



Survey Report - Geographic



|                  |                                 |                                     |  |
|------------------|---------------------------------|-------------------------------------|--|
| <b>Company:</b>  | Tug Hill Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Ten High 1N-02HM (J)              |
| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Site:</b>     | Ten High                        | <b>MD Reference:</b>                | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Well:</b>     | Ten High 1N-02HM (J)            | <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>                  | Ten High  |                     |                    |                          |              |
| <b>Site Position:</b>        |           | <b>Northing:</b>    | 14,456,545.60 usft | <b>Latitude:</b>         | 39.80680885  |
| <b>From:</b>                 | Lat/Long  | <b>Easting:</b>     | 1,730,001.41 usft  | <b>Longitude:</b>        | -80.68101011 |
| <b>Position Uncertainty:</b> | 0.00 usft | <b>Slot Radius:</b> | 13-3/16 "          | <b>Grid Convergence:</b> | 0.20 °       |

|                             |                      |           |                            |                    |                      |               |
|-----------------------------|----------------------|-----------|----------------------------|--------------------|----------------------|---------------|
| <b>Well</b>                 | Ten High 1N-02HM (J) |           |                            |                    |                      |               |
| <b>Well Position</b>        | <b>+N/-S</b>         | 0.00 usft | <b>Northing:</b>           | 14,456,525.13 usft | <b>Latitude:</b>     | 39.80675268   |
|                             | <b>+E/-W</b>         | 0.00 usft | <b>Easting:</b>            | 1,729,996.76 usft  | <b>Longitude:</b>    | -80.68102695  |
| <b>Position Uncertainty</b> | 0.00 usft            |           | <b>Wellhead Elevation:</b> | 0.00 usft          | <b>Ground Level:</b> | 1,310.00 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          | 9/1/2018           | -8.75                  | 66.87                | 52,041.07606269            |

|                          |                       |                                |                     |                      |                      |
|--------------------------|-----------------------|--------------------------------|---------------------|----------------------|----------------------|
| <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                 | 326.76               |

|                       |                  |                            |                  |                    |  |
|-----------------------|------------------|----------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>      | 10/30/2018                 |                  |                    |  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>   | <b>Tool Name</b> | <b>Description</b> |  |
| 188.00                | 1,129.00         | MWD 17 1/2 (Original Hole) | MWD              | MWD - Standard     |  |
| 1,178.00              | 2,911.00         | MWD 12 3/8 (Original Hole) | MWD              | MWD - Standard     |  |
| 2,980.00              | 15,287.00        | MWD 8 3/4 (Original Hole)  | MWD              | MWD - Standard     |  |
| 15,345.00             | 15,345.00        | Projection (Original Hole) | MWD              | MWD - Standard     |  |

|                              |   |                    |                              |                     |                     |                            |                           |                 |                  |  |
|------------------------------|---|--------------------|------------------------------|---------------------|---------------------|----------------------------|---------------------------|-----------------|------------------|--|
| <b>Survey</b>                | <div style="text-align: right;"> </div> |                    |                              |                     |                     |                            |                           |                 |                  |  |
| <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                | 14,456,525.13              | 1,729,996.76              | 39.80675268     | -80.68102695     |  |
| 188.00                       | 0.53                                    | 95.68              | 188.00                       | -0.09               | 0.87                | 14,456,525.05              | 1,729,997.62              | 39.80675244     | -80.68102387     |  |
| <b>MWD surveys</b>           |   |                    |                              |                     |                     |                            |                           |                 |                  |  |
| 219.00                       | 0.30                                    | 189.75             | 219.00                       | -0.18               | 0.99                | 14,456,524.95              | 1,729,997.75              | 39.80675218     | -80.68102341     |  |
| 251.00                       | 0.53                                    | 109.61             | 251.00                       | -0.31               | 1.12                | 14,456,524.82              | 1,729,997.88              | 39.80675181     | -80.68102297     |  |
| 283.00                       | 0.27                                    | 82.45              | 283.00                       | -0.35               | 1.33                | 14,456,524.78              | 1,729,998.09              | 39.80675170     | -80.68102221     |  |
| 314.00                       | 0.43                                    | 8.86               | 313.99                       | -0.23               | 1.42                | 14,456,524.90              | 1,729,998.18              | 39.80675204     | -80.68102188     |  |
| 346.00                       | 0.49                                    | 282.63             | 345.99                       | -0.08               | 1.31                | 14,456,525.05              | 1,729,998.07              | 39.80675245     | -80.68102229     |  |
| 384.00                       | 0.06                                    | 151.59             | 383.99                       | -0.06               | 1.16                | 14,456,525.07              | 1,729,997.92              | 39.80675250     | -80.68102282     |  |



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| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Site:</b>     | Ten High                        | <b>MD Reference:</b>                | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Well:</b>     | Ten High 1N-02HM (J)            | <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    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 416.00                | 0.62            | 350.87      | 415.99                | 0.10         | 1.14         | 14,456,525.23       | 1,729,997.90       | 39.80675293 | -80.68102289 |
| 448.00                | 0.20            | 305.88      | 447.99                | 0.30         | 1.07         | 14,456,525.43       | 1,729,997.83       | 39.80675349 | -80.68102315 |
| 479.00                | 0.67            | 31.30       | 478.99                | 0.49         | 1.12         | 14,456,525.62       | 1,729,997.88       | 39.80675400 | -80.68102296 |
| 511.00                | 0.89            | 187.36      | 510.99                | 0.40         | 1.18         | 14,456,525.53       | 1,729,997.94       | 39.80675377 | -80.68102273 |
| 542.00                | 1.01            | 91.41       | 541.99                | 0.15         | 1.43         | 14,456,525.29       | 1,729,998.18       | 39.80675309 | -80.68102187 |
| 574.00                | 0.08            | 162.83      | 573.99                | 0.12         | 1.71         | 14,456,525.26       | 1,729,998.47       | 39.80675301 | -80.68102085 |
| 605.00                | 0.67            | 251.17      | 604.99                | 0.05         | 1.55         | 14,456,525.18       | 1,729,998.31       | 39.80675279 | -80.68102143 |
| 637.00                | 0.46            | 77.27       | 636.98                | 0.01         | 1.50         | 14,456,525.15       | 1,729,998.26       | 39.80675270 | -80.68102162 |
| 700.00                | 0.51            | 356.46      | 699.98                | 0.35         | 1.73         | 14,456,525.48       | 1,729,998.49       | 39.80675362 | -80.68102080 |
| 731.00                | 0.18            | 299.01      | 730.98                | 0.51         | 1.68         | 14,456,525.64       | 1,729,998.43       | 39.80675407 | -80.68102098 |
| 763.00                | 0.58            | 115.59      | 762.98                | 0.46         | 1.78         | 14,456,525.60       | 1,729,998.54       | 39.80675394 | -80.68102062 |
| 794.00                | 0.37            | 113.63      | 793.98                | 0.36         | 2.01         | 14,456,525.49       | 1,729,998.77       | 39.80675364 | -80.68101979 |
| 826.00                | 0.58            | 140.89      | 825.98                | 0.19         | 2.21         | 14,456,525.32       | 1,729,998.97       | 39.80675318 | -80.68101909 |
| 857.00                | 0.09            | 149.53      | 856.98                | 0.05         | 2.32         | 14,456,525.18       | 1,729,999.08       | 39.80675279 | -80.68101869 |
| 889.00                | 0.26            | 90.17       | 888.98                | 0.03         | 2.40         | 14,456,525.16       | 1,729,999.16       | 39.80675273 | -80.68101839 |
| 921.00                | 0.39            | 156.60      | 920.98                | -0.07        | 2.52         | 14,456,525.06       | 1,729,999.28       | 39.80675245 | -80.68101798 |
| 952.00                | 0.31            | 125.96      | 951.98                | -0.22        | 2.63         | 14,456,524.91       | 1,729,999.39       | 39.80675205 | -80.68101759 |
| 974.00                | 0.52            | 205.45      | 973.98                | -0.35        | 2.64         | 14,456,524.79       | 1,729,999.39       | 39.80675171 | -80.68101757 |
| 1,015.00              | 0.38            | 186.44      | 1,014.98              | -0.65        | 2.54         | 14,456,524.48       | 1,729,999.30       | 39.80675087 | -80.68101791 |
| 1,047.00              | 0.06            | 121.96      | 1,046.98              | -0.76        | 2.54         | 14,456,524.37       | 1,729,999.30       | 39.80675056 | -80.68101791 |
| 1,078.00              | 0.04            | 88.63       | 1,077.98              | -0.77        | 2.57         | 14,456,524.36       | 1,729,999.33       | 39.80675054 | -80.68101782 |
| 1,110.00              | 0.31            | 227.28      | 1,109.98              | -0.83        | 2.51         | 14,456,524.30       | 1,729,999.27       | 39.80675038 | -80.68101801 |
| 1,129.00              | 0.28            | 204.41      | 1,128.98              | -0.91        | 2.46         | 14,456,524.22       | 1,729,999.22       | 39.80675017 | -80.68101821 |
| 1,178.00              | 0.22            | 140.58      | 1,177.98              | -1.09        | 2.47         | 14,456,524.04       | 1,729,999.23       | 39.80674967 | -80.68101818 |
| 1,273.00              | 0.24            | 151.29      | 1,272.97              | -1.40        | 2.68         | 14,456,523.73       | 1,729,999.44       | 39.80674880 | -80.68101743 |
| 1,367.00              | 0.17            | 244.89      | 1,366.97              | -1.64        | 2.65         | 14,456,523.50       | 1,729,999.41       | 39.80674816 | -80.68101754 |
| 1,462.00              | 1.58            | 207.72      | 1,461.96              | -2.86        | 1.91         | 14,456,522.28       | 1,729,998.67       | 39.80674482 | -80.68102018 |
| 1,557.00              | 3.05            | 197.87      | 1,556.88              | -6.42        | 0.53         | 14,456,518.71       | 1,729,997.28       | 39.80673504 | -80.68102516 |
| 1,651.00              | 4.90            | 191.41      | 1,650.65              | -12.74       | -1.04        | 14,456,512.40       | 1,729,995.72       | 39.80671771 | -80.68103080 |
| 1,746.00              | 6.40            | 182.10      | 1,745.19              | -22.01       | -2.03        | 14,456,503.13       | 1,729,994.73       | 39.80669227 | -80.68103447 |
| 1,841.00              | 6.43            | 181.60      | 1,839.59              | -32.61       | -2.38        | 14,456,492.52       | 1,729,994.38       | 39.80666314 | -80.68103582 |
| 1,935.00              | 5.12            | 178.67      | 1,933.12              | -42.07       | -2.42        | 14,456,483.06       | 1,729,994.33       | 39.80663717 | -80.68103612 |
| 2,030.00              | 3.76            | 175.05      | 2,027.83              | -49.41       | -2.06        | 14,456,475.72       | 1,729,994.70       | 39.80661701 | -80.68103490 |
| 2,124.00              | 3.58            | 190.57      | 2,121.64              | -55.37       | -2.33        | 14,456,469.77       | 1,729,994.43       | 39.80660065 | -80.68103595 |
| 2,219.00              | 4.38            | 206.53      | 2,216.41              | -61.53       | -4.49        | 14,456,463.60       | 1,729,992.26       | 39.80658375 | -80.68104374 |
| 2,314.00              | 5.49            | 207.49      | 2,311.06              | -68.81       | -8.21        | 14,456,456.33       | 1,729,988.55       | 39.80656381 | -80.68105707 |
| 2,409.00              | 5.93            | 205.78      | 2,405.59              | -77.26       | -12.44       | 14,456,447.88       | 1,729,984.31       | 39.80654064 | -80.68107224 |
| 2,504.00              | 4.84            | 205.52      | 2,500.17              | -85.29       | -16.31       | 14,456,439.84       | 1,729,980.45       | 39.80651861 | -80.68108609 |
| 2,599.00              | 3.88            | 199.19      | 2,594.89              | -91.94       | -19.09       | 14,456,433.19       | 1,729,977.67       | 39.80650037 | -80.68109609 |
| 2,693.00              | 5.45            | 199.41      | 2,688.58              | -99.16       | -21.62       | 14,456,425.97       | 1,729,975.14       | 39.80648058 | -80.68110518 |
| 2,788.00              | 5.73            | 194.11      | 2,783.12              | -108.01      | -24.27       | 14,456,417.12       | 1,729,972.49       | 39.80645629 | -80.68111475 |
| 2,883.00              | 6.00            | 192.77      | 2,877.63              | -117.45      | -26.53       | 14,456,407.68       | 1,729,970.23       | 39.80643038 | -80.68112290 |
| 2,911.00              | 6.29            | 194.31      | 2,905.47              | -120.37      | -27.23       | 14,456,404.76       | 1,729,969.53       | 39.80642239 | -80.68112543 |
| 3,004.00              | 6.48            | 190.97      | 2,997.89              | -130.46      | -29.49       | 14,456,394.68       | 1,729,967.27       | 39.80639471 | -80.68113360 |
| 3,067.00              | 6.38            | 193.84      | 3,060.49              | -137.35      | -31.00       | 14,456,387.79       | 1,729,965.76       | 39.80637580 | -80.68113908 |
| 3,161.00              | 5.12            | 201.04      | 3,154.02              | -146.33      | -33.76       | 14,456,378.80       | 1,729,963.00       | 39.80635115 | -80.68114900 |
| 3,255.00              | 3.75            | 196.44      | 3,247.74              | -153.19      | -36.13       | 14,456,371.94       | 1,729,960.63       | 39.80633233 | -80.68115755 |
| 3,350.00              | 3.27            | 194.22      | 3,342.56              | -158.80      | -37.68       | 14,456,366.33       | 1,729,959.08       | 39.80631694 | -80.68116312 |
| 3,444.00              | 3.20            | 189.81      | 3,436.41              | -163.99      | -38.78       | 14,456,361.15       | 1,729,957.98       | 39.80630272 | -80.68116713 |
| 3,539.00              | 3.00            | 188.80      | 3,531.27              | -169.05      | -39.62       | 14,456,356.08       | 1,729,957.14       | 39.80628880 | -80.68117015 |
| 3,634.00              | 4.19            | 190.37      | 3,626.08              | -174.93      | -40.62       | 14,456,350.21       | 1,729,956.14       | 39.80627269 | -80.68117381 |
| 3,728.00              | 4.64            | 186.81      | 3,719.80              | -182.08      | -41.69       | 14,456,343.05       | 1,729,955.07       | 39.80625306 | -80.68117770 |
| 3,823.00              | 4.51            | 186.53      | 3,814.50              | -189.60      | -42.57       | 14,456,335.53       | 1,729,954.19       | 39.80623240 | -80.68118093 |
| 3,917.00              | 5.64            | 198.31      | 3,908.13              | -197.66      | -44.44       | 14,456,327.47       | 1,729,952.32       | 39.80621029 | -80.68118770 |
| 4,011.00              | 5.54            | 197.66      | 4,001.68              | -206.37      | -47.27       | 14,456,318.76       | 1,729,949.49       | 39.80618640 | -80.68119788 |

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WV Department of Environmental Protection



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| <b>Wellbore:</b> | Original Hole                   | <b>Survey Calculation Method:</b>   | Minimum Curvature                      |
| <b>Design:</b>   | Surveys Original Hole           | <b>Database:</b>                    | DB_Jul2216dt_v14                       |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 4,106.00              | 4.87            | 195.74      | 4,096.29              | -214.62      | -49.75       | 14,456,310.51       | 1,729,947.00       | 39.80616376 | -80.68120683 |
| 4,200.00              | 4.78            | 193.34      | 4,189.96              | -222.27      | -51.74       | 14,456,302.86       | 1,729,945.02       | 39.80614277 | -80.68121400 |
| 4,295.00              | 4.51            | 194.18      | 4,284.65              | -229.75      | -53.57       | 14,456,295.39       | 1,729,943.19       | 39.80612227 | -80.68122060 |
| 4,389.00              | 4.40            | 192.16      | 4,378.36              | -236.85      | -55.23       | 14,456,288.28       | 1,729,941.53       | 39.80610276 | -80.68122662 |
| 4,486.00              | 5.87            | 193.51      | 4,474.97              | -245.31      | -57.18       | 14,456,279.82       | 1,729,939.58       | 39.80607955 | -80.68123365 |
| 4,581.00              | 6.43            | 193.26      | 4,569.42              | -255.22      | -59.53       | 14,456,269.92       | 1,729,937.23       | 39.80605238 | -80.68124216 |
| 4,676.00              | 5.04            | 187.98      | 4,663.95              | -264.53      | -61.33       | 14,456,260.61       | 1,729,935.43       | 39.80602683 | -80.68124868 |
| 4,770.00              | 4.78            | 187.00      | 4,757.60              | -272.50      | -62.38       | 14,456,252.63       | 1,729,934.38       | 39.80600493 | -80.68125253 |
| 4,865.00              | 5.52            | 195.71      | 4,852.22              | -280.83      | -64.10       | 14,456,244.30       | 1,729,932.66       | 39.80598208 | -80.68125875 |
| 4,960.00              | 6.25            | 205.29      | 4,946.72              | -289.90      | -67.55       | 14,456,235.23       | 1,729,929.21       | 39.80595719 | -80.68127114 |
| 5,054.00              | 6.85            | 208.74      | 5,040.11              | -299.45      | -72.43       | 14,456,225.69       | 1,729,924.33       | 39.80593104 | -80.68128864 |
| 5,148.00              | 6.28            | 202.59      | 5,133.49              | -309.11      | -77.10       | 14,456,216.02       | 1,729,919.66       | 39.80590455 | -80.68130540 |
| 5,243.00              | 8.74            | 194.60      | 5,227.67              | -320.89      | -80.91       | 14,456,204.24       | 1,729,915.84       | 39.80587222 | -80.68131913 |
| 5,338.00              | 10.13           | 191.64      | 5,321.38              | -336.06      | -84.42       | 14,456,189.07       | 1,729,912.34       | 39.80583060 | -80.68133180 |
| 5,432.00              | 10.57           | 189.90      | 5,413.85              | -352.65      | -87.57       | 14,456,172.48       | 1,729,909.19       | 39.80578508 | -80.68134323 |
| 5,527.00              | 10.35           | 194.26      | 5,507.28              | -369.50      | -91.17       | 14,456,155.63       | 1,729,905.59       | 39.80573882 | -80.68135626 |
| 5,621.00              | 10.31           | 195.27      | 5,599.75              | -385.80      | -95.47       | 14,456,139.33       | 1,729,901.29       | 39.80569411 | -80.68137177 |
| 5,716.00              | 10.42           | 200.00      | 5,693.21              | -402.08      | -100.64      | 14,456,123.05       | 1,729,896.12       | 39.80564946 | -80.68139041 |
| 5,811.00              | 10.49           | 201.34      | 5,786.63              | -418.21      | -106.73      | 14,456,106.93       | 1,729,890.03       | 39.80560523 | -80.68141228 |
| 5,905.00              | 10.96           | 198.01      | 5,878.99              | -434.67      | -112.60      | 14,456,090.46       | 1,729,884.15       | 39.80556006 | -80.68143341 |
| 5,930.00              | 11.42           | 197.72      | 5,903.51              | -439.29      | -114.09      | 14,456,085.84       | 1,729,882.67       | 39.80554739 | -80.68143877 |
| 6,025.00              | 12.18           | 195.31      | 5,996.50              | -457.92      | -119.60      | 14,456,067.21       | 1,729,877.16       | 39.80549630 | -80.68145862 |
| 6,119.00              | 12.48           | 222.64      | 6,088.41              | -474.97      | -129.11      | 14,456,050.16       | 1,729,867.65       | 39.80544957 | -80.68149269 |
| 6,214.00              | 14.59           | 263.51      | 6,180.98              | -483.89      | -147.99      | 14,456,041.24       | 1,729,848.76       | 39.80542524 | -80.68156004 |
| 6,308.00              | 16.97           | 298.67      | 6,271.63              | -478.64      | -171.85      | 14,456,046.50       | 1,729,824.91       | 39.80543991 | -80.68164492 |
| 6,403.00              | 21.54           | 319.67      | 6,361.40              | -458.66      | -195.34      | 14,456,066.48       | 1,729,801.42       | 39.80549501 | -80.68172831 |
| 6,497.00              | 29.14           | 328.81      | 6,446.32              | -425.86      | -218.40      | 14,456,099.27       | 1,729,778.35       | 39.80558530 | -80.68181002 |
| 6,592.00              | 39.43           | 328.90      | 6,524.71              | -380.12      | -246.04      | 14,456,145.01       | 1,729,750.72       | 39.80571119 | -80.68190784 |
| 6,687.00              | 48.57           | 325.12      | 6,592.99              | -324.94      | -282.07      | 14,456,200.19       | 1,729,714.69       | 39.80586306 | -80.68203544 |
| 6,781.00              | 52.84           | 325.03      | 6,652.51              | -265.31      | -323.71      | 14,456,259.82       | 1,729,673.05       | 39.80602723 | -80.68218295 |
| 6,876.00              | 57.71           | 325.91      | 6,706.61              | -201.00      | -367.94      | 14,456,324.13       | 1,729,628.82       | 39.80620428 | -80.68233962 |
| 6,971.00              | 61.93           | 326.62      | 6,754.35              | -132.72      | -413.53      | 14,456,392.42       | 1,729,583.23       | 39.80639225 | -80.68250108 |
| 7,065.00              | 64.97           | 326.79      | 6,796.37              | -62.44       | -459.68      | 14,456,462.69       | 1,729,537.08       | 39.80658570 | -80.68266453 |
| 7,160.00              | 69.89           | 327.14      | 6,832.82              | 11.08        | -507.49      | 14,456,536.22       | 1,729,489.27       | 39.80678807 | -80.68283382 |
| 7,254.00              | 74.99           | 328.37      | 6,861.17              | 86.86        | -555.27      | 14,456,611.99       | 1,729,441.48       | 39.80699665 | -80.68300302 |
| 7,349.00              | 79.16           | 328.46      | 6,882.41              | 165.72       | -603.76      | 14,456,690.85       | 1,729,393.00       | 39.80721368 | -80.68317467 |
| 7,444.00              | 82.90           | 328.46      | 6,897.22              | 245.68       | -652.84      | 14,456,770.82       | 1,729,343.92       | 39.80743376 | -80.68334842 |
| 7,539.00              | 87.12           | 328.99      | 6,905.48              | 326.55       | -701.96      | 14,456,851.69       | 1,729,294.80       | 39.80765632 | -80.68352230 |
| 7,633.00              | 89.98           | 330.13      | 6,907.86              | 407.56       | -749.56      | 14,456,932.69       | 1,729,247.20       | 39.80787925 | -80.68369078 |
| 7,728.00              | 91.52           | 330.04      | 6,906.62              | 489.89       | -796.93      | 14,457,015.03       | 1,729,199.83       | 39.80810582 | -80.68385843 |
| 7,822.00              | 92.31           | 330.13      | 6,903.48              | 571.32       | -843.78      | 14,457,096.46       | 1,729,152.97       | 39.80832990 | -80.68402423 |
| 7,917.00              | 91.25           | 331.27      | 6,900.53              | 654.13       | -890.25      | 14,457,179.26       | 1,729,106.51       | 39.80855775 | -80.68418865 |
| 8,012.00              | 90.51           | 331.27      | 6,899.07              | 737.42       | -935.91      | 14,457,262.55       | 1,729,060.85       | 39.80878694 | -80.68435019 |
| 8,107.00              | 91.56           | 331.89      | 6,897.35              | 820.96       | -981.12      | 14,457,346.09       | 1,729,015.64       | 39.80901678 | -80.68451011 |
| 8,201.00              | 89.80           | 329.78      | 6,896.24              | 903.03       | -1,026.92    | 14,457,428.16       | 1,728,969.84       | 39.80924261 | -80.68467217 |
| 8,295.00              | 90.99           | 330.13      | 6,895.59              | 984.39       | -1,073.98    | 14,457,509.53       | 1,728,922.78       | 39.80946651 | -80.68483873 |
| 8,390.00              | 90.73           | 330.75      | 6,894.16              | 1,067.02     | -1,120.84    | 14,457,592.15       | 1,728,875.92       | 39.80969387 | -80.68500456 |
| 8,485.00              | 91.43           | 330.57      | 6,892.37              | 1,149.82     | -1,167.38    | 14,457,674.95       | 1,728,829.38       | 39.80992171 | -80.68516925 |
| 8,580.00              | 89.85           | 330.75      | 6,891.31              | 1,232.62     | -1,213.93    | 14,457,757.76       | 1,728,782.83       | 39.81014957 | -80.68533395 |
| 8,674.00              | 90.73           | 330.13      | 6,890.83              | 1,314.39     | -1,260.30    | 14,457,839.52       | 1,728,736.46       | 39.81037455 | -80.68549805 |
| 8,768.00              | 91.74           | 330.13      | 6,888.81              | 1,395.88     | -1,307.10    | 14,457,921.01       | 1,728,689.66       | 39.81059880 | -80.68566370 |
| 8,863.00              | 90.51           | 330.31      | 6,886.94              | 1,478.32     | -1,354.27    | 14,458,003.45       | 1,728,642.48       | 39.81082565 | -80.68583065 |
| 8,957.00              | 91.52           | 331.01      | 6,885.28              | 1,560.24     | -1,400.33    | 14,458,085.38       | 1,728,596.43       | 39.81105109 | -80.68599361 |
| 9,051.00              | 92.48           | 330.57      | 6,882.00              | 1,642.24     | -1,446.17    | 14,458,167.37       | 1,728,550.59       | 39.81127671 | -80.68615583 |
| 9,146.00              | 91.38           | 331.27      | 6,878.80              | 1,725.21     | -1,492.32    | 14,458,250.35       | 1,728,504.44       | 39.81150503 | -80.68631912 |



Survey Report - Geographic



|                  |                                 |                                     |  |
|------------------|---------------------------------|-------------------------------------|--|
| <b>Company:</b>  | Tug Hill Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Ten High 1N-02HM (J)              |
| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Site:</b>     | Ten High                        | <b>MD Reference:</b>                | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Well:</b>     | Ten High 1N-02HM (J)            | <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    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 9,240.00              | 90.24           | 332.33      | 6,877.47              | 1,808.05     | -1,536.73    | 14,458,333.18       | 1,728,460.03       | 39.81173293 | -80.68647624 |
| 9,335.00              | 89.67           | 331.19      | 6,877.54              | 1,891.74     | -1,581.68    | 14,458,416.87       | 1,728,415.08       | 39.81196320 | -80.68663526 |
| 9,430.00              | 90.29           | 330.92      | 6,877.58              | 1,974.87     | -1,627.66    | 14,458,500.00       | 1,728,369.10       | 39.81219194 | -80.68679795 |
| 9,524.00              | 91.52           | 331.19      | 6,876.09              | 2,057.12     | -1,673.14    | 14,458,582.25       | 1,728,323.62       | 39.81241824 | -80.68695890 |
| 9,619.00              | 90.95           | 329.52      | 6,874.04              | 2,139.66     | -1,720.12    | 14,458,664.79       | 1,728,276.64       | 39.81264538 | -80.68712516 |
| 9,714.00              | 90.59           | 329.17      | 6,872.77              | 2,221.37     | -1,768.55    | 14,458,746.51       | 1,728,228.21       | 39.81287026 | -80.68729661 |
| 9,808.00              | 91.56           | 329.08      | 6,871.00              | 2,302.04     | -1,816.78    | 14,458,827.17       | 1,728,179.98       | 39.81309224 | -80.68746735 |
| 9,903.00              | 91.43           | 329.25      | 6,868.53              | 2,383.58     | -1,865.46    | 14,458,908.71       | 1,728,131.30       | 39.81331665 | -80.68763968 |
| 9,998.00              | 92.22           | 328.90      | 6,865.50              | 2,465.04     | -1,914.26    | 14,458,990.17       | 1,728,082.50       | 39.81354080 | -80.68781243 |
| 10,092.00             | 91.16           | 328.64      | 6,862.73              | 2,545.38     | -1,962.97    | 14,459,070.51       | 1,728,033.79       | 39.81376191 | -80.68798491 |
| 10,187.00             | 90.42           | 329.25      | 6,861.42              | 2,626.75     | -2,011.97    | 14,459,151.89       | 1,727,984.79       | 39.81398585 | -80.68815840 |
| 10,282.00             | 91.38           | 329.60      | 6,859.93              | 2,708.53     | -2,060.29    | 14,459,233.67       | 1,727,936.47       | 39.81421091 | -80.68832945 |
| 10,376.00             | 92.00           | 330.22      | 6,857.15              | 2,789.83     | -2,107.39    | 14,459,314.96       | 1,727,889.36       | 39.81443462 | -80.68849619 |
| 10,471.00             | 91.08           | 329.34      | 6,854.60              | 2,871.89     | -2,155.19    | 14,459,397.02       | 1,727,841.57       | 39.81466042 | -80.68866538 |
| 10,566.00             | 92.35           | 330.31      | 6,851.76              | 2,953.97     | -2,202.92    | 14,459,479.11       | 1,727,793.84       | 39.81488631 | -80.68883433 |
| 10,660.00             | 91.78           | 329.08      | 6,848.37              | 3,035.08     | -2,250.32    | 14,459,560.21       | 1,727,746.44       | 39.81510948 | -80.68900213 |
| 10,755.00             | 90.11           | 328.55      | 6,846.80              | 3,116.33     | -2,299.50    | 14,459,641.47       | 1,727,697.25       | 39.81533311 | -80.68917627 |
| 10,850.00             | 91.16           | 328.73      | 6,845.75              | 3,197.45     | -2,348.94    | 14,459,722.58       | 1,727,647.82       | 39.81555634 | -80.68935132 |
| 10,944.00             | 92.62           | 328.73      | 6,842.65              | 3,277.75     | -2,397.70    | 14,459,802.88       | 1,727,599.05       | 39.81577733 | -80.68952399 |
| 11,039.00             | 90.99           | 329.08      | 6,839.66              | 3,359.05     | -2,446.74    | 14,459,884.19       | 1,727,550.02       | 39.81600108 | -80.68969761 |
| 11,133.00             | 92.31           | 328.29      | 6,836.95              | 3,439.33     | -2,495.58    | 14,459,964.46       | 1,727,501.18       | 39.81622199 | -80.68987053 |
| 11,228.00             | 91.74           | 328.90      | 6,833.60              | 3,520.36     | -2,545.05    | 14,460,045.49       | 1,727,451.71       | 39.81644499 | -80.69004571 |
| 11,321.00             | 90.64           | 329.25      | 6,831.66              | 3,600.12     | -2,592.83    | 14,460,125.25       | 1,727,403.93       | 39.81666449 | -80.69021489 |
| 11,416.00             | 92.04           | 328.99      | 6,829.44              | 3,681.63     | -2,641.57    | 14,460,206.76       | 1,727,355.18       | 39.81688880 | -80.69038747 |
| 11,510.00             | 91.03           | 328.90      | 6,826.92              | 3,762.12     | -2,690.05    | 14,460,287.26       | 1,727,306.71       | 39.81711032 | -80.69055910 |
| 11,605.00             | 92.26           | 329.43      | 6,824.20              | 3,843.66     | -2,738.72    | 14,460,368.79       | 1,727,258.04       | 39.81733470 | -80.69073143 |
| 11,699.00             | 91.87           | 329.78      | 6,820.81              | 3,924.69     | -2,786.25    | 14,460,449.82       | 1,727,210.51       | 39.81755767 | -80.69089970 |
| 11,794.00             | 93.36           | 329.69      | 6,816.48              | 4,006.65     | -2,834.08    | 14,460,531.78       | 1,727,162.68       | 39.81778322 | -80.69106902 |
| 11,888.00             | 91.52           | 329.17      | 6,812.47              | 4,087.51     | -2,881.84    | 14,460,612.64       | 1,727,114.92       | 39.81800573 | -80.69123812 |
| 11,983.00             | 89.80           | 327.67      | 6,811.38              | 4,168.43     | -2,931.58    | 14,460,693.56       | 1,727,065.17       | 39.81822842 | -80.69141428 |
| 12,078.00             | 90.15           | 327.58      | 6,811.42              | 4,248.66     | -2,982.45    | 14,460,773.79       | 1,727,014.31       | 39.81844925 | -80.69159446 |
| 12,173.00             | 91.34           | 327.76      | 6,810.19              | 4,328.93     | -3,033.25    | 14,460,854.06       | 1,726,963.51       | 39.81867015 | -80.69177439 |
| 12,267.00             | 91.87           | 329.43      | 6,807.55              | 4,409.12     | -3,082.21    | 14,460,934.25       | 1,726,914.55       | 39.81889085 | -80.69194777 |
| 12,362.00             | 91.78           | 330.04      | 6,804.53              | 4,491.13     | -3,130.07    | 14,461,016.26       | 1,726,866.69       | 39.81911652 | -80.69211719 |
| 12,457.00             | 90.51           | 329.69      | 6,802.63              | 4,573.27     | -3,177.75    | 14,461,098.41       | 1,726,819.01       | 39.81934255 | -80.69228600 |
| 12,552.00             | 91.82           | 329.87      | 6,800.70              | 4,655.34     | -3,225.56    | 14,461,180.48       | 1,726,771.20       | 39.81956839 | -80.69245525 |
| 12,646.00             | 91.43           | 330.13      | 6,798.03              | 4,736.72     | -3,272.54    | 14,461,261.85       | 1,726,724.22       | 39.81979231 | -80.69262157 |
| 12,741.00             | 92.57           | 330.84      | 6,794.72              | 4,819.34     | -3,319.31    | 14,461,344.47       | 1,726,677.45       | 39.82001964 | -80.69278713 |
| 12,835.00             | 92.31           | 331.63      | 6,790.71              | 4,901.66     | -3,364.50    | 14,461,426.79       | 1,726,632.26       | 39.82024615 | -80.69294708 |
| 12,930.00             | 90.33           | 332.24      | 6,788.53              | 4,985.47     | -3,409.18    | 14,461,510.60       | 1,726,587.57       | 39.82047671 | -80.69310518 |
| 13,025.00             | 91.52           | 332.59      | 6,786.99              | 5,069.65     | -3,453.17    | 14,461,594.79       | 1,726,543.59       | 39.82070833 | -80.69326080 |
| 13,119.00             | 90.64           | 330.31      | 6,785.22              | 5,152.20     | -3,498.08    | 14,461,677.33       | 1,726,498.68       | 39.82093545 | -80.69341975 |
| 13,214.00             | 91.82           | 330.40      | 6,783.18              | 5,234.75     | -3,545.06    | 14,461,759.88       | 1,726,451.70       | 39.82116258 | -80.69358605 |
| 13,309.00             | 90.68           | 329.43      | 6,781.11              | 5,316.93     | -3,592.67    | 14,461,842.06       | 1,726,404.09       | 39.82138871 | -80.69375461 |
| 13,403.00             | 91.60           | 329.17      | 6,779.24              | 5,397.74     | -3,640.65    | 14,461,922.87       | 1,726,356.11       | 39.82161108 | -80.69392451 |
| 13,497.00             | 92.48           | 329.08      | 6,775.89              | 5,478.36     | -3,688.86    | 14,462,003.50       | 1,726,307.90       | 39.82183296 | -80.69409521 |
| 13,592.00             | 90.81           | 329.34      | 6,773.17              | 5,559.94     | -3,737.46    | 14,462,085.07       | 1,726,259.29       | 39.82205743 | -80.69426733 |
| 13,686.00             | 91.78           | 329.52      | 6,771.04              | 5,640.85     | -3,785.26    | 14,462,165.98       | 1,726,211.50       | 39.82228009 | -80.69443657 |
| 13,778.00             | 90.24           | 330.57      | 6,769.42              | 5,720.54     | -3,831.19    | 14,462,245.68       | 1,726,165.57       | 39.82249938 | -80.69459918 |
| 13,872.00             | 91.21           | 330.22      | 6,768.23              | 5,802.26     | -3,877.62    | 14,462,327.40       | 1,726,119.14       | 39.82272424 | -80.69476356 |
| 13,966.00             | 92.70           | 330.04      | 6,765.02              | 5,883.73     | -3,924.41    | 14,462,408.86       | 1,726,072.35       | 39.82294839 | -80.69492920 |
| 14,061.00             | 91.65           | 328.73      | 6,761.42              | 5,965.42     | -3,972.75    | 14,462,490.56       | 1,726,024.01       | 39.82317320 | -80.69510039 |
| 14,155.00             | 90.77           | 328.99      | 6,759.43              | 6,045.86     | -4,021.35    | 14,462,570.99       | 1,725,975.41       | 39.82339456 | -80.69527250 |
| 14,249.00             | 91.34           | 329.52      | 6,757.70              | 6,126.63     | -4,069.40    | 14,462,651.77       | 1,725,927.36       | 39.82361683 | -80.69544264 |
| 14,344.00             | 90.81           | 329.60      | 6,755.92              | 6,208.52     | -4,117.52    | 14,462,733.66       | 1,725,879.24       | 39.82384217 | -80.69561304 |

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WV Department of  
Environmental Protection



Survey Report - Geographic



|                  |                                 |                                     |  |
|------------------|---------------------------------|-------------------------------------|--|
| <b>Company:</b>  | Tug Hill Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Ten High 1N-02HM (J)              |
| <b>Project:</b>  | Marshall County, West Virginia. | <b>TVD Reference:</b>               | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Site:</b>     | Ten High                        | <b>MD Reference:</b>                | RKB=1310+33 @ 1343.00usft (Nabors X08) |
| <b>Well:</b>     | Ten High 1N-02HM (J)            | <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                       |

| Measured Depth (usft)                              | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude    | Longitude    |
|--|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 14,438.00  | 91.60           | 330.31      | 6,753.94              | 6,289.87     | -4,164.57    | 14,462,815.01       | 1,725,832.19       | 39.82406602 | -80.69577963 |
| 14,532.00  | 90.95           | 329.25      | 6,751.85              | 6,371.08     | -4,211.87    | 14,462,896.21       | 1,725,784.89       | 39.82428946 | -80.69594711 |
| 14,626.00  | 91.25           | 328.46      | 6,750.05              | 6,451.51     | -4,260.48    | 14,462,976.65       | 1,725,736.28       | 39.82451081 | -80.69611926 |
| 14,721.00  | 92.18           | 327.67      | 6,747.20              | 6,532.10     | -4,310.71    | 14,463,057.23       | 1,725,686.05       | 39.82473258 | -80.69629718 |
| 14,815.00  | 89.80           | 327.93      | 6,745.58              | 6,611.62     | -4,360.79    | 14,463,136.75       | 1,725,635.97       | 39.82495144 | -80.69647458 |
| 14,909.00  | 91.03           | 328.20      | 6,744.90              | 6,691.39     | -4,410.50    | 14,463,216.52       | 1,725,586.25       | 39.82517097 | -80.69665070 |
| 15,004.00  | 90.37           | 328.81      | 6,743.74              | 6,772.39     | -4,460.13    | 14,463,297.52       | 1,725,536.63       | 39.82539387 | -80.69682648 |
| 15,099.00  | 91.30           | 329.60      | 6,742.35              | 6,853.99     | -4,508.76    | 14,463,379.12       | 1,725,488.00       | 39.82561841 | -80.69699870 |
| 15,193.00  | 92.44           | 329.60      | 6,739.29              | 6,935.02     | -4,556.30    | 14,463,460.15       | 1,725,440.46       | 39.82584138 | -80.69716705 |
| 15,287.00  | 91.82           | 330.48      | 6,735.79              | 7,016.40     | -4,603.21    | 14,463,541.53       | 1,725,393.55       | 39.82606531 | -80.69733315 |
| <b>Survey @ 15287.00 MD 6735.79 TVD</b>            |                 |             |                       |              |              |                     |                    |             |              |
| 15,345.00  | 91.82           | 330.48      | 6,733.95              | 7,066.84     | -4,631.78    | 14,463,591.98       | 1,725,364.98       | 39.82620411 | -80.69743428 |
| <b>Survey projected to 15345.00 MD 6733.95 TVD</b> |                 |             |                       |              |              |                     |                    |             |              |

| Measured Depth (usft) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Comment                                     |
|-----------------------|-----------------------|--------------|--------------|---|
| 188.00                | 188.00                | -0.09        | 0.87         | MWD surveys                                 |
| 15,287.00             | 6,735.79              | 7,016.40     | -4,603.21    | Survey @ 15287.00 MD 6735.79 TVD            |
| 15,345.00             | 6,733.95              | 7,066.84     | -4,631.78    | Survey projected to 15345.00 MD 6733.95 TVD |