



west virginia department of environmental protection

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

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

Friday, October 26, 2018
WELL WORK PERMIT
Horizontal 6A / Drilling Deeper

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for LACKAWANNA 1H
47-103-02982-00-00

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

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned to the right of the printed name and title.

Operator's Well Number: Lackawanna 1H
Farm Name: M.B. INVESTMENTS
U.S. WELL NUMBER: 47-103-02982-00-00
Horizontal 6A Drilling Deeper
Date Issued: 10/26/2018

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.

API Number: 47 103 02982

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.

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 (7/27/2018) 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 other planned well and using that for permits

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Permit well - Lackawanna 1HM

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
4710302983	Tug Hill Operating	5530' MD	None	None	Yes, existing Marcellus top hole wellbore. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore	This is a shallow top hole wellbore for an undrilled lateral Marcellus well.
4710303006	Tug Hill Operating	2480' MD	None	None	No, existing shallow top hole well bore. Proper casing and cement should prevent migration of fluids from new wellbore to existing wellbore.	This is a shallow top hole wellbore for an undrilled lateral Utica well
4705901140	Scott Oil Company	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete

REC
Office
AU 5
W. J.
Environment

WVGS Pipeline

Well: County = 103 Permit = 02963

Map Info: Permit Info 07/27/2015 02:23 PM

Location Information:

PERMIT COUNTY PERMIT TAX DISTRICT QUAD_79 QUAD_18 LAY_00 LOW_D0 U756 U766

Bottom Hole Location Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Owner Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Completion Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Regulatory Information:

ASL	CAP_OF_SURFACE	ELEV	DATUM	FIELD	DEEPEST_FWI	DEEPEST_FINAL	INITIAL_CLASS	FINAL_CLASS	TYPE	RIS	CAP_MFTRD	TWO	TWO	NEW_FTG	KOD	U_BEF	U_AFF	U_D
41120000	2891.00	2891.00	100	PERMITS					1	Permitted								

WVGS Pipeline

Well: County = 103 Permit = 03006

Map Info: Permit Info 07/27/2015 02:24 PM

Location Information:

PERMIT COUNTY PERMIT TAX DISTRICT QUAD_79 QUAD_18 LAY_00 LOW_D0 U756 U766

Bottom Hole Location Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Owner Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Completion Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Regulatory Information:

ASL	CAP_OF_SURFACE	ELEV	DATUM	FIELD	DEEPEST_FWI	DEEPEST_FINAL	INITIAL_CLASS	FINAL_CLASS	TYPE	RIS	CAP_MFTRD	TWO	TWO	NEW_FTG	KOD	U_BEF	U_AFF	U_D
41120000	2891.00	2891.00	100	PERMITS					1	Permitted								

WVGS Pipeline

Well: County = 69 Permit = 01140

Map Info: Permit Info 07/27/2015 02:25 PM

Location Information:

PERMIT COUNTY PERMIT TAX DISTRICT QUAD_79 QUAD_18 LAY_00 LOW_D0 U756 U766

Bottom Hole Location Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Owner Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Completion Information:

ASL CAP_OF_SURFACE ELEV DATUM FIELD DEEPEST_FWI DEEPEST_FINAL INITIAL_CLASS FINAL_CLASS TYPE RIS CAP_MFTRD TWO TWO NEW_FTG KOD U_BEF U_AFF U_D

Regulatory Information:

There is no Production Gas data for this well

There is no Production Oil data for this well

There is no Production NGL data for this well

There is no Production Water data for this well

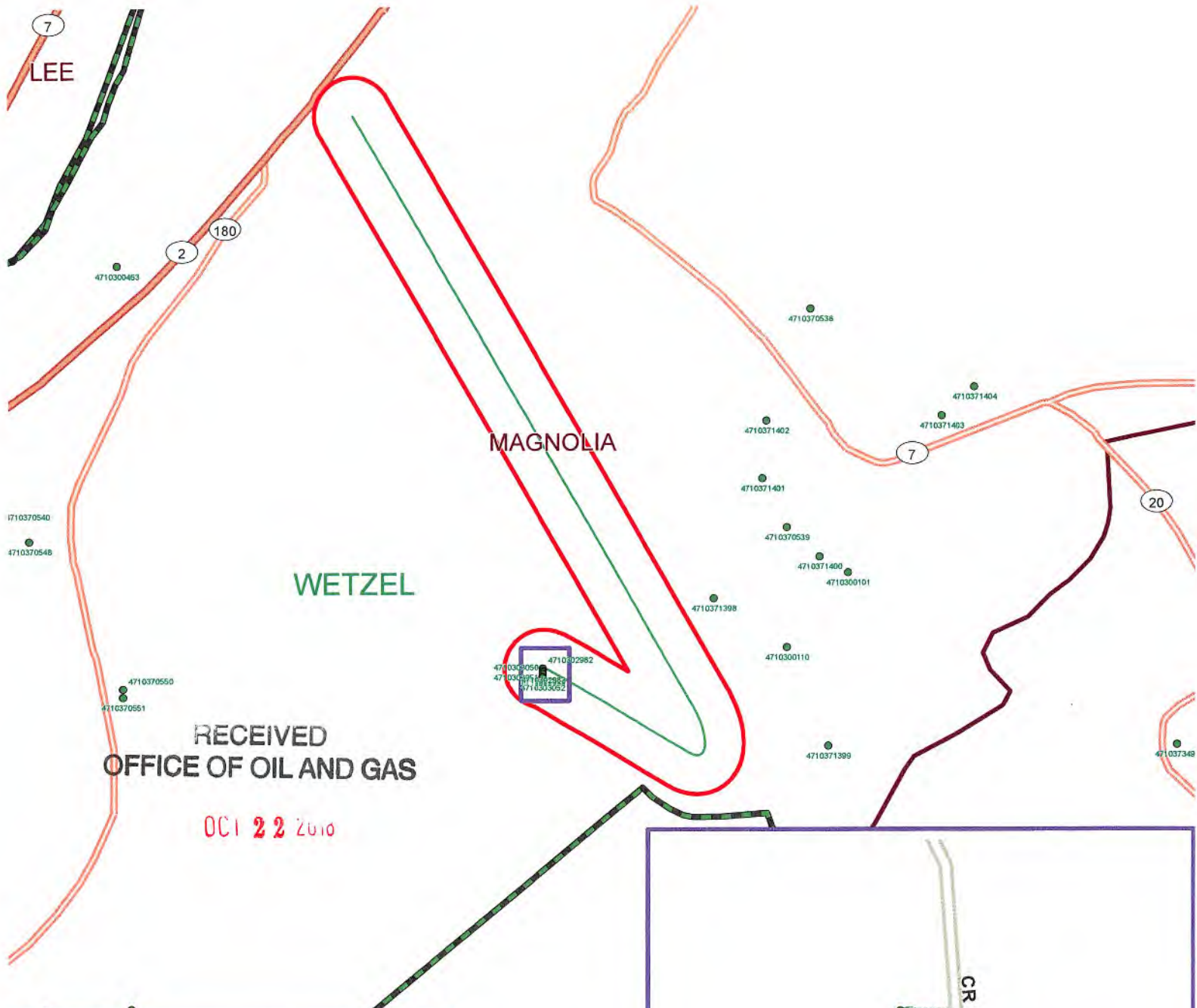
There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

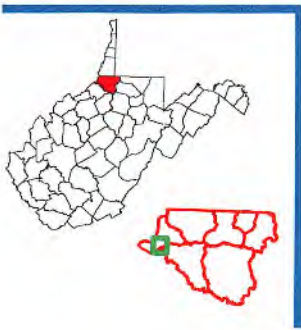
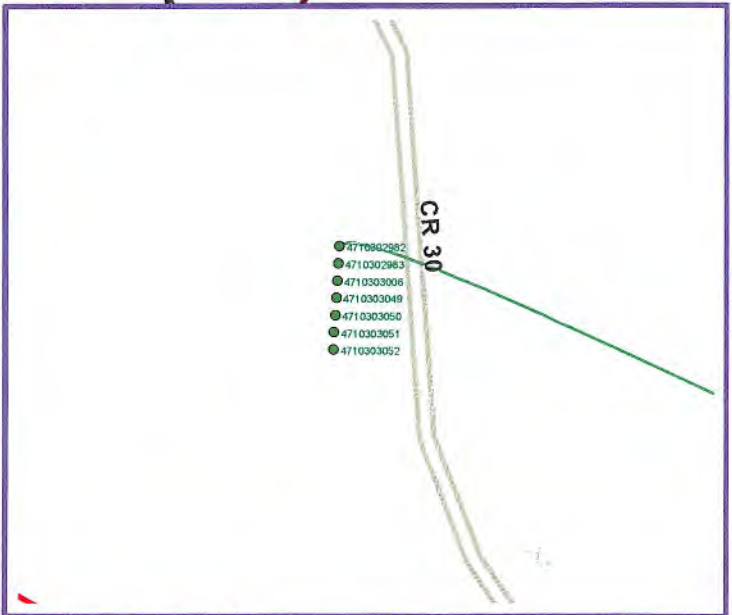
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Legend

- Well Locations (ims.wvgs.wvnet.edu)
- Lackawanna 1HM
- 500 Ft. Buffer
- Major Highways
- Major Roads
- ▭ Counties
- ▭ Districts



Lackawanna - 1HM Magnolia District Wetzel County, WV



Map Created: August 7, 2018

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

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	20"	NEW	BW	BW	set	40'	set
Fresh Water	13 3/8"	NEW	H40	48#	set	1,287'	set
Coal	13 3/8"	NEW	H40	48#	set	1,287'	set
Intermediate	9 5/8"	NEW	J55	36#	set	2,755'	set
Production	5 1/2"	NEW	P110	20#	16,732'	16,732'	3773ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#		7,536'	
Liners							

*DmH
8-8-18*

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	20"	26"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17 1/2"	.33	1,730	1,384	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.33	1,730	1,384	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	9,000	SEE#24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

Kind:	N/A				RECEIVED Office of Oil and Gas AUG 15 2018 WV Department of Environmental Protection
Sizes:	N/A				
Depths Set:	N/A				

WW-6B
(10/14)

API NO. 47-103 - 02982
OPERATOR WELL NO. Lackawanna 1H
Well Pad Name: Lackawanna

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

Drill through the Marcellus utilizing the existing casing as installed 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.

DMH
8-18

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

Well to be completed with approximately 21,875,000 lb proppant and 338,203 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 26.69 acres

22) Area to be disturbed for well pad only, less access road (acres): 4.32 acres

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 Attachment

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

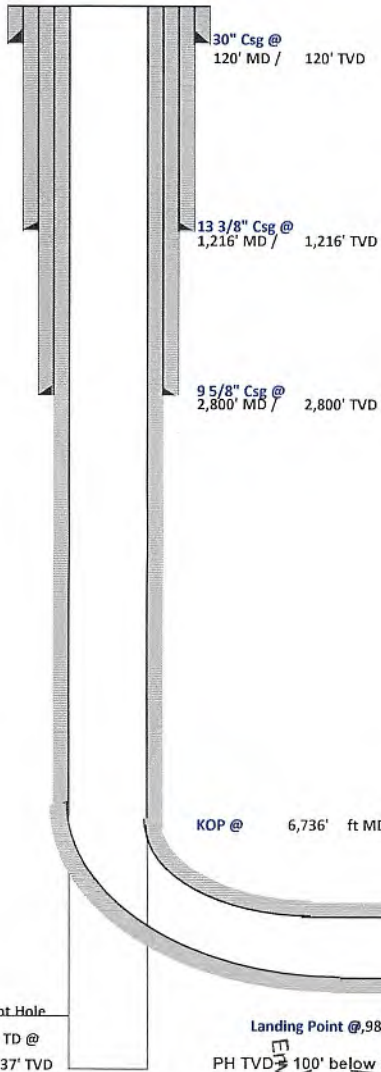


WELL NAME: Lackawanna 1H
 STATE: WV COUNTY: Wetzel
 DISTRICT: Magnolia
 DF Elev: 1,306' GL Elev: 1,306'
 TD: 16,732'
 TH Latitude: 39.60620769
 TH Longitude: -80.85669942
 BH Latitude: 39.62570057
 BH Longitude: -80.86534243

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1116
Sewickley Coal	1016
Pittsburgh Coal	1111
Big Lime	2141
Weir	2602
Berea	2794
Gordon	3175
Rhinestreet	6085
Geneseo/Burkett	6588
Tully	6640
Hamilton	6653
Marcellus	6786
Landing Depth	6808
Onondaga	6837
Pilot Hole Depth	6937

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	1,216'	1,216'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,800'	2,800'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	16,732'	6,655'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,215	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	906	A	15	Air	1 Centralizer every other jt
Production	3,773	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



KOP @ 6,736' ft MD

Pilot Hole
PH TD @
6,937' TVD

Landing Point @ 982' MD / 6,808' TVD
PH TD @ 100' below Onondaga Top

Lateral TD @ 16,732' ft MD
6,655' ft TVD

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Tug Hill Operating, LLC Casing and Cement Program

Lackawanna 1HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	20"	BW	26"	40'	CTS
Surface	13 3/8"	J55	17 1/2"	1,287'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,755'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4	16,344'	CTS

Cement

Conductor:	Previously set
Surface:	Previously set
Intermediate:	Previously set
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: Lackawanna 1H (slot X)
 Site: Lackawanna
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Design: rev0
 Rig:

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	2992.00	4.31	1.48	2991.76	-0.04	2.00	0.00	0.00	-0.69	S/T Begin 6°/100' build/turn
2	3888.64	39.57	120.47	3636.47	-90.42	202.88	6.00	123.29	-151.59	Begin 39.57° tangent
3	6736.11	39.57	120.47	5985.74	-1074.87	1875.85	0.00	0.00	-1627.45	Begin 10°/100' build/turn
4	7981.95	91.00	330.00	6807.71	-482.64	1929.36	10.00	-143.24	-1084.98	Begin 91.00° lateral
5	16731.95	91.00	330.00	6655.00	7093.93	-2444.97	0.00	0.00	7503.45	PBHL/TD 16731.95 MD/6655.00 TVD

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

System Datum: Mean Sea Level
 Depth Reference: GL @ 1306.00ft

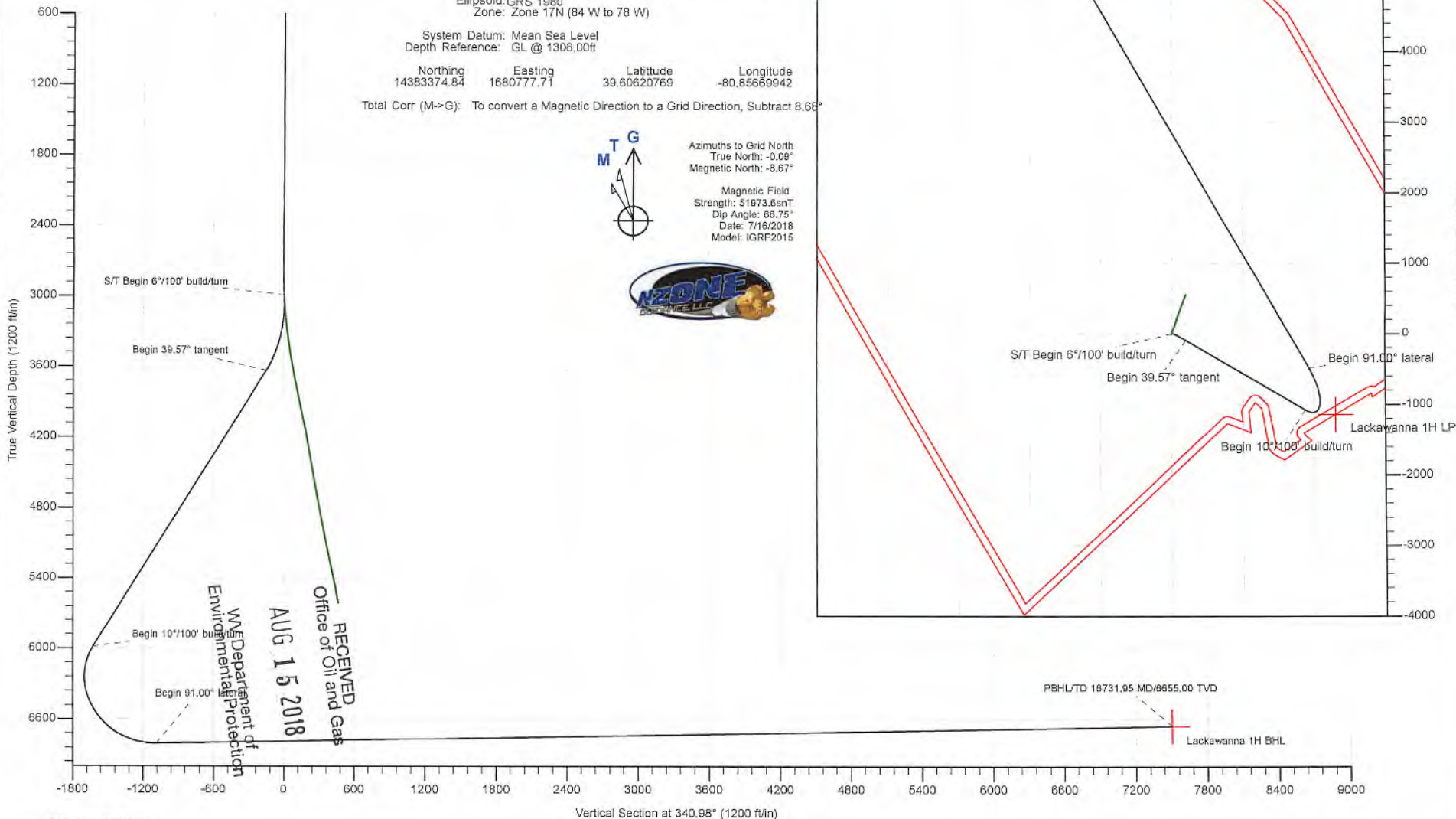
Northing	Easting	Latitude	Longitude
14383374.84	1680777.71	39.60620769	-80.85669942

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.66°



Azimuths to Grid North
 True North: -0.08°
 Magnetic North: -8.67°

Magnetic Field
 Strength: 51973.8snT
 Dip Angle: 66.75°
 Date: 7/16/2018
 Model: IGRF2015



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Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Lackawanna 1H (slot X)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1306.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1306.00ft
Site:	Lackawanna	North Reference:	Grid
Well:	Lackawanna 1H (slot X)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev0		

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Lackawanna				
Site Position:		Northing:	14,383,374.84 usft	Latitude:	39.60620769
From:	Lat/Long	Easting:	1,680,777.71 usft	Longitude:	-80.85669942
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.09 °

Well	Lackawanna 1H (slot X)					
Well Position	+N/-S	0.00 ft	Northing:	14,383,374.84 usft	Latitude:	39.60620769
	+E/-W	0.00 ft	Easting:	1,680,777.71 usft	Longitude:	-80.85669942
Position Uncertainty	0.00 ft	Wellhead Elevation:		Ground Level:	1,306.00 ft	

Wellbore	Sidetrack 01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/16/2018	-8.58	66.75	51,973.57665446

Design	rev0				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	2,992.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	340.98	

Plan Survey Tool Program	Date	7/17/2018			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	2,992.00	16,731.95 rev0 (Sidetrack 01)	MWD	MWD - Standard	

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Plan Sections											
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target	
2,992.00	4.31	1.48	2,991.76	-0.04	2.00	0.00	0.00	0.00	0.00	0.00	
3,688.64	39.57	120.47	3,636.47	-90.42	202.88	6.00	5.06	17.08	123.29		
6,736.11	39.57	120.47	5,985.74	-1,074.87	1,875.85	0.00	0.00	0.00	0.00		
7,981.95	91.00	330.00	6,807.71	-482.64	1,929.36	10.00	4.13	-12.08	-143.24		
16,731.95	91.00	330.00	6,655.00	7,093.93	-2,444.97	0.00	0.00	0.00	0.00	0.00	Lackawanna 1H BHL



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Lackawanna 1H (slot X)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1306.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1306.00ft
Site:	Lackawanna	North Reference:	Grid
Well:	Lackawanna 1H (slot X)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev0		

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,992.00	4.31	1.48	2,991.76	-0.04	2.00	14,383,374.80	1,680,779.71	39.60620758	-80.85669232
S/T Begin 6°/100' build/turn									
3,000.00	4.07	7.14	2,999.74	0.54	2.04	14,383,375.39	1,680,779.76	39.60620918	-80.85669217
3,100.00	5.46	83.67	3,099.48	4.59	7.22	14,383,379.44	1,680,784.93	39.60622028	-80.85667376
3,200.00	10.73	105.43	3,198.47	2.64	20.94	14,383,377.48	1,680,798.65	39.60621485	-80.85662508
3,300.00	16.50	112.57	3,295.63	-5.29	43.04	14,383,369.55	1,680,820.75	39.60619297	-80.85654665
3,400.00	22.39	116.05	3,389.89	-19.11	73.29	14,383,355.73	1,680,851.00	39.60615487	-80.85643933
3,500.00	28.32	118.13	3,480.21	-38.68	111.35	14,383,336.16	1,680,889.06	39.60610097	-80.85630431
3,600.00	34.28	119.54	3,565.62	-63.77	156.80	14,383,311.07	1,680,934.52	39.60603185	-80.85614306
3,688.64	39.57	120.47	3,636.47	-90.42	202.88	14,383,284.42	1,680,980.60	39.60595847	-80.85597961
Begin 39.57° tangent									
3,700.00	39.57	120.47	3,645.22	-94.09	209.12	14,383,280.75	1,680,986.83	39.60594837	-80.85595749
3,800.00	39.57	120.47	3,722.31	-126.39	264.02	14,383,248.45	1,681,041.73	39.60585941	-80.85576277
3,900.00	39.57	120.47	3,799.40	-158.70	318.91	14,383,216.15	1,681,096.62	39.60577045	-80.85556804
4,000.00	39.57	120.47	3,876.49	-191.00	373.81	14,383,183.84	1,681,151.52	39.60568149	-80.85537332
4,100.00	39.57	120.47	3,953.58	-223.30	428.71	14,383,151.54	1,681,206.42	39.60559253	-80.85517860
4,200.00	39.57	120.47	4,030.67	-255.61	483.60	14,383,119.24	1,681,261.31	39.60550357	-80.85498388
4,300.00	39.57	120.47	4,107.76	-287.91	538.50	14,383,086.93	1,681,316.21	39.60541461	-80.85478915
4,400.00	39.57	120.47	4,184.85	-320.22	593.40	14,383,054.63	1,681,371.11	39.60532564	-80.85459443
4,500.00	39.57	120.47	4,261.94	-352.52	648.29	14,383,022.32	1,681,426.01	39.60523668	-80.85439971
4,600.00	39.57	120.47	4,339.03	-384.82	703.19	14,382,990.02	1,681,480.90	39.60514772	-80.85420499
4,700.00	39.57	120.47	4,416.12	-417.13	758.09	14,382,957.72	1,681,535.80	39.60505875	-80.85401027
4,800.00	39.57	120.47	4,493.20	-449.43	812.99	14,382,925.41	1,681,590.70	39.60496979	-80.85381555
4,900.00	39.57	120.47	4,570.29	-481.74	867.88	14,382,893.11	1,681,645.59	39.60488083	-80.85362083
5,000.00	39.57	120.47	4,647.38	-514.04	922.78	14,382,860.80	1,681,700.49	39.60479186	-80.85342611
5,100.00	39.57	120.47	4,724.47	-546.34	977.68	14,382,828.50	1,681,755.39	39.60470290	-80.85323140
5,200.00	39.57	120.47	4,801.56	-578.65	1,032.57	14,382,796.20	1,681,810.28	39.60461393	-80.85303668
5,300.00	39.57	120.47	4,878.65	-610.95	1,087.47	14,382,763.89	1,681,865.18	39.60452497	-80.85284196
5,400.00	39.57	120.47	4,955.74	-643.26	1,142.37	14,382,731.59	1,681,920.08	39.60443600	-80.85264724
5,500.00	39.57	120.47	5,032.83	-675.56	1,197.27	14,382,699.28	1,681,974.98	39.60434704	-80.85245253
5,600.00	39.57	120.47	5,109.92	-707.86	1,252.16	14,382,666.98	1,682,029.87	39.60425807	-80.85225781
5,700.00	39.57	120.47	5,187.01	-740.17	1,307.06	14,382,634.68	1,682,084.77	39.60416911	-80.85206310
5,800.00	39.57	120.47	5,264.10	-772.47	1,361.96	14,382,602.37	1,682,139.67	39.60408014	-80.85186838
5,900.00	39.57	120.47	5,341.19	-804.77	1,416.85	14,382,570.07	1,682,194.56	39.60399117	-80.85167367
6,000.00	39.57	120.47	5,418.28	-837.08	1,471.75	14,382,537.77	1,682,249.46	39.60390220	-80.85147896
6,100.00	39.57	120.47	5,495.37	-869.38	1,526.65	14,382,505.46	1,682,304.36	39.60381324	-80.85128424
6,200.00	39.57	120.47	5,572.46	-901.69	1,581.55	14,382,473.16	1,682,359.25	39.60372427	-80.85108953
6,300.00	39.57	120.47	5,649.54	-933.99	1,636.44	14,382,440.85	1,682,414.15	39.60363530	-80.85089482
6,400.00	39.57	120.47	5,726.63	-966.29	1,691.34	14,382,408.55	1,682,469.05	39.60354633	-80.85070011
6,500.00	39.57	120.47	5,803.72	-998.60	1,746.24	14,382,376.25	1,682,523.95	39.60345736	-80.85050540
6,600.00	39.57	120.47	5,880.81	-1,030.90	1,801.13	14,382,343.94	1,682,578.84	39.60336839	-80.85031068
6,700.00	39.57	120.47	5,957.90	-1,063.21	1,856.03	14,382,311.64	1,682,633.74	39.60327942	-80.85011597
6,736.11	39.57	120.47	5,985.74	-1,074.87	1,875.85	14,382,299.97	1,682,653.56	39.60324730	-80.85004567
Begin 10°/100' build/turn									
6,800.00	34.62	113.74	6,036.71	-1,092.52	1,910.04	14,382,282.33	1,682,687.75	39.60319868	-80.84992440
6,900.00	27.93	99.34	6,122.24	-1,107.79	1,959.28	14,382,267.05	1,682,736.99	39.60315649	-80.84974968
7,000.00	23.46	78.54	6,212.52	-1,107.84	2,002.00	14,382,267.21	1,682,779.71	39.60315672	-80.84959801
7,100.00	22.58	52.88	6,304.79	-1,092.06	2,036.90	14,382,282.79	1,682,814.61	39.60319936	-80.84947400
7,200.00	25.68	29.44	6,396.25	-1,061.52	2,062.93	14,382,313.33	1,682,840.64	39.60328311	-80.84938141
7,300.00	31.60	12.50	6,484.11	-1,016.95	2,079.29	14,382,357.89	1,682,857.00	39.60340543	-80.84932305
7,400.00	39.07	0.93	6,565.72	-959.71	2,085.49	14,382,415.13	1,682,863.20	39.60356260	-80.84930070
7,500.00	47.36	352.73	6,638.59	-891.54	2,081.34	14,382,483.30	1,682,859.05	39.60374984	-80.84931504
7,600.00	56.09	346.50	6,700.51	-814.51	2,066.96	14,382,560.33	1,682,844.67	39.60396147	-80.84936563



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Lackawanna 1H (slot X)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1306.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1306.00ft
Site:	Lackawanna	North Reference:	Grid
Well:	Lackawanna 1H (slot X)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev0		

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WV Department of
Environmental Protection

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,700.00	65.08	341.46	6,749.59	-730.95	2,042.79	14,382,643.89	1,682,820.50	39.60419105	-80.84945093	
7,800.00	74.21	337.11	6,784.35	-643.42	2,009.57	14,382,731.43	1,682,787.28	39.60443162	-80.84956836	
7,900.00	83.43	333.14	6,803.73	-554.56	1,968.31	14,382,820.29	1,682,746.01	39.60467585	-80.84971435	
7,981.95	91.00	330.00	6,807.71	-482.64	1,929.36	14,382,892.20	1,682,707.07	39.60487353	-80.84985219	
Begin 91.00° lateral										
8,000.00	91.00	330.00	6,807.39	-467.01	1,920.34	14,382,907.83	1,682,698.05	39.60491650	-80.84988413	
8,100.00	91.00	330.00	6,805.65	-380.42	1,870.34	14,382,994.42	1,682,648.05	39.60515454	-80.85006111	
8,200.00	91.00	330.00	6,803.90	-293.83	1,820.35	14,383,081.01	1,682,598.06	39.60539257	-80.85023809	
8,300.00	91.00	330.00	6,802.16	-207.24	1,770.36	14,383,167.60	1,682,548.07	39.60563060	-80.85041507	
8,400.00	91.00	330.00	6,800.41	-120.65	1,720.37	14,383,254.19	1,682,498.08	39.60586864	-80.85059206	
8,500.00	91.00	330.00	6,798.67	-34.06	1,670.38	14,383,340.78	1,682,448.08	39.60610667	-80.85076904	
8,600.00	91.00	330.00	6,796.92	52.53	1,620.38	14,383,427.37	1,682,398.09	39.60634471	-80.85094603	
8,700.00	91.00	330.00	6,795.18	139.11	1,570.39	14,383,513.96	1,682,348.10	39.60658274	-80.85112301	
8,800.00	91.00	330.00	6,793.43	225.70	1,520.40	14,383,600.55	1,682,298.11	39.60682077	-80.85130000	
8,900.00	91.00	330.00	6,791.69	312.29	1,470.41	14,383,687.14	1,682,248.12	39.60705881	-80.85147699	
9,000.00	91.00	330.00	6,789.94	398.88	1,420.41	14,383,773.72	1,682,198.12	39.60729684	-80.85165398	
9,100.00	91.00	330.00	6,788.20	485.47	1,370.42	14,383,860.31	1,682,148.13	39.60753487	-80.85183097	
9,200.00	91.00	330.00	6,786.45	572.06	1,320.43	14,383,946.90	1,682,098.14	39.60777290	-80.85200796	
9,300.00	91.00	330.00	6,784.71	658.65	1,270.44	14,384,033.49	1,682,048.15	39.60801094	-80.85218496	
9,400.00	91.00	330.00	6,782.96	745.24	1,220.44	14,384,120.08	1,681,998.15	39.60824897	-80.85236195	
9,500.00	91.00	330.00	6,781.22	831.83	1,170.45	14,384,206.67	1,681,948.16	39.60848700	-80.85253895	
9,600.00	91.00	330.00	6,779.47	918.42	1,120.46	14,384,293.26	1,681,898.17	39.60872503	-80.85271594	
9,700.00	91.00	330.00	6,777.72	1,005.01	1,070.47	14,384,379.85	1,681,848.18	39.60896306	-80.85289294	
9,800.00	91.00	330.00	6,775.98	1,091.60	1,020.47	14,384,466.44	1,681,798.18	39.60920109	-80.85306994	
9,900.00	91.00	330.00	6,774.23	1,178.19	970.48	14,384,553.03	1,681,748.19	39.60943912	-80.85324694	
10,000.00	91.00	330.00	6,772.49	1,264.78	920.49	14,384,639.62	1,681,698.20	39.60967715	-80.85342395	
10,100.00	91.00	330.00	6,770.74	1,351.37	870.50	14,384,726.21	1,681,648.21	39.60991518	-80.85360095	
10,200.00	91.00	330.00	6,769.00	1,437.96	820.50	14,384,812.79	1,681,598.22	39.61015321	-80.85377795	
10,300.00	91.00	330.00	6,767.25	1,524.54	770.51	14,384,899.38	1,681,548.22	39.61039124	-80.85395496	
10,400.00	91.00	330.00	6,765.51	1,611.13	720.52	14,384,985.97	1,681,498.23	39.61062927	-80.85413197	
10,500.00	91.00	330.00	6,763.76	1,697.72	670.53	14,385,072.56	1,681,448.24	39.61086730	-80.85430898	
10,600.00	91.00	330.00	6,762.02	1,784.31	620.54	14,385,159.15	1,681,398.25	39.61110533	-80.85448599	
10,700.00	91.00	330.00	6,760.27	1,870.90	570.54	14,385,245.74	1,681,348.25	39.61134335	-80.85466300	
10,800.00	91.00	330.00	6,758.53	1,957.49	520.55	14,385,332.33	1,681,298.26	39.61158138	-80.85484001	
10,900.00	91.00	330.00	6,756.78	2,044.08	470.56	14,385,418.92	1,681,248.27	39.61181941	-80.85501702	
11,000.00	91.00	330.00	6,755.04	2,130.67	420.57	14,385,505.51	1,681,198.28	39.61205744	-80.85519404	
11,100.00	91.00	330.00	6,753.29	2,217.26	370.57	14,385,592.10	1,681,148.28	39.61229546	-80.85537105	
11,200.00	91.00	330.00	6,751.55	2,303.85	320.58	14,385,678.69	1,681,098.29	39.61253349	-80.85554807	
11,300.00	91.00	330.00	6,749.80	2,390.44	270.59	14,385,765.28	1,681,048.30	39.61277152	-80.85572509	
11,400.00	91.00	330.00	6,748.06	2,477.03	220.60	14,385,851.87	1,680,998.31	39.61300954	-80.85590210	
11,500.00	91.00	330.00	6,746.31	2,563.62	170.60	14,385,938.45	1,680,948.32	39.61324757	-80.85607913	
11,600.00	91.00	330.00	6,744.57	2,650.21	120.61	14,386,025.04	1,680,898.32	39.61348559	-80.85625615	
11,700.00	91.00	330.00	6,742.82	2,736.80	70.62	14,386,111.63	1,680,848.33	39.61372362	-80.85643317	
11,800.00	91.00	330.00	6,741.07	2,823.38	20.63	14,386,198.22	1,680,798.34	39.61396164	-80.85661019	
11,900.00	91.00	330.00	6,739.33	2,909.97	-29.37	14,386,284.81	1,680,748.35	39.61419967	-80.85678722	
12,000.00	91.00	330.00	6,737.58	2,996.56	-79.36	14,386,371.40	1,680,698.35	39.61443769	-80.85696425	
12,100.00	91.00	330.00	6,735.84	3,083.15	-129.35	14,386,457.99	1,680,648.36	39.61467572	-80.85714127	
12,200.00	91.00	330.00	6,734.09	3,169.74	-179.34	14,386,544.58	1,680,598.37	39.61491374	-80.85731830	
12,300.00	91.00	330.00	6,732.35	3,256.33	-229.34	14,386,631.17	1,680,548.38	39.61515176	-80.85749533	
12,400.00	91.00	330.00	6,730.60	3,342.92	-279.33	14,386,717.76	1,680,498.39	39.61538979	-80.85767236	
12,500.00	91.00	330.00	6,728.86	3,429.51	-329.32	14,386,804.35	1,680,448.39	39.61562781	-80.85784940	
12,600.00	91.00	330.00	6,727.11	3,516.10	-379.31	14,386,890.94	1,680,398.40	39.61586583	-80.85802643	
12,700.00	91.00	330.00	6,725.37	3,602.69	-429.30	14,386,977.52	1,680,348.41	39.61610386	-80.85820346	
12,800.00	91.00	330.00	6,723.62	3,689.28	-479.30	14,387,064.11	1,680,298.42	39.61634188	-80.85838050	



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Lackawanna 1H (slot X)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1306.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1306.00ft
Site:	Lackawanna	North Reference:	Grid
Well:	Lackawanna 1H (slot X)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev0		

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Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
12,900.00	91.00	330.00	6,721.88	3,775.87	-529.29	14,387,150.70	1,680,248.42	39.61657990	-80.85855754	
13,000.00	91.00	330.00	6,720.13	3,862.46	-579.28	14,387,237.29	1,680,198.43	39.61681792	-80.85873458	
13,100.00	91.00	330.00	6,718.39	3,949.05	-629.27	14,387,323.88	1,680,148.44	39.61705594	-80.85891162	
13,200.00	91.00	330.00	6,716.64	4,035.64	-679.27	14,387,410.47	1,680,098.45	39.61729396	-80.85908866	
13,300.00	91.00	330.00	6,714.90	4,122.23	-729.26	14,387,497.06	1,680,048.45	39.61753199	-80.85926570	
13,400.00	91.00	330.00	6,713.15	4,208.81	-779.25	14,387,583.65	1,679,998.46	39.61777001	-80.85944274	
13,500.00	91.00	330.00	6,711.41	4,295.40	-829.24	14,387,670.24	1,679,948.47	39.61800803	-80.85961979	
13,600.00	91.00	330.00	6,709.66	4,381.99	-879.24	14,387,756.83	1,679,898.48	39.61824605	-80.85979683	
13,700.00	91.00	330.00	6,707.91	4,468.58	-929.23	14,387,843.42	1,679,848.49	39.61848407	-80.85997388	
13,800.00	91.00	330.00	6,706.17	4,555.17	-979.22	14,387,930.01	1,679,798.49	39.61872209	-80.86015093	
13,900.00	91.00	330.00	6,704.42	4,641.76	-1,029.21	14,388,016.59	1,679,748.50	39.61896010	-80.86032798	
14,000.00	91.00	330.00	6,702.68	4,728.35	-1,079.21	14,388,103.18	1,679,698.51	39.61919812	-80.86050503	
14,100.00	91.00	330.00	6,700.93	4,814.94	-1,129.20	14,388,189.77	1,679,648.52	39.61943614	-80.86068208	
14,200.00	91.00	330.00	6,699.19	4,901.53	-1,179.19	14,388,276.36	1,679,598.52	39.61967416	-80.86085913	
14,300.00	91.00	330.00	6,697.44	4,988.12	-1,229.18	14,388,362.95	1,679,548.53	39.61991218	-80.86103619	
14,400.00	91.00	330.00	6,695.70	5,074.71	-1,279.18	14,388,449.54	1,679,498.54	39.62015020	-80.86121324	
14,500.00	91.00	330.00	6,693.95	5,161.30	-1,329.17	14,388,536.13	1,679,448.55	39.62038821	-80.86139030	
14,600.00	91.00	330.00	6,692.21	5,247.89	-1,379.16	14,388,622.72	1,679,398.55	39.62062623	-80.86156736	
14,700.00	91.00	330.00	6,690.46	5,334.48	-1,429.15	14,388,709.31	1,679,348.56	39.62086425	-80.86174442	
14,800.00	91.00	330.00	6,688.72	5,421.07	-1,479.15	14,388,795.90	1,679,298.57	39.62110226	-80.86192148	
14,900.00	91.00	330.00	6,686.97	5,507.65	-1,529.14	14,388,882.49	1,679,248.58	39.62134028	-80.86209854	
15,000.00	91.00	330.00	6,685.23	5,594.24	-1,579.13	14,388,969.08	1,679,198.59	39.62157830	-80.86227560	
15,100.00	91.00	330.00	6,683.48	5,680.83	-1,629.12	14,389,055.66	1,679,148.59	39.62181631	-80.86245267	
15,200.00	91.00	330.00	6,681.74	5,767.42	-1,679.11	14,389,142.25	1,679,098.60	39.62205433	-80.86262973	
15,300.00	91.00	330.00	6,679.99	5,854.01	-1,729.11	14,389,228.84	1,679,048.61	39.62229234	-80.86280680	
15,400.00	91.00	330.00	6,678.25	5,940.60	-1,779.10	14,389,315.43	1,678,998.62	39.62253036	-80.86298386	
15,500.00	91.00	330.00	6,676.50	6,027.19	-1,829.09	14,389,402.02	1,678,948.62	39.62276837	-80.86316093	
15,600.00	91.00	330.00	6,674.76	6,113.78	-1,879.08	14,389,488.61	1,678,898.63	39.62300639	-80.86333800	
15,700.00	91.00	330.00	6,673.01	6,200.37	-1,929.08	14,389,575.20	1,678,848.64	39.62324440	-80.86351508	
15,800.00	91.00	330.00	6,671.26	6,286.96	-1,979.07	14,389,661.79	1,678,798.65	39.62348242	-80.86369215	
15,900.00	91.00	330.00	6,669.52	6,373.55	-2,029.06	14,389,748.38	1,678,748.66	39.62372043	-80.86386922	
16,000.00	91.00	330.00	6,667.77	6,460.14	-2,079.05	14,389,834.97	1,678,698.66	39.62395844	-80.86404630	
16,100.00	91.00	330.00	6,666.03	6,546.73	-2,129.05	14,389,921.56	1,678,648.67	39.62419646	-80.86422337	
16,200.00	91.00	330.00	6,664.28	6,633.32	-2,179.04	14,390,008.15	1,678,598.68	39.62443447	-80.86440045	
16,300.00	91.00	330.00	6,662.54	6,719.91	-2,229.03	14,390,094.73	1,678,548.69	39.62467248	-80.86457753	
16,400.00	91.00	330.00	6,660.79	6,806.50	-2,279.02	14,390,181.32	1,678,498.69	39.62491049	-80.86475461	
16,500.00	91.00	330.00	6,659.05	6,893.08	-2,329.02	14,390,267.91	1,678,448.70	39.62514850	-80.86493169	
16,600.00	91.00	330.00	6,657.30	6,979.67	-2,379.01	14,390,354.50	1,678,398.71	39.62538652	-80.86510877	
16,700.00	91.00	330.00	6,655.56	7,066.26	-2,429.00	14,390,441.09	1,678,348.72	39.62562453	-80.86528585	
16,731.95	91.00	330.00	6,655.00	7,093.93	-2,444.97	14,390,468.76	1,678,332.74	39.62570057	-80.86534243	

PBHL/TD 16731.95 MD/6655.00 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Lackawanna 1H BHL - hit/miss target - Shape - Point	0.00	0.00	6,655.00	7,093.93	-2,444.97	14,390,468.76	1,678,332.74	39.62570057	-80.86534243	



Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	Local Co-ordinate Reference:	Well Lackawanna 1H (slot X)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1306.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL @ 1306.00ft
Site:	Lackawanna	North Reference:	Grid
Well:	Lackawanna 1H (slot X)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Sidetrack 01		
Design:	rev0		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,992.00	2,991.76	-0.04	2.00	S/T Begin 6°/100' build/turn
3,688.64	3,636.47	-90.42	202.88	Begin 39.57° tangent
6,736.11	5,985.74	-1,074.87	1,875.85	Begin 10°/100' build/turn
7,981.95	6,807.71	-482.64	1,929.36	Begin 91.00° lateral
16,731.95	6,655.00	7,093.93	-2,444.97	PBHL/TD 16731.95 MD/6655.00 TVD

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Environmental Protection

WW-9
(4/16)

API Number 47 - 103 - 02982

Operator's Well No. Lackawanna 1H

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) Outlet Middle Island Creek Quadrangle Porter Falls 7.5'

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

Will a pit be used? Yes No

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

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

*DH
8-8-18*

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 a Landfill

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0108185) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1396426)

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 *James A Pancake*
Company Official (Typed Name) Jim Pancake
Company Official Title Vice President Geoscience

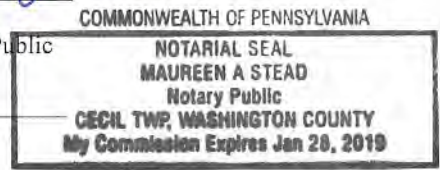
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Office of Oil and Gas
AUG 15 2018
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Environmental Protection

Subscribed and sworn before me this 7 day of AUG, 20 18

Maureen A Stead

Notary Public

My commission expires 1/28/19



Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 26.69 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20 or equivalent

Fertilizer amount 1/3 ton lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40

Seed Type	lbs/acre
Fox Tail / Grassy	40
Perennial Rye	30
Crown Vetch	20

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: 

Comments: _____

Title: Oil and Gas Inspector

Date: 8-8-18

Field Reviewed? () Yes () No

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AUG 15 2018
WV Department of
Environmental Protection

PROPOSED LACKAWANNA 1H

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.



TM 12 - PAR. 122
LACKAWANNA TRANS. CO.
94.5 ACRES

TM 12 - PAR. 130
LACKAWANNA TRANS. CO.
25.64 ACRES

1,387' @ 4% TO 10% GRADE

SEDIMENT POND

EXISTING ACCESS ROAD

LANDFILL ROAD

SWAMP

OVERHEAD UTILITY

1,803' @ 2% TO 9% GRADE

SEDIMENT POND

TRUCK WASH AREA

POND

TM 17 - PAR. 6.3
LACKAWANNA TRANS. CO.
4.13 ACRES

TM 17 - PAR. 7.1
LACKAWANNA TRANS. CO.
21.37 ACRES

TM 17 - PAR. 6
JERRY W. &
DELORIS THOMPSON
30.71 ACRES

STORM SEWER POND

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LEGEND

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

WV Department of Environmental Protection

TO ST. RT. 180

SEDIMENT POND

LANDFILL ROAD

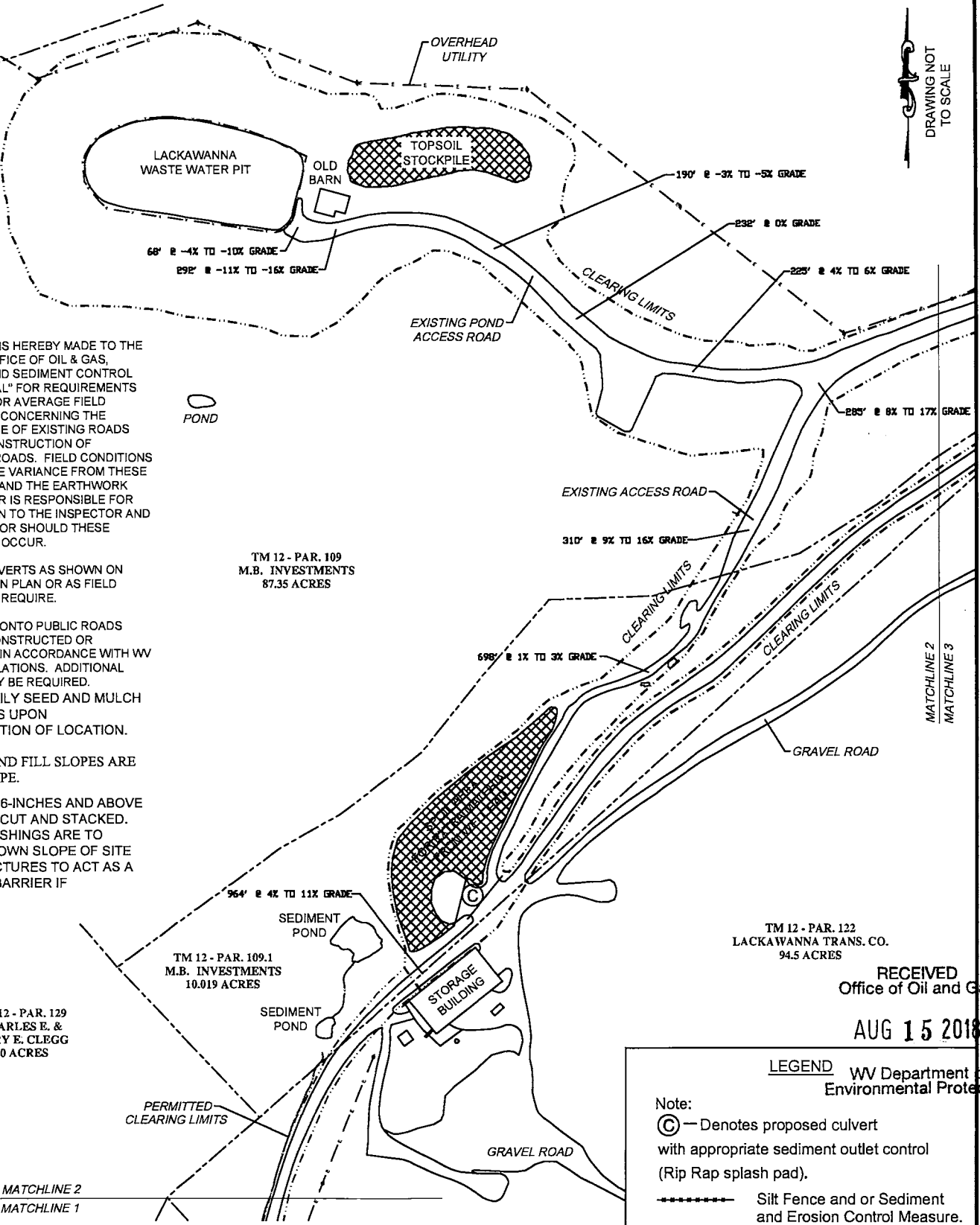
LANDFILL OFFICE

TM 17 - PAR. 10.1
LACKAWANNA TRANS. CO.
13 ACRES

TO CO. RT. 28

PROPOSED LACKAWANNA 1H

DRAWING NOT TO SCALE



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.

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POND

TM 12 - PAR. 109
M.B. INVESTMENTS
87.35 ACRES

TM 12 - PAR. 109.1
M.B. INVESTMENTS
10.019 ACRES

TM 12 - PAR. 129
CHARLES E. &
MARY E. CLEGG
20 ACRES

TM 12 - PAR. 122
LACKAWANNA TRANS. CO.
94.5 ACRES

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AUG 15 2018

LEGEND WV Department of Environmental Protection

Note:

⊙ — Denotes proposed culvert with appropriate sediment outlet control (Rip Rap splash pad).

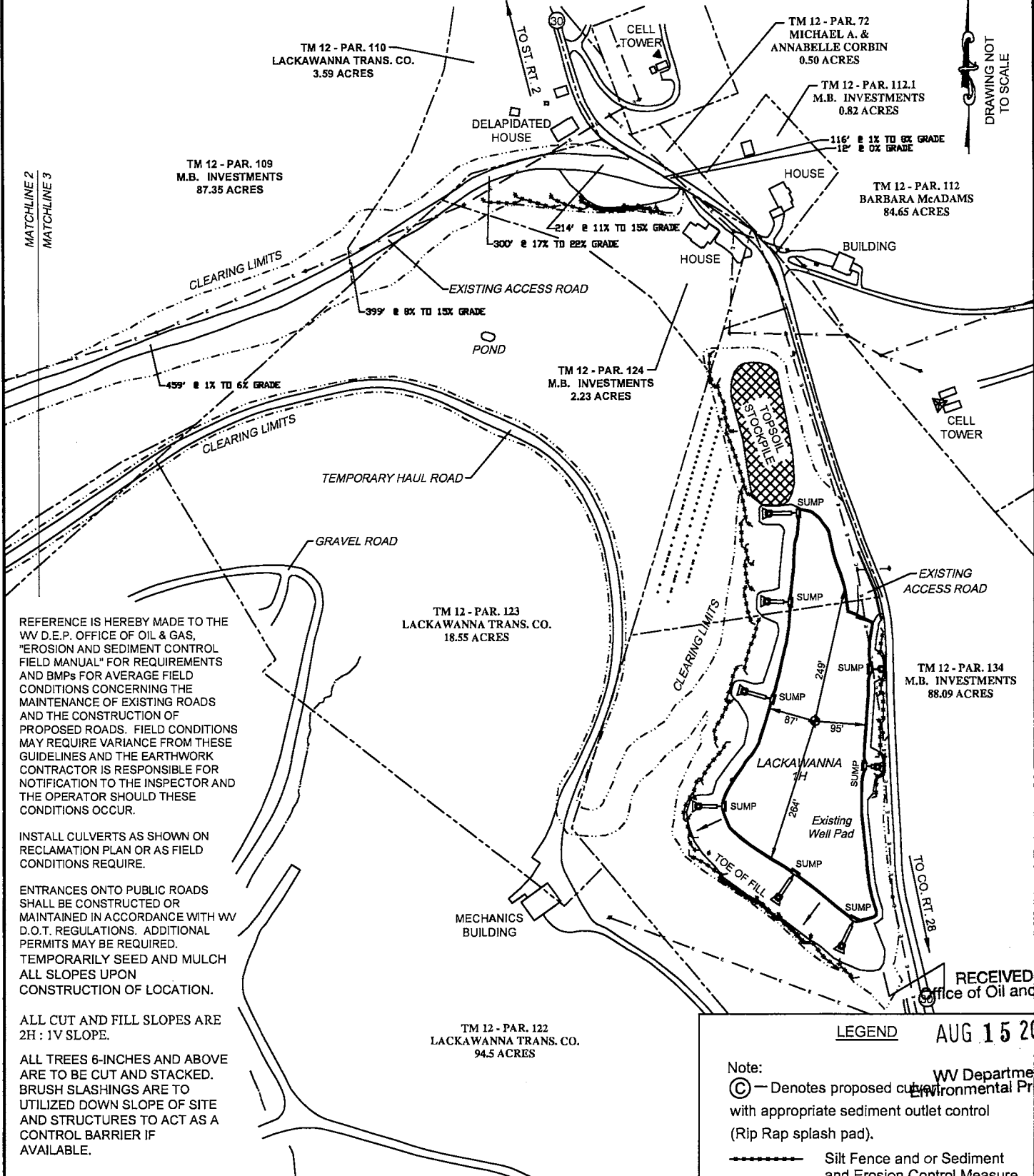
----- Silt Fence and or Sediment and Erosion Control Measure.

----- Surface Boundary

MATCHLINE 2
MATCHLINE 1

MATCHLINE 2
MATCHLINE 3

PROPOSED LACKAWANNA 1H



DRAWING NOT TO SCALE

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.

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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.

TM 12 - PAR. 123
LACKAWANNA TRANS. CO.
18.55 ACRES

TM 12 - PAR. 122
LACKAWANNA TRANS. CO.
94.5 ACRES

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AUG 15 2018

WV Department of Environmental Protection

LEGEND

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



Well Site Safety Plan

Tug Hill Operating, LLC

Well Name: Lackawanna 1H

Pad Location: Lackawanna Pad

Wetzel County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,384,061.53

Easting: 512,302.15

DMH
8-8-18

August 2018
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Office of Oil and Gas

AUG 15 2018

WV Department of
Environmental Protection

WW-9

PROPOSED LACKAWANNA 1H


SUPPLEMENT PG 2



NOTE: CLOSEST WATER PURVEYOR
 GRANDVIEW - DOOLIN PUBLIC SERVICE
 DISTRICT PROCTOR, WV
 LAT: 39.7136943
 LON: -80.8260157
 LOCATED N 13-18 E AT 40.092' FROM
 LACKAWANNA 1H
 SURFACE LOCATION

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 AUG 15 2018

WV Department of
 Environmental Protection

 TUG HILL OPERATING	OPERATOR 494510851 TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	TOPO SECTION PORTERS FALLS 7.5' SCALE: 1" = 2000'	LEASE NAME LACKAWANNA DATE: DATE: 08-01-2018
---	---	--	---

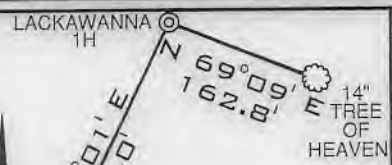
form ww6

LACKAWANNA LEASE WELL 1H

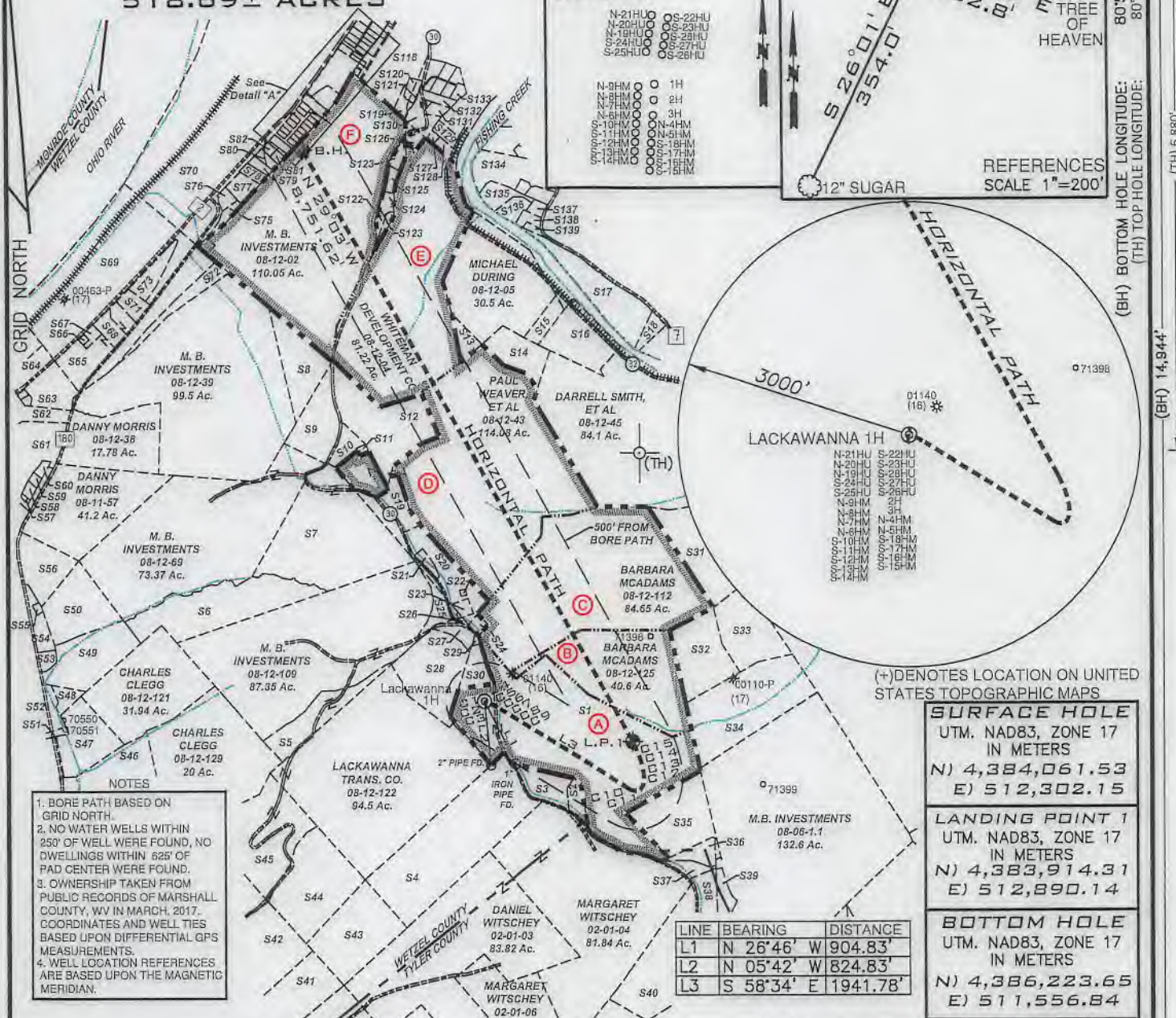
518.69± ACRES

TOP HOLE LATITUDE: 39°37'30"
BOTTOM HOLE LATITUDE: 39°40'00"

DETAIL SCALE 1"=100'
SKETCH "A"



REFERENCES SCALE 1"=200'



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

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

SURFACE HOLE UTM. NAD83, ZONE 17 IN METERS N) 4,384,061.53 E) 512,302.15
LANDING POINT 1 UTM. NAD83, ZONE 17 IN METERS N) 4,383,914.31 E) 512,890.14
BOTTOM HOLE UTM. NAD83, ZONE 17 IN METERS N) 4,386,223.65 E) 511,556.84

LINE	BEARING	DISTANCE
L1	N 26°46' W	904.83'
L2	N 05°42' W	824.83'
L3	S 58°34' E	1941.78'

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 73°28' W	3.16	10.50	3.17
C2	S 06°21' W	2.33	1.17	3.51
C3	S 55°28' E	6.93	88.28	6.93
C4	S 56°10' W	0.46	0.38	1.90
C5	N 02°36' W	5.76	20.99	5.78
C6	N 52°55' E	6.58	4.91	7.20
C7	S 73°36' E	37.17	92.41	37.43

LEGEND

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

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C8	S 62°23' E	100.90	920.82	100.95
C9	S 59°16' E	80.33	3090.61	80.33
C10	S 67°31' E	89.71	257.05	90.18
C11	N 79°30' E	79.23	97.91	81.57
C12	N 30°24' E	86.27	124.46	88.09
C13	N 01°54' E	125.47	373.57	126.07
C14	N 15°11' W	258.39	976.27	259.15
C15	N 25°34' W	179.73	1460.25	179.84

FILE NUMBER _____

DRAWING NUMBER LACKAWANNA_WP_1H

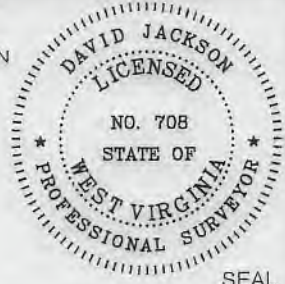
SCALE 1" = 2000'

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

David L Jackson



JACKSON SURVEYING INC.
P.O. Box 1460
Clarksburg, WV 26302
304-823-5851

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

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

DATE: AUGUST 2, 2018

OPERATORS WELL NO. LACKAWANNA 1H

API WELL NO. 47-103-02982HGA

STATE WV COUNTY WETZEL PERMIT SEE WW-6A1 FORM

LOCATION ELEVATION 1306.26' WATERSHED (HUC 10) OUTLET MIDDLE ISLAND CREEK

DISTRICT MAGNOLIA COUNTY WETZEL

QUADRANGLE PORTER FALLS 7.5' LEASE NUMBER SEE WW-6A1 FORM

SURFACE OWNER M. B. INVESTMENTS ACREAGE 88.09

OIL & GAS ROYALTY OWNER M. B. INVESTMENTS, ET AL LEASE ACREAGE 88.09

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

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD 6,937' TMD: 16,732'

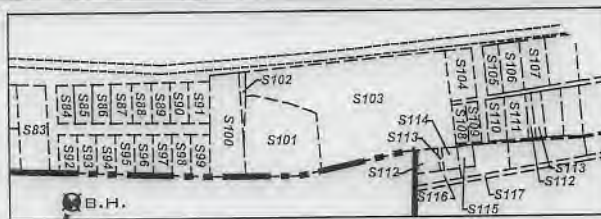
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
CT CORPORATION SYSTEM

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

COUNTY NAME
PERMIT

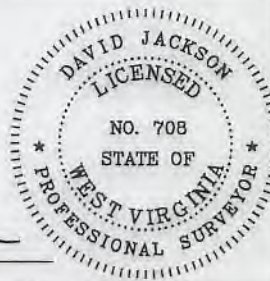
Form WVG

LACKAWANNA LEASE WELL 1H 518.69± ACRES



Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S1	08-12-134	M. B. Investments	88.09
S2	08-12-134.1	Raymond L. & Elizabeth Pribble	2.14
S3	08-12-134.3	M. B. Investments	5.55
S4	08-17-04	M. B. Investments	46.75
S5	08-12-109.1	M. B. Investments	10.019
S6	08-12-108	M. B. Investments	24.0
S7	08-12-70	M. B. Investments	50.37
S8	08-12-14	Thomas & Helena McLaughlin	10.5
S9	08-12-40	Timothy Doty & Helena McLaughlin	8.83
S10	08-12-41	Michael A. & Annabelle Corbin & Paul E. & Christine Weaver	3.39
S11	08-12-42	Shriver Cemetery	1.0
S12	08-12-43.1	Michael A. & Annabelle Corbin & Paul E. & Christine Weaver	22.25
S13	08-12-15	Michael A. & Annabelle Corbin & Paul E. & Christine Weaver	2.6
S14	08-12-44	Richard L. Armstrong, et al	8.0
S15	08-12-5.1	Michael & Joyce Durig	4.0
S16	08-12-16	Russell Dalrymple, et al	11.87
S17	08-12-08	Calvin Dean Cross	14.96
S18	08-12-17	Virgie E. Kuhns	1.25
S19	08-12-43.2	Michael A. & Annabelle Corbin & Paul E. & Christine Weaver	7.25
S20	08-12-43.5	M. B. Investments	8.774
S21	08-12-43.4	M. B. Investments	0.996
S22	08-12-43.3	Geraldine C. Cross	0.13
S23	08-12-111	WV Conservation Comm.	1.0
S24	08-12-112.1	M. B. Investments	0.82
S25	08-12-110	Lackawanna Transport Company	3.59
S26	08-12-72	Michael A. & Annabelle Corbin & Paul E. & Christine Weaver	0.50
S27	08-12-124	M. B. Investments	2.23
S28	08-12-123	Lackawanna Transport Company	18.55
S29	08-12-134.2	M. B. Investments	0.23
S30	08-12-134.4	M. B. Investments	3.51
S31	08-12-113	Jacob Presley Morgan III	16.30
S32	08-12-126	Jacob Presley Morgan III	16.06
S33	08-12-127	Jacob Presley Morgan III	10.0
S34	08-12-136	Jacob Presley Morgan III	28.25
S35	08-12-135	Timothy J. Haynes & Gary W. Wofter	21.0
S36	02-01-5.2	Mark K. & Teresa J. Loy	2.945
S37	02-01-5.3	Mark K. & Teresa J. Loy	1.939
S38	02-01-5.1	Mark K. & Teresa J. Loy	4.56
S39	05-06-01	Mark K. & Teresa J. Loy	2.37
S40	02-01-05	Daniel A. Witschey	21.5
S41	08-17-14	Sharon Manion	16.12
S42	08-17-10.1	Lackawanna Transport Company	13.0
S43	08-17-07	Daniel A. Witschey	21.375
S44	08-17-7.1	Lackawanna Transport Company	21.37
S45	08-12-130	Lackawanna Transport Company	25.64
S46	08-17-02	M. B. Investments	74.0
S47	08-12-120	Charles E. & Mary E. Clegg	12.61
S48	08-11-82	Mary Elizabeth Clegg	3.24
S49	08-12-106	Thomas C. Pennell	15.96
S50	08-12-106.1	Thomas R. & Tamara D. Pennell	14.04
S51	08-11-82.1	Pleasant Valley Church of Christ	0.77
S52	08-11-81	Timothy M. Clegg	0.75
S53	08-11-79	Floyd E. Lewis, Jr. & Floyd E. Lewis, Sr.	0.67
S54	08-11-73.2	Floyd E. Lewis, Jr. & Floyd E. Lewis, Sr.	3.88
S55	08-11-74	Vada Hart Est., et al	0.31
S56	08-11-61	Hunter B. McAdams & Doug McAdams	7.61
S57	08-11-57.2	Erick L. & Jessica Kibbey	28.51
S58	08-11-57.4	Ralph & Velinda Phillips	0.61
S59	08-11-57.1	Ralph & Velinda Phillips	0.48
S60	08-11-57.3	Martha L. Graham	1.8
S61	08-11-42	Martha L. Graham	5.0
S62	08-11-39.1	William L. & Beulah Talkington	1.83
S63	08-11-41	A+A Supply, LLC	1.63
S64	08-11-35	Lisa Straight & Edwin Rial	5.9
S65	08-12-11	Calvin T. Hedrick	6.64
S66	08-12-11.1	Larry D. McCaman	0.23

Number	TAX MAP-PARCEL	SURFACE OWNER	ACRES
S67	08-12-11.3	Larry McCaman	0.807
S68	08-12-11.4	Paul Andrew James Simmons, Jr.	1.94
S69	08-12-01	Mount Clare Properties, Inc	50.71
S70	08-07-105	Mount Clare Properties, Inc	106.08
S71	08-12-11.2	Ascent Resources Marcellus Minerals, LLC	1.811
S72	08-12-13	M. B. Investments	8.18
S73	08-12-139	Department of Public Safety	3.86
S75	08-07-87.2	H. Lee Scott Jr.	1.110
S76	08-07-87.1	H. Lee Scott Jr.	0.955
S77	08-07-87	H. Lee Scott Jr. & Colleen D., Stephen A. & Betty A. Davis	2.221
S78	08-07-88	Living Quarters, LLC	1.08
S79	08-07-89.3	Living Quarters, LLC	0.87
S80	08-07-89.2	Barbara S. Nice	0.89
S81	08-07-89	Barbara S. Nice	0.40
S82	08-07-89.1	Barbara S. Nice	0.35
S83	08-07-90	Barbara Shank	0.69
S84	08-07-91	Dennis Phillips	0.20
S85	08-07-92	Karen D. Pugh	0.20
S86	08-07-93	Darrell S. & Diana Lynn Hartwig	0.21
S87	08-07-94	Ronald D. & Carole Dawson	0.21
S88	08-07-95	Debra Barrile	0.21
S89	08-07-96	Rita E. Barrick	0.21
S90	08-07-102	Michael Vaughn Skeen & Patricia Ann Sawyer	0.22
S91	08-07-103.1	Charlotte M. Adams	0.22
S92	08-07-97	Roy H. Booher	0.20
S93	08-07-98	Roy H. Booher	0.20
S94	08-07-98.1	Lionel Kent, Helen A. Potts & Deloris Potts (Life)	0.20
S95	08-07-99	Lionel Kent, Helen A. Potts & Deloris Potts (Life)	0.20
S96	08-07-100	James J. & Carol Clark	0.21
S97	08-07-101	Doris A. Fannin & Richard S. Williamson	0.21
S98	08-07-102.1	Ronald E. Jr. & Lori J McCoy	0.21
S99	08-07-103	Michael L. & Joyce D. Durig	0.21
S100	08-07-104	Lisa Denise Bridge	0.12
S101	08-07-106.1	Tiona Henthorn	1.49
S102	08-07-104.1	Lisa Denise Bridge	0.06
S103	08-07-106	Route 2 South, LLC	4.33
S104	08-07-107	Route 2 South, LLC	0.36
S105	08-07-108	Donald W. Owens, Jr.	0.21
S106	08-07-109	Douglas E. & Amber L. Straight	0.21
S107	08-07-110	Allen R. & Malinda J. Laugh	0.34
S108	08-07-114	Ruth Leek	0.14
S109	08-07-115	William J. Leek	0.14
S110	08-07-116	Betty J. Yoho (Life), Sandra M. Hardman	0.20
S111	08-07-117	Jerry W. & Elizabeth Southerly	0.21
S112	08-07-123.1	Ruth Ann Leek	0.23
S113	08-07-123.2	Ruth Ann Leek	0.07
S114	08-07-124	Ruth Ann Leek	0.08
S115	08-07-125	Ruth Ann Leek	0.07
S116	08-07-126	Ruth Ann Leek	0.30
S117	08-07-129	John William Burton, et al	1.10
S118	08-07-131.3	Nancy J. Todd	9.726
S119	08-07-131.1	Edgor W. Whiteman, Jr.	1.25
S120	08-07-131.4	Nancy J. Todd	0.989
S121	08-07-137.4	Nancy J. Todd	0.06
S122	08-12-03	O. Terrell Coffield Family Trust	0.98
S123	08-12-4.1	Whiteman Development Co., LLC & PRN, LLC	2.59
S124	08-07-142	Pamela E. Weisenbarger	1.35
S125	08-07-142.1	Thomas W, II & Teena B. Emch	1.35
S126	08-07-160	Frank L. Price, Jr.	1.28
S127	08-07-144	Bennie D. Lewis, et al	5.58
S128	08-07-143	Dominic D. Yost	1.0
S129	08-07-144.1	Donald J. & Debby J. Powell	2.25
S130	08-07-137	462 Properties, LLC	1.836
S131	08-07-137.2	Steven D. Folmar	1.0
S132	08-07-138	Frederick W. & Leslie M. Emch	1.11
S133	08-07-137.1	Steven D. Folmar	0.94
S134	08-07-145	Lois J. Day	8.008
S135	08-07-145.5	Jodi Forni	3.65
S136	08-07-145.3	Jodi Forni	2.641
S137	08-07-145.2	David J. Jackson,(Life), James & Ruth Jackson	0.813
S138	08-12-06	David J. Jackson,(Life), James & Ruth Jackson	1.74
S139	08-12-07	David J. Jackson,(Life), James & Ruth Jackson	0.35



P.S. 708 *David L Jackson*



TUG HILL
OPERATING

OPERATOR'S
WELL #: LACKAWANNA 1H
DISTRICT: Magnolia
COUNTY: Wetzel
STATE: WV

WELL PLAT
PAGE 2 OF 2
DATE: 08/02/2018

**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**

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

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

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

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

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Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page		Assignment	Assignment	Assignment
10*47103.061.2	8-12-134	A	M B INVESTMENTS	TH EXPLORATION LLC	1/8+	179A	475	N/A	N/A	N/A
10*16201	8-12-125	B	BARBARA MCADAMS	TH EXPLORATION LLC	1/8+	189A	465	N/A	N/A	N/A
10*16201	8-12-112	C	BARBARA MCADAMS	TH EXPLORATION LLC	1/8+	189A	465	N/A	N/A	N/A
10*15191	8-12-43	D	MICHAEL A CORBIN	GASTAR EXPLORATION USA INC	1/8+	127A	392	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 129A/217	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*15192	8-12-43	D	PAUL E WEAVER	GASTAR EXPLORATION USA INC	1/8+	127A	395	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 129A/217	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*15242	8-12-4	E	PRN LLC	GASTAR EXPLORATION USA INC	1/8+	129A	576	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 135A/284	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*15243	8-12-4	E	WHITEMAN DEVELOPMENT COMPANY LLC	GASTAR EXPLORATION USA INC	1/8+	128A	931	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 135A/284	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*15187	8-12-2	F	PAMELA E. & PHILLIP C. WEISENBARGER	GASTAR EXPLORATION USA INC	1/8+	145A	914	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 126A/423	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*15188	8-12-2	F	REBECCA E. SULLIVAN	GASTAR EXPLORATION USA INC	1/8+	146A	401	Gastar Exploration USA, Inc. to Atinum Marcellus I LLC: 126A/423	Certificate of Merger of Gastar Exploration USA, Inc. to Gastar Exploration Inc: 13/270	Gastar Exploration Inc to TH Exploration II, LLC: 173A/431
10*47103.061.2	8-12-2	F	M B INVESTMENTS	TH EXPLORATION LLC	1/8+	179A	475	N/A	N/A	N/A

AFFIDAVIT

COPY

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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.

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WV Department of
Environmental Protection

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

David D. Kalish
Affiant: David D. Kalish

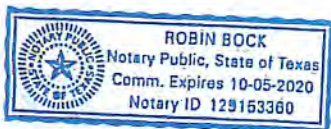
JURAT

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

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

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

DPS LAND SERVICES-CORP-TIM SCHULTZ
6000 TOWN CENTER BLVD STE 145
CANNONSBURG, PA 15317-5841

WHEN RECORDED RETURN TO:
TH Exploration II, LLC
1320 South University Drive, Suite 500
Fort Worth, Texas 76107
Attn: David Kalish

Execution Version

ASSIGNMENT AND BILL OF SALE

STATE OF WV §
 § KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF WETZEL §

THIS ASSIGNMENT AND BILL OF SALE (this "*Assignment*"), dated April 7, 2016, but effective as of 7:00 A.M. Houston time on January 1, 2016 (the "*Effective Time*"), is between Gastar Exploration Inc., a Delaware corporation, whose address is 1331 Lamar Street, Suite 650 Houston, Texas 77010 ("*Assignor*"), and TH Exploration II, LLC, a Texas limited liability company, whose address is 1320 South University Drive, Suite 500, Fort Worth, Texas 76107 ("*Assignee*"). Assignor and Assignee are each, individually, referred to herein as a "*Party*" and, collectively, as the "*Parties*".

Capitalized terms used but not defined herein shall have the respective meanings set forth in that certain Purchase and Sale Agreement (the "*Purchase Agreement*"), dated as of February 19, 2016, by and between Assignor and Assignee (as successor-in-interest).

Section 1. Assignment. The conveyance and assignment herein shall be deemed effective as of the Effective Time.

For Ten Dollars (\$10.00) and other good and valuable consideration (the receipt and sufficiency of which are hereby acknowledged), Assignor does hereby forever GRANT, BARGAIN, SELL, CONVEY, ASSIGN, TRANSFER, SET OVER AND DELIVER unto Assignee, all of Assignor's right, title and interest in and to the following interests and properties (such right, title and interest described in *subsections (a) through (k)* of this Section 1, less and except the Excluded Assets, collectively, the "*Conveyed Interests*");

(a) all oil, gas and/or mineral leases of Assignor, together with any and all other right, title and interest of Assignor in and to the leasehold estates created thereby, including subleases, royalties, overriding royalties, net profits interest, carried interests or similar rights or interests in such leases, and together with all rights, privileges, benefits and powers conferred upon Assignor with respect to the use and occupation of the lands covered thereby that may be necessary, convenient or incidental to the possession and enjoyment of such leases, located in Marshall, Wetzel, Doddridge, Harrison, Lewis, Marion, and Monongalia Counties, West Virginia and Greene, Butler, Fayette, Somerset, and Clearfield Counties, Pennsylvania, including those described on Exhibit A—Part 1 attached hereto (subject to any reservations, limitations or depth restrictions described on Exhibit A—Part 1), (Assignor's interest in such leases and other right, title and interest as so limited, the "*Leases*");

US 4080695

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WV Department of
Environmental Protection



August 14, 2018

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

RE: Lackawanna 1H

Dear Laura:

Tug Hill Operating, LLC (THO) hereby submits this letter as confirmation that THO has obtained the right to drill, extract and produce the minerals under Wetzel County Route 30 in the area reflected on the Lackawanna 1H well plat. THO has conducted a full title search in the relevant Court House to confirm its' ownership under said County Routes and is not currently aware of any recorded document that would suggest an ownership other than THO.

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

Sincerely,

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

Amy L. Miller
Permit Specialist – Appalachia

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

Date of Notice Certification: 08/13/2018

API No. 47- 103 - 02982
Operator's Well No. Lackawanna 1H
Well Pad Name: Lackawanna

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>512,302.15</u>
County: <u>Wetzel</u>	Northing: <u>4,384,061.53</u>
District: <u>Magnolia</u>	Public Road Access: <u>County Route 30</u>
Quadrangle: <u>Porter Falls</u>	Generally used farm name: <u>Wetzel County Sanitary Landfill</u>
Watershed: <u>Outlet Middle Island Creek</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.

<p>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:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 100px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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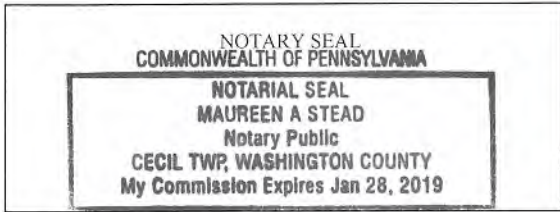
Required Attachments:

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>[Signature]</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permit Specialist</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 13 day of Aug, 2018.
Maureen A Stead Notary Public
 My Commission Expires 1/28/19

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at 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: 8/9/2018 **Date Permit Application Filed:** 8/10/2018

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: M.B. Investments
 Address: 2650 Audubon Road
Audubon, PA 19493
 Name: _____
 Address: _____

COAL OWNER OR LESSEE
 Name: M.B. Investments
 Address: 2650 Audubon Road
Audubon, PA 19493
 COAL OPERATOR
 Name: _____
 Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
 Name: Lackawanna Transport Company
 Address: 2650 Audubon Road
Audubon, PA 19493
 Name: _____
 Address: _____

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
 Name: *See attachment
 Address: _____

SURFACE OWNER(s) (Impoundments or Pits)
 Name: _____
 Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
 Name: _____
 Address: _____

*Please attach additional forms if necessary

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 Office of Oil and Gas
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 Environmental Protection

Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

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

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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

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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

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- 103 - 02982
OPERATOR WELL NO. Lackawanna 1H
Well Pad Name: Lackawanna

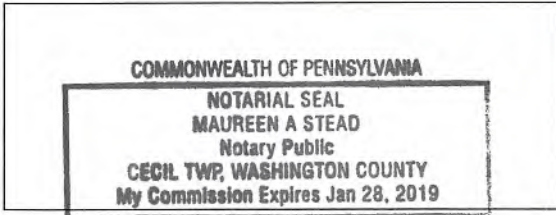
Notice is hereby given by:

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

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

Oil and Gas Privacy Notice:

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



Subscribed and sworn before me this 9 day of AUG. 2018.
Maureen A. Stead Notary Public
My Commission Expires 1/28/19

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AUG 15 2018
WV Department of
Environmental Protection

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

WATER WELL REPORT

Well: LACKAWANNA 1H
 District: Magnolia
 County: Wetzel
 State: WV

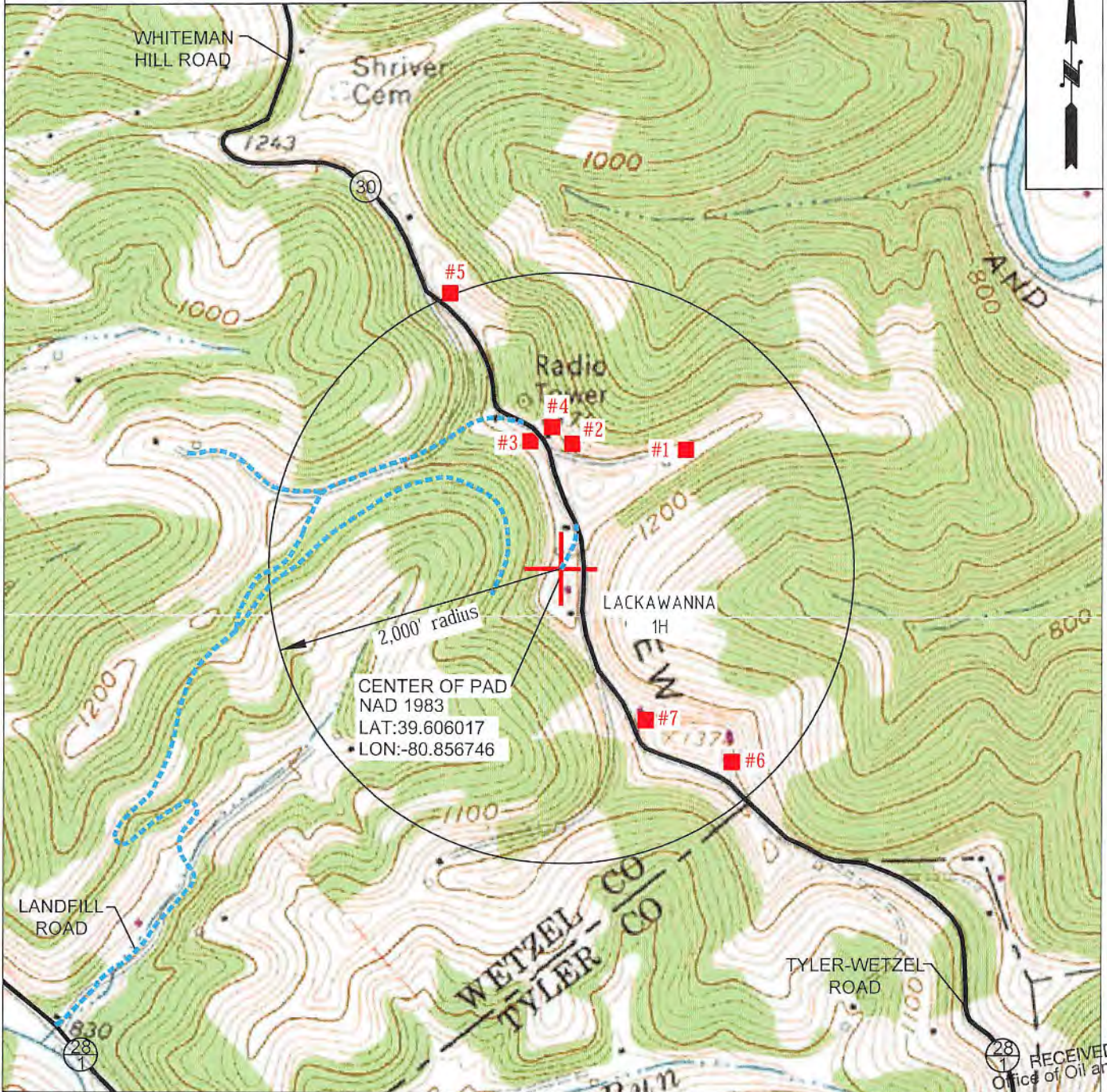
There appears to be Seven (7) possible water sources within 2,000 feet of the above referenced well location.

Topo Spot # 1 TM 12 Par. 112 Barbara McAdams 304-455-2350 6289 Veterans Hwy. New Martinsville, WV 26155	Topo Spot # 2 (Business) TM 12 Par. 112 Barbara McAdams 304-455-2350 6289 Veterans Hwy. New Martinsville, WV 26155	Topo Spot # 3 TM 12 Par. 124 M B Investments c/o J.R. Mascaro & Sons 267-933-6142 2650 Audubon Rd. Audubon, PA 19403
Topo Spot # 4 TM 12 Par. 112.1 M B Investments c/o J.P. Mascaro & Sons 267-933-6142 2650 Audubon Rd. Audubon, PA 19403	Topo Spot # 5 TM 12 Par. 43.4 M B Investments c/o J.P. Mascaro & Sons 267-933-6142 2650 Audubon Rd. Audubon, PA 19403	Topo Spot # 6 TM 12 Par. 134.1 Raymond L. & Elizabeth Pribble 304-546-3366 966 Doolin Run Rd. New Martinsville, WV 26155
Topo Spot # 7 TM 12 Par. 134.3 M B Investments c/o J.P. Mascaro & Sons 267-933-6142 2650 Audubon Rd. Audubon, PA 19403		

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PROPOSED LACKAWANNA 1H

There appears to be Seven (7) possible water sources within 2,000'.



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TUG HILL
OPERATING

OPERATOR	494510851
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	

TOPO SECTION	LEASE NAME
PORTERS FALLS 7.5'	LACKAWANNA
SCALE:	DATE:
1" = 1000'	DATE: 08-01-2018

TOPO SECTION	LEASE NAME
PORTERS FALLS 7.5'	LACKAWANNA
SCALE:	DATE:
1" = 1000'	DATE: 08-01-2018

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF INTENT TO DRILL

Pursuant to W. Va. Code § 22-6A-16(b), the Notice of Intent to Drill is only required if the notice requirements of W. Va. Code § 22-6A-10(a) have NOT been met or if the Notice of Intent to Drill requirement has NOT been waived in writing by the surface owner.

Notice Time Requirement: Notice shall be provided at least **TEN (10)** days prior to filing a permit application.

Date of Notice: 07/20/2018 **Date Permit Application Filed:** 08/13/2018

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

HAND DELIVERY CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Pursuant to W. Va. Code § 22-6A-16(b), at least ten days prior to filing a permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner notice of its intent to enter upon the surface owner's land for the purpose of drilling a horizontal well: *Provided*, That notice given pursuant to subsection (a), section ten of this article satisfies the requirements of this subsection as of the date the notice was provided to the surface owner: *Provided, however*, That the notice requirements of this subsection may be waived in writing by the surface owner. The notice, if required, shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative.

Notice is hereby provided to the SURFACE OWNER(s):

Name: M.B. Investments, a West Virginia Partnership
Address: 2650 Audubon Road
Audubon, PA 19403

Name: Lackawanna Transport Company, a West Virginia Corporation
Address: 2650 Audubon Road
Audubon, PA 19403

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(b), notice is hereby given that the undersigned well operator has an intent to enter upon 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>512,301.90</u>
County:	<u>Wetzel</u>		Northing:	<u>4,384,061.53</u>
District:	<u>Magnolia</u>	Public Road Access:		<u>County Route 30</u>
Quadrangle:	<u>Porters Falls</u>	Generally used farm name:		<u>Wetzel County Sanitary Landfill</u>
Watershed:	<u>Outlet Middle Island Creek (Undefined)</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(b), this notice shall include the name, address, telephone number, and if available, facsimile number and electronic mail address of the operator and the operator's authorized representative. 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.

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Telephone: 724-749-8388
Email: amiller@tug-hillop.com
Facsimile: 724-338-2030

Authorized Representative: Sean Cotter
Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Telephone: 724-749-8388
Email: scotter@tug-hillop.com
Facsimile: 724-338-2030

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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.

WV Department of Environmental Protection

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

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

Date of Notice: 08/13/2018 **Date Permit Application Filed:** 08/14/2018

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: M.B. Investments, a West Virginia Partnership
Address: 2650 Audubon Road
Audubon, PA 19403

Name: Lackawanna Transport Company, A West Virginia Corporation
Address: 2650 Audubon Road
Audubon, PA 19403

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>512,302.15</u>
County:	<u>Wetzel</u>		Northing:	<u>4,384,061.53</u>
District:	<u>Magnolia</u>	Public Road Access:	<u>County Route 30</u>	
Quadrangle:	<u>Porters Falls</u>	Generally used farm name:	<u>Wetzel County Sanitary Landfill</u>	
Watershed:	<u>Outlet Middle Island Creek</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-hillop.com

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

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WV Department of
Environmental Protection

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.



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

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

August 6, 2018

Jill M. Newman
Deputy Commissioner

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

Subject: DOH Permits for the Lackawanna Well Pad, Wetzel County
Lackawanna N-1H Well

Dear Mr. Martin,

This well site will be accessed from Permit #06-2013-0527 transferred to Tug Hill Operating for access to the State Road for a well site located off of Wetzel County Route 30 SLS.

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

Very Truly Yours,

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

Cc: Amy Miller
Tug Hill Operating
CH, OM, D-6
File

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Lackawanna 1H

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

RECEIVED
Office of Oil and Gas

AUG 15 2018

WV Department of
Environmental Protection



PROJECT LOCATION

**WVDEP OOG
ACCEPTED AS-BUILT**
WJ
10 / 23 / 2018

Lackawanna Well Site

Site Design, Construction Plan, &
Erosion and Sediment Control Plans
Tug Hill Operating
Wetzel County
Magnolia District
Latitude 39.60601695°
Longitude -80.85674612°
Outlet Middle Island Creek Watershed

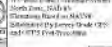
Pertinent Site Information
Lackawanna Well Site
Fingerprint Number: 314-15-53070
Magnolia District, Wetzel County, WV
Watershed: Outlet Middle Island Creek Watershed
Trg File Contact Number: 1-817-625-3400

Property Owner Information - Lackawanna Well Site

Owner	Acres	Year	Acres	Year	Acres	Year
Lackawanna Property Co	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978
Lackawanna Property Co	23.00	1978	1.00	1978	1.00	1978
Lackawanna Property Co	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978
Lackawanna Property Co	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978
WV Department of Transportation	23.00	1978	1.00	1978	1.00	1978

Exhibit A: Final Design: Issue for Permitting

Lot No.	APR/01/00	APR/01/00	APR/01/00	APR/01/00	APR/01/00	APR/01/00	APR/01/00
1
2
3
4
5
6
7
8
9
10



Across Road

Lot No.	Area (Acres)	Type
1	1.00	...
2	1.00	...
3	1.00	...
4	1.00	...
5	1.00	...
6	1.00	...
7	1.00	...
8	1.00	...
9	1.00	...
10	1.00	...

Detached Area

Lot No.	Area (Acres)
1	1.00
2	1.00
3	1.00
4	1.00
5	1.00
6	1.00
7	1.00
8	1.00
9	1.00
10	1.00

Lackawanna Well Site Quantities

Item	Quantity
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...

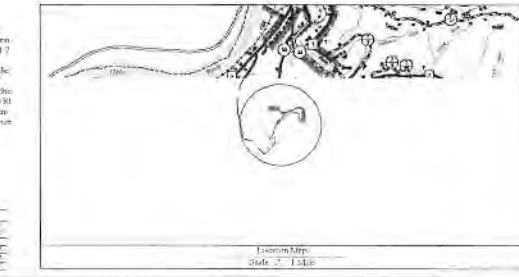
EXISTING API NUMBERS

- 47-103-02982
- 47-103-02983
- 47-103-03906

Site Locations (NAD 83)

Location	X	Y	Location	X	Y
1	2	...	...
3	4	...	...
5	6	...	...
7	8	...	...
9	10	...	...

Approach Routes



- 1. The applicant shall provide access to the well sites from the main road on the site.
- 2. The applicant shall provide access to the well sites from the main road on the site.
- 3. The applicant shall provide access to the well sites from the main road on the site.

Project Contacts

Role	Name	Contact Info
Project Manager
Site Supervisor
...



The WV Electric Light & Power Company (WV ELP) is a utility of the State of West Virginia. The project is subject to the terms and conditions of the Utility Service Agreement. The project is subject to the terms and conditions of the Utility Service Agreement.

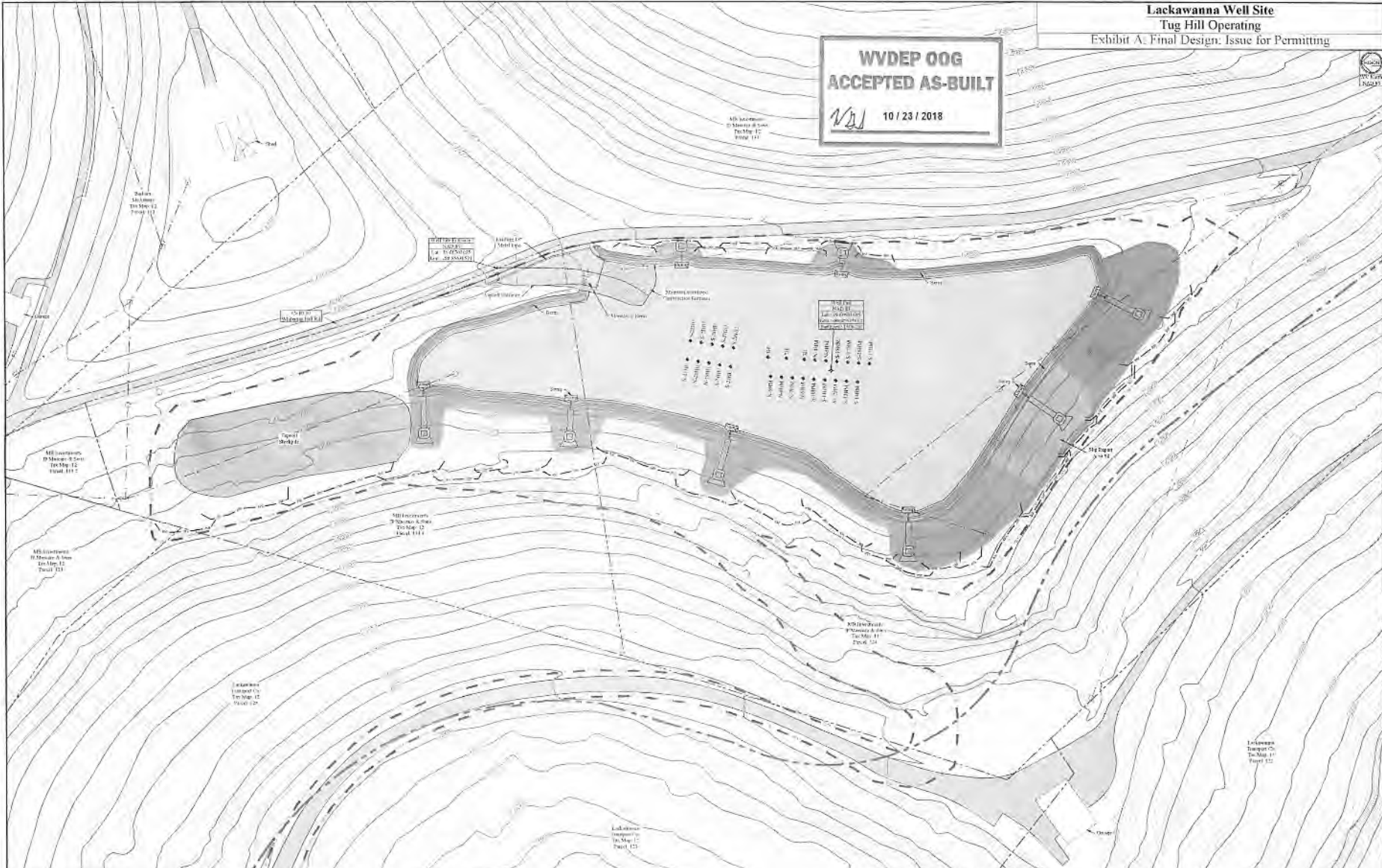


Sheet	Description
1	Project Sheet
2	Site Plan
3	Approach Routes
4	Erosion Control
5	Site Details
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
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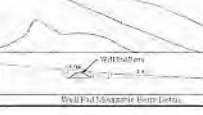
TUG HILL OPERATING
 Lackawanna Well Site
 Magnolia District
 Wetzel County, WV

WV DEP OOG
ACCEPTED AS-BUILT
 10/23/2018

MS Location
 95 Minutes to Site
 Date: 10/23/2018



Disturbed Area		Access Road	
Disturbed Area	1:12.5	Disturbed Area	1:12.5
Access Road	1:12.5	Access Road	1:12.5



Legend

Proposed 24" Water Main	Proposed 48" Water Main	Proposed 60" Water Main
Proposed 10" Gas	Proposed 18" Gas	Proposed 24" Gas
Proposed 36" Gas	Proposed 48" Gas	Proposed 60" Gas
Proposed 72" Gas	Proposed 84" Gas	Proposed 96" Gas
Proposed 108" Gas	Proposed 120" Gas	Proposed 144" Gas
Proposed 180" Gas	Proposed 216" Gas	Proposed 240" Gas
Proposed 360" Gas	Proposed 432" Gas	Proposed 480" Gas
Proposed 720" Gas	Proposed 864" Gas	Proposed 960" Gas
Proposed 1440" Gas	Proposed 1728" Gas	Proposed 1920" Gas
Proposed 2880" Gas	Proposed 5760" Gas	Proposed 7200" Gas

All notes and/or labels on this drawing are based on existing conditions unless otherwise noted. All dimensions are in feet unless otherwise specified.

TUG HILL OPERATING

Keystone
 SURVEYING & ENGINEERING

Division and Sediment Control Plan
Lackawanna Well Site
 Mingo County, West Virginia

Issue 10/23/2018
 Scale: As Shown
 Drawn By: JMS
 Date: 10/23/2018
 Sheet 1 of 23