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west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Tuesday, March 17, 2020  
WELL WORK PERMIT  
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC  
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for HANSEN N-2HU  
47-051-02174-00-00

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

Operator's Well Number: HANSEN N-2HU  
Farm Name: COVESTRO LLC  
U.S. WELL NUMBER: 47-051-02174-00-00  
Horizontal 6A New Drill  
Date Issued: 3/17/2020

# 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

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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](mailto:DEPOOGNotify@wv.gov).



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west virginia department of environmental protection

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Oil and Gas Conservation Commission  
601 57<sup>th</sup> 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 #47-051-02174

COMPANY: Tug Hill Operating, LLC

FARM: Covestro, LLC Hansen N-2HU

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 with the exception of the toe which is 10 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

Hansen N-4HU 47-051-02175, 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

WW-6B  
(04/15)

**4705102174**  
API NO. 47-051 - \_\_\_\_\_  
OPERATOR WELL NO. Hansen N-2HU  
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 New Martinsville 7  
Operator ID County District Quadrangle

2) Operator's Well Number: Hansen N-2HU 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: 1,247' Elevation, proposed post-construction: 1,247'

5) Well Type (a) Gas X Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_  
Other \_\_\_\_\_

(b) If Gas Shallow \_\_\_\_\_ Deep X  
Horizontal X

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 11,113' - 11,232' thickness of 119' and anticipated pressure of approx. 9,500 psi

8) Proposed Total Vertical Depth: 11,382'

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

10) Proposed Total Measured Depth: 24,243'

11) Proposed Horizontal Leg Length: 12,656.32'

12) Approximate Fresh Water Strata Depths: 848'

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: 1,740'

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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*Ju*  
*2/4/2020*

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   | 106.5#                 | 940'                       | 940'                         | 1,523FT^(CTS)                 |
| Coal         | 13 3/8"   | NEW         | J55   | 54.5#                  | 2,700'                     | 2,700'                       | 1,905FT^(CTS)                 |
| Intermediate | 9 5/8"    | NEW         | J55   | 47#                    | 10,050'                    | 10,050'                      | 3,281FT^(CTS)                 |
| Production   | 5 1/2"    | NEW         | HP110 | 23#                    | 24,243'                    | 24,243'                      | 5,724FT^(CTS)                 |
| Tubing       | 2 7/8"    | NEW         | P110  | 6.5#                   |                            | 11,081'                      |                               |
| Liners       |           |             |       |                        |                            |                              |                               |

*Handwritten signature*  
6/28/19

| 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      | 1.18                     |
| Tubing       | 2 7/8"    |                        |                     | 14,530               | 11,624                                   |             |                          |
| Liners       |           |                        |                     |                      |  |             |                          |

PACKERS

|             |     |  |  |   |
|-------------|-----|--|--|---|
| Kind:       | N/A |  |  | RECEIVED<br>Office of Oil and Gas<br>AUG - 9 2019<br>WV Department of<br>Environmental Protection |
| Sizes:      | N/A |  |  |   |
| Depths Set: | N/A |  |  |   |

4705102174

WW-6B  
(10/14)

API NO. 47-051 -  
OPERATOR WELL NO. Hansen N-2HU  
Well Pad Name: Hansen

*JW*  
*2/4/2020*

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

Drill through the Point Pleasant and TD Pilot Hole 150' into the Trenton. Log vertical section and run a solid cement plug back to proposed KOP (10,581'). 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 31,635,000 lb proppant and 490,530 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 will have 1 centralizer every other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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

\*See Attachment

25) Proposed borehole conditioning procedures:

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

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\*Note: Attach additional sheets as needed.



4705102174

WELL NAME: Hansen N-2HU COUNTY: Marshall  
 STATE: WV DISTRICT: Franklin  
 DF Elev: 1,247' GL Elev: 1,247'  
 TD: 24,243'  
 TH Latitude: 39.7256025  
 TH Longitude: -80.81429514  
 BH Latitude: 39.758163  
 BH Longitude: -80.8845574

CASING SUMMARY

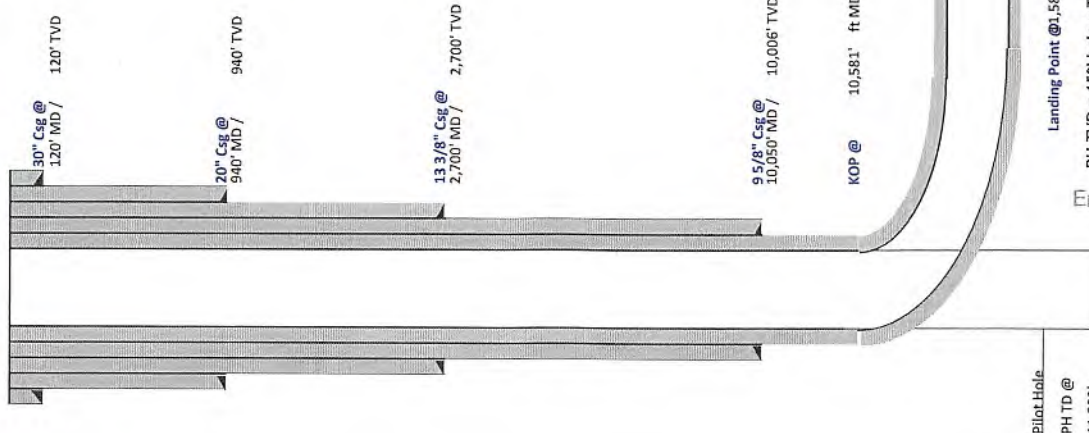
| Type           | Hole Size (in) | Csg Size (in) | Depth (MD) | Depth (TVD) | Weight (lb/ft) | Grade  | Top of Cement |
|----------------|----------------|---------------|------------|-------------|----------------|--------|---------------|
| Conductor      | 36             | 30            | 120'       | 120'        | BW             | BW     | Surface       |
| Surface        | 26             | 20            | 940'       | 940'        | 106.5          | J55    | Surface       |
| Intermediate 1 | 17 1/2         | 13 3/8        | 2,700'     | 2,700'      | 54.5           | J55    | Surface       |
| Intermediate 2 | 12 1/4         | 9 5/8         | 10,050'    | 10,006'     | 47             | HPP110 | Surface       |
| Production     | 8 1/2          | 5 1/2         | 24,243'    | 10,942'     | 23             | HCP110 | Surface       |

CEMENT SUMMARY

| Sacks | Class | Density | Fluid Type  | Centralizer Notes  |
|-------|-------|---------|-------------|--|
| 338   | A     | 15.6    | Air         | None   |
| 1,642 | A     | 15.6    | Air         | 3 Centralizers at equal distance   |
| 2,064 | A     | 15      | Air         | 1 Centralizer every other jt   |
| 2,787 | A     | 14.5    | Air         | 1 Centralizer every other jt   |
| 5,088 | A     | 15      | Air / SOBMM | 1 every other joint in lateral; 1 per joint in curve;<br>1 every other jt to sfc |

FORMATION TOPS

| Formation           | Depth TVD |
|---------------------|-----------|
| Deepest Fresh Water | 848'      |
| Sewickley Coal      | 758'      |
| Pittsburgh Coal     | 843'      |
| Big Lime            | 2,028'    |
| Berea               | 2,571'    |
| Tully               | 6,423'    |
| Marcellus           | 6,482'    |
| Onondaga            | 6,534'    |
| Salina              | 7,185'    |
| Lockport            | 8,207'    |
| Utica               | 10,860'   |
| Point Pleasant      | 11,113'   |
| Landing Depth       | 11,163'   |
| Trenton             | 11,232'   |
| Pilot Hole TD       | 11,382'   |



*Handwritten signature and date: 6/28/19*

Pilot Hole PH TD @ 11,382'

Landing Point @ 11,163' MD / 11,163' TVD

PH TVD = 150' below Trenton Top

Lateral TD @ 24,243' ft MD  
10,942' ft TVD

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4705102174



**Tug Hill Operating, LLC Casing and Cement Program**

**Hansen N-2HU**

**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"  | 2,700'           | CTS            |
| Intermediate 2 | 9 5/8"  | HPP110 | 12 1/4"  | 10,050'          | CTS            |
| Production     | 5 1/2"  | HCP110 | 8 1/2"   | 24,243'          | 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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## 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](mailto: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

4705102174

Permit well - Hansen 1N-2HU

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<br>4705101646               | Tug Hill Operating<br>Gastar Exploration                         | 6522' TVD,<br>12308 MD                         | Marcellus<br>Shale | None                           | No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.   | Marcellus Horizontal Well,<br>Producing<br>Cancelled Location  |
| 4705101647<br>4705101648               | Tug Hill Operating<br>(Gastar Exploration)<br>Gastar Exploration | 6,067' TVD,<br>6,409 TMD,<br>Top holed<br>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<br>Cancelled Location |
| 4705101649<br>4705101650<br>4705101651 | Tug Hill Operating<br>Gastar Exploration<br>Gastar Exploration   | 6532' TVD,<br>12178 MD                         | Marcellus<br>Shale | None                           | No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.   | Marcellus Horizontal Well,<br>Producing<br>Cancelled Location<br>Cancelled Location                                  |
| 4705101652<br>4705101653               | Tug Hill Operating<br>Gastar Exploration                         | 6532' TVD,<br>12178 MD                         | Marcellus<br>Shale | None                           | No, the well is not deep enough to be within the expected fracture propagation from a Point Pleasant stimulation.   | Marcellus Horizontal Well,<br>Producing<br>Cancelled Location  |
| 4705101654                             | Tug Hill Operating<br>(Gastar Exploration)                       | 5760' TVD,<br>top holed<br>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  |
| 4705170797                             | Unknown  | Unknown  | Unknown            | Unknown                        | Unknown but unlikely,<br>Appears to be old shallow hole well  | Old well, records are incomplete   |
| 4705170369                             | Unknown  | Unknown  | Unknown            | Unknown                        | Unknown but unlikely,<br>Appears to be old shallow hole well  | Old well, records are incomplete   |

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 West Virginia Department of Environmental Protection

4705102174

WV Geological & Economic Survey

Well: County = 51 Permit = 01645

Location Information: View Map
API COUNTY PERMIT TAX DISTRICT QUAD\_75 QUAD\_75 LAY\_CD LON\_CD UTMN UTMW

Bottom Hole Location Information:
API EP FLAG UTMN UTMW LON\_CD LAY\_CD
4705101845 1 A4 Dries 416204 416204 -50 502029 32 702747

Owner Information:

API CMP\_DT SURF STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_CAT COMPLETION PROP\_VD PROP\_TRTY\_FM TFM\_EST\_FRT

Completion Information:

API CMP\_DT SPUG\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FWT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMO NEW\_PTD ROD O\_BEFF O\_AFT O\_BEFF O\_AFT NGL\_BEFF NGL\_AFT P\_BEFF TCB

Pay/Show/Water Information:

API CMP\_DT ACTIVITY PRODUCT SECTION DEPTH\_TOP FM\_TOP DEPTH\_BOT FM\_BOT O\_BEFF O\_AFT O\_BEFF O\_AFT WATER\_UNITS

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

WV Geological & Economic Survey

Well: County = 51 Permit = 01646

Location Information: View Map
API COUNTY PERMIT TAX DISTRICT QUAD\_75 QUAD\_75 LAY\_CD LON\_CD UTMN UTMW

Bottom Hole Location Information:
API EP FLAG UTMN UTMW LON\_CD LAY\_CD

Owner Information:

API CMP\_DT SURF STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_CAT COMPLETION PROP\_VD PROP\_TRTY\_FM TFM\_EST\_FRT

Completion Information:

API CMP\_DT SPUG\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FWT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMO NEW\_PTD ROD O\_BEFF O\_AFT O\_BEFF O\_AFT NGL\_BEFF NGL\_AFT P\_BEFF TCB

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 = 01647

Location Information: View Map
API COUNTY PERMIT TAX DISTRICT QUAD\_75 QUAD\_75 LAY\_CD LON\_CD UTMN UTMW

Bottom Hole Location Information:
API EP FLAG UTMN UTMW LON\_CD LAY\_CD

Owner Information:

API CMP\_DT SURF STATUS SURFACE\_OWNER WELL\_NUM CO\_NUM LEASE LEASE\_NUM MINERAL\_OWN OPERATOR\_CAT COMPLETION PROP\_VD PROP\_TRTY\_FM TFM\_EST\_FRT

Completion Information:

API CMP\_DT SPUG\_DT ELEV DATUM FIELD DEEPEST\_FM DEEPEST\_FWT INITIAL\_CLASS FINAL\_CLASS TYPE RIG CMP\_MTHD TVD TMO NEW\_PTD ROD O\_BEFF O\_AFT O\_BEFF O\_AFT NGL\_BEFF NGL\_AFT P\_BEFF TCB

Pay/Show/Water Information:

API CMP\_DT ACTIVITY PRODUCT SECTION DEPTH\_TOP FM\_TOP DEPTH\_BOT FM\_BOT O\_BEFF O\_AFT O\_BEFF O\_AFT WATER\_UNITS

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

API PRODUCTION\_OPERATOR PRD\_YEAR ANN\_WYR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Stratigraphy Information:

API SURF FM FM QUALITY DEPTH\_TOP DEPTH\_QUALITY THICKNESS THICKNESS\_QUALITY ELEV DATUM

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

There is no Plugging data for this well

There is no Sample data for this well



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

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX DISTRICT | QUAD_75         | QUAD_15         | LAY_CD    | LON_CD    | UTME     | UTSN      |
|------------|----------|--------|--------------|-----------------|-----------------|-----------|-----------|----------|-----------|
| 4725101448 | Marshall | 1448   | Franklin     | New-Marcusville | New-Marcusville | 32-726719 | 30-814273 | 210217.3 | 4397448.1 |

Bottom Hole Location Information:

| API        | EP FLAG | UTME                 | LON_CD    | LAY_CD    |
|------------|---------|----------------------|-----------|-----------|
| 4725101448 | 1       | As Proposed 414919.7 | 30-814273 | 32-726719 |

Owner Information:

| API        | CMP_ID | SUFFIX | STATUS    | SURFACE_OWNER                 | WELL_NUM | CO_NUM | LEASE    | LEASE_NUM                   | MINERAL_OWN                          | OPERATOR_AT_COMPLETION            | PROP_VD | PROP_TYD_FM  | TYM_EST_FM |
|------------|--------|--------|-----------|-------------------------------|----------|--------|----------|-----------------------------|--------------------------------------|-----------------------------------|---------|--------------|------------|
| 4725101448 | 000    |        | Cancelled | Barco, Vintona & Scoville LLC | 481      |        | Marshall | WV16-0069-000/WV16-0127-001 | Barco, Vintona & Scoville LLC et al. | Operator: Eurologistics USA, Inc. | 5425    | Marcellus Fm | 3000       |

Completion Information:

| API        | CMP_ID | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM   | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FIG | ROD | O_BEF | O_AFT | O_BEF | O_AFT | NGL_BEF | NGL_AFT | P_BEF | TLS |
|------------|--------|---------|------------|-------|--------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-----|-------|-------|-------|-------|---------|---------|-------|-----|
| 4725101448 | 000    |         | 000        | 1245  | Marcellus Fm |             |               |             |      |     |          |     |     |         |     |       |       |       |       |         |         |       |     |

Comment: --?-- Additional Lease Numbers: WV16-0076-001/WV16-0099-000

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 = 01648

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX DISTRICT | QUAD_75         | QUAD_15         | LAY_CD    | LON_CD    | UTME     | UTSN      |
|------------|----------|--------|--------------|-----------------|-----------------|-----------|-----------|----------|-----------|
| 4725101448 | Marshall | 1448   | Franklin     | New-Marcusville | New-Marcusville | 32-726719 | 30-814273 | 210217.3 | 4397448.1 |

Bottom Hole Location Information:

| API        | EP FLAG | UTME                 | LON_CD    | LAY_CD    |
|------------|---------|----------------------|-----------|-----------|
| 4725101448 | 1       | As Proposed 414919.7 | 30-814273 | 32-726719 |

Owner Information:

| API        | CMP_ID | SUFFIX | STATUS    | SURFACE_OWNER                 | WELL_NUM | CO_NUM | LEASE    | LEASE_NUM                   | MINERAL_OWN                          | OPERATOR_AT_COMPLETION            | PROP_VD | PROP_TYD_FM  | TYM_EST_FM |
|------------|--------|--------|-----------|-------------------------------|----------|--------|----------|-----------------------------|--------------------------------------|-----------------------------------|---------|--------------|------------|
| 4725101448 | 414    | 2014   | Cancelled | Barco, Vintona & Scoville LLC | 481      |        | Marshall | WV16-0069-000/WV16-0127-001 | Barco, Vintona & Scoville LLC et al. | Operator: Eurologistics USA, Inc. | 5425    | Marcellus Fm | 3000       |

Completion Information:

| API        | CMP_ID | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM   | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FIG | ROD | O_BEF | O_AFT | O_BEF | O_AFT | NGL_BEF | NGL_AFT | P_BEF | TLS |
|------------|--------|---------|------------|-------|--------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-----|-------|-------|-------|-------|---------|---------|-------|-----|
| 4725101448 | 414    | 2014    | 000        | 1245  | Marcellus Fm |             |               |             |      |     |          |     |     |         |     |       |       |       |       |         |         |       |     |

Comment: 4/15/2015 Additional Lease Numbers: WV16-0076-001/WV16-0127-001, KOP 8420

Pay/Show/Water Information:

| API        | CMP_ID | ACTIVITY | PRODUCT | SECTION  | DEPTH_TOP | FM_TGP | DEPTH_BOTTOM | PHI_FOOT | O_BEF        | O_AFT | O_BEF | O_AFT | WATER_QNTY |
|------------|--------|----------|---------|----------|-----------|--------|--------------|----------|--------------|-------|-------|-------|------------|
| 4725101448 | 414    | 2015     | Water   | Vertical |           |        | 1000         |          |              |       |       |       |            |
| 4725101448 | 414    | 2015     | Water   | Vertical |           |        | 1000         |          |              |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 7127   | Marcellus Fm | 7349     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 7450   | Marcellus Fm | 7505     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 7672   | Marcellus Fm | 7774     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 7922   | Marcellus Fm | 8126     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 8178   | Marcellus Fm | 8379     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 8435   | Marcellus Fm | 8621     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 8683   | Marcellus Fm | 8911     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 8974   | Marcellus Fm | 9122     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 9282   | Marcellus Fm | 9228     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 9599   | Marcellus Fm | 9601     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 9774   | Marcellus Fm | 9923     | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 10178  | Marcellus Fm | 10279    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 10425  | Marcellus Fm | 10640    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 10704  | Marcellus Fm | 10774    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 10941  | Marcellus Fm | 11159    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 11204  | Marcellus Fm | 11422    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 11532  | Marcellus Fm | 11532    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 11803  | Marcellus Fm | 11700    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 11942  | Marcellus Fm | 11970    | Marcellus Fm |       |       |       |            |
| 4725101448 | 414    | 2015     | Pay     | O & Gas  | Deviated  | 12019  | Marcellus Fm | 12117    | Marcellus Fm |       |       |       |            |

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

| API        | PRODUCING_OPERATOR                | PRD_YEAR | ANL_GAS | JAN    | FEB    | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP    | OCT    | NOV    | DOM    |
|------------|-----------------------------------|----------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 4725101448 | Operator: Eurologistics USA, Inc. | 2014     | 18,608  | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 16,000 |
| 4725101448 | Tug Hill Operating, LLC           | 2015     | 441,114 | 60,348 | 63,441 | 82,285 | 83,405 | 82,113 | 42,464 | 40,808 | 43,030 | 46,200 | 56,742 | 48,110 | 39,219 |
| 4725101448 | Tug Hill Operating, LLC           | 2016     | 628,451 | 61,918 | 40,717 | 40,354 | 48,254 | 47,300 | 44,052 | 41,858 | 42,224 | 41,788 | 41,219 | 37,002 | 38,164 |
| 4725101448 | Tug Hill Operating, LLC           | 2017     | 383,423 | 35,897 | 31,205 | 34,809 | 32,219 | 34,240 | 31,703 | 33,485 | 33,247 | 32,803 | 30,764 | 30,707 | 32,032 |
| 4725101448 | Tug Hill Operating, LLC           | 2018     | 248,484 | 28,529 | 24,284 | 26,019 | 25,151 | 22,871 | 25,606 | 26,416 | 22,275 | 20,841 | 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 | ANL_OIL | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   | OCT   | NOV   | DOM |
|------------|-----------------------------------|----------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 4725101448 | Operator: Eurologistics USA, Inc. | 2014     | 2,048   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0   |
| 4725101448 | Tug Hill Operating, LLC           | 2015     | 37,426  | 3,111 | 1,160 | 2,654 | 2,359 | 2,742 | 2,410 | 1,649 | 1,893 | 2,000 | 1,607 | 1,424 |     |
| 4725101448 | Tug Hill Operating, LLC           | 2016     | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     |
| 4725101448 | Tug Hill Operating, LLC           | 2017     | 6,379   | 509   | 682   | 846   | 846   | 803   | 439   | 473   | 497   | 439   | 404   | 473   | 449 |
| 4725101448 | Tug Hill Operating, LLC           | 2018     | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     |

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

| API        | PRODUCING_OPERATOR                | PRD_YEAR | ANL_NGL | JAN   | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP | OCT | NOV | DOM |
|------------|-----------------------------------|----------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-----|-----|
| 4725101448 | Operator: Eurologistics USA, Inc. | 2014     | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0   | 0   | 0   | 0   |
| 4725101448 | Tug Hill Operating, LLC           | 2015     | 11,772  | 1,301 | 1,284 | 1,103 | 1,213 | 1,173 | 851   | 884   | 608   | 765 | 600 | 677 | 848 |
| 4725101448 | Tug Hill Operating, LLC           | 2016     | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0   | 0   | 0   |     |
| 4725101448 | Tug Hill Operating, LLC           | 2017     | 20,073  | 3,317 | 2,730 | 3,149 | 3,001 | 2,950 | 2,049 | 2,173 | 2,016 | 0   | 0   | 0   |     |

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

| API        | PRODUCING_OPERATOR      | PRD_YEAR | ANL_WTR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DOM |
|------------|-------------------------|----------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4725101448 | Tug Hill Operating, LLC | 2015     | 2,305   | 40  | 44  | 154 | 222 | 259 | 224 | 294 | 300 | 271 | 289 | 485 |     |
| 4725101448 | Tug Hill Operating, LLC | 2017     | 2,832   | 233 | 218 | 200 | 228 | 237 | 192 | 237 | 213 | 213 | 205 | 173 |     |
| 4725101448 | Tug Hill Operating, LLC | 2018     | 1,331   | 151 | 125 | 154 | 152 | 125 | 119 | 133 | 84  | 101 | 0   | 0   |     |



WV Geological & Economic Survey Well: County = 51 Permit = 01660

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX DISTRICT | QUAD_75         | QUAD_15         | LAY_CD    | LON_CD    | UTME     | UTSN      |
|------------|----------|--------|--------------|-----------------|-----------------|-----------|-----------|----------|-----------|
| 4725101460 | Marshall | 1460   | Franklin     | New-Marcusville | New-Marcusville | 32-726719 | 30-814273 | 210217.3 | 4397448.1 |

Bottom Hole Location Information:

| API        | EP FLAG | UTME                 | LON_CD    | LAY_CD    |
|------------|---------|----------------------|-----------|-----------|
| 4725101460 | 1       | As Proposed 414919.7 | 30-814273 | 32-726719 |

Owner Information:

| API        | CMP_ID | SUFFIX | STATUS    | SURFACE_OWNER                 | WELL_NUM | CO_NUM | LEASE    | LEASE_NUM                   | MINERAL_OWN                          | OPERATOR_AT_COMPLETION            | PROP_VD | PROP_TYD_FM  | TYM_EST_FM |
|------------|--------|--------|-----------|-------------------------------|----------|--------|----------|-----------------------------|--------------------------------------|-----------------------------------|---------|--------------|------------|
| 4725101460 | 000    |        | Cancelled | Barco, Vintona & Scoville LLC | 481      |        | Marshall | WV16-0069-000/WV16-0127-001 | Barco, Vintona & Scoville LLC et al. | Operator: Eurologistics USA, Inc. | 5425    | Marcellus Fm | 3000       |

Completion Information:

| API        | CMP_ID | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM   | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FIG | ROD | O_BEF | O_AFT | O_BEF | O_AFT | NGL_BEF | NGL_AFT | P_BEF | TLS |
|------------|--------|---------|------------|-------|--------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-----|-------|-------|-------|-------|---------|---------|-------|-----|
| 4725101460 | 000    |         | 000        | 1245  | Marcellus Fm |             |               |             |      |     |          |     |     |         |     |       |       |       |       |         |         |       |     |

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



4705102174

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

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX_DISTRICT | QUAD_75          | QUAD_15          | LAT_DD    | LONG_DD    | UTME     | UTMN      |
|------------|----------|--------|--------------|------------------|------------------|-----------|------------|----------|-----------|
| 4705101654 | Marshall | 01654  | Franklin     | New Martinsville | New Martinsville | 39 256175 | -80 511240 | 410019 E | 4307460 N |

Bottom Hole Location Information:

| API        | EP_FLAG | UTME        | UTMN               | LONG_DD   | LAT_DD   |
|------------|---------|-------------|--------------------|-----------|----------|
| 4705101654 | 1       | As Ordns    | 016418 E 4327117 S | -80 50141 | 39 25175 |
| 4705101654 | 1       | As Procegrs | 017102 E 4325227 S | -80 50041 | 39 25020 |

Owner Information:

| API        | CMP_DT | SUFFIX | STATUS | SURFACE_OWNER                 | WELL_NUM | CO_NUM | LEASE | LEASE_NUM | MINERAL_OWN | OPERATOR_AT_COMPLETION        | PROP_VO | PROP_TRGT_FM | TFM_EST_FR |
|------------|--------|--------|--------|-------------------------------|----------|--------|-------|-----------|-------------|-------------------------------|---------|--------------|------------|
| 4705101654 | ...    | ...    | ...    | Bay State Energy Services LLC | 74       | ...    | ...   | ...       | ...         | Bay State Energy Services LLC | ...     | ...          | ...        |

Completion Information:

| API        | CMP_DT | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FTO | G_BEF | O_AFT | O_BI |
|------------|--------|---------|------------|-------|------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-------|-------|------|
| 4705101654 | ...    | ...     | ...        | ...   | ...        | ...         | ...           | ...         | ...  | ... | ...      | ... | ... | ...     | ...   | ...   | ...  |

Comment: -#- Additional Lease Numbers WV16-0078-001WV16-0127-001

Pay/Show/Water Information:

| API        | CMP_DT | ACTIVITY | PRODUCT | SECTION | DEPTH_TOP | FM_TOP | DEPTH_BOT | FM_BOT | O_BEF | O_AFT | O_BI | WATER_QNTY |
|------------|--------|----------|---------|---------|-----------|--------|-----------|--------|-------|-------|------|------------|
| 4705101654 | ...    | ...      | ...     | ...     | ...       | ...    | ...       | ...    | ...   | ...   | ...  | ...        |

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 |
|------------|------------------------|----------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4705101654 | Tug Hill Operating LLC | 2017     | 0       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 4705101654 | 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 |
|------------|------------------------|----------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4705101654 | Tug Hill Operating LLC | 2017     | 0       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 4705101654 | 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 |
|------------|------------------------|----------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4705101654 | Tug Hill Operating LLC | 2017     | 0       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 4705101654 | 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 |
|------------|------------------------|----------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4705101654 | Tug Hill Operating LLC | 2017     | 0       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 4705101654 | Tug Hill Operating LLC | 2018     | 0       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |

Stratigraphy Information:

| API        | SUFFIX         | SI                | THICKNESS | QUALITY    | DEPTH_TOP | DEPTH_BOTTOM | THICKNESS | THICKNESS | QUALITY | ELEV DATUM |
|------------|----------------|-------------------|-----------|------------|-----------|--------------|-----------|-----------|---------|------------|
| 4705101654 | Divd Crign Lec | Sereesky coal     | 787       | Reasonable | 1219      | 1245         | 26        | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Franklin coal     | 822       | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Marion            | 1007      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Big Lime          | 2027      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Big Top (Produce) | 2258      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Waver             | 2395      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Sereesky Sa       | 2559      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Green             | 2640      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Frnk              | 2650      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Sereesky          | 2840      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Marion            | 4923      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |
| 4705101654 | Divd Crign Lec | Marion            | 7252      | Reasonable | 1245      | 1245         | 0         | ...       | ...     | 1245       |

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

WVGES Pipeline

Select County: (051) Marshall Select datatypes:  (Check All)

Enter Permit #: 70797

Location  Production  Plugging

Owner/Completion  Stratigraphy  Sample

Pay/Show/Water  Logs  Bottom Hole Log

Get Data Reset

Link Descriptions  
County Code Translations  
Permit/Lease/Well Series  
Block Logs  
Geological Information  
Welllogs  
WVGES Map  
Production Data: New

WV Geological & Economic Survey Well: County = 51 Permit = 70797

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX_DISTRICT | QUAD_75          | QUAD_15          | LAT_DD    | LONG_DD    | UTME     | UTMN      |
|------------|----------|--------|--------------|------------------|------------------|-----------|------------|----------|-----------|
| 4705107097 | Marshall | 70797  | Franklin     | New Martinsville | New Martinsville | 39 251578 | -80 522857 | 214877 E | 4400243 N |

There is no Bottom Hole Location data for this well

Owner Information:

| API        | CMP_DT | SUFFIX | STATUS | SURFACE_OWNER                    | WELL_NUM | CO_NUM | LEASE | LEASE_NUM | MINERAL_OWN | OPERATOR_AT_COMPLETION | PROP_VO | PROP_TRGT_FM | TFM_EST_FR |
|------------|--------|--------|--------|----------------------------------|----------|--------|-------|-----------|-------------|------------------------|---------|--------------|------------|
| 4705107097 | ...    | ...    | ...    | Uniontown Prody Map, C E Bassett | ...      | ...    | ...   | ...       | ...         | Uniontown              | ...     | ...          | ...        |

Completion Information:

| API        | CMP_DT | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FTO | G_BEF | O_AFT | O_BI |
|------------|--------|---------|------------|-------|------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-------|-------|------|
| 4705107097 | ...    | ...     | ...        | ...   | ...        | ...         | ...           | ...         | ...  | ... | ...      | ... | ... | ...     | ...   | ...   | ...  |

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 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

WVGES Pipeline

Select County: (051) Marshall Select datatypes:  (Check All)

Enter Permit #: 70369

Location  Production  Plugging

Owner/Completion  Stratigraphy  Sample

Pay/Show/Water  Logs  Bottom Hole Log

Get Data Reset

Link Descriptions  
County Code Translations  
Permit/Lease/Well Series  
Block Logs  
Geological Information  
Welllogs  
WVGES Map  
Production Data: New

WV Geological & Economic Survey Well: County = 51 Permit = 70369

Location Information: [View Map](#)

| API        | COUNTY   | PERMIT | TAX_DISTRICT | QUAD_75          | QUAD_15          | LAT_DD   | LONG_DD    | UTME     | UTMN      |
|------------|----------|--------|--------------|------------------|------------------|----------|------------|----------|-----------|
| 4728170369 | Marshall | 70369  | Franklin     | New Martinsville | New Martinsville | 39 74252 | -80 521855 | 516260 E | 4292228 N |

There is no Bottom Hole Location data for this well

Owner Information:

| API        | CMP_DT | SUFFIX | STATUS | SURFACE_OWNER                    | WELL_NUM | CO_NUM | LEASE | LEASE_NUM | MINERAL_OWN | OPERATOR_AT_COMPLETION | PROP_VO | PROP_TRGT_FM | TFM_EST_FR |
|------------|--------|--------|--------|----------------------------------|----------|--------|-------|-----------|-------------|------------------------|---------|--------------|------------|
| 4728170369 | ...    | ...    | ...    | Uniontown Prody Map, Coburn Sims | ...      | ...    | ...   | ...       | ...         | Uniontown              | ...     | ...          | ...        |

Completion Information:

| API        | CMP_DT | SPUD_DT | ELEV DATUM | FIELD | DEEPEST_FM | DEEPEST_FMT | INITIAL_CLASS | FINAL_CLASS | TYPE | RIG | CMP_MTHD | TVD | TMD | NEW_FTO | G_BEF | O_AFT | O_BI |
|------------|--------|---------|------------|-------|------------|-------------|---------------|-------------|------|-----|----------|-----|-----|---------|-------|-------|------|
| 4728170369 | ...    | ...     | ...        | ...   | ...        | ...         | ...           | ...         | ...  | ... | ...      | ... | ... | ...     | ...   | ...   | ...  |

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 Stratigraphy data for this well

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

There is no Plugging data for this well

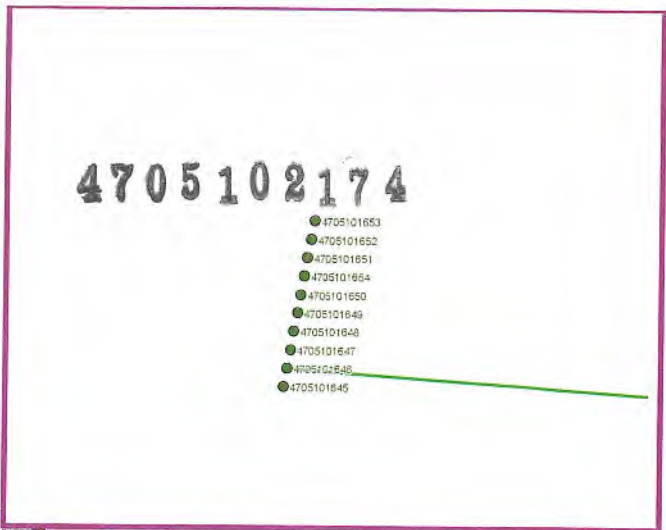
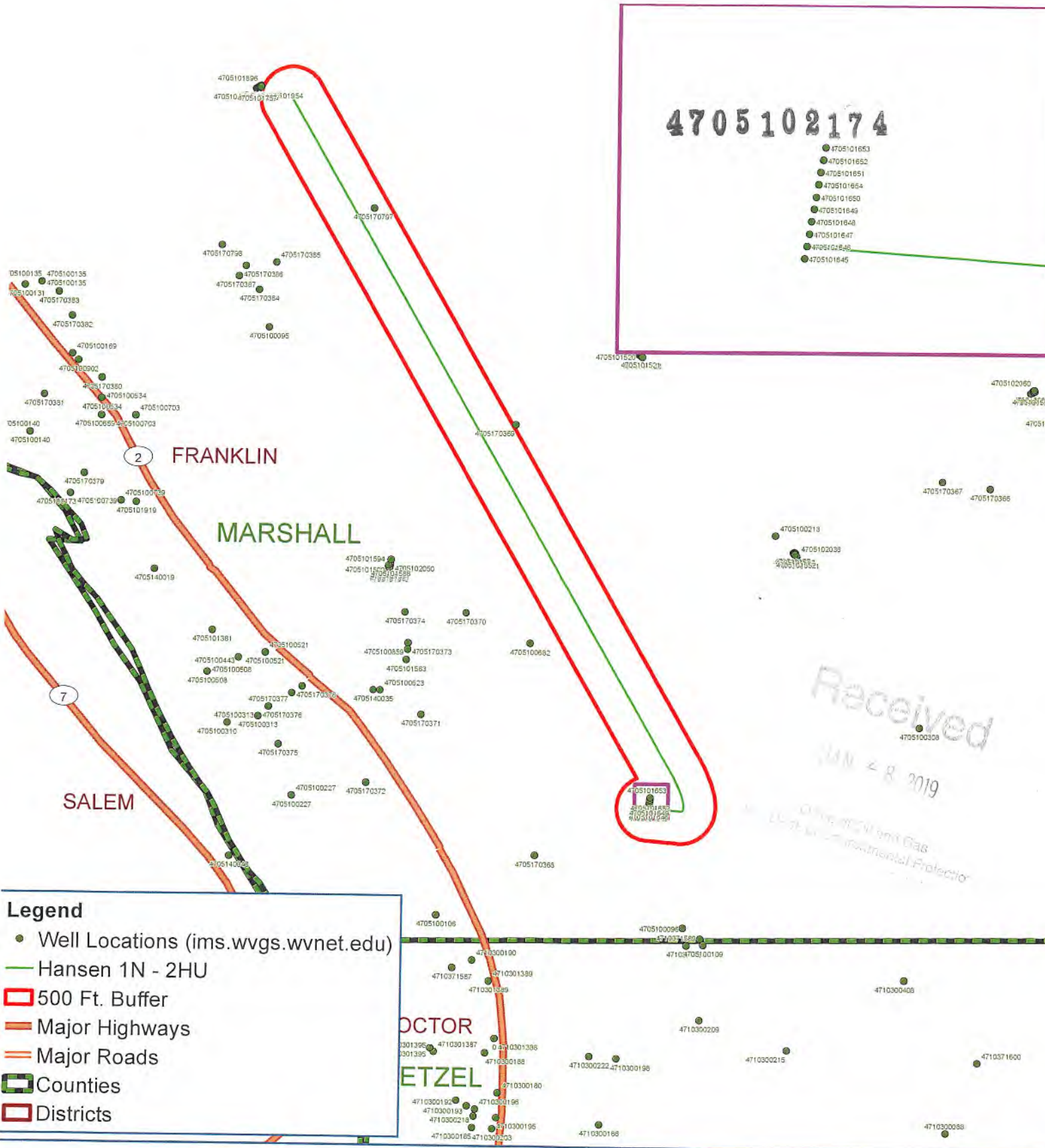
There is no Sample data for this well

Received

JAN 4 8 2019

Office of Oil and Gas  
WV Dept of Environmental Protection





Hansen 1N - 2HU  
 Franklin District  
 Marshall County, WV



Well: Hansen 1N-2HU (F)  
 Site: Hansen  
 Project: Wetzel County, West Virginia (UTM17 NAD83)  
 Design: rev4



SECTION DETAILS

| Sec | MD       | Inc   | Azi    | TVD      | +N-S      | +E-W     | Dleg  | TFace   | Vsect   | Annotation                      |
|-----|----------|-------|--------|----------|-----------|----------|-------|---------|---------|---------------------------------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00     | 0.00      | 0.00     | 0.00  | 0.00    | 0.00    |                                 |
| 2   | 8500.00  | 0.00  | 0.00   | 8500.00  | 0.00      | 0.00     | 0.00  | 0.00    | 0.00    | KOP Begin 2°/100' build         |
| 3   | 8361.31  | 17.23 | 95.17  | 9348.40  | -11.58    | 127.98   | 2.00  | 95.171  | -69.58  | Begin 17.23° tangent            |
| 4   | 10580.98 | 17.23 | 95.17  | 10513.35 | -44.14    | 487.71   | 0.00  | 0.000   | -265.15 | Begin 10°/100' build/turn       |
| 5   | 11589.20 | 91.00 | 329.88 | 11163.02 | 536.58    | 344.43   | 10.00 | 123.811 | 315.84  | Begin 91.00° lateral            |
| 6   | 24243.17 | 91.00 | 329.88 | 10942.00 | -11480.29 | -6004.53 | 0.00  | 0.000   | 2955.75 | PBHLTD 24243.17 MD/10942.00 TVD |

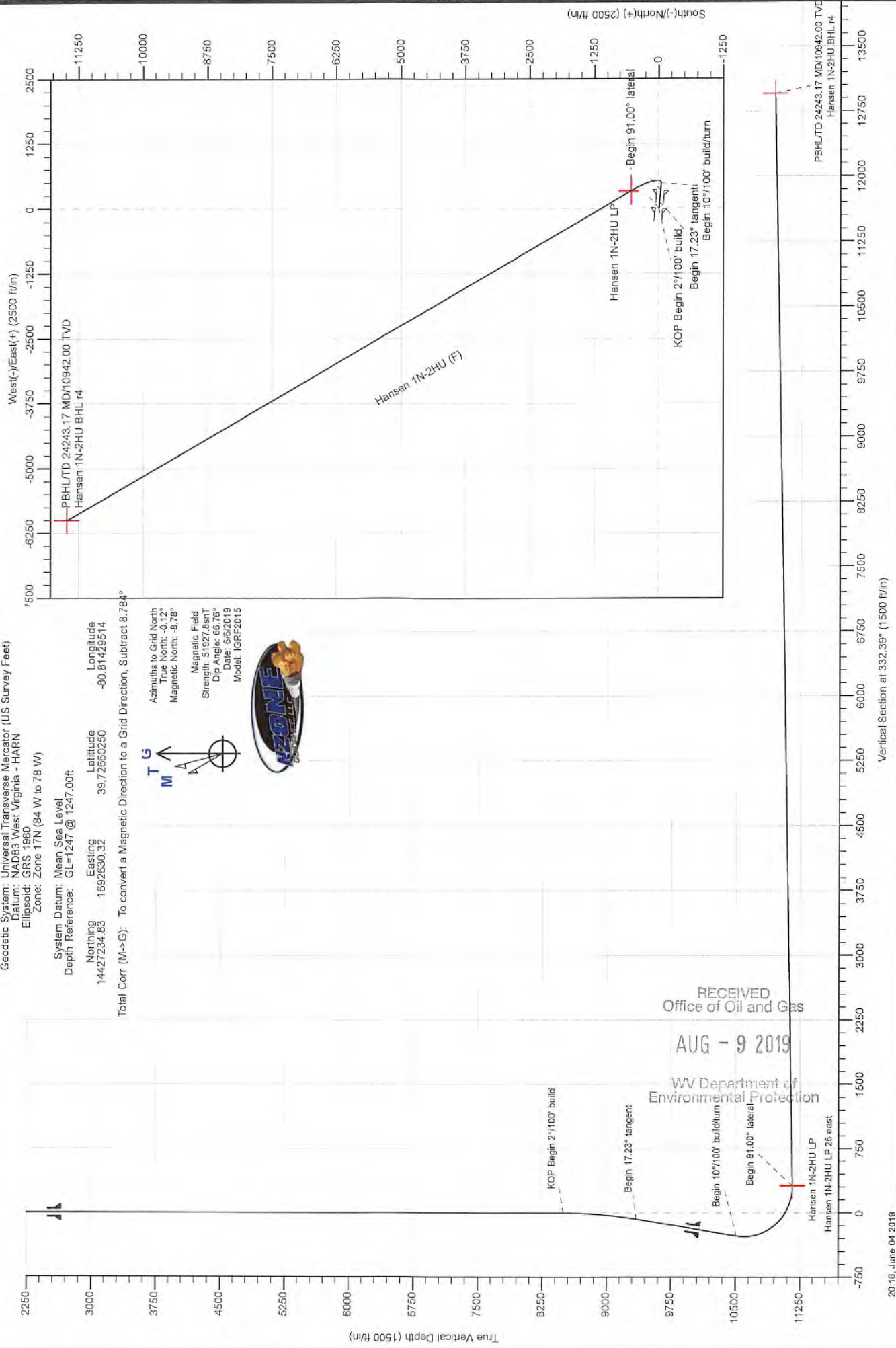
Geodetic System: Universal Transverse Mercator (US Survey Feet)  
 Datum: NAD83 West Virginia - HARN  
 Ellipsoid: GRS 1980  
 Zone: Zone 17N (84 W to 78 W)

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

Northing: 14427234.83  
 Easting: 1692630.32  
 Latitude: 39.72660250  
 Longitude: -80.81429514

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.784°

Azimuths to Grid North  
 True North: -0.12°  
 Magnetic North: -8.78°  
 Magnetic Field  
 Strength: 51927.8nT  
 Dip Angle: 66.76°  
 Date: 6/6/2019  
 Model: IGRF2015



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 WV Department of  
 Environmental Protection



Planning Report - Geographic

4705102174

|           |  |                              |                        |
|-----------|--|------------------------------|------------------------|
| Database: | DB_Jul2216dt_v14                           | Local Co-ordinate Reference: | Well Hansen 1N-2HU (F) |
| Company:  | Tug Hill Operating LLC                     | TVD Reference:               | GL=1247 @ 1247.00ft    |
| Project:  | Wetzel County, West Virginia (UTM17 NAD83) | MD Reference:                | GL=1247 @ 1247.00ft    |
| Site:     | Hansen                                     | North Reference:             | Grid                   |
| Well:     | Hansen 1N-2HU (F)                          | Survey Calculation Method:   | Minimum Curvature      |
| Wellbore: | Original Hole                              |                              |                        |
| Design:   | rev4                                       |                              |                        |

|             |  |               |                |
|-------------|--|---------------|----------------|
| Project     | Wetzel County, West Virginia (UTM17 NAD83)     |               |                |
| Map System: | Universal Transverse Mercator (US Survey Feet) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD83 West Virginia - HARN                     |               |                |
| Map Zone:   | Zone 17N (84 W to 78 W)                        |               |                |

|                       |          |              |                    |                   |              |
|-----------------------|----------|--------------|--------------------|-------------------|--------------|
| Site                  | Hansen   |              |                    |                   |              |
| Site Position:        |          | Northing:    | 14,427,333.87 usft | Latitude:         | 39.72687441  |
| From:                 | Lat/Long | Easting:     | 1,692,643.93 usft  | Longitude:        | -80.81424599 |
| Position Uncertainty: | 0.00 ft  | Slot Radius: | 13-3/16 "          | Grid Convergence: | 0.119 °      |

|                      |                   |         |                     |                    |               |              |
|----------------------|-------------------|---------|---------------------|--------------------|---------------|--------------|
| Well                 | Hansen 1N-2HU (F) |         |                     |                    |               |              |
| Well Position        | +N/-S             | 0.00 ft | Northing:           | 14,427,234.83 usft | Latitude:     | 39.72660250  |
|                      | +E/-W             | 0.00 ft | Easting:            | 1,692,630.32 usft  | Longitude:    | -80.81429514 |
| Position Uncertainty |                   | 0.00 ft | Wellhead Elevation: | 0.00 ft            | Ground Level: | 1,247.00 ft  |

|           |               |             |                 |               |                     |
|-----------|---------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | Original Hole |             |                 |               |                     |
| Magnetics | Model Name    | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | IGRF2015      | 6/6/2019    | -8.666          | 66.759        | 51,927.82042532     |

|                   |                       |            |               |               |
|-------------------|-----------------------|------------|---------------|---------------|
| Design            | rev4                  |            |               |               |
| Audit Notes:      |                       |            |               |               |
| Version:          | Phase:                | PLAN       | Tie On Depth: | 0.00          |
| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft)    | Direction (°) |
|                   | 0.00                  | 0.00       | 0.00          | 332.39        |

|                          |               |                                |                       |   |
|--------------------------|---------------|--------------------------------|-----------------------|---|
| Plan Survey Tool Program | Date          | 6/4/2019                       |                       |   |
| Depth From (ft)          | Depth To (ft) | Survey (Wellbore)              | Tool Name             | Remarks   |
| 1                        | 0.00          | 24,243.17 rev4 (Original Hole) | MWD<br>MWD - Standard | RECEIVED<br>Office of Oil and Gas<br>AUG - 9 2019 |

|                     |   |             |                     |            |            |                       |                      |                     |          |                    |
|---------------------|---|-------------|---------------------|------------|------------|-----------------------|----------------------|---------------------|----------|--------------------|
| Plan Sections       | WV Department of Environmental Protection |             |                     |            |            |                       |                      |                     |          |                    |
| Measured Depth (ft) | Inclination (°)                           | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | TFO (°)  | Target             |
| 0.00                | 0.00                                      | 0.00        | 0.00                | 0.00       | 0.00       | 0.00                  | 0.00                 | 0.00                | 0.000    |                    |
| 8,500.00            | 0.00                                      | 0.00        | 8,500.00            | 0.00       | 0.00       | 0.00                  | 0.00                 | 0.00                | 0.000    |                    |
| 9,361.31            | 17.23                                     | 95.17       | 9,348.40            | -11.58     | 127.98     | 2.00                  | 2.00                 | 0.00                | 95.171   |                    |
| 10,580.98           | 17.23                                     | 95.17       | 10,513.35           | -44.14     | 487.71     | 0.00                  | 0.00                 | 0.00                | 0.000    |                    |
| 11,589.20           | 91.00                                     | 329.88      | 11,163.02           | 536.58     | 344.43     | 10.00                 | 7.32                 | -12.43              | -123.811 | Hansen 1N-2HU LP 2 |
| 24,243.17           | 91.00                                     | 329.88      | 10,942.00           | 11,480.29  | -6,004.53  | 0.00                  | 0.00                 | 0.00                | 0.000    | Hansen 1N-2HU BHL  |



Planning Report - Geographic

4705102174

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Wetzel County, West Virginia (UTM17 NAD83)  
 Site: Hansen  
 Well: Hansen 1N-2HU (F)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Hansen 1N-2HU (F)  
 TVD Reference: GL=1247 @ 1247.00ft  
 MD Reference: GL=1247 @ 1247.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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 AUG - 9 2019

| Planned Survey      |                 |             |                     |           |           |                     |                    |             |              | WV Department of Environmental Protection |
|---------------------|-----------------|-------------|---------------------|-----------|-----------|---------------------|--------------------|-------------|--------------|---|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N-S (ft) | +E-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |   |
| 0.00                | 0.00            | 0.00        | 0.00                | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 100.00              | 0.00            | 0.00        | 100.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 200.00              | 0.00            | 0.00        | 200.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 300.00              | 0.00            | 0.00        | 300.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 400.00              | 0.00            | 0.00        | 400.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 500.00              | 0.00            | 0.00        | 500.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 600.00              | 0.00            | 0.00        | 600.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 700.00              | 0.00            | 0.00        | 700.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 800.00              | 0.00            | 0.00        | 800.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 900.00              | 0.00            | 0.00        | 900.00              | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,000.00            | 0.00            | 0.00        | 1,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,100.00            | 0.00            | 0.00        | 1,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,200.00            | 0.00            | 0.00        | 1,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,300.00            | 0.00            | 0.00        | 1,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,400.00            | 0.00            | 0.00        | 1,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,500.00            | 0.00            | 0.00        | 1,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,600.00            | 0.00            | 0.00        | 1,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,700.00            | 0.00            | 0.00        | 1,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,800.00            | 0.00            | 0.00        | 1,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 1,900.00            | 0.00            | 0.00        | 1,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,000.00            | 0.00            | 0.00        | 2,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,100.00            | 0.00            | 0.00        | 2,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,200.00            | 0.00            | 0.00        | 2,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,300.00            | 0.00            | 0.00        | 2,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,400.00            | 0.00            | 0.00        | 2,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,500.00            | 0.00            | 0.00        | 2,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,600.00            | 0.00            | 0.00        | 2,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,700.00            | 0.00            | 0.00        | 2,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,800.00            | 0.00            | 0.00        | 2,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 2,900.00            | 0.00            | 0.00        | 2,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,000.00            | 0.00            | 0.00        | 3,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,100.00            | 0.00            | 0.00        | 3,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,200.00            | 0.00            | 0.00        | 3,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,300.00            | 0.00            | 0.00        | 3,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,400.00            | 0.00            | 0.00        | 3,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,500.00            | 0.00            | 0.00        | 3,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,600.00            | 0.00            | 0.00        | 3,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,700.00            | 0.00            | 0.00        | 3,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,800.00            | 0.00            | 0.00        | 3,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 3,900.00            | 0.00            | 0.00        | 3,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,000.00            | 0.00            | 0.00        | 4,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,100.00            | 0.00            | 0.00        | 4,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,200.00            | 0.00            | 0.00        | 4,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,300.00            | 0.00            | 0.00        | 4,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,400.00            | 0.00            | 0.00        | 4,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,500.00            | 0.00            | 0.00        | 4,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,600.00            | 0.00            | 0.00        | 4,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,700.00            | 0.00            | 0.00        | 4,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,800.00            | 0.00            | 0.00        | 4,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 4,900.00            | 0.00            | 0.00        | 4,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 5,000.00            | 0.00            | 0.00        | 5,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 5,100.00            | 0.00            | 0.00        | 5,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 5,200.00            | 0.00            | 0.00        | 5,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |
| 5,300.00            | 0.00            | 0.00        | 5,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |   |



Planning Report - Geographic

4705102174

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Wetzel County, West Virginia (UTM17 NAD83)  
 Site: Hansen  
 Well: Hansen 1N-2HU (F)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Hansen 1N-2HU (F)  
 TVD Reference: GL=1247 @ 1247.00ft  
 MD Reference: GL=1247 @ 1247.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

WV Department of  
 Environmental Protection

| Measured Depth (ft)            | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N-S (ft) | +E-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|--------------------------------|-----------------|-------------|---------------------|-----------|-----------|---------------------|--------------------|-------------|--------------|
| 5,400.00                       | 0.00            | 0.00        | 5,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 5,500.00                       | 0.00            | 0.00        | 5,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 5,600.00                       | 0.00            | 0.00        | 5,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 5,700.00                       | 0.00            | 0.00        | 5,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 5,800.00                       | 0.00            | 0.00        | 5,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 5,900.00                       | 0.00            | 0.00        | 5,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,000.00                       | 0.00            | 0.00        | 6,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,100.00                       | 0.00            | 0.00        | 6,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,200.00                       | 0.00            | 0.00        | 6,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,300.00                       | 0.00            | 0.00        | 6,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,400.00                       | 0.00            | 0.00        | 6,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,500.00                       | 0.00            | 0.00        | 6,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,600.00                       | 0.00            | 0.00        | 6,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,700.00                       | 0.00            | 0.00        | 6,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,800.00                       | 0.00            | 0.00        | 6,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 6,900.00                       | 0.00            | 0.00        | 6,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,000.00                       | 0.00            | 0.00        | 7,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,100.00                       | 0.00            | 0.00        | 7,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,200.00                       | 0.00            | 0.00        | 7,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,300.00                       | 0.00            | 0.00        | 7,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,400.00                       | 0.00            | 0.00        | 7,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,500.00                       | 0.00            | 0.00        | 7,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,600.00                       | 0.00            | 0.00        | 7,600.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,700.00                       | 0.00            | 0.00        | 7,700.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,800.00                       | 0.00            | 0.00        | 7,800.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 7,900.00                       | 0.00            | 0.00        | 7,900.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,000.00                       | 0.00            | 0.00        | 8,000.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,100.00                       | 0.00            | 0.00        | 8,100.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,200.00                       | 0.00            | 0.00        | 8,200.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,300.00                       | 0.00            | 0.00        | 8,300.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,400.00                       | 0.00            | 0.00        | 8,400.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| 8,500.00                       | 0.00            | 0.00        | 8,500.00            | 0.00      | 0.00      | 14,427,234.83       | 1,692,630.32       | 39.72660250 | -80.81429514 |
| <b>KOP Begin 2°/100' build</b> |                 |             |                     |           |           |                     |                    |             |              |
| 8,600.00                       | 2.00            | 95.17       | 8,599.98            | -0.16     | 1.74      | 14,427,234.68       | 1,692,632.06       | 39.72660206 | -80.81428896 |
| 8,700.00                       | 4.00            | 95.17       | 8,699.84            | -0.63     | 6.95      | 14,427,234.21       | 1,692,637.27       | 39.72660073 | -80.81427043 |
| 8,800.00                       | 6.00            | 95.17       | 8,799.45            | -1.41     | 15.63     | 14,427,233.42       | 1,692,645.95       | 39.72659853 | -80.81423956 |
| 8,900.00                       | 8.00            | 95.17       | 8,898.70            | -2.51     | 27.77     | 14,427,232.32       | 1,692,658.09       | 39.72659544 | -80.81419641 |
| 9,000.00                       | 10.00           | 95.17       | 8,997.47            | -3.92     | 43.35     | 14,427,230.91       | 1,692,673.66       | 39.72659148 | -80.81414101 |
| 9,100.00                       | 12.00           | 95.17       | 9,095.62            | -5.64     | 62.35     | 14,427,229.19       | 1,692,692.67       | 39.72658665 | -80.81407344 |
| 9,200.00                       | 14.00           | 95.17       | 9,193.06            | -7.67     | 84.75     | 14,427,227.16       | 1,692,715.07       | 39.72658095 | -80.81399378 |
| 9,300.00                       | 16.00           | 95.17       | 9,289.64            | -10.00    | 110.53    | 14,427,224.83       | 1,692,740.84       | 39.72657440 | -80.81390212 |
| 9,361.31                       | 17.23           | 95.17       | 9,348.40            | -11.58    | 127.98    | 14,427,223.25       | 1,692,758.30       | 39.72656996 | -80.81384004 |
| <b>Begin 17.23° tangent</b>    |                 |             |                     |           |           |                     |                    |             |              |
| 9,400.00                       | 17.23           | 95.17       | 9,385.35            | -12.62    | 139.39    | 14,427,222.22       | 1,692,769.71       | 39.72656706 | -80.81379947 |
| 9,500.00                       | 17.23           | 95.17       | 9,480.86            | -15.28    | 168.89    | 14,427,219.55       | 1,692,799.21       | 39.72655956 | -80.81369459 |
| 9,600.00                       | 17.23           | 95.17       | 9,576.38            | -17.95    | 198.38    | 14,427,216.88       | 1,692,828.70       | 39.72655206 | -80.81358971 |
| 9,700.00                       | 17.23           | 95.17       | 9,671.89            | -20.62    | 227.88    | 14,427,214.21       | 1,692,858.19       | 39.72654456 | -80.81348483 |
| 9,800.00                       | 17.23           | 95.17       | 9,767.40            | -23.29    | 257.37    | 14,427,211.54       | 1,692,887.69       | 39.72653707 | -80.81337995 |
| 9,900.00                       | 17.23           | 95.17       | 9,862.92            | -25.96    | 286.86    | 14,427,208.87       | 1,692,917.18       | 39.72652957 | -80.81327507 |
| 10,000.00                      | 17.23           | 95.17       | 9,958.43            | -28.63    | 316.36    | 14,427,206.20       | 1,692,946.68       | 39.72652207 | -80.81317019 |
| 10,100.00                      | 17.23           | 95.17       | 10,053.95           | -31.30    | 345.85    | 14,427,203.53       | 1,692,976.17       | 39.72651457 | -80.81306531 |
| 10,200.00                      | 17.23           | 95.17       | 10,149.46           | -33.97    | 375.35    | 14,427,200.86       | 1,693,005.66       | 39.72650707 | -80.81296044 |
| 10,300.00                      | 17.23           | 95.17       | 10,244.98           | -36.64    | 404.84    | 14,427,198.20       | 1,693,035.16       | 39.72649957 | -80.81285556 |



Planning Report - Geographic

|                  |  |                                     |                        |
|------------------|--|-------------------------------------|------------------------|
| <b>Database:</b> | DB_Jul2216dt_v14                           | <b>Local Co-ordinate Reference:</b> | Well Hansen 1N-2HU (F) |
| <b>Company:</b>  | Tug Hill Operating LLC                     | <b>TVD Reference:</b>               | GL=1247 @ 1247.00ft    |
| <b>Project:</b>  | Wetzel County, West Virginia (UTM17 NAD83) | <b>MD Reference:</b>                | GL=1247 @ 1247.00ft    |
| <b>Site:</b>     | Hansen                                     | <b>North Reference:</b>             | Grid                   |
| <b>Well:</b>     | Hansen 1N-2HU (F)                          | <b>Survey Calculation Method:</b>   | Minimum Curvature      |
| <b>Wellbore:</b> | Original Hole                              |                                     |                        |
| <b>Design:</b>   | rev4                                       |                                     |                        |

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| Planned Survey                   |                 |             |                     |            |            |                     |                    |             |              | WV Department of Environmental Protection |
|----------------------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|---|
| Measured Depth (ft)              | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |   |
| 10,400.00                        | 17.23           | 95.17       | 10,340.49           | -39.31     | 434.33     | 14,427,195.53       | 1,693,064.65       | 39.72649207 | -80.81275068 |   |
| 10,500.00                        | 17.23           | 95.17       | 10,436.00           | -41.98     | 463.83     | 14,427,192.86       | 1,693,094.15       | 39.72648457 | -80.81264580 |   |
| 10,580.98                        | 17.23           | 95.17       | 10,513.35           | -44.14     | 487.71     | 14,427,190.70       | 1,693,118.03       | 39.72647849 | -80.81256087 |   |
| <b>Begin 10°/100' build/turn</b> |                 |             |                     |            |            |                     |                    |             |              |   |
| 10,600.00                        | 16.24           | 89.51       | 10,531.57           | -44.37     | 493.18     | 14,427,190.46       | 1,693,123.50       | 39.72647783 | -80.81254143 |   |
| 10,700.00                        | 14.40           | 51.61       | 10,628.25           | -36.51     | 516.97     | 14,427,198.32       | 1,693,147.28       | 39.72649928 | -80.81245677 |   |
| 10,800.00                        | 18.62           | 19.04       | 10,724.30           | -13.64     | 531.95     | 14,427,221.19       | 1,693,162.27       | 39.72656199 | -80.81240329 |   |
| 10,900.00                        | 26.11           | 1.33        | 10,816.82           | 23.54      | 537.69     | 14,427,258.37       | 1,693,168.01       | 39.72666407 | -80.81238262 |   |
| 11,000.00                        | 34.82           | 351.54      | 10,902.99           | 73.90      | 533.99     | 14,427,308.74       | 1,693,164.31       | 39.72680241 | -80.81239540 |   |
| 11,100.00                        | 44.03           | 345.36      | 10,980.18           | 135.92     | 520.98     | 14,427,370.76       | 1,693,151.29       | 39.72697281 | -80.81244122 |   |
| 11,200.00                        | 53.47           | 340.97      | 11,046.06           | 207.71     | 499.04     | 14,427,442.54       | 1,693,129.36       | 39.72717008 | -80.81251871 |   |
| 11,300.00                        | 63.04           | 337.55      | 11,098.62           | 287.08     | 468.85     | 14,427,521.92       | 1,693,099.16       | 39.72738824 | -80.81262550 |   |
| 11,400.00                        | 72.68           | 334.67      | 11,136.27           | 371.63     | 431.32     | 14,427,606.47       | 1,693,061.63       | 39.72762066 | -80.81275836 |   |
| 11,500.00                        | 82.36           | 332.09      | 11,157.86           | 458.79     | 387.59     | 14,427,693.62       | 1,693,017.91       | 39.72786027 | -80.81291324 |   |
| 11,589.20                        | 91.00           | 329.88      | 11,163.02           | 536.58     | 344.43     | 14,427,771.41       | 1,692,974.75       | 39.72807414 | -80.81306615 |   |
| <b>Begin 91.00° lateral</b>      |                 |             |                     |            |            |                     |                    |             |              |   |
| 11,600.00                        | 91.00           | 329.88      | 11,162.83           | 545.92     | 339.01     | 14,427,780.75       | 1,692,969.33       | 39.72809983 | -80.81308536 |   |
| 11,700.00                        | 91.00           | 329.88      | 11,161.09           | 632.41     | 288.84     | 14,427,867.24       | 1,692,919.16       | 39.72833763 | -80.81326317 |   |
| 11,800.00                        | 91.00           | 329.88      | 11,159.34           | 718.89     | 238.66     | 14,427,953.72       | 1,692,868.98       | 39.72857543 | -80.81344099 |   |
| 11,900.00                        | 91.00           | 329.88      | 11,157.59           | 805.37     | 188.49     | 14,428,040.21       | 1,692,818.81       | 39.72881323 | -80.81361880 |   |
| 12,000.00                        | 91.00           | 329.88      | 11,155.85           | 891.86     | 138.32     | 14,428,126.69       | 1,692,768.64       | 39.72905103 | -80.81379661 |   |
| 12,100.00                        | 91.00           | 329.88      | 11,154.10           | 978.34     | 88.14      | 14,428,213.18       | 1,692,718.46       | 39.72928883 | -80.81397443 |   |
| 12,200.00                        | 91.00           | 329.88      | 11,152.35           | 1,064.83   | 37.97      | 14,428,299.66       | 1,692,668.29       | 39.72952662 | -80.81415225 |   |
| 12,300.00                        | 91.00           | 329.88      | 11,150.61           | 1,151.31   | -12.20     | 14,428,386.14       | 1,692,618.11       | 39.72976442 | -80.81433007 |   |
| 12,400.00                        | 91.00           | 329.88      | 11,148.86           | 1,237.80   | -62.38     | 14,428,472.63       | 1,692,567.94       | 39.73000222 | -80.81450789 |   |
| 12,500.00                        | 91.00           | 329.88      | 11,147.11           | 1,324.28   | -112.55    | 14,428,559.11       | 1,692,517.77       | 39.73024002 | -80.81468571 |   |
| 12,600.00                        | 91.00           | 329.88      | 11,145.37           | 1,410.76   | -162.73    | 14,428,645.60       | 1,692,467.59       | 39.73047781 | -80.81486353 |   |
| 12,700.00                        | 91.00           | 329.88      | 11,143.62           | 1,497.25   | -212.90    | 14,428,732.08       | 1,692,417.42       | 39.73071561 | -80.81504135 |   |
| 12,800.00                        | 91.00           | 329.88      | 11,141.87           | 1,583.73   | -263.07    | 14,428,818.56       | 1,692,367.25       | 39.73095341 | -80.81521918 |   |
| 12,900.00                        | 91.00           | 329.88      | 11,140.13           | 1,670.22   | -313.25    | 14,428,905.05       | 1,692,317.07       | 39.73119120 | -80.81539700 |   |
| 13,000.00                        | 91.00           | 329.88      | 11,138.38           | 1,756.70   | -363.42    | 14,428,991.53       | 1,692,266.90       | 39.73142900 | -80.81557483 |   |
| 13,100.00                        | 91.00           | 329.88      | 11,136.63           | 1,843.19   | -413.59    | 14,429,078.02       | 1,692,216.73       | 39.73166679 | -80.81575266 |   |
| 13,200.00                        | 91.00           | 329.88      | 11,134.89           | 1,929.67   | -463.77    | 14,429,164.50       | 1,692,166.55       | 39.73190459 | -80.81593049 |   |
| 13,300.00                        | 91.00           | 329.88      | 11,133.14           | 2,016.16   | -513.94    | 14,429,250.99       | 1,692,116.38       | 39.73214238 | -80.81610832 |   |
| 13,400.00                        | 91.00           | 329.88      | 11,131.39           | 2,102.64   | -564.11    | 14,429,337.47       | 1,692,066.21       | 39.73238018 | -80.81628615 |   |
| 13,500.00                        | 91.00           | 329.88      | 11,129.65           | 2,189.12   | -614.29    | 14,429,423.95       | 1,692,016.03       | 39.73261797 | -80.81646398 |   |
| 13,600.00                        | 91.00           | 329.88      | 11,127.90           | 2,275.61   | -664.46    | 14,429,510.44       | 1,691,965.86       | 39.73285577 | -80.81664182 |   |
| 13,700.00                        | 91.00           | 329.88      | 11,126.15           | 2,362.09   | -714.64    | 14,429,596.92       | 1,691,915.68       | 39.73309356 | -80.81681965 |   |
| 13,800.00                        | 91.00           | 329.88      | 11,124.41           | 2,448.58   | -764.81    | 14,429,683.41       | 1,691,865.51       | 39.73333136 | -80.81699749 |   |
| 13,900.00                        | 91.00           | 329.88      | 11,122.66           | 2,535.06   | -814.98    | 14,429,769.89       | 1,691,815.34       | 39.73356915 | -80.81717533 |   |
| 14,000.00                        | 91.00           | 329.88      | 11,120.91           | 2,621.55   | -865.16    | 14,429,856.38       | 1,691,765.16       | 39.73380694 | -80.81735317 |   |
| 14,100.00                        | 91.00           | 329.88      | 11,119.17           | 2,708.03   | -915.33    | 14,429,942.86       | 1,691,714.99       | 39.73404473 | -80.81753101 |   |
| 14,200.00                        | 91.00           | 329.88      | 11,117.42           | 2,794.52   | -965.50    | 14,430,029.34       | 1,691,664.82       | 39.73428253 | -80.81770885 |   |
| 14,300.00                        | 91.00           | 329.88      | 11,115.67           | 2,881.00   | -1,015.68  | 14,430,115.83       | 1,691,614.64       | 39.73452032 | -80.81788669 |   |
| 14,400.00                        | 91.00           | 329.88      | 11,113.93           | 2,967.48   | -1,065.85  | 14,430,202.31       | 1,691,564.47       | 39.73475811 | -80.81806454 |   |
| 14,500.00                        | 91.00           | 329.88      | 11,112.18           | 3,053.97   | -1,116.02  | 14,430,288.80       | 1,691,514.30       | 39.73499590 | -80.81824238 |   |
| 14,600.00                        | 91.00           | 329.88      | 11,110.43           | 3,140.45   | -1,166.20  | 14,430,375.28       | 1,691,464.12       | 39.73523369 | -80.81842023 |   |
| 14,700.00                        | 91.00           | 329.88      | 11,108.69           | 3,226.94   | -1,216.37  | 14,430,461.77       | 1,691,413.95       | 39.73547149 | -80.81859808 |   |
| 14,800.00                        | 91.00           | 329.88      | 11,106.94           | 3,313.42   | -1,266.55  | 14,430,548.25       | 1,691,363.78       | 39.73570928 | -80.81877593 |   |
| 14,900.00                        | 91.00           | 329.88      | 11,105.19           | 3,399.91   | -1,316.72  | 14,430,634.73       | 1,691,313.60       | 39.73594707 | -80.81895378 |   |
| 15,000.00                        | 91.00           | 329.88      | 11,103.45           | 3,486.39   | -1,366.89  | 14,430,721.22       | 1,691,263.43       | 39.73618486 | -80.81913163 |   |
| 15,100.00                        | 91.00           | 329.88      | 11,101.70           | 3,572.88   | -1,417.07  | 14,430,807.70       | 1,691,213.25       | 39.73642265 | -80.81930948 |   |
| 15,200.00                        | 91.00           | 329.88      | 11,099.95           | 3,659.36   | -1,467.24  | 14,430,894.19       | 1,691,163.08       | 39.73666044 | -80.81948733 |   |



Planning Report - Geographic

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Wetzel County, West Virginia (UTM17 NAD83)  
 Site: Hansen  
 Well: Hansen 1N-2HU (F)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Hansen 1N-2HU (F)  
 TVD Reference: GL=1247 @ 1247.00ft  
 MD Reference: GL=1247 @ 1247.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Planned Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N-S (ft) | +E-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|---------------------|-----------------|-------------|---------------------|-----------|-----------|---------------------|--------------------|-------------|--------------|
| 15,300.00           | 91.00           | 329.88      | 11,098.21           | 3,745.84  | -1,517.41 | 14,430,980.67       | 1,691,112.91       | 39.73689823 | -80.81966519 |
| 15,400.00           | 91.00           | 329.88      | 11,096.46           | 3,832.33  | -1,567.59 | 14,431,067.16       | 1,691,062.73       | 39.73713602 | -80.81984304 |
| 15,500.00           | 91.00           | 329.88      | 11,094.71           | 3,918.81  | -1,617.76 | 14,431,153.64       | 1,691,012.56       | 39.73737380 | -80.82002090 |
| 15,600.00           | 91.00           | 329.88      | 11,092.97           | 4,005.30  | -1,667.93 | 14,431,240.12       | 1,690,962.39       | 39.73761159 | -80.82019876 |
| 15,700.00           | 91.00           | 329.88      | 11,091.22           | 4,091.78  | -1,718.11 | 14,431,326.61       | 1,690,912.21       | 39.73784938 | -80.82037662 |
| 15,800.00           | 91.00           | 329.88      | 11,089.47           | 4,178.27  | -1,768.28 | 14,431,413.09       | 1,690,862.04       | 39.73808717 | -80.82055448 |
| 15,900.00           | 91.00           | 329.88      | 11,087.73           | 4,264.75  | -1,818.46 | 14,431,499.58       | 1,690,811.87       | 39.73832496 | -80.82073234 |
| 16,000.00           | 91.00           | 329.88      | 11,085.98           | 4,351.24  | -1,868.63 | 14,431,586.06       | 1,690,761.69       | 39.73856275 | -80.82091021 |
| 16,100.00           | 91.00           | 329.88      | 11,084.23           | 4,437.72  | -1,918.80 | 14,431,672.54       | 1,690,711.52       | 39.73880053 | -80.82108807 |
| 16,200.00           | 91.00           | 329.88      | 11,082.49           | 4,524.20  | -1,968.98 | 14,431,759.03       | 1,690,661.35       | 39.73903832 | -80.82126594 |
| 16,300.00           | 91.00           | 329.88      | 11,080.74           | 4,610.69  | -2,019.15 | 14,431,845.51       | 1,690,611.17       | 39.73927611 | -80.82144381 |
| 16,400.00           | 91.00           | 329.88      | 11,078.99           | 4,697.17  | -2,069.32 | 14,431,932.00       | 1,690,561.00       | 39.73951389 | -80.82162168 |
| 16,500.00           | 91.00           | 329.88      | 11,077.25           | 4,783.66  | -2,119.50 | 14,432,018.48       | 1,690,510.83       | 39.73975168 | -80.82179954 |
| 16,600.00           | 91.00           | 329.88      | 11,075.50           | 4,870.14  | -2,169.67 | 14,432,104.97       | 1,690,460.65       | 39.73998946 | -80.82197742 |
| 16,700.00           | 91.00           | 329.88      | 11,073.75           | 4,956.63  | -2,219.85 | 14,432,191.45       | 1,690,410.48       | 39.74022725 | -80.82215529 |
| 16,800.00           | 91.00           | 329.88      | 11,072.01           | 5,043.11  | -2,270.02 | 14,432,277.93       | 1,690,360.30       | 39.74046504 | -80.82233316 |
| 16,900.00           | 91.00           | 329.88      | 11,070.26           | 5,129.59  | -2,320.19 | 14,432,364.42       | 1,690,310.13       | 39.74070282 | -80.82251104 |
| 17,000.00           | 91.00           | 329.88      | 11,068.51           | 5,216.08  | -2,370.37 | 14,432,450.90       | 1,690,259.96       | 39.74094060 | -80.82268891 |
| 17,100.00           | 91.00           | 329.88      | 11,066.77           | 5,302.56  | -2,420.54 | 14,432,537.39       | 1,690,209.78       | 39.74117839 | -80.82286679 |
| 17,200.00           | 91.00           | 329.88      | 11,065.02           | 5,389.05  | -2,470.71 | 14,432,623.87       | 1,690,159.61       | 39.74141617 | -80.82304467 |
| 17,300.00           | 91.00           | 329.88      | 11,063.27           | 5,475.53  | -2,520.89 | 14,432,710.36       | 1,690,109.44       | 39.74165396 | -80.82322255 |
| 17,400.00           | 91.00           | 329.88      | 11,061.53           | 5,562.02  | -2,571.06 | 14,432,796.84       | 1,690,059.26       | 39.74189174 | -80.82340043 |
| 17,500.00           | 91.00           | 329.88      | 11,059.78           | 5,648.50  | -2,621.23 | 14,432,883.32       | 1,690,009.09       | 39.74212952 | -80.82357831 |
| 17,600.00           | 91.00           | 329.88      | 11,058.03           | 5,734.99  | -2,671.41 | 14,432,969.81       | 1,689,958.92       | 39.74236731 | -80.82375619 |
| 17,700.00           | 91.00           | 329.88      | 11,056.29           | 5,821.47  | -2,721.58 | 14,433,056.29       | 1,689,908.74       | 39.74260509 | -80.82393408 |
| 17,800.00           | 91.00           | 329.88      | 11,054.54           | 5,907.95  | -2,771.76 | 14,433,142.78       | 1,689,858.57       | 39.74284287 | -80.82411196 |
| 17,900.00           | 91.00           | 329.88      | 11,052.79           | 5,994.44  | -2,821.93 | 14,433,229.26       | 1,689,808.40       | 39.74308065 | -80.82428985 |
| 18,000.00           | 91.00           | 329.88      | 11,051.05           | 6,080.92  | -2,872.10 | 14,433,315.75       | 1,689,758.22       | 39.74331844 | -80.82446774 |
| 18,100.00           | 91.00           | 329.88      | 11,049.30           | 6,167.41  | -2,922.28 | 14,433,402.23       | 1,689,708.05       | 39.74355622 | -80.82464563 |
| 18,200.00           | 91.00           | 329.88      | 11,047.55           | 6,253.89  | -2,972.45 | 14,433,488.71       | 1,689,657.87       | 39.74379400 | -80.82482352 |
| 18,300.00           | 91.00           | 329.88      | 11,045.81           | 6,340.38  | -3,022.62 | 14,433,575.20       | 1,689,607.70       | 39.74403178 | -80.82500141 |
| 18,400.00           | 91.00           | 329.88      | 11,044.06           | 6,426.86  | -3,072.80 | 14,433,661.68       | 1,689,557.53       | 39.74426956 | -80.82517930 |
| 18,500.00           | 91.00           | 329.88      | 11,042.31           | 6,513.35  | -3,122.97 | 14,433,748.17       | 1,689,507.35       | 39.74450734 | -80.82535720 |
| 18,600.00           | 91.00           | 329.88      | 11,040.57           | 6,599.83  | -3,173.14 | 14,433,834.65       | 1,689,457.18       | 39.74474512 | -80.82553509 |
| 18,700.00           | 91.00           | 329.88      | 11,038.82           | 6,686.31  | -3,223.32 | 14,433,921.14       | 1,689,407.01       | 39.74498290 | -80.82571299 |
| 18,800.00           | 91.00           | 329.88      | 11,037.07           | 6,772.80  | -3,273.49 | 14,434,007.62       | 1,689,356.83       | 39.74522068 | -80.82589089 |
| 18,900.00           | 91.00           | 329.88      | 11,035.33           | 6,859.28  | -3,323.67 | 14,434,094.10       | 1,689,306.66       | 39.74545846 | -80.82606878 |
| 19,000.00           | 91.00           | 329.88      | 11,033.58           | 6,945.77  | -3,373.84 | 14,434,180.59       | 1,689,256.49       | 39.74569624 | -80.82624668 |
| 19,100.00           | 91.00           | 329.88      | 11,031.83           | 7,032.25  | -3,424.01 | 14,434,267.07       | 1,689,206.31       | 39.74593402 | -80.82642459 |
| 19,200.00           | 91.00           | 329.88      | 11,030.09           | 7,118.74  | -3,474.19 | 14,434,353.56       | 1,689,156.14       | 39.74617180 | -80.82660249 |
| 19,300.00           | 91.00           | 329.88      | 11,028.34           | 7,205.22  | -3,524.36 | 14,434,440.04       | 1,689,105.97       | 39.74640958 | -80.82678039 |
| 19,400.00           | 91.00           | 329.88      | 11,026.59           | 7,291.71  | -3,574.53 | 14,434,526.52       | 1,689,055.79       | 39.74664735 | -80.82695830 |
| 19,500.00           | 91.00           | 329.88      | 11,024.85           | 7,378.19  | -3,624.71 | 14,434,613.01       | 1,689,005.62       | 39.74688513 | -80.82713620 |
| 19,600.00           | 91.00           | 329.88      | 11,023.10           | 7,464.67  | -3,674.88 | 14,434,699.49       | 1,688,955.45       | 39.74712291 | -80.82731411 |
| 19,700.00           | 91.00           | 329.88      | 11,021.35           | 7,551.16  | -3,725.05 | 14,434,785.98       | 1,688,905.27       | 39.74736069 | -80.82749202 |
| 19,800.00           | 91.00           | 329.88      | 11,019.61           | 7,637.64  | -3,775.23 | 14,434,872.46       | 1,688,855.10       | 39.74759846 | -80.82766993 |
| 19,900.00           | 91.00           | 329.88      | 11,017.86           | 7,724.13  | -3,825.40 | 14,434,958.95       | 1,688,804.92       | 39.74783624 | -80.82784784 |
| 20,000.00           | 91.00           | 329.88      | 11,016.11           | 7,810.61  | -3,875.58 | 14,435,045.43       | 1,688,754.75       | 39.74807402 | -80.82802575 |
| 20,100.00           | 91.00           | 329.88      | 11,014.37           | 7,897.10  | -3,925.75 | 14,435,131.91       | 1,688,704.58       | 39.74831179 | -80.82820367 |
| 20,200.00           | 91.00           | 329.88      | 11,012.62           | 7,983.58  | -3,975.92 | 14,435,218.40       | 1,688,654.40       | 39.74854957 | -80.82838158 |
| 20,300.00           | 91.00           | 329.88      | 11,010.87           | 8,070.06  | -4,026.10 | 14,435,304.88       | 1,688,604.23       | 39.74878734 | -80.82855950 |
| 20,400.00           | 91.00           | 329.88      | 11,009.13           | 8,156.55  | -4,076.27 | 14,435,391.37       | 1,688,554.06       | 39.74902512 | -80.82873742 |
| 20,500.00           | 91.00           | 329.88      | 11,007.38           | 8,243.03  | -4,126.44 | 14,435,477.85       | 1,688,503.88       | 39.74926289 | -80.82891534 |
| 20,600.00           | 91.00           | 329.88      | 11,005.63           | 8,329.52  | -4,176.62 | 14,435,564.34       | 1,688,453.71       | 39.74950067 | -80.82909326 |



Planning Report - Geographic

4705102174

Database: DB\_Jul2216dt\_v14  
 Company: Tug Hill Operating LLC  
 Project: Wetzel County, West Virginia (UTM17 NAD83)  
 Site: Hansen  
 Well: Hansen 1N-2HU (F)  
 Wellbore: Original Hole  
 Design: rev4

Local Co-ordinate Reference: Well Hansen 1N-2HU (F)  
 TVD Reference: GL=1247 @ 1247.00ft  
 MD Reference: GL=1247 @ 1247.00ft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

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Environmental Protection

Planned Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|
| 20,700.00           | 91.00           | 329.88      | 11,003.89           | 8,416.00   | -4,226.79  | 14,435,650.82       | 1,688,403.54       | 39.74973844 | -80.82927118 |
| 20,800.00           | 91.00           | 329.88      | 11,002.14           | 8,502.49   | -4,276.96  | 14,435,737.30       | 1,688,353.36       | 39.74997622 | -80.82944910 |
| 20,900.00           | 91.00           | 329.88      | 11,000.39           | 8,588.97   | -4,327.14  | 14,435,823.79       | 1,688,303.19       | 39.75021399 | -80.82962702 |
| 21,000.00           | 91.00           | 329.88      | 10,998.65           | 8,675.46   | -4,377.31  | 14,435,910.27       | 1,688,253.02       | 39.75045176 | -80.82980495 |
| 21,100.00           | 91.00           | 329.88      | 10,996.90           | 8,761.94   | -4,427.49  | 14,435,996.76       | 1,688,202.84       | 39.75068954 | -80.82998287 |
| 21,200.00           | 91.00           | 329.88      | 10,995.15           | 8,848.42   | -4,477.66  | 14,436,083.24       | 1,688,152.67       | 39.75092731 | -80.83016080 |
| 21,300.00           | 91.00           | 329.88      | 10,993.41           | 8,934.91   | -4,527.83  | 14,436,169.73       | 1,688,102.49       | 39.75116508 | -80.83033873 |
| 21,400.00           | 91.00           | 329.88      | 10,991.66           | 9,021.39   | -4,578.01  | 14,436,256.21       | 1,688,052.32       | 39.75140286 | -80.83051666 |
| 21,500.00           | 91.00           | 329.88      | 10,989.91           | 9,107.88   | -4,628.18  | 14,436,342.69       | 1,688,002.15       | 39.75164063 | -80.83069459 |
| 21,600.00           | 91.00           | 329.88      | 10,988.17           | 9,194.36   | -4,678.35  | 14,436,429.18       | 1,687,951.97       | 39.75187840 | -80.83087252 |
| 21,700.00           | 91.00           | 329.88      | 10,986.42           | 9,280.85   | -4,728.53  | 14,436,515.66       | 1,687,901.80       | 39.75211617 | -80.83105045 |
| 21,800.00           | 91.00           | 329.88      | 10,984.67           | 9,367.33   | -4,778.70  | 14,436,602.15       | 1,687,851.63       | 39.75235394 | -80.83122839 |
| 21,900.00           | 91.00           | 329.88      | 10,982.93           | 9,453.82   | -4,828.88  | 14,436,688.63       | 1,687,801.45       | 39.75259171 | -80.83140632 |
| 22,000.00           | 91.00           | 329.88      | 10,981.18           | 9,540.30   | -4,879.05  | 14,436,775.12       | 1,687,751.28       | 39.75282948 | -80.83158426 |
| 22,100.00           | 91.00           | 329.88      | 10,979.43           | 9,626.78   | -4,929.22  | 14,436,861.60       | 1,687,701.11       | 39.75306725 | -80.83176220 |
| 22,200.00           | 91.00           | 329.88      | 10,977.69           | 9,713.27   | -4,979.40  | 14,436,948.08       | 1,687,650.93       | 39.75330502 | -80.83194014 |
| 22,300.00           | 91.00           | 329.88      | 10,975.94           | 9,799.75   | -5,029.57  | 14,437,034.57       | 1,687,600.76       | 39.75354279 | -80.83211808 |
| 22,400.00           | 91.00           | 329.88      | 10,974.19           | 9,886.24   | -5,079.74  | 14,437,121.05       | 1,687,550.59       | 39.75378056 | -80.83229602 |
| 22,500.00           | 91.00           | 329.88      | 10,972.45           | 9,972.72   | -5,129.92  | 14,437,207.54       | 1,687,500.41       | 39.75401833 | -80.83247396 |
| 22,600.00           | 91.00           | 329.88      | 10,970.70           | 10,059.21  | -5,180.09  | 14,437,294.02       | 1,687,450.24       | 39.75425610 | -80.83265191 |
| 22,700.00           | 91.00           | 329.88      | 10,968.95           | 10,145.69  | -5,230.26  | 14,437,380.50       | 1,687,400.06       | 39.75449387 | -80.83282985 |
| 22,800.00           | 91.00           | 329.88      | 10,967.21           | 10,232.18  | -5,280.44  | 14,437,466.99       | 1,687,349.89       | 39.75473164 | -80.83300780 |
| 22,900.00           | 91.00           | 329.88      | 10,965.46           | 10,318.66  | -5,330.61  | 14,437,553.47       | 1,687,299.72       | 39.75496941 | -80.83318575 |
| 23,000.00           | 91.00           | 329.88      | 10,963.71           | 10,405.14  | -5,380.79  | 14,437,639.96       | 1,687,249.54       | 39.75520718 | -80.83336370 |
| 23,100.00           | 91.00           | 329.88      | 10,961.97           | 10,491.63  | -5,430.96  | 14,437,726.44       | 1,687,199.37       | 39.75544494 | -80.83354165 |
| 23,200.00           | 91.00           | 329.88      | 10,960.22           | 10,578.11  | -5,481.13  | 14,437,812.93       | 1,687,149.20       | 39.75568271 | -80.83371960 |
| 23,300.00           | 91.00           | 329.88      | 10,958.47           | 10,664.60  | -5,531.31  | 14,437,899.41       | 1,687,099.02       | 39.75592048 | -80.83389755 |
| 23,400.00           | 91.00           | 329.88      | 10,956.73           | 10,751.08  | -5,581.48  | 14,437,985.89       | 1,687,048.85       | 39.75615824 | -80.83407551 |
| 23,500.00           | 91.00           | 329.88      | 10,954.98           | 10,837.57  | -5,631.65  | 14,438,072.38       | 1,686,998.68       | 39.75639601 | -80.83425346 |
| 23,600.00           | 91.00           | 329.88      | 10,953.23           | 10,924.05  | -5,681.83  | 14,438,158.86       | 1,686,948.50       | 39.75663378 | -80.83443142 |
| 23,700.00           | 91.00           | 329.88      | 10,951.49           | 11,010.54  | -5,732.00  | 14,438,245.35       | 1,686,898.33       | 39.75687154 | -80.83460937 |
| 23,800.00           | 91.00           | 329.88      | 10,949.74           | 11,097.02  | -5,782.17  | 14,438,331.83       | 1,686,848.16       | 39.75710931 | -80.83478733 |
| 23,900.00           | 91.00           | 329.88      | 10,947.99           | 11,183.50  | -5,832.35  | 14,438,418.32       | 1,686,797.98       | 39.75734707 | -80.83496529 |
| 24,000.00           | 91.00           | 329.88      | 10,946.25           | 11,269.99  | -5,882.52  | 14,438,504.80       | 1,686,747.81       | 39.75758484 | -80.83514326 |
| 24,100.00           | 91.00           | 329.88      | 10,944.50           | 11,356.47  | -5,932.70  | 14,438,591.28       | 1,686,697.64       | 39.75782260 | -80.83532122 |
| 24,200.00           | 91.00           | 329.88      | 10,942.75           | 11,442.96  | -5,982.87  | 14,438,677.77       | 1,686,647.46       | 39.75806037 | -80.83549918 |
| 24,243.17           | 91.00           | 329.88      | 10,942.00           | 11,480.29  | -6,004.53  | 14,438,715.10       | 1,686,625.80       | 39.75816300 | -80.83557600 |

PBHL/TD 24243.17 MD/10942.00 TVD





|                  |  |                                     |                        |
|------------------|--|-------------------------------------|------------------------|
| <b>Database:</b> | DB_Jul2216dt_v14                           | <b>Local Co-ordinate Reference:</b> | Well Hansen 1N-2HU (F) |
| <b>Company:</b>  | Tug Hill Operating LLC                     | <b>TVD Reference:</b>               | GL=1247 @ 1247.00ft    |
| <b>Project:</b>  | Wetzel County, West Virginia (UTM17 NAD83) | <b>MD Reference:</b>                | GL=1247 @ 1247.00ft    |
| <b>Site:</b>     | Hansen                                     | <b>North Reference:</b>             | Grid                   |
| <b>Well:</b>     | Hansen 1N-2HU (F)                          | <b>Survey Calculation Method:</b>   | Minimum Curvature      |
| <b>Wellbore:</b> | Original Hole                              |                                     |                        |
| <b>Design:</b>   | rev4                                       |                                     |                        |

| Design Targets  |           |          |           |           |           |               |              |             |              |
|---|-----------|----------|-----------|-----------|-----------|---------------|--------------|-------------|--------------|
| Target Name   | Dip Angle | Dip Dir. | TVD       | +N/-S     | +E/-W     | Northing      | Easting      | Latitude    | Longitude    |
| - hit/miss target   | (°)       | (°)      | (ft)      | (ft)      | (ft)      | (usft)        | (usft)       |             |              |
| - Shape   |           |          |           |           |           |               |              |             |              |
| Hansen 1N-2HU BHL r4<br>- plan hits target center<br>- Point  | 0.00      | 0.00     | 10,942.00 | 11,480.29 | -6,004.53 | 14,438,715.10 | 1,686,625.80 | 39.75816300 | -80.83557600 |
| Hansen 1N-2HU LP<br>- plan misses target center by 21.63ft at 11601.74ft MD (11162.80 TVD, 547.43 N, 338.14 E)<br>- Point | 0.00      | 0.01     | 11,163.02 | 536.58    | 319.43    | 14,427,771.41 | 1,692,949.75 | 39.72807428 | -80.81315508 |
| Hansen 1N-2HU LP 25 ε<br>- plan hits target center<br>- Point   | 0.00      | 0.00     | 11,163.02 | 536.58    | 344.43    | 14,427,771.41 | 1,692,974.75 | 39.72807414 | -80.81306615 |

| Casing Points  |                |      |                 |               |
|----------------|----------------|------|-----------------|---------------|
| Measured Depth | Vertical Depth | Name | Casing Diameter | Hole Diameter |
| (ft)           | (ft)           |      | (")             | (")           |
| 120.00         | 120.00         |      | 30              | 36            |
| 1,200.00       | 1,200.00       |      | 20              | 24            |
| 2,650.01       | 2,650.01       |      | 13-3/8          | 17            |
| 10,122.06      | 10,075.02      |      | 9-5/8           | 12-1/4        |

| Plan Annotations |                |                   |           |                                  |
|------------------|----------------|-------------------|-----------|----------------------------------|
| Measured Depth   | Vertical Depth | Local Coordinates |           | Comment                          |
| (ft)             | (ft)           | +N/-S             | +E/-W     |                                  |
| (ft)             | (ft)           | (ft)              | (ft)      |                                  |
| 8,500.00         | 8,500.00       | 0.00              | 0.00      | KOP Begin 2°/100' build          |
| 9,361.31         | 9,348.40       | -11.58            | 127.98    | Begin 17.23° tangent             |
| 10,580.98        | 10,513.35      | -44.14            | 487.71    | Begin 10°/100' build/turn        |
| 11,589.20        | 11,163.02      | 536.58            | 344.43    | Begin 91.00° lateral             |
| 24,243.17        | 10,942.00      | 11,480.29         | -6,004.53 | PBHL/TD 24243.17 MD/10942.00 TVD |

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Office of Oil and Gas

AUG - 9 2019

WV Department of  
Environmental Protection

WW-9  
(4/16)

API Number 47 - 051 - \_\_\_\_\_  
Operator's Well No. Hansen N-2HU

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) French Creek - Ohio River Quadrangle New Martinsville 7.5'

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

Will a pit be used? Yes  No

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

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

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.

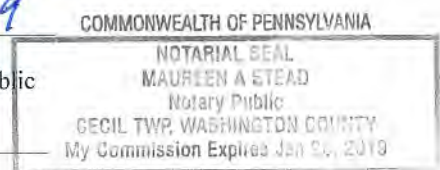
Company Official Signature *Jim Pancake*  
Company Official (Typed Name) Jim Pancake  
Company Official Title Vice President Geoscience

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

*Maureen A Stead*

Notary Public

My commission expires 1/28/19



Form WW-9

Operator's Well No. Hansen N-2HU

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 28.28 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

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

Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: *Jim Mulhoba*

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title: Oil and Gas Inspector Date: 1/23/19

Field Reviewed? ( 2 ) Yes ( ) No

606 17 440  
JAN 27 2019  
RECEIVED

WW-9

# PROPOSED HANSEN N-2HU

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.

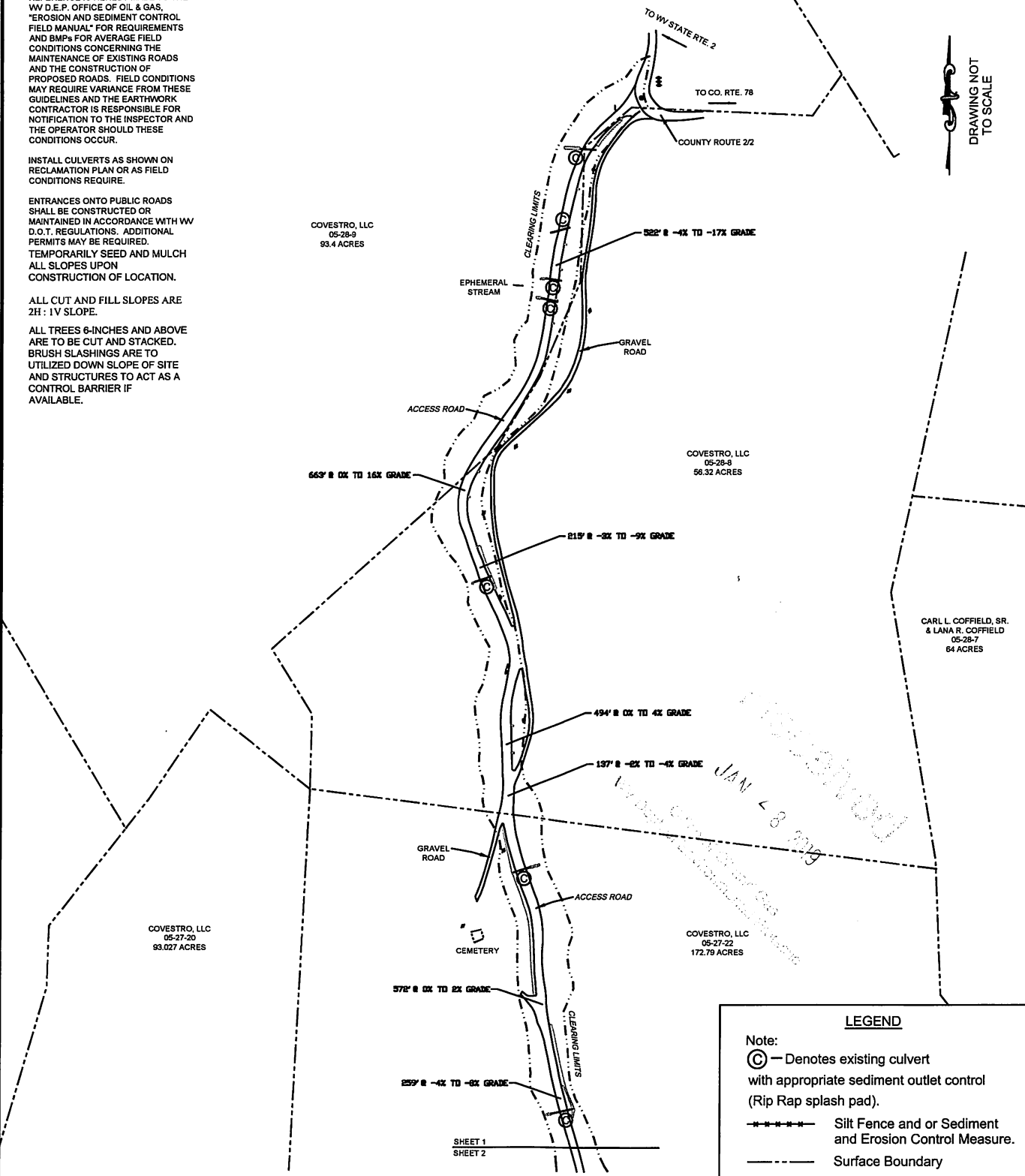
INSTALL CULVERTS AS SHOWN ON RECLAMATION PLAN OR AS FIELD CONDITIONS REQUIRE.

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.

DRAWING NOT TO SCALE



**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-2HU

SUPPLEMENT PG 1

SHEET 2

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  
05-27-20  
93.027 ACRES

COVESTRO, LLC  
05-27-21  
22.87 ACRES

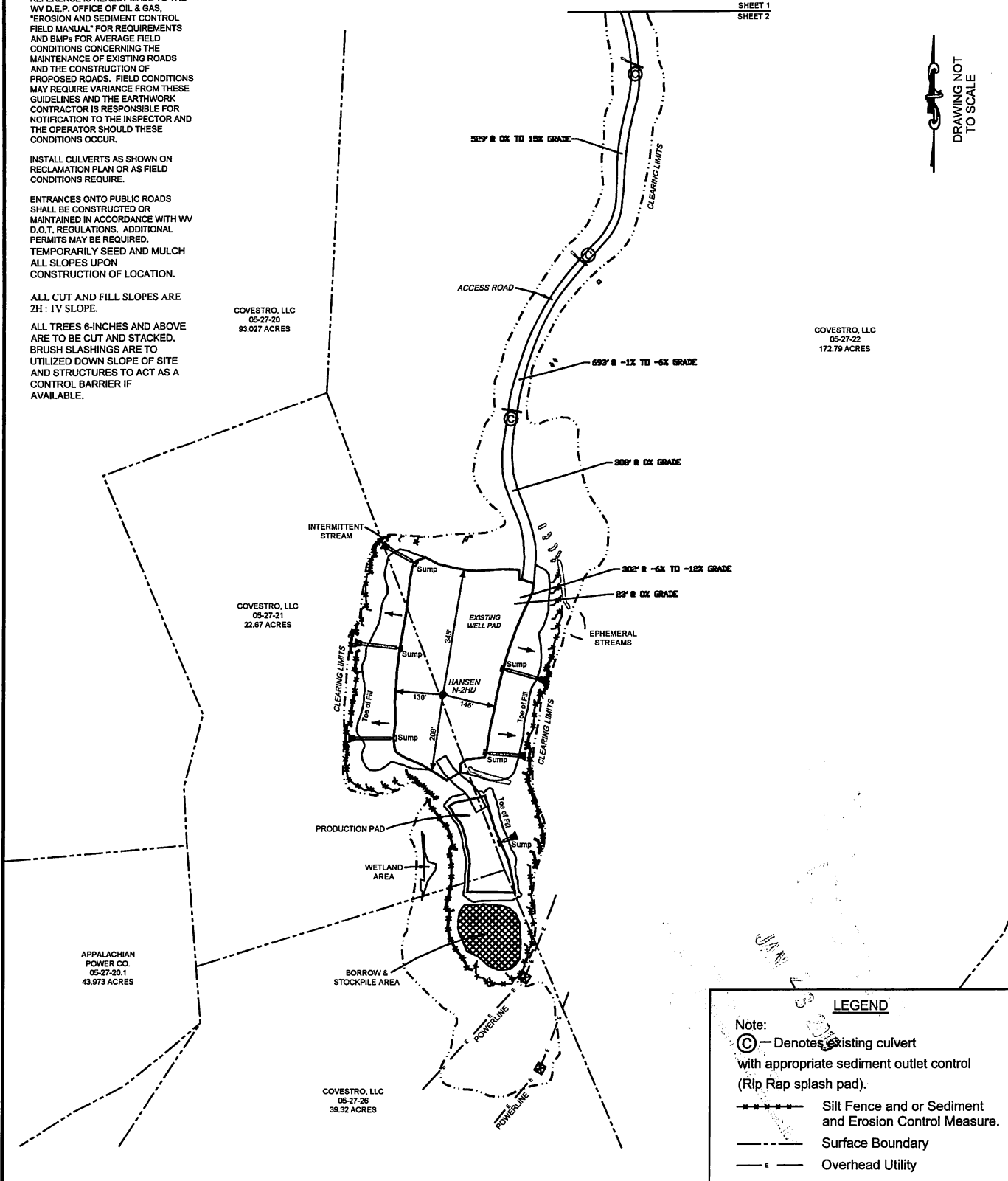
APPALACHIAN  
POWER CO.  
05-27-20.1  
43.873 ACRES

COVESTRO, LLC  
05-27-26  
39.32 ACRES

COVESTRO, LLC  
05-27-22  
172.79 ACRES

SHEET 1  
SHEET 2

DRAWING NOT  
TO SCALE



**LEGEND**

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

4705102174

4705102174



# Well Site Safety Plan

## Tug Hill Operating, LLC

*ju*  
*6/28/19*

Well Name: Hansen N-2HU

Pad Location: Hansen

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

NORTHING - 4,397,429.97

EASTING - 515,914.75

Updated June 2019

RECEIVED  
Office of Oil and Gas

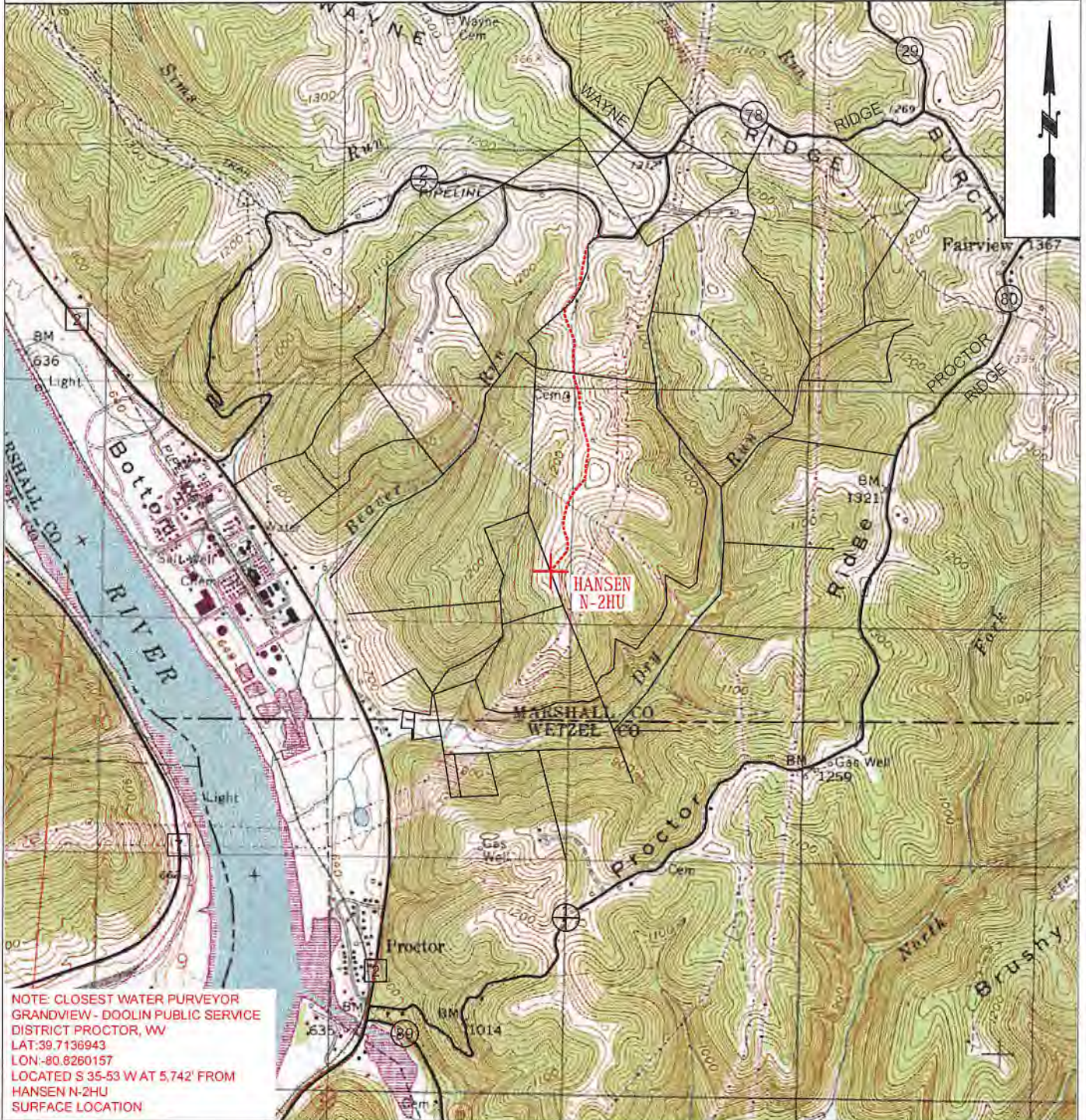
AUG - 9 2019


WV Department of  
Environmental Protection

WW-9

# PROPOSED HANSEN N-2HU

SUPPLEMENT PG 2

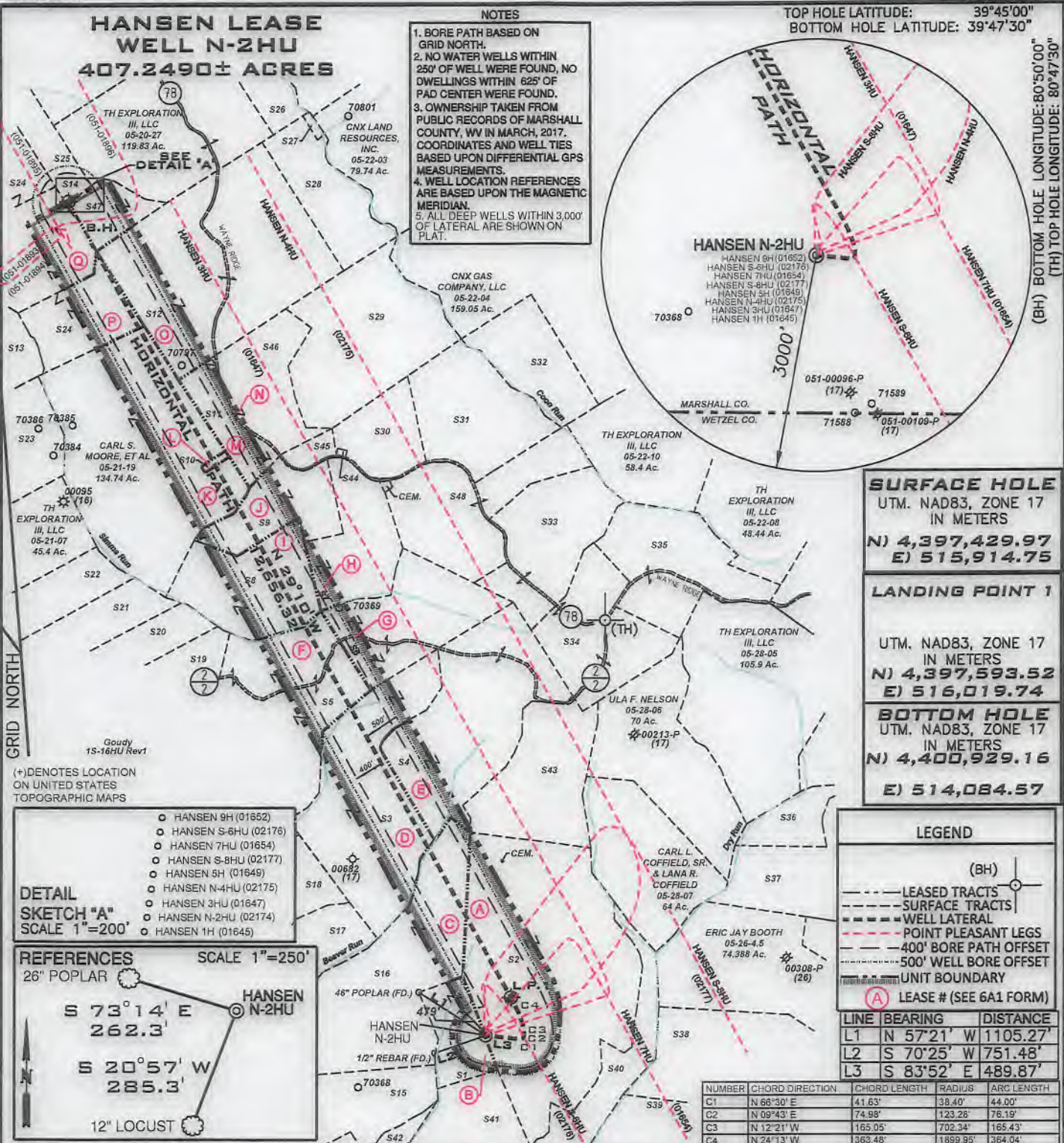


|   |  |            |                       |            |
|---|--|------------|-----------------------|------------|
|  <b>TUG HILL<br/>OPERATING</b> | OPERATOR   | 494510851  | TOPO SECTION          | LEASE NAME |
|   | TUG HILL OPERATING, LLC<br>380 SOUTHPOINTE BLVD<br>SUITE 200<br>CANONSBURG, PA 15317 |            | NEW MARTINSVILLE 7.5' | HANSEN     |
|   |  |            | SCALE: JAN 4 8 2019   | DATE:      |
|   |  | 1" = 2000' | DATE: 01/17/2019      |            |

**HANSEN LEASE  
WELL N-2HU  
407.2490± 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"

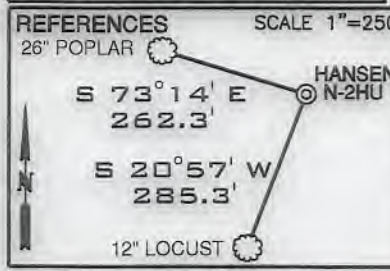


**SURFACE HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,397,429.97**  
**E) 515,914.75**

**LANDING POINT 1**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,397,593.52**  
**E) 516,019.74**

**BOTTOM HOLE**  
 UTM. NAD83, ZONE 17  
 IN METERS  
**N) 4,400,929.16**  
**E) 514,084.57**

- DETAIL SKETCH "A"**  
 SCALE 1"=200'
- HANSEN 9H (01652)
  - HANSEN S-6HU (02176)
  - HANSEN 7HU (01654)
  - HANSEN S-8HU (02177)
  - HANSEN 5H (01649)
  - HANSEN N-4HU (02175)
  - HANSEN 3HU (01647)
  - HANSEN N-2HU (02174)
  - HANSEN 1H (01645)



**LEGEND**

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

| LINE | BEARING    | DISTANCE |
|------|------------|----------|
| L1   | N 57°21' W | 1105.27' |
| L2   | S 70°25' W | 751.48'  |
| L3   | S 83°52' E | 489.87'  |

| NUMBER | CHORD DIRECTION | CHORD LENGTH | RADIUS   | ARC LENGTH |
|--------|-----------------|--------------|----------|------------|
| C1     | N 66°30' E      | 41.63'       | 38.40'   | 44.00'     |
| C2     | N 09°43' E      | 74.98'       | 123.28'  | 78.19'     |
| C3     | N 12°21' W      | 165.05'      | 702.34'  | 165.43'    |
| C4     | N 24°13' W      | 363.48'      | 1699.95' | 364.04'    |

FILE NUMBER \_\_\_\_\_

DRAWING NUMBER HANSEN\_N-2HU\_REV4

SCALE 1" = 2000'

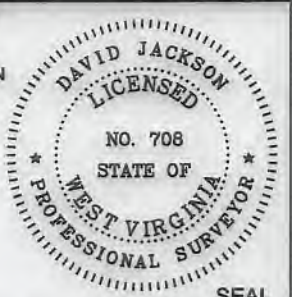
MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING  
GRADE GPS

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

P.S. 708 *David L Jackson*

JACKSON SURVEYING INC.  
 P.O. Box 1480  
 Clarksburg, WV 26302  
 304-623-5851



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

DATE: JANUARY 26, 2019

REVISED: JULY 08, 2019

OPERATORS WELL NO. HANSEN N-2HU

API WELL NO. 47-051-02174

STATE WV COUNTY MARSHALL PERMIT 1654

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL

(IF "GAS") PRODUCTION  STORAGE  DEEP  SHALLOW

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

DISTRICT FRANKLIN COUNTY MARSHALL

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

SURFACE OWNER COVESTRO, LLC ACREAGE 172.79

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

PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION

PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) \_\_\_\_\_

PLUG & ABANDON  CLEAN OUT & REPLUG

TARGET FORMATION POINT PLEASANT ESTIMATED DEPTH TVD: 11,382' TMD: 24,243'

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

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

COUNTY NAME  
 PERMIT



form ww6

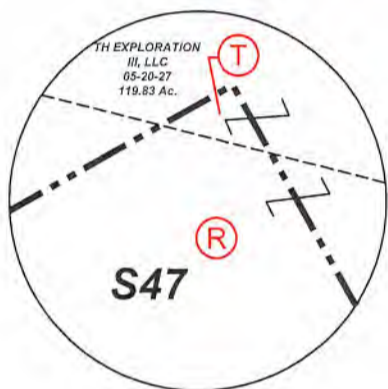
HANSEN LEASE  
WELL N-2HU  
407.2490± ACRES

DETAIL "A"

4705102174

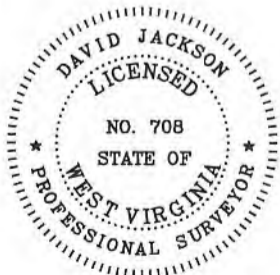


DETAIL "B"



| Number | TAX MAP -PARCEL | ADJOINER OWNER                                   | ACRES  |
|--------|-----------------|--|--------|
| S1     | B 05-27-21      | COVESTRO, LLC                                    | 22.67  |
| S2     | A 05-27-22      | COVESTRO, LLC                                    | 172.79 |
| S3     | D 05-28-10      | CAROL MARTIN                                     | 100.0  |
| S4     | E 05-28-9       | COVESTRO, LLC                                    | 93.4   |
| S5     | F 05-28-2       | COVESTRO, LLC                                    | 99.5   |
| S6     | G 05-28-3       | TH EXPLORATION III, LLC                          | 53.44  |
| S7     | H 05-22-13      | JOHN M. MOORE, TERESA R. MOORE & ANDREA S. MOORE | 40.57  |
| S8     | I 05-21-18      | JOHN M. MOORE, TERESA R. MOORE & ANDREA S. MOORE | 51.44  |
| S9     | J 05-21-20      | JOHN M. MOORE, TERESA R. MOORE & ANDREA S. MOORE | 31.0   |
| S10    | L 05-21-19.1    | JOHN G. MOORE, ETAL                              | 0.92   |
| S11    | M 05-21-22      | PEGGY LEE BOWEN, ETAL                            | 18.29  |
| S12    | O 05-21-24      | TH EXPLORATION III, LLC                          | 132.5  |
| S13    | 05-20-34        | TH EXPLORATION III, LLC                          | 116.7  |
| S14    | Q 05-20-33      | TH EXPLORATION III, LLC                          | 42.186 |
| S15    | 05-27-20.1      | APPALACHIAN POWER CO.                            | 43.973 |
| S16    | C 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    | P 05-20-32      | TH EXPLORATION III, LLC                          | 28.8   |
| S25    | S 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    | 05-22-2         | TH EXPLORATION III, LLC                          | 30.0   |
| S29    | 05-22-18        | EDWARD R. YOHO, JR.                              | 77.13  |
| S30    | 05-22-15        | EDWARD R. YOHO, JR.                              | 25.5   |
| S31    | 05-22-16        | EDWARD R. YOHO, JR.                              | 57.0   |
| S32    | 05-22-17        | CNX GAS COMPANY, LLC.                            | 37.5   |
| S33    | 05-22-11        | TH EXPLORATION III, LLC                          | 55.65  |
| S34    | 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    | 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    | 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    | N 05-21-23      | PEGGY LEE BROWN, ETAL                            | 42.62  |
| S47    | R 05-20-28      | TH EXPLORATION III, LLC                          | 15.34  |
| S48    | 05-22-12        | TH EXPLORATION III, LLC                          | 61.49  |

4705102174



P.S. 708

*David L Jackson*



**TUG HILL**  
**OPERATING**

OPERATOR'S  
WELL #: HANSEN N-2HU  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV  
API #: 47-051-02174

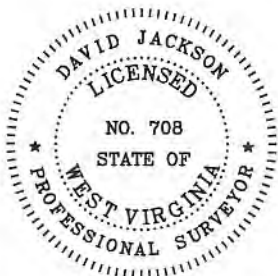
WELL PLAT  
PAGE 2 OF 2  
DATE: 01/26/2019  
REVISED: 07/08/2019

form ww6

**HANSEN LEASE  
WELL N-2HU  
407.2489± ACRES**

| Lease No. | Tags | Parcel    | Oil & Gas Royalty Owner               | Book | Page |
|-----------|------|-----------|---------------------------------------|------|------|
| 10*14418  | A    | 5-27-22   | PPG INDUSTRIES, INC.                  | 878  | 610  |
| 10*27022  | B    | 5-27-21   | COVESTRO LLC                          | 1046 | 431  |
| 10*14493  | C    | 5-27-20   | BETTY JEAN NEELY                      | 748  | 468  |
| 10*14494  | C    | 5-27-20   | MARY LOU WILSON                       | 748  | 471  |
| 10*14495  | C    | 5-27-20   | PATRICIA HARTMAN                      | 752  | 197  |
| 10*14496  | C    | 5-27-20   | STEPHANIE L. HALL                     | 752  | 215  |
| 10*14497  | C    | 5-27-20   | CAROL DEEN GARDNER                    | 752  | 212  |
| 10*22926  | C    | 5-27-20   | COVESTRO LLC                          | 976  | 27   |
| 10*14565  | D    | 5-28-10   | HARRY LEE GOUDY                       | 670  | 59   |
| 10*14418  | E    | 5-28-9    | PPG INDUSTRIES, INC.                  | 878  | 610  |
| 10*27022  | F    | 5-28-2    | COVESTRO LLC                          | 1046 | 431  |
| 10*14418  | G    | 5-28-3    | PPG INDUSTRIES, INC.                  | 878  | 610  |
| 10*14482  | G    | 5-28-3    | RALPH EARNEST                         | 745  | 578  |
| 10*14483  | G    | 5-28-3    | CHARLES H EARNEST                     | 746  | 319  |
| 10*14484  | G    | 5-28-3    | ARTHUR L JOSEPH                       | 748  | 474  |
| 10*14485  | G    | 5-28-3    | LINDA K HASSLEN                       | 748  | 476  |
| 10*14486  | G    | 5-28-3    | THOMAS ATKINSON                       | 754  | 248  |
| 10*14487  | G    | 5-28-3    | DOUGLAS ATKINSON                      | 754  | 577  |
| 10*14488  | G    | 5-28-3    | HEATHER GUIDRY                        | 754  | 244  |
| 10*14489  | G    | 5-28-3    | AUGUSTA L SPIHER                      | 754  | 246  |
| 10*14490  | G    | 5-28-3    | JAMES WELCH JR                        | 752  | 445  |
| 10*14491  | G    | 5-28-3    | CHRISTOPHER PRICE                     | 752  | 208  |
| 10*14492  | G    | 5-28-3    | MARJORIE A MCCLAUGHLIN                | 749  | 526  |
| 10*14937  | H    | 5-22-13   | JOHN M MOORE AND MELANIE A MOORE ETAL | 850  | 524  |
| 10*14937  | I    | 5-21-18   | JOHN M MOORE AND MELANIE A MOORE ETAL | 850  | 524  |
| 10*14937  | J    | 5-21-20   | JOHN M MOORE AND MELANIE A MOORE ETAL | 850  | 524  |
| 10*14933  | K    | 5-21-19   | CLARA LOU HERRICK AND EDWIN A HERRICK | 850  | 531  |
| 10*14934  | K    | 5-21-19   | GLENDIA ROSE MOORE                    | 849  | 564  |
| 10*14935  | K    | 5-21-19   | JOHN M MOORE AND MELANIE A MOORE      | 849  | 562  |
| 10*14936  | K    | 5-21-19   | LINDA L MOORE                         | 850  | 533  |
| 10*14933  | L    | 5-21-19.1 | CLARA LOU HERRICK AND EDWIN A HERRICK | 850  | 531  |
| 10*14934  | L    | 5-21-19.1 | GLENDIA ROSE MOORE                    | 849  | 564  |
| 10*14947  | M    | 5-21-22   | DANA SMALLWOOD                        | 850  | 520  |
| 10*14948  | M    | 5-21-22   | PEGGY L BROWN                         | 850  | 522  |
| 10*14947  | N    | 5-21-23   | DANA SMALLWOOD                        | 850  | 520  |
| 10*14948  | N    | 5-21-23   | PEGGY L BROWN                         | 850  | 522  |
| 10*14418  | O    | 5-21-24   | PPG INDUSTRIES, INC.                  | 878  | 610  |
| 10*14418  | P    | 5-20-32   | PPG INDUSTRIES, INC.                  | 878  | 610  |
| 10*14312  | Q    | 5-20-33   | JAMIE LU BENSON                       | 790  | 531  |
| 10*14313  | Q    | 5-20-33   | TERRI JEAN GODDARD                    | 790  | 585  |
| 10*14314  | Q    | 5-20-33   | RALPH BLACHLY                         | 790  | 529  |
| 10*14315  | Q    | 5-20-33   | MARGARET ROSS                         | 790  | 527  |
| 10*14316  | Q    | 5-20-33   | ANDREW GERST                          | 791  | 645  |
| 10*14317  | Q    | 5-20-33   | HAROLD BLACHLY                        | 791  | 643  |
| 10*14318  | Q    | 5-20-33   | MARTHA BLACHLY-CROSS                  | 792  | 112  |
| 10*14319  | Q    | 5-20-33   | JACK J PFALZGRAF                      | 792  | 118  |
| 10*14320  | Q    | 5-20-33   | SANDRA CHEYNEY                        | 792  | 91   |
| 10*14321  | Q    | 5-20-33   | HERBERT BLACHLY                       | 792  | 102  |
| 10*14322  | Q    | 5-20-33   | LOIS KAY MORFORD                      | 792  | 110  |
| 10*14327  | Q    | 5-20-33   | ROBERT D OKEY                         | 792  | 646  |

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P.S. 708

*David L Jackson*

| Lease No. | Tags | Parcel  | Oil & Gas Royalty Owner                                  | Book | Page |
|-----------|------|---------|--|------|------|
| 10*14328  | Q    | 5-20-33 | RAE ELLEN STUART   | 796  | 38   |
| 10*14329  | Q    | 5-20-33 | TONDA ROTHENBUHLER                                       | 796  | 40   |
| 10*14331  | Q    | 5-20-33 | CHRISTINA JEAN RIOUX                                     | 796  | 70   |
| 10*14332  | Q    | 5-20-33 | MICHAEL EDWARD BARTH                                     | 796  | 68   |
| 10*14333  | Q    | 5-20-33 | DEAN ROTHENBUHLER  | 796  | 42   |
| 10*14355  | Q    | 5-20-33 | DEWAYNE STARKEY  | 815  | 228  |
| 10*14356  | Q    | 5-20-33 | FREDRIC & BETTY RICHTER                                  | 822  | 270  |
| 10*14362  | Q    | 5-20-33 | CAROLYN STARKEY  | 827  | 226  |
| 10*14368  | Q    | 5-20-33 | JOSEPH B LONG  | 836  | 106  |
| 10*14371  | Q    | 5-20-33 | THOMAS F & JENNIFER LONG                                 | 842  | 398  |
| 10*14372  | Q    | 5-20-33 | UNITED CHURCH HOMES INC                                  | 846  | 408  |
| 10*14377  | Q    | 5-20-33 | JOSEPH A LONG  | 849  | 519  |
| 10*14387  | Q    | 5-20-33 | JOHN F & PAM LONG  | 849  | 542  |
| 10*14388  | Q    | 5-20-33 | IMMANUEL CHURCH OF UNITED CC OF SALEM TWP MONROE CO., OH | 849  | 513  |
| 10*14398  | Q    | 5-20-33 | MARY J KAFFENBERGER                                      | 860  | 434  |
| 10*14399  | Q    | 5-20-33 | RITA ANN & RONALD DOEBERT                                | 860  | 437  |
| 10*14400  | Q    | 5-20-33 | COLEEN SLAGLE & FRANKLIN SLAGLE JR                       | 860  | 440  |
| 10*14401  | Q    | 5-20-33 | IMELDA J SCURLOCK  | 860  | 443  |
| 10*14402  | Q    | 5-20-33 | CARDL F & RICHARD WILSON                                 | 860  | 446  |
| 10*14403  | Q    | 5-20-33 | SUE WHITE  | 862  | 429  |
| 10*14404  | Q    | 5-20-33 | DON FORGRAVES  | 862  | 426  |
| 10*14405  | Q    | 5-20-33 | JOHN WHITE   | 862  | 423  |
| 10*14406  | Q    | 5-20-33 | WILLIAM V BUCKNOR  | 862  | 421  |
| 10*14407  | Q    | 5-20-33 | LESUE F BUCKNOR  | 862  | 419  |
| 10*14408  | Q    | 5-20-33 | LORNA M LONG MORGAN                                      | 864  | 323  |
| 10*14409  | Q    | 5-20-33 | JAMES C LONG & PATTI LONG                                | 864  | 326  |
| 10*14410  | Q    | 5-20-33 | HENRY T LONG   | 867  | 385  |
| 10*14411  | Q    | 5-20-33 | JOHN EDWARD HARRIS JR ET AL                              | 870  | 34   |
| 10*14412  | Q    | 5-20-33 | THE VILLAGE NETWORK F/K/A BOYS VILLAGE                   | 872  | 203  |
| 10*14413  | Q    | 5-20-33 | JUANITA SANDIFER   | 872  | 206  |
| 10*14416  | Q    | 5-20-33 | KATHERINE ANN WILLIAMS COTHRAN                           | 879  | 1    |
| 10*14418  | Q    | 5-20-33 | PPG INDUSTRIES, INC.                                     | 878  | 610  |
| 10*14419  | Q    | 5-20-33 | CROSSROAD CHILD & FAMILY SERVICES, INC                   | 887  | 105  |
| 10*15734  | Q    | 5-20-33 | GENEVIEVE L LONG   | 904  | 13   |
| 10*15760  | Q    | 5-20-33 | DEIRDRE L WINGER AND DANIEL W WINGER                     | 903  | 645  |
| 10*15761  | Q    | 5-20-33 | CAMERON CEMETARY ASSOCIATION INC                         | 903  | 642  |
| 10*15762  | Q    | 5-20-33 | DAWN PETROVICH   | 904  | 4    |
| 10*15763  | Q    | 5-20-33 | BONNIE J SELDERS   | 904  | 34   |
| 10*15764  | Q    | 5-20-33 | JAMES E BUCKNOR  | 904  | 28   |
| 10*15765  | Q    | 5-20-33 | JOHN A BUCKNOR AND RHONDA BUCKNOR                        | 904  | 16   |
| 10*15766  | Q    | 5-20-33 | JOHN J POZENEL   | 904  | 7    |
| 10*16220  | Q    | 5-20-33 | WILLIAM LONG   | 792  | 95   |
| 10*16230  | Q    | 5-20-33 | JAMES BRIAN YOHO   | 900  | 134  |
| 10*16355  | Q    | 5-20-33 | JAMES P LONG AND LINDA L LONG                            | 904  | 10   |
| 10*16356  | Q    | 5-20-33 | DARYL S BUCKNOR AND JOYCE T BUCKNOR                      | 904  | 31   |
| 10*16357  | Q    | 5-20-33 | DEANNA M BONVISSUTO                                      | 904  | 1    |
| 10*16358  | Q    | 5-20-33 | ANNE MARIE KRAMER AND CHRISTOPHER E CUEVAS               | 903  | 648  |
| 10*16454  | Q    | 5-20-33 | CHURCH OF CHRIST OF CAMERON OHIO                         | 900  | 128  |
| 10*14307  | R    | 5-20-28 | SALLY CYNTHIA HOPKINS                                    | 777  | 572  |
| 10*14308  | R    | 5-20-28 | MARY E BASSETT   | 779  | 492  |
| 10*14309  | R    | 5-20-28 | ROBERT B THOMAS  | 779  | 484  |
| 10*14310  | R    | 5-20-28 | JEAN C THOMAS  | 781  | 614  |
| 10*14324  | R    | 5-20-28 | RUTH E BASSETT MEADOWS                                   | 792  | 100  |
| 10*14325  | R    | 5-20-28 | ELIZABETH ANN STRAUSBAUGH                                | 792  | 104  |
| 10*14326  | R    | 5-20-28 | JANET LEA BLANKENSHIP                                    | 792  | 580  |
| 10*14418  | R    | 5-20-28 | PPG INDUSTRIES, INC.                                     | 878  | 610  |
| 10*14307  | S    | 5-20-29 | SALLY CYNTHIA HOPKINS                                    | 777  | 572  |
| 10*14308  | S    | 5-20-29 | MARY E BASSETT   | 779  | 492  |
| 10*14309  | S    | 5-20-29 | ROBERT B THOMAS  | 779  | 484  |
| 10*14310  | S    | 5-20-29 | JEAN C THOMAS  | 781  | 614  |
| 10*14324  | S    | 5-20-29 | RUTH E BASSETT MEADOWS                                   | 792  | 100  |
| 10*14325  | S    | 5-20-29 | ELIZABETH ANN STRAUSBAUGH                                | 792  | 104  |
| 10*14326  | S    | 5-20-29 | JANET LEA BLANKENSHIP                                    | 792  | 580  |
| 10*14418  | S    | 5-20-29 | PPG INDUSTRIES, INC.                                     | 878  | 610  |
| 10*14307  | T    | 5-20-27 | SALLY CYNTHIA HOPKINS                                    | 777  | 572  |
| 10*14308  | T    | 5-20-27 | MARY E BASSETT   | 779  | 492  |
| 10*14309  | T    | 5-20-27 | ROBERT B THOMAS  | 779  | 484  |
| 10*14310  | T    | 5-20-27 | JEAN C THOMAS  | 781  | 614  |
| 10*14324  | T    | 5-20-27 | RUTH E BASSETT MEADOWS                                   | 792  | 100  |
| 10*14325  | T    | 5-20-27 | ELIZABETH ANN STRAUSBAUGH                                | 792  | 104  |
| 10*14326  | T    | 5-20-27 | JANET LEA BLANKENSHIP                                    | 792  | 580  |
| 10*14418  | T    | 5-20-27 | PPG INDUSTRIES, INC.                                     | 878  | 610  |

OPERATOR'S  
WELL #: HANSEN N-2HU WELL PLAT  
DISTRICT: Franklin PAGE 3 OF 3  
COUNTY: Marshall DATE: 06/27/2019  
STATE: WV REVISED: 07/08/2019  
API #: 47-051-02174



**TUG HILL  
OPERATING**

WW-6A1  
(5/13)

Operator's Well No. Hansen N-2HU

**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 |
|----------------------|-----------------------|-----------------------|---------|-----------|
|----------------------|-----------------------|-----------------------|---------|-----------|

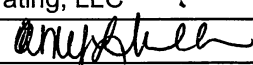
\*See attached pages

**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**

**4705102174**

**Operator's Well No. Hansen N - 2HU**

| 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         | NA  | NA  | NA  |
| 10*14493  | C    | 5-27-20 | BETTY JEAN NEELY     | GASTAR EXPLORATION USA, INC | 1/8+    | 748  | 468  | NA         | NA         | 21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger | 32/428 Gastar Exploration USA to Atinum Marcellus I LLC | 36/9 Gastar Exploration USA Inc to TH Exploration II, LLC |
| 10*14494  | C    | 5-27-20 | MARY LOU WILSON      | GASTAR EXPLORATION USA, INC | 1/8+    | 748  | 471  | NA         | NA         | 21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger | 32/428 Gastar Exploration USA to Atinum Marcellus I LLC | 36/9 Gastar Exploration USA Inc to TH Exploration II, LLC |
| 10*14495  | C    | 5-27-20 | PATRICIA HARTMAN     | GASTAR EXPLORATION USA, INC | 1/8+    | 752  | 197  | NA         | NA         | 21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger | 32/428 Gastar Exploration USA to Atinum Marcellus I LLC | 36/9 Gastar Exploration USA Inc to TH Exploration II, LLC |
| 10*14496  | C    | 5-27-20 | STEPHANIE L. HALL    | GASTAR EXPLORATION USA, INC | 1/8+    | 752  | 215  | NA         | NA         | 21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger | 32/428 Gastar Exploration USA to Atinum Marcellus I LLC | 36/9 Gastar Exploration USA Inc to TH Exploration II, LLC |
| 10*14497  | C    | 5-27-20 | CAROL DEEN GARDNER   | GASTAR EXPLORATION USA, INC | 1/8+    | 752  | 212  | NA         | NA         | 21/41 Gastar Exploration USA, Inc and Gastar Exploration Inc merger | 32/428 Gastar Exploration USA to Atinum Marcellus I LLC | 36/9 Gastar Exploration USA Inc to TH Exploration II, LLC |
| 10*22926  | C    | 5-27-20 | COVESTRO LLC         | TH EXPLORATION, LLC         | 1/8+    | 976  | 27   | NA         | NA         | NA  | NA  | NA  |

**4705102174**

4705108174

## WW-6A1 Supplement

Operator's Well No. Hansen N - 2HU

|          |   |         |                         |  |      |      |     |   |  |   |  |   |
|----------|---|---------|-------------------------|--|------|------|-----|---|--|---|--|---|
| 10*14565 | D | 5-28-10 | HARRY LEE<br>GOUDY      | CENTRAL<br>MICHIGAN<br>EXPLORATION LLC | 1/8+ | 670  | 59  | 21/288 Central<br>Michigan<br>Exploration LLC to<br>Stone Energy<br>Corporation | 21/356 Central<br>Michigan<br>Exploration LLC to<br>Stone Energy<br>Corporation<br>corrected | 34/113 Stone Energy<br>Corporation to Gastar<br>Exploration USA, Inc<br>and Atinum Marcellus I<br>LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>USA Inc to TH Exploration<br>II, LLC |
| 10*14418 | E | 5-28-9  | PPG INDUSTRIES,<br>INC. | GASTAR<br>EXPLORATION<br>USA, INC      | 1/8+ | 878  | 610 | NA  | NA   | NA  | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC     |
| 10*27022 | F | 5-28-2  | COVESTRO LLC            | TH EXPLORATION,<br>LLC                 | 1/8+ | 1046 | 431 | NA  | NA   | NA  | NA   | NA  |
| 10*14418 | G | 5-28-3  | PPG INDUSTRIES,<br>INC. | GASTAR<br>EXPLORATION<br>USA, INC      | 1/8+ | 878  | 610 | NA  | NA   | NA  | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC     |
| 10*14482 | G | 5-28-3  | RALPH EARNEST           | GASTAR<br>EXPLORATION<br>USA, INC      | 1/8+ | 745  | 578 | NA  | NA   | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC                                    | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC     |
| 10*14483 | G | 5-28-3  | CHARLES H<br>EARNEST    | GASTAR<br>EXPLORATION<br>USA, INC      | 1/8+ | 746  | 319 | NA  | NA   | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC                                    | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC     |
| 10*14484 | G | 5-28-3  | ARTHUR L JOSEPH         | GASTAR<br>EXPLORATION<br>USA, INC      | 1/8+ | 748  | 474 | NA  | NA   | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC                                    | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC     |

|          |   |        |                      |                                   |      |     |     |    |    |  |  |   |
|----------|---|--------|----------------------|-----------------------------------|------|-----|-----|----|----|--|--|---|
| 10*14485 | G | 5-28-3 | LINDA K HASSLEN      | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 748 | 476 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14486 | G | 5-28-3 | THOMAS<br>ATKINSON   | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 754 | 248 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14487 | G | 5-28-3 | DOUGLAS<br>ATKINSON  | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 754 | 577 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14488 | G | 5-28-3 | HEATHER GUIDRY       | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 754 | 244 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14489 | G | 5-28-3 | AUGUSTA L<br>SPIHER  | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 754 | 246 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14490 | G | 5-28-3 | JAMES WELCH JR       | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 752 | 445 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14491 | G | 5-28-3 | CHRISTOPHER<br>PRICE | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 752 | 208 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

|          |   |         |   |                                   |      |     |     |    |    |  |  |   |
|----------|---|---------|---|-----------------------------------|------|-----|-----|----|----|--|--|---|
| 10*14492 | G | 5-28-3  | MARJORIE A<br>MCLAUGHLIN                    | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 749 | 526 | NA | NA | 24/332 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14937 | H | 5-22-13 | JOHN M MOORE<br>AND MELANIE A<br>MOORE ETAL | GASTAR<br>EXPLORATION INC         | 1/8+ | 850 | 524 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14937 | I | 5-21-18 | JOHN M MOORE<br>AND MELANIE A<br>MOORE ETAL | GASTAR<br>EXPLORATION INC         | 1/8+ | 850 | 524 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14937 | J | 5-21-20 | JOHN M MOORE<br>AND MELANIE A<br>MOORE ETAL | GASTAR<br>EXPLORATION INC         | 1/8+ | 850 | 524 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14933 | K | 5-21-19 | CLARA LOU<br>HERRICK AND<br>EDWIN A HERRICK | GASTAR<br>EXPLORATION INC         | 1/8+ | 850 | 531 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14934 | K | 5-21-19 | GLENDA ROSE<br>MOORE                        | GASTAR<br>EXPLORATION INC         | 1/8+ | 849 | 564 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14935 | K | 5-21-19 | JOHN M MOORE<br>AND MELANIE A<br>MOORE      | GASTAR<br>EXPLORATION INC         | 1/8+ | 849 | 562 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14936 | K | 5-21-19 | LINDA L MOORE                               | GASTAR<br>EXPLORATION INC         | 1/8+ | 850 | 533 | NA | NA | NA   | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

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| 10*14933 | L | 5-21-19.1 | CLARA LOU<br>HERRICK AND<br>EDWIN A HERRICK | GASTAR<br>EXPLORATION INC | 1/8+ | 850 | 531 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14934 | L | 5-21-19.1 | GLEENDA ROSE<br>MOORE                       | GASTAR<br>EXPLORATION INC | 1/8+ | 849 | 564 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14947 | M | 5-21-22   | DANA<br>SMALLWOOD                           | GASTAR<br>EXPLORATION INC | 1/8+ | 850 | 520 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14948 | M | 5-21-22   | PEGGY L BROWN                               | GASTAR<br>EXPLORATION INC | 1/8+ | 850 | 522 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14947 | N | 5-21-23   | DANA<br>SMALLWOOD                           | GASTAR<br>EXPLORATION INC | 1/8+ | 850 | 520 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14948 | N | 5-21-23   | PEGGY L BROWN                               | GASTAR<br>EXPLORATION INC | 1/8+ | 850 | 522 | NA | NA | NA | NA | 34/302 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14418 | O | 5-21-24   | PPG INDUSTRIES,<br>INC.                     | GASTAR<br>EXPLORATION INC | 1/8+ | 878 | 610 | NA | NA | NA | NA | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC       |
| 10*14418 | P | 5-20-32   | PPG INDUSTRIES,<br>INC.                     | GASTAR<br>EXPLORATION INC | 1/8+ | 878 | 610 | NA | NA | NA | NA | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |



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| 10*14312 | Q | 5-20-33 | JAMIE LU BENSON         | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 790 | 531 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14313 | Q | 5-20-33 | TERRI JEAN<br>GODDARD   | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 790 | 585 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14314 | Q | 5-20-33 | RALPH BLACHLY           | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 790 | 529 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14315 | Q | 5-20-33 | MARGARET ROSS           | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 790 | 527 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14316 | Q | 5-20-33 | ANDREW GERST            | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 791 | 645 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14317 | Q | 5-20-33 | HAROLD BLACHLY          | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 791 | 643 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14318 | Q | 5-20-33 | MARTHA BLACHLY<br>CROSS | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 112 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

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| 10*14319 | Q | 5-20-33 | JACK J PEALZGRAF      | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 118 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14320 | Q | 5-20-33 | SANDRA CHEYNEY        | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 91  | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14321 | Q | 5-20-33 | HERBERT BLACHLY       | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 102 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14322 | Q | 5-20-33 | LOIS KAY<br>MORFORD   | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 110 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14327 | Q | 5-20-33 | ROBERT D OKEY         | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 646 | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14328 | Q | 5-20-33 | RAE ELLEN<br>STUART   | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 796 | 38  | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14329 | Q | 5-20-33 | TONDA<br>ROTHENBUHLER | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 796 | 40  | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

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| 10*14331 | Q | 5-20-33 | CHRISTINA JEAN<br>RIOUX     | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 796 | 70  | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14332 | Q | 5-20-33 | MICHAEL<br>EDWARD BARTH     | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 796 | 68  | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14333 | Q | 5-20-33 | DEAN<br>ROTHENBUHLER        | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 796 | 42  | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14355 | Q | 5-20-33 | DEWAYNE<br>STARKEY          | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 815 | 228 | NA | NA | 31/184 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 21/41 Gastar<br>Exploration USA, Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14356 | Q | 5-20-33 | FREDRIC & BETTY<br>RICHTER  | GASTAR<br>EXPLORATION INC         | 1/8+ | 822 | 270 | NA | NA | NA   | 32/428 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14362 | Q | 5-20-33 | CAROLYN<br>STARKEY          | GASTAR<br>EXPLORATION INC         | 1/8+ | 827 | 226 | NA | NA | NA   | 32/428 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14368 | Q | 5-20-33 | JOSEPH B LONG               | GASTAR<br>EXPLORATION INC         | 1/8+ | 836 | 106 | NA | NA | NA   | 32/428 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14371 | Q | 5-20-33 | THOMAS F &<br>JENNIFER LONG | GASTAR<br>EXPLORATION INC         | 1/8+ | 842 | 398 | NA | NA | NA   | 33/308 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC                | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

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| 10*14372 | Q | 5-20-33 | UNITED CHURCH HOMES INC                         | GASTAR EXPLORATION INC | 1/8+ | 846 | 408 | NA | NA | NA | NA | 34/302 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14377 | Q | 5-20-33 | JOSEPH A LONG                                   | GASTAR EXPLORATION INC | 1/8+ | 849 | 519 | NA | NA | NA | NA | 34/302 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14387 | Q | 5-20-33 | JOHN F & PAM LONG<br><small>HIVW/ATWVLE</small> | GASTAR EXPLORATION INC | 1/8+ | 849 | 542 | NA | NA | NA | NA | 34/302 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14388 | Q | 5-20-33 | CHURCH OF UNITED CC OF SALEM TWP                | GASTAR EXPLORATION INC | 1/8+ | 849 | 513 | NA | NA | NA | NA | 34/302 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14398 | Q | 5-20-33 | MARY J KAFFENBERGER                             | GASTAR EXPLORATION INC | 1/8+ | 860 | 434 | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14399 | Q | 5-20-33 | RITA ANN & RONALD DOEBERT                       | GASTAR EXPLORATION INC | 1/8+ | 860 | 437 | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14400 | Q | 5-20-33 | COLEEN SLAGLE & FRANKLIN SLAGLE JR              | GASTAR EXPLORATION INC | 1/8+ | 860 | 440 | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14401 | Q | 5-20-33 | IMELDA J SCURLOCK                               | GASTAR EXPLORATION INC | 1/8+ | 860 | 443 | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14402 | Q | 5-20-33 | CAROL F & RICHARD WILSON                        | GASTAR EXPLORATION INC | 1/8+ | 860 | 446 | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |

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| 10*14403 | Q | 5-20-33 | SUE WHITE                      | GASTAR<br>EXPLORATION INC | 1/8+ | 862 | 429 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14404 | Q | 5-20-33 | DON FORGRAVES                  | GASTAR<br>EXPLORATION INC | 1/8+ | 862 | 426 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14405 | Q | 5-20-33 | JOHN WHITE                     | GASTAR<br>EXPLORATION INC | 1/8+ | 862 | 423 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14406 | Q | 5-20-33 | WILLIAM V<br>BUCKNOR           | GASTAR<br>EXPLORATION INC | 1/8+ | 862 | 421 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14407 | Q | 5-20-33 | LESLIE F BUCKNOR               | GASTAR<br>EXPLORATION INC | 1/8+ | 862 | 419 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14408 | Q | 5-20-33 | LORNA M LONG<br>MORGAN         | GASTAR<br>EXPLORATION INC | 1/8+ | 864 | 323 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14409 | Q | 5-20-33 | JAMES C LONG &<br>PATTI LONG   | GASTAR<br>EXPLORATION INC | 1/8+ | 864 | 326 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14410 | Q | 5-20-33 | HENRY T LONG                   | GASTAR<br>EXPLORATION INC | 1/8+ | 867 | 385 | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |
| 10*14411 | Q | 5-20-33 | JOHN EDWARD<br>HARRIS JR ET AL | GASTAR<br>EXPLORATION INC | 1/8+ | 870 | 34  | NA | NA | NA | 35/119 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC |

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| 10*14412 | Q | 5-20-33 | THE VILLAGE NETWORK F/K/A BOYS VILLAGE | GASTAR EXPLORATION INC | 1/8+ | 872 | 203 | NA | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14413 | Q | 5-20-33 | JUANITA SANDIFFER                      | GASTAR EXPLORATION INC | 1/8+ | 872 | 206 | NA | NA | NA | NA | NA | 35/119 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14416 | Q | 5-20-33 | KATHERINE ANN WILLIAMS COTHRAN         | GASTAR EXPLORATION INC | 1/8+ | 879 | 1   | NA | NA | 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 | 5-20-33 | PPG INDUSTRIES, INC.                   | GASTAR EXPLORATION INC | 1/8+ | 878 | 610 | NA | NA | NA | NA | NA | 35/144 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*14419 | Q | 5-20-33 | CROSSROAD CHILD & FAMILY SERVICES, INC | GASTAR EXPLORATION INC | 1/8+ | 887 | 105 | NA | NA | NA | NA | NA | 35/575 Gastar Exploration Inc to Atinum Marcellus I LLC | 36/9 Gastar Exploration Inc to TH Exploration II, LLC |
| 10*15734 | Q | 5-20-33 | GENEVEVE L LONG                        | TH EXPLORATION, LLC    | 1/8+ | 904 | 13  | NA | NA | NA | NA | NA | NA  | NA  |
| 10*15760 | Q | 5-20-33 | DEIRDRE L WINGER AND DANIEL W WINGER   | TH EXPLORATION, LLC    | 1/8+ | 903 | 645 | NA | NA | NA | NA | NA | NA  | NA  |
| 10*15761 | Q | 5-20-33 | CAMERON CEMETARY ASSOCIATION INC       | TH EXPLORATION, LLC    | 1/8+ | 903 | 642 | NA | NA | NA | NA | NA | NA  | NA  |
| 10*15762 | Q | 5-20-33 | DAWN PETROVICH                         | TH EXPLORATION, LLC    | 1/8+ | 904 | 4   | NA | NA | NA | NA | NA | NA  | NA  |



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| 10*16358 | Q | 5-20-33 | ANNE MARIE<br>KRAMER AND<br>CHRISTOPHER E<br>CUEVAS | TH EXPLORATION,<br>LLC            | 1/8+ | 903 | 648 | NA | NA | NA | NA | 28/499 GASTAR<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | NA  | NA  | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*16454 | Q | 5-20-33 | CHURCH OF<br>CHRIST OF<br>CAMERON OHIO              | TH EXPLORATION,<br>LLC            | 1/8+ | 900 | 128 | NA | NA | NA | NA | NA   | NA  | NA  | NA  |
| 10*14307 | R | 5-20-28 | SALLY CYNTHIA<br>HOPKINS                            | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 777 | 572 | NA | NA | NA | NA | 28/499 GASTAR<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 GASTAR<br>Exploration USA Inc and<br>GASTAR Exploration Inc<br>merger | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |   |
| 10*14308 | R | 5-20-28 | MARY E BASSETT                                      | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 779 | 492 | NA | NA | NA | NA | 28/499 GASTAR<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 GASTAR<br>Exploration USA Inc and<br>GASTAR Exploration Inc<br>merger | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |   |
| 10*14309 | R | 5-20-28 | ROBERT B<br>THOMAS                                  | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 779 | 484 | NA | NA | NA | NA | 28/499 GASTAR<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 GASTAR<br>Exploration USA Inc and<br>GASTAR Exploration Inc<br>merger | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |   |
| 10*14310 | R | 5-20-28 | JEAN C THOMAS                                       | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 781 | 614 | NA | NA | NA | NA | 28/499 GASTAR<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 GASTAR<br>Exploration USA Inc and<br>GASTAR Exploration Inc<br>merger | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |   |
| 10*14324 | R | 5-20-28 | RUTH E BASSETT<br>MEADOWS                           | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 100 | NA | NA | NA | NA | 29/157 GASTAR<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 GASTAR<br>Exploration USA Inc and<br>GASTAR Exploration Inc<br>merger | 36/9 GASTAR Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |   |



|          |   |         |                           |                             |      |     |     |    |    |  |  |   |
|----------|---|---------|---------------------------|-----------------------------|------|-----|-----|----|----|--|--|---|
| 10*14325 | R | 5-20-28 | ELIZABETH ANN STRAUSBAUGH | GASTAR EXPLORATION USA, INC | 1/8+ | 792 | 104 | NA | NA | 29/157 Gastar Exploration USA Inc to Atinum Marcellus I LLC  | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |
| 10*14326 | R | 5-20-28 | JANET LEA BLANKENSHIP     | GASTAR EXPLORATION USA, INC | 1/8+ | 792 | 580 | NA | NA | 30/136 Gastar Exploration USA Inc to Atinum Marcellus I LLC  | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |
| 10*14418 | R | 5-20-28 | 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 14418 |
| 10*14307 | S | 5-20-29 | SALLY CYNTHIA HOPKINS     | GASTAR EXPLORATION USA, INC | 1/8+ | 777 | 572 | NA | NA | 28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |
| 10*14308 | S | 5-20-29 | MARY E BASSETT            | GASTAR EXPLORATION USA, INC | 1/8+ | 779 | 492 | NA | NA | 28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |
| 10*14309 | S | 5-20-29 | ROBERT B THOMAS           | GASTAR EXPLORATION USA, INC | 1/8+ | 779 | 484 | NA | NA | 28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |
| 10*14310 | S | 5-20-29 | JEAN C THOMAS             | GASTAR EXPLORATION USA, INC | 1/8+ | 781 | 614 | NA | NA | 28/499 Gastar Exploration USA, Inc to Atinum Marcellus I LLC | 41/21 Gastar Exploration USA Inc and Gastar Exploration Inc merger | 36/9 Gastar Exploration Inc to TH Exploration II, LLC 14418 |

**WW-6A1 Supplement**

**4705102174**

**Operator's Well No. Hansen N - 2HU**

|          |   |         |                              |                                   |      |     |     |    |    |  |   |   |
|----------|---|---------|------------------------------|-----------------------------------|------|-----|-----|----|----|--|---|---|
| 10*14324 | S | 5-20-29 | RUTH E BASSETT<br>MEADOWS    | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 100 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14325 | S | 5-20-29 | ELIZABETH ANN<br>STRAUSBAUGH | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 104 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14326 | S | 5-20-29 | JANET LEA<br>BLANKENSHIP     | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 580 | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14418 | S | 5-20-29 | PPG INDUSTRIES,<br>INC.      | GASTAR<br>EXPLORATION INC         | 1/8+ | 878 | 610 | NA | NA | NA   | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC               | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14307 | T | 5-20-27 | SALLY CVNTHIA<br>HOPKINS     | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 777 | 572 | NA | NA | 28/499 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14308 | T | 5-20-27 | MARY E BASSETT               | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 779 | 492 | NA | NA | 28/499 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14309 | T | 5-20-27 | ROBERT B<br>THOMAS           | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 779 | 484 | NA | NA | 28/499 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |

**WW-6A1 Supplement**

**4705108174**

**Operator's Well No. Hansen N - 2HU**

|          |   |         |                              |                                   |      |     |     |    |    |  |   |   |
|----------|---|---------|------------------------------|-----------------------------------|------|-----|-----|----|----|--|---|---|
| 10*14310 | T | 5-20-27 | JEAN C THOMAS                | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 781 | 614 | NA | NA | 28/499 Gastar<br>Exploration USA, Inc to<br>Atinum Marcellus I LLC | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14324 | T | 5-20-27 | RUTH E BASSETT<br>MEADOWS    | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 100 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14325 | T | 5-20-27 | ELIZABETH ANN<br>STRAUSBAUGH | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 104 | NA | NA | 29/157 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14326 | T | 5-20-27 | JANET LEA<br>BLANKENSHIP     | GASTAR<br>EXPLORATION<br>USA, INC | 1/8+ | 792 | 580 | NA | NA | 30/136 Gastar<br>Exploration USA Inc to<br>Atinum Marcellus I LLC  | 41/21 Gastar<br>Exploration USA Inc and<br>Gastar Exploration Inc<br>merger | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |
| 10*14418 | T | 5-20-27 | PPG INDUSTRIES,<br>INC.      | GASTAR<br>EXPLORATION INC         | 1/8+ | 878 | 610 | NA | NA | NA   | 35/144 Gastar<br>Exploration Inc to<br>Atinum Marcellus I LLC               | 36/9 Gastar Exploration<br>Inc to TH Exploration II,<br>LLC 14418 |



AFFIDAVIT

**COPY**

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

4705102174

On this 18<sup>th</sup> 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 18<sup>th</sup> day of October, 2016.

David D. Kalish  
Affiant: David D. Kalish

JURAT

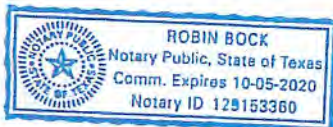
Jan Pest  
MARSHALL County 03:44:28 PM  
Instrument No 1416299  
Date Recorded 10/19/2016  
Document Type HIS  
Pages Recorded 1  
Book-Page 28-62  
Recording Fee \$5.00  
Additional \$6.00

Received  
JAN 18 2019

STATE OF TEXAS §  
§ SS  
COUNTY OF TARRANT §

Sworn and subscribed to (or affirmed) before me on this, the 18<sup>th</sup> 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





January 24, 2019

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

RE: Hansen N-2HU

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-2HU 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](mailto: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**

**4705102174**

Date of Notice Certification: 01/25/2019

API No. 47- 051 -  
Operator's Well No. Hansen N-2HU  
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>515,914.75</u>                         |
| County: <u>Marshall</u>                     | UTM NAD 83 Northing: <u>4,397,429.97</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.

|   |   |
|---|---|
| <p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><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</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p> | <p><b>OOG OFFICE USE ONLY</b></p> <p><input type="checkbox"/> RECEIVED/<br/>NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/<br/>NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> |
|---|---|

**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.

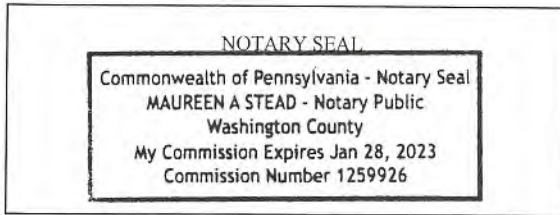


4705102174

**Certification of Notice is hereby given:**

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

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



Subscribed and sworn before me this 25 day of JANUARY, 2019.  
Maureen A Stead Notary Public  
 My Commission Expires 1/28/23

**Oil and Gas Privacy Notice:**

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

*1/25/2019*

APR 20 1973

Commonwealth of Pennsylvania - Notary Seal  
MAUREN A STAD - Notary Public  
Washington County  
My Commission Expires Jan 28, 2023  
Commission Number 128928

WW-6A  
(9-13)

4705102174  
API NO. 47- 051  
OPERATOR WELL NO. Hansen N-2HU  
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: \_\_\_\_\_

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(s) (Road and/or Other Disturbance)  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)  
Name: none  
Address: \_\_\_\_\_

SURFACE OWNER(s) (Impoundments or Pits)  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

OPERATOR OF ANY NATURAL GAS STORAGE FIELD  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_

\*Please attach additional forms if necessary

5 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 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://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

WW-6A  
(8-13)

4705102174  
API NO. 47-051 -  
OPERATOR WELL NO. Hansen N-2HU  
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 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

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

APPROVED  
7 8 2019

**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 4 8 2019

WW-6A  
(8-13)

API NO. 47-03 **4705102174**  
OPERATOR WELL NO. Hansen N-2HU  
Well Pad Name: Hansen

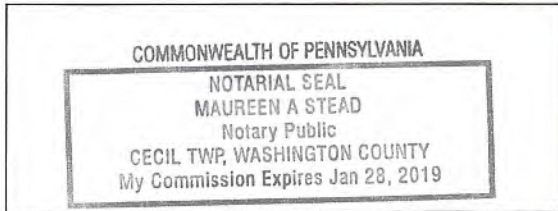
**Notice is hereby given by:**

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

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

**Oil and Gas Privacy Notice:**

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

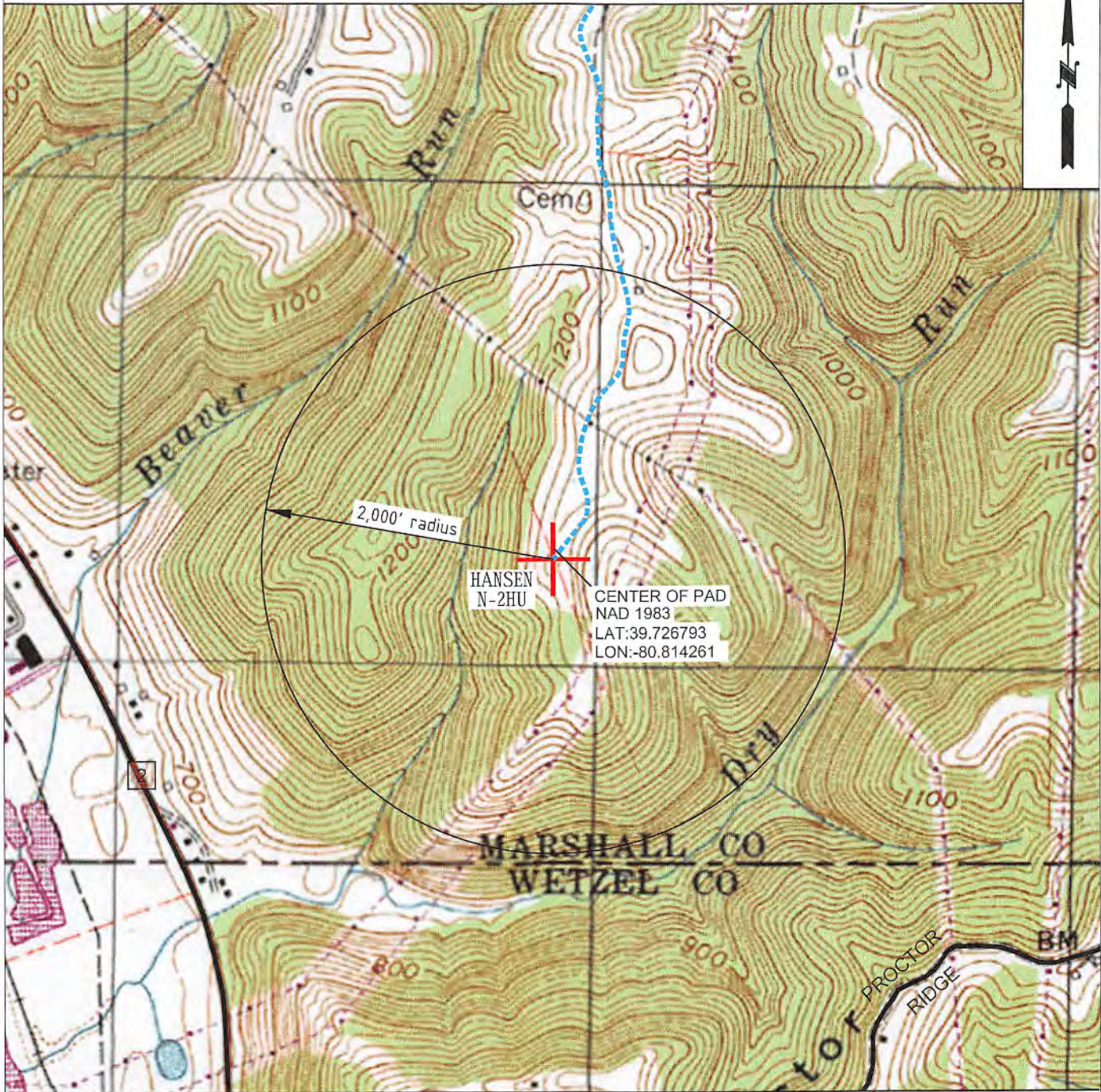
WW-6A

**PROPOSED** JAN 4 8 2019  
**HANSEN N-2HU**

SUPPLEMENT PG 1

Office of Oil and Gas  
 WV Dept. of Environmental Protection

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



|  |           |                       |                  |
|--|-----------|-----------------------|------------------|
| OPERATOR   | 494510851 | TOPO SECTION          | LEASE NAME       |
| TUG HILL OPERATING, LLC<br>380 SOUTHPOINTE BLVD<br>SUITE 200<br>CANONSBURG, PA 15317 |           | NEW MARTINSVILLE 7.5' | HANSEN           |
|  |           | SCALE:                | DATE:            |
|  |           | 1" = 1000'            | DATE: 01/17/2019 |



4705102174

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: West Virginia  
County: Marshall  
District: Franklin  
Quadrangle: New Martinsville 7.5'

Approx. Latitude & Longitude: 39.4336.5; -80.4851.3  
Public Road Access: Wells Hill Lane (CR 2/2)  
Watershed: French Creek - Ohio River  
Generally used farm name: Covestro, LLC

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 57<sup>th</sup> 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](http://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

**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](mailto:depprivacyofficer@wv.gov).

Received  
JAN 14 2018  
Office of Oil and Gas  
WV Dept. of Environmental Protection

**4705102174**

**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

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>515,914.75</u>    |
| County: <u>Marshall</u>                     |   | Northing: <u>4,397,429.97</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 57<sup>th</sup> Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting [www.dep.wv.gov/oil-and-gas/pages/default.aspx](http://www.dep.wv.gov/oil-and-gas/pages/default.aspx).

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

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

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*Received*  
1/24/2019



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 57<sup>th</sup> Street, SE  
 Charleston, WV 25304

Subject: DOH Permit for the Hansen Pad, Marshall County  
 Hansen N-2HU 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,

A handwritten signature in blue ink that reads "Gary K. Clayton".

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



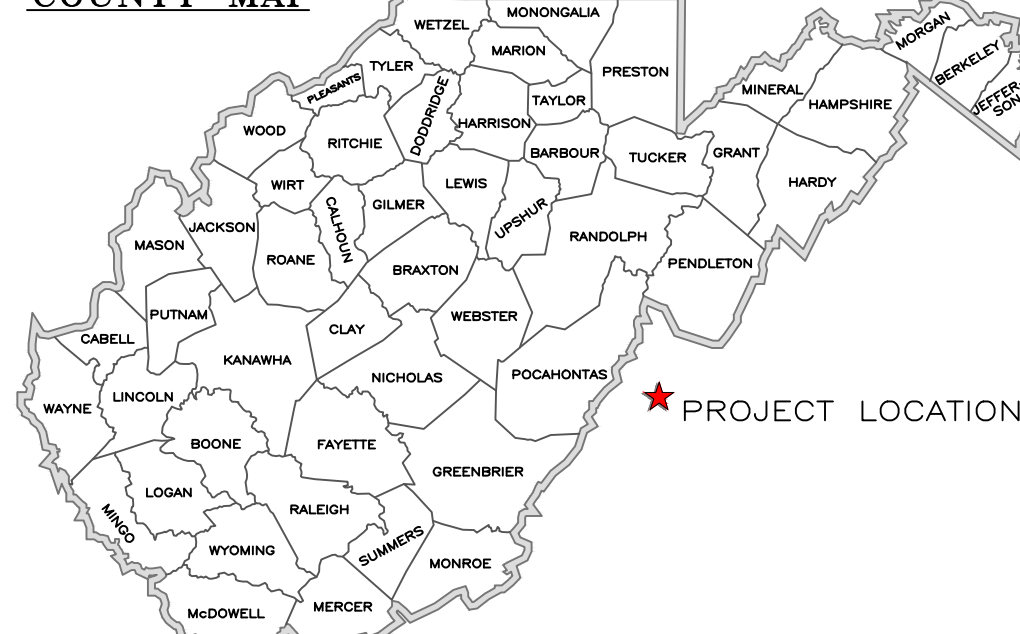
TUG HILL 4705102174

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<br>Quaternary ammonium chloride<br>CAS# 007173-51-5<br>Alky dimethyl benzyl ammonium<br>Chloride (C12-16) – CAS#068424-85-1<br>Ethanol – CAS# 000064-17-5<br>Water – CAS# 007732-18-5 |
| FRAC SAND     | Silica Sand (various Mesh sizes) | Proppant         | Crystalline silica (quartz)<br>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,<br>(Not Associated with Diesel Fuel)<br>Guar gum – CAS# 009000-30-0  |
| FRW-18        |                                  | Friction Reducer | Hydrotreated light distillate<br>CAS# 064742-47-8  |
| Scaletrol     |                                  | Scale Inhibitor  | Ethylene glycol – CAS# 000107-21-1<br>Diethylene glycol – CAS# 000111-46-6   |

Received  
JAN 4 8 2019  
Office of Oil and Gas  
West Virginia Department of Environmental Protection

**WEST VIRGINIA COUNTY MAP**



# Hansen Well Site

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

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

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

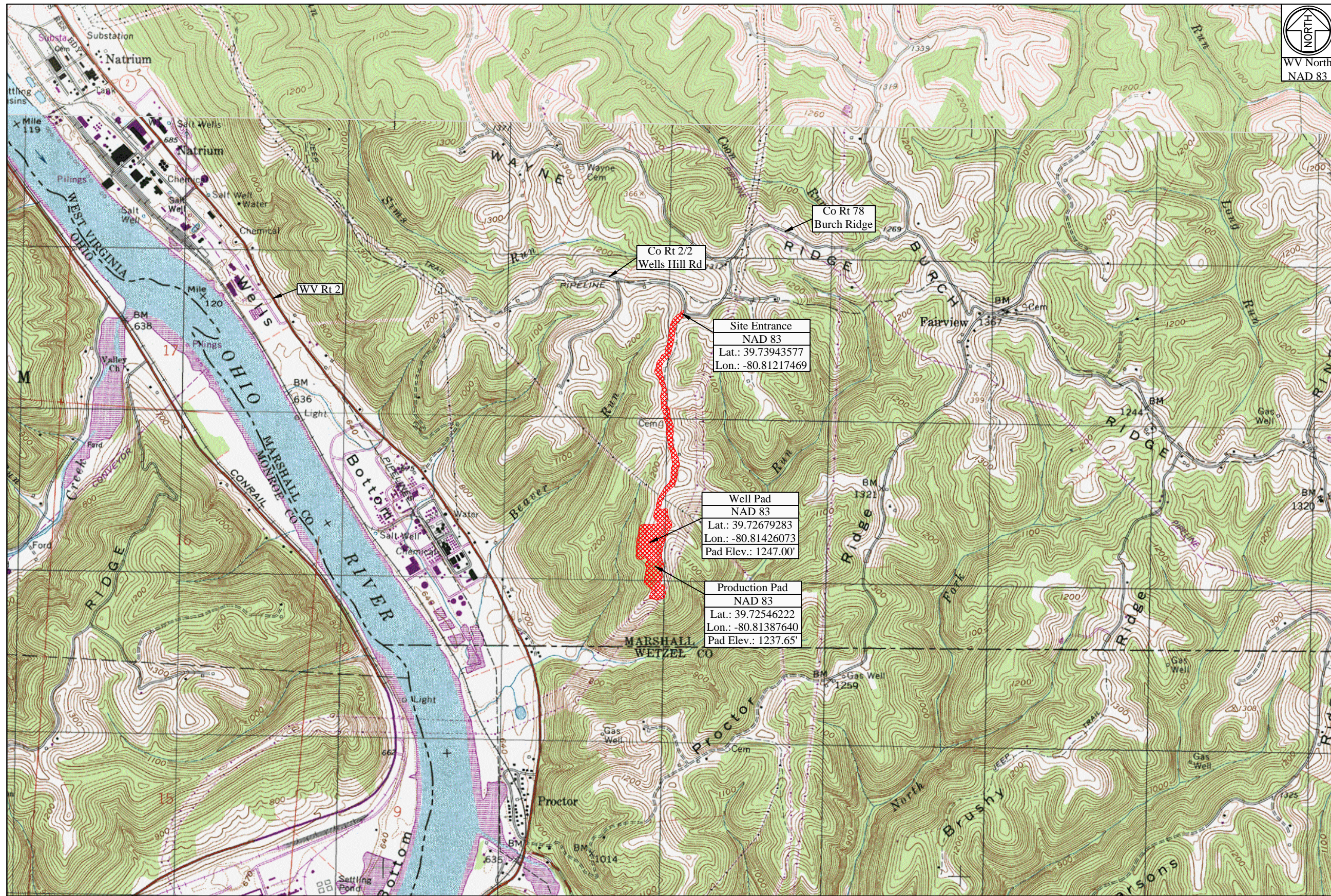
## Exhibit A: Final Design: Issue for Permitting

| 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            |
| <b>Site Totals (Ac)</b>                       | <b>6.22</b> | <b>0.91</b> | <b>5.48</b> | <b>2.13</b> | <b>13.54</b>   | <b>28.28</b>  |                 |

| Site Entrance   | Center of Well Pad   | Center of Production Pad   |
|---|--|--|
| WV-N NAD 83 N: 454134.91<br>WV-N NAD 83 E: 1599517.96<br>WV-N NAD 27 N: 454098.98<br>WV-N NAD 27 E: 1630955.93<br>Lat. NAD 83: 39.73943577<br>Lon. NAD 83: -80.81217469<br>Lat. NAD 27: 39.73935892<br>Lon. NAD 27: -80.81235959<br>UTM 17 NAD 83 N: 4598854.65<br>UTM 17 NAD 83 E: 516093.49 | WV-N NAD 83 N: 449538.81<br>WV-N NAD 83 E: 1598864.04<br>WV-N NAD 27 N: 449502.93<br>WV-N NAD 27 E: 1630302.19<br>Lat. NAD 83: 39.72679283<br>Lon. NAD 83: -80.81426073<br>Lat. NAD 27: 39.72671589<br>Lon. NAD 27: -80.81444491<br>UTM 17 NAD 83 N: 4397451.10<br>UTM 17 NAD 83 E: 515917.66<br>Pad Elev.: 1247.00' | WV-N NAD 83 N: 449052.61<br>WV-N NAD 83 E: 1598965.04<br>WV-N NAD 27 N: 449016.73<br>WV-N NAD 27 E: 1630403.20<br>Lat. NAD 83: 39.72546222<br>Lon. NAD 83: -80.81387640<br>Lat. NAD 27: 39.72538526<br>Lon. NAD 27: -80.81406053<br>UTM 17 NAD 83 N: 4397303.49<br>UTM 17 NAD 83 E: 515950.90<br>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<br/>WV-N NAD 83 E: 1598849.80<br/>WV-N NAD 27 N: 449414.10<br/>WV-N NAD 27 E: 1630287.95<br/>Lat. NAD 83: 39.72654843<br/>Lon. NAD 83: -80.81430676<br/>Lat. NAD 27: 39.72647149<br/>Lon. NAD 27: -80.81449092<br/>UTM 17 NAD 83 (m) N: 4397423.97<br/>UTM 17 NAD 83 (m) E: 515913.77</td> <td>WV-N NAD 83 N: 449469.63<br/>WV-N NAD 83 E: 1598853.35<br/>WV-N NAD 27 N: 449433.75<br/>WV-N NAD 27 E: 1630291.50<br/>Lat. NAD 83: 39.72650250<br/>Lon. NAD 83: -80.81429514<br/>Lat. NAD 27: 39.72652556<br/>Lon. NAD 27: -80.81447931<br/>UTM 17 NAD 83 (m) N: 4397429.97<br/>UTM 17 NAD 83 (m) E: 515914.75</td> <td>WV-N NAD 83 N: 449489.50<br/>WV-N NAD 83 E: 1598856.23<br/>WV-N NAD 27 N: 449433.62<br/>WV-N NAD 27 E: 1630297.61<br/>Lat. NAD 83: 39.72667177<br/>Lon. NAD 83: -80.81428593<br/>Lat. NAD 27: 39.72658023<br/>Lon. NAD 27: -80.81447010<br/>UTM 17 NAD 83 (m) N: 4397436.04<br/>UTM 17 NAD 83 (m) E: 515915.53</td> <td>WV-N NAD 83 N: 449509.16<br/>WV-N NAD 83 E: 1598859.46<br/>WV-N NAD 27 N: 449433.28<br/>WV-N NAD 27 E: 1630297.61<br/>Lat. NAD 83: 39.72671126<br/>Lon. NAD 83: -80.81427541<br/>Lat. NAD 27: 39.72663432<br/>Lon. NAD 27: -80.81455965<br/>UTM 17 NAD 83 (m) N: 4397442.05<br/>UTM 17 NAD 83 (m) E: 515916.41</td> <td>WV-N NAD 83 N: 449529.26<br/>WV-N NAD 83 E: 1598862.00<br/>WV-N NAD 27 N: 449493.38<br/>WV-N NAD 27 E: 1630300.15<br/>Lat. NAD 83: 39.72676654<br/>Lon. NAD 83: -80.81426750<br/>Lat. NAD 27: 39.72668960<br/>Lon. NAD 27: -80.8145167<br/>UTM 17 NAD 83 (m) N: 4397448.18<br/>UTM 17 NAD 83 (m) E: 515917.08</td> </tr> </tbody> </table><br><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<br/>WV-N NAD 83 E: 1598865.57<br/>WV-N NAD 27 N: 449512.81<br/>WV-N NAD 27 E: 1630303.72<br/>Lat. NAD 83: 39.72682002<br/>Lon. NAD 83: -80.8142582<br/>Lat. NAD 27: 39.72674308<br/>Lon. NAD 27: -80.81443999<br/>UTM 17 NAD 83 (m) N: 4397454.12<br/>UTM 17 NAD 83 (m) E: 515918.07</td> <td>WV-N NAD 83 N: 449568.65<br/>WV-N NAD 83 E: 1598868.34<br/>WV-N NAD 27 N: 449532.77<br/>WV-N NAD 27 E: 1630306.48<br/>Lat. NAD 83: 39.72682002<br/>Lon. NAD 83: -80.8142582<br/>Lat. NAD 27: 39.72679799<br/>Lon. NAD 27: -80.81443120<br/>UTM 17 NAD 83 (m) N: 4397460.22<br/>UTM 17 NAD 83 (m) E: 515918.81</td> <td>WV-N NAD 83 N: 449588.22<br/>WV-N NAD 83 E: 1598871.68<br/>WV-N NAD 27 N: 449552.34<br/>WV-N NAD 27 E: 1630309.82<br/>Lat. NAD 83: 39.72692878<br/>Lon. NAD 83: -80.81423615<br/>Lat. NAD 27: 39.72685184<br/>Lon. NAD 27: -80.81441174<br/>UTM 17 NAD 83 (m) N: 4397466.19<br/>UTM 17 NAD 83 (m) E: 515919.73</td> <td>WV-N NAD 83 N: 449608.06<br/>WV-N NAD 83 E: 1598874.39<br/>WV-N NAD 27 N: 449572.17<br/>WV-N NAD 27 E: 1630312.53<br/>Lat. NAD 83: 39.72693354<br/>Lon. NAD 83: -80.81422755<br/>Lat. NAD 27: 39.72690640<br/>Lon. NAD 27: -80.81441174<br/>UTM 17 NAD 83 (m) N: 4397472.25<br/>UTM 17 NAD 83 (m) E: 515920.46</td> </tr> </tbody> </table> | Hansen IH   | Hansen N-2HU  | Hansen 3HU  | Hansen N-4HU   | Hansen 5H | WV-N NAD 83 N: 449449.99<br>WV-N NAD 83 E: 1598849.80<br>WV-N NAD 27 N: 449414.10<br>WV-N NAD 27 E: 1630287.95<br>Lat. NAD 83: 39.72654843<br>Lon. NAD 83: -80.81430676<br>Lat. 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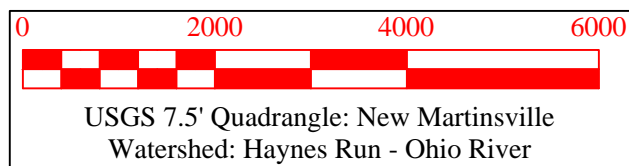


WV State Plane Coordinate System  
North Zone, NAD 83  
Elevations Based on NAV88  
Established By Survey Grade GPS  
and OPUS Post-Processing

| 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        |
| <b>Total Disturbed Area</b>      | <b>53.83 Ac</b> |
| <b>Additional Information</b>    |                 |
| 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             |
| <b>Totals</b>                     | <b>4,467.70</b> | <b>4,831.90</b>                 | <b>2,762.34</b> | <b>3,126.54</b> |            |                 |
| 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.

**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 22 (Wells Hill Rd). Follow Co Rt 22 for 2.0 mi. The site entrance will be on the Right (South) side of the road.

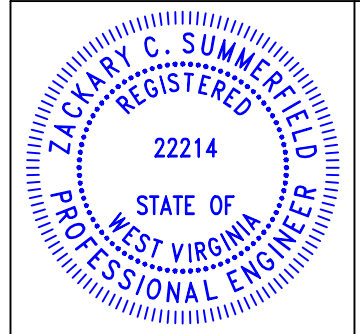
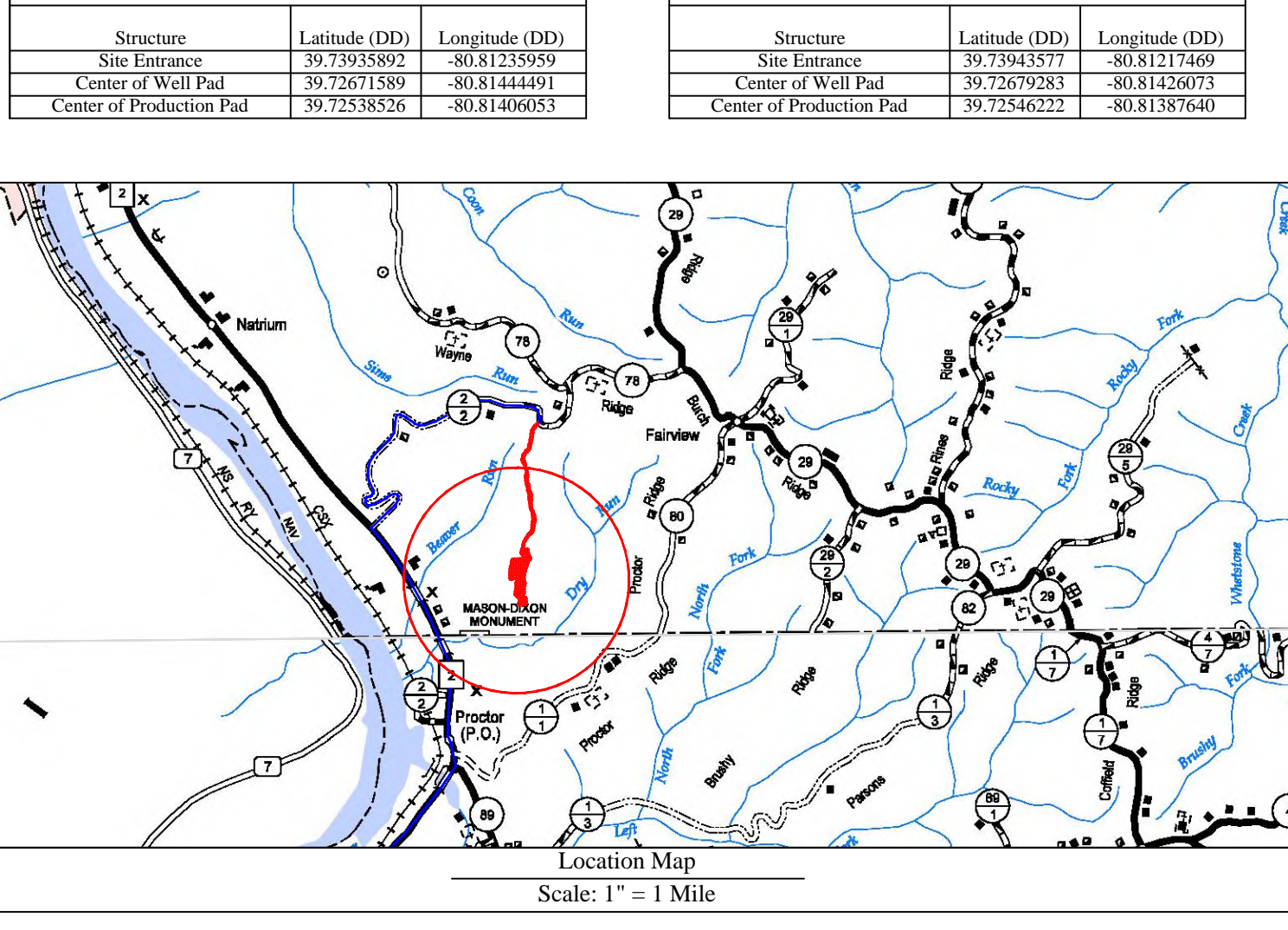
**Well Location Restrictions**  
All Pad construction complies with the following restrictions.  
\*250' from an existing well or developed spring used for human or domestic animals.  
\*625' from an occupied dwelling or barn greater than 2,500 SF used for poultry or dairy measured from the center of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

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

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

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

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



Design Certification  
The drawings, construction notes and reference diagrams attached hereto have been prepared in accordance with the West Virginia Code of State Rules, Division of Environmental Protection, Office of Oil and Gas, 39CSR30.  
All Plans, Sheets, and/or Reference Diagrams included in this design constitute a complete set of plans. A complete set of plans is necessary to construct the site in accordance with the design.  
Zachary C. Summerfield  
RPE 22214  
Kelly Surveying PLLC  
CO# 004232-09  
Date: 01-20-2019

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

Revision: Design  
Date: 01-20-2019

**TUG HILL OPERATING**

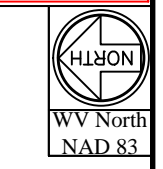
THIS DOCUMENT PREPARED FOR TUG HILL OPERATING

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

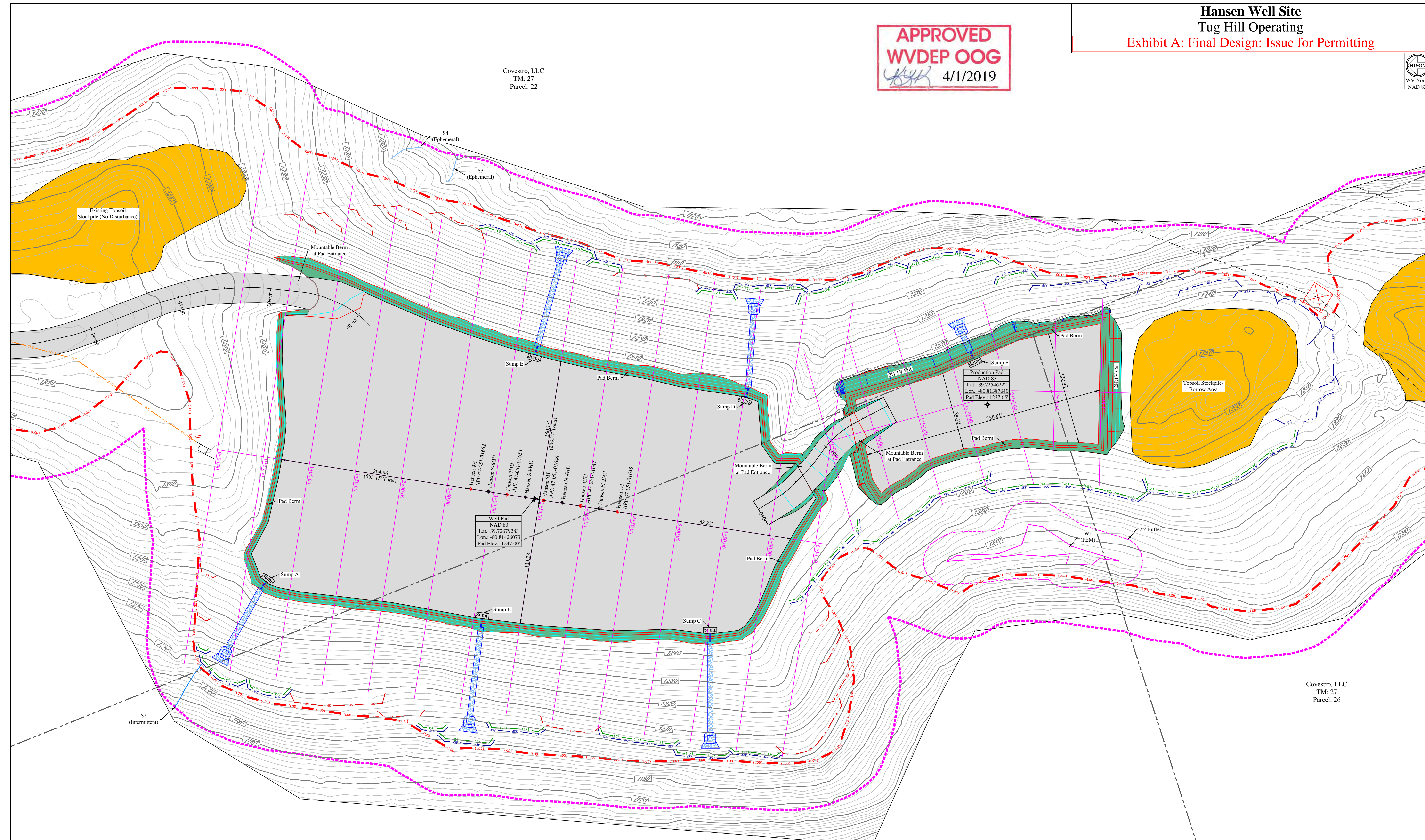
Cover Sheet  
**Hansen Well Site**  
Franklin District  
Marshall County, WV

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

**APPROVED**  
WVDEP OOG  
4/1/2019



Covestro, LLC  
TM: 27  
Parcel: 22

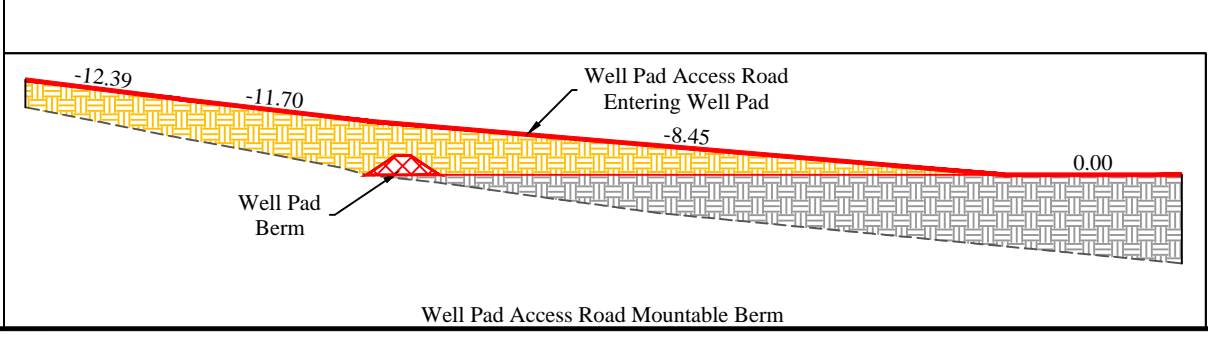
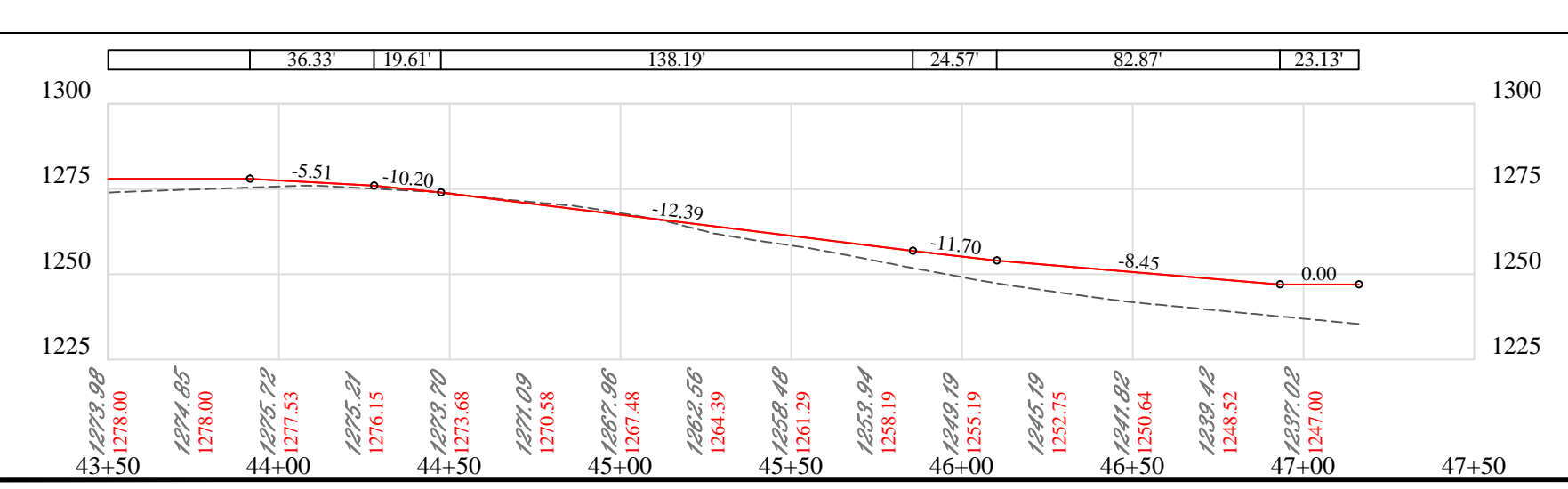


Well Pad  
NAD 83  
Lat.: -80.81426073  
Lon.: -80.81387640  
Pad Elev.: 1247.00'

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

Covestro, LLC  
TM: 27  
Parcel: 21

Covestro, LLC  
TM: 27  
Parcel: 26



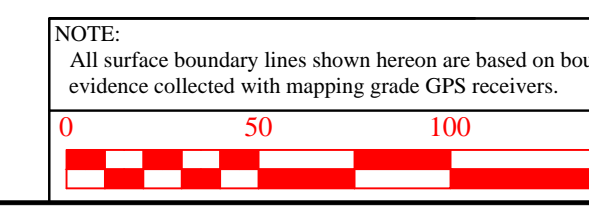
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|---------------|-------------|-------------|-------------|
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| Covestro, LLC | 28-9        | 1,065.55'   | Access Road |
| Covestro, LLC | 28-8        | 966.56'     | Access Road |
| Covestro, LLC | 27-22       | 2,684.23'   | Access Road |
| Covestro, LLC | 27-21       | 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   | 2.13 Ac         |
| Additional Clearing         | 13.54 Ac        |
| <b>Total Disturbed Area</b> | <b>28.28 Ac</b> |

| 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