



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, March 20, 2020
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for HANSEN S-6HU
47-051-02176-00-00

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

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

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

James A. Martin
Chief

Operator's Well Number: HANSEN S-6HU
Farm Name: COVESTRO LLC
U.S. WELL NUMBER: 47-051-02176-00-00
Horizontal 6A New Drill
Date Issued: 3/20/2020

A blue ink signature of James A. Martin, written in a cursive style.

Promoting a healthy environment.

PERMIT CONDITIONS

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

CONDITIONS

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

PERMIT CONDITIONS

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



west virginia department of environmental protection

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

Barry K. Lay, Chairman
dep.wv.gov

October 9, 2019

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

RE: Application for Deep Well Permit – API #47-051-02176

COMPANY: Tug Hill Operating, LLC


FARM: Covestro, LLC Hansen S-6HU

COUNTY: Marshall DISTRICT: Franklin QUAD: New Martinsville

The deep well review of the application for the above company is **Approved to drill to Trenton for Point Pleasant completion.**

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

1. Comments to Notice of Deviation filed? No
2. Provided a certified copy of duly acknowledged and recorded consent and easement form from all surface owners? Yes
3. Provided a tabulation of all deep wells within one mile of the proposed location, including the API number of all deep wells: ****yes; Docket 288-268 Exception Location Hearing**
4. Provided a plat showing that the proposed location is a distance of 400+ feet from the nearest lease line or unit boundary and showing the following wells drilled to or capable of producing from the objective formation within 3,000 feet of the proposed location.

Sincerely,

Susan Rose
Administrator

** Blake U-7H 47-051-01766, Blake N-9HU 47-051-02203, Armstrong 1N-13HU 47-051-02259, Armstrong 1N-14HU 47-051-02260, Armstrong 1S-10HU 47-051-02256, Armstrong 1S-11HU 47-051-02257, Armstrong 1S-12HU 47-051-02258, Hansen N-2HU 47-051-02174, Hansen 3HU 47-051-01647, Hansen N-4HU 47-051-02175, Hansen S-7HU 47-051-01654, Hansen S-8HU 47-051-02177, and Burch Ridge S-

6HU 47-051-02193, Burch Ridge S-7HU 47-051-02194, Greer 1N-5HU 47-051-01893, Greer 1N-10HU 47-051-01894, Greer 1N-11HU 47-051-01895, Greer 1N-12HU 47-051-01896, Eagle Natrium #28 47-051-01381, Eagle Natrium #8 47-051-00310, Eagle Natrium #9 47-051-00313, Eagle Natrium #11 47-051-00523, Eagle Natrium #35 47-051-00562, Goudy 1N-12HU 47-051-02261, Goudy 1N-13HU 47-051-02198, Goudy 1N-14HU 47-051-02199, Goudy 1N-15HU 47-051-02200, Goudy 1S-16HU 47-051-02195, Goudy 1S-17HU 47-051-02196, Goudy 1S-18HU 47-051-02197

WW-6B
(04/15)

4705102176
API NO. 47-051 -
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Franklin Powhatan Point 7
Operator ID County District Quadrangle

2) Operator's Well Number: Hansen S-6HU Well Pad Name: Hansen

3) Farm Name/Surface Owner: Covestro LLC, FKA Bayer Material Science, LLC Public Road Access: County Route 2/2 - Wells Hill Road

4) Elevation, current ground: 1,245' Elevation, proposed post-construction: 1,245'

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

(b) If Gas Shallow Deep
Horizontal

Handwritten signature and date: 2/4/2020

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Point Pleasant is the target formation at a depth of 11,130' - 11,249', thickness of 119' and anticipated pressure of approx. 9,500 psi

8) Proposed Total Vertical Depth: 11,399'

9) Formation at Total Vertical Depth: Trenton, plug back to Reedsville

10) Proposed Total Measured Depth: 18,251'

11) Proposed Horizontal Leg Length: 6,505.89'

12) Approximate Fresh Water Strata Depths: 850'

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

14) Approximate Saltwater Depths: 1740'

15) Approximate Coal Seam Depths: Sewickly Coal - 758' and Pittsburgh Coal - 843'

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

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

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

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WW-6B
(04/15)

47 05 1 02 1 7 6
API NO. 47- 051
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259FT^3(CTS)
Fresh Water	20"	NEW	J55	94#	940'	940'	1,523ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	2,800'	2,800'	1,974ft^3(CTS)
Intermediate	9 5/8"	NEW	HPP110	47#	10,148'	10,148'	3,317ft^3(CTS)
Production	5 1/2"	NEW	P110	23#	18,251'	18,251'	4,353ft^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		10,379'	
Liners							

JW
1/23/19

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	20"	26"	.5	2,410	1,928	SEE #24	1.2
Coal	13 3/8"	17 1/2"	.38	2,740	2,192	SEE#24	1.2
Intermediate	9 5/8"	12 1/4"	.472	10,730	6,968	SEE#24	1.99
Production	5 1/2"	8 1/2"	.415	13,580	10,864	SEE#24	1.17/1.19
Tubing	2 7/8"			14,530	11,624		
Liners							

PACKERS

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

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WW-6B
(10/14)

4705102176
API NO. 47- 051 - _____
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

JW
2/4/2020

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. Log vertical section and run a solid cement plug back to proposed KOP (9,879'). Drill curve and lateral per proposed well plan, run and cement production casing. Perform CBL from 60 deg to surface, make cleanout run, and stimulate.

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

Well to be completed with approximately 16,262,500 lb proppant and 251,430 bbl of water. Max rate = 80 bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 28.28

22) Area to be disturbed for well pad only, less access road (acres): 6.22

23) Describe centralizer placement for each casing string:

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

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

*See Attached

25) Proposed borehole conditioning procedures:

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

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*Note: Attach additional sheets as needed.

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Conductor and Fresh Water Casing Cement:

Premium NE-1 + 2% CaCl

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

Coal Casing Cement:

Premium NE-1 + 1.5% CaCL + Flake

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

Intermediate Casing Cement:

Lead: *Premium NE-1 + 5% BA-90 + .85% R-3 + 3% KCl + .75 gals/100sk FP-13L + 1% MPA-170*

Tail: *Premium NE-1 + .1% R-3 + 5% KCl + 1% CD-32 + .4% FL-52 + .2% ASA-301 + .6% Sodium Metasilicate*

- Premium NE-1 – Class A Portland API spec
- BA-90 – Gas Migration Mitigator
- R-3 – Cement Retarder
- KCl – Potassium Chloride
- FP-13L – Anti-Foaming Agent
- MPA-170 – Gelling Agent
- CD-32 – Dispersant
- FL-52 – Fluid Loss Agent
- ASA-301 – Free Water Control Agent
- Sodium Metasilicate – Extending Agent

Kick Off Plug:

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

- CD-32 – Dispersant
- Sodium Metasilicate – Extending Agent
- R-3 – Cement Retarder
- FP-13L – Anti-Foaming Agent

Production Casing Cement:

Lead: *50:50 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .75 gal/100sk FP-13L*

Tail: *25:75 (Poz:Class H) + .3% R-3 + .3% MPA-250 + .375 gal/100sk FP-13L*

- R-3 – Cement Retarder
- MPA-250 – Gelling Agent
- FP-13L – Anti-Foaming Agent

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WELL NAME: Hansen 1S-6HU
 STATE: WV COUNTY: Marshall
 DISTRICT: Franklin
 DP Elev: 1,247' GL Elev: 1,247'
 TD: 18,251'
 TH Latitude: 39.72692877
 TH Longitude: -80.81423615
 BH Latitude: 39.7114737
 BH Longitude: -80.80992492

30" Csg @ 120' TVD

20" Csg @ 940' TVD

13 3/8" Csg @ 2,800' TVD

FORMATION TOPS		Depth TVD
Formation		848'
Deepest Fresh Water		758'
Sewickley Coal		843'
Pittsburgh Coal		2,045'
Big Lime		2,588'
Berea		6,440'
Tully		6,499'
Marcellus		6,551'
Onondaga		7,202'
Salina		8,224'
Lockport		10,877'
Utica		11,130'
Point Pleasant		11,180'
Landing Depth		11,249'
Trenton		11,399'
Pilot Hole TD		

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	26	20	940'	940'	106.5	J55	Surface
Intermediate 1	17 1/2	13 3/8	2,800'	2,800'	54.5	J55	Surface
Intermediate 2	12 1/4	9 5/8	10,148'	10,020'	47	HPP110	Surface
Production	8 1/2	5 1/2	18,251'	11,293'	23	HCP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centraliser Notes	
338	A	15.6	Air	None	
1,642	A	15.6	Air	3 Centralizers at equal distance	
2,140	A	15	Air	1 Centralizer every other ft	
2,725	A	14.5	Air	1 Centralizer every other ft	
3,818	A	15	Air / SOBMM	1 every other joint in lateral; 1 per joint in curve; 1 every other ft to stc	

Handwritten signature and date: 1/23/19

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 9,879' ft MD
 10,020' TVD

Pilot Hole PH TD @ 11,399'
 Landing Point @ 1,747' MD / 11,180' TVD
 PH TVD = 150' below Trenton Top
 Lateral TD @ 18,251' ft MD / 11,293' ft TVD

4705102176



Tug Hill Operating, LLC Casing and Cement Program

Hansen 1S-6HU

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	20"	J55	26"	940'	CTS
Intermediate 1	13 3/8"	J55	17 1/2"	2,800'	CTS
Intermediate 2	9 5/8"	HPP110	12 1/4"	10,148'	CTS
Production	5 1/2"	HCP110	8 1/2"	18,251'	CTS

Cement

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

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

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

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

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TUG HILL OPERATING

Well: Hansen S-6HU (A)
Site: Hansen
Project: Wetzel County, West Virginia (UTM17 NAD83)
Design: rev3



SECTION DETAILS

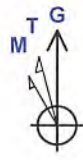
Table with 11 columns: Sec, MD, Inc, Azi, TVD, +N/-S, +E/-W, Dleg, TFace, VSect, Annotation. Contains wellbore data for 9 sections.

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

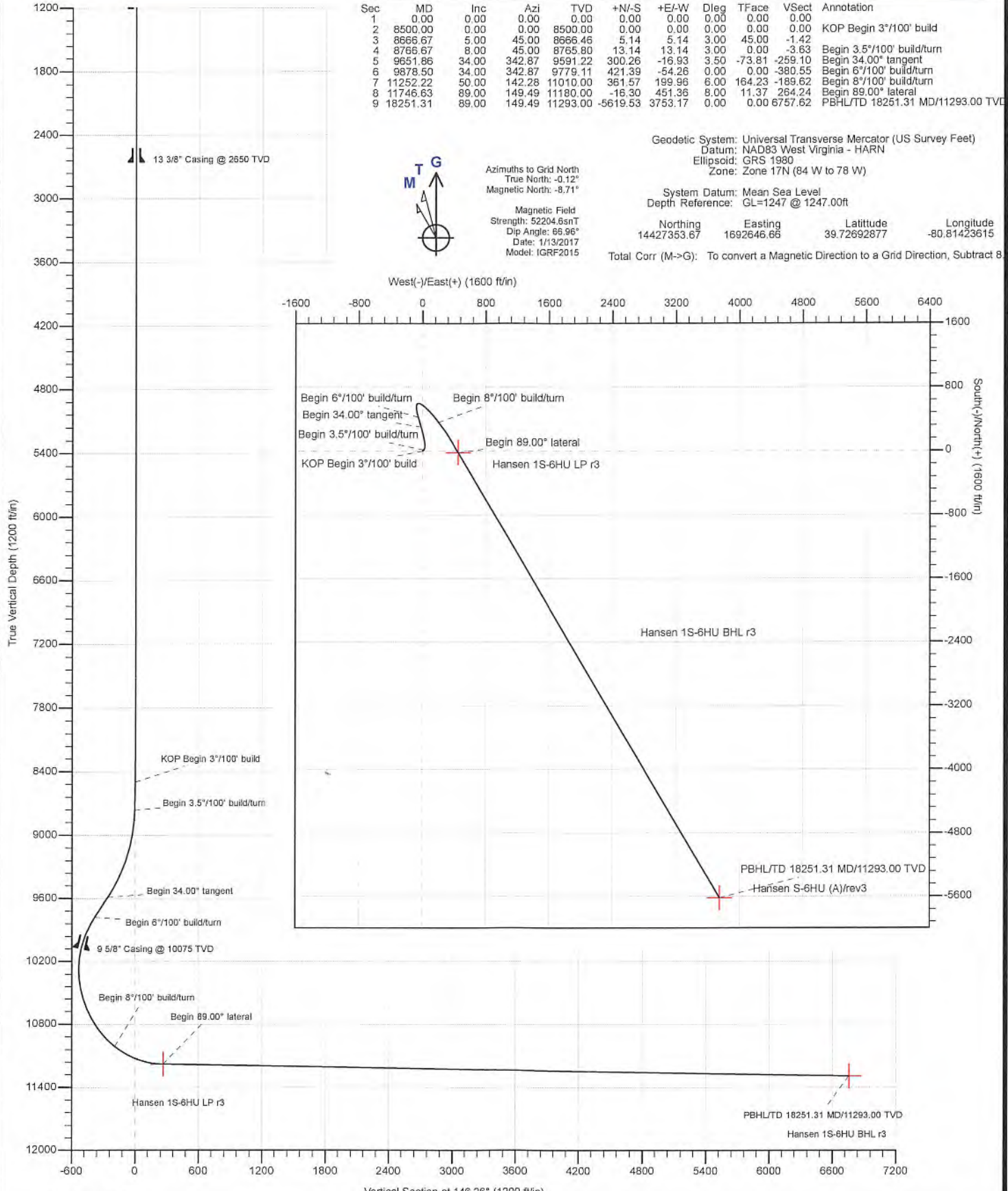
System Datum: Mean Sea Level
Depth Reference: GL=1247 @ 1247.00ft

Northing: 14427353.67, Easting: 1692646.66, Latitude: 39.72692877, Longitude: -80.81423615

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.71°



Azimuths to Grid North
True North: -0.12°
Magnetic North: -8.71°
Magnetic Field
Strength: 52204.6snT
Dip Angle: 66.96°
Date: 1/13/2017
Model: IGRF2015



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 (1/14/2019) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

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

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

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

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Permit well - Hansen 1S-6HU

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
4705101645 4705101646	Tug Hill Operating Gastar Exploration	6522' TVD, 12308 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location
4705101647 4705101648	Tug Hill Operating (Gastar Exploration) Gastar Exploration	6,067' TVD, 6,409 TMD, Top holed only	None	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Top hole only, Revised to be current Hansen No. 3H utilizing Utica well the existing top hole Cancelled Location
4705101649 4705101650 4705101651	Tug Hill Operating Gastar Exploration Gastar Exploration	6532' TVD, 12178 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location Cancelled Location
4705101652 4705101653	Tug Hill Operating Gastar Exploration	6532' TVD, 12178 MD	Marcellus Shale	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Marcellus Horizontal Well, Producing Cancelled Location
4705101654	Tug Hill Operating (Gastar Exploration))	5760' TVD, top holed only	None	None	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Top hole only
4710300215	George P. Wasmuth	1,286' TVD	Dry	Unknown	No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.	Old dry hole.

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WV Geological & Economic Survey

Well: County = 51 Permit = 01645

Location Information: View Map

Table with columns: API, COUNTY, PERMIT, TAX, DISTRICT, QUAD, 75, QUAD, 15, LAY, DD, LON, DD, UTM, E, UTM, N

Bottom Hole Location Information:

Table with columns: API, EP, FLAG, UTM, E, UTM, N, LON, DD, LAY, DD

Owner Information:

Table with columns: API, CMP, DT, SUFFX, STATUS, SURFACE_OWNER, WELL_NUM, CO, NUM, LEASE, LEASE_NUM, MINERAL_OWN, OPERATOR, AT, COMPLETION, PROP, VD, PROP, TRST, FM, YFM, EST, PR

Completion Information:

Table with columns: API, CMP, DT, SPOD, DT, ELEV, DATUM, FIELD, DEEPEST_FM, DEEPEST_FHT, INITIAL_CLASS, FINAL_CLASS, TYPE, RIG, CMP, MTHD, TVC, TMD, NEW, PTO, ROD, Q, BEF, O, ART, O, BEF, O, ART, NGL, BEF, NGL, ART, P, BEF, T, BE

Pay/Show/Water Information:

Table with columns: API, CMP, DT, ACTIVITY, PRODUCT, SECTION, DEPTH, TOP, FM, TOP, DEPTH, BOY, FM, BOY, Q, BEF, O, ART, O, BEF, O, ART, WATER, QNTY

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, NGL, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, NGL, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Stratigraphy Information:

Table with columns: API, SUFFX, FM, FM_QUALITY, DEPTH, TOP, DEPTH, QUALITY, THICKNESS, THICKNESS, QUALITY, ELEV, DATUM

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

WV Geological & Economic Survey

Well: County = 51 Permit = 01646

Location Information: View Map

Table with columns: API, COUNTY, PERMIT, TAX, DISTRICT, QUAD, 75, QUAD, 15, LAY, DD, LON, DD, UTM, E, UTM, N

Bottom Hole Location Information:

Table with columns: API, EP, FLAG, UTM, E, UTM, N, LON, DD, LAY, DD

Owner Information:

Table with columns: API, CMP, DT, SUFFX, STATUS, SURFACE_OWNER, WELL_NUM, CO, NUM, LEASE, LEASE_NUM, MINERAL_OWN, OPERATOR, AT, COMPLETION, PROP, VD, PROP, TRST, FM, YFM, EST, PR

Completion Information:

Table with columns: API, CMP, DT, SPOD, DT, ELEV, DATUM, FIELD, DEEPEST_FM, DEEPEST_FHT, INITIAL_CLASS, FINAL_CLASS, TYPE, RIG, CMP, MTHD, TVC, TMD, NEW, PTO, ROD, Q, BEF, O, ART, O, BEF, O, ART, NGL, BEF, NGL, ART, P, BEF, T, BE

Pay/Show/Water Information:

Table with columns: API, CMP, DT, ACTIVITY, PRODUCT, SECTION, DEPTH, TOP, FM, TOP, DEPTH, BOY, FM, BOY, Q, BEF, O, ART, O, BEF, O, ART, WATER, QNTY

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, NGL, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, NGL, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time

Table with columns: API, PRODUCING_OPERATOR, PRD_YEAR, ANN, WITH, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DCSM

Stratigraphy Information:

Table with columns: API, SUFFX, FM, FM_QUALITY, DEPTH, TOP, DEPTH, QUALITY, THICKNESS, THICKNESS, QUALITY, ELEV, DATUM

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

WV Geological & Economic Survey Well: County = 51 Permit = 01648

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTM_E	UTM_N
4705101849	Marshall	1849	Franklin	New-Marketsville	New-Marketsville	39.720719	-82.815279	416216.4	4327442.1

Bottom Hole Location Information:

API	EP	FLAG	UTM_E	UTM_N	LONG_DD	LAT_DD
4705101849	1	Ax	4327442.1	416216.4	-82.815279	39.720719

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRDY_FM	TYM_EST_PR
4705101849	1		Drill	Drill	WV15-0099-000	WV15-0127-001	Bayle	Marshall Sciences LLC et al.	Gasar Exploration USA, Inc.	8458	Marshall Fm	2000	

Completion Information:

API	CMP_ID	SUFFIX	DEPTH	DATE	FIELD	DEEPTST_FTH	DEEPTST_FTH	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTRD	TVD	TMD	NEW_FTG	RIG_O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	P_AFT
4705101849	1		1247	2018	Gas	1247	1247	Gas	Gas	Oil	Bayle	WV15-0099-000	WV15-0127-001	1247	0	0	0	0	0	0	0	0	0

Comment: --- Additional Lease Numbers: WV15-0099-000/WV15-0127-001

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

WV Geological & Economic Survey Well: County = 51 Permit = 01648

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTM_E	UTM_N
4705101849	Marshall	1849	Franklin	New-Marketsville	New-Marketsville	39.720719	-82.815279	416216.4	4327442.1

Bottom Hole Location Information:

API	EP	FLAG	UTM_E	UTM_N	LONG_DD	LAT_DD
4705101849	1	Ax	4327442.1	416216.4	-82.815279	39.720719

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRDY_FM	TYM_EST_PR
4705101849	1		Drill	Drill	WV15-0099-000	WV15-0127-001	Bayle	Marshall Sciences LLC et al.	Gasar Exploration USA, Inc.	8458	Marshall Fm	2000	

Completion Information:

API	CMP_ID	SUFFIX	DEPTH	DATE	FIELD	DEEPTST_FTH	DEEPTST_FTH	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTRD	TVD	TMD	NEW_FTG	RIG_O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	P_AFT
4705101849	1		1218	2018	Gas	1218	1218	Gas	Gas	Oil	Bayle	WV15-0099-000	WV15-0127-001	1218	0	0	0	0	0	0	0	0	

Comment: --- Additional Lease Numbers: WV15-0099-000/WV15-0127-001, KOP-2420

Pay/Show/Water Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TCF	FM_TCF	DEPTH	FM	BOY	O_BEF	O_AFT	O_BEF	O_AFT	WATER_QNTY
4705101849	1	15	Water	Vertical	15	15	15	15	15	0	0	0	0	0
4705101849	1	15	Water	Vertical	15	15	15	15	15	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	7127	7127	7127	7127	7127	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	7425	7425	7425	7425	7425	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	7675	7675	7675	7675	7675	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	7822	7822	7822	7822	7822	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	8175	8175	8175	8175	8175	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	8455	8455	8455	8455	8455	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	8581	8581	8581	8581	8581	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	8674	8674	8674	8674	8674	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	9180	9180	9180	9180	9180	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	9550	9550	9550	9550	9550	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	9972	9972	9972	9972	9972	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	10275	10275	10275	10275	10275	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	10425	10425	10425	10425	10425	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	12705	12705	12705	12705	12705	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	11015	11015	11015	11015	11015	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	11244	11244	11244	11244	11244	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	11800	11800	11800	11800	11800	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	11900	11900	11900	11900	11900	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	11940	11940	11940	11940	11940	0	0	0	0	0
4705101849	1	15	Oil & Gas	Deviated	12015	12015	12015	12015	12015	0	0	0	0	0

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_Q33	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101849	Gasar Exploration USA, Inc.	2018	641.114	90.349	83.441	82.285	83.403	82.210	42.404	40.009	43.033	45.883	66.743	45.110	32.010
4705101849	Tug Hill Operating LLC	2018	628.481	88.951	80.254	80.254	80.254	47.200	44.200	41.408	42.824	41.789	61.213	37.000	38.184
4705101849	Tug Hill Operating LLC	2018	301.623	32.587	31.255	34.828	32.819	34.340	31.703	32.458	33.247	32.508	32.784	30.781	30.858
4705101849	Tug Hill Operating LLC	2018	249.494	28.943	28.242	28.679	28.121	23.272	23.609	26.810	26.375	26.581	0	0	0

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_Q33	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101849	Gasar Exploration USA, Inc.	2018	2.046	0	0	0	0	0	0	0	0	0	0	0	0
4705101849	Gasar Exploration USA, Inc.	2018	37.605	9.111	9.160	8.824	8.393	8.607	2.742	2.410	1.695	1.603	2.045	1.667	1.400
4705101849	Tug Hill Operating LLC	2018	6.372	869	863	848	848	848	439	427	427	424	454	473	524
4705101849	Tug Hill Operating LLC	2018	3.268	343	378	463	417	392	323	324	321	325	0	0	0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_Q33	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101849	Gasar Exploration USA, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4705101849	Gasar Exploration USA, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4705101849	Tug Hill Operating LLC	2018	11.772	1.381	1.284	1.199	1.210	1.170	861	834	600	760	663	677	943
4705101849	Tug Hill Operating LLC	2018	20.972	2.817	2.208	2.148	2.061	2.805	2.249	2.172	2.015	0	0	0	0

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4705101849	Tug Hill Operating LLC	2018	2.628	232	218	154	154	225	225	225	225	225	225	225	245
4705101849	Tug Hill Operating LLC	2018	1.237	181	128	128	128	128	128	128	128	128	128	128	173

WV Geological & Economic Survey Well: County = 51 Permit = 01650

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LONG_DD	UTM_E	UTM_N
4705101900	Marshall	1900	Franklin	New-Marketsville	New-Marketsville	39.720719	-82.815279	416216.4	4327442.1

Bottom Hole Location Information:

API	EP	FLAG	UTM_E	UTM_N	LONG_DD	LAT_DD
4705101900	1	Ax	4327442.1	416216.4	-82.815279	39.720719

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRDY_FM	TYM_EST_PR
4705101900	1		Drill	Drill	WV15-0099-000	WV15-0127-001	Bayle	Marshall Sciences LLC et al.	Gasar Exploration USA, Inc.	8458	Marshall Fm	2000	

Completion Information:

API	CMP_ID	SUFFIX	DEPTH	DATE	FIELD	DEEPTST_FTH	DEEPTST_FTH	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTRD	TVD	TMD	NEW_FTG	RIG_O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	P_AFT
4705101900	1		1247	2018	Gas	1247	1247	Gas	Gas	Oil	Bayle	WV15-0099-000	WV15-0127-001	1247	0	0	0	0	0	0	0	0	

Comment: --- Additional Lease Numbers: WV15-0099-000/WV15-0127-001/WV15-0115-000

There is no Pay data for this well

There is no Production Gas data for this well

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

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

There is no Production Water data for this well

There is no Stratigraphy data for this well

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

There is no Plugging data for this well

There is no Sample data for this well

4705102176

WV Geological & Economic Survey Well: County = 51 Permit = 01654

Location Information: [View Map](#)
 ARI COUNTY PERMIT TAX DISTRICT QUAD_75 QUAD_18 LAT_DD LONG_DD UTMN UTMN
 6752101654 Marshall 1874 Francon New Martinsville New Martinsville 43 29292 102 815048 4165318.6 6397962.4

Bottom Hole Location Information:
 ARI EP FLAG TIME UTMN LONG_DD LAT_DD
 6752101654 48 31668 1874 4165318 102 815048 4165318.6 6397962.4
 6752101654 1 48 31668 1874 4165318 102 815048 4165318.6 6397962.4

Owner Information:
 ARI CMP_ID1 SUFFIX STATUS SURFACE_OWNER WELL_NUM CO_NUM LEASE LEASE_NUM MINERAL_OWN OPERATOR_AT_COMPLETION PROP_VO PROP_TRGT_FM TRM_EST_FR
 6752101654 48 31668 1874 4165318 102 815048 4165318.6 6397962.4 74 48 31668 1874 4165318 102 815048 4165318.6 6397962.4

Completion Information:
 ARI CMP_ID1 SUFFIX ELEV DATUM FIELD DEEPEST_FM DEEPEST_FHT INITIAL_CLASS FINAL_CLASS TYPE RIG CMP_MTHD YVD YMD NEW_FIG ROD O_BEF O_AFT O_BEF O_AFT NGL_BOT
 6752101654 48 31668 1874 4165318 102 815048 4165318.6 6397962.4 74 48 31668 1874 4165318 102 815048 4165318.6 6397962.4

Comment: -H- Additional Lease Numbers WV15-0078-001/WV15-0127-001

Pay/Show/Water Information:
 ARI CMP_ID1 ACTIVITY PRODUCT SECTION DEPTH_TOP FM_TOP DEPTH_BOTTOM FM_BOTTOM O_BEF O_AFT O_BEF O_AFT WATER_QNTY
 6752101654 48 31668 1874 4165318 102 815048 4165318.6 6397962.4 74 48 31668 1874 4165318 102 815048 4165318.6 6397962.4

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_GAS JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6752101654 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6752101654 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_OIL JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6752101654 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6752101654 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_NGL JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6752101654 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6752101654 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_WTR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6752101654 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6752101654 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Stratigraphy Information:
 ARI SUFFIX FM FM_QUALITY DEPTH_TOP DEPTH_QUALITY THICKNESS THICKNESS_QUALITY ELEV DATUM
 6752101654 Duid Crnl Loc Sweeney coal Well Record 1201 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Pittsburgh coal Well Record 852 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc 1007 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Big Lime Well Record 2307 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Big Run (Pre-Sale) Well Record 2338 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Vesp Well Record 2368 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Beech St Well Record 2509 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Green Well Record 2640 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Fan Well Record 3005 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Sweeney Well Record 3240 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc Benton Well Record 4203 Reasonable 1245 Ground Level
 6752101654 Duid Crnl Loc 5529 Reasonable 1245 Ground Level

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

WV Geological & Economic Survey Well: County = 103 Permit = 00215

Location Information: [View Map](#)
 ARI COUNTY PERMIT TAX DISTRICT QUAD_75 QUAD_18 LAT_DD LONG_DD UTMN UTMN
 6710300215 Wayne 14 Francon New Martinsville New Martinsville 43 29292 102 815048 4165318.6 6397962.4

Bottom Hole Location Information:
 ARI EP FLAG TIME UTMN LONG_DD LAT_DD
 6710300215 14 31668 1874 4165318 102 815048 4165318.6 6397962.4

Owner Information:
 ARI CMP_ID1 SUFFIX STATUS SURFACE_OWNER WELL_NUM CO_NUM LEASE LEASE_NUM MINERAL_OWN OPERATOR_AT_COMPLETION PROP_VO PROP_TRGT_FM TRM_EST_FR
 6710300215 14 31668 1874 4165318 102 815048 4165318.6 6397962.4 1 14 31668 1874 4165318 102 815048 4165318.6 6397962.4

Completion Information:
 ARI CMP_ID1 SUFFIX ELEV DATUM FIELD DEEPEST_FM DEEPEST_FHT INITIAL_CLASS FINAL_CLASS TYPE RIG CMP_MTHD YVD YMD NEW_FIG ROD O_BEF O_AFT O_BEF O_AFT NGL_BOT
 6710300215 14 31668 1874 4165318 102 815048 4165318.6 6397962.4 1 14 31668 1874 4165318 102 815048 4165318.6 6397962.4

Pay/Show/Water Information:
 ARI CMP_ID1 ACTIVITY PRODUCT SECTION DEPTH_TOP FM_TOP DEPTH_BOTTOM FM_BOTTOM O_BEF O_AFT O_BEF O_AFT WATER_QNTY
 6710300215 14 31668 1874 4165318 102 815048 4165318.6 6397962.4 1 14 31668 1874 4165318 102 815048 4165318.6 6397962.4

Production Gas Information: (Volumes in Mcf) * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_GAS JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6710300215 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6710300215 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_OIL JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6710300215 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6710300215 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_NGL JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6710300215 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6710300215 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Production Water Information: (Volumes in Gallons) * 2018 data are incomplete at this time
 ARI PRODUCING_OPERATOR PRD_YEAR ANN_WTR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
 6710300215 Tug Hill Operating LLC 2017 0 0 0 0 0 0 0 0 0 0 0 0
 6710300215 Tug Hill Operating LLC 2018 0 0 0 0 0 0 0 0 0 0 0 0

Stratigraphy Information:
 ARI SUFFIX FM FM_QUALITY DEPTH_TOP DEPTH_QUALITY THICKNESS THICKNESS_QUALITY ELEV DATUM
 6710300215 Original Loc Unidentified coal Well Record 800 Reasonable 1 Reasonable 1270 Ground Level
 6710300215 Original Loc Pittsburgh coal Well Record 852 Reasonable 2 Reasonable 1270 Ground Level
 6710300215 Original Loc Conestoga Group Well Record 856 Reasonable 0 Castore Fox 1270 Ground Level
 6710300215 Original Loc Dayton St Well Record 1168 Reasonable 22 Reasonable 1270 Ground Level
 6710300215 Original Loc 1st Cove (Municipal) Well Record 1417 Reasonable 22 Reasonable 1270 Ground Level

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

4705102176

MARSHALL
FRANKLIN

OHIO

WETZEL PROCTOR

Legend

- Well Locations (ims.wvgs.wvnet.edu)
- Hansen 1S - 6HU
- 500 Ft. Buffer
- Major Highways
- Major Roads
- ▭ Counties
- ▭ Districts

RECEIVED
Office of Oil and Gas

JAN 28 REC'D

WV Department of
Environmental Protection



Hansen 1S - 6HU

Franklin District

Marshall County, WV



Map Created: January 14, 2019

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

4705102176



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

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	Hansen				
Site Position:		Northing:	14,427,333.87 usft	Latitude:	39.72687441
From:	Lat/Long	Easting:	1,692,643.93 usft	Longitude:	-80.81424599
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	Hansen S-6HU (A)					
Well Position	+N/-S	0.00 ft	Northing:	14,427,353.67 usft	Latitude:	39.72692877
	+E/-W	0.00 ft	Easting:	1,692,646.66 usft	Longitude:	-80.81423615
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	1,247.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/13/2017	-8.59	66.96	52,204.58727165

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	146.26

Plan Survey Tool Program	Date	1/11/2019		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,251.31 rev3 (Original Hole)	MWD MWD - Standard	

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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
8,666.67	5.00	45.00	8,666.46	5.14	5.14	3.00	3.00	0.00	45.00	
8,766.67	8.00	45.00	8,765.80	13.14	13.14	3.00	3.00	0.00	0.00	
9,651.86	34.00	342.87	9,591.22	300.26	-16.93	3.50	2.94	-7.02	-73.81	
9,878.50	34.00	342.87	9,779.11	421.39	-54.26	0.00	0.00	0.00	0.00	
11,252.22	50.00	142.28	11,010.00	361.57	199.96	6.00	1.16	11.60	164.23	
11,746.63	89.00	149.49	11,180.00	-16.30	451.36	8.00	7.89	1.46	11.37	
18,251.31	89.00	149.49	11,293.00	-5,619.53	3,753.17	0.00	0.00	0.00	0.00	Hansen 1S-6HU BHL



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
100.00	0.00	0.00	100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
200.00	0.00	0.00	200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
300.00	0.00	0.00	300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
400.00	0.00	0.00	400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
500.00	0.00	0.00	500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
600.00	0.00	0.00	600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
700.00	0.00	0.00	700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
800.00	0.00	0.00	800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
900.00	0.00	0.00	900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,500.00	0.00	0.00	2,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,600.00	0.00	0.00	2,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,700.00	0.00	0.00	2,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,800.00	0.00	0.00	2,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
2,900.00	0.00	0.00	2,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,000.00	0.00	0.00	3,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,100.00	0.00	0.00	3,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,200.00	0.00	0.00	3,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,300.00	0.00	0.00	3,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,400.00	0.00	0.00	3,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,500.00	0.00	0.00	3,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,600.00	0.00	0.00	3,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,700.00	0.00	0.00	3,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,800.00	0.00	0.00	3,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
3,900.00	0.00	0.00	3,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,000.00	0.00	0.00	4,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,100.00	0.00	0.00	4,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,200.00	0.00	0.00	4,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,300.00	0.00	0.00	4,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,400.00	0.00	0.00	4,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,500.00	0.00	0.00	4,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,600.00	0.00	0.00	4,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,700.00	0.00	0.00	4,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,800.00	0.00	0.00	4,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
4,900.00	0.00	0.00	4,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,000.00	0.00	0.00	5,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,100.00	0.00	0.00	5,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,200.00	0.00	0.00	5,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,300.00	0.00	0.00	5,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615

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West Virginia Department of Environmental Protection



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,400.00	0.00	0.00	5,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,500.00	0.00	0.00	5,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,600.00	0.00	0.00	5,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,700.00	0.00	0.00	5,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,800.00	0.00	0.00	5,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
5,900.00	0.00	0.00	5,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,000.00	0.00	0.00	6,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,100.00	0.00	0.00	6,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,200.00	0.00	0.00	6,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,300.00	0.00	0.00	6,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,400.00	0.00	0.00	6,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,500.00	0.00	0.00	6,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,600.00	0.00	0.00	6,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,700.00	0.00	0.00	6,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,800.00	0.00	0.00	6,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
6,900.00	0.00	0.00	6,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,000.00	0.00	0.00	7,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,100.00	0.00	0.00	7,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,200.00	0.00	0.00	7,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,300.00	0.00	0.00	7,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,400.00	0.00	0.00	7,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,500.00	0.00	0.00	7,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,600.00	0.00	0.00	7,600.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,700.00	0.00	0.00	7,700.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,800.00	0.00	0.00	7,800.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
7,900.00	0.00	0.00	7,900.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,000.00	0.00	0.00	8,000.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,100.00	0.00	0.00	8,100.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,200.00	0.00	0.00	8,200.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,300.00	0.00	0.00	8,300.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,400.00	0.00	0.00	8,400.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
8,500.00	0.00	0.00	8,500.00	0.00	0.00	14,427,353.67	1,692,646.66	39.72692877	-80.81423615
KOP Begin 3°/100' build									
8,600.00	3.00	45.00	8,599.95	1.85	1.85	14,427,355.52	1,692,648.51	39.72693384	-80.81422955
8,666.67	5.00	45.00	8,666.46	5.14	5.14	14,427,358.81	1,692,651.80	39.72694286	-80.81421784
8,700.00	6.00	45.00	8,699.63	7.40	7.40	14,427,361.07	1,692,654.06	39.72694905	-80.81420978
8,766.67	8.00	45.00	8,765.80	13.14	13.14	14,427,366.81	1,692,659.80	39.72696479	-80.81418931
Begin 3.5°/100' build/turn									
8,800.00	8.40	37.31	8,798.79	16.72	16.26	14,427,370.39	1,692,662.92	39.72697460	-80.81417820
8,900.00	10.32	19.14	8,897.48	30.99	23.62	14,427,384.67	1,692,670.28	39.72701376	-80.81415190
9,000.00	12.91	7.37	8,995.44	50.54	28.00	14,427,404.21	1,692,674.65	39.72706741	-80.81413621
9,100.00	15.85	359.69	9,092.30	75.29	29.36	14,427,428.96	1,692,678.01	39.72713537	-80.81413119
9,200.00	18.98	354.42	9,187.71	105.14	27.70	14,427,458.81	1,692,674.36	39.72721737	-80.81413685
9,300.00	22.22	350.62	9,281.31	139.99	23.04	14,427,493.66	1,692,669.70	39.72731310	-80.81415318
9,400.00	25.52	347.75	9,372.75	179.71	15.38	14,427,533.38	1,692,662.04	39.72742222	-80.81418011
9,500.00	28.87	345.50	9,461.68	224.14	4.77	14,427,577.81	1,692,651.43	39.72754431	-80.81421754
9,600.00	32.24	343.69	9,547.79	273.13	-8.77	14,427,626.80	1,692,637.88	39.72767891	-80.81426534
9,651.86	34.00	342.87	9,591.22	300.26	-16.93	14,427,653.93	1,692,629.73	39.72775348	-80.81429416
Begin 34.00° tangent									
9,700.00	34.00	342.87	9,631.13	325.99	-24.86	14,427,679.66	1,692,620.00	39.72782418	-80.81432217
9,800.00	34.00	342.87	9,714.03	379.43	-41.33	14,427,733.10	1,692,605.33	39.72797105	-80.81438035
9,878.50	34.00	342.87	9,779.11	421.39	-54.26	14,427,775.06	1,692,592.40	39.72808633	-80.81442602
Begin 6°/100' build/turn									

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Planning Report - Geographic

4705102176

Database: DB_Jul2216dt_v14
Company: Tug Hill Operating LLC
Project: Wetzel County, West Virginia (UTM17 NAD83)
Site: Hansen
Well: Hansen S-6HU (A)
Wellbore: Original Hole
Design: rev3

Local Co-ordinate Reference: Well Hansen S-6HU (A)
TVD Reference: GL=1247 @ 1247.00ft
MD Reference: GL=1247 @ 1247.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Table with 11 columns: Measured Depth (ft), Inclination (°), Azimuth (°), Vertical Depth (ft), +N-S (ft), +E-W (ft), Map Northing (usft), Map Easting (usft), Latitude, Longitude. Contains multiple rows of data for a planned survey, including specific section markers like 'Begin 8°/100' build/turn' and 'Begin 89.00° lateral'.





Planning Report - Geographic

4705102176

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,800.00	89.00	149.49	11,233.04	-2,646.52	2,001.27	14,424,707.16	1,694,647.92	39.71964902	-80.80713864
14,900.00	89.00	149.49	11,234.78	-2,732.66	2,052.03	14,424,621.02	1,694,698.68	39.71941215	-80.80695878
15,000.00	89.00	149.49	11,236.52	-2,818.80	2,102.79	14,424,534.87	1,694,749.44	39.71917528	-80.80677893
15,100.00	89.00	149.49	11,238.26	-2,904.94	2,153.55	14,424,448.73	1,694,800.20	39.71893841	-80.80659907
15,200.00	89.00	149.49	11,239.99	-2,991.09	2,204.31	14,424,362.59	1,694,850.96	39.71870153	-80.80641922
15,300.00	89.00	149.49	11,241.73	-3,077.23	2,255.07	14,424,276.45	1,694,901.72	39.71846466	-80.80623937
15,400.00	89.00	149.49	11,243.47	-3,163.37	2,305.83	14,424,190.31	1,694,952.48	39.71822779	-80.80605951
15,500.00	89.00	149.49	11,245.20	-3,249.51	2,356.59	14,424,104.17	1,695,003.24	39.71799092	-80.80587967
15,600.00	89.00	149.49	11,246.94	-3,335.65	2,407.35	14,424,018.03	1,695,054.01	39.71775404	-80.80569982
15,700.00	89.00	149.49	11,248.68	-3,421.79	2,458.11	14,423,931.89	1,695,104.77	39.71751717	-80.80551997
15,800.00	89.00	149.49	11,250.42	-3,507.93	2,508.87	14,423,845.74	1,695,155.53	39.71728030	-80.80534012
15,900.00	89.00	149.49	11,252.15	-3,594.08	2,559.63	14,423,759.60	1,695,206.29	39.71704342	-80.80516028
16,000.00	89.00	149.49	11,253.89	-3,680.22	2,610.39	14,423,673.46	1,695,257.05	39.71680655	-80.80498043
16,100.00	89.00	149.49	11,255.63	-3,766.36	2,661.15	14,423,587.32	1,695,307.81	39.71656967	-80.80480059
16,200.00	89.00	149.49	11,257.36	-3,852.50	2,711.91	14,423,501.18	1,695,358.57	39.71633280	-80.80462075
16,300.00	89.00	149.49	11,259.10	-3,938.64	2,762.67	14,423,415.04	1,695,409.33	39.71609592	-80.80444091
16,400.00	89.00	149.49	11,260.84	-4,024.78	2,813.43	14,423,328.90	1,695,460.09	39.71585905	-80.80426107
16,500.00	89.00	149.49	11,262.58	-4,110.93	2,864.19	14,423,242.75	1,695,510.85	39.71562217	-80.80408123
16,600.00	89.00	149.49	11,264.31	-4,197.07	2,914.96	14,423,156.61	1,695,561.61	39.71538530	-80.80390140
16,700.00	89.00	149.49	11,266.05	-4,283.21	2,965.72	14,423,070.47	1,695,612.37	39.71514842	-80.80372156
16,800.00	89.00	149.49	11,267.79	-4,369.35	3,016.48	14,422,984.33	1,695,663.13	39.71491155	-80.80354173
16,900.00	89.00	149.49	11,269.53	-4,455.49	3,067.24	14,422,898.19	1,695,713.89	39.71467467	-80.80336190
17,000.00	89.00	149.49	11,271.26	-4,541.63	3,118.00	14,422,812.05	1,695,764.65	39.71443779	-80.80318207
17,100.00	89.00	149.49	11,273.00	-4,627.77	3,168.76	14,422,725.91	1,695,815.41	39.71420091	-80.80300224
17,200.00	89.00	149.49	11,274.74	-4,713.92	3,219.52	14,422,639.76	1,695,866.17	39.71396404	-80.80282241
17,300.00	89.00	149.49	11,276.47	-4,800.06	3,270.28	14,422,553.62	1,695,916.93	39.71372716	-80.80264258
17,400.00	89.00	149.49	11,278.21	-4,886.20	3,321.04	14,422,467.48	1,695,967.69	39.71349028	-80.80246275
17,500.00	89.00	149.49	11,279.95	-4,972.34	3,371.80	14,422,381.34	1,696,018.45	39.71325340	-80.80228293
17,600.00	89.00	149.49	11,281.69	-5,058.48	3,422.56	14,422,295.20	1,696,069.21	39.71301652	-80.80210310
17,700.00	89.00	149.49	11,283.42	-5,144.62	3,473.32	14,422,209.06	1,696,119.97	39.71277965	-80.80192328
17,800.00	89.00	149.49	11,285.16	-5,230.77	3,524.08	14,422,122.92	1,696,170.73	39.71254277	-80.80174346
17,900.00	89.00	149.49	11,286.90	-5,316.91	3,574.84	14,422,036.78	1,696,221.49	39.71230589	-80.80156364
18,000.00	89.00	149.49	11,288.63	-5,403.05	3,625.60	14,421,950.63	1,696,272.25	39.71206901	-80.80138382
18,100.00	89.00	149.49	11,290.37	-5,489.19	3,676.36	14,421,864.49	1,696,323.01	39.71183213	-80.80120400
18,200.00	89.00	149.49	11,292.11	-5,575.33	3,727.12	14,421,778.35	1,696,373.77	39.71159525	-80.80102419
18,251.31	89.00	149.49	11,293.00	-5,619.53	3,753.17	14,421,734.15	1,696,399.82	39.71147370	-80.80093192

PBHL/TD 18251.31 MD/11293.00 TVD

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Hansen 1S-6HU LP r3 - hit/miss target - Shape	0.00	0.00	11,180.00	-16.31	451.30	14,427,337.36	1,693,097.96	39.72688139	-80.81263116
- plan misses target center by 0.06ft at 11746.61ft MD (11180.00 TVD, -16.28 N, 451.35 E)									
- Point									
Hansen 1S-6HU BHL r3 - plan hits target center - Point	0.00	0.00	11,293.00	-5,619.53	3,753.17	14,421,734.15	1,696,399.82	39.71147370	-80.80093192

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4705102176

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Hansen S-6HU (A)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00ft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00ft
Site:	Hansen	North Reference:	Grid
Well:	Hansen S-6HU (A)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
120.00	120.00	30" Casing @ 120 TVD	30	36	
1,200.00	1,200.00	20" Casing @ 1200 TVD	20	24	
2,650.01	2,650.01	13 3/8" Casing @ 2650 TVD	13-3/8	17	
10,205.76	10,075.02	9 5/8" Casing @ 10075 TVD	9-5/8	12-1/4	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
8,500.00	8,500.00	0.00	0.00	KOP Begin 3°/100' build	
8,766.67	8,765.80	13.14	13.14	Begin 3.5°/100' build/turn	
9,651.86	9,591.22	300.26	-16.93	Begin 34.00° tangent	
9,878.50	9,779.11	421.39	-54.26	Begin 6°/100' build/turn	
11,252.22	11,010.00	361.57	199.96	Begin 8°/100' build/turn	
11,746.63	11,180.00	-16.30	451.37	Begin 89.00° lateral	
18,251.31	11,293.00	-5,619.53	3,753.17	PBHL/TD 18251.31 MD/11293.00 TVD	

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WW-9
(4/16)

API Number 47 - 051 - _____
Operator's Well No. Hansen S-6HU

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) French Creek - Ohio River Quadrangle New Martinsville 7.5'

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

Will a pit be used? Yes No

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

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number UIC 9658, UIC2D0732540, UIC2D0732523)
- 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. Wetzel County Sanitary Landfill / Westmoreland Sanitary Landfill

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

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV0109185) / Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426)

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

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

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

Company Official Signature Jim Pancake

Company Official (Typed Name) Jim Pancake

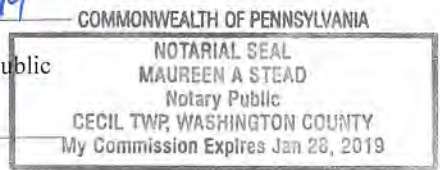
Company Official Title Vice President Geoscience

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WV Department of
Environmental Protection

Subscribed and sworn before me this 21 day of JANUARY, 20 19

Maureen A Stead
Notary Public

My commission expires 1/28/19



Form WW-9

Operator's Well No. Hansen S-6HU

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 28.28 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Winter Rye	168	Tall Fescue	40
Winter Wheat	180	Ladino Clover	3
Field Bromegrass	40	Redtop	3

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: *Jan Udelover*

Comments: _____

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WV Department of
Environmental Protection

Title: Oil and Gas Inspector

Date: 1/23/19

Field Reviewed? () Yes () No

WW-9

PROPOSED HANSEN S-6HU

SUPPLEMENT PG 1

SHEET 1

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

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

ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.

TEMPORARILY SEED AND MULCH ALL SLOPES UPON CONSTRUCTION OF LOCATION.

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

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

COVESTRO, LLC
05-28-9
93.4 ACRES

COVESTRO, LLC
05-28-8
56.32 ACRES

CARL L. COFFIELD SR.
& LANA R. COFFIELD
05-28-7
64 ACRES

COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-28-8
11.25 ACRES

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Environmental Protection

663' R DX TO 16X GRADE

215' R -3X TO -9X GRADE

494' R DX TO 4X GRADE

137' R -2X TO -4X GRADE

572' R DX TO 2X GRADE

259' R -4X TO -8X GRADE

SHEET 1
SHEET 2



LEGEND

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

PROPOSED HANSEN S-6HU

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 8-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.

SHEET 1
SHEET 2



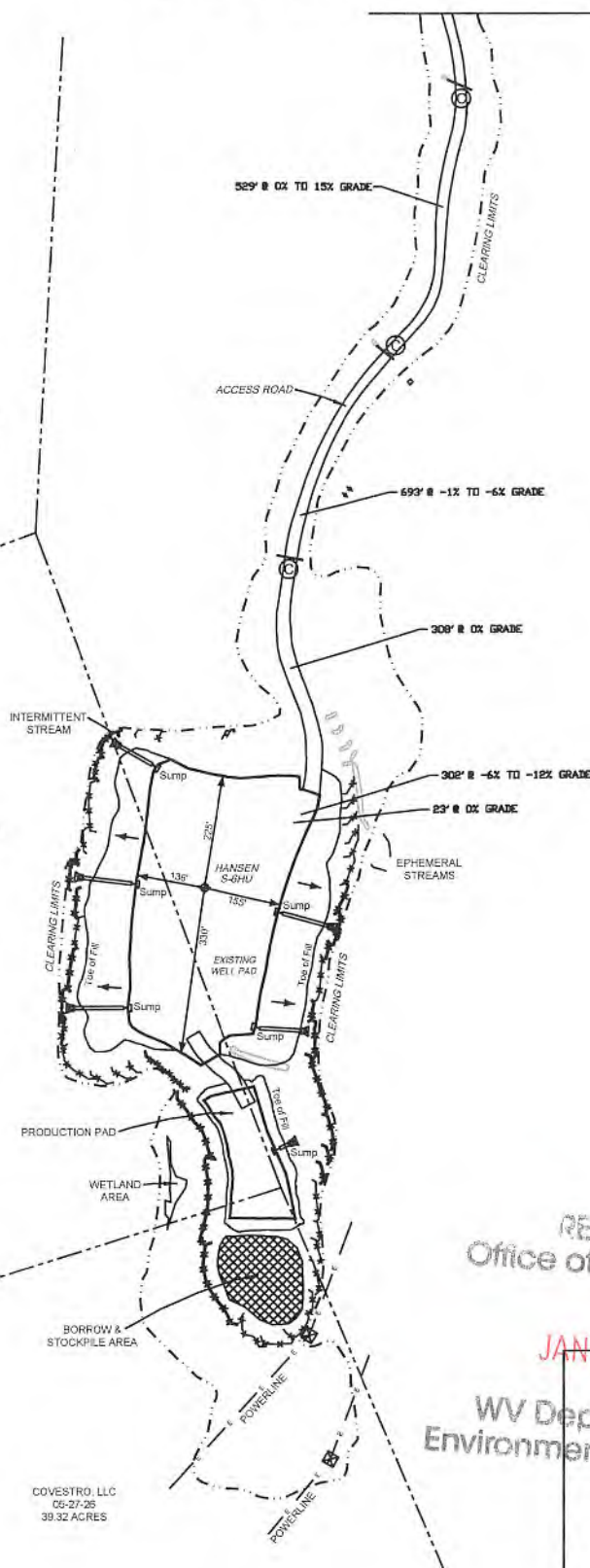
COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-27-22
172.79 ACRES

COVESTRO, LLC
05-27-21
22.67 ACRES

APPALACHIAN
POWER CO.
05-27-21
43.973 ACRES

COVESTRO, LLC
05-27-25
39.32 ACRES



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JAN 28 RECD

LEGEND

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

DATE: 01/17/2019

PROJECT NO: 494510851

DRAWN BY: J.A.H.

4705102176

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SUPPLEMENT PG 2

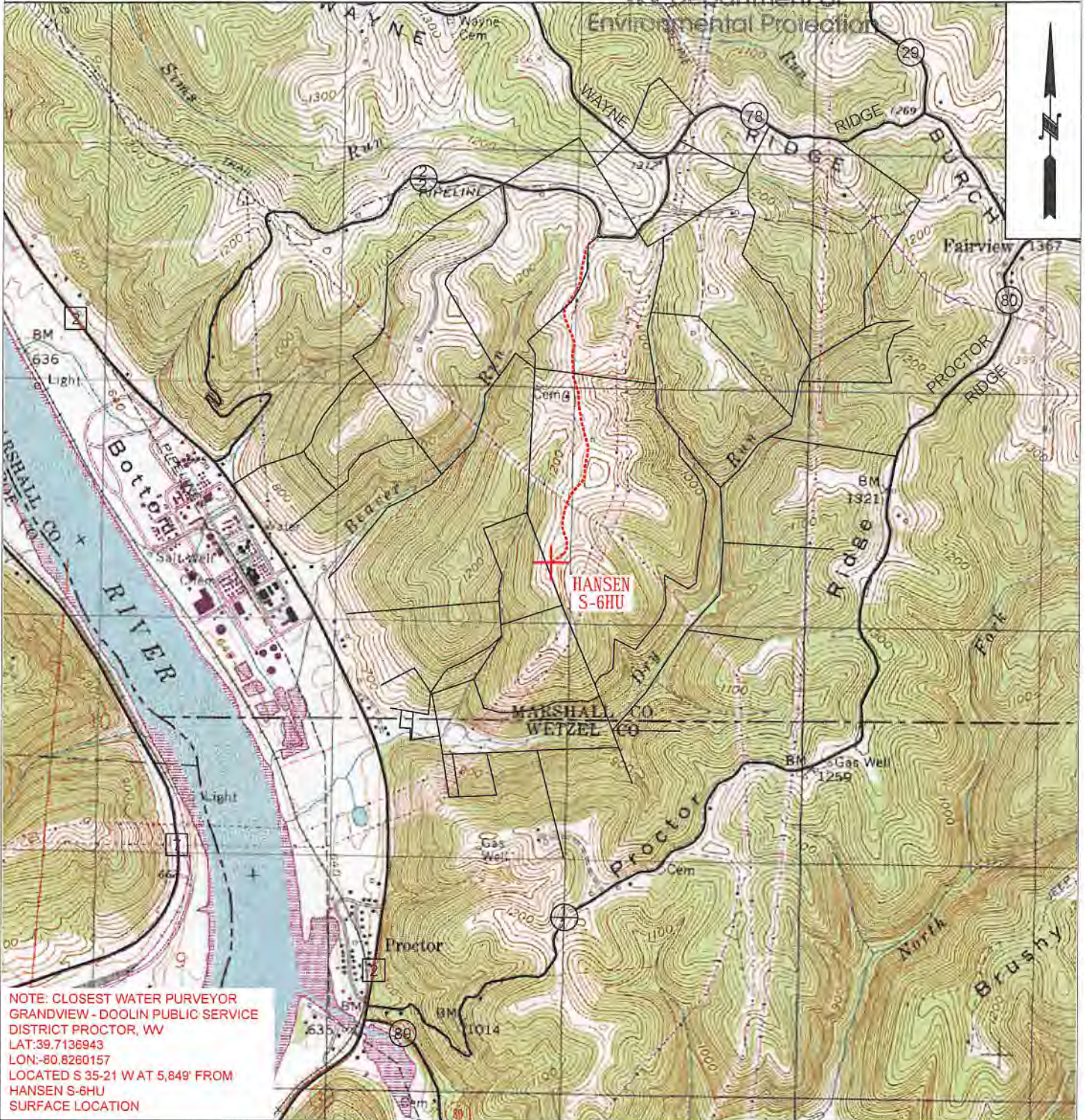
WW-9

PROPOSED HANSEN S-6HU

JAN 28 REC'D

WV Department of

Environmental Protection



NOTE: CLOSEST WATER PURVEYOR
 GRANDVIEW - DOOLIN PUBLIC SERVICE
 DISTRICT PROCTOR, WV
 LAT: 39.7136943
 LON: -80.8260157
 LOCATED S 35-21 W AT 5,849' FROM
 HANSEN S-6HU
 SURFACE LOCATION



TUG HILL
 OPERATING

OPERATOR	494510851	TOPO SECTION	LEASE NAME
TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317		NEW MARTINSVILLE 7.5'	HANSEN
		SCALE:	DATE:
		1" = 2000'	DATE: 01/17/2019



Well Site Safety Plan

Tug Hill Operating, LLC

ju
1/23/19

Well Name: Hansen S-6HU

Pad Location: Hansen
Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING - 4,397,466.20

EASTING - 515,919.73

RECEIVED
January 2019
Office of Oil and Gas

JAN 28 REC'D

WV Department of
Environmental Protection

HANSEN LEASE WELL S-6HU 435.7640± ACRES

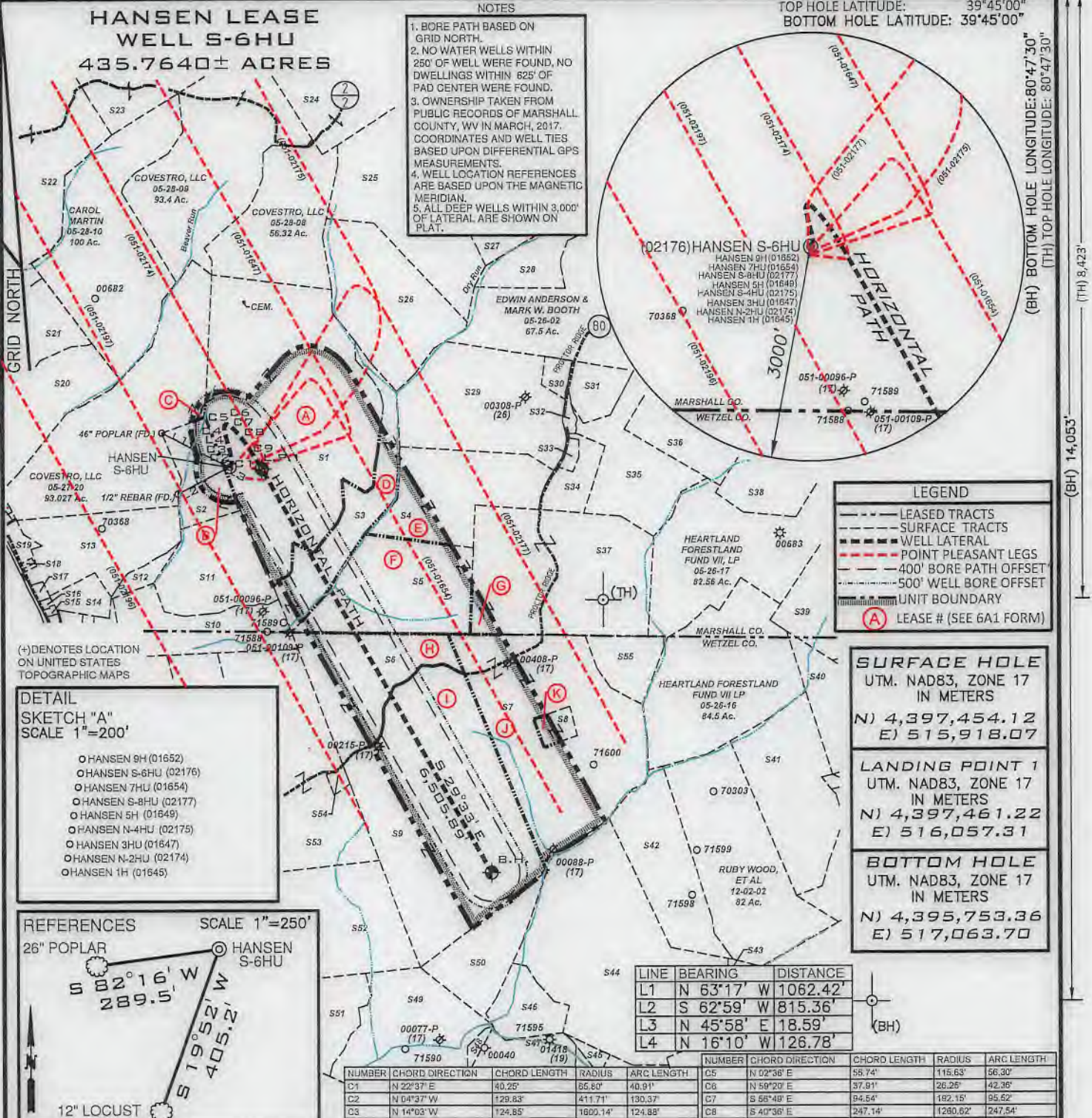
NOTES

1. BORE PATH BASED ON GRID NORTH.
2. NO WATER WELLS WITHIN 250' OF WELL WERE FOUND, NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
3. OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
4. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.
5. ALL DEEP WELLS WITHIN 3,000' OF LATERAL ARE SHOWN ON PLAT.

TOP HOLE LATITUDE: 39°45'00"
BOTTOM HOLE LATITUDE: 39°45'00"

(BH) BOTTOM HOLE LONGITUDE: 80°47'30"
(TH) TOP HOLE LONGITUDE: 80°47'30"

(BH) 14,053'
(TH) 8,423'



SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,397,454.12
E) 515,918.07

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,397,461.22
E) 516,057.31

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,395,753.36
E) 517,063.70

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 1450
Clarksburg, WV 26302
304-623-5651



FILE NUMBER _____

DRAWING NUMBER HANSEN_S-6HU_REV4

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

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 X SHALLOW ___

LOCATION ELEVATION 1247.0' WATERSHED (HUC 10) FRENCH CREEK - OHIO RIVER

DISTRICT FRANKLIN COUNTY MARSHALL

QUADRANGLE NEW MARTINSVILLE 7.5' LEASE NUMBER SEE WW-6A1 FORM

SURFACE OWNER COVESTRO, LLC ACREAGE 172.79

OIL & GAS ROYALTY OWNER PPG INDUSTRIES, INC. LEASE ACREAGE 172.79

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

TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH TVD: 11,399' TMD: 18,251'

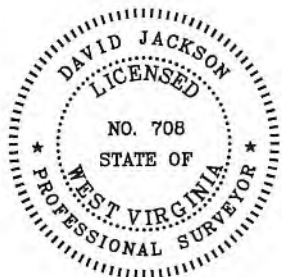
WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
CT CORPORATION SYSTEM

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

Form WWS

**HANSEN LEASE
WELL S-6HU
435.7640± ACRES**

Number	TAX MAP -PARCEL	SURFACE OWNER	ACRES
S1	A 05-27-22	COVESTRO, LLC.	172.79
S2	B 05-27-21	COVESTRO, LLC.	22.67
S3	D 05-27-23	ROBERT F. ROTH LISBERGER	35.77
S4	E 05-26-19	ERIC JAY & KARROLL S. BOOTH	50.0
S5	F 05-27-24	ROBERT F. ROTH LISBERGER	60.10
S6	H 12-1-8.1	ROBERT F. ROTH LISBERGER	50.33
S7	J 12-1-40	MARK W. BOOTH, ETAL	117.0
S8	K 12-1-41	MARK W. BOOTH, ETAL	5.0
S9	I 12-1-8	BENJAMIN J. KOCHER	168.67
S10	05-27-25	JAMES RICHMOND	41.35
S11	05-27-26	COVESTRO, LLC	39.32
S12	05-27-27	JAMES ANDREW & KAREN LYNNE RICHMOND	8.9353
S13	05-27-20.1	APPALACHIAN POWER CO.	43.973
S14	05-27-28	COVESTRO, LLC.	8.0
S15	05-27-42	COVESTRO, LLC.	0.52
S16	05-27-42.1	COVESTRO, LLC.	0.52
S17	12-27-41	MARTHA JEAN ARRICK	0.99
S18	05-27-30	COVESTRO, LLC.	0.371
S19	05-27-31.1	COVESTRO, LLC.	3.0
S20	05-27-19	COVESTRO, LLC.	33.786
S21	05-28-11	CAROL A. MARTIN	24.681
S22	05-28-2	COVESTRO, LLC.	99.5
S23	05-28-3	TH EXPLORATION III, LLC	53.44
S24	05-28-4	TH EXPLORATION III, LLC	48.44
S25	05-28-6	ULA F. NELSON	70.0
S26	05-28-7	CARL L. COFFIELD, SR. & LANA R. COFFIELD	64.0
S27	05-28-5	TH EXPLORATION III, LLC	105.9
S28	05-26-1	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	12.94
S29	05-26-4.5	ERIC JAY BOOTH	74.388
S30	05-26-4	JAMES R. & MELODY A. ANDERSON	3.887
S31	05-26-4.6	OTIS F. RUSH, JR.	12.268
S32	05-26-4.2	OTIS S. & GLENDA RUSH	1.58
S33	05-26-4.3	CRYSTAL & RANDOLPH F. MATASK	2.253
S34	05-26-4.1	OTIS S. RUSH, ETUX	12.188
S35	05-26-4.4	OTIS F. & GLENDA M. RUSH	39.436
S36	05-26-5	MICHAEL J. WILEY, ETAL	65.0
S37	05-26-18	ERIC JAY BOOTH	94.0
S38	05-26-6	HEARTWOOD FORESTLAND FUND VII LP.	36.17
S39	05-26-15	ROBERT D. OLIVER, ET UX	69.0
S40	12-2-5	CLIFFORD W. & ALBERTA B. JOHNSON	75.96
S41	12-2-3	NELSON M. & MARY D. MILLER	51.75
S42	12-2-1	NELSON M. & MARY D. MILLER	49.0
S43	12-2-7	JOHN D. AMNAH	44.5
S44	12-1-20	CHARLES E. FROHNAPFEL, TRUSTEE OF THE CHARLES E. FROHNAPFEL LIVING TRUST DATED OCTOBER 3, 2017	126.0
S45	12-1-34.1	HERBERT PARSONS & VIRGINIA YOHO ROY	2.0
S46	12-1-31	STEVEN JACK & SUSAN LOUISE HAFER	20.0
S47	12-1-32	BAXTER FARM, LLC.	78.74
S48	12-1-29	BAXTER FARM, LLC.	2.0
S49	12-1-28	STEVEN J. & SUSAN L. HAFER	88.39
S50	12-1-19	STEVEN J. & SUSAN L. HAFER	36.5
S51	12-1-18	TRAVIS DARRELL BLAKE & ANGELA DAWN MITCHELL	48.4
S52	12-1-17	VIVIAN A. PARSONS, ETAL	112.0
S53	12-1-7	KEITH ACKER, ETAL.	101.0
S54	12-1-7.1	HARRY WAYMAN ESTATE	2.0
S55	12-2-24	MARK W. BOOTH, MAGGIE ANN ROCKWELL & GEORGE E. BOOTH, JR.	13.1



P.S. 708 *David L Jackson*

47-051-02176 H6A



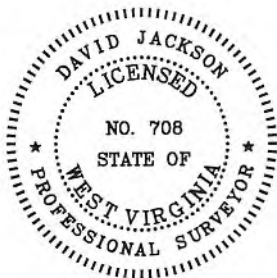
**TUG HILL
OPERATING**

OPERATOR'S
WELL #: HANSEN S-6HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-02176

WELL PLAT
PAGE 2 OF 3
DATE: 08/07/2019

**HANSEN LEASE
WELL S-6HU
435.7640± ACRES**

Lease ID	Tags	Parcel	Grantor, Lessor, Etc.	Deed Book	Page
10*14418	A	5-27-22	PPG INDUSTRIES, INC.	878	610
10*27022	B	5-27-21	COVESTRO LLC	1046	431
10*14493	C	5-27-20	BETTY JEAN NEELY	748	468
10*14494	C	5-27-20	MARY LOU WILSON	748	471
10*14495	C	5-27-20	PATRICIA HARTMAN	752	197
10*14496	C	5-27-20	STEPHANIE L HALL	752	215
10*14497	C	5-27-20	CAROL DEEN GARDNER	752	212
10*27022	C	5-27-20	COVESTRO LLC	1046	431
10*14609	D	5-27-23	PATRICIA HADDIX	700	113
10*14610	D	5-27-23	SUZANNE HILL	699	45
10*14611	D	5-27-23	ULLIAN PRISCILLA GRIMM	699	41
10*19908	E	5-26-19	GOLDA K ANDERSON	945	434
10*21935	E	5-26-19	KARROLL S BOOTH AND LOIS E BOOTH	940	493
10*22015	E	5-26-19	ERIC JAY BOOTH	942	217
10*14504	F	5-27-24	GEORGE A. STICKLER	756	83
10*19733	G	5-26-18	GEORGE E BOOTH SR AND MARGARET E BOOTH	944	575
10*19910	G	5-26-18	GOLDA K ANDERSON	945	440
10*21450	G	5-26-18	ERIC JAY BOOTH	953	258
10*15066	H	12-1-8.1	ROBERT J. HENRY	110A	335
10*23504	H	12-1-8.1	ROBERT F ROTHLSBERGER	210A	803
10*15066	I	12-1-8	ROBERT J. HENRY	110A	335
10*15071	I	12-1-8	BENJAMIN J. KOCHER	119A	463
10*15088	J	12-1-40	MARK W BOOTH	154A	122
10*15089	J	12-1-40	MAGGIE ANN ROCKWELL	152A	437
10*15090	J	12-1-40	GEORGE E BOOTH JR	152A	440
10*21151	J	12-1-40	RICHARD K REYNOLDS & SHIRLEY REYNOLDS	198A	347
10*21165	J	12-1-40	GARNETT IRENE ROBINSON	198A	349
10*15088	K	12-1-41	MARK W BOOTH	154A	122
10*15089	K	12-1-41	MAGGIE ANN ROCKWELL	152A	437
10*15090	K	12-1-41	GEORGE E BOOTH JR	152A	440



P.S. 708 *David L Jackson*

47-051-02176 H6A

 <p>TUG HILL OPERATING</p>	OPERATOR'S	WELL PLAT
	WELL #: <u>HANSEN S-6HU</u>	
	DISTRICT: <u>Franklin</u>	PAGE 3 OF 3
	COUNTY: <u>Marshall</u>	DATE: 08/07/2019
	STATE: <u>WV</u>	
	API #: <u>47-051-02176</u>	

WW-6A1
(5/13)

Operator's Well No. Hansen S-6HU

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

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

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

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

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

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

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

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

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

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment
10*14418	A	5-27-22	PG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*27022	B	5-27-21	COVESTRO LLC	TH EXPLORATION, LLC	1/8+	1046	431	NA	NA	NA	NA
10*14493	C	5-27-20	BETTY JEAN NEELEY	GASTAR EXPLORATION USA, INC	1/8+	748	468	NA	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	32/428 Gastar Exploration USA to Atinum Marcellus I LLC	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*14494	C	5-27-20	MARY LOU WILSON	GASTAR EXPLORATION USA, INC	1/8+	748	471	NA	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	32/428 Gastar Exploration USA to Atinum Marcellus I LLC	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*14495	C	5-27-20	PATRICIA HARTMAN	GASTAR EXPLORATION USA, INC	1/8+	752	197	NA	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	32/428 Gastar Exploration USA to Atinum Marcellus I LLC	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*14496	C	5-27-20	STEPHANIE L HALL	GASTAR EXPLORATION USA, INC	1/8+	752	215	NA	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	32/428 Gastar Exploration USA to Atinum Marcellus I LLC	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*14497	C	5-27-20	CAROL DEEN GARDNER	GASTAR EXPLORATION USA, INC	1/8+	752	212	NA	21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger	32/428 Gastar Exploration USA to Atinum Marcellus I LLC	36/9 Gastar Exploration USA Inc to TH Exploration II, LLC
10*27022	C	5-27-20	COVESTRO LLC	TH EXPLORATION, LLC	1/8+	1046	431	NA	NA	NA	NA
10*14609	D	5-27-23	PATRICIA HADDIX	CHESAPEAKE APPALACHIA LLC	1/8+	700	113	23/512 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC

4705102176

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment
10*14610	D	5-27-23	SUZANNE HILL	CHESAPEAKE APPALACHIA LLC	1/8+	699	45	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14611	D	5-27-23	LILLIAN PRISCILLA GRIMM	CHESAPEAKE APPALACHIA LLC	1/8+	699	41	23/479 Chesapeake Appalachia LLC to Statoil USA Onshore properties Inc	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*19908	E	5-26-19	GOLDA K ANDERSON	TH EXPLORATION, LLC	1/8+	945	434	NA	NA	NA	NA
10*21935	E	5-26-19	KARROLL S BOOTH AND LOIS E BOOTH	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	940	493	NA	NA	NA	41/224 American Petroleum Partners Operating LLC to TH Exploration LLC
10*22015	E	5-26-19	ERIC JAY BOOTH	AMERICAN PETROLEUM PARTNERS OPERATING LLC	1/8+	942	217	NA	NA	NA	41/224 American Petroleum Partners Operating LLC to TH Exploration LLC
10*14504	F	5-27-24	GEORGE A. STICKLER	GASTAR EXPLORATION USA, INC	1/8+	756	83	NA	26/639 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*19733	G	5-26-18	GEORGE E BOOTH SR AND MARGARET E BOOTH	TH EXPLORATION, LLC	1/8+	944	575	NA	NA	NA	NA
10*19910	G	5-26-18	GOLDA K ANDERSON	TH EXPLORATION, LLC	1/8+	945	440	NA	NA	NA	NA
10*21450	G	5-26-18	ERIC JAY BOOTH	TH EXPLORATION, LLC	1/8+	953	258	NA	NA	NA	NA

4705102176

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment
10*15066	H	12-1-8.1	ROBERT J. HENRY	GASTAR EXPLORATION USA, INC	1/8+	110A	335	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*23504	H	12-1-8.1	ROBERT F ROTHILSBERGER	TH EXPLORATION, LLC	1/8+	210A	803	NA	NA	NA	NA
10*15066	I	12-1-8	ROBERT J. HENRY	GASTAR EXPLORATION USA, INC	1/8+	110A	335	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*15071	I	12-1-8	BENJAMIN J. KOCHER	STONE ENERGY CORPORATION	1/8+	119A	463	NA	137A/877 Stone Energy Corporation to Gastar Exploration USA Inc and Athum Marcellus I LLC	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*15088	J	12-1-40	MARK W BOOTH	GASTAR EXPLORATION INC	1/8+	154A	122	NA	NA	35/144 Gastar Exploration Inc to Athum Marcellus I LLC	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*15089	J	12-1-40	MAGGIE ANN ROCKWELL	GASTAR EXPLORATION INC	1/8+	152A	437	NA	NA	35/144 Gastar Exploration Inc to Athum Marcellus I LLC	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*15090	J	12-1-40	GEORGE E BOOTH JR	GASTAR EXPLORATION INC	1/8+	152A	440	NA	NA	35/144 Gastar Exploration Inc to Athum Marcellus I LLC	173A/431 Gastar Exploration Inc to TH Exploration II LLC
10*21151	J	12-1-40	RICHARD K REYNOLDS & SHIRLEY REYNOLDS	TH EXPLORATION, LLC	1/8+	198A	347	NA	NA	NA	NA
10*21165	J	12-1-40	GARNETT IRENE ROBINSON	TH EXPLORATION, LLC	1/8+	198A	349	NA	NA	NA	NA

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment
10*15088	K	12-1-41	MARK W BOOTH	GASTAR EXPLORATION INC	1/8+	154A	122	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	173A/431 Gaster Exploration Inc to TH Exploration II LLC
10*15089	K	12-1-41	MAGGIE ANN ROCKWELL	GASTAR EXPLORATION INC	1/8+	152A	437	NA	NA	35/144 Gaster Exploration Inc to Atinum Marcellus I LLC	173A/431 Gaster Exploration Inc to TH Exploration II LLC
10*15090	K	12-1-41	GEORGE E BOOTH JR	GASTAR EXPLORATION INC	1/8+	152A	440	NA	NA	35/144 Gaster Exploration Inc to Atinum Marcellus I LLC	173A/431 Gaster Exploration Inc to TH Exploration II LLC

04/27/2016
MARSHALL County 01:22:38 PM
Instrument No 1403489
Date Recorded 04/27/2016
Document Type ASB
Pages Recorded 77
Book-Page 36-9
Recording Fee \$77.00
Additional \$13.00

4705102176

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 MARSHALL §

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 Gaster 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, Wetzell, 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");

(b) all rights and interests in, under or derived from all unitization agreements in effect with respect to any of the Leases and the units created thereby, including those described

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AUG - 9 2019
WV Department of
Environmental Protection

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Marshall County
Jan Pest, Clerk
Instrument 1436500
02/14/2018 @ 01:32:11 PM
ASSIGNMENTS
Book 41 @ Page 224
Pages Recorded 7
Recording Cost \$ 13.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "Assignment") is made and entered into this 5th day of February, 2018, and made effective December 12, 2017 (the "Effective Date"), by and between AMERICAN PETROLEUM PARTNERS OPERATING, LLC, (hereinafter "Assignor") and TH EXPLORATION, LLC (hereinafter "Assignee") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated December 12, 2017 (the "Acreage Trade Agreement"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

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

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

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

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

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

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

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AUG - 9 2019
WV Department of
Environmental Protection

DPS LAND SERVICES-CORP-TIM SCHULTZ
6000 TOWN CENTER BLVD STE 145
CAMONSBURG, PA 15317-5861

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

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

RECEIVED
Office of Oil and Gas
AUG - 9 2019
WV Department of
Environmental Protection

Carol S Haught
WETZEL County 02:43:00 PM
Instrument No 200730
Date Recorded 04/27/2016
Document Type O&G
Pages Recorded 40
Book+Page 175A-431
Recording Fee \$40.00
Additional \$10.00

AFFIDAVIT

COPY

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

4705102176

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

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

FURTHER, AFFIANT SAITH NOT.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this 18th day of October, 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 MIS
Pages Recorded 1
Book-Page 28-62
Recording Fee \$5.00
Additional \$5.00

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

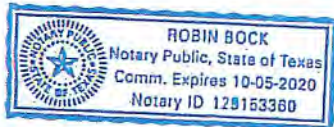
IN WITNESS WHEREOF, I hereunto set my hand and official seal.

RECEIVED
Office of Oil and Gas

My Commission Expires: 10-05-2020

Signature/Notary Public: Robin Bock

Name/Notary Public (Print): Robin Bock Department of Environmental Protection



4705102176

Jan Pest
MARSHALL County 01:22:38 PM
Instrument No 1403489
Date Recorded 04/27/2016
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Additional 413.00

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 MARSHALL

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 Gasar 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 (b) 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, Wetzell, 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");

(b) all rights and interests in, under or derived from all unitization agreements in effect with respect to any of the Leases and the units created thereby, including those described

US 4080690

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Department of
Financial Protection

STATE OF WEST VIRGINIA §
 §
COUNTY OF MARSHALL §

Marshall County
Jan Pest. Clerk
Instrument 1436500
02/14/2018 @ 01:32:11 PM
ASSIGNMENTS
Book 41 @ Page 224
Pages Recorded 7
Recording Cost \$ 13.00

ASSIGNMENT AND CONVEYANCE

THIS ASSIGNMENT AND CONVEYANCE (the "**Assignment**") is made and entered into this 5th day of February, 2018, and made effective December 12, 2017 (the "**Effective Date**"), by and between **AMERICAN PETROLEUM PARTNERS OPERATING, LLC**, (hereinafter "**Assignor**") and **TH EXPLORATION, LLC** (hereinafter "**Assignee**") pursuant to the terms of that certain Acreage Trade Agreement between the Assignor and the Assignee dated December 12, 2017 (the "**Acreage Trade Agreement**"). Capitalized terms used but not defined herein and defined in the Acreage Trade Agreement shall have the meanings given to such terms in the Acreage Trade Agreement.

WITNESSETH:

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

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

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

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

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

2. **Special Warranty.** Assignor represents and warrants that Assignor has not conveyed or otherwise encumbered (other than Permitted Encumbrances) its interest in the

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WV Department of
Environmental Protection

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 I attached hereto (subject to any reservations, limitations or depth restrictions described on Exhibit A—Part I), (Assignor's interest in such leases and other right, title and interest as so limited, the "*Leases*");

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Environmental Protection

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January 24, 2019

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

RE: Hansen S-6HU

Subject: Marshall County 80 Road Crossing Letter

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 Marshall County Route 80 in the area reflected on the Hansen S-6HU 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 directly at 304-376-0111, or by email at amiller@tug-hilop.com.

Sincerely,

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

Amy L. Miller
Permitting Specialist – Appalachia Region

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Environmental Protection

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

Date of Notice Certification: 01/25/2019

API No. 47-051-4705102176

Operator's Well No. Hansen S-6HU

Well Pad Name: Hansen

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>515,918.07</u>
County:	<u>Marshall</u>		Northing:	<u>4,397,454.12</u>
District:	<u>Franklin</u>	Public Road Access:	<u>County Route 2/2 - Wells Hill Road</u>	
Quadrangle:	<u>New Martinsville 7.5'</u>	Generally used farm name:	<u>Covestro, LLC</u>	
Watershed:	<u>French Creek - Ohio River</u>			

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

Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:

*PLEASE CHECK ALL THAT APPLY

- 1. NOTICE OF SEISMIC ACTIVITY or NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED
- 2. NOTICE OF ENTRY FOR PLAT SURVEY or NO PLAT SURVEY WAS CONDUCTED
- 3. NOTICE OF INTENT TO DRILL or NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)
- 4. NOTICE OF PLANNED OPERATION
- 5. PUBLIC NOTICE
- 6. NOTICE OF APPLICATION

OOG OFFICE USE ONLY
<input type="checkbox"/> RECEIVED/ NOT REQUIRED
<input type="checkbox"/> RECEIVED
<input type="checkbox"/> RECEIVED/ NOT REQUIRED
<input type="checkbox"/> RECEIVED
<input type="checkbox"/> RECEIVED
<input type="checkbox"/> RECEIVED

Office of Oil and Gas
JAN 28 RECD
WV Department of Environmental Protection

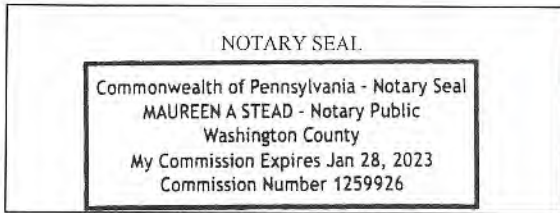
Required Attachments:

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

Certification of Notice is hereby given:

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

Well Operator:	<u>Tug Hill Operating, LLC</u>	Address:	<u>380 Southpointe Boulevard, Plaza II, Suite 200</u>
By:	<u>Amy L. Miller <i>Amy Miller</i></u>		<u>Canonsburg, PA 15317</u>
Its:	<u>Permitting Specialist - Appalachia Region</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 25 day of JANUARY, 2019
Maureen A Stead Notary Public
 My Commission Expires 1/28/23

Oil and Gas Privacy Notice:

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

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WV Department of
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WW-6A
(9-13)

4705102176
API NO. 47-051 -
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

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: 1/24/2019 Date Permit Application Filed: 1/25/2019

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: Covestro, LLC Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

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

Name: _____
Address: _____

Name: _____
Address: _____

SURFACE OWNER(s) (Impoundments or Pits)

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: CONSOL Energy, LLC Attn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

COAL OPERATOR

Name: _____
Address: _____

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

Name: none
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD

Name: _____
Address: _____

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WV Department of
Environmental Protection

*Please attach additional forms if necessary

Notice is hereby given:

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

This Notice Shall Include:

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

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

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

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

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

Well Location Restrictions

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

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Environmental Protection

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APL NO. 47-051 -
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

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

Water Well Testing:

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

Water Testing Laboratories:

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

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

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

Written Comment:

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

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

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

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Office of Oil and Gas

JAN 28 REC'D

WV Department of
Environmental Protection

Time Limits and Methods for Filing Comments.

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

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

Comment Requirements

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

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

Permit Denial or Condition

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

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

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

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

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WV Department of
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WW-6A
(8-13)

4705102176

API NO. 47- 051 -
OPERATOR WELL NO. Hansen S-6HU
Well Pad Name: Hansen

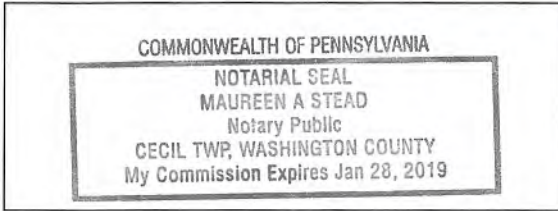
Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.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 23 day of JANUARY, 2019.
Maureen A Stead Notary Public
My Commission Expires 1/28/19

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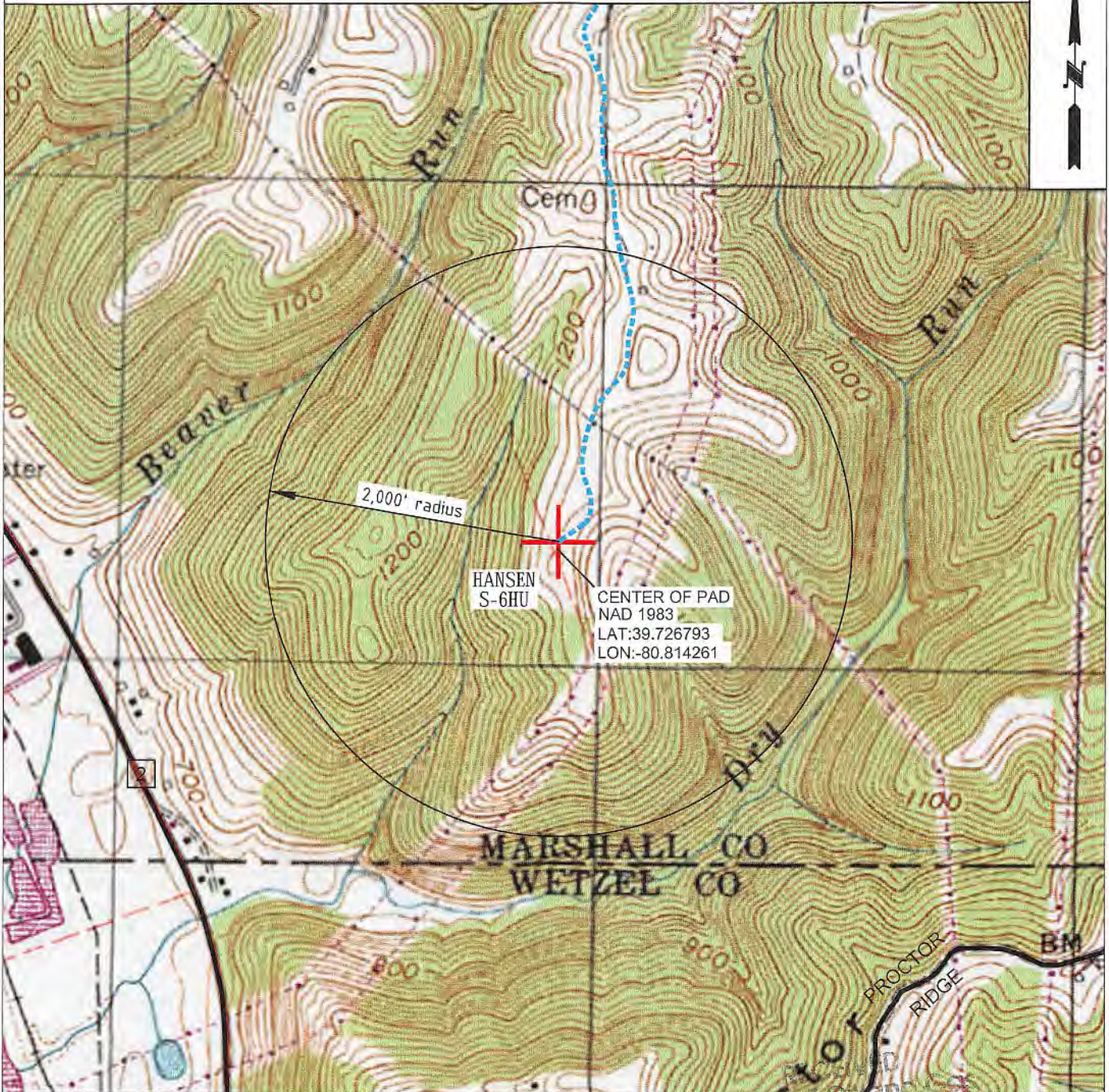
WV Department of
Environmental Protection


WW-6A

PROPOSED HANSEN S-6HU

SUPPLEMENT PG 1

There appears to be zero (0) possible water sources within 2,000'.



 TUG HILL OPERATING	OPERATOR 494510851	TOPO SECTION NEW MARTINSVILLE 7.5'	LEASE NAME HANSEN
	TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	SCALE: 1" = 1000'	DATE: 01/17/2019
	Office of Oil and Gas WV Department of Environmental Protection	JAN 28 2019	DATE: 01/17/2019

4705102176

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

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

Date of Notice: 1/7/2018 **Date of Planned Entry:** 1/14/2018

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

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

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

Notice is hereby provided to:

SURFACE OWNER(s)

Name: Covestro, LLC, Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

Name: _____
Address: _____

COAL OWNER OR LESSEE

Name: CONSOL Energy, LLC Attn: Casey Saunders
Address: 1000 CONSOL Energy Drive
Canonsburg, PA 15317

MINERAL OWNER(s)

Name: TH Exploration III, LLC Attn: David Kalish
Address: 1320 S. University Drive, Suite 500
Ft. Worth, TX 76107

*please attach additional forms if necessary

Notice is hereby given:

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

State: <u>West Virginia</u>	Approx. Latitude & Longitude: <u>39.4336.5; -80.4851.3</u>
County: <u>Marshall</u>	Public Road Access: <u>Wells Hill Lane (CR 2/2)</u>
District: <u>Franklin</u>	Watershed: <u>French Creek - Ohio River</u>
Quadrangle: <u>New Martinsville 7.5'</u>	Generally used farm name: <u>Covestro, LLC</u>

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

Notice is hereby given by:

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

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

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Office of Oil and Gas

Oil and Gas Privacy Notice:

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

JAN 20 2018
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: 01/24/2019 **Date Permit Application Filed:** 01/25/2019

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

- CERTIFIED MAIL
RETURN RECEIPT REQUESTED
- HAND 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: Covestro, LLC Attn: Tax Department (Well Pad and Access Road)
Address: 1 Covestro Circle
Pittsburgh, PA 15205

Name: _____
Address: _____

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:	West Virginia	UTM NAD 83	Easting:	515,918.07
County:	Marshall		Northing:	4,397,454.12
District:	Franklin	Public Road Access:	County Route 2/2 - Wells Hill Road	
Quadrangle:	New Martinsville 7.5'	Generally used farm name:	Covestro, LLC	
Watershed:	French Creek - Ohio River			

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



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

January 24, 2019

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 Permit for the Hansen Pad, Marshall County
 Hansen S-6HU Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permits #06-2017-0178 which have been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 2/2 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated October 1, 2018.

Very Truly Yours,

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

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

JAN 28 REC'D

WV Department of
 Environmental Protection



TUG HILL

4705102176

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

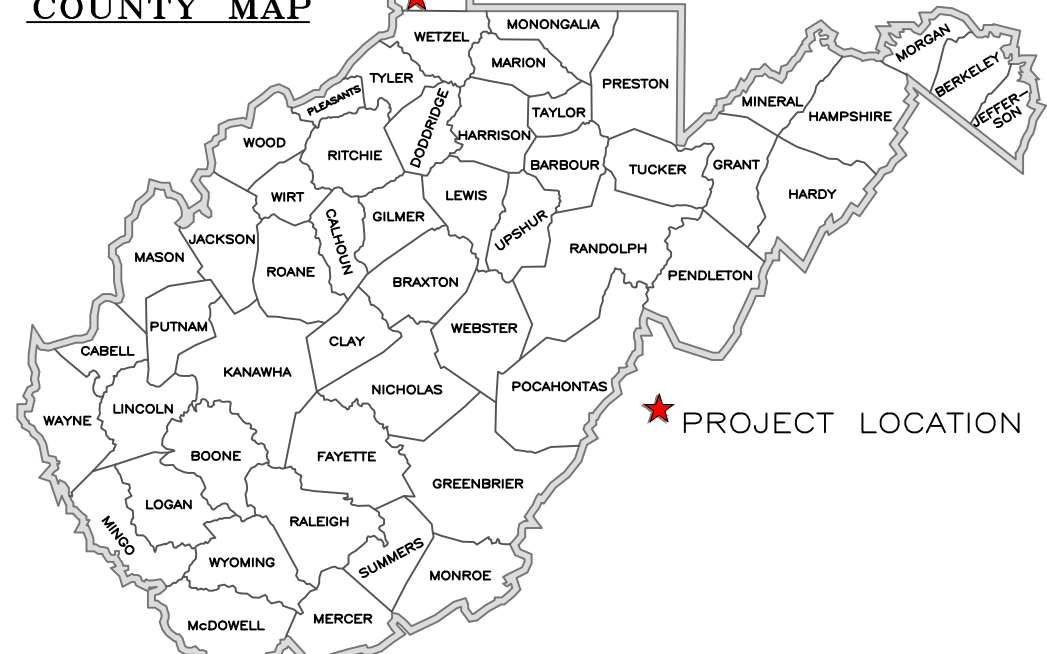
PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS#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

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Office of Oil and Gas

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WV Department of
Environmental Protection

WEST VIRGINIA COUNTY MAP



Hansen Well Site

Site Design, Construction Plan, &
Erosion and Sediment Control Plans

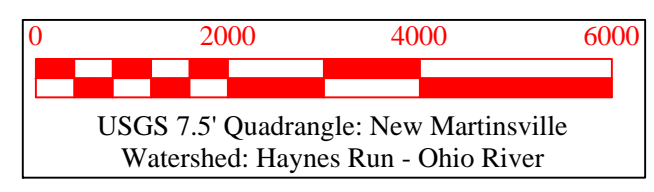
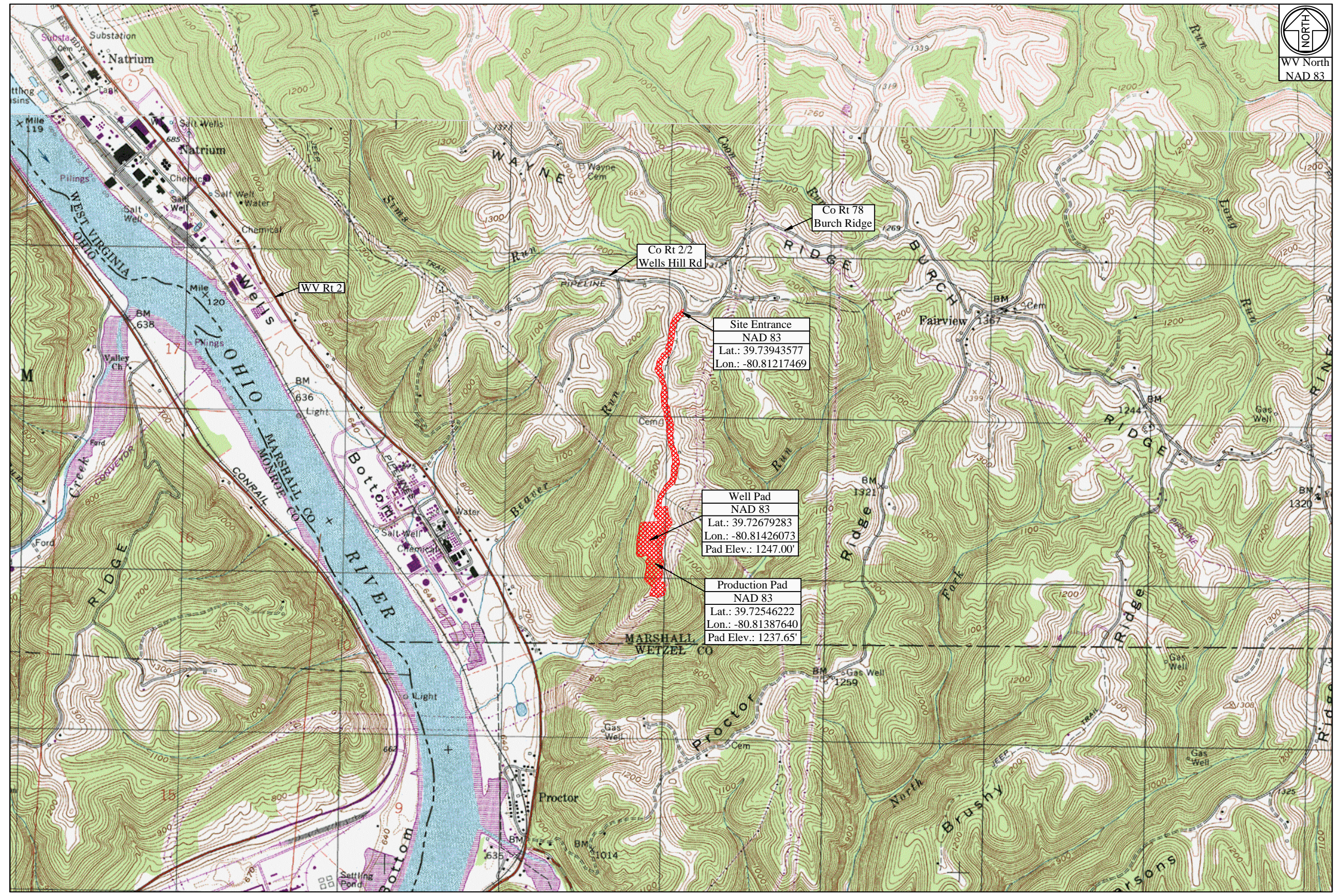
Tug Hill Operating
Marshall County
Franklin District
Latitude 39.72679283°
Longitude -80.81426073°
Haynes Run - Ohio River Watershed

Pertinent Site Information
Hansen Well Site
Emergency Number: 304-845-1920
Franklin District, Marshall County, WV
Watershed: Haynes Run - Ohio River Watershed
Tug Hill Contact Number: 1-817-632-3400

Exhibit A: Final Design: Issue for Permitting

Site Entrance	Center of Well Pad	Center of Production Pad
WV-N NAD 83 N: 454134.91 WV-N NAD 83 E: 1599517.96 WV-N NAD 27 N: 454098.98 WV-N NAD 27 E: 1630955.93 Lat. NAD 83: 39.73943577 Lon. NAD 83: -80.81217469 Lat. NAD 27: 39.73935892 Lon. NAD 27: -80.81235959 UTM 17 NAD 83 N: 4598854.65 UTM 17 NAD 83 E: 516693.49	WV-N NAD 83 N: 449538.81 WV-N NAD 83 E: 1598864.04 WV-N NAD 27 N: 449502.93 WV-N NAD 27 E: 1630302.19 Lat. NAD 83: 39.72679283 Lon. NAD 83: -80.81426073 Lat. NAD 27: 39.72671589 Lon. NAD 27: -80.81444491 UTM 17 NAD 83 N: 4397451.10 UTM 17 NAD 83 E: 515917.66 Pad Elev.: 1247.00'	WV-N NAD 83 N: 449052.61 WV-N NAD 83 E: 1598965.04 WV-N NAD 27 N: 449016.73 WV-N NAD 27 E: 1630403.20 Lat. NAD 83: 39.72546222 Lon. NAD 83: -80.81387640 Lat. NAD 27: 39.72538526 Lon. NAD 27: -80.81406053 UTM 17 NAD 83 N: 4397303.49 UTM 17 NAD 83 E: 515950.90 Pad Elev.: 1237.65'

Well Table																		
<table border="1"> <tr><th>Hansen IH</th><th>Hansen N-2HU</th><th>Hansen 3HU</th><th>Hansen N-4HU</th><th>Hansen 5H</th></tr> <tr><td>WV-N NAD 83 N: 449449.99 WV-N NAD 83 E: 1598849.80 WV-N NAD 27 N: 449414.10 WV-N NAD 27 E: 1630287.95 Lat. NAD 83: 39.72654843 Lon. NAD 83: -80.81430676 Lat. NAD 27: 39.72647149 Lon. NAD 27: -80.81449892 UTM 17 NAD 83 (m) N: 4397423.97 UTM 17 NAD 83 (m) E: 515913.77</td><td>WV-N NAD 83 N: 449469.63 WV-N NAD 83 E: 1598853.35 WV-N NAD 27 N: 449433.75 WV-N NAD 27 E: 1630291.50 Lat. NAD 83: 39.72650250 Lon. NAD 83: -80.81429514 Lat. NAD 27: 39.72652556 Lon. NAD 27: -80.81447931 UTM 17 NAD 83 (m) N: 4397429.97 UTM 17 NAD 83 (m) E: 515914.75</td><td>WV-N NAD 83 N: 449489.50 WV-N NAD 83 E: 1598856.23 WV-N NAD 27 N: 449433.62 WV-N NAD 27 E: 1630297.61 Lat. NAD 83: 39.72667177 Lon. NAD 83: -80.81428593 Lat. NAD 27: 39.72658023 Lon. NAD 27: -80.81447010 UTM 17 NAD 83 (m) N: 4397436.04 UTM 17 NAD 83 (m) E: 515915.53</td><td>WV-N NAD 83 N: 449509.16 WV-N NAD 83 E: 1598859.46 WV-N NAD 27 N: 449433.28 WV-N NAD 27 E: 1630297.61 Lat. NAD 83: 39.72671126 Lon. NAD 83: -80.81427541 Lat. NAD 27: 39.72663432 Lon. NAD 27: -80.81455965 UTM 17 NAD 83 (m) N: 4397442.05 UTM 17 NAD 83 (m) E: 515916.41</td><td>WV-N NAD 83 N: 449529.26 WV-N NAD 83 E: 1598862.00 WV-N NAD 27 N: 449493.38 WV-N NAD 27 E: 1630300.15 Lat. NAD 83: 39.72676654 Lon. NAD 83: -80.81426750 Lat. NAD 27: 39.72668960 Lon. NAD 27: -80.8145167 UTM 17 NAD 83 (m) N: 4397448.18 UTM 17 NAD 83 (m) E: 515917.08</td></tr> </table> <table border="1"> <tr><th>Hansen S-8HU</th><th>Hansen 7HU</th><th>Hansen S-6HU</th><th>Hansen 9H</th></tr> <tr><td>WV-N NAD 83 N: 449548.69 WV-N NAD 83 E: 1598865.57 WV-N NAD 27 N: 449512.81 WV-N NAD 27 E: 1630303.72 Lat. NAD 83: 39.72682002 Lon. NAD 83: -80.8142582 Lat. NAD 27: 39.72674308 Lon. NAD 27: -80.81443999 UTM 17 NAD 83 (m) N: 4397454.12 UTM 17 NAD 83 (m) E: 515918.07</td><td>WV-N NAD 83 N: 449568.65 WV-N NAD 83 E: 1598868.34 WV-N NAD 27 N: 449532.77 WV-N NAD 27 E: 1630306.48 Lat. NAD 83: 39.72682002 Lon. NAD 83: -80.8142582 Lat. NAD 27: 39.72679799 Lon. NAD 27: -80.81443120 UTM 17 NAD 83 (m) N: 4397460.22 UTM 17 NAD 83 (m) E: 515918.81</td><td>WV-N NAD 83 N: 449588.22 WV-N NAD 83 E: 1598871.68 WV-N NAD 27 N: 449552.34 WV-N NAD 27 E: 1630309.82 Lat. NAD 83: 39.72692878 Lon. NAD 83: -80.81423615 Lat. NAD 27: 39.72685184 Lon. NAD 27: -80.81442034 UTM 17 NAD 83 (m) N: 4397466.19 UTM 17 NAD 83 (m) E: 515919.73</td><td>WV-N NAD 83 N: 449608.06 WV-N NAD 83 E: 1598874.39 WV-N NAD 27 N: 449572.17 WV-N NAD 27 E: 1630312.53 Lat. NAD 83: 39.72693334 Lon. NAD 83: -80.81422755 Lat. NAD 27: 39.72696040 Lon. NAD 27: -80.81441174 UTM 17 NAD 83 (m) N: 4397472.25 UTM 17 NAD 83 (m) E: 515920.46</td></tr> </table>	Hansen IH	Hansen N-2HU	Hansen 3HU	Hansen N-4HU	Hansen 5H	WV-N NAD 83 N: 449449.99 WV-N NAD 83 E: 1598849.80 WV-N NAD 27 N: 449414.10 WV-N NAD 27 E: 1630287.95 Lat. NAD 83: 39.72654843 Lon. NAD 83: -80.81430676 Lat. NAD 27: 39.72647149 Lon. NAD 27: -80.81449892 UTM 17 NAD 83 (m) N: 4397423.97 UTM 17 NAD 83 (m) E: 515913.77	WV-N NAD 83 N: 449469.63 WV-N NAD 83 E: 1598853.35 WV-N NAD 27 N: 449433.75 WV-N NAD 27 E: 1630291.50 Lat. NAD 83: 39.72650250 Lon. NAD 83: -80.81429514 Lat. NAD 27: 39.72652556 Lon. NAD 27: -80.81447931 UTM 17 NAD 83 (m) N: 4397429.97 UTM 17 NAD 83 (m) E: 515914.75	WV-N NAD 83 N: 449489.50 WV-N NAD 83 E: 1598856.23 WV-N NAD 27 N: 449433.62 WV-N NAD 27 E: 1630297.61 Lat. NAD 83: 39.72667177 Lon. NAD 83: -80.81428593 Lat. NAD 27: 39.72658023 Lon. 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WV-N NAD 83 N: 449449.99 WV-N NAD 83 E: 1598849.80 WV-N NAD 27 N: 449414.10 WV-N NAD 27 E: 1630287.95 Lat. NAD 83: 39.72654843 Lon. NAD 83: -80.81430676 Lat. NAD 27: 39.72647149 Lon. NAD 27: -80.81449892 UTM 17 NAD 83 (m) N: 4397423.97 UTM 17 NAD 83 (m) E: 515913.77	WV-N NAD 83 N: 449469.63 WV-N NAD 83 E: 1598853.35 WV-N NAD 27 N: 449433.75 WV-N NAD 27 E: 1630291.50 Lat. NAD 83: 39.72650250 Lon. NAD 83: -80.81429514 Lat. NAD 27: 39.72652556 Lon. NAD 27: -80.81447931 UTM 17 NAD 83 (m) N: 4397429.97 UTM 17 NAD 83 (m) E: 515914.75	WV-N NAD 83 N: 449489.50 WV-N NAD 83 E: 1598856.23 WV-N NAD 27 N: 449433.62 WV-N NAD 27 E: 1630297.61 Lat. NAD 83: 39.72667177 Lon. NAD 83: -80.81428593 Lat. NAD 27: 39.72658023 Lon. NAD 27: -80.81447010 UTM 17 NAD 83 (m) N: 4397436.04 UTM 17 NAD 83 (m) E: 515915.53	WV-N NAD 83 N: 449509.16 WV-N NAD 83 E: 1598859.46 WV-N NAD 27 N: 449433.28 WV-N NAD 27 E: 1630297.61 Lat. NAD 83: 39.72671126 Lon. NAD 83: -80.81427541 Lat. NAD 27: 39.72663432 Lon. NAD 27: -80.81455965 UTM 17 NAD 83 (m) N: 4397442.05 UTM 17 NAD 83 (m) E: 515916.41	WV-N NAD 83 N: 449529.26 WV-N NAD 83 E: 1598862.00 WV-N NAD 27 N: 449493.38 WV-N NAD 27 E: 1630300.15 Lat. NAD 83: 39.72676654 Lon. NAD 83: -80.81426750 Lat. NAD 27: 39.72668960 Lon. NAD 27: -80.8145167 UTM 17 NAD 83 (m) N: 4397448.18 UTM 17 NAD 83 (m) E: 515917.08														
Hansen S-8HU	Hansen 7HU	Hansen S-6HU	Hansen 9H															
WV-N NAD 83 N: 449548.69 WV-N NAD 83 E: 1598865.57 WV-N NAD 27 N: 449512.81 WV-N NAD 27 E: 1630303.72 Lat. NAD 83: 39.72682002 Lon. NAD 83: -80.8142582 Lat. NAD 27: 39.72674308 Lon. NAD 27: -80.81443999 UTM 17 NAD 83 (m) N: 4397454.12 UTM 17 NAD 83 (m) E: 515918.07	WV-N NAD 83 N: 449568.65 WV-N NAD 83 E: 1598868.34 WV-N NAD 27 N: 449532.77 WV-N NAD 27 E: 1630306.48 Lat. NAD 83: 39.72682002 Lon. NAD 83: -80.8142582 Lat. NAD 27: 39.72679799 Lon. NAD 27: -80.81443120 UTM 17 NAD 83 (m) N: 4397460.22 UTM 17 NAD 83 (m) E: 515918.81	WV-N NAD 83 N: 449588.22 WV-N NAD 83 E: 1598871.68 WV-N NAD 27 N: 449552.34 WV-N NAD 27 E: 1630309.82 Lat. NAD 83: 39.72692878 Lon. NAD 83: -80.81423615 Lat. NAD 27: 39.72685184 Lon. NAD 27: -80.81442034 UTM 17 NAD 83 (m) N: 4397466.19 UTM 17 NAD 83 (m) E: 515919.73	WV-N NAD 83 N: 449608.06 WV-N NAD 83 E: 1598874.39 WV-N NAD 27 N: 449572.17 WV-N NAD 27 E: 1630312.53 Lat. NAD 83: 39.72693334 Lon. NAD 83: -80.81422755 Lat. NAD 27: 39.72696040 Lon. NAD 27: -80.81441174 UTM 17 NAD 83 (m) N: 4397472.25 UTM 17 NAD 83 (m) E: 515920.46															



Project Contacts

Tug Hill Operating
Jonathan White - Regulatory Analyst
724-485-2000 Off. 304-689-7676 Cell
Geoff Radler - V.P. Production
817-632-5200 Off.

Survey and Engineer
Kenneth Kelly
304-338-6985 Off.
John P. See
304-442-0220 Off.
Zachary Summerfield
304-338-6987 Off.

Tug Hill Operating, LLC
380 Southpointe Blvd
Southpointe Plaza II, Suite 200
Canonsburg, PA 15317

Environmental:
Wetland Delineations as provided by Allstar Ecology dated February 3, 2017

Topographic Information:
The topographic information shown herein is based on aerial photography by Blue Mountain Aerial Mapping, Burton, WV

MISS UTILITY OF WEST VIRGINIA
1-800-245-4848
West Virginia State Law Section XIV, Chapter 24-C requires that you call two business days before you dig in the state of West Virginia.
IT'S THE LAW
Know what's below. Call before you dig.

Approach Routes:
From the intersection of WV Rt 2 and OH Rt 7 near New Martinsville, WV. Travel North on WV Rt 2 for 6.1 mi. Turn Right onto Co Rt 2 (Wells Hill Rd). Follow Co Rt 2 for 2.0 mi. The site entrance will be on the Right (South) side of the road.

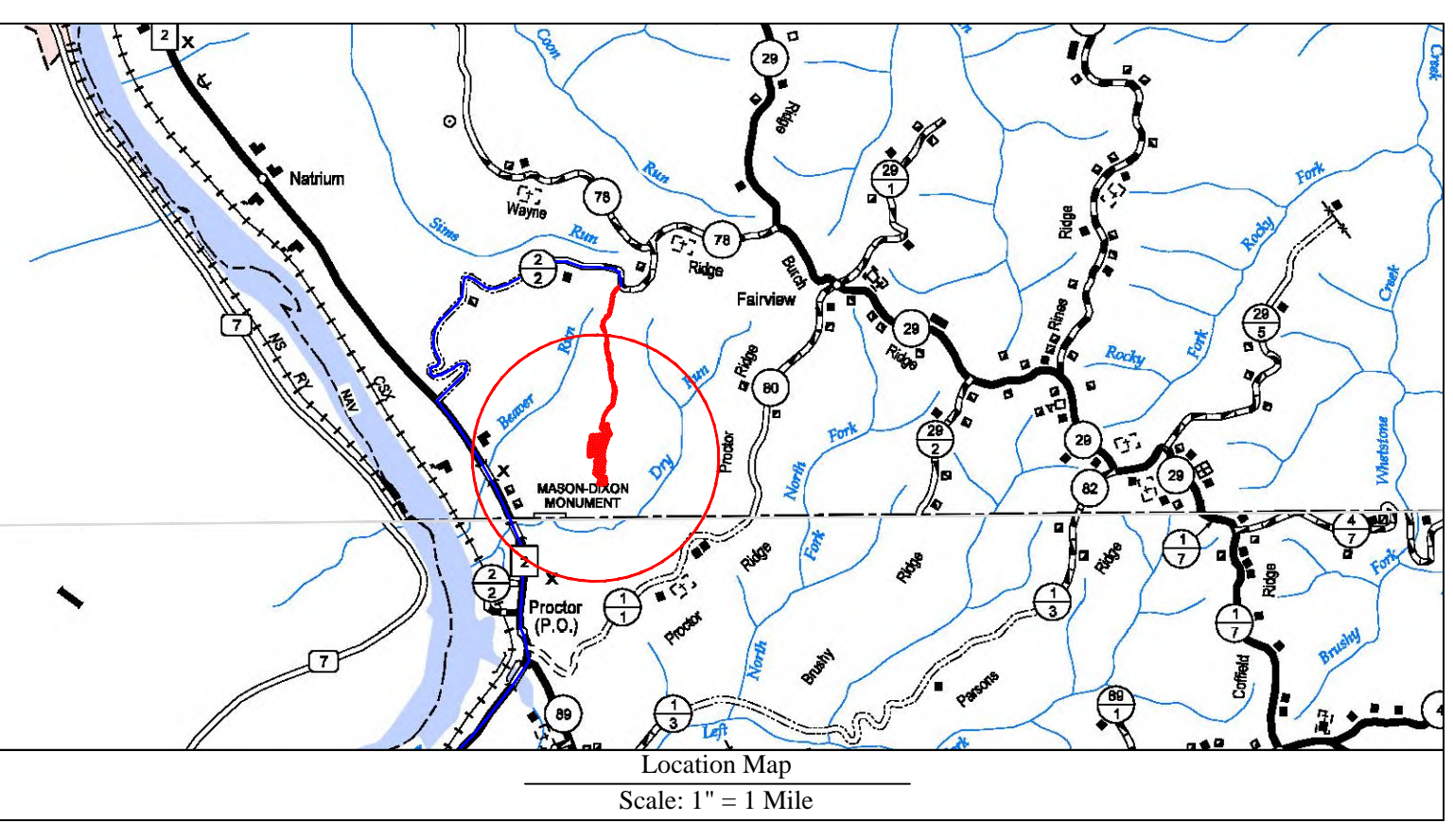
Well Location Restrictions
All Pad construction complies with the following restrictions.
*250' from an existing well or developed spring used for human or domestic animals.
*625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad.
*100' from the edge of disturbance to wetlands, perennial streams, natural or artificial lake, pond or reservoir.
*300' from the edge of disturbance to a naturally reproducing trout stream.
*1,000' of a surface or ground water intake to a public water supply.
(Well Location Restrictions of WV Code 22-6A-12)

Tug Hill Operating will obtain an Encroachment Permit (Form MM-109) from the WV Department of Transportation, Division of Highways, prior to the commencement of any construction activities

The WV Mines Website was consulted. Previous (Current) mining activities are not within the AOI.

WVDEP Website files show that there are active and/or abandoned gas wells within the AOI

Site Locations (NAD 27)			Site Locations (NAD 83)		
Structure	Latitude (DD)	Longitude (DD)	Structure	Latitude (DD)	Longitude (DD)
Site Entrance	39.73935892	-80.81235959	Site Entrance	39.73943577	-80.81217469
Center of Well Pad	39.72671589	-80.81444491	Center of Well Pad	39.72679283	-80.81426073
Center of Production Pad	39.72538526	-80.81406053	Center of Production Pad	39.72546222	-80.81387640



Design Certification

The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas, 39CSR30.

All Plans, Sheets, and/or Reference Diagrams included in this design constitute a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.

Zachary C. Summerfield
RPE 22214
Kelly Surveying PLLC
CO# 004232-09

Date: 01-20-2019

Sheet	Description
1	Cover Sheet
V1	Schedule of Quantities
N1-N4	Site Notes
2	Pre-Construction Site Conditions
3	Site Soil Map
4	Clearing Exhibit
5	Overall Plan View
6-7	E&S Plan View
8	Toe Key Exhibit
9-13	Plan View
14	Cross Sections - Well Pad
15	Cross Sections - Production Pad
16-17	Cross Sections - Access Road
G1-G2	Geotechnical Exhibit
L1	Landowner Disturbed Area Exhibit
S1	Site Reclamation
M1-M2	Production Exhibit
D1-D2	Erosion and Sediment Control Details
R1	Access Road Details
P1	Pad Details

Revision: Design

Date: 01-20-2019

TUG HILL OPERATING

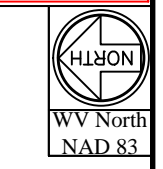
THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

Kelly Surveying
22214
200 W. 24th St.
Martinsburg, WV 26159
304-338-6985

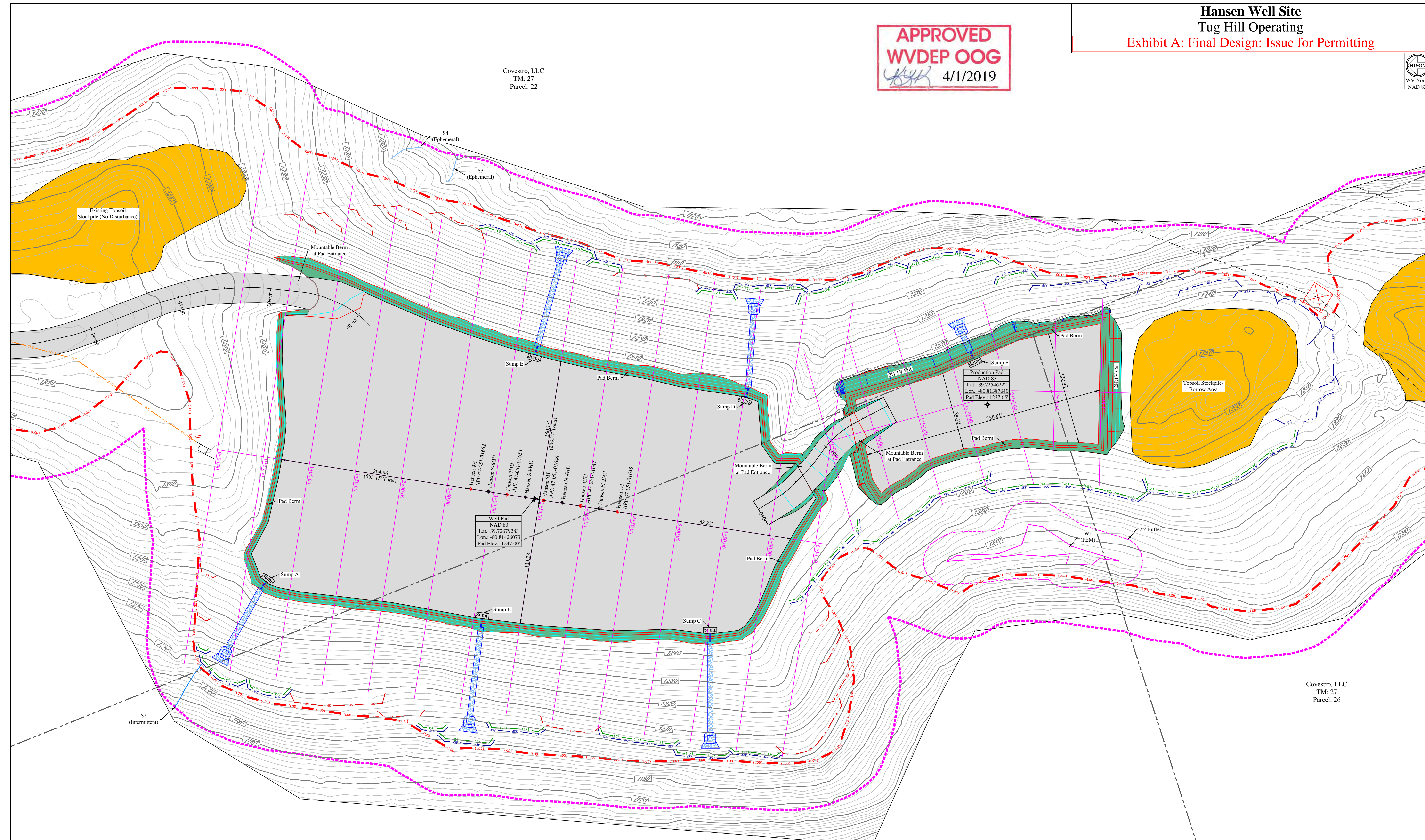
Cover Sheet
Hansen Well Site
Franklin District
Marshall County, WV

Date: 01/20/2019
Scale: As Shown
Designed By: ZS
File No.
Sheet 1 of 17

APPROVED
WVDEP OOG
4/1/2019



Covestro, LLC
TM: 27
Parcel: 22

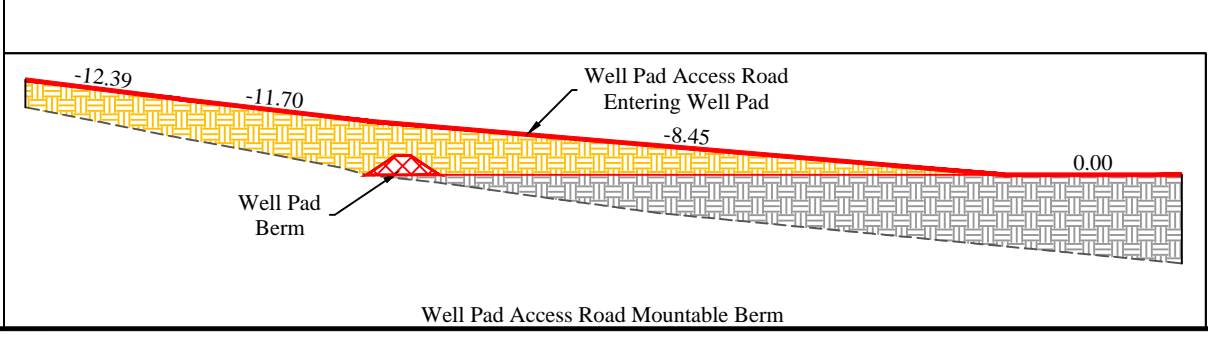
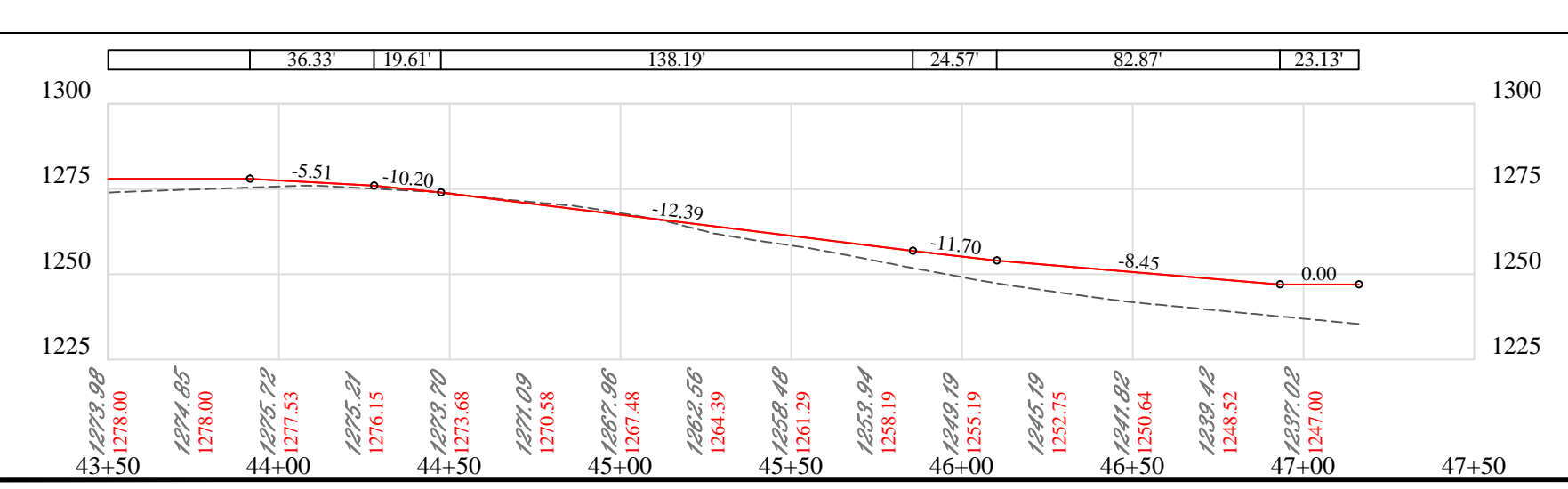


Well Pad
NAD 83
Lat.: -80.81426073
Lon.: -80.81426073
Pad Elev.: 1247.00'

Production Pad
NAD 83
Lat.: -80.81387640
Lon.: -80.81387640
Pad Elev.: 1237.65'

Covestro, LLC
TM: 27
Parcel: 21

Covestro, LLC
TM: 27
Parcel: 26



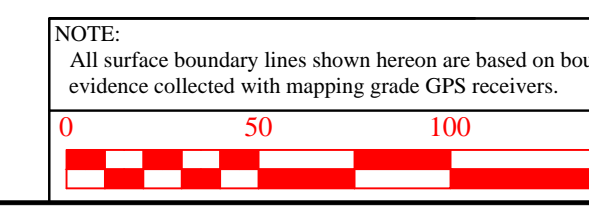
Access Road			
Surface Owner	TM - Parcel	Road Length	Type
Covestro, LLC	28-9	1,065.55'	Access Road
Covestro, LLC	28-8	966.56'	Access Road
Covestro, LLC	27-22	2,684.23'	Access Road
Covestro, LLC	27-21	1,803.88'	Access Road

Disturbed Area	
Well Pad Construction	6.22 Ac
Production Pad Construction	0.91 Ac
Access Road Construction	5.48 Ac
Topsoil / Excess Material	2.13 Ac
Additional Clearing	13.54 Ac
Total Disturbed Area	28.28 Ac

Additional Information	
Total Wooded Acres Disturbed	0.00 Ac
Total Linear Feet of Access Road	4,896.56'

Legend

- Original Ground 2' Contour
- Original Ground 10' Contour
- Design 2' Contour
- Design 10' Contour
- Center of Structure
- 3" Silt Fence
- 24" Compost Filter Sock
- Super Silt Fence
- Limits of Disturbance
- Area of Interest
- Existing Gas Line
- Existing Utility Pole Line
- Property Line
- PEM Wetland
- POW Wetland
- Super Silt Fence
- PSS Wetland
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Toe Key
- Erosion Control Blanket Slope Area



NOTE: All surface boundary lines shown hereon are based on boundary evidence collected with mapping grade GPS receivers.

Date	Revision
01-20-2019	Design



THIS DOCUMENT PREPARED FOR TUG HILL OPERATING



Hansen Well Site
Franklin District
Marshall County, WV