



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, October 24, 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-2HM
47-051-01999-00-00

Shroten bottom hole location of lateral

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.



James A. Martin
Chief

Operator's Well Number: BRYAN N-2HM
Farm Name: CNX LAND RESOURCES, INC.
U.S. WELL NUMBER: 47-051-01999-00-00
Horizontal 6A New Drill
Date Modification Issued: 10/24/2018

Promoting a healthy environment.



September 4, 2018

WVDEP Office of Oil & Gas
Attn: Laura Adkins
601 57th Street, SE
Charleston, WV 25304-2345

Subject: **Permit Modification Request** for Bryan N-2HM API # 47-051-01999
Franklin District; Marshall County, WV
Changes to Permit: Lateral extension

Dear Laura:

Tug Hill is requesting a modification to the above-mentioned permit that will allow us to shorten the bottom hole location of this lateral. Enclosed please find the following:

- Revised WW-6B (approved by Jim Nicholson)
- Revised Mylar Well Plat
- Updated WW-6A1 Information

If you have any question or need any additional information please feel free to call me at 304-376-0111.
Thank you for your consideration in this matter.

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia Region

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WW-6B
(04/15)

API NO. 47-051 - 01999
OPERATOR WELL NO. Bryan N-2HM
Well Pad Name: Bryan

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-2HM 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 X Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow X Deep _____
Horizontal X

6) Existing Pad: Yes or No Yes

Handwritten: 9/4/18

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6429' - 6479', thickness of 50' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,579' *original 6596'*

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 18,319' *original 13,745'*

11) Proposed Horizontal Leg Length: 11,201' *original 6495'*

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

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

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

WW-6B
(04/15)

API NO. 47-051 - 01999
 OPERATOR WELL NO. Bryan N-2HM
 Well Pad Name: Bryan

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#	2,600'	2,600'	847ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	18,319'	18,319'	4671ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,073'	
Liners	N/A						

Handwritten signature and date: 8/4/15

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			
Sizes:	N/A			
Depths Set:	N/A			

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WW-6B
(10/14)

API NO. 47-051 - _____
OPERATOR WELL NO. Bryan N-2HM
Well Pad Name: Bryan

2/27/15

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 28,002,500 lb proppant and 432,939 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

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

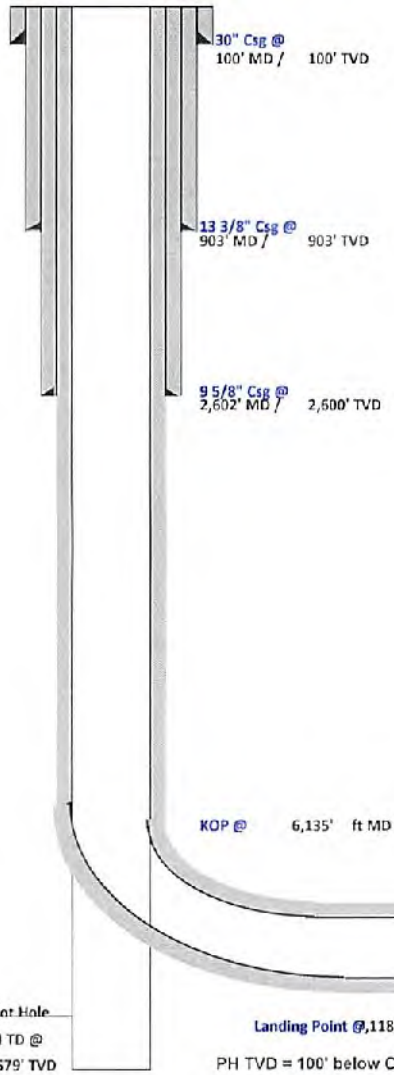


WELL NAME: Bryan N-2HM
STATE: West Virginia **COUNTY:** Marshall
DISTRICT: Franklin
DF Elev: 1,191' **GI Elev:** 1,191'
TD: 18,319'
TH Latitude: 39.800436
TH Longitude: -80.801866
BH Latitude: 39.800861
BH Longitude: -80.802191

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
Genesee/Burkett	6327
Tully	6362
Hamilton	6397
Marcellus	6429
Landing Depth	6459
Onondaga	6479
Pilot Hole Depth	6579

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'	BW	BW	Surface
Surface	17.5	13 3/8	903'	903'	54.5	H40	Surface
Intermediate 1	12 1/4	9 5/8	2,602'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	18,319' ✓	6,263' ✓	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	4,122	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



Pilot Hole
 PH TD @
 5,579' TVD

Landing Point @ 118' MD, 6,459' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 18,319' ft MD
 6,263' ft TVD

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Handwritten signature and date: 9/4/18



Tug Hill Operating, LLC Casing and Cement Program

Bryan N-2HM

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"	2,602'	CTS
Production	5 1/2"	P110	8 7/8 x 8 3/4"	18,319'	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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TUG HILL
OPERATING

Tug Hill Operating LLC
Well: **Bryan N-02HM (slot M)**
Site: **Bryan Pad**
Project: **Marshall County, WV**
Design: **rev4**

SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFabs	vSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
850.00	3.00	220.00	849.93	-3.01	-2.52	2.00	220.00	-0.80	Begin 3.00° tangent section
3003.02	3.00	220.00	3000.00	-89.33	-74.95	0.00	0.00	-23.70	Begin 2°/100' build/turn
4185.19	26.64	222.54	4134.76	-311.48	-275.89	2.00	2.84	-73.04	Begin 26.64° tangent section
6134.91	26.64	222.54	5877.50	-855.65	-867.92	0.00	0.00	-212.70	Begin 10°/100' build/turn
7118.32	91.00	329.32	6458.61	-604.54	-1407.21	10.00	104.65	396.97	Begin 91.00° lateral section
18318.82	91.00	329.32	5263.00	9026.73	-7121.37	0.00	0.00	1497.64	PBHL/TD 18318.82 MD 6263.00 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)

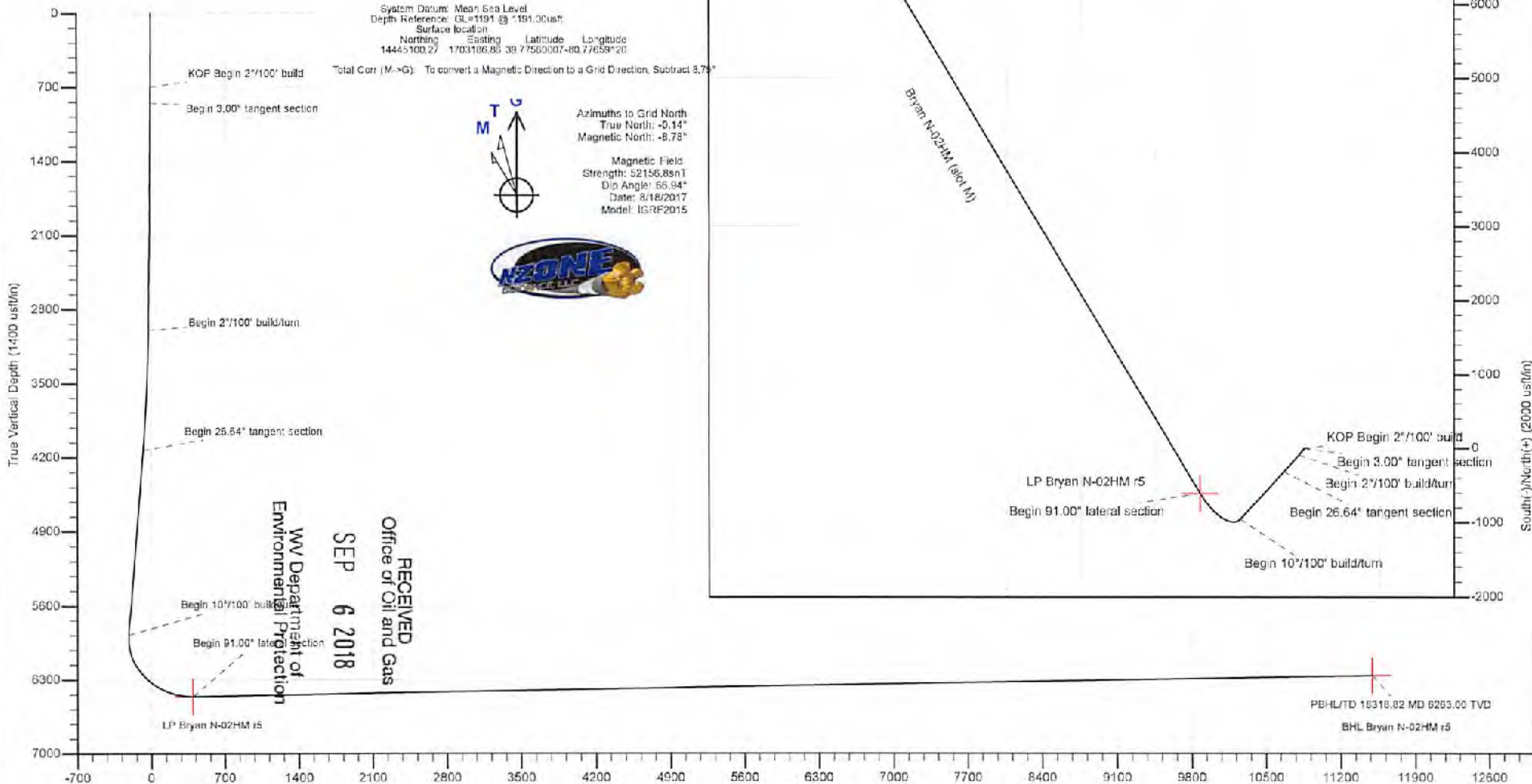
System Datum: Mean Sea Level
Depth Reference: GL=1191 @ 1191.000ft
Surface location:
Northing: 14445100.27 Easting: 1703186.86 Latitude: 39.77560007 Longitude: -80.77658920

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.75°



Azimuths to Grid North
True North: -0.14°
Magnetic North: -8.78°

Magnetic Field
Strength: 52156.85nT
Dip Angle: 66.94°
Date: 8/18/2017
Model: IGRF2015



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Vertical Section at 321.73° (1400 usf/m)



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryan N-02HM (slot M)
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-02HM (slot M)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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:		Northing:	14,445,110.80 usft	Latitude:	39.77562900
From:	Lat/Long	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-02HM (slot M)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,100.28 usft	Latitude:	39.77560007
	+E/-W	0.00 usft	Easting:	1,703,186.86 usft	Longitude:	-80.77659120
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	52,156.77728981

Design	rev4			
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	321.73

Plan Survey Tool Program	Date	8/17/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,318.82 rev4 (Original Hole)	MWD	MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
850.00	3.00	220.00	849.93	-3.01	-2.52	2.00	2.00	0.00	220.00	2.84
3,003.02	3.00	220.00	3,000.00	-89.33	-74.95	0.00	0.00	0.00	0.00	0.00
4,185.19	26.64	222.54	4,134.76	-311.48	-276.89	2.00	2.00	0.21	0.00	0.00
6,134.91	26.64	222.54	5,877.50	-955.65	-867.92	0.00	0.00	0.00	0.00	0.00
7,118.32	91.00	329.32	6,458.81	-604.54	-1,407.21	10.00	6.54	10.86	104.65	0.00
18,318.82	91.00	329.32	6,263.00	9,026.73	-7,121.37	0.00	0.00	0.00	0.00	0.00

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Planning Report - Geographic

Database: DB_Aug0118_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-02HM (slot M)
 Wellbore: Original Hole
 Design: rev4

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

Well Bryan N-02HM (slot M)
 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	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
100.00	0.00	0.00	100.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
200.00	0.00	0.00	200.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
300.00	0.00	0.00	300.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
400.00	0.00	0.00	400.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
500.00	0.00	0.00	500.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
600.00	0.00	0.00	600.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
700.00	0.00	0.00	700.00	0.00	0.00	14,445,100.28	1,703,186.86	39.77560007	-80.77659120
KOP Begin 2°/100' build									
800.00	2.00	220.00	799.98	-1.34	-1.12	14,445,098.94	1,703,185.74	39.77559641	-80.77659521
850.00	3.00	220.00	849.93	-3.01	-2.52	14,445,097.27	1,703,184.34	39.77559183	-80.77660021
Begin 3.00° tangent section									
900.00	3.00	220.00	899.86	-5.01	-4.21	14,445,095.26	1,703,182.65	39.77558634	-80.77660621
1,000.00	3.00	220.00	999.73	-9.02	-7.57	14,445,091.26	1,703,179.29	39.77557535	-80.77661822
1,100.00	3.00	220.00	1,099.59	-13.03	-10.93	14,445,087.25	1,703,175.93	39.77556436	-80.77663023
1,200.00	3.00	220.00	1,199.45	-17.04	-14.30	14,445,083.24	1,703,172.56	39.77555337	-80.77664224
1,300.00	3.00	220.00	1,299.31	-21.05	-17.66	14,445,079.23	1,703,169.20	39.77554239	-80.77665425
1,400.00	3.00	220.00	1,399.18	-25.06	-21.03	14,445,075.22	1,703,165.83	39.77553140	-80.77666626
1,500.00	3.00	220.00	1,499.04	-29.07	-24.39	14,445,071.21	1,703,162.47	39.77552041	-80.77667827
1,600.00	3.00	220.00	1,598.90	-33.08	-27.75	14,445,067.20	1,703,159.11	39.77550943	-80.77669028
1,700.00	3.00	220.00	1,698.77	-37.09	-31.12	14,445,063.19	1,703,155.74	39.77549844	-80.77670228
1,800.00	3.00	220.00	1,798.63	-41.09	-34.48	14,445,059.18	1,703,152.38	39.77548745	-80.77671429
1,900.00	3.00	220.00	1,898.49	-45.10	-37.85	14,445,055.17	1,703,149.01	39.77547646	-80.77672630
2,000.00	3.00	220.00	1,998.36	-49.11	-41.21	14,445,051.16	1,703,145.65	39.77546548	-80.77673831
2,100.00	3.00	220.00	2,098.22	-53.12	-44.57	14,445,047.15	1,703,142.29	39.77545449	-80.77675032
2,200.00	3.00	220.00	2,198.08	-57.13	-47.94	14,445,043.15	1,703,138.92	39.77544350	-80.77676233
2,300.00	3.00	220.00	2,297.94	-61.14	-51.30	14,445,039.14	1,703,135.56	39.77543251	-80.77677434
2,400.00	3.00	220.00	2,397.81	-65.15	-54.67	14,445,035.13	1,703,132.19	39.77542153	-80.77678635
2,500.00	3.00	220.00	2,497.67	-69.16	-58.03	14,445,031.12	1,703,128.83	39.77541054	-80.77679835
2,600.00	3.00	220.00	2,597.53	-73.17	-61.40	14,445,027.11	1,703,125.47	39.77539955	-80.77681036
2,700.00	3.00	220.00	2,697.40	-77.18	-64.76	14,445,023.10	1,703,122.10	39.77538857	-80.77682237
2,800.00	3.00	220.00	2,797.26	-81.19	-68.12	14,445,019.09	1,703,118.74	39.77537758	-80.77683438
2,900.00	3.00	220.00	2,897.12	-85.20	-71.49	14,445,015.08	1,703,115.37	39.77536659	-80.77684639
3,000.00	3.00	220.00	2,996.99	-89.20	-74.85	14,445,011.07	1,703,112.01	39.77535560	-80.77685840
3,003.02	3.00	220.00	3,000.00	-89.33	-74.95	14,445,010.95	1,703,111.91	39.77535527	-80.77685876
Begin 2°/100' build/turn									
3,100.00	4.94	221.11	3,096.74	-94.41	-79.33	14,445,005.86	1,703,107.53	39.77534132	-80.77687439
3,200.00	6.94	221.61	3,196.20	-102.17	-86.17	14,444,998.10	1,703,100.69	39.77532006	-80.77689880
3,300.00	8.94	221.89	3,295.24	-112.47	-95.37	14,444,987.80	1,703,091.49	39.77529184	-80.77693163
3,400.00	10.94	222.06	3,393.73	-125.30	-106.91	14,444,974.98	1,703,079.95	39.77525670	-80.77697283
3,500.00	12.94	222.19	3,491.57	-140.84	-120.79	14,444,959.64	1,703,066.07	39.77521467	-80.77702234
3,600.00	14.94	222.28	3,588.62	-158.47	-136.97	14,444,941.81	1,703,049.89	39.77516581	-80.77708011
3,700.00	16.94	222.34	3,684.77	-178.77	-155.46	14,444,921.50	1,703,031.40	39.77511018	-80.77714608
3,800.00	18.94	222.40	3,779.90	-201.52	-176.21	14,444,898.75	1,703,010.65	39.77504784	-80.77722015
3,900.00	20.94	222.44	3,873.91	-226.69	-199.21	14,444,873.58	1,702,987.65	39.77497698	-80.77730223
4,000.00	22.94	222.46	3,966.66	-254.25	-224.43	14,444,846.03	1,702,962.43	39.77490337	-80.77739224
4,100.00	24.94	222.51	4,058.08	-284.16	-251.84	14,444,816.11	1,702,935.02	39.77482141	-80.77749005
4,185.19	26.64	222.54	4,134.76	-311.48	-276.89	14,444,788.80	1,702,909.97	39.77474657	-80.77757944
4,185.20	26.64	222.54	4,134.77	-311.48	-276.89	14,444,788.80	1,702,909.97	39.77474656	-80.77757945
Begin 26.64° tangent section									
4,200.00	26.64	222.54	4,148.00	-316.37	-281.38	14,444,783.91	1,702,905.48	39.77473316	-80.77759546
4,300.00	26.64	222.54	4,237.38	-349.41	-311.69	14,444,750.87	1,702,875.17	39.77464283	-80.77770364
4,400.00	26.64	222.54	4,326.77	-382.45	-342.01	14,444,717.83	1,702,844.85	39.77455210	-80.77781182
4,500.00	26.64	222.54	4,416.15	-415.49	-372.32	14,444,684.79	1,702,814.54	39.77446158	-80.77792000



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryan N-02HM (slot M)
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-02HM (slot M)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,600.00	26.64	222.54	4,505.53	-446.52	-402.63	14,444,651.75	1,702,784.23	39.77437105	-80.77802818
4,700.00	26.64	222.54	4,594.92	-481.58	-432.95	14,444,618.71	1,702,753.91	39.77428052	-80.77813636
4,800.00	26.64	222.54	4,684.30	-514.60	-463.26	14,444,585.67	1,702,723.60	39.77418999	-80.77824454
4,900.00	26.64	222.54	4,773.69	-547.64	-493.57	14,444,552.63	1,702,693.29	39.77409946	-80.77835272
5,000.00	26.64	222.54	4,863.07	-580.68	-523.89	14,444,519.59	1,702,662.97	39.77400893	-80.77846090
5,100.00	26.64	222.54	4,952.45	-613.72	-554.20	14,444,486.56	1,702,632.66	39.77391840	-80.77856907
5,200.00	26.64	222.54	5,041.84	-646.76	-584.51	14,444,453.52	1,702,602.35	39.77382787	-80.77867725
5,300.00	26.64	222.54	5,131.22	-679.80	-614.83	14,444,420.48	1,702,572.03	39.77373734	-80.77878543
5,400.00	26.64	222.54	5,220.61	-712.84	-645.14	14,444,387.44	1,702,541.72	39.77364681	-80.77889361
5,500.00	26.64	222.54	5,309.99	-745.89	-675.45	14,444,354.40	1,702,511.41	39.77355629	-80.77900178
5,600.00	26.64	222.54	5,399.37	-778.92	-705.77	14,444,321.36	1,702,481.09	39.77346576	-80.77910996
5,700.00	26.64	222.54	5,488.75	-811.96	-736.08	14,444,288.32	1,702,450.78	39.77337523	-80.77921814
5,800.00	26.64	222.54	5,578.14	-845.00	-766.40	14,444,255.28	1,702,420.47	39.77328470	-80.77932631
5,900.00	26.64	222.54	5,667.53	-878.03	-796.71	14,444,222.24	1,702,390.15	39.77319417	-80.77943449
6,000.00	26.64	222.54	5,756.91	-911.07	-827.02	14,444,189.20	1,702,359.84	39.77310364	-80.77954266
6,100.00	26.64	222.54	5,846.29	-944.11	-857.34	14,444,156.16	1,702,329.52	39.77301311	-80.77965084
6,134.91	26.64	222.54	5,877.50	-955.65	-867.92	14,444,144.63	1,702,318.94	39.77298150	-80.77968860
Begin 10°/100' build/turn									
6,200.00	25.72	237.18	5,935.97	-974.08	-889.88	14,444,126.20	1,702,297.19	39.77283104	-80.77978620
6,300.00	27.23	259.47	6,025.71	-990.06	-930.50	14,444,110.22	1,702,256.36	39.77280743	-80.77991164
6,400.00	31.74	277.72	6,112.91	-960.70	-979.18	14,444,109.57	1,702,207.68	39.77288597	-80.78003488
6,500.00	38.20	291.11	6,194.94	-976.00	-1,034.22	14,444,124.28	1,702,152.64	39.77292673	-80.78029065
6,600.00	45.78	300.90	6,289.30	-948.39	-1,093.97	14,444,153.88	1,702,092.90	39.77300844	-80.78049302
6,700.00	54.00	308.36	6,333.72	-902.79	-1,156.59	14,444,197.50	1,702,030.27	39.77312664	-80.78071552
6,800.00	62.59	314.38	6,386.28	-848.48	-1,220.19	14,444,253.79	1,701,966.67	39.77328337	-80.78094139
6,900.00	71.41	319.52	6,425.31	-778.22	-1,282.84	14,444,321.06	1,701,904.02	39.77346881	-80.78116378
7,000.00	80.35	324.14	6,449.70	-703.03	-1,342.64	14,444,397.25	1,701,844.23	39.77367845	-80.78137592
7,100.00	89.35	328.52	6,458.67	-620.23	-1,397.75	14,444,480.05	1,701,788.11	39.77380622	-80.78157137
7,118.32	91.00	329.32	6,458.61	-604.54	-1,407.21	14,444,495.73	1,701,779.65	39.77394936	-80.78160489
Begin 91.00° lateral section									
7,200.00	91.00	329.32	6,457.19	-534.30	-1,448.88	14,444,565.97	1,701,737.98	39.77414254	-80.78175259
7,300.00	91.00	329.32	6,455.44	-448.31	-1,489.90	14,444,651.96	1,701,686.96	39.77437903	-80.78193342
7,400.00	91.00	329.32	6,453.69	-362.32	-1,550.92	14,444,737.95	1,701,635.95	39.77461552	-80.78211425
7,500.00	91.00	329.32	6,451.94	-276.33	-1,601.93	14,444,823.94	1,701,584.93	39.77485202	-80.78229508
7,600.00	91.00	329.32	6,450.20	-190.34	-1,652.95	14,444,909.93	1,701,533.91	39.77508851	-80.78247591
7,700.00	91.00	329.32	6,448.45	-104.35	-1,703.97	14,444,995.92	1,701,482.89	39.77532500	-80.78265674
7,800.00	91.00	329.32	6,446.70	-16.36	-1,754.98	14,445,081.91	1,701,431.88	39.77556149	-80.78283757
7,900.00	91.00	329.32	6,444.95	67.62	-1,806.00	14,445,167.90	1,701,380.86	39.77579798	-80.78301841
8,000.00	91.00	329.32	6,443.21	153.61	-1,857.02	14,445,253.89	1,701,329.84	39.77603447	-80.78319924
8,100.00	91.00	329.32	6,441.47	239.60	-1,908.03	14,445,339.88	1,701,278.83	39.77627097	-80.78338008
8,200.00	91.00	329.32	6,439.72	325.59	-1,959.05	14,445,425.87	1,701,227.81	39.77650746	-80.78356092
8,300.00	91.00	329.32	6,437.97	411.58	-2,010.07	14,445,511.86	1,701,176.79	39.77674395	-80.78374176
8,400.00	91.00	329.32	6,436.23	497.57	-2,061.09	14,445,597.85	1,701,125.78	39.77698044	-80.78392260
8,500.00	91.00	329.32	6,434.48	583.56	-2,112.10	14,445,683.84	1,701,074.76	39.77721693	-80.78410344
8,600.00	91.00	329.32	6,432.73	669.55	-2,163.12	14,445,769.83	1,701,023.74	39.77745341	-80.78428428
8,700.00	91.00	329.32	6,430.99	755.54	-2,214.14	14,445,855.82	1,700,972.72	39.77768990	-80.78446513
8,800.00	91.00	329.32	6,429.24	841.53	-2,265.15	14,445,941.81	1,700,921.71	39.77792639	-80.78464597
8,900.00	91.00	329.32	6,427.49	927.52	-2,316.17	14,446,027.80	1,700,870.69	39.77816288	-80.78482682
9,000.00	91.00	329.32	6,425.75	1,013.51	-2,367.19	14,446,113.79	1,700,819.67	39.77839937	-80.78500767
9,100.00	91.00	329.32	6,424.00	1,099.50	-2,418.20	14,446,199.78	1,700,768.66	39.77863586	-80.78518852
9,200.00	91.00	329.32	6,422.25	1,185.49	-2,469.22	14,446,285.77	1,700,717.64	39.77887234	-80.78536937
9,300.00	91.00	329.32	6,420.51	1,271.48	-2,520.24	14,446,371.76	1,700,666.62	39.77910883	-80.78555022
9,400.00	91.00	329.32	6,418.76	1,357.47	-2,571.26	14,446,457.75	1,700,615.61	39.77934532	-80.78573107
9,500.00	91.00	329.32	6,417.02	1,443.46	-2,622.27	14,446,543.74	1,700,564.59	39.77958180	-80.78591193



Planning Report - Geographic

Database: DB_Aug0116_LT_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-02HM (slot M)
 Wellbore: Original Hole
 Design: rev4

Local Co-ordinate Reference: Well Bryan N-02HM (slot M)
 TVD Reference: GL=1191 @ 1191.00usft
 MD Reference: GL=1191 @ 1191.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,600.00	91.00	329.32	6,415.27	1,529.45	-2,673.29	14,446,629.73	1,700,513.57	39.77881829	-80.78609278
9,700.00	91.00	329.32	6,413.52	1,615.44	-2,724.31	14,446,715.71	1,700,452.55	39.78005478	-80.78627364
9,800.00	91.00	329.32	6,411.78	1,701.43	-2,775.32	14,446,801.70	1,700,411.54	39.78029126	-80.78645450
9,900.00	91.00	329.32	6,410.03	1,787.42	-2,826.34	14,446,887.69	1,700,350.52	39.78052775	-80.78663536
10,000.00	91.00	329.32	6,408.28	1,873.41	-2,877.36	14,446,973.68	1,700,309.50	39.78076423	-80.78681622
10,100.00	91.00	329.32	6,406.54	1,959.40	-2,928.37	14,447,059.67	1,700,258.49	39.78100072	-80.78699708
10,200.00	91.00	329.32	6,404.79	2,045.39	-2,979.39	14,447,145.66	1,700,207.47	39.78123270	-80.78717794
10,300.00	91.00	329.32	6,403.04	2,131.38	-3,030.41	14,447,231.65	1,700,156.45	39.78147369	-80.78735881
10,400.00	91.00	329.32	6,401.30	2,217.37	-3,081.43	14,447,317.64	1,700,105.44	39.78171017	-80.78753967
10,500.00	91.00	329.32	6,399.55	2,303.36	-3,132.44	14,447,403.63	1,700,054.42	39.78194665	-80.78772054
10,600.00	91.00	329.32	6,397.80	2,389.34	-3,183.46	14,447,489.62	1,700,003.40	39.78218314	-80.78790141
10,700.00	91.00	329.32	6,396.06	2,475.33	-3,234.48	14,447,575.61	1,699,952.38	39.78241962	-80.78808227
10,800.00	91.00	329.32	6,394.31	2,561.32	-3,285.49	14,447,661.60	1,699,901.37	39.78265610	-80.78826314
10,900.00	91.00	329.32	6,392.57	2,647.31	-3,336.51	14,447,747.59	1,699,850.35	39.78289259	-80.78844402
11,000.00	91.00	329.32	6,390.82	2,733.30	-3,387.53	14,447,833.58	1,699,799.33	39.78312907	-80.78862489
11,100.00	91.00	329.32	6,389.07	2,819.29	-3,438.54	14,447,919.57	1,699,748.32	39.78336555	-80.78880576
11,200.00	91.00	329.32	6,387.33	2,905.28	-3,489.56	14,448,005.56	1,699,697.30	39.78360203	-80.78898664
11,300.00	91.00	329.32	6,385.58	2,991.27	-3,540.58	14,448,091.55	1,699,646.28	39.78383851	-80.78916751
11,400.00	91.00	329.32	6,383.83	3,077.26	-3,591.59	14,448,177.54	1,699,595.27	39.78407500	-80.78934839
11,500.00	91.00	329.32	6,382.09	3,163.25	-3,642.61	14,448,263.53	1,699,544.25	39.78431148	-80.78952927
11,600.00	91.00	329.32	6,380.34	3,249.24	-3,693.63	14,448,349.52	1,699,493.23	39.78454796	-80.78971015
11,700.00	91.00	329.32	6,378.59	3,335.23	-3,744.65	14,448,435.51	1,699,442.21	39.78478444	-80.78989103
11,800.00	91.00	329.32	6,376.85	3,421.22	-3,795.66	14,448,521.50	1,699,391.20	39.78502092	-80.79007192
11,900.00	91.00	329.32	6,375.10	3,507.21	-3,846.68	14,448,607.49	1,699,340.18	39.78525740	-80.79025280
12,000.00	91.00	329.32	6,373.35	3,593.20	-3,897.70	14,448,693.48	1,699,289.16	39.78549388	-80.79043368
12,100.00	91.00	329.32	6,371.61	3,679.19	-3,948.71	14,448,779.47	1,699,238.15	39.78573036	-80.79061457
12,200.00	91.00	329.32	6,369.86	3,765.18	-3,999.73	14,448,865.46	1,699,187.13	39.78596683	-80.79079546
12,300.00	91.00	329.32	6,368.12	3,851.17	-4,050.75	14,448,951.45	1,699,136.11	39.78620331	-80.79097635
12,400.00	91.00	329.32	6,366.37	3,937.16	-4,101.76	14,449,037.43	1,699,085.10	39.78643979	-80.79115724
12,500.00	91.00	329.32	6,364.62	4,023.15	-4,152.78	14,449,123.42	1,699,034.08	39.78667627	-80.79133813
12,600.00	91.00	329.32	6,362.88	4,109.14	-4,203.80	14,449,209.41	1,698,983.06	39.78691275	-80.79151902
12,700.00	91.00	329.32	6,361.13	4,195.13	-4,254.82	14,449,295.40	1,698,932.04	39.78714922	-80.79169992
12,800.00	91.00	329.32	6,359.38	4,281.12	-4,305.83	14,449,381.39	1,698,881.03	39.78738570	-80.79188081
12,900.00	91.00	329.32	6,357.64	4,367.11	-4,356.85	14,449,467.38	1,698,830.01	39.78762218	-80.79206171
13,000.00	91.00	329.32	6,355.89	4,453.10	-4,407.87	14,449,553.37	1,698,778.99	39.78785865	-80.79224260
13,100.00	91.00	329.32	6,354.14	4,539.09	-4,458.88	14,449,639.36	1,698,727.98	39.78809513	-80.79242350
13,200.00	91.00	329.32	6,352.40	4,625.08	-4,509.90	14,449,725.35	1,698,676.96	39.78833161	-80.79260440
13,300.00	91.00	329.32	6,350.65	4,711.07	-4,560.92	14,449,811.34	1,698,625.94	39.78856808	-80.79278530
13,400.00	91.00	329.32	6,348.90	4,797.05	-4,611.93	14,449,897.33	1,698,574.93	39.78880456	-80.79296621
13,500.00	91.00	329.32	6,347.16	4,883.04	-4,662.95	14,449,983.32	1,698,523.91	39.78904103	-80.79314711
13,600.00	91.00	329.32	6,345.41	4,969.03	-4,713.97	14,450,069.31	1,698,472.89	39.78927751	-80.79332802
13,700.00	91.00	329.32	6,343.67	5,055.02	-4,764.99	14,450,155.30	1,698,421.87	39.78951398	-80.79350892
13,800.00	91.00	329.32	6,341.92	5,141.01	-4,816.00	14,450,241.29	1,698,370.86	39.78975046	-80.79368983
13,900.00	91.00	329.32	6,340.17	5,227.00	-4,867.02	14,450,327.28	1,698,319.84	39.78998693	-80.79387074
14,000.00	91.00	329.32	6,338.43	5,312.99	-4,918.04	14,450,413.27	1,698,268.82	39.79022340	-80.79405165
14,100.00	91.00	329.32	6,336.68	5,398.98	-4,969.05	14,450,499.26	1,698,217.81	39.79045988	-80.79423256
14,200.00	91.00	329.32	6,334.93	5,484.97	-5,020.07	14,450,585.25	1,698,166.79	39.79069635	-80.79441347
14,300.00	91.00	329.32	6,333.19	5,570.96	-5,071.09	14,450,671.24	1,698,115.77	39.79093282	-80.79459438
14,400.00	91.00	329.32	6,331.44	5,656.95	-5,122.10	14,450,757.23	1,698,064.76	39.79116930	-80.79477530
14,500.00	91.00	329.32	6,329.69	5,742.94	-5,173.12	14,450,843.22	1,698,013.74	39.79140577	-80.79495622
14,600.00	91.00	329.32	6,327.95	5,828.93	-5,224.14	14,450,929.21	1,697,962.72	39.79164224	-80.79513713
14,700.00	91.00	329.32	6,326.20	5,914.92	-5,275.16	14,451,015.20	1,697,911.71	39.79187871	-80.79531805
14,800.00	91.00	329.32	6,324.45	6,000.91	-5,326.17	14,451,101.19	1,697,860.69	39.79211518	-80.79549897
14,900.00	91.00	329.32	6,322.71	6,086.90	-5,377.19	14,451,187.18	1,697,809.67	39.79235165	-80.79567989
15,000.00	91.00	329.32	6,320.96	6,172.89	-5,428.21	14,451,273.17	1,697,758.65	39.79258812	-80.79586081



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryen N-02HM (slot M)
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-02HM (slot M)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

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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	
15,100.00	91.00	329.32	6,319.21	6,258.88	-5,479.22	14,451,359.15	1,697,707.64	39.79262459	-80.79604174	
15,200.00	91.00	329.32	6,317.47	6,344.87	-5,530.24	14,451,445.14	1,697,858.62	39.79308107	-80.79622266	
15,300.00	91.00	329.32	6,315.72	6,430.86	-5,581.26	14,451,531.13	1,697,605.60	39.79329753	-80.79640359	
15,400.00	91.00	329.32	6,313.98	6,516.85	-5,632.27	14,451,617.12	1,697,554.59	39.79353400	-80.79658452	
15,500.00	91.00	329.32	6,312.23	6,602.84	-5,683.29	14,451,703.11	1,697,503.57	39.79377047	-80.79676544	
15,600.00	91.00	329.32	6,310.48	6,688.83	-5,734.31	14,451,789.10	1,697,452.55	39.79400694	-80.79694637	
15,700.00	91.00	329.32	6,308.74	6,774.82	-5,785.33	14,451,875.09	1,697,401.54	39.79424341	-80.79712730	
15,800.00	91.00	329.32	6,306.99	6,860.81	-5,836.34	14,451,961.08	1,697,350.52	39.79447988	-80.79730824	
15,900.00	91.00	329.32	6,305.24	6,946.80	-5,887.36	14,452,047.07	1,697,299.50	39.79471635	-80.79748917	
16,000.00	91.00	329.32	6,303.50	7,032.79	-5,938.38	14,452,133.06	1,697,248.48	39.79495282	-80.79767010	
16,100.00	91.00	329.32	6,301.75	7,118.77	-5,989.39	14,452,219.05	1,697,197.47	39.79518928	-80.79785104	
16,200.00	91.00	329.32	6,300.00	7,204.76	-6,040.41	14,452,305.04	1,697,146.45	39.79542575	-80.79803198	
16,300.00	91.00	329.32	6,298.26	7,290.75	-6,091.43	14,452,391.03	1,697,095.43	39.79566222	-80.79821292	
16,400.00	91.00	329.32	6,296.51	7,376.74	-6,142.44	14,452,477.02	1,697,044.42	39.79589868	-80.79839386	
16,500.00	91.00	329.32	6,294.76	7,462.73	-6,193.46	14,452,563.01	1,696,993.40	39.79613515	-80.79857480	
16,600.00	91.00	329.32	6,293.02	7,548.72	-6,244.48	14,452,649.00	1,696,942.38	39.79637162	-80.79875574	
16,700.00	91.00	329.32	6,291.27	7,634.71	-6,295.50	14,452,734.99	1,696,891.37	39.79660808	-80.79893668	
16,800.00	91.00	329.32	6,289.53	7,720.70	-6,346.51	14,452,820.98	1,696,840.35	39.79684455	-80.79911763	
16,900.00	91.00	329.32	6,287.78	7,806.69	-6,397.53	14,452,906.97	1,696,789.33	39.79708101	-80.79929857	
17,000.00	91.00	329.32	6,286.03	7,892.68	-6,448.55	14,452,992.96	1,696,738.31	39.79731748	-80.79947952	
17,100.00	91.00	329.32	6,284.29	7,978.67	-6,499.56	14,453,078.95	1,696,687.30	39.79755394	-80.79966047	
17,200.00	91.00	329.32	6,282.54	8,064.66	-6,550.58	14,453,164.94	1,696,636.28	39.79779041	-80.79984142	
17,300.00	91.00	329.32	6,280.79	8,150.65	-6,601.60	14,453,250.93	1,696,585.26	39.79802687	-80.80002237	
17,400.00	91.00	329.32	6,279.05	8,236.64	-6,652.61	14,453,336.92	1,696,534.25	39.79826334	-80.80020332	
17,500.00	91.00	329.32	6,277.30	8,322.63	-6,703.63	14,453,422.91	1,696,483.23	39.79849980	-80.80038427	
17,600.00	91.00	329.32	6,275.55	8,408.62	-6,754.65	14,453,508.90	1,696,432.21	39.79873628	-80.80056523	
17,700.00	91.00	329.32	6,273.81	8,494.61	-6,805.67	14,453,594.89	1,696,381.20	39.79897273	-80.80074618	
17,800.00	91.00	329.32	6,272.06	8,580.60	-6,856.68	14,453,680.88	1,696,330.18	39.79920919	-80.80092714	
17,900.00	91.00	329.32	6,270.31	8,666.59	-6,907.70	14,453,766.86	1,696,279.16	39.79944565	-80.80110810	
18,000.00	91.00	329.32	6,268.57	8,752.58	-6,958.72	14,453,852.85	1,696,228.14	39.79968211	-80.80128906	
18,100.00	91.00	329.32	6,266.82	8,838.57	-7,009.73	14,453,938.84	1,696,177.13	39.79991857	-80.80147002	
18,200.00	91.00	329.32	6,265.08	8,924.56	-7,060.75	14,454,024.83	1,696,126.11	39.80015504	-80.80165098	
18,300.00	91.00	329.32	6,263.33	9,010.55	-7,111.77	14,454,110.82	1,696,075.09	39.80039150	-80.80183194	
18,318.82	91.00	329.32	6,263.00	9,026.73	-7,121.37	14,454,127.01	1,696,065.49	39.80043600	-80.80188600	

PBHL/TD 18318.82 MD 6263.00 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-02HM r5 - plan hits target center - Point	0.00	0.00	6,263.00	9,026.73	-7,121.37	14,454,127.01	1,696,065.49	39.80043600	-80.80188600	
LP Bryan N-02HM r5 - plan hits target center - Point	0.00	0.00	6,458.61	-604.54	-1,407.21	14,444,495.74	1,701,779.65	39.77394937	-80.78160489	



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Bryan N-02HM (slot M)
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-02HM (slot M)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev4		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.00	700.00	0.00	0.00	KOP Begin 2°/100' build
850.00	849.93	-3.01	-2.52	Begin 3.00° tangent section
3,003.02	3,000.00	-89.33	-74.95	Begin 2°/100' build/turn
4,185.20	4,134.77	-311.48	-276.89	Begin 26.64° tangent section
6,134.91	5,877.50	-955.65	-867.92	Begin 10°/100' build/turn
7,118.32	6,458.61	-604.54	-1,407.21	Begin 91.00° lateral section
18,318.82	6,263.00	9,026.73	-7,121.37	PBHL/TD 18318.82 MD 6263.00 TVD

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form wv6

PG 2 OF 2

**BRYAN LEASE
WELL N-2HM
876.208± 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	1.726
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 C. 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. Gartman & 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. Rine	42.367
S62	05-11-2.2	Joshua A. Myers	2.193
S63	05-11-2.1	Walter C. & Cheryl A. Rine	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-2HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 2
DATE: 12/12/2017
REVISED DATE:
08/23/18

WW-6A1
(5/13)

Operator's Well No. Bryan N-2HM

**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

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@tughill.com*

Its: Permitting Specialist

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Office of Oil and Gas

SEP 6 2018

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 I 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*19339	B	5-15-10	MARK STANLEY RUCKMAN	TRIENERGY INC	1/8+	741	75	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*19337	C	5-15-12	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*19337	D	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	E	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	E	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	E	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	E	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	E	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	E	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

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Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19315	E	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	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19316	E	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	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19317	E	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	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19318	E	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	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19319	E	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	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19320	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	E	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	40/57 Chevron USA Inc to TH Exploration LLC	
10*14053	F	5-15-1	LARRY D. MCWHORTER	GASTAR EXPLORATION USA, INC.	1/8+	727	570	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc
10*14054	F	5-15-1	RUDELPH RAUKAR, JR.	GASTAR EXPLORATION USA, INC.	1/8+	730	189	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc
10*14055	F	5-15-1	VICTOR PEDDICORD	GASTAR EXPLORATION USA, INC.	1/8+	730	193	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc
10*14056	F	5-15-1	WALLACE T. BERRY	GASTAR EXPLORATION USA, INC.	1/8+	731	156	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc

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10*14057	F	5-15-1	THE SAMUEL MILTON SHEETS TRUST	GASTAR EXPLORATION USA, INC.	1/8+	732	624	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14058	F	5-15-1	NANCY HOFSTATTER	GASTAR EXPLORATION USA, INC.	1/8+	732	628	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14059	F	5-15-1	LAURA BERRY MCGLYNN	GASTAR EXPLORATION USA, INC.	1/8+	732	622	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14060	F	5-15-1	SUSAN E GORE	GASTAR EXPLORATION USA INC	1/8+	768	488	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14061	F	5-15-1	LINDA TAYLOR	GASTAR EXPLORATION USA, INC	1/8+	770	476	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14062	F	5-15-1	REBECCA MCMILLAN	GASTAR EXPLORATION USA INC	1/8+	803	482	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14063	F	5-15-1	DAVID BURKETT	GASTAR EXPLORATION USA INC	1/8+	803	480	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14043	F	5-15-1	PATRICK R. WALSH	GASTAR EXPLORATION USA, INC.	1/8+	725	566	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14044	F	5-15-1	JOSEPH WESLEY GALLAHER, II	GASTAR EXPLORATION USA, INC.	1/8+	724	232	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14045	F	5-15-1	LAMOYNE BAKER	GASTAR EXPLORATION USA, INC.	1/8+	724	236	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14046	F	5-15-1	CHARLES THOMPSON GALLAHER, II	GASTAR EXPLORATION USA, INC.	1/8+	724	234	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14047	F	5-15-1	LESLIE ANN BLYTHE	GASTAR EXPLORATION USA, INC.	1/8+	726	645	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14048	F	5-15-1	BRYANNA FLYNN RANKIN	GASTAR EXPLORATION USA, INC.	1/8+	727	3	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14049	F	5-15-1	WILDA WINTERS	GASTAR EXPLORATION USA, INC.	1/8+	726	643	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14050	F	5-15-1	JUDITH L. CHAMBERS	GASTAR EXPLORATION USA, INC.	1/8+	726	647	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14051	F	5-15-1	AMANDA L. SMITH	GASTAR EXPLORATION USA, INC.	1/8+	727	572	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14052	F	5-15-1	MAY ELIZABETH GALLAHER BROWNING	GASTAR EXPLORATION USA, INC.	1/8+	727	568	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*47051.331.1	F	5-15-1	LEEANN M LEMONOVICH	TH EXPLORATION LLC	1/8+	910	136	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14042	F	5-15-1	RALPH B TAYLOR	GASTAR EXPLORATION USA, INC.	1/8+	665	487	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14064	F	5-15-1	CIRRUS MINERALS LLC BY CHRISTO	GASTAR EXPLORATION INC	1/8+	843	452	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*19038	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC

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10*19254	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19046	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19047	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19048	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19055	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19056	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19061	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19066	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19068	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19069	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19071	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19074	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19076	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19030	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19080	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19081	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19128	G	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19293	G	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*19374	H	5-11-15	BARBARA ANN ADKINS JOHNSON	TH EXPLORATION LLC	1/8+	938	387	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19353	H	5-11-15	KATHLEEN TOLER CLEMENTS AND DAN CLEMENTS	TH EXPLORATION LLC	1/8+	939	322	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19350	H	5-11-15	JANE A TOLER FOREMAN	TH EXPLORATION LLC	1/8+	939	329	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18174	H	5-11-15	THE ESTATE OF ROY JOSEPH LEACH	TH EXPLORATION LLC	1/8+	927	647	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18045	H	5-11-15	KLOVA ANN MORRIS	TH EXPLORATION LLC	1/8+	927	114	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*17329	H	5-11-15	JOHN P ICARD AND REVA J ICARD	TH EXPLORATION LLC	1/8+	943	524	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*16913	H	5-11-15	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	910	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*14911	H	5-11-15	FORREST MILLER	GASTAR EXPLORATION USA INC	1/8+	819	316	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc
10*19642	H	5-11-15	NOEL A PARKS	TH EXPLORATION LLC	1/8+	944	92	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*19009	I	5-12-11	LAMOYNE BAKER	GASTAR EXPLORATION USA INC	1/8+	665	554	N/A	N/A	N/A	23/353 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	26/419 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration, Inc and Gastar Exploration USA, Inc merger	32/362 Gastar Exploration Inc. and Atinum Marcellus I LLC, to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*22065	I	5-12-11	WESLEY R BRYAN II	TH EXPLORATION LLC	1/8+	960	417	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*22066	I	5-12-11	WESLEY R BRYAN	TH EXPLORATION LLC	1/8+	960	419	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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10*22667	J	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
10*22773	J	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	J	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	J	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	J	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	J	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	J	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	J	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	J	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	J	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
10*16908	K	5-12-12	LIONEL L AND MARY LEE PERSINGER	TH EXPLORATION LLC	1/8+	976	623	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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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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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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DPS LAND SERVICES CORP
6000 TOWN CENTER BOULEVARD, SUITE 145
CANONSBURG, PA 15317-5941

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement is entered into this 26th day of February, 2018, between TUG HILL OPERATING, LLC ("THQ"), a Texas limited liability company, whose address is 1320 S. University Blvd., Suite 500, Fort Worth, TX 76107 and HG Energy II APPALACHIA, LLC ("HG"), a Delaware limited liability company, whose address is 5260 Dupont Road, Parkersburg, WV 26101.

PARTIES AND AGREEMENT REFERENCE: THQ and HG entered into a letter agreement ("Letter Agreement") dated February 26, 2018 (the "Commencement Date") outlining pursuit of definitive agreements to allow THQ the right to permit, drill, extract, produce and market oil and gas from those certain oil and gas interests controlled by HG in Franklin District of Marshall County, West Virginia, as more fully described in Exhibit A attached hereto, made a part hereof, and incorporated herein by reference.


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


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

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

Tug Hill Operating, LLC

HG Energy II Appalachia, LLC

By: 
Name: Douglas L. DeMartino
Title: Attorney-in-Fact

By: 
Its: V. Prof Land + Attorney in - Fact

Prepared by Tug Hill Operating, LLC
1320 S. University Dr., Suite 500, Fort Worth, TX 76107

Marshall County
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Instrument 1437593
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AGREEMENT
Book 962 @ Page 488
Pages Recorded 3
Recording Cost \$ 11.00