



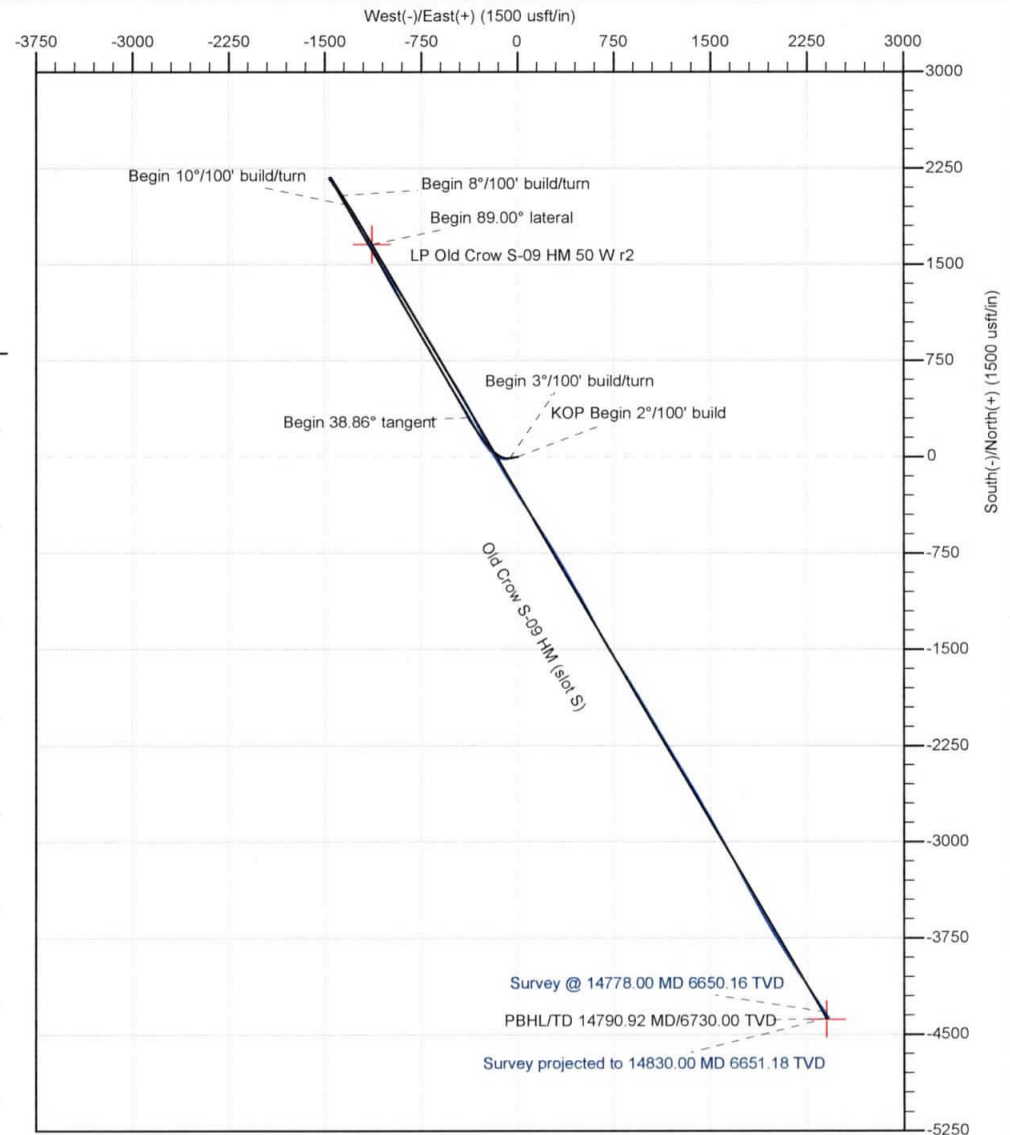
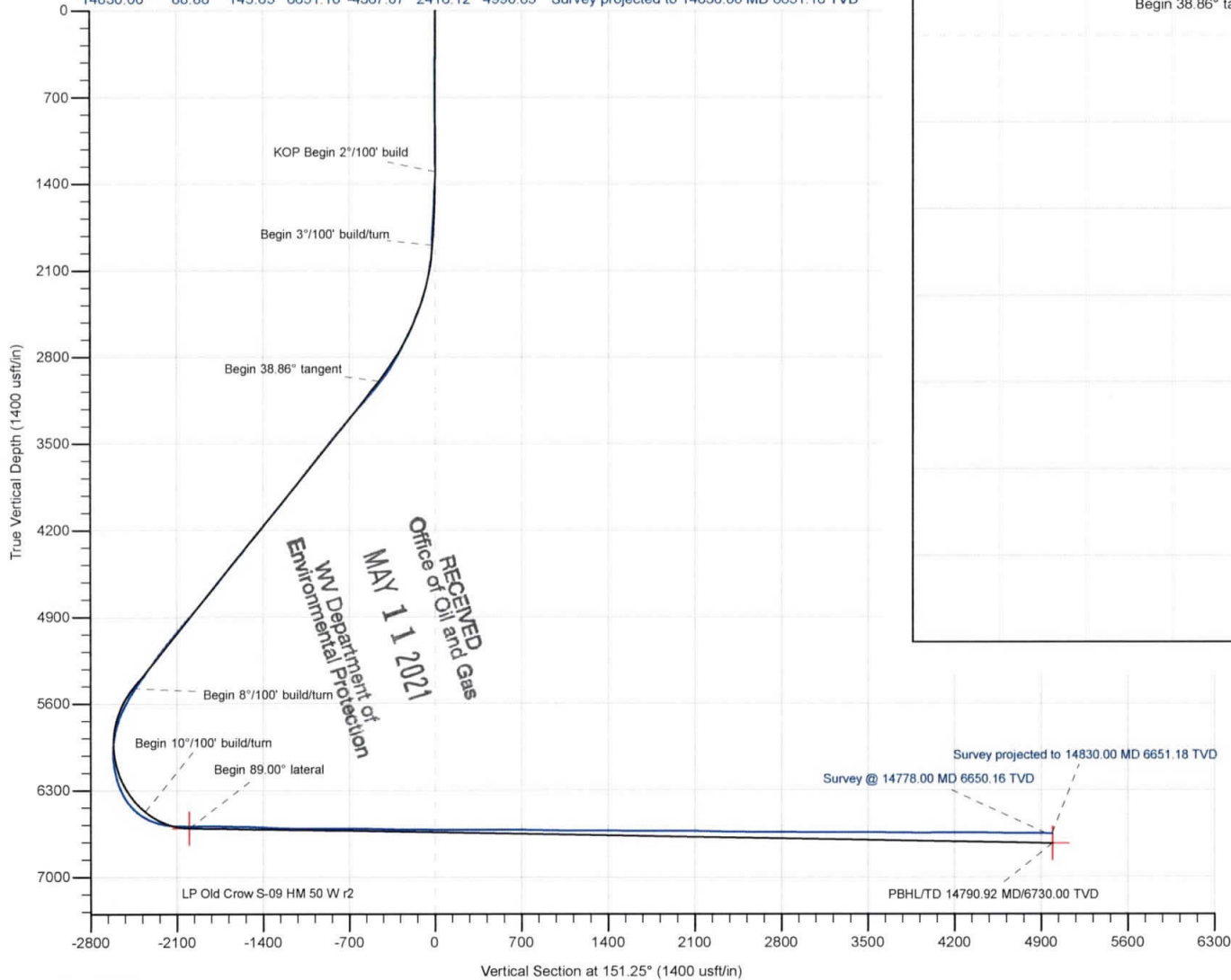
Well: Old Crow S-09 HM (slot S)
 Site: Old Crow Pad
 Project: Marshall County, West Virginia.
 Design: rev2

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | Vsect | Annotation |
|-----|----------|-------|--------|---------|----------|----------|-------|---------|----------|---------------------------------|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 | |
| 2 | 1300.00 | 0.00 | 0.00 | 1300.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 | KOP Begin 2"/100' build |
| 3 | 1500.00 | 4.00 | 260.00 | 1499.84 | -1.21 | -6.87 | 2.00 | 260.000 | -2.24 | |
| 4 | 1900.00 | 12.00 | 260.00 | 1895.62 | -10.87 | -61.65 | 2.00 | 0.000 | -20.12 | Begin 3"/100' build/turn |
| 5 | 3109.78 | 38.86 | 330.14 | 2995.34 | 307.12 | -385.34 | 3.00 | 85.488 | -454.61 | Begin 38.86° tangent |
| 6 | 6295.72 | 38.86 | 330.14 | 5476.24 | 2040.63 | -1380.47 | 0.00 | 0.000 | -2453.07 | Begin 8"/100' build/turn |
| 7 | 7406.27 | 50.00 | 148.31 | 6473.97 | 1965.03 | -1317.25 | 8.00 | 178.597 | -2356.38 | Begin 10"/100' build/turn |
| 8 | 7796.46 | 89.00 | 149.65 | 6608.00 | 1657.56 | -1132.98 | 10.00 | 2.121 | -1998.18 | Begin 89.00° lateral |
| 9 | 14790.92 | 89.00 | 149.65 | 6730.00 | -4377.14 | 2401.14 | 0.00 | 0.000 | 4992.47 | PBHL/TD 14790.92 MD/6730.00 TVD |

ANNOTATIONS SURVEYS

| MD | Inc | Azi | TVD | +N/-S | +E/-W | Vsect | Annotation |
|----------|-------|--------|---------|----------|---------|---------|---------------------------------------------|
| 191.00 | 0.35 | 301.31 | 191.00 | 0.30 | -0.50 | -0.51 | MWD surveys |
| 14778.00 | 88.88 | 145.65 | 6650.16 | -4324.14 | 2386.79 | 4939.11 | Survey @ 14778.00 MD 6650.16 TVD |
| 14830.00 | 88.88 | 145.65 | 6651.18 | -4367.07 | 2416.12 | 4990.85 | Survey projected to 14830.00 MD 6651.18 TVD |



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

System Datum: Mean Sea Level
 Depth Reference: RKB=1265+26 @ 1291.00usft

Northing: 14446109.13 Easting: 1707020.20 Latitude: 39.77834361 Longitude: -80.76293838

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.86°



Azimuths to Grid North
 True North: -0.15°
 Magnetic North: -8.86°

Magnetic Field
 Strength: 51941.8snT
 Dip Angle: 66.79°
 Date: 6/26/2019
 Model: IGRF2015



| | | | |
|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

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

| | | | | | |
|------------------------------|--------------|---------------------|--------------------|--------------------------|--------------|
| Site | Old Crow Pad | | | | |
| Site Position: | | Northing: | 14,446,179.89 usft | Latitude: | 39.77853828 |
| From: | Lat/Long | Easting: | 1,706,970.33 usft | Longitude: | -80.76311519 |
| Position Uncertainty: | 0.00 usft | Slot Radius: | 13-3/16 " | Grid Convergence: | 0.152 ° |

| | | | | | | |
|-----------------------------|---------------------------|----------------------------|------------------|----------------------|-------------------|--------------|
| Well | Old Crow S-09 HM (slot S) | | | | | |
| Well Position | +N/-S | 0.00 usft | Northing: | 14,446,109.14 usft | Latitude: | 39.77834361 |
| | +E/-W | 0.00 usft | Easting: | 1,707,020.19 usft | Longitude: | -80.76293838 |
| Position Uncertainty | 0.00 usft | Wellhead Elevation: | usft | Ground Level: | 1,265.00 usft | |

| | | | | | |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| Wellbore | Original Hole | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2015 | 6/26/2019 | -8.712 | 66.788 | 51,941.76048752 |

| | | | | | |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|------|
| Design | Surveys Original Hole | | | | |
| Audit Notes: | | | | | |
| Version: | 1.0 | Phase: | ACTUAL | Tie On Depth: | 0.00 |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) | |
| | 0.00 | 0.00 | 0.00 | 151.25 | |

| | | | | | |
|-----------------------|------------------|----------------------------|------------------|--------------------|--|
| Survey Program | Date | 11/20/2019 | | | |
| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description | |
| 191.00 | 970.00 | MWD surf (Original Hole) | MWD | MWD - Standard | |
| 1,065.00 | 2,822.00 | MWD int (Original Hole) | MWD | MWD - Standard | |
| 2,887.00 | 14,778.00 | MWD (Original Hole) | MWD | MWD - Standard | |
| 14,830.00 | 14,830.00 | Projection (Original Hole) | MWD | MWD - Standard | |

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|------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|--|
| Survey | | | | | | | | | | |
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 191.00 | 0.35 | 301.31 | 191.00 | 0.30 | -0.50 | -0.51 | 0.18 | 0.18 | 0.00 | |
| MWD surveys | | | | | | | | | | |
| 234.00 | 0.26 | 285.49 | 234.00 | 0.40 | -0.70 | -0.69 | 0.28 | -0.21 | -36.79 | |
| 279.00 | 0.22 | 313.00 | 279.00 | 0.48 | -0.87 | -0.84 | 0.27 | -0.09 | 61.13 | |
| 324.00 | 0.09 | 261.14 | 324.00 | 0.54 | -0.96 | -0.93 | 0.40 | -0.29 | -115.24 | |
| 369.00 | 0.18 | 285.31 | 369.00 | 0.55 | -1.07 | -1.00 | 0.23 | 0.20 | 53.71 | |
| 414.00 | 0.13 | 290.50 | 414.00 | 0.59 | -1.18 | -1.08 | 0.12 | -0.11 | 11.53 | |

| | | | |
|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 459.00 | 0.09 | 261.14 | 459.00 | 0.60 | -1.27 | -1.13 | 0.15 | -0.09 | -65.24 |
| 504.00 | 0.04 | 261.14 | 504.00 | 0.59 | -1.32 | -1.15 | 0.11 | -0.11 | 0.00 |
| 549.00 | 0.09 | 241.01 | 549.00 | 0.57 | -1.36 | -1.16 | 0.12 | 0.11 | -44.73 |
| 594.00 | 0.13 | 234.86 | 594.00 | 0.53 | -1.44 | -1.15 | 0.09 | 0.09 | -13.67 |
| 688.00 | 0.13 | 232.40 | 688.00 | 0.40 | -1.61 | -1.12 | 0.01 | 0.00 | -2.62 |
| 781.00 | 0.09 | 239.52 | 781.00 | 0.30 | -1.75 | -1.10 | 0.05 | -0.04 | 7.66 |
| 875.00 | 0.13 | 189.33 | 874.99 | 0.15 | -1.83 | -1.02 | 0.11 | 0.04 | -53.39 |
| 970.00 | 0.18 | 177.56 | 969.99 | -0.10 | -1.85 | -0.80 | 0.06 | 0.05 | -12.39 |
| 1,065.00 | 0.40 | 161.47 | 1,064.99 | -0.56 | -1.73 | -0.34 | 0.24 | 0.23 | -16.94 |
| 1,159.00 | 0.53 | 204.45 | 1,158.99 | -1.27 | -1.81 | 0.24 | 0.38 | 0.14 | 45.72 |
| 1,255.00 | 0.48 | 216.32 | 1,254.99 | -2.00 | -2.23 | 0.68 | 0.12 | -0.05 | 12.36 |
| 1,350.00 | 1.36 | 273.44 | 1,349.98 | -2.25 | -3.59 | 0.25 | 1.23 | 0.93 | 60.13 |
| 1,446.00 | 3.56 | 272.57 | 1,445.88 | -2.05 | -7.71 | -1.91 | 2.29 | 2.29 | -0.91 |
| 1,541.00 | 6.06 | 272.65 | 1,540.54 | -1.69 | -15.67 | -6.06 | 2.63 | 2.63 | 0.08 |
| 1,636.00 | 8.75 | 264.48 | 1,634.74 | -2.15 | -27.87 | -11.52 | 3.03 | 2.83 | -8.60 |
| 1,731.00 | 10.67 | 257.27 | 1,728.38 | -4.78 | -43.64 | -16.80 | 2.39 | 2.02 | -7.59 |
| 1,827.00 | 12.26 | 254.10 | 1,822.46 | -9.53 | -62.12 | -21.52 | 1.78 | 1.66 | -3.30 |
| 1,922.00 | 12.04 | 256.30 | 1,915.33 | -14.64 | -81.44 | -26.33 | 0.54 | -0.23 | 2.32 |
| 2,017.00 | 12.26 | 268.69 | 2,008.22 | -17.22 | -101.16 | -33.56 | 2.75 | 0.23 | 13.04 |
| 2,112.00 | 13.44 | 283.55 | 2,100.87 | -14.86 | -121.98 | -45.64 | 3.68 | 1.24 | 15.64 |
| 2,207.00 | 15.55 | 295.59 | 2,192.86 | -6.78 | -144.20 | -63.42 | 3.86 | 2.22 | 12.67 |
| 2,302.00 | 17.58 | 305.52 | 2,283.93 | 7.06 | -167.37 | -86.70 | 3.66 | 2.14 | 10.45 |
| 2,397.00 | 18.68 | 312.91 | 2,374.22 | 25.76 | -190.20 | -114.07 | 2.68 | 1.16 | 7.78 |
| 2,492.00 | 20.92 | 317.48 | 2,463.61 | 48.62 | -212.81 | -144.99 | 2.86 | 2.36 | 4.81 |
| 2,586.00 | 24.43 | 320.99 | 2,550.33 | 76.11 | -236.39 | -180.43 | 4.00 | 3.73 | 3.73 |
| 2,681.00 | 27.03 | 324.68 | 2,635.91 | 108.99 | -261.24 | -221.21 | 3.21 | 2.74 | 3.88 |
| 2,776.00 | 28.34 | 327.67 | 2,720.04 | 145.66 | -285.79 | -265.17 | 2.01 | 1.38 | 3.15 |
| 2,822.00 | 29.00 | 329.17 | 2,760.40 | 164.46 | -297.34 | -287.21 | 2.12 | 1.43 | 3.26 |
| 2,887.00 | 30.54 | 331.18 | 2,816.82 | 192.47 | -313.38 | -319.47 | 2.82 | 2.37 | 3.09 |
| 2,963.00 | 32.12 | 330.48 | 2,881.74 | 226.97 | -332.64 | -358.98 | 2.13 | 2.08 | -0.92 |
| 3,058.00 | 36.73 | 330.66 | 2,960.08 | 273.73 | -359.02 | -412.67 | 4.85 | 4.85 | 0.19 |
| 3,155.00 | 40.12 | 330.13 | 3,036.06 | 326.13 | -388.81 | -472.94 | 3.51 | 3.49 | -0.55 |
| 3,250.00 | 40.73 | 328.37 | 3,108.38 | 379.07 | -420.30 | -534.50 | 1.36 | 0.64 | -1.85 |
| 3,344.00 | 41.52 | 328.37 | 3,179.19 | 431.71 | -452.73 | -596.25 | 0.84 | 0.84 | 0.00 |
| 3,439.00 | 40.78 | 328.55 | 3,250.72 | 484.98 | -485.43 | -658.68 | 0.79 | -0.78 | 0.19 |
| 3,533.00 | 39.77 | 330.13 | 3,322.44 | 537.25 | -516.42 | -719.41 | 1.53 | -1.07 | 1.68 |
| 3,628.00 | 39.95 | 329.08 | 3,395.36 | 589.76 | -547.23 | -780.27 | 0.73 | 0.19 | -1.11 |
| 3,722.00 | 38.94 | 330.31 | 3,467.95 | 641.32 | -577.37 | -839.97 | 1.36 | -1.07 | 1.31 |
| 3,816.00 | 38.45 | 330.31 | 3,541.32 | 692.37 | -606.47 | -898.73 | 0.62 | -0.52 | 0.00 |
| 3,910.00 | 38.80 | 329.96 | 3,614.76 | 743.25 | -635.69 | -957.39 | 0.44 | -0.37 | -0.37 |
| 4,004.00 | 38.50 | 329.78 | 3,688.17 | 794.03 | -665.16 | -1,016.08 | 0.34 | -0.32 | -0.19 |
| 4,099.00 | 37.66 | 330.93 | 3,762.95 | 844.95 | -694.15 | -1,074.67 | 1.16 | 0.88 | 1.21 |
| 4,193.00 | 37.97 | 330.05 | 3,837.21 | 895.10 | -722.54 | -1,132.29 | 0.66 | 0.33 | -0.94 |

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N-S (usft) | +E-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|-------------|-------------|-------------------------|-------------------------|------------------------|-----------------------|
| 4,288.00 | 38.50 | 330.31 | 3,911.83 | 946.11 | -751.77 | -1,191.08 | 0.58 | 0.56 | 0.27 |
| 4,382.00 | 39.37 | 330.75 | 3,984.95 | 997.54 | -780.83 | -1,250.14 | 0.97 | 0.93 | 0.47 |
| 4,476.00 | 39.24 | 331.45 | 4,057.68 | 1,049.67 | -809.61 | -1,309.69 | 0.49 | -0.14 | 0.74 |
| 4,571.00 | 39.68 | 330.49 | 4,131.03 | 1,102.46 | -838.91 | -1,370.06 | 0.79 | 0.46 | -1.01 |
| 4,666.00 | 39.42 | 329.44 | 4,204.28 | 1,154.83 | -869.18 | -1,430.54 | 0.76 | -0.27 | -1.11 |
| 4,760.00 | 38.58 | 330.13 | 4,277.33 | 1,205.94 | -898.96 | -1,489.67 | 1.01 | -0.89 | 0.73 |
| 4,855.00 | 37.57 | 330.48 | 4,352.12 | 1,256.83 | -927.98 | -1,548.25 | 1.09 | -1.06 | 0.37 |
| 4,949.00 | 38.84 | 331.10 | 4,425.98 | 1,307.58 | -956.35 | -1,606.38 | 1.41 | 1.35 | 0.66 |
| 5,044.00 | 39.15 | 329.43 | 4,499.82 | 1,359.48 | -986.00 | -1,666.15 | 1.15 | 0.33 | -1.76 |
| 5,139.00 | 38.67 | 329.60 | 4,573.74 | 1,410.90 | -1,016.27 | -1,725.79 | 0.52 | -0.51 | 0.18 |
| 5,233.00 | 38.45 | 329.69 | 4,647.24 | 1,461.46 | -1,045.88 | -1,784.36 | 0.24 | -0.23 | 0.10 |
| 5,328.00 | 38.75 | 331.62 | 4,721.49 | 1,513.12 | -1,074.92 | -1,843.62 | 1.31 | 0.32 | 2.03 |
| 5,422.00 | 39.99 | 331.62 | 4,794.16 | 1,565.58 | -1,103.26 | -1,903.24 | 1.32 | 1.32 | 0.00 |
| 5,517.00 | 40.56 | 330.31 | 4,866.64 | 1,619.27 | -1,133.07 | -1,964.65 | 1.07 | 0.60 | -1.38 |
| 5,612.00 | 40.51 | 329.78 | 4,938.84 | 1,672.76 | -1,163.90 | -2,026.38 | 0.37 | -0.05 | -0.56 |
| 5,706.00 | 39.90 | 328.72 | 5,010.63 | 1,724.91 | -1,194.92 | -2,087.02 | 0.98 | -0.65 | -1.13 |
| 5,800.00 | 38.10 | 330.04 | 5,083.68 | 1,775.81 | -1,225.06 | -2,146.14 | 2.11 | -1.91 | 1.40 |
| 5,895.00 | 37.57 | 332.16 | 5,158.71 | 1,826.81 | -1,253.22 | -2,204.40 | 1.48 | -0.56 | 2.23 |
| 5,989.00 | 36.96 | 329.96 | 5,233.53 | 1,876.62 | -1,280.75 | -2,261.31 | 1.56 | -0.65 | -2.34 |
| 6,084.00 | 36.56 | 330.05 | 5,309.63 | 1,925.86 | -1,309.17 | -2,318.15 | 0.42 | -0.42 | 0.09 |
| 6,122.00 | 36.22 | 330.13 | 5,340.22 | 1,945.40 | -1,320.42 | -2,340.69 | 0.90 | -0.89 | 0.21 |
| 6,169.00 | 33.89 | 330.13 | 5,378.70 | 1,968.81 | -1,333.86 | -2,367.68 | 4.96 | -4.96 | 0.00 |
| 6,215.00 | 33.54 | 329.69 | 5,416.96 | 1,990.90 | -1,346.66 | -2,393.20 | 0.93 | -0.76 | -0.96 |
| 6,262.00 | 33.67 | 329.17 | 5,456.10 | 2,013.30 | -1,359.89 | -2,419.20 | 0.67 | 0.28 | -1.11 |
| 6,310.00 | 33.19 | 328.20 | 5,496.16 | 2,035.89 | -1,373.63 | -2,445.62 | 1.50 | -1.00 | -2.02 |
| 6,357.00 | 31.96 | 326.79 | 5,535.77 | 2,057.23 | -1,387.22 | -2,470.87 | 3.08 | -2.62 | -3.00 |
| 6,404.00 | 29.49 | 327.06 | 5,576.17 | 2,077.35 | -1,400.33 | -2,494.81 | 5.26 | -5.26 | 0.57 |
| 6,451.00 | 27.21 | 327.76 | 5,617.53 | 2,096.15 | -1,412.35 | -2,517.08 | 4.90 | -4.85 | 1.49 |
| 6,498.00 | 25.05 | 327.59 | 5,659.72 | 2,113.64 | -1,423.42 | -2,537.74 | 4.60 | -4.60 | -0.36 |
| 6,545.00 | 21.89 | 325.56 | 5,702.83 | 2,129.27 | -1,433.71 | -2,556.39 | 6.94 | -6.72 | -4.32 |
| 6,593.00 | 18.99 | 325.30 | 5,747.80 | 2,143.08 | -1,443.22 | -2,573.06 | 6.04 | -6.04 | -0.54 |
| 6,640.00 | 15.60 | 327.85 | 5,792.67 | 2,154.72 | -1,450.94 | -2,586.98 | 7.39 | -7.21 | 5.43 |
| 6,687.00 | 11.96 | 325.83 | 5,838.31 | 2,164.10 | -1,457.04 | -2,598.14 | 7.81 | -7.74 | -4.30 |
| 6,734.00 | 8.57 | 329.43 | 5,884.55 | 2,171.15 | -1,461.56 | -2,606.49 | 7.34 | -7.21 | 7.66 |
| 6,781.00 | 4.92 | 346.22 | 5,931.22 | 2,176.12 | -1,463.82 | -2,611.94 | 8.75 | -7.77 | 35.72 |
| 6,828.00 | 3.08 | 44.58 | 5,978.13 | 2,178.98 | -1,463.41 | -2,614.25 | 8.97 | -3.91 | 124.17 |
| 6,876.00 | 3.34 | 90.37 | 6,026.06 | 2,179.89 | -1,461.11 | -2,613.94 | 5.23 | 0.54 | 95.40 |
| 6,923.00 | 5.98 | 125.09 | 6,072.91 | 2,178.47 | -1,457.74 | -2,611.08 | 7.98 | 5.62 | 73.87 |
| 6,971.00 | 9.32 | 133.17 | 6,120.47 | 2,174.37 | -1,452.85 | -2,605.14 | 7.29 | 6.96 | 16.83 |
| 7,018.00 | 12.22 | 145.56 | 6,166.65 | 2,167.67 | -1,447.26 | -2,596.57 | 7.86 | 6.17 | 26.36 |
| 7,065.00 | 15.78 | 150.31 | 6,212.25 | 2,158.01 | -1,441.28 | -2,585.22 | 7.95 | 7.57 | 10.11 |
| 7,112.00 | 19.82 | 154.62 | 6,256.99 | 2,145.25 | -1,434.70 | -2,570.87 | 8.04 | 8.60 | 9.17 |
| 7,161.00 | 23.96 | 156.64 | 6,302.45 | 2,128.60 | -1,427.19 | -2,552.67 | 8.59 | 8.60 | 4.12 |
| 7,194.00 | 27.30 | 156.46 | 6,332.19 | 2,115.51 | -1,421.51 | -2,538.46 | 10.12 | 10.12 | -0.55 |

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| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 7,242.00 | 32.57 | 152.51 | 6,373.78 | 2,093.94 | -1,411.14 | -2,514.56 | 11.72 | 10.98 | -8.23 |
| 7,289.00 | 38.46 | 148.82 | 6,412.02 | 2,070.19 | -1,397.72 | -2,487.28 | 13.33 | 12.53 | -7.85 |
| 7,337.00 | 43.60 | 147.41 | 6,448.22 | 2,043.46 | -1,381.07 | -2,455.83 | 10.88 | 10.71 | -2.94 |
| 7,384.00 | 49.23 | 147.23 | 6,480.61 | 2,014.81 | -1,362.69 | -2,421.88 | 11.98 | 11.98 | -0.38 |
| 7,431.00 | 56.31 | 146.35 | 6,509.03 | 1,983.53 | -1,342.19 | -2,384.60 | 15.14 | 15.06 | -1.87 |
| 7,478.00 | 62.95 | 146.09 | 6,532.78 | 1,949.85 | -1,319.66 | -2,344.22 | 14.14 | 14.13 | -0.55 |
| 7,525.00 | 68.26 | 146.79 | 6,552.19 | 1,914.19 | -1,296.01 | -2,301.59 | 11.38 | 11.30 | 1.49 |
| 7,572.00 | 73.05 | 149.87 | 6,567.75 | 1,876.45 | -1,272.75 | -2,257.32 | 11.92 | 10.19 | 6.55 |
| 7,618.00 | 77.98 | 150.93 | 6,579.26 | 1,837.74 | -1,250.76 | -2,212.80 | 10.95 | 10.72 | 2.30 |
| 7,665.00 | 82.07 | 152.07 | 6,587.40 | 1,797.07 | -1,228.68 | -2,166.52 | 9.02 | 8.70 | 2.43 |
| 7,713.00 | 85.93 | 151.54 | 6,592.41 | 1,755.00 | -1,206.13 | -2,118.79 | 8.12 | 8.04 | -1.10 |
| 7,760.00 | 90.33 | 150.13 | 6,593.95 | 1,713.99 | -1,183.25 | -2,071.83 | 9.83 | 9.36 | -3.00 |
| 7,808.00 | 91.43 | 150.40 | 6,593.21 | 1,672.32 | -1,159.44 | -2,023.85 | 2.36 | 2.29 | 0.56 |
| 7,902.00 | 90.86 | 148.38 | 6,591.33 | 1,591.44 | -1,111.59 | -1,929.92 | 2.23 | -0.61 | -2.15 |
| 7,996.00 | 89.36 | 147.67 | 6,591.15 | 1,511.70 | -1,061.81 | -1,836.07 | 1.77 | -1.60 | -0.76 |
| 8,090.00 | 88.31 | 146.97 | 6,593.06 | 1,432.60 | -1,011.07 | -1,742.31 | 1.34 | -1.12 | -0.74 |
| 8,185.00 | 89.71 | 147.59 | 6,594.70 | 1,352.69 | -959.73 | -1,647.56 | 1.61 | 1.47 | 0.65 |
| 8,277.00 | 88.35 | 147.85 | 6,596.26 | 1,274.92 | -910.60 | -1,555.75 | 1.51 | -1.48 | 0.28 |
| 8,372.00 | 88.04 | 148.90 | 6,599.25 | 1,194.07 | -860.81 | -1,460.92 | 1.15 | -0.33 | 1.11 |
| 8,466.00 | 86.81 | 149.43 | 6,603.47 | 1,113.44 | -812.68 | -1,367.08 | 1.42 | -1.31 | 0.56 |
| 8,561.00 | 87.12 | 149.43 | 6,608.50 | 1,031.76 | -764.43 | -1,272.26 | 0.33 | 0.33 | 0.00 |
| 8,654.00 | 89.85 | 150.13 | 6,610.96 | 951.44 | -717.65 | -1,179.33 | 3.03 | 2.94 | 0.75 |
| 8,747.00 | 90.51 | 150.31 | 6,610.67 | 870.72 | -671.46 | -1,086.35 | 0.74 | 0.71 | 0.19 |
| 8,841.00 | 90.29 | 148.82 | 6,610.01 | 789.68 | -623.84 | -992.39 | 1.60 | -0.23 | -1.59 |
| 8,936.00 | 89.32 | 148.73 | 6,610.34 | 708.44 | -574.60 | -897.48 | 1.03 | -1.02 | -0.09 |
| 9,031.00 | 89.85 | 149.78 | 6,611.03 | 626.79 | -526.03 | -802.54 | 1.24 | 0.56 | 1.11 |
| 9,125.00 | 89.71 | 148.64 | 6,611.39 | 546.05 | -477.92 | -708.61 | 1.22 | -0.15 | -1.21 |
| 9,221.00 | 89.58 | 150.49 | 6,611.98 | 463.28 | -429.29 | -612.65 | 1.93 | -0.14 | 1.93 |
| 9,316.00 | 88.57 | 151.89 | 6,613.52 | 380.05 | -383.52 | -517.67 | 1.82 | -1.06 | 1.47 |
| 9,409.00 | 88.97 | 151.98 | 6,615.51 | 298.01 | -339.77 | -424.70 | 0.44 | 0.43 | 0.10 |
| 9,504.00 | 89.76 | 152.51 | 6,616.56 | 213.94 | -295.53 | -329.72 | 1.00 | 0.83 | 0.56 |
| 9,599.00 | 89.71 | 150.93 | 6,617.00 | 130.29 | -250.53 | -234.73 | 1.66 | -0.05 | -1.66 |
| 9,694.00 | 88.79 | 149.61 | 6,618.25 | 47.80 | -203.42 | -139.75 | 1.69 | -0.97 | -1.39 |
| 9,790.00 | 89.23 | 150.31 | 6,619.91 | -35.29 | -155.37 | -43.79 | 0.86 | 0.46 | 0.73 |
| 9,885.00 | 89.67 | 148.29 | 6,620.82 | -116.97 | -106.87 | 51.15 | 2.18 | 0.46 | -2.13 |
| 9,980.00 | 90.55 | 148.64 | 6,620.64 | -197.94 | -57.19 | 146.03 | 1.00 | 0.93 | 0.37 |
| 10,075.00 | 89.80 | 147.32 | 6,620.35 | -278.48 | -6.82 | 240.87 | 1.60 | -0.79 | -1.39 |
| 10,170.00 | 90.37 | 147.85 | 6,620.20 | -358.68 | 44.11 | 335.68 | 0.82 | 0.60 | 0.56 |
| 10,265.00 | 89.10 | 147.32 | 6,620.64 | -438.88 | 95.03 | 430.48 | 0.97 | -1.34 | -0.56 |
| 10,360.00 | 90.02 | 147.41 | 6,621.37 | -518.87 | 146.26 | 525.26 | 0.97 | 0.97 | 0.09 |
| 10,455.00 | 89.10 | 148.02 | 6,622.10 | -599.18 | 197.00 | 620.07 | 1.20 | -0.97 | 0.64 |
| 10,549.00 | 89.89 | 148.82 | 6,622.93 | -679.26 | 246.22 | 713.95 | 1.20 | 0.46 | 0.85 |
| 10,645.00 | 89.19 | 148.73 | 6,623.70 | -761.35 | 295.99 | 809.86 | 1.20 | -0.73 | -0.09 |

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Survey | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 10,739.00 | 88.62 | 149.43 | 6,625.50 | -841.97 | 344.28 | 903.78 | 0.96 | -0.61 | 0.74 |
| 10,833.00 | 89.23 | 150.05 | 6,627.26 | -923.15 | 391.64 | 997.73 | 0.93 | 0.65 | 0.66 |
| 10,928.00 | 90.15 | 150.05 | 6,627.78 | -1,005.46 | 439.07 | 1,092.70 | 0.97 | 0.97 | 0.00 |
| 11,023.00 | 88.48 | 149.96 | 6,628.91 | -1,087.73 | 486.55 | 1,187.67 | 1.76 | -1.76 | -0.09 |
| 11,118.00 | 89.32 | 150.66 | 6,630.74 | -1,170.24 | 533.60 | 1,282.64 | 1.15 | 0.88 | 0.74 |
| 11,213.00 | 90.24 | 153.12 | 6,631.10 | -1,254.03 | 578.35 | 1,377.62 | 2.76 | 0.97 | 2.59 |
| 11,307.00 | 90.77 | 152.07 | 6,630.27 | -1,337.47 | 621.62 | 1,471.59 | 1.25 | 0.56 | -1.12 |
| 11,402.00 | 90.68 | 150.75 | 6,629.07 | -1,420.88 | 667.07 | 1,566.58 | 1.39 | -0.09 | -1.39 |
| 11,496.00 | 89.85 | 148.99 | 6,628.64 | -1,502.18 | 714.26 | 1,660.55 | 2.07 | -0.88 | -1.87 |
| 11,590.00 | 88.92 | 147.50 | 6,629.64 | -1,582.10 | 763.72 | 1,754.41 | 1.87 | -0.99 | -1.59 |
| 11,685.00 | 89.85 | 148.20 | 6,630.66 | -1,662.53 | 814.27 | 1,849.24 | 1.23 | 0.98 | 0.74 |
| 11,780.00 | 88.79 | 148.02 | 6,631.79 | -1,743.18 | 864.46 | 1,944.09 | 1.13 | -1.12 | -0.19 |
| 11,873.00 | 89.98 | 148.99 | 6,632.79 | -1,822.47 | 913.04 | 2,036.97 | 1.65 | 1.28 | 1.04 |
| 11,968.00 | 89.71 | 150.22 | 6,633.05 | -1,904.41 | 961.10 | 2,131.93 | 1.33 | -0.28 | 1.29 |
| 12,062.00 | 89.63 | 149.78 | 6,633.59 | -1,985.82 | 1,008.10 | 2,225.90 | 0.48 | -0.09 | -0.47 |
| 12,156.00 | 88.79 | 149.61 | 6,634.88 | -2,066.96 | 1,055.53 | 2,319.86 | 0.91 | -0.89 | -0.18 |
| 12,251.00 | 89.49 | 149.52 | 6,636.31 | -2,148.86 | 1,103.65 | 2,414.81 | 0.74 | 0.74 | -0.09 |
| 12,345.00 | 88.62 | 148.73 | 6,637.86 | -2,229.53 | 1,151.88 | 2,508.73 | 1.25 | -0.93 | -0.84 |
| 12,439.00 | 89.45 | 148.64 | 6,639.44 | -2,309.83 | 1,200.72 | 2,602.62 | 0.89 | 0.88 | -0.10 |
| 12,534.00 | 90.59 | 148.73 | 6,639.41 | -2,390.98 | 1,250.10 | 2,697.52 | 1.20 | 1.20 | 0.09 |
| 12,628.00 | 89.01 | 149.08 | 6,639.74 | -2,471.47 | 1,298.64 | 2,791.44 | 1.72 | -1.68 | 0.37 |
| 12,723.00 | 89.85 | 150.22 | 6,640.68 | -2,553.45 | 1,346.64 | 2,886.40 | 1.49 | 0.88 | 1.20 |
| 12,818.00 | 88.97 | 150.49 | 6,641.66 | -2,636.01 | 1,393.63 | 2,981.38 | 0.97 | -0.93 | 0.28 |
| 12,913.00 | 90.51 | 150.05 | 6,642.09 | -2,718.50 | 1,440.74 | 3,076.36 | 1.69 | 1.62 | -0.46 |
| 13,007.00 | 90.07 | 150.93 | 6,641.62 | -2,800.30 | 1,487.04 | 3,170.35 | 1.05 | -0.47 | 0.94 |
| 13,101.00 | 90.95 | 150.75 | 6,640.78 | -2,882.39 | 1,532.84 | 3,264.34 | 0.96 | 0.94 | -0.19 |
| 13,196.00 | 89.58 | 151.10 | 6,640.34 | -2,965.41 | 1,579.00 | 3,359.34 | 1.49 | -1.44 | 0.37 |
| 13,290.00 | 90.37 | 151.01 | 6,640.38 | -3,047.67 | 1,624.50 | 3,453.34 | 0.85 | 0.84 | -0.10 |
| 13,385.00 | 88.79 | 151.45 | 6,641.08 | -3,130.94 | 1,670.22 | 3,548.33 | 1.73 | -1.66 | 0.46 |
| 13,480.00 | 89.58 | 151.36 | 6,642.43 | -3,214.34 | 1,715.68 | 3,643.32 | 0.84 | 0.83 | -0.09 |
| 13,575.00 | 88.35 | 150.84 | 6,644.15 | -3,297.49 | 1,761.58 | 3,738.30 | 1.41 | -1.29 | -0.55 |
| 13,669.00 | 88.92 | 151.19 | 6,646.38 | -3,379.70 | 1,807.12 | 3,832.28 | 0.71 | 0.61 | 0.37 |
| 13,763.00 | 90.07 | 153.21 | 6,647.21 | -3,462.84 | 1,850.96 | 3,926.25 | 2.47 | 1.22 | 2.15 |
| 13,857.00 | 90.77 | 151.19 | 6,646.52 | -3,545.98 | 1,894.79 | 4,020.23 | 2.27 | 0.74 | -2.15 |
| 13,952.00 | 90.55 | 150.31 | 6,645.43 | -3,628.86 | 1,941.21 | 4,115.22 | 0.95 | -0.23 | -0.93 |
| 14,047.00 | 90.46 | 148.20 | 6,644.59 | -3,710.50 | 1,989.77 | 4,210.15 | 2.22 | -0.09 | -2.22 |
| 14,144.00 | 90.33 | 147.85 | 6,643.92 | -3,792.78 | 2,041.13 | 4,307.00 | 0.38 | -0.13 | -0.36 |
| 14,236.00 | 89.10 | 146.79 | 6,644.38 | -3,870.22 | 2,090.81 | 4,398.78 | 1.76 | -1.34 | -1.15 |
| 14,331.00 | 88.48 | 148.02 | 6,646.39 | -3,950.23 | 2,141.97 | 4,493.54 | 1.08 | -0.65 | 1.29 |
| 14,426.00 | 89.36 | 147.50 | 6,648.18 | -4,030.57 | 2,192.64 | 4,588.35 | 2.03 | 0.93 | -0.55 |
| 14,521.00 | 91.08 | 146.62 | 6,647.81 | -4,110.30 | 2,244.29 | 4,683.09 | 2.34 | 1.81 | -0.93 |
| 14,615.00 | 88.88 | 146.62 | 6,647.85 | -4,188.78 | 2,296.01 | 4,776.77 | 0.85 | -2.34 | 0.00 |
| 14,710.00 | 89.49 | 146.09 | 6,649.20 | -4,267.86 | 2,348.64 | 4,871.42 | 0.85 | 0.64 | -0.56 |

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Survey | | | | | | | | | |
|----------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 14,778.00 | 88.88 | 145.65 | 6,650.16 | -4,324.14 | 2,386.79 | 4,939.11 | 1.11 | -0.90 | -0.65 |
| Survey @ 14778.00 MD 6650.16 TVD | | | | | | | | | |
| 14,830.00 | 88.88 | 145.65 | 6,651.18 | -4,367.07 | 2,416.12 | 4,990.85 | 0.00 | 0.00 | 0.00 |
| Survey projected to 14830.00 MD 6651.18 TVD | | | | | | | | | |

| Design Annotations | | | | | |
|-----------------------|-----------------------|-------------------|--------------|----------------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment | |
| | | +N/-S (usft) | +E/-W (usft) | | |
| 191.00 | 191.00 | 0.30 | -0.50 | MWD surveys | |
| 14,778.00 | 6,650.16 | -4,324.14 | 2,386.79 | Survey @ 14778.00 MD 6650.16 TVD | |

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

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


| | | | | | |
|------------------------------|--------------|---------------------|--------------------|--------------------------|--------------|
| Site | Old Crow Pad | | | | |
| Site Position: | | Northing: | 14,446,179.89 usft | Latitude: | 39.77853828 |
| From: | Lat/Long | Easting: | 1,706,970.33 usft | Longitude: | -80.76311519 |
| Position Uncertainty: | 0.00 usft | Slot Radius: | 13-3/16 " | Grid Convergence: | 0.152 ° |

| | | | | | | |
|-----------------------------|---------------------------|-----------|----------------------------|--------------------|----------------------|---------------|
| Well | Old Crow S-09 HM (slot S) | | | | | |
| Well Position | +N/-S | 0.00 usft | Northing: | 14,446,109.14 usft | Latitude: | 39.77834361 |
| | +E/-W | 0.00 usft | Easting: | 1,707,020.19 usft | Longitude: | -80.76293838 |
| Position Uncertainty | 0.00 usft | | Wellhead Elevation: | usft | Ground Level: | 1,265.00 usft |

| | | | | | |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| Wellbore | Original Hole | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2015 | 6/26/2019 | -8.712 | 66.788 | 51,941.76048752 |

| | | | | | |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|------|
| Design | Surveys Original Hole | | | | |
| Audit Notes: | | | | | |
| Version: | 1.0 | Phase: | ACTUAL | Tie On Depth: | 0.00 |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) | |
| | 0.00 | 0.00 | 0.00 | 151.25 | |

| | | | | | |
|-----------------------|------------------|----------------------------|------------------|--------------------|--|
| Survey Program | Date | 11/20/2019 | | | |
| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description | |
| 191.00 | 970.00 | MWD surf (Original Hole) | MWD | MWD - Standard | |
| 1,065.00 | 2,822.00 | MWD int (Original Hole) | MWD | MWD - Standard | |
| 2,887.00 | 14,778.00 | MWD (Original Hole) | MWD | MWD - Standard | |
| 14,830.00 | 14,830.00 | Projection (Original Hole) | MWD | MWD - Standard | |

| | | | | | | | | | | |
|------------------------------|---------------------------------------------------------------------------------------|--------------------|------------------------------|---------------------|---------------------|----------------------------|---------------------------|-----------------|------------------|--|
| Survey |  | | | | | | | | | |
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14,446,109.14 | 1,707,020.19 | 39.77834361 | -80.76293838 | |
| 191.00 | 0.35 | 301.31 | 191.00 | 0.30 | -0.50 | 14,446,109.44 | 1,707,019.70 | 39.77834445 | -80.76294015 | |
| MWD surveys | | | | | | | | | | |
| 234.00 | 0.26 | 285.49 | 234.00 | 0.40 | -0.70 | 14,446,109.53 | 1,707,019.49 | 39.77834471 | -80.76294089 | |
| 279.00 | 0.22 | 313.00 | 279.00 | 0.48 | -0.87 | 14,446,109.62 | 1,707,019.33 | 39.77834495 | -80.76294146 | |
| 324.00 | 0.09 | 261.14 | 324.00 | 0.54 | -0.96 | 14,446,109.67 | 1,707,019.23 | 39.77834509 | -80.76294181 | |
| 369.00 | 0.18 | 285.31 | 369.00 | 0.55 | -1.07 | 14,446,109.69 | 1,707,019.13 | 39.77834513 | -80.76294217 | |
| 414.00 | 0.13 | 290.50 | 414.00 | 0.59 | -1.18 | 14,446,109.72 | 1,707,019.01 | 39.77834523 | -80.76294259 | |
| 459.00 | 0.09 | 261.14 | 459.00 | 0.60 | -1.27 | 14,446,109.73 | 1,707,018.93 | 39.77834527 | -80.76294288 | |

| | | | |
|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|
| 504.00 | 0.04 | 261.14 | 504.00 | 0.59 | -1.32 | 14,446,109.73 | 1,707,018.88 | 39.77834525 | -80.76294306 |
| 549.00 | 0.09 | 241.01 | 549.00 | 0.57 | -1.36 | 14,446,109.71 | 1,707,018.83 | 39.77834519 | -80.76294323 |
| 594.00 | 0.13 | 234.86 | 594.00 | 0.53 | -1.44 | 14,446,109.66 | 1,707,018.76 | 39.77834507 | -80.76294349 |
| 688.00 | 0.13 | 232.40 | 688.00 | 0.40 | -1.61 | 14,446,109.53 | 1,707,018.59 | 39.77834472 | -80.76294410 |
| 781.00 | 0.09 | 239.52 | 781.00 | 0.30 | -1.75 | 14,446,109.43 | 1,707,018.44 | 39.77834444 | -80.76294462 |
| 875.00 | 0.13 | 189.33 | 874.99 | 0.15 | -1.83 | 14,446,109.29 | 1,707,018.36 | 39.77834405 | -80.76294491 |
| 970.00 | 0.18 | 177.56 | 969.99 | -0.10 | -1.85 | 14,446,109.03 | 1,707,018.35 | 39.77834335 | -80.76294495 |
| 1,065.00 | 0.40 | 161.47 | 1,064.99 | -0.56 | -1.73 | 14,446,108.57 | 1,707,018.46 | 39.77834208 | -80.76294456 |
| 1,159.00 | 0.53 | 204.45 | 1,158.99 | -1.27 | -1.81 | 14,446,107.86 | 1,707,018.38 | 39.77834013 | -80.76294483 |
| 1,255.00 | 0.48 | 216.32 | 1,254.99 | -2.00 | -2.23 | 14,446,107.14 | 1,707,017.96 | 39.77833814 | -80.76294634 |
| 1,350.00 | 1.36 | 273.44 | 1,349.98 | -2.25 | -3.59 | 14,446,106.88 | 1,707,016.60 | 39.77833745 | -80.76295119 |
| 1,446.00 | 3.56 | 272.57 | 1,445.88 | -2.05 | -7.71 | 14,446,107.09 | 1,707,012.49 | 39.77833804 | -80.76296584 |
| 1,541.00 | 6.06 | 272.65 | 1,540.54 | -1.69 | -15.67 | 14,446,107.45 | 1,707,004.53 | 39.77833910 | -80.76299415 |
| 1,636.00 | 8.75 | 264.48 | 1,634.74 | -2.15 | -27.87 | 14,446,106.99 | 1,706,992.32 | 39.77833791 | -80.76303760 |
| 1,731.00 | 10.67 | 257.27 | 1,728.38 | -4.78 | -43.64 | 14,446,104.35 | 1,706,976.55 | 39.77833079 | -80.76309376 |
| 1,827.00 | 12.26 | 254.10 | 1,822.46 | -9.53 | -62.12 | 14,446,099.60 | 1,706,958.08 | 39.77831788 | -80.76315955 |
| 1,922.00 | 12.04 | 256.30 | 1,915.33 | -14.64 | -81.44 | 14,446,094.49 | 1,706,938.75 | 39.77830399 | -80.76322839 |
| 2,017.00 | 12.26 | 268.69 | 2,008.22 | -17.22 | -101.16 | 14,446,091.91 | 1,706,919.04 | 39.77829705 | -80.76329858 |
| 2,112.00 | 13.44 | 283.55 | 2,100.87 | -14.86 | -121.98 | 14,446,094.27 | 1,706,898.21 | 39.77830368 | -80.76337268 |
| 2,207.00 | 15.55 | 295.59 | 2,192.86 | -6.78 | -144.20 | 14,446,102.36 | 1,706,875.99 | 39.77832605 | -80.76345171 |
| 2,302.00 | 17.58 | 305.52 | 2,283.93 | 7.06 | -167.37 | 14,446,116.20 | 1,706,852.82 | 39.77836423 | -80.76353404 |
| 2,397.00 | 18.68 | 312.91 | 2,374.22 | 25.76 | -190.20 | 14,446,134.90 | 1,706,830.00 | 39.77841574 | -80.76361510 |
| 2,492.00 | 20.92 | 317.48 | 2,463.61 | 48.62 | -212.81 | 14,446,157.76 | 1,706,807.39 | 39.77847869 | -80.76369536 |
| 2,586.00 | 24.43 | 320.99 | 2,550.33 | 76.11 | -236.39 | 14,446,185.24 | 1,706,783.80 | 39.77855434 | -80.76377905 |
| 2,681.00 | 27.03 | 324.68 | 2,635.91 | 108.99 | -261.24 | 14,446,218.13 | 1,706,758.95 | 39.77864483 | -80.76386720 |
| 2,776.00 | 28.34 | 327.67 | 2,720.04 | 145.66 | -285.79 | 14,446,254.80 | 1,706,734.41 | 39.77874572 | -80.76395420 |
| 2,822.00 | 29.00 | 329.17 | 2,760.40 | 164.46 | -297.34 | 14,446,273.60 | 1,706,722.85 | 39.77879743 | -80.76399515 |
| 2,887.00 | 30.54 | 331.18 | 2,816.82 | 192.47 | -313.38 | 14,446,301.60 | 1,706,706.82 | 39.77887445 | -80.76405197 |
| 2,963.00 | 32.12 | 330.48 | 2,881.74 | 226.97 | -332.64 | 14,446,336.10 | 1,706,687.55 | 39.77896934 | -80.76412021 |
| 3,058.00 | 36.73 | 330.66 | 2,960.08 | 273.73 | -359.02 | 14,446,382.87 | 1,706,661.17 | 39.77909796 | -80.76421366 |
| 3,155.00 | 40.12 | 330.13 | 3,036.06 | 326.13 | -388.81 | 14,446,435.27 | 1,706,631.39 | 39.77924208 | -80.76431919 |
| 3,250.00 | 40.73 | 328.37 | 3,108.38 | 379.07 | -420.30 | 14,446,488.20 | 1,706,599.89 | 39.77938768 | -80.76443081 |
| 3,344.00 | 41.52 | 328.37 | 3,179.19 | 431.71 | -452.73 | 14,446,540.84 | 1,706,567.47 | 39.77953248 | -80.76454572 |
| 3,439.00 | 40.78 | 328.55 | 3,250.72 | 484.98 | -485.43 | 14,446,594.12 | 1,706,534.77 | 39.77967903 | -80.76466161 |
| 3,533.00 | 39.77 | 330.13 | 3,322.44 | 537.25 | -516.42 | 14,446,646.38 | 1,706,503.77 | 39.77982278 | -80.76477143 |
| 3,628.00 | 39.95 | 329.08 | 3,395.36 | 589.76 | -547.23 | 14,446,698.90 | 1,706,472.97 | 39.77996723 | -80.76488059 |
| 3,722.00 | 38.94 | 330.31 | 3,467.95 | 641.32 | -577.37 | 14,446,750.45 | 1,706,442.83 | 39.78010903 | -80.76498739 |
| 3,816.00 | 38.45 | 330.31 | 3,541.32 | 692.37 | -606.47 | 14,446,801.51 | 1,706,413.72 | 39.78024944 | -80.76509052 |
| 3,910.00 | 38.80 | 329.96 | 3,614.76 | 743.25 | -635.69 | 14,446,852.39 | 1,706,384.50 | 39.78038939 | -80.76519404 |
| 4,004.00 | 38.50 | 329.78 | 3,688.17 | 794.03 | -665.16 | 14,446,903.17 | 1,706,355.03 | 39.78052905 | -80.76529846 |
| 4,099.00 | 37.66 | 330.93 | 3,762.95 | 844.95 | -694.15 | 14,446,954.08 | 1,706,326.05 | 39.78066909 | -80.76540115 |
| 4,193.00 | 37.97 | 330.05 | 3,837.21 | 895.10 | -722.54 | 14,447,004.24 | 1,706,297.66 | 39.78080704 | -80.76550174 |
| 4,288.00 | 38.50 | 330.31 | 3,911.83 | 946.11 | -751.77 | 14,447,055.25 | 1,706,268.42 | 39.78094733 | -80.76560532 |
| 4,382.00 | 39.37 | 330.75 | 3,984.95 | 997.54 | -780.83 | 14,447,106.68 | 1,706,239.36 | 39.78108878 | -80.76570828 |
| 4,476.00 | 39.24 | 331.45 | 4,057.68 | 1,049.67 | -809.61 | 14,447,158.81 | 1,706,210.58 | 39.78123215 | -80.76581022 |
| 4,571.00 | 39.68 | 330.49 | 4,131.03 | 1,102.46 | -838.91 | 14,447,211.59 | 1,706,181.29 | 39.78137733 | -80.76591402 |
| 4,666.00 | 39.42 | 329.44 | 4,204.28 | 1,154.83 | -869.18 | 14,447,263.96 | 1,706,151.01 | 39.78152136 | -80.76602130 |
| 4,760.00 | 38.58 | 330.13 | 4,277.33 | 1,205.94 | -898.96 | 14,447,315.08 | 1,706,121.24 | 39.78166195 | -80.76612679 |
| 4,855.00 | 37.57 | 330.48 | 4,352.12 | 1,256.83 | -927.98 | 14,447,365.97 | 1,706,092.21 | 39.78180192 | -80.76622963 |
| 4,949.00 | 38.84 | 331.10 | 4,425.98 | 1,307.58 | -956.35 | 14,447,416.71 | 1,706,063.85 | 39.78194148 | -80.76633013 |
| 5,044.00 | 39.15 | 329.43 | 4,499.82 | 1,359.48 | -986.00 | 14,447,468.62 | 1,706,034.85 | 39.78208423 | -80.76643518 |
| 5,139.00 | 38.67 | 329.60 | 4,573.74 | 1,410.90 | -1,016.27 | 14,447,520.04 | 1,706,005.93 | 39.78222566 | -80.76654246 |
| 5,233.00 | 38.45 | 329.69 | 4,647.24 | 1,461.46 | -1,045.88 | 14,447,570.60 | 1,705,974.32 | 39.78236473 | -80.76664739 |
| 5,328.00 | 38.75 | 331.62 | 4,721.49 | 1,513.12 | -1,074.92 | 14,447,622.26 | 1,705,943.28 | 39.78250681 | -80.76675027 |
| 5,422.00 | 39.99 | 331.62 | 4,794.16 | 1,565.58 | -1,103.26 | 14,447,674.72 | 1,705,916.93 | 39.78264706 | -80.76685067 |

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West Virginia Department of Environmental Protection
08/27/2021

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Survey | | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 5,517.00 | 40.56 | 330.31 | 4,866.64 | 1,619.27 | -1,133.07 | 14,447,728.41 | 1,705,887.13 | 39.78279874 | -80.76695627 | |
| 5,612.00 | 40.51 | 329.78 | 4,938.84 | 1,672.76 | -1,163.90 | 14,447,781.90 | 1,705,856.30 | 39.78294587 | -80.76706551 | |
| 5,706.00 | 39.90 | 328.72 | 5,010.63 | 1,724.91 | -1,194.92 | 14,447,834.05 | 1,705,825.28 | 39.78308931 | -80.76717545 | |
| 5,800.00 | 38.10 | 330.04 | 5,083.68 | 1,775.81 | -1,225.06 | 14,447,884.94 | 1,705,795.14 | 39.78322930 | -80.76728226 | |
| 5,895.00 | 37.57 | 332.16 | 5,158.71 | 1,826.81 | -1,253.22 | 14,447,935.95 | 1,705,766.97 | 39.78336957 | -80.76738203 | |
| 5,989.00 | 36.96 | 329.96 | 5,233.53 | 1,876.62 | -1,280.75 | 14,447,985.76 | 1,705,739.44 | 39.78350655 | -80.76747957 | |
| 6,084.00 | 36.56 | 330.05 | 5,309.63 | 1,925.86 | -1,309.17 | 14,448,035.00 | 1,705,711.02 | 39.78364198 | -80.76758029 | |
| 6,122.00 | 36.22 | 330.13 | 5,340.22 | 1,945.40 | -1,320.42 | 14,448,054.54 | 1,705,699.78 | 39.78369572 | -80.76762012 | |
| 6,169.00 | 33.89 | 330.13 | 5,378.70 | 1,968.81 | -1,333.86 | 14,448,077.94 | 1,705,686.33 | 39.78376010 | -80.76766776 | |
| 6,215.00 | 33.54 | 329.69 | 5,416.96 | 1,990.90 | -1,346.66 | 14,448,100.04 | 1,705,673.53 | 39.78382086 | -80.76771312 | |
| 6,262.00 | 33.67 | 329.17 | 5,456.10 | 2,013.30 | -1,359.89 | 14,448,122.43 | 1,705,660.30 | 39.78388247 | -80.76776001 | |
| 6,310.00 | 33.19 | 328.20 | 5,496.16 | 2,035.89 | -1,373.63 | 14,448,145.03 | 1,705,646.56 | 39.78394461 | -80.76780872 | |
| 6,357.00 | 31.96 | 326.79 | 5,535.77 | 2,057.23 | -1,387.22 | 14,448,166.37 | 1,705,632.97 | 39.78400332 | -80.76785690 | |
| 6,404.00 | 29.49 | 327.06 | 5,576.17 | 2,077.35 | -1,400.33 | 14,448,186.49 | 1,705,619.86 | 39.78405866 | -80.76790337 | |
| 6,451.00 | 27.21 | 327.76 | 5,617.53 | 2,096.15 | -1,412.35 | 14,448,205.29 | 1,705,607.84 | 39.78411038 | -80.76794599 | |
| 6,498.00 | 25.05 | 327.59 | 5,659.72 | 2,113.64 | -1,423.42 | 14,448,222.78 | 1,705,596.77 | 39.78415849 | -80.76798523 | |
| 6,545.00 | 21.89 | 325.56 | 5,702.83 | 2,129.27 | -1,433.71 | 14,448,238.41 | 1,705,586.48 | 39.78420149 | -80.76802171 | |
| 6,593.00 | 18.99 | 325.30 | 5,747.80 | 2,143.08 | -1,443.22 | 14,448,252.21 | 1,705,576.97 | 39.78423946 | -80.76805543 | |
| 6,640.00 | 15.60 | 327.85 | 5,792.67 | 2,154.72 | -1,450.94 | 14,448,263.85 | 1,705,569.25 | 39.78427149 | -80.76808280 | |
| 6,687.00 | 11.96 | 325.83 | 5,838.31 | 2,164.10 | -1,457.04 | 14,448,273.23 | 1,705,563.15 | 39.78429730 | -80.76810443 | |
| 6,734.00 | 8.57 | 329.43 | 5,884.55 | 2,171.15 | -1,461.56 | 14,448,280.28 | 1,705,558.64 | 39.78431668 | -80.76812044 | |
| 6,781.00 | 4.92 | 346.22 | 5,931.22 | 2,176.12 | -1,463.82 | 14,448,285.26 | 1,705,556.37 | 39.78433036 | -80.76812845 | |
| 6,828.00 | 3.08 | 44.58 | 5,978.13 | 2,178.98 | -1,463.41 | 14,448,288.11 | 1,705,556.78 | 39.78433821 | -80.76812697 | |
| 6,876.00 | 3.34 | 90.37 | 6,026.06 | 2,179.89 | -1,461.11 | 14,448,289.02 | 1,705,559.08 | 39.78434069 | -80.76811877 | |
| 6,923.00 | 5.98 | 125.09 | 6,072.91 | 2,178.47 | -1,457.74 | 14,448,287.61 | 1,705,562.46 | 39.78433677 | -80.76810677 | |
| 6,971.00 | 9.32 | 133.17 | 6,120.47 | 2,174.37 | -1,452.85 | 14,448,283.51 | 1,705,567.34 | 39.78432549 | -80.76808943 | |
| 7,018.00 | 12.22 | 145.56 | 6,166.65 | 2,167.67 | -1,447.26 | 14,448,276.80 | 1,705,572.93 | 39.78430702 | -80.76806959 | |
| 7,065.00 | 15.78 | 150.31 | 6,212.25 | 2,158.01 | -1,441.28 | 14,448,267.14 | 1,705,578.91 | 39.78428046 | -80.76804839 | |
| 7,112.00 | 19.82 | 154.62 | 6,256.99 | 2,145.25 | -1,434.70 | 14,448,254.39 | 1,705,585.50 | 39.78424538 | -80.76802507 | |
| 7,161.00 | 23.96 | 156.64 | 6,302.45 | 2,128.60 | -1,427.19 | 14,448,237.74 | 1,705,593.00 | 39.78419961 | -80.76799850 | |
| 7,194.00 | 27.30 | 156.46 | 6,332.19 | 2,115.51 | -1,421.51 | 14,448,224.65 | 1,705,598.69 | 39.78416361 | -80.76797840 | |
| 7,242.00 | 32.57 | 152.51 | 6,373.78 | 2,093.94 | -1,411.14 | 14,448,203.08 | 1,705,609.05 | 39.78410430 | -80.76794169 | |
| 7,289.00 | 38.46 | 148.82 | 6,412.02 | 2,070.19 | -1,397.72 | 14,448,179.33 | 1,705,622.47 | 39.78403898 | -80.76789414 | |
| 7,337.00 | 43.60 | 147.41 | 6,448.22 | 2,043.46 | -1,381.07 | 14,448,152.59 | 1,705,639.13 | 39.78396544 | -80.76783510 | |
| 7,384.00 | 49.23 | 147.23 | 6,480.61 | 2,014.81 | -1,362.69 | 14,448,123.95 | 1,705,657.51 | 39.78388665 | -80.76776995 | |
| 7,431.00 | 56.31 | 146.35 | 6,509.03 | 1,983.53 | -1,342.19 | 14,448,092.67 | 1,705,678.00 | 39.78380059 | -80.76769729 | |
| 7,478.00 | 62.95 | 146.09 | 6,532.78 | 1,949.85 | -1,319.66 | 14,448,058.98 | 1,705,700.54 | 39.78370793 | -80.76761738 | |
| 7,525.00 | 68.26 | 146.79 | 6,552.19 | 1,914.19 | -1,296.01 | 14,448,023.32 | 1,705,724.18 | 39.78360983 | -80.76753353 | |
| 7,572.00 | 73.05 | 149.87 | 6,567.75 | 1,876.45 | -1,272.75 | 14,447,985.59 | 1,705,747.44 | 39.78350603 | -80.76745110 | |
| 7,618.00 | 77.98 | 150.93 | 6,579.26 | 1,837.74 | -1,250.76 | 14,447,946.87 | 1,705,769.43 | 39.78339955 | -80.76737319 | |
| 7,665.00 | 82.07 | 152.07 | 6,587.40 | 1,797.07 | -1,228.68 | 14,447,906.20 | 1,705,791.51 | 39.78328770 | -80.76729497 | |
| 7,713.00 | 85.93 | 151.54 | 6,592.41 | 1,755.00 | -1,206.13 | 14,447,864.14 | 1,705,814.06 | 39.78317202 | -80.76721509 | |
| 7,760.00 | 90.33 | 150.13 | 6,593.95 | 1,713.99 | -1,183.25 | 14,447,823.13 | 1,705,836.95 | 39.78305924 | -80.76713400 | |
| 7,808.00 | 91.43 | 150.40 | 6,593.21 | 1,672.32 | -1,159.44 | 14,447,781.46 | 1,705,860.75 | 39.78294462 | -80.76704966 | |
| 7,902.00 | 90.86 | 148.38 | 6,591.33 | 1,591.44 | -1,111.59 | 14,447,700.57 | 1,705,908.60 | 39.78272216 | -80.76688008 | |
| 7,996.00 | 89.36 | 147.67 | 6,591.15 | 1,511.70 | -1,061.81 | 14,447,620.84 | 1,705,958.38 | 39.78250282 | -80.76670364 | |
| 8,090.00 | 88.31 | 146.97 | 6,593.06 | 1,432.60 | -1,011.07 | 14,447,541.74 | 1,706,009.12 | 39.78228523 | -80.76652375 | |
| 8,185.00 | 89.71 | 147.59 | 6,594.70 | 1,352.69 | -959.73 | 14,447,461.83 | 1,706,060.46 | 39.78206540 | -80.76634175 | |
| 8,277.00 | 88.35 | 147.85 | 6,596.26 | 1,274.92 | -910.60 | 14,447,384.06 | 1,706,109.59 | 39.78185148 | -80.76616761 | |
| 8,372.00 | 88.04 | 148.90 | 6,599.25 | 1,194.07 | -860.81 | 14,447,303.21 | 1,706,159.35 | 39.78162908 | -80.76599114 | |
| 8,466.00 | 86.81 | 149.43 | 6,603.47 | 1,113.44 | -812.68 | 14,447,222.58 | 1,706,207.51 | 39.78140730 | -80.76582057 | |
| 8,561.00 | 87.12 | 149.43 | 6,608.50 | 1,031.76 | -764.43 | 14,447,140.90 | 1,706,255.76 | 39.78118264 | -80.76564960 | |
| 8,654.00 | 89.85 | 150.13 | 6,610.96 | 951.44 | -717.65 | 14,447,060.57 | 1,706,302.55 | 39.78096171 | -80.76548381 | |
| 8,747.00 | 90.51 | 150.31 | 6,610.67 | 870.72 | -671.46 | 14,446,979.85 | 1,706,348.74 | 39.78073970 | -80.76532015 | |
| 8,841.00 | 90.29 | 148.82 | 6,610.01 | 789.68 | -623.84 | 14,446,898.81 | 1,706,396.35 | 39.78051679 | -80.76515143 | |

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|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Survey | | | | | | | | | | |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 8,936.00 | 89.32 | 148.73 | 6,610.34 | 708.44 | -574.60 | 14,446,817.57 | 1,706,445.60 | 39.78029334 | -80.76497690 | |
| 9,031.00 | 89.85 | 149.78 | 6,611.03 | 626.79 | -526.03 | 14,446,735.93 | 1,706,494.16 | 39.78006877 | -80.76480481 | |
| 9,125.00 | 89.71 | 148.64 | 6,611.39 | 546.05 | -477.92 | 14,446,655.18 | 1,706,542.28 | 39.77984667 | -80.76463430 | |
| 9,221.00 | 89.58 | 150.49 | 6,611.98 | 463.28 | -429.29 | 14,446,572.42 | 1,706,590.90 | 39.77961902 | -80.76446200 | |
| 9,316.00 | 88.57 | 151.89 | 6,613.52 | 380.05 | -383.52 | 14,446,489.19 | 1,706,636.68 | 39.77939012 | -80.76429985 | |
| 9,409.00 | 88.97 | 151.98 | 6,615.51 | 298.01 | -339.77 | 14,446,407.14 | 1,706,680.42 | 39.77916449 | -80.76414492 | |
| 9,504.00 | 89.76 | 152.51 | 6,616.56 | 213.94 | -295.53 | 14,446,323.08 | 1,706,724.66 | 39.77893330 | -80.76398826 | |
| 9,599.00 | 89.71 | 150.93 | 6,617.00 | 130.29 | -250.53 | 14,446,239.42 | 1,706,769.67 | 39.77870323 | -80.76382885 | |
| 9,694.00 | 88.79 | 149.61 | 6,618.25 | 47.80 | -203.42 | 14,446,156.94 | 1,706,816.77 | 39.77847636 | -80.76366196 | |
| 9,790.00 | 89.23 | 150.31 | 6,619.91 | -35.29 | -155.37 | 14,446,073.84 | 1,706,864.82 | 39.77824782 | -80.76349172 | |
| 9,885.00 | 89.67 | 148.29 | 6,620.82 | -116.97 | -106.87 | 14,445,992.17 | 1,706,913.32 | 39.77802316 | -80.76331987 | |
| 9,980.00 | 90.55 | 148.64 | 6,620.64 | -197.94 | -57.19 | 14,445,911.20 | 1,706,963.01 | 39.77780043 | -80.76314379 | |
| 10,075.00 | 89.80 | 147.32 | 6,620.35 | -278.48 | -6.82 | 14,445,830.65 | 1,707,013.37 | 39.77757887 | -80.76296527 | |
| 10,170.00 | 90.37 | 147.85 | 6,620.20 | -358.68 | 44.11 | 14,445,750.46 | 1,707,064.30 | 39.77735826 | -80.76278478 | |
| 10,265.00 | 89.10 | 147.32 | 6,620.64 | -438.88 | 95.03 | 14,445,670.26 | 1,707,115.22 | 39.77713765 | -80.76260429 | |
| 10,360.00 | 90.02 | 147.41 | 6,621.37 | -518.87 | 146.26 | 14,445,590.26 | 1,707,166.45 | 39.77691758 | -80.76242271 | |
| 10,455.00 | 89.10 | 148.02 | 6,622.10 | -599.18 | 197.00 | 14,445,509.95 | 1,707,217.19 | 39.77669666 | -80.76224287 | |
| 10,549.00 | 89.89 | 148.82 | 6,622.93 | -679.26 | 246.22 | 14,445,429.88 | 1,707,266.42 | 39.77647639 | -80.76206843 | |
| 10,645.00 | 89.19 | 148.73 | 6,623.70 | -761.35 | 295.99 | 14,445,347.79 | 1,707,316.18 | 39.77625058 | -80.76189209 | |
| 10,739.00 | 88.62 | 149.43 | 6,625.50 | -841.97 | 344.28 | 14,445,267.16 | 1,707,364.47 | 39.77602881 | -80.76172098 | |
| 10,833.00 | 89.23 | 150.05 | 6,627.26 | -923.15 | 391.64 | 14,445,185.98 | 1,707,411.83 | 39.77580553 | -80.76155318 | |
| 10,928.00 | 90.15 | 150.05 | 6,627.78 | -1,005.46 | 439.07 | 14,445,103.67 | 1,707,459.26 | 39.77557913 | -80.76138516 | |
| 11,023.00 | 88.48 | 149.96 | 6,628.91 | -1,087.73 | 486.55 | 14,445,021.40 | 1,707,506.75 | 39.77535285 | -80.76121693 | |
| 11,118.00 | 89.32 | 150.66 | 6,630.74 | -1,170.24 | 533.60 | 14,444,938.89 | 1,707,553.79 | 39.77512591 | -80.76105028 | |
| 11,213.00 | 90.24 | 153.12 | 6,631.10 | -1,254.03 | 578.35 | 14,444,855.11 | 1,707,598.55 | 39.77489548 | -80.76089178 | |
| 11,307.00 | 90.77 | 152.07 | 6,630.27 | -1,337.47 | 621.62 | 14,444,771.66 | 1,707,641.81 | 39.77466600 | -80.76073859 | |
| 11,402.00 | 90.68 | 150.75 | 6,629.07 | -1,420.88 | 667.07 | 14,444,688.25 | 1,707,687.27 | 39.77443660 | -80.76057761 | |
| 11,496.00 | 89.85 | 148.99 | 6,628.64 | -1,502.18 | 714.26 | 14,444,606.96 | 1,707,734.45 | 39.77421300 | -80.76041046 | |
| 11,590.00 | 88.92 | 147.50 | 6,629.64 | -1,582.10 | 763.72 | 14,444,527.04 | 1,707,783.92 | 39.77399315 | -80.76023516 | |
| 11,685.00 | 89.85 | 148.20 | 6,630.66 | -1,662.53 | 814.27 | 14,444,446.61 | 1,707,834.47 | 39.77377190 | -80.76005602 | |
| 11,780.00 | 88.79 | 148.02 | 6,631.79 | -1,743.18 | 864.46 | 14,444,365.96 | 1,707,884.65 | 39.77355004 | -80.75987819 | |
| 11,873.00 | 89.98 | 148.99 | 6,632.79 | -1,822.47 | 913.04 | 14,444,286.66 | 1,707,933.23 | 39.77333192 | -80.75970605 | |
| 11,968.00 | 89.71 | 150.22 | 6,633.05 | -1,904.41 | 961.10 | 14,444,204.72 | 1,707,981.29 | 39.77310653 | -80.75953577 | |
| 12,062.00 | 89.63 | 149.78 | 6,633.59 | -1,985.82 | 1,008.10 | 14,444,123.32 | 1,708,028.29 | 39.77288262 | -80.75936927 | |
| 12,156.00 | 88.79 | 149.61 | 6,634.88 | -2,066.96 | 1,055.53 | 14,444,042.17 | 1,708,075.72 | 39.77265942 | -80.75920126 | |
| 12,251.00 | 89.49 | 149.52 | 6,636.31 | -2,148.86 | 1,103.65 | 14,443,960.27 | 1,708,123.84 | 39.77243415 | -80.75903079 | |
| 12,345.00 | 88.62 | 148.73 | 6,637.86 | -2,229.53 | 1,151.88 | 14,443,879.60 | 1,708,172.07 | 39.77221226 | -80.75885992 | |
| 12,439.00 | 89.45 | 148.64 | 6,639.44 | -2,309.83 | 1,200.72 | 14,443,799.31 | 1,708,220.92 | 39.77199139 | -80.75868684 | |
| 12,534.00 | 90.59 | 148.73 | 6,639.41 | -2,390.98 | 1,250.10 | 14,443,718.15 | 1,708,270.29 | 39.77176813 | -80.75851189 | |
| 12,628.00 | 89.01 | 149.08 | 6,639.74 | -2,471.47 | 1,298.64 | 14,443,637.66 | 1,708,318.84 | 39.77154673 | -80.75833990 | |
| 12,723.00 | 89.85 | 150.22 | 6,640.68 | -2,553.45 | 1,346.64 | 14,443,555.69 | 1,708,366.84 | 39.77132125 | -80.75816986 | |
| 12,818.00 | 88.97 | 150.49 | 6,641.66 | -2,636.01 | 1,393.63 | 14,443,473.13 | 1,708,413.82 | 39.77109417 | -80.75800344 | |
| 12,913.00 | 90.51 | 150.05 | 6,642.09 | -2,718.50 | 1,440.74 | 14,443,390.63 | 1,708,460.93 | 39.77086727 | -80.75783657 | |
| 13,007.00 | 90.07 | 150.93 | 6,641.62 | -2,800.30 | 1,487.04 | 14,443,308.83 | 1,708,507.23 | 39.77064227 | -80.75767258 | |
| 13,101.00 | 90.95 | 150.75 | 6,640.78 | -2,882.39 | 1,532.84 | 14,443,226.75 | 1,708,553.03 | 39.77041651 | -80.75751038 | |
| 13,196.00 | 89.58 | 151.10 | 6,640.34 | -2,965.41 | 1,579.00 | 14,443,143.72 | 1,708,599.20 | 39.77018815 | -80.75734689 | |
| 13,290.00 | 90.37 | 151.01 | 6,640.38 | -3,047.67 | 1,624.50 | 14,443,061.47 | 1,708,644.69 | 39.76996191 | -80.75718578 | |
| 13,385.00 | 88.79 | 151.45 | 6,641.08 | -3,130.94 | 1,670.22 | 14,442,978.20 | 1,708,690.41 | 39.76973290 | -80.75702387 | |
| 13,480.00 | 89.58 | 151.36 | 6,642.43 | -3,214.34 | 1,715.68 | 14,442,894.79 | 1,708,735.97 | 39.76950351 | -80.75686288 | |
| 13,575.00 | 88.35 | 150.84 | 6,644.15 | -3,297.49 | 1,761.58 | 14,442,811.64 | 1,708,781.71 | 39.76927480 | -80.75670033 | |
| 13,669.00 | 88.92 | 151.19 | 6,646.38 | -3,379.70 | 1,807.12 | 14,442,729.44 | 1,708,827.31 | 39.76904871 | -80.75653906 | |
| 13,763.00 | 90.07 | 153.21 | 6,647.21 | -3,462.84 | 1,850.96 | 14,442,646.30 | 1,708,871.11 | 39.76882006 | -80.75638387 | |
| 13,857.00 | 90.77 | 151.19 | 6,646.52 | -3,545.98 | 1,894.79 | 14,442,563.15 | 1,708,914.99 | 39.76859139 | -80.75622867 | |
| 13,952.00 | 90.55 | 150.31 | 6,645.43 | -3,628.86 | 1,941.21 | 14,442,480.27 | 1,708,961.40 | 39.76836343 | -80.75606429 | |
| 14,047.00 | 90.46 | 148.20 | 6,644.59 | -3,710.50 | 1,989.77 | 14,442,398.63 | 1,709,008.98 | 39.76813886 | -80.75589226 | |

APPROVED
 Environmental Department
 08/27/2021

| | | | |
|------------------|---------------------------------|-------------------------------------|--------------------------------|
| Company: | Tug Hill Operating LLC | Local Co-ordinate Reference: | Well Old Crow S-09 HM (slot S) |
| Project: | Marshall County, West Virginia. | TVD Reference: | RKB=1265+26 @ 1291.00usft |
| Site: | Old Crow Pad | MD Reference: | RKB=1265+26 @ 1291.00usft |
| Well: | Old Crow S-09 HM (slot S) | North Reference: | Grid |
| Wellbore: | Original Hole | Survey Calculation Method: | Minimum Curvature |
| Design: | Surveys Original Hole | Database: | DB_Aug1919_v14 |

| Survey | | | | | | | | | | |
|----------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-------------|--------------|--|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude | |
| 14,144.00 | 90.33 | 147.85 | 6,643.92 | -3,792.78 | 2,041.13 | 14,442,316.35 | 1,709,061.33 | 39.76791251 | -80.75571027 | |
| 14,236.00 | 89.10 | 146.79 | 6,644.38 | -3,870.22 | 2,090.81 | 14,442,238.92 | 1,709,111.00 | 39.76769949 | -80.75553425 | |
| 14,331.00 | 88.48 | 148.02 | 6,646.39 | -3,950.23 | 2,141.97 | 14,442,158.90 | 1,709,162.16 | 39.76747935 | -80.75535295 | |
| 14,426.00 | 89.36 | 147.50 | 6,648.18 | -4,030.57 | 2,192.64 | 14,442,078.56 | 1,709,212.83 | 39.76725834 | -80.75517341 | |
| 14,521.00 | 91.08 | 146.62 | 6,647.81 | -4,110.30 | 2,244.29 | 14,441,998.84 | 1,709,264.49 | 39.76703901 | -80.75499037 | |
| 14,615.00 | 88.88 | 146.62 | 6,647.85 | -4,188.78 | 2,296.01 | 14,441,920.35 | 1,709,316.20 | 39.76682307 | -80.75480709 | |
| 14,710.00 | 89.49 | 146.09 | 6,649.20 | -4,267.86 | 2,348.64 | 14,441,841.27 | 1,709,368.83 | 39.76660551 | -80.75462058 | |
| 14,778.00 | 88.88 | 145.65 | 6,650.16 | -4,324.14 | 2,386.79 | 14,441,784.99 | 1,709,406.98 | 39.76645065 | -80.75448537 | |
| Survey @ 14778.00 MD 6650.16 TVD | | | | | | | | | | |
| 14,830.00 | 88.88 | 145.65 | 6,651.18 | -4,367.07 | 2,416.12 | 14,441,742.07 | 1,709,436.31 | 39.76633255 | -80.75438139 | |
| Survey projected to 14830.00 MD 6651.18 TVD | | | | | | | | | | |

| Design Annotations | | | | | |
|-----------------------|-----------------------|-------------------|--------------|---------------------------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment | |
| | | +N/-S (usft) | +E/-W (usft) | | |
| 191.00 | 191.00 | 0.30 | -0.50 | MWD surveys | |
| 14,778.00 | 6,650.16 | -4,324.14 | 2,386.79 | Survey @ 14778.00 MD 6650.16 TVD | |
| 14,830.00 | 6,651.18 | -4,367.07 | 2,416.12 | Survey projected to 14830.00 MD 6651.18 TVD | |

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 WV Department of
 Environmental Protection