



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

Tuesday, September 11, 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-4HM
47-051-02076-00-00

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-4HM
Farm Name: CNX LAND RESOURCES
U.S. WELL NUMBER: 47-051-02076-00-00
Horizontal 6A New Drill
Date Issued: 9/11/2018

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.

4705 02076

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-4HM Well Pad Name: Bryan

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

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

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

(b) If Gas Shallow Deep
Horizontal

6) Existing Pad: Yes or No Yes

Handwritten signature and date: 6/28/18

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6443' - 6497', thickness of 54' and anticipated pressure of approx. 3800 psi

8) Proposed Total Vertical Depth: 6,596'

9) Formation at Total Vertical Depth: Onondoga

10) Proposed Total Measured Depth: 16,903'

11) Proposed Horizontal Leg Length: 10,012' *w/plus*

12) Approximate Fresh Water Strata Depths: 70'; 803' ✓

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

14) Approximate Saltwater Depths: 2040' ✓

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

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

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

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

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18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120' ✓	259FT^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	953'	953' ✓	1012ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	953'	953'	1012ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,600'	2,600' ✓	863ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	16,903'	16,903'	4311ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		6,410'	
Liners	N/A						

ju
6/28/18

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	13 3/8"	17 1/2"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	2,740	2,192	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE#24	1.19
Production	5 1/2"	8 7/8_8 3/4	.361	12,640	8,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200 ✓	8,960		
Liners	N/A						

PACKERS

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

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WW-6B
(10/14)

API NO. 47-051 -
OPERATOR WELL NO. Bryan NCHM
Well Pad Name: Bryan 4705102076

J. [Signature]
6/28/18

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

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

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

Well to be completed with approximately 25,030,000 lb proppant and 386,982 bbl of water. Max rate = 80 bpm; max psi = 9,000#. ✓

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

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

23) Describe centralizer placement for each casing string:

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

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

*See Attached

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

Area of Review**Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.**

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (4/26/2018) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits

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Permit well - Bryan N-4HM

Wells within 500' Buffer

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

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
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.
4705101977	Tug Hill Operating	6596' TVD, planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101978	Tug Hill Operating	6596' TVD, planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101979	Tug Hill Operating	6596' TVD, planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled
4705101980	Tug Hill Operating	6596' TVD, planned	None	None	No, Permit submitted Marcellus well	Permit submitted Marcellus well. Not yet drilled

WAGES Pipeline

Select County: **(05) Madison** Select datatype: Check All

Enter Permit #: **01340** Location Production Pivots

Get Data Reset Owner/Completion Stratigraphy Sample Logs Bit-Hole Log

Tasks: Descriptions, Safety Zone Integrations, Screen Coordinates Tables, Screen Tables, Control Information, Attributes, Production Maps, Hydrology

WV Geological & Economic Survey Well: County = 05 Permit = 01340 Refresh Time: 7/6/2018 10:55:00 AM

Location Information: View Map

API: COUNTY PERMIT TAX_DISTRICT SWAN_ZONE SWAN_ZONE_LEAD_ZONE LOU_CO_UTM_W STATE: WV DATE_CREATED: 11/22/2012 05:01:30 05:01:30 05:01:30 05:01:30

Bottom Hole Location Information

API: EP_NUM UTM_W UTM_N LOU_CO LAT_DEC LONG_DEC

4705101340 1 4444001 4444001 4444001 39 28 52.2 78 20 24.1

Owner Information:

API: COMP_NUM STATUS SURFACE_OWNER WELL_NAME CO_OWNER LEASE_NUM MINERAL_OWNER OPERATOR_AT_COMPLETION PROP_YD PROF_THYD_FM TFM_LSE_FR FTSO FTSO_OWNER

4705101340 4 0013 Chevron CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON CHEVRON

Completion Information:

API	COMP_NUM	DEPTH_FT	ELEV_FT	FIELD	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT	DEPTH_FT
4705101340	4705101340	6450	41230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pay/Show/Well Information:

API: COMP_NUM ACTIVITY PRODUCT SECTION DEPTH_TOP_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU DEPTH_BOTTOM_FU

4705101340 4705101340 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Production Gas Information (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_MG	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4705101340	AB Resources RA	2012	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Oil Information (Volumes in Bbl) - some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_MG	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4705101340	AB Resources RA	2012	0	0	0	0	0	0	0	0	0	0	0	0	0

Production NGL Information (Volumes in Bbl) - some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_MG	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4705101340	Chevron Appalachia LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_MG	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4705101340	Chevron Appalachia LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0

Stratigraphy Information:

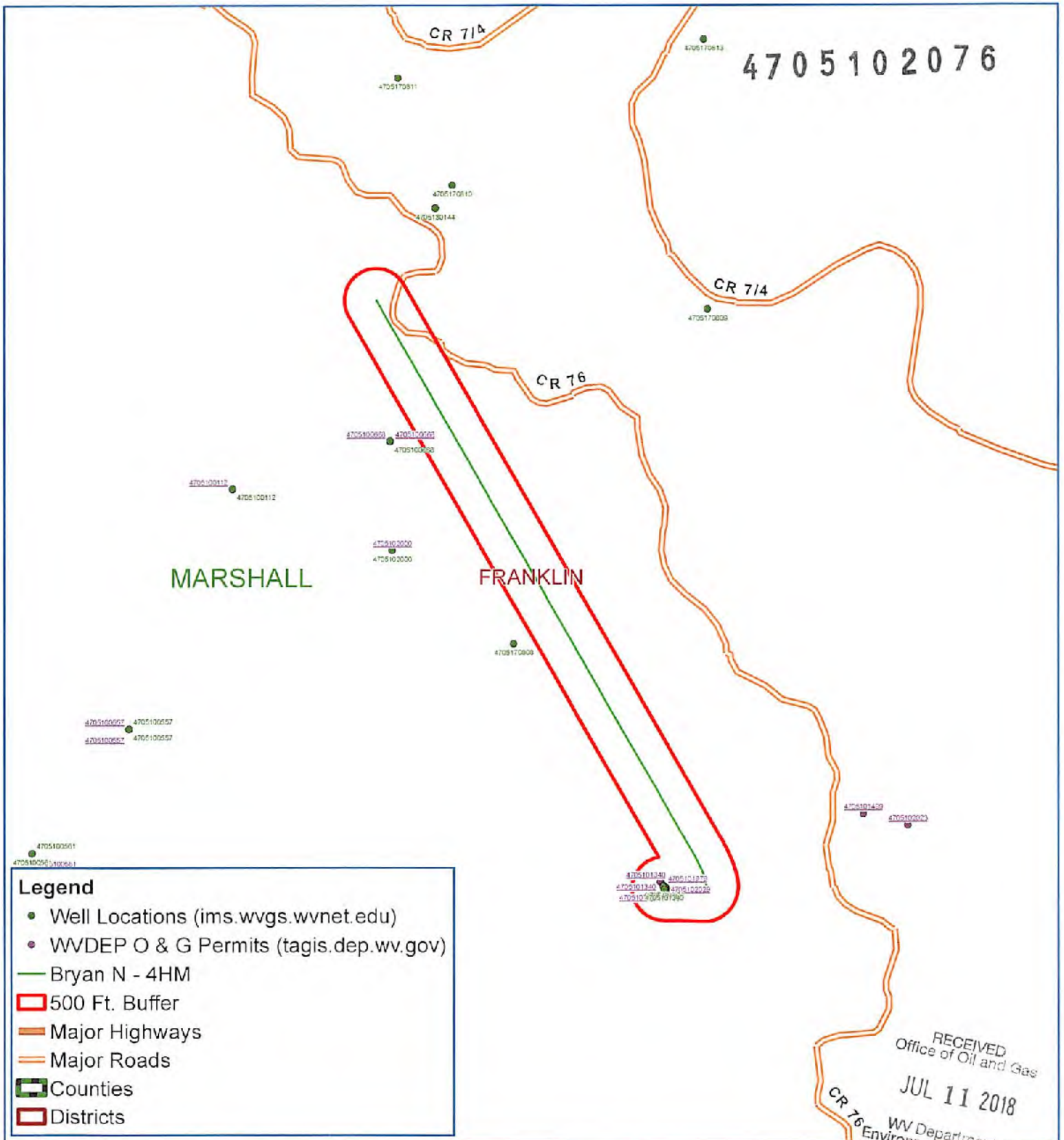
API	SUFFIX	FB	FU_QUALITY	DEPTH_TOP	DEPTH_BOTTOM	THICKNESS	THICKNESS_C1Q1ARY	ELEV DATUM
4705101340	Dual Depth Log	Bur	WSP	4000	4000	0	0	4000

Wireline (CT Log) Information:

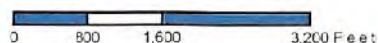
API	LOG_TOP	LOG_BOTTOM	REPEAT	INCL.	LOGS_AVAILABLE	SCAN	DIGITIZED	GR.TOP	GR.BOTTOM	D.TOP	D.BOTTOM	N.TOP	N.BOTTOM	L.TOP	L.BOTTOM	T.TOP	T.BOTTOM	S.TOP	S.BOTTOM	G.TOP	G.BOTTOM	INCH	INCH	REDUCED	MDP	LOGGING	ELEV.M
4705101340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments: None. Paper, format, PE EVAL: 0 with measured and vertical depth included

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Bryan N-4HM Franklin District Marshall County, WV





Tug Hill Operating, LLC Casing and Cement Program

Bryan N-4HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	953'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,604'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	16,903'	CTS

Cement

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

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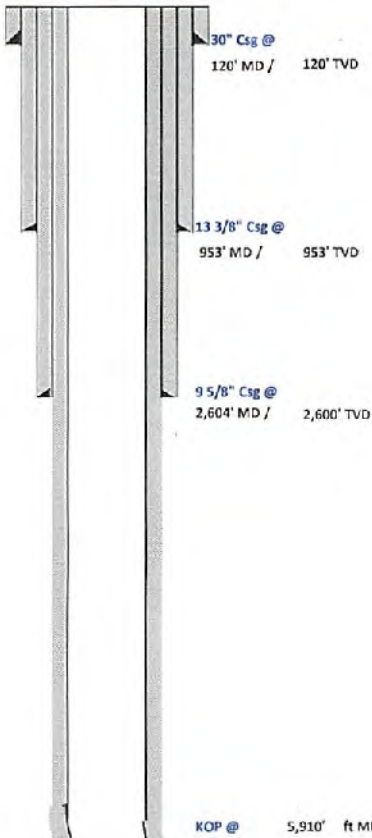


WELL NAME: Bryan N-4HM
STATE: West Virginia **COUNTY:** Marshall
DISTRICT: Franklin
DF Elev: 1,191' **GL Elev:** 1,191'
TD: 16,903'
TH Latitude: 39.77566597
TH Longitude: -80.77661603
BH Latitude: 39.801049
BH Longitude: 80.793621

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	803
Sewickley Coal	701
Pittsburgh Coal	795
Big Lime	1970
Weir	2324
Berea	2519
Gordon	2864
Rhinestreet	5837
Genesee/Burkett	6327
Tully	6362
Hamilton	6397
Marcellus	6443
Landing Depth	6485
Onondaga	6497
Pilot Hole Depth	6596

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	953'	953'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,604'	2,600'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	16,903'	6,310'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,017	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	848	A	15	Air	1 Centralizer every other jt
Production	3,803	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



Handwritten signature and date: 6/28/18

Pilot Hole
PH TD @
6,596' TVD

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 Landing Point @ 6,891' MD / 6,485' TVD
 PH TD @ 100' below Onondaga Top

Lateral TD @ 16,903' ft MD
 6,310' ft TVD

4705402076



TUG HILL
OPERATING

Tug Hill Operating LLC
Well: **Bryan N-04HM (slot K)**
Site: **Bryan Pad**
Project: **Marshall County, WV**
Design: **rev3**

SECTION DETAILS

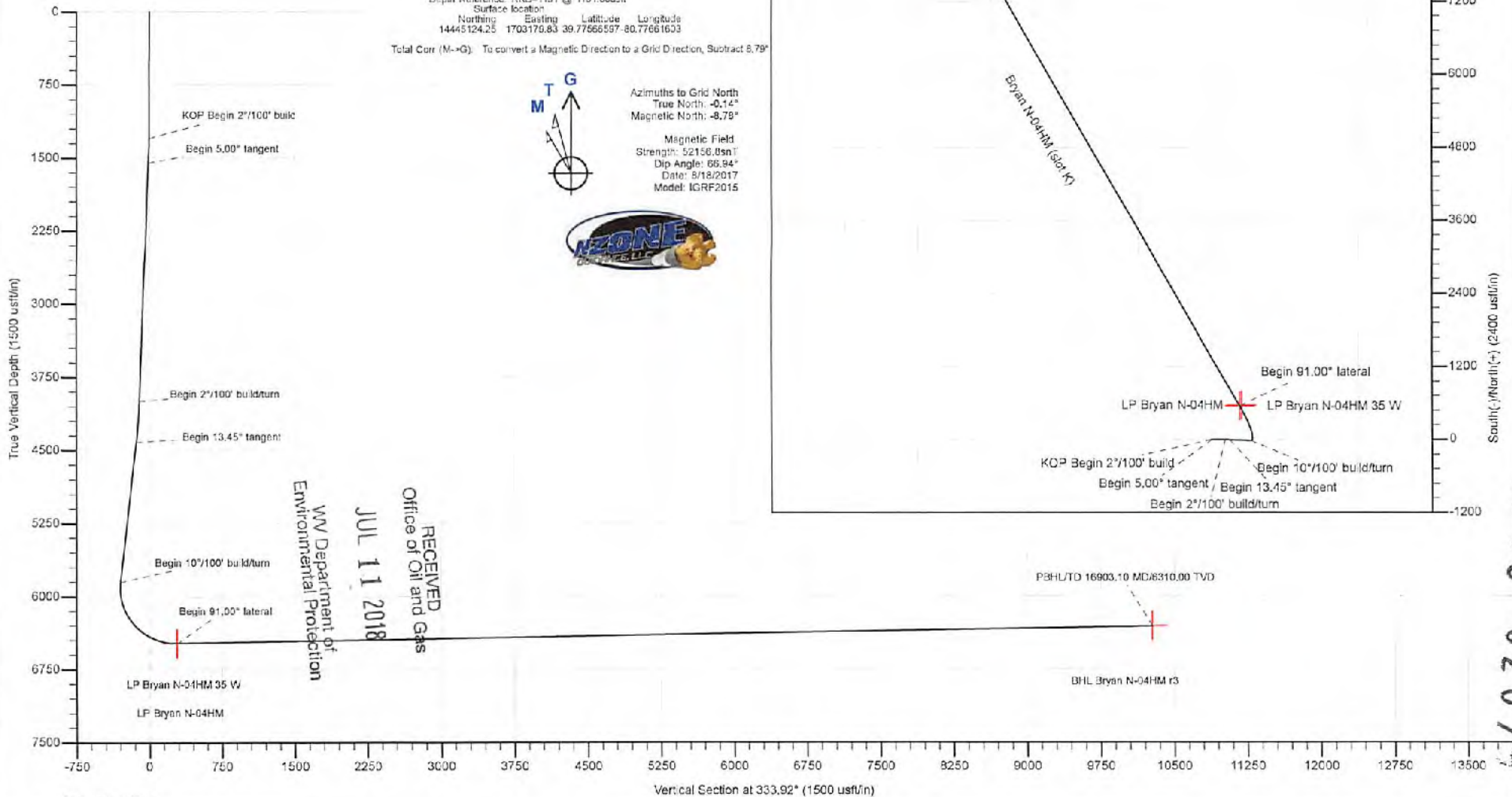
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1550.00	5.00	90.00	1549.68	0.00	10.90	2.00	90.00	-4.79	Begin 5.00° tangent
4	4009.68	5.00	90.00	4000.00	0.00	226.28	0.00	0.00	-89.03	Begin 2°/100' build/turn
5	4432.80	13.45	92.65	4417.28	-2.28	293.01	2.00	4.20	-130.86	Begin 13.45° tangent
6	5909.78	13.45	92.65	5853.72	-18.19	836.28	0.00	0.00	-298.05	Begin 10°/100' build/turn
7	6891.38	91.00	330.17	6485.00	548.00	461.16	10.00	-121.57	289.48	Begin 91.00° lateral
8	16903.10	91.00	330.17	6310.00	8231.84	-4518.25	0.00	0.00	0278.21	PBHL/TD 16903.10 MD/6310.00 TVD

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

System Datum: Mean Sea Level
Depth Reference: RKB=1191 @ 1191.00ust
Surface location

Northing Easting Latitude Longitude
14445124.25 1703176.83 39.7756597 -80.77661633

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



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4705-0207



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-04HM (slot K)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1191 @ 1191.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1191 @ 1191.00usft
Site:	Bryan Pad	North Reference:	Grid
Well:	Bryan N-04HM (slot K)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Project	Marshall County, West Virginia		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Bryan Pad				
Site Position:	Lat/Long	Northing:	14,445,110.80 usft	Latitude:	39.77562900
From:		Easting:	1,703,181.57 usft	Longitude:	-80.77860992
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	Bryan N-04HM (slot K)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,124.25 usft	Latitude:	39.77566597
	+E/-W	0.00 usft	Easting:	1,703,179.82 usft	Longitude:	-80.77861603
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	52,156.81341352

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	333.92

Plan Survey Tool Program	Date	4/24/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	16,903.10 rev3 (Original Hole)	MWD	MWD - Standard

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Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,550.00	5.00	90.00	1,549.68	0.00	10.90	2.00	2.00	0.00	90.00	0.00
4,009.68	5.00	90.00	4,000.00	0.00	225.28	0.00	0.00	0.00	0.00	0.00
4,432.80	13.45	92.65	4,417.28	-2.28	293.01	2.00	2.00	0.63	4.20	0.00
5,909.78	13.45	92.65	5,853.72	-18.19	636.28	0.00	0.00	0.00	0.00	0.00
6,891.38	91.00	330.17	6,485.00	546.00	461.16	10.00	7.90	-12.48	-121.57	LP Bryan N-04HM 35
16,903.10	91.00	330.17	6,310.00	9,231.84	-4,518.25	0.00	0.00	0.00	0.00	BHL Bryan N-04HM r.

WV Department of Environmental Protection



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-04HM (slot K)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference: Well Bryan N-04HM (slot K)
 TVD Reference: RKB=1191 @ 1191.00usft
 MD Reference: RKB=1191 @ 1191.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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 WV Department of
 Environmental Protection

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
100.00	0.00	0.00	100.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
200.00	0.00	0.00	200.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
300.00	0.00	0.00	300.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
400.00	0.00	0.00	400.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
500.00	0.00	0.00	500.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
600.00	0.00	0.00	600.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
700.00	0.00	0.00	700.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
800.00	0.00	0.00	800.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
900.00	0.00	0.00	900.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,445,124.25	1,703,179.82	39.77566597	-80.77661603
KOP Begin 2°/100' build									
1,400.00	2.00	90.00	1,399.98	0.00	1.75	14,445,124.25	1,703,181.57	39.77566598	-80.77660992
1,500.00	4.00	90.00	1,499.83	0.00	6.98	14,445,124.25	1,703,186.80	39.77566592	-80.77659119
1,550.00	5.00	90.00	1,549.68	0.00	10.90	14,445,124.25	1,703,190.73	39.77566590	-80.77657723
Begin 5.00° tangent									
1,600.00	5.00	90.00	1,599.49	0.00	15.26	14,445,124.25	1,703,195.08	39.77566587	-80.77656172
1,700.00	5.00	90.00	1,699.11	0.00	23.97	14,445,124.25	1,703,203.60	39.77566581	-80.77653070
1,800.00	5.00	90.00	1,798.73	0.00	32.69	14,445,124.25	1,703,212.51	39.77566575	-80.77649968
1,900.00	5.00	90.00	1,898.35	0.00	41.41	14,445,124.25	1,703,221.23	39.77566569	-80.77646866
2,000.00	5.00	90.00	1,997.97	0.00	50.12	14,445,124.25	1,703,229.95	39.77566563	-80.77643764
2,100.00	5.00	90.00	2,097.59	0.00	58.84	14,445,124.25	1,703,238.66	39.77566557	-80.77640662
2,200.00	5.00	90.00	2,197.21	0.00	67.55	14,445,124.25	1,703,247.38	39.77566551	-80.77637560
2,300.00	5.00	90.00	2,296.82	0.00	76.27	14,445,124.25	1,703,256.09	39.77566545	-80.77634458
2,400.00	5.00	90.00	2,396.44	0.00	84.98	14,445,124.25	1,703,264.81	39.77566539	-80.77631356
2,500.00	5.00	90.00	2,496.06	0.00	93.70	14,445,124.25	1,703,273.52	39.77566533	-80.77628254
2,599.99	5.00	90.00	2,595.68	0.00	102.41	14,445,124.25	1,703,282.24	39.77566527	-80.77625152
2,699.99	5.00	90.00	2,695.30	0.00	111.13	14,445,124.25	1,703,290.95	39.77566521	-80.77622050
2,799.99	5.00	90.00	2,794.92	0.00	119.85	14,445,124.25	1,703,299.67	39.77566515	-80.77618948
2,899.99	5.00	90.00	2,894.54	0.00	128.56	14,445,124.25	1,703,308.39	39.77566509	-80.77615846
2,999.99	5.00	90.00	2,994.16	0.00	137.28	14,445,124.25	1,703,317.10	39.77566503	-80.77612744
3,099.99	5.00	90.00	3,093.78	0.00	145.99	14,445,124.25	1,703,325.82	39.77566497	-80.77609643
3,199.99	5.00	90.00	3,193.40	0.00	154.71	14,445,124.25	1,703,334.53	39.77566491	-80.77606541
3,299.99	5.00	90.00	3,293.02	0.00	163.42	14,445,124.25	1,703,343.25	39.77566485	-80.77603439
3,399.99	5.00	90.00	3,392.64	0.00	172.14	14,445,124.25	1,703,351.96	39.77566479	-80.77600337
3,499.99	5.00	90.00	3,492.26	0.00	180.85	14,445,124.25	1,703,360.68	39.77566473	-80.77597235
3,599.99	5.00	90.00	3,591.87	0.00	189.57	14,445,124.25	1,703,369.39	39.77566467	-80.77594133
3,699.99	5.00	90.00	3,691.49	0.00	198.29	14,445,124.25	1,703,378.11	39.77566461	-80.77591031
3,799.99	5.00	90.00	3,791.11	0.00	207.00	14,445,124.25	1,703,386.83	39.77566455	-80.77587929
3,899.99	5.00	90.00	3,890.73	0.00	215.72	14,445,124.25	1,703,395.54	39.77566449	-80.77584827
3,999.99	5.00	90.00	3,990.35	0.00	224.43	14,445,124.25	1,703,404.26	39.77566443	-80.77581725
4,009.68	5.00	90.00	4,000.00	0.00	225.28	14,445,124.25	1,703,405.10	39.77566443	-80.77581424
Begin 2°/100' build/turn									
4,099.99	6.80	91.12	4,089.83	-0.10	234.56	14,445,124.15	1,703,414.39	39.77566408	-80.77578120
4,199.99	8.80	91.82	4,188.90	-0.46	246.13	14,445,123.79	1,703,427.95	39.77566300	-80.77573291
4,299.99	10.80	92.26	4,287.44	-1.08	265.14	14,445,123.18	1,703,444.96	39.77566120	-80.77567238
4,399.99	12.80	92.57	4,385.32	-1.94	285.57	14,445,122.31	1,703,465.39	39.77565968	-80.77561968
4,432.80	13.45	92.65	4,417.27	-2.28	293.01	14,445,121.97	1,703,472.83	39.77565769	-80.77557320
Begin 13.45° tangent									
4,499.99	13.45	92.65	4,482.62	-3.01	308.62	14,445,121.25	1,703,488.45	39.77565560	-80.77551762
4,599.99	13.45	92.65	4,579.87	-4.08	331.87	14,445,120.17	1,703,511.69	39.77565248	-80.77543491



Planning Report - Geographic

Database:	DB_Jul2218dt_v14	Local Co-ordinate Reference:	Well Bryan N-04HM (slot K)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1191 @ 1191.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1191 @ 1191.00usft
Site:	Bryan Pad	North Reference:	Grid
Well:	Bryan N-04HM (slot K)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

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Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,699.99	13.45	92.65	4,677.13	-5.16	355.11	14,445,119.09	1,703,534.93	39.77564936	-80.77535220	
4,799.99	13.45	92.65	4,774.38	-6.24	378.35	14,445,118.02	1,703,558.17	39.77564624	-80.77526949	
4,899.99	13.45	92.65	4,871.64	-7.31	401.59	14,445,116.94	1,703,581.42	39.77564312	-80.77518878	
4,999.99	13.45	92.65	4,968.90	-8.39	424.83	14,445,115.86	1,703,604.68	39.77564001	-80.77510407	
5,099.99	13.45	92.65	5,066.15	-9.47	448.07	14,445,114.79	1,703,627.90	39.77563689	-80.77502136	
5,199.99	13.45	92.65	5,163.41	-10.55	471.32	14,445,113.71	1,703,651.14	39.77563377	-80.77493865	
5,299.99	13.45	92.65	5,260.66	-11.62	494.56	14,445,112.63	1,703,674.38	39.77563065	-80.77485594	
5,399.99	13.45	92.65	5,357.92	-12.70	517.80	14,445,111.56	1,703,697.62	39.77562753	-80.77477323	
5,499.99	13.45	92.65	5,455.17	-13.78	541.04	14,445,110.48	1,703,720.87	39.77562441	-80.77469052	
5,599.99	13.45	92.65	5,552.43	-14.85	564.28	14,445,109.40	1,703,744.11	39.77562130	-80.77460781	
5,699.99	13.45	92.65	5,649.68	-15.93	587.52	14,445,108.32	1,703,767.35	39.77561818	-80.77452510	
5,799.99	13.45	92.65	5,746.94	-17.01	610.77	14,445,107.25	1,703,790.59	39.77561506	-80.77444239	
5,899.99	13.45	92.65	5,844.19	-18.08	634.01	14,445,106.17	1,703,813.83	39.77561194	-80.77435968	
5,909.78	13.45	92.65	5,853.72	-18.19	636.28	14,445,106.06	1,703,816.11	39.77561163	-80.77435158	
Begin 10°/100' build/turn										
5,999.99	11.59	50.96	5,941.95	-12.96	653.84	14,445,111.30	1,703,833.66	39.77562588	-80.77428905	
6,099.99	16.43	13.67	6,039.14	7.16	665.01	14,445,131.42	1,703,844.83	39.77568106	-80.77424912	
6,199.99	24.56	356.64	6,132.81	41.74	667.14	14,445,165.99	1,703,846.96	39.77577600	-80.77424123	
6,299.99	33.87	348.05	6,220.12	89.72	660.16	14,445,213.98	1,703,839.99	39.77590783	-80.77426562	
6,399.99	43.14	342.84	6,296.42	149.66	644.30	14,445,273.91	1,703,824.12	39.77607253	-80.77432155	
6,499.99	52.77	339.21	6,365.33	219.72	620.02	14,445,343.97	1,703,799.84	39.77626511	-80.77440733	
6,599.99	62.49	336.42	6,416.81	297.78	588.07	14,445,422.03	1,703,767.69	39.77647970	-80.77452035	
6,699.99	72.25	334.08	6,457.25	381.46	549.42	14,445,505.72	1,703,729.24	39.77670980	-80.77465717	
6,799.99	82.04	331.99	6,479.46	468.24	505.24	14,445,592.49	1,703,685.06	39.77694840	-80.77481363	
6,891.38	91.00	330.17	6,485.00	548.00	461.16	14,445,672.25	1,703,640.99	39.77716775	-80.77496979	
Begin 91.00° lateral										
6,899.99	91.00	330.17	6,484.65	555.46	456.88	14,445,679.72	1,703,636.71	39.77718828	-80.77496495	
6,999.99	91.00	330.17	6,483.10	642.20	407.15	14,445,766.45	1,703,596.97	39.77742683	-80.77516120	
7,099.99	91.00	330.17	6,481.35	728.94	357.41	14,445,853.19	1,703,537.24	39.77766537	-80.77533745	
7,199.99	91.00	330.17	6,479.61	815.67	307.68	14,445,939.93	1,703,487.50	39.77790392	-80.77551369	
7,299.99	91.00	330.17	6,477.86	902.41	257.94	14,446,026.66	1,703,437.76	39.77814247	-80.77568994	
7,399.99	91.00	330.17	6,476.11	989.15	208.20	14,446,113.40	1,703,388.03	39.77838101	-80.77586619	
7,499.99	91.00	330.17	6,474.36	1,075.88	158.47	14,446,200.14	1,703,338.29	39.77861956	-80.77604244	
7,599.98	91.00	330.17	6,472.61	1,162.62	108.73	14,446,286.87	1,703,288.56	39.77885810	-80.77621870	
7,699.98	91.00	330.17	6,470.87	1,249.36	59.00	14,446,373.61	1,703,238.82	39.77909564	-80.77639495	
7,799.98	91.00	330.17	6,469.12	1,336.09	9.28	14,446,460.35	1,703,189.09	39.77933519	-80.77657120	
7,899.98	91.00	330.17	6,467.37	1,422.83	-40.47	14,446,547.08	1,703,139.35	39.77957373	-80.77674746	
7,999.98	91.00	330.17	6,465.62	1,509.57	-90.21	14,446,633.82	1,703,089.61	39.77981228	-80.77692372	
8,099.98	91.00	330.17	6,463.87	1,596.30	-139.95	14,446,720.56	1,703,039.88	39.78005082	-80.77709998	
8,199.98	91.00	330.17	6,462.13	1,683.04	-189.68	14,446,807.29	1,702,990.14	39.78028936	-80.77727624	
8,299.98	91.00	330.17	6,460.38	1,769.78	-239.42	14,446,894.03	1,702,940.41	39.78052790	-80.77745250	
8,399.98	91.00	330.17	6,458.63	1,856.51	-289.15	14,446,980.77	1,702,890.67	39.78076645	-80.77762876	
8,499.98	91.00	330.17	6,456.88	1,943.25	-338.89	14,447,067.50	1,702,840.94	39.78100499	-80.77780502	
8,599.98	91.00	330.17	6,455.13	2,029.99	-388.63	14,447,154.24	1,702,791.20	39.78124353	-80.77798129	
8,699.98	91.00	330.17	6,453.39	2,116.72	-438.36	14,447,240.98	1,702,741.46	39.78148207	-80.77815755	
8,799.98	91.00	330.17	6,451.64	2,203.46	-488.10	14,447,327.71	1,702,691.73	39.78172061	-80.77833382	
8,899.98	91.00	330.17	6,449.89	2,290.20	-537.83	14,447,414.45	1,702,641.99	39.78195915	-80.77851009	
8,999.98	91.00	330.17	6,448.14	2,376.93	-587.57	14,447,501.19	1,702,592.26	39.78219769	-80.77868636	
9,099.98	91.00	330.17	6,446.39	2,463.67	-637.30	14,447,587.92	1,702,542.52	39.78243623	-80.77886263	
9,199.98	91.00	330.17	6,444.65	2,550.41	-687.04	14,447,674.66	1,702,492.78	39.78267477	-80.77903890	
9,299.98	91.00	330.17	6,442.90	2,637.14	-736.78	14,447,761.40	1,702,443.05	39.78291331	-80.77921517	
9,399.98	91.00	330.17	6,441.15	2,723.88	-786.51	14,447,848.13	1,702,393.31	39.78315185	-80.77939145	
9,499.98	91.00	330.17	6,439.40	2,810.62	-836.25	14,447,934.87	1,702,343.58	39.78339039	-80.77956772	
9,599.98	91.00	330.17	6,437.66	2,897.35	-885.98	14,448,021.61	1,702,293.84	39.78362893	-80.77974400	



Planning Report - Geographic

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Bryan Pad
 Well: Bryan N-04HM (slot K)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference: Well Bryan N-04HM (slot K)
 TVD Reference: RKB=1191 @ 1191.00usft
 MD Reference: RKB=1191 @ 1191.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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WV Department of
Environmental Protection

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,699.98	91.00	330.17	6,435.91	2,984.09	-935.72	14,448,108.34	1,702,244.11	39.78386747	-80.77992028
9,799.98	91.00	330.17	6,434.16	3,070.83	-995.46	14,448,195.08	1,702,194.37	39.78410601	-80.78009658
9,899.98	91.00	330.17	6,432.41	3,157.56	-1,035.19	14,448,281.82	1,702,144.63	39.78434455	-80.78027284
9,999.98	91.00	330.17	6,430.66	3,244.30	-1,084.93	14,448,368.55	1,702,094.90	39.78458309	-80.78044912
10,099.98	91.00	330.17	6,428.92	3,331.04	-1,134.66	14,448,455.29	1,702,045.16	39.78482182	-80.78062540
10,199.98	91.00	330.17	6,427.17	3,417.77	-1,184.40	14,448,542.03	1,701,995.43	39.78506016	-80.78080168
10,299.98	91.00	330.17	6,425.42	3,504.51	-1,234.13	14,448,628.76	1,701,945.69	39.78529870	-80.78097797
10,399.98	91.00	330.17	6,423.67	3,591.25	-1,283.87	14,448,715.50	1,701,895.95	39.78553723	-80.78115426
10,499.98	91.00	330.17	6,421.92	3,677.98	-1,333.61	14,448,802.24	1,701,846.22	39.78577577	-80.78133054
10,599.98	91.00	330.17	6,420.18	3,764.72	-1,383.34	14,448,888.97	1,701,796.48	39.78601431	-80.78150663
10,699.98	91.00	330.17	6,418.43	3,851.46	-1,433.08	14,448,975.71	1,701,746.75	39.78625284	-80.78168312
10,799.98	91.00	330.17	6,416.68	3,938.19	-1,482.81	14,449,062.45	1,701,697.01	39.78649138	-80.78185941
10,899.98	91.00	330.17	6,414.93	4,024.93	-1,532.55	14,449,149.18	1,701,647.28	39.78672991	-80.78203571
10,999.98	91.00	330.17	6,413.18	4,111.67	-1,582.28	14,449,235.92	1,701,597.54	39.78696845	-80.78221200
11,099.98	91.00	330.17	6,411.44	4,198.40	-1,632.02	14,449,322.66	1,701,547.80	39.78720698	-80.78238830
11,199.98	91.00	330.17	6,409.69	4,285.14	-1,681.76	14,449,409.39	1,701,498.07	39.78744552	-80.78256459
11,299.98	91.00	330.17	6,407.94	4,371.88	-1,731.49	14,449,496.13	1,701,448.33	39.78768405	-80.78274089
11,399.98	91.00	330.17	6,406.19	4,458.61	-1,781.23	14,449,582.87	1,701,398.60	39.78792259	-80.78291719
11,499.98	91.00	330.17	6,404.44	4,545.35	-1,830.96	14,449,669.60	1,701,348.86	39.78816112	-80.78309349
11,599.98	91.00	330.17	6,402.70	4,632.09	-1,880.70	14,449,756.34	1,701,299.12	39.78839965	-80.78326979
11,699.98	91.00	330.17	6,400.95	4,718.82	-1,930.44	14,449,843.08	1,701,249.39	39.78863819	-80.78344609
11,799.98	91.00	330.17	6,399.20	4,805.56	-1,980.17	14,449,929.81	1,701,199.65	39.78887672	-80.78362239
11,899.98	91.00	330.17	6,397.45	4,892.30	-2,029.91	14,450,016.55	1,701,149.92	39.78911525	-80.78379870
11,999.98	91.00	330.17	6,395.70	4,979.03	-2,079.64	14,450,103.29	1,701,100.18	39.78935379	-80.78397500
12,099.98	91.00	330.17	6,393.96	5,065.77	-2,129.38	14,450,190.02	1,701,050.45	39.78959232	-80.78415131
12,199.98	91.00	330.17	6,392.21	5,152.51	-2,179.11	14,450,276.76	1,701,000.71	39.78983085	-80.78432762
12,299.98	91.00	330.17	6,390.46	5,239.24	-2,228.85	14,450,363.50	1,700,950.97	39.79006938	-80.78450393
12,399.98	91.00	330.17	6,388.71	5,325.98	-2,278.59	14,450,450.23	1,700,901.24	39.79030791	-80.78468024
12,499.98	91.00	330.17	6,386.96	5,412.72	-2,328.32	14,450,536.97	1,700,851.50	39.79054644	-80.78485655
12,599.98	91.00	330.17	6,385.22	5,499.45	-2,378.06	14,450,623.71	1,700,801.77	39.79078497	-80.78503287
12,699.97	91.00	330.17	6,383.47	5,586.19	-2,427.79	14,450,710.44	1,700,752.03	39.79102350	-80.78520918
12,799.97	91.00	330.17	6,381.72	5,672.93	-2,477.53	14,450,797.18	1,700,702.29	39.79126204	-80.78538550
12,899.97	91.00	330.17	6,379.97	5,759.66	-2,527.27	14,450,883.92	1,700,652.56	39.79150057	-80.78556181
12,999.97	91.00	330.17	6,378.22	5,846.40	-2,577.00	14,450,970.65	1,700,602.82	39.79173909	-80.78573813
13,099.97	91.00	330.17	6,376.48	5,933.14	-2,626.74	14,451,057.39	1,700,553.09	39.79197762	-80.78591445
13,199.97	91.00	330.17	6,374.73	6,019.87	-2,676.47	14,451,144.13	1,700,503.35	39.79221615	-80.78609077
13,299.97	91.00	330.17	6,372.98	6,106.61	-2,726.21	14,451,230.86	1,700,453.62	39.79245468	-80.78626709
13,399.97	91.00	330.17	6,371.23	6,193.35	-2,775.94	14,451,317.60	1,700,403.88	39.79269321	-80.78644341
13,499.97	91.00	330.17	6,369.49	6,280.08	-2,825.68	14,451,404.34	1,700,354.14	39.79293174	-80.78661974
13,599.97	91.00	330.17	6,367.74	6,366.82	-2,875.42	14,451,491.07	1,700,304.41	39.79317027	-80.78679606
13,699.97	91.00	330.17	6,365.99	6,453.56	-2,925.15	14,451,577.81	1,700,254.67	39.79340879	-80.78697239
13,799.97	91.00	330.17	6,364.24	6,540.29	-2,974.89	14,451,664.55	1,700,204.94	39.79364732	-80.78714872
13,899.97	91.00	330.17	6,362.49	6,627.03	-3,024.62	14,451,751.28	1,700,155.20	39.79388585	-80.78732505
13,999.97	91.00	330.17	6,360.75	6,713.77	-3,074.36	14,451,838.02	1,700,105.46	39.79412438	-80.78750138
14,099.97	91.00	330.17	6,359.00	6,800.50	-3,124.10	14,451,924.76	1,700,055.73	39.79436290	-80.78767771
14,199.97	91.00	330.17	6,357.25	6,887.24	-3,173.83	14,452,011.49	1,700,005.99	39.79460143	-80.78785404
14,299.97	91.00	330.17	6,355.50	6,973.98	-3,223.57	14,452,098.23	1,699,956.26	39.79483996	-80.78803038
14,399.97	91.00	330.17	6,353.75	7,060.71	-3,273.30	14,452,184.97	1,699,906.52	39.79507848	-80.78820671
14,499.97	91.00	330.17	6,352.01	7,147.45	-3,323.04	14,452,271.70	1,699,856.79	39.79531701	-80.78838305
14,599.97	91.00	330.17	6,350.26	7,234.19	-3,372.77	14,452,358.44	1,699,807.05	39.79555553	-80.78855938
14,699.97	91.00	330.17	6,348.51	7,320.92	-3,422.51	14,452,445.18	1,699,757.31	39.79579406	-80.78873572
14,799.97	91.00	330.17	6,346.76	7,407.66	-3,472.25	14,452,531.92	1,699,707.58	39.79603258	-80.78891206
14,899.97	91.00	330.17	6,345.01	7,494.40	-3,521.98	14,452,618.65	1,699,657.84	39.79627111	-80.78908840
14,999.97	91.00	330.17	6,343.27	7,581.13	-3,571.72	14,452,705.39	1,699,608.11	39.79650963	-80.78926475
15,099.97	91.00	330.17	6,341.52	7,667.87	-3,621.45	14,452,792.13	1,699,558.37	39.79674815	-80.78944109



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Bryan N-04HM (slot K)
Company:	Tug Hill Operating LLC	TVD Reference:	RKB=1191 @ 1191.00usft
Project:	Marshall County, West Virginia	MD Reference:	RKB=1191 @ 1191.00usft
Site:	Bryan Pad	North Reference:	Grid
Well:	Bryan N-04HM (slot K)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,199.97	91.00	330.17	6,339.77	7,754.61	-3,871.19	14,452,878.88	1,699,508.64	39.79698668	-80.78961743	
15,299.97	91.00	330.17	6,339.02	7,841.34	-3,720.93	14,452,965.60	1,699,458.90	39.79722520	-80.78979378	
15,399.97	91.00	330.17	6,338.27	7,928.08	-3,770.68	14,453,052.34	1,699,409.16	39.79746372	-80.78997013	
15,499.97	91.00	330.17	6,334.53	8,014.82	-3,820.40	14,453,139.07	1,699,359.43	39.79770225	-80.79014648	
15,599.97	91.00	330.17	6,332.78	8,101.55	-3,870.13	14,453,225.81	1,699,309.69	39.79794077	-80.79032283	
15,699.97	91.00	330.17	6,331.03	8,188.29	-3,919.87	14,453,312.55	1,699,259.96	39.79817929	-80.79049918	
15,799.97	91.00	330.17	6,329.28	8,275.03	-3,969.60	14,453,399.28	1,699,210.22	39.79841781	-80.79067553	
15,899.97	91.00	330.17	6,327.53	8,361.76	-4,019.34	14,453,486.02	1,699,160.48	39.79865634	-80.79085188	
15,999.97	91.00	330.17	6,325.79	8,448.50	-4,069.08	14,453,572.76	1,699,110.75	39.79889486	-80.79102824	
16,099.97	91.00	330.17	6,324.04	8,535.24	-4,118.81	14,453,659.49	1,699,061.01	39.79913338	-80.79120459	
16,199.97	91.00	330.17	6,322.29	8,621.97	-4,168.55	14,453,746.23	1,699,011.28	39.79937190	-80.79138095	
16,299.97	91.00	330.17	6,320.54	8,708.71	-4,218.28	14,453,832.97	1,698,961.54	39.79961042	-80.79155731	
16,399.97	91.00	330.17	6,318.79	8,795.45	-4,268.02	14,453,919.70	1,698,911.81	39.79984894	-80.79173387	
16,499.97	91.00	330.17	6,317.05	8,882.18	-4,317.76	14,454,006.44	1,698,862.07	39.80008746	-80.79191003	
16,599.97	91.00	330.17	6,315.30	8,968.92	-4,367.49	14,454,093.18	1,698,812.33	39.80032598	-80.79208639	
16,699.97	91.00	330.17	6,313.55	9,055.66	-4,417.23	14,454,179.91	1,698,762.60	39.80056450	-80.79226275	
16,799.97	91.00	330.17	6,311.80	9,142.39	-4,466.96	14,454,266.65	1,698,712.86	39.80080302	-80.79243912	
16,899.97	91.00	330.17	6,310.05	9,229.13	-4,516.70	14,454,353.39	1,698,663.13	39.80104154	-80.79261548	
16,903.10	91.00	330.17	6,310.00	9,231.84	-4,518.25	14,454,356.10	1,698,661.57	39.80104900	-80.79262100	

PBHL/TD 16903.10 MD/6310.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
BHL Bryan N-04HM r3 - hit/miss target - Shape - Point	0.00	0.00	6,310.00	9,231.84	-4,518.25	14,454,356.10	1,698,661.57	39.80104900	-80.79262100	
LP Bryan N-04HM 35 W - plan hits target center - Point	0.00	0.00	6,485.00	548.00	461.16	14,445,672.25	1,703,640.99	39.77716776	-80.77496679	
LP Bryan N-04HM - plan misses target center by 35.83usft at 6885.68usft MD (6485.07 TVD, 543.05 N, 463.99 E) - Point	0.00	0.00	6,485.00	560.38	495.35	14,445,684.63	1,703,675.18	39.77720151	-80.77484799	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
1,300.00	1,300.00	0.00	0.00	KOP Begin 2"/100' build	
1,550.00	1,549.68	0.00	10.90	Begin 5.00° tangent	
4,009.68	4,000.00	0.00	225.28	Begin 2"/100' build/turn	
4,432.80	4,417.27	-2.28	293.01	Begin 13.45° tangent	
5,909.78	5,853.72	-18.19	636.28	Begin 10"/100' build/turn	
6,891.38	6,485.00	548.00	461.16	Begin 91.00° lateral	
16,903.10	6,310.00	9,231.84	-4,518.25	PBHL/TD 16903.10 MD/6310.00 TVD	

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WW-9
(4/16)

API Number 47 - 05 **4705** * **02076**
Operator's Well No. Bryan N-4HM

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 contain

Proposed Disposal Method For Treated Pit Wastes:

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

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

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

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

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in 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 Landfil (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 Jim Pancake
Company Official (Typed Name) Jim Pancake
Company Official Title Vice President GeoScience

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Environmental P...

Subscribed and sworn before me this 26 day of JUNE, 2018

Maureen A Stead Notary Public

My commission expires 1/28/19

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

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 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	Seed Type	lbs/acre
Rye Grain	140	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: *Jim Underwood*

Comments: _____

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Environmental Protection

Title: *Oil & Gas Inspector* Date: *6/28/18*

Field Reviewed? () Yes () No

WW-9

PROPOSED BRYAN N-4HM

SUPPLEMENT PG 1

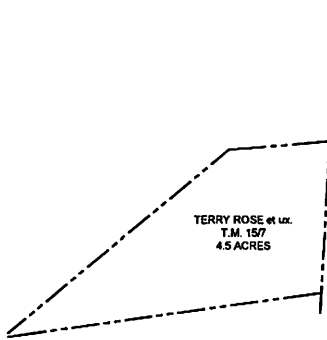
REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.

INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

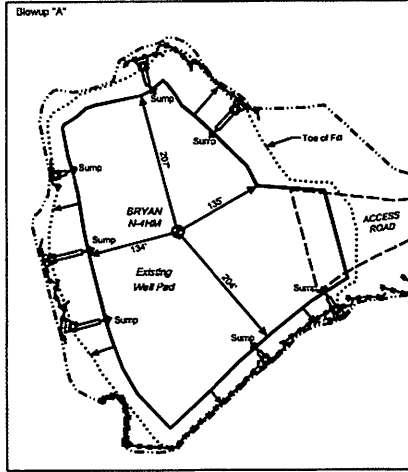
ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED. TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

ALL CUT AND FILL SLOPES ARE 2H : 1V SLOPE.

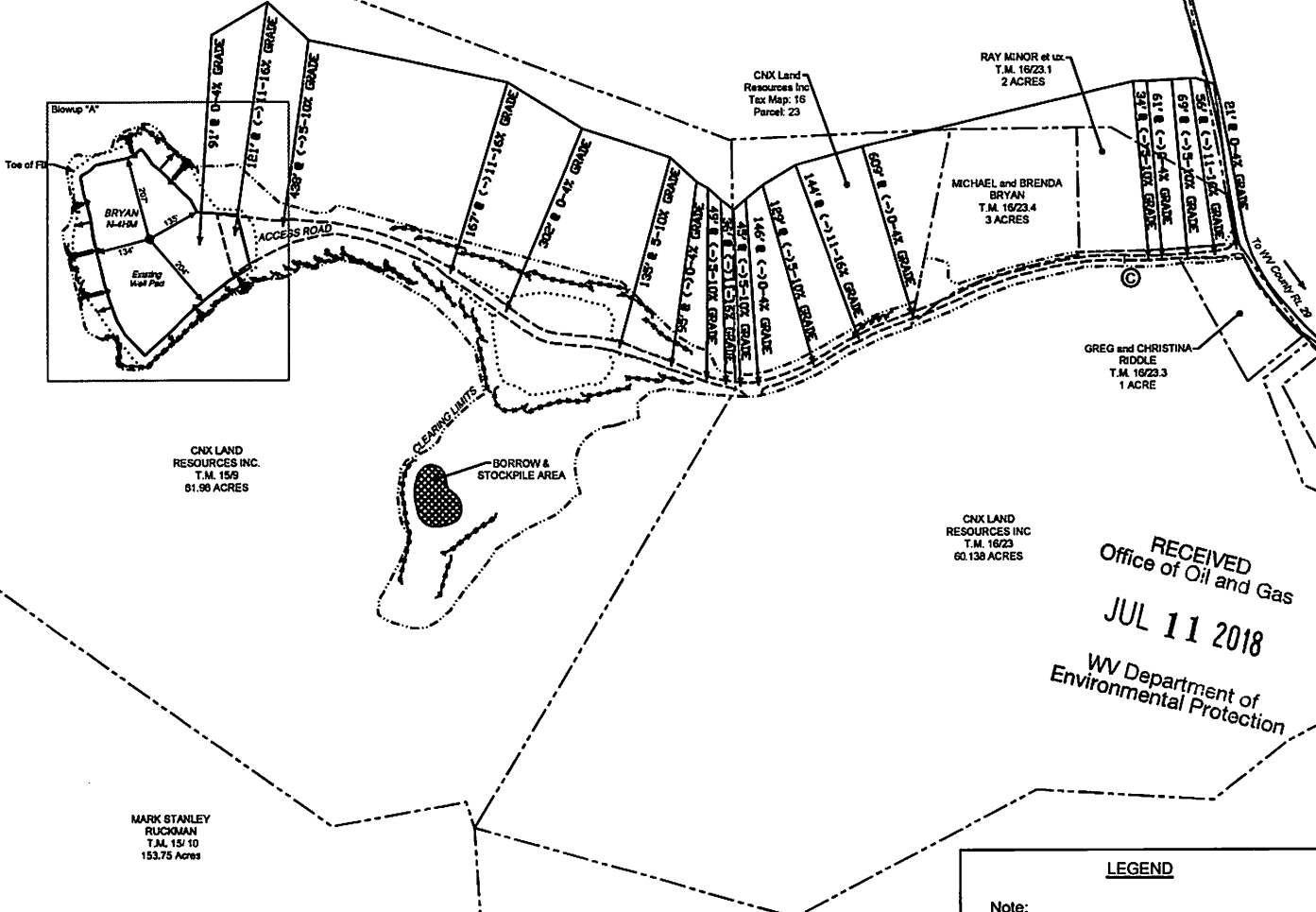
ALL TREES 6-INCHES AND ABOVE ARE TO BE CUT AND STACKED. BRUSH SLASHINGS ARE TO UTILIZED DOWN SLOPE OF SITE AND STRUCTURES TO ACT AS A CONTROL BARRIER IF AVAILABLE.



TERRY D. ROSE ET UX
T.M. 151/08
77.11 Acres



DRAWING NOT TO SCALE



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LEGEND

Note:
 (C) — Denotes existing culvert with appropriate sediment outlet control (Rip Rap splash pad).
 - - - - - Silt Fence and or Sediment and Erosion Control Measure.
 - - - - - Surface Boundary

4705 + 02076



Well Site Safety Plan
Tug Hill Operating, LLC

Handwritten signature and date: 6/28/18

Well Name: Bryan N-4HM

Pad Location: Bryan Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,402,882.68

Easting: 519,130.25

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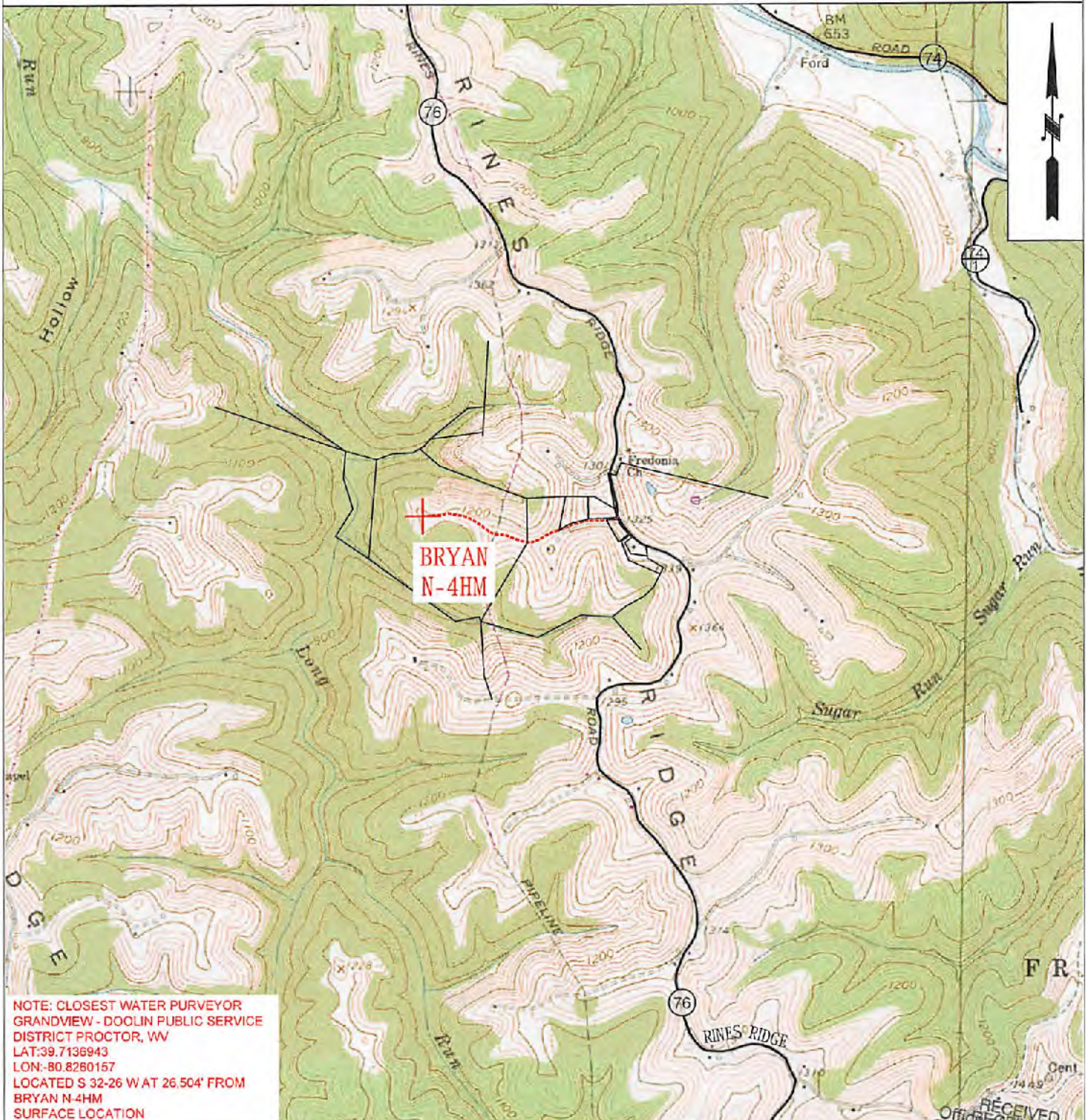
JUL 11 2018

WV Department of
Environmental Protection
JUL 26 2018

WW-9


SUPPLEMENT PG 2

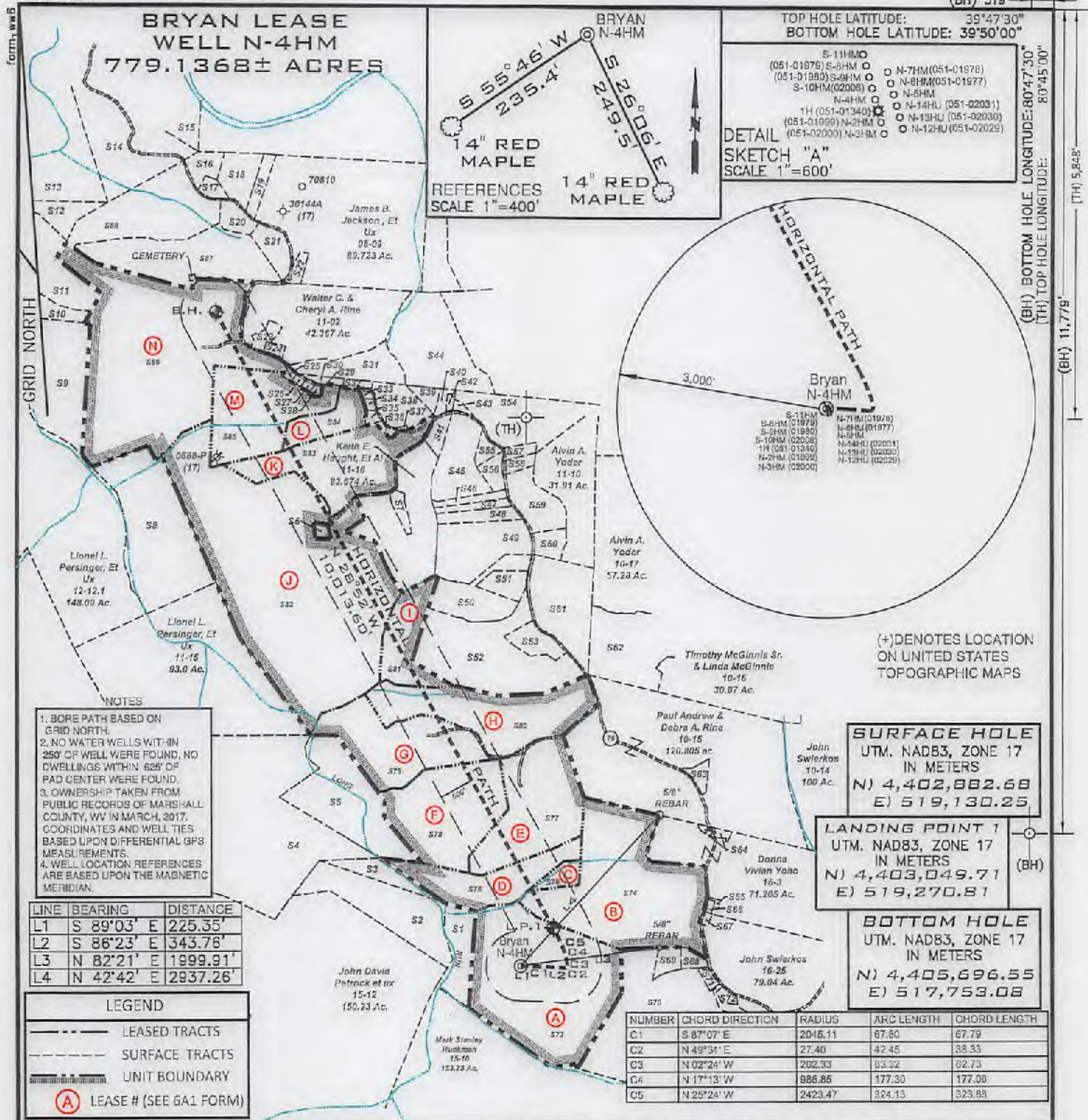
PROPOSED BRYAN N-4HM



NOTE: CLOSEST WATER PURVEYOR
GRANDVIEW - DOOLIN PUBLIC SERVICE
DISTRICT PROCTOR, WV
LAT:39.7136943
LON:-80.8260157
LOCATED S 32-26 W AT 26.504' FROM
BRYAN N-4HM
SURFACE LOCATION

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 TUG HILL OPERATING	OPERATOR 494510851 TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	TOPO SECTION POWHATAN POINT 7.5'	LEASE NAME BRYAN
	SCALE: 1" = 2000'	DATE: DATE: 10/25/17	JUL 11 2018 Environmental Protection



FILE NUMBER _____

DRAWING NUMBER BRYAN_WP_N-4HM

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

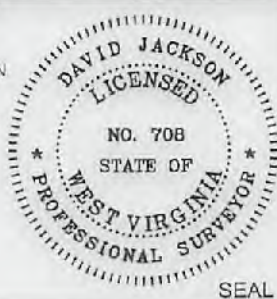
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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

P.S. 708

David L Jackson

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



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



DATE: OCTOBER 25, 2017

REVISED DATE: May 09, 2018

OPERATORS WELL NO. BRYAN N-4HM

API WELL NO. 47-051-02076 H6A

STATE WV COUNTY Marshall PERMIT 47-051-02076 H6A

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

LOCATION ELEVATION 1191.0' WATERSHED (HUC 10) Fish Creek

DISTRICT Franklin COUNTY Marshall

QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE WW-6A1 Form

SURFACE OWNER CNX LAND RESOURCES, INC. ACREAGE 81.98

OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW 6A1 LEASE ACREAGE 81.98

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

TARGET FORMATION Marcellus ESTIMATED DEPTH TVD: 6,596' TMD: 16,903'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM

ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME

PERMIT

47 051 02076

form wv6

PG 2 OF 2 **BRYAN LEASE**
WELL N-4HM
779.1368± ACRES

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	15-13	CNX Land Resources	11.0
S2	15-14	Jehn David Petrock et ux	25.0
S3	15-2	Jehn David Petrock et ux	5.0
S4	15-1	Marcus Sharp & David Schlabach	121.0
S5	15-3	Joseph J. Kramer et ux	36.10
S6	11-14.1	Dennis F. Moore et ux	1.056
S7	11-16.2	Joseph Haught	2.181
S8	12-11	Wesley Bryan & Wesley Bryan II	52.478
S9	12-12	Lionel L. Persinger et ux	45.0
S10	12-10	Murray Energy	13.76
S11	12-10.1	Murray Energy	38.48
S12	12-9	Lionel & Mary Lee Persinger	10.15
S13	7-39	Lionel L. Persinger et ux	57.0
S14	7-33	William N. Roupe	24.60
S15	7-31	William N. Roupe	43.147
S16	11-1	William N. & Virginia A. Roupe	4.527
S17	11-1.6	Debra Morris	2.093
S18	11-1.7	William S. & Mary K. Adams	8.0
S19	11-1.5	Paul & Sandy Whitt	3.507
S20	11-1.3	Jay A. Conner, et ux	4.256
S21	11-1.2	Jay A. Conner, et ux	5.824
S22	8-9.1	Scott E. Jackson, Tammy S. South & Merlon Jackson	1.957
S23	11-2.1	Walter C. & Cheryl A. Rine	1.19
S24	11-2.2	Joshua A. Myers	2.193
S25	11-20	David E. Gray	0.569
S26	11-19	David E. Gray	0.532
S27	11-18	David E. Gray	0.569
S28	11-22	David E. Gray	0.353
S29	11-17.1	David Gray	0.297
S30	11-5	Kevin R. Corley et ux	10.36
S31	11-3	Kevin R. Corley et ux	13.18
S32	11-5.2	Ricky Lynn & Victoria Rose Cross	1.0
S33	11-24	Charles Edward Furbee et ux	0.603
S34	11-23	Owen Michael Barr	0.845
S35	11-25	Owen Michael Barr	0.598
S36	11-16.1	Susan Marie Smith - Life	0.876
S37	11-5.1	James R. Anderson et ux	0.205
S38	11-5	(Part of S30) Kevin R. Corley et ux	10.36
S39	11-5.3	Robert Harris Arrick et ux	3.0
S40	11-8	Robert & Rebecca Arrick	1.29
S41	11-16.3	Kegan Michael Haught - Life	3.265
S42	11-7	Baptist Cemetery	1.0
S43	11-8	Baptist Church	0.8
S44	11-4	David H. Arrick et ux	31.5
S45	11-9.3	Joseph M. Haught & Steven Haught	16.3
S46	11-9.5	Southern Country Farms, Inc	2.559
S47	11-9.6	Southern Country Farms, Inc	2.488
S48	11-9.9	Leonard L. Parsons, et ux	5.89
S49	11-9	Edwin C. & Kimberly A. Miller	41.773
S50	11-11.4	Brad M. & Amanda J. Blake	15.193
S51	11-11	Brad M. & Amanda J. Blake	5.0
S52	11-11.3	Herman D. Lantz & Herman J. Lantz	43.96
S53	11-11.1	Nellie Marie & Robert W. Spencer	5.813
S54	11-9	(Part of S49) Edwin C. & Kimberly A. Miller	41.773
S55	11-9.10	John A. & Janet L. Beucke	2.348
S56	11-9.2	Michael R. Bryan	3.143
S57	11-9.8	Sean F. Moore	2.070
S58	11-9.7	Sean F. Moore	2.026
S59	11-9.1	Jack Shephard Huggins Jr., et al	10.92
S60	11-9.4	Jack S. Huggins et al	4.129
S61	11-11.2	Wesley R. Bryan & Wesley R. Bryan II	25.031
S62	10-16.4	Elizabeth & Melvin E. Ferguson Jr.	30.87
S63	10-15.1	Donald T. Miller	2.095
S64	16-3.2	Jimmy Lee Ostrander Jr., Sheena Lynn Ostrander, & Brody Ray Ostrander	1.435
S65	16-3.1	Dennis E. Jackson, et ux	0.27
S66	16-2	Christian Church	0.19
S67	16-1	Christian Church	0.50
S68	16-23.1	Ray E. Minor, et ux	2.0
S69	16-23.4	Michael R. & Brenda K. Bryan	3.0
S70	16-23	CNX Land Resources, Inc.	60.138
S71	16-23.3	Greg & Christina Riddle	1.0
S72	16-24	Alan M. Boyser, et ux	1.083
S73	15-9	CNX Land Resources Inc.	81.98
S74	15-8	Terry D. Rose et ux	77.11
S75	15-7	Terry D. Rose et ux	4.5
S76	15-6.1	Joseph J. Kramer et ux	39.40
S77	15-6	Joseph J. Kramer et ux	42.50
S78	15-5	Joseph J. Kramer et ux	35.0
S79	15-4	Joseph J. Kramer et ux	41.106
S80	11-12	Joseph J. Kramer et ux	43.2188
S81	11-13	Joy D. Gartman & Arlin Gatts	12.29
S82	11-14	Hiram's Est. Family LTD LLP	158.054
S83	11-16	Keith E. Haught et al	83.674
S84	11-17.2	Brenda & Michael Bryan	11.504
S85	11-17	Kevin R. Corley et ux	36.13
S86	11-21	Omar Rine Est.	112.67
S87	11-1.1	Larry W. Dunlap et al	34.405
S88	11-1.4	Larry W. Dunlap et al	32.493



P.S. 708

David L Jackson



TUG HILL
OPERATING

OPERATOR'S
 WELL #: Bryan N-4HM
 DISTRICT: Franklin
 COUNTY: Marshall
 STATE: WV

WELL PLAT
 PAGE 2 OF 2
 DATE: 10/25/2017
 REVISED DATE:
05/09/2018

WW-6A1
(5/13)

Operator's Well No. Bryan N-4HM

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

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

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

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

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

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

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

RECEIVED
Office of Oil and Gas
JUL 11 2018
WV Department of
Environmental Protection

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

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

Loase No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19294	A	5-15-9	BRYAN MICHAEL ET UX	TRIENERGY, INC.	1/8+	666	289	N/A	20/348 TriEnergy Inc to AB Resources LLC	21/491 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	685/643 Chief Exploration & Development LLC and Radler 2000 Limited Partnership to Enerplus Resources (USA) Corporation	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19940	B	5-15-8	YOHO DONNA VIVIAN	GASTAR EXPLORATION USA, INC.	1/8+	665	407	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC to TriEnergy Holdings LLC	24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (USA) Corporation to Chevron USA Inc.	756/397 AB Resources LLC to Chevron USA Inc	40/57 Chevron USA Inc to TH Exploration LLC
10*19340	C	5-15-7	DONNA VIVIAN YOHO	GASTAR EXPLORATION USA INC	1/8+	665	407	23/353 Gastar Exploration USA Inc. to Atinum Marcellus I LLC	23/617 Gastar Exploration USA Inc and Atinum Marcellus I LLC to AB Resources LLC	23/633 AB Resources LLC to TriEnergy Holdings LLC	24/319 AB Resources LLC to Chief Exploration & Development LLC and Radler 2000 Limited Partnership	25/1 Chief Exploration & Development, LLC, Chief Oil and Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources to Chevron USA Inc	25/105 Chief Exploration & Development, LLC, Chief Oil & Gas, LLC, Radler 2000 Limited Partnership and Enerplus Resources (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*19293	D	5-15-6.1	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*19295	D	5-15-6.1	KEVIN J. KELLY PAMELA MARXEN-KELLY	CHEVRON USA INC	1/8+	858	381	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19296	D	5-15-6.1	MARISSA C MARXEN	CHEVRON USA INC	1/8+	837	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19297	D	5-15-6.1	PHILIP LEONARD MARXEN	CHEVRON USA INC	1/8+	839	410	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19298	D	5-15-6.1	BETTY J MARXEN SLEZAK	CHEVRON USA INC	1/8+	822	351	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19299	D	5-15-6.1	ANNETTE CONWAY MARXEN	CHEVRON USA INC	1/8+	817	512	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19300	D	5-15-6.1	DEBORAH F HAGEMAN HUPPERT	CHEVRON USA INC	1/8+	815	145	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19301	D	5-15-6.1	SANDRA HAGEMAN KANGAS	CHEVRON USA INC	1/8+	815	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19302	D	5-15-6.1	JEFFREY C MARXEN SAMANTHA L MARXEN	CHEVRON USA INC	1/8+	817	506	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19303	D	5-15-6.1	THOMAS O MARXEN	CHEVRON USA INC	1/8+	814	589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19304	D	5-15-6.1	DEAN L. RINE, JR. PAMELA F. RINE	CHEVRON USA INC	1/8+	813	635	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC

WW-6A1 Supplement

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*19305	D	5-15-6.1	KAREN MARXEN SONDROL	CHEVRON USA INC	1/8+	813	605	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19306	D	5-15-6.1	RICHARD L. TATE MARCELINE RINE TATE	CHEVRON USA INC	1/8+	814	594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19307	D	5-15-6.1	MARY SUE RINE-WALTER	CHEVRON USA INC	1/8+	815	155	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19308	D	5-15-6.1	WILLIAM WEBER	CHEVRON USA INC	1/8+	817	646	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19293	E	5-15-6	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*19295	E	5-15-6	KEVIN J. KELLY PAMELA MARXEN-KELLY	CHEVRON USA INC	1/8+	858	381	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19296	E	5-15-6	MARISSA C MARXEN	CHEVRON USA INC	1/8+	857	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19297	E	5-15-6	PHILIP LEONARD MARXEN	CHEVRON USA INC	1/8+	839	410	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19298	E	5-15-6	BETTY J MARXEN SLEZAK	CHEVRON USA INC	1/8+	822	351	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19299	E	5-15-6	ANNETTE CONWAY MARXEN	CHEVRON USA INC	1/8+	817	512	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19300	E	5-15-6	DEBORAH F HAGEMAN HUPPERT	CHEVRON USA INC	1/8+	815	145	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19301	E	5-15-6	SANDRA HAGEMAN KANGAS	CHEVRON USA INC	1/8+	815	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19302	E	5-15-6	JEFFREY C MARXEN SAMANTHA L MARXEN	CHEVRON USA INC	1/8+	817	506	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19303	E	5-15-6	THOMAS O MARXEN	CHEVRON USA INC	1/8+	814	589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19304	E	5-15-6	DEAN L. RINE, JR. PAMELA F. RINE	CHEVRON USA INC	1/8+	813	635	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19305	E	5-15-6	KAREN MARXEN SONDROL	CHEVRON USA INC	1/8+	813	605	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19306	E	5-15-6	RICHARD L. TATE MARCELINE RINE TATE	CHEVRON USA INC	1/8+	814	594	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC

WW-6A1 Supplement

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19307	E	5-15-6	MARY SUE RINE-WALTER	CHEVRON USA INC	1/8+	815	155	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19308	E	5-15-6	WILLIAM WEBER	CHEVRON USA INC	1/8+	817	646	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40/57 Chevron USA Inc to TH Exploration LLC
10*19293	F	5-15-5	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*19293	G	5-15-4	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*19293	H	5-11-12	KRAMAR JOSEPH ET UX	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*18972	I	5-11-13	MARGARET CLICKNER	TH EXPLORATION LLC	1/8+	941	281	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19224	I	5-11-13	AMYSUE G BAHL	GASTAR EXPLORATION USA INC	1/8+	731	166	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19225	I	5-11-13	LOIS BURNS	GASTAR EXPLORATION USA INC	1/8+	731	174	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19226	I	5-11-13	THOMAS RAY GATTS	TRIENERGY, INC.	1/8+	731	162	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19227	I	5-11-13	CONNIE KRESS KNAPP	GASTAR EXPLORATION USA INC	1/8+	734	451	N/A	N/A	N/A	N/A	26/183 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19228	I	5-11-13	CAROLE J LAMBERT	GASTAR EXPLORATION USA INC	1/8+	737	225	N/A	N/A	N/A	N/A	26/183 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19229	I	5-11-13	PATRICIA A LAMBERT	GASTAR EXPLORATION USA INC	1/8+	731	158	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19230	I	5-11-13	MARIANN VIRGINIA MUNN	GASTAR EXPLORATION USA INC	1/8+	731	160	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gastar Exploration USA, Inc and Gastar Exploration Inc	32/362 Gastar Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19231	I	5-11-13	DALE F RADCLIFF	GASTAR EXPLORATION USA INC	1/8+	734	462	N/A	N/A	N/A	N/A	26/183 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19232	I	5-11-13	SANDRA J STOWE HARMON	GASTAR EXPLORATION USA INC	1/8+	731	149	N/A	N/A	N/A	N/A	735/263 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19233	I	5-11-13	SHERLEY RAY STOWE	GASTAR EXPLORATION USA INC	1/8+	731	170	N/A	N/A	N/A	N/A	735/263 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19234	I	5-11-13	STANLEY EUGENE STOWE	GASTAR EXPLORATION USA INC	1/8+	732	631	N/A	N/A	N/A	N/A	26/183 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19235	I	5-11-13	ROSE EDGE	GASTAR EXPLORATION USA INC	1/8+	731	164	N/A	N/A	N/A	N/A	735/263 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19244	I	5-11-13	JERRY L BLOOD	GASTAR EXPLORATION USA INC	1/8+	736	177	N/A	N/A	N/A	N/A	26/183 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*19247	I	5-11-13	JUANITA MCVEY	GASTAR EXPLORATION USA INC	1/8+	745	580	N/A	N/A	N/A	N/A	26/639 Gaster Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Merger Gaster Exploration USA, Inc and Gaster Exploration Inc	32/362 Gaster Exploration Inc and Atinum Marcellus I LLC to Chevron USA Inc	40/127 Chevron USA Inc to TH Exploration LLC
10*21009	I	5-11-13	JOY DENEAN GARTMAN	TH EXPLORATION, LLC	1/8+	951	595	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21042	I	5-11-13	REBECCA ASPERY	TH EXPLORATION, LLC	1/8+	952	428	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21046	I	5-11-13	KELLY R DUNN	TH EXPLORATION, LLC	1/8+	951	591	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21047	I	5-11-13	RACHEL D DONAHUE	TH EXPLORATION, LLC	1/8+	951	589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21048	I	5-11-13	MICHAEL P OLSON	TH EXPLORATION, LLC	1/8+	951	593	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*21253	I	5-11-13	MARY ANN STURGILL	TH EXPLORATION, LLC	1/8+	952	430	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10*19139	J	5-11-14	HIRAM V MOORE	GASTAR EXPLORATION USA INC	1/8+	699	53	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gaster Exploration USA, Inc to Gaster Exploration Inc	23/353 Gaster Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gaster Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19139	K	5-11-16	MOORE HIRAM V - SFX	GASTAR EXPLORATION USA, INC.	1/8+	699	53	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gaster Exploration USA, Inc to Gaster Exploration Inc	23/353 Gaster Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gaster Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19179	K	5-11-16	HAUGHT KEITH ET UX - SFX	GASTAR EXPLORATION USA, INC.	1/8+	710	587	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gaster Exploration USA, Inc to Gaster Exploration Inc	23/353 Gaster Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gaster Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19180	K	5-11-16	HAUGHT STEVEN - SFX	TRIENERGY, INC. - LEASE SAYS GASTAR EXPLORATION USA INC	1/8+	710	67	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gaster Exploration USA, Inc to Gaster Exploration Inc	23/353 Gaster Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gaster Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19178	K	5-11-16	HAUGHT JOSEPH - SFX	GASTAR EXPLORATION USA, INC.	1/8+	710	69	N/A	N/A	N/A	N/A	21/41 Cert. of Merger Gaster Exploration USA, Inc to Gaster Exploration Inc	23/353 Gaster Exploration USA Inc. to Atinum Marcellus I LLC	32/362 Gaster Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC

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10*19502	L	5-11-17.2	MAUNA MAXINE BEYSER	GASTAR EXPLORATION USA INC	1/8+	710	602	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19177	L	5-11-17.2	NINA L KOVACS	GASTAR EXPLORATION USA INC	1/8+	710	594	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19185	L	5-11-17.2	HARRIETT LODUTH FOLEY	GASTAR EXPLORATION USA INC	1/8+	710	598	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19186	L	5-11-17.2	JOEL GLOVER	GASTAR EXPLORATION USA INC	1/8+	710	600	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19189	L	5-11-17.2	SHERRY ANN MCPHERON	GASTAR EXPLORATION USA INC	1/8+	710	606	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19190	L	5-11-17.2	SALLY LEE RIVERA	GASTAR EXPLORATION USA INC	1/8+	710	590	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19191	L	5-11-17.2	SHARLA BETH WEAVER	GASTAR EXPLORATION USA INC	1/8+	710	608	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19192	L	5-11-17.2	JAMES E YOHO	GASTAR EXPLORATION USA INC	1/8+	714	129	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19201	L	5-11-17.2	DANIEL K YOHO	GASTAR EXPLORATION USA INC	1/8+	714	125	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19202	L	5-11-17.2	DEBORAH L WOOLEY	GASTAR EXPLORATION USA INC	1/8+	714	131	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19203	L	5-11-17.2	CAROL M YOHO	GASTAR EXPLORATION USA INC	1/8+	713	205	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19204	L	5-11-17.2	DAYNA MARLENE YOHO	GASTAR EXPLORATION USA INC	1/8+	714	127	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19205	L	5-11-17.2	JEFFREY C YOHO	GASTAR EXPLORATION USA INC	1/8+	713	203	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC

WW-6A1 Supplement

Lease No.	Tag	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment	
10*19251	L	5-11-17.2	RAE SUZETTE BAKER	GASTAR EXPLORATION USA INC	1/8+	748	315	N/A	N/A	N/A	N/A	26/639 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19252	L	5-11-17.2	JOHN WILSON	GASTAR EXPLORATION USA INC	1/8+	749	522	N/A	N/A	N/A	N/A	26/639 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19502	L	5-11-17.2	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	L	5-11-17.2	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	L	5-11-17.2	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*19126	M	5-11-17	KEVIN R. CORLEY AND ANITA L. CORLEY, HUSBAND AND WIFE	CHEVRON USA INC	1/8+	859	44	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	M	5-11-17	MAUNA MAXINE BEYSER	GASTAR EXPLORATION USA INC	1/8+	710	602	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19177	M	5-11-17	NINA L KOVACS	GASTAR EXPLORATION USA INC	1/8+	710	594	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19185	M	5-11-17	HARRIETT LODUTH FOLEY	GASTAR EXPLORATION USA INC	1/8+	710	598	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19186	M	5-11-17	JOEL GLOVER	GASTAR EXPLORATION USA INC	1/8+	710	600	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19189	M	5-11-17	SHERRY ANN MCPHERON	GASTAR EXPLORATION USA INC	1/8+	710	606	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19190	M	5-11-17	SALLY LEE RIVERA	GASTAR EXPLORATION USA INC	1/8+	710	590	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19191	M	5-11-17	SHARLA BETH WEAVER	GASTAR EXPLORATION USA INC	1/8+	710	608	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19192	M	5-11-17	JAMES E YOHO	GASTAR EXPLORATION USA INC	1/8+	714	129	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19201	M	5-11-17	DANIEL K YOHO	GASTAR EXPLORATION USA INC	1/8+	714	125	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19202	M	5-11-17	DEBORAH L WOOLEY	GASTAR EXPLORATION USA INC	1/8+	714	131	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC

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10*19203	M	5-11-17	CAROL M YOHO	GASTAR EXPLORATION USA INC	1/8+	713	205	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19204	M	5-11-17	DAYNA MARLENE YOHO	GASTAR EXPLORATION USA INC	1/8+	714	127	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19205	M	5-11-17	JEFFREY C YOHO	GASTAR EXPLORATION USA INC	1/8+	713	203	N/A	N/A	N/A	N/A	735/263 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19251	M	5-11-17	RAE SUZETTE BAKER	GASTAR EXPLORATION USA INC	1/8+	748	315	N/A	N/A	N/A	N/A	26/639 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19252	M	5-11-17	JOHN WILSON	GASTAR EXPLORATION USA INC	1/8+	749	522	N/A	N/A	N/A	N/A	26/639 Gastar Exploration USA, Inc to Atinum Marcellus I LLC	21/41 Cert. of Merger Gastar Exploration USA, Inc to Gastar Exploration Inc	32/362 Gastar Exploration USA Inc and Atinum Marcellus I LLC to Chevron USA	40/127 Chevron USA Inc to TH Exploration LLC
10*19502	M	5-11-17	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	M	5-11-17	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	M	5-11-17	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
Q088586003	N	5-11-21	GENIE SUE THOMAS AND JOHN L HOLMES	NOBLE ENERGY INC	1/8+	848	204	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*22780	N	5-11-21	BRENDA FAYE THOMAS PETRACK	NOBLE ENERGY INC	1/8+	850	161	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
Q088586002	N	5-11-21	GAIL ANN YATES AND WESLEY J WOOD	NOBLE ENERGY INC	1/8+	848	208	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
Q088586005	N	5-11-21	SHIRLEY YATES AND FREDDIE LEE HARTSELL	NOBLE ENERGY INC	1/8+	848	212	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
Q088586004	N	5-11-21	BOYD DALE JR AND MARLA YATES	NOBLE ENERGY INC	1/8+	848	210	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
Q088586001	N	5-11-21	GUY YATES	NOBLE ENERGY INC	1/8+	848	206	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*22667	N	5-11-21	REBEKAH DRAYER AND CHRISTOPHER ELDRIDGE	NOBLE ENERGY INC	1/8+	850	157	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*22777	N	5-11-21	BOYD BUESKING	NOBLE ENERGY INC	1/8+	850	159	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*22773	N	5-11-21	CHRISTA DRAYER AND JOSHUA STALEY	NOBLE ENERGY INC	1/8+	851	3	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC
10*21152	N	5-11-21	KAREN AND CLYDE REED	NOBLE ENERGY INC	1/8+	864	190	N/A	N/A	N/A	N/A	36/395 Noble Energy Inc to CNX Gas Company LLC	37/169 CNX Gas Company LLC to Noble Energy Inc	39/1 Noble Energy Inc to HG Energy II Appalachia LLC	41/398 HG Energy II Appalachia, LLC to TH Exploration, LLC

HG ENERGY LLC
JEANIE
5260 DUPONT RD
PARKERSBURG WV 26101

4705102076

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 29th day of March, 2018 (the "Effective Date"), by and between HG ENERGY II APPALACHIA, LLC, (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Exchange Agreement between the Assignor and the Assignee dated November 1st, 2017 (the "Exchange Agreement"). Capitalized terms used but not defined herein and defined in the Exchange Agreement shall have the meanings given to such terms in the Exchange 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"); and

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

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

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

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

2. Special Warranty. Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the Leases since the time that Assignor obtained its interests in the Leases. Assignor does

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AFFIDAVIT

COPY

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

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

FURTHER, AFFIANT SAITH NOT.

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

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David D. Kalish
Affiant: David D. Kalish

JURAT

Jan Pest
MARSHALL County 03:44:28 PM
Instrument No 1416299
Date Recorded 10/19/2016
Document Type MIS
Pages Recorded 1
Book-Page 29-62
Recording Fee \$5.00
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Sworn and subscribed to (or affirmed) before me on this, the 18th day of October, 2016, by David D. Kalish

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

My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock



STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

ASSIGNMENT AND BILL OF SALE

This **ASSIGNMENT AND BILL OF SALE** (this "Assignment") dated as of August 1, 2017 (the "Signing Date"), but effective from and after 7:00 a.m., Eastern Standard Time on August 2, 2017 being the day immediately following the Signing Date (the "Effective Date"), is made by **Chevron U.S.A. Inc.**, a Pennsylvania corporation, with an address at 700 Cherrington Parkway, Coraopolis, PA 15108 ("Chevron" or "Assignor") to **TH Exploration II, LLC** and **TH Exploration, LLC**, Texas limited liability companies, with an address at 1320 S. University Drive, Suite 500, Fort Worth, TX 76107 (collectively "Assignee") and is accepted by Assignee upon the following terms and conditions.

RECITALS

- A. Assignor desires to sell, convey, transfer, assign and deliver to Assignee Assignor's Bryan 1H well and certain related assets, including certain leasehold interests, located in Marshall County, West Virginia.
- B. Through an Acreage Trade Agreement to be executed contemporaneously with this Assignment, Assignor desires to transfer, convey and assign to Assignee certain of Assignor's oil and gas leasehold interests located in Marshall County, West Virginia in exchange for the transfer, conveyance and assignment to Assignor by Assignee certain of Assignee's oil and gas leasehold interests located in Marshall County, West Virginia and Greene County, West Virginia.
- C. In consideration of the mutual promises set out in this Assignment, including execution of the Acreage Trade Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to be bound by the terms of this Assignment.

1. DEFINITIONS

1.1 **Definitions.** As used in this Assignment, these words and expressions have the following meanings:

"Acreage Trade Agreement" means that certain Acreage Trade Agreement by and between Chevron U.S.A. Inc. and TH Exploration, LLC with an Effective Date of August 1, 2017 to be contemporaneously executed with this Assignment.

"Act" has the meaning given to such term in Section 9.1(C).

"Affiliate" means any legal entity which controls, is controlled by, or is under common control with, another legal entity. An entity is deemed to "control" another if it owns directly or indirectly at least fifty percent of either of the following: (A) the shares entitled to vote at a general election of directors of such other entity or (B) the voting interest in such other entity if such entity does not have either shares or directors.

"Applicable Law(s)" means all laws, principles of common law, regulations, statutes, codes, rules, orders, ordinances, permits, enforceable policies, licenses, certifications, decrees, constitutions, standards or other requirements with similar effect of any Government Entity and any binding interpretations of the foregoing.

"Assets" has the meaning given to such term in Section 2.1 of this Assignment.

"Assigned Hydrocarbons" means all Hydrocarbons produced and severed from, or allocable, after severance, to the Leases, Units, and Wells on and after the Effective Date.

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COUNTY OF MARSHALL §

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

ASSIGNMENT AND CONVEYANCE

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

WITNESSETH:

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

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

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

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 Cornell Holdings Incorporated and Chevron U.S.A. Inc., which is recorded at Book 0028, Page 0239 in the Office of the County Clerk of Marshall County, West Virginia, and

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

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September 22, 2017

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

RE: Bryan N-4HM

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-4HM 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,

Amy L. Miller
Permitting Specialist – Appalachia Region

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

Date of Notice Certification: 12/14/2017

API No. 47- 051 - _____

Operator's Well No. Bryan N-4HM

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>519,130.25</u>
County: <u>Marshall</u>	Northing: <u>4,402,882.68</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
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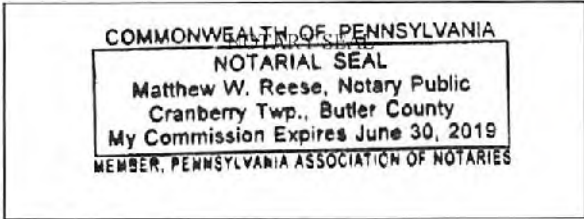
Required Attachments:

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

Certification of Notice is hereby given:

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy L. Miller</i></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 6th day of July 2018.

Matthew W. Reese Notary Public

My Commission Expires June 30, 2019

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 deprivacyofficer@wv.gov.

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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: 7/3/2018 **Date Permit Application Filed:** 7/6/2018

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. and Brenda K. Bryan
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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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

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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Environmental Protection

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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WW-6A
(8-13)

API NO. 47- _____ - _____
OPERATOR WELL NO. Bryan N-4HM
Well Pad Name: Bryan

4705 * 02076

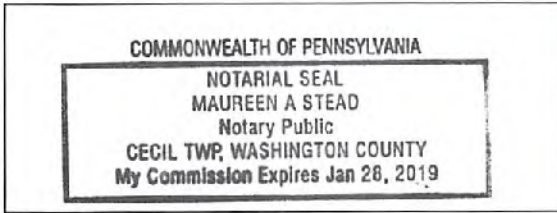
Notice is hereby given by:

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

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 deprivacyofficer@wv.gov.



Subscribed and sworn before me this 2 day of JULY 2018.
Maureen A Stead Notary Public
My Commission Expires 1/28/19

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

WATER WELL REPORT

Well: BRYAN No. N-4HM
 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	
		RECEIVED Office of Oil and Gas JUL 11 2018 WV Department of Environmental Protection

WW-6A

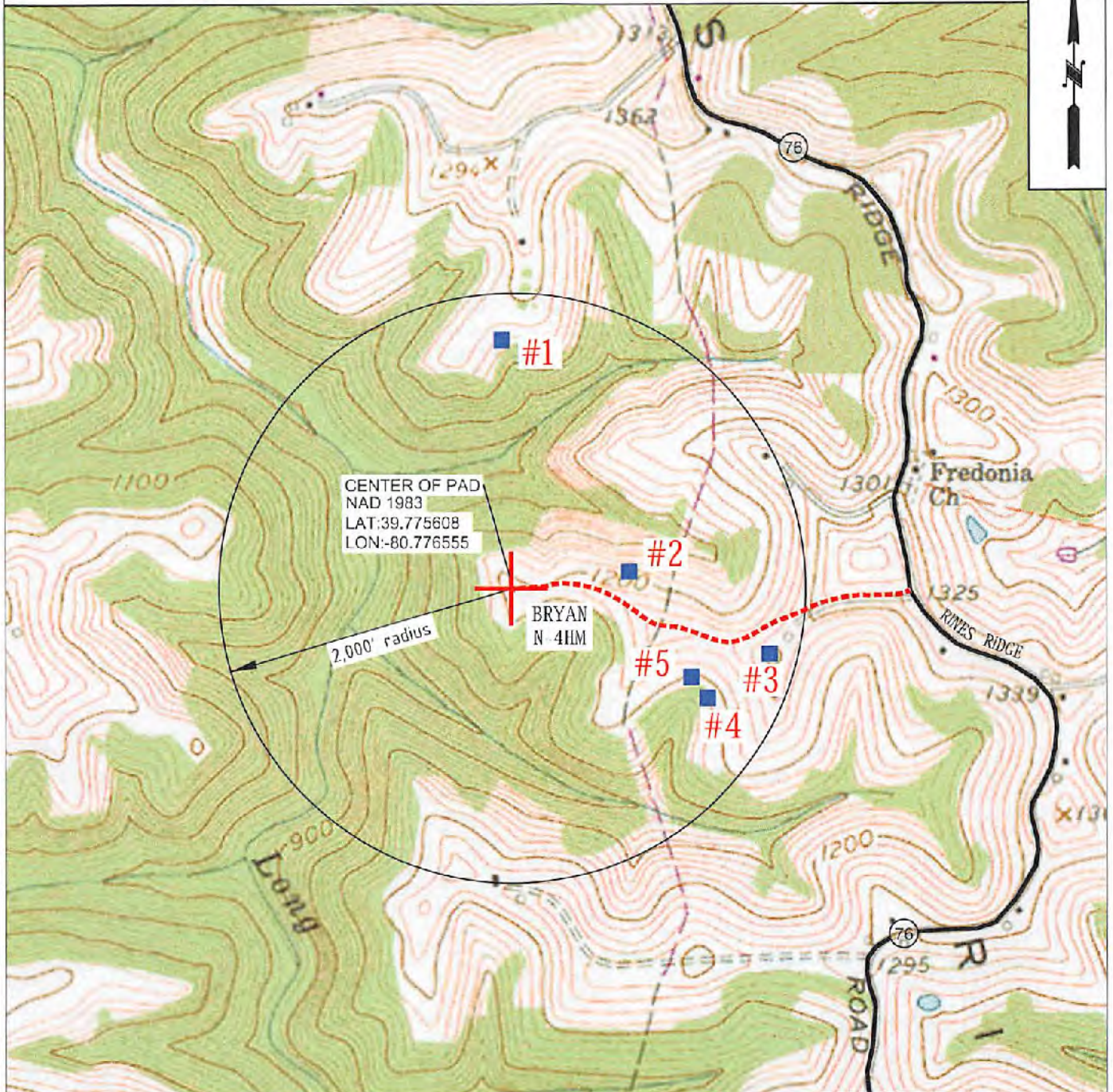
PROPOSED BRYAN N-4HM

SUPPLEMENT ~~PG. 1~~
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There appears to be Five (5) possible water sources within 2,000'.



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

2,000' radius

BRYAN
N-4HM

#1

#2

#5

#3

#4

Fredonia
Ch

RINES RIDGE

76

ROAD



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:	DATE:
		1" = 1000'	DATE: 10/25/17

**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

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 Isalah 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 Riddla
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; -80.7766011</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: 724-749-8398
Email: emiller@tug-hill-op.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-336-2030

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Oil and Gas Privacy Notice:

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

WW-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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WW-6A5
(1/12)

Operator Well No. Bryan N-4HM

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

4705-02076

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

Date of Notice: 07/03/2018 **Date Permit Application Filed:** 07/03/2018

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>519,130.25</u>
County:	<u>Marshall</u>		Northing:	<u>4,402,862.68</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-hill-op.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-358-2030

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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 of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

Operator Well No. Bryan N-4HM

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

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4705 - 0207

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-4HM Well site

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

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Environmental Protection

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



TUG HILL

4705102076

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

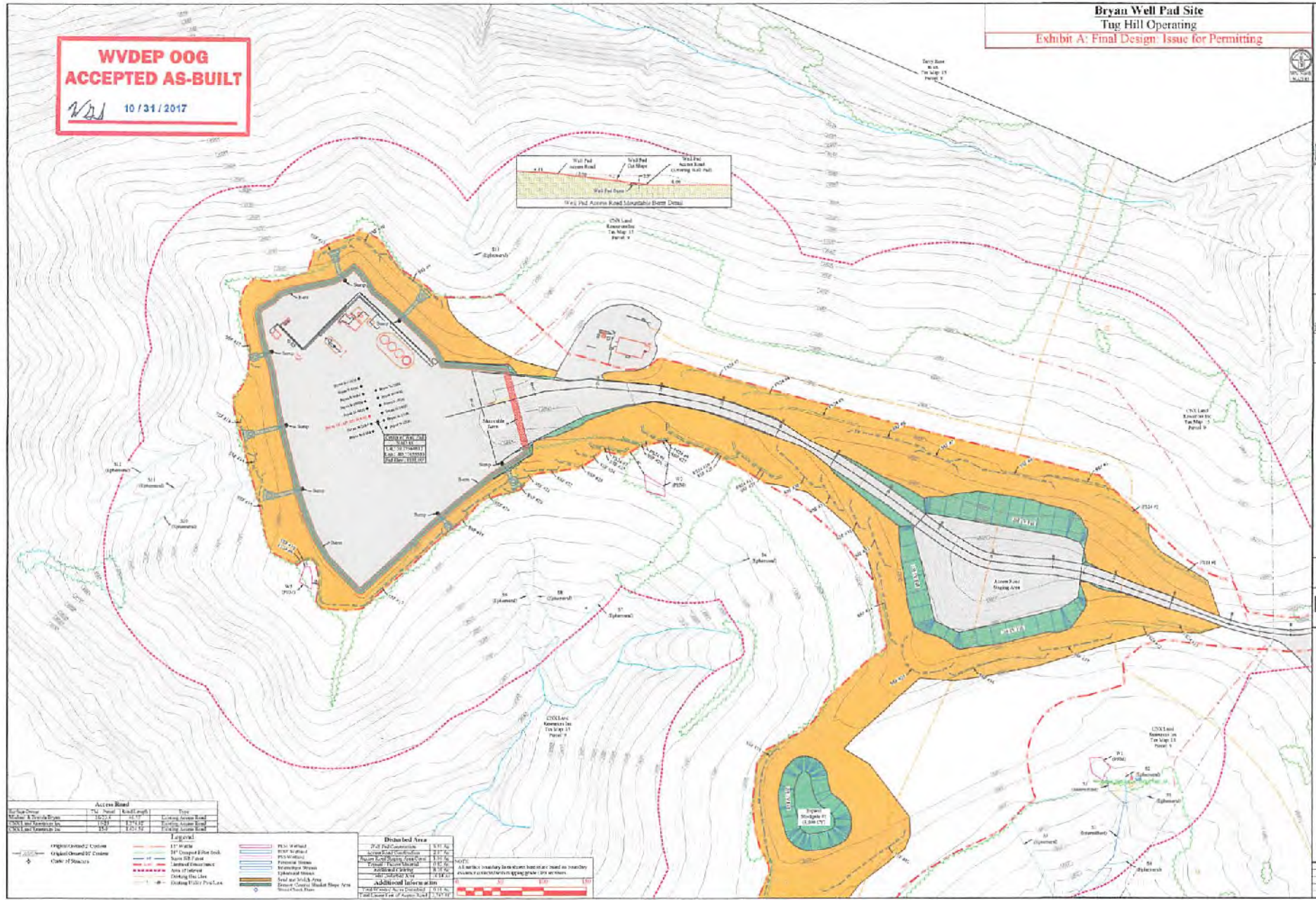
Well No. Bryan N-4HM

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

WVDEP OOG
ACCEPTED AS-BUILT
 10/31/2017



Access Road	WV Dept	WV Dept	WV Dept	Type
WV Dept	10/31/17	10/31/17	10/31/17	Access Road
WV Dept	10/31/17	10/31/17	10/31/17	Access Road
WV Dept	10/31/17	10/31/17	10/31/17	Access Road

Legend	Color/Line Style	Description
11' or more	Red dashed line	11' or more
5' to 10'	Blue dashed line	5' to 10'
3' to 4'	Green dashed line	3' to 4'
2' to 3'	Yellow dashed line	2' to 3'
1' to 2'	Orange dashed line	1' to 2'
0' to 1'	Purple dashed line	0' to 1'
Other	Black dashed line	Other

Disturbed Area	Color/Line Style	Description
Disturbed Area	Red solid line	Disturbed Area
Disturbed Area	Blue solid line	Disturbed Area
Disturbed Area	Green solid line	Disturbed Area
Disturbed Area	Yellow solid line	Disturbed Area
Disturbed Area	Orange solid line	Disturbed Area
Disturbed Area	Purple solid line	Disturbed Area
Disturbed Area	Black solid line	Disturbed Area

Additional Information	Color/Line Style	Description
Additional Information	Red dashed line	Additional Information
Additional Information	Blue dashed line	Additional Information
Additional Information	Green dashed line	Additional Information
Additional Information	Yellow dashed line	Additional Information
Additional Information	Orange dashed line	Additional Information
Additional Information	Purple dashed line	Additional Information
Additional Information	Black dashed line	Additional Information

TUG HILL OPERATING

THIS DOCUMENT IS PREPARED FOR TUG HILL OPERATING

Key Surveys

Engineering and Settlement Control Plan
Bryan Well Pad Site
 Franklin District
 Marshall County, WV

DATE: 10/31/2017
 SCALE: AS SHOWN
 DRAWN BY: JES
 PAGE 1 OF 17