



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 N-4HU
47-051-02175-00-00

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

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

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

James A. Martin
Chief

A handwritten signature in blue ink, appearing to read "James A. Martin", is written over a faint blue circular stamp or watermark.

Operator's Well Number: HANSEN N-4HU
Farm Name: COVESTRO LLC
U.S. WELL NUMBER: 47-051-02175-00-00
Horizontal 6A New Drill
Date Issued: 3/20/2020

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 #47-051-02175

COMPANY: Tug Hill Operating, LLC

FARM: Covestro, LLC Hansen N-4HU

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,

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

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 S-6HU 47-051-02176, 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

4705102175

WW-6B
(04/15)

API NO. 47-051 -
OPERATOR WELL NO. Hansen N-4HU
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 Z
Operator ID County District Quadrangle

2) Operator's Well Number: Hansen N-4HU 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 X Oil Underground Storage
Other

(b) If Gas Shallow Deep X
Horizontal X

ju
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 11,122' - 11,241', thickness of 119' and anticipated pressure of approx. 9,500 psi

8) Proposed Total Vertical Depth: 11,391'

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

10) Proposed Total Measured Depth: 23,780'

11) Proposed Horizontal Leg Length: 10,881.94'

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 X

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

Depth: _____

Seam: _____

Owner: _____

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259FT^3(CTS)
Fresh Water	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#	10,272'	10,272'	3,356ft^3(CTS)
Production	5 1/2"	NEW	P110	23#	23,780'	23,780'	5,622ft^3(CTS)
Tubing	2 7/8"	NEW	P110	6.5#		11,028'	
Liners							

Jy 11/23/19

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							

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PACKERS

Office of Oil and Gas
WV Dept. of Environmental Protection

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

WW-6B
(10/14)

API NO. 47- 051 _____
OPERATOR WELL NO. Hansen N-4HU
Well Pad Name: Hansen

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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 (11,092'). 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 27,200,000 lb proppant and 420,532 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.

WW6B Attachment to #24

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

Received

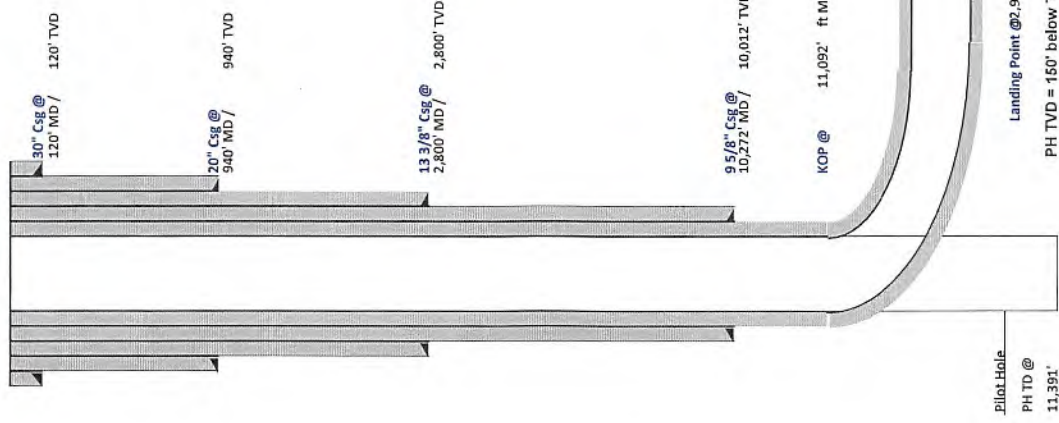
JAN 28 2019

Office of Oil and Gas
WV Dept. of Environmental Protection

4705102175



WELL NAME: Hansen 1N-4HU COUNTY: Marshall
 STATE: WV DISTRICT: Franklin
 DE Elev: 1,247' GL Elev: 1,247'
 ID: 23,780'
 TH Latitude: 39.72671127
 TH Longitude: -80.81427548
 BH Latitude: 39.76001022
 BH Longitude: -80.83566564



FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	848'
Sewickley Coal	758'
Pittsburgh Coal	843'
Big Urme	2,037'
Berea	2,580'
Tully	6,432'
Marcellus	6,491'
Onondaga	6,543'
Salina	7,194'
Lockport	8,216'
Utica	10,869'
Point Pleasant	11,122'
Landing Depth	11,172'
Trenton	11,241'
Pilot Hole TD	11,391'

CASING SUMMARY						
Type	Hole Size (in)	Csg. Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade
Conductor	36	30	120'	120'	BW	BW
Surface	26	20	940'	940'	106.5	J55
Intermediate 1	17 1/2	13 3/8	2,800'	2,800'	54.5	J55
Intermediate 2	12 1/4	9 5/8	10,012'	10,012'	47	HPP110
Production	8 1/2	5 1/2	23,780'	10,982'	23	HCP110

CEMENT SUMMARY			DRILLING DETAILS	
Sacks	Class	Density	Fluid Type	Centralizer 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 jt
2,750	A	14.5	Air	1 Centralizer every other jt
4,988	A	15	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc

Handwritten signature and date: 1/23/19

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 WV Dept. of Environmental Protection

Pilot Hole
 PH TD @ 11,391'
 Landing Point @ 2,900' MD / 11,172' TVD
 PH TVD = 150' below Trenton Top

Lateral TD @ 23,780' ft MD
 10,982' ft TVD

9 5/8" Csg @ 10,272' MD / 10,012' TVD
 KOP @ 11,092' ft MD

4705102175



Tug Hill Operating, LLC Casing and Cement Program

Hansen 1N-4HU

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"	10,272'	CTS
Production	5 1/2"	HCP110	8 1/2"	23,780'	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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Office of Oil and Gas
NY Dept. of Environmental Protection

Well: Hansen 1N-4HU (D)
 Site: Hansen
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Design: rev3



Azimuths to Grid North
 True North: -0.12°
 Magnetic North: -8.71°
 Magnetic Field
 Strength: 52204.5nT
 Dip Angle: 66.96°
 Date: 1/13/2017
 Model: IGRF2015

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

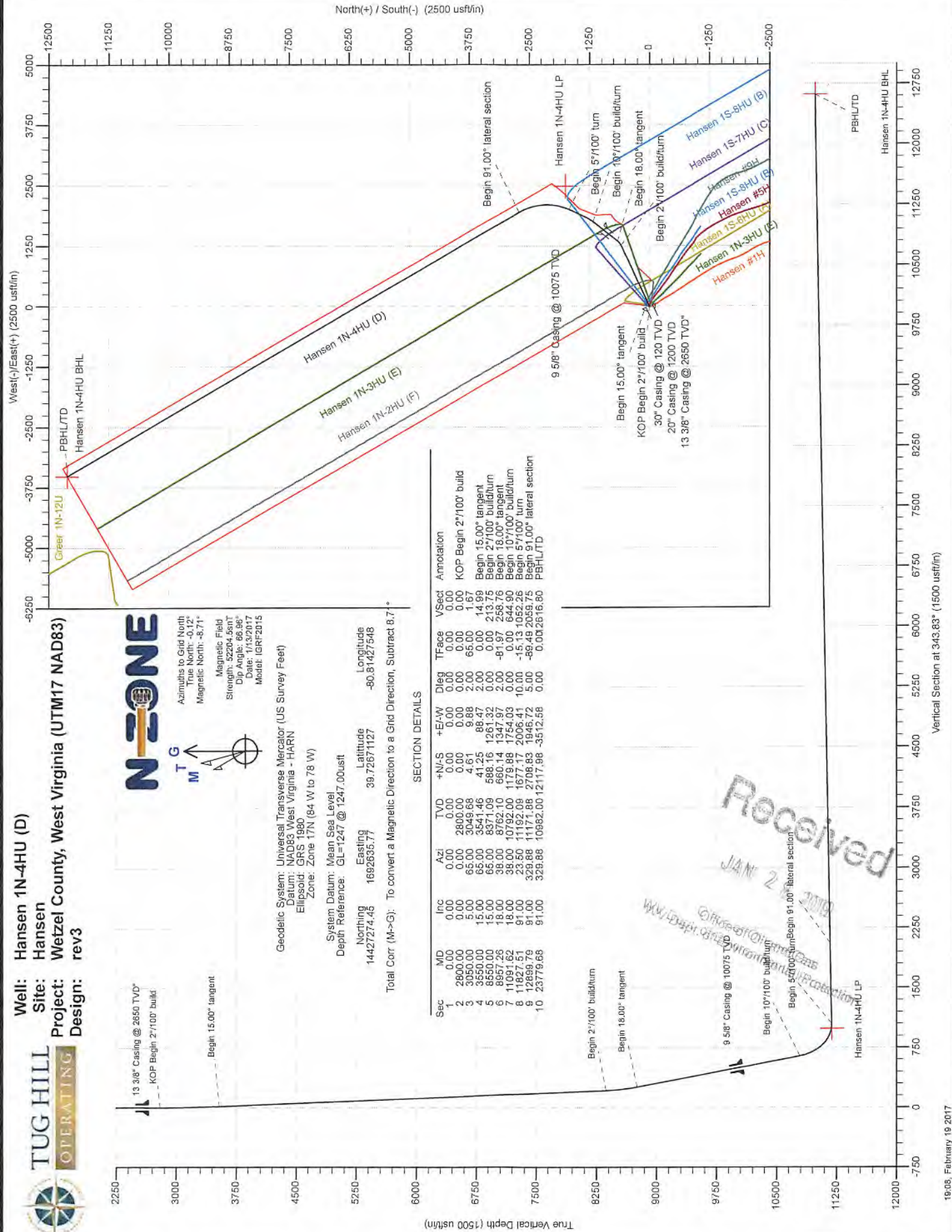
System Datum: Mean Sea Level
 Depth Reference: GL=1247 @ 1247.00usft

Northing: 14427274.45
 Easting: 1692335.77
 Longitude: 39.72671127
 Latitude: -80.81427548

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.7°

SECTION DETAILS

Sec	MD	IPC	Azi	TVD	+N/S	+E/W	Diag	TFace	V Sect	Annotation
1	2800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	3050.00	5.00	65.00	3049.68	4.61	9.88	2.00	65.00	0.00	KOP Begin 2'100' build
3	3550.00	15.00	65.00	3541.46	41.25	88.47	2.00	0.00	14.89	Begin 15.00° tangent
4	3650.00	15.00	65.00	8371.09	588.16	1261.32	2.00	0.00	213.75	Begin 2'100' build/tum
5	3650.00	15.00	65.00	8762.10	660.14	1347.97	2.00	-91.97	258.76	Begin 18.00° tangent
6	3800.00	18.00	38.00	40792.00	1179.88	1754.03	2.00	0.00	644.90	Begin 10'100' build/tum
7	11091.62	18.00	23.50	11192.09	1677.17	2006.41	10.00	-15.13	1052.26	Begin 5'100' turn
8	11827.51	91.00	329.88	11171.88	2706.83	1945.72	5.00	-89.48	2059.75	Begin 91.00° lateral section
9	12899.79	91.00	329.88	10962.00	12117.98	-3512.58	0.00	0.00	2616.80	PBHLTD
10	23779.68	91.00	329.88	10962.00	12117.98	-3512.58	0.00	0.00	2616.80	PBHLTD





Planning Report - Geographic

4705102175

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	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 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	Hansen 1N-4HU (D)					
Well Position	+N-S	0.00 usft	Northing:	14,427,274.45 usft	Latitude:	39.72671127
	+E-W	0.00 usft	Easting:	1,692,635.76 usft	Longitude:	-80.81427548
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,247.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/13/2017	-8.59	66.96	52,204

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	343.83

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,050.00	5.00	65.00	3,049.68	4.61	9.88	2.00	2.00	0.00	65.00	
3,550.00	15.00	65.00	3,541.46	41.25	88.47	2.00	2.00	0.00	0.00	
8,550.00	15.00	65.00	8,371.09	588.16	1,261.32	0.00	0.00	0.00	0.00	
8,957.26	18.00	38.00	8,762.10	660.14	1,347.97	2.00	0.74	-6.63	-81.97	
11,091.62	18.00	38.00	10,792.00	1,179.88	1,754.03	0.00	0.00	0.00	0.00	
11,827.51	91.00	23.50	11,192.09	1,677.17	2,006.41	10.00	9.92	-1.97	-15.13	
12,899.79	91.00	329.88	11,171.88	2,708.83	1,946.72	5.00	0.00	-5.00	-89.49	
23,779.68	91.00	329.88	10,982.00	12,117.98	-3,512.58	0.00	0.00	0.00	0.00	Hansen 1N-4HU BHL

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JAN 28 2019



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
100.00	0.00	0.00	100.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
200.00	0.00	0.00	200.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
300.00	0.00	0.00	300.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
400.00	0.00	0.00	400.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
500.00	0.00	0.00	500.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
600.00	0.00	0.00	600.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
700.00	0.00	0.00	700.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
800.00	0.00	0.00	800.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
900.00	0.00	0.00	900.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,500.00	0.00	0.00	2,500.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,599.99	0.00	0.00	2,599.99	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,699.99	0.00	0.00	2,699.99	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,799.99	0.00	0.00	2,799.99	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
2,800.00	0.00	0.00	2,800.00	0.00	0.00	14,427,274.45	1,692,635.76	39.72671127	-80.81427548
KOP Begin 2°/100' build									
2,899.99	2.00	65.00	2,899.97	0.74	1.58	14,427,275.19	1,692,637.35	39.72671329	-80.81426985
2,999.99	4.00	65.00	2,999.83	2.95	6.32	14,427,277.40	1,692,642.09	39.72671933	-80.81425297
3,050.00	5.00	65.00	3,049.68	4.61	9.88	14,427,279.06	1,692,645.64	39.72672387	-80.81424031
3,099.99	6.00	65.00	3,099.45	6.63	14.22	14,427,281.08	1,692,649.99	39.72672940	-80.81422485
3,199.99	8.00	65.00	3,198.70	11.78	25.27	14,427,286.23	1,692,661.03	39.72674349	-80.81418553
3,299.99	10.00	65.00	3,297.46	18.39	39.44	14,427,292.84	1,692,675.21	39.72676156	-80.81413506
3,399.99	12.00	65.00	3,395.62	26.46	56.74	14,427,300.91	1,692,692.50	39.72678361	-80.81407350
3,499.99	14.00	65.00	3,493.05	35.96	77.12	14,427,310.41	1,692,712.89	39.72680960	-80.81400092
3,550.00	15.00	65.00	3,541.46	41.25	88.47	14,427,315.71	1,692,724.23	39.72682406	-80.81396052
Begin 15.00° tangent									
3,599.99	15.00	65.00	3,589.75	46.72	100.20	14,427,321.17	1,692,735.96	39.72683901	-80.81391878
3,699.99	15.00	65.00	3,686.34	57.66	123.65	14,427,332.11	1,692,759.42	39.72686892	-80.81383527
3,799.99	15.00	65.00	3,782.94	68.60	147.11	14,427,343.05	1,692,782.87	39.72689883	-80.81375176
3,899.99	15.00	65.00	3,879.53	79.54	170.57	14,427,353.99	1,692,806.33	39.72692873	-80.81366825
3,999.99	15.00	65.00	3,976.12	90.47	194.02	14,427,364.93	1,692,829.79	39.72695864	-80.81358474
4,099.99	15.00	65.00	4,072.71	101.41	217.48	14,427,375.86	1,692,853.25	39.72698854	-80.81350123
4,199.99	15.00	65.00	4,169.31	112.35	240.94	14,427,386.80	1,692,876.70	39.72701845	-80.81341772
4,299.99	15.00	65.00	4,265.90	123.29	264.39	14,427,397.74	1,692,900.16	39.72704835	-80.81333422
4,399.99	15.00	65.00	4,362.49	134.23	287.85	14,427,408.68	1,692,923.62	39.72707826	-80.81325071
4,499.99	15.00	65.00	4,459.08	145.17	311.31	14,427,419.62	1,692,947.07	39.72710816	-80.81316720
4,599.99	15.00	65.00	4,555.68	156.10	334.77	14,427,430.56	1,692,970.53	39.72713807	-80.81308369
4,699.99	15.00	65.00	4,652.27	167.04	358.22	14,427,441.49	1,692,993.99	39.72716797	-80.81300018

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 Office of Oil and Gas
 West Virginia Department of Environmental Protection



Planning Report - Geographic

4705102175

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,799.99	15.00	65.00	4,748.86	177.98	381.68	14,427,452.43	1,693,017.44	39.72719788	-80.81291667	
4,899.99	15.00	65.00	4,845.45	188.92	405.14	14,427,463.37	1,693,040.90	39.72722779	-80.81283316	
4,999.99	15.00	65.00	4,942.04	199.86	428.59	14,427,474.31	1,693,064.36	39.72725769	-80.81274965	
5,099.99	15.00	65.00	5,038.64	210.79	452.05	14,427,485.25	1,693,087.81	39.72728759	-80.81266614	
5,199.99	15.00	65.00	5,135.23	221.73	475.51	14,427,496.18	1,693,111.27	39.72731750	-80.81258263	
5,299.99	15.00	65.00	5,231.82	232.67	498.96	14,427,507.12	1,693,134.73	39.72734740	-80.81249912	
5,399.99	15.00	65.00	5,328.41	243.61	522.42	14,427,518.06	1,693,158.19	39.72737731	-80.81241561	
5,499.99	15.00	65.00	5,425.01	254.55	545.88	14,427,529.00	1,693,181.64	39.72740721	-80.81233210	
5,599.99	15.00	65.00	5,521.60	265.49	569.33	14,427,539.94	1,693,205.10	39.72743712	-80.81224859	
5,699.99	15.00	65.00	5,618.19	276.42	592.79	14,427,550.87	1,693,228.56	39.72746702	-80.81216509	
5,799.99	15.00	65.00	5,714.78	287.36	616.25	14,427,561.81	1,693,252.01	39.72749693	-80.81208158	
5,899.99	15.00	65.00	5,811.38	298.30	639.71	14,427,572.75	1,693,275.47	39.72752683	-80.81199807	
5,999.99	15.00	65.00	5,907.97	309.24	663.16	14,427,583.69	1,693,298.93	39.72755674	-80.81191456	
6,099.99	15.00	65.00	6,004.56	320.18	686.62	14,427,594.63	1,693,322.38	39.72758664	-80.81183105	
6,199.99	15.00	65.00	6,101.15	331.11	710.08	14,427,605.57	1,693,345.84	39.72761655	-80.81174754	
6,299.99	15.00	65.00	6,197.75	342.05	733.53	14,427,616.50	1,693,369.30	39.72764645	-80.81166402	
6,399.99	15.00	65.00	6,294.34	352.99	756.99	14,427,627.44	1,693,392.75	39.72767635	-80.81158051	
6,499.99	15.00	65.00	6,390.93	363.93	780.45	14,427,638.38	1,693,416.21	39.72770626	-80.81149700	
6,599.99	15.00	65.00	6,487.52	374.87	803.90	14,427,649.32	1,693,439.67	39.72773616	-80.81141349	
6,699.99	15.00	65.00	6,584.12	385.80	827.36	14,427,660.26	1,693,463.13	39.72776607	-80.81132998	
6,799.99	15.00	65.00	6,680.71	396.74	850.82	14,427,671.19	1,693,486.58	39.72779597	-80.81124647	
6,899.99	15.00	65.00	6,777.30	407.68	874.27	14,427,682.13	1,693,510.04	39.72782587	-80.81116296	
6,999.99	15.00	65.00	6,873.89	418.62	897.73	14,427,693.07	1,693,533.50	39.72785578	-80.81107945	
7,099.99	15.00	65.00	6,970.49	429.56	921.19	14,427,704.01	1,693,556.95	39.72788568	-80.81099594	
7,199.99	15.00	65.00	7,067.08	440.50	944.65	14,427,714.95	1,693,580.41	39.72791558	-80.81091243	
7,299.99	15.00	65.00	7,163.67	451.43	968.10	14,427,725.89	1,693,603.87	39.72794549	-80.81082892	
7,399.99	15.00	65.00	7,260.26	462.37	991.56	14,427,736.82	1,693,627.32	39.72797539	-80.81074541	
7,499.99	15.00	65.00	7,356.85	473.31	1,015.02	14,427,747.76	1,693,650.78	39.72800529	-80.81066190	
7,599.98	15.00	65.00	7,453.45	484.25	1,038.47	14,427,758.70	1,693,674.24	39.72803520	-80.81057839	
7,699.98	15.00	65.00	7,550.04	495.19	1,061.93	14,427,769.64	1,693,697.69	39.72806510	-80.81049487	
7,799.98	15.00	65.00	7,646.63	506.12	1,085.39	14,427,780.58	1,693,721.15	39.72809501	-80.81041136	
7,899.98	15.00	65.00	7,743.22	517.06	1,108.84	14,427,791.51	1,693,744.61	39.72812491	-80.81032785	
7,999.98	15.00	65.00	7,839.82	528.00	1,132.30	14,427,802.45	1,693,768.07	39.72815481	-80.81024434	
8,099.98	15.00	65.00	7,936.41	538.94	1,155.76	14,427,813.39	1,693,791.52	39.72818471	-80.81016083	
8,199.98	15.00	65.00	8,033.00	549.88	1,179.21	14,427,824.33	1,693,814.98	39.72821462	-80.81007732	
8,299.98	15.00	65.00	8,129.59	560.82	1,202.67	14,427,835.27	1,693,838.44	39.72824452	-80.80999381	
8,399.98	15.00	65.00	8,226.19	571.75	1,226.13	14,427,846.20	1,693,861.89	39.72827442	-80.80991029	
8,499.98	15.00	65.00	8,322.78	582.69	1,249.59	14,427,857.14	1,693,885.35	39.72830433	-80.80982678	
8,550.00	15.00	65.00	8,371.09	588.16	1,261.32	14,427,862.61	1,693,897.08	39.72833424	-80.80978501	
Begin 2°/100' build/turn										
8,599.98	15.17	61.22	8,419.35	594.05	1,272.91	14,427,868.50	1,693,908.68	39.72833537	-80.80974373	
8,699.98	15.70	53.96	8,515.76	608.31	1,295.32	14,427,882.76	1,693,931.09	39.72837441	-80.80966392	
8,799.98	16.44	47.25	8,611.86	625.87	1,316.65	14,427,900.33	1,693,952.42	39.72842253	-80.80958791	
8,899.98	17.39	41.18	8,707.54	646.73	1,336.89	14,427,921.18	1,693,972.65	39.72847968	-80.80951579	
8,957.26	18.00	38.00	8,762.11	660.14	1,347.97	14,427,934.59	1,693,983.73	39.72851646	-80.80947627	
Begin 18.00° tangent										
8,999.98	18.00	38.00	8,802.74	670.55	1,356.10	14,427,945.00	1,693,991.86	39.72854498	-80.80944728	
9,099.98	18.00	38.00	8,897.84	694.90	1,375.12	14,427,969.35	1,694,010.89	39.72861174	-80.80937943	
9,199.98	18.00	38.00	8,992.95	719.25	1,394.15	14,427,993.70	1,694,029.91	39.72867851	-80.80931158	
9,299.98	18.00	38.00	9,088.05	743.60	1,413.17	14,428,018.05	1,694,048.94	39.72874527	-80.80924373	
9,399.98	18.00	38.00	9,183.16	767.95	1,432.20	14,428,042.40	1,694,067.96	39.72881204	-80.80917588	
9,499.98	18.00	38.00	9,278.26	792.30	1,451.22	14,428,066.75	1,694,086.99	39.72887880	-80.80910803	
9,599.98	18.00	38.00	9,373.37	816.65	1,470.25	14,428,091.10	1,694,106.01	39.72894556	-80.80904018	

Received

JAN 2019

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Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,699.98	18.00	38.00	9,468.47	841.00	1,489.27	14,428,115.45	1,694,125.04	39.72901233	-80.80897233	
9,799.98	18.00	38.00	9,563.58	865.35	1,508.30	14,428,139.80	1,694,144.06	39.72907909	-80.80890448	
9,899.98	18.00	38.00	9,658.69	889.70	1,527.32	14,428,164.15	1,694,163.09	39.72914585	-80.80883663	
9,999.98	18.00	38.00	9,753.79	914.05	1,546.35	14,428,188.51	1,694,182.11	39.72921262	-80.80876877	
10,099.98	18.00	38.00	9,848.90	938.41	1,565.37	14,428,212.86	1,694,201.14	39.72927938	-80.80870092	
10,199.98	18.00	38.00	9,944.00	962.76	1,584.40	14,428,237.21	1,694,220.16	39.72934614	-80.80863307	
10,299.98	18.00	38.00	10,039.11	987.11	1,603.42	14,428,261.56	1,694,239.19	39.72941291	-80.80856522	
10,399.98	18.00	38.00	10,134.21	1,011.46	1,622.45	14,428,285.91	1,694,258.21	39.72947967	-80.80849737	
10,499.98	18.00	38.00	10,229.32	1,035.81	1,641.47	14,428,310.26	1,694,277.24	39.72954643	-80.80842951	
10,599.98	18.00	38.00	10,324.42	1,060.16	1,660.50	14,428,334.61	1,694,296.26	39.72961320	-80.80836166	
10,699.98	18.00	38.00	10,419.53	1,084.51	1,679.52	14,428,358.96	1,694,315.29	39.72967996	-80.80829381	
10,799.98	18.00	38.00	10,514.63	1,108.86	1,698.55	14,428,383.31	1,694,334.31	39.72974672	-80.80822596	
10,899.98	18.00	38.00	10,609.74	1,133.21	1,717.57	14,428,407.66	1,694,353.34	39.72981349	-80.80815810	
10,999.98	18.00	38.00	10,704.85	1,157.56	1,736.60	14,428,432.01	1,694,372.36	39.72988025	-80.80809025	
11,091.62	18.00	38.00	10,792.00	1,179.88	1,754.03	14,428,454.33	1,694,389.80	39.72994143	-80.80802807	
Begin 10°/100' build/turn										
11,099.98	18.81	37.32	10,799.93	1,181.97	1,755.84	14,428,456.42	1,694,391.41	39.72994716	-80.80802232	
11,199.98	28.60	32.12	10,891.40	1,215.14	1,778.20	14,428,489.59	1,694,413.96	39.73003813	-80.80794185	
11,299.98	38.49	29.42	10,974.65	1,262.63	1,806.28	14,428,537.08	1,694,442.04	39.73016839	-80.80784161	
11,399.98	48.42	27.70	11,047.15	1,323.00	1,839.03	14,428,597.45	1,694,474.79	39.73033400	-80.80772466	
11,499.98	58.37	26.44	11,106.71	1,394.42	1,875.46	14,428,668.87	1,694,511.22	39.73052991	-80.80759454	
11,599.98	68.32	25.42	11,151.52	1,474.70	1,914.46	14,428,749.16	1,694,550.22	39.73075017	-80.80745521	
11,699.98	78.29	24.54	11,180.21	1,561.43	1,954.85	14,428,835.88	1,694,590.61	39.73098809	-80.80731090	
11,799.98	88.26	23.72	11,191.91	1,651.95	1,995.39	14,428,926.40	1,694,631.15	39.73123645	-80.80716600	
11,827.51	91.00	23.50	11,192.09	1,677.17	2,006.42	14,428,951.62	1,694,642.18	39.73130566	-80.80712658	
Begin 5°/100' turn										
11,899.98	91.03	19.88	11,190.80	1,744.49	2,033.19	14,429,018.94	1,694,668.95	39.73149037	-80.80703085	
11,999.98	91.06	14.88	11,188.97	1,839.88	2,063.04	14,429,114.33	1,694,698.80	39.73175217	-80.80692395	
12,099.98	91.09	9.87	11,187.09	1,937.50	2,084.46	14,429,211.96	1,694,720.22	39.73202016	-80.80684701	
12,199.98	91.11	4.87	11,185.17	2,036.63	2,097.29	14,429,311.08	1,694,733.05	39.73229230	-80.80680062	
12,299.98	91.12	359.87	11,183.23	2,136.49	2,101.42	14,429,410.94	1,694,737.19	39.73256653	-80.80678514	
12,399.98	91.12	354.87	11,181.27	2,236.33	2,096.84	14,429,510.79	1,694,732.61	39.73284076	-80.80680067	
12,499.98	91.11	349.87	11,179.32	2,335.40	2,083.57	14,429,609.85	1,694,719.34	39.73311290	-80.80684711	
12,599.98	91.10	344.87	11,177.39	2,432.93	2,061.72	14,429,707.38	1,694,697.48	39.73338088	-80.80692409	
12,699.97	91.07	339.87	11,175.50	2,528.19	2,031.45	14,429,802.64	1,694,667.21	39.73364266	-80.80703104	
12,799.97	91.04	334.87	11,173.65	2,620.44	1,992.99	14,429,894.89	1,694,628.75	39.73389625	-80.80716714	
12,899.79	91.00	329.88	11,171.88	2,708.83	1,946.72	14,429,983.28	1,694,582.49	39.73413927	-80.80733103	
Begin 91.00° lateral section										
12,899.97	91.00	329.88	11,171.87	2,708.99	1,946.63	14,429,983.44	1,694,582.39	39.73413971	-80.80733135	
12,999.97	91.00	329.88	11,170.13	2,795.47	1,896.45	14,430,069.93	1,694,532.21	39.73437751	-80.80750918	
13,099.97	91.00	329.88	11,168.38	2,881.96	1,846.27	14,430,156.41	1,694,482.04	39.73461531	-80.80768700	
13,199.97	91.00	329.88	11,166.64	2,968.44	1,796.09	14,430,242.89	1,694,431.86	39.73485311	-80.80786482	
13,299.97	91.00	329.88	11,164.89	3,054.92	1,745.92	14,430,329.37	1,694,381.68	39.73509092	-80.80804265	
13,399.97	91.00	329.88	11,163.15	3,141.40	1,695.74	14,430,415.85	1,694,331.50	39.73532872	-80.80822047	
13,499.97	91.00	329.88	11,161.40	3,227.88	1,645.56	14,430,502.33	1,694,281.33	39.73556652	-80.80839830	
13,599.97	91.00	329.88	11,159.66	3,314.37	1,595.38	14,430,588.82	1,694,231.15	39.73580432	-80.80857613	
13,699.97	91.00	329.88	11,157.91	3,400.85	1,545.21	14,430,675.30	1,694,180.97	39.73604212	-80.80875396	
13,799.97	91.00	329.88	11,156.17	3,487.33	1,495.03	14,430,761.78	1,694,130.79	39.73627991	-80.80893179	
13,899.97	91.00	329.88	11,154.42	3,573.81	1,444.85	14,430,848.26	1,694,080.61	39.73651771	-80.80910963	
13,999.97	91.00	329.88	11,152.68	3,660.29	1,394.67	14,430,934.74	1,694,030.44	39.73675551	-80.80928746	
14,099.97	91.00	329.88	11,150.93	3,746.77	1,344.49	14,431,021.23	1,693,980.26	39.73699331	-80.80946530	
14,199.97	91.00	329.88	11,149.19	3,833.26	1,294.32	14,431,107.71	1,693,930.08	39.73723111	-80.80964313	
14,299.97	91.00	329.88	11,147.44	3,919.74	1,244.14	14,431,194.19	1,693,879.90	39.73746891	-80.80982097	



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
14,399.97	91.00	329.88	11,145.69	4,006.22	1,193.96	14,431,280.67	1,693,829.73	39.73770670	-80.80999881	
14,499.97	91.00	329.88	11,143.95	4,092.70	1,143.78	14,431,367.15	1,693,779.55	39.73794450	-80.81017665	
14,599.97	91.00	329.88	11,142.20	4,179.18	1,093.61	14,431,453.63	1,693,729.37	39.73818230	-80.81035449	
14,699.97	91.00	329.88	11,140.46	4,265.67	1,043.43	14,431,540.12	1,693,679.19	39.73842009	-80.81053233	
14,799.97	91.00	329.88	11,138.71	4,352.15	993.25	14,431,626.60	1,693,629.01	39.73865789	-80.81071018	
14,899.97	91.00	329.88	11,136.97	4,438.63	943.07	14,431,713.08	1,693,578.84	39.73889569	-80.81088802	
14,999.97	91.00	329.88	11,135.22	4,525.11	892.89	14,431,799.56	1,693,528.66	39.73913348	-80.81106587	
15,099.97	91.00	329.88	11,133.48	4,611.59	842.72	14,431,886.04	1,693,478.48	39.73937128	-80.81124372	
15,199.97	91.00	329.88	11,131.73	4,698.07	792.54	14,431,972.53	1,693,428.30	39.73960907	-80.81142156	
15,299.97	91.00	329.88	11,129.99	4,784.56	742.36	14,432,059.01	1,693,378.13	39.73984687	-80.81159941	
15,399.97	91.00	329.88	11,128.24	4,871.04	692.18	14,432,145.49	1,693,327.95	39.74008466	-80.81177727	
15,499.97	91.00	329.88	11,126.50	4,957.52	642.01	14,432,231.97	1,693,277.77	39.74032246	-80.81195512	
15,599.97	91.00	329.88	11,124.75	5,044.00	591.83	14,432,318.45	1,693,227.59	39.74056025	-80.81213297	
15,699.97	91.00	329.88	11,123.01	5,130.48	541.65	14,432,404.93	1,693,177.41	39.74079805	-80.81231083	
15,799.97	91.00	329.88	11,121.26	5,216.97	491.47	14,432,491.42	1,693,127.24	39.74103584	-80.81248868	
15,899.97	91.00	329.88	11,119.52	5,303.45	441.29	14,432,577.90	1,693,077.06	39.74127363	-80.81266654	
15,999.97	91.00	329.88	11,117.77	5,389.93	391.12	14,432,664.38	1,693,026.88	39.74151143	-80.81284440	
16,099.97	91.00	329.88	11,116.03	5,476.41	340.94	14,432,750.86	1,692,976.70	39.74174922	-80.81302226	
16,199.97	91.00	329.88	11,114.28	5,562.89	290.76	14,432,837.34	1,692,926.53	39.74198701	-80.81320012	
16,299.97	91.00	329.88	11,112.54	5,649.37	240.58	14,432,923.83	1,692,876.35	39.74222480	-80.81337798	
16,399.97	91.00	329.88	11,110.79	5,735.86	190.41	14,433,010.31	1,692,826.17	39.74246260	-80.81355584	
16,499.97	91.00	329.88	11,109.05	5,822.34	140.23	14,433,096.79	1,692,775.99	39.74270039	-80.81373371	
16,599.97	91.00	329.88	11,107.30	5,908.82	90.05	14,433,183.27	1,692,725.81	39.74293818	-80.81391157	
16,699.97	91.00	329.88	11,105.56	5,995.30	39.87	14,433,269.75	1,692,675.64	39.74317597	-80.81408944	
16,799.97	91.00	329.88	11,103.81	6,081.78	-10.31	14,433,356.23	1,692,625.46	39.74341376	-80.81426731	
16,899.97	91.00	329.88	11,102.06	6,168.27	-60.48	14,433,442.72	1,692,575.28	39.74365155	-80.81444518	
16,999.97	91.00	329.88	11,100.32	6,254.75	-110.66	14,433,529.20	1,692,525.10	39.74388934	-80.81462305	
17,099.97	91.00	329.88	11,098.57	6,341.23	-160.84	14,433,615.68	1,692,474.93	39.74412713	-80.81480092	
17,199.97	91.00	329.88	11,096.83	6,427.71	-211.02	14,433,702.16	1,692,424.75	39.74436492	-80.81497879	
17,299.97	91.00	329.88	11,095.08	6,514.19	-261.19	14,433,788.64	1,692,374.57	39.74460271	-80.81515667	
17,399.97	91.00	329.88	11,093.34	6,600.67	-311.37	14,433,875.13	1,692,324.39	39.74484050	-80.81533454	
17,499.97	91.00	329.88	11,091.59	6,687.16	-361.55	14,433,961.61	1,692,274.21	39.74507829	-80.81551242	
17,599.97	91.00	329.88	11,089.85	6,773.64	-411.73	14,434,048.09	1,692,224.04	39.74531608	-80.81569030	
17,699.96	91.00	329.88	11,088.10	6,860.12	-461.91	14,434,134.57	1,692,173.86	39.74555387	-80.81586818	
17,799.96	91.00	329.88	11,086.36	6,946.60	-512.08	14,434,221.05	1,692,123.68	39.74579166	-80.81604606	
17,899.96	91.00	329.88	11,084.61	7,033.08	-562.26	14,434,307.53	1,692,073.50	39.74602944	-80.81622394	
17,999.96	91.00	329.88	11,082.87	7,119.57	-612.44	14,434,394.02	1,692,023.33	39.74626723	-80.81640182	
18,099.96	91.00	329.88	11,081.12	7,206.05	-662.62	14,434,480.50	1,691,973.15	39.74650502	-80.81657971	
18,199.96	91.00	329.88	11,079.38	7,292.53	-712.79	14,434,566.98	1,691,922.97	39.74674280	-80.81675759	
18,299.96	91.00	329.88	11,077.63	7,379.01	-762.97	14,434,653.46	1,691,872.79	39.74698059	-80.81693548	
18,399.96	91.00	329.88	11,075.89	7,465.49	-813.15	14,434,739.94	1,691,822.60	39.74721838	-80.81711337	
18,499.96	91.00	329.88	11,074.14	7,551.97	-863.33	14,434,826.43	1,691,772.42	39.74745616	-80.81729126	
18,599.96	91.00	329.88	11,072.40	7,638.46	-913.51	14,434,912.91	1,691,722.24	39.74769395	-80.81746915	
18,699.96	91.00	329.88	11,070.65	7,724.94	-963.68	14,434,999.39	1,691,672.08	39.74793173	-80.81764703	
18,799.96	91.00	329.88	11,068.91	7,811.42	-1,013.86	14,435,085.87	1,691,621.90	39.74816952	-80.81782493	
18,899.96	91.00	329.88	11,067.16	7,897.90	-1,064.04	14,435,172.35	1,691,571.73	39.74840730	-80.81800282	
18,999.96	91.00	329.88	11,065.42	7,984.38	-1,114.22	14,435,258.83	1,691,521.55	39.74864509	-80.81818072	
19,099.96	91.00	329.88	11,063.67	8,070.87	-1,164.39	14,435,345.32	1,691,471.37	39.74888287	-80.81835862	
19,199.96	91.00	329.88	11,061.93	8,157.35	-1,214.57	14,435,431.80	1,691,421.19	39.74912066	-80.81853651	
19,299.96	91.00	329.88	11,060.18	8,243.83	-1,264.75	14,435,518.28	1,691,371.01	39.74935844	-80.81871441	
19,399.96	91.00	329.88	11,058.44	8,330.31	-1,314.93	14,435,604.76	1,691,320.84	39.74959622	-80.81889231	
19,499.96	91.00	329.88	11,056.69	8,416.79	-1,365.11	14,435,691.24	1,691,270.66	39.74983401	-80.81907021	
19,599.96	91.00	329.88	11,054.94	8,503.27	-1,415.28	14,435,777.73	1,691,220.48	39.75007179	-80.81924812	
19,699.96	91.00	329.88	11,053.20	8,589.76	-1,465.46	14,435,864.21	1,691,170.30	39.75030957	-80.81942602	

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 Environmental Protection



Planning Report - Geographic

Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
19,799.96	91.00	329.88	11,051.45	8,676.24	-1,515.64	14,435,950.69	1,691,120.13	39.75054736	-80.81960392
19,899.96	91.00	329.88	11,049.71	8,762.72	-1,565.82	14,436,037.17	1,691,069.95	39.75078514	-80.81978183
19,999.96	91.00	329.88	11,047.96	8,849.20	-1,615.99	14,436,123.65	1,691,019.77	39.75102292	-80.81995974
20,099.96	91.00	329.88	11,046.22	8,935.68	-1,666.17	14,436,210.13	1,690,969.59	39.75126070	-80.82013765
20,199.96	91.00	329.88	11,044.47	9,022.17	-1,716.35	14,436,296.62	1,690,919.41	39.75149848	-80.82031556
20,299.96	91.00	329.88	11,042.73	9,108.65	-1,766.53	14,436,383.10	1,690,869.24	39.75173626	-80.82049347
20,399.96	91.00	329.88	11,040.98	9,195.13	-1,816.71	14,436,469.58	1,690,819.06	39.75197404	-80.82067138
20,499.96	91.00	329.88	11,039.24	9,281.61	-1,866.88	14,436,556.06	1,690,768.88	39.75221183	-80.82084929
20,599.96	91.00	329.88	11,037.49	9,368.09	-1,917.06	14,436,642.54	1,690,718.70	39.75244961	-80.82102721
20,699.96	91.00	329.88	11,035.75	9,454.57	-1,967.24	14,436,729.03	1,690,668.53	39.75268739	-80.82120512
20,799.96	91.00	329.88	11,034.00	9,541.06	-2,017.42	14,436,815.51	1,690,618.35	39.75292517	-80.82138304
20,899.96	91.00	329.88	11,032.26	9,627.54	-2,067.59	14,436,901.99	1,690,568.17	39.75316294	-80.82156096
20,999.96	91.00	329.88	11,030.51	9,714.02	-2,117.77	14,436,988.47	1,690,517.99	39.75340072	-80.82173888
21,099.96	91.00	329.88	11,028.77	9,800.50	-2,167.95	14,437,074.95	1,690,467.81	39.75363850	-80.82191680
21,199.96	91.00	329.88	11,027.02	9,886.98	-2,218.13	14,437,161.44	1,690,417.64	39.75387628	-80.82209472
21,299.96	91.00	329.88	11,025.28	9,973.47	-2,268.31	14,437,247.92	1,690,367.46	39.75411406	-80.82227264
21,399.96	91.00	329.88	11,023.53	10,059.95	-2,318.48	14,437,334.40	1,690,317.28	39.75435184	-80.82245057
21,499.96	91.00	329.88	11,021.79	10,146.43	-2,368.66	14,437,420.88	1,690,267.10	39.75458961	-80.82262849
21,599.96	91.00	329.88	11,020.04	10,232.91	-2,418.84	14,437,507.36	1,690,216.93	39.75482739	-80.82280642
21,699.96	91.00	329.88	11,018.30	10,319.39	-2,469.02	14,437,593.84	1,690,166.75	39.75506517	-80.82298435
21,799.96	91.00	329.88	11,016.55	10,405.87	-2,519.19	14,437,680.33	1,690,116.57	39.75530295	-80.82316228
21,899.96	91.00	329.88	11,014.81	10,492.36	-2,569.37	14,437,766.81	1,690,066.39	39.75554072	-80.82334021
21,999.96	91.00	329.88	11,013.06	10,578.84	-2,619.55	14,437,853.29	1,690,016.21	39.75577850	-80.82351814
22,099.96	91.00	329.88	11,011.31	10,665.32	-2,669.73	14,437,939.77	1,689,966.04	39.75601628	-80.82369607
22,199.96	91.00	329.88	11,009.57	10,751.80	-2,719.91	14,438,026.25	1,689,915.86	39.75625405	-80.82387401
22,299.96	91.00	329.88	11,007.82	10,838.28	-2,770.08	14,438,112.74	1,689,865.68	39.75649183	-80.82405194
22,399.96	91.00	329.88	11,006.08	10,924.77	-2,820.26	14,438,199.22	1,689,815.50	39.75672960	-80.82422988
22,499.96	91.00	329.88	11,004.33	11,011.25	-2,870.44	14,438,285.70	1,689,765.33	39.75696738	-80.82440782
22,599.96	91.00	329.88	11,002.59	11,097.73	-2,920.62	14,438,372.18	1,689,715.15	39.75720515	-80.82458576
22,699.96	91.00	329.88	11,000.84	11,184.21	-2,970.79	14,438,458.66	1,689,664.97	39.75744293	-80.82476370
22,799.96	91.00	329.88	10,999.10	11,270.69	-3,020.97	14,438,545.14	1,689,614.79	39.75768070	-80.82494164
22,899.95	91.00	329.88	10,997.35	11,357.17	-3,071.15	14,438,631.63	1,689,564.61	39.75791847	-80.82511958
22,999.95	91.00	329.88	10,995.61	11,443.66	-3,121.33	14,438,718.11	1,689,514.44	39.75815625	-80.82529752
23,099.95	91.00	329.88	10,993.86	11,530.14	-3,171.51	14,438,804.59	1,689,464.26	39.75839402	-80.82547547
23,199.95	91.00	329.88	10,992.12	11,616.62	-3,221.68	14,438,891.07	1,689,414.08	39.75863179	-80.82565342
23,299.95	91.00	329.88	10,990.37	11,703.10	-3,271.86	14,438,977.55	1,689,363.90	39.75886957	-80.82583136
23,399.95	91.00	329.88	10,988.63	11,789.58	-3,322.04	14,439,064.04	1,689,313.73	39.75910734	-80.82600931
23,499.95	91.00	329.88	10,986.88	11,876.07	-3,372.22	14,439,150.52	1,689,263.55	39.75934511	-80.82618726
23,599.95	91.00	329.88	10,985.14	11,962.55	-3,422.39	14,439,237.00	1,689,213.37	39.75958288	-80.82636521
23,699.95	91.00	329.88	10,983.39	12,049.03	-3,472.57	14,439,323.48	1,689,163.19	39.75982065	-80.82654317
23,779.68	91.00	329.88	10,982.00	12,117.98	-3,512.58	14,439,392.43	1,689,123.19	39.76001022	-80.82668504

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Database:	DB Jul2216dt	Local Co-ordinate Reference:	Well Hansen 1N-4HU (D)
Company:	Tug Hill Operating LLC	TVD Reference:	GL=1247 @ 1247.00usft
Project:	Wetzel County, West Virginia (UTM17 NAD83)	MD Reference:	GL=1247 @ 1247.00usft
Site:	Hansen	North Reference:	Grid
Well:	Hansen 1N-4HU (D)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Hansen 1N-4HU BHL - plan hits target center - Point	0.00	0.00	10,982.00	12,117.98	-3,512.58	14,439,392.43	1,689,123.19	39.76001023	-80.82668505
Hansen 1N-4HU LP - plan misses target center by 425.79usft at 11999.98usft MD (11188.97 TVD, 1839.88 N, 2063.04 E) - Point	0.00	0.00	11,192.00	1,747.57	2,478.69	14,429,022.02	1,695,114.45	39.73149620	-80.80544624

Casing Points					
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter	
(usft)	(usft)		(")	(")	
120.00	120.00	30" Casing @ 120 TVD	30	36	
1,200.00	1,200.00	20" Casing @ 1200 TVD	20	24	
2,650.00	2,650.00	13 3/8" Casing @ 2650 TVD"	13-3/8	17	
10,337.72	10,075.00	9 5/8" Casing @ 10075 TVD	9-5/8	12-1/4	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S	+E/-W		
		(usft)	(usft)		
2,800.00	2,800.00	0.00	0.00	KOP Begin 2°/100' build	
3,550.00	3,541.46	4.61	9.88	Begin 15.00° tangent	
8,550.00	8,371.09	41.25	88.47	Begin 2°/100' build/turn	
8,957.26	8,762.10	588.16	1,261.32	Begin 18.00° tangent	
11,091.62	10,792.00	680.14	1,347.97	Begin 10°/100' build/turn	
11,827.51	11,192.09	1,179.88	1,754.03	Begin 5°/100' turn	
12,899.79	11,171.88	1,677.17	2,006.41	Begin 91.00° lateral section	
23,779.68	10,982.00	2,708.83	1,946.72	PBHL/TD	

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Office of Oil and Gas
WV Dept. of Environmental Protection

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 1N-4HU

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 exisiting 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
4705101520	Tug Hill Operating	6617' TVD, 12620' 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
4705101521	Tug Hill Operating	6618' TVD, 12124' 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
4705101522	Tug Hill Operating	6610' TVD, 12104' 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
4705101523	Tug Hill Operating	6612' TVD, 12270' 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

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

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_CD	LOC_CD	UTMR	UTWN
470510148	Mitchell	1049	Franklin	New-Mitchell	New-Mitchell	32-224215	32-814278	8160164	43774491

Bottom Hole Location Information:

API	EP_FLAG	UTMR	UTWN	LOC_CD	LAT_CD
470510148	1	As Proposed	4149118	4307071	32-224215

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TYD1	FM	TYM_EST	PR
470510148	48	...	...	...	...	...	...	...	...	...	...

Completion Information:

API	CMP_ID	SPOD_ID	ELEV	BATHM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF	
470510148

Comment: -/- Additional Lease Numbers:WV16-0079-001/WV16-0095-005

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 = 01649

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_CD	LOC_CD	UTMR	UTWN
470510149	Mitchell	1049	Franklin	New-Mitchell	New-Mitchell	32-224208	32-814265	2161172	43774491

Bottom Hole Location Information:

API	EP_FLAG	UTMR	UTWN	LOC_CD	LAT_CD
470510149	1	As Proposed	4110206	4306014	32-224208
470510149	1	As Proposed	4110206	4306014	32-224208

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TYD1	FM	TYM_EST	PR
470510149	84	...	...	...	...	...	...	...	...	...	...

Completion Information:

API	CMP_ID	SPOD_ID	ELEV	BATHM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF	
470510149

Comment: -/- Additional Lease Numbers:WV16-0075-001/WV16-0127-001, KCP: 0420

Pay/ShowWater Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TCF	FM_TCF	DEPTH_NFT	FM_BOY	O_BEF	O_AFT	O_BEF	O_AFT	WATER_UNTY
470510149

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510149	Gasar Exploration USA, Inc.	2018	841.114	90.349	83.841	82.283	83.893	82.213	82.484	40.699	43.028	45.283	58.743	45.119	16.888

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_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510149	Gasar Exploration USA, Inc.	2018	2.545	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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510149	Gasar Exploration USA, Inc.	2018	0	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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510149	Gasar Exploration USA, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_CD	LOC_CD	UTMR	UTWN
470510150	Mitchell	1049	Franklin	New-Mitchell	New-Mitchell	32-224202	32-814268	2110181	43774491

Bottom Hole Location Information:

API	EP_FLAG	UTMR	UTWN	LOC_CD	LAT_CD
470510150	1	As Proposed	4140467	4307786	32-224202

Owner Information:

API	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TYD1	FM	TYM_EST	PR
470510150	81	...	...	...	...	...	...	...	...	...	...

Completion Information:

API	CMP_ID	SPOD_ID	ELEV	BATHM	FIELD	DEEPEST_FM	DEEPEST_FHT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTO	RCD	O_BEF	O_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	T_BEF	
470510150

Comment: -/- Additional Lease Numbers:WV16-0069-000/WV16-0127-001/WV16-0115-000

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

WV Geological & Economic Survey Well: County = 51 Permit = 01664

Location Information: View Map

API	COUNTY	FEDTAX	DISTRICT	QUAD_W	QUAD_E	LAT_DD	LONG_DD	UTME	UTMN
470510164	Marietta	1854	Franklin	New Martinsville	New Martinsville	39.756877	-80.254549	216518	4397462

Bottom Hole Location Information:

API	EP_FLAG	UTME	UTMN	CON_CD	LAT_DD
470510164	1	As Drilled	216418	4397462	39.756877
470510164	1	As Proposed	217195	4396962	39.756841

Owner Information:

API	CMP_ID	SURFAC	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_CAT	COMPLETION	PROF_VO	PROF_TROT_FM	TRM_EST_PM
470510164	1	Oil/Gas/Lease	Completed	Gasar Energy LLC	14	1	1	1	Gasar Exploration USA, Inc.	9487	Marietta	2000		

Completion Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FTM	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	YOB	NEW_FIG	KOD	U_BEP	O_APT	O_BEP	O_APT	NGL
470510164	1	4/23/2012	2457	Gasar	1000	1000	Oil	Oil	Oil	1000	1000	2012							

Comment: -N- Additional Lease Numbers: WV16-0076-00 (WV15-0127-00)

Pay/Show/Water Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOTTOM	FM_BOTTOM	U_BEP	O_APT	O_BEP	O_APT	WATER_QNTY
470510164	1	Water	Fresh Water	Vertical	0	0	0	0	0	0	0	0	0
470510164	1	Water	Salt Water	Vertical	0	0	0	0	0	0	0	0	0

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510164	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
470510164	Tug Hill Operating LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0

Stratigraphy Information:

API	SURFAC	FM	QUALITY	DEPTH_TOP	DEPTH_BOTTOM	THICKNESS	THICKNESS_QUALITY	ELEV DATUM
470510164	Oil/Gas/Lease	Sandstone	Well Record	127	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	322	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	307	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Big Lime	Well Record	2027	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Shale	Well Record	2358	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Shale	Well Record	2309	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	2348	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	3208	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	3542	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	4003	Reasonable			1245 Ground Level
470510164	Oil/Gas/Lease	Sandstone	Well Record	5238	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 = 51 Permit = 01620

Location Information: View Map

API	COUNTY	FEDTAX	DISTRICT	QUAD_W	QUAD_E	LAT_DD	LONG_DD	UTME	UTMN
470510162	Marietta	1820	Franklin	New Martinsville	New Martinsville	39.751810	-80.231020	215824	4366624

Bottom Hole Location Information:

API	EP_FLAG	UTME	UTMN	CON_CD	LAT_DD
470510162	1	As Drilled	215824	4366624	39.751810
470510162	1	As Proposed	215824	4366624	39.751810

Owner Information:

API	CMP_ID	SURFAC	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_CAT	COMPLETION	PROF_VO	PROF_TROT_FM	TRM_EST_PM
470510162	1	Oil/Gas/Lease	Completed	Gasar Energy LLC	14	1	1	1	Gasar Exploration USA, Inc.	9487	Marietta	2000		

Completion Information:

API	CMP_ID	SPUD_DT	ELEV DATUM	FIELD	DEEPEST_FM	DEEPEST_FTM	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	YOB	NEW_FIG	KOD	U_BEP	O_APT	O_BEP	O_APT	NGL
470510162	1	4/23/2012	2457	Gasar	1000	1000	Oil	Oil	Oil	1000	1000	2012							

Comment: 8/26/2012 Revised strat in 11-22-2012 batch

Pay/Show/Water Information:

API	CMP_ID	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOTTOM	FM_BOTTOM	U_BEP	O_APT	O_BEP	O_APT	WATER_QNTY
470510162	8/25/2012	Water	Fresh Water	Vertical	0	0	0	0	0	0	0	0	0
470510162	8/25/2012	Water	Salt Water	Vertical	0	0	0	0	0	0	0	0	0
470510162	8/25/2012	Pay	Oil & Gas	Deviated	5024	Marietta Fm	1600	Marietta Fm	1000	Parry/Jordan System			
470510162	8/25/2012	Pay	Oil & Gas	Deviated	7254	Marietta Fm	7000	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	7804	Marietta Fm	7804	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	8254	Marietta Fm	8404	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	7254	Marietta Fm	8404	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	8654	Marietta Fm	8704	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	8854	Marietta Fm	9004	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	9154	Marietta Fm	9304	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	9454	Marietta Fm	9604	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	9654	Marietta Fm	9654	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1024	Marietta Fm	1024	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1024	Marietta Fm	1024	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1024	Marietta Fm	1184	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1124	Marietta Fm	1184	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1184	Marietta Fm	1184	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1184	Marietta Fm	1204	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1214	Marietta Fm	1234	Marietta Fm					
470510162	8/25/2012	Pay	Oil & Gas	Deviated	1244	Marietta Fm	1244	Marietta Fm					

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510162	Gasar Exploration USA, Inc.	2012	254	824	0	0	0	0	0	0	0	0	0	0	0
470510162	Gasar Exploration USA, Inc.	2013	462	448	46	465	17	742	53	548	48	375	40	100	40
470510162	Gasar Exploration USA, Inc.	2014	344	122	41	271	86	77	40	432	35	104	34	204	31
470510162	Gasar Exploration USA, Inc.	2015	161	79	19	130	18	162	21	174	12	823	15	232	15
470510162	Tug Hill Operating LLC	2016	240	467	17	18	182	20	163	22	233	22	154	20	126
470510162	Tug Hill Operating LLC	2017	188	251	18	14	18	173	17	142	18	244	18	244	18

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_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510162	Gasar Exploration USA, Inc.	2012	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Gasar Exploration USA, Inc.	2013	10	689	2	200	749	2	203	1	1	1	1	1	1
470510162	Gasar Exploration USA, Inc.	2014	0	7	122	1	127	0	89	1	85	78	48	52	0
470510162	Gasar Exploration USA, Inc.	2015	0	6	12	212	324	408	880	1	129	1	101	52	0
470510162	Tug Hill Operating LLC	2016	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Tug Hill Operating LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0

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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510162	Gasar Exploration USA, Inc.	2012	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Gasar Exploration USA, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Gasar Exploration USA, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Gasar Exploration USA, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Tug Hill Operating LLC	2016	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Tug Hill Operating LLC	2017	0	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

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
470510162	Tug Hill Operating LLC	2012	0	0	0	0	0	0	0	0	0	0	0	0	0
470510162	Tug Hill Operating LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0

WW-9
(4/16)

API Number 47 - 051 - _____
Operator's Well No. Hansen N-4HU

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 containment

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

Received
JAN 28 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

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

Maureen A Stead Notary Public

My commission expires 1/20/19

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MAUREEN A STEAD
Notary Public
CECIL TWP, WASHINGTON COUNTY
My Commission Expires Jan 20, 2019

Form WW-9

Operator's Well No. Hansen N-4HU

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
Winter Rye	168
Winter Wheat	180
Field Bromegrass	40

Seed Type	lbs/acre
Tall Fescue	40
Ladino Clover	3
Redtop	3

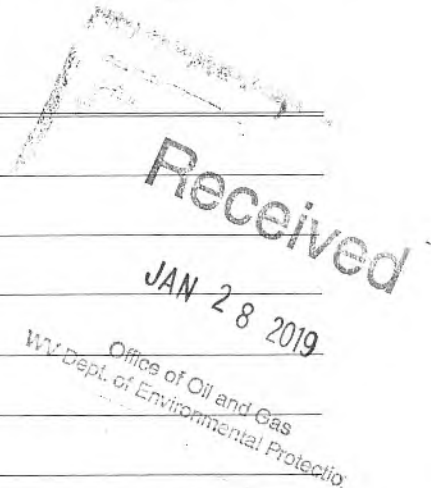
Attach:

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: *James Wickham*

Comments: _____



Title: Oil and Gas Inspector

Date: 1/23/19

Field Reviewed? () Yes () No

WW-9

PROPOSED HANSEN N-4HU

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

COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-27-22
172.79 ACRES

663' @ 0% TO 16% GRADE

215' @ -2% TO -9% GRADE

494' @ 0% TO 4% GRADE

137' @ -2% TO -4% GRADE

572' @ 0% TO 2% GRADE

259' @ -4% TO -6% GRADE

SHEET 1
SHEET 2

TO WV STATE RTE. 2
TO CO. RTE. 78
COUNTY ROUTE 2/2

EPHEMERAL STREAM
GRAVEL ROAD
ACCESS ROAD

GRAVEL ROAD
ACCESS ROAD
CEMETERY

DRAWING NOT
TO SCALE

Received
JAN 13 2010
OFFICE OF OIL AND GAS
WV Dept. of Environmental Protection
COPELAND, SR.
OFFICE

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
 — — — — — Overhead Utility

PROPOSED HANSEN N-4HU

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.

SHEET 1
SHEET 2



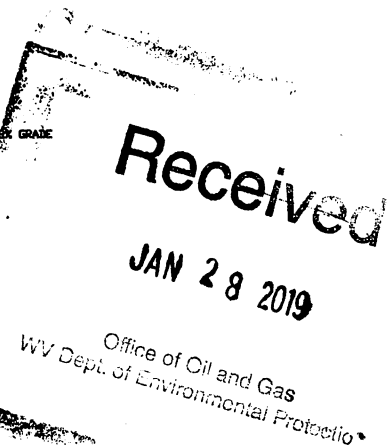
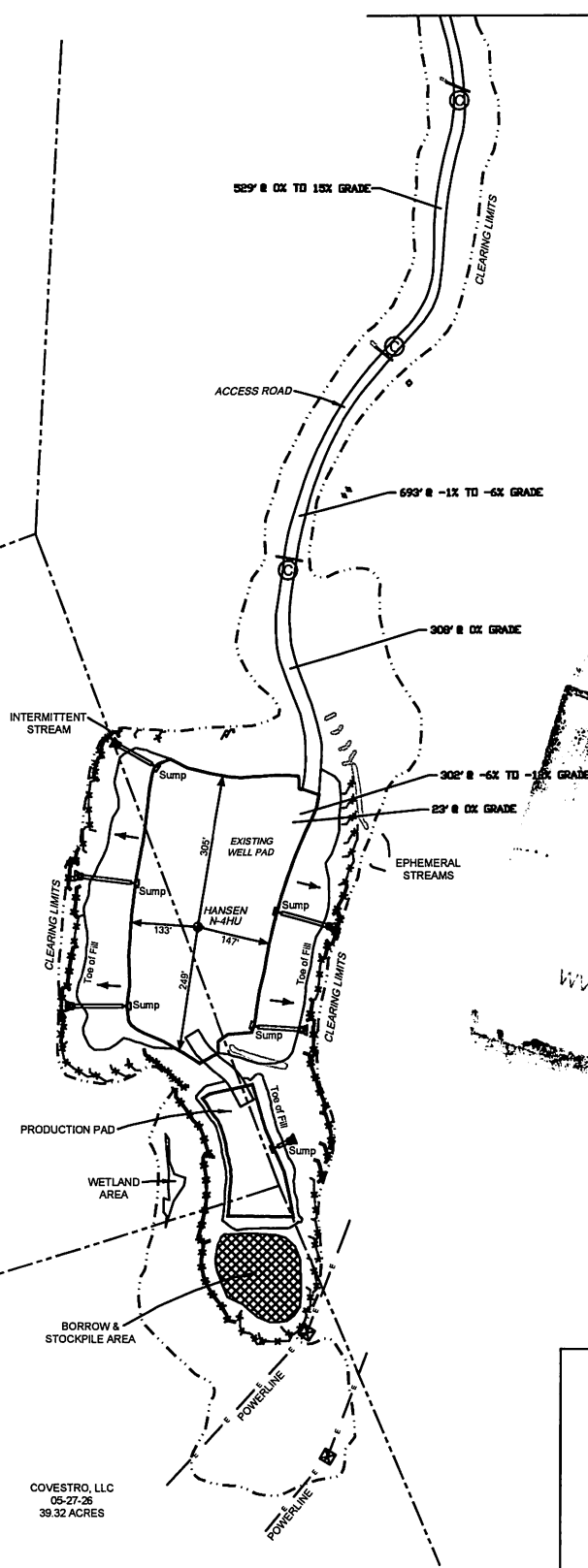
COVESTRO, LLC
05-27-20
93.027 ACRES

COVESTRO, LLC
05-27-22
172.79 ACRES

COVESTRO, LLC
05-27-21
22.67 ACRES

APPALACHIAN
POWER CO.
05-27-20.1
43.973 ACRES

COVESTRO, LLC
05-27-26
39.32 ACRES



LEGEND

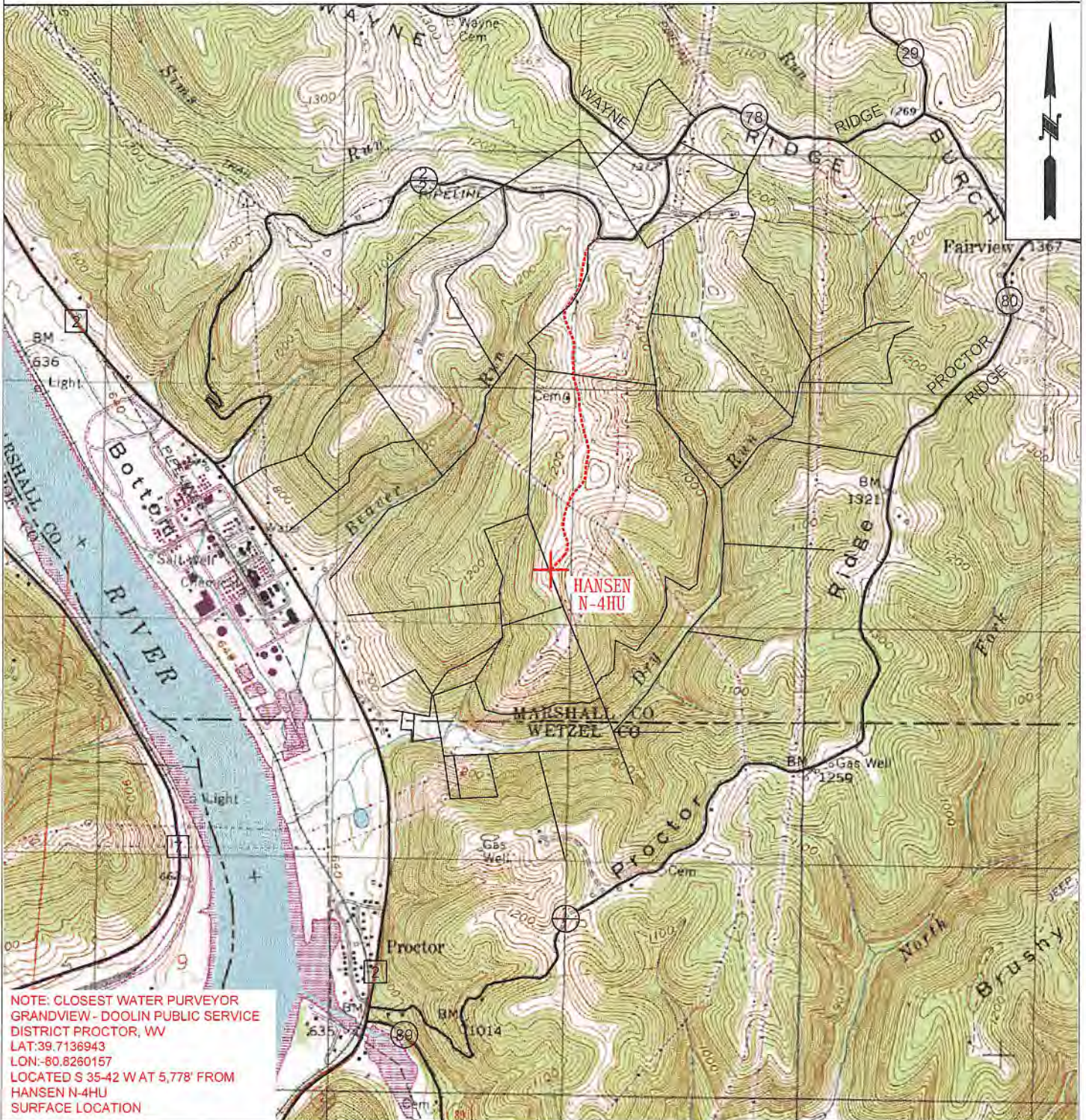
Note:
 (C) — Denotes existing culvert with appropriate sediment outlet control (Rip Rap splash pad).
 - - - - - Silt Fence and or Sediment and Erosion Control Measure.
 - - - - - Surface Boundary
 — + — Overhead Utility

WW-9


PROPOSED HANSEN N-4HU

SUPPLEMENT PG 2

4705102175



NOTE: CLOSEST WATER PURVEYOR
 GRANDVIEW - DOOLIN PUBLIC SERVICE
 DISTRICT PROCTOR, WV
 LAT:39.7136943
 LON:-80.8260157
 LOCATED S 35-42 W AT 5,778' FROM
 HANSEN N-4HU
 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

Handwritten signature and date: 1/23/19

Well Name: Hansen N-4HU

Pad Location: Hansen
Marshall County, West Virginia

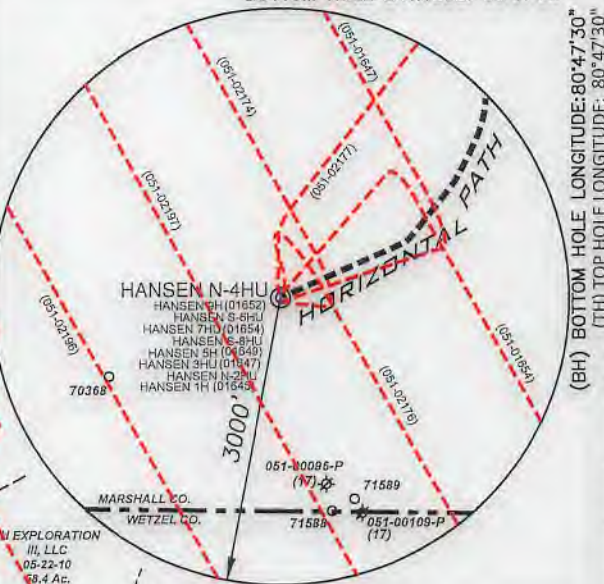
UTM (meters), NAD83, Zone 17:
NORTHING - 4,397,442.05
EASTING - 515,916.41

January 2019
Received
JAN 28 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

HANSEN LEASE WELL N-4HU 451.4284 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°47'30"



LEGEND

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

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,397,442.05
E) 515,916.41

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,398,267.70
E) 516,509.78

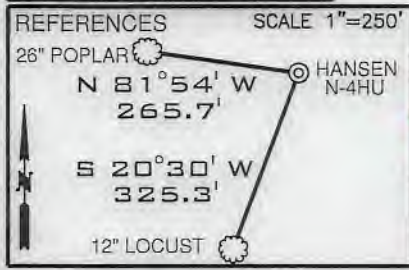
BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,401,135.62
E) 514,845.78

LINE	BEARING	DISTANCE
L1	N 59°17' W	1089.71'
L2	S 67°48' W	771.29'
L3	N 65°57' E	1392.18'
L4	N 38°57' E	659.78'

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 51°14' E	112.69'	234.45'	113.50'
C2	N 33°13' E	97.91'	733.35'	97.95'
C3	N 27°59' E	238.16'	3347.72'	238.21'
C4	N 25°23' E	222.43'	6566.03'	222.44'
C5	N 12°39' E	469.22'	1145.97'	472.58'
C6	N 14°10' W	593.06'	1145.88'	599.89'

(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

- DETAIL SKETCH "A"**
SCALE 1"=200'
- HANSEN 9H (01652)
 - HANSEN S-6HU
 - HANSEN 7HU (01654)
 - HANSEN S-8HU
 - HANSEN 6H (01549)
 - HANSEN N-4HU
 - HANSEN 5HU (01647)
 - HANSEN N-2HU
 - HANSEN 1H (01645)



FILE NUMBER _____

DRAWING NUMBER HANSEN_N-4HU_REV3

SCALE 1" = 2000'

MINIMUM DEGREE OF ACCURACY 1/200

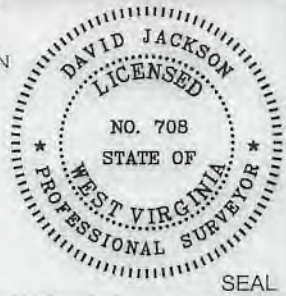
PROVEN SOURCE OF ELEVATION SUBMETER MAPPING
GRADE GPS

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

David L Jackson

P.S. 708

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



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

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

DATE: MARCH 06, 2019

REVISED DATE: AUGUST 09, 2019

OPERATORS WELL NO. HANSEN N-4HU

API WELL NO. 47-051-02175

STATE WV COUNTY MARSHALL PERMIT H6A

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: 11,391' TMD: 23,780'

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

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



COUNTY NAME
PERMIT

**HANSEN LEASE
WELL N-4HU
451.4284 ACRES**

4705102175 H6A

Number	TAX MAP -PARCEL	SURFACE OWNER	ACRES
S1 B	05-27-21	COVESTRO, LLC	22.67
S2 A	05-27-22	COVESTRO, LLC	172.79
S3	05-28-10	CAROL MARTIN	100.0
S4 H	05-28-9	COVESTRO, LLC	93.4
S5	05-28-2	COVESTRO, LLC	99.5
S6 J	05-28-3	TH EXPLORATION III, LLC	53.44
S7	05-22-13	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	40.57
S8	05-21-18	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	51.44
S9	05-21-20	JOHN M. MOORE , TERESA R. MOORE & ANDREA S. MOORE	31.0
S10	05-21-19.1	JOHN G. MOORE , ETAL	0.92
S11	05-21-22	PEGGY LEE BOWEN, ETAL	18.29
S12 P	05-21-24	TH EXPLORATION III, LLC	132.5
S13	05-20-34	TH EXPLORATION III, LLC	116.7
S14	05-20-33	TH EXPLORATION III, LLC	42.186
S15	05-27-20.1	APPALACHIAN POWER CO.	43.973
S16	05-27-20	COVESTRO, LLC.	93.027
S17	05-27-19	COVESTRO, LLC.	33.786
S18	05-28-11	CAROL A. MARTIN	24.681
S19	05-21-15	TH EXPLORATION III, LLC	52.97
S20	05-21-16	TH EXPLORATION III, LLC	38.38
S21	05-21-17	TH EXPLORATION III, LLC	31.68
S22	05-21-8	TH EXPLORATION III, LLC	38.94
S23	05-21-3	TH EXPLORATION III, LLC	146.0
S24	05-20-32	TH EXPLORATION III, LLC	28.8
S25	05-20-29	TH EXPLORATION III, LLC	30.08
S26	05-19-23	WSD PROPERTIES, LLC	28.4
S27	05-22-1	MARY P. MASON, EST.	2.0
S28 Q	05-22-2	TH EXPLORATION III, LLC	30.0
S29 N	05-22-18	EDWARD R. YOHO, JR.	77.13
S30 M	05-22-15	EDWARD R. YOHO, JR.	25.5
S31 L	05-22-16	EDWARD R. YOHO, JR.	57.0
S32	05-22-17	CNX GAS COMPANY, LLC.	37.5
S33 I	05-22-11	TH EXPLORATION III, LLC	55.65
S34 G	05-28-4	TH EXPLORATION III, LLC	48.44
S35	05-28-9	TH EXPLORATION III, LLC	63.44
S36	05-26-1	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	12.94
S37	05-26-2	EDWIN BOOTH ANDERSON & MARK W. ANDERSON	67.5
S38	05-26-19	ERIC JAY & KARROLL S. BOOTH	50.0
S39	05-27-24	ROBERT F. ROTHLSBERGER	60.10
S40 C	05-27-23	ROBERT F. ROTHLSBERGER	35.77
S41	05-27-26	COVESTRO, LLC.	39.32
S42	05-27-27	JAMES ANDREW & KAREN R. LYNNE RICHMOND	8.9353
S43 F	05-28-8	COVESTRO, LLC.	56.32
S44	05-22-14	CNX LAND RESOURCES, INC.	0.30
S45	05-21-21	CNX LAND RESOURCES, INC.	4.0
S46 O	05-21-23	PEGGY LEE BROWN, ETAL	42.62
S47	05-20-28	TH EXPLORATION III, LLC	15.34
S48 K	05-22-12	TH EXPLORATION III, LLC	61.49



P.S. 708 *David L Jackson*



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: HANSEN N-4HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-02175

WELL PLAT
PAGE 2 OF 3
DATE: 03/06/2019
REVISED DATE:
08/09/2019

HANSEN LEASE
WELL N-4HU
451.4284 ACRES

4705102175 H6A

Lease ID	Tags	Parcel	Grantor, Lessor, Etc.	Deed Book	Page
10*14418	A	5-27-22	PPG INDUSTRIES, INC.	878	610
10*14500	B	5-27-21	BAYER MATERIAL SCIENCE LLC	826	305
10*14609	C	5-27-23	PATRICIA HADDIX	700	113
10*14610	C	5-27-23	SUZANNE HILL	699	45
10*14611	C	5-27-23	LILLIAN PRISCILLA GRIMM	699	41
10*14065	D	5-28-7	CARL L COFFIELD SR	665	363
10*14572	E	5-28-6	VICKI LYNN WOOD	681	326
10*14573	E	5-28-6	AARON D LITMAN	681	317
10*14574	E	5-28-6	KLOVA ANN MORRIS	681	320
10*14575	E	5-28-6	REVA JUNE ICARD	681	323
10*14576	E	5-28-6	WILLIAM L LITMAN	681	329
10*14577	E	5-28-6	ULA NELSON	681	332
10*14578	E	5-28-6	BETTY KNOWLES	767	36
10*14418	F	5-28-8	PPG INDUSTRIES, INC.	878	610
10*14418	G	5-28-4	PPG INDUSTRIES, INC.	878	610
10*14418	H	5-28-9	PPG INDUSTRIES, INC.	878	610
10*14418	I	5-22-11	PPG INDUSTRIES, INC.	878	610
10*14418	J	5-28-3	PPG INDUSTRIES, INC.	878	610
10*14482	J	5-28-3	RALPH E EARNEST	745	578
10*14483	J	5-28-3	CHARLES H EARNEST	746	319
10*14484	J	5-28-3	ARTHUR L JOSEPH	748	474
10*14485	J	5-28-3	LINDA K HASSLEN	748	476
10*14486	J	5-28-3	THOMAS ATKINSON	754	248
10*14487	J	5-28-3	DOUGLAS ATKINSON	754	577
10*14488	J	5-28-3	HEATHER GUIDRY	754	244
10*14489	J	5-28-3	AUGUSTA L SPIHER	754	246
10*14490	J	5-28-3	JAMES WELCH JR	752	445
10*14491	J	5-28-3	CHRISTOPHER PRICE	752	208
10*14492	J	5-28-3	MARJORIE A MCLAUGHLIN	749	526
10*14418	K	5-22-12	PPG INDUSTRIES, INC.	878	610
10*14457	L	5-22-16	HARRY LEE GOUDY	731	140
10*14457	M	5-22-15	HARRY LEE GOUDY	731	140
10*14457	N	5-22-18	HARRY LEE GOUDY	731	140
10*14947	O	5-21-23	DANA NEAL SMALLWOOD	850	520
10*14948	O	5-21-23	PEGGY BOWEN BROWN	850	522
10*14418	P	5-21-24	PPG INDUSTRIES, INC.	878	610
10*14418	Q	5-22-2	PPG INDUSTRIES, INC.	878	610
10*14307	R	5-20-27	SALLY CYNTHIA HOPKINS	777	572
10*14308	R	5-20-27	MARY E. BASSETT	779	492
10*14309	R	5-20-27	ROBERT B. THOMAS	779	484
10*14310	R	5-20-27	JEAN C. THOMAS	781	614
10*14324	R	5-20-27	RUTH E. BASSETT MEADOWS	792	100
10*14325	R	5-20-27	ELIZABETH ANN STRAUSBAUGH	792	104
10*14326	R	5-20-27	JANET LEA BLANKENSHIP	792	580
10*14418	R	5-20-27	PPG INDUSTRIES, INC.	878	610



P.S. 708

David L Jackson



TUG HILL
OPERATING

OPERATOR'S
WELL #: HANSEN N-4HU
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-02175

WELL PLAT
PAGE 3 OF 3
DATE: 03/06/2019
REVISED DATE: 08/09/2019

WW-6A1
(5/13)

Operator's Well No. Hansen N-4HU

**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 
 Its: Permitting Specialist - Appalachia Region

WW-6A1 Supplement

9 4 1 2 0 1 5 0 2 7

4 7 0 5 1 0 2 1 7 8

Operator's Well No. Hansen N-4HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14418	A	5-27-22	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	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	27/321 Chesapeake Appalachia LLC and Statoil USA Onshore Properties Inc to Gastar Exploration USA Inc and	NA	NA
10*14609	C	5-27-23	PATRICIA HADDIX	CHESAPEAKE APPALACHIA LLC	1/8+	700	113	NA	23/512 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	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14610	C	5-27-23	SUZANNE HILL	CHESAPEAKE APPALACHIA LLC	1/8+	699	45	NA	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	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14611	C	5-27-23	LILLIAN PRISCILLA GRIMM	CHESAPEAKE APPALACHIA LLC	1/8+	699	41	NA	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	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14065	D	5-28-7	CARL L COFFIELD SR	GASTAR EXPLORATION USA, INC	1/8+	665	363	NA	NA	23/353 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*14572	E	5-28-6	VICKI LYNN WOOD	CHESAPEAKE APPALACHIA LLC	1/8+	681	326	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC

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Operator's Well No. Hansen N-4HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14573	E	5-28-6	AARON D LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	317	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14574	E	5-28-6	KLOVA ANN MORRIS	CHESAPEAKE APPALACHIA LLC	1/8+	681	320	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14575	E	5-28-6	REVA JUNE ICARD	CHESAPEAKE APPALACHIA LLC	1/8+	681	323	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14576	E	5-28-6	WILLIAM L LITMAN	CHESAPEAKE APPALACHIA LLC	1/8+	681	329	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14577	E	5-28-6	ULA NELSON	CHESAPEAKE APPALACHIA LLC	1/8+	681	332	NA	NA	22/200 Chesapeake 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	36/9 Gastar Exploration Inc to TH Exploration II LLC

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Operator's Well No. Hansen N-4HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14578	E	5-28-6	BETTY KNOWLES	GASTAR EXPLORATION USA, INC	1/8+	767	36	NA	NA	27/639 Gastar Exploration USA Inc to Atinum Marcellus I LLC	21/41 Gastar Exploration USA Inc to Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II LLC
10*14418	F	5-28-8	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14418	G	5-28-4	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14418	H	5-28-9	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14418	I	5-22-11	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14418	J	5-28-3	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC
10*14482	J	5-28-3	RALPH E EARNEST	GASTAR EXPLORATION USA, INC	1/8+	745	578	NA	NA	24/332 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

4705102175

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Operator's Well No. Hansen N-4HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14483	J	5-28-3	CHARLES H EARNEST	GASTAR EXPLORATION USA, INC	1/8+	746	319	NA	NA	24/332 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*14484	J	5-28-3	ARTHUR L JOSEPH	GASTAR EXPLORATION USA, INC	1/8+	748	474	NA	NA	24/332 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*14485	J	5-28-3	LINDA K HASSLIEN	GASTAR EXPLORATION USA, INC	1/8+	748	476	NA	NA	24/332 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*14486	J	5-28-3	THOMAS ATKINSON	GASTAR EXPLORATION USA, INC	1/8+	754	248	NA	NA	24/332 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*14487	J	5-28-3	DOUGLAS ATKINSON	GASTAR EXPLORATION USA, INC	1/8+	754	577	NA	NA	24/332 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*14488	J	5-28-3	HEATHER GUIDRY	GASTAR EXPLORATION USA, INC	1/8+	754	244	NA	NA	24/332 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*14489	J	5-28-3	AUGUSTA L SPIHER	GASTAR EXPLORATION USA, INC	1/8+	754	246	NA	NA	24/332 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*14490	J	5-28-3	JAMES WELCH JR	GASTAR EXPLORATION USA, INC	1/8+	752	445	NA	NA	24/332 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

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Operator's Well No. Hansen N-4HU

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment	Assignment
10*14491	J	5-28-3	CHRISTOPHER PRICE	GASTAR EXPLORATION USA, INC	1/8+	752	208	NA	NA	24/332 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*14492	J	5-28-3	MARJORIE A MCLAUGHLIN	GASTAR EXPLORATION USA, INC	1/8+	749	526	NA	NA	24/332 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*14418	K	5-22-12	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14457	L	5-22-16	HARRY LEE GOUDY	GASTAR EXPLORATION USA, INC	1/8+	731	140	NA	NA	735/263 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*14457	M	5-22-15	HARRY LEE GOUDY	GASTAR EXPLORATION USA, INC	1/8+	731	140	NA	NA	735/263 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*14457	N	5-22-18	HARRY LEE GOUDY	GASTAR EXPLORATION USA, INC	1/8+	731	140	NA	NA	735/263 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*14947	O	5-21-23	DANA NEAL SMALLWOOD	GASTAR EXPLORATION INC	1/8+	850	520	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14948	O	5-21-23	PEGGY BOWEN BROWN	GASTAR EXPLORATION INC	1/8+	850	522	NA	NA	NA	34/302 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14418	P	5-21-24	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	
10*14418	Q	5-22-2	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC	

Lease No.	Tags	Parcel	Lessor	Lessee	Royalty	Book	Page	Assignment	Assignment	Assignment	Assignment	Assignment
10*14307	R	5-20-27	SALLY CVNTHIA HOPKINS	GASTAR EXPLORATION USA, INC	1/8+	777	572	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14419
10*14308	R	5-20-27	MARY E. BASSETT	GASTAR EXPLORATION USA, INC	1/8+	779	492	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14420
10*14309	R	5-20-27	ROBERT B. THOMAS	GASTAR EXPLORATION USA, INC	1/8+	779	484	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14421
10*14310	R	5-20-27	JEAN C. THOMAS	GASTAR EXPLORATION USA, INC	1/8+	781	614	NA	NA	NA	21/41 Gastar Exploration USA Inc and Gastar Exploration Inc merger	36/9 Gastar Exploration Inc to TH Exploration II, LLC 14422
10*14324	R	5-20-27	RUTH E. BASSETT MEADOWS	GASTAR EXPLORATION USA, INC	1/8+	792	100	NA	NA	29/157 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*14325	R	5-20-27	ELIZABETH ANN STRAUSBAUGH	GASTAR EXPLORATION USA, INC	1/8+	792	104	NA	NA	29/157 Gastar Exploration 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*14326	R	5-20-27	JANET LEA BLANKENSHIP	GASTAR EXPLORATION USA, INC	1/8+	792	580	NA	NA	30/136 Gastar Exploration 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*14418	R	5-20-27	PPG INDUSTRIES, INC.	GASTAR EXPLORATION INC	1/8+	878	610	NA	NA	NA	35/144 Gastar Exploration Inc to Atinum Marcellus I LLC	36/9 Gastar Exploration Inc to TH Exploration II, LLC

AFFIDAVIT

COPY

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

4705102175

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

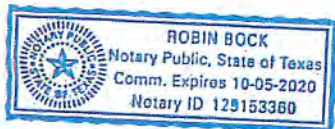
JURAT

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 \$6.00

STATE OF TEXAS §
§ SS
COUNTY OF TARRANT §

Sworn and subscribed to (or affirmed) before me on this, the 18th day of October, 2016, by David D. Kalish

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



My Commission Expires: 10-05-2020
Signature/Notary Public: Robin Bock
Name/Notary Public (Print): Robin Bock

Received
JAN 28 2019
Oil and Gas
Interracial Protection

Jan Pest
MARSHALL County 01:22:38 PM
Instrument No 1405489
Date Recorded 04/27/2016
Document Type AEN
Pages Recorded 77
Book Page 36-9
Recording Fee \$77.00
Additional \$13.00

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
COUNTY OF MARSHALL

§
§
§

KNOW ALL MEN BY THESE PRESENTS

4705102175

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 (c) 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 408069

Received

JAN 28 2019

Office of Oil and Gas
WV Dept. of Environmental Protection

4705102175



January 24, 2019

4705102175

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

RE: Hansen N-4HU

Subject: Marshall County Route 78, and 2/2 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 78, and 2/2 in the area reflected on the Hansen N-4HU 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

Received

JAN 28 2019

Office of Oil and Gas
WV Dept. of Environmental Protection

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

4705102175

Date of Notice Certification: 01/25/2019

API No. 47- 051 -

Operator's Well No. Hansen N-4HU

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>515,916.41</u>
County: <u>Marshall</u>		Northing: <u>4,397,442.05</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		OOG OFFICE USE ONLY
<input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED		<input type="checkbox"/> RECEIVED/ NOT REQUIRED
<input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED		<input type="checkbox"/> RECEIVED
<input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or <input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)		<input type="checkbox"/> RECEIVED/ NOT REQUIRED
<input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION		<input type="checkbox"/> RECEIVED
<input checked="" type="checkbox"/> 5. PUBLIC NOTICE		<input type="checkbox"/> RECEIVED
<input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION		<input type="checkbox"/> RECEIVED

Required Attachments:

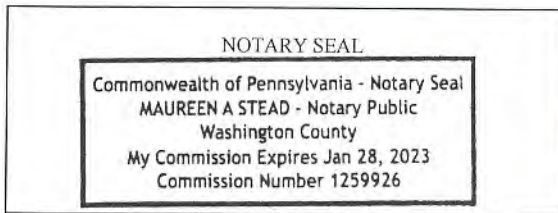
The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication 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: Tug Hill Operating, LLC
By: Amy L. Miller *amy l miller*
Its: Permitting Specialist - Appalachia Region
Telephone: 724-749-8388

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030
Email: amiller@tug-hillop.com



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.

Received

JAN 4 8 2019

Office of Oil and Gas
WV Dept. of Environmental Protection

WW-6A
(9-13)

4705102175

APT NO. 47-051
OPERATOR WELL NO. Hansen N-4HU
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: _____

*Please attach additional forms if necessary

Received
JAN 29 2019

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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(8-13)

API NO. 47-051 -
OPERATOR WELL NO. Hansen N-4HU
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

JAN 4 8 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

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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(8-13)

API NO. 47- 051 -
OPERATOR WELL NO. Hansen N-4HU
Well Pad Name: Hansen

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.

Received
JAN 28 2019
Office of Oil and Gas
West Virginia Department of Environmental Protection

WW-6A
(8-13)

4705102175
API NO. 47-051
OPERATOR WELL NO. Hansen N-4HU
Well Pad Name: Hansen

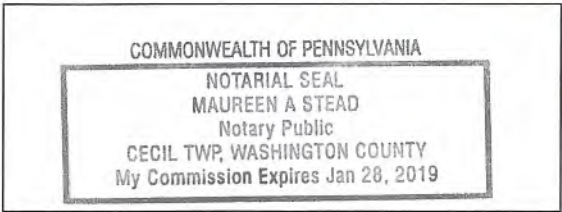
Notice is hereby given by:

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

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

Received
JAN 28 2019
Office of Oil and Gas
WV Dept. of Environmental Protection

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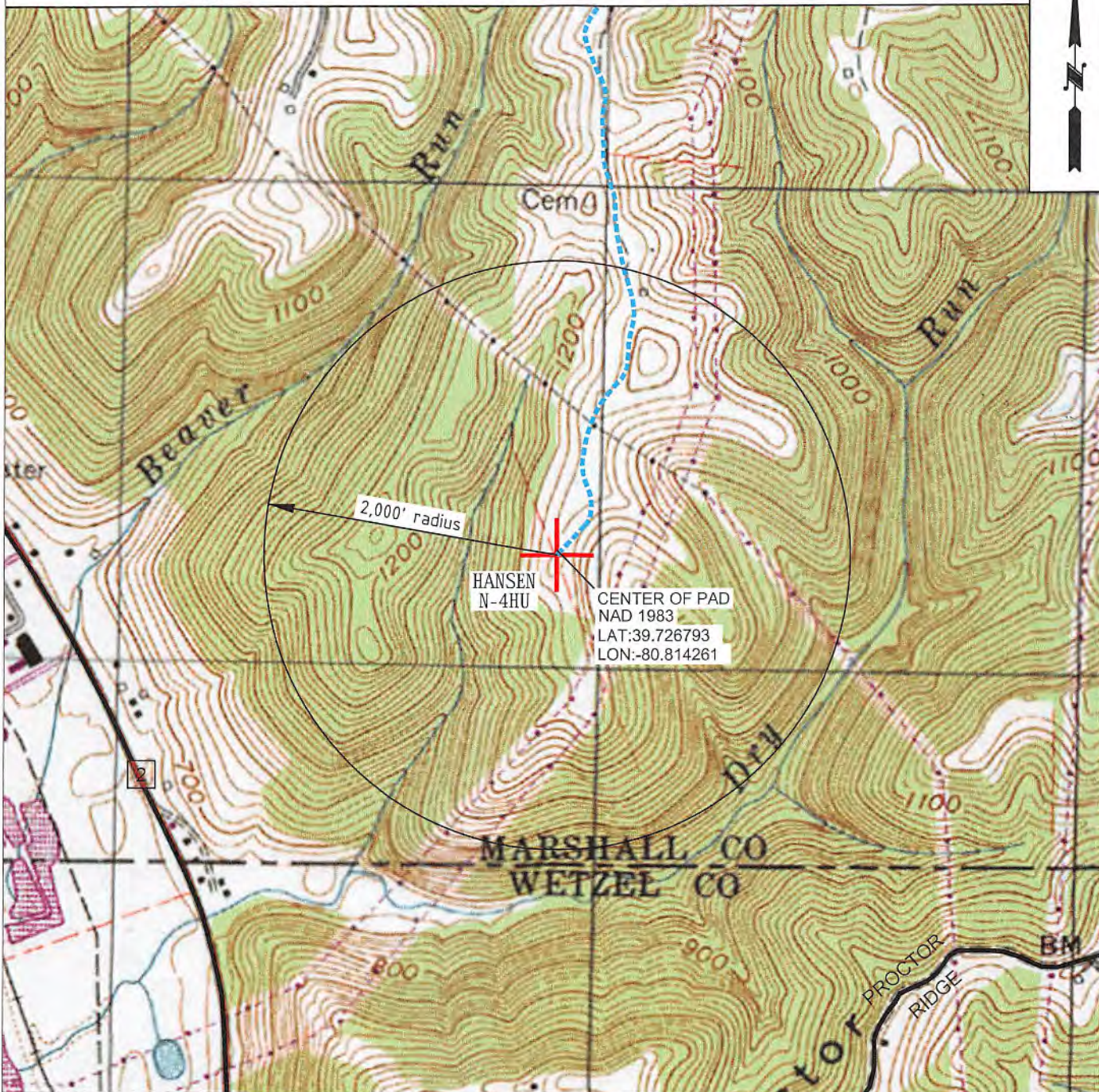
WW-6A

PROPOSED HANSEN N-4HU

SUPPLEMENT PG 1

JAN 4 8 2019

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



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" = 1000'		DATE: 01/17/2019	

4705102175

**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

Received
JAN 28 2019
Office of Oil and Gas
West Virginia Department of Environmental Protection

Oil and Gas Privacy Notice:

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

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 HAND
RETURN RECEIPT REQUESTED DELIVERY

4705102175

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:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>515,916.41</u>
County:	<u>Marshall</u>		Northing:	<u>4,397,442.05</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>			

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.

Received

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

Office of Oil and Gas
West Virginia Department of Environmental Protection

Oil and Gas Privacy Notice:

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



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

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

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 N-4HU 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

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

Received

JAN 28 2019

Office of Oil and Gas
Department of Environmental Protection



TUG HILL 4705102175

PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

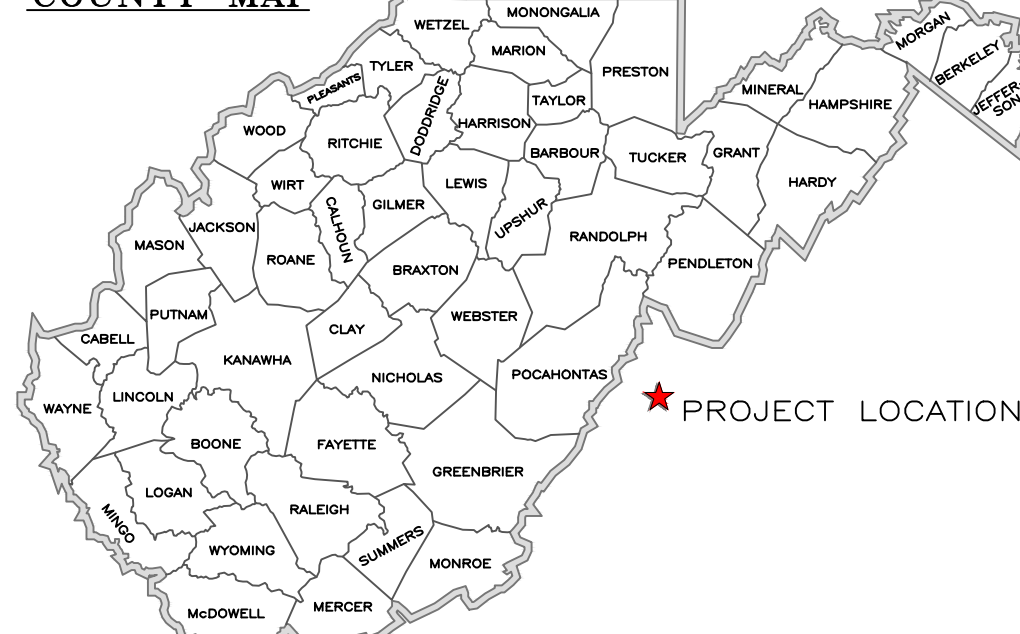
PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 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

Received

JAN 28 2019

Office of Oil and Gas
WV Dept. 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

Property Owner Information - Hansen Well Site							
Franklin District - Marshall County							
Owner	TM - Parcel	Well Pad	Prod. Pad	Access Road	Topsoil/Excess	Add. Clearing	Total Disturbed
Covestro, LLC	28-9	0.00	0.00	1.09	0.00	1.50	2.59
Covestro, LLC	28-8	0.00	0.00	1.18	0.00	1.56	2.74
Covestro, LLC	27-22	4.04	0.12	3.14	0.80	6.10	14.20
Covestro, LLC	27-21	2.18	0.54	0.07	0.00	1.85	4.64
Covestro, LLC	27-26	0.00	0.25	0.00	1.33	2.53	4.11
Site Totals (Ac)	6.22	0.91	5.48	2.13	13.54	28.28	

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: 516093.49	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"> <thead> <tr> <th>Hansen IH</th> <th>Hansen N-2HU</th> <th>Hansen 3HU</th> <th>Hansen N-4HU</th> <th>Hansen 5H</th> </tr> </thead> <tbody> <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: -80.81449092 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: 39.72657177 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> </tbody> </table> <table border="1"> <thead> <tr> <th>Hansen S-8HU</th> <th>Hansen 7HU</th> <th>Hansen S-6HU</th> <th>Hansen 9H</th> </tr> </thead> <tbody> <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: -80.81441174 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. 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WV State Plane Coordinate System
North Zone, NAD 83
Elevations Based on NAV88
Established By Survey Grade GPS
and OPUS Post-Processing

Access Road			
Surface Owner	TM - Parcel	Road Length	Type
Covestro, LLC	28-9	1,065.55'	Access Road
Covestro, LLC	28-8	966.36'	Access Road
Covestro, LLC	27-23	2,684.79'	Access Road
Covestro, LLC	27-21	180.38'	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	13.54 Ac
Additional Clearing	28.28 Ac
Total Disturbed Area	53.83 Ac
Additional Information	
Total Wasted Access Disturbed	0.00 Ac
Total Linear Feet of Access Road	4,896.56'

Hansen Well Site Quantities						
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope	Length of Slope
Well Pad	1,423.28	3,649.30	2,226.02	N/A	N/A	N/A
Production Pad	3,044.39	282.05	2,762.34	N/A	N/A	N/A
Production Pad Access Road	0.03	400.55	400.52	11.54%	76.71'	
Topsoil/Excess Material Stockpile	0.00	500.00	500.00	N/A	N/A	N/A
Totals	4,467.70	4,831.90	2,762.34	3,126.54		
Total Spoil (CY) =			-364.20	(Excess Spoil Capacity)		

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
digging in the state of West Virginia.
IT'S THE LAW
Know what's below.
Call before you dig.

Well Location Restrictions

All Pad construction complies with the following restrictions.

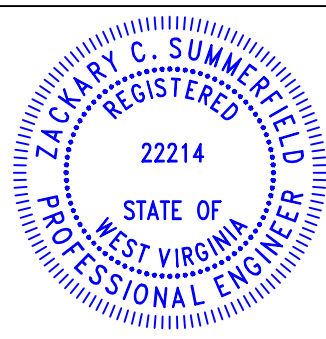
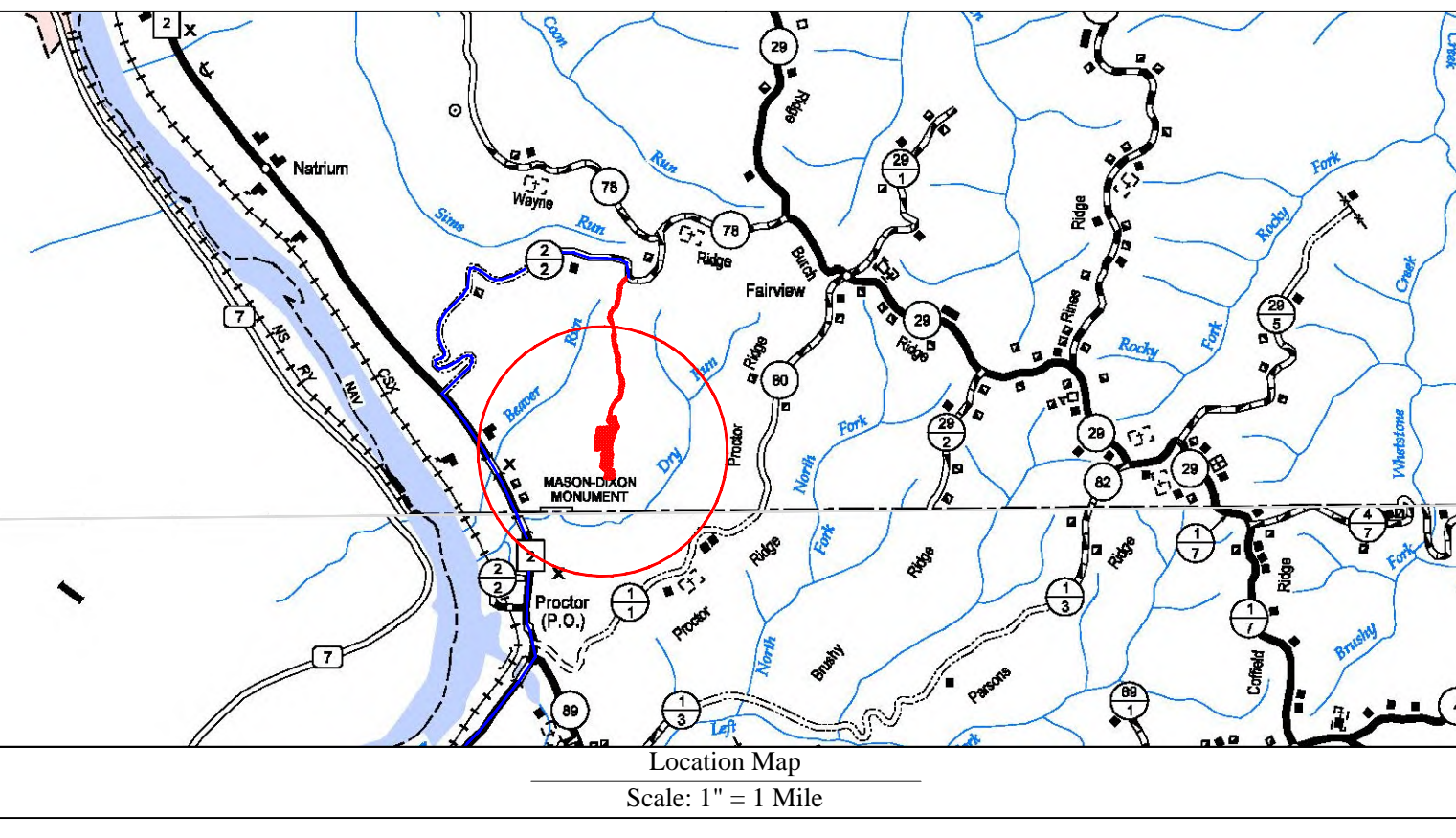
- *250' from an existing well or developed spring used for human or domestic animals.
- *625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of the pad.
- *100' from the edge of disturbance to wetlands, perennial streams, natural or artificial 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)

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.

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

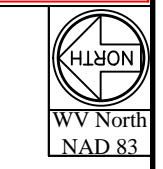
Kelly Surveying
224 S. Main St.
Martinsville, WV 26159
304-338-6985

Hansen Well Site
Franklin District
Marshall County, WV

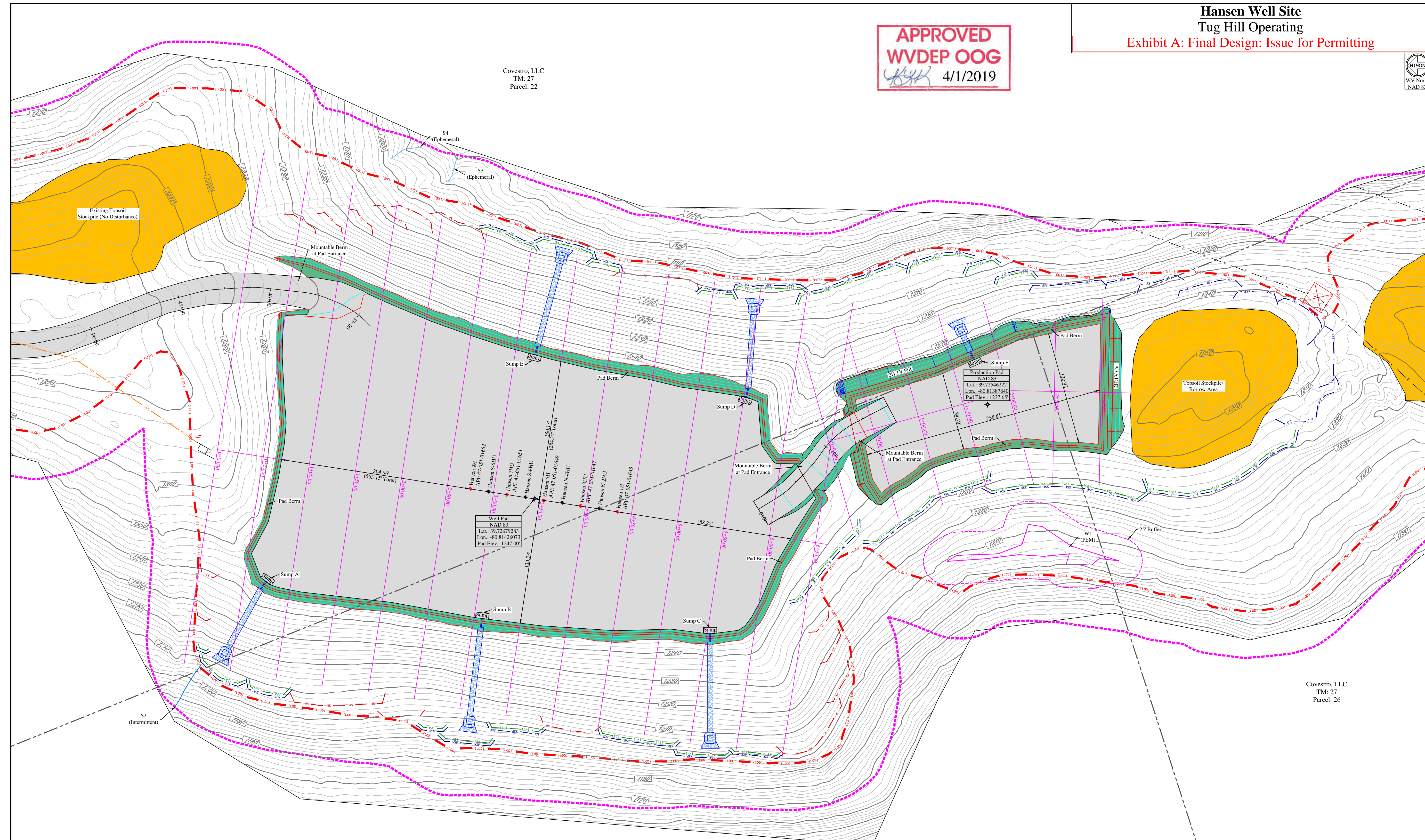
Cover Sheet

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

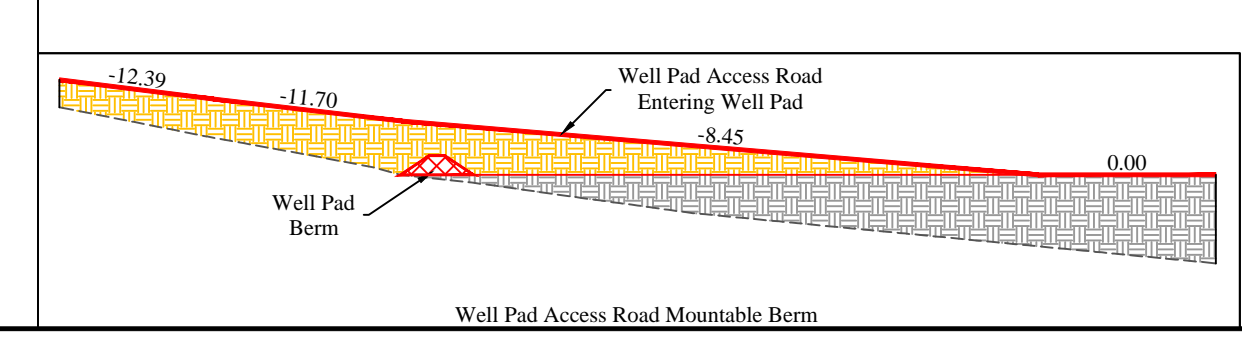
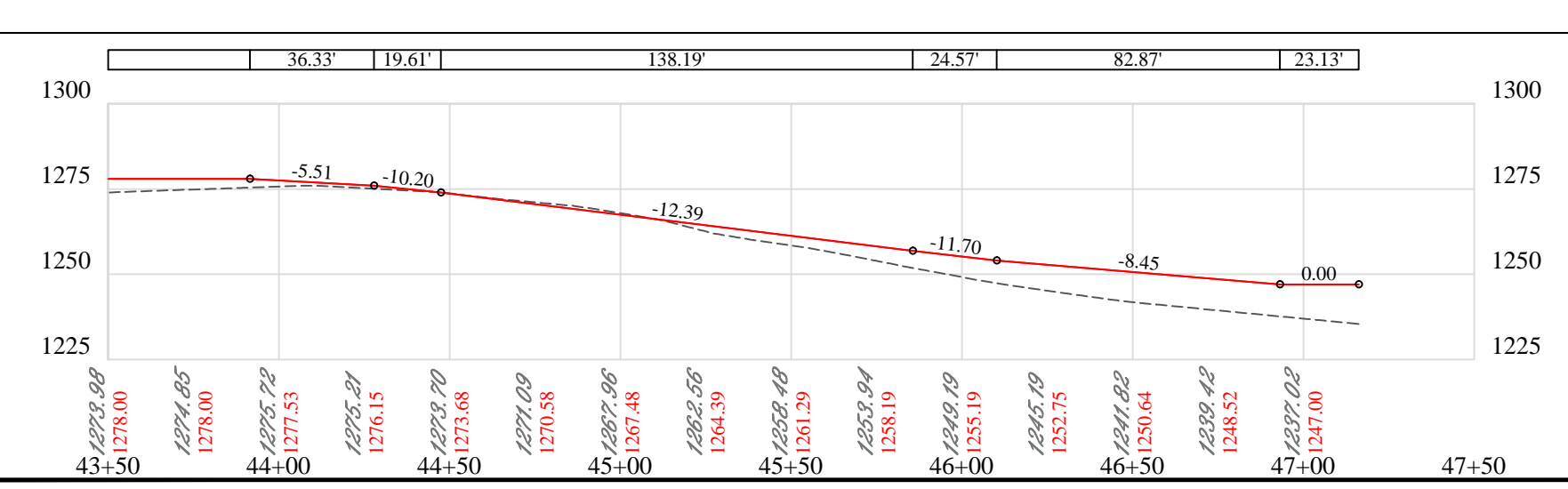


Well Pad
NAD 83
Lat.: -80.81426073
Lon.: -80.81387640
Pad Elev.: 1247.00'

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

Covestro, LLC
TM: 27
Parcel: 26

Covestro, LLC
TM: 27
Parcel: 21



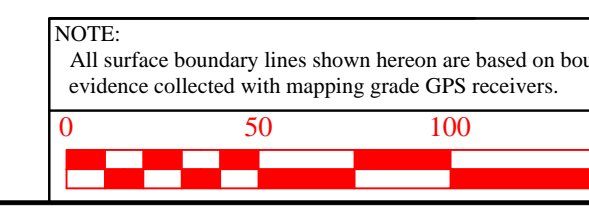
Access Road			
Surface Owner	TM - Parcel	Road Length	Type
Covestro, LLC	28-9	1,065.55'	Access Road
Covestro, LLC	28-8	966.56'	Access Road
Covestro, LLC	27-22	2,684.23'	Access Road
Covestro, LLC	27-21	1,803.88'	Access Road

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.

Revision	Date
Design	01-20-2019



THIS DOCUMENT
PREPARED FOR
TUG HILL
OPERATING



Hansen Well Site
Franklin District
Marshall County, WV