



Survey Report - Geographic



|                  |                                 |                                     |  |
|------------------|---------------------------------|-------------------------------------|--|
| <b>Company:</b>  | Tug Hill Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Weller 2 HM (F)                   |
| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1273+26 @ 1299.00usft (Nabors B28) |
| <b>Site:</b>     | Lily/Weller                     | <b>MD Reference:</b>                | RKB=1273+26 @ 1299.00usft (Nabors B28) |
| <b>Well:</b>     | Weller 2 HM (F)                 | <b>North Reference:</b>             | Grid                                   |
| <b>Wellbore:</b> | Original Hole                   | <b>Survey Calculation Method:</b>   | Minimum Curvature                      |
| <b>Design:</b>   | Surveys Original Hole           | <b>Database:</b>                    | DB_Jul2216dt_v14                       |

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

|                              |             |                     |                    |                          |              |
|------------------------------|-------------|---------------------|--------------------|--------------------------|--------------|
| <b>Site</b>                  | Lily/Weller |                     |                    |                          |              |
| <b>Site Position:</b>        |             | <b>Northing:</b>    | 14,431,189.55 usft | <b>Latitude:</b>         | 39.73745061  |
| <b>From:</b>                 | Lat/Long    | <b>Easting:</b>     | 1,694,826.67 usft  | <b>Longitude:</b>        | -80.80645320 |
| <b>Position Uncertainty:</b> | 0.00 usft   | <b>Slot Radius:</b> | 13-3/16 "          | <b>Grid Convergence:</b> | 0.124 °      |

|                             |                 |           |                            |                    |                      |               |
|-----------------------------|-----------------|-----------|----------------------------|--------------------|----------------------|---------------|
| <b>Well</b>                 | Weller 2 HM (F) |           |                            |                    |                      |               |
| <b>Well Position</b>        | <b>+N/-S</b>    | 0.00 usft | <b>Northing:</b>           | 14,431,147.49 usft | <b>Latitude:</b>     | 39.73733483   |
|                             | <b>+E/-W</b>    | 0.00 usft | <b>Easting:</b>            | 1,694,869.42 usft  | <b>Longitude:</b>    | -80.80630143  |
| <b>Position Uncertainty</b> | 0.00 usft       |           | <b>Wellhead Elevation:</b> | usft               | <b>Ground Level:</b> | 1,273.00 usft |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | Original Hole     |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2015          | 4/7/2019           | -8.668                 | 66.780               | 51,950.93847803            |

|                          |                                |                     |                     |                      |      |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|------|
| <b>Design</b>            | Surveys Original Hole          |                     |                     |                      |      |
| <b>Audit Notes:</b>      |                                |                     |                     |                      |      |
| <b>Version:</b>          | 1.0                            | <b>Phase:</b>       | ACTUAL              | <b>Tie On Depth:</b> | 0.00 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Direction (°)</b> |      |
|                          | 0.00                           | 0.00                | 0.00                | 135.58               |      |

|                       |                  |                            |                  |                    |
|-----------------------|------------------|----------------------------|------------------|--------------------|
| <b>Survey Program</b> | Date 4/14/2019   |                            |                  |                    |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>   | <b>Tool Name</b> | <b>Description</b> |
| 158.00                | 950.00           | MWD surf (Original Hole)   | MWD              | MWD - Standard     |
| 1,078.00              | 2,726.00         | MWD int (Original Hole)    | MWD              | MWD - Standard     |
| 2,868.00              | 14,237.00        | MWD (Original Hole)        | MWD              | MWD - Standard     |
| 14,292.00             | 14,292.00        | Projection (Original Hole) | MWD              | MWD - Standard     |

|                              |                        |                    |                              |                     |                     |                            |                           |                 |                  |  |
|------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|----------------------------|---------------------------|-----------------|------------------|--|
| <b>Survey</b>                |                        |                    |                              |                     |                     |                            |                           |                 |                  |  |
| <b>Measured Depth (usft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Map Northing (usft)</b> | <b>Map Easting (usft)</b> | <b>Latitude</b> | <b>Longitude</b> |  |
| 0.00                         | 0.00                   | 0.00               | 0.00                         | 0.00                | 0.00                | 14,431,147.49              | 1,694,869.42              | 39.73733483     | -80.80630143     |  |
| 158.00                       | 1.02                   | 221.67             | 157.99                       | -1.05               | -0.93               | 14,431,146.44              | 1,694,868.49              | 39.73733195     | -80.80630477     |  |
| <b>MWD surveys</b>           |                        |                    |                              |                     |                     |                            |                           |                 |                  |  |
| 188.00                       | 0.75                   | 256.50             | 187.99                       | -1.30               | -1.30               | 14,431,146.19              | 1,694,868.12              | 39.73733128     | -80.80630608     |  |
| 218.00                       | 0.76                   | 257.57             | 217.99                       | -1.38               | -1.69               | 14,431,146.10              | 1,694,867.74              | 39.73733104     | -80.80630745     |  |
| 248.00                       | 0.78                   | 249.01             | 247.98                       | -1.50               | -2.07               | 14,431,145.99              | 1,694,867.35              | 39.73733072     | -80.80630882     |  |
| 278.00                       | 0.32                   | 293.09             | 277.98                       | -1.54               | -2.34               | 14,431,145.95              | 1,694,867.08              | 39.73733061     | -80.80630977     |  |
| 309.00                       | 0.29                   | 202.57             | 308.98                       | -1.58               | -2.45               | 14,431,145.91              | 1,694,866.97              | 39.73733051     | -80.80631016     |  |
| 339.00                       | 0.15                   | 266.97             | 338.98                       | -1.65               | -2.52               | 14,431,145.84              | 1,694,866.91              | 39.73733031     | -80.80631041     |  |



Survey Report - Geographic



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**Project:** Marshall County, West Virginia.  
**Site:** Lily/Weller  
**Well:** Weller 2 HM (F)  
**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

**Local Co-ordinate Reference:** Well Weller 2 HM (F)  
**TVD Reference:** RKB=1273+26 @ 1299.00usft (Nabors B28)  
**MD Reference:** RKB=1273+26 @ 1299.00usft (Nabors B28)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** DB\_Jul2216dt\_v14

Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 369.00                | 0.46            | 296.46      | 368.98                | -1.60        | -2.67        | 14,431,145.89       | 1,694,866.76       | 39.73733045 | -80.80631093 |
| 399.00                | 0.43            | 279.23      | 398.98                | -1.53        | -2.89        | 14,431,145.96       | 1,694,866.54       | 39.73733065 | -80.80631171 |
| 429.00                | 0.61            | 249.09      | 428.98                | -1.57        | -3.15        | 14,431,145.92       | 1,694,866.28       | 39.73733055 | -80.80631263 |
| 459.00                | 0.17            | 302.74      | 458.98                | -1.60        | -3.33        | 14,431,145.89       | 1,694,866.09       | 39.73733046 | -80.80631330 |
| 490.00                | 0.49            | 196.63      | 489.98                | -1.70        | -3.41        | 14,431,145.79       | 1,694,866.02       | 39.73733018 | -80.80631357 |
| 520.00                | 0.26            | 237.99      | 519.98                | -1.86        | -3.50        | 14,431,145.63       | 1,694,865.92       | 39.73732974 | -80.80631391 |
| 550.00                | 0.13            | 326.45      | 549.98                | -1.87        | -3.58        | 14,431,145.62       | 1,694,865.85       | 39.73732972 | -80.80631418 |
| 580.00                | 0.18            | 287.87      | 579.98                | -1.83        | -3.64        | 14,431,145.66       | 1,694,865.78       | 39.73732984 | -80.80631441 |
| 611.00                | 0.05            | 181.32      | 610.98                | -1.82        | -3.69        | 14,431,145.66       | 1,694,865.73       | 39.73732984 | -80.80631457 |
| 640.00                | 0.29            | 156.74      | 639.98                | -1.90        | -3.66        | 14,431,145.58       | 1,694,865.76       | 39.73732962 | -80.80631447 |
| 671.00                | 0.27            | 199.48      | 670.98                | -2.05        | -3.65        | 14,431,145.44       | 1,694,865.77       | 39.73732924 | -80.80631445 |
| 700.00                | 0.58            | 353.29      | 699.98                | -1.96        | -3.69        | 14,431,145.52       | 1,694,865.73       | 39.73732946 | -80.80631459 |
| 731.00                | 0.23            | 146.50      | 730.98                | -1.86        | -3.68        | 14,431,145.63       | 1,694,865.75       | 39.73732974 | -80.80631453 |
| 763.00                | 0.22            | 195.95      | 762.98                | -1.97        | -3.66        | 14,431,145.52       | 1,694,865.76       | 39.73732943 | -80.80631447 |
| 794.00                | 0.16            | 204.99      | 793.97                | -2.07        | -3.69        | 14,431,145.42       | 1,694,865.73       | 39.73732917 | -80.80631459 |
| 825.00                | 0.24            | 70.04       | 824.97                | -2.09        | -3.65        | 14,431,145.40       | 1,694,865.77       | 39.73732912 | -80.80631444 |
| 856.00                | 0.34            | 60.55       | 855.97                | -2.02        | -3.51        | 14,431,145.47       | 1,694,865.91       | 39.73732931 | -80.80631394 |
| 887.00                | 0.00            | 125.60      | 886.97                | -1.97        | -3.43        | 14,431,145.51       | 1,694,865.99       | 39.73732943 | -80.80631365 |
| 919.00                | 0.39            | 128.70      | 918.97                | -2.04        | -3.35        | 14,431,145.45       | 1,694,866.08       | 39.73732924 | -80.80631335 |
| 950.00                | 0.30            | 85.93       | 949.97                | -2.10        | -3.18        | 14,431,145.39       | 1,694,866.24       | 39.73732908 | -80.80631277 |
| 1,078.00              | 0.23            | 174.84      | 1,077.97              | -2.33        | -2.83        | 14,431,145.15       | 1,694,866.60       | 39.73732844 | -80.80631150 |
| 1,173.00              | 1.06            | 56.54       | 1,172.97              | -2.04        | -2.07        | 14,431,145.45       | 1,694,867.35       | 39.73732924 | -80.80630883 |
| 1,268.00              | 1.70            | 55.86       | 1,267.94              | -0.76        | -0.18        | 14,431,146.72       | 1,694,869.25       | 39.73733273 | -80.80630206 |
| 1,362.00              | 2.06            | 86.51       | 1,361.89              | 0.12         | 2.66         | 14,431,147.61       | 1,694,872.09       | 39.73733515 | -80.80629195 |
| 1,456.00              | 2.65            | 106.15      | 1,455.81              | -0.38        | 6.44         | 14,431,147.11       | 1,694,875.86       | 39.73733375 | -80.80627853 |
| 1,550.00              | 2.52            | 98.03       | 1,549.72              | -1.27        | 10.57        | 14,431,146.21       | 1,694,880.00       | 39.73733127 | -80.80626383 |
| 1,645.00              | 3.33            | 82.93       | 1,644.59              | -1.23        | 15.38        | 14,431,146.26       | 1,694,884.80       | 39.73733137 | -80.80624674 |
| 1,740.00              | 4.23            | 77.87       | 1,739.39              | -0.15        | 21.54        | 14,431,147.34       | 1,694,890.97       | 39.73733429 | -80.80622480 |
| 1,834.00              | 5.01            | 85.31       | 1,833.08              | 0.91         | 29.02        | 14,431,148.40       | 1,694,898.45       | 39.73733717 | -80.80619819 |
| 1,928.00              | 6.26            | 86.95       | 1,926.63              | 1.52         | 38.23        | 14,431,149.01       | 1,694,907.66       | 39.73733879 | -80.80616542 |
| 2,022.00              | 9.09            | 87.31       | 2,019.77              | 2.14         | 50.77        | 14,431,149.63       | 1,694,920.19       | 39.73734042 | -80.80612082 |
| 2,117.00              | 11.59           | 87.23       | 2,113.22              | 2.96         | 67.80        | 14,431,150.45       | 1,694,937.22       | 39.73734255 | -80.80606024 |
| 2,211.00              | 14.08           | 83.74       | 2,204.87              | 4.66         | 88.60        | 14,431,152.15       | 1,694,958.03       | 39.73734710 | -80.80598623 |
| 2,306.00              | 15.47           | 81.19       | 2,296.73              | 7.86         | 112.61       | 14,431,155.35       | 1,694,982.03       | 39.73735575 | -80.80590080 |
| 2,401.00              | 16.10           | 80.48       | 2,388.14              | 11.98        | 138.12       | 14,431,159.47       | 1,695,007.55       | 39.73736691 | -80.80581002 |
| 2,495.00              | 17.49           | 80.99       | 2,478.13              | 16.35        | 164.93       | 14,431,163.84       | 1,695,034.35       | 39.73737875 | -80.80571463 |
| 2,588.00              | 18.33           | 81.13       | 2,566.62              | 20.79        | 193.18       | 14,431,168.28       | 1,695,062.60       | 39.73739078 | -80.80561410 |
| 2,654.00              | 18.17           | 81.59       | 2,629.30              | 23.90        | 213.61       | 14,431,171.39       | 1,695,083.04       | 39.73739919 | -80.80554139 |
| 2,726.00              | 20.30           | 82.53       | 2,697.28              | 27.16        | 237.10       | 14,431,174.65       | 1,695,106.53       | 39.73740802 | -80.80545780 |
| 2,868.00              | 27.62           | 77.72       | 2,826.97              | 37.38        | 293.77       | 14,431,184.87       | 1,695,163.20       | 39.73743574 | -80.80525614 |
| 2,962.00              | 31.87           | 80.16       | 2,908.57              | 46.26        | 339.54       | 14,431,193.75       | 1,695,208.96       | 39.73745986 | -80.80509328 |
| 3,056.00              | 31.28           | 78.63       | 2,988.65              | 55.31        | 387.91       | 14,431,202.80       | 1,695,257.34       | 39.73748443 | -80.80492113 |
| 3,151.00              | 29.91           | 76.57       | 3,070.43              | 65.68        | 435.13       | 14,431,213.17       | 1,695,304.56       | 39.73751261 | -80.80475308 |
| 3,248.00              | 29.68           | 79.74       | 3,154.61              | 75.57        | 482.29       | 14,431,223.06       | 1,695,351.72       | 39.73753950 | -80.80458526 |
| 3,343.00              | 28.49           | 78.51       | 3,237.63              | 84.28        | 527.64       | 14,431,231.76       | 1,695,397.07       | 39.73756313 | -80.80442387 |
| 3,437.00              | 26.24           | 76.61       | 3,321.11              | 93.55        | 569.83       | 14,431,241.04       | 1,695,439.26       | 39.73758836 | -80.80427372 |
| 3,531.00              | 26.89           | 80.15       | 3,405.19              | 102.00       | 610.99       | 14,431,249.49       | 1,695,480.42       | 39.73761132 | -80.80412723 |
| 3,625.00              | 25.70           | 79.33       | 3,489.46              | 109.41       | 651.97       | 14,431,256.90       | 1,695,521.39       | 39.73763142 | -80.80398142 |
| 3,720.00              | 26.76           | 78.80       | 3,574.68              | 117.38       | 693.19       | 14,431,264.87       | 1,695,562.62       | 39.73765306 | -80.80383471 |
| 3,814.00              | 25.12           | 76.53       | 3,659.21              | 126.14       | 733.36       | 14,431,273.63       | 1,695,602.78       | 39.73767687 | -80.80369177 |
| 3,909.00              | 25.76           | 80.22       | 3,745.00              | 134.35       | 773.32       | 14,431,281.83       | 1,695,642.74       | 39.73769916 | -80.80354957 |
| 4,004.00              | 27.75           | 80.12       | 3,829.83              | 141.65       | 815.45       | 14,431,289.14       | 1,695,684.88       | 39.73771896 | -80.80339963 |
| 4,099.00              | 26.58           | 77.39       | 3,914.35              | 150.08       | 857.98       | 14,431,297.57       | 1,695,727.41       | 39.73774187 | -80.80324826 |
| 4,193.00              | 26.58           | 79.25       | 3,998.41              | 158.60       | 899.17       | 14,431,306.09       | 1,695,768.59       | 39.73776501 | -80.80310170 |
| 4,288.00              | 28.41           | 82.81       | 4,082.69              | 165.39       | 942.48       | 14,431,312.88       | 1,695,811.90       | 39.73778340 | -80.80294759 |

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**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

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Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 4,383.00              | 28.73           | 83.30       | 4,166.12              | 170.88       | 987.58       | 14,431,318.37       | 1,695,857.00       | 39.73779822 | -80.80278712 |
| 4,477.00              | 26.25           | 80.40       | 4,249.50              | 176.99       | 1,030.52     | 14,431,324.48       | 1,695,899.94       | 39.73781472 | -80.80263432 |
| 4,572.00              | 27.16           | 80.15       | 4,334.37              | 184.20       | 1,072.60     | 14,431,331.69       | 1,695,942.02       | 39.73783427 | -80.80248458 |
| 4,667.00              | 29.40           | 80.63       | 4,418.02              | 191.71       | 1,116.97     | 14,431,339.20       | 1,695,986.40       | 39.73785462 | -80.80232667 |
| 4,761.00              | 27.20           | 77.34       | 4,500.79              | 200.17       | 1,160.71     | 14,431,347.66       | 1,696,030.13       | 39.73787761 | -80.80217103 |
| 4,856.00              | 28.38           | 76.58       | 4,584.83              | 210.17       | 1,203.85     | 14,431,357.66       | 1,696,073.28       | 39.73790481 | -80.80201747 |
| 4,950.00              | 29.72           | 78.87       | 4,667.01              | 219.86       | 1,248.45     | 14,431,367.34       | 1,696,117.88       | 39.73793113 | -80.80185876 |
| 5,044.00              | 27.82           | 75.01       | 4,749.41              | 230.03       | 1,292.51     | 14,431,377.52       | 1,696,161.93       | 39.73795880 | -80.80170195 |
| 5,139.00              | 27.20           | 75.35       | 4,833.66              | 241.25       | 1,334.93     | 14,431,388.74       | 1,696,204.35       | 39.73798937 | -80.80155097 |
| 5,234.00              | 26.43           | 78.74       | 4,918.45              | 250.87       | 1,376.67     | 14,431,398.36       | 1,696,246.10       | 39.73801554 | -80.80140239 |
| 5,329.00              | 27.09           | 81.36       | 5,003.28              | 258.25       | 1,418.80     | 14,431,405.74       | 1,696,288.22       | 39.73803554 | -80.80125250 |
| 5,423.00              | 28.27           | 83.16       | 5,086.52              | 264.12       | 1,462.06     | 14,431,411.61       | 1,696,331.49       | 39.73805139 | -80.80109855 |
| 5,517.00              | 27.09           | 79.95       | 5,169.77              | 270.51       | 1,505.24     | 14,431,418.00       | 1,696,374.67       | 39.73806867 | -80.80094490 |
| 5,611.00              | 27.70           | 78.66       | 5,253.23              | 278.54       | 1,547.74     | 14,431,426.03       | 1,696,417.16       | 39.73809046 | -80.80079366 |
| 5,706.00              | 27.77           | 80.87       | 5,337.32              | 286.39       | 1,591.24     | 14,431,433.88       | 1,696,460.67       | 39.73811177 | -80.80063886 |
| 5,800.00              | 25.41           | 77.32       | 5,421.37              | 294.29       | 1,632.55     | 14,431,441.78       | 1,696,501.97       | 39.73813322 | -80.80049187 |
| 5,894.00              | 26.05           | 78.26       | 5,506.05              | 302.92       | 1,672.43     | 14,431,450.41       | 1,696,541.86       | 39.73815667 | -80.80034992 |
| 5,989.00              | 25.45           | 76.37       | 5,591.62              | 311.98       | 1,712.69     | 14,431,459.46       | 1,696,582.12       | 39.73818129 | -80.80020663 |
| 6,084.00              | 25.43           | 73.26       | 5,677.41              | 322.66       | 1,752.06     | 14,431,470.15       | 1,696,621.49       | 39.73821039 | -80.80006649 |
| 6,179.00              | 25.74           | 79.49       | 5,763.11              | 332.30       | 1,791.89     | 14,431,479.79       | 1,696,661.31       | 39.73823662 | -80.79992476 |
| 6,274.00              | 25.87           | 82.28       | 5,848.64              | 338.85       | 1,832.71     | 14,431,486.34       | 1,696,702.13       | 39.73825435 | -80.79977949 |
| 6,369.00              | 25.23           | 82.09       | 5,934.91              | 345.88       | 1,873.98     | 14,431,493.37       | 1,696,743.41       | 39.73827336 | -80.79959704 |
| 6,464.00              | 25.54           | 82.18       | 6,021.60              | 349.11       | 1,917.34     | 14,431,496.60       | 1,696,776.76       | 39.73828208 | -80.79951393 |
| 6,559.00              | 28.31           | 85.34       | 6,108.34              | 350.57       | 1,962.84     | 14,431,498.06       | 1,696,790.26       | 39.73828600 | -80.79946590 |
| 6,654.00              | 29.67           | 88.77       | 6,195.34              | 350.96       | 1,928.58     | 14,431,498.45       | 1,696,798.01       | 39.73828703 | -80.79943836 |
| 6,749.00              | 31.52           | 96.33       | 6,282.81              | 349.86       | 1,952.43     | 14,431,497.35       | 1,696,821.86       | 39.73828385 | -80.79935352 |
| 6,844.00              | 32.92           | 101.42      | 6,370.58              | 345.97       | 1,977.17     | 14,431,493.46       | 1,696,846.59       | 39.73827303 | -80.79926556 |
| 6,939.00              | 35.16           | 104.24      | 6,458.32              | 340.11       | 2,002.81     | 14,431,487.60       | 1,696,872.23       | 39.73825678 | -80.79917440 |
| 7,034.00              | 36.97           | 105.64      | 6,546.06              | 332.82       | 2,030.11     | 14,431,480.31       | 1,696,899.53       | 39.73823659 | -80.79907735 |
| 7,129.00              | 40.26           | 107.84      | 6,633.80              | 324.36       | 2,058.18     | 14,431,471.85       | 1,696,927.61       | 39.73821317 | -80.79897755 |
| 7,224.00              | 42.93           | 112.41      | 6,721.54              | 313.83       | 2,086.83     | 14,431,461.32       | 1,696,956.25       | 39.73818407 | -80.79887574 |
| 7,319.00              | 44.92           | 116.01      | 6,809.28              | 300.44       | 2,116.54     | 14,431,447.93       | 1,696,985.97       | 39.73814714 | -80.79877014 |
| 7,414.00              | 48.00           | 118.04      | 6,897.02              | 284.62       | 2,147.52     | 14,431,432.11       | 1,697,016.95       | 39.73810350 | -80.79866006 |
| 7,509.00              | 51.96           | 118.92      | 6,984.76              | 267.46       | 2,179.15     | 14,431,414.95       | 1,697,048.58       | 39.73805616 | -80.79854769 |
| 7,604.00              | 55.96           | 122.96      | 7,072.50              | 247.90       | 2,211.71     | 14,431,395.39       | 1,697,081.14       | 39.73800224 | -80.79843202 |
| 7,699.00              | 58.11           | 126.83      | 7,160.24              | 225.34       | 2,244.04     | 14,431,372.82       | 1,697,113.46       | 39.73794008 | -80.79831722 |
| 7,794.00              | 60.04           | 131.40      | 7,247.98              | 199.36       | 2,275.96     | 14,431,346.85       | 1,697,145.38       | 39.73786853 | -80.79820387 |
| 7,889.00              | 64.31           | 136.76      | 7,335.72              | 170.44       | 2,305.77     | 14,431,317.92       | 1,697,175.19       | 39.73778892 | -80.79809807 |
| 7,984.00              | 69.71           | 141.24      | 7,423.46              | 137.09       | 2,334.71     | 14,431,284.58       | 1,697,204.14       | 39.73769716 | -80.79799538 |
| 8,079.00              | 72.13           | 144.40      | 7,511.20              | 101.70       | 2,361.54     | 14,431,249.19       | 1,697,230.97       | 39.73759981 | -80.79790022 |
| 8,174.00              | 76.04           | 146.51      | 7,598.94              | 63.68        | 2,387.70     | 14,431,211.17       | 1,697,257.13       | 39.73749525 | -80.79780747 |
| 8,269.00              | 79.82           | 148.01      | 7,686.68              | 25.03        | 2,412.55     | 14,431,172.52       | 1,697,281.98       | 39.73738894 | -80.79771939 |
| 8,364.00              | 86.02           | 149.85      | 7,774.42              | -14.90       | 2,436.61     | 14,431,132.59       | 1,697,306.03       | 39.73727912 | -80.79763414 |
| 8,459.00              | 90.46           | 150.20      | 7,862.16              | -55.58       | 2,460.07     | 14,431,091.90       | 1,697,329.50       | 39.73716725 | -80.79755100 |
| 8,554.00              | 90.55           | 149.59      | 7,949.90              | -97.11       | 2,484.15     | 14,431,050.38       | 1,697,353.57       | 39.73705306 | -80.79746570 |
| 8,649.00              | 89.49           | 148.45      | 8,037.64              | -178.55      | 2,533.04     | 14,430,968.93       | 1,697,402.47       | 39.73682909 | -80.79729241 |
| 8,744.00              | 89.54           | 146.78      | 8,125.38              | -257.93      | 2,583.39     | 14,430,889.56       | 1,697,452.81       | 39.73661079 | -80.79711397 |
| 8,839.00              | 89.14           | 148.89      | 8,213.12              | -337.49      | 2,633.42     | 14,430,810.00       | 1,697,502.85       | 39.73639197 | -80.79693663 |
| 8,934.00              | 89.27           | 149.41      | 8,300.86              | -419.04      | 2,682.13     | 14,430,728.45       | 1,697,551.56       | 39.73616771 | -80.79676402 |
| 9,029.00              | 89.27           | 148.80      | 8,388.60              | -499.70      | 2,730.40     | 14,430,647.79       | 1,697,599.82       | 39.73594590 | -80.79659300 |
| 9,124.00              | 88.97           | 148.71      | 8,476.34              | -580.05      | 2,779.15     | 14,430,567.44       | 1,697,648.57       | 39.73572492 | -80.79642203 |
| 9,219.00              | 88.97           | 151.52      | 8,564.08              | -662.40      | 2,826.47     | 14,430,485.09       | 1,697,695.89       | 39.73549847 | -80.79625257 |
| 9,314.00              | 91.56           | 151.43      | 8,651.82              | -745.86      | 2,871.83     | 14,430,401.63       | 1,697,741.26       | 39.73526898 | -80.79609189 |
| 9,409.00              | 89.98           | 151.96      | 8,739.56              | -827.73      | 2,915.92     | 14,430,319.76       | 1,697,785.35       | 39.73504387 | -80.79593572 |
| 9,504.00              | 90.46           | 151.87      | 8,827.30              | -911.54      | 2,960.65     | 14,430,235.95       | 1,697,830.07       | 39.73481341 | -80.79577731 |

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Survey Report - Geographic



**Company:** Tug Hill Operating LLC  
**Project:** Marshall County, West Virginia.  
**Site:** Lily/Weller  
**Well:** Weller 2 HM (F)  
**Wellbore:** Original Hole  
**Design:** Surveys Original Hole

**Local Co-ordinate Reference:** Well Weller 2 HM (F)  
**TVD Reference:** RKB=1273+26 @ 1299.00usft (Nabors B28)  
**MD Reference:** RKB=1273+26 @ 1299.00usft (Nabors B28)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** DB\_Jul2216dt\_v14

**Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 8,478.00              | 90.99           | 150.47      | 6,541.63              | -993.88      | 3,005.97     | 14,430,153.61       | 1,697,875.39       | 39.73458700 | -80.79561676 |
| 8,572.00              | 89.05           | 152.14      | 6,541.59              | -1,076.33    | 3,051.10     | 14,430,071.16       | 1,697,920.52       | 39.73436029 | -80.79545690 |
| 8,667.00              | 89.49           | 152.40      | 6,542.80              | -1,160.41    | 3,095.30     | 14,429,987.08       | 1,697,964.73       | 39.73412909 | -80.79530037 |
| 8,761.00              | 90.02           | 149.68      | 6,543.21              | -1,242.65    | 3,140.81     | 14,429,904.84       | 1,698,010.23       | 39.73390296 | -80.79513916 |
| 8,856.00              | 90.20           | 147.13      | 6,543.02              | -1,323.56    | 3,190.58     | 14,429,823.93       | 1,698,060.00       | 39.73368044 | -80.79496279 |
| 8,950.00              | 89.85           | 149.59      | 6,542.98              | -1,403.58    | 3,239.88     | 14,429,743.90       | 1,698,109.31       | 39.73346037 | -80.79478806 |
| 9,045.00              | 89.45           | 152.31      | 6,543.56              | -1,486.62    | 3,286.01     | 14,429,660.87       | 1,698,155.43       | 39.73323203 | -80.79462468 |
| 9,140.00              | 90.02           | 149.50      | 6,544.00              | -1,569.63    | 3,332.20     | 14,429,577.86       | 1,698,201.62       | 39.73300378 | -80.79446106 |
| 9,234.00              | 88.88           | 148.09      | 6,544.90              | -1,650.02    | 3,380.89     | 14,429,497.47       | 1,698,250.32       | 39.73278269 | -80.79428850 |
| 9,329.00              | 89.49           | 147.66      | 6,546.26              | -1,730.46    | 3,431.41     | 14,429,417.02       | 1,698,300.83       | 39.73256145 | -80.79410949 |
| 9,424.00              | 89.67           | 150.64      | 6,546.95              | -1,812.01    | 3,480.12     | 14,429,335.48       | 1,698,349.54       | 39.73233719 | -80.79393691 |
| 9,518.00              | 90.11           | 149.50      | 6,547.13              | -1,893.47    | 3,527.02     | 14,429,254.01       | 1,698,396.44       | 39.73211317 | -80.79377075 |
| 9,614.00              | 89.58           | 150.47      | 6,547.39              | -1,976.60    | 3,575.04     | 14,429,170.89       | 1,698,444.46       | 39.73188458 | -80.79360063 |
| 9,709.00              | 90.29           | 149.33      | 6,547.50              | -2,058.79    | 3,622.68     | 14,429,088.70       | 1,698,492.10       | 39.73165857 | -80.79343185 |
| 9,804.00              | 90.55           | 149.76      | 6,546.80              | -2,140.68    | 3,670.83     | 14,429,006.81       | 1,698,540.25       | 39.73143337 | -80.79326125 |
| 9,899.00              | 89.45           | 148.18      | 6,546.80              | -2,222.08    | 3,719.80     | 14,428,925.41       | 1,698,589.22       | 39.73120951 | -80.79308775 |
| 9,994.00              | 90.07           | 150.12      | 6,547.20              | -2,303.63    | 3,768.51     | 14,428,843.86       | 1,698,637.94       | 39.73098523 | -80.79291515 |
| 10,089.00             | 89.93           | 151.26      | 6,547.20              | -2,386.47    | 3,815.02     | 14,428,761.02       | 1,698,684.44       | 39.73075743 | -80.79275042 |
| 10,184.00             | 89.63           | 150.91      | 6,547.57              | -2,469.62    | 3,860.95     | 14,428,677.86       | 1,698,730.37       | 39.73052877 | -80.79258773 |
| 10,279.00             | 90.59           | 148.97      | 6,547.38              | -2,551.84    | 3,908.53     | 14,428,595.65       | 1,698,777.96       | 39.73030267 | -80.79241916 |
| 10,374.00             | 91.03           | 150.20      | 6,546.04              | -2,633.76    | 3,956.62     | 14,428,513.73       | 1,698,826.05       | 39.73007740 | -80.79224880 |
| 10,469.00             | 89.98           | 152.58      | 6,545.20              | -2,717.15    | 4,002.10     | 14,428,430.34       | 1,698,871.53       | 39.72984810 | -80.79208771 |
| 10,564.00             | 90.15           | 154.51      | 6,545.10              | -2,802.20    | 4,044.42     | 14,428,345.29       | 1,698,913.85       | 39.72961426 | -80.79193789 |
| 10,658.00             | 89.19           | 153.63      | 6,545.64              | -2,886.73    | 4,085.53     | 14,428,260.76       | 1,698,954.95       | 39.72938184 | -80.79179239 |
| 10,753.00             | 89.19           | 154.60      | 6,546.98              | -2,972.19    | 4,127.00     | 14,428,175.30       | 1,698,996.42       | 39.72914688 | -80.79164560 |
| 10,847.00             | 89.01           | 152.31      | 6,548.46              | -3,056.26    | 4,169.00     | 14,428,091.22       | 1,699,038.42       | 39.72891572 | -80.79149692 |
| 10,942.00             | 88.97           | 151.52      | 6,550.13              | -3,140.06    | 4,213.71     | 14,428,007.42       | 1,699,083.14       | 39.72868529 | -80.79133856 |
| 11,037.00             | 89.89           | 151.61      | 6,551.08              | -3,223.60    | 4,258.95     | 14,427,923.89       | 1,699,128.37       | 39.72845559 | -80.79117838 |
| 11,132.00             | 89.10           | 149.50      | 6,551.91              | -3,306.32    | 4,305.64     | 14,427,841.17       | 1,699,175.07       | 39.72822812 | -80.79101298 |
| 11,226.00             | 90.07           | 147.57      | 6,552.60              | -3,386.49    | 4,354.70     | 14,427,761.00       | 1,699,224.13       | 39.72800763 | -80.79083915 |
| 11,320.00             | 90.46           | 148.36      | 6,552.16              | -3,466.17    | 4,404.56     | 14,427,681.31       | 1,699,273.99       | 39.72778847 | -80.79066247 |
| 11,415.00             | 90.86           | 147.92      | 6,551.07              | -3,546.86    | 4,454.71     | 14,427,600.63       | 1,699,324.13       | 39.72756657 | -80.79048480 |
| 11,510.00             | 89.93           | 148.45      | 6,550.41              | -3,627.58    | 4,504.79     | 14,427,519.91       | 1,699,374.21       | 39.72734456 | -80.79030736 |
| 11,604.00             | 90.11           | 148.09      | 6,550.38              | -3,707.53    | 4,554.22     | 14,427,439.96       | 1,699,423.65       | 39.72712467 | -80.79013220 |
| 11,699.00             | 90.59           | 148.80      | 6,549.80              | -3,788.48    | 4,603.94     | 14,427,359.01       | 1,699,473.36       | 39.72690204 | -80.78995606 |
| 11,793.00             | 89.19           | 148.71      | 6,549.98              | -3,868.84    | 4,652.69     | 14,427,278.64       | 1,699,522.12       | 39.72668102 | -80.78978332 |
| 11,888.00             | 89.45           | 149.68      | 6,551.11              | -3,950.43    | 4,701.34     | 14,427,197.05       | 1,699,570.76       | 39.72645664 | -80.78961098 |
| 11,983.00             | 89.67           | 149.15      | 6,551.84              | -4,032.21    | 4,749.67     | 14,427,115.27       | 1,699,619.10       | 39.72623173 | -80.78943975 |
| 12,078.00             | 90.42           | 150.38      | 6,551.76              | -4,114.29    | 4,797.51     | 14,427,033.20       | 1,699,666.94       | 39.72600602 | -80.78927031 |
| 12,173.00             | 89.89           | 149.94      | 6,551.50              | -4,196.69    | 4,844.78     | 14,426,950.80       | 1,699,714.21       | 39.72577941 | -80.78910288 |
| 12,266.00             | 89.32           | 149.94      | 6,552.14              | -4,277.18    | 4,891.36     | 14,426,870.31       | 1,699,760.79       | 39.72555806 | -80.78893788 |
| 12,361.00             | 89.45           | 149.85      | 6,553.16              | -4,359.36    | 4,939.01     | 14,426,788.13       | 1,699,808.44       | 39.72533206 | -80.78876910 |
| 12,456.00             | 89.71           | 151.00      | 6,553.86              | -4,441.98    | 4,985.90     | 14,426,705.51       | 1,699,855.32       | 39.72510486 | -80.78860304 |
| 12,552.00             | 88.92           | 152.05      | 6,555.01              | -4,526.36    | 5,031.66     | 14,426,621.13       | 1,699,901.09       | 39.72487283 | -80.78844098 |
| 12,647.00             | 89.01           | 153.37      | 6,556.72              | -4,610.77    | 5,075.21     | 14,426,536.72       | 1,699,944.64       | 39.72464073 | -80.78828681 |
| 12,741.00             | 89.41           | 148.01      | 6,558.02              | -4,692.70    | 5,121.21     | 14,426,454.79       | 1,699,990.63       | 39.72441543 | -80.78812391 |
| 12,837.00             | 89.23           | 147.74      | 6,559.16              | -4,774.00    | 5,172.25     | 14,426,373.49       | 1,700,041.68       | 39.72419184 | -80.78794305 |
| 12,931.00             | 89.63           | 148.18      | 6,560.10              | -4,853.67    | 5,222.12     | 14,426,293.82       | 1,700,091.54       | 39.72397270 | -80.78776638 |
| 13,025.00             | 89.71           | 148.80      | 6,560.64              | -4,933.81    | 5,271.25     | 14,426,213.68       | 1,700,140.67       | 39.72375230 | -80.78759233 |
| 13,119.00             | 89.80           | 148.97      | 6,561.04              | -5,014.29    | 5,319.82     | 14,426,133.20       | 1,700,189.25       | 39.72353097 | -80.78742025 |
| 13,215.00             | 89.63           | 148.71      | 6,561.52              | -5,096.43    | 5,369.49     | 14,426,051.05       | 1,700,238.92       | 39.72330504 | -80.78724429 |
| 13,309.00             | 89.89           | 149.24      | 6,561.91              | -5,176.99    | 5,417.94     | 14,425,970.50       | 1,700,287.37       | 39.72308350 | -80.78707267 |
| 13,404.00             | 89.58           | 148.53      | 6,562.35              | -5,258.32    | 5,467.03     | 14,425,889.17       | 1,700,336.46       | 39.72285982 | -80.78689877 |
| 13,498.00             | 89.76           | 148.89      | 6,562.89              | -5,338.64    | 5,515.85     | 14,425,808.84       | 1,700,385.28       | 39.72263891 | -80.78672582 |
| 13,593.00             | 89.93           | 149.33      | 6,563.15              | -5,420.17    | 5,564.63     | 14,425,727.32       | 1,700,434.05       | 39.72241470 | -80.78655306 |

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Survey Report - Geographic



|                  |                                 |                                     |  |
|------------------|---------------------------------|-------------------------------------|--|
| <b>Company:</b>  | Tug Hill Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Weller 2 HM (F)                   |
| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1273+26 @ 1299.00usft (Nabors B28) |
| <b>Site:</b>     | Lily/Weller                     | <b>MD Reference:</b>                | RKB=1273+26 @ 1299.00usft (Nabors B28) |
| <b>Well:</b>     | Weller 2 HM (F)                 | <b>North Reference:</b>             | Grid                                   |
| <b>Wellbore:</b> | Original Hole                   | <b>Survey Calculation Method:</b>   | Minimum Curvature                      |
| <b>Design:</b>   | Surveys Original Hole           | <b>Database:</b>                    | DB_Jul2216dt_v14                       |

| Survey   |                 |             |                       |              |              |                     |                    |             |              |
|--|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| Measured Depth (usft)                              | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
| 13,688.00  | 90.15           | 148.80      | 6,563.08              | -5,501.65    | 5,613.46     | 14,425,645.83       | 1,700,482.89       | 39.72219059 | -80.78638007 |
| 13,782.00  | 90.68           | 148.71      | 6,562.40              | -5,582.02    | 5,662.22     | 14,425,565.47       | 1,700,531.64       | 39.72196957 | -80.78620736 |
| 13,877.00  | 89.98           | 147.13      | 6,561.85              | -5,662.51    | 5,712.67     | 14,425,484.98       | 1,700,582.09       | 39.72174819 | -80.78602861 |
| 13,972.00  | 89.85           | 150.29      | 6,562.00              | -5,743.68    | 5,762.00     | 14,425,403.81       | 1,700,631.43       | 39.72152494 | -80.78585385 |
| 14,067.00  | 87.96           | 149.68      | 6,563.81              | -5,825.92    | 5,809.51     | 14,425,321.57       | 1,700,678.94       | 39.72129877 | -80.78568559 |
| 14,161.00  | 88.04           | 150.56      | 6,567.09              | -5,907.37    | 5,856.31     | 14,425,240.11       | 1,700,725.74       | 39.72107477 | -80.78551984 |
| 14,237.00  | 88.26           | 151.00      | 6,569.54              | -5,973.67    | 5,893.40     | 14,425,173.82       | 1,700,762.82       | 39.72089246 | -80.78538854 |
| <b>Survey @ 14237.00 MD 6569.54 TVD</b>            |                 |             |                       |              |              |                     |                    |             |              |
| 14,292.00  | 88.26           | 151.00      | 6,571.21              | -6,021.75    | 5,920.05     | 14,425,125.74       | 1,700,789.47       | 39.72076024 | -80.78529416 |
| <b>Survey projected to 14292.00 MD 6571.21 TVD</b> |                 |             |                       |              |              |                     |                    |             |              |

| Design Annotations    |                       |                   |              |   |  |
|-----------------------|-----------------------|-------------------|--------------|---|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                     |  |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |   |  |
| 158.00                | 157.99                | -1.05             | -0.93        | MWD surveys                                 |  |
| 14,237.00             | 6,569.54              | -5,973.67         | 5,893.40     | Survey @ 14237.00 MD 6569.54 TVD            |  |
| 14,292.00             | 6,571.21              | -6,021.75         | 5,920.05     | Survey projected to 14292.00 MD 6571.21 TVD |  |

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