

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

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Office of Oil and Gas

JUN 10 2020

WV Department of  
Environmental Protection

API 47 - 051 - 01972 County Marshall District Franklin  
Quad Powhatan Point Pad Name Corley Field/Pool Name \_\_\_\_\_  
Farm name Corley, James A. and Jill C. Well Number Corley N-7HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 1320 S. University Drive, Suite 215 City Ft. Worth State TX Zip 76107

As Drilled location NAD 83 UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,400,370.15 Easting 520,287.64  
Landing Point of Curve Northing 4,400,847.66 Easting 520,036.16  
Bottom hole Northing 4,402,693.70 Easting 518,963.60

Elevation (ft) 1254.22' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Completion  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

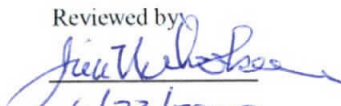
Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additives SOBM; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; Specific additives per WSSP and Permit.

Date permit issued 1/2/2018 Date drilling commenced 7/11/2018 Date drilling ceased 7/28/2018  
Date completion activities began 12/21/2018 Date completion activities ceased 2/23/2019  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 70' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1595' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 947' - 980', 1064' - 1072' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by  
  
6/22/2020

API 47-051 - 01972 Farm name Corley, James A. and Jill C. Well number Corley N-7HM

| CASING STRINGS            | Hole Size | Casing Size | Depth   | New or Used | Grade wt/ft | Basket Depth(s) | Did cement circulate (Y/ N)<br>* Provide details below* |
|---------------------------|-----------|-------------|---------|-------------|-------------|-----------------|---|
| Conductor                 | 36"       | 30"         | 120'    | NEW         | 94.5#       | N/A             | Y   |
| Surface                   | 17 1/2"   | 13 3/8"     | 1,013'  | NEW         | 54.5#       | N/A             | Y   |
| Coal                      | 17 1/2"   | 13 3/8"     | 1,013'  | NEW         | 54.5#       | N/A             | Y   |
| Intermediate 1            | 12 1/4"   | 9 5/8"      | 2,627'  | NEW         | 36#         | N/A             | Y   |
| Intermediate 2            |           |             |         |             |             |                 |   |
| Intermediate 3            |           |             |         |             |             |                 |   |
| Production                | 8 3/4"    | 5 1/2"      | 14,234' | NEW         | 20#         | N/A             | Y   |
| Tubing                    |           | 2 3/8"      | 7,117'  | NEW         | 4.7#        | N/A             |   |
| Packer type and depth set |           |             |         |             |             |                 |   |

Comment Details

| CEMENT DATA    | Class/Type of Cement | Number of Sacks | Slurry wt (ppg) | Yield (ft <sup>3</sup> /sks) | Volume (ft <sup>3</sup> ) | Cement Top (MD) | WOC (hrs) |
|----------------|----------------------|-----------------|-----------------|------------------------------|---------------------------|-----------------|-----------|
| Conductor      | A                    |                 | 15.6            | 1.19                         |                           | 0               | 8         |
| Surface        | A                    | 1073            | 15.6            | 1.19                         | 1277                      | 0               | 8         |
| Coal           | A                    | 1073            | 15.6            | 1.19                         | 1277                      | 0               | 8         |
| Intermediate 1 | A                    | 878             | 15.6            | 1.19                         | 1045                      | 0               | 8         |
| Intermediate 2 |                      |                 |                 |                              |                           |                 |           |
| Intermediate 3 |                      |                 |                 |                              |                           |                 |           |
| Production     | A                    | 3557            | 14.5            | 1.17                         | 4176                      | 0               | 8         |
| Tubing         |                      |                 |                 |                              |                           |                 |           |

Drillers TD (ft) 14,257' Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated (ft) n/a Plug back to (ft) n/a  
 Plug back procedure n/a

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Kick off depth (ft) 6,067'

Check all wireline logs run:  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 3 centralizers on surface casing at equal distance.  
Intermediate - one centralizer every other joint  
 Production - one centralizer every other joint

WAS WELL COMPLETED AS SHOT HOLE?  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED AS OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED? Yes  No  TYPE OF TRACER(S) USED \_\_\_\_\_

API 47- 051 - 01972

Farm name Corley, James A. and Jill C.

Well number Corley N-7HM

**PERFORATION RECORD**

| Stage No. | Perforation date | Perforated from MD ft. | Perforated to MD ft. | Number of Perforations | Formation(s) |
|-----------|------------------|------------------------|----------------------|------------------------|--------------|
|           | *See attached    |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
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|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |
|           |                  |                        |                      |                        |              |

Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

| Stage No. | Stimulations Date | Ave Stage Rate (bbl/d) | Ave Treatment Pressure (PSI) | Max Breakdown Pressure (PSI) | ISIP (PSI) | Amount of Proppant (lbs) | Amount of Water (bbls) | Amount of Nitrogen/other (units) |
|-----------|-------------------|------------------------|------------------------------|------------------------------|------------|--------------------------|------------------------|----------------------------------|
|           |                   |                        | *see attached                |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |
|           |                   |                        |                              |                              |            |                          |                        |                                  |

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Please insert additional pages as applicable.

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| PRODUCING FORMATION(S) | DEPTHS        |                       |
|------------------------|---------------|-----------------------|
| Marcellus              | 6,602'-6,560' | TVD 7,092'-14,257' MD |
|                        |               |                       |
|                        |               |                       |
|                        |               |                       |

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1132 psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 0 bpd Oil 0 bpd NGL 0 bpd Water 600 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

| LITHOLOGY/<br>FORMATION | TOP                  | BOTTOM             | TOP               | BOTTOM            | DESCRIBE ROCK TYPE AND RECORD QUANTITY AND<br>TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC) |
|-------------------------|----------------------|--------------------|-------------------|-------------------|--|
|                         | DEPTH IN<br>NAME TVD | DEPTH IN FT<br>TVD | DEPTH IN FT<br>MD | DEPTH IN FT<br>MD |  |
| *See attachment         | 0                    |                    | 0                 |                   |  |
|                         |                      |                    |                   |                   |  |
|                         |                      |                    |                   |                   |  |
|                         |                      |                    |                   |                   |  |
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|                         |                      |                    |                   |                   |  |
|                         |                      |                    |                   |                   |  |
|                         |                      |                    |                   |                   |  |

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling Address 10350 Richmond Avenue, Suite 700 City Houston State TX Zip 77042

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Logging Company n/a Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

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Cementing Company C&J Well Services Address 380 Southpointe Boulevard, Suite 210 City Canonsburg State PA Zip 15317

Stimulating Company Hartman Energy Services, Inc. Address 121 Champion Way, Suite 200 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Amy L. Miller Telephone 304-376-0111  
Signature *Amy L. Miller* Title Permitting Specialist Date 3/23/2020

**Corley N-7HM**  
**PEFORATION RECORD**

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| Stage No. | Perforation Date | Perforated from MD ft. | Perforated to MD. Ft. | Number of Perforations | Formation(s) |
|-----------|------------------|------------------------|-----------------------|------------------------|--------------|
| 1         | 1/23/2019        | 14,083                 | 14,134                | 16                     | Marcellus    |
| 2         | 1/24/2019        | 13,869                 | 14,014                | 48                     | Marcellus    |
| 3         | 1/25/2019        | 13,694                 | 13,839                | 48                     | Marcellus    |
| 4         | 1/25/2019        | 13,520                 | 13,665                | 48                     | Marcellus    |
| 5         | 1/25/2019        | 13,345                 | 13,490                | 48                     | Marcellus    |
| 6         | 1/26/2019        | 13,171                 | 13,316                | 48                     | Marcellus    |
| 7         | 1/26/2019        | 12,996                 | 13,141                | 48                     | Marcellus    |
| 8         | 1/27/2019        | 12,822                 | 12,967                | 48                     | Marcellus    |
| 9         | 1/27/2019        | 12,647                 | 12,792                | 48                     | Marcellus    |
| 10        | 1/28/2019        | 12,473                 | 12,618                | 48                     | Marcellus    |
| 11        | 1/28/2019        | 12,298                 | 12,443                | 48                     | Marcellus    |
| 12        | 1/29/2019        | 12,124                 | 12,269                | 48                     | Marcellus    |
| 13        | 1/29/2019        | 11,949                 | 12,094                | 48                     | Marcellus    |
| 14        | 1/30/2019        | 11,775                 | 11,920                | 48                     | Marcellus    |
| 15        | 1/30/2019        | 11,600                 | 11,745                | 48                     | Marcellus    |
| 16        | 1/31/2019        | 11,425                 | 11,571                | 48                     | Marcellus    |
| 17        | 2/2/2019         | 11,251                 | 11,396                | 48                     | Marcellus    |
| 18        | 2/2/2019         | 11,076                 | 11,222                | 48                     | Marcellus    |
| 19        | 2/3/2019         | 10,902                 | 11,047                | 48                     | Marcellus    |
| 20        | 2/4/2019         | 10,727                 | 10,873                | 48                     | Marcellus    |
| 21        | 2/4/2019         | 10,553                 | 10,698                | 48                     | Marcellus    |
| 22        | 2/5/2019         | 10,378                 | 10,524                | 48                     | Marcellus    |
| 23        | 2/5/2019         | 10,204                 | 10,349                | 48                     | Marcellus    |
| 24        | 2/6/2019         | 10,029                 | 10,175                | 48                     | Marcellus    |
| 25        | 2/6/2019         | 9,855                  | 10,000                | 48                     | Marcellus    |
| 26        | 2/7/2019         | 9,680                  | 9,826                 | 48                     | Marcellus    |
| 27        | 2/7/2019         | 9,506                  | 9,651                 | 48                     | Marcellus    |
| 28        | 2/8/2019         | 9,331                  | 9,477                 | 48                     | Marcellus    |
| 29        | 2/9/2019         | 9,157                  | 9,302                 | 48                     | Marcellus    |
| 30        | 2/10/2019        | 8,982                  | 9,128                 | 48                     | Marcellus    |
| 31        | 2/11/2019        | 8,808                  | 8,953                 | 48                     | Marcellus    |
| 32        | 2/11/2019        | 8,633                  | 8,779                 | 48                     | Marcellus    |
| 33        | 2/12/2019        | 8,459                  | 8,604                 | 48                     | Marcellus    |
| 34        | 2/13/2019        | 8,284                  | 8,430                 | 48                     | Marcellus    |
| 35        | 2/14/2019        | 8,110                  | 8,255                 | 48                     | Marcellus    |
| 36        | 2/14/2019        | 7,935                  | 8,081                 | 48                     | Marcellus    |
| 37        | 2/15/2019        | 7,761                  | 7,906                 | 48                     | Marcellus    |
| 38        | 2/16/2019        | 7,586                  | 7,732                 | 48                     | Marcellus    |
| 39        | 2/17/2019        | 7,412                  | 7,557                 | 48                     | Marcellus    |
| 40        | 2/18/2019        | 7,237                  | 7,383                 | 48                     | Marcellus    |
| 41        | 2/19/2019        | 7,063                  | 7,208                 | 48                     | Marcellus    |

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Corley N-7HM

STIMULATION INFORMATION PER STAGE

| Stage No. | Ave. Pump Rate (BPM) | Ave Treatment Pressure (PSI) | Max Breakdown Pressure (PSI) | ISIP (PSI) | Amount of Proppant (lbs) | Amount of Water (bbbls) | Amount of Nitrogen/other (units) |
|-----------|----------------------|------------------------------|------------------------------|------------|--------------------------|-------------------------|----------------------------------|
| 1         | 89.3                 | 6615                         | 6180                         | 3284       | 357710                   | 8214                    | 0                                |
| 2         | 86.8                 | 7087                         | 5743                         | 3875       | 438120                   | 7838                    | 0                                |
| 3         | 88.1                 | 6855                         | 5517                         | 4036       | 440020                   | 7863                    | 0                                |
| 4         | 83.9                 | 6780                         | 5044                         | 3841       | 435320                   | 8205                    | 0                                |
| 5         | 85.6                 | 6700                         | 4729                         | 4433       | 435150                   | 7765                    | 0                                |
| 6         | 84.4                 | 7070                         | 5165                         | 3565       | 436220                   | 8123                    | 0                                |
| 7         | 88.1                 | 6855                         | 4999                         | 4662       | 435680                   | 7872                    | 0                                |
| 8         | 85.2                 | 6728                         | 4894                         | 4800       | 426610                   | 7723                    | 0                                |
| 9         | 87.2                 | 6925                         | 5410                         | 4708       | 438320                   | 7873                    | 0                                |
| 10        | 89.1                 | 6873                         | 5134                         | 4907       | 441370                   | 7893                    | 0                                |
| 11        | 89.1                 | 6845                         | 5046                         | 4769       | 439330                   | 7886                    | 0                                |
| 12        | 86.1                 | 6513                         | 5387                         | 4886       | 441570                   | 7773                    | 0                                |
| 13        | 85.5                 | 6629                         | 5200                         | 5030       | 444370                   | 7868                    | 0                                |
| 14        | 86.1                 | 6541                         | 5054                         | 4689       | 443430                   | 7866                    | 0                                |
| 15        | 85.8                 | 6608                         | 5301                         | 4965       | 435220                   | 7760                    | 0                                |
| 16        | 81.1                 | 6931                         | 5415                         | 4536       | 437670                   | 9794                    | 0                                |
| 17        | 85.5                 | 6729                         | 5011                         | 5051       | 447270                   | 7847                    | 0                                |
| 18        | 85.5                 | 6739                         | 4988                         | 4977       | 446320                   | 7311                    | 0                                |
| 19        | 85.8                 | 6362                         | 4963                         | 4989       | 442940                   | 7366                    | 0                                |
| 20        | 86.5                 | 6401                         | 4963                         | 4891       | 441650                   | 7336                    | 0                                |
| 21        | 85.1                 | 6272                         | 5049                         | 4793       | 435820                   | 7482                    | 0                                |
| 22        | 85.8                 | 6447                         | 4853                         | 4895       | 437490                   | 7218                    | 0                                |
| 23        | 87.2                 | 6519                         | 5225                         | 4773       | 443510                   | 7305                    | 0                                |
| 24        | 85.5                 | 6370                         | 4779                         | 4885       | 450070                   | 7339                    | 0                                |
| 25        | 86.2                 | 6279                         | 4942                         | 4781       | 443900                   | 7250                    | 0                                |
| 26        | 84                   | 6405                         | 4973                         | 4324       | 449140                   | 7708                    | 0                                |
| 27        | 85.2                 | 6173                         | 4957                         | 4368       | 444270                   | 7442                    | 0                                |
| 28        | 84                   | 6065                         | 4905                         | 4708       | 434820                   | 8415                    | 0                                |
| 29        | 86                   | 6182                         | 4697                         | 4608       | 436520                   | 8098                    | 0                                |

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| Stage No. | Ave. Pump Rate (BPM) | Ave Treatment Pressure (PSI) | Max Breakdown Pressure (PSI) | ISIP (PSI) | Amount of Proppant (lbs) | Amount of Water (bbls) | Amount of Nitrogen/other (units) |
|-----------|----------------------|------------------------------|------------------------------|------------|--------------------------|------------------------|----------------------------------|
| 30        | 85.3                 | 6079                         | 4942                         | 4766       | 437880                   | 7478                   | 0                                |
| 31        | 85.2                 | 6233                         | 5071                         | 4985       | 446315                   | 7637                   | 0                                |
| 32        | 85.3                 | 6345                         | 4948                         | 5091       | 438520                   | 7359                   | 0                                |
| 33        | 86.8                 | 6279                         | 5069                         | 4921       | 410120                   | 7493                   | 0                                |
| 34        | 85.5                 | 6225                         | 4734                         | 4604       | 438810                   | 7553                   | 0                                |
| 35        | 85.5                 | 6222                         | 5027                         | 5087       | 440900                   | 7366                   | 0                                |
| 36        | 85.3                 | 6239                         | 5123                         | 5058       | 440070                   | 7388                   | 0                                |
| 37        | 85.4                 | 6226                         | 4993                         | 4964       | 443330                   | 7409                   | 0                                |
| 38        | 84.6                 | 6317                         | 5171                         | 4688       | 433700                   | 7434                   | 0                                |
| 39        | 85.1                 | 6690                         | 5054                         | 4641       | 377530                   | 6724                   | 0                                |
| 40        | 84.4                 | 6362                         | 4984                         | 4488       | 413355                   | 7025                   | 0                                |
| 41        | 85.2                 | 6216                         | 5115                         | 4936       | 440730                   | 7575                   | 0                                |

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## CORLEY N-7HM

| LITHOLOGY/FORMATION | TOP DEPTH IN FT/<br>Name TVD | BOTTOM DEPTH<br>IN FT TVD | TOP DEPTH<br>IN FT MD | BOTTOM DEPTH<br>IN FT MD | DESCRIBE ROCK TYPE AND RECORD<br>QUANTITY AND TYPE OF FLUID |
|---------------------|------------------------------|---------------------------|-----------------------|--------------------------|---|
| Maxton              | 1955                         | 2049                      | 1960                  | 2057                     | Sandstone   |
| Big Lime            | 2049                         | 2091                      | 2057                  | 2100                     | Limestone   |
| Big Injun           | 2091                         | 2108                      | 2100                  | 2422                     | Sandstone   |
| Weir                | 2408                         | 2587                      | 2422                  | 2604                     | Sandstone   |
| Berea               | 2587                         | 2867                      | 2604                  | 2890                     | Sandstone   |
| Gordon              | 2867                         | 2931                      | 2890                  | 2955                     | Sandstone   |
| Fifty Foot          | 2931                         | 3531                      | 2955                  | 3568                     | Sandstone   |
| Speechley           | 3531                         | 4945                      | 3568                  | 5013                     | Sandstone   |
| Benson              | 4945                         | 5321                      | 5013                  | 5397                     | Sandstone   |
| Alexander           | 5321                         | 5953                      | 5397                  | 6045                     | Siltstone   |
| Rhinestreet         | 5953                         | 6382                      | 6045                  | 6537                     | Black shale   |
| Middlesex           | 6382                         | 6446                      | 6537                  | 6637                     | Black shale   |
| Geneseo/Burkett     | 6446                         | 6476                      | 6637                  | 6686                     | Black shale   |
| Tully               | 6476                         | 6514                      | 6686                  | 6760                     | Limestone   |
| Hamilton            | 6514                         | 6574                      | 6760                  | 6939                     | Grey shale  |
| Marcellus           | 6574                         | -                         | 6939                  | -                        | Black shale   |

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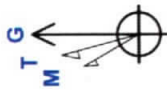




**Tug Hill Operating LLC**  
**Well: Corley N-07HM (slot H)**  
**Site: Corley Pad**  
**Project: Marshall County, WV**  
**Design: rev2**  
**Rig: Precision 110**

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: Rig 1254+28 @ 1282.00uoft (Precision 110)  
 Northing Easting Latitude Longitude



Azimuths to Grid North  
 True North: 0.15°  
 Magnetic North: 8.83°  
 Strength: 52039.6nT  
 Dip Angle: 66.85°  
 Date: 7/17/2018  
 Model: IGRF2015

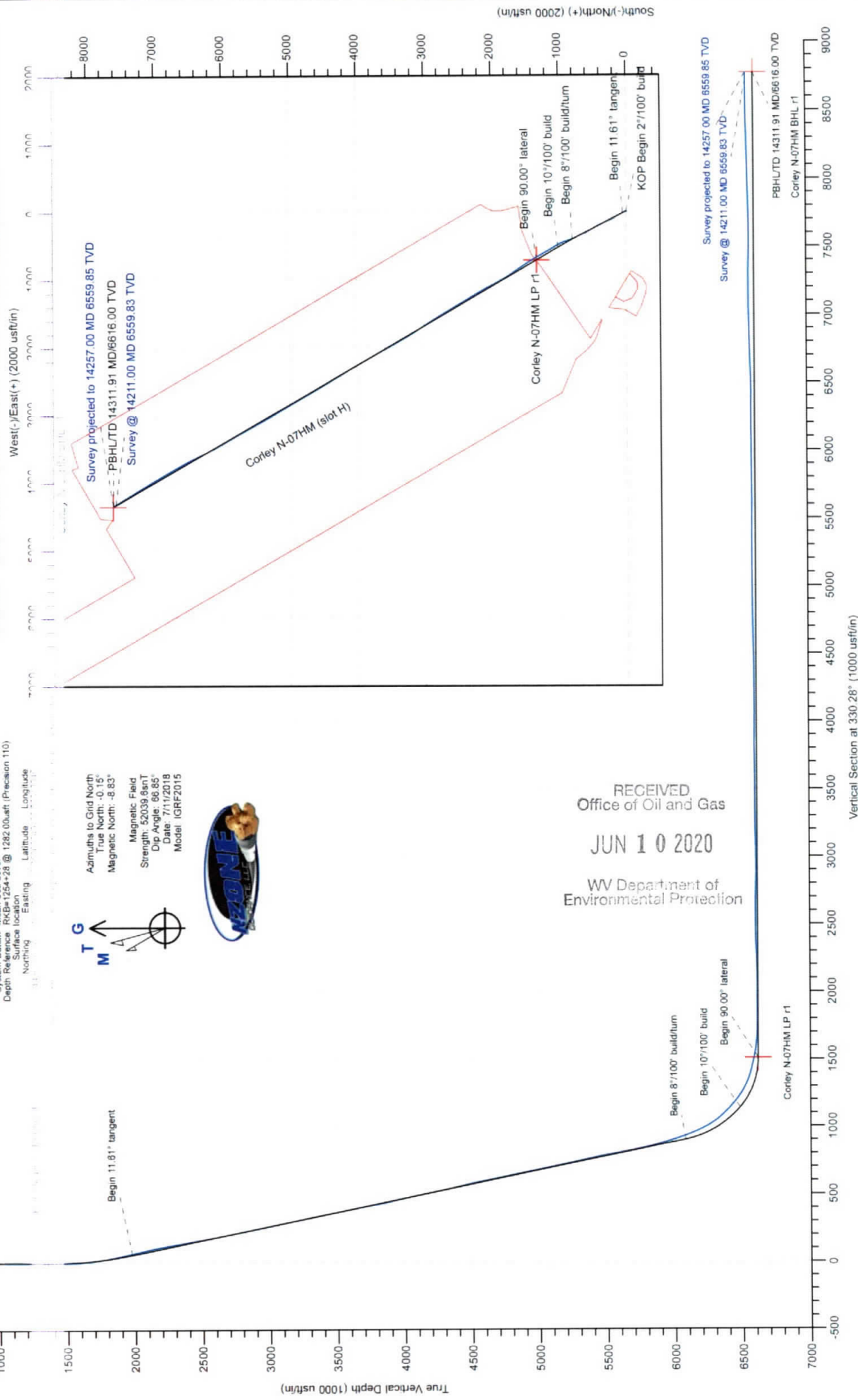


**SECTION DETAILS**

| Sec | MD       | Inc   | Azi    | TVD     | +N/-S   | +E/-W    | Dleg  | TFace  | V/Sect  | Annotation                      |
|-----|----------|-------|--------|---------|---------|----------|-------|--------|---------|---------------------------------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00    | 0.00    | 0.00     | 0.00  | 0.00   | 0.00    |                                 |
| 2   | 1400.00  | 0.00  | 0.00   | 1400.00 | 0.00    | 0.00     | 0.00  | 0.00   | 0.00    | KOP Begin 2'/100' build         |
| 3   | 1980.75  | 11.62 | 332.58 | 1976.78 | 52.07   | -27.02   | 2.00  | 332.58 | 58.72   | Begin 11.61° tangent            |
| 4   | 6167.04  | 11.62 | 332.58 | 6077.35 | 800.21  | -415.19  | 0.00  | 0.00   | 900.79  | Begin 8'/100' build/tum         |
| 5   | 6647.03  | 50.00 | 330.00 | 6481.95 | 1010.24 | -533.85  | 8.00  | 0.00   | -3.18   | Begin 10'/100' build            |
| 6   | 7047.03  | 90.00 | 330.00 | 6616.00 | 1329.19 | -717.99  | 10.00 | 0.00   | 1510.30 | Begin 90.00° lateral            |
| 7   | 14311.91 | 90.00 | 330.00 | 6616.00 | 7620.75 | -4350.43 | 0.00  | 0.00   | 8775.09 | PBHL/TD 14311.91 MD/6616.00 TVD |

**ANNOTATIONS SURVEYS**

| MD       | Inc   | Azi    | TVD     | +N/-S   | +E/-W    | V/Sect  | Annotation                                  |
|----------|-------|--------|---------|---------|----------|---------|---|
| 276.00   | 0.64  | 257.27 | 275.99  | -0.34   | -1.50    | 0.45    | MWD surveys                                 |
| 14211.00 | 89.98 | 328.93 | 6559.83 | 7583.79 | -4320.24 | 8728.02 | Survey @ 14211.00 MD 6559.83 TVD            |
| 14257.00 | 89.98 | 328.93 | 6559.85 | 7623.19 | -4343.98 | 8774.00 | Survey projected to 14257.00 MD 6559.85 TVD |



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# Hydraulic Fracturing Fluid Product Component Information Disclosure

|                                |                         |
|--------------------------------|-------------------------|
| Job Start Date:                | 1/23/2019               |
| Job End Date:                  | 2/19/2019               |
| State:                         | West Virginia           |
| County:                        | Marshall                |
| API Number:                    | 47-051-01972-00-00      |
| Operator Name:                 | Tug Hill Operating, LLC |
| Well Name and Number:          | Corley N 7HM            |
| Latitude:                      | 39.75300049             |
| Longitude:                     | -80.76318049            |
| Datum:                         | NAD27                   |
| Federal Well:                  | NO                      |
| Indian Well:                   | NO                      |
| True Vertical Depth:           | 6,612                   |
| Total Base Water Volume (gal): | 13,567,585              |
| Total Base Non Water Volume:   | 0                       |



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## Hydraulic Fracturing Fluid Composition:

| Trade Name     | Supplier | Purpose    | Ingredients | Chemical Abstract Service Number (CAS #) | Maximum Ingredient Concentration in Additive (% by mass)** | Maximum Ingredient Concentration in HF Fluid (% by mass)** | Comments        |
|----------------|----------|------------|-------------|--|--|--|-----------------|
| Fresh Water    | Operator | Base Fluid |             |  |  |  |                 |
|                |          |            | Water       | 7732-18-5                                | 100.00000  | 68.00132   | Density = 8.330 |
| Produced Water | Operator | Base Fluid |             |  |  |  |                 |
|                |          |            | Water       | 7732-18-5                                | 100.00000  | 17.87900   | Density = 9.000 |

| Ingredients                    | Listed Above | Listed Above         |       |  |              |           |         |  |  |
|--------------------------------|--------------|----------------------|-------|--|--------------|-----------|---------|--|--|
|                                |              |                      | Water |  | 7732-18-5    | 100.00000 | 0.60256 |  |  |
| FDP-S1296-17                   | Halliburton  | Corrosion Inhibitor  |       |  | Listed Below |           |         |  |  |
| CALCIUM CHLORIDE - FLAKE       | Halliburton  | Additive             |       |  | Listed Below |           |         |  |  |
| MC MX 8-4743                   | multi-chem   | Biocide              |       |  | Listed Below |           |         |  |  |
| OILPERM A                      | Halliburton  | Non-ionic Surfactant |       |  | Listed Below |           |         |  |  |
| LD-2850                        | multi-chem   | Friction Reducer     |       |  | Listed Below |           |         |  |  |
| HYDROCHLORIC ACID              | Halliburton  | Solvent              |       |  | Listed Below |           |         |  |  |
| SAND-PREMIUM WHITE-40/70, BULK | Halliburton  | Proppant             |       |  | Listed Below |           |         |  |  |

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|   |             |                 |   |             |           |              |  |  |  |
|---|-------------|-----------------|---|-------------|-----------|--------------|--|--|--|
| SAND-COMMON<br>WHITE-100<br>MESH, SSA-2,<br>BULK<br>(100003676)   | Halliburton | Proppant        |   |             |           | Listed Below |  |  |  |
| SAND-<br>PREMIUM<br>WHITE-30/50,<br>BULK  | Halliburton | Proppant        |   |             |           | Listed Below |  |  |  |
| SCALECHEK<br>LP-50  | Halliburton | Scale Inhibitor |   |             |           | Listed Below |  |  |  |
| Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients. |             |                 |   |             |           |              |  |  |  |
|   |             |                 | Crystalline silica, quartz                          | 14808-60-7  | 100.00000 | 13.36972     |  |  |  |
|   |             |                 | Hydrochloric acid                                   | 7647-01-0   | 7.50000   | 0.04518      |  |  |  |
|   |             |                 | Sodium chloride                                     | 7647-14-5   | 30.00000  | 0.02754      |  |  |  |
|   |             |                 | Hydrotreated light<br>petroleum distillate          | 64742-47-8  | 30.00000  | 0.02753      |  |  |  |
|   |             |                 | Sodium nitrate                                      | 7631-99-4   | 60.00000  | 0.02024      |  |  |  |
|   |             |                 | Methanol  | 67-56-1     | 100.00000 | 0.00663      |  |  |  |
|   |             |                 | Phosphonic acid salt                                | Proprietary | 30.00000  | 0.00619      |  |  |  |
|   |             |                 | 9-Octadecenamide, n,n-<br>bis-2(hydroxy-ethyl)-,(Z) | 93-83-4     | 5.00000   | 0.00459      |  |  |  |
|   |             |                 | Alcohols, C12-16,<br>ethoxylated                    | 68551-12-2  | 5.00000   | 0.00459      |  |  |  |
|   |             |                 | Ammonium chloride                                   | 12125-02-9  | 5.00000   | 0.00459      |  |  |  |
|   |             |                 | Calcium chloride                                    | 10043-52-4  | 100.00000 | 0.00052      |  |  |  |
|   |             |                 | Ethanol   | 64-17-5     | 60.00000  | 0.00028      |  |  |  |
|   |             |                 | Oxyalkylated phenolic<br>resin                      | Proprietary | 30.00000  | 0.00018      |  |  |  |
|   |             |                 | Heavy aromatic<br>petroleum naphtha                 | 64742-94-5  | 30.00000  | 0.00014      |  |  |  |

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|  |  |             |          |         |  |
|--|--|-------------|----------|---------|--|
|  | Modified thiourea polymer  | Proprietary | 30.00000 | 0.00013 |  |
|  | Potassium chloride   | 7447-40-7   | 5.00000  | 0.00003 |  |
|  | Strontium chloride   | 10476-85-4  | 5.00000  | 0.00003 |  |
|  | Naphthalene  | 91-20-3     | 5.00000  | 0.00002 |  |
|  | Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-, omega-hydroxy-, branched | 127087-87-0 | 5.00000  | 0.00002 |  |
|  | Propargyl alcohol  | 107-19-7    | 5.00000  | 0.00002 |  |
|  | Ethoxylated alcohols   | Proprietary | 5.00000  | 0.00002 | Denise Tuck,<br>Halliburton, 3000 N.<br>Sam Houston Pkwy E.,<br>Houston, TX 77032,<br>281-871-6226 |
|  | 1,2,4 Trimethylbenzene   | 95-63-6     | 1.00000  | 0.00000 |  |

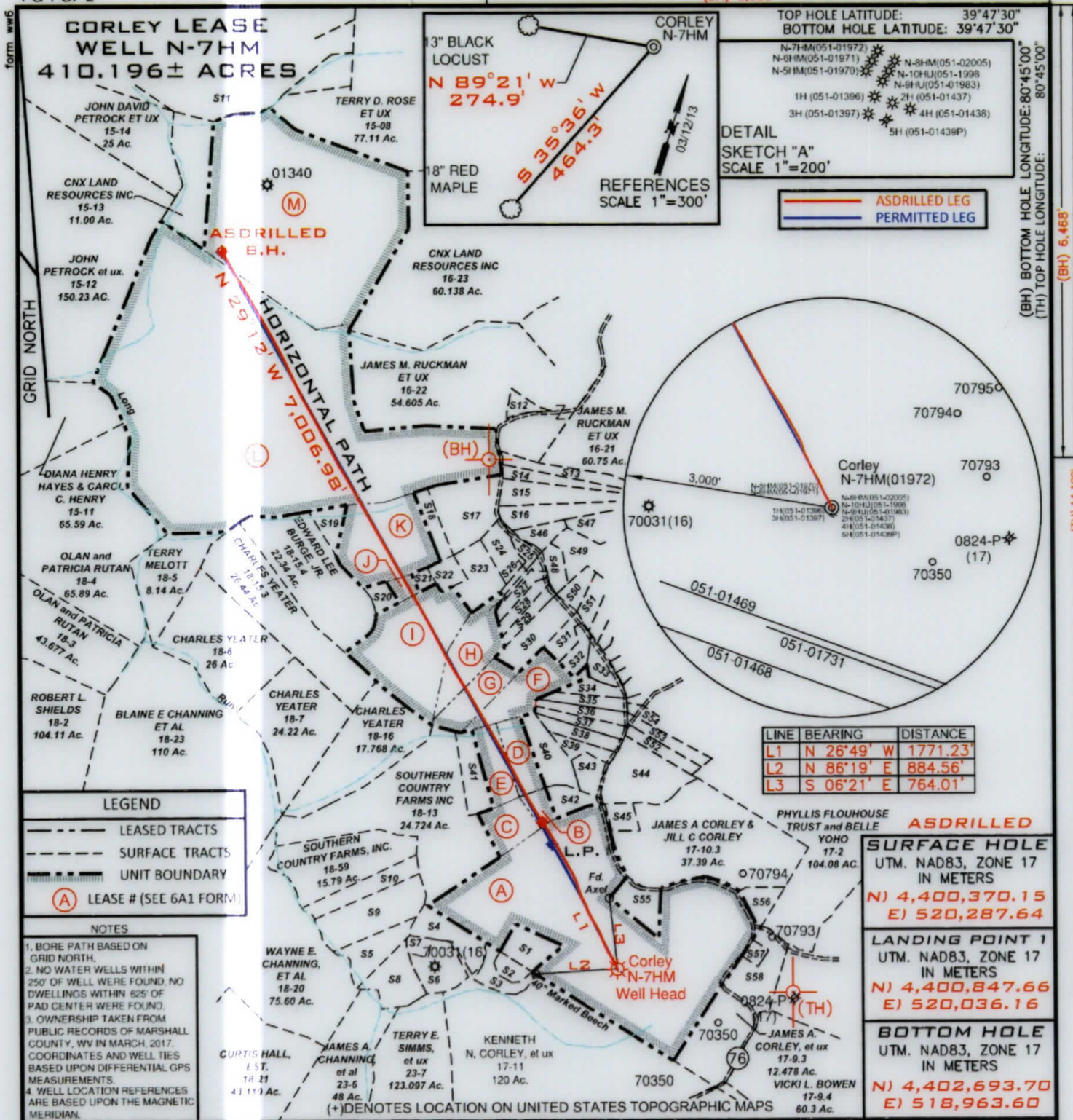
\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

\*\*\* If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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(BH) BOTTOM HOLE LONGITUDE: 80°45'00"  
(TH) TOP HOLE LONGITUDE: 80°45'00"

(BH) 6,468'  
(TH) 14,100'

**ASDRILLED SURFACE HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,400,370.15  
E) 520,287.64

**LANDING POINT 1**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,400,847.66  
E) 520,036.16

**BOTTOM HOLE**  
UTM. NAD83, ZONE 17  
IN METERS  
N) 4,402,693.70  
E) 518,963.60

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

DRAWING NUMBER CORLEY\_WP\_N-7HM

SCALE 1" = 1500'

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.  
2413 East Pike St. #112  
Clarksburg, WV 26301  
304-623-5851



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

DATE: OCTOBER 7, 2019

OPERATORS WELL NO. CORLEY N-7HM

API WELL NO. 47-051-01972

STATE COUNTY PERMIT

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

LOCATION ELEVATION 1,554.4' WATERSHED (HUC 10) Fish Creek

DISTRICT Franklin COUNTY Marshall

QUADRANGLE Powhatan Point 7.5' LEASE NUMBER SEE 6A1 Form

SURFACE OWNER James A. & Jill C. Corley, et al ACREAGE 92.61

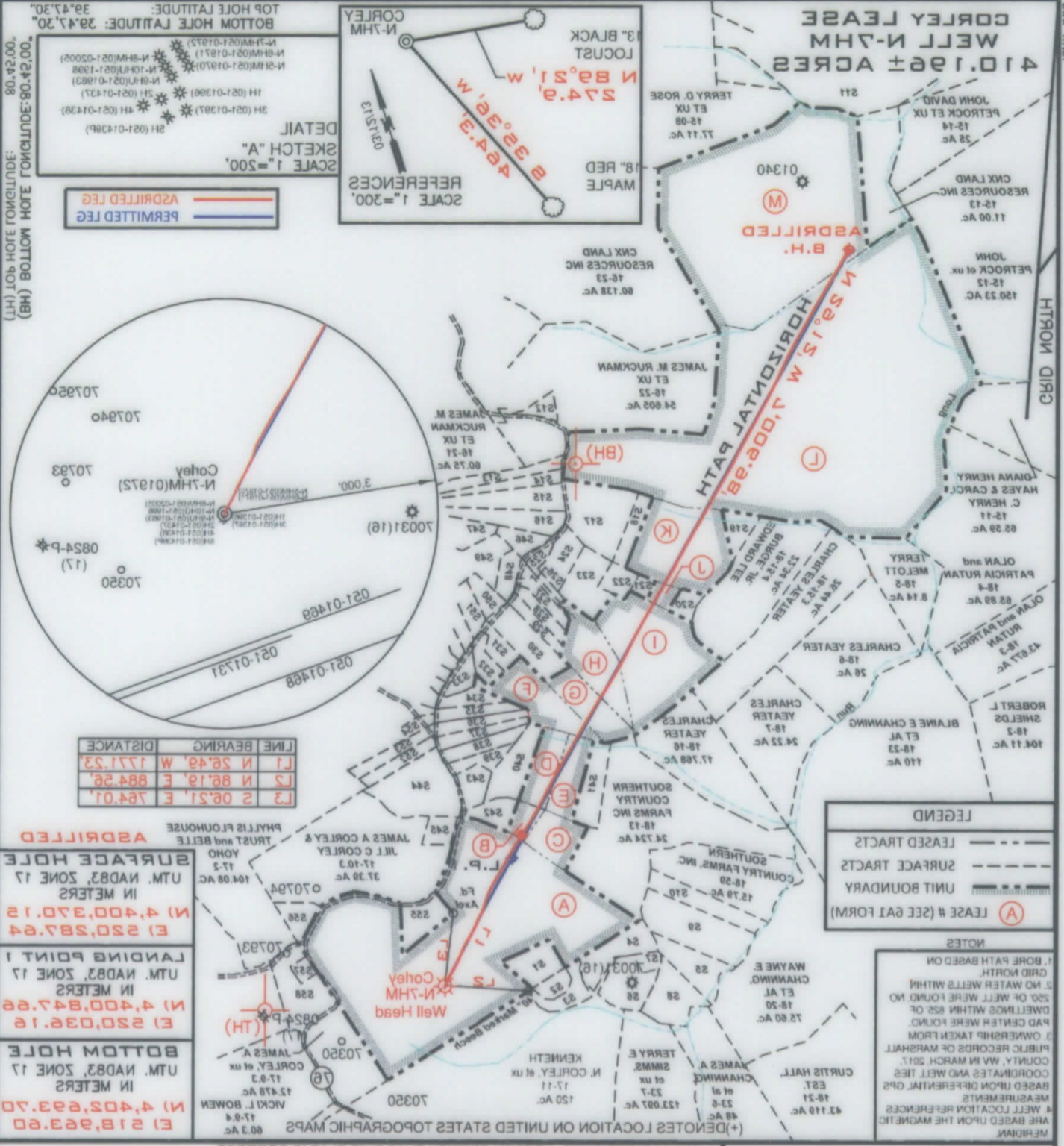
OIL & GAS ROYALTY OWNER James A. & Jill C. Corley, et al LEASE ACREAGE 92.61

PROPOSED WORK: DRILL \_\_\_ CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE \_\_\_ PLUG OFF OLD FORMATION \_\_\_  
PERFORM NEW FORMATION \_\_\_ OTHER PHYSICAL CHANGE (SPECIFY) ASDRILLED

TARGET FORMATION Marcellus ESTIMATED DEPTH TVD: 6,612' TMD: 14,257'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER  
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME  
PERMIT



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

*David Jackson*  
P.S. 708

JACKSON SURVEYING INC.  
2413 East Park Rd. #112  
Charleston, WV 25301  
304-823-8881

DAVID JACKSON  
LICENSED  
NO. 708  
STATE OF WEST VIRGINIA  
PROFESSIONAL SURVEYOR

FILE NUMBER \_\_\_\_\_  
DRAWING NUMBER CORLEY\_WP-N-7HM  
SCALE 1" = 1500'  
MINIMUM DEGREE \_\_\_\_\_  
OF ACCURACY 1/200  
PROVEN SOURCE \_\_\_\_\_  
OF ELEVATION SUBMETER MAPPING  
GRADE GPS

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

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

LOCATION ELEVATION 1252.4' WATERSHED (HUC 10) Fish Creek

DISTRICT Franklin COUNTY Marshall  
QUADRANGLE Powhatan Point 7.5' LEASE NUMBER \_\_\_\_\_ SEE 6A1 Form

SURFACE OWNER James A. & Jill C. Corley et al ACREAGE 92.81  
OIL & GAS ROYALTY OWNER James A. & Jill C. Corley et al LEASE ACREAGE 92.81  
PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION

PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE (SPECIFY) ADSRILLED   
PLUG & ABANDON  CLEAN OUT & REPLUG

TARGET FORMATION Marcellus  
ESTIMATED DEPTH TVD: 6812', TMD: 14752'

DESIGNATED AGENT DIANNA STAMPER  
CT CORPORATION SYSTEM  
Address 5400 D BIG TYLER ROAD  
CHARLESTON, WV 25313

WELL OPERATOR TUG HILL OPERATING, LLC  
Address 1320 SOUTH UNIVERSITY DRIVE, SUITE 200  
FORT WORTH, TX 76107

DATE: OCTOBER 7, 2019  
OPERATORS WELL NO. CORLEY N-7HM  
APR WELL NO. \_\_\_\_\_  
STATE COUNTY PERMIT 47-051-01972

**CORLEY LEASE  
WELL N-7HM  
410.196± ACRES**

GRID NORTH

| Number | TAX MAP -PARCEL | ADJOINER OWNER                                      | ACRES  |
|--------|-----------------|---|--------|
| S1     | 17-10.5         | Williams Ohio Valley Midstream LLC                  | 4.24   |
| S2     | 17-12.1         | Williams Ohio Valley Midstream LLC                  | 1.67   |
| S3     | 17-12           | James A. & Jill C. Corley                           | 3.33   |
| S4     | 18-13.8         | Lori D. Carpenter                                   | 5.545  |
| S5     | 18-29           | Carl G Berg   | 5.319  |
| S6     | 18-32           | Kenneth E Rastall                                   | 5.335  |
| S7     | 18-32.1         | Lori D. Carpenter                                   | 1.165  |
| S8     | 18-31           | Kenneth E Rastall                                   | 6.94   |
| S9     | 18-13.10        | Carl Berg   | 10.88  |
| S10    | 18-30           | John Schmidt et al                                  | 5.46   |
| S11    | 15-6.1          | Joseph J. Kramer et ux                              | 39.40  |
| S12    | 16-22.1         | Heather A. Burgy                                    | 1.465  |
| S13    | 18-56           | William E. O'Hara                                   | 3.965  |
| S14    | 18-55           | William E. O'Hara                                   | 3.202  |
| S15    | 18-28           | Dotson Harrison et ux                               | 6.36   |
| S16    | 18-28.1         | Carol Diane Helmick                                 | 5.696  |
| S17    | 18-11           | Benjamin Robinson                                   | 10.883 |
| S18    | 18-11.2         | Edward Lee Burge Jr.                                | 2.0    |
| S19    | 18-15           | Edward Lee Burge Jr.                                | 2.495  |
| S20    | 18-10.1         | David V Anderson Et Ux                              | 1.65   |
| S21    | 18-10           | David & Nancy Anderson                              | .907   |
| S22    | 18-12           | William L Wayne Et Ux                               | 2.270  |
| S23    | 18-15.1         | Jason Blair   | 5.948  |
| S24    | 18-15.2         | Edward L. Burge                                     | 4.171  |
| S25    | 18-36           | Ruth Mulligan Est.                                  | 2.003  |
| S26    | 18-13.5         | Bryan Wesley  | 1.023  |
| S27    | 18-47           | Robert Richard Pelley II & Susan Lynn Briggs        | 2.01   |
| S28    | 18-46           | Dale W. & Patricia Gardner                          | 2.03   |
| S29    | 18-45           | Michael Finchman & Kezia Winters                    | 2.07   |
| S30    | 18-14           | Michael Finchman & Kezia Winters                    | 6.386  |
| S31    | 18-40           | Cory A. Holt  | 2.237  |
| S32    | 18-41           | Cory A. Holt  | 2.308  |
| S33    | 18-25           | Charles & Maria Rayl                                | 2.521  |
| S34    | 18-44           | Renee Streight                                      | 2.133  |
| S35    | 18-43           | Roy & Renee Butler                                  | 2.532  |
| S36    | 18-51           | Roger Hall Jr.                                      | 2.505  |
| S37    | 18-52           | Roger Hall Jr.                                      | 2.536  |
| S38    | 18-61           | Roger White Jr.                                     | 2.984  |
| S39    | 18-57           | Marvin Roberts                                      | 2.228  |
| S40    | 18-13.7         | Victor W. Woods Jr. & Jessica L. Woods              | 5.255  |
| S41    | 18-34           | Jodi A & Gary A Hall                                | 5.002  |
| S42    | 18-48           | Marvin Dean Roberts Et Ux & Brad & Bridget Williams | 2.920  |
| S43    | 18-18           | Linda J. Coen                                       | 3.0    |
| S44    | 18-19           | Roger D. White Jr.                                  | 10     |
| S45    | 17-10.4         | Ron & Winnie Murrin et al                           | 2.01   |
| S46    | 18-50           | Steven G. Berisford                                 | 2.170  |
| S47    | 18-13.2         | Steven G. Berisford                                 | 6.023  |
| S48    | 18-49           | Tanner M. Butler                                    | 2.023  |
| S49    | 18-13           | Southern Country Farms Inc.                         | 11.054 |
| S50    | 18-37           | John W. Wetzel                                      | 2.064  |
| S51    | 18-38           | Marlon Connor                                       | 2.231  |
| S52    | 18-41           | Roger Hall Jr.                                      | 2.308  |
| S53    | 18-35           | Mary Anderson                                       | 2.308  |
| S54    | 18-58           | Kevin Roberts                                       | 2.635  |
| S55    | 17-10.1         | James A. & Jill C. Corley                           | 4.51   |
| S56    | 17-10.2         | Sidney Pozell Et Ux Ests.                           | 2.6    |
| S57    | 17-9.1          | Jeri J. White                                       | 1.0    |
| S58    | 17-9.2          | Jeri J. White                                       | 7.136  |

**PERMITTED**

|  |
|--|
| <b>SURFACE HOLE</b><br>UTM. NAD83, ZONE 17<br>IN METERS<br>N) 4,400,370.09<br>E) 520,287.50    |
| <b>LANDING POINT 1</b><br>UTM. NAD83, ZONE 17<br>IN METERS<br>N) 4,400,775.22<br>E) 520,068.66 |
| <b>BOTTOM HOLE</b><br>UTM. NAD83, ZONE 17<br>IN METERS<br>N) 4,402,692.90<br>E) 518,961.49     |



P.S. 708

*David L Jackson*



**TUG HILL  
OPERATING**

**OPERATOR'S**

WELL #: Corley N-7HM  
DISTRICT: Franklin  
COUNTY: Marshall  
STATE: WV  
API #: 47-051-01971

**WELL PLAT**

PAGE 2 OF 2  
DATE: 10/07/2017