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|--|---|
| Company: Tug Hill Operating LLC | Local Co-ordinate Reference: Well Blake 04 HM (slot D) |
| Project: Marshall County, West Virginia | TVD Reference: RKB=1326+18 @ 1344.00ft (Precision 528) |
| Site: Blake Pad | MD Reference: RKB=1326+18 @ 1344.00ft (Precision 528) |
| Well: Blake 04 HM (slot D) | North Reference: Grid |
| Wellbore: Sidetrack 01 | Survey Calculation Method: Minimum Curvature |
| Design: Surveys Sidetrack 01 | Database: DB_Jul2216dt_v14 |

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

| | | | | |
|--------------------------------------|-------------------------------------|---------------------------------|--|--|
| Site Blake Pad | | | | |
| Site Position: | Northing: 14,440,917.72 usft | Latitude: 39.76416471 | | |
| From: Lat/Long | Easting: 1,695,217.29 usft | Longitude: -80.80498839 | | |
| Position Uncertainty: 0.00 ft | Slot Radius: 13-3/16 " | Grid Convergence: 0.12 " | | |

| | | | | |
|-------------------------------------|-------------------------------------|----------------------------------|--|--|
| Well Blake 04 HM (slot D) | | | | |
| Well Position +N/-S 0.00 ft | Northing: 14,440,951.21 usft | Latitude: 39.76425661 | | |
| +E/-W 0.00 ft | Easting: 1,695,230.46 usft | Longitude: -80.80494126 | | |
| Position Uncertainty 0.00 ft | Wellhead Elevation: ft | Ground Level: 1,326.00 ft | | |

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|------------------------------|--|--|--|--|
| Wellbore Sidetrack 01 | | | | |
|------------------------------|--|--|--|--|

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|-----------|------------|-------------|-----------------|---------------|---------------------|
| | IGRF2015 | 12/27/2018 | -8.66 | 66.82 | 51,996.01897138 |

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|------------------------------------|--|--|--|--|
| Design Surveys Sidetrack 01 | | | | |
|------------------------------------|--|--|--|--|

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|---------------------|----------------------|-------------------------------|--|--|
| Audit Notes: | | | | |
| Version: 1.0 | Phase: ACTUAL | Tie On Depth: 2,880.00 | | |

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|-------------------|-----------------------|------------|------------|---------------|
| | 0.00 | 0.00 | 0.00 | 320.12 |

| Survey Program | Date | 1/9/2019 | | | |
|----------------|-----------|---------------------------|------------|----------------------------------|--|
| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description | |
| 30.00 | 2,880.00 | Gyro (Original Hole) | NS-GYRO-MS | North sensing gyrocompassing m/s | |
| 2,894.00 | 19,233.00 | MWD ST1 (Sidetrack 01) | MWD | MWD - Standard | |
| 19,291.00 | 19,291.00 | Projection (Sidetrack 01) | MWD | MWD - Standard | |

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14,440,951.21 | 1,695,230.46 | 39.76425661 | -80.80494126 |
| 30.00 | 0.43 | 264.17 | 30.00 | -0.01 | -0.11 | 14,440,951.20 | 1,695,230.35 | 39.76425658 | -80.80494166 |
| 60.00 | 0.95 | 303.14 | 60.00 | 0.11 | -0.43 | 14,440,951.33 | 1,695,230.02 | 39.76425692 | -80.80494280 |
| 90.00 | 1.10 | 297.40 | 89.99 | 0.38 | -0.90 | 14,440,951.60 | 1,695,229.56 | 39.76425766 | -80.80494445 |
| 120.00 | 1.14 | 288.96 | 119.99 | 0.61 | -1.43 | 14,440,951.82 | 1,695,229.02 | 39.76425830 | -80.80494636 |
| 150.00 | 1.08 | 317.26 | 149.98 | 0.92 | -1.91 | 14,440,952.13 | 1,695,228.55 | 39.76425914 | -80.80494804 |
| 180.00 | 1.00 | 307.94 | 179.98 | 1.28 | -2.31 | 14,440,952.50 | 1,695,228.15 | 39.76426015 | -80.80494946 |
| 210.00 | 0.82 | 311.40 | 209.97 | 1.59 | -2.67 | 14,440,952.80 | 1,695,227.78 | 39.76426099 | -80.80495076 |
| 240.00 | 0.65 | 310.72 | 239.97 | 1.84 | -2.96 | 14,440,953.05 | 1,695,227.49 | 39.76426168 | -80.80495179 |
| 270.00 | 0.56 | 311.82 | 269.97 | 2.05 | -3.20 | 14,440,953.26 | 1,695,227.26 | 39.76426226 | -80.80495264 |



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| Wellbore: | Sidetrack 01 | Survey Calculation Method: | Minimum Curvature |
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| Survey | | | | | | | | | WV Department of Environmental Protection | |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|---|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 300.00 | 0.59 | 305.45 | 299.97 | 2.24 | -3.44 | 14,440,953.45 | 1,695,227.02 | 39.76426277 | -80.80495348 | |
| 330.00 | 0.21 | 297.10 | 329.97 | 2.35 | -3.61 | 14,440,953.56 | 1,695,226.85 | 39.76426309 | -80.80495410 | |
| 360.00 | 0.18 | 314.23 | 359.97 | 2.41 | -3.69 | 14,440,953.62 | 1,695,226.76 | 39.76426325 | -80.80495439 | |
| 390.00 | 0.21 | 330.81 | 389.97 | 2.49 | -3.76 | 14,440,953.70 | 1,695,226.70 | 39.76426347 | -80.80495461 | |
| 420.00 | 0.29 | 300.52 | 419.97 | 2.58 | -3.85 | 14,440,953.79 | 1,695,226.61 | 39.76426371 | -80.80495493 | |
| 450.00 | 0.21 | 309.58 | 449.97 | 2.65 | -3.96 | 14,440,953.86 | 1,695,226.50 | 39.76426391 | -80.80495532 | |
| 480.00 | 0.12 | 261.35 | 479.97 | 2.68 | -4.03 | 14,440,953.89 | 1,695,226.43 | 39.76426400 | -80.80495558 | |
| 510.00 | 0.10 | 31.79 | 509.97 | 2.70 | -4.05 | 14,440,953.91 | 1,695,226.41 | 39.76426404 | -80.80495564 | |
| 540.00 | 0.11 | 93.28 | 539.97 | 2.72 | -4.00 | 14,440,953.93 | 1,695,226.45 | 39.76426410 | -80.80495549 | |
| 570.00 | 0.06 | 331.11 | 569.97 | 2.73 | -3.98 | 14,440,953.94 | 1,695,226.47 | 39.76426413 | -80.80495541 | |
| 600.00 | 0.10 | 329.44 | 599.97 | 2.77 | -4.00 | 14,440,953.98 | 1,695,226.45 | 39.76426423 | -80.80495549 | |
| 630.00 | 0.18 | 263.27 | 629.97 | 2.78 | -4.06 | 14,440,954.00 | 1,695,226.39 | 39.76426428 | -80.80495570 | |
| 660.00 | 0.11 | 203.01 | 659.97 | 2.75 | -4.12 | 14,440,953.97 | 1,695,226.34 | 39.76426419 | -80.80495591 | |
| 690.00 | 0.13 | 219.21 | 689.97 | 2.70 | -4.15 | 14,440,953.91 | 1,695,226.30 | 39.76426405 | -80.80495602 | |
| 720.00 | 0.06 | 133.02 | 719.97 | 2.66 | -4.16 | 14,440,953.88 | 1,695,226.29 | 39.76426395 | -80.80495606 | |
| 750.00 | 0.08 | 111.39 | 749.97 | 2.64 | -4.13 | 14,440,953.86 | 1,695,226.32 | 39.76426390 | -80.80495595 | |
| 780.00 | 0.04 | 346.67 | 779.97 | 2.65 | -4.12 | 14,440,953.86 | 1,695,226.34 | 39.76426390 | -80.80495589 | |
| 810.00 | 0.10 | 271.62 | 809.97 | 2.66 | -4.14 | 14,440,953.87 | 1,695,226.31 | 39.76426393 | -80.80495599 | |
| 840.00 | 0.07 | 265.54 | 839.97 | 2.66 | -4.19 | 14,440,953.87 | 1,695,226.27 | 39.76426393 | -80.80495615 | |
| 870.00 | 0.08 | 223.20 | 869.97 | 2.64 | -4.22 | 14,440,953.85 | 1,695,226.24 | 39.76426389 | -80.80495626 | |
| 900.00 | 0.15 | 196.16 | 899.96 | 2.59 | -4.25 | 14,440,953.80 | 1,695,226.21 | 39.76426374 | -80.80495635 | |
| 930.00 | 0.13 | 162.12 | 929.96 | 2.52 | -4.25 | 14,440,953.73 | 1,695,226.21 | 39.76426355 | -80.80495636 | |
| 960.00 | 0.14 | 112.21 | 959.96 | 2.47 | -4.20 | 14,440,953.68 | 1,695,226.25 | 39.76426342 | -80.80495620 | |
| 990.00 | 0.20 | 308.06 | 989.96 | 2.49 | -4.21 | 14,440,953.70 | 1,695,226.25 | 39.76426347 | -80.80495622 | |
| 1,020.00 | 0.11 | 130.52 | 1,019.96 | 2.50 | -4.23 | 14,440,953.72 | 1,695,226.23 | 39.76426351 | -80.80495629 | |
| 1,050.00 | 0.15 | 121.50 | 1,049.96 | 2.46 | -4.17 | 14,440,953.68 | 1,695,226.28 | 39.76426340 | -80.80495610 | |
| 1,080.00 | 0.04 | 355.39 | 1,079.96 | 2.45 | -4.14 | 14,440,953.67 | 1,695,226.32 | 39.76426337 | -80.80495598 | |
| 1,110.00 | 0.14 | 49.40 | 1,109.96 | 2.49 | -4.11 | 14,440,953.70 | 1,695,226.34 | 39.76426347 | -80.80495588 | |
| 1,140.00 | 0.30 | 88.48 | 1,139.96 | 2.51 | -4.01 | 14,440,953.73 | 1,695,226.45 | 39.76426354 | -80.80495551 | |
| 1,170.00 | 0.41 | 76.50 | 1,169.96 | 2.54 | -3.83 | 14,440,953.75 | 1,695,226.63 | 39.76426361 | -80.80495485 | |
| 1,200.00 | 0.34 | 84.70 | 1,199.96 | 2.57 | -3.63 | 14,440,953.79 | 1,695,226.82 | 39.76426370 | -80.80495417 | |
| 1,230.00 | 0.48 | 142.12 | 1,229.96 | 2.48 | -3.47 | 14,440,953.70 | 1,695,226.99 | 39.76426345 | -80.80495358 | |
| 1,260.00 | 0.52 | 104.03 | 1,259.96 | 2.35 | -3.26 | 14,440,953.56 | 1,695,227.20 | 39.76426309 | -80.80495283 | |
| 1,290.00 | 0.56 | 118.32 | 1,289.96 | 2.25 | -3.00 | 14,440,953.46 | 1,695,227.46 | 39.76426280 | -80.80495191 | |
| 1,320.00 | 0.58 | 67.13 | 1,319.96 | 2.24 | -2.73 | 14,440,953.45 | 1,695,227.73 | 39.76426277 | -80.80495095 | |
| 1,350.00 | 1.07 | 76.02 | 1,349.96 | 2.36 | -2.32 | 14,440,953.58 | 1,695,228.14 | 39.76426312 | -80.80494948 | |
| 1,380.00 | 1.35 | 77.96 | 1,379.95 | 2.51 | -1.70 | 14,440,953.72 | 1,695,228.76 | 39.76426350 | -80.80494728 | |
| 1,410.00 | 1.59 | 76.54 | 1,409.94 | 2.68 | -0.95 | 14,440,953.89 | 1,695,229.51 | 39.76426397 | -80.80494461 | |
| 1,440.00 | 2.24 | 84.64 | 1,439.92 | 2.83 | 0.04 | 14,440,954.04 | 1,695,230.50 | 39.76426438 | -80.80494109 | |
| 1,470.00 | 2.45 | 81.80 | 1,469.90 | 2.97 | 1.26 | 14,440,954.19 | 1,695,231.72 | 39.76426477 | -80.80493676 | |
| 1,500.00 | 2.60 | 81.39 | 1,499.87 | 3.17 | 2.57 | 14,440,954.38 | 1,695,233.02 | 39.76426529 | -80.80493210 | |
| 1,530.00 | 2.74 | 77.72 | 1,529.84 | 3.42 | 3.94 | 14,440,954.64 | 1,695,234.40 | 39.76426598 | -80.80492721 | |
| 1,560.00 | 2.92 | 78.97 | 1,559.80 | 3.72 | 5.39 | 14,440,954.93 | 1,695,235.85 | 39.76426680 | -80.80492205 | |
| 1,590.00 | 2.92 | 79.51 | 1,589.76 | 4.01 | 6.89 | 14,440,955.22 | 1,695,237.35 | 39.76426757 | -80.80491670 | |
| 1,620.00 | 3.03 | 80.06 | 1,619.72 | 4.28 | 8.42 | 14,440,955.50 | 1,695,238.88 | 39.76426832 | -80.80491125 | |
| 1,650.00 | 3.10 | 88.95 | 1,649.68 | 4.43 | 10.02 | 14,440,955.85 | 1,695,240.47 | 39.76426873 | -80.80490558 | |
| 1,680.00 | 2.92 | 91.26 | 1,679.64 | 4.43 | 11.59 | 14,440,955.85 | 1,695,242.05 | 39.76426871 | -80.80489998 | |
| 1,710.00 | 2.77 | 92.47 | 1,709.60 | 4.38 | 13.08 | 14,440,955.60 | 1,695,243.54 | 39.76426857 | -80.80489468 | |
| 1,740.00 | 2.37 | 90.08 | 1,739.57 | 4.35 | 14.42 | 14,440,955.56 | 1,695,244.88 | 39.76426847 | -80.80488990 | |
| 1,770.00 | 2.27 | 93.24 | 1,769.54 | 4.32 | 15.64 | 14,440,955.53 | 1,695,246.09 | 39.76426837 | -80.80488558 | |
| 1,800.00 | 1.86 | 90.20 | 1,799.52 | 4.28 | 16.72 | 14,440,955.50 | 1,695,247.17 | 39.76426827 | -80.80488174 | |
| 1,830.00 | 1.61 | 97.78 | 1,829.51 | 4.22 | 17.62 | 14,440,955.44 | 1,695,248.08 | 39.76426810 | -80.80487852 | |
| 1,860.00 | 1.57 | 108.01 | 1,859.50 | 4.04 | 18.43 | 14,440,955.25 | 1,695,248.89 | 39.76426759 | -80.80487564 | |
| 1,890.00 | 1.56 | 118.27 | 1,889.49 | 3.72 | 19.18 | 14,440,954.93 | 1,695,249.64 | 39.76426671 | -80.80487298 | |
| 1,920.00 | 1.79 | 129.64 | 1,919.47 | 3.23 | 19.90 | 14,440,954.44 | 1,695,250.36 | 39.76426535 | -80.80487042 | |



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| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|
| 1,950.00 | 2.00 | 131.47 | 1,949.46 | 2.58 | 20.65 | 14,440,953.79 | 1,695,251.11 | 39.76426357 | -80.80486774 |
| 1,980.00 | 2.20 | 138.36 | 1,979.44 | 1.80 | 21.43 | 14,440,953.02 | 1,695,251.89 | 39.76426144 | -80.80486499 |
| 2,010.00 | 2.38 | 142.65 | 2,009.41 | 0.88 | 22.19 | 14,440,952.09 | 1,695,252.65 | 39.76425889 | -80.80486229 |
| 2,040.00 | 2.72 | 139.57 | 2,039.38 | -0.16 | 23.03 | 14,440,951.05 | 1,695,253.49 | 39.76425604 | -80.80485931 |
| 2,070.00 | 2.84 | 145.26 | 2,069.35 | -1.31 | 23.91 | 14,440,949.90 | 1,695,254.37 | 39.76425287 | -80.80485617 |
| 2,100.00 | 2.89 | 143.06 | 2,099.31 | -2.53 | 24.79 | 14,440,948.69 | 1,695,255.25 | 39.76424952 | -80.80485306 |
| 2,130.00 | 3.06 | 144.91 | 2,129.27 | -3.79 | 25.71 | 14,440,947.43 | 1,695,256.16 | 39.76424606 | -80.80484981 |
| 2,160.00 | 3.36 | 148.58 | 2,159.22 | -5.19 | 26.63 | 14,440,946.02 | 1,695,257.08 | 39.76424219 | -80.80484655 |
| 2,190.00 | 3.58 | 145.09 | 2,189.17 | -6.71 | 27.62 | 14,440,944.50 | 1,695,258.08 | 39.76423802 | -80.80484303 |
| 2,220.00 | 3.81 | 150.21 | 2,219.11 | -8.34 | 28.65 | 14,440,942.87 | 1,695,259.11 | 39.76423353 | -80.80483937 |
| 2,250.00 | 3.85 | 146.26 | 2,249.04 | -10.05 | 29.71 | 14,440,941.17 | 1,695,260.16 | 39.76422884 | -80.80483563 |
| 2,280.00 | 3.65 | 148.35 | 2,278.98 | -11.70 | 30.77 | 14,440,939.52 | 1,695,261.22 | 39.76422431 | -80.80483187 |
| 2,310.00 | 3.38 | 147.66 | 2,308.92 | -13.26 | 31.74 | 14,440,937.96 | 1,695,262.20 | 39.76422001 | -80.80482841 |
| 2,340.00 | 2.99 | 143.75 | 2,338.87 | -14.63 | 32.68 | 14,440,936.58 | 1,695,263.13 | 39.76421622 | -80.80482509 |
| 2,370.00 | 2.48 | 137.38 | 2,368.84 | -15.74 | 33.58 | 14,440,935.47 | 1,695,264.04 | 39.76421317 | -80.80482189 |
| 2,400.00 | 1.74 | 126.73 | 2,398.82 | -16.49 | 34.38 | 14,440,934.72 | 1,695,264.84 | 39.76421111 | -80.80481904 |
| 2,430.00 | 1.60 | 113.74 | 2,428.81 | -16.93 | 35.13 | 14,440,934.28 | 1,695,265.59 | 39.76420989 | -80.80481638 |
| 2,460.00 | 1.55 | 107.69 | 2,458.79 | -17.23 | 35.90 | 14,440,933.99 | 1,695,266.36 | 39.76420909 | -80.80481364 |
| 2,490.00 | 1.42 | 95.62 | 2,488.78 | -17.39 | 36.66 | 14,440,933.83 | 1,695,267.12 | 39.76420864 | -80.80481095 |
| 2,520.00 | 1.37 | 91.50 | 2,518.78 | -17.43 | 37.39 | 14,440,933.78 | 1,695,267.84 | 39.76420851 | -80.80480836 |
| 2,550.00 | 1.55 | 84.83 | 2,548.77 | -17.40 | 38.15 | 14,440,933.81 | 1,695,268.61 | 39.76420858 | -80.80480564 |
| 2,580.00 | 1.60 | 75.18 | 2,578.75 | -17.26 | 38.96 | 14,440,933.95 | 1,695,269.42 | 39.76420897 | -80.80480276 |
| 2,610.00 | 1.61 | 70.35 | 2,608.74 | -17.01 | 39.76 | 14,440,934.20 | 1,695,270.22 | 39.76420965 | -80.80479991 |
| 2,640.00 | 1.43 | 57.95 | 2,638.73 | -16.67 | 40.47 | 14,440,934.54 | 1,695,270.93 | 39.76421058 | -80.80479736 |
| 2,670.00 | 1.83 | 68.53 | 2,668.72 | -16.30 | 41.24 | 14,440,934.92 | 1,695,271.69 | 39.76421161 | -80.80479464 |
| 2,700.00 | 1.73 | 60.81 | 2,698.71 | -15.90 | 42.08 | 14,440,935.31 | 1,695,272.54 | 39.76421269 | -80.80479165 |
| 2,730.00 | 1.98 | 66.77 | 2,728.69 | -15.48 | 42.95 | 14,440,935.74 | 1,695,273.41 | 39.76421385 | -80.80478854 |
| 2,760.00 | 1.72 | 59.37 | 2,758.67 | -15.04 | 43.81 | 14,440,936.17 | 1,695,274.27 | 39.76421504 | -80.80478547 |
| 2,790.00 | 1.92 | 60.02 | 2,788.66 | -14.56 | 44.64 | 14,440,936.65 | 1,695,275.09 | 39.76421635 | -80.80478253 |
| 2,820.00 | 1.96 | 67.94 | 2,818.64 | -14.12 | 45.55 | 14,440,937.10 | 1,695,276.00 | 39.76421757 | -80.80477929 |
| 2,850.00 | 2.01 | 60.52 | 2,848.62 | -13.67 | 46.48 | 14,440,937.55 | 1,695,276.94 | 39.76421880 | -80.80477596 |
| 2,880.00 | 2.20 | 68.77 | 2,878.60 | -13.20 | 47.48 | 14,440,938.01 | 1,695,277.93 | 39.76422008 | -80.80477242 |
| Tie into original hole @ 2880 MD | | | | | | | | | |
| 2,894.00 | 2.06 | 50.03 | 2,892.59 | -12.94 | 47.92 | 14,440,938.27 | 1,695,278.38 | 39.76422079 | -80.80477084 |
| 2,968.00 | 2.98 | 74.63 | 2,966.52 | -11.58 | 50.79 | 14,440,939.64 | 1,695,281.25 | 39.76422452 | -80.80476060 |
| 3,000.00 | 5.76 | 96.64 | 2,998.43 | -11.54 | 53.19 | 14,440,939.67 | 1,695,283.65 | 39.76422460 | -80.80475207 |
| 3,062.00 | 8.90 | 104.08 | 3,059.92 | -13.07 | 60.93 | 14,440,938.15 | 1,695,291.39 | 39.76422036 | -80.80472452 |
| 3,156.00 | 8.42 | 101.67 | 3,152.85 | -16.23 | 74.73 | 14,440,934.98 | 1,695,305.18 | 39.76421159 | -80.80467547 |
| 3,250.00 | 10.08 | 107.39 | 3,245.62 | -20.08 | 89.32 | 14,440,931.13 | 1,695,319.78 | 39.76420093 | -80.80462357 |
| 3,344.00 | 9.53 | 105.06 | 3,338.25 | -24.56 | 104.68 | 14,440,926.65 | 1,695,335.14 | 39.76418853 | -80.80456893 |
| 3,437.00 | 11.73 | 109.11 | 3,429.65 | -29.66 | 121.05 | 14,440,921.56 | 1,695,351.51 | 39.76417444 | -80.80451072 |
| 3,533.00 | 15.24 | 110.35 | 3,522.99 | -37.24 | 142.11 | 14,440,913.97 | 1,695,372.57 | 39.76415348 | -80.80443585 |
| 3,628.00 | 18.30 | 116.92 | 3,613.94 | -48.34 | 167.12 | 14,440,902.87 | 1,695,397.58 | 39.76412286 | -80.80434692 |
| 3,723.00 | 22.52 | 115.64 | 3,702.96 | -62.97 | 196.84 | 14,440,888.24 | 1,695,427.29 | 39.76408250 | -80.80424130 |
| 3,818.00 | 25.42 | 115.36 | 3,789.76 | -79.58 | 231.67 | 14,440,871.63 | 1,695,462.13 | 39.76403667 | -80.80411747 |
| 3,913.00 | 28.45 | 114.43 | 3,874.44 | -97.68 | 270.71 | 14,440,853.54 | 1,695,501.16 | 39.76398674 | -80.80397870 |
| 4,008.00 | 27.45 | 110.97 | 3,958.37 | -114.87 | 311.76 | 14,440,836.34 | 1,695,542.22 | 39.76393927 | -80.80383275 |
| 4,103.00 | 28.83 | 114.63 | 4,042.14 | -132.26 | 353.03 | 14,440,818.96 | 1,695,583.49 | 39.76389128 | -80.80368602 |
| 4,197.00 | 31.23 | 117.63 | 4,123.52 | -153.01 | 395.23 | 14,440,798.21 | 1,695,625.69 | 39.76383404 | -80.80353601 |
| 4,292.00 | 29.84 | 115.57 | 4,205.35 | -174.63 | 438.37 | 14,440,776.58 | 1,695,668.83 | 39.76377439 | -80.80338265 |
| 4,386.00 | 27.86 | 113.40 | 4,287.68 | -193.45 | 479.63 | 14,440,757.76 | 1,695,710.09 | 39.76372246 | -80.80323598 |
| 4,481.00 | 29.99 | 115.20 | 4,370.83 | -212.38 | 521.49 | 14,440,738.84 | 1,695,751.95 | 39.76367023 | -80.80308717 |
| 4,576.00 | 28.86 | 113.53 | 4,453.57 | -231.64 | 564.00 | 14,440,719.57 | 1,695,794.45 | 39.76361707 | -80.80293606 |
| 4,670.00 | 30.33 | 115.41 | 4,535.31 | -250.88 | 606.24 | 14,440,700.33 | 1,695,836.69 | 39.76356397 | -80.80278590 |
| 4,765.00 | 30.05 | 113.65 | 4,617.42 | -270.72 | 649.69 | 14,440,680.50 | 1,695,880.15 | 39.76350923 | -80.80263142 |



| | | | |
|------------------|--------------------------------|-------------------------------------|---|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Blake 04 HM (slot D) |
| Project: | Marshall County, West Virginia | TVD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Site: | Blake Pad | MD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Well: | Blake 04 HM (slot D) | North Reference: | Grid |
| Wellbore: | Sidetrack 01 | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Sidetrack 01 | Database: | DB_Jul2216dt_v14 |

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| Survey | | | | | | | | | |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
| 4,860.00 | 29.93 | 117.66 | 4,699.71 | -291.26 | 692.48 | 14,440,659.95 | 1,695,922.93 | 39.76345255 | -80.80247934 |
| 4,955.00 | 28.88 | 116.37 | 4,782.47 | -312.46 | 734.02 | 14,440,638.76 | 1,695,964.48 | 39.76339410 | -80.80233166 |
| 5,048.00 | 30.96 | 118.84 | 4,863.08 | -333.97 | 775.11 | 14,440,617.24 | 1,696,005.56 | 39.76333476 | -80.80218563 |
| 5,143.00 | 30.16 | 118.29 | 4,944.88 | -357.07 | 817.53 | 14,440,594.14 | 1,696,047.98 | 39.76327107 | -80.80203486 |
| 5,238.00 | 29.79 | 113.43 | 5,027.19 | -377.77 | 860.20 | 14,440,573.45 | 1,696,090.66 | 39.76321397 | -80.80188317 |
| 5,333.00 | 27.70 | 107.64 | 5,110.49 | -393.85 | 902.91 | 14,440,557.37 | 1,696,133.36 | 39.76316955 | -80.80173132 |
| 5,427.00 | 29.82 | 105.86 | 5,192.89 | -406.86 | 946.22 | 14,440,544.36 | 1,696,176.67 | 39.76313356 | -80.80157731 |
| 5,521.00 | 30.72 | 99.39 | 5,274.10 | -417.17 | 992.40 | 14,440,534.05 | 1,696,222.86 | 39.76310497 | -80.80141305 |
| 5,616.00 | 29.11 | 96.55 | 5,356.44 | -423.76 | 1,039.30 | 14,440,527.45 | 1,696,269.76 | 39.76308657 | -80.80124620 |
| 5,711.00 | 28.30 | 96.97 | 5,439.77 | -429.13 | 1,084.61 | 14,440,522.08 | 1,696,315.07 | 39.76307155 | -80.80108500 |
| 5,805.00 | 27.00 | 95.88 | 5,523.03 | -434.02 | 1,127.96 | 14,440,517.19 | 1,696,358.41 | 39.76305785 | -80.80093080 |
| 5,841.00 | 26.24 | 95.36 | 5,555.21 | -435.60 | 1,144.01 | 14,440,515.61 | 1,696,374.47 | 39.76305342 | -80.80087369 |
| 5,925.00 | 25.89 | 92.72 | 5,630.67 | -438.21 | 1,180.82 | 14,440,513.01 | 1,696,411.28 | 39.76304604 | -80.80074273 |
| 5,936.00 | 25.05 | 91.14 | 5,640.60 | -438.37 | 1,185.55 | 14,440,512.85 | 1,696,416.00 | 39.76304557 | -80.80072591 |
| 5,983.00 | 21.19 | 75.85 | 5,683.86 | -436.48 | 1,203.76 | 14,440,514.73 | 1,696,434.21 | 39.76305062 | -80.80066110 |
| 6,031.00 | 21.01 | 71.19 | 5,728.64 | -431.59 | 1,220.31 | 14,440,519.63 | 1,696,450.77 | 39.76306397 | -80.80060214 |
| 6,078.00 | 21.85 | 72.42 | 5,772.39 | -426.23 | 1,236.63 | 14,440,524.98 | 1,696,467.08 | 39.76307858 | -80.80054405 |
| 6,125.00 | 20.97 | 66.09 | 5,816.16 | -420.18 | 1,252.66 | 14,440,531.03 | 1,696,483.11 | 39.76309510 | -80.80048696 |
| 6,172.00 | 23.90 | 67.80 | 5,859.60 | -413.17 | 1,269.16 | 14,440,538.04 | 1,696,499.62 | 39.76311425 | -80.80042816 |
| 6,221.00 | 27.52 | 69.96 | 5,903.74 | -405.54 | 1,289.00 | 14,440,545.67 | 1,696,519.45 | 39.76313509 | -80.80035753 |
| 6,268.00 | 28.31 | 56.34 | 5,945.31 | -395.63 | 1,308.49 | 14,440,555.58 | 1,696,538.95 | 39.76316218 | -80.80028807 |
| 6,316.00 | 28.62 | 41.31 | 5,987.56 | -380.67 | 1,325.58 | 14,440,570.55 | 1,696,556.03 | 39.76320317 | -80.80022716 |
| 6,363.00 | 27.52 | 29.62 | 6,029.07 | -362.76 | 1,338.39 | 14,440,588.46 | 1,696,568.84 | 39.76325227 | -80.80018144 |
| 6,411.00 | 26.90 | 18.98 | 6,071.78 | -342.84 | 1,347.40 | 14,440,608.38 | 1,696,577.86 | 39.76330692 | -80.80014919 |
| 6,458.00 | 26.59 | 8.61 | 6,113.77 | -322.37 | 1,352.44 | 14,440,628.84 | 1,696,582.89 | 39.76336310 | -80.80013111 |
| 6,505.00 | 27.21 | 1.67 | 6,155.70 | -301.23 | 1,354.33 | 14,440,649.99 | 1,696,584.78 | 39.76342116 | -80.80012422 |
| 6,552.00 | 28.22 | 355.78 | 6,197.31 | -279.40 | 1,353.82 | 14,440,671.82 | 1,696,584.28 | 39.76348111 | -80.80012584 |
| 6,601.00 | 30.15 | 350.59 | 6,240.10 | -255.70 | 1,350.96 | 14,440,695.52 | 1,696,581.41 | 39.76354621 | -80.80013585 |
| 6,648.00 | 33.41 | 348.66 | 6,280.05 | -231.36 | 1,346.48 | 14,440,719.85 | 1,696,576.94 | 39.76361308 | -80.80015158 |
| 6,696.00 | 37.93 | 349.54 | 6,319.03 | -203.88 | 1,341.20 | 14,440,747.33 | 1,696,571.66 | 39.76368858 | -80.80017015 |
| 6,743.00 | 44.00 | 351.91 | 6,354.51 | -173.48 | 1,336.28 | 14,440,777.73 | 1,696,566.73 | 39.76377209 | -80.80018744 |
| 6,791.00 | 49.71 | 346.55 | 6,387.33 | -139.13 | 1,329.67 | 14,440,812.08 | 1,696,560.12 | 39.76386647 | -80.80021069 |
| 6,838.00 | 56.18 | 340.58 | 6,415.66 | -103.23 | 1,318.99 | 14,440,847.99 | 1,696,549.44 | 39.76396514 | -80.80024841 |
| 6,886.00 | 59.30 | 334.60 | 6,441.29 | -65.75 | 1,303.49 | 14,440,885.47 | 1,696,533.95 | 39.76406817 | -80.80030325 |
| 6,933.00 | 61.41 | 331.43 | 6,464.54 | -29.36 | 1,284.95 | 14,440,921.85 | 1,696,515.41 | 39.76416821 | -80.80036894 |
| 6,979.00 | 64.00 | 327.74 | 6,485.64 | 5.87 | 1,264.25 | 14,440,957.09 | 1,696,494.70 | 39.76426509 | -80.80044233 |
| 7,026.00 | 67.03 | 324.05 | 6,505.12 | 41.27 | 1,240.26 | 14,440,992.48 | 1,696,470.72 | 39.76436244 | -80.80052741 |
| 7,074.00 | 70.99 | 322.56 | 6,522.31 | 77.19 | 1,213.48 | 14,441,028.40 | 1,696,443.94 | 39.76446126 | -80.80062242 |
| 7,121.00 | 74.33 | 320.27 | 6,536.32 | 112.25 | 1,185.50 | 14,441,063.46 | 1,696,415.96 | 39.76455770 | -80.80072172 |
| 7,169.00 | 78.29 | 318.60 | 6,547.68 | 147.66 | 1,155.18 | 14,441,098.88 | 1,696,385.63 | 39.76465515 | -80.80082935 |
| 7,216.00 | 82.24 | 316.93 | 6,555.62 | 181.95 | 1,124.04 | 14,441,133.16 | 1,696,354.50 | 39.76474950 | -80.80093987 |
| 7,264.00 | 86.95 | 315.88 | 6,560.14 | 216.55 | 1,091.10 | 14,441,167.76 | 1,696,321.55 | 39.76484472 | -80.80105682 |
| 7,311.00 | 90.77 | 315.53 | 6,561.08 | 250.17 | 1,058.29 | 14,441,201.39 | 1,696,288.74 | 39.76493727 | -80.80117332 |
| 7,359.00 | 90.86 | 315.79 | 6,560.40 | 284.50 | 1,024.75 | 14,441,235.71 | 1,696,255.20 | 39.76503174 | -80.80129242 |
| 7,379.00 | 89.49 | 314.65 | 6,560.34 | 298.69 | 1,010.66 | 14,441,249.91 | 1,696,241.11 | 39.76507081 | -80.80134243 |
| 7,453.00 | 88.62 | 313.77 | 6,561.56 | 350.29 | 957.62 | 14,441,301.50 | 1,696,188.08 | 39.76521282 | -80.80153075 |
| 7,547.00 | 88.97 | 313.24 | 6,563.53 | 414.98 | 889.46 | 14,441,366.20 | 1,696,119.92 | 39.76539091 | -80.80177281 |
| 7,641.00 | 89.80 | 315.70 | 6,564.54 | 480.82 | 822.39 | 14,441,432.04 | 1,696,052.85 | 39.76557214 | -80.80201097 |
| 7,735.00 | 90.68 | 314.56 | 6,564.15 | 547.44 | 756.07 | 14,441,498.65 | 1,695,986.53 | 39.76575549 | -80.80224644 |
| 7,828.00 | 91.91 | 313.50 | 6,562.05 | 612.06 | 689.23 | 14,441,563.27 | 1,695,919.69 | 39.76593335 | -80.80248381 |
| 7,922.00 | 91.16 | 314.82 | 6,559.53 | 677.52 | 621.82 | 14,441,628.73 | 1,695,852.28 | 39.76611354 | -80.80272318 |
| 8,017.00 | 90.77 | 317.72 | 6,557.93 | 746.15 | 556.17 | 14,441,697.36 | 1,695,786.62 | 39.76630241 | -80.80295628 |
| 8,112.00 | 91.47 | 317.64 | 6,556.07 | 816.38 | 492.22 | 14,441,767.59 | 1,695,722.68 | 39.76649567 | -80.80318329 |
| 8,207.00 | 90.24 | 316.84 | 6,554.65 | 886.12 | 427.73 | 14,441,837.33 | 1,695,658.19 | 39.76668758 | -80.80341225 |
| 8,303.00 | 91.38 | 316.67 | 6,553.30 | 956.04 | 361.97 | 14,441,907.25 | 1,695,592.42 | 39.76688000 | -80.80364573 |

 WV Department of
 Environmental Protection



| | | | |
|------------------|--------------------------------|-------------------------------------|---|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Blake 04 HM (slot D) |
| Project: | Marshall County, West Virginia | TVD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Site: | Blake Pad | MD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Well: | Blake 04 HM (slot D) | North Reference: | Grid |
| Wellbore: | Sidetrack 01 | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Sidetrack 01 | Database: | DB_Jul2216dt_v14 |

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| Survey | | | | | | | | | | WV Department of Environmental Protection | |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|--------------|---|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (ustf) | Map Easting (ustf) | Latitude | Longitude | | |
| 8,398.00 | 90.11 | 314.21 | 6,552.06 | 1,023.72 | 295.32 | 14,441,974.93 | 1,695,525.78 | 39.76706626 | -80.80388237 | | |
| 8,492.00 | 90.68 | 314.65 | 6,551.41 | 1,089.52 | 228.20 | 14,442,040.73 | 1,695,458.65 | 39.76724737 | -80.80412073 | | |
| 8,587.00 | 91.38 | 314.03 | 6,549.71 | 1,155.90 | 160.26 | 14,442,107.12 | 1,695,390.72 | 39.76743009 | -80.80436197 | | |
| 8,682.00 | 89.76 | 315.44 | 6,548.76 | 1,222.76 | 92.79 | 14,442,173.97 | 1,695,323.24 | 39.76761411 | -80.80460159 | | |
| 8,776.00 | 90.02 | 315.44 | 6,548.94 | 1,289.74 | 26.83 | 14,442,240.95 | 1,695,257.29 | 39.76779844 | -80.80483578 | | |
| 8,870.00 | 90.81 | 315.26 | 6,548.26 | 1,356.61 | -39.23 | 14,442,307.82 | 1,695,191.23 | 39.76798248 | -80.80507035 | | |
| 8,965.00 | 91.47 | 315.17 | 6,546.37 | 1,424.02 | -106.14 | 14,442,375.23 | 1,695,124.32 | 39.76816801 | -80.80530794 | | |
| 9,059.00 | 90.42 | 316.84 | 6,544.82 | 1,491.63 | -171.42 | 14,442,442.84 | 1,695,059.04 | 39.76835408 | -80.80553973 | | |
| 9,154.00 | 91.16 | 316.05 | 6,543.51 | 1,560.47 | -236.87 | 14,442,511.68 | 1,694,993.59 | 39.76854352 | -80.80577213 | | |
| 9,249.00 | 90.29 | 317.46 | 6,542.31 | 1,629.67 | -301.95 | 14,442,580.88 | 1,694,928.51 | 39.76873394 | -80.80600320 | | |
| 9,344.00 | 90.86 | 317.46 | 6,541.35 | 1,699.66 | -366.17 | 14,442,650.87 | 1,694,864.28 | 39.76892654 | -80.80623122 | | |
| 9,438.00 | 90.33 | 315.26 | 6,540.38 | 1,767.68 | -431.04 | 14,442,718.89 | 1,694,799.42 | 39.76911372 | -80.80646154 | | |
| 9,532.00 | 90.95 | 315.00 | 6,539.33 | 1,834.29 | -497.35 | 14,442,785.50 | 1,694,733.11 | 39.76929706 | -80.80669702 | | |
| 9,627.00 | 91.52 | 315.17 | 6,537.28 | 1,901.55 | -564.41 | 14,442,852.76 | 1,694,666.05 | 39.76948216 | -80.80693516 | | |
| 9,722.00 | 91.25 | 314.03 | 6,534.98 | 1,968.23 | -632.03 | 14,442,919.44 | 1,694,598.43 | 39.76966570 | -80.80717530 | | |
| 9,817.00 | 90.55 | 314.30 | 6,533.49 | 2,034.41 | -700.17 | 14,442,985.62 | 1,694,530.29 | 39.76984785 | -80.80741728 | | |
| 9,910.00 | 90.73 | 315.26 | 6,532.45 | 2,099.92 | -766.18 | 14,443,051.13 | 1,694,464.28 | 39.77002813 | -80.80765169 | | |
| 10,005.00 | 91.21 | 315.53 | 6,530.85 | 2,167.54 | -832.88 | 14,443,118.75 | 1,694,397.58 | 39.77021424 | -80.80788855 | | |
| 10,100.00 | 89.80 | 314.38 | 6,530.01 | 2,234.66 | -900.10 | 14,443,185.87 | 1,694,330.36 | 39.77039896 | -80.80812728 | | |
| 10,194.00 | 90.42 | 314.38 | 6,529.83 | 2,300.41 | -967.28 | 14,443,251.61 | 1,694,263.17 | 39.77057991 | -80.80836587 | | |
| 10,289.00 | 91.12 | 314.12 | 6,528.55 | 2,366.69 | -1,035.33 | 14,443,317.90 | 1,694,195.13 | 39.77076234 | -80.80860752 | | |
| 10,385.00 | 90.90 | 313.86 | 6,526.86 | 2,433.35 | -1,104.38 | 14,443,384.56 | 1,694,126.08 | 39.77094583 | -80.80885278 | | |
| 10,479.00 | 91.03 | 314.21 | 6,525.28 | 2,498.68 | -1,171.95 | 14,443,449.89 | 1,694,058.51 | 39.77112564 | -80.80909275 | | |
| 10,574.00 | 90.24 | 315.44 | 6,524.22 | 2,565.65 | -1,239.33 | 14,443,516.86 | 1,693,991.13 | 39.77130993 | -80.80933202 | | |
| 10,669.00 | 90.07 | 316.67 | 6,523.97 | 2,634.05 | -1,305.25 | 14,443,585.26 | 1,693,925.21 | 39.77149816 | -80.80956613 | | |
| 10,764.00 | 90.64 | 315.70 | 6,523.38 | 2,702.59 | -1,371.02 | 14,443,653.80 | 1,693,859.44 | 39.77168680 | -80.80979968 | | |
| 10,859.00 | 91.16 | 315.88 | 6,521.88 | 2,770.68 | -1,437.25 | 14,443,721.89 | 1,693,793.21 | 39.77187417 | -80.81003489 | | |
| 10,954.00 | 90.77 | 317.11 | 6,520.28 | 2,839.57 | -1,502.64 | 14,443,790.78 | 1,693,727.82 | 39.77206375 | -80.81026708 | | |
| 11,049.00 | 91.65 | 317.37 | 6,518.28 | 2,909.31 | -1,567.13 | 14,443,860.52 | 1,693,663.33 | 39.77225563 | -80.81049605 | | |
| 11,143.00 | 91.03 | 315.88 | 6,516.08 | 2,977.61 | -1,631.66 | 14,443,928.82 | 1,693,598.80 | 39.77244359 | -80.81072522 | | |
| 11,237.00 | 89.80 | 315.79 | 6,515.40 | 3,045.04 | -1,697.15 | 14,443,996.25 | 1,693,533.31 | 39.77262914 | -80.81095779 | | |
| 11,332.00 | 90.51 | 316.05 | 6,515.14 | 3,113.28 | -1,763.24 | 14,444,064.49 | 1,693,467.22 | 39.77281694 | -80.81119248 | | |
| 11,427.00 | 91.12 | 316.14 | 6,513.79 | 3,181.72 | -1,829.11 | 14,444,132.93 | 1,693,401.35 | 39.77300528 | -80.81142640 | | |
| 11,521.00 | 89.58 | 316.14 | 6,513.22 | 3,249.50 | -1,894.24 | 14,444,200.70 | 1,693,336.22 | 39.77319178 | -80.81165769 | | |
| 11,616.00 | 89.98 | 315.70 | 6,513.58 | 3,317.74 | -1,960.33 | 14,444,268.95 | 1,693,270.13 | 39.77337958 | -80.81189238 | | |
| 11,712.00 | 90.90 | 315.00 | 6,512.84 | 3,386.03 | -2,027.79 | 14,444,337.24 | 1,693,202.67 | 39.77356752 | -80.81213198 | | |
| 11,807.00 | 90.07 | 315.97 | 6,512.04 | 3,453.77 | -2,094.39 | 14,444,404.98 | 1,693,136.07 | 39.77375393 | -80.81236850 | | |
| 11,899.00 | 90.77 | 314.82 | 6,511.37 | 3,519.27 | -2,158.99 | 14,444,470.48 | 1,693,071.47 | 39.77393417 | -80.81259793 | | |
| 11,994.00 | 91.56 | 314.91 | 6,509.43 | 3,586.27 | -2,226.31 | 14,444,537.48 | 1,693,004.15 | 39.77411857 | -80.81283702 | | |
| 12,087.00 | 90.42 | 314.12 | 6,507.83 | 3,651.46 | -2,292.62 | 14,444,602.67 | 1,692,937.85 | 39.77429798 | -80.81307252 | | |
| 12,181.00 | 91.03 | 314.03 | 6,506.64 | 3,716.84 | -2,360.14 | 14,444,668.05 | 1,692,870.32 | 39.77447792 | -80.81331236 | | |
| 12,276.00 | 89.98 | 315.97 | 6,505.80 | 3,784.01 | -2,427.31 | 14,444,735.22 | 1,692,803.15 | 39.77466277 | -80.81355092 | | |
| 12,371.00 | 90.29 | 316.05 | 6,505.58 | 3,852.36 | -2,493.29 | 14,444,803.57 | 1,692,737.17 | 39.77485085 | -80.81378525 | | |
| 12,466.00 | 90.64 | 315.79 | 6,504.81 | 3,920.60 | -2,559.38 | 14,444,871.81 | 1,692,671.09 | 39.77503864 | -80.81401995 | | |
| 12,562.00 | 91.21 | 316.32 | 6,503.26 | 3,989.71 | -2,625.99 | 14,444,940.92 | 1,692,604.47 | 39.77522882 | -80.81425651 | | |
| 12,657.00 | 90.77 | 316.84 | 6,501.61 | 4,058.70 | -2,691.28 | 14,445,009.91 | 1,692,539.19 | 39.77541866 | -80.81448837 | | |
| 12,751.00 | 90.24 | 315.70 | 6,500.79 | 4,126.62 | -2,756.25 | 14,445,077.83 | 1,692,474.21 | 39.77560556 | -80.81471912 | | |
| 12,846.00 | 90.55 | 315.70 | 6,500.13 | 4,194.61 | -2,822.60 | 14,445,145.82 | 1,692,407.87 | 39.77579265 | -80.81495476 | | |
| 12,941.00 | 89.67 | 315.17 | 6,499.95 | 4,262.30 | -2,889.26 | 14,445,213.50 | 1,692,341.20 | 39.77597890 | -80.81519153 | | |
| 13,036.00 | 90.20 | 314.74 | 6,500.06 | 4,329.42 | -2,956.49 | 14,445,280.62 | 1,692,273.98 | 39.77616362 | -80.81543031 | | |
| 13,131.00 | 90.81 | 314.47 | 6,499.22 | 4,396.13 | -3,024.12 | 14,445,347.33 | 1,692,206.34 | 39.77634720 | -80.81567054 | | |
| 13,226.00 | 89.32 | 314.30 | 6,499.11 | 4,462.57 | -3,092.01 | 14,445,413.78 | 1,692,138.45 | 39.77653007 | -80.81591168 | | |
| 13,321.00 | 89.71 | 313.68 | 6,499.92 | 4,528.55 | -3,160.36 | 14,445,479.76 | 1,692,070.11 | 39.77671165 | -80.81615446 | | |
| 13,416.00 | 91.03 | 315.97 | 6,499.30 | 4,595.51 | -3,227.73 | 14,445,546.72 | 1,692,002.73 | 39.77689593 | -80.81639376 | | |
| 13,511.00 | 91.78 | 315.70 | 6,496.97 | 4,663.64 | -3,293.90 | 14,445,614.84 | 1,691,936.57 | 39.77708339 | -80.81662877 | | |

| | | | |
|------------------|--------------------------------|-------------------------------------|---|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Blake 04 HM (slot D) |
| Project: | Marshall County, West Virginia | TVD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Site: | Blake Pad | MD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Well: | Blake 04 HM (slot D) | North Reference: | Grid |
| Wellbore: | Sidetrack 01 | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Sidetrack 01 | Database: | DB_Jul2216dt_v14 |

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| Survey | | | | | | | | | WV Department of Environmental Protection | |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|-------------|---|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 13,606.00 | 90.02 | 316.14 | 6,495.48 | 4,731.87 | -3,359.98 | 14,445,683.08 | 1,691,870.49 | 39.77727115 | -80.81686346 | |
| 13,701.00 | 90.42 | 315.44 | 6,495.12 | 4,799.97 | -3,426.22 | 14,445,751.17 | 1,691,804.25 | 39.77745853 | -80.81709873 | |
| 13,796.00 | 90.77 | 316.14 | 6,494.13 | 4,868.06 | -3,492.46 | 14,445,819.26 | 1,691,738.01 | 39.77764590 | -80.81733399 | |
| 13,892.00 | 91.12 | 317.02 | 6,492.55 | 4,937.78 | -3,558.43 | 14,445,888.98 | 1,691,672.03 | 39.77783773 | -80.81756831 | |
| 13,987.00 | 91.69 | 316.76 | 6,490.22 | 5,007.11 | -3,623.33 | 14,445,958.31 | 1,691,607.13 | 39.77802850 | -80.81779981 | |
| 14,081.00 | 89.93 | 316.93 | 6,488.89 | 5,075.67 | -3,687.62 | 14,446,026.88 | 1,691,542.85 | 39.77821715 | -80.81802712 | |
| 14,176.00 | 90.24 | 316.58 | 6,488.75 | 5,144.87 | -3,752.70 | 14,446,096.08 | 1,691,477.76 | 39.77840756 | -80.81825828 | |
| 14,271.00 | 90.73 | 316.05 | 6,487.94 | 5,213.57 | -3,818.32 | 14,446,164.77 | 1,691,412.15 | 39.77859659 | -80.81849132 | |
| 14,366.00 | 91.47 | 315.44 | 6,486.12 | 5,281.60 | -3,884.60 | 14,446,232.80 | 1,691,345.86 | 39.77878378 | -80.81872675 | |
| 14,461.00 | 89.58 | 315.26 | 6,485.25 | 5,349.18 | -3,951.36 | 14,446,300.38 | 1,691,279.11 | 39.77896974 | -80.81896387 | |
| 14,557.00 | 90.20 | 314.82 | 6,485.43 | 5,417.11 | -4,019.19 | 14,446,368.31 | 1,691,211.27 | 39.77915667 | -80.81920483 | |
| 14,652.00 | 90.90 | 314.82 | 6,484.52 | 5,484.07 | -4,086.57 | 14,446,435.27 | 1,691,143.89 | 39.77934094 | -80.81944418 | |
| 14,746.00 | 91.34 | 315.70 | 6,482.68 | 5,550.82 | -4,152.73 | 14,446,502.02 | 1,691,077.74 | 39.77952463 | -80.81967916 | |
| 14,841.00 | 91.82 | 315.88 | 6,480.06 | 5,618.89 | -4,218.94 | 14,446,570.09 | 1,691,011.52 | 39.77971193 | -80.81991436 | |
| 14,936.00 | 90.68 | 314.82 | 6,477.99 | 5,686.46 | -4,285.69 | 14,446,637.66 | 1,690,944.78 | 39.77989786 | -80.82015145 | |
| 15,031.00 | 91.30 | 314.30 | 6,476.35 | 5,753.10 | -4,353.37 | 14,446,704.31 | 1,690,877.10 | 39.78008126 | -80.82039187 | |
| 15,127.00 | 90.42 | 315.42 | 6,474.91 | 5,820.81 | -4,421.41 | 14,446,772.01 | 1,690,809.06 | 39.78026758 | -80.82063356 | |
| 15,222.00 | 90.77 | 315.88 | 6,473.92 | 5,888.74 | -4,487.81 | 14,446,839.94 | 1,690,742.65 | 39.78045449 | -80.82086943 | |
| 15,316.00 | 89.54 | 316.32 | 6,473.67 | 5,956.47 | -4,552.99 | 14,446,907.67 | 1,690,677.48 | 39.78064086 | -80.82110095 | |
| 15,411.00 | 89.63 | 316.41 | 6,474.36 | 6,025.22 | -4,618.54 | 14,446,976.43 | 1,690,611.92 | 39.78083004 | -80.82133379 | |
| 15,506.00 | 89.89 | 315.79 | 6,474.75 | 6,093.68 | -4,684.42 | 14,447,044.88 | 1,690,546.05 | 39.78101838 | -80.82156777 | |
| 15,601.00 | 90.20 | 314.65 | 6,474.68 | 6,161.11 | -4,751.33 | 14,447,112.31 | 1,690,479.13 | 39.78120393 | -80.82180547 | |
| 15,696.00 | 90.81 | 314.82 | 6,473.84 | 6,227.97 | -4,818.81 | 14,447,179.17 | 1,690,411.65 | 39.78138792 | -80.82204520 | |
| 15,791.00 | 89.85 | 314.30 | 6,473.30 | 6,294.62 | -4,886.50 | 14,447,245.82 | 1,690,343.97 | 39.78157134 | -80.82228565 | |
| 15,886.00 | 90.42 | 314.30 | 6,473.07 | 6,360.97 | -4,954.49 | 14,447,312.17 | 1,690,275.98 | 39.78175393 | -80.82252719 | |
| 15,981.00 | 90.77 | 314.38 | 6,472.09 | 6,427.37 | -5,022.43 | 14,447,378.57 | 1,690,208.04 | 39.78193663 | -80.82276856 | |
| 16,076.00 | 89.49 | 315.17 | 6,471.87 | 6,494.27 | -5,089.87 | 14,447,445.47 | 1,690,140.60 | 39.78212075 | -80.82300812 | |
| 16,171.00 | 90.07 | 314.82 | 6,472.23 | 6,561.44 | -5,157.05 | 14,447,512.64 | 1,690,073.42 | 39.78230558 | -80.82324678 | |
| 16,266.00 | 90.81 | 315.53 | 6,471.51 | 6,628.82 | -5,224.02 | 14,447,580.02 | 1,690,006.45 | 39.78249097 | -80.82348467 | |
| 16,360.00 | 91.16 | 315.53 | 6,469.89 | 6,695.89 | -5,289.86 | 14,447,647.09 | 1,689,940.61 | 39.78267552 | -80.82371856 | |
| 16,456.00 | 90.55 | 315.44 | 6,468.46 | 6,764.34 | -5,357.15 | 14,447,715.54 | 1,689,873.31 | 39.78286386 | -80.82395762 | |
| 16,551.00 | 90.68 | 313.94 | 6,467.44 | 6,831.14 | -5,424.68 | 14,447,782.34 | 1,689,805.78 | 39.78304769 | -80.82419754 | |
| 16,644.00 | 89.58 | 315.53 | 6,467.23 | 6,896.59 | -5,490.75 | 14,447,847.79 | 1,689,739.72 | 39.78322780 | -80.82443222 | |
| 16,738.00 | 89.41 | 315.97 | 6,468.05 | 6,963.92 | -5,556.34 | 14,447,915.12 | 1,689,674.13 | 39.78341306 | -80.82466522 | |
| 16,833.00 | 89.58 | 315.70 | 6,468.89 | 7,032.07 | -5,622.52 | 14,447,983.27 | 1,689,607.95 | 39.78360055 | -80.82490034 | |
| 16,926.00 | 89.76 | 316.23 | 6,469.43 | 7,098.93 | -5,687.16 | 14,448,050.12 | 1,689,543.30 | 39.78378451 | -80.82512998 | |
| 17,021.00 | 90.86 | 316.32 | 6,468.91 | 7,167.58 | -5,752.83 | 14,448,118.78 | 1,689,477.64 | 39.78397340 | -80.82536323 | |
| 17,115.00 | 91.34 | 316.49 | 6,467.11 | 7,235.64 | -5,817.63 | 14,448,186.84 | 1,689,412.84 | 39.78416067 | -80.82559344 | |
| 17,209.00 | 89.63 | 316.23 | 6,466.31 | 7,303.66 | -5,882.50 | 14,448,254.86 | 1,689,347.97 | 39.78434782 | -80.82582386 | |
| 17,304.00 | 90.33 | 315.97 | 6,466.35 | 7,372.12 | -5,948.37 | 14,448,323.31 | 1,689,282.10 | 39.78453616 | -80.82605787 | |
| 17,400.00 | 90.37 | 315.35 | 6,465.76 | 7,440.77 | -6,015.47 | 14,448,391.97 | 1,689,215.00 | 39.78472508 | -80.82629622 | |
| 17,494.00 | 90.95 | 315.26 | 6,464.68 | 7,507.59 | -6,081.58 | 14,448,458.79 | 1,689,148.89 | 39.78490892 | -80.82653108 | |
| 17,588.00 | 90.95 | 315.44 | 6,463.12 | 7,574.45 | -6,147.63 | 14,448,525.65 | 1,689,082.84 | 39.78509290 | -80.82676574 | |
| 17,684.00 | 91.74 | 315.44 | 6,460.87 | 7,642.84 | -6,214.97 | 14,448,594.03 | 1,689,015.50 | 39.78528105 | -80.82700497 | |
| 17,778.00 | 90.51 | 315.88 | 6,459.02 | 7,710.05 | -6,280.65 | 14,448,661.25 | 1,688,949.82 | 39.78546599 | -80.82723832 | |
| 17,873.00 | 91.38 | 315.97 | 6,457.45 | 7,778.29 | -6,346.72 | 14,448,729.49 | 1,688,883.75 | 39.78565375 | -80.82747305 | |
| 17,967.00 | 90.37 | 315.09 | 6,456.02 | 7,845.36 | -6,412.56 | 14,448,796.56 | 1,688,817.91 | 39.78583829 | -80.82770696 | |
| 18,062.00 | 90.73 | 314.91 | 6,455.11 | 7,912.53 | -6,479.74 | 14,448,863.73 | 1,688,750.73 | 39.78602312 | -80.82794561 | |
| 18,158.00 | 90.99 | 314.56 | 6,453.66 | 7,980.09 | -6,547.92 | 14,448,931.29 | 1,688,682.55 | 39.78620902 | -80.82818788 | |
| 18,252.00 | 90.81 | 315.44 | 6,452.19 | 8,046.55 | -6,614.38 | 14,448,997.75 | 1,688,616.09 | 39.78639188 | -80.82842399 | |
| 18,346.00 | 91.34 | 314.82 | 6,450.42 | 8,113.16 | -6,680.69 | 14,449,064.36 | 1,688,549.78 | 39.78657515 | -80.82865957 | |
| 18,441.00 | 89.85 | 315.44 | 6,449.44 | 8,180.48 | -6,747.70 | 14,449,131.68 | 1,688,482.77 | 39.78676039 | -80.82889767 | |
| 18,537.00 | 90.73 | 315.35 | 6,448.95 | 8,248.83 | -6,815.12 | 14,449,200.02 | 1,688,415.36 | 39.78694844 | -80.82913717 | |
| 18,631.00 | 91.38 | 315.61 | 6,447.22 | 8,315.84 | -6,881.01 | 14,449,267.04 | 1,688,349.46 | 39.78713282 | -80.82937129 | |
| 18,726.00 | 92.31 | 315.35 | 6,444.16 | 8,383.54 | -6,947.59 | 14,449,334.73 | 1,688,282.88 | 39.78731909 | -80.82960782 | |



| | | | |
|------------------|--------------------------------|-------------------------------------|---|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Blake 04 HM (slot D) |
| Project: | Marshall County, West Virginia | TVD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Site: | Blake Pad | MD Reference: | RKB=1326+18 @ 1344.00ft (Precision 528) |
| Well: | Blake 04 HM (slot D) | North Reference: | Grid |
| Wellbore: | Sidetrack 01 | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Sidetrack 01 | Database: | DB_Jul2216dt_v14 |

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| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | WV Department of Environmental Protection | |
|--|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|---|--------------|
| | | | | | | | | Latitude | Longitude |
| 18,821.00 | 92.79 | 314.91 | 6,439.94 | 8,450.80 | -7,014.54 | 14,449,402.00 | 1,688,215.93 | 39.78750415 | -80.82984571 |
| 18,916.00 | 91.25 | 316.05 | 6,436.59 | 8,518.49 | -7,081.11 | 14,449,469.69 | 1,688,149.36 | 39.78769040 | -80.83008220 |
| 19,011.00 | 89.36 | 316.05 | 6,436.08 | 8,586.88 | -7,147.04 | 14,449,538.08 | 1,688,083.43 | 39.78787856 | -80.83031643 |
| 19,106.00 | 89.76 | 315.88 | 6,436.81 | 8,655.17 | -7,213.07 | 14,449,606.37 | 1,688,017.40 | 39.78806646 | -80.83055103 |
| 19,199.00 | 90.02 | 316.05 | 6,436.99 | 8,722.03 | -7,277.71 | 14,449,673.23 | 1,687,952.76 | 39.78825041 | -80.83078070 |
| 19,233.00 | 90.02 | 315.35 | 6,436.98 | 8,746.37 | -7,301.46 | 14,449,697.56 | 1,687,929.01 | 39.78831736 | -80.83086507 |
| Survey @ 19233.00 MD 6436.98 TVD | | | | | | | | | |
| 19,291.00 | 90.02 | 315.35 | 6,436.96 | 8,787.63 | -7,342.22 | 14,449,738.83 | 1,687,888.25 | 39.78843089 | -80.83100989 |
| Survey projected to 19291.00 MD 6436.96 TVD | | | | | | | | | |

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates | | Comment |
|---------------------|---------------------|-------------------|------------|---|
| | | +N/-S (ft) | +E/-W (ft) | |
| 2,880.00 | 2,878.60 | -13.20 | 47.48 | Tie into original hole @ 2880 MD |
| 19,233.00 | 6,436.98 | 8,746.37 | -7,301.46 | Survey @ 19233.00 MD 6436.98 TVD |
| 19,291.00 | 6,436.96 | 8,787.63 | -7,342.22 | Survey projected to 19291.00 MD 6436.96 TVD |