



west virginia department of environmental protection

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

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

Wednesday, June 26, 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-3HM
47-051-02226-00-00

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-3HM
Farm Name: DONNA VIVIAN YOHO (TO) 
U.S. WELL NUMBER: 47-051-02226-00-00
Horizontal 6A New Drill
Date Issued: 6/26/2019

PERMIT CONDITIONS**4705102226**

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 4705102226

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

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

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin Powhatan Point 7
Operator ID County District Quadrangle

2) Operator's Well Number: Old Crow N-3HM 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

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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 6538' - 6589', thickness of 51' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 6689'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 21,326'

11) Proposed Horizontal Leg Length: 13,640.42'

12) Approximate Fresh Water Strata Depths: 70'; 886'

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'

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

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

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

Depth: _____

Seam: _____

Owner: _____

18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	30"	NEW	BW	BW	120'	120'	259ft ³ (CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	980'	980'	1031ft ³ (CTS)
Coal	13 3/8"	NEW	J55	54.5#	980'	980'	1031ft ³ (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,804'	2,804'	927ft ³ (CTS)
Production	5 1/2"	NEW	P110	20#	21,326'	21,326'	5440ft ³ (CTS)
Tubing	2 3/8"	NEW	N80	4.7#	7,602'		
Liners							

JW
1/23/19

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
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							

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PACKERS

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

WW-6B
(10/14)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-3HM
Well Pad Name: Old Crow

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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 34,095,000 lb. proppant and 527,134 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.

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

*See attachment

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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.

*Note: Attach additional sheets as needed.



WELL NAME: Old Crow N-3HM COUNTY: Marshall
 STATE: WV DISTRICT: Franklin
 DF Elev: 1,265' GL Elev: 1,265'
 TD: 21,326'
 TH Latitude: 39.77847314
 TH Longitude: -80.7631319
 BH Latitude: 39.818532
 BH Longitude: 80.787326

30" Csg @ 120' MD / 120' TVD

13 3/8" Csg @ 976' MD / 976' TVD

9 5/8" Csg @ 2,804' MD / 2,800' TVD

KOP @ 7,102' ft MD

table @ TVD 6689

FORMATION TOPS		Depth TVD
Formation		886
Deepest Fresh Water		788
Sewickley Coal		880
Pittsburgh Coal		2077
Big Lime		2431
Weir		2626
Berea		2971
Gordon		5944
Rhinestreet		6434
Genesee/Burkett		6469
Tully		6504
Hamilton		6538
Marcellus		6578
Landing Depth		6589
Onondaga		6689
Pilot Hole Depth		

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	2,804'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	21,326'	6,340'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centralizer Notes	
338	A	15.6	Air	None	
1,034	A	15.6	Air	3 Centralizers at equal distance	
913	A	15	Air	1 Centralizer every other ft	
5,002	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curves; 1 every other ft to sfc	

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Lateral TD @ 21,326' ft MD
 6,340' ft TVD

Landing Point @ 7,688' MD / 6,578' TVD
 PH TVD = 100' below Onondaga Top



Tug Hill Operating, LLC Casing and Cement Program

Old Crow N-3HM

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"	2,804'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	21,326'	CTS

Cement

Conductor:	Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2
Surface:	Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2
Intermediate:	Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19
Kick Off Plug:	Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug
Production:	50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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Well: Old Crow N-03 HM (slot M)
 Site: Old Crow Pad
 Project: Marshall County, West Virginia
 Design: rev1

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+NW-S	+EAW	Dleg	TFaces	VSect	Amotiation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1750.00	5.00	2.82	1749.68	10.89	0.54	2.00	2.82	0.00	Begin 5.00° tangent
4	3306.24	5.00	2.82	3300.00	146.36	7.91	0.00	2.00	129.64	Begin 3°/100' build
5	4510.94	41.14	5.50	4390.12	608.65	49.16	0.00	2.99	539.68	Begin 41.14° tangent
6	7101.58	91.00	5.50	6341.28	2305.03	212.45	0.00	43.20	1963.51	Begin 10°/100' build
7	7687.92	91.00	329.72	6578.00	2793.54	70.54	0.00	-83.20	2501.29	Begin 91.00° lateral section
8	21325.77	91.00	329.72	6340.00	14589.56	-6804.01	0.00	0.00	6066.01	PBHL/TD 21325.76 MD 6340.00 TVD

T G
M A

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

Magnetic Field
 Strength: 52107.1snT
 Dip Angle: 66.91°
 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 @ 1265.00ust

Northing 14446156.15 Easting 1706965.70 Latitude 39.77847314 Longitude -80.76313190

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

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3:39, August 03 2018



Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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-03 HM (slot M)					
Well Position	+N/-S	0.00 usft	Northing:	14,446,156.16 usft	Latitude:	39.77847314
	+E/-W	0.00 usft	Easting:	1,706,965.70 usft	Longitude:	-80.76313190
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	52,107.08132202

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	334.97

Plan Survey Tool Program	Date	8/3/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	21,325.77 rev1 (Original Hole)	MWD	MWD - Standard

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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)	Target	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,750.00	5.00	2.82	1,749.68	10.89	0.54	2.00	2.00	0.00	2.82	
3,306.24	5.00	2.82	3,300.00	146.36	7.21	0.00	0.00	0.00	0.00	
4,510.94	41.14	5.50	4,390.12	608.65	49.16	3.00	3.00	0.22	2.99	
7,101.58	41.14	5.50	6,341.28	2,305.03	212.45	0.00	0.00	0.00	0.00	
7,687.92	91.00	329.72	6,578.00	2,793.54	70.54	10.00	8.50	-6.10	-43.20	LP Old Crow N-03 HM
21,325.77	91.00	329.72	6,340.00	14,569.57	-6,804.01	0.00	0.00	0.00	0.00	BHL Old Crow N-03 H

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Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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	
0.00	0.00	0.00	0.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
100.00	0.00	0.00	100.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
200.00	0.00	0.00	200.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
300.00	0.00	0.00	300.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
400.00	0.00	0.00	400.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
500.00	0.00	0.00	500.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
600.00	0.00	0.00	600.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
700.00	0.00	0.00	700.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
800.00	0.00	0.00	800.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
900.00	0.00	0.00	900.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,446,156.16	1,706,965.70	39.77847314	-80.76313190	
KOP Begin 2°/100' build										
1,600.00	2.00	2.82	1,599.98	1.74	0.09	14,446,157.90	1,706,965.78	39.77847793	-80.76313158	
1,700.00	4.00	2.82	1,699.83	6.97	0.34	14,446,163.13	1,706,966.04	39.77849228	-80.76313061	
1,750.00	5.00	2.82	1,749.68	10.89	0.54	14,446,167.04	1,706,966.23	39.77850304	-80.76312989	
Begin 5.00° tangent										
1,800.00	5.00	2.82	1,799.49	15.24	0.75	14,446,171.40	1,706,966.45	39.77851499	-80.76312909	
1,900.00	5.00	2.82	1,899.11	23.95	1.18	14,446,180.10	1,706,966.88	39.77853889	-80.76312748	
2,000.00	5.00	2.82	1,998.73	32.65	1.61	14,446,188.81	1,706,967.31	39.77856280	-80.76312587	
2,100.00	5.00	2.82	2,098.35	41.36	2.04	14,446,197.51	1,706,967.74	39.77858670	-80.76312426	
2,200.00	5.00	2.82	2,197.97	50.06	2.47	14,446,206.22	1,706,968.16	39.77861060	-80.76312265	
2,300.00	5.00	2.82	2,297.59	58.77	2.89	14,446,214.92	1,706,968.59	39.77863451	-80.76312104	
2,400.00	5.00	2.82	2,397.20	67.47	3.32	14,446,223.63	1,706,969.02	39.77865841	-80.76311943	
2,500.00	5.00	2.82	2,496.82	76.18	3.75	14,446,232.33	1,706,969.45	39.77868231	-80.76311783	
2,599.99	5.00	2.82	2,596.44	84.88	4.18	14,446,241.04	1,706,969.88	39.77870622	-80.76311622	
2,699.99	5.00	2.82	2,696.06	93.59	4.61	14,446,249.74	1,706,970.31	39.77873012	-80.76311461	
2,799.99	5.00	2.82	2,795.68	102.29	5.04	14,446,258.45	1,706,970.74	39.77875402	-80.76311300	
2,899.99	5.00	2.82	2,895.30	111.00	5.47	14,446,267.15	1,706,971.17	39.77877793	-80.76311140	
2,999.99	5.00	2.82	2,994.92	119.70	5.90	14,446,275.86	1,706,971.59	39.77880183	-80.76310979	
3,099.99	5.00	2.82	3,094.54	128.41	6.33	14,446,284.56	1,706,972.02	39.77882573	-80.76310818	
3,199.99	5.00	2.82	3,194.16	137.11	6.75	14,446,293.27	1,706,972.45	39.77884964	-80.76310657	
3,299.99	5.00	2.82	3,293.78	145.82	7.18	14,446,301.97	1,706,972.88	39.77887354	-80.76310496	
3,306.24	5.00	2.82	3,300.00	146.36	7.21	14,446,302.52	1,706,972.91	39.77887503	-80.76310486	
Begin 3°/100' build/turn										
3,399.99	7.81	3.90	3,393.16	156.80	7.84	14,446,312.95	1,706,973.54	39.77890989	-80.76310251	
3,499.99	10.81	4.43	3,491.83	172.93	9.03	14,446,329.09	1,706,974.73	39.77894799	-80.76309813	
3,599.99	13.81	4.74	3,589.52	194.17	10.74	14,446,350.33	1,706,976.44	39.77900632	-80.76309184	
3,699.99	16.81	4.93	3,685.96	220.48	12.97	14,446,376.63	1,706,978.67	39.77907954	-80.76308366	
3,799.99	19.81	5.07	3,780.89	251.77	15.71	14,446,407.92	1,706,981.41	39.77916445	-80.76307360	
3,899.99	22.81	5.18	3,874.04	287.95	18.96	14,446,444.11	1,706,984.66	39.77924880	-80.76306170	
3,999.99	25.81	5.26	3,965.17	328.94	22.71	14,446,485.10	1,706,988.40	39.77932658	-80.76304799	
4,099.99	28.81	5.32	4,054.01	374.62	26.94	14,446,530.77	1,706,992.64	39.77950174	-80.76303250	
4,199.99	31.81	5.38	4,140.34	424.85	31.64	14,446,581.01	1,706,997.34	39.77963968	-80.76301528	
4,299.99	34.81	5.42	4,223.90	479.52	36.81	14,446,635.67	1,707,002.51	39.77978976	-80.76299637	
4,399.99	37.81	5.46	4,304.48	538.45	42.42	14,446,694.61	1,707,008.12	39.77995157	-80.76297583	
4,499.99	40.81	5.49	4,381.85	601.50	48.47	14,446,757.66	1,707,014.17	39.78012468	-80.76295371	
4,510.94	41.13	5.50	4,390.11	608.65	49.16	14,446,764.81	1,707,014.86	39.78014430	-80.76295120	
Begin 41.14° tangent										
4,599.99	41.14	5.50	4,457.18	666.96	54.77	14,446,823.12	1,707,020.47	39.78030440	-80.76293067	

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WV Department of Environmental Protection



Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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	
4,699.99	41.14	5.50	4,532.50	732.44	61.07	14,446,888.60	1,707,026.77	39.78048418	-80.76290762	
4,799.99	41.14	5.50	4,607.81	797.92	67.38	14,446,954.08	1,707,033.08	39.78066396	-80.76288456	
4,899.99	41.14	5.50	4,683.13	863.40	73.68	14,447,019.56	1,707,039.38	39.78084375	-80.76286151	
4,999.99	41.14	5.50	4,758.45	928.88	79.98	14,447,085.04	1,707,045.68	39.78102353	-80.76283846	
5,099.99	41.14	5.50	4,833.76	994.36	86.29	14,447,150.52	1,707,051.99	39.78120331	-80.76281541	
5,199.99	41.14	5.50	4,909.08	1,059.84	92.59	14,447,216.00	1,707,058.29	39.78138309	-80.76279235	
5,299.99	41.14	5.50	4,984.39	1,125.33	98.89	14,447,281.48	1,707,064.59	39.78156288	-80.76276930	
5,399.99	41.14	5.50	5,059.71	1,190.81	105.20	14,447,346.96	1,707,070.89	39.78174266	-80.76274625	
5,499.99	41.14	5.50	5,135.03	1,256.29	111.50	14,447,412.44	1,707,077.20	39.78192244	-80.76272320	
5,599.99	41.14	5.50	5,210.34	1,321.77	117.80	14,447,477.92	1,707,083.50	39.78210222	-80.76270014	
5,699.99	41.14	5.50	5,285.66	1,387.25	124.11	14,447,543.41	1,707,089.80	39.78228201	-80.76267709	
5,799.99	41.14	5.50	5,360.97	1,452.73	130.41	14,447,608.89	1,707,096.11	39.78246179	-80.76265404	
5,899.99	41.14	5.50	5,436.29	1,518.21	136.71	14,447,674.37	1,707,102.41	39.78264157	-80.76263098	
5,999.99	41.14	5.50	5,511.61	1,583.69	143.01	14,447,739.85	1,707,108.71	39.78282135	-80.76260793	
6,099.99	41.14	5.50	5,586.92	1,649.17	149.32	14,447,805.33	1,707,115.02	39.78300114	-80.76258487	
6,199.99	41.14	5.50	5,662.24	1,714.65	155.62	14,447,870.81	1,707,121.32	39.78318092	-80.76256182	
6,299.99	41.14	5.50	5,737.55	1,780.13	161.92	14,447,936.29	1,707,127.62	39.78336070	-80.76253877	
6,399.99	41.14	5.50	5,812.87	1,845.62	168.23	14,448,001.77	1,707,133.93	39.78354048	-80.76251571	
6,499.99	41.14	5.50	5,888.19	1,911.10	174.53	14,448,067.25	1,707,140.23	39.78372026	-80.76249266	
6,599.99	41.14	5.50	5,963.50	1,976.58	180.83	14,448,132.73	1,707,146.53	39.78390005	-80.76246960	
6,699.99	41.14	5.50	6,038.82	2,042.06	187.14	14,448,198.21	1,707,152.83	39.78407983	-80.76244655	
6,799.99	41.14	5.50	6,114.13	2,107.54	193.44	14,448,263.70	1,707,159.14	39.78425961	-80.76242350	
6,899.99	41.14	5.50	6,189.45	2,173.02	199.74	14,448,329.18	1,707,165.44	39.78443939	-80.76240044	
6,999.99	41.14	5.50	6,264.77	2,238.50	206.05	14,448,394.66	1,707,171.74	39.78461918	-80.76237739	
7,099.99	41.14	5.50	6,340.08	2,303.98	212.35	14,448,460.14	1,707,178.05	39.78479896	-80.76235433	
7,101.58	41.14	5.50	6,341.28	2,305.02	212.45	14,448,461.18	1,707,178.15	39.78480182	-80.76235396	
Begin 10°/100° build/turn										
7,199.99	48.69	356.54	6,410.99	2,374.31	213.32	14,448,530.46	1,707,179.02	39.78499208	-80.76235021	
7,299.99	56.93	349.40	6,471.43	2,453.18	203.32	14,448,609.34	1,707,169.02	39.78520876	-80.76238505	
7,399.99	65.50	343.52	6,519.58	2,538.21	182.65	14,448,694.36	1,707,148.35	39.78544243	-80.76245782	
7,499.99	74.27	338.39	6,553.95	2,626.81	151.94	14,448,782.96	1,707,117.64	39.78568597	-80.76256630	
7,599.98	83.15	333.70	6,573.52	2,716.29	112.13	14,448,872.44	1,707,077.83	39.78593199	-80.76270719	
7,687.92	91.00	329.72	6,578.00	2,793.54	70.54	14,448,949.70	1,707,036.24	39.78614445	-80.76285449	
Begin 91.00° lateral section										
7,699.98	91.00	329.72	6,577.79	2,803.96	64.46	14,448,960.11	1,707,030.16	39.78617310	-80.76287604	
7,799.98	91.00	329.72	6,576.04	2,890.30	14.05	14,449,046.46	1,706,979.75	39.78641060	-80.76305466	
7,899.98	91.00	329.72	6,574.30	2,976.65	-36.36	14,449,132.81	1,706,929.34	39.78664811	-80.76323328	
7,999.98	91.00	329.72	6,572.55	3,063.00	-86.76	14,449,219.16	1,706,878.94	39.78688561	-80.76341191	
8,099.98	91.00	329.72	6,570.81	3,149.35	-137.17	14,449,305.50	1,706,828.53	39.78712311	-80.76359053	
8,199.98	91.00	329.72	6,569.06	3,235.70	-187.58	14,449,391.85	1,706,778.12	39.78736061	-80.76376916	
8,299.98	91.00	329.72	6,567.32	3,322.04	-237.99	14,449,478.20	1,706,727.71	39.78759811	-80.76394779	
8,399.98	91.00	329.72	6,565.57	3,408.39	-288.39	14,449,564.55	1,706,677.30	39.78783561	-80.76412642	
8,499.98	91.00	329.72	6,563.83	3,494.74	-338.80	14,449,650.90	1,706,626.90	39.78807311	-80.76430505	
8,599.98	91.00	329.72	6,562.08	3,581.09	-389.21	14,449,737.24	1,706,576.49	39.78831061	-80.76448368	
8,699.98	91.00	329.72	6,560.34	3,667.44	-439.62	14,449,823.59	1,706,526.08	39.78854811	-80.76466231	
8,799.98	91.00	329.72	6,558.59	3,753.78	-490.03	14,449,909.94	1,706,475.67	39.78878561	-80.76484095	
8,899.98	91.00	329.72	6,556.85	3,840.13	-540.43	14,449,996.29	1,706,425.26	39.78902311	-80.76501958	
8,999.98	91.00	329.72	6,555.10	3,926.48	-590.84	14,450,082.64	1,706,374.86	39.78926061	-80.76519822	
9,099.98	91.00	329.72	6,553.36	4,012.83	-641.25	14,450,168.98	1,706,324.45	39.78949811	-80.76537686	
9,199.98	91.00	329.72	6,551.61	4,099.18	-691.66	14,450,255.33	1,706,274.04	39.78973561	-80.76555549	
9,299.98	91.00	329.72	6,549.87	4,185.52	-742.06	14,450,341.68	1,706,223.63	39.78997311	-80.76573413	
9,399.98	91.00	329.72	6,548.12	4,271.87	-792.47	14,450,428.03	1,706,173.23	39.79021061	-80.76591278	
9,499.98	91.00	329.72	6,546.38	4,358.22	-842.88	14,450,514.38	1,706,122.82	39.79044811	-80.76609142	
9,599.98	91.00	329.72	6,544.63	4,444.57	-893.29	14,450,600.72	1,706,072.41	39.79068561	-80.76627006	

Office of Mineral Gas
 MAY 29 2019
 WV Department of Environmental Protection



Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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	
9,699.98	91.00	329.72	6,542.89	4,530.92	-943.70	14,450,687.07	1,706,022.00	39.79092308	-80.76644871	
9,799.98	91.00	329.72	6,541.14	4,617.26	-994.10	14,450,773.42	1,705,971.59	39.79116057	-80.76662735	
9,899.98	91.00	329.72	6,539.40	4,703.61	-1,044.51	14,450,859.77	1,705,921.19	39.79139807	-80.76680600	
9,999.98	91.00	329.72	6,537.65	4,789.96	-1,094.92	14,450,946.12	1,705,870.78	39.79163556	-80.76698465	
10,099.98	91.00	329.72	6,535.91	4,876.31	-1,145.33	14,451,032.46	1,705,820.37	39.79187306	-80.76716330	
10,199.98	91.00	329.72	6,534.16	4,962.65	-1,195.73	14,451,118.81	1,705,769.96	39.79211055	-80.76734195	
10,299.98	91.00	329.72	6,532.42	5,049.00	-1,246.14	14,451,205.16	1,705,719.56	39.79234805	-80.76752060	
10,399.98	91.00	329.72	6,530.67	5,135.35	-1,296.55	14,451,291.51	1,705,669.15	39.79258554	-80.76769926	
10,499.98	91.00	329.72	6,528.93	5,221.70	-1,346.96	14,451,377.86	1,705,618.74	39.79282304	-80.76787791	
10,599.98	91.00	329.72	6,527.18	5,308.05	-1,397.37	14,451,464.20	1,705,568.33	39.79306053	-80.76805657	
10,699.98	91.00	329.72	6,525.44	5,394.39	-1,447.77	14,451,550.55	1,705,517.92	39.79329802	-80.76823522	
10,799.98	91.00	329.72	6,523.69	5,480.74	-1,498.18	14,451,636.90	1,705,467.52	39.79353552	-80.76841388	
10,899.98	91.00	329.72	6,521.95	5,567.09	-1,548.59	14,451,723.25	1,705,417.11	39.79377301	-80.76859254	
10,999.98	91.00	329.72	6,520.20	5,653.44	-1,599.00	14,451,809.60	1,705,366.70	39.79401050	-80.76877120	
11,099.98	91.00	329.72	6,518.45	5,739.79	-1,649.41	14,451,895.94	1,705,316.29	39.79424799	-80.76894987	
11,199.98	91.00	329.72	6,516.71	5,826.13	-1,699.81	14,451,982.29	1,705,265.89	39.79448548	-80.76912853	
11,299.98	91.00	329.72	6,514.96	5,912.48	-1,750.22	14,452,068.64	1,705,215.48	39.79472298	-80.76930719	
11,399.98	91.00	329.72	6,513.22	5,998.83	-1,800.63	14,452,154.99	1,705,165.07	39.79496047	-80.76948586	
11,499.98	91.00	329.72	6,511.47	6,085.18	-1,851.04	14,452,241.33	1,705,114.66	39.79519796	-80.76966453	
11,599.98	91.00	329.72	6,509.73	6,171.53	-1,901.44	14,452,327.68	1,705,064.25	39.79543545	-80.76984320	
11,699.98	91.00	329.72	6,507.98	6,257.87	-1,951.85	14,452,414.03	1,705,013.85	39.79567294	-80.77002186	
11,799.98	91.00	329.72	6,506.24	6,344.22	-2,002.26	14,452,500.38	1,704,963.44	39.79591043	-80.77020054	
11,899.98	91.00	329.72	6,504.49	6,430.57	-2,052.67	14,452,586.73	1,704,913.03	39.79614792	-80.77037921	
11,999.98	91.00	329.72	6,502.75	6,516.92	-2,103.08	14,452,673.07	1,704,862.62	39.79638541	-80.77055788	
12,099.98	91.00	329.72	6,501.00	6,603.27	-2,153.48	14,452,759.42	1,704,812.22	39.79662290	-80.77073656	
12,199.98	91.00	329.72	6,499.26	6,689.61	-2,203.89	14,452,845.77	1,704,761.81	39.79686039	-80.77091523	
12,299.98	91.00	329.72	6,497.51	6,775.96	-2,254.30	14,452,932.12	1,704,711.40	39.79709788	-80.77109391	
12,399.98	91.00	329.72	6,495.77	6,862.31	-2,304.71	14,453,018.47	1,704,660.99	39.79733536	-80.77127259	
12,499.98	91.00	329.72	6,494.02	6,948.66	-2,355.11	14,453,104.81	1,704,610.58	39.79757285	-80.77145127	
12,599.98	91.00	329.72	6,492.28	7,035.01	-2,405.52	14,453,191.16	1,704,560.18	39.79781034	-80.77162995	
12,699.97	91.00	329.72	6,490.53	7,121.35	-2,455.93	14,453,277.51	1,704,509.77	39.79804783	-80.77180863	
12,799.97	91.00	329.72	6,488.79	7,207.70	-2,506.34	14,453,363.86	1,704,459.36	39.79828532	-80.77198731	
12,899.97	91.00	329.72	6,487.04	7,294.05	-2,556.75	14,453,450.21	1,704,408.95	39.79852280	-80.77216599	
12,999.97	91.00	329.72	6,485.30	7,380.40	-2,607.15	14,453,536.55	1,704,358.54	39.79876029	-80.77234468	
13,099.97	91.00	329.72	6,483.55	7,466.75	-2,657.56	14,453,622.90	1,704,308.14	39.79899778	-80.77252337	
13,199.97	91.00	329.72	6,481.81	7,553.09	-2,707.97	14,453,709.25	1,704,257.73	39.79923526	-80.77270205	
13,299.97	91.00	329.72	6,480.06	7,639.44	-2,758.38	14,453,795.60	1,704,207.32	39.79947275	-80.77288074	
13,399.97	91.00	329.72	6,478.32	7,725.79	-2,808.78	14,453,881.95	1,704,156.91	39.79971023	-80.77305943	
13,499.97	91.00	329.72	6,476.57	7,812.14	-2,859.19	14,453,968.29	1,704,106.50	39.79994772	-80.77323813	
13,599.97	91.00	329.72	6,474.83	7,898.49	-2,909.60	14,454,054.64	1,704,056.10	39.80018520	-80.77341682	
13,699.97	91.00	329.72	6,473.08	7,984.83	-2,960.01	14,454,140.99	1,704,005.69	39.80042269	-80.77359551	
13,799.97	91.00	329.72	6,471.34	8,071.18	-3,010.42	14,454,227.34	1,703,955.28	39.80066017	-80.77377421	
13,899.97	91.00	329.72	6,469.59	8,157.53	-3,060.82	14,454,313.69	1,703,904.87	39.80089766	-80.77395290	
13,999.97	91.00	329.72	6,467.85	8,243.88	-3,111.23	14,454,400.03	1,703,854.47	39.80113514	-80.77413160	
14,099.97	91.00	329.72	6,466.10	8,330.22	-3,161.64	14,454,486.38	1,703,804.06	39.80137262	-80.77431030	
14,199.97	91.00	329.72	6,464.36	8,416.57	-3,212.05	14,454,572.73	1,703,753.65	39.80161011	-80.77448900	
14,299.97	91.00	329.72	6,462.61	8,502.92	-3,262.45	14,454,659.08	1,703,703.24	39.80184759	-80.77466770	
14,399.97	91.00	329.72	6,460.87	8,589.27	-3,312.86	14,454,745.43	1,703,652.84	39.80208507	-80.77484641	
14,499.97	91.00	329.72	6,459.12	8,675.62	-3,363.27	14,454,831.77	1,703,602.43	39.80232256	-80.77502511	
14,599.97	91.00	329.72	6,457.37	8,761.96	-3,413.68	14,454,918.12	1,703,552.02	39.80256004	-80.77520381	
14,699.97	91.00	329.72	6,455.63	8,848.31	-3,464.09	14,455,004.47	1,703,501.61	39.80279752	-80.77538252	
14,799.97	91.00	329.72	6,453.88	8,934.66	-3,514.49	14,455,090.82	1,703,451.20	39.80303500	-80.77556123	
14,899.97	91.00	329.72	6,452.14	9,021.01	-3,564.90	14,455,177.17	1,703,400.80	39.80327248	-80.77573994	
14,999.97	91.00	329.72	6,450.39	9,107.36	-3,615.31	14,455,263.51	1,703,350.39	39.80350997	-80.77591865	
15,099.97	91.00	329.72	6,448.65	9,193.70	-3,665.72	14,455,349.86	1,703,299.98	39.80374745	-80.77609736	

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Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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	
15,199.97	91.00	329.72	6,446.90	9,280.05	-3,716.13	14,455,436.21	1,703,249.57	39.80398493	-80.77627607	
15,299.97	91.00	329.72	6,445.16	9,366.40	-3,766.53	14,455,522.56	1,703,199.17	39.80422241	-80.77645478	
15,399.97	91.00	329.72	6,443.41	9,452.75	-3,816.94	14,455,608.90	1,703,148.76	39.80445989	-80.77663350	
15,499.97	91.00	329.72	6,441.67	9,539.10	-3,867.35	14,455,695.25	1,703,098.35	39.80469737	-80.77681222	
15,599.97	91.00	329.72	6,439.92	9,625.44	-3,917.76	14,455,781.60	1,703,047.94	39.80493485	-80.77699093	
15,699.97	91.00	329.72	6,438.18	9,711.79	-3,968.16	14,455,867.95	1,702,997.53	39.80517233	-80.77716965	
15,799.97	91.00	329.72	6,436.43	9,798.14	-4,018.57	14,455,954.30	1,702,947.13	39.80540980	-80.77734837	
15,899.97	91.00	329.72	6,434.69	9,884.49	-4,068.98	14,456,040.64	1,702,896.72	39.80564728	-80.77752709	
15,999.97	91.00	329.72	6,432.94	9,970.84	-4,119.39	14,456,126.99	1,702,846.31	39.80588476	-80.77770582	
16,099.97	91.00	329.72	6,431.20	10,057.18	-4,169.80	14,456,213.34	1,702,795.90	39.80612224	-80.77788454	
16,199.97	91.00	329.72	6,429.45	10,143.53	-4,220.20	14,456,299.69	1,702,745.50	39.80635972	-80.77806326	
16,299.97	91.00	329.72	6,427.71	10,229.88	-4,270.61	14,456,386.04	1,702,695.09	39.80659719	-80.77824199	
16,399.97	91.00	329.72	6,425.96	10,316.23	-4,321.02	14,456,472.38	1,702,644.68	39.80683467	-80.77842072	
16,499.97	91.00	329.72	6,424.22	10,402.58	-4,371.43	14,456,558.73	1,702,594.27	39.80707215	-80.77859944	
16,599.97	91.00	329.72	6,422.47	10,488.92	-4,421.83	14,456,645.08	1,702,543.86	39.80730963	-80.77877817	
16,699.97	91.00	329.72	6,420.73	10,575.27	-4,472.24	14,456,731.43	1,702,493.46	39.80754710	-80.77895691	
16,799.97	91.00	329.72	6,418.98	10,661.62	-4,522.65	14,456,817.78	1,702,443.05	39.80778458	-80.77913564	
16,899.97	91.00	329.72	6,417.24	10,747.97	-4,573.06	14,456,904.12	1,702,392.64	39.80802205	-80.77931437	
16,999.97	91.00	329.72	6,415.49	10,834.32	-4,623.47	14,456,990.47	1,702,342.23	39.80825953	-80.77949311	
17,099.97	91.00	329.72	6,413.75	10,920.66	-4,673.87	14,457,076.82	1,702,291.82	39.80849700	-80.77967184	
17,199.97	91.00	329.72	6,412.00	11,007.01	-4,724.28	14,457,163.17	1,702,241.42	39.80873448	-80.77985058	
17,299.97	91.00	329.72	6,410.26	11,093.36	-4,774.69	14,457,249.52	1,702,191.01	39.80897195	-80.78002932	
17,399.97	91.00	329.72	6,408.51	11,179.71	-4,825.10	14,457,335.86	1,702,140.60	39.80920943	-80.78020806	
17,499.97	91.00	329.72	6,406.77	11,266.06	-4,875.50	14,457,422.21	1,702,090.19	39.80944690	-80.78038680	
17,599.97	91.00	329.72	6,405.02	11,352.40	-4,925.91	14,457,508.56	1,702,039.79	39.80968438	-80.78056554	
17,699.96	91.00	329.72	6,403.28	11,438.75	-4,976.32	14,457,594.91	1,701,989.38	39.80992185	-80.78074428	
17,799.96	91.00	329.72	6,401.53	11,525.10	-5,026.73	14,457,681.26	1,701,938.97	39.81015932	-80.78092303	
17,899.96	91.00	329.72	6,399.79	11,611.45	-5,077.14	14,457,767.60	1,701,888.56	39.81039680	-80.78110177	
17,999.96	91.00	329.72	6,398.04	11,697.79	-5,127.54	14,457,853.95	1,701,838.15	39.81063427	-80.78128052	
18,099.96	91.00	329.72	6,396.30	11,784.14	-5,177.95	14,457,940.30	1,701,787.75	39.81087174	-80.78145927	
18,199.96	91.00	329.72	6,394.55	11,870.49	-5,228.36	14,458,026.65	1,701,737.34	39.81110921	-80.78163802	
18,299.96	91.00	329.72	6,392.80	11,956.84	-5,278.77	14,458,113.00	1,701,686.93	39.81134668	-80.78181677	
18,399.96	91.00	329.72	6,391.06	12,043.19	-5,329.17	14,458,199.34	1,701,636.52	39.81158416	-80.78199552	
18,499.96	91.00	329.72	6,389.31	12,129.53	-5,379.58	14,458,285.69	1,701,586.12	39.81182163	-80.78217427	
18,599.96	91.00	329.72	6,387.57	12,215.88	-5,429.99	14,458,372.04	1,701,535.71	39.81205910	-80.78235303	
18,699.96	91.00	329.72	6,385.82	12,302.23	-5,480.40	14,458,458.39	1,701,485.30	39.81229657	-80.78253178	
18,799.96	91.00	329.72	6,384.08	12,388.58	-5,530.81	14,458,544.74	1,701,434.89	39.81253404	-80.78271054	
18,899.96	91.00	329.72	6,382.33	12,474.93	-5,581.21	14,458,631.08	1,701,384.48	39.81277151	-80.78288930	
18,999.96	91.00	329.72	6,380.59	12,561.27	-5,631.62	14,458,717.43	1,701,334.08	39.81300898	-80.78306805	
19,099.96	91.00	329.72	6,378.84	12,647.62	-5,682.03	14,458,803.78	1,701,283.67	39.81324645	-80.78324681	
19,199.96	91.00	329.72	6,377.10	12,733.97	-5,732.44	14,458,890.13	1,701,233.26	39.81348392	-80.78342558	
19,299.96	91.00	329.72	6,375.35	12,820.32	-5,782.85	14,458,976.47	1,701,182.85	39.81372139	-80.78360434	
19,399.96	91.00	329.72	6,373.61	12,906.67	-5,833.25	14,459,062.82	1,701,132.45	39.81395886	-80.78378310	
19,499.96	91.00	329.72	6,371.86	12,993.01	-5,883.66	14,459,149.17	1,701,082.04	39.81419632	-80.78396187	
19,599.96	91.00	329.72	6,370.12	13,079.36	-5,934.07	14,459,235.52	1,701,031.63	39.81443379	-80.78414063	
19,699.96	91.00	329.72	6,368.37	13,165.71	-5,984.48	14,459,321.87	1,700,981.22	39.81467126	-80.78431940	
19,799.96	91.00	329.72	6,366.63	13,252.06	-6,034.88	14,459,408.21	1,700,930.81	39.81490873	-80.78449817	
19,899.96	91.00	329.72	6,364.88	13,338.41	-6,085.29	14,459,494.56	1,700,880.41	39.81514620	-80.78467694	
19,999.96	91.00	329.72	6,363.14	13,424.75	-6,135.70	14,459,580.91	1,700,830.00	39.81538366	-80.78485571	
20,099.96	91.00	329.72	6,361.39	13,511.10	-6,186.11	14,459,667.26	1,700,779.59	39.81562113	-80.78503449	
20,199.96	91.00	329.72	6,359.65	13,597.45	-6,236.52	14,459,753.61	1,700,729.18	39.81585860	-80.78521326	
20,299.96	91.00	329.72	6,357.90	13,683.80	-6,286.92	14,459,839.95	1,700,678.78	39.81609606	-80.78539203	
20,399.96	91.00	329.72	6,356.16	13,770.15	-6,337.33	14,459,926.30	1,700,628.37	39.81633353	-80.78557081	
20,499.96	91.00	329.72	6,354.41	13,856.49	-6,387.74	14,460,012.65	1,700,577.96	39.81657099	-80.78574959	
20,599.96	91.00	329.72	6,352.67	13,942.84	-6,438.15	14,460,099.00	1,700,527.55	39.81680846	-80.78592837	

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Planning Report - Geographic

4705102226

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Old Crow N-03 HM (slot M)
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-03 HM (slot M)	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	329.72	6,350.92	14,029.19	-6,488.55	14,460,185.35	1,700,477.14	39.81704592	-80.78610715	
20,799.96	91.00	329.72	6,349.18	14,115.54	-6,538.96	14,460,271.69	1,700,426.74	39.81728339	-80.78628593	
20,899.96	91.00	329.72	6,347.43	14,201.89	-6,589.37	14,460,358.04	1,700,376.33	39.81752085	-80.78646471	
20,999.96	91.00	329.72	6,345.69	14,288.23	-6,639.78	14,460,444.39	1,700,325.92	39.81775832	-80.78664349	
21,099.96	91.00	329.72	6,343.94	14,374.58	-6,690.19	14,460,530.74	1,700,275.51	39.81799578	-80.78682228	
21,199.96	91.00	329.72	6,342.20	14,460.93	-6,740.59	14,460,617.09	1,700,225.10	39.81823325	-80.78700107	
21,299.96	91.00	329.72	6,340.45	14,547.28	-6,791.00	14,460,703.43	1,700,174.70	39.81847071	-80.78717985	
21,325.76	91.00	329.72	6,340.00	14,569.56	-6,804.01	14,460,725.71	1,700,161.69	39.81853198	-80.78722598	
PBHL/TD 21325.76 MD 6340.00 TVD										
21,325.77	91.00	329.72	6,340.00	14,569.57	-6,804.01	14,460,725.72	1,700,161.69	39.81853200	-80.78722600	

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-03 HM - hit/miss target - Shape - Point	0.00	0.00	6,340.00	14,569.57	-6,804.01	14,460,725.72	1,700,161.69	39.81853200	-80.78722600	
LP Old Crow N-03 HM 5 - plan hits target center - Point	0.00	0.00	6,578.00	2,793.54	70.54	14,448,949.70	1,707,036.24	39.78614446	-80.76285450	
LP Old Crow N-03 HM - plan misses target center by 43.18usft at 7713.13usft MD (6577.56 TVD, 2815.30 N, 57.84 E) - Point	0.00	0.00	6,578.00	2,793.54	20.54	14,448,949.70	1,706,986.24	39.78614482	-80.76303247	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,500.00	1,500.00	0.00	0.00	KOP Begin 2°/100' build	
1,750.00	1,749.68	10.89	0.54	Begin 5.00° tangent	
3,306.24	3,300.00	146.36	7.21	Begin 3°/100' build/turn	
4,510.94	4,390.11	608.65	49.16	Begin 41.14° tangent	
7,101.58	6,341.28	2,305.02	212.45	Begin 10°/100' build/turn	
7,687.92	6,578.00	2,793.54	70.54	Begin 91.00° lateral section	
21,325.76	6,340.00	14,569.56	-6,804.01	PBHL/TD 21325.76 MD 6340.00 TVD	

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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.

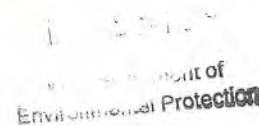
Data Sources Reviewed:

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-3HM

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.
4705170809	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete

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

Location Information View Map
 API: COUNTY PERMIT TAX DISTRICT SERIAL# QUANT# H CAP#66 LOW#66 UNK# UNKN
 DIST#00002 WEL#040_000 F#0000 F#0000# P#0000# QUANT# 31 #1000# 10 00000 02000# 00000# 00000# 00000#

Bottom Hole Location Information
 API# 51 02040 02040 02040 LOW#66 LOW#66
 ELEVATION# 1 34 83500# 34724# 34724# 34 7850# 34 7850#

Owner Information
 API# WEL#040 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#
 DIST#00002 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#

Completion Information
 API# WEL#040 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#
 DIST#00002 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#

There is no Play 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 PERMIT TAX DISTRICT SERIAL# QUANT# H CAP#66 LOW#66 UNK# UNKN
 DIST#00002 WEL#040_000 F#0000 F#0000# P#0000# QUANT# 31 #1000# 10 00000 02000# 00000# 00000# 00000#

Bottom Hole Location Information
 API# 51 02040 02040 02040 LOW#66 LOW#66
 ELEVATION# 1 34 83500# 34724# 34724# 34 7850# 34 7850#

Owner Information
 API# WEL#040 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#
 DIST#00002 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#

Completion Information
 API# WEL#040 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#
 DIST#00002 SURF# STATE SURFACE OWNER WEL#040 COL#040 LEASE# LEASE#040 MINER# OWN# OPERATOR# AT COMPLETION PROP# VO PROP#040#040# THE#040#040#

There is no Play 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.

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4705102226

WV Geological & Economic Survey Well: County = 51 Permit = 02042

Location Information: WVA 4705102226
 PER COUNTY PERMIT NO DEPTH SQAC 71 QUAC 14 LAT 40 LONG 00 TIME 0000
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000) (0000)

System Hole Location Information
 PER DEPTH TIME TIME LONG LAT DE
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000)

Owner Information
 PER CAP OF SURF STATE SURFACE OWNER WELL NUM TO SUR LEASE LEASE NUM MINERAL OWN OPERATOR AT COMPLETION PROP VO PROP REG JM TRACT OR
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000)

Completion Information
 PER CAP OF SURF DEPT SURF FIELD DEPTH 10 DEPTH 100 INITIAL CLASS FINAL CLASS TYPE NO CAP WIND TO TO NO NEW TO NO CAP SURF CAPT NO CAP NO CAP NO CAP
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000)

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 = 02042

Location Information: WVA 4705102226
 PER COUNTY PERMIT NO DEPTH SQAC 71 QUAC 14 LAT 40 LONG 00 TIME 0000
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Owner Information
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 There is no Plugging data for this well
 There is no Sample data for this well

WV Geological & Economic Survey Well: County = 51 Permit = 70809

Location Information: WVA 4705102226
 PER COUNTY PERMIT NO DEPTH SQAC 71 QUAC 14 LAT 40 LONG 00 TIME 0000
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000) (0000)

System Hole Location Information
 PER DEPTH TIME TIME LONG LAT DE
 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000)

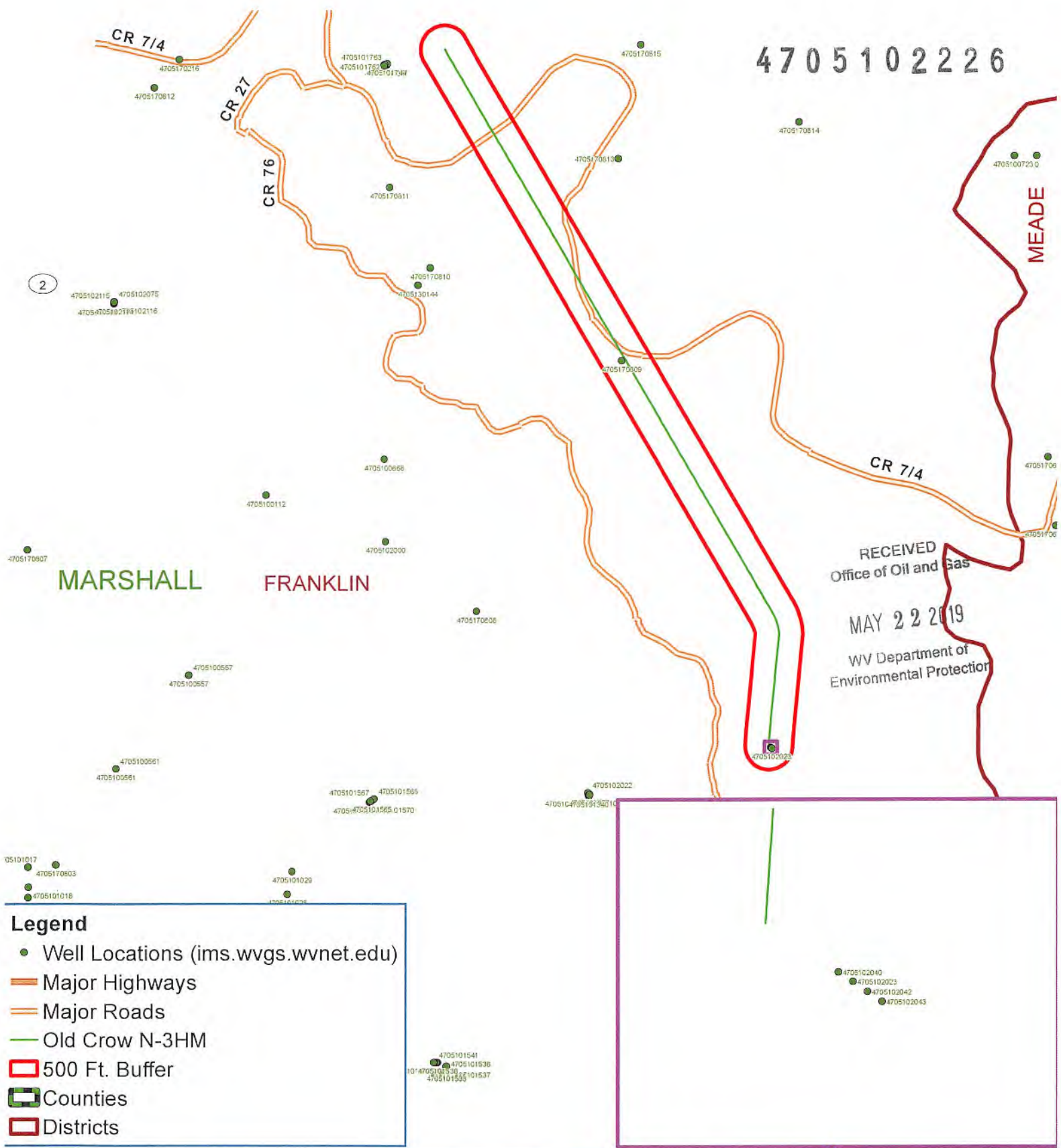
Owner Information
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 (WVA 4705102226) (51) (02042) (14) (40) (00) (00) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000) (0000)

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There is no Pay data for this well
 There is no Production Gas data for this well
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RECEIVED
 Office of Oil and Gas
 MAY 22 2019
 WV Department of
 Environmental Protection

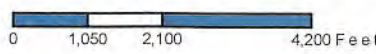
4705102226



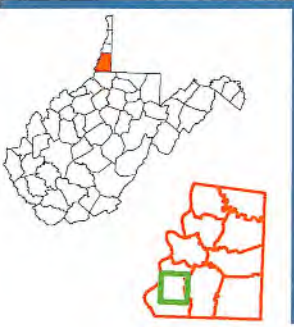
RECEIVED
Office of Oil and Gas
MAY 22 2019
WV Department of
Environmental Protection

- Legend**
- Well Locations (ims.wvgs.wvnet.edu)
 - Major Highways
 - Major Roads
 - Old Crow N-3HM
 - 500 Ft. Buffer
 - Counties
 - Districts

Old Crow N - 3HM Franklin District Marshall County, WV



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



WW-9
(4/16)

47 05 02226

API Number 47 - 051 -
Operator's Well No. Old Crow N-3HM

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 ECF1386426)

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
 MAY 22 2019
 WV Department of
 Environmental Protection

Subscribed and sworn before me this 23 day of JANUARY, 20 19
Maureen A Stead
 My commission expires 1/28/19

COMMONWEALTH OF PENNSYLVANIA
 NOTARIAL SEAL
 MAUREEN A STEAD
 Notary Public
 CECIL TWP, WASHINGTON COUNTY
 My Commission Expires Jan 28, 2019

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

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Nicholas*

Comments: _____

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Office of Oil and Gas

MAY 22 2019

WV Department of
Environmental Protection

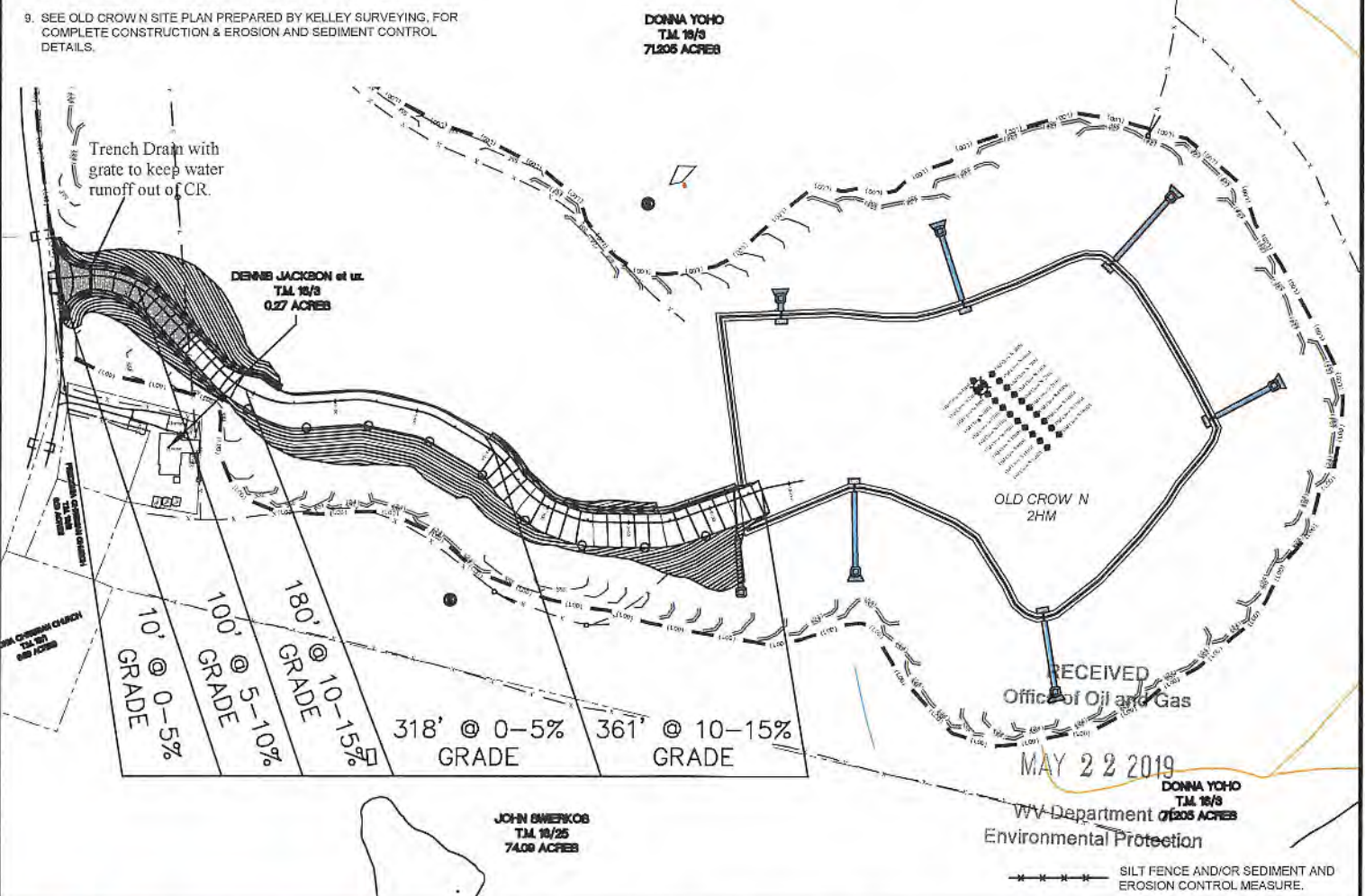
Title: Oil and Gas Inspector Date: 1/23/19

Field Reviewed? () Yes () No

PROPOSED OLD CROW N - 3HM

NOTES:

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



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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

ju
1/23/19

Well Name: Old Crow N-3HM

Pad Location: Old Crow Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,403,197.20

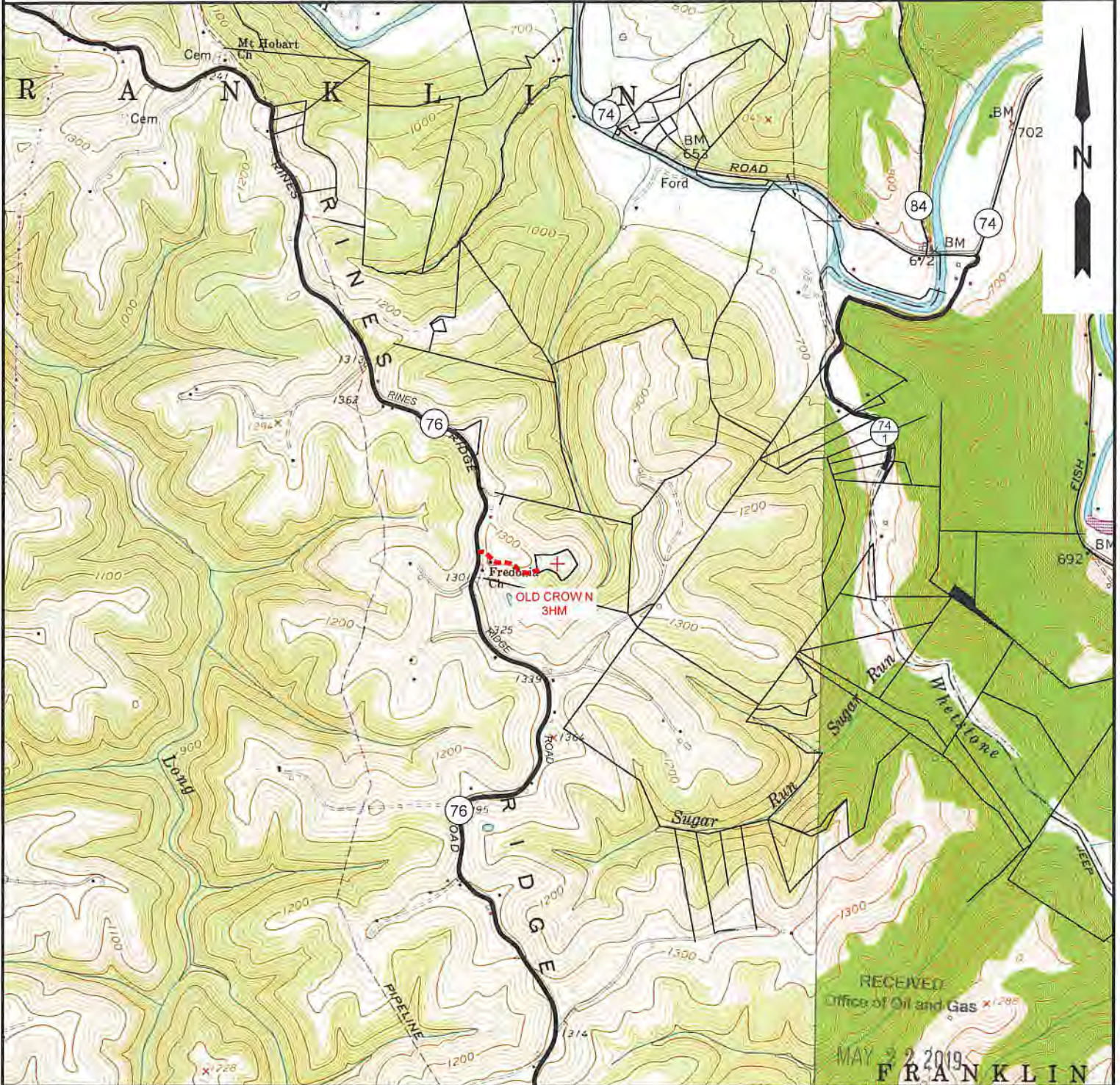
Easting: 520,284.19

RECEIVED
January 2019
Office of Oil and Gas

MAY 22 2019

WV Department of
Environmental Protection

PROPOSED OLD CROWN - 3HM



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 - 3HM SURFACE LOCATION

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MAY 2 2019
FRANKLIN

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Environmental Protection

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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	
DRAWN BY		DATE	SCALE
K.G.M.		06/22/18	1" = 2000'

TUG HILL
OPERATING

10,456' B.H.

3,691' T.H.

**OLD CROW N LEASE
WELL 3HM
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. 468,155.21	E. 1,613,507.73
NAD'83 GEO.	LAT-(N) 39.778473	LONG-(W) 80.763132
NAD'83 UTM (M)	N. 4,403,197.20	E. 520,284.19
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 470,948.1	E. 1,613,625.0
NAD'83 GEO.	LAT-(N) 39.786144	LONG-(W) 80.762854
NAD'83 UTM (M)	N. 4,404,048.7	E. 520,305.7
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 482,841.4	E. 1,606,945.8
NAD'83 GEO.	LAT-(N) 39.818532	LONG-(W) 80.787226
NAD'83 UTM (M)	N. 4,407,638.0	E. 518,210.3

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

5,392' B.H. 4,806' T.H.

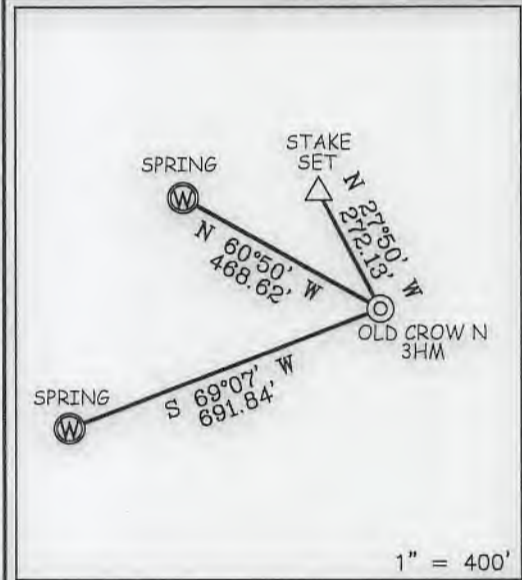


NOTES ON SURVEY

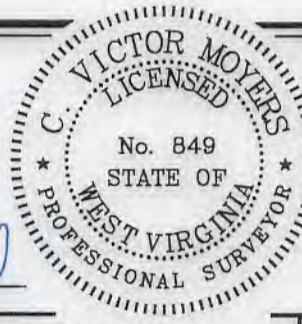
- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS OR DWELLINGS ≥ 2500 SQ. FT. WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- BASED ON WV DOT COUNTY ROUTE 74 IS A 40' STRIP OF LAND ACQUIRED IN NUMEROUS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

REFERENCES

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-34	NORMAN G. JOHNSON ET UX - LIFE	11,123 SQ. FT.
5-9-1.1	FRANK C. CLARK	0.52
5-9-1.4	SHELDON R. RUCKMAN ET AL - LIFE	4.49
5-9-4.2	LINDA J. SIMMONS	0.80
5-9-4.13	SAMUEL LEE CANTERBURY, ET UX	0.9284
5-9-25	DELBERT K. & LINDA K. MYERS	14.49
5-9-27	JOHN F. KAZEMKA	4.02
5-9-28	WILLIAM N. & DOLORES E. MCDONOUGH - LIFE	4.01
5-9-30	MATTHEW B. GRIFFITH	2.708
5-9-30.3	MATTHEW B. GRIFFITH	0.82
5-9-32	SANDRA J. BONNETTE	2.321
5-9-32.9	LIONEL E. HENRY, SR., ET AL	1.269
5-9-33.1	DANIELS FAMILY TRUST	1
5-9-33.2	DANIELS FAMILY TRUST	1.534
5-9-33.3	RALPH EARL DUNLAP - LIFE	0.50
5-9-34	LOUIS D. & PATRICIA L. VAN SCYOC	0.850
5-9-34.3	SANDRA J. BONNETTE	1.988
5-9-34.6	EARL B. SUTER, JR., ET UX	0.085
5-9-36	FRANK T. & ANNA M. WALKER	PARCEL
5-9-37	FRANK T. & ANNA M. WALKER	10.857
5-9-38	SHIRLEY A. HILL EST.	3.331



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*
849

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JUNE 22, 20 18
REVISED 08/23/2018, 1/17/2019, 5/20/2019
OPERATORS WELL NO. OLD CROW N-3HM
API WELL NO. 47 - 51 - 02226
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8796P3HMR1R.dwg
OLD CROW NORTH 3HM 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 INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: GROUND = 1,285.80' 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: LEASE NO. SEE WWV-6A1
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER
PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS
ESTIMATED DEPTH TVD: 6,689' / TMD: 21,326'

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

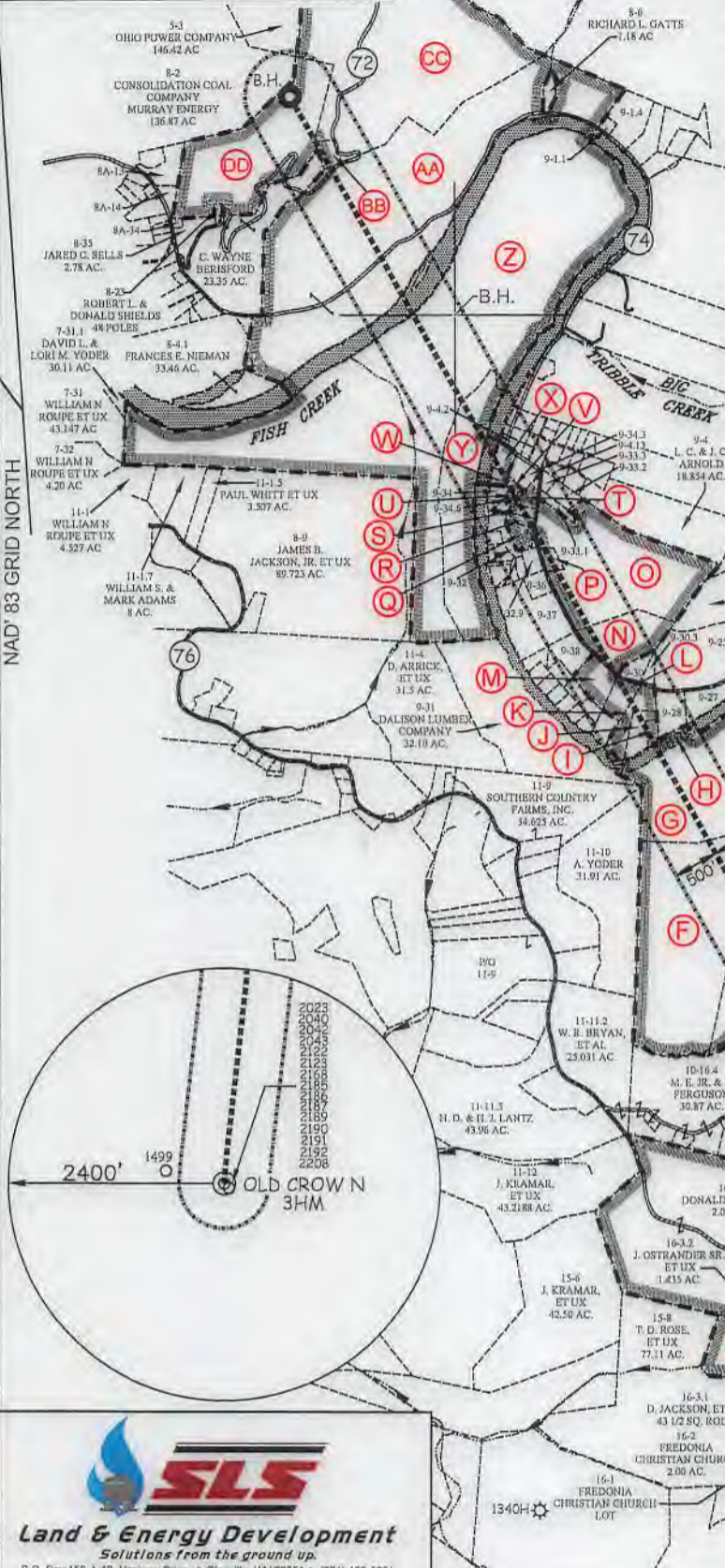
10,456' B.H.

3,691' T.H.

**OLD CROW N LEASE
WELL 3HM
TUG HILL OPERATING**

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

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	JOHN SWIERKOS	5-10-14	100.00
D	HERBERT M. AULENBACHER, JR.	5-10-3	225.50
E	WILLIAM A. PRASCIK, ET AL	5-10-2	52.00
F	ALVIN A. YODER	5-10-17	57.28
G	EDWIN C. MILLER	5-10-1	49.96
H	STATE OF WEST VIRGINIA (FISH CREEK)	N/A	N/A
I	JAMES E. & HARLEY J. MCDONOUGH	5-9-29.1	1.026
J	JAMES E. & HARLEY J. MCDONOUGH	5-9-29.2	2.807
K	JAMES M. & ROBERTA L. STERN	5-9-29	3.1777
L	DAVID JR. & MELISSA LOVE	5-9-30.1	2.518
M	SHIRLEY A. HILL ESTATE	5-9-40	368'x425'
N	DENNIS P. CADMUS	5-9-39	9.5
O	KEITH D. DANIELS, ET UX	5-9-33	40.331
P	DAVID D. & CHRISTINE S. DANIELS	5-9-33.4	1.025
Q	TIMOTHY Q. HOYT, ET UX	5-9-32.11	1.717
R	TIMOTHY Q. HOYT, ET UX	T.H. 5-9-32.10	0.588
S	TIMOTHY Q. HOYT, ET UX	5-9-32.8	0.711
T	GARNET D. MIDCAP	5-9-32.5	270'x390'
U	MILLARD BONETTE, ET UX	5-9-34.2	0.76
V	MILLARD BONETTE, JR., ET UX	5-9-34.5	0.444
W	LOUIS D. VAN SCYOC	5-9-34.1	0.556
X	LOUIS D. VAN SCYOC	5-9-34.4	1.042
Y	JAMES EDWARD FRANCIS, JR. ET UX	5-8-8	28.3
Z	EDWIN C. MILLER	5-8-7	180.31
AA	RICHARD L. GATTS - LIFE	5-8-5	98.819
BB	JOHN F. ARRUDA ET UX	5-5-4.1	1.399
CC	GENEVA BASSETT SANCHEZ	5-5-4	133.601
DD	TAMMY L. MITCHELL	5-8-3	35.07



CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	173.22'	14603.19'	N 03°57' E	173.22'
C2	156.67'	13488.40'	N 05°58' E	156.67'
C3	191.76'	612.79'	N 04°30' W	190.98'
C4	324.21'	1169.14'	N 21°34' W	323.17'

LINE	BEARING	DISTANCE
L1	N 63°33' E	1179.33'
L2	S 53°47' E	1229.87'

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(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)		
NAD'83 S.P.C.(FT)	N. 468,155.21	E. 1,613,507.73
NAD'83 GEO.	LAT-(N) 39.778473	LONG-(W) 80.763132
NAD'83 UTM (M)	N. 4,403,197.20	E. 520,284.19
LANDING POINT		
NAD'83 S.P.C.(FT)	N. 470,948.1	E. 1,613,625.0
NAD'83 GEO.	LAT-(N) 39.786144	LONG-(W) 80.762854
NAD'83 UTM (M)	N. 4,404,048.7	E. 520,305.7
BOTTOM HOLE		
NAD'83 S.P.C.(FT)	N. 482,841.4	E. 1,606,945.8
NAD'83 GEO.	LAT-(N) 39.818582	LONG-(W) 80.787226
NAD'83 UTM (M)	N. 4,407,838.0	E. 518,210.3



(+) 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)

SCALE	1" = 2000'	FILE NO.	8796P3HMR1R.dwg
			OLD CROW NORTH 3HM REV1
DATE	JUNE 22		20 18
REVISED	08/23/2018, 1/17/2019, 5/20/2019		
OPERATORS WELL NO.			OLD CROW N-3HM
API WELL NO.	47		
NO.	STATE	COUNTY	PERMIT

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

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

B.H. LONGITUDE 80°45'00"
T.H. LONGITUDE 80°45'00"
5,392' B.H.
4,806' T.H.

WW-6A1
(5/13)

Operator's Well No. Old Crow N-3HM

**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
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*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

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

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

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19340	5-16-3	A	DONNA V YOHO	GASTAR EXPLORATION USA INC	1/8+	665 407	N/A	N/A	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 LLC: 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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19673	5-10-14	C	CHESTNUT HOLDINGS INC	TH EXPLORATION LLC	1/8+	949 313	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19673	5-10-3	D	CHESTNUT HOLDINGS INC	TH EXPLORATION LLC	1/8+	949 313	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	WILLIAM A PRASCIK, A SINGLE MAN	TH EXPLORATION LLC	1/8+	936 547	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	CATHERINE A PRASCIK, A SINGLE WOMAN	TH EXPLORATION LLC	1/8+	936 549	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	LORI J PRASCIK, A SINGLE WOMAN	TH EXPLORATION LLC	1/8+	936 551	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	FRANCIS C PRASCIK, A MARRIED MAN DEALING IN HIS SOLE AND SEPARATE PROPERTY	TH EXPLORATION LLC	1/8+	943 535	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*18970	5-10-1	G	DONALD E BERISFORD	TH EXPLORATION LLC	1/8+	941 287	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19036	5-10-1	G	HAROLD W HOWARD JR	CHEVRON USA INC	1/8+	813 91	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19037	5-10-1	G	NEVELLE SEELEY	CHEVRON USA INC	1/8+	813 116	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19039	5-10-1	G	RALPH B RUSSELL MARY ANN RUSSELL	CHEVRON USA INC	1/8+	813 106	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19040	5-10-1	G	RUTHANNE RUSSELL TOPPING	CHEVRON USA INC	1/8+	813 79	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19041	5-10-1	G	CHERYL L HILL	CHEVRON USA INC	1/8+	813 101	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19043	5-10-1	G	JACK R BERISFORD LINDA JO BERISFORD	CHEVRON USA INC	1/8+	813 96	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19045	5-10-1	G	JOHN W MURDOCK HELEN CAROLINA MURDOCK	CHEVRON USA INC	1/8+	814 327	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19049	5-10-1	G	RUTH ANN FERRIS	CHEVRON USA INC	1/8+	814 313	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19050	5-10-1	G	LARRY F JEFFERSON CATHY L JEFFERSON	CHEVRON USA INC	1/8+	814 473	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19059	5-10-1	G	MARY VANESSA GILSON	CHEVRON USA INC	1/8+	815 464	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19060	5-10-1	G	ALYSIA JORDAN	CHEVRON USA INC	1/8+	815 135	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19503	5-10-1	G	FRANK DALE BERISFORD AND KATHLEEN BERISFORD	TH EXPLORATION LLC	1/8+	942 625	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19673	5-10-14	C	CHESTNUT HOLDINGS INC	TH EXPLORATION LLC	1/8+	949 313	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19673	5-10-3	D	CHESTNUT HOLDINGS INC	TH EXPLORATION LLC	1/8+	949 313	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	WILLIAM A PRASCIK, A SINGLE MAN	TH EXPLORATION LLC	1/8+	936 547	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	CATHERINE A PRASCIK, A SINGLE WOMAN	TH EXPLORATION LLC	1/8+	936 549	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	LORI J PRASCIK, A SINGLE WOMAN	TH EXPLORATION LLC	1/8+	936 551	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.260.0	5-10-2	E	FRANCIS C PRASCIK, A MARRIED MAN DEALING IN HIS SOLE AND SEPARATE PROPERTY	TH EXPLORATION LLC	1/8+	943 535	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 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	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*18970	5-10-1	G	DONALD E BERISFORD	TH EXPLORATION LLC	1/8+	941 287	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19036	5-10-1	G	HAROLD W HOWARD JR	CHEVRON USA INC	1/8+	813 91	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19037	5-10-1	G	NEVELLE SEELEY	CHEVRON USA INC	1/8+	813 116	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19039	5-10-1	G	RALPH B RUSSELL MARY ANN RUSSELL	CHEVRON USA INC	1/8+	813 106	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19040	5-10-1	G	RUTHANNE RUSSELL TOPPING	CHEVRON USA INC	1/8+	813 79	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19041	5-10-1	G	CHERYL L HILL	CHEVRON USA INC	1/8+	813 101	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19043	5-10-1	G	JACK R BERISFORD LINDA JO BERISFORD	CHEVRON USA INC	1/8+	813 96	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19045	5-10-1	G	JOHN W MURDOCK HELEN CAROLINA MURDOCK	CHEVRON USA INC	1/8+	814 327	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19049	5-10-1	G	RUTH ANN FERRIS	CHEVRON USA INC	1/8+	814 313	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19050	5-10-1	G	LARRY F JEFFERSON CATHY L JEFFERSON	CHEVRON USA INC	1/8+	814 473	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19059	5-10-1	G	MARY VANESSA GILSON	CHEVRON USA INC	1/8+	815 464	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19060	5-10-1	G	ALYSIA JORDAN	CHEVRON USA INC	1/8+	815 135	N/A	N/A	N/A	N/A	N/A	N/A	Chevron USA Inc to TH Exploration LLC: 40/127
10*19503	5-10-1	G	FRANK DALE BERISFORD AND KATHLEEN BERISFORD	TH EXPLORATION LLC	1/8+	942 625	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19610	5-10-1	G	BRENT BERISFORD AND JEAN MARIE COSTA	TH EXPLORATION LLC	1/8+	944	207	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22637	5-10-1	G	HOWARD T CONNER AND NANETTE CONNER	TH EXPLORATION LLC	1/8+	968	219	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22639	5-10-1	G	EDWIN MARK KNABENSHUE	TH EXPLORATION LLC	1/8+	968	217	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22640	5-10-1	G	JESSICA M CREMEANS	TH EXPLORATION LLC	1/8+	984	532	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22641	5-10-1	G	CHRISTOPHER STALEY & MICHAEL ANNE STALEY	TH EXPLORATION LLC	1/8+	968	221	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22772	5-10-1	G	BILLIE J STALEY III AND APRIL STALEY	TH EXPLORATION LLC	1/8+	970	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23040	5-10-1	G	MARY L WHITTINGTON	TH EXPLORATION LLC	1/8+	977	300	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23725	5-10-1	G	GRAYSVILLE CALVARY UNITED METHODIST	TH EXPLORATION LLC	1/8+	1011	550	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24072	5-10-1	G	MICHAEL L STEWART	TH EXPLORATION LLC	1/8+	1020	188	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24260	5-10-1	G	GREG STEWART	TH EXPLORATION LLC	1/8+	1020	352	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24511	5-10-1	G	DAVID W HALE JR	TH EXPLORATION LLC	1/8+	1024	260	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24512	5-10-1	G	GAYLE F BRITTON TRUST	TH EXPLORATION LLC	1/8+	1026	250	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24513	5-10-1	G	AARON M BROWN	TH EXPLORATION LLC	1/8+	1024	272	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24526	5-10-1	G	DAVID E BOWYER	TH EXPLORATION LLC	1/8+	1027	287	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24553	5-10-1	G	JOSH D AND LAUREN K HALE	TH EXPLORATION LLC	1/8+	1024	251	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24557	5-10-1	G	BETTY L KEAN	TH EXPLORATION LLC	1/8+	1024	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.1	5-10-1	G	EDWIN C MILLER AND KIMBERLY ANN MILLER	TH EXPLORATION LLC	1/8+	885	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.2	5-10-1	G	JANE S BLANEY	TH EXPLORATION LLC	1/8+	898	547	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.3	5-10-1	G	JOANNE SCHALL FOSTER	TH EXPLORATION LLC	1/8+	895	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.4	5-10-1	G	RAYMOND E SCHALL	TH EXPLORATION LLC	1/8+	898	550	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.5	5-10-1	G	FIRST CHRISTIAN CHURCH OF MOUNDSVILLE BY ROGER FRANCIS AND ROBERT ALBERT TRUSTEES	TH EXPLORATION LLC	1/8+	898	600	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*47051.127.6	5-10-1	G	BARBARA GODWIN AND CHARLES RODNEY GODWIN	TH EXPLORATION LLC	1/8+	902	419	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25617	5-10-1	G	GLEN DALE UNITED METHODIST CHURCH	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	1031	610	N/A	N/A	N/A	N/A	N/A	N/A	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/503
PENDING	5-10-1	G	FORREST O MILLER	HG ENERGY II APPALACHIA, LLC	1/8+	1029	581	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q091960000	FISH CREEK	H	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865	558	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*19572	5-9-29.1	I	DOUGLAS R BISHOP	TH EXPLORATION LLC	1/8+	943	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19608	5-9-29.1	I	CLIFFORD VAN SCYOC AND DENISE VAN SCYOC	TH EXPLORATION LLC	1/8+	953	252	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21478	5-9-29.1	I	CHILDRENS HOME SOCIETY OF WEST VIRGINIA	TH EXPLORATION LLC	1/8+	960	173	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18796	5-9-29.1	I	DWG OIL & GAS ACQUISITIONS LLC	TH EXPLORATION LLC	1/8+	938	476	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22547	5-9-29.1	I	LAWRENCE EDWARD MURPHY AND JOAN MARIE MURPHY	TH EXPLORATION LLC	1/8+	966	628	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22606	5-9-29.1	I	ROBERT B MURPHY AND LINDA MURPHY	TH EXPLORATION LLC	1/8+	966	469	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22636	5-9-29.1	I	CHANDA WILSON AND DANIEL WILSON	TH EXPLORATION LLC	1/8+	968	226	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17916	5-9-29.1	I	MARY E BISHOP	TH EXPLORATION LLC	1/8+	927	167	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18270	5-9-29.1	I	GERALD L BISHOP III	TH EXPLORATION, LLC	1/8+	943	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17512	5-9-29.1	I	BONNIE LOU POSTLEWAIT	TH EXPLORATION LLC	1/8+	917	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17530	5-9-29.1	I	WOODROW N WARD AND HILDA A WARD	TH EXPLORATION LLC	1/8+	916	208	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22044	5-9-29.1	I	MICHAEL A BISHOP	TH EXPLORATION LLC	1/8+	960	421	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22296	5-9-29.1	I	NOAH BAKER AND ALISA BAKER	TH EXPLORATION LLC	1/8+	962	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22407	5-9-29.1	I	BRADLEY MURPHY	TH EXPLORATION LLC	1/8+	962	575	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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10*19193	5-9-29.2	J	LARRY A GUMP	TRIENERGY HOLDINGS, LLC	1/8+	717 488	N/A	N/A	N/A	TriEnergy Holdings Inc to NPAR LLC: 24/430	NPAR LLC to Chevron USA Inc: 756/332	TriEnergy Holdings Inc & TriEnergy Inc to Chevron USA Inc: 28/356	Chevron USA Inc to TH Exploration LLC: 40/127
PENDING	5-9-29.2	J	SANDRA PARDINI AKA KATHERINE S PARDINI AND ALLEN F PARDINI	TH EXPLORATION LLC	1/8+	1031 540	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q090332007	5-9-29.2	J	ROBERT RANDOLPH WOODBURN ET UX	NOBLE ENERGY INC	1/8+	860 568	N/A	N/A	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
Q090332003	5-9-29.2	J	PATTY BERISFORD ET VIR	NOBLE ENERGY INC	1/8+	860 555	N/A	N/A	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
Q090332002	5-9-29.2	J	LORETTA JEAN RIGGLE ET VIR	NOBLE ENERGY INC	1/8+	860 538	N/A	N/A	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
10*17600	5-9-29.2	J	CARLA JO ALLEN AND KENNETH ALLEN	TH EXPLORATION LLC	1/8+	916 129	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17512	5-9-29	K	BONNIE LOU POSTLEWAIT	TH EXPLORATION LLC	1/8+	917 68	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17530	5-9-29	K	WOODROW N WARD AND HILDA A WARD	TH EXPLORATION LLC	1/8+	916 208	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17916	5-9-29	K	MARY E BISHOP	TH EXPLORATION LLC	1/8+	927 167	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18270	5-9-29	K	GERALD L BISHOP III	TH EXPLORATION, LLC	1/8+	943 10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18796	5-9-29	K	DWG OIL & GAS ACQUISITIONS LLC	TH EXPLORATION LLC	1/8+	938 476	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19193	5-9-29	K	LARRY A GUMP	TRIENERGY HOLDINGS, LLC	1/8+	717 488	N/A	N/A	N/A	TriEnergy Holdings Inc to NPAR LLC: 24/430	NPAR LLC to Chevron USA Inc: 756/332	TriEnergy Holdings Inc & TriEnergy Inc to Chevron USA Inc: 28/356	Chevron USA Inc to TH Exploration LLC: 40/127
10*19572	5-9-29	K	DOUGLAS R BISHOP	TH EXPLORATION LLC	1/8+	943 12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21478	5-9-29	K	CHILDRENS HOME SOCIETY OF WEST VIRGINIA	TH EXPLORATION LLC	1/8+	960 173	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21937	5-9-29	K	WHEELING SOCIETY FOR CRIPPLED CHILDREN JAY E PRAGER PRESIDENT	TH EXPLORATION LLC	1/8+	960 33	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22044	5-9-29	K	MICHAEL A BISHOP	TH EXPLORATION LLC	1/8+	960 421	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22296	5-9-29	K	NOAH BAKER AND ALISA BAKER	TH EXPLORATION LLC	1/8+	962 200	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22326	5-9-29	K	RACHEL SONDA AND SCOTT SONDA	TH EXPLORATION LLC	1/8+	962 532	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22407	5-9-29	K	BRADLEY MURPHY	TH EXPLORATION LLC	1/8+	962 575	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22430	5-9-29	K	DEBORAH VANVRANKEN	TH EXPLORATION LLC	1/8+	964 510	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22492	5-9-29	K	FAITH MARIE FREESTONE AND ERIC FREESTONE	TH EXPLORATION LLC	1/8+	972 50	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22547	5-9-29	K	LAWRENCE EDWARD MURPHY AND JOAN MARIE MURPHY	TH EXPLORATION LLC	1/8+	966 628	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22606	5-9-29	K	ROBERT B MURPHY AND LINDA MURPHY	TH EXPLORATION LLC	1/8+	966 469	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22636	5-9-29	K	CHANDA WILSON AND DANIEL WILSON	TH EXPLORATION LLC	1/8+	968 226	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23035	5-9-29	K	DEAN S CARR	TH EXPLORATION LLC	1/8+	977 364	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*23508	5-9-29	K	MICHAEL A MURPHY	TH EXPLORATION LLC	1/8+	1009 98	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24888	5-9-29	K	ARTHUR LEE MILLER ET AL	TH EXPLORATION LLC	1/8+	1027 187	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*24985	5-9-29	K	JONATHAN BAKER	TH EXPLORATION LLC	1/8+	1027 558	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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PENDING	5-9-29	K	SANDRA PARDINI AKA KATHERINE S PARDINI AND ALLEN F PARDINI	TH EXPLORATION LLC	1/8+	1031	540	N/A	N/A	N/A	N/A	N/A	N/A
10*17600	5-9-29	K	CARLA JO ALLEN AND KENNETH ALLEN	TH EXPLORATION LLC	1/8+	916	129	N/A	N/A	N/A	N/A	N/A	N/A
Q090332002	5-9-29	K	LORETTA JEAN RIGGLE ET VIR	NOBLE ENERGY INC	1/8+	860	538	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q090332003	5-9-29	K	PATTY BERISFORD ET VIR	NOBLE ENERGY INC	1/8+	860	555	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q090332007	5-9-29	K	ROBERT RANDOLPH WOODBURN ET UX	NOBLE ENERGY INC	1/8+	860	568	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
10*21547	5-9-30.1	L	GARY A MILLER AND MARCELLE T MILLER	TH EXPLORATION LLC	1/8+	952	370	N/A	N/A	N/A	N/A	N/A	N/A
10*21548	5-9-30.1	L	JEANNE M MILLER	TH EXPLORATION LLC	1/8+	952	386	N/A	N/A	N/A	N/A	N/A	N/A
10*21719	5-9-30.1	L	ROBERT A MILLER	TH EXPLORATION LLC	1/8+	952	389	N/A	N/A	N/A	N/A	N/A	N/A
10*22566	5-9-30.1	L	KENNETH A MILLER	TH EXPLORATION LLC	1/8+	964	233	N/A	N/A	N/A	N/A	N/A	N/A
CVX935271	5-9-30.1	L	CHARLES W. MILLER AND ESTHER JEAN MILLER	CHEVRON USA INC	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935273	5-9-30.1	L	PAUL PARSONS ET UX	CHEVRON USA INC	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935276	5-9-30.1	L	SHARON LYN RUSSELL	CHEVRON USA INC	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX935969	5-9-30.1	L	TIMOTHY HUFF ET UX	CHEVRON USA INC	1/8+	864	47	N/A	N/A	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
CVX936053	5-9-30.1	L	LLOYD C. ARNOLD ET UX	CHEVRON USA INC	1/8+	864	39	N/A	N/A	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
CVX936054	5-9-30.1	L	MARY JO CRONIN	CHEVRON USA INC	1/8+	864	43	N/A	N/A	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
CVX936058	5-9-30.1	L	RICHARD KURPIL ET UX	CHEVRON USA INC	1/8+	863	594	N/A	N/A	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
CVX936061	5-9-30.1	L	CLARA MAE CLIFTON	CHEVRON USA INC	1/8+	853	426	N/A	N/A	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
CVX936062	5-9-30.1	L	GEORGE EDWARDS ET UX	CHEVRON USA INC	1/8+	853	418	N/A	N/A	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
CVX936112	5-9-30.1	L	DONNA FAE KYLE	CHEVRON USA INC	1/8+	853	449	N/A	N/A	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

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CVX936113	5-9-30.1	L	JUDITH MAY CONNER	CHEVRON USA INC	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX866958	5-9-30.1	L	ANITA L. SLOUGH AND WILLIAM O. JOBES	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX866959	5-9-30.1	L	PAUL SCHEIBELHOOD ET AL	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX866958	5-9-40	M	CHARLES W. MILLER AND ESTHER JEAN MILLER	CHEVRON USA INC	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX866959	5-9-40	M	PAUL PARSONS ET UX	CHEVRON USA INC	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX935271	5-9-40	M	SHARON LYN RUSSELL	CHEVRON USA INC	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX935273	5-9-40	M	TIMOTHY HUFF ET UX	CHEVRON USA INC	1/8+	864	47	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154

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CVX935276	5-9-40	M	LLOYD C. ARNOLD ET UX	CHEVRON USA INC	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-40	M	MARY JO CRONIN	CHEVRON USA INC	1/8+	864	43	N/A	N/A	RECEIVED Office of Oil and Gas JUN 20 2019 WV Department of Environmental Protection	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-40	M	RICHARD KURPIL ET UX	CHEVRON USA INC	1/8+	863	594	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-40	M	CLARA MAE CLIFTON	CHEVRON USA INC	1/8+	853	426	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-40	M	GEORGE EDWARDS ET UX	CHEVRON USA INC	1/8+	853	418	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-40	M	DONNA FAE KYLE	CHEVRON USA INC	1/8+	853	449	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-40	M	JUDITH MAY CONNER	CHEVRON USA INC	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936112	5-9-40	M	ANITA L. SLOUGH AND WILLIAM O. JOBES	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	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
CVX936113	5-9-40	M	PAUL SCHEIBELHOOD ET AL	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	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
CVX935271	5-9-39	N	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	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
CVX935273	5-9-39	N	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	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
CVX935276	5-9-39	N	SHARON LYN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	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
CVX935969	5-9-39	N	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	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
CVX936053	5-9-39	N	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	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

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CVX936054	5-9-39	N	MARY JO CRONIN	CHEVRON U.S.A., INC.	1/8+	864	43	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CVX936058	5-9-39	N	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863	594	N/A	N/A	RECEIVED Office of Oil and Gas JUN 20 2019 WV Department of Environmental Protection	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CVX936061	5-9-39	N	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853	426	N/A	N/A		N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX936062	5-9-39	N	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853	418	N/A	N/A		N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154
CVX936112	5-9-39	N	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853	449	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CVX936113	5-9-39	N	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/154	
CVX866959	5-9-39	N	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286 Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	

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CVX866958	5-9-39	N	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
PENDING	5-9-33	O	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1034 626	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PENDING	5-9-33.4	P	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1034 626	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CVX935271	5-9-32.11	Q	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853 59	N/A	N/A	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
CVX935273	5-9-32.11	Q	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853 430	N/A	N/A	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
CVX935276	5-9-32.11	Q	SHARON LYN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853 422	N/A	N/A	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
CVX935969	5-9-32.11	Q	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864 47	N/A	N/A	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
CVX936053	5-9-32.11	Q	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864 39	N/A	N/A	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
CVX936054	5-9-32.11	Q	MARY JO CRONIN	CHEVRON U.S.A., INC.	1/8+	864 43	N/A	N/A	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

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
CVX936058	5-9-32.11	Q	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863 594	N/A	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-32.11	Q	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853 426	N/A	N/A	RECEIVED Office of Oil and Gas JUN 20 2019 WV Department of Environmental Protection	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CVX936062	5-9-32.11	Q	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853 418	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CVX936112	5-9-32.11	Q	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 449	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CVX936113	5-9-32.11	Q	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853 445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286	
CVX866959	5-9-32.11	Q	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-32.11	Q	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX935271	5-9-32.10	R	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935273	5-9-32.10	R	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	RECEIVED Office of Oil and Gas JUN 20 2019 WV Department of Environmental Protection	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935276	5-9-32.10	R	SHARON LYN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-32.10	R	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	N/A	N/A		N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-32.10	R	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-32.10	R	MARY JO CRONIN	CHEVRON U.S.A., INC.	1/8+	864	43	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-32.10	R	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863	594	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936061	5-9-32.10	R	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853	426	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-32.10	R	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853	418	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936112	5-9-32.10	R	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853	449	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936113	5-9-32.10	R	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853	445	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866959	5-9-32.10	R	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-32.10	R	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935271	5-9-32.8	S	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX935273	5-9-32.8	S	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935276	5-9-32.8	S	SHARON LYN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-32.8	S	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-32.8	S	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-32.8	S	MARY JO CRONIN	CHEVRON U.S.A., INC.	1/8+	864	43	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-32.8	S	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863	594	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-32.8	S	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853	426	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936062	5-9-32.8	S	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853	418	N/A	N/A	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
CVX936112	5-9-32.8	S	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853	449	N/A	N/A	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
CVX936113	5-9-32.8	S	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853	445	N/A	N/A	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
CVX866959	5-9-32.8	S	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695	629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-32.8	S	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696	7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156 Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935271	5-9-32.5	T	CHARLES W. MILLER AND ESTHER JEAN MILLER, HUSBAND AND WIFE	CHEVRON U.S.A., INC.	1/8+	853	59	N/A	N/A	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
CVX935273	5-9-32.5	T	PAUL PARSONS ET UX	CHEVRON U.S.A., INC.	1/8+	853	430	N/A	N/A	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

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CVX935276	5-9-32.5	T	SHARON LYN RUSSELL	CHEVRON U.S.A., INC.	1/8+	853	422	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX935969	5-9-32.5	T	TIMOTHY HUFF ET UX	CHEVRON U.S.A., INC.	1/8+	864	47	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936053	5-9-32.5	T	LLOYD C. ARNOLD ET UX	CHEVRON U.S.A., INC.	1/8+	864	39	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936054	5-9-32.5	T	MARY JO CRONIN	CHEVRON U.S.A., INC.	1/8+	864	43	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936058	5-9-32.5	T	RICHARD KURPIL ET UX	CHEVRON U.S.A., INC.	1/8+	863	594	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936061	5-9-32.5	T	CLARA MAE CLIFTON	CHEVRON U.S.A., INC.	1/8+	853	426	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX936062	5-9-32.5	T	GEORGE EDWARDS ET UX	CHEVRON U.S.A., INC.	1/8+	853	418	N/A	N/A				Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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CVX936112	5-9-32.5	T	DONNA FAE KYLE	CHEVRON U.S.A., INC.	1/8+	853 449	N/A	N/A	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
CVX936113	5-9-32.5	T	JUDITH MAY CONNER	CHEVRON U.S.A., INC.	1/8+	853 445	N/A	N/A	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
CVX866959	5-9-32.5	T	PAUL SCHEIBELHOOD AND DELORIS LEE SCHEIBELHOOD, HUSBAND AND WIFE, AND GEORGE FRANKLIN MINOR, A SINGLE MAN	AB RESOURCES LLC	1/8+	695 629	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/484	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to HG Energy II Appalachia LLC: 41/155	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
CVX866958	5-9-32.5	T	ANITA L SLOUGH, A SINGLE WOMAN, AND WILLIAM O JOBES, A SINGLE MAN	AB RESOURCES LLC	1/8+	696 7	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/485	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/2	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/106	AB Resources LLC to NPAR LLC: 25/485	NPAR LLC to Chevron USA: 756/333	Chevron USA Inc to HG Energy II Appalachia LLC: 41/156	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q078775000	5-9-34.2	U	MILLARD BONNETTE JR AND SANDRA J BONNETTE	NOBLE ENERGY INC	1/8+	810 70	N/A	N/A	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
Q078775000	5-9-34.5	V	MILLARD BONNETTE JR AND SANDRA J BONNETTE	NOBLE ENERGY INC	1/8+	810 70	N/A	N/A	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
10*26004	5-9-34.1	W	VAN SCYOC LOUIS ET UX	AB RESOURCES LLC	1/8+	697 461	N/A	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/382	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to TH Exploration LLC: 43/95

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 IN THE COUNTY OF...

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10*26004	5-9-34.4	X	VAN SCYOC LOUIS ET UX	AB RESOURCES LLC	1/8+	697	461	N/A	AB Resources LLC to Chief Exploration & Development LLC & Radler 2000 LP: 24/382	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/1	Chief Exploration & Development LLC, Radler 2000, & Enerplus Resources Corp to Chevron USA Inc: 25/105	AB Resources LLC to NPAR LLC: 25/484	NPAR LLC to Chevron USA: 756/332	Chevron USA Inc to TH Exploration LLC: 43/95
10*25487	5-8-8	Y	STONE HILL MINERALS HOLDINGS LLC	TH EXPLORATION LLC	1/8+	1031	538	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*25370	5-8-8	Y	JAMES EDWARD & LAURA J FRANCIS	TH EXPLORATION LLC	1/8+	1030	377	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21546	5-8-7	Z	EDWIN C MILLER AND KIMBERLY ANN MILLER	TH EXPLORATION LLC	1/8+	957	257	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CVX946510	5-8-5	AA	NICOLE GATTS-SFX	CHEVRON U.S.A., INC	1/8+	899	470	N/A	N/A	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	AA	RICHARD J. GATTS	CHEVRON USA INC	1/8+	899	479	N/A	N/A	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	AA	LOIS ZWOLENSKY-SFX	CHEVRON U.S.A., INC	1/8+	899	476	N/A	N/A	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
CVX920045	5-5-4.1	BB	GENEVA BASSETT SANCHEZ AKA GENEVA A BASSETT SANCHEZ	CHEVRON U.S.A., INC	1/8+	813	593	N/A	N/A	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
Q086805001	5-5-4.1	BB	ROGER B ROSE ET UX	NOBLE ENERGY INC	1/8+	841	358	N/A	N/A	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

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
Q086805002	5-5-4.1	BB	MARY E BASSETT	NOBLE ENERGY INC	1/8+	841 362	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805003	5-5-4.1	BB	RUTH ANN WALLACE ET VIR	NOBLE ENERGY INC	1/8+	841 364	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805004	5-5-4.1	BB	CHARLES HOWARD BASSETT JR ET UX	NOBLE ENERGY INC	1/8+	842 1	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805005	5-5-4.1	BB	RUTH E BASSETT MEADOWS ET VIR	NOBLE ENERGY INC	1/8+	842 38	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805006	5-5-4.1	BB	ROBERT B THOMAS ET UX	NOBLE ENERGY INC	1/8+	842 28	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805007	5-5-4.1	BB	ELIZABETH A STRAUSBAUGH ET VIR	NOBLE ENERGY INC	1/8+	841 370	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286
Q086805008	5-5-4.1	BB	CYNTHIA P HOPKINS REVOCABLE TRUST UTA	NOBLE ENERGY INC	1/8+	841 366	N/A	N/A	N/A	N/A	N/A	Memorandum of Operating Agreement between TH Exploration LLC and HG Energy II Appalachia, LLC: 988/286

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DPS LAND SERVICES CORP
6000 TOWN CENTER BOULEVARD, SUITE 145
CANDONSBURG PA 15317-5841

BOOK 0040 PAGE 0057

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.

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2019
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MICHAEL MORAN
BRIGHTON RESOURCES
5851 ELLSWORTH AVENUE, #1
PITTSBURGH PA 15232-1707

4705102226
BOOK:040 PAGE 0127

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

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COPY

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1453305
04/24/2019 @ 11:51:22 AM
ASSIGNMENTS
Book 43 @ Page 503
Pages Recorded 10
Recording Cost \$ 17.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 23rd day of April, 2019 (the "Effective Date"), by and between AMERICAN PETROLEUM PARTNERS OPERATING, LLC, (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 November 15, 2018 (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-2, attached hereto and made a part hereof (hereinafter the "Leases"); and

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

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

1. Assignment. Assignor does hereby grant, bargain, sell, convey, deliver, assign, set over and transfer, as of the Effective Date, to Assignee, its respective successors and assigns, forever, all of Assignor's right, title and interest in and to the Leases, and the lands covered thereby, together with all rights incident thereto and appurtenances thereon.

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

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

Assignor represents and warrants that Assignor has paid any and all bonuses, rentals, royalties, overriding royalties, and other payments required by the Leases which were due for the period in which Assignor held its interests in the Leases, and that Assignor has fully performed all conditions necessary to maintain the Leases in full force and effect during such period, free and clear of all Encumbrances, except for and subject only to Permitted Encumbrances.

3. Successors and Assigns. The terms of this Assignment shall be binding upon and inure to the benefit of the parties hereto and each of their respective successors

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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.

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April 26, 2019

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

RE: Old Crow N-3HM

Subject: Marshall County Route 72 and County Route 74 Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Marshall County Route 72 and 74 in the area reflected on the Old Crow N-3HM well plat. THO has conducted a full title search in the relevant Court House to confirm its ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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

Sincerely,

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

Amy Miller
Permit Specialist – Appalachia Region
Cell 304-376-0111
Email: amiller@tug-hilop.com

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

Date of Notice Certification: 04/24/2019

API No. 47- 051 -

Operator's Well No. Old Crow N-3HM

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>520,284.19</u>
County: <u>Marshall</u>	Northing: <u>4,403,197.20</u>
District: <u>Franklin</u>	Public Road Access: <u>Rines Ridge Road (CR 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 checked="" type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED NOT REQUIRED</p> <p align="center">MAY 22 2019</p> <p align="center">WV Department of Environmental Protection</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p>
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Required Attachments:

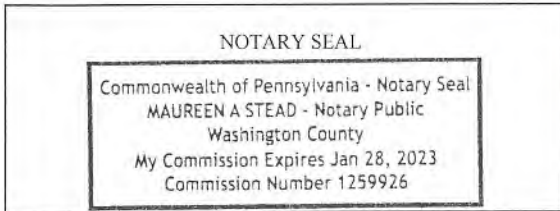
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication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

WW-6AC
(1/12)

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 24 day of APRIL, 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.

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WW-6A
(9-13)

API NO. 47- 051 -
OPERATOR WELL NO. Old Crow N-3HM
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: 3/10/2019 Date Permit Application Filed: 3/20/2019

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.

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WV Department of Environmental Protection

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to: MAY 22 2019

SURFACE OWNER(s)
Name: Donna Yoho
Address: 3682 Rines Ridge Road
Proctor, WV 26055
Name: _____
Address: _____

COAL OWNER OR LESSEE
Name: Consol Energy, Inc. Leatherwood, Inc. Attn: Casey Samire
Address: 1000 CONSOL Energy DRive
Canonsburg, PA 15317
 COAL OPERATOR
Name: _____
Address: _____

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

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

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

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

*Please attach additional forms if necessary

4705102226

WW-6A
(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-3HM
Well Pad Name: Old Crow

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

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WW-6A
(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-3HM
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, cooperating with the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

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

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

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

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(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-3HM
Well Pad Name: Old Crow

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.

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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.

WW-6A
(8-13)

4705102226

API NO. 47-051 -
OPERATOR WELL NO. Old Crow N-3HM
Well Pad Name: Old Crow

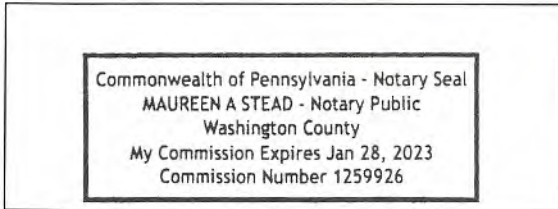
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilltop.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 11 day of MARCH, 2019.

Maureen A Stead Notary Public

My Commission Expires 1/28/23

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Exhibit WW-6A

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

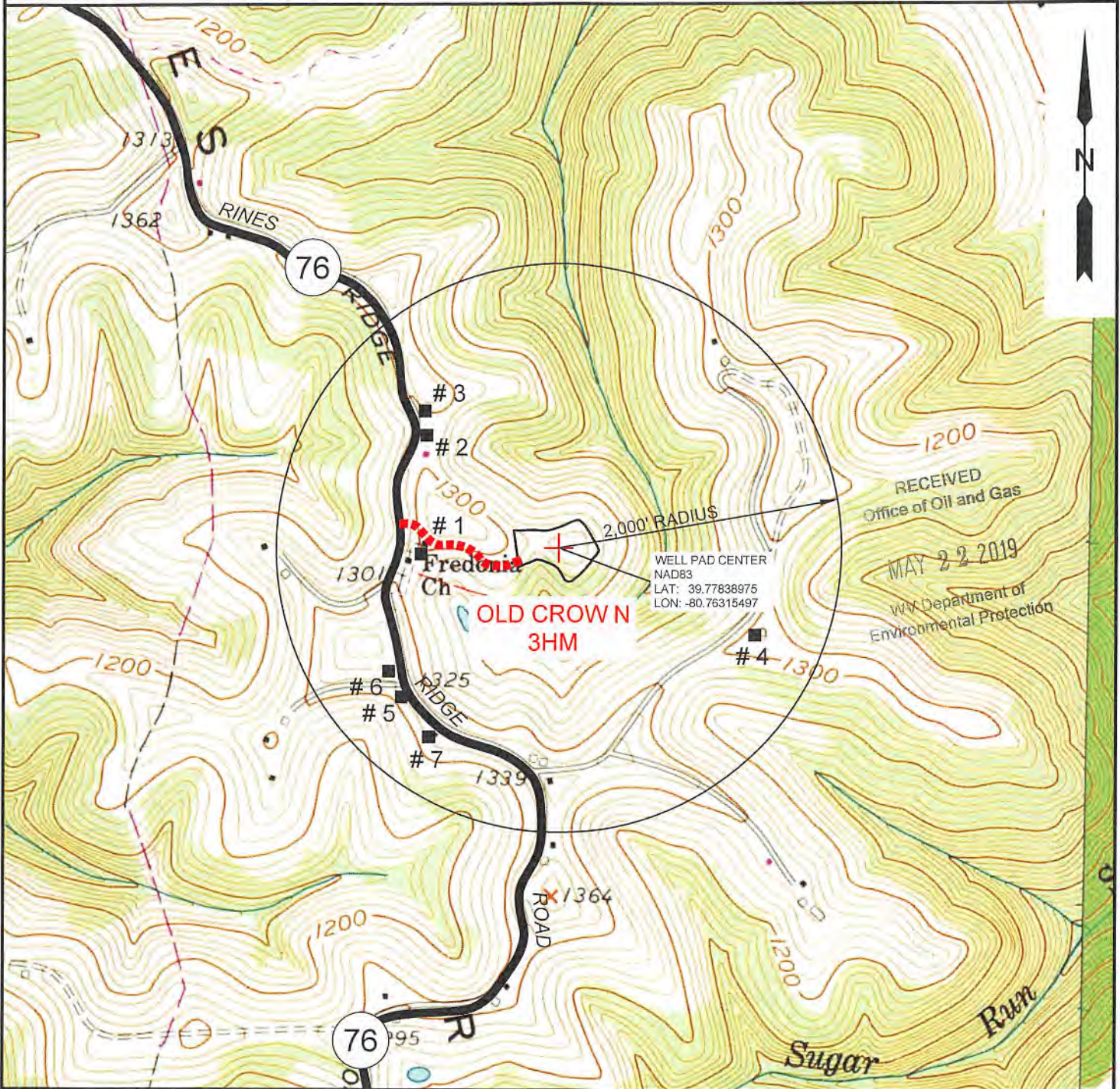
Residences within Two-Thousand Feet (2,000')

Well: Old Crow N – 3HM
 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>		

PROPOSED OLD CROW N - 3HM



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

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

TOPO SECTION:		OPERATOR:	
GLEN EASTON & 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'

TUG HILL
OPERATING

WW-6A3
(1/12)

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: West Virginia
 County: Marshall
 District: Franklin
 Quadrangle: Powhatan Point 7.5'

Approx. Latitude & Longitude: 39.7784004; -80.7631353
 Public Road Access: Rines Ridge Road (County Route 76)
 Watershed: Trubutary of Fish Creek (HUC 10)
 Generally used farm name: Donna Yoho

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

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

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.

WW-6A5
(1/12)

Operator Well No. Old Crow N-3HM

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: 03/12/2019

Date Permit Application Filed: 03/20/2019

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

Name: _____

Address: _____

Notice is hereby given:

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

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>520,284.19</u>
County:	<u>Marshall</u>		Northing:	<u>4,403,197.20</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>Donna Yoho</u>	
Watershed:	<u>Tributary of Fish Creek (HUC 10)</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Tug Hill Operating, LLC

Telephone: 724-749-8388

Email: amiller@tug-hillop.com

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.

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MAY 22 2019

Environmental Protection

WV Department of Environmental Protection

www.dep.wv.gov



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Byrd E. White, III
Secretary of Transportation

May 6, 2019

Jimmy Wriston, P. E.
Deputy Secretary/
Acting 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-3HM 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: Amy Miller
Tug Hill Operating, LLC
CH, OM, D-6
File

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MAY 20 2019
WV Department of
Environmental Protection



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Old Crow N-3HM

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

WEST VIRGINIA COUNTY MAP



**WVDEP OOG
ACCEPTED AS-BUILT**

NAD 3/4/2019

Old Crow Well Site

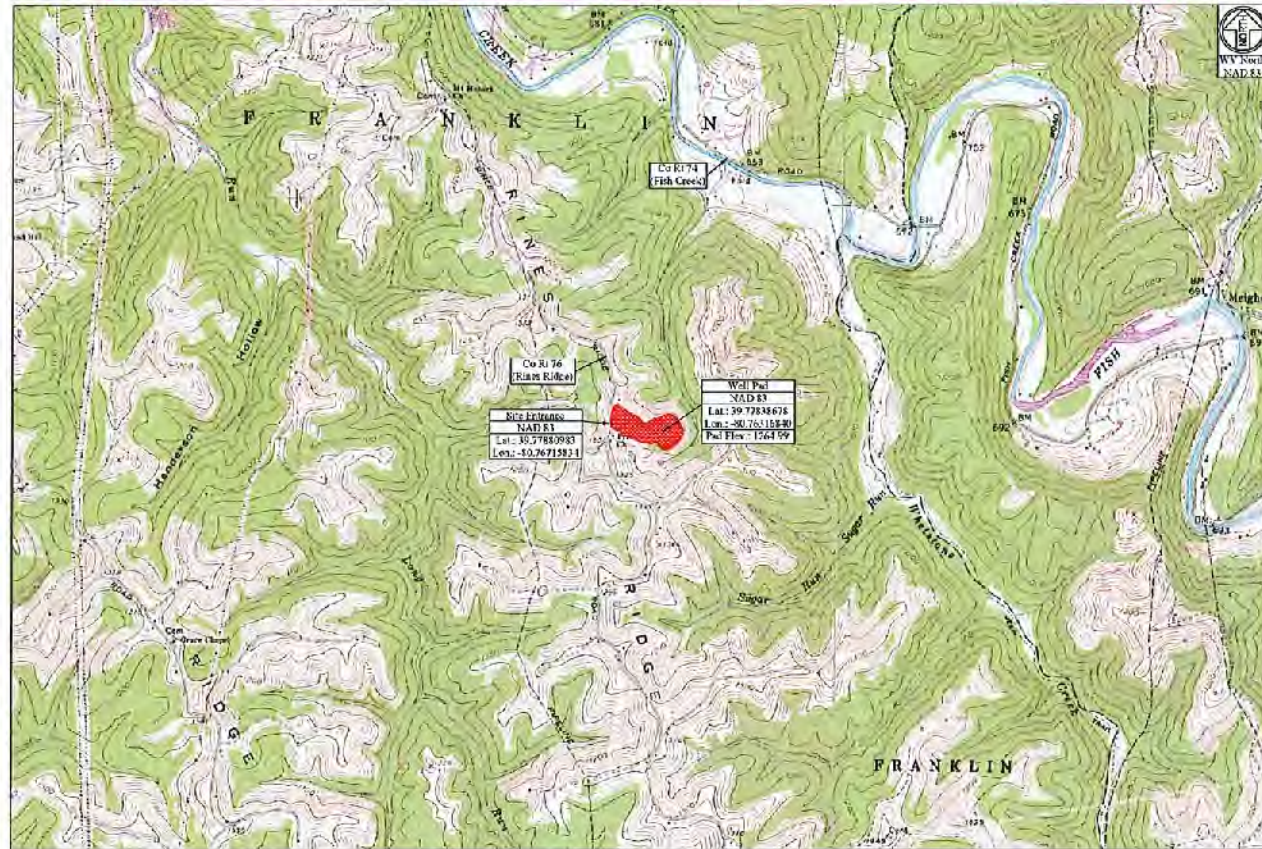
Site Design, Construction Plan, &
Erosion and Sediment Control Plans
Tug Hill Operating
Marshall County
Franklin District
Latitude 39.77838678°
Longitude -80.76316840°
Lower Fish Creek Watershed

Pertinent Site Information
Old Crow Well Site
Emergency Number: 304-845-1920
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	TM	Foot	Well	Access Road	Topsoil	Excav	Adq. Clearing	Total Disturbed
Dwain Yoho	16.3	6.64	1.71	1.91	5.92		19.18	
Site Total (Ac)	6.64	1.71	1.91	5.92	19.18			

Exhibit A: Site As-Built



WV State Plane Coordinate System
North Zone, NAD 83
Elevations Based on NAVD83
Established By Survey Grade GPS
and OPUS Post Processing

Access Road

Surface Owner	TM	Foot	Well	Access Road	Topsoil	Excav	Adq. Clearing	Total Disturbed
Dwain Yoho	16.3	6.64	1.71	1.91	5.92		19.18	

Disturbed Area

Well Pad Construction	6.51 Ac
Access Road Construction	1.71 Ac
Topsoil Excess Material	1.91 Ac
Additional Clearing	1.92 Ac
Total Disturbed Area	19.18 Ac

Additional Information

Total Disturbed Area Excluded	0.59 Ac
Total Disturbed Area	19.18 Ac

Old Crow Well Site Quantities

Description	Quantity	Unit	Remarks
Well Pad	35,413.87	Sq. Ft.	1.71 Ac
Access Road	8,492.11	Sq. Ft.	0.19 Ac
Topsoil Excess Material Storage	0.00	Cu. Yd.	N/A
Totals	63,905.98	Sq. Ft.	2.90 Ac

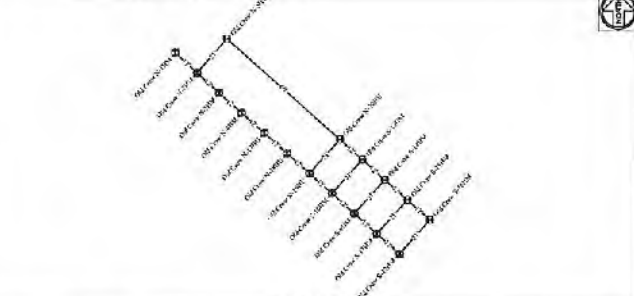
EXISTING API NUMBERS

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

ju
2/20/19

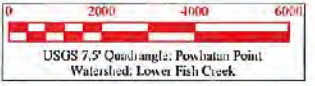
Site Entrance

WV-NAD 83 E: 408183.78	WV-NAD 83 E: 408183.78
WV-NAD 83 E: 151277.51	WV-NAD 83 E: 151277.51
WV-NAD 83 E: 408257.51	WV-NAD 83 E: 408257.51
WV-NAD 83 E: 143815.36	WV-NAD 83 E: 143815.36
UTM 17 NAD 83 E: 51999.28	UTM 17 NAD 83 E: 51999.28

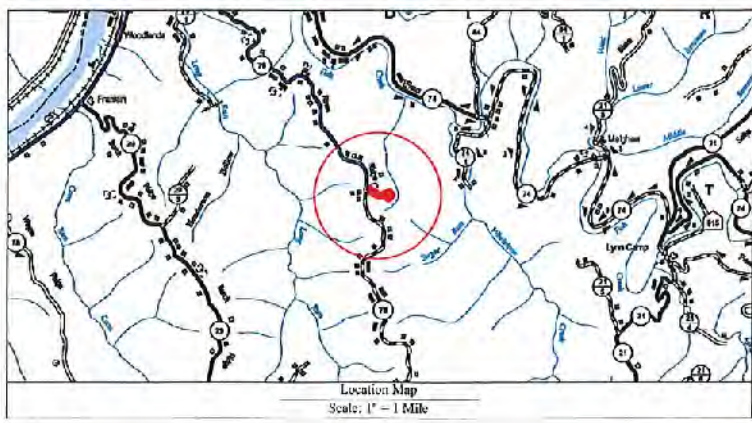


Well Pads

Well Pad	Structure	Latitude (DD)	Longitude (DD)
OH-Crow-2-001	Well Pad	39.77838678	-80.76316840
OH-Crow-2-002	Well Pad	39.77838678	-80.76316840
OH-Crow-2-003	Well Pad	39.77838678	-80.76316840
OH-Crow-2-004	Well Pad	39.77838678	-80.76316840
OH-Crow-2-005	Well Pad	39.77838678	-80.76316840
OH-Crow-2-006	Well Pad	39.77838678	-80.76316840
OH-Crow-2-007	Well Pad	39.77838678	-80.76316840
OH-Crow-2-008	Well Pad	39.77838678	-80.76316840
OH-Crow-2-009	Well Pad	39.77838678	-80.76316840
OH-Crow-2-010	Well Pad	39.77838678	-80.76316840
OH-Crow-2-011	Well Pad	39.77838678	-80.76316840
OH-Crow-2-012	Well Pad	39.77838678	-80.76316840
OH-Crow-2-013	Well Pad	39.77838678	-80.76316840
OH-Crow-2-014	Well Pad	39.77838678	-80.76316840
OH-Crow-2-015	Well Pad	39.77838678	-80.76316840
OH-Crow-2-016	Well Pad	39.77838678	-80.76316840
OH-Crow-2-017	Well Pad	39.77838678	-80.76316840
OH-Crow-2-018	Well Pad	39.77838678	-80.76316840
OH-Crow-2-019	Well Pad	39.77838678	-80.76316840
OH-Crow-2-020	Well Pad	39.77838678	-80.76316840
OH-Crow-2-021	Well Pad	39.77838678	-80.76316840
OH-Crow-2-022	Well Pad	39.77838678	-80.76316840
OH-Crow-2-023	Well Pad	39.77838678	-80.76316840
OH-Crow-2-024	Well Pad	39.77838678	-80.76316840
OH-Crow-2-025	Well Pad	39.77838678	-80.76316840
OH-Crow-2-026	Well Pad	39.77838678	-80.76316840
OH-Crow-2-027	Well Pad	39.77838678	-80.76316840
OH-Crow-2-028	Well Pad	39.77838678	-80.76316840
OH-Crow-2-029	Well Pad	39.77838678	-80.76316840
OH-Crow-2-030	Well Pad	39.77838678	-80.76316840



Site Locations (NAD 27)			Site Locations (NAD 83)		
Structure	Latitude (DD)	Longitude (DD)	Structure	Latitude (DD)	Longitude (DD)
Site Entrance	39.77838678	-80.76316840	Site Entrance	39.77838678	-80.76316840
Center of Well Pad	39.77838678	-80.76316840	Center of Well Pad	39.77838678	-80.76316840



- Well Location Restrictions**
- All land and construction complies with the following restrictions:
 - 1250' from an existing well or developed spring used for human or domestic animals.
 - 625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy inventory from the center of the pad.
 - 100' from the edge of a disturbance to wetlands, perennial streams, natural or artificial lake, pond or reservoir.
 - 500' from the edge of a disturbance to a naturally reproducing trout stream.
 - 41,600' of a surface or ground water intake to a public water supply.
- (Well Location Restrictions of WV Code 22-6-12)

As-Built Construction

Zachary C. Summers
Professional Engineer
No. 22214
State of West Virginia
CVA 0022214

Date: 02/20/19

Project Contacts

Tug Hill Operating
Jonathan White - Regulatory Analyst
724-853-2000 Cell, 304-649-7675 Cell
Gail Butler - V.P. Production
817-632-5200 Cell

Survey and Engineer
Kewell Kelly
304-338-6515 Cell
John P. Siz
304-447-0220 Cell
Zachary Summers
304-338-6787 Cell

Environmental:
Weed & Defoliant as provided by Alliant Ecology dated November 6, 2017

Toxicologic Information:
The toxicologic information provided is based on aerial photography by Dins Mountain Aerial Mapping, Burns, WV

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

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

The WV Mines Website was consulted. Previous (Current) mining activities are not within the ADO.

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

Floodplain Conditions

Do site construction activities take place in a floodplain?	NO
Permit needed from county floodplain coordinator?	NO
Flood Hazard Zone?	N/A
Flood Hazard Study completed?	N/A
Floodplain shown on drawings?	N/A
FIRM Map Number(s) for site?	5001C0413E
Average of construction in floodplain?	N/A

TUG HILL
OPERATING

THIS DOCUMENT PREPARED FOR
TUG HILL OPERATING

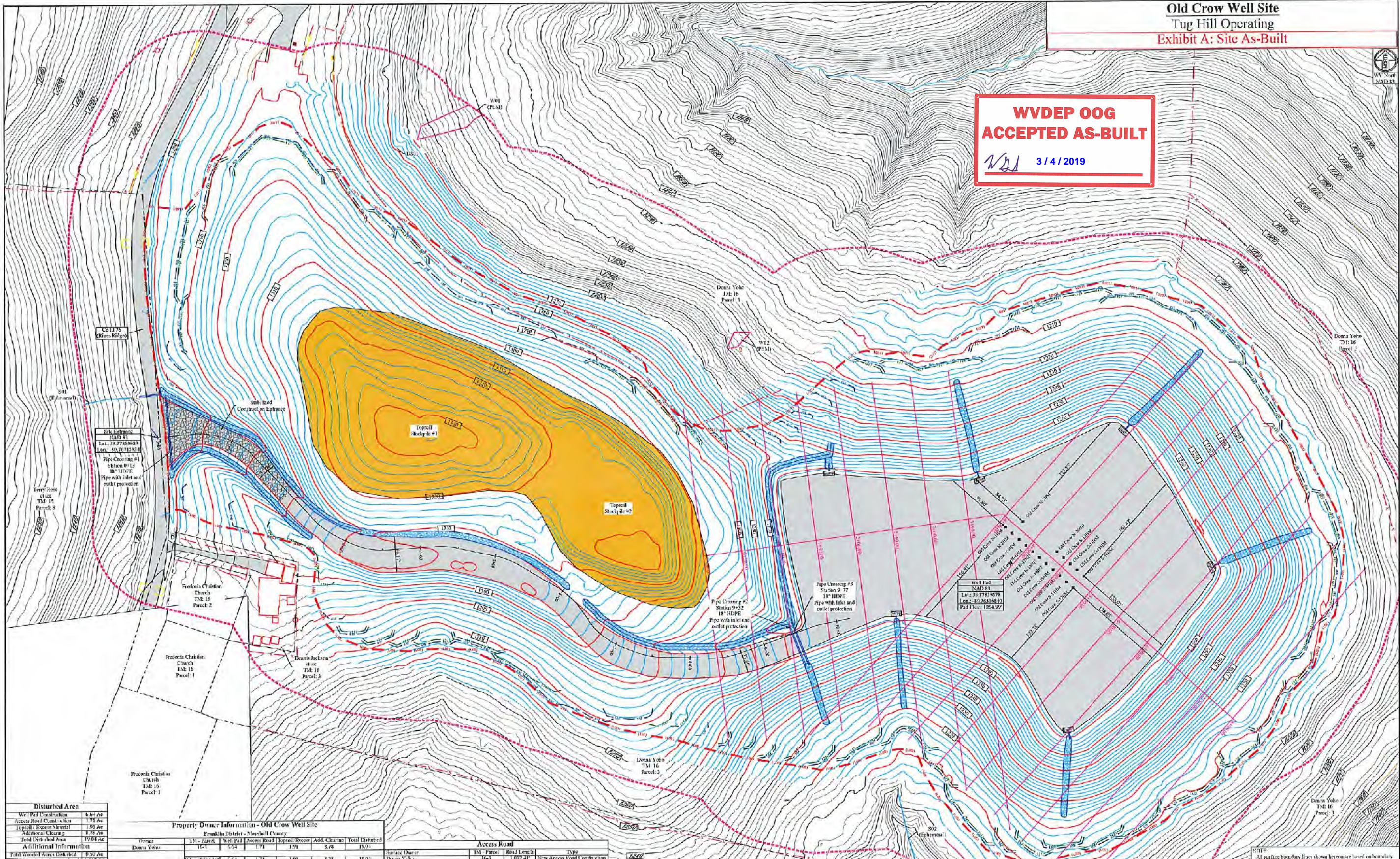
Kelly Surveying
Professional Surveyors
304-338-6787

Cover Sheet
Old Crow Well Site
Franklin District
Marshall County, WV

Date: 02/20/19
Scale: As Shown
Designed By: ZS
File No.
Sheet 1 of 9

**WVDEP OOG
ACCEPTED AS-BUILT**

VJL 3/4/2019



Disturbed Area

Well Pad Construction	6.64 Ac
Access Road Construction	1.74 Ac
Topsoil Stockpile	1.09 Ac
Site Preparation	8.78 Ac
Total Disturbed Area	19.04 Ac

Additional Information

Total Wooded Area Disturbed	0.39 Ac
Total Linear Foot of Access Road	1,017.41'

Property Owner Information - Old Crow Well Site

Owner	1st Parcel	Well Pad	Access Road	Topsoil Stockpile	Area	Clearing	Total Disturbed
Dennis Yoho	16-1	6/6	1/7	1/9	8.48	19.04	

Access Road

TM Parcel	Road Length	Type
16-1	1,017.41'	New Access Road Construction



Legend

- Original Ground 2' Contour
- Original Ground 10' Contour
- As-Built 2' Contour
- As-Built 10' Contour
- Center of Structure
- 12" Waifu
- 24" Compact Filter Sock
- 8" Sp. 60" Fence
- Line of Disturbance
- Area of Interest
- Existing Gas Line
- Existing Utility Pick-Up
- Drain E
- Existing Fence
- PFM Wetland
- OTW Wetland
- OTW Well Pad
- Perennial Stream
- Intermittent Stream
- Epifaunal Stream
- Stream Check Dam
- Head Loss Ditch

NOT: All surface boundary lines shown herein are based on boundary evidence collected with mapping grade GPS receivers.

TUG HILL OPERATING

THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

Kelly Surviving

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

Date: 02/28/2018
Scale: As Shown
Drawn By: JZS
File No:
Sheet 5 of 9