



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-7HM
47-051-01978-00-00

Extend bottom hole with lease(s)

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 stylized and cursive.

James A. Martin
Chief

Operator's Well Number: BRYAN N-7HM
Farm Name: CNX LAND RESOURCES, INC.
U.S. WELL NUMBER: 47-051-01978-00-00
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-7HM 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 _____

Handwritten signature and date: 8/15/18

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6466' - 6519', thickness of 54' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,596'

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 22,277'

11) Proposed Horizontal Leg Length: 14,527.38'

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

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

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	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#	2,622'	2,622'	854ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	22,277'	22,277'	5679ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,593'	
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 31 2018
Depths Set:	N/A				WV Department of Environmental Protection

JW
5/15/18

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

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

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

Well to be completed with approximately 36,312,500 lb proppant and 561,418 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

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*Note: Attach additional sheets as needed.



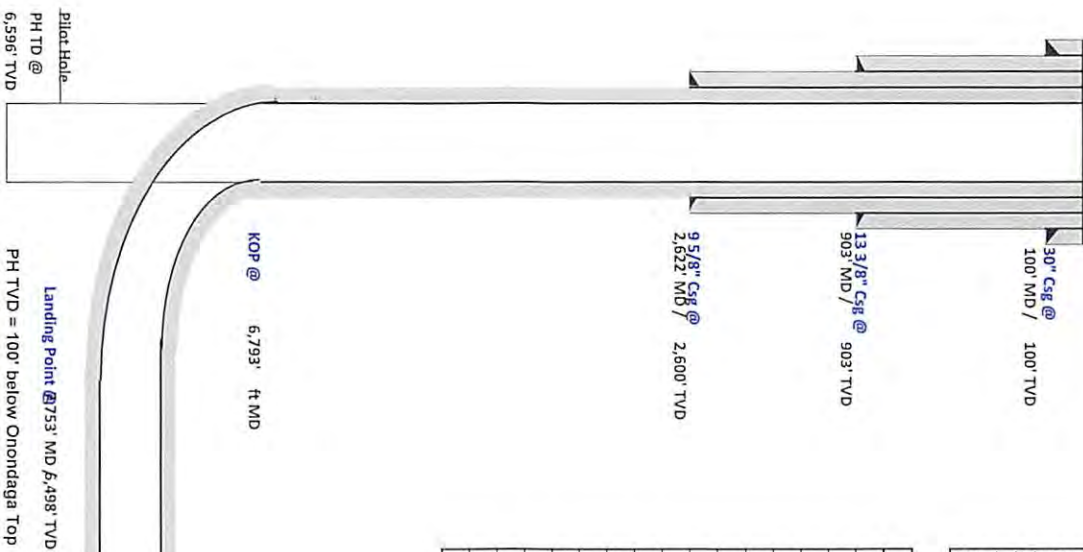
TUG HILL
OPERATING

WELL NAME: Bryan N-7HM COUNTY: Marshall
 STATE: West Virginia DISTRICT: Franklin
 DE Elev: 1,191' GL Elev: 1,191'
 TD: 22,277'
 TH Latitude: 39.77574797
 TH Longitude: -80.77656912
 BH Latitude: 39.81485799
 BH Longitude: -80.79566099

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FORMATION TOPS	Depth TVD
Formation	803
Deepest Fresh Water	701
Sewickley Coal	796
Pittsburgh Coal	1970
Big Lime	2324
Weir	2519
Berea	2864
Gordon	5717
Rhinestreet	6347
Genesee/Burkett	6382
Tully	6417
Hamilton	6465
Marcellus	6498
Landing Depth	6515
Onondaga	6596
Pilot Hole Depth	6596

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	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,622'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	22,277'	6,245'	20	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centralizer Notes	
291	A	15.6	Air	None	
934	A	15.6	Air	3 Centralizers at equal distance	
845	A	15	Air	1 Centralizer every other jt	
5,013	A	14.5	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc	

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Landing Point @ 753' MD 6,498' TVD
 PH TVD = 100' below Onondaga Top

Lateral TD @ 22,277' ft MD
 6,245' ft TVD



Tug Hill Operating, LLC Casing and Cement Program

Bryan N-7HM

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Casing	String	Conductor	Surface	Intermediate	Production
Grade	30"	30"	13 3/8"	9 5/8"	5 1/2"
BW	BW	J55	J55	J55	P110
Bit Size	36"	17 1/2"	12 1/4"	8 7/8 x 8 3/4"	
Depth (Measured)	100'	903'	2,622'	22,277'	
Cement Fill Up	CTS	CTS	CTS	CTS	CTS

Cement

Conductor:	Surface:	Intermediate:	Kick Off Plug:	Production:
Premium NE-1 + 2% bwoc CAC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2	Premium NE-1 + 2% bwoc CAC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2	Premium NE-1 + 1% bwoc CAC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19	Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug	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

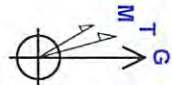


TUG HILL
OPERATING

Tug Hill Operating LLC
Well: **Bryan N-07HM (Slot A)**
Site: **Bryan Pad**
Project: **Marshall County, WV**
Design: **rev5**

SECTION DETAILS

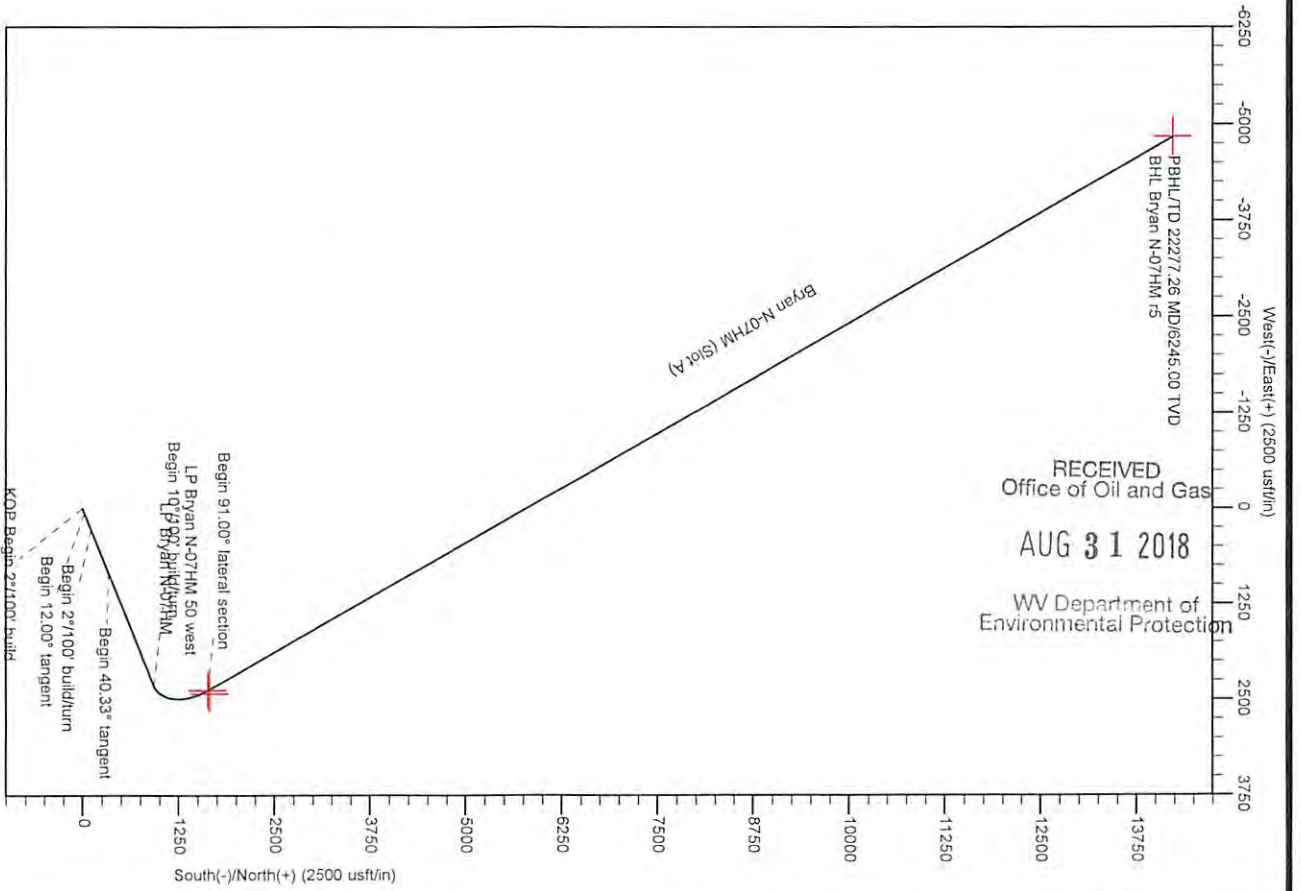
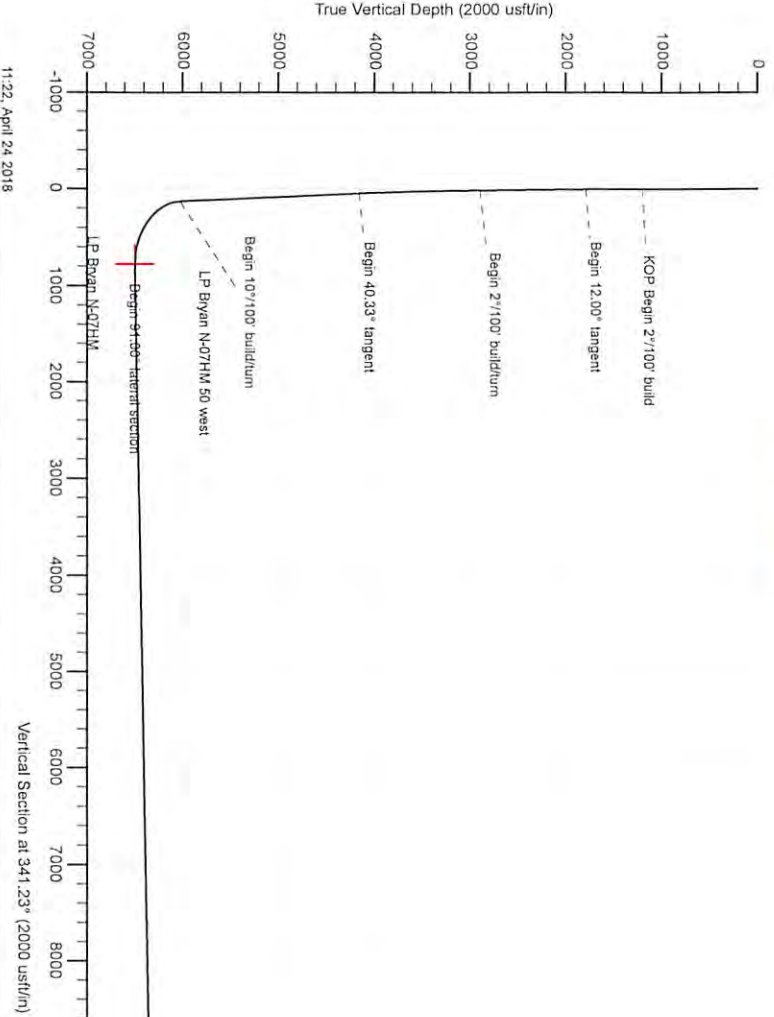
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2'100" build
3	1800.00	12.00	68.23	1795.62	23.22	58.14	2.00	68.23	3.28	Begin 12.00° tangent
4	2829.05	12.00	68.23	2900.00	110.28	276.14	0.00	0.00	15.58	Begin 2'100" build
5	4345.43	40.33	68.35	4158.34	339.37	850.32	2.00	0.03	47.76	Begin 40.33° tangent
6	6792.81	40.33	68.25	6024.12	926.17	2321.44	0.00	0.00	130.07	Begin 10'100" build
7	7752.62	91.00	330.18	6498.00	1630.49	2387.50	10.00	-95.53	775.68	Begin 91.00° lateral section
8	22277.26	91.00	330.18	6245.00	14229.53	-4835.05	0.00	0.00	5028.55	PBHL/TD 22277.26 MD/6245.00 TVD



Azimuths to Grid North
True North: -0.14°
Magnetic North: -8.78°
Magnetic Field
Strength: 52156.8nT
Dip Angle: 66.94°
Date: 01/02/07
Model: GSRF2015



Geodetic System: Universal Transverse Mercator (US Survey Feet)
Datum: NAD83 West Virginia - HARN
Ellipsoid: GRS 1980
Zone: Zone 17N (94 W to 78 W)
System Datum: Mean Sea Level
Depth Ref Surface: @ 1191.00ust
Northing: 14445154.14
Easting: 1703192.93
Latitude: 39.77574797
Longitude: -80.77655912
Total Corr' (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.79°



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11:22, April 24, 2018

Vertical Section at 341.23° (2000 usf/in)



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
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-07HM (Slot A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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-07HM (Slot A)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,154.15 usft	Latitude:	39.77574797
	+E/-W	0.00 usft	Easting:	1,703,192.93 usft	Longitude:	-80.77656912
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
	IGRF2015	8/18/2017	(°)	(°)	(nT)
			-8.64	66.94	52,156.84969974

Design	rev5			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	341.23

Plan Survey Tool Program	Date	4/24/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	22,277.26 rev5 (Original Hole)	MWD	MWD - Standard

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Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	12.00	68.23	1,795.62	23.22	58.14	2.00	2.00	0.00	68.23	
2,929.05	12.00	68.23	2,900.00	110.28	276.14	0.00	0.00	0.00	0.00	
4,345.43	40.33	68.25	4,158.34	339.37	850.32	2.00	2.00	0.00	0.03	
6,792.81	40.33	68.25	6,024.13	926.17	2,321.44	0.00	0.00	0.00	0.00	
7,752.62	91.00	330.18	6,498.00	1,630.49	2,387.50	10.00	5.28	-10.22	-95.53	LP Bryan N-07HM 50
22,277.26	91.00	330.18	6,245.00	14,229.53	-4,835.05	0.00	0.00	0.00	0.00	BHL Bryan N-07HM r

Database: DB_Jul2216dt_v14
Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Bryan Pad
Well: Bryan N-07HM (Slot A)
Wellbore: Original Hole
Design: rev5

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

Well Bryan N-07HM (Slot A)
 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	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
100.00	0.00	0.00	100.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
200.00	0.00	0.00	200.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
300.00	0.00	0.00	300.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
400.00	0.00	0.00	400.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
500.00	0.00	0.00	500.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
600.00	0.00	0.00	600.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
700.00	0.00	0.00	700.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
800.00	0.00	0.00	800.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
900.00	0.00	0.00	900.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,445,154.15	1,703,192.93	39.77574797	-80.77656912
KOP Begin 2°/100' build									
1,300.00	2.00	68.23	1,299.98	0.65	1.62	14,445,154.79	1,703,194.55	39.77574974	-80.77656335
1,400.00	4.00	68.23	1,399.83	2.59	6.48	14,445,156.73	1,703,199.41	39.77575504	-80.77654603
1,500.00	6.00	68.23	1,499.45	5.82	14.57	14,445,159.97	1,703,207.50	39.77576386	-80.77651720
1,600.00	8.00	68.23	1,598.70	10.34	25.89	14,445,164.49	1,703,218.82	39.77577619	-80.77647688
1,700.00	10.00	68.23	1,697.46	16.14	40.42	14,445,170.29	1,703,233.35	39.77579202	-80.77642512
1,800.00	12.00	68.23	1,795.62	23.22	58.14	14,445,177.36	1,703,251.07	39.77581134	-80.77636199
Begin 12.00° tangent									
1,900.00	12.00	68.23	1,893.43	30.93	77.45	14,445,185.08	1,703,270.38	39.77583238	-80.77629321
2,000.00	12.00	68.23	1,991.25	38.64	96.75	14,445,192.79	1,703,289.68	39.77585342	-80.77622442
2,100.00	12.00	68.23	2,089.06	46.35	116.06	14,445,200.50	1,703,308.99	39.77587447	-80.77615563
2,200.00	12.00	68.23	2,186.88	54.06	135.37	14,445,208.21	1,703,328.30	39.77589551	-80.77608684
2,300.00	12.00	68.23	2,284.69	61.77	154.68	14,445,215.92	1,703,347.61	39.77591656	-80.77601805
2,400.00	12.00	68.23	2,382.51	69.48	173.99	14,445,223.63	1,703,366.92	39.77593760	-80.77594926
2,500.00	12.00	68.23	2,480.32	77.20	193.30	14,445,231.34	1,703,386.23	39.77595864	-80.77588047
2,599.99	12.00	68.23	2,578.14	84.91	212.60	14,445,239.05	1,703,405.53	39.77597969	-80.77581168
2,699.99	12.00	68.23	2,675.95	92.62	231.91	14,445,246.76	1,703,424.84	39.77600073	-80.77574289
2,799.99	12.00	68.23	2,773.77	100.33	251.22	14,445,254.47	1,703,444.15	39.77602178	-80.77567410
2,899.99	12.00	68.23	2,871.58	108.04	270.53	14,445,262.19	1,703,463.46	39.77604282	-80.77560531
2,929.05	12.00	68.23	2,900.00	110.28	276.14	14,445,264.43	1,703,469.07	39.77604893	-80.77558532
Begin 2°/100' build/turn									
2,999.99	13.42	68.23	2,969.20	116.07	290.63	14,445,270.21	1,703,483.56	39.77606473	-80.77553368
3,099.99	15.42	68.24	3,066.05	125.30	313.76	14,445,279.45	1,703,506.69	39.77608993	-80.77545129
3,199.99	17.42	68.24	3,161.97	135.78	340.01	14,445,289.93	1,703,532.94	39.77611852	-80.77535777
3,299.99	19.42	68.24	3,256.84	147.49	369.35	14,445,301.64	1,703,562.28	39.77615049	-80.77525323
3,399.99	21.42	68.24	3,350.55	160.42	401.75	14,445,314.57	1,703,594.68	39.77618577	-80.77513779
3,499.99	23.42	68.25	3,442.99	174.56	437.17	14,445,328.70	1,703,630.10	39.77622435	-80.77501160
3,599.99	25.42	68.25	3,534.04	189.88	475.57	14,445,344.02	1,703,668.50	39.77626615	-80.77487481
3,699.99	27.42	68.25	3,623.59	206.36	516.89	14,445,360.51	1,703,709.82	39.77631115	-80.77472759
3,799.99	29.42	68.25	3,711.53	224.00	561.09	14,445,378.14	1,703,754.02	39.77635927	-80.77457012
3,899.99	31.42	68.25	3,797.76	242.76	608.12	14,445,396.91	1,703,801.05	39.77641047	-80.77440258
3,999.99	33.42	68.25	3,882.18	262.62	657.91	14,445,416.77	1,703,850.84	39.77646468	-80.77422518
4,099.99	35.42	68.25	3,964.66	283.56	710.41	14,445,437.71	1,703,903.34	39.77652182	-80.77403814
4,199.99	37.42	68.25	4,045.13	305.56	765.55	14,445,459.71	1,703,958.48	39.77658185	-80.77384169
4,299.99	39.42	68.25	4,123.47	328.58	823.26	14,445,482.73	1,704,016.19	39.77664467	-80.77363607
4,345.43	40.33	68.25	4,158.35	339.37	850.32	14,445,493.52	1,704,043.25	39.77667412	-80.77353967
Begin 40.33° tangent									
4,399.99	40.33	68.25	4,199.94	352.46	883.11	14,445,506.60	1,704,076.04	39.77670982	-80.77342282
4,499.99	40.33	68.25	4,276.18	376.43	943.22	14,445,530.58	1,704,136.15	39.77677525	-80.77320866
4,599.99	40.33	68.25	4,352.41	400.41	1,003.33	14,445,554.56	1,704,196.26	39.77684068	-80.77299450
4,699.99	40.33	68.25	4,428.65	424.39	1,063.44	14,445,578.53	1,704,256.37	39.77690611	-80.77278035

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-07HM (Slot A)
 Wellbore: Original Hole
 Design: rev5

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

Well Bryan N-07HM (Slot A)
 GL=1191 @ 1191.00usft
 GL=1191 @ 1191.00usft
 Grid
 Minimum Curvature

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 AUG 31 2018

Planned Survey

WV Department of
 Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,799.99	40.33	68.25	4,504.88	448.36	1,123.55	14,445,602.51	1,704,316.48	39.77697153	-80.77256618
4,899.99	40.33	68.25	4,581.12	472.34	1,183.66	14,445,626.49	1,704,376.59	39.77703696	-80.77235202
4,999.99	40.33	68.25	4,657.35	496.32	1,243.77	14,445,650.46	1,704,436.70	39.77710239	-80.77213786
5,099.99	40.33	68.25	4,733.59	520.29	1,303.88	14,445,674.44	1,704,496.81	39.77716781	-80.77192370
5,199.99	40.33	68.25	4,809.83	544.27	1,363.99	14,445,698.42	1,704,556.92	39.77723324	-80.77170954
5,299.99	40.33	68.25	4,886.06	568.25	1,424.10	14,445,722.39	1,704,617.04	39.77729866	-80.77149538
5,399.99	40.33	68.25	4,962.30	592.22	1,484.22	14,445,746.37	1,704,677.15	39.77736409	-80.77128122
5,499.99	40.33	68.25	5,038.53	616.20	1,544.33	14,445,770.34	1,704,737.26	39.77742951	-80.77106705
5,599.99	40.33	68.25	5,114.77	640.18	1,604.44	14,445,794.32	1,704,797.37	39.77749494	-80.77085289
5,699.99	40.33	68.25	5,191.00	664.15	1,664.55	14,445,818.30	1,704,857.48	39.77756036	-80.77063873
5,799.99	40.33	68.25	5,267.24	688.13	1,724.66	14,445,842.27	1,704,917.59	39.77762578	-80.77042456
5,899.99	40.33	68.25	5,343.48	712.10	1,784.77	14,445,866.25	1,704,977.70	39.77769121	-80.77021040
5,999.99	40.33	68.25	5,419.71	736.08	1,844.88	14,445,890.23	1,705,037.81	39.77775663	-80.76999623
6,099.99	40.33	68.25	5,495.95	760.06	1,904.99	14,445,914.20	1,705,097.92	39.77782205	-80.76978207
6,199.99	40.33	68.25	5,572.18	784.03	1,965.10	14,445,938.18	1,705,158.03	39.77788747	-80.76956790
6,299.99	40.33	68.25	5,648.42	808.01	2,025.21	14,445,962.16	1,705,218.14	39.77795289	-80.76935373
6,399.99	40.33	68.25	5,724.65	831.99	2,085.32	14,445,986.13	1,705,278.25	39.77801831	-80.76913957
6,499.99	40.33	68.25	5,800.89	855.96	2,145.43	14,446,010.11	1,705,338.36	39.77808373	-80.76892540
6,599.99	40.33	68.25	5,877.12	879.94	2,205.54	14,446,034.09	1,705,398.47	39.77814915	-80.76871123
6,699.99	40.33	68.25	5,953.36	903.92	2,265.65	14,446,058.06	1,705,458.58	39.77821457	-80.76849707
6,792.81	40.33	68.25	6,024.12	926.17	2,321.44	14,446,080.32	1,705,514.37	39.77827530	-80.76829827
Begin 10°/100' build/turn									
6,799.99	40.26	67.15	6,029.60	927.93	2,325.74	14,446,082.08	1,705,518.67	39.77828010	-80.76828297
6,899.99	40.48	51.69	6,105.98	960.69	2,381.12	14,446,114.84	1,705,574.05	39.77836966	-80.76808553
6,999.99	42.68	36.96	6,180.96	1,008.02	2,427.09	14,446,162.16	1,705,620.02	39.77849931	-80.76792149
7,099.99	46.59	23.83	6,252.26	1,068.48	2,462.24	14,446,222.62	1,705,655.17	39.77866510	-80.76779583
7,199.99	51.79	12.53	6,317.71	1,140.24	2,485.50	14,446,294.38	1,705,678.43	39.77886201	-80.76771237
7,299.99	57.93	2.86	6,375.33	1,221.11	2,496.17	14,446,375.26	1,705,689.10	39.77908404	-80.76767364
7,399.99	64.71	354.47	6,423.36	1,308.65	2,493.92	14,446,462.79	1,705,686.85	39.77932445	-80.76768083
7,499.99	71.90	346.99	6,460.35	1,400.18	2,478.83	14,446,554.33	1,705,671.76	39.77957594	-80.76773371
7,599.98	79.37	340.11	6,485.17	1,492.93	2,451.34	14,446,647.08	1,705,644.27	39.77983086	-80.76783069
7,699.98	86.97	333.57	6,497.07	1,584.09	2,412.30	14,446,738.23	1,705,605.23	39.78008147	-80.76796880
7,752.62	91.00	330.18	6,498.00	1,630.48	2,387.50	14,446,784.63	1,705,580.43	39.78020906	-80.76805665
Begin 91.00° lateral section									
7,799.98	91.00	330.18	6,497.18	1,671.57	2,363.95	14,446,825.71	1,705,556.88	39.78032206	-80.76814011
7,899.98	91.00	330.18	6,495.43	1,758.31	2,314.22	14,446,912.46	1,705,507.15	39.78056063	-80.76831630
7,999.98	91.00	330.18	6,493.69	1,845.05	2,264.50	14,446,999.20	1,705,457.43	39.78079920	-80.76849250
8,099.98	91.00	330.18	6,491.95	1,931.79	2,214.77	14,447,085.94	1,705,407.70	39.78103777	-80.76866870
8,199.98	91.00	330.18	6,490.21	2,018.54	2,165.04	14,447,172.68	1,705,357.97	39.78127634	-80.76884489
8,299.98	91.00	330.18	6,488.47	2,105.28	2,115.32	14,447,259.43	1,705,308.25	39.78151491	-80.76902109
8,399.98	91.00	330.18	6,486.72	2,192.02	2,065.59	14,447,346.17	1,705,258.52	39.78175348	-80.76919729
8,499.98	91.00	330.18	6,484.98	2,278.76	2,015.87	14,447,432.91	1,705,208.80	39.78199205	-80.76937350
8,599.98	91.00	330.18	6,483.24	2,365.51	1,966.14	14,447,519.65	1,705,159.07	39.78223062	-80.76954970
8,699.98	91.00	330.18	6,481.50	2,452.25	1,916.41	14,447,606.40	1,705,109.34	39.78246919	-80.76972590
8,799.98	91.00	330.18	6,479.76	2,538.99	1,866.69	14,447,693.14	1,705,059.62	39.78270776	-80.76990211
8,899.98	91.00	330.18	6,478.01	2,625.73	1,816.96	14,447,779.88	1,705,009.89	39.78294633	-80.77007832
8,999.98	91.00	330.18	6,476.27	2,712.48	1,767.23	14,447,866.62	1,704,960.16	39.78318490	-80.77025452
9,099.98	91.00	330.18	6,474.53	2,799.22	1,717.51	14,447,953.37	1,704,910.44	39.78342347	-80.77043073
9,199.98	91.00	330.18	6,472.79	2,885.96	1,667.78	14,448,040.11	1,704,860.71	39.78366204	-80.77060694
9,299.98	91.00	330.18	6,471.05	2,972.70	1,618.06	14,448,126.85	1,704,810.99	39.78390061	-80.77078316
9,399.98	91.00	330.18	6,469.31	3,059.45	1,568.33	14,448,213.59	1,704,761.26	39.78413917	-80.77095937
9,499.98	91.00	330.18	6,467.56	3,146.19	1,518.60	14,448,300.33	1,704,711.53	39.78437774	-80.77113558
9,599.98	91.00	330.18	6,465.82	3,232.93	1,468.88	14,448,387.08	1,704,661.81	39.78461631	-80.77131180
9,699.98	91.00	330.18	6,464.08	3,319.67	1,419.15	14,448,473.82	1,704,612.08	39.78485488	-80.77148801

Database: DB_Jul2216dt_v14
Company: Tug Hill Operating LLC
Project: Marshall County, West Virginia
Site: Bryan Pad
Well: Bryan N-07HM (Slot A)
Wellbore: Original Hole
Design: rev5

Local Co-ordinate Reference: Well Bryan N-07HM (Slot A)
TVD Reference: GL=1191 @ 1191.00usft
MD Reference: GL=1191 @ 1191.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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WV Department of
 Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,799.98	91.00	330.18	6,462.34	3,406.42	1,369.43	14,448,560.56	1,704,562.36	39.78509344	-80.77166423
9,899.98	91.00	330.18	6,460.60	3,493.16	1,319.70	14,448,647.30	1,704,512.63	39.78533201	-80.77184045
9,999.98	91.00	330.18	6,458.85	3,579.90	1,269.97	14,448,734.05	1,704,462.90	39.78557058	-80.77201667
10,099.98	91.00	330.18	6,457.11	3,666.64	1,220.25	14,448,820.79	1,704,413.18	39.78580914	-80.77219289
10,199.98	91.00	330.18	6,455.37	3,753.39	1,170.52	14,448,907.53	1,704,363.45	39.78604771	-80.77236912
10,299.98	91.00	330.18	6,453.63	3,840.13	1,120.80	14,448,994.27	1,704,313.73	39.78628627	-80.77254534
10,399.98	91.00	330.18	6,451.89	3,926.87	1,071.07	14,449,081.02	1,704,264.00	39.78652484	-80.77272156
10,499.98	91.00	330.18	6,450.14	4,013.61	1,021.34	14,449,167.76	1,704,214.27	39.78676340	-80.77289779
10,599.98	91.00	330.18	6,448.40	4,100.35	971.62	14,449,254.50	1,704,164.55	39.78700197	-80.77307402
10,699.98	91.00	330.18	6,446.66	4,187.10	921.89	14,449,341.24	1,704,114.82	39.78724053	-80.77325025
10,799.98	91.00	330.18	6,444.92	4,273.84	872.17	14,449,427.99	1,704,065.10	39.78747910	-80.77342648
10,899.98	91.00	330.18	6,443.18	4,360.58	822.44	14,449,514.73	1,704,015.37	39.78771766	-80.77360271
10,999.98	91.00	330.18	6,441.44	4,447.32	772.71	14,449,601.47	1,703,965.64	39.78795622	-80.77377894
11,099.98	91.00	330.18	6,439.69	4,534.07	722.99	14,449,688.21	1,703,915.92	39.78819479	-80.77395517
11,199.98	91.00	330.18	6,437.95	4,620.81	673.26	14,449,774.96	1,703,866.19	39.78843335	-80.77413141
11,299.98	91.00	330.18	6,436.21	4,707.55	623.54	14,449,861.70	1,703,816.47	39.78867191	-80.77430764
11,399.98	91.00	330.18	6,434.47	4,794.29	573.81	14,449,948.44	1,703,766.74	39.78891047	-80.77448388
11,499.98	91.00	330.18	6,432.73	4,881.04	524.08	14,450,035.18	1,703,717.01	39.78914904	-80.77466012
11,599.98	91.00	330.18	6,430.98	4,967.78	474.36	14,450,121.93	1,703,667.29	39.78938760	-80.77483636
11,699.98	91.00	330.18	6,429.24	5,054.52	424.63	14,450,208.67	1,703,617.56	39.78962616	-80.77501260
11,799.98	91.00	330.18	6,427.50	5,141.26	374.90	14,450,295.41	1,703,567.83	39.78986472	-80.77518884
11,899.98	91.00	330.18	6,425.76	5,228.01	325.18	14,450,382.15	1,703,518.11	39.79010328	-80.77536509
11,999.98	91.00	330.18	6,424.02	5,314.75	275.45	14,450,468.89	1,703,468.38	39.79034184	-80.77554133
12,099.98	91.00	330.18	6,422.28	5,401.49	225.73	14,450,555.64	1,703,418.66	39.79058040	-80.77571758
12,199.98	91.00	330.18	6,420.53	5,488.23	176.00	14,450,642.38	1,703,368.93	39.79081896	-80.77589382
12,299.98	91.00	330.18	6,418.79	5,574.98	126.27	14,450,729.12	1,703,319.20	39.79105752	-80.77607007
12,399.98	91.00	330.18	6,417.05	5,661.72	76.55	14,450,815.86	1,703,269.48	39.79129608	-80.77624632
12,499.98	91.00	330.18	6,415.31	5,748.46	26.82	14,450,902.61	1,703,219.75	39.79153464	-80.77642257
12,599.98	91.00	330.18	6,413.57	5,835.20	-22.90	14,450,989.35	1,703,170.03	39.79177320	-80.77659882
12,699.97	91.00	330.18	6,411.82	5,921.95	-72.63	14,451,076.09	1,703,120.30	39.79201176	-80.77677508
12,799.97	91.00	330.18	6,410.08	6,008.69	-122.36	14,451,162.83	1,703,070.57	39.79225032	-80.77695133
12,899.97	91.00	330.18	6,408.34	6,095.43	-172.08	14,451,249.58	1,703,020.85	39.79248888	-80.77712759
12,999.97	91.00	330.18	6,406.60	6,182.17	-221.81	14,451,336.32	1,702,971.12	39.79272743	-80.77730384
13,099.97	91.00	330.18	6,404.86	6,268.91	-271.53	14,451,423.06	1,702,921.40	39.79296599	-80.77748010
13,199.97	91.00	330.18	6,403.11	6,355.66	-321.26	14,451,509.80	1,702,871.67	39.79320455	-80.77765636
13,299.97	91.00	330.18	6,401.37	6,442.40	-370.99	14,451,596.55	1,702,821.94	39.79344311	-80.77783262
13,399.97	91.00	330.18	6,399.63	6,529.14	-420.71	14,451,683.29	1,702,772.22	39.79368166	-80.77800888
13,499.97	91.00	330.18	6,397.89	6,615.88	-470.44	14,451,770.03	1,702,722.49	39.79392022	-80.77818514
13,599.97	91.00	330.18	6,396.15	6,702.63	-520.16	14,451,856.77	1,702,672.77	39.79415878	-80.77836141
13,699.97	91.00	330.18	6,394.41	6,789.37	-569.89	14,451,943.52	1,702,623.04	39.79439733	-80.77853767
13,799.97	91.00	330.18	6,392.66	6,876.11	-619.62	14,452,030.26	1,702,573.31	39.79463589	-80.77871394
13,899.97	91.00	330.18	6,390.92	6,962.85	-669.34	14,452,117.00	1,702,523.59	39.79487444	-80.77889021
13,999.97	91.00	330.18	6,389.18	7,049.60	-719.07	14,452,203.74	1,702,473.86	39.79511300	-80.77906647
14,099.97	91.00	330.18	6,387.44	7,136.34	-768.80	14,452,290.48	1,702,424.13	39.79535155	-80.77924274
14,199.97	91.00	330.18	6,385.70	7,223.08	-818.52	14,452,377.23	1,702,374.41	39.79559011	-80.77941902
14,299.97	91.00	330.18	6,383.95	7,309.82	-868.25	14,452,463.97	1,702,324.68	39.79582866	-80.77959529
14,399.97	91.00	330.18	6,382.21	7,396.57	-917.97	14,452,550.71	1,702,274.96	39.79606722	-80.77977156
14,499.97	91.00	330.18	6,380.47	7,483.31	-967.70	14,452,637.45	1,702,225.23	39.79630577	-80.77994784
14,599.97	91.00	330.18	6,378.73	7,570.05	-1,017.43	14,452,724.20	1,702,175.50	39.79654433	-80.78012411
14,699.97	91.00	330.18	6,376.99	7,656.79	-1,067.15	14,452,810.94	1,702,125.78	39.79678288	-80.78030039
14,799.97	91.00	330.18	6,375.24	7,743.54	-1,116.88	14,452,897.68	1,702,076.05	39.79702143	-80.78047667
14,899.97	91.00	330.18	6,373.50	7,830.28	-1,166.60	14,452,984.42	1,702,026.33	39.79725998	-80.78065295
14,999.97	91.00	330.18	6,371.76	7,917.02	-1,216.33	14,453,071.17	1,701,976.60	39.79749854	-80.78082923
15,099.97	91.00	330.18	6,370.02	8,003.76	-1,266.06	14,453,157.91	1,701,926.87	39.79773709	-80.78100551
15,199.97	91.00	330.18	6,368.28	8,090.51	-1,315.78	14,453,244.65	1,701,877.15	39.79797564	-80.78118179



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
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-07HM (Slot A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

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WV Department of
Environmental Protection

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,299.97	91.00	330.18	6,366.54	8,177.25	-1,365.51	14,453,331.39	1,701,827.42	39.79821419	-80.78135808
15,399.97	91.00	330.18	6,364.79	8,263.99	-1,415.23	14,453,418.14	1,701,777.70	39.79845274	-80.78153437
15,499.97	91.00	330.18	6,363.05	8,350.73	-1,464.96	14,453,504.88	1,701,727.97	39.79869130	-80.78171065
15,599.97	91.00	330.18	6,361.31	8,437.47	-1,514.69	14,453,591.62	1,701,678.24	39.79892985	-80.78188694
15,699.97	91.00	330.18	6,359.57	8,524.22	-1,564.41	14,453,678.36	1,701,628.52	39.79916840	-80.78206323
15,799.97	91.00	330.18	6,357.83	8,610.96	-1,614.14	14,453,765.11	1,701,578.79	39.79940695	-80.78223952
15,899.97	91.00	330.18	6,356.08	8,697.70	-1,663.86	14,453,851.85	1,701,529.07	39.79964550	-80.78241581
15,999.97	91.00	330.18	6,354.34	8,784.44	-1,713.59	14,453,938.59	1,701,479.34	39.79988405	-80.78259211
16,099.97	91.00	330.18	6,352.60	8,871.19	-1,763.32	14,454,025.33	1,701,429.61	39.80012260	-80.78276840
16,199.97	91.00	330.18	6,350.86	8,957.93	-1,813.04	14,454,112.08	1,701,379.89	39.80036115	-80.78294470
16,299.97	91.00	330.18	6,349.12	9,044.67	-1,862.77	14,454,198.82	1,701,330.16	39.80059969	-80.78312099
16,399.97	91.00	330.18	6,347.37	9,131.41	-1,912.50	14,454,285.56	1,701,280.43	39.80083824	-80.78329729
16,499.97	91.00	330.18	6,345.63	9,218.16	-1,962.22	14,454,372.30	1,701,230.71	39.80107679	-80.78347359
16,599.97	91.00	330.18	6,343.89	9,304.90	-2,011.95	14,454,459.04	1,701,180.98	39.80131534	-80.78364989
16,699.97	91.00	330.18	6,342.15	9,391.64	-2,061.67	14,454,545.79	1,701,131.26	39.80155389	-80.78382619
16,799.97	91.00	330.18	6,340.41	9,478.38	-2,111.40	14,454,632.53	1,701,081.53	39.80179243	-80.78400249
16,899.97	91.00	330.18	6,338.67	9,565.13	-2,161.13	14,454,719.27	1,701,031.80	39.80203098	-80.78417880
16,999.97	91.00	330.18	6,336.92	9,651.87	-2,210.85	14,454,806.01	1,700,982.08	39.80226953	-80.78435510
17,099.97	91.00	330.18	6,335.18	9,738.61	-2,260.58	14,454,892.76	1,700,932.35	39.80250808	-80.78453141
17,199.97	91.00	330.18	6,333.44	9,825.35	-2,310.30	14,454,979.50	1,700,882.63	39.80274662	-80.78470772
17,299.97	91.00	330.18	6,331.70	9,912.10	-2,360.03	14,455,066.24	1,700,832.90	39.80298517	-80.78488403
17,399.97	91.00	330.18	6,329.96	9,998.84	-2,409.76	14,455,152.98	1,700,783.17	39.80322371	-80.78506034
17,499.97	91.00	330.18	6,328.21	10,085.58	-2,459.48	14,455,239.73	1,700,733.45	39.80346226	-80.78523665
17,599.97	91.00	330.18	6,326.47	10,172.32	-2,509.21	14,455,326.47	1,700,683.72	39.80370081	-80.78541296
17,699.96	91.00	330.18	6,324.73	10,259.06	-2,558.93	14,455,413.21	1,700,634.00	39.80393935	-80.78558927
17,799.96	91.00	330.18	6,322.99	10,345.81	-2,608.66	14,455,499.95	1,700,584.27	39.80417790	-80.78576559
17,899.96	91.00	330.18	6,321.25	10,432.55	-2,658.39	14,455,586.70	1,700,534.54	39.80441644	-80.78594190
17,999.96	91.00	330.18	6,319.51	10,519.29	-2,708.11	14,455,673.44	1,700,484.82	39.80465498	-80.78611822
18,099.96	91.00	330.18	6,317.76	10,606.03	-2,757.84	14,455,760.18	1,700,435.09	39.80489353	-80.78629454
18,199.96	91.00	330.18	6,316.02	10,692.78	-2,807.56	14,455,846.92	1,700,385.37	39.80513207	-80.78647086
18,299.96	91.00	330.18	6,314.28	10,779.52	-2,857.29	14,455,933.67	1,700,335.64	39.80537062	-80.78664718
18,399.96	91.00	330.18	6,312.54	10,866.26	-2,907.02	14,456,020.41	1,700,285.91	39.80560916	-80.78682350
18,499.96	91.00	330.18	6,310.80	10,953.00	-2,956.74	14,456,107.15	1,700,236.19	39.80584770	-80.78699983
18,599.96	91.00	330.18	6,309.05	11,039.75	-3,006.47	14,456,193.89	1,700,186.46	39.80608624	-80.78717615
18,699.96	91.00	330.18	6,307.31	11,126.49	-3,056.19	14,456,280.64	1,700,136.74	39.80632479	-80.78735248
18,799.96	91.00	330.18	6,305.57	11,213.23	-3,105.92	14,456,367.38	1,700,087.01	39.80656333	-80.78752881
18,899.96	91.00	330.18	6,303.83	11,299.97	-3,155.65	14,456,454.12	1,700,037.28	39.80680187	-80.78770513
18,999.96	91.00	330.18	6,302.09	11,386.72	-3,205.37	14,456,540.86	1,699,987.56	39.80704041	-80.78788146
19,099.96	91.00	330.18	6,300.34	11,473.46	-3,255.10	14,456,627.60	1,699,937.83	39.80727895	-80.78805779
19,199.96	91.00	330.18	6,298.60	11,560.20	-3,304.83	14,456,714.35	1,699,888.10	39.80751749	-80.78823413
19,299.96	91.00	330.18	6,296.86	11,646.94	-3,354.55	14,456,801.09	1,699,838.38	39.80775603	-80.78841046
19,399.96	91.00	330.18	6,295.12	11,733.69	-3,404.28	14,456,887.83	1,699,788.65	39.80799457	-80.78858679
19,499.96	91.00	330.18	6,293.38	11,820.43	-3,454.00	14,456,974.57	1,699,738.93	39.80823311	-80.78876313
19,599.96	91.00	330.18	6,291.64	11,907.17	-3,503.73	14,457,061.32	1,699,689.20	39.80847165	-80.78893947
19,699.96	91.00	330.18	6,289.89	11,993.91	-3,553.46	14,457,148.06	1,699,639.47	39.80871019	-80.78911580
19,799.96	91.00	330.18	6,288.15	12,080.66	-3,603.18	14,457,234.80	1,699,589.75	39.80894873	-80.78929214
19,899.96	91.00	330.18	6,286.41	12,167.40	-3,652.91	14,457,321.54	1,699,540.02	39.80918727	-80.78946848
19,999.96	91.00	330.18	6,284.67	12,254.14	-3,702.63	14,457,408.29	1,699,490.30	39.80942581	-80.78964483
20,099.96	91.00	330.18	6,282.93	12,340.88	-3,752.36	14,457,495.03	1,699,440.57	39.80966435	-80.78982117
20,199.96	91.00	330.18	6,281.18	12,427.62	-3,802.09	14,457,581.77	1,699,390.84	39.80990289	-80.78999751
20,299.96	91.00	330.18	6,279.44	12,514.37	-3,851.81	14,457,668.51	1,699,341.12	39.81014143	-80.79017386
20,399.96	91.00	330.18	6,277.70	12,601.11	-3,901.54	14,457,755.26	1,699,291.39	39.81037996	-80.79035020
20,499.96	91.00	330.18	6,275.96	12,687.85	-3,951.26	14,457,842.00	1,699,241.67	39.81061850	-80.79052655
20,599.96	91.00	330.18	6,274.22	12,774.59	-4,000.99	14,457,928.74	1,699,191.94	39.81085704	-80.79070290
20,699.96	91.00	330.18	6,272.47	12,861.34	-4,050.72	14,458,015.48	1,699,142.21	39.81109558	-80.79087925

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-07HM (Slot A)
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-07HM (Slot A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev5		

 RECEIVED
 Office of Oil and Gas

AUG 31 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
20,799.96	91.00	330.18	6,270.73	12,948.08	-4,100.44	14,458,102.23	1,699,092.49	39.81133411	-80.79105560
20,899.96	91.00	330.18	6,268.99	13,034.82	-4,150.17	14,458,188.97	1,699,042.76	39.81157265	-80.79123196
20,999.96	91.00	330.18	6,267.25	13,121.56	-4,199.89	14,458,275.71	1,698,993.04	39.81181118	-80.79140831
21,099.96	91.00	330.18	6,265.51	13,208.31	-4,249.62	14,458,362.45	1,698,943.31	39.81204972	-80.79158466
21,199.96	91.00	330.18	6,263.77	13,295.05	-4,299.35	14,458,449.20	1,698,893.58	39.81228826	-80.79176102
21,299.96	91.00	330.18	6,262.02	13,381.79	-4,349.07	14,458,535.94	1,698,843.86	39.81252679	-80.79193738
21,399.96	91.00	330.18	6,260.28	13,468.53	-4,398.80	14,458,622.68	1,698,794.13	39.81276533	-80.79211374
21,499.96	91.00	330.18	6,258.54	13,555.28	-4,448.53	14,458,709.42	1,698,744.40	39.81300386	-80.79229010
21,599.96	91.00	330.18	6,256.80	13,642.02	-4,498.25	14,458,796.16	1,698,694.68	39.81324239	-80.79246646
21,699.96	91.00	330.18	6,255.06	13,728.76	-4,547.98	14,458,882.91	1,698,644.95	39.81348093	-80.79264282
21,799.96	91.00	330.18	6,253.31	13,815.50	-4,597.70	14,458,969.65	1,698,595.23	39.81371946	-80.79281918
21,899.96	91.00	330.18	6,251.57	13,902.25	-4,647.43	14,459,056.39	1,698,545.50	39.81395800	-80.79299555
21,999.96	91.00	330.18	6,249.83	13,988.99	-4,697.16	14,459,143.13	1,698,495.77	39.81419653	-80.79317192
22,099.96	91.00	330.18	6,248.09	14,075.73	-4,746.88	14,459,229.88	1,698,446.05	39.81443506	-80.79334828
22,199.96	91.00	330.18	6,246.35	14,162.47	-4,796.61	14,459,316.62	1,698,396.32	39.81467359	-80.79352465
22,277.26	91.00	330.18	6,245.00	14,229.53	-4,835.05	14,459,383.67	1,698,357.88	39.81485799	-80.79366099

PBHL/TD 22277.26 MD/6245.00 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-07HM r5 - hit/miss target - Shape - Point	0.00	0.01	6,245.00	14,229.53	-4,835.05	14,459,383.68	1,698,357.88	39.81485800	-80.79366100
LP Bryan N-07HM - plan misses target center by 50.00usft at 7752.77usft MD (6498.00 TVD, 1630.61 N, 2387.43 E) - Point	0.00	0.00	6,498.00	1,655.48	2,430.80	14,446,809.63	1,705,623.73	39.78027740	-80.76790229
LP Bryan N-07HM 50 wε - plan hits target center - Point	0.00	0.01	6,498.00	1,630.49	2,387.50	14,446,784.63	1,705,580.43	39.78020907	-80.76805666

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,200.00	1,200.00	0.00	0.00	KOP Begin 2°/100' build
1,800.00	1,795.62	23.22	58.14	Begin 12.00° tangent
2,929.05	2,900.00	110.28	276.14	Begin 2°/100' build/turn
4,345.43	4,158.35	339.37	850.32	Begin 40.33° tangent
6,792.81	6,024.12	926.17	2,321.44	Begin 10°/100' build/turn
7,752.62	6,498.00	1,630.48	2,387.50	Begin 91.00° lateral section
22,277.26	6,245.00	14,229.53	-4,835.05	PBHL/TD 22277.26 MD/6245.00 TVD

**BRYAN LEASE
WELL N-7HM
921.878± ACRES**

Kentucky Power Company
& A.E.P. Generation
Resources, Inc.
05-5-12
165.0

John F.
Arruda, Et Ux
05-5-4.1
1.399

Edwin C.
Miller
05-08-07
180.31 Ac.

James B.
Jackson
Jr. et ux
05-08-09
89.723

Edwin Miller
05-09-31
32.10 Ac.

Alvin A.
Yoder
05-11-10
31.91 Ac.

Alvin A.
Yoder
05-10-17
57.28 Ac.

Timothy
McGinnis Sr.
& Linda
05-10-16
30.67 Ac.

John Swierkos
05-16-05
52.07 Ac.

John Swierkos
05-16-06
134.05 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-25
79.04 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

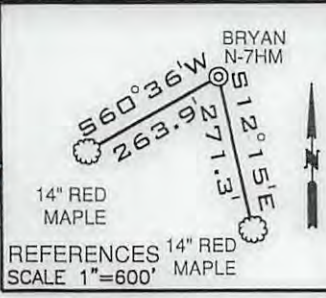
John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.

John Swierkos
05-16-04
0.96 Ac.



TOP HOLE LATITUDE: 39°47'30"
BOTTOM HOLE LATITUDE: 39°50'00"

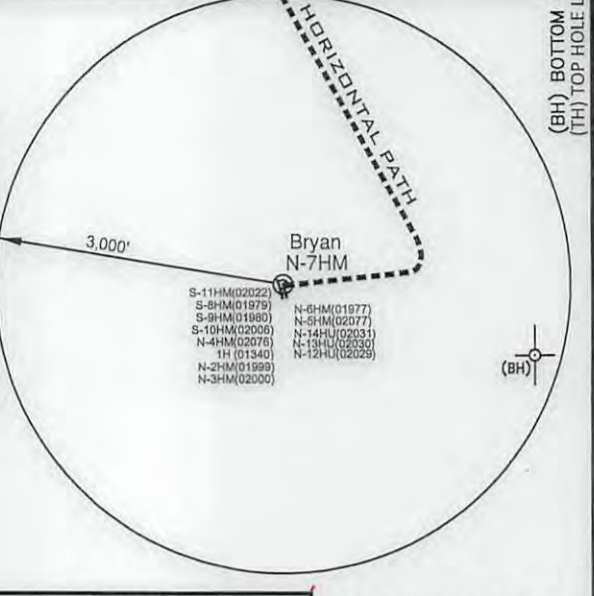
S-11HM(02022) ○
S-8HM(01979) ○
S-9HM(01980) ○
S-10HM(02006) ○
N-4HM(02078) ○
1H (01340) ○
N-2HM(01999) ○
N-3HM(02000) ○

N-7HM(01978) ○
N-8HM(01977) ○
N-14HM(02031) ○
N-13HU(02030) ○
N-12HU(02029) ○

DETAIL
SKETCH "A"
SCALE 1"=800'

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.



GRID NORTH

LINE	BEARING	DISTANCE
L1	N 42°54' E	2906.24'
L2	N 83°09' E	1982.66'
L3	N 69°12' E	2504.88'

LEGEND

- LEASED TRACTS
- - - SURFACE TRACTS
- == UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,891.79
E) 519,134.24

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,403,388.76
E) 519,861.96

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,407,228.96
E) 517,660.52

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 52°38' E	129.22'	245.88'	130.76'
C2	N 24°47' E	144.59'	341.80'	145.89'
C3	N 01°37' E	213.94'	558.21'	215.27'
C4	N 19°01' W	294.18'	836.94'	295.72'

FILE NUMBER _____

DRAWING NUMBER BRYAN_WP_N-7HM

SCALE 1" = 2500'

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



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: SEPTEMBER 19, 2017

REVISED DATE: AUGUST 14, 2018

OPERATORS WELL NO. BRYAN N-7HM
API WELL NO. _____

47-051-01978 MDP
STATE COUNTY PERMIT

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

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

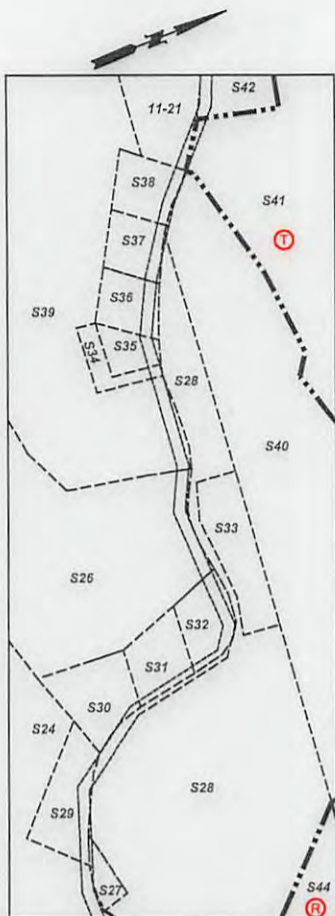
PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
PERFORMATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____

TARGET FORMATION Marcellus PLUG & ABANDON CLEAN OUT & REPLUG

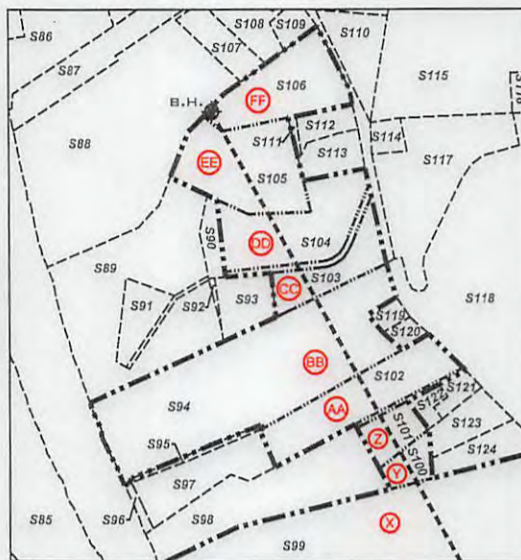
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

COUNTY NAME
PERMIT

BRYAN LEASE WELL N-7HM 921.878± ACRES



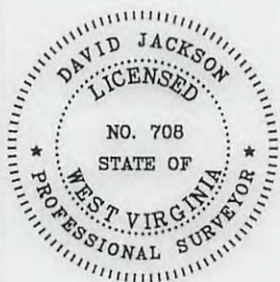
DETAIL "A"
SCALE 1"=500'



DETAIL "C"
SCALE 1"=500'



DETAIL "B"
SCALE 1"=250'



P.S.
708

David L Jackson

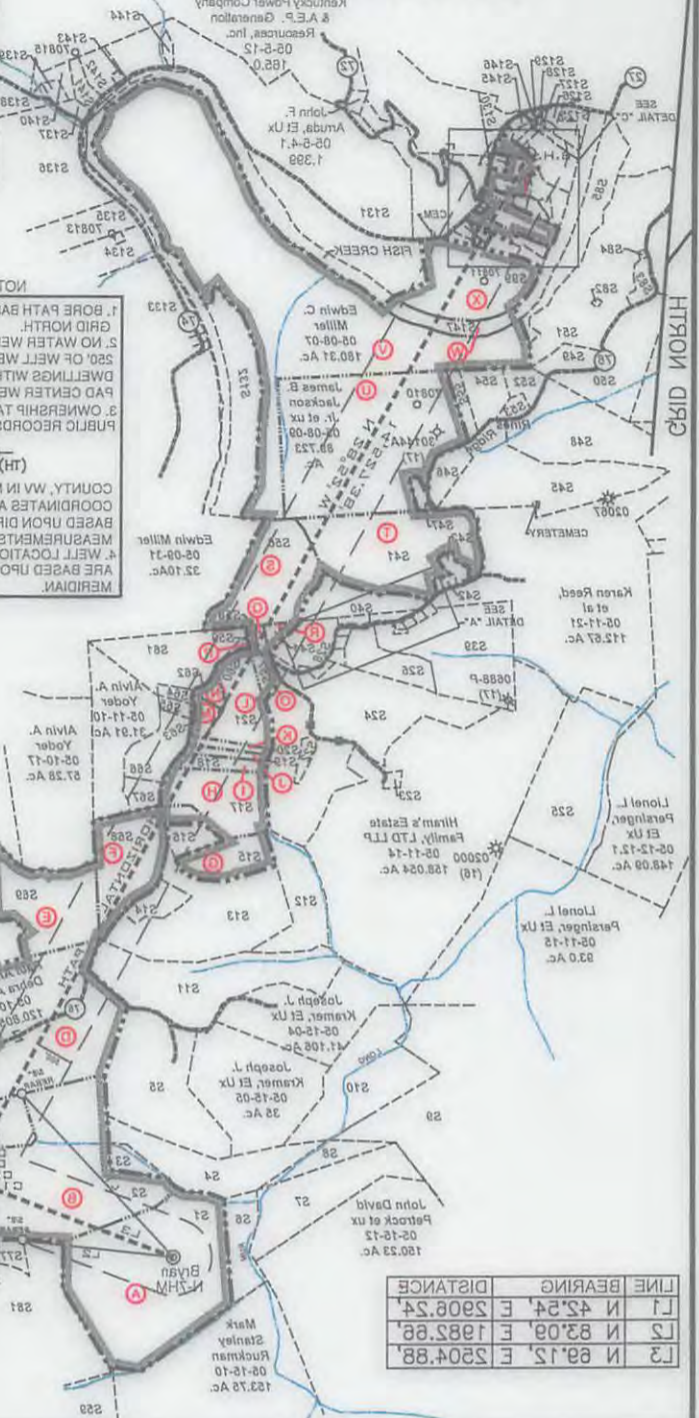


TUG HILL OPERATING

OPERATOR'S
WELL #: Bryan N-7HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 3
DATE: 9/19/2017
REVISED DATE:
8/14/18

BRYAN LEASE WELL N-7HM 21.878± ACRES



NOTES

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

LEGEND

- LEASED TRACTS
- SURFACE TRACTS
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

LEGEND

- (+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

POINT	UTM. NAD83, ZONE 17	E	N	IN METERS
BOTTOM HOLE	UTM. NAD83, ZONE 17	217,660.52	4,407,228.96	
LANDING POINT 1	UTM. NAD83, ZONE 17	219,881.96	4,403,388.76	
SURFACE HOLE	UTM. NAD83, ZONE 17	219,134.24	4,402,881.79	

CURVE	CHORD BEARING	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 52.38, E	129.22	245.88	130.76
C2	N 24.47, E	144.29	341.80	145.89
C3	N 01.37, E	213.94	558.21	215.27
C4	N 19.01, W	294.18	836.94	298.72



PERMIT

TARGET FORMATION Matellus

WELL OPERATOR TUG HILL OPERATING, LLC

DESIGNATED AGENT DIANNA STAMPER

ESTIMATED DEPTH TVD: 6,296' TMD: 22,227'

PLUG & ABANDON CLEAN OUT & REPLUG

PERFORM NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION

OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW 6A1

SURFACE OWNER CIX LAND RESOURCES, INC.

ACREAGE 81.98

LEASE ACREAGE 81.98

QUADRANGLE Powhatan Point 7.5' LEASE NUMBER _____

DISTRICT Franklin COUNTY Marshall

LOCATION ELEVATION 1191.0' WATERSHED (HUC 10) Fish Creek

(IF "GAS") PRODUCTION STORAGE DEEP SHALLOW WASTE DISPOSAL

WELL TYPE: OIL GAS LIQUID INJECTION

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

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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

David L Jackson
P. 2.
708

JACKSON SURVEYING INC.
P.O. Box 1460
Charleston, WV 25302
304-823-8881

FILE NUMBER _____

DRAWING NUMBER BRYAN_WP_N-7HM

SCALE 1" = 2500'

MINIMUM DEGREE _____

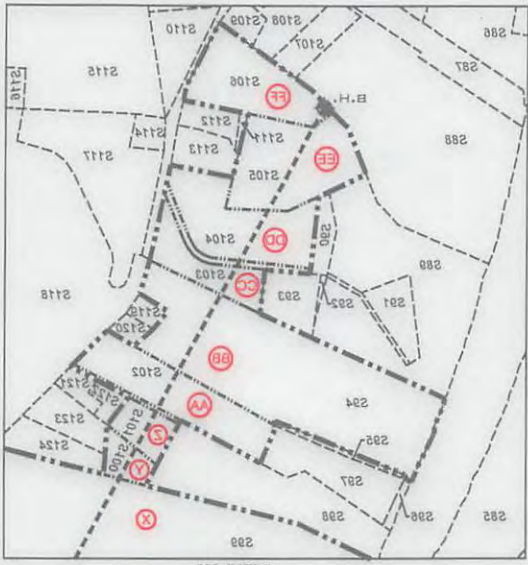
OF ACCURACY 1/200

PROVEN SOURCE _____

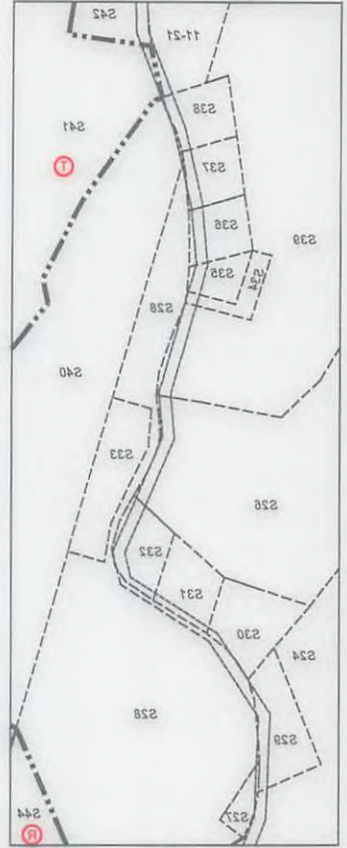
OF ELEVATION SUBMETER MAPPING

GRADE GPS

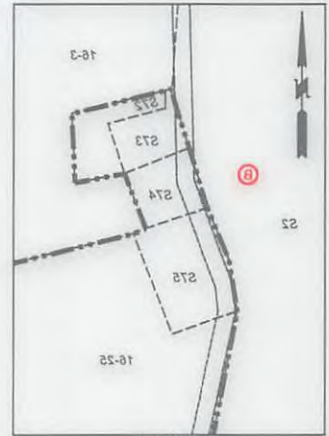
BRYAN LEASE
WELL N-7HM
921.878± ACRES



DETAIL C
SCALE 1"=200'



DETAIL A
SCALE 1"=200'



DETAIL B
SCALE 1"=250'



David Jackson

P.2.
708

TUG HILL
OPERATING

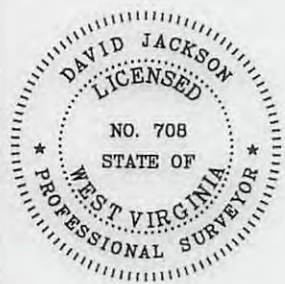


STATE: WV	COUNTY: Marshall	DISTRICT: Franklin	WELL #: Bryan N-7HM	OPERATOR'S WELL PLAT
REVISID DATE: 8/14/18	DATE: 9/19/2017	PAGE 2 OF 3		

BRYAN LEASE
WELL N-7HM
921.878± ACRES

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	05-15-9	CNX Land Resources, Inc.	81.98
S2	05-15-8	Terry D. Rose, et ux	77.11
S3	05-15-7	Terry D. Rose, et ux	4.5
S4	05-15-6.1	Joseph J. Kramar, et ux	39.40
S5	05-15-6	Joseph J. Kramar, et ux	42.5
S6	05-15-13	CNX Land Resources, Inc.	11.0
S7	05-15-14	John David Petrock, et ux	25.0
S8	05-15-2	John David Petrock, et ux	5.0
S9	05-15-1	Marcus Sharp & David Schlabach, Hrs.	121.0
S10	05-15-3	Joseph J. Kramar, et ux	36.10
S11	05-11-12	Joseph J. Kramar, et ux	43.2188
S12	05-11-13	Joy D. Gartman & Arlin Gatts	12.29
S13	05-11-11.3	Herman D. Lantz	43.96
S14	05-11-11.1	Nelle Marie & Robert W. Spencer	5.813
S15	05-11-11.4	Brad M. & Amanda J. Blake	15.193
S16	05-11-11	Brad M. & Amanda J. Blake	5.0
S17	05-11-9	Edwin C. & Kimberly A. Miller	54.625
S18	05-11-9.9	Leonard L. Parsons, et ux	5.89
S19	05-11-9.6	Southern Country Farms, Inc	2.488
S20	05-11-9.5	Southern Country Farms, Inc	2.559
S21	05-11-9.3	Joseph M. & Steven Haught	16.3
S22	05-11-16.2	Joseph Haught	2.181
S23	05-11-14.1	Dennis F. Moore, et ux	1.056
S24	05-11-16	Keith E. Haught, et al	83.674
S25	05-12-11	Wesley R. Bryan & Wesley R. Bryan II	52.478
S26	05-11-17.2	Brenda & Michael Bryan	11.504
S27	05-11-5.1	James R. Anderson, et ux	0.205
S28	05-11-5	Kevin R. Corley, et ux	10.36
S29	05-11-16.1	Susan Marie Smith, (Life)	0.876
S30	05-11-25	Owen Michael Barr	0.598
S31	05-11-23	Owen Michael Barr	0.845
S32	05-11-24	Charles Edward Furbee, et ux	0.603
S33	05-11-5.2	Rickey Lynn & Victoria Rose Cross	1.0
S34	05-11-17.1	David Gray	0.297
S35	05-11-22	David Gray	0.353
S36	05-11-18	David E. Gray	0.569
S37	05-11-19	David E. Gray	0.532
S38	05-11-20	David E. Gray	0.569
S39	05-11-17	Kevin R. Corley, et ux	36.13
S40	05-11-3	Kevin R. Corley, et ux	13.18
S41	05-11-2	Walter C. Cheryl A. Rine	42.367
S42	05-11-2.1	Walter C. & Cheryl A. Rine	1.19
S43	05-11-2.2	Joshua A. Myers	2.193
S44	05-11-5.3	Robert Harris Arrick, et ux	3.0
S45	05-11-1.1	Larry W. Dunlap & Charles Lee Dunlap	34.405
S46	05-11-1.2	Jay A. Conner, et ux	5.824
S47	05-8-9.1	Scott E. Jackson, Tammy S. South & Marlon Jackson	1.957
S48	05-11-1.4	Larry W. Dunlap, et al	32.493
S49	05-7-32	William N. & Virginia A. Roupe	4.2
S50	05-7-33	William N. Roupe	24.60
S51	05-7-31	William N. Roupe et ux	43.147
S52	05-11-1	William N. & Virginia A. Roupe	4.527
S53	05-11-1.6	Debra Morris	2.093
S54	05-11-1.7	William S. & Mary K. Adams	8.0
S55	05-11-1.5	Paul & Sandy Whitt	3.507
S56	05-11-4	David H. Arrick, et ux	31.5
S57	05-11-16.3	Kegan Michael Haught - Life	3.265
S58	05-11-6	Robert & Rebecca Arrick	1.29
S59	05-11-7	Baptist Cemetery	1.0
S60	05-11-8	Baptist Church	0.8
S61	05-11-9	Edwin C. & Kimberly A. Miller	54.625
S62	05-11-9.10	John A. & Janet L. Beucke	2.348
S63	05-11-9.2	Michael R. Bryan	3.143
S64	05-11-9.8	Sean F. Moore	2.070
S65	05-11-9.7	Sean F. Moore	2.026
S66	05-11-9.1	Jack Shephard Huggins Jr., et al	10.92
S67	05-11-9.4	Jack S. Huggins, et ux	4.129
S68	05-11-11.2	Wesley R. Bryan & Wesley R. Bryan II	25.031
S69	05-10-16.4	Melvin E. Jr. & Elizabeth Ferguson	30.87
S70	05-10-15.1	Donald T. Miller	2.095

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S71	05-16-3.2	Jimmy Lee Ostrander Jr., Sheana Lynn Ostrander & Brody Ray Ostrander	1.435
S72	05-16-3.1	Dennis Jackson, et ux	0.27
S73		Cemetery - No Deed	
S74	05-16-2	Christian Church	0.19
S75	05-16-1	Christian Church	0.50
S76	05-16-23.1	Ray E. Minor, et ux	2.0
S77	05-16-23.4	Michael R. & Brenda K. Bryan	3.0
S78	05-16-23.3	Greg & Christina Riddle	1.0
S79	05-16-24	Alan M. Beyser, et ux	1.083
S80	05-16-23.2	Alan M. Beyser, et ux	1.726
S81	05-16-23	CNX Land Resources, Inc.	60.138
S82	05-7-31.4	Grandview-Doolen PSD	0.23
S83	05-7-31.2	William N. Roupe Et Ux	3.304
S84	05-7-31.3	William N. & Virginia A. Roupe	0.230
S85	05-7-31.1	David L. & Lori M. Yoders	30.115
S86	05-8A-16	Jon David Fromhart	2.0
S87	05-8A-26	Albert James Anderson Jr.	1.605
S88	05-8A-27	Clarence S. Siburt, Et Ux	8.296
S89	05-8A-39	Barbara L. Daniels & Elaine Wills	3.223
S90	05-8A-38	William J. Gamble, Et Ux	0.354
S91	05-8A-40	Barbara L. Daniels & Elaine Wills	0.627
S92	05-8A-41	William J. Gamble, Et ux	0.046
S93	05-8A-37	William J. Gamble, Et Ux	0.706
S94	05-8A-42	Robert M. White	7.23
S95	05-8A-49	Raymond Scott, Jr. & Larriette	0.159
S96	05-8A-45	Raymond Scott, Jr. & Larriette	0.305
S97	05-8A-46	Barbara L. & Mary L. Rose	1.5
S98	05-8A-47	Barbara L. & Mary L. Rose	3.0
S99	05-8-4.1	Frances E. Nieman	33.46
S100	05-8A-53	Frances E. Nieman	0.422
S101	05-8A-52	Barbara L. & Mary L. Rose	0.59
S102	05-8A-48	Raymond Scott, Jr. + Larriette	2.12
S103	05-8A-36	William J. & Linda E. & Erin R. Gamble	1.031
S104	05-8A-33	Elaine Wills & Jeffrey D. Brooks	2.517
S105	05-8A-31	Randall K. Keener, Et Ux	2.346
S106	05-8A-28	Norman G. Johnson (Life)	2.0
S107	05-8A-24	Clarence Paul Siburt	0.653
S108	05-8A-23	Danny Lee & Leona May Darrah	0.738
S109	05-8A-25	Charles & Whitney Woods	2.6
S110	05-8A-14	Board Of Education	1.0
S111	05-8A-30	Randall Keith Keener, Et Ux	0.059
S112	05-8A-29	Catherine P. Rine	0.394
S113	05-8A-32	Jonathan David Bopp	0.580
S114	05-8A-34	Norman G Johnson, Et Ux (Life)	0.25
S115	05-8-3	Tammy L. Mitchell	35.07
S116	05-8-23	Robert L. & Donald Shields	0.46
S117	05-8A-35	Jared C. Sells	2.780
S118	05-8-4	C. Wayne Berisford	23.355
S119	05-8A-43	Charles G. Stein & Eva A. Wade	0.17
S120	05-8A-44	Charles G. Stein & Eva A Wade	0.18
S121	05-8A-50	Lucretia M. Harrison	0.277
S122	05-8A-51	Lucretia M. Harrison	0.210
S123	05-8A-54	David D. & Christine S. Daniels	0.68
S124	05-8A-54.1	David D. & Christine S. Daniels	0.69
S125	05-8A-15	June Morris	2.06
S126	05-8A-17	Isaac Luke Vanscyoc	1.44
S127	05-8A-18	David D. & Christine S. Daniels	0.25
S128	05-8A-19	David D. & Christine S. Daniels	0.25
S129	05-8A-21	David D. & Christine S. Daniels	0.122
S130	05-8A-13	Letha I. Ruckman	2.993
S131	05-8-5	Richard L. Gatts (Life)	98.819
S132	05-8-8	James Edward Francis, Et Ux	28.3
S133	05-9-35	Lloyd C. & Judith C. Arnold	47.0
S134	05-9-2	James R. Legg Estate	23.141
S135	05-9-2.1	Jeffery L. Legg	20.5
S136	05-9-1	Sheldon Ray Ruckman & Marvin Edgar Ruckman	57.683
S137	05-9-1.2	Marvin E. Ruckman	1.359
S138	05-4-17	JPM Properties, LLC	5.0
S139	05-4-19	William L. Maxwell Jr.	1.5
S140	05-4-18	William L. Maxwell Jr.	3.0
S141	05-9-1.3	Marvin E. Ruckman Et Ux	3.326
S142	05-9-1.4	Sheldon R. Ruckman Et Al Life	4.494
S143	05-9-1.1	Beverly E. Clark	0.52
S144	05-8-6	Richard L. Gatts - Life	1.181
S145	05-8A-22	Whitney Woods	0.715
S146	05-8A-10	David D. & Christine S. Daniels	0.20
S147	Fish Creek	State of W.V.	8.16



P.S. 708
David L Jackson



OPERATOR'S WELL #: Bryan N-7HM
 DISTRICT: Franklin
 COUNTY: Marshall
 STATE: WV

WELL PLAT
 PAGE 3 OF 3
 DATE: 9/19/2017
 REVISED DATE: 8/14/18

BRYAN LEASE WELL N-7HM ±21.87± ACRES

Number	TAX MAP PARCEL	ADJOINER OWNER	ACRES
217	05-15-9	CNX Land Resources, Inc.	81.98
218	05-15-8	Terry D. Rose, et ux	77.11
219	05-15-7	Terry D. Rose, et ux	4.2
220	05-15-6.1	Joseph J. Kramer, et ux	39.40
221	05-15-6	Joseph J. Kramer, et ux	42.5
222	05-15-13	CNX Land Resources, Inc.	11.0
223	05-15-14	John David Petrock, et ux	25.0
224	05-15-2	John David Petrock, et ux	5.0
225	05-15-1	Marous Sharp & David Schlabach, Hrs.	121.0
226	05-15-3	Joseph J. Kramer, et ux	38.10
227	05-11-12	Joseph J. Kramer, et ux	43.2188
228	05-11-13	Joy D. Garthman & Ahin Gatta	12.29
229	05-11-13	Herbert D. Lantz	43.88
230	05-11-11.1	Nellie Mahé & Robert W. Spencer	5.813
231	05-11-14	Brad M. & Amanda J. Blake	15.193
232	05-11-11	Brad M. & Amanda J. Blake	5.0
233	05-11-9	Edwin C. & Kimberly A. Miller	54.525
234	05-11-9.9	Leonard J. Parsons, et ux	5.89
235	05-11-9.8	Southern County Farms, Inc.	2.488
236	05-11-9.8	Southern County Farms, Inc.	2.559
237	05-11-9.3	Joseph M. & Steven Haight	1.63
238	05-11-8.2	Joseph Haight	2.181
239	05-11-14.1	Dennis F. Moore, et ux	1.058
240	05-11-8	Keith E. Haight, et ux	83.874
241	05-12-11	Wesley R. Bryan & Wesley R. Bryan II	52.478
242	05-11-17.2	Brenda & Michael Bryan	11.204
243	05-11-5.1	James R. Anderson, et ux	0.205
244	05-11-2	Kevin R. Cohey, et ux	10.38
245	05-11-8.1	Susan Mahé Smith, (Life)	0.978
246	05-11-25	Owen Michael Barr	0.958
247	05-11-23	Owen Michael Barr	0.845
248	05-11-24	Charles Edward Furbee, et ux	0.803
249	05-11-2.2	Rickey Lynn & Victoria Rose Cross	1.0
250	05-11-17.1	David Gray	0.297
251	05-11-22	David Gray	0.253
252	05-11-18	David E. Gray	0.289
253	05-11-19	David E. Gray	0.232
254	05-11-20	David E. Gray	0.289
255	05-11-17	Kevin R. Cohey, et ux	36.13
256	05-11-3	Kevin R. Cohey, et ux	13.18
257	05-11-2	Walter C. Cheryl A. Rine	42.387
258	05-11-2.1	Walter C. Cheryl A. Rine	1.19
259	05-11-2.2	Joshua A. Myers	2.193
260	05-11-2.3	Robert Hama Amick, et ux	3.0
261	05-11-1.1	Larry W. Dunlap & Charles Lee Dunlap	34.405
262	05-11-1.2	Jay A. Conner, et ux	5.824
263	05-8-9.1	Scott E. Jackson, Tammy S. South & Mahon Jackson	1.957
264	05-11-1.4	Larry W. Dunlap, et ux	32.493
265	05-7-32	William N. & Virginia A. Rouse	4.2
266	05-7-33	William N. Rouse	24.80
267	05-7-31	William N. Rouse et ux	43.147
268	05-11-1	William N. & Virginia A. Rouse	4.227
269	05-11-1.6	Debra Mome	2.093
270	05-11-7	William S. & Mary K. Adams	8.0
271	05-11-1.5	Paul & Sandy Whitliff	3.507
272	05-11-4	David H. Amick, et ux	31.5
273	05-11-6.3	Kegan Michael Haight - Life	3.285
274	05-11-8	Robert & Rebecca Amick	1.29
275	05-11-7	Babette Cemetery	1.0
276	05-11-8	Baptist Church	0.8
277	05-11-9	Edwin C. & Kimberly A. Miller	54.525
278	05-11-9.10	John A. & Janet L. Boucke	2.348
279	05-11-9.2	Michael R. Bryan	3.143
280	05-11-9.8	Sean F. Moore	2.070
281	05-11-9.7	Sean F. Moore	2.026
282	05-11-9.1	Jack Shepherd Huggins Jr., et ux	10.92
283	05-11-9.4	Jack S. Huggins, et ux	4.129
284	05-11-11.2	Wesley R. Bryan & Wesley R. Bryan II	25.031
285	05-10-16.4	Malvin E. Jr. & Elizabeth Ferguson	30.87
286	05-10-15.1	Donald T. Miller	2.055

Number	TAX MAP PARCEL	ADJOINER OWNER	ACRES
214	05-18-3.2	Jimmy Lee Oatlander, Jr. & Sherrin Lynn Oatlander & Brady Ray Oatlander	1.435
215	05-18-3.1	Dennis Jackson, et ux	0.27
216	05-18-2	Cometery - No Dead	0.19
217	05-18-1	Christian Church	0.50
218	05-18-2.1	Ray E. Minor, et ux	2.0
219	05-18-2.4	Michael R. & Brenda K. Bryan	3.0
220	05-18-2.3	Greg & Christina Riddle	1.0
221	05-18-2.4	Alan M. Beyer, et ux	1.083
222	05-18-2.2	Alan M. Beyer, et ux	1.728
223	05-18-2.3	CNX Land Resources, Inc.	80.138
224	05-7-31.4	Grandview-Doyle PSD	0.23
225	05-7-31.2	William N. Rouse Et UX	3.304
226	05-7-31.3	William N. & Virginia A. Rouse	0.230
227	05-7-31.1	David L. & Lori M. Yobere	30.115
228	05-8A-18	Jon David Fromhart	2.0
229	05-8A-26	Albert James Anderson Jr.	1.805
230	05-8A-27	Clarence S. Siburt, Et UX	8.298
231	05-8A-29	Barbara L. Daniels & Elaine Willis	3.232
232	05-8A-38	William J. Gamble, Et UX	0.234
233	05-8A-40	Barbara L. Daniels & Elaine Willis	0.827
234	05-8A-41	William J. Gamble, Et ux	0.048
235	05-8A-37	William J. Gamble, Et UX	0.708
236	05-8A-42	Roder M. White	7.23
237	05-8A-49	Raymond Scott, Jr. & Lorette	0.199
238	05-8A-45	Raymond Scott, Jr. & Lorette	0.305
239	05-8A-46	Barbara L. & Mary L. Rose	1.5
240	05-8A-47	Barbara L. & Mary L. Rose	3.0
241	05-8-4.1	Frances E. Nieman	33.48
242	05-8A-23	Frances E. Nieman	0.422
243	05-8A-22	Barbara L. & Mary L. Rose	0.59
244	05-8A-48	Raymond Scott, Jr. & Lorette	2.12
245	05-8A-36	William J. & Linda E. & Ehn R. Gamble	1.031
246	05-8A-33	Elaine Willis & Jeffrey D. Brooks	2.217
247	05-8A-31	Randall K. Keener, Et UX	2.348
248	05-8A-28	Norman G. Johnson (Life)	2.0
249	05-8A-24	Clarence Paul Siburt	0.853
250	05-8A-23	Danny Lee & Leona May Darnah	0.738
251	05-8A-25	Charles & Whitney Woods	2.8
252	05-8A-14	Board Of Education	1.0
253	05-8A-30	Randall Keith Keener, Et UX	0.059
254	05-8A-29	Caroline F. Rine	0.394
255	05-8A-32	Jonathan David Bopp	0.580
256	05-8A-34	Norman G Johnson, Et UX (Life)	0.25
257	05-8-3	Tammy L. Mitchell	35.07
258	05-8-23	Robert L. & Donald Shields	0.48
259	05-8A-25	Jared C. Sells	2.780
260	05-8-4	C. Wynne Behford	23.288
261	05-8A-43	Charles G. Stein & Eva A. Wade	0.17
262	05-8A-44	Charles G. Stein & Eva A. Wade	0.18
263	05-8A-50	Lucretia M. Harrison	0.277
264	05-8A-51	Lucretia M. Harrison	0.210
265	05-8A-54	David D. & Christine S. Daniels	0.88
266	05-8A-54.1	David D. & Christine S. Daniels	0.89
267	05-8A-15	June Morns	2.08
268	05-8A-17	Isaac Luke Vanscyoc	1.44
269	05-8A-18	David D. & Christine S. Daniels	0.25
270	05-8A-19	David D. & Christine S. Daniels	0.25
271	05-8A-21	David D. & Christine S. Daniels	0.122
272	05-8A-13	Leta I. Ruckman	2.993
273	05-8-5	Richard L. Gatta (Life)	98.819
274	05-8-8	James Edward Farnold, Et UX	28.3
275	05-9-35	Lloyd C. & Judith C. Arnold	47.0
276	05-9-2	James R. Legg Estate	23.141
277	05-9-2.1	Jeffery L. Legg	20.5
278	05-9-1	Sheldon Ray Ruckman & Marvin Edgar Ruckman	27.883
279	05-9-1.2	Marvin E. Ruckman	1.359
280	05-4-17	JPM Properties, LLC	5.0
281	05-4-19	William L. Maxwell Jr.	1.5
282	05-4-18	William L. Maxwell Jr.	3.0
283	05-9-1.3	Marvin E. Ruckman Et UX	3.328
284	05-9-1.4	Sheldon R. Ruckman Et Al Life	4.494
285	05-9-1.1	Beverly E. Clark	0.52
286	05-8-8	Richard L. Gatta - Life	1.181
287	05-8A-22	Whitney Woods	0.715
288	05-8A-10	David D. & Christine S. Daniels	0.20
289	Fish Creek	State Of W.V.	8.18



David Jackson



STATE: WV
 COUNTY: Marshall
 DISTRICT: Franklin
 WELL #: Bryan N-7HM
 OPERATORS: WELL PLAT
 DATE: 9/19/2017
 PAGE 3 OF 3
 REVISED DATE: 8/14/18

**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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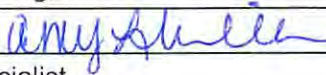
*See attached list

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

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

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

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

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

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19294	A	5-15-9	BRYAN MICHAEL ET UX	TRIENERGY, INC.	1/8+	741	78	N/A	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & 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	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*19340	B	5-15-8	YOHO DONNA VIVIAN	GASTAR EXPLORATION USA, INC.	1/8+	665	407	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC to AB Resources LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC 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 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	40/57 Chevron USA Inc to TH Exploration LLC
10*19017	C	5-10-15	RINE PAUL ANDREW ET UX	CHEVRON U.S.A. INC	1/8+	796	24	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	D	5-11-12	KRAMMAR JOSEPH ET UX	TRIENERGY, INC.	1/8+	655	566	N/A	19/623 TriEnergy Inc to AB Resources LLC	24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	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	40/57 Chevron USA Inc to TH Exploration LLC	
10*19336	E	5-11-11.3	DAWSON BONNIE ET UX	GASTAR EXPLORATION USA, INC.	1/8+	665	397	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC and Atinum Marcellus I LLC to AB Resources LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC 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 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	40/57 Chevron USA Inc to TH Exploration LLC

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19141	F	5-11-11.1	SPENCER ROBERT W JR ET UX	GASTAR EXPLORATION USA, INC.	1/8+	706	468	N/A	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	23/624 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC, Chief Exploration & Development LLC, Radler 2000 Limited Partnership and Enerplus Resources USA Corp	24/1 AB Resources LLC, Chief Exploration & Development LLC, Radler 2000 Limited Partnership, Enerplus Resources Corp to TriEnergy Holdings LLC	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 to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC		
10*19336	G	5-11-11.4	DAWSON BONNIE ET UX	GASTAR EXPLORATION USA, INC.	1/8+	665	397	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC 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 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 to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC		
10*19336	H	5-11-11	DAWSON BONNIE ET UX	GASTAR EXPLORATION USA, INC.	1/8+	665	397	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC 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 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 to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC		
10*14099	I	5-11-9	SOUTHERN COUNTRY FARMS	GASTAR EXPLORATION USA, INC.	1/8+	666	489	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC		
10*19158	J	5-11-9.9	PARSONS LEONARD ET UX	GASTAR EXPLORATION USA, INC.	1/8+	705	125	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC		
10*14099	K	5-11-9.6	SOUTHERN COUNTRY FARMS	GASTAR EXPLORATION USA, INC.	1/8+	666	489	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC		

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10*14099	L	5-11-9.5	SOUTHERN COUNTRY FARMS	GASTAR EXPLORATION USA, INC.	1/8+	666	489	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Athnum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Athnum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC	
10*18339	M	5-11-9.3	RESOURCE MINERALS HEADWATER I, LP	TH EXPLORATION LLC	1/8+	940	448	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10*19139	N	5-11-16	MOORE HIRAM V - SFX	GASTAR EXPLORATION USA, INC.	1/8+	699	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Athnum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Athnum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC	
10*19179	N	5-11-16	HAUGHT KEITH ET UX - SFX	GASTAR EXPLORATION USA, INC.	1/8+	710	587	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Athnum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Athnum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC	
10*19180	N	5-11-16	HAUGHT STEVEN - SFX	TRIENERGY, INC. - LEASE SAYS GASTAR EXPLORATION USA INC	1/8+	710	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Athnum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Athnum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC	
10*19178	N	5-11-16	HAUGHT JOSEPH - SFX	GASTAR EXPLORATION USA, INC.	1/8+	710	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc. to Athnum Marcellus I LLC	32/362 Gastar Exploration USA Inc and Athnum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC	
10*19139	O	5-11-16.1	HIRAM V MOORE	GASTAR EXPLORATION USA INC	1/8+	699	53	N/A	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	23/353 Gastar Exploration USA Inc to Athnum Marcellus I LLC	32/362 Gastar Exploration Inc. and Athnum Marcellus I LLC, to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19170	O	5-11-16.1	SUSAN MARIE SMITH NKA SUSAN MARIE HAMNER	GASTAR EXPLORATION USA INC	1/8+	706	583	N/A	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	23/353 Gastar Exploration USA Inc to Athnum Marcellus I LLC	32/362 Gastar Exploration Inc. and Athnum Marcellus I LLC, to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*22665	P	5-11-5.1	JAMES R AND MELODY A ANDERSON	NOBLE ENERGY INC	1/8+	812	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34/167 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	38/297 Noble Energy, Inc. to HG Energy II Appalachia, LLC	962/488 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*19126	Q	5-11-5	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	839	47	N/A	N/A	N/A	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	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19176	Q	5-11-5	MAUNA MAXINE BEYSER	GASTAR EXPLORATION USA INC	1/8+	710	602	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Athnum Marcellus I LLC	32/362 Gastar Exploration Inc. and Athnum Marcellus I LLC, to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC	

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10*19177	Q	5-11-5	NINA L KOVACS	GASTAR EXPLORATION USA INC	1/8+	710	594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19185	Q	5-11-5	HARRIETT LODUTH FOLEY	GASTAR EXPLORATION USA INC	1/8+	710	598	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19186	Q	5-11-5	JOEL GLOVER	GASTAR EXPLORATION USA INC	1/8+	710	600	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19189	Q	5-11-5	SHERRY ANN MCPHERON	GASTAR EXPLORATION USA INC	1/8+	710	606	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19190	Q	5-11-5	SALLY LEE RIVERA	GASTAR EXPLORATION USA INC	1/8+	710	590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19191	Q	5-11-5	SHARLA BETH WEAVER	GASTAR EXPLORATION USA INC	1/8+	710	608	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19192	Q	5-11-5	JAMES E YOHO	GASTAR EXPLORATION USA INC	1/8+	714	129	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19201	Q	5-11-5	DANIEL K YOHO	GASTAR EXPLORATION USA INC	1/8+	714	125	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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*19202	Q	5-11-5	DEBORAH L WOOLEY	GASTAR EXPLORATION USA INC	1/8+	714	131	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	735/263 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

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10*19219	U	5-8-9.1	SCOTT E AND TAMMY SUE JACKSON	TRIENERGY HOLDINGS, LLC	1/8+	731	102	N/A	N/A	N/A	N/A	N/A	N/A	25/449 TriEnergy Holdings LLC to NPAR, LLC	756/332 NPAR, LLC to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19168	V	5-11-1.5	PAUL AND SANDY WHITT	CHESAPEAKE APPALACHIA LLC	1/8+	715	565	N/A	N/A	N/A	N/A	N/A	N/A	30/392 Chesapeake Appalachia, LLC, to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration, LLC	
10*19174	W	5-11-1.7	WILLIAM S ADAMS MARY K ADAMS	TRIENERGY HOLDINGS, LLC	1/8+	711	318	N/A	N/A	24/430 TriEnergy Holdings, LLC to NPAR, LLC	24/466 AB Resources LLC and NPAR LLC to Chief Exploration & Development, LLC and Radler 2000 Limited Partnership	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.	756/332 NPAR LLC to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC	
10*21546	X	5-8-7	EDWIN C MILLER AND KIMBERLY A MILLER	TH EXPLORATION, LLC	1/8+	957	257	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q091960000	Y	FISH CREEK	WEST VIRGINIA DIVISION OF NATURAL RESOURCES	NOBLE ENERGY INC	1/8+	865	558	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC	
10*19101	Z	5-8-4.1	FRANCIS E NIEMAN	AB RESOURCES LLC	1/8+	685	288	N/A	N/A	24/466 AB Resources LLC and NPAR LLC to Chief Exploration and Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration and Development LLC, Radler 2000 Limited Partnership and Enerplus Resources Corporation to Chevron USA Inc	25/105 Chief Exploration and Development LLC, Radler 2000 Limited Partnership and Enerplus Resources Corporation to	conveyance 756/397 AB Resources LLC to Chevron USA Inc 8/5/2011	40/127 Chevron USA Inc to TH Exploration, LLC		
Q099899000	AA	5-8A-47	THOMAS DANIEL BLUE ET UX	NOBLE ENERGY INC	1/8+	898	584	N/A	N/A	N/A	N/A	N/A	N/A	931/43 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC	
Q097976007	AA	5-8A-47	CHARLES EDWIN BLU	NOBLE ENERGY INC	1/8+	890	316	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC	

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Q097976006	AA	5-8A-47	VICTORIA A PAKROVSKY ET VIR	NOBLE ENERGY INC	1/8+	890	590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976005	AA	5-8A-47	MARJORIE B KIDD ET VIR	NOBLE ENERGY INC	1/8+	890	596	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q099899000	BB	5-8A-46	THOMAS DANIEL BLUE ET UX	NOBLE ENERGY INC	1/8+	898	584	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	931/43 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976007	BB	5-8A-46	CHARLES EDWIN BLU	NOBLE ENERGY INC	1/8+	890	316	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976006	BB	5-8A-46	VICTORIA A PAKROVSKY ET VIR	NOBLE ENERGY INC	1/8+	890	590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976005	BB	5-8A-46	MARJORIE B KIDD ET VIR	NOBLE ENERGY INC	1/8+	890	596	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q099899000	CC	5-8A-49	THOMAS DANIEL BLUE ET UX	NOBLE ENERGY INC	1/8+	898	584	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976007	CC	5-8A-49	CHARLES EDWIN BLU	NOBLE ENERGY INC	1/8+	890	316	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976006	CC	5-8A-49	VICTORIA A PAKROVSKY ET VIR	NOBLE ENERGY INC	1/8+	890	590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
Q097976005	CC	5-8A-49	MARJORIE B KIDD ET VIR	NOBLE ENERGY INC	1/8+	890	596	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q099899000	DD	5-8A-42	THOMAS DANIEL BLUE ET UX	NOBLE ENERGY INC	1/8+	898	584	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976007	DD	5-8A-42	CHARLES EDWIN BLU	NOBLE ENERGY INC	1/8+	890	316	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976006	DD	5-8A-42	VICTORIA A PAKROVSKY ET VIR	NOBLE ENERGY INC	1/8+	890	590	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q097976005	DD	5-8A-42	MARJORIE B KIDD ET VIR	NOBLE ENERGY INC	1/8+	890	596	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC
Q078626017	EE	5-8A-39	SOUTHEASTERN GUIDE DOGS INC	NOBLE ENERGY INC	1/8+	820	516	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39/1 Noble Energy Inc to HG Energy Appalachia LLC	988/286 TH Exploration, LLC, HG Energy Appalachia LLC and TH Exploration II, LLC

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

BOOK 040 PAGE 0127

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

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

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this day of August, 2017 (the "Effective Date"), by and between CHEVRON U.S.A. INC. (hereinafter "Assignor") and TR EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated the 1st day of August, 2017 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to those certain Oil and Gas Leases situated in Marshall County, West Virginia, as described in Exhibit "A", attached hereto and made a part hereof (hereinafter the "Leases"), less and except certain overriding royalty interests and exclusions; and

WHEREAS, Assignor desires to assign, set over, and transfer to Assignee all of Assignor's right, title, and interest in and to the Leases as described below, subject to certain overriding royalty interests and less and except certain exclusions.

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

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

A. The Chevron ORRI previously conveyed to Assignor and as described in that certain Memorandum of Assignment of Oil and Gas Lease Interests dated November 6, 2012 by and between Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia, and

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

RECEIVED
Office of Oil and Gas
AUG 31 2018
WV Department of
Environmental Protection

DPS LAND SERVICES CORP
6000 TOWN CENTER BOULEVARD, SUITE 105
CANONSBURG, PA 15317-5841

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

By: E. J. Heas
Its: V.P. of Land + Attorney in - Fact

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

Marshall County
Jan Pest, Clerk
Instrument 1437593
03/12/2018 @ 03:12:57 PM
AGREEMENT
Book 962 @ Page 488
Pages Recorded 3
Recording Cost \$ 11.00

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Office of Oil and Gas
AUG 31 2018
WV Department of
Environmental Protection

MEMORANDUM OF OPERATING AGREEMENT AND FINANCING STATEMENT

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

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

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

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

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

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Office of Oil and Gas
AUG 31 2018
WV Department of
Environmental Protection



August 30, 2018

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

Subject: **Permit Modification Request** for Bryan N-7HM API # 47-051-01978
District; Marshall County, WV
Changes to Permit: Lateral extension

Dear Laura:

As the result of a recent acreage trade, Tug Hill is requesting a modification to the above-mentioned permit that will allow us to extend the bottom hole location of this lateral. Enclosed please find the following:

- Revised WW-6B (approved by Jim Nicholson)
- Revised Mylar Well Plat (Approved by Jim Nicholson)
- 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,

Amy L. Miller
Permitting Specialist – Appalachia Region

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AUG 31 2018
WV Department of
Environmental Protection