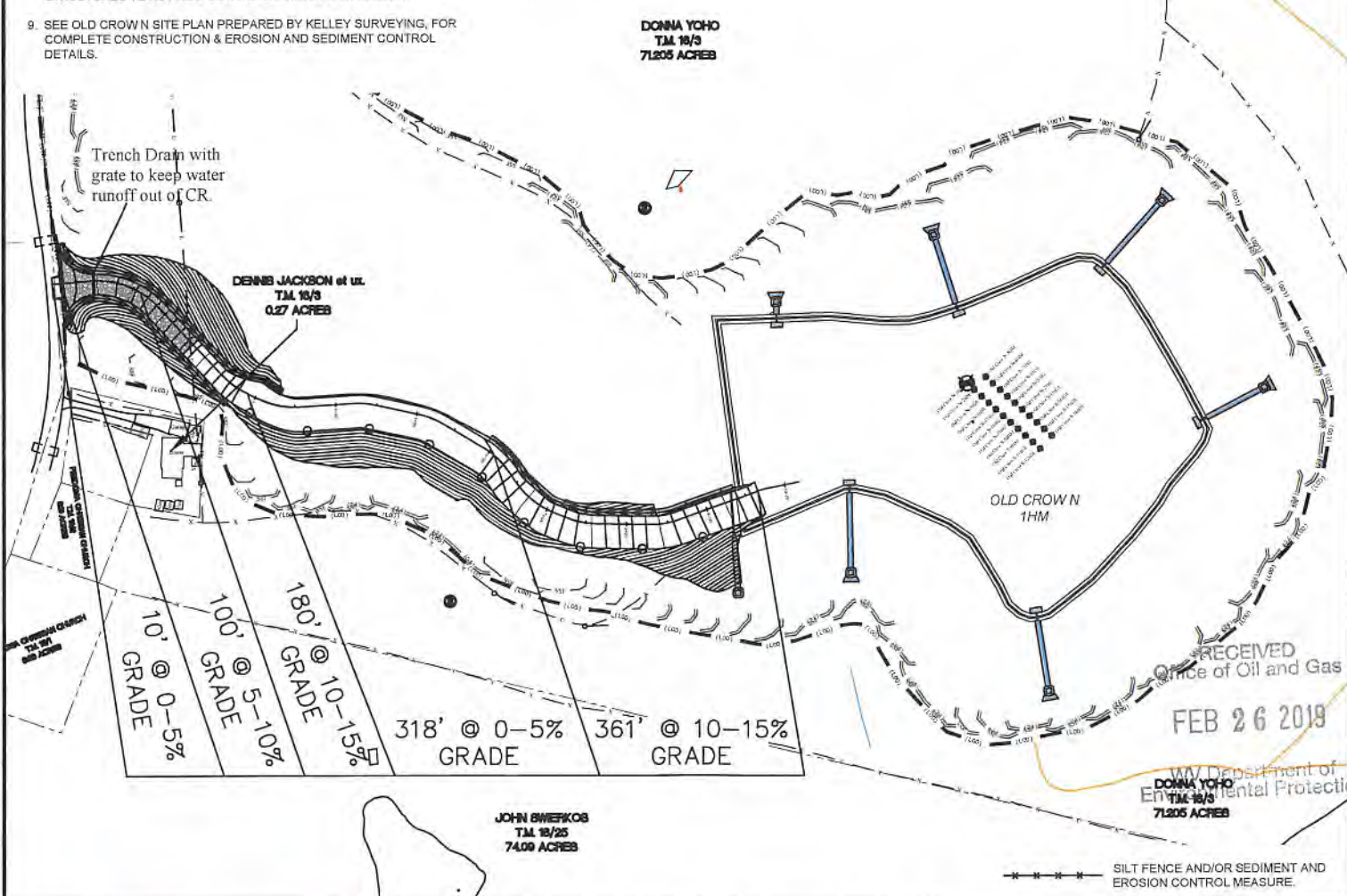
Date: 1/23/19

Field Reviewed? Yes No

PROPOSED OLD CROW N - 1HM

NOTES:

1. - DENOTES INSTALL 18" PVC CULVERT AND APPLY APPROPRIATE SEDIMENT OUTLET CONTROL (R/P 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 OLD CROWN SITE PLAN PREPARED BY KELLEY SURVEYING, FOR COMPLETE CONSTRUCTION & EROSION AND SEDIMENT CONTROL DETAILS.



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

TOPO SECTION:		OPERATOR:	
POWHATAN POINT 7.5'		PREPARED FOR: TUG HILL OPERATING, LLC 380 SOUTHPONTE BLVD SUITE 200 CANONSBURG, PA 15317	
COUNTY	DISTRICT		
MARSHALL	FRANKLIN		
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8769	06/22/18	NONE

TUG HILL
OPERATING



Well Site Safety Plan

Tug Hill Operating, LLC

Joe
1/23/19

Well Name: Old Crow N-1HM

Pad Location: Old Crow Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,403,201.98

Easting: 520,278.65

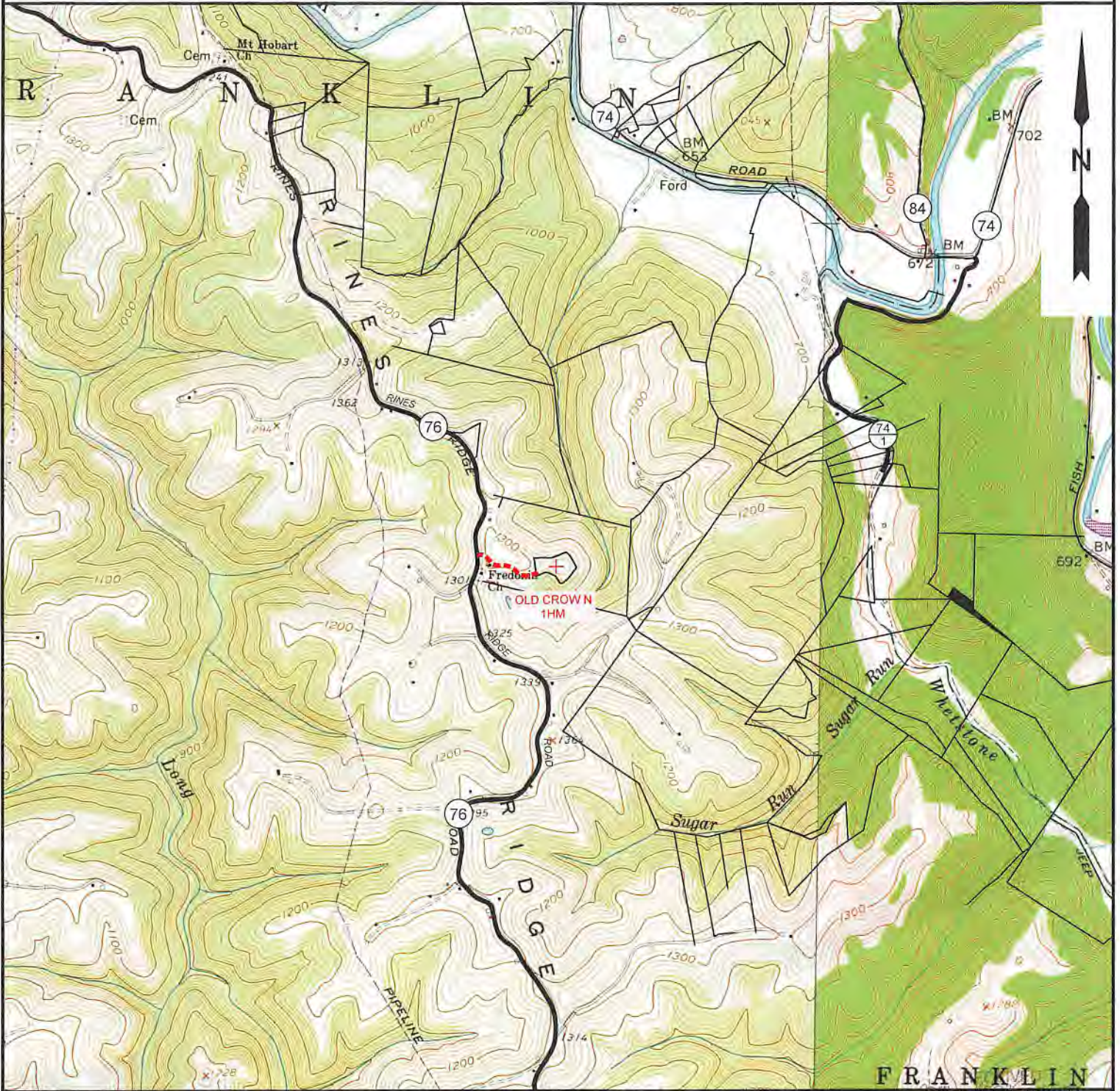
January 2019

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

PROPOSED OLD CROWN - 1HM



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

LAT: 39.7137712
LON: -80.8258327
LOCATED: S 37°39'00" W AT 29,404.13' FROM OLD CROWN - 1HM SURFACE LOCATION

FEB 26 2019

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 112 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5534
www.slssurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON & POWHATAN POINT 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	FRANKLIN	380 SOUTHPOINTE BLVD	
		SUITE 200	
		CANONSBURG, PA 15317	
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8796	06/22/18	1" = 2000'

WV Department of Environmental Protection
TUG HILL OPERATING

**OLD CROW N LEASE
WELL 1HM
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"
B.H. LATITUDE 39°50'00"

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

NAD'83 S.P.C.(FT)	N. 468,171.20	E. 1,613,489.83
NAD'83 GEO.	LAT-(N) 39.778516	LONG-(W) 80.763196
NAD'83 UTM (M)	N. 4,403,201.98	E. 520,278.65

LANDING POINT

NAD'83 S.P.C.(FT)	N. 470,219.7	E. 1,612,313.1
NAD'83 GEO.	LAT-(N) 39.784094	LONG-(W) 80.767486
NAD'83 UTM (M)	N. 4,403,820.1	E. 519,909.7

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 481,944.8	E. 1,605,732.6
NAD'83 GEO.	LAT-(N) 39.816023	LONG-(W) 80.791501
NAD'83 UTM (M)	N. 4,407,358.7	E. 517,845.1

T.H. LONGITUDE 80°45'00"
B.H. LONGITUDE 80°45'00"
4,791' T.H.
6,305' B.H.

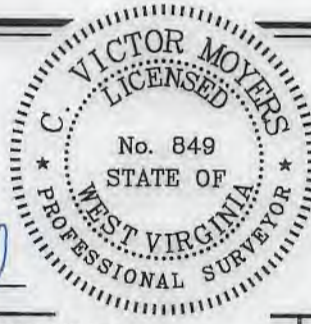
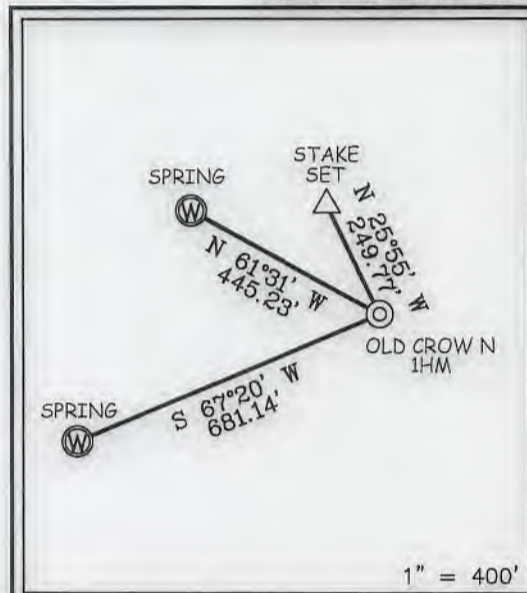


MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
5-8A-13	LETHA I. RUCKMAN	2.993
5-8A-14	BOARD OF EDUCATION	137 SQ RODS
5-8A-32	JONATHAN DAVID BOPP	0.580
5-8A-33	ELAIN & JEFFREY D. WILLS	2.51
5-8A-34	NORMAN G. JOHNSON ET UX - LIFE	11,123 SQ. FT.
5-8A-36	WILLIAM J. GAMBLE ET UX	1.031
5-8A-42	ROBERT M. WHITE	7.23
5-8A-43	CHARLES G. STEIN & EVA A. WADE	0.17
5-8A-44	CHARLES G. STEIN & EVA A. WADE	0.18
5-8A-48	RAYMOND A., JR. & LARIETTE SCOTT	2.12
5-8A-49	RAYMOND A., JR. & LARIETTE SCOTT	0.159
5-8A-54	DONALD D. & CHRISTINE S. DANIELS	0.68
5-8A-54.1	DONALD D. & CHRISTINE S. DANIELS	0.69
5-8-2	CONSOLIDATED COAL COMPANY-MURRAY ENERGY	136.87
5-8-4.1	FRANCES E. NIEMAN	33.46
5-8-9.1	SCOTT E. JACKSON, TAMMY S. SOUTH & MARION JACKSON	1.957
5-11-1.2	JAY A. CONNER, ET UX	5.824
5-11-1.3	JAY A. CONNER, ET UX	4.256
5-11-1.5	PAUL & SANDY WHITT	3.507
5-11-1.7	WILLIAM S. & MARY K. ADAMS	8.00
5-11-6	ROBERT & REBECCA ARRICK	1.29
5-11-7	MT. HOBART MISSIONARY BAPTIST CHURCH	0.25
5-11-8	MT. HOBART MISSIONARY BAPTIST CHURCH	0.8
5-11-9.2	MICHAEL R. BRYAN	3.143
5-11-9.4	JACK S. HUGGINS, ET UX	4.129
5-11-9.5	SOUTHERN COUNTRY FARMS INC.	2.559
5-11-9.6	SOUTHERN COUNTRY FARMS INC.	2.488
5-11-9.9	LEONARD L. PARSONS, ET UX	5.89
5-11-9.10	JOHN A. & JANET L. BEUCKE	2.348

NOTES ON SURVEY

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS OR DWELLINGS ≥ 2500 SQ. FT. WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- BASED ON WV DOT COUNTY ROUTE 74 IS A 40' STRIP OF LAND ACQUIRED IN NUMEROUS DEEDS.

REFERENCES



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. *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE JUNE 22, 2018
 REVISED 08/23/2018, 1/17/2019
 OPERATORS WELL NO. OLD CROW N-1HM
 API WELL NO. 47 — 051 — 02189
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8796P1HMR1.dwg
OLD CROW NORTH 1HM REV1
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: GROUND = 1,283.80' ELEVATION PROPOSED = 1,264.99' WATERSHED TRIBUTARY OF FISH CREEK (HUC-10)
 DISTRICT FRANKLIN COUNTY MARSHALL QUADRANGLE POWHATAN POINT 7.5'

SURFACE OWNER DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO ACREAGE 71.205±
 ROYALTY OWNER DONNA VIVIAN YOHO, ET AL ACREAGE 71.205±

PROPOSED WORK: 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: 6,679' / TMD: 20,814'

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

COUNTY NAME
PERMIT

**OLD CROW N LEASE
WELL 1HM
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"
B.H. LATITUDE 39°50'00"

TAG	SURFACE OWNER	PARCEL	ACRES
A	DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO	5-16-3	71.205
B	PAUL ANDREW & DEBRA A. RINE	5-10-15	120.805
C	DONALD T. MILLER	5-10-15.1	2.095
D	TIMOTHY, SR. & LINDA MCGINNIS	5-10-16	30.87
E	MELVIN E. JR., & ELIZABETH FERGUSON	5-10-16.4	30.87
F	ALVIN A. YODER	5-10-17	57.28
G	ALVIN A. YODER	5-11-10	31.91
H	JACK SHEPHARD HUGGINS JR., ET AL	5-11-9.1	10.92
I	JACK SHEPHARD HUGGINS JR., ET AL	5-11-9.7	2.026
J	JACK HUGGINS, ET AL	5-11-9.5	0.412
K	SOUTHERN COUNTRY FARMS, INC.	5-11-9	54.625
L	DALISON LUMBER COMPANY	5-9-31	32.10
M	EDWIN C. MILLER	5-8-7	180.31
N	JAMES B. JACKSON, JR., ET UX	5-8-9	89.723
O	STATE OF WEST VIRGINIA (FISH CREEK)	N/A	N/A
P	RICHARD GATTS - LIFE	5-8-5	98.819
Q	WAYNE C. BERISFORD	5-8-4	23.3555
R	JARED C. SELLS	5-8A-35	2.78
S	TAMMY L. MITCHELL	5-8-3	35.07

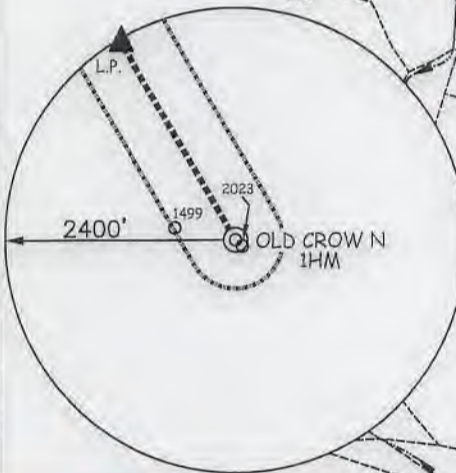
LINE	BEARING	DISTANCE
L1	N 64°37' E	1188.44'
L2	S 53°41' E	1253.76'
L3	N 29°31' W	455.78'

NAD'83 GRID NORTH

T.H. LATITUDE 80°45'00"
B.H. LATITUDE 80°45'00"

4,791' T.H.

6,305' B.H.



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

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

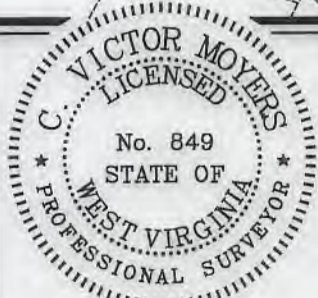
NAD'83 S.P.C.(FT)	N. 468,171.20	E. 1,613,489.83
NAD'83 GEO.	LAT-(N) 39.778516	LONG-(W) 80.763196
NAD'83 UTM (M)	N. 4,403,201.98	E. 520,278.65

LANDING POINT

NAD'83 S.P.C.(FT)	N. 470,219.7	E. 1,612,313.1
NAD'83 GEO.	LAT-(N) 39.784094	LONG-(W) 80.767488
NAD'83 UTM (M)	N. 4,403,820.1	E. 519,909.7

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 481,944.8	E. 1,605,732.0
NAD'83 GEO.	LAT-(N) 39.816023	LONG-(W) 80.791501
NAD'83 UTM (M)	N. 4,407,358.7	E. 517,845.1



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

P.S. 849 *C. Victor Moyers*

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

SCALE 1" = 2000' FILE NO. 8796P1HMR1.dwg
 DATE JUNE 22, 2018
 REVISED 08/23/2018, 1/17/2019
 OPERATORS WELL NO. OLD CROW N-1HM
 API WELL NO. 47-051-02189
 STATE COUNTY PERMIT

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

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

WW-6A1
(5/13)

Operator's Well No. Old Crow N-1HM

**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

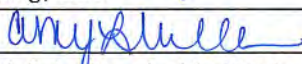
**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

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 

Its: Permitting Specialist - Appalachia Region

WW-6A1 Supplement

Operator's Well No. Old Crow N - 1HM

Lease ID	Parcel	Tags	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment
10*19340	5-16-3	A	DONNA V YOHO	GASTAR EXPLORATION USA INC	1/8+	665	407	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 23/353	Gastar & Atinum to AB Resources LLC: 23/617	AB Resources to Chief Exploration et al: 24/319	Chief Exploration et al to Chevron: 25/1 & 25/105	Chevron USA Inc to TH Exploration LLP: 40/57
10*19017	5-10-15	B	PAUL A RINE AND DEBRA A RINE	CHEVRON USA INC	1/8+	796	24	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19223	5-10-15.1	C	DONALD T MILLER	TRIENERGY HOLDINGS, LLC	1/8+	737	284	N/A	N/A	N/A	TriEnergy Holdings LLC & TriEnergy Inc to Chevron USA Inc: 28/356	Chevron USA Inc to TH Exploration LLC: 40/127
10*19126	5-10-16	D	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	859	44	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19109	5-10-16.4	E	JOHN W. MILLER AND MARY ALICE MILLER, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	863	275	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19021	5-10-17	F	MARCELLUS TX MINERAL PARTNERS LTD	CHEVRON USA INC	1/8+	800	216	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19034	5-10-17	F	JMK IRREVOCABLE TRUST	CHEVRON USA INC	1/8+	813	145	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19035	5-10-17	F	PURPLEBURGH VENTURES, LLC	CHEVRON USA INC	1/8+	813	138	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19021	5-11-10	G	MARCELLUS TX MINERAL PARTNERS LTD	CHEVRON USA INC	1/8+	800	216	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19034	5-11-10	G	JMK IRREVOCABLE TRUST	CHEVRON USA INC	1/8+	813	145	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19035	5-11-10	G	PURPLEBURGH VENTURES, LLC	CHEVRON USA INC	1/8+	813	138	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLP: 40/127
10*19153	5-11-9.1	H	JACK S HUGGINS JR	GASTAR EXPLORATION USA INC	1/8+	700	396	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron: 32/362	Chevron to TH Exploration LLC: 40/127
10*14099	5-11-9.7	I	SOUTHERN COUNTRY FARMS INC	GASTAR EXPLORATION USA INC	1/8+	666	489	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron: 32/362	Chevron to TH Exploration LLC: 40/127
10*19172	5-11-9.8	J	SEAN F MOORE LINDA MOORE	GASTAR EXPLORATION USA INC	1/8+	706	581	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron: 32/362	Chevron to TH Exploration LLC: 40/127

WW-6A1 Supplement

Operator's Well No. Old Crow N - 1HM

Lease ID	Parcel	Tags	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment
10*14099	5-11-9	K	SOUTHERN COUNTRY FARMS INC	GASTAR EXPLORATION USA INC	1/8+	666	489	N/A	Gastar Exploration USA Inc to Atinum Marcellus I LLC: 23/353	Merger of Gastar Exploration Inc and Gastar Exploration USA Inc: 21/41	Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron: 32/362	Chevron to TH Exploration LLC: 40/127
10*19217	5-9-31	L	JAY DEE DALLISON EDDIE D DALLISON	CHESAPEAKE APPALACHIA LLC	1/8+	676	463	N/A	Chesapeake Appalachia LLC to Statoil USA Onshore Properties Inc: 22/536	Chesapeake Appalachia LLC to Chevron USA Inc: 30/392	Statoil USA Onshore Properties Inc to Chevron USA Inc: 30/404	Chevron USA Inc to TH Exploration LLP: 40/127
10*21546	5-8-7	M	EDWIN C MILLER AND KIMBERLY ANN MILLER	TH EXPLORATION LLC	1/8+	957	257	N/A	N/A	N/A	N/A	N/A
10*47051.105.0	5-8-9	N	JAMES B JACKSON JR AND MARION L JACKSON	TH EXPLORATION LLC	1/8+	859	478	N/A	N/A	N/A	N/A	N/A
Q091960000	FISH CREEK	O	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865	558	N/A	N/A	N/A	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX946510	5-8-5	P	NICOLE GATTS-SFX	CHEVRON U.S.A., INC	1/8+	899	470	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 42/219	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX947093	5-8-5	P	RICHARD J. GATTS	CHEVRON USA INC	1/8+	899	479	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX947094	5-8-5	P	LOIS ZWOLENSKY-SFX	CHEVRON U.S.A., INC	1/8+	899	476	N/A	N/A	N/A	Chevron USA Inc to HG Energy II Appalachia LLC: 42/219	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866629	5-8-4	Q	FRANCES E NIEMAN ET AL	AB RESOURCES LLC	1/8+	685	283	AB Resources LLC & NPAR LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/466	Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to Chevron USA Inc: 756/397	Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

WW-6A1 Supplement

Operator's Well No. Old Crow N - 1HM

Lease ID	Parcel	Tags	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment
PENDING	5-8A-35	R	WILLIAM MCGLUMPHY	TRIENERGY HOLDINGS, LLC	1/8+	752	370	N/A	N/A	N/A	TriEnergy Holdings Inc & TriEnergy Inc to Chevron USA Inc: 28/348	Chevron USA Inc to TH Exploration LLC: 43/164
Q081033000	5-8-3	S	TAMMY L MITCHELL ET VIR	NOBLE ENERGY INC	1/8+	816	176	N/A	Noble Energy Inc to CNX Gas Company LLC: 34/189	CNX Gas Company LLC to Noble Energy Inc: 37/169	Noble Energy Inc to HG Energy II Appalachia LLC: 39/1	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

ASSIGNMENT AND BILL OF SALE

This **ASSIGNMENT AND BILL OF SALE** (this “Assignment”) dated as of August 1, 2017 (the “Signing Date”), but effective from and after 7:00 a.m., Eastern Standard Time on August 2, 2017 being the day immediately following the Signing Date (the “Effective Date”), is made by **Chevron U.S.A. Inc.**, a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 (“Chevron” or “Assignor”) to **TH Exploration II, LLC** and **TH Exploration, LLC**, Texas limited liability companies, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (collectively “Assignee”) and is accepted by Assignee upon the following terms and conditions.

RECITALS

- A. Assignor desires to sell, convey, transfer, assign and deliver to Assignee Assignor’s Bryan 1H well and certain related assets, including certain leasehold interests, located in Marshall County, West Virginia.
- B. Through an Acreage Trade Agreement to be executed contemporaneously with this Assignment, Assignor desires to transfer, convey and assign to Assignee certain of Assignor’s oil and gas leasehold interests located in Marshall County, West Virginia in exchange for the transfer, conveyance and assignment to Assignor by Assignee certain of Assignee’s oil and gas leasehold interests located in Marshall County, West Virginia and Greene County, West Virginia.
- C. In consideration of the mutual promises set out in this Assignment, including execution of the Acreage Trade Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

1. DEFINITIONS

1.1 Definitions. As used in this Assignment, these words and expressions have the following meanings:

“Acreage Trade Agreement” means that certain Acreage Trade Agreement by and between Chevron U.S.A. Inc. and TH Exploration, LLC with an Effective Date of August 1, 2017 to be contemporaneously executed with this Assignment.

“Act” has the meaning given to such term in Section 9.1(C).

“Affiliate” means any legal entity which controls, is controlled by, or is under common control with, another legal entity. An entity is deemed to “control” another if it owns directly or indirectly at least fifty percent of either of the following: (A) the shares entitled to vote at a general election of directors of such other entity or (B) the voting interest in such other entity if such entity does not have either shares or directors.

“Applicable Law(s)” means all laws, principles of common law, regulations, statutes, codes, rules, orders, ordinances, permits, enforceable policies, licenses, certifications, decrees, constitutions, standards or other requirements with similar effect of any Government Entity and any binding interpretations of the foregoing.

“Assets” has the meaning given to such term in Section 2.1 of this Assignment.

“Assigned Hydrocarbons” means all Hydrocarbons produced and severed from, or allocable, after severance, to the Leases, Units, and Wells on and after the Effective Date.

RECEIVED
Office of Oil and Gas
FEB 26 2019

WV Department of
Environmental Protection

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1428356
08/16/2017 @ 12:08:49 PM
ASSIGNMENTS
Book 40 @ Page 127
Pages Recorded 25
Recording Cost \$ 33.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 1 day of August, 2017 (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 the 1st day of August, 2017 (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", attached hereto and made a part hereof (hereinafter the "Leases"), less and except certain overriding royalty interests and exclusions; 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, subject to certain overriding royalty interests and less and except certain exclusions.

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 excepts and reserves from this Assignment the following:

A. 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, and

B. As to each of the Leases and all oil, gas, and associated hydrocarbons produced, saved and sold thereunder, an overriding royalty interest equal to the difference between 82% and the

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT

This Memorandum of Operating Agreement and Financing Statement (hereinafter referred to as "Memorandum") is executed to be effective concurrently with that certain Operating Agreement (the "Operating Agreement") by and between TH Exploration, LLC, as Operator, and HG Energy II Appalachia, LLC and TH Exploration II, LLC, as Non-Operators, covering, among other things, the development and production of crude oil, natural gas and associated substances from the leases (hereinafter called the "Contract Area") described on Exhibit "A-1" and Exhibit "A-2" attached hereto and owned by Operator and Non-Operator in the respective percentages of shares indicated on Exhibit "A" to the Operating Agreement.

The Operating Agreement contains an Accounting Procedure, along with provisions giving the parties hereto mutual liens and security interests where one or more parties hereto are or may become Debtors to one or more other parties hereto. This Memorandum incorporates by reference all of the terms and conditions of the Operating Agreement, including but not limited to the lien and security interest provisions.

The purpose of this Memorandum is to place third parties on notice of the Operating Agreement, and to secure and perfect the mutual liens and security interests of the parties hereto.

The Operating Agreement specifically provides and the parties do hereby confirm and agree that:

1. The Operator shall conduct and direct and have full control of all operations on the Contract Area as permitted and required by, and within the limits of, the Operating Agreement.
2. The liability of the parties under the Operating Agreement shall be several, not joint or collective. Each party shall be responsible only for its obligations and shall be liable only for its proportionate share of costs.
3. Each Non-Operator grants to Operator a lien upon its oil and gas rights, oil and gas leases and mineral interests in the Contract Area, and a security interest in its share of oil and/or gas when extracted and its interest in all fixtures, inventory, personal property and equipment located on or used on the Contract Area and in all its contract rights and receivables related thereto and arising therefrom to secure payment of its present and future share of costs and expenses, together with interest thereon at the rate provided in the Accounting Procedure referred to above. To the extent that Operator has a security interest under the Uniform Commercial Code ("Code") of the state or states in which the Contract Area is located, Operator without prejudice and in addition to all other legal, equitable and contractual remedies which are expressly reserved, shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the rights or security interests for the payment thereof.
4. The Operator grants to Non-Operator a lien and security interest equivalent to that granted to Operator as described in Paragraph 3 above, to secure payment by Operator of its own share of costs and expenses when due.

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 7th day of February, 2019 (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 the 1st day of February, 2019 (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"**, attached hereto and made a part hereof (hereinafter the "Leases"), less and except certain overriding royalty interests and exclusions; 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, subject to certain overriding royalty interests and less and except certain exclusions.

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 excepts and reserves from this Assignment the following:

- A. 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, and
- B. Any portion of the Leases set forth in the column entitled "Less and Except" on Exhibit A.

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.

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

04/12/2019



February 21, 2019

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

RE: Old Crow N-1HM

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Old Crow N-1HM well plat.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me directly 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
Permitting Specialist – Appalachia Region

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

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

Date of Notice Certification: 02/21/2019

API No. 47- 051 -
Operator's Well No. Old Crow N-1HM
Well Pad Name: Old Crow

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>520,278.65</u>
County: <u>Marshall</u>		Northing: <u>4,403,201.98</u>
District: <u>Franklin</u>	Public Road Access: <u>Rines Ridge Road (GR 76)</u>	
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>Donna Yoho</u>	
Watershed: <u>Fish Creek (HUC 10)</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.

<p>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:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p align="center">OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
--	--

Required Attachments:

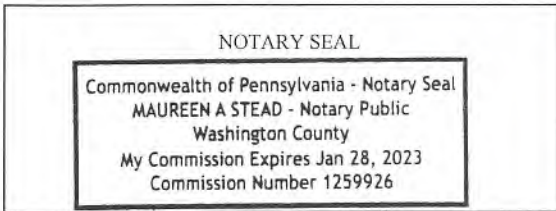
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication 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.

RECEIVED
Office of Oil and Gas
FEB 26 2019
West Virginia
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 Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia Region</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 21 day of FEB., 2019.
Maureen A Stead Notary Public
My Commission Expires 1/28/23

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.

WW-6A3
(1/12)

Operator Well No. Old Crown Hill **04/12/2019**

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: 11/16/2018 **Date of Planned Entry:** 11/17/2018

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: Donna Yoho ✓
 Address: 3682 Rines Ridge Road
Proctor, WV 26055
 Name: _____
 Address: _____
 Name: _____
 Address: _____

COAL OWNER OR LESSEE

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

MINERAL OWNER(s)

Name: _____
 Address: _____

*please attach additional forms if necessary

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: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>39.7784004; -80.7631353</u>
County: <u>Marshall</u>	Public Road Access: <u>Rines Ridge Road (County Route 76)</u>
District: <u>Franklin</u>	Watershed: <u>TrIBUTARY OF Fish Creek (HUC 10)</u>
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>Donna Yoho</u>

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: <u>Tug Hill Operating, LLC</u>	Address: <u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
Telephone: <u>724-749-8388</u>	<u>Canonsburg, PA 15317</u>
Email: <u>amiller@tug-hillop.com</u>	Facsimile: <u>724-338-2030</u>

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.

FEB 26 2019

WW-6A
(9-13)

4705102189
~~04/22/2019~~
API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-1HM
Well Pad Name: Old Crow

**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: 2/8/2019 **Date Permit Application Filed:** 2/8/2019

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: Donna Yoho
Address: 3682 Rines Ridge Road
Proctor, WV 26055
Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: _____
Address: _____
Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
Name: _____
Address: _____

COAL OWNER OR LESSEE
Name: Consol Energy, Inc. Leatherwood, Inc. Attn: Casey Saunders ✓
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

COAL OPERATOR
Name: _____
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name: *See attached list
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: _____
Address: _____

*Please attach additional forms if necessary

RECEIVED
Office of Oil and Gas
FEB 26 2019

04/12/2019

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

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

WW-6A
(8-13)

API NO. 47-051 - _____
OPERATOR WELL NO. Old Crow N-1HM
Well Pad Name: Old Crow

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

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

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

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.

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

04/12/2019

WW-6A
(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-1HM
Well Pad Name: Old Crow

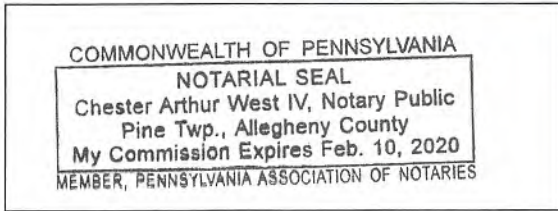
Notice is hereby given by:

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

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

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 8th day of FEB, 2019.
[Signature] Notary Public
My Commission Expires 2.10.2020

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

PROPOSED OLD CROW N - 1HM



NOTE: THERE APPEARS TO BE SEVEN (7) POSSIBLE WATER SOURCES WITHIN 2,000'.

Office of Oil and Gas

FEB 26 2019

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 482-5834
www.slsurveys.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON & POWHATAN POINT 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	FRANKLIN	380 SOUTHPOINTE BLVD	
		SUITE 200	
		CANONSBURG, PA 15317	
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8796	06/22/18	1" - 1000'

WV Department of Environmental Protection
TUG HILL
OPERATING

Exhibit WW-6A

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

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

Well: Old Crow N – 1HM
District: Franklin (Residence #'s 1-7)
State: WV

There are seven (7) residences, no businesses, no churches, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

<p>Residence 1 TM 16 Pcl. 3.1 ✓ Dennis Jackson, Et Ux Phone: 304-843-1762 Physical Address: 4004 Rines Ridge Rd. Proctor, WV 26055 Tax Address: P.O. Box 109 Woodsfield, OH 43793</p>	<p>Residence 2 TM 16 Pcl. 3 ✓ Donna Vivian Yoho - TOD Phone: 304-845-5590 (Rev. Address) Physical Address: 3862 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p>	<p>Residence 3 TM 16 Pcl. 3.2 ✓ Jimmy Ostrander, Sr., Et Ux Phone: 304-845-5599, 304-845-5590 Physical Address: 3810 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p>
<p>Residence 4 TM 16 Pcl. 6 ✓ John Swierkos Phone: 304-810-4092 Physical Address: 110 Rahm Dr. Proctor, WV 26055 Tax Address: Same</p>	<p>Residence 5 TM 16 Pcl. 23.3 ✓ Greg & Christina Riddle Phone: 304-843-0173 ✓ Physical Address: 4205 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p>	<p>Residence 6 TM 16 Pcl. 23.1 ✓ Ray E. Minor, Et Ux Phone: 304-843-1713 ✓ Physical Address: 4193 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p>
<p>Residence 7 TM 16 Pcl. 24 ✓ Alan M. Beyser, Et Ux Phone: 304-810-0617 Physical Address: 4271 Rines Ridge Rd. Proctor, WV 26055 Tax Address: Same</p>		

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection

WW-6A5
(1/12)

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: 02/08/2019 Date Permit Application Filed: 02/08/2019

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

CERTIFIED MAIL RETURN RECEIPT REQUESTED HAND 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: Donna Yoho ✓ Address: 3862 Rines Ridge Road Proctor, WV 26055

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: West Virginia UTM NAD 83 Easting: 520,278.65
County: Marshall Northing: 4,403,201.98
District: Franklin Public Road Access: Rines Ridge Road (County Route 76)
Quadrangle: Powhatan Point 7.5' Generally used farm name: Donna Yoho
Watershed: Tributary of Fish Creek (HUC 10)

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 Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Telephone: 724-749-8388 Canonsburg, PA 15317
Email: amiller@tug-hillop.com 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.

RECEIVED
Office of Oil and Gas
FEB 26 2019
WV Department of
Environmental Protection



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

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

March 2, 2018

Jill M. Newman
Deputy Commissioner

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 Old Crow Pad, Marshall County
Old Crow N-1HM Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2018-0130 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 76 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

RECEIVED
Office of Oil and Gas

FEB 26 2019

WV Department of
Environmental Protection



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

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

RECEIVED
Office of Oil and Gas

FEB 26 2019

PA Department of
Environmental Protection



**WVDEP OOG
ACCEPTED AS-BUILT**

WJL 3/4/2019

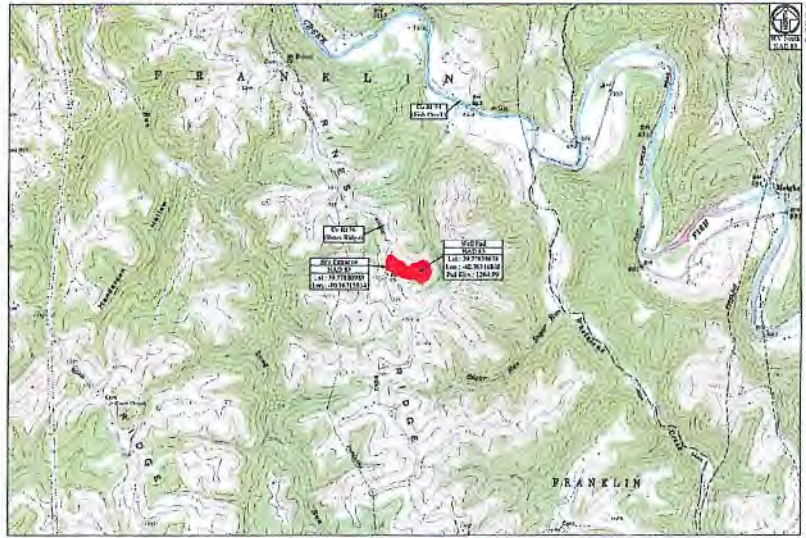
Old Crow Well Site
Site Design, Construction Plan, &
Erosion and Sediment Control Plans
Tug Hill Operating
Marshall County
Franklin District
Latitude 39.77838678°
Longitude -80.76316840°
Lower Fish Creek Watershed

Permit Site Information
Old Crow Well Site
Emergency Number: 304-645-1920
Franklin District, Marshall County, WV
Watershed: Lower Fish Creek Watershed
Tug Hill Contact Number: 1-817-632-3400

Property Owner Information - Old Crow Well Site

Owner	Parcel ID	Area (Acres)	Value	Year	Assessed	Year
Franklin District - Marshall County	10-3	4.44	1.71	201	8.92	17.14
Franklin District - Marshall County	10-3	4.44	1.71	201	8.92	17.14

Exhibit A: Site As-Built



Parcel ID	Area (Acres)	Value	Year	Assessed	Year
10-3	4.44	1.71	201	8.92	17.14
10-3	4.44	1.71	201	8.92	17.14

Parcel ID	Area (Acres)	Value	Year	Assessed	Year
10-3	4.44	1.71	201	8.92	17.14
10-3	4.44	1.71	201	8.92	17.14

Access Road

Access Road	Area (Acres)	Value	Year	Assessed	Year
10-3	4.44	1.71	201	8.92	17.14

Old Crow Well Site Quantities

Item	Quantity	Unit	Value	Year	Assessed	Year
Access Road	4.44	Acres	1.71	201	8.92	17.14

EXISTING API NUMBERS

- 47-051-02023
- 47-051-02040
- 47-051-02042
- 47-051-02043
- 47-051-02122
- 47-051-02123

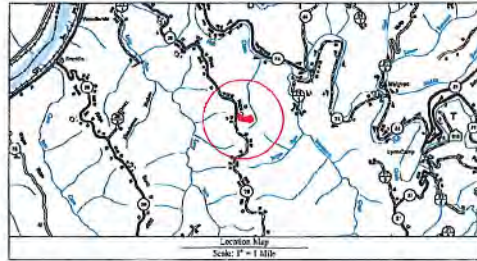
JW
2/20/19

USGS 1:25000 Quadrangle: Foxham Post
Watershed: Lower Fish Creek

Site Locations (NAD 83)			Site Locations (NAD 83)		
Structure	Latitude (N)	Longitude (W)	Structure	Latitude (N)	Longitude (W)
Well	39.77838678	-80.76316840	Well	39.77838678	-80.76316840

Approach Route:

From the intersection of OH Rt 7 and WV Rt 2 near New Meadows, WV. Travel North on WV Rt 2 for 13.0 mi. Turn right onto Co Rd 27 (Woodland and Covey Ridge). Follow Co Rd 27 for 4.0 mi. Turn right onto Co Rd 76 (Rivers Ridge). Follow Co Rd 76 for 4.0 mi. The site entrance will be on the left (East) side of the road.



- *101 means no structure
- *102 means structure complete with all finishing touches
- *103 means structure will be developed and used for human or animal use
- *104 means no structure or foundation greater than 1000 sq ft for poultry or dairy raised for production or sale
- *105 means no structure or foundation greater than 1000 sq ft for other uses
- *106 means no structure or foundation greater than 1000 sq ft for other uses
- *107 means no structure or foundation greater than 1000 sq ft for other uses
- *108 means no structure or foundation greater than 1000 sq ft for other uses
- *109 means no structure or foundation greater than 1000 sq ft for other uses



STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Franklin District
Marshall County, WV

Project Contacts

Tug Hill Operating	Survey and Engineer
Attn: Mike White - Operations Manager 124-485-2000 ext. 304-98-9816 Fax	Kearney & Sons 321.318.4283 Cell
Franklin District - Tug Hill 632-632-0400	632-632-0400
The Tug Hill Operating, LLC 100 South Mountain Blvd. Ste 200 Canaan, VA 24552	Kearney & Sons, LLC 101-08-9700

Environmental
Watershed boundaries as established by MSW Agency dated November 6, 2013

Permit Information
The appropriate information should be found on the permit application. In the absence of such information, contact the WV DEEP.

MISER UTILITY OF WEST VIRGINIA
1-800-245-4444
1000 West Virginia Ave
Martinsburg, WV 26150
1-817-632-3400
1-817-632-3400

811
Know what's below. Call before you dig.

Tug Hill Operating will obtain an Enforcement Permit (Form 130-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities.

The WV Motor Vehicle was checked. Previous driver's license activities are not within the AOI.

WVDEP Wildlife files show that there are no active and/or abandoned gas wells within the AOI.

Franklin District

Structure	Latitude (N)	Longitude (W)	Structure	Latitude (N)	Longitude (W)
Well	39.77838678	-80.76316840	Well	39.77838678	-80.76316840

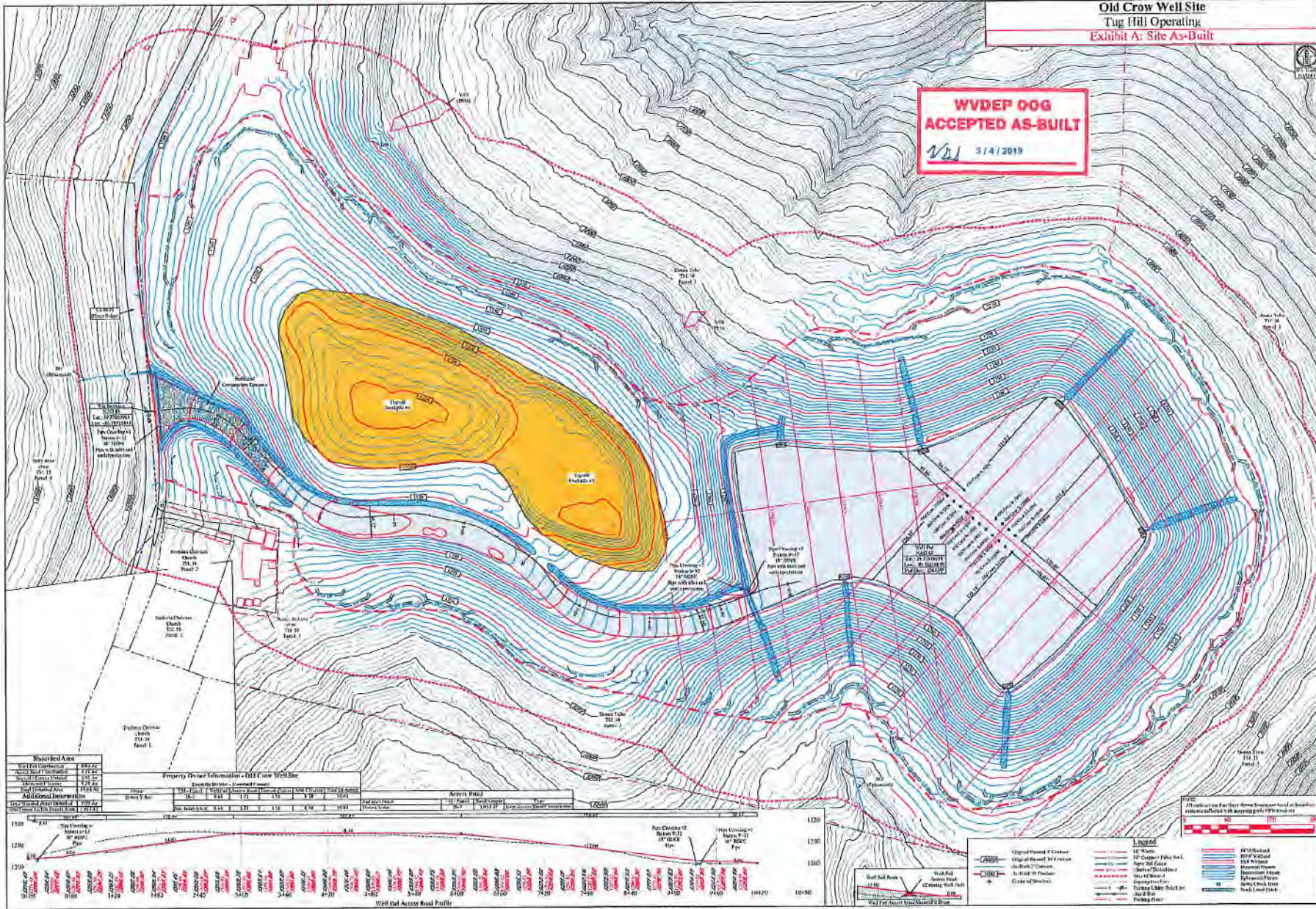
Sheet

Sheet	Description
1	Cover Sheet
1-1	Schedule of Quantities
1-1-1	Site Notes
2	Pre-Construction Site Conditions
3	Site Plan
4	Overall Plan View
5	Plan View
6-8	Cross Sections - Well Pad
9	Cross Sections - Access Road
10	Construction Erosion and Sedimentation Control Details
11-12	Landowner Unaltered Area Exhibit
13	Site Relocation Map
14-15	Production Exhibit
16-17	Erosion and Sedimentation Control Details
18	Access Road Details
19	Well Details

TUG HILL OPERATING
 Franklin District
 Marshall County, WV
 Old Crow Well Site
 Franklin District
 Marshall County, WV
 Date: 03/20/2019
 Drawn by: JWS
 Sheet 1 of 3

Old Crow Well Site
Tug Hill Operating
Exhibit A: Site As-Built

**WVDEP O&G
ACCEPTED AS-BUILT**
3/4/2019



TUG HILL
OPERATIONS



THIS DOCUMENT IS PREPARED FOR:
TUG HILL OPERATIONS

K&S SCORING
CONSULTANTS

Overall Plan View
Old Crow Well Site
Franklin District
Marshall County, WV

Use 10/27/2018
Scale: As Shown
Legend: AS-BUILT
File No.
Sheet 1 of 9