



west virginia department of environmental protection

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

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

Friday, November 2, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD
CANONSBURG, PA 15317

Re: Permit Modification Approval for BRYAN N-3HM
47-051-02000-00-00

Extend bottom hole with lease(s) updated

TUG HILL OPERATING, LLC

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

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

A blue ink signature of James A. Martin, Chief, is written over a white background. The signature is cursive and stylized.

James A. Martin
Chief

Operator's Well Number: BRYAN N-3HM
Farm Name: CNX LAND RESOURCES, INC.
U.S. WELL NUMBER: 47-051-02000-00-00
Horizontal 6A New Drill
Date Modification Issued: 11/02/2018

Promoting a healthy environment.

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
Operator ID County District Quadrangle

2) Operator's Well Number: Bryan N-3HM Well Pad Name: Bryan

3) Farm Name/Surface Owner: CNX Land Resources, Inc. Public Road Access: Rines Ridge Rd

4) Elevation, current ground: 1191' Elevation, proposed post-construction: 1191'

5) Well Type (a) Gas Oil Underground Storage

Other _____

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No Yes

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7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6443' - 6496', thickness of 53' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,592'

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 17,324'

11) Proposed Horizontal Leg Length: 10,417.87'

12) Approximate Fresh Water Strata Depths: 803'

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

14) Approximate Saltwater Depths: 2040'

15) Approximate Coal Seam Depths: Sewickly Coal - 701' and Pittsburgh Coal - 796'

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

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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	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	100'	100'	216ft ³ (CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	903'	903'	919ft ³ (CTS)
Coal	13 3/8"	NEW	J55	54.5#	903'	903'	919ft ³ (CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,603'	2,603'	848ft ³ (CTS)
Production	5 1/2"	NEW	P110	20#	17,324'	17,324'	4418ft ³ (CTS)
Tubing	2 3/8"	NEW	N80	4.7#		6,426'	
Liners	N/A						

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TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17 1/2"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.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	8,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners	N/A						

PACKERS

Kind:	N/A				RECEIVED Office of Oil and Gas
Sizes:	N/A				AUG 16 2018
Depths Set:	N/A				WV Department of Environmental Protection

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

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

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

Well to be completed with approximately 28,450,000 lb proppant and 439,858 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.14

22) Area to be disturbed for well pad only, less access road (acres): 5.98

23) Describe centralizer placement for each casing string:

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

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

*See Attached

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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.

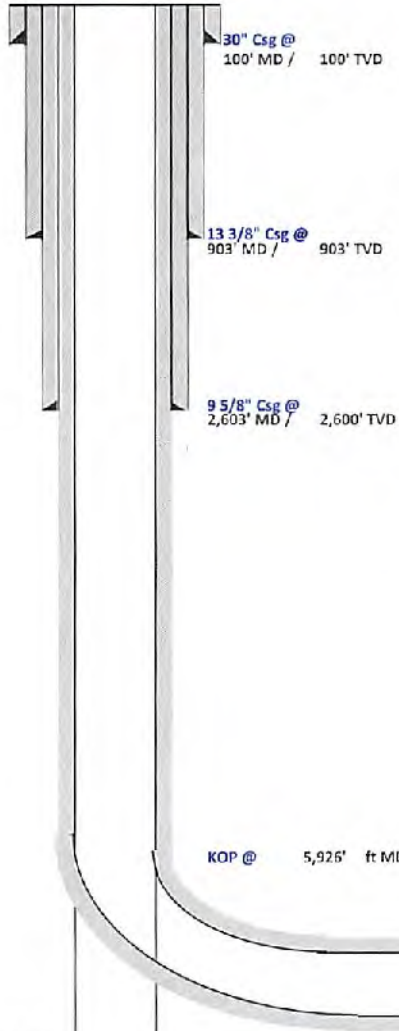


WELL NAME: Bryan N-3HM
 STATE: West Virginia COUNTY: Marshall
 DISTRICT: Franklin
 DF Elev: 1,191' GL Elev: 1,191'
 TD: 17,324'
 TH Latitude: 39.77556711
 TH Longitude: -80.77657879
 BH Latitude: 39.799683
 BH Longitude: -80.797824

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	803
Sewickley Coal	701
Pittsburgh Coal	796
Big Lime	1970
Weir	2324
Berea	2519
Gordon	2864
Rhinestreet	5837
Geneseo/Burkett	6327
Tully	6362
Hamilton	6397
Marcellus	6442
Landing Depth	6472
Onondaga	6492
Pilot Hole Depth	6592

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	100'	100'	8W	8W	Surface
Surface	17.5	13 3/8	903'	903'	54.5	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,603'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	17,324'	6,290'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	291	A	15.6	Air	None
Surface	934	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	838	A	15	Air	1 Centralizer every other jt
Production	3,897	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



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8/15/18

Pilot Hole
PH TD @
6,592' TVD

Landing Point @ 6,908' MD / 6,472' TVD
PH TVD = 100' below Onondaga Top

Lateral TD @ 17,324' ft MD
6,290' ft TVD

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Tug Hill Operating, LLC Casing and Cement Program

Bryan N-3HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	100'	CTS
Surface	13 3/8"	H40	17 1/2"	903'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,603'	CTS
Production	5 1/2"	P110	8 7/8 x 8 3/4"	17,324'	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: Bryan N-03HM (slot N)
 Site: Bryan Pad
 Project: Marshall County, WV
 Design: rev3

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	650.00	3.00	200.00	649.93	-3.69	-1.34	2.00	200.00	-2.29	Begin 3.00' tangent section
4	3203.57	3.00	200.00	3200.00	-129.27	-47.05	0.00	0.00	-80.20	Begin 2°/100' build/turn
5	3795.88	14.81	210.33	3785.15	-209.58	-90.90	2.00	12.88	-121.84	Begin 14.81° tangent section
6	5925.80	14.81	210.33	5943.38	-679.15	-355.52	0.00	0.00	-354.61	Begin 10°/100' build/turn
7	6908.22	91.00	330.00	6471.78	-252.00	-781.85	10.00	118.62	232.94	Begin 91.00° lateral section
8	17324.13	91.00	330.00	6290.00	6767.07	-5989.01	0.00	0.00	0517.43	PBHL/TD 17324.13 MD 6290.00 TVD

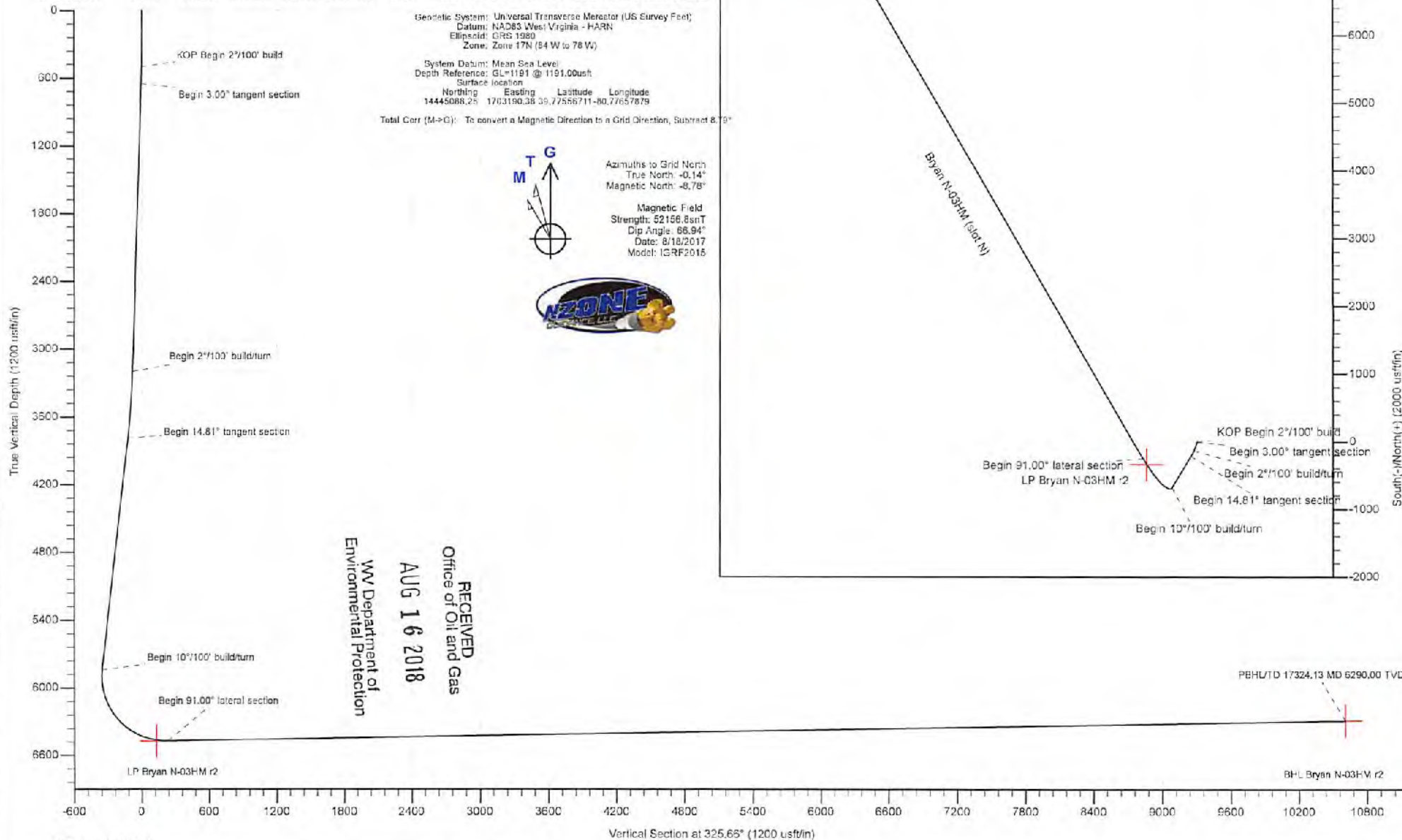
Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: GL+1191 @ 1191.00usft
 Surface location
 Northing Easting Latitude Longitude
 14445088.25 1703190.38 39.72556711 -80.72657879

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.78°



Azimuths to Grid North
 True North: -0.14°
 Magnetic North: -8.78°
 Magnetic Field
 Strength: 52156.8nT
 Dip Angle: 66.94°
 Date: 8/18/2017
 Model: IGRF2015



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Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryan N-03HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1191 @ 1191.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1191 @ 1191.00usft
Site:	Bryan Pad	North Reference:	Grid
Well:	Bryan N-03HM (slot N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

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	Bryan Pad				
Site Position:	Lat/Long	Northing:	14,445,110.80 usft	Latitude:	39.77562900
From:		Easting:	1,703,181.57 usft	Longitude:	-80.77660992
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	Bryan N-03HM (slot N)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,088.28 usft	Latitude:	39.77556711
	+E/-W	0.00 usft	Easting:	1,703,190.38 usft	Longitude:	-80.77657879
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	1,191.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/18/2017	-8.64	66.94	52,156.75922341

Design	rev3			
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	325.66

Plan Survey Tool Program	Date	8/3/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	17,324.13 rev3 (Original Hole)	MWD	MWD - Standard

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
650.00	3.00	200.00	649.93	-3.69	-1.34	2.00	2.00	0.00	200.00	
3,203.57	3.00	200.00	3,200.00	-129.27	-47.05	0.00	0.00	0.00	0.00	
3,796.88	14.81	210.33	3,785.15	-209.58	-90.80	2.00	1.99	1.74	12.88	
5,925.80	14.81	210.33	5,843.38	-679.15	-365.52	0.00	0.00	0.00	0.00	
6,908.22	91.00	330.00	6,471.78	-252.00	-781.85	10.00	7.76	12.18	118.62	
17,324.13	91.00	330.00	6,290.00	8,767.07	-5,989.01	0.00	0.00	0.00	0.00	BHL Bryan N-03HM r



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-03HM (slot N)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well Bryan N-03HM (slot N)
 GL=1191 @ 1191.00usft
 GL=1191 @ 1191.00usft
 Grid
 Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
100.00	0.00	0.00	100.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
200.00	0.00	0.00	200.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
300.00	0.00	0.00	300.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
400.00	0.00	0.00	400.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
500.00	0.00	0.00	500.00	0.00	0.00	14,445,088.28	1,703,190.38	39.77556711	-80.77657879
KOP Begin 2°/100' build									
600.00	2.00	200.00	599.98	-1.64	-0.60	14,445,086.64	1,703,189.78	39.77556261	-80.77658093
650.00	3.00	200.00	649.93	-3.69	-1.34	14,445,084.59	1,703,189.03	39.77555699	-80.77658360
Begin 3.00° tangent section									
700.00	3.00	200.00	699.86	-6.15	-2.24	14,445,082.14	1,703,188.14	39.77555024	-80.77658681
800.00	3.00	200.00	799.72	-11.07	-4.03	14,445,077.22	1,703,186.35	39.77553675	-80.77659322
900.00	3.00	200.00	899.59	-15.98	-5.82	14,445,072.30	1,703,184.56	39.77552325	-80.77659964
1,000.00	3.00	200.00	999.45	-20.90	-7.61	14,445,067.38	1,703,182.77	39.77550976	-80.77660605
1,100.00	3.00	200.00	1,099.31	-25.82	-9.40	14,445,062.46	1,703,180.98	39.77549627	-80.77661247
1,200.00	3.00	200.00	1,199.18	-30.74	-11.19	14,445,057.55	1,703,179.19	39.77548277	-80.77661888
1,300.00	3.00	200.00	1,299.04	-35.66	-12.98	14,445,052.63	1,703,177.40	39.77546928	-80.77662530
1,400.00	3.00	200.00	1,398.90	-40.57	-14.77	14,445,047.71	1,703,175.61	39.77545579	-80.77663171
1,500.00	3.00	200.00	1,498.76	-45.49	-16.56	14,445,042.79	1,703,173.82	39.77544229	-80.77663813
1,600.00	3.00	200.00	1,598.63	-50.41	-18.35	14,445,037.87	1,703,172.03	39.77542880	-80.77664454
1,700.00	3.00	200.00	1,698.49	-55.33	-20.14	14,445,032.96	1,703,170.24	39.77541530	-80.77665095
1,800.00	3.00	200.00	1,798.35	-60.25	-21.93	14,445,028.04	1,703,168.45	39.77540181	-80.77665737
1,900.00	3.00	200.00	1,898.21	-65.16	-23.72	14,445,023.12	1,703,166.66	39.77538832	-80.77666378
2,000.00	3.00	200.00	1,998.08	-70.08	-25.51	14,445,018.20	1,703,164.87	39.77537482	-80.77667020
2,100.00	3.00	200.00	2,097.94	-75.00	-27.30	14,445,013.28	1,703,163.08	39.77536133	-80.77667661
2,200.00	3.00	200.00	2,197.80	-79.92	-29.09	14,445,008.37	1,703,161.29	39.77534783	-80.77668303
2,300.00	3.00	200.00	2,297.67	-84.84	-30.88	14,445,003.45	1,703,159.50	39.77533434	-80.77668944
2,400.00	3.00	200.00	2,397.53	-89.75	-32.67	14,444,998.53	1,703,157.71	39.77532085	-80.77669586
2,500.00	3.00	200.00	2,497.39	-94.67	-34.46	14,444,993.61	1,703,155.92	39.77530735	-80.77670227
2,599.99	3.00	200.00	2,597.25	-99.59	-36.25	14,444,988.69	1,703,154.13	39.77529386	-80.77670868
2,699.99	3.00	200.00	2,697.12	-104.51	-38.04	14,444,983.78	1,703,152.34	39.77528037	-80.77671510
2,799.99	3.00	200.00	2,796.98	-109.43	-39.83	14,444,978.86	1,703,150.55	39.77526687	-80.77672151
2,899.99	3.00	200.00	2,896.84	-114.34	-41.62	14,444,973.94	1,703,148.76	39.77525338	-80.77672793
2,999.99	3.00	200.00	2,996.70	-119.26	-43.41	14,444,969.02	1,703,146.97	39.77523988	-80.77673434
3,099.99	3.00	200.00	3,096.57	-124.18	-45.20	14,444,964.10	1,703,145.18	39.77522639	-80.77674076
3,199.99	3.00	200.00	3,196.43	-129.10	-46.99	14,444,959.19	1,703,143.39	39.77521290	-80.77674717
3,203.57	3.00	200.00	3,200.00	-129.27	-47.05	14,444,959.01	1,703,143.33	39.77521241	-80.77674740
Begin 2°/100' build/turn									
3,299.99	4.90	205.04	3,296.19	-135.38	-49.66	14,444,952.91	1,703,140.72	39.77519567	-80.77675673
3,399.99	6.89	207.32	3,395.66	-144.57	-54.22	14,444,943.71	1,703,136.16	39.77517045	-80.77677303
3,499.99	8.88	208.58	3,494.71	-156.67	-60.66	14,444,931.61	1,703,129.72	39.77513726	-80.77679607
3,599.99	10.87	209.38	3,593.22	-171.67	-68.98	14,444,916.61	1,703,121.40	39.77509613	-80.77682581
3,699.99	12.87	209.93	3,691.08	-189.54	-79.18	14,444,898.74	1,703,111.21	39.77504711	-80.77686222
3,796.88	14.81	210.33	3,785.15	-209.58	-90.80	14,444,878.70	1,703,099.56	39.77499216	-80.77690382
Begin 14.81° tangent section									
3,799.99	14.81	210.33	3,788.16	-210.27	-91.20	14,444,878.01	1,703,099.18	39.77499028	-80.77690525
3,899.99	14.81	210.33	3,884.84	-232.33	-104.10	14,444,855.96	1,703,086.27	39.77492979	-80.77695137
3,999.99	14.81	210.33	3,981.52	-254.38	-117.01	14,444,833.90	1,703,073.37	39.77486931	-80.77699750
4,099.99	14.81	210.33	4,078.20	-276.44	-129.91	14,444,811.84	1,703,060.46	39.77480882	-80.77704362
4,199.99	14.81	210.33	4,174.88	-298.50	-142.82	14,444,789.79	1,703,047.56	39.77474834	-80.77708974
4,299.99	14.81	210.33	4,271.56	-320.55	-155.72	14,444,767.73	1,703,034.66	39.77468785	-80.77713586
4,399.99	14.81	210.33	4,368.24	-342.61	-168.63	14,444,745.67	1,703,021.75	39.77462736	-80.77718199
4,499.99	14.81	210.33	4,464.92	-364.67	-181.53	14,444,723.62	1,703,008.85	39.77456688	-80.77722811
4,599.99	14.81	210.33	4,561.59	-386.72	-194.43	14,444,701.56	1,702,995.94	39.77450639	-80.77727423

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryan N-03HM (slot N)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1191 @ 1191.00usft
Project:	Marshall County, West Virginia	MD Reference:	GL=1191 @ 1191.00usft
Site:	Bryan Pad	North Reference:	Grid
Well:	Bryan N-03HM (slot: N)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

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	14.81	210.33	4,658.27	-408.78	-207.34	14,444,679.50	1,702,983.04	39.77444591	-80.77732035
4,799.99	14.81	210.33	4,754.95	-430.84	-220.24	14,444,657.45	1,702,970.13	39.77438542	-80.77736647
4,899.99	14.81	210.33	4,851.63	-452.89	-233.15	14,444,635.39	1,702,957.23	39.77432494	-80.77741260
4,999.99	14.81	210.33	4,948.31	-474.95	-246.05	14,444,613.33	1,702,944.33	39.77426445	-80.77745872
5,099.99	14.81	210.33	5,044.99	-497.01	-258.95	14,444,591.28	1,702,931.42	39.77420396	-80.77750484
5,199.99	14.81	210.33	5,141.67	-519.06	-271.66	14,444,569.22	1,702,918.52	39.77414348	-80.77755096
5,299.99	14.81	210.33	5,238.35	-541.12	-284.76	14,444,547.16	1,702,905.61	39.77408299	-80.77759708
5,399.99	14.81	210.33	5,335.03	-563.18	-297.67	14,444,525.11	1,702,892.71	39.77402251	-80.77764320
5,499.99	14.81	210.33	5,431.71	-585.23	-310.57	14,444,503.05	1,702,879.81	39.77396202	-80.77768933
5,599.99	14.81	210.33	5,528.39	-607.29	-323.48	14,444,480.99	1,702,866.90	39.77390153	-80.77773545
5,699.99	14.81	210.33	5,625.07	-629.35	-336.38	14,444,458.94	1,702,854.00	39.77384105	-80.77778157
5,799.99	14.81	210.33	5,721.75	-651.40	-349.28	14,444,436.88	1,702,841.09	39.77378056	-80.77782769
5,899.99	14.81	210.33	5,818.43	-673.46	-362.18	14,444,414.82	1,702,828.19	39.77372007	-80.77787381
5,925.80	14.81	210.33	5,843.38	-679.15	-365.52	14,444,409.13	1,702,824.86	39.77370446	-80.77786572
Begin 10°/100' build/turn									
5,999.99	12.96	240.68	5,915.50	-691.43	-377.58	14,444,396.85	1,702,812.80	39.77367083	-80.77792874
6,099.99	16.44	278.51	6,012.42	-694.84	-401.42	14,444,393.45	1,702,788.96	39.77366164	-80.77801361
6,199.99	23.86	298.40	6,106.34	-683.09	-433.28	14,444,405.19	1,702,757.10	39.77369411	-80.77812692
6,299.99	32.62	308.69	6,194.41	-656.55	-472.21	14,444,431.73	1,702,718.17	39.77376726	-80.77826522
6,399.99	41.90	314.91	6,273.93	-616.02	-517.01	14,444,472.26	1,702,673.37	39.77387886	-80.77842433
6,499.99	51.41	319.18	6,342.51	-562.74	-566.33	14,444,525.54	1,702,624.05	39.77402553	-80.77859939
6,599.99	61.04	322.45	6,398.05	-498.32	-618.67	14,444,589.97	1,702,571.71	39.77420281	-80.77878510
6,699.99	70.73	325.15	6,438.87	-424.71	-672.44	14,444,663.57	1,702,517.94	39.77440532	-80.77897581
6,799.99	80.46	327.55	6,463.73	-344.16	-726.00	14,444,744.12	1,702,464.38	39.77462689	-80.77916572
6,899.99	90.20	329.82	6,471.87	-259.12	-777.72	14,444,829.17	1,702,412.66	39.77486080	-80.77934907
6,908.22	91.00	330.00	6,471.78	-252.00	-781.85	14,444,836.29	1,702,408.53	39.77488039	-80.77936370
Begin 91.00° lateral section									
6,999.99	91.00	330.00	6,470.18	-172.53	-827.73	14,444,915.75	1,702,362.65	39.77509892	-80.77952628
7,099.99	91.00	330.00	6,468.44	-85.94	-877.72	14,445,002.34	1,702,312.66	39.77533705	-80.77970345
7,199.99	91.00	330.00	6,466.69	0.64	-927.71	14,445,088.93	1,702,262.67	39.77557519	-80.77988063
7,299.99	91.00	330.00	6,464.95	87.23	-977.70	14,445,175.52	1,702,212.67	39.77581333	-80.78005780
7,399.99	91.00	330.00	6,463.20	173.82	-1,027.70	14,445,262.11	1,702,162.68	39.77605146	-80.78023497
7,499.99	91.00	330.00	6,461.46	260.41	-1,077.69	14,445,348.70	1,702,112.69	39.77628960	-80.78041215
7,599.98	91.00	330.00	6,459.71	347.00	-1,127.68	14,445,435.28	1,702,062.70	39.77652773	-80.78058932
7,699.98	91.00	330.00	6,457.96	433.59	-1,177.67	14,445,521.87	1,702,012.71	39.77676586	-80.78076650
7,799.98	91.00	330.00	6,456.22	520.18	-1,227.66	14,445,608.46	1,701,962.71	39.77700400	-80.78094368
7,899.98	91.00	330.00	6,454.47	606.77	-1,277.65	14,445,695.05	1,701,912.72	39.77724213	-80.78112086
7,999.98	91.00	330.00	6,452.73	693.36	-1,327.65	14,445,781.64	1,701,862.73	39.77748027	-80.78129804
8,099.98	91.00	330.00	6,450.98	779.95	-1,377.64	14,445,868.23	1,701,812.74	39.77771840	-80.78147522
8,199.98	91.00	330.00	6,449.24	866.54	-1,427.63	14,445,954.82	1,701,762.74	39.77795653	-80.78165240
8,299.98	91.00	330.00	6,447.49	953.13	-1,477.63	14,446,041.41	1,701,712.75	39.77819466	-80.78182959
8,399.98	91.00	330.00	6,445.75	1,039.71	-1,527.62	14,446,128.00	1,701,662.76	39.77843280	-80.78200677
8,499.98	91.00	330.00	6,444.00	1,126.30	-1,577.61	14,446,214.59	1,701,612.77	39.77867093	-80.78218396
8,599.98	91.00	330.00	6,442.26	1,212.89	-1,627.60	14,446,301.18	1,701,562.77	39.77890906	-80.78236115
8,699.98	91.00	330.00	6,440.51	1,299.48	-1,677.59	14,446,387.77	1,701,512.78	39.77914719	-80.78253833
8,799.98	91.00	330.00	6,438.77	1,386.07	-1,727.59	14,446,474.35	1,701,462.79	39.77938532	-80.78271552
8,899.98	91.00	330.00	6,437.02	1,472.66	-1,777.58	14,446,560.94	1,701,412.80	39.77962345	-80.78289272
8,999.98	91.00	330.00	6,435.28	1,559.25	-1,827.57	14,446,647.53	1,701,362.81	39.77986159	-80.78306991
9,099.98	91.00	330.00	6,433.53	1,645.84	-1,877.56	14,446,734.12	1,701,312.81	39.78009972	-80.78324710
9,199.98	91.00	330.00	6,431.79	1,732.43	-1,927.56	14,446,820.71	1,701,262.82	39.78033785	-80.78342430
9,299.98	91.00	330.00	6,430.04	1,819.02	-1,977.55	14,446,907.30	1,701,212.83	39.78057598	-80.78360149
9,399.98	91.00	330.00	6,428.30	1,905.61	-2,027.54	14,446,993.89	1,701,162.84	39.78081411	-80.78377869
9,499.98	91.00	330.00	6,426.55	1,992.20	-2,077.53	14,447,080.48	1,701,112.84	39.78105223	-80.78395589
9,599.98	91.00	330.00	6,424.81	2,078.78	-2,127.53	14,447,167.07	1,701,062.85	39.78129036	-80.78413309



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-03HM (slot N)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well Bryan N-03HM (slot N)
 GL=1191 @ 1191.00usft
 GL=1191 @ 1191.00usft
 Grid
 Minimum Curvature

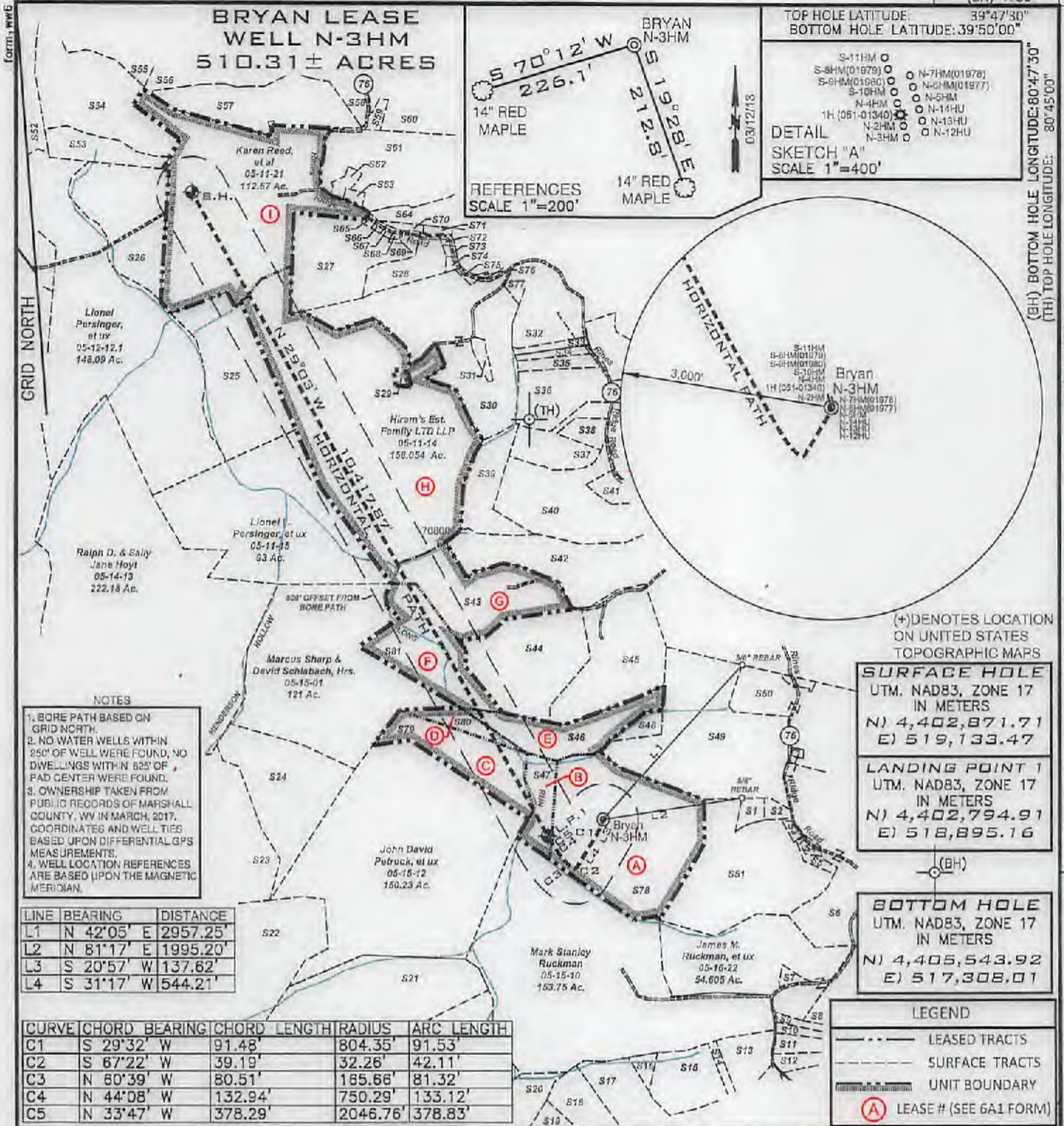
RECEIVED
 Office of Oil and Gas
 AUG 16 2018
 WV Department of
 Environmental Protection

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,199.97	91.00	330.00	6,327.07	6,927.78	-4,927.09	14,452,016.06	1,698,263.26	39.79462515	-80.79405824	
15,299.97	91.00	330.00	6,325.33	7,014.37	-4,977.09	14,452,102.65	1,698,213.29	39.79466326	-80.79423551	
15,399.97	91.00	330.00	6,323.58	7,100.98	-5,027.08	14,452,189.24	1,698,163.30	39.79510137	-80.79441278	
15,499.97	91.00	330.00	6,321.84	7,187.55	-5,077.07	14,452,275.83	1,698,113.31	39.79533949	-80.79459006	
15,599.97	91.00	330.00	6,320.09	7,274.14	-5,127.06	14,452,362.42	1,698,063.31	39.79557760	-80.79476733	
15,699.97	91.00	330.00	6,318.35	7,360.72	-5,177.05	14,452,449.01	1,698,013.32	39.79581571	-80.79494460	
15,799.97	91.00	330.00	6,316.60	7,447.31	-5,227.05	14,452,535.60	1,697,963.33	39.79605382	-80.79512188	
15,899.97	91.00	330.00	6,314.86	7,533.90	-5,277.04	14,452,622.19	1,697,913.34	39.79629194	-80.79529916	
15,999.97	91.00	330.00	6,313.11	7,620.49	-5,327.03	14,452,708.78	1,697,863.35	39.79653005	-80.79547643	
16,099.97	91.00	330.00	6,311.36	7,707.08	-5,377.02	14,452,795.36	1,697,813.35	39.79676816	-80.79565371	
16,199.97	91.00	330.00	6,309.62	7,793.67	-5,427.02	14,452,881.95	1,697,763.36	39.79700627	-80.79583099	
16,299.97	91.00	330.00	6,307.87	7,880.26	-5,477.01	14,452,968.54	1,697,713.37	39.79724438	-80.79600828	
16,399.97	91.00	330.00	6,306.13	7,966.85	-5,527.00	14,453,055.13	1,697,663.38	39.79748249	-80.79618556	
16,499.97	91.00	330.00	6,304.38	8,053.44	-5,576.99	14,453,141.72	1,697,613.38	39.79772060	-80.79636284	
16,599.97	91.00	330.00	6,302.64	8,140.03	-5,626.99	14,453,228.31	1,697,563.39	39.79795871	-80.79654013	
16,699.97	91.00	330.00	6,300.89	8,226.62	-5,676.98	14,453,314.90	1,697,513.40	39.79819682	-80.79671742	
16,799.97	91.00	330.00	6,299.15	8,313.21	-5,726.97	14,453,401.49	1,697,463.41	39.79843493	-80.79689470	
16,899.97	91.00	330.00	6,297.40	8,399.79	-5,776.96	14,453,488.08	1,697,413.42	39.79867304	-80.79707199	
16,999.97	91.00	330.00	6,295.66	8,486.38	-5,826.95	14,453,574.67	1,697,363.42	39.79891114	-80.79724928	
17,099.97	91.00	330.00	6,293.91	8,572.97	-5,876.95	14,453,661.26	1,697,313.43	39.79914925	-80.79742657	
17,199.97	91.00	330.00	6,292.17	8,659.56	-5,926.94	14,453,747.85	1,697,263.44	39.79938736	-80.79760387	
17,299.97	91.00	330.00	6,290.42	8,746.15	-5,976.93	14,453,834.43	1,697,213.45	39.79962547	-80.79778116	
17,324.13	91.00	330.00	6,290.00	8,767.07	-5,989.01	14,453,855.36	1,697,201.37	39.79968300	-80.79782400	

PBHL/TD 17324.13 MD 6290.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
BHL Bryan N-03HM r2 - hit/miss target - Shape - Point	0.00	0.00	6,290.00	8,767.07	-5,989.01	14,453,855.36	1,697,201.37	39.79968300	-80.79782400	
LP Bryan N-03HM r2 - plan misses target center by 8.22usft at 6908.53usft MD (6465.08 TVD, -337.04 N, -730.51 E) - Point	0.00	0.00	6,473.00	-338.67	-731.99	14,444,749.61	1,702,458.39	39.77464200	-80.77918700	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
500.00	500.00	0.00	0.00	KOP Begin 2"/100' build	
650.00	649.93	-3.69	-1.34	Begin 3.00° tangent section	
3,203.57	3,200.00	-129.27	-47.05	Begin 2"/100' build/turn	
3,796.88	3,785.15	-209.58	-90.80	Begin 14.81° tangent section	
5,925.80	5,843.38	-879.15	-365.52	Begin 10"/100' build/turn	
6,908.22	6,471.78	-252.00	-781.85	Begin 91.00° lateral section	
17,324.13	6,290.00	8,767.07	-5,989.01	PBHL/TD 17324.13 MD 6290.00 TVD	



TOP HOLE LATITUDE: 39°47'30"
 BOTTOM HOLE LATITUDE: 39°50'00"
 S-11HM ○
 S-9HM(01979) ○
 S-9HM(01980) ○
 S-10HM ○
 N-4HM ○
 1H (051-01340) ○
 N-2HM ○
 N-3HM ○
 N-7HM(01978) ○
 N-6HM(01977) ○
 N-5HM ○
 N-11HM ○
 N-13HM ○
 N-12HM ○

REFERENCES
 SCALE 1"=200'

DETAIL
 SKETCH "A"
 SCALE 1"=400'

NOTES
 1. BORE PATH BASED ON GRID NORTH.
 2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
 3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
 4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

SURFACE HOLE
 UTM, NAD83, ZONE 17
 IN METERS
 N) 4,402,871.71
 E) 519,133.47

LANDING POINT 1
 UTM, NAD83, ZONE 17
 IN METERS
 N) 4,402,794.91
 E) 518,895.16

BOTTOM HOLE
 UTM, NAD83, ZONE 17
 IN METERS
 N) 4,405,543.92
 E) 517,308.01

LINE	BEARING	DISTANCE
L1	N 42°05' E	2957.25'
L2	N 81°17' E	1995.20'
L3	S 20°57' W	137.62'
L4	S 31°17' W	544.21'

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	S 29°32' W	91.48'	804.35'	91.53'
C2	S 67°22' W	39.19'	32.26'	42.11'
C3	N 60°39' W	80.51'	185.66'	81.32'
C4	N 44°08' W	132.94'	750.29'	133.12'
C5	N 33°47' W	378.29'	2046.76'	378.83'

LEGEND
 - - - LEASED TRACTS
 - - - SURFACE TRACTS
 [Symbol] UNIT BOUNDARY
 (A) LEASE # (SEE 6A1 FORM)

FILE NUMBER _____
 DRAWING NUMBER BRYAN_WP_N-3HM
 SCALE 1" = 2000'
 MINIMUM DEGREE OF ACCURACY 1/200
 PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708
David L Jackson

JACKSON SURVEYING INC.
 P.O. Box 1460
 Clarksburg, WV 26302
 304-623-5851



WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET, SE
 CHARLESTON, WV 25304

DATE: DECEMBER 12, 2017
 REVISED DATE: AUGUST 10, 2018
 OPERATORS WELL NO. BRYAN N-3HM
 API WELL NO. _____
47-051-02000 MOD
 STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
 (IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

LOCATION ELEVATION 1191.0' WATERSHED (HUC 10) Fish Creek
 DISTRICT Franklin COUNTY Marshall
 QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE WW-6A1 Form

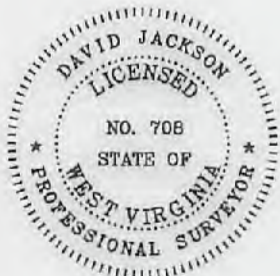
SURFACE OWNER CNX LAND RESOURCES, INC. ACREAGE 81.98
 OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW 6A1 LEASE ACREAGE 81.98
 PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
 PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) _____
 PLUG & ABANDON ___ CLEAN OUT & REPLUG ___
 TARGET FORMATION Marcellus ESTIMATED DEPTH TVD: 6,592' TMD: 17,324'
 WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
 ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

COUNTY NAME
 PERMIT

**BRYAN LEASE
WELL N-3HM
510.31± ACRES**

GRID NORTH

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	05-16-23.4	Michael R. & Brenda K. Bryan	3.0
S2	05-16-23.1	Ray E. Minor, Et Ux	2.0
S3	05-16-23.3	Greg & Christina Riddle	1.0
S4	05-16-24	Alan M. Beyser, Et Ux	1.083
S5	05-16-23.2	Alan M. Beyser, Et Ux	1.728
S6	05-16-25	John Swierkos	79.04
S7	05-16-22.1	Heather A. Burgy	1.465
S8	05-16-21	James M. Ruckman, Et Ux	60.75
S9	05-18-56	William E. O'Hara	3.965
S10	05-18-55	William E. O'Hara	3.202
S11	05-18-28	Dotson G. Harrison, Et Ux	6.36
S12	05-18-28.1	Carol Diane Helmick	5.696
S13	05-18-11	Benjamin Robinson	10.883
S14	05-18-11.2	Edward Lee Burge Jr.	2.0
S15	05-18-11.1	Edward Lee Burge Jr.	18.0
S16	05-18-15	Edward Lee Burge Jr.	2.495
S17	05-18-15.4	Edward Lee Burge Jr.	22.34
S18	05-18-15.3	Charles Yeater	26.44
S19	05-18-6	Charles Yeater	26.0
S20	05-18-5	Terry L. Melott	8.14
S21	05-15-11	Diana Henry Haynes & Carol G. Henry	65.59
S22	05-19-13	Rona Lee Rice & Charles Franklin McCardle	94.925
S23	05-14-15	Robert L. Shields Et Al	53.0
S24	05-15-15	Robert L. Shields Et Al	49.0
S25	05-12-11	Wesley R. & Wesley R. Bryan II	52.478
S26	05-12-12	Lionel L. Persinger, Et Ux	45.0
S27	05-11-17	Kevin R. Corley, Et Ux	36.13
S28	05-11-17.2	Brenda & Michael Bryan	11.504
S29	05-11-14.1	Dennis F. Moore, Et Ux	1.056
S30	05-11-16	Keith E. Haught, Et Al	83.674
S31	05-11-16.2	Joseph Haught	2.181
S32	05-11-9.3	Joseph M. & Steven Haught	16.3
S33	05-11-9.5	Southern Country Farms Inc.	2.559
S34	05-11-9.6	Southern Country Farms Inc.	2.488
S35	05-11-9.9	Leonard L. Parsons Et Ux	5.89
S36	05-11-9	Edwin C. & Kimberly A. Miller	54.625
S37	05-11-11.4	Brad M. & Amanda J. Blake	15.193
S38	05-11-11	Brad M. & Amanda J. Blake	5.0
S39	05-11-13	Joy D. Garlman & Arlin Gatts	12.29
S40	05-11-11.3	Herman D. Lantz	43.96
S41	05-11-11.1	Nellie Marie & Robert W. Spencer	5.813
S42	05-11-12	Joseph J. Kramer, Et Ux	43.2188
S43	05-15-4	Joseph J. Kramer, Et Ux	41.106
S44	05-15-5	Joseph J. Kramer, Et Ux	35.0
S45	05-15-6	Joseph J. Kramer, Et Ux	42.5
S46	05-15-6.1	Joseph J. Kramer, Et Ux	39.4
S47	05-15-13	CNX Land Resources Inc.	11.0
S48	05-15-7	Terry D. Rose, Et Ux	4.5
S49	05-15-8	Terry D. Rose, Et Ux	77.11
S50	05-16-3	Donna Vivian Yoho	71.205
S51	05-16-23	CNX Land Resources, Inc.	60.138
S52	05-12-08	Anita Rae Miller (Life)	100.35
S53	05-12-10	Consolidation Coal Company/ Murray Energy	13.76
S54	05-12-10.1	Consolidation Coal Company/ Murray Energy	38.48
S55	05-12-09	Lionel & Mary Lee Persinger	10.15
S56	05-11-1.4	Larry W. Dunlap, Et Al	32.493
S57	05-11-1.1	Larry W. Dunlap & Charles Leroy Dunlap	34.405
S58	05-11-1.2	Jay A. Conner, Et Ux	5.824
S59	05-08-9.1	Scott E. Jackson, Tammy S. South & Marion Jackson	1.957
S60	05-08-09	James B. Jackson Jr., Et Ux	89.723
S61	05-11-02	Walter C. & Cheryl A. Rina	42.367
S62	05-11-2.2	Joshua A. Myers	2.193
S63	05-11-2.1	Walter C. & Cheryl A. Rina	1.19
S64	05-11-3	Kevin R. Corley, Et Ux	13.18
S65	05-11-20	David E. Gray	0.569
S66	05-11-19	David E. Gray	0.532
S67	05-11-18	David E. Gray	0.569
S68	05-11-22	David Gray	0.353
S69	05-11-17.1	David Gray	0.297
S70	05-11-05	Kevin R. Corley, Et Ux	10.36
S71	05-11-5.2	Rickey Lynn & Victoria Rose Cross	1.0
S72	05-11-24	Charles Edward Furbee, Et Ux	0.603
S73	05-11-23	Owen Michael Barr	0.845
S74	05-11-25	Owen Michael Barr	0.598
S75	05-11-16.1	Susan Marie Smith (Life)	0.876
S76	05-11-5.1	James R. Anderson, Et Ux	0.205
S77	05-11-16.3	Kegan Michael Haught (Life)	3.265
S78	05-15-09	CNX Land Resources, Inc.	81.98
S79	05-15-14	John David Petrock, et al	25.0
S80	05-15-02	John David Petrock, et al	5.0
S81	05-15-03	Joseph J. Kramer, et ux	36.10



P.S. 708

David L Jackson



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Bryan N-3HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 2
DATE: 12/12/2017
REVISED DATE:
08/10/18

WW-6A1
(5/13)

Operator's Well No. Bryan 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:

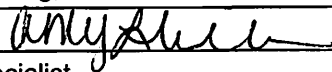
- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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Office of Oil and Gas

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WV Department of
Environmental Protection

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

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

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19294	A	5-15-9	BRENDA K BRYAN	TRIENERGY INC	1/8+	741	78	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19294	A	5-15-9	MICHAEL R BRYAN	TRIENERGY INC	1/8+	741	78	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19294	A	5-15-9	WESLEY RUSSELL BRYAN II	TRIENERGY INC	1/8+	741	78	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19294	A	5-15-9	APPALACHIAN ENERGY HOLDINGS LP	TRIENERGY INC	1/8+	741	78	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*21175	B	5-15-13	KEITH A RYAN	TH EXPLORATION, LLC	1/8+	952	177	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21177	B	5-15-13	RHONDA R AND DAVID R TOPPER	TH EXPLORATION, LLC	1/8+	952	181	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21176	B	5-15-13	FLORENCE K AND DAVID B FOSTER	TH EXPLORATION, LLC	1/8+	952	179	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19294	B	5-15-13	MICHAEL R. BRYAN BRENDA K. BRYAN	TRIENERGY, INC.	1/8+	666	289	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19337	C	5-15-14	JACK PETROCK HATTIE PETROCK	TRIENERGY, INC.	1/8+	663	498	N/A	20/252 TriEnergy Inc to AB Resources LLC	666/40 AB Resources LLC to Chief Exploration & Development LLC	21/520 Chief Exploration & Development, LLC and Radler 2000 Limited Partnership to Enerplus Resources USA Corporation	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19309	D	5-15-2	KAREN I DENNY	CHEVRON USA INC	1/8+	798	551	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19310	D	5-15-2	ELLEN DINGER	CHEVRON USA INC	1/8+	799	101	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19311	D	5-15-2	FLORENCE KATHERINE FOSTER	CHEVRON USA INC	1/8+	798	395	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19312	D	5-15-2	MARK A GALLAGHER	CHEVRON USA INC	1/8+	799	92	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19313	D	5-15-2	NANCY KAY GALLAGHER	CHEVRON USA INC	1/8+	798	579	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19314	D	5-15-2	THE JOSEPHINE A. RYAN REVOCABLE LIVING TRUST	CHEVRON USA INC	1/8+	798	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19315	D	5-15-2	REBECCA J KOVALCHIK	CHEVRON USA INC	1/8+	798	597	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19316	D	5-15-2	CAROL A KURTZ	CHEVRON USA INC	1/8+	798	361	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19317	D	5-15-2	SHIRLEY J POGORZELSKI	CHEVRON USA INC	1/8+	798	588	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19318	D	5-15-2	PATRICIA M PORTWOOD	CHEVRON USA INC	1/8+	798	561	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19319	D	5-15-2	JUDY L RIDGWAY	CHEVRON USA INC	1/8+	798	110	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC

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WV Department of Environmental Protection

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19320	D	5-15-2	ALBERTA RYAN	CHEVRON USA INC	1/8+	799	46	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19321	D	5-15-2	FINLEY L RYAN JR	CHEVRON USA INC	1/8+	798	624	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19322	D	5-15-2	JAMES D RYAN	CHEVRON USA INC	1/8+	798	504	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19323	D	5-15-2	JAMES R RYAN JR	CHEVRON USA INC	1/8+	798	370	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19324	D	5-15-2	KEVIN MICHAEL RYAN	CHEVRON USA INC	1/8+	799	166	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19325	D	5-15-2	RUTH E RYAN	CHEVRON USA INC	1/8+	798	570	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19326	D	5-15-2	VINCENT JASON RYAN III	CHEVRON USA INC	1/8+	799	137	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19327	D	5-15-2	WILBERT W RYAN JR	CHEVRON USA INC	1/8+	798	615	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19328	D	5-15-2	WILLIAM HERVEY MILLER RYAN	CHEVRON USA INC	1/8+	799	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19329	D	5-15-2	GEORGE SETTLES	CHEVRON USA INC	1/8+	799	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19330	D	5-15-2	ELSIE M SHORTLAND	CHEVRON USA INC	1/8+	799	119	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19331	D	5-15-2	RHONDA R TOPPER	CHEVRON USA INC	1/8+	799	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19332	D	5-15-2	MARY F WASZKIEWICZ	CHEVRON USA INC	1/8+	798	606	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19333	D	5-15-2	AUDREY E WELLS	CHEVRON USA INC	1/8+	798	386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19334	D	5-15-2	KATHRYN G WOOD	CHEVRON USA INC	1/8+	800	162	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19335	D	5-15-2	WOODROW A. RYAN REV TRST JACK W. RYAN, TRUSTEE	CHEVRON USA INC	1/8+	799	37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19337	D	5-15-2	JACK PETROCK HATTIE PETROCK	TRIENERGY, INC.	1/8+	663	498	N/A	20/252 TriEnergy Inc to AB Resources LLC	666/40 AB Resources LLC to Chief Exploration & Development LLC	21/520 Chief Exploration & Development, LLC and Radler 2000 Limited Partnership to Enerplus Resources USA Corporation	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19293	E	5-15-6.1	JOSEPH I. KRAMAR, SR. JO ANN KRAMAR	TRIENERGY, INC.	1/8+	655	566	N/A	19/623 TriEnergy, Inc. to AB Resources, LLC	21/148 TriEnergy, Inc. to TriEnergy Holdings, LLC	24/319 AB Resources, LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	25/105 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	28/356 TriEnergy Holdings, LLC and TriEnergy, Inc. to Chevron USA	N/A	40/57 Chevron USA to TH Exploration LLC
10*19295	E	5-15-6.1	KEVIN J. KELLY PAMELA MARXEN-KELLY	CHEVRON USA INC	1/8+	858	381	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19296	E	5-15-6.1	MARISSA C MARXEN	CHEVRON USA INC	1/8+	837	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19297	E	5-15-6.1	PHILIP LEONARD MARXEN	CHEVRON USA INC	1/8+	839	410	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19298	E	5-15-6.1	BETTY J MARXEN SLEZAK	CHEVRON USA INC	1/8+	822	351	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19299	E	5-15-6.1	ANNETTE CONWAY MARXEN	CHEVRON USA INC	1/8+	817	512	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19300	E	5-15-6.1	DEBORAH F HAGEMAN HUPPERT	CHEVRON USA INC	1/8+	815	145	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19301	E	5-15-6.1	SANDRA HAGEMAN KANGAS	CHEVRON USA INC	1/8+	815	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19302	E	5-15-6.1	JEFFREY C MARXEN SAMANTHA L MARXEN	CHEVRON USA INC	1/8+	817	506	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19303	E	5-15-6.1	THOMAS O MARXEN	CHEVRON USA INC	1/8+	814	589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19304	E	5-15-6.1	DEAN L. RINE, JR. PAMELA F. RINE	CHEVRON USA INC	1/8+	813	635	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19305	E	5-15-6.1	KAREN MARXEN SONDROL	CHEVRON USA INC	1/8+	813	605	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19306	E	5-15-6.1	RICHARD L. TATE MARCELINE RINE TATE	CHEVRON USA INC	1/8+	814	594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19307	E	5-15-6.1	MARY SUE RINE-WALTER	CHEVRON USA INC	1/8+	815	155	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19308	E	5-15-6.1	WILLIAM WEBER	CHEVRON USA INC	1/8+	817	646	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA to TH Exploration LLC
10*19038	F	5-15-3	PHYLLIS L. PARSONS	CHEVRON USA INC	1/8+	814	379	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19254	F	5-15-3	JOANNE LABRY	CHEVRON USA INC	1/8+	820	320	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19046	F	5-15-3	CAROL J. WEINSTEIN	CHEVRON USA INC	1/8+	813	33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19047	F	5-15-3	DEBORAH CROSTEN-PURCELL	CHEVRON USA INC	1/8+	813	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19048	F	5-15-3	JANET FRANKHAUSER WILSON	CHEVRON USA INC	1/8+	817	627	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19055	F	5-15-3	DONNA J. GORDYAN	CHEVRON USA INC	1/8+	814	468	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19056	F	5-15-3	LESLIE R. KEYS	CHEVRON USA INC	1/8+	814	463	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19061	F	5-15-3	ANN WOLLSCHLEGER	CHEVRON USA INC	1/8+	817	615	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19066	F	5-15-3	MICHAEL L. FRANKHAUSER	CHEVRON USA INC	1/8+	818	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19068	F	5-15-3	LINDA L. RUPERT	CHEVRON USA INC	1/8+	820	229	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19069	F	5-15-3	SCOTT D. FRANKHAUSER	CHEVRON USA INC	1/8+	822	446	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19071	F	5-15-3	DONNA L. CLAPPER	CHEVRON USA INC	1/8+	820	191	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19074	F	5-15-3	PHILIP G. FRANKHAUSER	CHEVRON USA INC	1/8+	822	441	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19076	F	5-15-3	FRANKHAUSER LIVING TRUST SUSAN LIVINGSTON, TRUSTEE	CHEVRON USA INC	1/8+	826	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19030	F	5-15-3	KATHLEEN R. CUSTEAD	CHEVRON USA INC	1/8+	806	39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19080	F	5-15-3	REVOCABLE TRUST AGREEMENT CHARLES S. HAMEL	CHEVRON USA INC	1/8+	835	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19081	F	5-15-3	RUDINA A. FRANKHAUSER	CHEVRON USA INC	1/8+	831	457	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19128	F	5-15-3	RUDOLPH G. FRANKHAUSER	CHEVRON USA INC	1/8+	860	258	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19293	F	5-15-3	JOSEPH I. KRAMAR, SR. JO ANN KRAMAR	TRIENERGY, INC.	1/8+	655	566	N/A	19/623 TriEnergy, Inc. to AB Resources, LLC	21/148 TriEnergy, Inc. to TriEnergy Holdings, LLC	24/319 AB Resources, LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	25/105 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	28/356 TriEnergy Holdings, LLC and TriEnergy, Inc. to Chevron USA	40/57 Chevron USA to TH Exploration LLC	
10*19293	G	5-15-4	JOSEPH I. KRAMAR, SR. JO ANN KRAMAR	TRIENERGY, INC.	1/8+	655	566	N/A	19/623 TriEnergy, Inc. to AB Resources, LLC	21/148 TriEnergy, Inc. to TriEnergy Holdings, LLC	24/319 AB Resources, LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	25/105 Chief Exploration & Development LLC, Chief Oil & Gas LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA	28/356 TriEnergy Holdings, LLC and TriEnergy, Inc. to Chevron USA	40/57 Chevron USA to TH Exploration LLC	
10*19139	H	5-11-14	HIRAM V. MOORE	GASTAR EXPLORATION USA INC	1/8+	699	53	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC	32/362 Gastar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC	
10*22667	I	5-11-21	REBEKAH DRAYER ELDRIDGE AND CHRISTOPHER ELDRIDGE	NOBLE ENERGY INC	1/8+	850	157	N/A	N/A	N/A	N/A	35/1 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC	

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Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*22773	I	5-11-21	CHRISTA DRAYER STALEY AND JOSHUA STALEY	NOBLE ENERGY INC	1/8+	851	3	N/A	N/A	N/A	N/A	35/1 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22777	I	5-11-21	BOYD BUESKING	NOBLE ENERGY INC	1/8+	850	159	N/A	N/A	N/A	N/A	35/1 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22780	I	5-11-21	BRENDA FAYE THOMAS PETRACK	NOBLE ENERGY INC	1/8+	850	161	N/A	N/A	N/A	N/A	35/1 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22786	I	5-11-21	GUY YATES	NOBLE ENERGY INC	1/8+	848	206	N/A	N/A	N/A	N/A	34/550 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22787	I	5-11-21	GAIL ANN YATES WOOD AND WESLEY J WOOD	NOBLE ENERGY INC	1/8+	848	208	N/A	N/A	N/A	N/A	34/550 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22788	I	5-11-21	GENIE SUE THOMAS HOLMES AND JOHN L HOLMES	NOBLE ENERGY INC	1/8+	848	204	N/A	N/A	N/A	N/A	34/550 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22801	I	5-11-21	BOYD DAIL YATES JR AND MARLA YATES	NOBLE ENERGY INC	1/8+	848	210	N/A	N/A	N/A	N/A	34/550 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22808	I	5-11-21	SHIRLEY YATES HARTSELL AND FREDDIE LEE HARTSELL	NOBLE ENERGY INC	1/8+	848	212	N/A	N/A	N/A	N/A	34/550 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC
10*22810	I	5-11-21	CLYDE V. & KAREN S REED	NOBLE ENERGY INC	1/8+	864	190	N/A	N/A	N/A	N/A	36/395 Noble Energy, Inc to CNX Gas Company, LLC	37/169 CNX Gas Company, LLC to Noble Energy, Inc	39/1 Noble Energy, Inc to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to Tug Hill Operating, LLC

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§ SS
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On this 18th day of October, 2016, before me, the undersigned authority, personally appeared David D. Kalish ("Affiant") who being first duly sworn under oath, deposes and saith:

1. TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC are wholly owned subsidiaries of THQ Appalachia I, LLC.
2. Tug Hill Operating, LLC provides oil and gas operations services to THQ Appalachia I, LLC under an Operating Services Agreement dated July 23, 2014.
3. David D. Kalish, the Affiant, is the Vice President of Tug Hill Operating, LLC, THQ Appalachia I, LLC, TH Exploration, LLC, TH Exploration II, LLC and TH Exploration III, LLC, and;
3. Tug Hill Operating, LLC is authorized to operate and maintain the assets owned by THQ Appalachia I, LLC, including, as referenced above, TH Exploration, LLC, TH Exploration II, LLC, and TH Exploration III, LLC, including oil and gas leases, wells, pipelines, surface facilities, and other all other assets that support the business of THQ Appalachia I, LLC, and;
4. Specifically, Tug Hill Operating, LLC is authorized to submit and obtain well work permits and carry out all activities pursuant to such work permits for assets owned by TH Exploration, LLC, TH Exploration II, LLC, TH Exploration III, LLC.

FURTHER, AFFIANT SAITH NOT.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 18th day of October, 2016.

David D. Kalish
Affiant: David D. Kalish

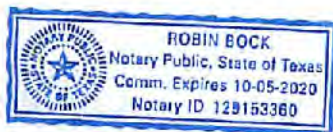
JURAT

Jan Pest
MARSHALL County 03:44:28 PM
Instrument No 1416299
Date Recorded 10/19/2016
Document Type HIS
Pages Recorded 1
Book-Page 29-62
Recording Fee \$5.00
Additional \$6.00

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Sworn and subscribed to (or affirmed) before me on this, the 18th day of October, 2016, by David D. Kalish

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



My Commission Expires: 10-05-2020
Signature/Notary Public: Robin Bock
Name/Notary Public (Print): Robin Bock

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Environmental Protection

STATE OF WEST VIRGINIA

§

COUNTY OF MARSHALL

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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 IH 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.

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1628355
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 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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August 15, 2018

MS LAURA ADKINS
WV DEP OFFICE OF OIL & GAS
601 57TH STREET SE
CHARLESTON, WV 25304-2345

VIA USPS

RE: Bryan N-3HM (47-051-02000) H6A Modification
Reason for Modification Request: Lengthen lateral
Franklin District, Marshall County, WV

Dear Laura:

Tug Hill Operating, LLC is submitting a modification to our approved permit # 47-051-0200 to extend the well bore due to recent acquisitions. To accompany this submittal, please find:

- Updated WW-6B signed by Jim Nicholson
- Updated Well bore schematic
- Updated Directional plan
- Updated well plat
- Updated mylar plat

If you have any questions or need any additional information, please do not hesitate to call me on (304) 376-0111. Thank you for your consideration.

Sincerely,

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

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Enclosures