



west virginia department of environmental protection

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

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

Wednesday, September 5, 2018
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BOULEVARD, PLAZA II
SUITE 200
CANNONSBURG, PA 15317

Re: Permit approval for BRYAN N-14HU
47-051-02031-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: BRYAN N-14HU
Farm Name: CNX LAND RESOURCES INC.
U.S. WELL NUMBER: 47-051-02031-00-00
Horizontal 6A New Drill
Date Issued: 9/5/2018

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

PERMIT CONDITIONS

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



west virginia department of environmental protection

Oil and Gas Conservation Commission
601 57th Street SE, Charleston, WV 25304
304-926-0499 Ext 1274

Barry K. Lay, Chairman
dep.wv.gov

July 26, 2018

Department of Environmental Protection
Office of Oil and Gas
Charleston, WV 25304

RE: Application for Deep Well Permit – API #47-051-02031

COMPANY: Tug Hill Operating, LLC

FARM: Bryan N-14HU

COUNTY: Marshall DISTRICT: Franklin QUAD: Powhatan Point

The deep well review of the application for the above company is **Approved to drill to the Trenton for Point Pleasant completion. Pooling Docket No. 265-254**

The applicant has complied with the provision of Chapter 22C-9, of the Code of West Virginia, nineteen hundred and thirty-one (1931), as amended, Oil and Gas Conservation Commission as follows:

1. Comments to Notice of Deviation filed? None
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: *yes, Docket 265-254 Exception Location Hearing, 47-051-02029 and 47-051-02030; and CORLEY N-9HU 47-051-01983 and CORLEY N-10HU 47-051-01998
4. Provided a plat showing that the proposed location is a distance of 400+ feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

A handwritten signature in blue ink that reads "Susan Rose".

Susan Rose
Administrator

4705102031

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-14HU Well Pad Name: Bryan

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

4) Elevation, current ground: 1254' Elevation, proposed post-construction: 1254'

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

Other _____

(b) If Gas Shallow _____ Deep

Horizontal

6) Existing Pad: Yes or No Yes *JWH/6/18*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Point Pleasant is the target formation at a depth of 11,124' - 11,243' thickness of 119' and anticipated pressure of approx. 9000 psi

8) Proposed Total Vertical Depth: 11,393'

9) Formation at Total Vertical Depth: Trenton

10) Proposed Total Measured Depth: 24,181'

11) Proposed Horizontal Leg Length: 11,538'

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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WW-6B
(04/15)

API NO. 47-051 - 02031
 OPERATOR WELL NO. Bryan N-14HU
 Well Pad Name: Bryan

18)

CASING AND TUBING PROGRAM

4705102031

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	20"	NEW	J55	106.5#	965'	953'	1,525ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2,800'	2,800'	1,978ft^3(CTS)
Intermediate	9 5/8"	NEW	HPP110	47#	10,600'	10,600'	3,459ft^3(CTS)
Production	5 1/2"	NEW	HCP110	23#	24,181'	24,181'	5,721ft^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		12,078'	
Liners							

JW4/6/18

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	20"	26"	.5	2,410	1,928	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.472	10,730	6,968	SEE#24	1.99
Production	5 1/2"	8 1/2"	.415	13,580	10,864	SEE#24	1.18
Tubing	2 7/8"			14,530	11,624		
Liners							

PACKERS

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

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09/07/2018

WW-6B
(10/14)

API NO. 47-051 - 02031
OPERATOR WELL NO. Bryan N-14HU
Well Pad Name: Bryan

JW4/6/18

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. Log vertical section and run a solid cement plug back to proposed KOP. Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 28,887,500 lb proppant and 446,622 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 third joint. Production casing will have one centralizer every third joint in lateral, one centralizer every joint through curve, one centralizer every third joint to surface.

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

*See Attachment

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

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Permit well - Bryan N-14HU

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within range of fracture propagation

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Comments
4705101340	Tug Hill Operating (formerly operated by Chevron and AB Resources)	6450' TVD 10601' MD	Marcellus	Unknown	Yes, existing Marcellus producer. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore Producing Marcellus horizontal well. A field survey was conducted to locate this well and it was found producing at the location shown on the well plat.
4705170810	Manufacturers Light and Heat Co	Unknown	Unknown	Unknown	Unknown but unlikely. Probably an old shallow well.
4705101499	AB Resources	Unknown	Unknown	Unknown	No, Permit submitted but never issued. State records are incomplete Status on WVDEP website lists "Well Status" as "Never Issued"

WVDEP Pipeline Search Interface

Select County: (051) Marshall | Select databases: (Check All) Location, Production, Flapping, Owner/Compass, Stratigraphy, Sample, Pay/Stem/Water, Logs, Bon Hole Log

Well: County = 01 Permit = 01340

Location Information: View Map
 API: 4705101340 | County: Marshall | Perm: 01340 | Well Name: GUARD_18 | Lat: 39.77822 | Lon: -81.10273

Bottom Hole Location Information:
 API: 4705101340 | Well Name: GUARD_18 | Lat: 39.77822 | Lon: -81.10273

Owner Information:
 API: 4705101340 | Operator: AB Resources | Completion Date: 08/03/2010

Completion Information:
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Pay/Stem/Water Information:
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Production Gas Information (Volumes in Mcf):
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Production Oil Information (Volumes in Bbl):
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Production NGL Information (Volumes in Bbl):
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Production Water Information (Volumes in Gallons):
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Stratigraphy Information:
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

Wellbore (E-Log) Information:
 API: 4705101340 | Well Name: GUARD_18 | Completion Date: 08/03/2010

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Select County: (051) Marshall
 Enter Permit #: 70810
 Get Data Reset

Select datatypes: (Check All)
 Location Production Plugging
 Owner/Completion Stratigraphy Sample
 Pay/ShowWater Logs Btm Hole Loc

[Table Descriptions](#)
[County Code Translations](#)
[Permit Numbering Series](#)
[Usage Notes](#)
[Contact Information](#)
[Disclaimer](#)
[WVGES Main](#)
[Pipeline Plus: New](#)

WV Geological & Economic Survey Well: County = 51 Permit = 70810

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_16	LAT_DD	LONG_DD	UTME	UTMN
4705170810	Marshall	70810	Franklin	Powhatan Point	Clarrington	39 00'59.78"	-80 78'03.95"	118117	4450244.4

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4705170810	---	---	---	Johnson, Prsty Mfg, Joanna Schels	1	---	---	---	---	Manufacturers Light & Heat Co	---	---	---

Completion Information:

API	CMP_DT	SPUO_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTC	G_BEF	G_AFF	O_BEF
4705170810	---	---	---	---	---	---	---	unclassified	unclassified	not available	springer	unclassified	---	---	---	---	---	---

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well



Select County: (051) Marshall
 Enter Permit #: 01499
 Get Data Reset

Select datatypes: (Check All)
 Location Production Plugging
 Owner/Completion Stratigraphy Sample
 Pay/ShowWater Logs Btm Hole Loc

[Table Descriptions](#)
[County Code Translations](#)
[Permit Numbering Series](#)
[Usage Notes](#)
[Contact Information](#)
[Disclaimer](#)
[WVGES Main](#)
[Pipeline Plus: New](#)

WV Geological & Economic Survey Well: County = 51 Permit = 01499

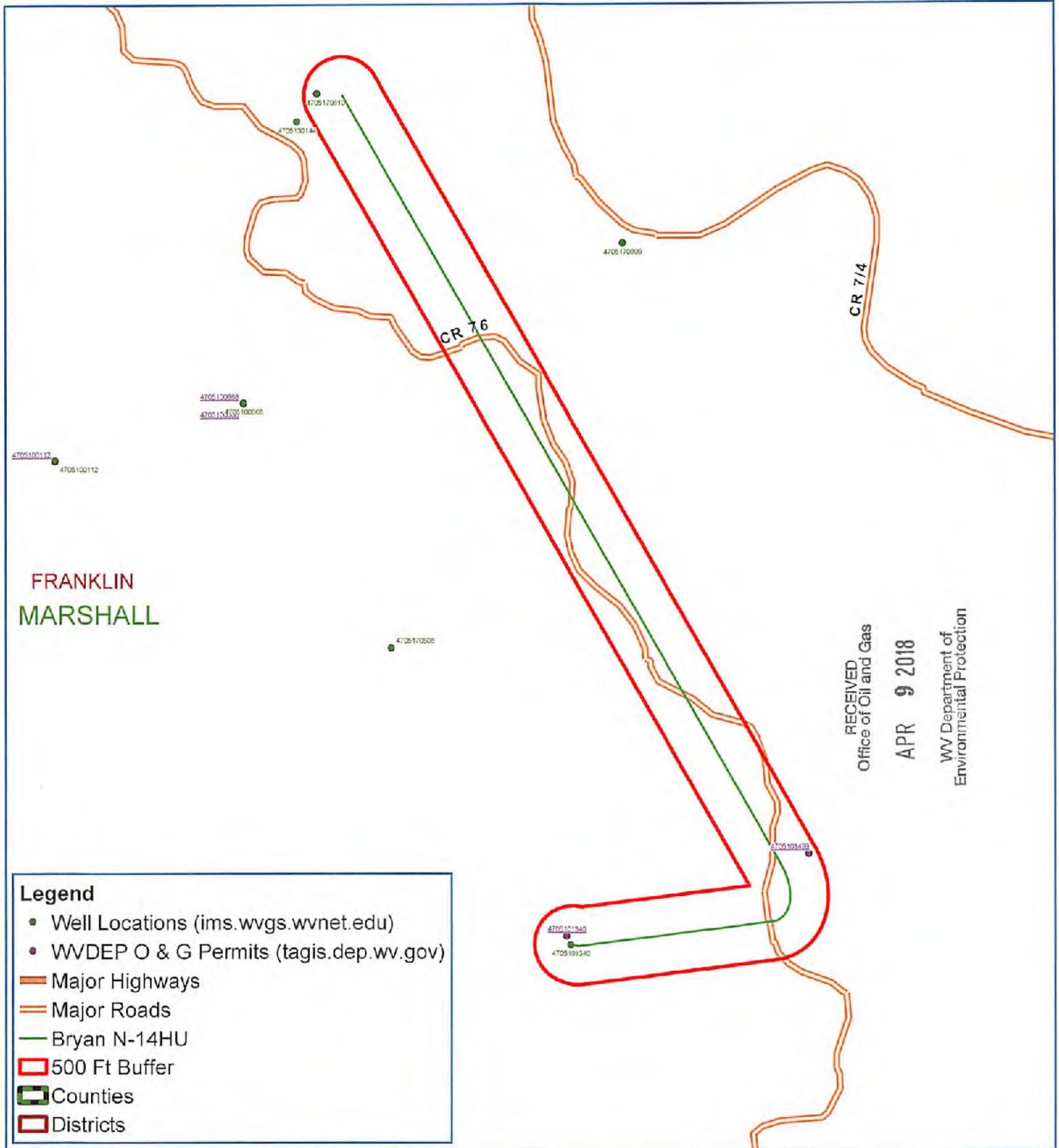
No records found for Well: County = 51 Permit = 01499

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Legend

- Well Locations (ims.wvgs.wvnet.edu)
- WVDEP O & G Permits (tagis.dep.wv.gov)
- Major Highways
- Major Roads
- Bryan N-14HU
- 500 Ft Buffer
- Counties
- Districts



Bryan N-14HU Franklin District Marshall County, WV



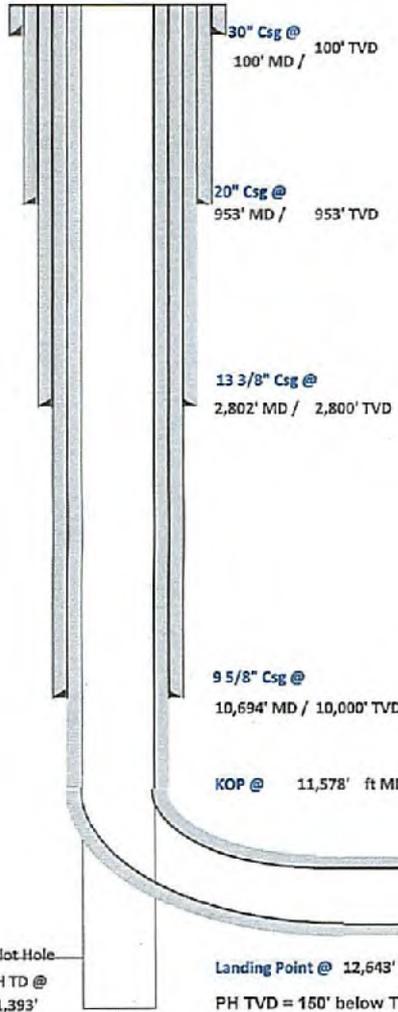
Map Created: December 7, 2017
Map Current As Of: December 7, 2017

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

Map Prepared by:
PS
09/07/2018
LAND SERVICES



WELL NAME: Bryan N-14HU
STATE: West Virginia **COUNTY:** Marshall
DISTRICT: Franklin
DF Elev: 1,191' **GL Elev:** 1,191'
TD: 24,181'
TH Latitude: 39.77564911
TH Longitude: -80.77653187 39.80588899
BH Latitude: -80.787159
BH Longitude:



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	803'
Sewickley Coal	701'
Pittsburgh Coal	796'
Big Lime	1,970'
Berea	2,519'
Tully	6,362'
Marcellus	6,443'
Onondaga	6,496'
Salina	7,186'
Lockport	8,211'
Utica	10,870'
Point Pleasant	11,124'
Landing Depth	11,213'
Trenton	11,243'
Pilot Hole TD	11,393'

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	100'	100'	8W	BW	Surface
Surface	26	20	953'	953'	106.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,802'	2,800'	54.5	J55	Surface
Intermediate 2	12 1/4	9 5/8	10,694'	10,000'	47	HP110	Surface
Production	8 1/2	5 1/2	24,181'	10,810'	23	P110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	291	A	15.6	Air	None
Surface	1,657	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	2,145	A	15	Air	1 Centralizer every other jt
Intermediate 2	2,833	A	14.5	Air	1 Centralizer every other jt
Production	4,941	A	15	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

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Tug Hill Operating, LLC Casing and Cement Program

Bryan N-14HU

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	100'	CTS
Surface	20"	J55	26"	953'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,802'	CTS
Intermediate 2	9 5/8"	HP110	12 1/4"	10,600'	CTS
Production	5 1/2"	P110	8 1/2"	24,181'	CTS

Cement

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate 1: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.2

Intermediate 2: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.99

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.18

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WW-6B Attachment to #24

Conductor, Coal and Fresh Water Casing Cement:

Premium NE-1 + 2% CaCl

- Premium NE-1 – Class A Portland API Spec
- CaCl – Calcium Chloride

Intermediate Casing:

Premium NE-1 + 2% bwoc CaCl₂ + 46.5% Fresh Water

- Premium NE-1 – Class A Portland API spec
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Kick Off Plug:

Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L + 38% Fresh Water

- Class H – Increased Compressive Strength Cement
- Sodium Metasilicate – Free Water Control; Early Strength Additive
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent
- CaCl₂ – Calcium Chloride
- Cello Flake – Fluid Loss Preventer

Production Casing Cement:

Lead: *50:50 (Poz:Premium NE-1) + .2% R-3 + .2% MPA-170 + .75 gal/100sk FP-13L*

Tail: *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*

- Poz – Fly Ash
- Premium NE-1 – Class A Portland API spec
- R-3 – Cement Retarder
- MPA-170 – Gelling Agent
- FP-13L – Anti-Foaming Agent
- ASA-301 – Free Water Control Agent
- BA-10A – Bonding Agent
- ASCA-1 – Solubility Additive

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TUG HILL
OPERATING

Tug Hill Operating LLC
Well: Bryan N-14HU (slot D)
Site: Bryan Pad
Project: Marshall County, WV
Design: rev2

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

System Datum: Mean Sea Level
Depth Reference: GLE1191 @ 1191.00ust
Surface location
Northing Easting Longitude
14445118.17 1703203.45 38.77564911-80.77653187

Total Corr (M→G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.79°



Azimuths to Grid North
True North: -0.14°
Magnetic North: -8.73°

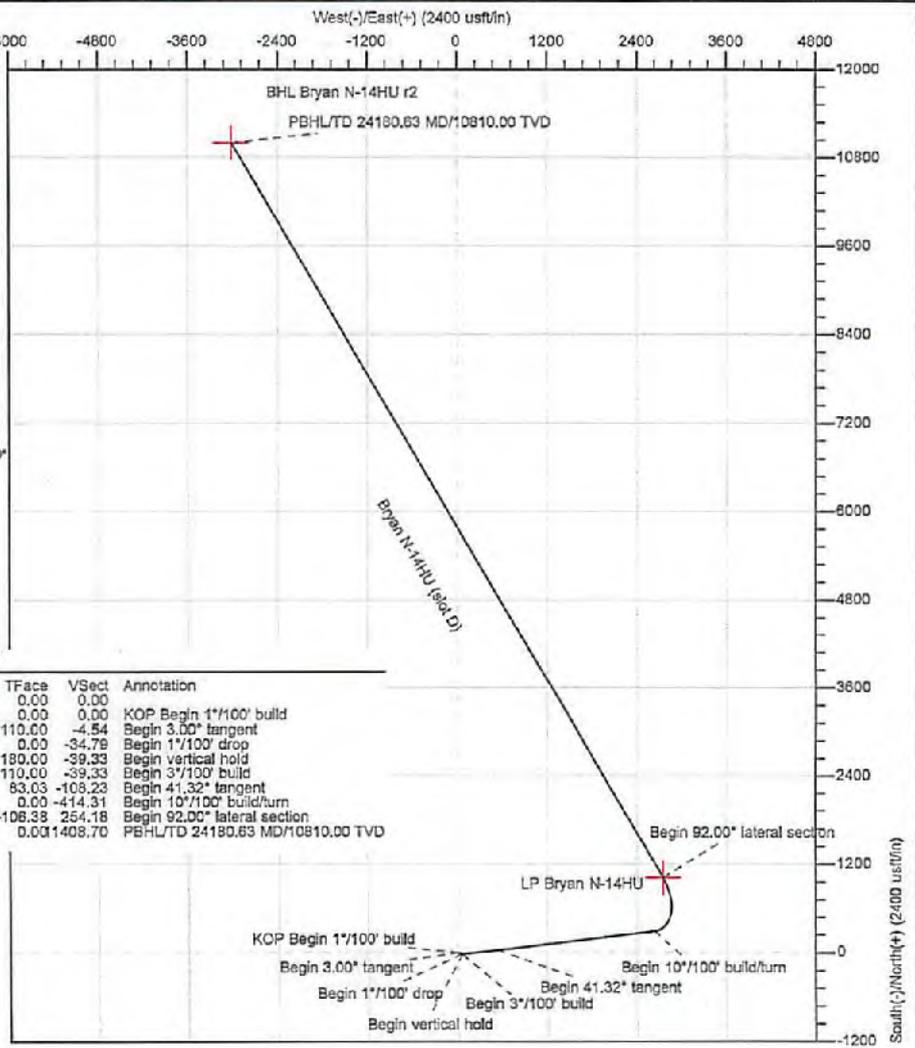
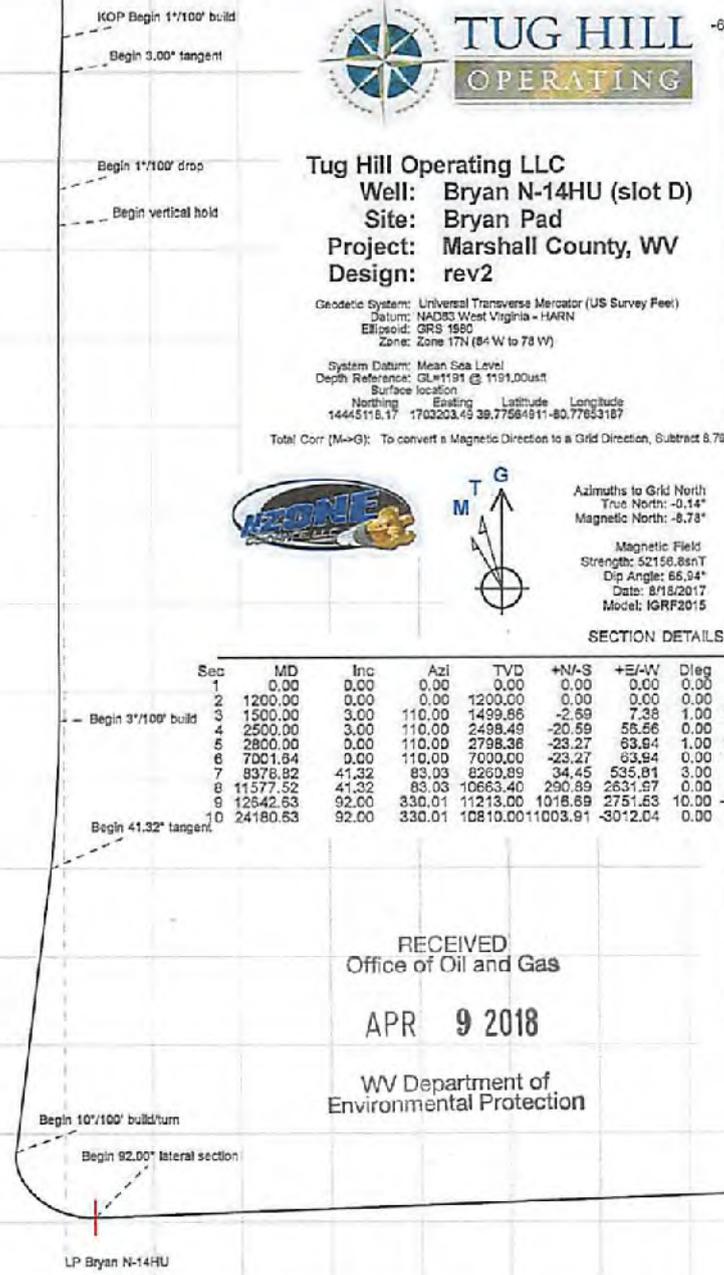
Magnetic Field
Strength: 52156.8nT
Dip Angle: 66.94°
Date: 8/18/2017
Model: IGRF2015

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 1°/100' build
3	1500.00	3.00	110.00	1499.86	-2.69	7.38	1.00	110.00	-4.54	Begin 3.00° tangent
4	2500.00	3.00	110.00	2498.48	-20.59	55.56	0.00	0.00	-34.79	Begin 1°/100' drop
5	2800.00	0.00	110.00	2798.36	-23.27	63.94	1.00	180.00	-39.33	Begin vertical hold
6	7001.84	0.00	110.00	7000.00	-23.27	63.94	0.00	110.00	-39.33	Begin 3°/100' build
7	8378.82	-41.32	83.03	8269.89	34.45	535.81	3.00	63.03	-103.23	Begin 41.32° tangent
8	11577.52	41.32	83.03	10663.40	290.85	2631.87	0.00	0.00	-414.31	Begin 10°/100' build/turn
9	12542.53	92.00	330.01	11213.00	1018.89	2751.63	10.00	-108.38	254.18	Begin 92.00° lateral section
10	24180.63	92.00	330.01	10810.00	11003.91	-30°2.04	0.00	0.00	1408.70	PBHL/TD 24180.63 MD/10810.00 TVD

True Vertical Depth (1500 usft/in)

South(-)/North(+) (2400 usft/in)



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Vertical Section at 344.69° (1500 usft/in)

51-02031

51-02031



Planning Report - Geographic

Database:	DB_Jul2216d_v14	Local Co-ordinate Reference:	Well Bryan N-14HU (slot D)
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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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-14HU (slot D)					
Well Position	+N-S	0.00 usft	Northing:	14,445,118.17 usft	Latitude:	39.77564911
	+E-W	0.00 usft	Easting:	1,703,203.49 usft	Longitude:	-80.77653187
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	1,191.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/18/2017	-8.64	66.94	52,156.79550864

Design	rev2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	344.69

Plan Survey Tool Program	Date	12/15/2017		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	24,180.63 rev2 (Original Hole)	MWD	
			MWD - Standard	

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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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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		
1,500.00	3.00	110.00	1,499.86	-2.69	7.38	1.00	1.00	0.00	110.00		
2,500.00	3.00	110.00	2,498.49	-20.59	58.56	0.00	0.00	0.00	0.00		
2,800.00	0.00	110.00	2,798.36	-23.27	63.94	1.00	-1.00	0.00	180.00		
7,001.64	0.00	110.00	7,000.00	-23.27	63.94	0.00	0.00	0.00	110.00		
8,378.82	41.32	83.03	8,260.89	34.45	535.81	3.00	3.00	0.00	83.03		
11,577.52	41.32	83.03	10,863.40	290.89	2,631.97	0.00	0.00	0.00	0.00		
12,642.63	92.00	330.01	11,213.00	1,016.69	2,751.53	10.00	4.76	-10.61	-106.38	LP Bryan N-14HU	
24,180.63	92.00	330.01	10,810.00	11,003.91	-3,012.04	0.00	0.00	0.00	0.00	BHL Bryan N-14HU r	

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Planning Report - Geographic

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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-14HU (slot D)
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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

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	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
100.00	0.00	0.00	100.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
200.00	0.00	0.00	200.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
300.00	0.00	0.00	300.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
400.00	0.00	0.00	400.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
500.00	0.00	0.00	500.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
600.00	0.00	0.00	600.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
700.00	0.00	0.00	700.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
800.00	0.00	0.00	800.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
900.00	0.00	0.00	900.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,445,118.17	1,703,203.49	39.77564911	-80.77653187	
KOP Begin 1"/100' build										
1,300.00	1.00	110.00	1,299.99	-0.30	0.82	14,445,117.88	1,703,204.31	39.77564829	-80.77652896	
1,400.00	2.00	110.00	1,399.96	-1.19	3.28	14,445,116.98	1,703,206.77	39.77564581	-80.77652021	
1,500.00	3.00	110.00	1,499.86	-2.69	7.38	14,445,115.49	1,703,210.86	39.77564189	-80.77650563	
Begin 3.00° tangent										
1,600.00	3.00	110.00	1,599.72	-4.48	12.30	14,445,113.70	1,703,215.78	39.77563674	-80.77648815	
1,700.00	3.00	110.00	1,699.59	-6.27	17.21	14,445,111.91	1,703,220.70	39.77563179	-80.77647066	
1,800.00	3.00	110.00	1,799.45	-8.06	22.13	14,445,110.12	1,703,225.62	39.77562684	-80.77645317	
1,900.00	3.00	110.00	1,899.31	-9.85	27.05	14,445,108.33	1,703,230.54	39.77562189	-80.77643568	
2,000.00	3.00	110.00	1,999.17	-11.64	31.97	14,445,106.54	1,703,235.45	39.77561694	-80.77641819	
2,100.00	3.00	110.00	2,099.04	-13.43	36.89	14,445,104.75	1,703,240.37	39.77561199	-80.77640071	
2,200.00	3.00	110.00	2,198.90	-15.22	41.80	14,445,102.96	1,703,245.29	39.77560704	-80.77638322	
2,300.00	3.00	110.00	2,298.76	-17.01	46.72	14,445,101.17	1,703,250.21	39.77560209	-80.77636573	
2,400.00	3.00	110.00	2,398.62	-18.80	51.64	14,445,099.38	1,703,255.13	39.77559714	-80.77634824	
2,500.00	3.00	110.00	2,498.49	-20.59	56.56	14,445,097.59	1,703,260.04	39.77559219	-80.77633076	
Begin 1"/100' drop										
2,500.00	3.00	110.00	2,498.49	-20.59	56.56	14,445,097.59	1,703,260.04	39.77559219	-80.77633076	
2,599.99	2.00	110.00	2,598.39	-22.06	60.65	14,445,096.10	1,703,264.14	39.77558807	-80.77631618	
2,699.99	1.00	110.00	2,698.36	-22.97	63.12	14,445,095.20	1,703,266.60	39.77558559	-80.77630743	
2,799.99	0.00	0.00	2,798.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
2,800.00	0.00	0.00	2,798.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
Begin vertical hold										
2,899.99	0.00	0.00	2,898.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
2,999.99	0.00	0.00	2,998.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,099.99	0.00	0.00	3,098.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,199.99	0.00	0.00	3,198.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,299.99	0.00	0.00	3,298.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,399.99	0.00	0.00	3,398.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,499.99	0.00	0.00	3,498.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,599.99	0.00	0.00	3,598.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,699.99	0.00	0.00	3,698.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,799.99	0.00	0.00	3,798.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,899.99	0.00	0.00	3,898.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
3,999.99	0.00	0.00	3,998.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,099.99	0.00	0.00	4,098.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,199.99	0.00	0.00	4,198.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,299.99	0.00	0.00	4,298.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,399.99	0.00	0.00	4,398.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,499.99	0.00	0.00	4,498.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,599.99	0.00	0.00	4,598.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,699.99	0.00	0.00	4,698.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	

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Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,799.99	0.00	0.00	4,799.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,899.99	0.00	0.00	4,899.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
4,999.99	0.00	0.00	4,999.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,099.99	0.00	0.00	5,099.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,199.99	0.00	0.00	5,199.35	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,299.99	0.00	0.00	5,299.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,399.99	0.00	0.00	5,399.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,499.99	0.00	0.00	5,499.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,599.99	0.00	0.00	5,599.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,699.99	0.00	0.00	5,699.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,799.99	0.00	0.00	5,799.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,899.99	0.00	0.00	5,899.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
5,999.99	0.00	0.00	5,999.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,099.99	0.00	0.00	6,099.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,199.99	0.00	0.00	6,199.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,299.99	0.00	0.00	6,299.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,399.99	0.00	0.00	6,399.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,499.99	0.00	0.00	6,499.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,599.99	0.00	0.00	6,599.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,699.99	0.00	0.00	6,699.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,799.99	0.00	0.00	6,799.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,899.99	0.00	0.00	6,899.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
6,999.99	0.00	0.00	6,999.34	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
7,001.64	0.00	0.00	7,000.00	-23.27	63.94	14,445,094.90	1,703,267.42	39.77558476	-80.77630452	
Begin 3°/100' build										
7,099.99	2.95	83.03	7,098.30	-22.96	66.45	14,445,095.21	1,703,269.94	39.77568559	-80.77629557	
7,199.99	5.95	83.03	7,197.98	-22.02	74.15	14,445,096.15	1,703,277.64	39.77558813	-80.77626818	
7,299.99	8.95	83.03	7,297.13	-20.45	87.02	14,445,097.73	1,703,290.51	39.77559236	-80.77622234	
7,399.99	11.95	83.03	7,395.46	-18.25	105.02	14,445,099.93	1,703,308.51	39.77559829	-80.77615825	
7,499.99	14.95	83.03	7,492.70	-15.42	128.11	14,445,102.75	1,703,331.59	39.77560588	-80.77607606	
7,599.99	17.95	83.03	7,588.60	-11.98	156.21	14,445,106.19	1,703,359.70	39.77561513	-80.77597600	
7,699.99	20.95	83.03	7,682.89	-7.94	189.26	14,445,110.23	1,703,392.75	39.77562601	-80.77585834	
7,799.99	23.95	83.03	7,775.29	-3.30	227.16	14,445,114.87	1,703,430.65	39.77563848	-80.77572340	
7,899.99	26.95	83.03	7,865.58	1.91	269.81	14,445,120.09	1,703,473.30	39.77565252	-80.77557156	
7,999.99	29.95	83.03	7,953.49	7.70	317.09	14,445,125.87	1,703,520.68	39.77566908	-80.77540323	
8,099.99	32.95	83.03	8,038.79	14.03	368.68	14,445,132.21	1,703,572.36	39.77568512	-80.77521887	
8,199.99	35.95	83.03	8,121.24	20.90	425.02	14,445,139.08	1,703,628.51	39.77570359	-80.77501898	
8,299.99	38.95	83.03	8,200.62	28.28	485.37	14,445,146.46	1,703,688.88	39.77572345	-80.77480412	
8,378.82	41.32	83.03	8,280.89	34.45	535.81	14,445,152.63	1,703,739.29	39.77574005	-80.77462455	
8,378.83	41.32	83.03	8,280.90	34.46	535.81	14,445,152.63	1,703,739.30	39.77574005	-80.77462454	
Begin 41.32° tangent										
8,399.99	41.32	83.03	8,276.79	36.15	549.67	14,445,154.33	1,703,753.16	39.77574461	-80.77457518	
8,499.99	41.32	83.03	8,351.90	44.17	615.21	14,445,162.34	1,703,818.68	39.77576617	-80.77434188	
8,599.99	41.32	83.03	8,427.01	52.18	680.74	14,445,170.36	1,703,884.22	39.77578773	-80.77410857	
8,699.99	41.32	83.03	8,502.11	60.20	746.27	14,445,178.38	1,703,949.75	39.77580930	-80.77387526	
8,799.99	41.32	83.03	8,577.22	68.22	811.80	14,445,186.39	1,704,015.29	39.77583088	-80.77364195	
8,899.99	41.32	83.03	8,652.33	76.23	877.33	14,445,194.41	1,704,080.82	39.77585242	-80.77340884	
8,999.99	41.32	83.03	8,727.44	84.25	942.86	14,445,202.43	1,704,146.35	39.77587396	-80.77317534	
9,099.99	41.32	83.03	8,802.55	92.27	1,008.40	14,445,210.44	1,704,211.88	39.77589554	-80.77294203	
9,199.99	41.32	83.03	8,877.66	100.29	1,073.93	14,445,218.46	1,704,277.41	39.77591710	-80.77270872	
9,299.99	41.32	83.03	8,952.77	108.30	1,139.46	14,445,226.48	1,704,342.94	39.77593866	-80.77247541	
9,399.99	41.32	83.03	9,027.87	116.32	1,204.99	14,445,234.49	1,704,408.48	39.77596022	-80.77224210	
9,499.99	41.32	83.03	9,102.98	124.34	1,270.52	14,445,242.51	1,704,474.01	39.77598178	-80.77200879	
9,599.99	41.32	83.03	9,178.09	132.35	1,336.05	14,445,250.53	1,704,539.54	39.77600333	-80.77177548	

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WV Department of
 Environmental Protection



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-14HU (slot D)
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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,699.98	41.32	83.03	9,253.20	140.37	1,401.59	14,445,256.54	1,704,605.07	39.77602489	-80.77154217	
9,799.98	41.32	83.03	9,328.31	148.39	1,467.12	14,445,266.58	1,704,670.60	39.77604645	-80.77130888	
9,899.98	41.32	83.03	9,403.42	156.40	1,532.65	14,445,274.58	1,704,736.13	39.77606801	-80.77107555	
9,999.98	41.32	83.03	9,478.53	164.42	1,598.18	14,445,282.59	1,704,801.67	39.77608956	-80.77094224	
10,099.98	41.32	83.03	9,553.63	172.44	1,663.71	14,445,290.61	1,704,867.20	39.77611112	-80.77080893	
10,199.98	41.32	83.03	9,628.74	180.45	1,729.24	14,445,298.63	1,704,932.73	39.77613267	-80.77037562	
10,299.98	41.32	83.03	9,703.85	188.47	1,794.77	14,445,306.64	1,704,998.26	39.77615423	-80.77014231	
10,399.98	41.32	83.03	9,778.96	196.49	1,860.31	14,445,314.66	1,705,063.79	39.77617578	-80.76990900	
10,499.98	41.32	83.03	9,854.07	204.50	1,925.84	14,445,322.68	1,705,129.32	39.77619733	-80.76987569	
10,599.98	41.32	83.03	9,929.18	212.52	1,991.37	14,445,330.69	1,705,194.86	39.77621889	-80.76944238	
10,699.98	41.32	83.03	10,004.29	220.54	2,056.90	14,445,338.71	1,705,260.39	39.77624044	-80.76920907	
10,799.98	41.32	83.03	10,079.39	228.55	2,122.43	14,445,346.73	1,705,325.92	39.77626199	-80.76897576	
10,899.98	41.32	83.03	10,154.50	236.57	2,187.96	14,445,354.74	1,705,391.45	39.77628354	-80.76874245	
10,999.98	41.32	83.03	10,229.61	244.58	2,253.50	14,445,362.76	1,705,456.98	39.77630509	-80.76850914	
11,099.98	41.32	83.03	10,304.72	252.60	2,319.03	14,445,370.78	1,705,522.51	39.77632665	-80.76827582	
11,199.98	41.32	83.03	10,379.83	260.62	2,384.56	14,445,378.80	1,705,588.05	39.77634820	-80.76804251	
11,299.98	41.32	83.03	10,454.94	268.64	2,450.09	14,445,386.81	1,705,653.58	39.77636975	-80.76780920	
11,399.98	41.32	83.03	10,530.05	276.65	2,515.62	14,445,394.83	1,705,719.11	39.77639130	-80.76757589	
11,499.98	41.32	83.03	10,605.15	284.67	2,581.15	14,445,402.85	1,705,784.64	39.77641284	-80.76734258	
11,577.52	41.32	83.03	10,683.40	290.88	2,631.97	14,445,409.06	1,705,835.46	39.77642955	-80.76716168	
Begin 10°/100' build/turn										
11,599.98	40.73	79.72	10,680.34	293.09	2,646.54	14,445,411.27	1,705,850.02	39.77643551	-80.76710979	
11,699.98	39.33	64.30	10,757.10	312.71	2,707.35	14,445,430.88	1,705,910.83	39.77648894	-80.76689317	
11,799.98	40.03	48.65	10,834.25	347.79	2,760.18	14,445,465.96	1,705,963.65	39.77658491	-80.76670481	
11,899.98	42.73	34.05	10,909.46	397.27	2,803.43	14,445,515.45	1,706,006.91	39.77672049	-80.76655043	
11,999.98	47.06	21.26	10,980.43	459.66	2,835.77	14,445,577.83	1,706,039.26	39.77689158	-80.76643472	
12,099.98	52.62	10.36	11,045.01	533.04	2,856.24	14,445,651.21	1,706,059.73	39.77709297	-80.76636119	
12,199.98	59.03	1.07	11,101.23	615.20	2,864.21	14,445,733.37	1,706,087.69	39.77731854	-80.76633208	
12,299.98	66.02	353.00	11,147.40	703.63	2,859.43	14,445,821.81	1,706,082.91	39.77756144	-80.76634827	
12,399.98	73.39	345.78	11,182.09	795.66	2,842.05	14,445,913.83	1,706,045.53	39.77781429	-80.76640928	
12,499.98	80.99	339.11	11,204.27	888.48	2,812.59	14,446,006.65	1,706,016.08	39.77806940	-80.76651324	
12,599.98	88.70	332.71	11,213.26	979.27	2,771.97	14,446,097.44	1,705,975.45	39.77831903	-80.76665701	
12,642.63	92.00	330.01	11,213.00	1,016.69	2,751.53	14,446,134.87	1,705,955.01	39.77842197	-80.76672940	
Begin 92.00° lateral section										
12,699.97	92.00	330.01	11,211.00	1,066.33	2,722.88	14,446,184.51	1,705,926.37	39.77855849	-80.76683090	
12,799.97	92.00	330.01	11,207.50	1,152.89	2,672.93	14,446,271.07	1,705,876.41	39.77879656	-80.76700790	
12,899.97	92.00	330.01	11,204.01	1,239.45	2,622.98	14,446,357.62	1,705,826.48	39.77903463	-80.76716489	
12,999.97	92.00	330.01	11,200.52	1,326.01	2,573.02	14,446,444.18	1,705,776.51	39.77927271	-80.76736189	
13,099.97	92.00	330.01	11,197.03	1,412.57	2,523.07	14,446,530.74	1,705,726.56	39.77951078	-80.76753889	
13,199.97	92.00	330.01	11,193.53	1,499.13	2,473.12	14,446,617.30	1,705,676.60	39.77974885	-80.76771588	
13,299.97	92.00	330.01	11,190.04	1,585.69	2,423.16	14,446,703.86	1,705,626.65	39.77998692	-80.76789288	
13,399.97	92.00	330.01	11,186.55	1,672.25	2,373.21	14,446,790.42	1,705,576.70	39.78022499	-80.76806989	
13,499.97	92.00	330.01	11,183.05	1,758.80	2,323.26	14,446,876.98	1,705,526.75	39.78046306	-80.76824689	
13,599.97	92.00	330.01	11,179.56	1,845.36	2,273.31	14,446,963.54	1,705,476.79	39.78070113	-80.76842389	
13,699.97	92.00	330.01	11,176.07	1,931.92	2,223.35	14,447,050.10	1,705,426.84	39.78093920	-80.76860090	
13,799.97	92.00	330.01	11,172.58	2,018.48	2,173.40	14,447,136.66	1,705,376.89	39.78117727	-80.76877790	
13,899.97	92.00	330.01	11,169.08	2,105.04	2,123.45	14,447,223.22	1,705,326.93	39.78141534	-80.76895491	
13,999.97	92.00	330.01	11,165.59	2,191.60	2,073.50	14,447,309.78	1,705,276.98	39.78165341	-80.76913192	
14,099.97	92.00	330.01	11,162.10	2,278.16	2,023.54	14,447,396.33	1,705,227.03	39.78189148	-80.76930893	
14,199.97	92.00	330.01	11,158.61	2,364.72	1,973.59	14,447,482.89	1,705,177.08	39.78212954	-80.76948594	
14,299.97	92.00	330.01	11,155.11	2,451.28	1,923.64	14,447,569.45	1,705,127.12	39.78236761	-80.76966296	
14,399.97	92.00	330.01	11,151.62	2,537.84	1,873.68	14,447,656.01	1,705,077.17	39.78260568	-80.76983997	
14,499.97	92.00	330.01	11,148.13	2,624.40	1,823.73	14,447,742.57	1,705,027.22	39.78284375	-80.77001698	
14,599.97	92.00	330.01	11,144.63	2,710.95	1,773.78	14,447,829.13	1,704,977.26	39.78308182	-80.77019400	

09/07/2018

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WV Department of
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Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-14HU (slot D)
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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
14,699.97	92.00	330.01	11,141.14	2,797.51	1,723.83	14,447,815.69	1,704,927.31	39.78331988	-80.77037102	
14,799.97	92.00	330.01	11,137.65	2,884.07	1,673.87	14,448,002.25	1,704,877.36	39.78355795	-80.77054804	
14,899.97	92.00	330.01	11,134.16	2,970.63	1,623.92	14,448,098.81	1,704,827.41	39.78379602	-80.77072506	
14,999.97	92.00	330.01	11,130.66	3,057.19	1,573.97	14,448,175.37	1,704,777.45	39.78403408	-80.77090208	
15,099.97	92.00	330.01	11,127.17	3,143.75	1,524.02	14,448,261.93	1,704,727.50	39.78427215	-80.77107910	
15,199.97	92.00	330.01	11,123.68	3,230.31	1,474.06	14,448,348.48	1,704,677.55	39.78451021	-80.77125612	
15,299.97	92.00	330.01	11,120.18	3,316.87	1,424.11	14,448,435.04	1,704,627.60	39.78474828	-80.77143315	
15,399.97	92.00	330.01	11,115.69	3,403.43	1,374.16	14,448,521.60	1,704,577.64	39.78498634	-80.77161017	
15,499.97	92.00	330.01	11,113.20	3,489.99	1,324.20	14,448,608.16	1,704,527.69	39.78522441	-80.77178720	
15,599.97	92.00	330.01	11,109.71	3,576.55	1,274.25	14,448,694.72	1,704,477.74	39.78546247	-80.77196423	
15,699.97	92.00	330.01	11,106.21	3,663.11	1,224.30	14,448,781.28	1,704,427.78	39.78570054	-80.77214128	
15,799.97	92.00	330.01	11,102.72	3,749.66	1,174.35	14,448,867.84	1,704,377.83	39.78593860	-80.77231829	
15,899.97	92.00	330.01	11,099.23	3,836.22	1,124.39	14,448,954.40	1,704,327.88	39.78617667	-80.77249532	
15,999.97	92.00	330.01	11,095.73	3,922.78	1,074.44	14,449,040.96	1,704,277.93	39.78641473	-80.77267235	
16,099.97	92.00	330.01	11,092.24	4,009.34	1,024.49	14,449,127.52	1,704,227.97	39.78665279	-80.77284939	
16,199.97	92.00	330.01	11,088.75	4,095.90	974.53	14,449,214.08	1,704,178.02	39.78689085	-80.77302642	
16,299.97	92.00	330.01	11,085.26	4,182.46	924.58	14,449,300.63	1,704,128.07	39.78712892	-80.77320346	
16,399.97	92.00	330.01	11,081.76	4,269.02	874.63	14,449,387.19	1,704,078.11	39.78736698	-80.77338050	
16,499.97	92.00	330.01	11,078.27	4,355.58	824.68	14,449,473.75	1,704,028.16	39.78760504	-80.77355754	
16,599.97	92.00	330.01	11,074.78	4,442.14	774.72	14,449,560.31	1,703,978.21	39.78784310	-80.77373458	
16,699.97	92.00	330.01	11,071.29	4,528.70	724.77	14,449,646.87	1,703,928.26	39.78808116	-80.77391162	
16,799.97	92.00	330.01	11,067.79	4,615.26	674.82	14,449,733.43	1,703,878.30	39.78831923	-80.77408866	
16,899.97	92.00	330.01	11,064.30	4,701.81	624.87	14,449,819.99	1,703,828.35	39.78855729	-80.77426571	
16,999.97	92.00	330.01	11,060.81	4,788.37	574.91	14,449,906.55	1,703,778.40	39.78879535	-80.77444275	
17,099.97	92.00	330.01	11,057.31	4,874.93	524.96	14,449,993.11	1,703,728.45	39.78903341	-80.77461980	
17,199.97	92.00	330.01	11,053.82	4,961.49	475.01	14,450,079.67	1,703,678.49	39.78927147	-80.77479685	
17,299.97	92.00	330.01	11,050.33	5,048.05	425.05	14,450,166.23	1,703,628.54	39.78950953	-80.77497390	
17,399.97	92.00	330.01	11,046.84	5,134.61	375.10	14,450,252.79	1,703,578.59	39.78974759	-80.77515095	
17,499.97	92.00	330.01	11,043.34	5,221.17	325.15	14,450,339.34	1,703,528.63	39.78998565	-80.77532800	
17,599.97	92.00	330.01	11,039.85	5,307.73	275.20	14,450,425.90	1,703,478.68	39.79022371	-80.77550505	
17,699.96	92.00	330.01	11,036.36	5,394.29	225.24	14,450,512.46	1,703,428.73	39.79046176	-80.77568210	
17,799.96	92.00	330.01	11,032.86	5,480.85	175.29	14,450,599.02	1,703,378.78	39.79069982	-80.77585916	
17,899.96	92.00	330.01	11,029.37	5,567.41	125.34	14,450,685.58	1,703,328.82	39.79093788	-80.77603622	
17,999.96	92.00	330.01	11,025.88	5,653.97	75.38	14,450,772.14	1,703,278.87	39.79117594	-80.77621327	
18,099.96	92.00	330.01	11,022.39	5,740.52	25.43	14,450,858.70	1,703,228.92	39.79141400	-80.77639033	
18,199.96	92.00	330.01	11,018.89	5,827.08	-24.52	14,450,945.26	1,703,178.96	39.79165205	-80.77656739	
18,299.96	92.00	330.01	11,015.40	5,913.64	-74.47	14,451,031.82	1,703,129.01	39.79189011	-80.77674445	
18,399.96	92.00	330.01	11,011.91	6,000.20	-124.43	14,451,118.38	1,703,079.06	39.79212817	-80.77692152	
18,499.96	92.00	330.01	11,008.41	6,086.76	-174.38	14,451,204.94	1,703,029.11	39.79236622	-80.77709858	
18,599.96	92.00	330.01	11,004.92	6,173.32	-224.33	14,451,291.49	1,702,979.15	39.79260428	-80.77727564	
18,699.96	92.00	330.01	11,001.43	6,259.88	-274.28	14,451,378.05	1,702,929.20	39.79284234	-80.77745271	
18,799.96	92.00	330.01	10,997.94	6,346.44	-324.24	14,451,464.61	1,702,879.25	39.79308039	-80.77762978	
18,899.96	92.00	330.01	10,994.44	6,433.00	-374.19	14,451,551.17	1,702,829.30	39.79331845	-80.77780685	
18,999.96	92.00	330.01	10,990.95	6,519.56	-424.14	14,451,637.73	1,702,779.34	39.79355650	-80.77798392	
19,099.96	92.00	330.01	10,987.46	6,606.12	-474.10	14,451,724.29	1,702,729.39	39.79379456	-80.77816099	
19,199.96	92.00	330.01	10,983.97	6,692.67	-524.05	14,451,810.85	1,702,679.44	39.79403261	-80.77833806	
19,299.96	92.00	330.01	10,980.47	6,779.23	-574.00	14,451,897.41	1,702,629.48	39.79427067	-80.77851513	
19,399.96	92.00	330.01	10,976.98	6,865.79	-623.95	14,451,983.97	1,702,579.53	39.79450872	-80.77869221	
19,499.96	92.00	330.01	10,973.49	6,952.35	-673.91	14,452,070.53	1,702,529.58	39.79474677	-80.77886928	
19,599.96	92.00	330.01	10,969.99	7,038.91	-723.86	14,452,157.09	1,702,479.63	39.79498483	-80.77904636	
19,699.96	92.00	330.01	10,966.50	7,125.47	-773.81	14,452,243.64	1,702,429.67	39.79522288	-80.77922344	
19,799.96	92.00	330.01	10,963.01	7,212.03	-823.77	14,452,330.20	1,702,379.72	39.79546093	-80.77940052	
19,899.96	92.00	330.01	10,959.52	7,298.59	-873.72	14,452,416.76	1,702,329.77	39.79569899	-80.77957760	
19,999.96	92.00	330.01	10,956.02	7,385.15	-923.67	14,452,503.32	1,702,279.81	39.79593704	-80.77975468	
20,099.96	92.00	330.01	10,952.53	7,471.71	-973.62	14,452,589.88	1,702,229.86	39.79617509	-80.77993176	

SI-02031



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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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
20,199.96	92.00	330.01	10,949.04	7,558.27	-1,023.59	14,452,676.44	1,702,179.91	39.79841314	-80.78010685	
20,299.96	92.00	330.01	10,945.54	7,644.82	-1,073.53	14,452,763.00	1,702,129.96	39.79865119	-80.78028593	
20,399.96	92.00	330.01	10,942.05	7,731.36	-1,123.48	14,452,849.56	1,702,080.00	39.79889925	-80.78046302	
20,499.96	92.00	330.01	10,938.56	7,817.94	-1,173.43	14,452,936.12	1,702,030.05	39.79712730	-80.78064011	
20,599.96	92.00	330.01	10,935.07	7,904.50	-1,223.39	14,453,022.68	1,701,980.10	39.79736535	-80.78081720	
20,699.96	92.00	330.01	10,931.57	7,991.06	-1,273.34	14,453,109.24	1,701,930.15	39.79760340	-80.78099429	
20,799.96	92.00	330.01	10,928.08	8,077.62	-1,323.29	14,453,195.80	1,701,880.19	39.79784145	-80.78117138	
20,899.96	92.00	330.01	10,924.59	8,164.18	-1,373.25	14,453,282.35	1,701,830.24	39.79807950	-80.78134847	
20,999.96	92.00	330.01	10,921.10	8,250.74	-1,423.20	14,453,368.91	1,701,780.29	39.79831755	-80.78152557	
21,099.96	92.00	330.01	10,917.60	8,337.30	-1,473.15	14,453,455.47	1,701,730.33	39.79855560	-80.78170266	
21,199.96	92.00	330.01	10,914.11	8,423.86	-1,523.10	14,453,542.03	1,701,680.38	39.79879365	-80.78187976	
21,299.96	92.00	330.01	10,910.62	8,510.42	-1,573.06	14,453,628.59	1,701,630.43	39.79903169	-80.78205686	
21,399.96	92.00	330.01	10,907.13	8,596.98	-1,623.01	14,453,715.15	1,701,580.48	39.79926974	-80.78223396	
21,499.96	92.00	330.01	10,903.63	8,683.53	-1,672.96	14,453,801.71	1,701,530.52	39.79850779	-80.78241105	
21,599.96	92.00	330.01	10,900.14	8,770.09	-1,722.92	14,453,888.27	1,701,480.57	39.79874584	-80.78258816	
21,699.96	92.00	330.01	10,896.65	8,856.65	-1,772.87	14,453,974.83	1,701,430.62	39.79898389	-80.78276526	
21,799.96	92.00	330.01	10,893.15	8,943.21	-1,822.82	14,454,061.39	1,701,380.66	39.80022193	-80.78294236	
21,899.96	92.00	330.01	10,889.66	9,029.77	-1,872.77	14,454,147.95	1,701,330.71	39.80045998	-80.78311947	
21,999.96	92.00	330.01	10,886.17	9,116.33	-1,922.73	14,454,234.50	1,701,280.76	39.80069803	-80.78329657	
22,099.96	92.00	330.01	10,882.67	9,202.89	-1,972.68	14,454,321.06	1,701,230.81	39.80093608	-80.78347368	
22,199.96	92.00	330.01	10,879.18	9,289.45	-2,022.63	14,454,407.62	1,701,180.85	39.80117412	-80.78365079	
22,299.96	92.00	330.01	10,875.69	9,376.01	-2,072.59	14,454,494.18	1,701,130.90	39.80141217	-80.78382790	
22,399.96	92.00	330.01	10,872.20	9,462.57	-2,122.54	14,454,580.74	1,701,080.95	39.80165021	-80.78400501	
22,499.96	92.00	330.01	10,868.70	9,549.13	-2,172.49	14,454,667.30	1,701,031.00	39.80188826	-80.78418212	
22,599.96	92.00	330.01	10,865.21	9,635.69	-2,222.44	14,454,753.86	1,700,981.04	39.80212630	-80.78435924	
22,699.96	92.00	330.01	10,861.72	9,722.24	-2,272.40	14,454,840.42	1,700,931.09	39.80236435	-80.78453635	
22,799.95	92.00	330.01	10,858.22	9,808.80	-2,322.35	14,454,926.98	1,700,881.14	39.80260239	-80.78471347	
22,899.95	92.00	330.01	10,854.73	9,895.36	-2,372.30	14,455,013.54	1,700,831.18	39.80284044	-80.78489059	
22,999.95	92.00	330.01	10,851.24	9,981.92	-2,422.25	14,455,100.10	1,700,781.23	39.80307848	-80.78506770	
23,099.95	92.00	330.01	10,847.75	10,068.48	-2,472.21	14,455,186.65	1,700,731.28	39.80331653	-80.78524482	
23,199.95	92.00	330.01	10,844.25	10,155.04	-2,522.16	14,455,273.21	1,700,681.33	39.80355457	-80.78542195	
23,299.95	92.00	330.01	10,840.76	10,241.60	-2,572.11	14,455,359.77	1,700,631.37	39.80379261	-80.78559907	
23,399.95	92.00	330.01	10,837.27	10,328.16	-2,622.07	14,455,446.33	1,700,581.42	39.80403066	-80.78577619	
23,499.95	92.00	330.01	10,833.78	10,414.72	-2,672.02	14,455,532.89	1,700,531.47	39.80426870	-80.78595332	
23,599.95	92.00	330.01	10,830.28	10,501.28	-2,721.97	14,455,619.45	1,700,481.52	39.80450674	-80.78613044	
23,699.95	92.00	330.01	10,826.79	10,587.83	-2,771.92	14,455,706.01	1,700,431.56	39.80474478	-80.78630757	
23,799.95	92.00	330.01	10,823.30	10,674.39	-2,821.88	14,455,792.57	1,700,381.61	39.80498282	-80.78648470	
23,899.95	92.00	330.01	10,819.80	10,760.95	-2,871.83	14,455,879.13	1,700,331.66	39.80522087	-80.78666183	
23,999.95	92.00	330.01	10,816.31	10,847.51	-2,921.78	14,455,965.69	1,700,281.70	39.80545891	-80.78683896	
24,099.95	92.00	330.01	10,812.82	10,934.07	-2,971.73	14,456,052.25	1,700,231.75	39.80569695	-80.78701609	
24,180.63	92.00	330.01	10,810.00	11,003.91	-3,012.04	14,456,122.08	1,700,191.45	39.80588900	-80.78715900	

PBHL/TD 24180.63 MDH0810.00 TVD

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51-02031



Planning Report - Geographic

Database:	DB_Jul2216dt_V14	Local Co-ordinate Reference:	Well Bryan N-14HU (slot D)
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-14HU (slot D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
BHL Bryan N-14HU r2 - plan hits target center - Point	0.00	0.00	10,810.00	11,003.91	-3,012.04	14,456,122.03	1,700,191.45	39.80588900	-80.78715900
LP Bryan N-14HU - plan hits target center - Point	0.00	0.00	11,213.00	1,016.69	2,751.53	14,446,134.87	1,705,955.01	39.77842196	-80.78672940

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 1"/100' build
1,500.00	1,499.86	-2.69	7.36	Begin 3.00° tangent
2,500.00	2,498.49	-20.59	56.56	Begin 1"/100' drop
2,800.00	2,798.36	-23.27	63.94	Begin vertical hold
7,001.64	7,000.00	-23.27	63.94	Begin 3"/100' build
8,378.83	8,260.90	34.46	535.81	Begin 41.32° tangent
11,577.52	10,663.40	290.89	2,631.97	Begin 10"/100' build/turn
12,842.63	11,213.00	1,016.69	2,751.53	Begin 92.00° lateral section
24,180.63	10,810.00	11,003.91	-3,012.04	PBHL/TD 24180.83 MD/10810.00 TVD

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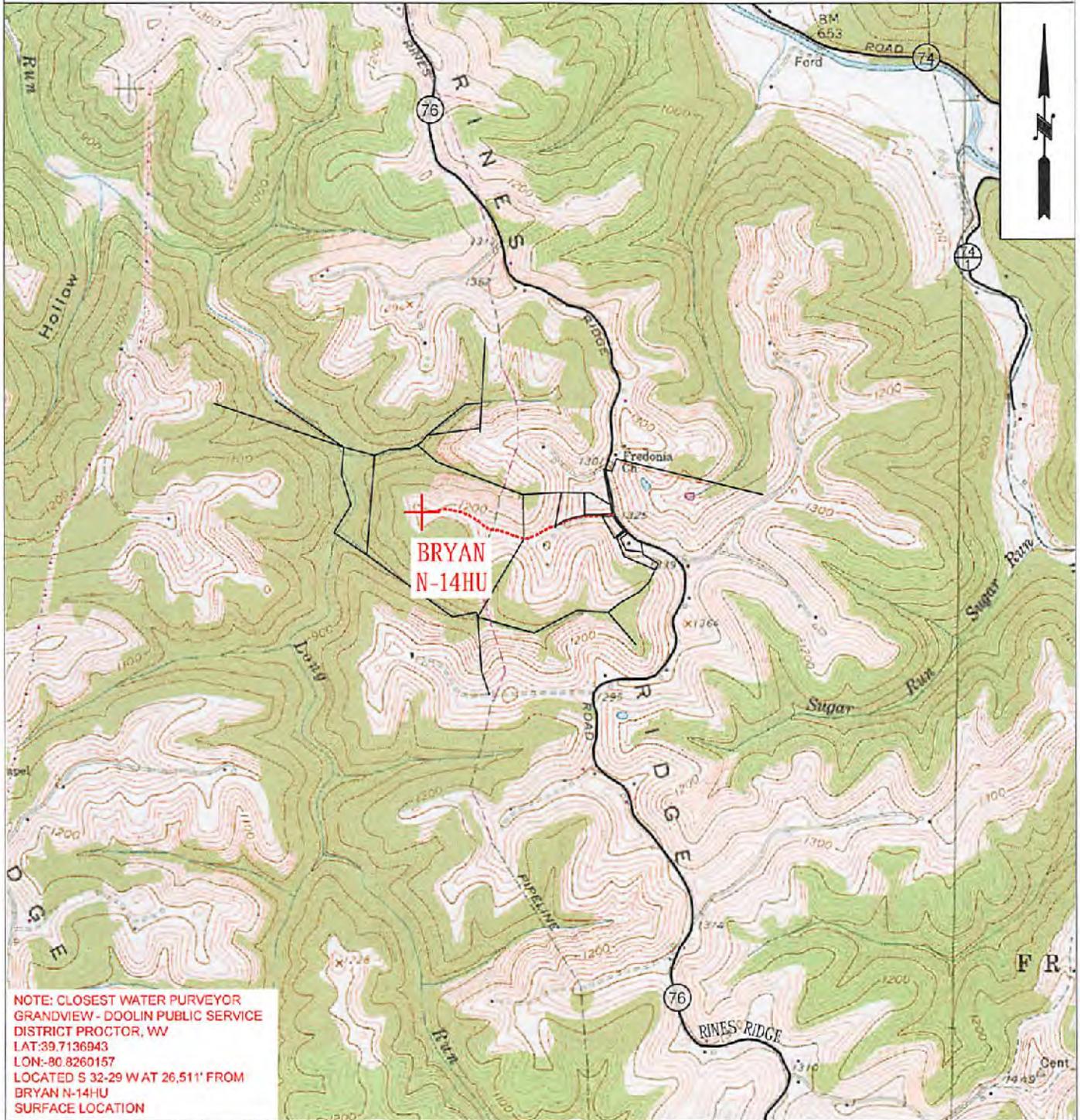
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WW-9

WV Department of
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**PROPOSED
BRYAN N-14HU**

SUPPLEMENT PG 2

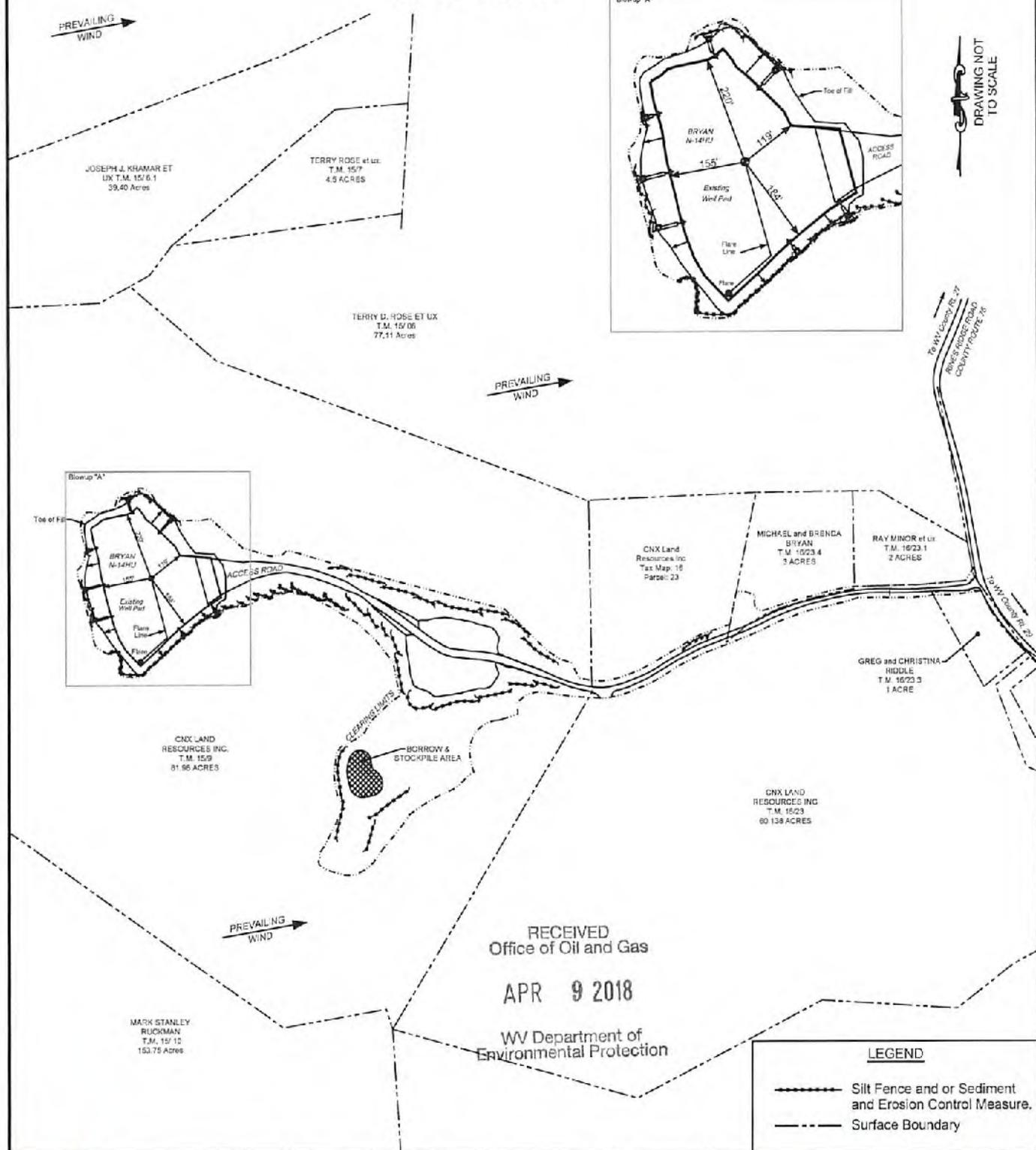


 TUG HILL OPERATING	OPERATOR	494510851	TOPO SECTION	LEASE NAME
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	BRYAN
			SCALE: 1" = 2000'	DATE: DATE: 12/12/17

51-02031

PROPOSED BRYAN N-14HU

Exhibit 1



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LEGEND

- Silt Fence and or Sediment and Erosion Control Measure.
- Surface Boundary

Jackson Surveying Inc.
877 W. Main St.
Clarksburg, Wv 26301
Phone: 804-623-5851

TOPO SECTION:		OPERATOR:	
PDWHATAN POINT 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	FRANKLIN	380 SOUTHPOINTE BLVD	
DRAWN BY	JOB NO.	SUITE 200	
J.A.H	694510651	CANONSDURG, PA 15317	
		DATE	SCALE
		12-12-2017	NONE

**TUG HILL
OPERATING**

09/07/2018

4705102031

WW-9
(4/16)

API Number 47 - 051 - _____
Operator's Well No. Bryan N-14HU

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Fish Creek - Ohio River (Undefined) Quadrangle Powhatan Point 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper containment

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in Wetzel County Sanitary Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature _____

Company Official (Typed Name) David Patterson

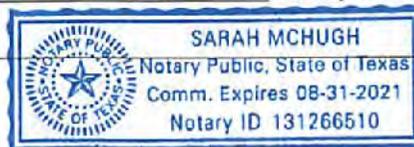
Company Official Title Senior Vice President, Operations

Subscribed and sworn before me this 12th day of December, 2017

Sarah Mchugh

Notary Public

My commission expires 08-31-2021



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51-02031

Form WW-9

Operator's Well No. Bryan N-14HU

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 17.78 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Rye Grain	140

Seed Type	lbs/acre
Tall Fescue	40
Ladino Clover	5

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *John Ventolosa*

Comments: _____

Title: Oil & Gas Inspector Date: 12/12/17

Field Reviewed? Yes No

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4705102031



Well Site Safety Plan
Tug Hill Operating, LLC *JW 3/28/18*

Well Name: Bryan N-14HU

Pad Location: Bryan

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING -4,402,880.82

EASTING -519,137.46

December 2017

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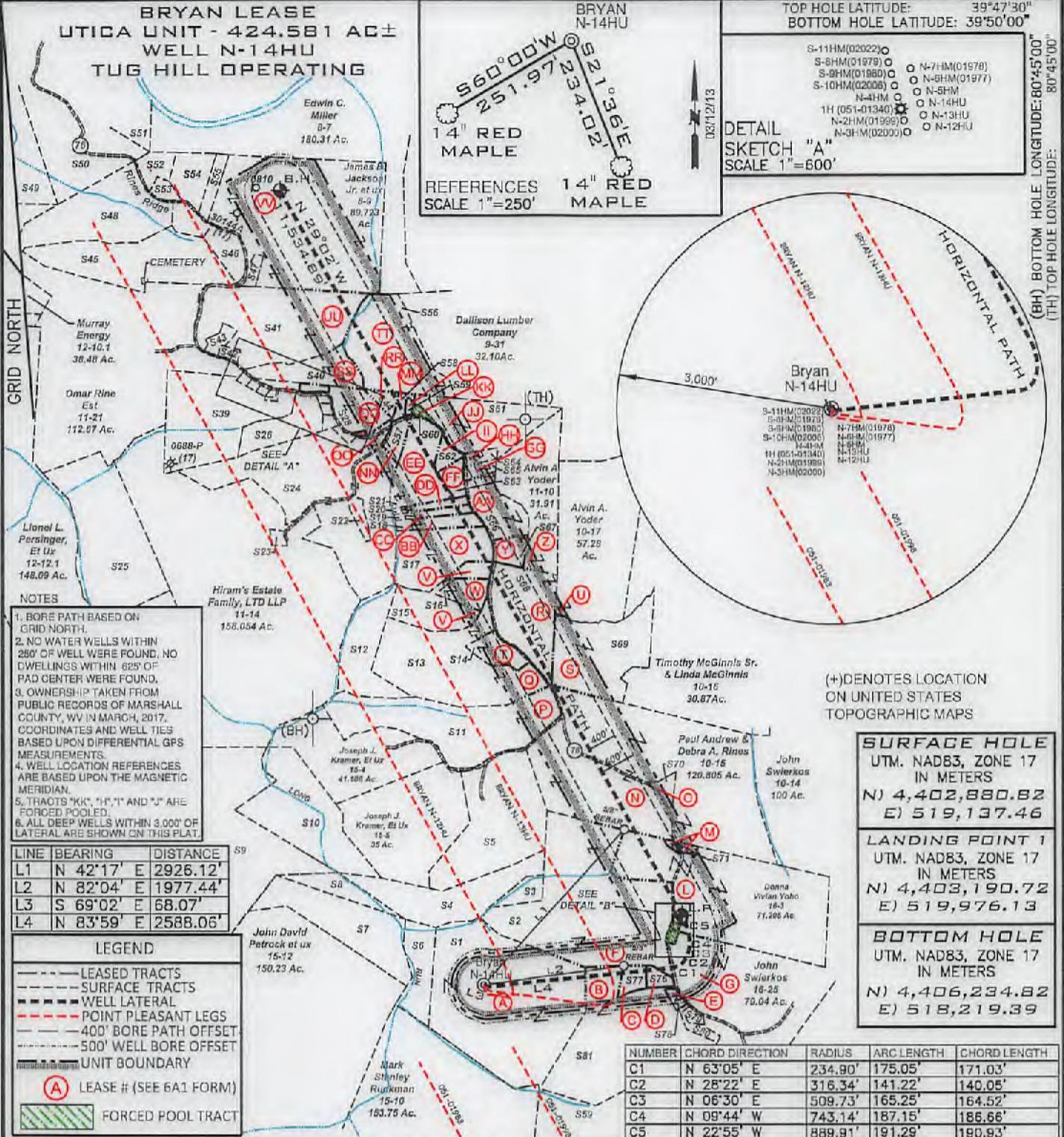
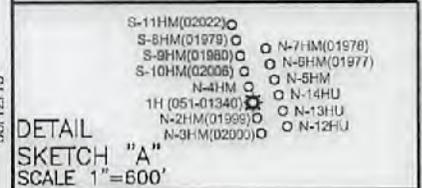
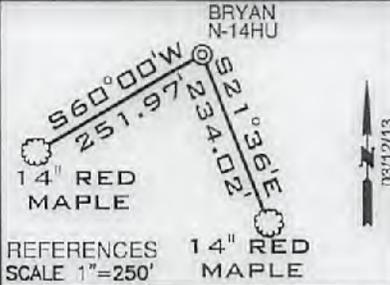
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WV Department of
Environmental Protection

09/07/2018

BRYAN LEASE
UTICA UNIT - 424.581 AC±
WELL N-14HU
TUG HILL OPERATING

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



- 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.
 5. TRACTS "KK", "I", "T" AND "J" ARE FORCED POOLED.
 6. ALL DEEP WELLS WITHIN 3,000' OF LATERAL ARE SHOWN ON THIS PLAT.

LINE	BEARING	DISTANCE
L1	N 42°17' E	2926.12'
L2	N 82°04' E	1977.44'
L3	S 69°02' E	68.07'
L4	N 83°59' E	2588.06'

LEGEND

- LEASE TRACTS
- SURFACE TRACTS
- WELL LATERAL
- POINT PLEASANT LEGS
- 400' BORE PATH OFFSET
- 500' WELL BORE OFFSET
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)
- FORCED POOL TRACT

NUMBER	CHORD DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH
C1	N 63°05' E	234.90'	175.05'	171.03'
C2	N 28°22' E	316.34'	141.22'	140.05'
C3	N 06°30' E	509.73'	165.25'	164.52'
C4	N 09°44' W	743.14'	187.15'	186.66'
C5	N 22°55' W	889.91'	191.29'	190.93'

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,880.82
E) 519,137.46

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,403,190.72
E) 519,976.13

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,406,234.82
E) 518,219.39

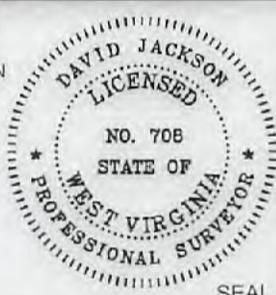
FILE NUMBER _____
DRAWING NUMBER BRYAN_WP_N-14HU
SCALE 1" = 2000'
MINIMUM DEGREE OF ACCURACY 1/200
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. 708
David L Jackson



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



WVDEP
OFFICE OF OIL & GAS
801 57TH STREET, SE
CHARLESTON, WV 25304

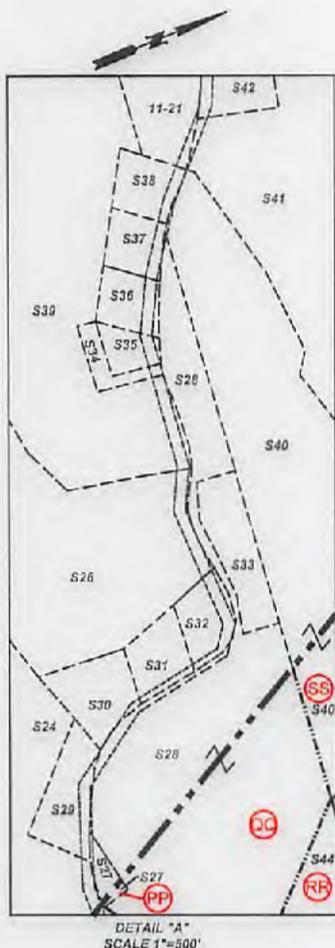
WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP X SHALLOW ___
LOCATION ELEVATION 1191.0' WATERSHED (HUC 10) Fish Creek
DISTRICT Franklin COUNTY Marshall
QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE WW-6A1 ROYALTY OWNERS

SURFACE OWNER CNX LAND RESOURCES, INC. ACREAGE 81.98
OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW-6A1 ROYALTY OWNERS LEASE ACREAGE 81.98
PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) _____
TARGET FORMATION Point Pleasant ESTIMATED DEPTH TVD: 11,393' TMD: 24,181'
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
CT CORPORATION SYSTEM
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5400 D BIG TYLER ROAD
FORT WORTH, TX 76107 CHARLESTON, WV 25313

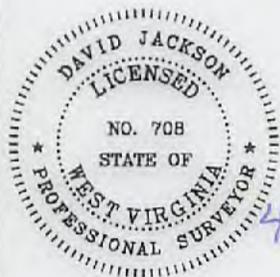
09/07/2018

COPY NAME PERMIT

**BRYAN LEASE
UTICA UNIT - 424.581 AC±
WELL N-14HU
TUG HILL OPERATING**



Number	TAX MAP -PARCEL	SURFACE OWNER	ACRES
S1	15-9	CNX Land Resources, Inc.	81.98
S2	15-8	Terry D. Rose, et ux	77.1
S3	15-7	Terry D. Rose, et ux	4.5
S4	15-6.1	Joseph J. Kramar, et ux	39.40
S5	15-6	Joseph J. Kramar, et ux	42.5
S6	15-13	CNX Land Resources	11.0
S7	15-14	John David Petrock, et ux	25.0
S8	15-2	John David Petrock, et ux	5.0
S9	15-1	Marcus Sharp & David Schlabach	121.0
S10	15-3	Joseph J. Kramar, et ux	36.10
S11	11-12	Joseph J. Kramar, et ux	43.2188
S12	11-13	Joy D. Gartman & Arlin Gatts	12.29
S13	11-11.3	Herman D. & Herman J. Lentz	43.96
S14	11-11.1	Nellie Marie & Robert W. Spencer	5.813
S15	11-11.4	Brad M. & Amenda J. Blake	15.193
S16	11-11	Brad M. & Amenda J. Blake	5.0
S17	11-9	Edwin C. & Kimberly A. Miller	41.773
S18	11-9.9	Leonard L. Parsons, et ux	5.89
S19	11-9.6	Southern Country Farms, Inc	2.488
S20	11-9.5	Southern Country Farms, Inc	2.559
S21	11-9.3	Joseph M. Haught & Steven Haught	16.3
S22	11-16.2	Joseph Haught	2.181
S23	11-14.1	Dennis F. Moore, et ux	1.056
S24	11-16	Keith E. Haught, et al	83.674
S25	12-11	Wesley Bryan & Wesley Bryan II	52.478
S26	11-17.2	Brenda & Michael Bryan	11.504
S27	11-5.1	James R. Anderson, et ux	0.205
S28	11-5	Kevin R. Corley, et ux	10.36
S29	11-16.1	Susan Smith, LE	0.876
S30	11-25	Owen Michael Barr	0.598
S31	11-23	Owen Michael Barr	0.845
S32	11-24	Charles Edward Furbee, et ux	0.603
S33	11-5.2	Rickey & Victoria Cross	1.0
S34	11-17.1	David Gray	0.297
S35	11-22	David Gray	0.353
S36	11-18	David E. Gray	0.569
S37	11-19	David E. Gray	0.532
S38	11-20	David E. Gray	0.569
S39	11-17	Kevin R. Corley, et ux	36.13
S40	11-3	Kevin R. Corley, et al	13.18
S41	11-2	Walter C. Cheryl A. Rine	42.367
S42	11-2.2	Joshua A. Myers	2.193
S43	11-2.1	Walter C. & Cheryl A. Rine	1.19
S44	11-5.3	Robert Harris Arrick, et ux	3.0
S45	11-1.1	Larry W. Dunlap, et al	34.405
S46	11-1.2	Jay A. Conner, et ux	5.824
S47	8-9.1	Scott E. Jackson, Tammy S. South & Marion Jackson	1.957
S48	11-1.4	Larry W. Dunlap, et al	32.493
S49	7-39	Lionel L. Persinger, et ux	57.0
S50	7-33	William N. Roupe	24.60
S51	7-31	William N. Roupe	43.147
S52	11-1	William N. & Virginia A. Roupe	4.527
S53	11-1.6	Debra Morris	2.093
S54	11-1.7	William S. & Mary K. Adams	8.0
S55	11-1.5	Paul White	3.507
S56	11-4	David H. Arrick, et ux	31.5
S57	11-16.3	Kegan Michael Haught - Life	3.265
S58	11-6	Robert & Rebecca Arrick	1.29
S59	11-7	Baptist Cemetery	1.0
S60	11-8	Baptist Church	0.8
S61	11-9	Edwin C. & Kimberly A. Miller	41.773
S62	11-9.10	John A. & Janet L. Beucke	2.348
S63	11-9.2	Michael R. Bryan	3.143
S64	11-9.8	Sean F. Moore	2.070
S65	11-9.7	Sean F. Moore	2.026
S66	11-9.1	Jack Shepard Huggins Jr., et al	10.92
S67	11-9.4	Jack S. Huggins, et al	4.129
S68	11-11.2	Wesley R. Bryan & Wesley R. Bryan II	25.031
S69	10-16.4	Melvin E. Ferguson & Elizabeth Ferguson	30.87
S70	10-15.1	Donald T. Miller	2.095
S71	16-3.2	Jimmy Lee Ostrander Jr., Sheena Lynn Ostrander & Brody Ray Ostrander	1.435
S72	16-3.1	Dennis E. Jackson, et ux	0.27
S73		Cemetery - No Daed	
S74	16-2	Christian Church	0.19
S75	16-1	Christian Church	0.50
S76	16-23.1	Ray E. Minor, et ux	2.0
S77	16-23.4	Michael R. & Brenda K. Bryan	3.0
S78	16-23.3	Greg & Christine Riddle	1.0
S79	16-24	Alan M. Beyser, et ux	1.083
S80	16-23.2	Alan M. Beyser, et ux	
S81	16-23	CNX Land Resources, Inc.	60.138



47-51-D 2031 HG A

P.S.
708

David L Jackson

09/07/2018



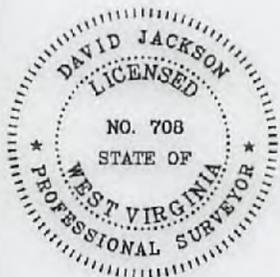
**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Bryan N-14HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 2 OF 3
DATE: 01/10/2018
REVISED DATE:
03/27/2018

**BRYAN LEASE
UTICA UNIT - 424.581 AC±
WELL N-14HU
TUG HILL OPERATING**

LEASE NO.	TAGS	PARCEL	OIL & GAS ROYALTY OWNER	DEED BOOK	PAGE
10*19294	A	5-15-9	BRENDA K BRYAN ET AL	666	289
10*19294	B	5-16-23	BRENDA K BRYAN ET AL	666	289
10*19294	C	5-16-23.4	BRENDA K BRYAN ET AL	666	289
10*19146	D	5-16-23.1	RAY E MINOR CATHY L MINOR	705	293
10*19144	E	5-16-23.3	GREG A RIDDLE CHRISTINA L RIDDLE	704	364
10*19340	F	5-15-8	DONNA V YOHO	665	407
10*21468	G	5-16-25	JOHN A SWIERKOS	772	21
10*21468	H	5-16-1	JOHN A SWIERKOS	772	21
***	H	5-16-1	TRUSTEES OF FREDONIA CHRISTIAN CHURCH AND CEMETERY		
***	I	5-16-2	TRUSTEES OF FREDONIA CHRISTIAN CHURCH AND CEMETERY		
***	J		CEMETERY-N ADJCN TO 5-16-2		
10*21044	K	5-16-3.1	RITA COX	951	600
10*21043	K	5-16-3.1	BRENDA HOYLE	951	598
10*19473	K	5-16-3.1	DANIEL JACOB ALLMAN	942	567
10*19340	L	5-16-3	DONNA V YOHO	665	407
10*19340	M	5-16-3.2	DONNA V YOHO	665	407
10*19017	N	5-10-15	PAUL A RINE AND DEBRA A RINE	796	24
10*19223	O	5-10-15.1	DONALD T MILLER	737	284
10*19293	P	5-11-12	JOSEPH L KRAMAR, SR. JO ANN KRAMAR	655	566
10*19336	Q	5-11-11.3	BONNIE JEAN DAWSON	665	397
10*19336	Q	5-11-11.3	BONNIE JEAN DAWSON	665	397
10*19336	R	5-11-11.2	BONNIE JEAN DAWSON	665	397
10*19109	S	5-10-16.4	JOHN W. MILLER AND MARY ALICE MILLER, HUSBAND AND WIFE	863	275
10*19141	T	5-11-11.1	ROBERT W SPENCER JR NELLIE MARIE SPENCER	706	468
10*19021	U	5-10-17	MARCELLUS TX MINERAL PARTNERS LTD	800	216
10*19034	U	5-10-17	JMK IRREVOCABLE TRUST	813	145
10*19035	U	5-10-17	PURPLEBURGH VENTURES, LLC	813	138
10*19336	V	5-11-11.4	BONNIE JEAN DAWSON	665	397
10*19336	W	5-11-11	BONNIE JEAN DAWSON	665	397
10*14099	X	5-11-9	SOUTHERN COUNTRY FARMS INC	666	489
10*19153	Y	5-11-9.4	JACK S HUGGINS JR	700	396
10*19021	Z	5-11-10	MARCELLUS TX MINERAL PARTNERS LTD	800	216
10*19034	Z	5-11-10	JMK IRREVOCABLE TRUST	813	145
10*19035	Z	5-11-10	PURPLEBURGH VENTURES, LLC	813	138
10*19153	AA	5-11-9.1	JACK S HUGGINS JR	700	396
10*19158	BB	5-11-9.9	LEONARD PARSONS CONNIE R PARSONS	705	125
10*14099	CC	5-11-9.6	SOUTHERN COUNTRY FARMS INC	666	489
10*14099	DD	5-11-9.5	SOUTHERN COUNTRY FARMS INC	666	489
10*18339	EE	5-11-9.3	RESOURCE MINERALS HEADWATER I, LP	940	448
10*18339	FF	5-11-9.2	RESOURCE MINERALS HEADWATER I, LP	940	448
10*14099	GG	5-11-9.7	SOUTHERN COUNTRY FARMS INC	666	489
10*19172	GG	5-11-9.7	SEAN F MOORE LINDA MOORE	706	581
10*19172	HH	5-11-9.8	SEAN F MOORE LINDA MOORE	706	581
10*18339	II	5-11-9.10	RESOURCE MINERALS HEADWATER I, LP	940	448
10*14099	JJ	5-11-9	SOUTHERN COUNTRY FARMS INC	666	489
***	KK	5-11-8	MOUNT HOBART MISSIONARY BAPTIST CHURCH		
10*19502	LL	5-11-7	SUSAN BLANCHE BEYSER	942	623
10*19893	LL	5-11-7	WINIFRED G AND EDDIE G TURNER	948	277
10*21041	LL	5-11-7	SHERY AND RANDEN RITCHEA	949	365
10*19221	MM	5-11-6	ROBERT H ARRICK REBECCA L ARRICK	737	240
10*19502	MM	5-11-6	SUSAN BLANCHE BEYSER	942	623
10*19893	MM	5-11-6	WINIFRED G AND EDDIE G TURNER	948	277
10*21041	MM	5-11-6	SHERY AND RANDEN RITCHEA	949	365
10*19139	NN	5-11-16.3	HIRAM V MOORE	699	53
10*19179	NN	5-11-16.3	KEITH HAUGHT BEVERLY HAUGHT	710	587
10*19139	OO	5-11-16	HIRAM V MOORE	699	53
10*19178	OO	5-11-16	JOSEPH HAUGHT	710	69
10*19179	OO	5-11-16	KEITH HAUGHT BEVERLY HAUGHT	710	587
10*19180	OO	5-11-16	STEVEN HAUGHT	710	67
Q079728000	PP	5-11-5.1	JAMES R AND MELODY A ANDERSON	812	31
10*19126	QQ	5-11-5	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	859	47
10*19176	QQ	5-11-5	MAUNA MAXINE BEYSER	710	602
10*19177	QQ	5-11-5	NINA L KOVACS	710	594
10*19185	QQ	5-11-5	HARRIETT LODDUTH FOLEY	710	598
10*19186	QQ	5-11-5	JOEL GLOVER	710	600
10*19189	QQ	5-11-5	SHERRY ANN MCPHERON	710	606
10*19190	QQ	5-11-5	SALLY LEE RIVERA	710	590
10*19191	QQ	5-11-5	SHARLA BETH WEAVER	710	608
10*19192	QQ	5-11-5	JAMES E YOHO	714	129
10*19201	QQ	5-11-5	DANIEL K YOHO	714	125
10*19202	QQ	5-11-5	DEBORAH L WOOLEY	714	131
10*19203	QQ	5-11-5	CAROL M YOHO	713	205
10*19204	QQ	5-11-5	DAYNA MARLENE YOHO	714	127
10*19205	QQ	5-11-5	JEFFREY C YOHO	713	203
10*19251	QQ	5-11-5	RAE SUZETTE BAKER	748	315
10*19252	QQ	5-11-5	JOHN WILSON	749	522
10*19502	QQ	5-11-5	SUSAN BLANCHE BEYSER	942	623
10*19893	QQ	5-11-5	WINIFRED G AND EDDIE G TURNER	948	277
10*21041	QQ	5-11-5	SHERY AND RANDEN RITCHEA	949	365
10*19176	RR	5-11-5.3	MAUNA MAXINE BEYSER	710	602
10*19177	RR	5-11-5.3	NINA L KOVACS	710	594
10*19185	RR	5-11-5.3	HARRIETT LODDUTH FOLEY	710	598
10*19186	RR	5-11-5.3	JOEL GLOVER	710	600
10*19189	RR	5-11-5.3	SHERRY ANN MCPHERON	710	606
10*19190	RR	5-11-5.3	SALLY LEE RIVERA	710	590
10*19191	RR	5-11-5.3	SHARLA BETH WEAVER	710	608
10*19192	RR	5-11-5.3	JAMES E YOHO	714	129
10*19201	RR	5-11-5.3	DANIEL K YOHO	714	125
10*19202	RR	5-11-5.3	DEBORAH L WOOLEY	714	131
10*19203	RR	5-11-5.3	CAROL M YOHO	713	205
10*19204	RR	5-11-5.3	DAYNA MARLENE YOHO	714	127
10*19205	RR	5-11-5.3	JEFFREY C YOHO	713	203
10*19221	RR	5-11-5.3	ROBERT H ARRICK REBECCA L ARRICK	737	240
10*19251	RR	5-11-5.3	RAE SUZETTE BAKER	748	315
10*19252	RR	5-11-5.3	JOHN WILSON	749	522
10*19502	RR	5-11-5.3	SUSAN BLANCHE BEYSER	942	623
10*19893	RR	5-11-5.3	WINIFRED G AND EDDIE G TURNER	948	277
10*21041	RR	5-11-5.3	SHERY AND RANDEN RITCHEA	949	365
10*18722	SS	5-11-3	HIRAMS ESTATE FAMILY LIMITED LIABILITY LIMITED PARTNERSHIP	938	523
10*19126	SS	5-11-3	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	859	47
10*19098	TT	5-11-4	DAVID H ARRICK LELAH M ARRICK	800	505
10*19127	UU	5-11-2	WALTER C. RINE AND CHERYL ANN RINE	859	47
10*47051.105.0	VV	5-8-9	JAMES B JACKSON JR AND MARION L JACKSON	859	478
***			Force pool interest		



47-051-02031

P.S. 708

David L Jackson

09/07/2018



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Bryan N-14HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV

WELL PLAT
PAGE 3 OF 3
DATE: 01/10/2018
REVISED DATE:
03/27/2018

WW-6A1
(5/13)

Operator's Well No. Bryan N-14HU

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
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*See attached pages

RECEIVED
Office of Oil and Gas

APR 9 2018

WV Department of
Environmental Protection

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

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

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

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

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

51-02031

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19340	L	5-16-3	DONNA V YOHO	GASTAR EXPLORATION USA INC	1/8+	665	407	N/A	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	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*19340	M	5-16-3.2	DONNA V YOHO	GASTAR EXPLORATION USA INC	1/8+	665	407	N/A	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	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	N	5-10-15	PAULA RINE AND DEBRA A RINE	CHEVRON USA 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*19223	O	5-10-15.1	DONALD T MILLER	TRIENERGY HOLDINGS, LLC	1/8+	737	284	N/A	N/A	N/A	N/A	N/A	N/A	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19293	P	5-11-12	JOSEPH I. KRAMAR, SR. JO ANN KRAMAR	TRIENERGY, INC.	1/8+	655	566	N/A	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	Q	5-11-11.3	BONNIE JEAN DAWSON	GASTAR EXPLORATION USA INC	1/8+	655	397	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC	23/617 Gastar Exploration USA, Atinum Marcellus I LLC to AB Resources LLC	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19336	Q	5-11-11.3	BONNIE JEAN DAWSON	GASTAR EXPLORATION USA INC	1/8+	655	397	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC	23/617 Gastar Exploration USA, Atinum Marcellus I LLC to AB Resources LLC	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19336	R	5-11-11.2	BONNIE JEAN DAWSON	GASTAR EXPLORATION USA INC	1/8+	665	397	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC	23/617 Gastar Exploration USA, Atinum Marcellus I LLC to AB Resources LLC	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19109	S	5-10-16.4	JOHN W. MILLER AND MARY ALICE MILLER, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	853	275	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19141	T	5-11-11.1	ROBERT W SPENCER JR NELLIE MARIE SPENCER	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 and Atinum Marcellus I LLC to AB Resources	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 (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19021	U	5-10-17	MARCELLUS TX MINERAL PARTNERS LTD	CHEVRON USA INC	1/8+	800	216	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19034	U	5-10-17	JMK IRREVOCABLE TRUST	CHEVRON USA INC	1/8+	813	145	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19035	U	5-10-17	PURPLEBURGH VENTURES, LLC	CHEVRON USA INC	1/8+	813	138	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19336	V	5-11-11.4	BONNIE JEAN DAWSON	GASTAR EXPLORATION USA INC	1/8+	665	397	N/A	N/A	N/A	N/A	23/353 Gastar Exploration USA Inc to Atinum Marcellus I LLC	23/617 Gastar Exploration USA, Atinum Marcellus I LLC to AB Resources LLC	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	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*21041	LL ✓	5-11-7	SHERY AND RANDEN RITCHEA	TH EXPLORATION, LLC	1/8+	949	365	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19221	MM ✓	5-11-6	ROBERT H ARRICK REBECCA L ARRICK	TRIENERGY HOLDINGS, LLC	1/8+	737	240	N/A	N/A	N/A	N/A	N/A	N/A	N/A	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc 40/127 Chevron USA Inc. to TH Exploration, LLC
10*19502	MM ✓	5-11-6	SUSAN BLANCHE BEYSER	TH EXPLORATION LLC	1/8+	942	623	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19893	MM ✓	5-11-6	WINIFRED G AND EDDIE G TURNER	TH EXPLORATION, LLC	1/8+	948	277	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21041	MM ✓	5-11-6	SHERY AND RANDEN RITCHEA	TH EXPLORATION, LLC	1/8+	949	365	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19139	NN ✓	5-11-16.3	HIRAM V MOORE	GASTAR EXPLORATION USA INC	1/8+	699	53	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 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*19179	NN ✓	5-11-16.3	KEITH HAUGHT BEVERLY HAUGHT	GASTAR EXPLORATION USA INC	1/8+	710	587	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*19139	OO ✓	5-11-16	HIRAM V MOORE	GASTAR EXPLORATION USA INC	1/8+	699	53	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 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*19178	OO ✓	5-11-16	JOSEPH HAUGHT	GASTAR EXPLORATION USA INC	1/8+	710	69	N/A	N/A	N/A	N/A	N/A	N/A	24/335 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*19179	OO ✓	5-11-16	KEITH HAUGHT BEVERLY HAUGHT	GASTAR EXPLORATION USA INC	1/8+	710	587	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*19180	OO ✓	5-11-16	STEVEN HAUGHT	TRIENERGY, INC.	1/8+	710	67	N/A	N/A	N/A	N/A	N/A	N/A	24/335 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
Q079728000	PP ✓	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	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
10*19126	QQ ✓	5-11-5	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	859	47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19176	QQ ✓	5-11-5	MALINA MAXINE BEYSER	GASTAR EXPLORATION USA INC	1/8+	710	602	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*19177	QQ ✓	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	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	QQ ✓	5-11-5	HARRIETT LODDUTH FOLEY	GASTAR EXPLORATION USA INC	1/8+	710	595	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	QQ ✓	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	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	QQ ✓	5-11-5	SHERRY ANN MCPHERSON	GASTAR EXPLORATION USA INC	1/8+	710	606	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	QQ ✓	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	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	QQ ✓	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	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

51-0203

51-0203

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19192	QQ	5-11-5	JAMES E YOHO	GASTAR EXPLORATION USA INC	1/8+	714	129	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	QQ	5-11-5	DANIEL K YOHO	GASTAR EXPLORATION USA INC	1/8+	714	125	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	QQ	5-11-5	DEBORAH L WOOLEY	GASTAR EXPLORATION USA INC	1/8+	714	131	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*19203	QQ	5-11-5	CAROL M YOHO	GASTAR EXPLORATION USA INC	1/8+	713	205	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*19204	QQ	5-11-5	DAYNA MARLENE YOHO	GASTAR EXPLORATION USA INC	1/8+	714	127	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*19205	QQ	5-11-5	JEFFREY C YOHO	GASTAR EXPLORATION USA INC	1/8+	713	203	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*19251	QQ	5-11-5	RAE SUZETTE BAKER	GASTAR EXPLORATION USA INC	1/8+	748	315	N/A	N/A	N/A	N/A	N/A	26/639 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*19252	QQ	5-11-5	JOHN WILSON	GASTAR EXPLORATION USA INC	1/8+	749	522	N/A	N/A	N/A	N/A	N/A	26/639 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*19502	QQ	5-11-5	SUSAN BLANCHE BEYSER	TH EXPLORATION LLC	1/8+	942	623	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19893	QQ	5-11-5	WINIFRED G AND EDDIE G TURNER	TH EXPLORATION, LLC	1/8+	948	277	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21041	QQ	5-11-5	SHERY AND RANDEN RITCHEA	TH EXPLORATION, LLC	1/8+	949	365	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19176	RR	5-11-5.3	MAUNA MAXINE BEYSER	GASTAR EXPLORATION USA INC	1/8+	710	602	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*19177	RR	5-11-5.3	NINA L KOVACS	GASTAR EXPLORATION USA INC	1/8+	710	594	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	RR	5-11-5.3	HARRIETT LODUTH FOLEY	GASTAR EXPLORATION USA INC	1/8+	710	598	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	RR	5-11-5.3	JOEL GLOVER	GASTAR EXPLORATION USA INC	1/8+	710	600	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	RR	5-11-5.3	SHERRY ANN MCPHERON	GASTAR EXPLORATION USA INC	1/8+	710	606	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	RR	5-11-5.3	SALLY LEE RIVERA	GASTAR EXPLORATION USA INC	1/8+	710	590	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	RR	5-11-5.3	SHARLA BETH WEAVER	GASTAR EXPLORATION USA INC	1/8+	710	608	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	RR	5-11-5.3	JAMES E YOHO	GASTAR EXPLORATION USA INC	1/8+	714	129	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	RR	5-11-5.3	DANIEL K YOHO	GASTAR EXPLORATION USA INC	1/8+	714	125	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

51-2031

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Pg	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19202	RR	5-11-5.3	DEBORAH L WOOLEY	GASTAR EXPLORATION USA INC	1/8+	714	131	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*19203	RR	5-11-5.3	CAROL M YOHO	GASTAR EXPLORATION USA INC	1/8+	713	205	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*19204	RR	5-11-5.3	DAYNA MARLENE YOHO	GASTAR EXPLORATION USA INC	1/8+	714	127	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*19205	RR	5-11-5.3	JEFFREY C YOHO	GASTAR EXPLORATION USA INC	1/8+	713	203	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*19221	RR	5-11-5.3	ROBERT H ARRICK REBECCA L ARRICK	TRIENERGY HOLDINGS, LLC	1/8+	737	240	N/A	N/A	N/A	N/A	N/A	N/A	28/356 TriEnergy Holdings LLC and TriEnergy Inc to Chevron USA Inc	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19251	RR	5-11-5.3	RAE SUZETTE BAKER	GASTAR EXPLORATION USA INC	1/8+	748	315	N/A	N/A	N/A	N/A	N/A	26/639 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*19252	RR	5-11-5.3	JOHN WILSON	GASTAR EXPLORATION USA INC	1/8+	749	522	N/A	N/A	N/A	N/A	N/A	26/639 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*19502	RR	5-11-5.3	SUSAN BLANCHE BEYSER	TH EXPLORATION LLC	1/8+	942	623	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19893	RR	5-11-5.3	WINIFRED G AND EDDIE G TURNER	TH EXPLORATION, LLC	1/8+	948	277	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21041	RR	5-11-5.3	SHERY AND RANDEN RITCHEA	TH EXPLORATION, LLC	1/8+	949	365	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*18722	SS	5-11-3	HIRAMS ESTATE FAMILY LIMITED LIABILITY LIMITED PARTNERSHIP	TH EXPLORATION LLC	1/8+	938	523	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19126	SS	5-11-3	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	859	47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*19098	TT	5-11-4	DAVID H ARRICK LELAH M ARRICK	CHEVRON USA INC	1/8+	800	505	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
Q076871001	TT	5-11-4	JAMES BRUCE MIDCAP AND DIANA K MIDCAP	NOBLE ENERGY INC	1/8+	803	615	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
10*19127	UU	5-11-2	WALTER C. RINE AND CHERYL ANN RINE	CHEVRON USA INC	1/8+	859	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/127 Chevron USA Inc. to TH Exploration, LLC
10*47051.105.0	VV	5-8-9	JAMES B JACKSON JR AND MARION L JACKSON	TH EXPLORATION LLC	1/8+	859	478	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*** Force pool Interest

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

BOOK 0:04 0 PAGE 0127

STATE OF WEST VIRGINIA §
§
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1628356
08/16/2017 @ 12:08:49 PM
ASSIGNMENTS
Book 40 @ Page 127
Pages Recorded 25
Recording Cost \$ 33.00

ASSIGNMENT AND CONVEYANCE

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

WITNESSETH:

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

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

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

I. 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 Comell 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

APR 9 2018

WV Department of
Environmental Protection

09/07/2018



April 6, 2018

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

RE: Bryan N-14HU

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Bryan N-14HU well plat.

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

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia Region

RECEIVED
Office of Oil and Gas

APR 9 2018

WV Department of
Environmental Protection

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

Date of Notice Certification: 04/06/2018

API No. 47- 051 - _____

Operator's Well No. Bryan N-14HU

Well Pad Name: Bryan

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State: <u>West Virginia</u>	UTM NAD 83 Easting: <u>519,137.46</u>
County: <u>Marshall</u>	Northing: <u>4,402,880.82</u>
District: <u>Franklin</u>	Public Road Access: <u>Rines Ridge Road</u>
Quadrangle: <u>Powhatan Point 7.5'</u>	Generally used farm name: <u>CNX Land Resources, Inc.</u>
Watershed: <u>Fish Creek (HUC-10)</u>	

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following: *PLEASE CHECK ALL THAT APPLY <input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED <input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED <input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or <input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH) <input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION <input checked="" type="checkbox"/> 5. PUBLIC NOTICE <input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION		OOG OFFICE USE ONLY <input type="checkbox"/> RECEIVED/ NOT REQUIRED <input type="checkbox"/> RECEIVED <input type="checkbox"/> RECEIVED/ NOT REQUIRED <input type="checkbox"/> RECEIVED <input type="checkbox"/> RECEIVED <input type="checkbox"/> RECEIVED
RECEIVED Office of Oil and Gas APR 9 2018 WV Department of Environmental Protection		

Required Attachments:

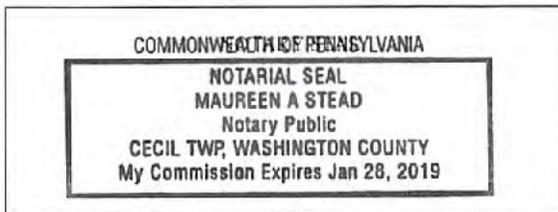
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

WW-6AC
(1/12)

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller *Amy Miller*, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller</u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permit Specialist - Appalachia</u>	Facsimile:	<u>724-338-2030</u>
Telephone:	<u>724-749-8388</u>	Email:	<u>amiller@tug-hillop.com</u>



Subscribed and sworn before me this 6 day of APRIL 2018.
Maureen A Stead Notary Public
 My Commission Expires 1/28/19

Oil and Gas Privacy Notice:

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

RECEIVED
Office of Oil and Gas

APR 9 2018

WV Department of
Environmental Protection

WW-6A
(9-13)

API NO. 47- 51 0 2031
OPERATOR WELL NO. Bryan N-14HU
Well Pad Name: Bryan

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

Notice Time Requirement: notice shall be provided no later than the filing date of permit application.

Date of Notice: 4/6/2018 **Date Permit Application Filed:** 4/8/2018

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

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

SURFACE OWNER(s)

Name: CNX Land Resources, Inc. (Pad)
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317

Name: Greg and Christina Riddle (Road)
Address: 4205 Rines Ridge Road
Proctor, WV 26055

SURFACE OWNER(s) (Road and/or Other Disturbance)

Name: Ray E. and Katherine L. Minor
Address: 4193 Rines Ridge Road
Proctor, WV 26055

Name: Michael R. Bryan *see attached list
Address: 195 Isaiah Drive
Proctor, WV 26055

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: Leatherwood, Inc.
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317-6506

COAL OPERATOR

Name: _____
Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)

Name: *See attached sheet
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

*Please attach additional forms if necessary

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WW-6A
(8-13)

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API NO. 47- 51-02031
OPERATOR WELL NO. Bryan N-14HU
Well Pad Name: BryanWV Department of
Environmental Protection**Notice is hereby given:**

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

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

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

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

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Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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Environmental Protection

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WW-6A
(8-13)

API NO. 47- 51 - 02031
OPERATOR WELL NO. Bryan N-14HU
Well Pad Name: Bryan

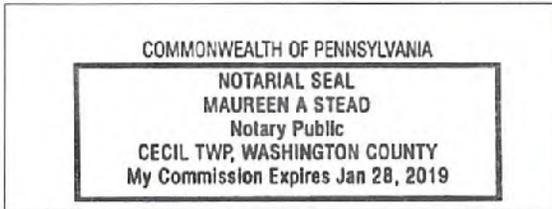
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilltop.com *Amy Miller*

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

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 6 day of APRIL 2018.
Maureen A Stead Notary Public
My Commission Expires 1/28/19

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Environmental Protection

09/07/2018

51-02031

Operator Well No. Bryan N-14HU

WW-6A Notice of Application

Attachment 1 of 1

Surface Owner(s) Road and Other Disturbances:

Name: Brenda K. Bryan
Address: 1971 Rines Ridge Road
Proctor, WV 26055

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09/07/2018

51-02031

WW-6A

Supplement Pg. 1A

Tug Hill Operating, LLC
380 Southpointe BLVD, Suite 200
Canonsburg, PA 15317

WATER WELL REPORT

Well: BRYAN No. N-14HU
District: Franklin
County: Marshall
State: WV

There appears to be Five (5) possible water sources within 2,000 feet of the above referenced well location.

Topo spot #1 (Possible Spring) TM 15 Par.6 Joseph & Joann Kramer 304-845-0896 3303 Rines Ridge Rd. Proctor, WV 26055	Topo Spot # 2 (Spring) TM 15 Par. 9 CNX Land Resources, LLC 724-485-4000, 713-893-4476 1000 Consol Energy Dr. Canonsburg, PA 15317	Topo Spot # 3 (Water Well) TM 16 Par. 23 CNX Land Resources, LLC 724-485-4000, 713-893-4476 1000 Consol Energy Dr. Canonsburg, PA 15317
Topo Spot # 4 (Water Trough) TM 16 Par. 23 CNX Land Resources, LLC 724-485-4000, 713-893-4476 1000 Consol Energy Dr. Canonsburg, PA 15317	Topo Spot # 5 (Water Trough) TM 15 Par. 9 CNX Land Resources, LLC 724-485-4000, 713-893-4476 1000 Consol Energy Dr. Canonsburg, PA 15317	

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WW-6A

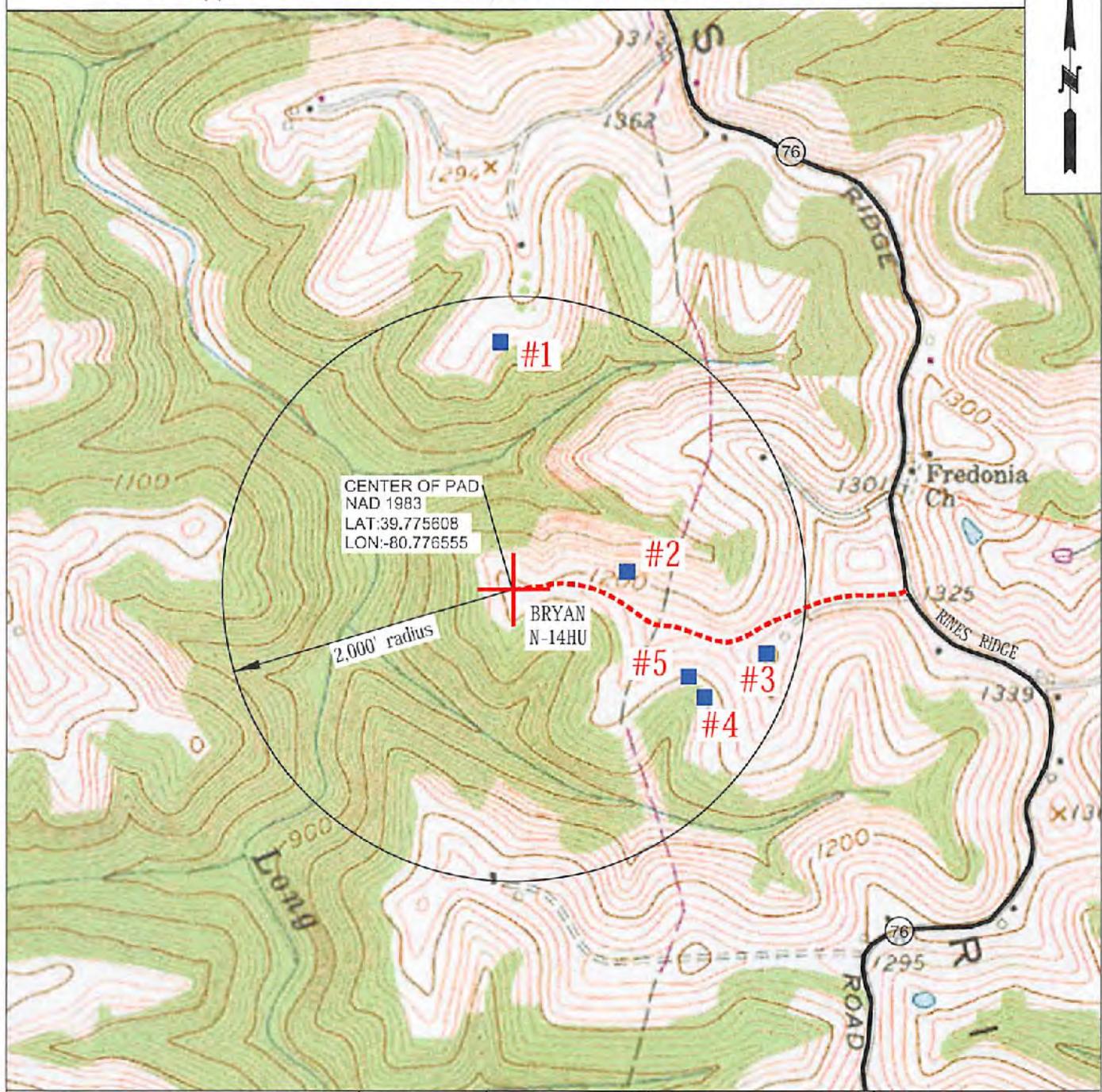
APR 9 2018

**PROPOSED
BRYAN N-14HU**

SUPPLEMENT PG 1

WV Department of
Environmental Protection

There appears to be Five (5) possible water sources within 2,000'.



CENTER OF PAD
NAD 1983
LAT:39.775608
LON:-80.776555

BRYAN
N-14HU

2,000' radius



OPERATOR	494510851	TOPO SECTION	LEASE NAME
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		POWHATAN POINT 7.5'	BRYAN
SCALE:		DATE:	
1" = 1000'		DATE: 12/12/17	

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

Date of Notice: 8/10/2017 **Date of Planned Entry:** 8/17/2017

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Environmental Protection

Delivery method pursuant to West Virginia Code § 22-6A-10a

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(s)
Name: CNX Land Resources, Inc.
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317
Name: Ray E. and Katherine L. Minor
Address: 4193 Rines Ridge Road
Proctor, WV 26055
Name: Michael R. and Brenda K. Bryan
Address: 195 Isaiah Drive
Proctor, WV 26055 *See Attachment

COAL OWNER OR LESSEE
Name: Leatherwood, Inc.
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317-6506

MINERAL OWNER(s)
Name: Greg and Christina Riddle
Address: 4205 Rines Ridge Road
Proctor, WV 26055

*please attach additional forms if necessary

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State:	<u>West Virginia</u>	Approx. Latitude & Longitude:	<u>39.7756312; -80.7768011</u>
County:	<u>Marshall</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>
District:	<u>Franklin</u>	Watershed:	<u>(HUC-10) Fish Creek</u>
Quadrangle:	<u>Powhatan Point</u>	Generally used farm name:	<u>Michael and Brenda Bryan</u>

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

Notice is hereby given by:

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

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

Oil and Gas Privacy Notice:

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

Operator Well No. Bryan N-14HU

WW-6A3 Notice of Entry for Plat Survey

Attachment 1 of 1

Surface Owner(s):

Name: Greg and Christina Riddle
Address: 4205 Rines Ridge Road
Proctor, WV 26055

Mineral Owner(s):

Name: Ray E. and Katherine L. Minor
Address: 4193 Rines Ridge Road
Proctor, WV 26055

Name: Michael R. Bryan
Address: 195 Isaiah Drive
Proctor, WV 26055

Name: Brenda K. Bryan
Address: 1971 Rines Ridge Road
Proctor, WV 26055

Name: Wesley Russell Bryan II
Address: P.O. Box 1107
Sunbury, OH 43074

Name: Appalachian Energy Holdings I, LP
Address: 14 Dunmoyle Place
Pittsburgh, PA 15217

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WV Department of
Environmental Protection

09/07/2018

WW-6A5
(1/12)

Operator Well No. Bryan N-14HU

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 04/06/2018 **Date Permit Application Filed:** 04/08/2018

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

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)
(at the address listed in the records of the sheriff at the time of notice):

Name: CNX Land Resources, Inc.
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317

Name: Ray E. and Katherine L. Minor
Address: 4193 Rines Ridge Road
Proctor, WV 26055 *See attached sheet

Notice is hereby given:

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

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>519,137.46</u>
County:	<u>Marshall</u>		Northing:	<u>4,402,880.83</u>
District:	<u>Franklin</u>	Public Road Access:	<u>Rines Ridge Road</u>	
Quadrangle:	<u>Powhatan Point 7.5'</u>	Generally used farm name:	<u>CNX Land Resources, Inc.</u>	
Watershed:	<u>Fish Creek (HUC-10)</u>			

This Notice Shall Include:

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

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

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

Oil and Gas Privacy Notice:

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

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09/07/2018
WV Department of
Environmental Protection

51-02031

Operator Well No. Bryan N-14HU

WW-6A5 NOTICE OF PLANNED OPERATION

ATTACHMENT 1 OF 1

Surface Owner(s):

Greg and Christina Riddle
4205 Rines Ridge Road
Proctor, WV 26055

Michael R. and Brenda K. Bryan
195 Isaiah Drive
Proctor, WV 26055

Brenda K. Bryan
1971 Rines Ridge Road
Proctor, Wv 26055

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09/07/2018

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways

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

Jim Justice
Governor

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

September 7, 2017

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Bryan Pad, Marshall County
Bryan N-14HU Well site

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Environmental Protection

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2017-0528 which has been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 76 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated January 3, 2012.

Very Truly Yours,

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G Coordinator

Cc: Jonathan White
Tug Hill Operating, LLC
CH, OM, D-6
File



PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

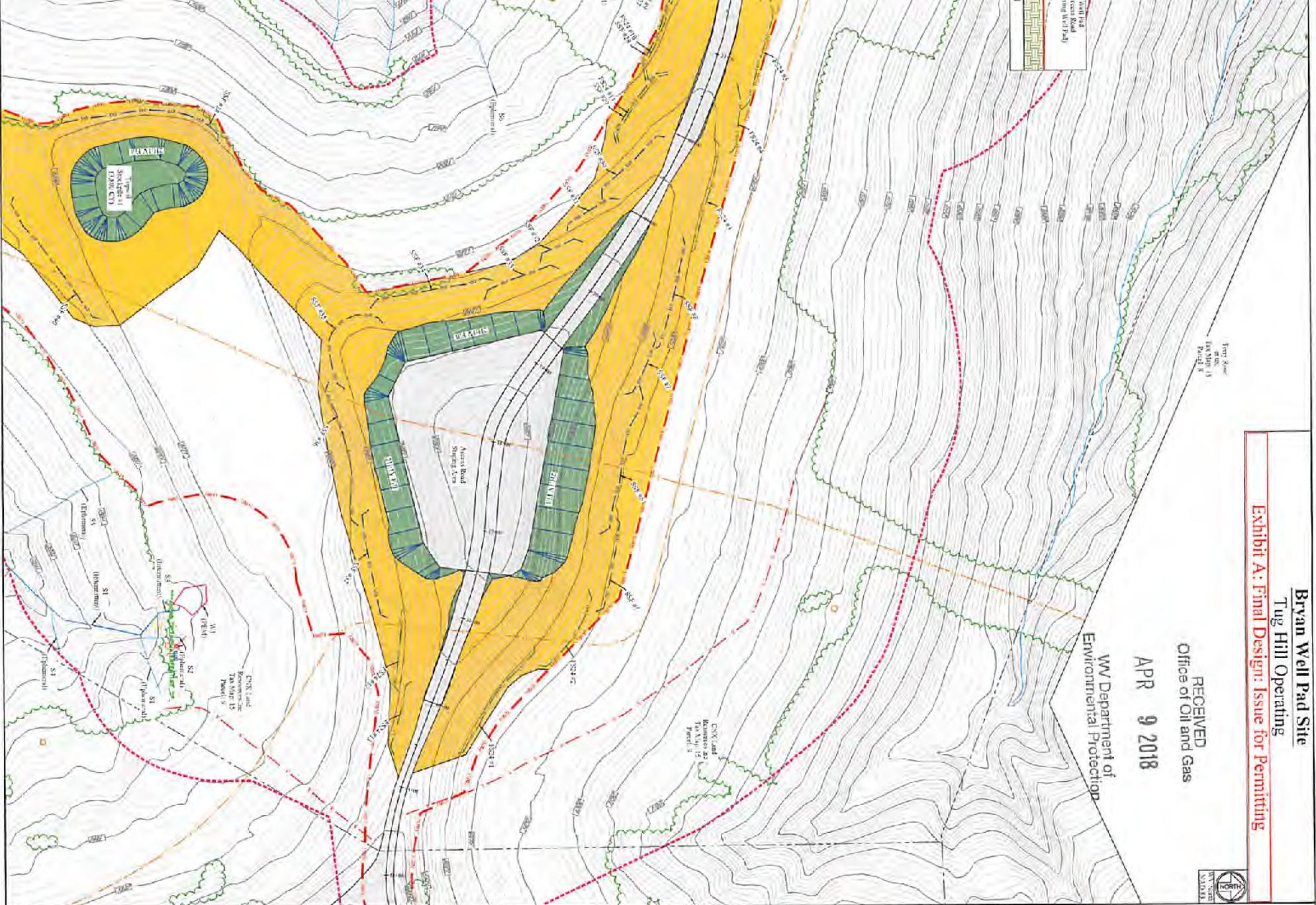
Well No. Bryan N-14HU

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

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Bryan Well Pad Site
Tug Hill Operating
Exhibit A: Final Design: Issue for Permitting

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51-02031

Date	Revision
08-29-2017	Design
10-30-2017	Design: WVDLP Comments

TUG HILL
 OPERATING



THIS DOCUMENT
 PREPARED FOR
 TUG HILL
 OPERATING

Kelly Succinea
 Environmental Engineer

Erosion and Sediment Control Plan
Bryan Well Pad Site

Franklin District
 Marshall County, WV

Date: 08/29/2017
 Scale: AS SHOWN
 Designed By: JS
 The
 Sheet 2 of 17