



Job Number: 1020295
Company: Black Hills E&P
Lease/Well: Ute #33-23
Location: La Plata County, Colorado
Rig Name: Aztec 507
RKB: 7305'
G.L. or M.S.L.: 7294'

State/Country: CO
Declination: 10.02511
Grid: 1.11
File name: C:\102029~1\33#23.SVY
Date/Time: 11-Jun-10 / 07:16
Curve Name: UTE #33 - 23 Surveys

UTE #33 - 23 Surveys

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 229.31
Vertical Section Referenced to Wellhead
Rectangular Coordinates Referenced to Wellhead

| <i>Measured Depth FT</i> | <i>Incl Angle Deg</i> | <i>Drift Direction Deg</i> | <i>True Vertical Depth</i> | <i>N-S FT</i> | <i>E-W FT</i> | <i>Vertical Section FT</i> | <i>C L O S U R E Distance FT</i> | <i>Direction Deg</i> | <i>Dogleg Severity Deg/100</i> |
|----------------------------------|-------------------------------|------------------------------------|------------------------------------|-------------------|-------------------|------------------------------------|--|--------------------------|--|
| Tie In To Surface | | | | | | | | | |
| .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| First Nevis MWD Surveys | | | | | | | | | |
| 488.00 | 1.20 | 24.80 | 487.96 | 4.64 | 2.14 | -4.65 | 5.11 | 24.80 | .25 |
| 518.00 | 1.00 | 359.50 | 517.96 | 5.19 | 2.27 | -5.10 | 5.66 | 23.67 | 1.73 |
| 548.00 | .30 | 280.00 | 547.96 | 5.46 | 2.19 | -5.22 | 5.89 | 21.88 | 3.30 |
| 579.00 | 1.60 | 229.90 | 578.95 | 5.20 | 1.78 | -4.74 | 5.49 | 18.93 | 4.60 |
| 610.00 | 3.00 | 228.00 | 609.93 | 4.37 | .85 | -3.50 | 4.46 | 10.97 | 4.52 |
| 641.00 | 4.20 | 222.50 | 640.87 | 3.00 | -.52 | -1.56 | 3.04 | 350.12 | 4.02 |
| 671.00 | 5.50 | 227.80 | 670.76 | 1.22 | -2.33 | .97 | 2.63 | 297.64 | 4.58 |
| 702.00 | 6.70 | 228.03 | 701.58 | -.99 | -4.77 | 4.26 | 4.88 | 258.31 | 3.87 |
| 733.00 | 7.30 | 227.93 | 732.35 | -3.52 | -7.58 | 8.04 | 8.36 | 245.11 | 1.94 |
| 764.00 | 7.60 | 225.10 | 763.09 | -6.28 | -10.49 | 12.05 | 12.23 | 239.09 | 1.53 |
| 795.00 | 8.50 | 227.20 | 793.78 | -9.29 | -13.63 | 16.39 | 16.49 | 235.73 | 3.05 |
| 825.00 | 9.00 | 228.10 | 823.43 | -12.36 | -17.00 | 20.95 | 21.02 | 233.98 | 1.73 |
| 856.00 | 9.60 | 228.60 | 854.03 | -15.69 | -20.74 | 25.96 | 26.01 | 232.90 | 1.95 |
| 887.00 | 9.70 | 225.70 | 884.59 | -19.22 | -24.55 | 31.15 | 31.18 | 231.94 | 1.60 |
| 918.00 | 10.50 | 225.70 | 915.11 | -23.02 | -28.44 | 36.58 | 36.59 | 231.02 | 2.58 |
| 948.00 | 10.90 | 226.90 | 944.59 | -26.87 | -32.47 | 42.14 | 42.15 | 230.40 | 1.53 |
| 979.00 | 11.30 | 229.50 | 975.01 | -30.84 | -36.92 | 48.10 | 48.11 | 230.13 | 2.07 |
| 1011.00 | 11.20 | 232.80 | 1006.39 | -34.76 | -41.78 | 54.34 | 54.35 | 230.24 | 2.04 |
| 1043.00 | 11.40 | 233.60 | 1037.77 | -38.51 | -46.80 | 60.60 | 60.61 | 230.55 | .79 |
| 1073.00 | 11.60 | 232.90 | 1067.17 | -42.09 | -51.59 | 66.56 | 66.59 | 230.79 | .81 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | True Vertical Depth | N-S FT | E-W FT | Vertical Section FT | C L O S U R E | | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 1105.00 | 12.20 | 230.10 | 1098.48 | -46.20 | -56.75 | 73.15 | 73.18 | 230.85 | 2.60 |
| 1136.00 | 12.80 | 229.90 | 1128.75 | -50.51 | -61.89 | 79.86 | 79.89 | 230.78 | 1.94 |
| 1168.00 | 14.00 | 231.10 | 1159.87 | -55.23 | -67.62 | 87.28 | 87.31 | 230.76 | 3.85 |
| 1200.00 | 14.60 | 231.10 | 1190.88 | -60.19 | -73.77 | 95.18 | 95.21 | 230.79 | 1.88 |
| 1231.00 | 15.30 | 230.30 | 1220.83 | -65.26 | -79.96 | 103.17 | 103.21 | 230.78 | 2.35 |
| | | | | | | | | | |
| 1262.00 | 15.10 | 230.60 | 1250.75 | -70.43 | -86.22 | 111.30 | 111.33 | 230.76 | .69 |
| 1294.00 | 15.50 | 231.60 | 1281.61 | -75.74 | -92.79 | 119.74 | 119.78 | 230.78 | 1.50 |
| 1326.00 | 16.00 | 230.80 | 1312.41 | -81.18 | -99.56 | 128.42 | 128.46 | 230.81 | 1.70 |
| 1357.00 | 16.30 | 230.00 | 1342.19 | -86.68 | -106.21 | 137.04 | 137.09 | 230.78 | 1.20 |
| 1389.00 | 16.80 | 229.03 | 1372.86 | -92.59 | -113.14 | 146.16 | 146.20 | 230.70 | 1.79 |
| | | | | | | | | | |
| 1420.00 | 17.70 | 230.30 | 1402.47 | -98.54 | -120.15 | 155.35 | 155.39 | 230.64 | 3.15 |
| 1451.00 | 17.90 | 228.50 | 1431.99 | -104.71 | -127.34 | 164.82 | 164.86 | 230.57 | 1.89 |
| 1483.00 | 18.60 | 228.80 | 1462.38 | -111.33 | -134.86 | 174.84 | 174.88 | 230.46 | 2.21 |
| 1514.00 | 19.50 | 228.40 | 1491.68 | -118.02 | -142.45 | 184.96 | 184.99 | 230.36 | 2.93 |
| 1546.00 | 19.60 | 229.13 | 1521.83 | -125.08 | -150.51 | 195.67 | 195.70 | 230.27 | .82 |
| | | | | | | | | | |
| 1578.00 | 19.70 | 229.50 | 1551.97 | -132.09 | -158.67 | 206.43 | 206.45 | 230.22 | .50 |
| 1610.00 | 20.00 | 228.90 | 1582.07 | -139.19 | -166.89 | 217.29 | 217.32 | 230.17 | 1.13 |
| 1641.00 | 20.30 | 228.80 | 1611.17 | -146.22 | -174.93 | 227.97 | 227.99 | 230.11 | .97 |
| 1672.00 | 20.70 | 229.70 | 1640.21 | -153.31 | -183.16 | 238.83 | 238.85 | 230.07 | 1.64 |
| 1704.00 | 20.60 | 227.90 | 1670.15 | -160.74 | -191.65 | 250.11 | 250.13 | 230.01 | 2.01 |
| | | | | | | | | | |
| 1735.00 | 21.20 | 228.00 | 1699.11 | -168.15 | -199.86 | 261.17 | 261.18 | 229.93 | 1.94 |
| 1767.00 | 21.70 | 227.90 | 1728.90 | -175.98 | -208.55 | 272.87 | 272.88 | 229.84 | 1.57 |
| 1799.00 | 21.80 | 228.20 | 1758.62 | -183.91 | -217.37 | 284.72 | 284.73 | 229.77 | .47 |
| 1830.00 | 21.60 | 227.80 | 1787.42 | -191.58 | -225.89 | 296.18 | 296.19 | 229.70 | .80 |
| 1862.00 | 21.70 | 227.40 | 1817.16 | -199.54 | -234.60 | 307.98 | 307.99 | 229.62 | .56 |
| | | | | | | | | | |
| 1894.00 | 21.40 | 228.60 | 1846.93 | -207.41 | -243.34 | 319.73 | 319.73 | 229.56 | 1.67 |
| 1925.00 | 21.10 | 228.60 | 1875.82 | -214.84 | -251.77 | 330.97 | 330.97 | 229.53 | .97 |
| 1956.00 | 21.40 | 229.20 | 1904.71 | -222.22 | -260.23 | 342.20 | 342.20 | 229.50 | 1.20 |
| 1988.00 | 21.60 | 229.70 | 1934.48 | -229.85 | -269.14 | 353.93 | 353.93 | 229.50 | .85 |
| 2020.00 | 21.00 | 229.80 | 1964.30 | -237.36 | -278.02 | 365.55 | 365.56 | 229.51 | 1.88 |
| | | | | | | | | | |
| 2051.00 | 21.00 | 229.00 | 1993.24 | -244.59 | -286.45 | 376.66 | 376.66 | 229.51 | .92 |
| 2082.00 | 21.90 | 229.20 | 2022.09 | -252.01 | -295.02 | 388.00 | 388.00 | 229.50 | 2.91 |
| 2113.00 | 22.60 | 228.70 | 2050.78 | -259.72 | -303.87 | 399.74 | 399.74 | 229.48 | 2.34 |
| 2145.00 | 22.90 | 229.40 | 2080.29 | -267.83 | -313.22 | 412.11 | 412.11 | 229.47 | 1.26 |
| 2176.00 | 22.60 | 228.90 | 2108.88 | -275.67 | -322.29 | 424.10 | 424.10 | 229.46 | 1.15 |
| | | | | | | | | | |
| 2207.00 | 21.90 | 228.20 | 2137.57 | -283.44 | -331.08 | 435.83 | 435.84 | 229.43 | 2.41 |
| 2239.00 | 22.20 | 228.70 | 2167.23 | -291.40 | -340.07 | 447.85 | 447.85 | 229.41 | 1.11 |
| 2270.00 | 21.50 | 228.30 | 2196.01 | -299.05 | -348.72 | 459.38 | 459.38 | 229.38 | 2.31 |
| 2302.00 | 21.50 | 228.10 | 2225.78 | -306.87 | -357.46 | 471.11 | 471.11 | 229.36 | .23 |
| 2332.00 | 21.00 | 228.50 | 2253.74 | -314.10 | -365.58 | 481.98 | 481.98 | 229.33 | 1.74 |
| | | | | | | | | | |
| 2364.00 | 20.70 | 228.20 | 2283.64 | -321.67 | -374.09 | 493.37 | 493.37 | 229.31 | 1.00 |
| 2395.00 | 21.70 | 229.50 | 2312.55 | -329.04 | -382.53 | 504.58 | 504.58 | 229.30 | 3.56 |
| 2427.00 | 21.60 | 230.23 | 2342.29 | -336.65 | -391.56 | 516.38 | 516.38 | 229.31 | .90 |
| 2458.00 | 21.30 | 230.13 | 2371.14 | -343.91 | -400.26 | 527.72 | 527.72 | 229.33 | .97 |
| 2490.00 | 21.20 | 229.80 | 2400.97 | -351.37 | -409.14 | 539.31 | 539.31 | 229.34 | .49 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | True Vertical Depth | N-S FT | E-W FT | Vertical Section FT | C L O S U R E | | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | FT | FT | FT | Distance FT | Direction Deg | |
| 2522.00 | 21.10 | 228.90 | 2430.81 | -358.89 | -417.90 | 550.86 | 550.86 | 229.34 | 1.06 |
| 2553.00 | 21.70 | 228.90 | 2459.67 | -366.33 | -426.43 | 562.17 | 562.17 | 229.34 | 1.94 |
| 2584.00 | 21.90 | 230.10 | 2488.46 | -373.81 | -435.18 | 573.68 | 573.68 | 229.34 | 1.58 |
| 2615.00 | 22.10 | 228.70 | 2517.20 | -381.36 | -444.00 | 585.29 | 585.30 | 229.34 | 1.81 |
| 2646.00 | 22.20 | 227.90 | 2545.91 | -389.14 | -452.72 | 596.98 | 596.98 | 229.32 | 1.03 |
| | | | | | | | | | |
| 2678.00 | 22.80 | 229.00 | 2575.47 | -397.26 | -461.89 | 609.22 | 609.22 | 229.30 | 2.29 |
| 2709.00 | 22.60 | 230.20 | 2604.07 | -405.01 | -471.00 | 621.19 | 621.19 | 229.31 | 1.63 |
| 2741.00 | 22.80 | 229.90 | 2633.59 | -412.94 | -480.46 | 633.54 | 633.54 | 229.32 | .72 |
| 2773.00 | 22.30 | 231.20 | 2663.15 | -420.74 | -489.94 | 645.80 | 645.80 | 229.35 | 2.21 |
| 2805.00 | 22.10 | 231.40 | 2692.78 | -428.30 | -499.37 | 657.89 | 657.89 | 229.38 | .67 |
| | | | | | | | | | |
| 2837.00 | 21.80 | 230.00 | 2722.46 | -435.87 | -508.63 | 669.84 | 669.84 | 229.40 | 1.88 |
| 2868.00 | 22.40 | 231.20 | 2751.18 | -443.28 | -517.64 | 681.50 | 681.50 | 229.43 | 2.42 |
| 2900.00 | 22.60 | 231.70 | 2780.74 | -450.91 | -527.22 | 693.74 | 693.74 | 229.46 | .86 |
| 2932.00 | 22.00 | 231.00 | 2810.35 | -458.49 | -536.70 | 705.88 | 705.88 | 229.49 | 2.05 |
| 2964.00 | 21.60 | 230.60 | 2840.06 | -466.00 | -545.91 | 717.75 | 717.76 | 229.52 | 1.33 |
| | | | | | | | | | |
| 2995.00 | 21.30 | 230.00 | 2868.91 | -473.24 | -554.64 | 729.09 | 729.09 | 229.53 | 1.20 |
| 3027.00 | 21.70 | 230.20 | 2898.69 | -480.76 | -563.63 | 740.82 | 740.82 | 229.54 | 1.27 |
| 3059.00 | 22.60 | 232.30 | 2928.33 | -488.31 | -573.04 | 752.87 | 752.88 | 229.56 | 3.75 |
| 3091.00 | 22.50 | 232.30 | 2957.88 | -495.82 | -582.75 | 765.13 | 765.14 | 229.61 | .31 |
| 3123.00 | 22.10 | 230.40 | 2987.49 | -503.40 | -592.24 | 777.26 | 777.27 | 229.64 | 2.58 |
| | | | | | | | | | |
| 3155.00 | 22.10 | 231.60 | 3017.14 | -510.97 | -601.59 | 789.29 | 789.31 | 229.66 | 1.41 |
| 3186.00 | 21.60 | 230.70 | 3045.91 | -518.21 | -610.58 | 800.82 | 800.84 | 229.68 | 1.94 |
| 3218.00 | 21.20 | 231.20 | 3075.70 | -525.57 | -619.65 | 812.50 | 812.51 | 229.70 | 1.37 |
| 3249.00 | 22.00 | 230.50 | 3104.53 | -532.77 | -628.49 | 823.90 | 823.92 | 229.71 | 2.71 |
| 3281.00 | 21.80 | 228.40 | 3134.22 | -540.53 | -637.56 | 835.84 | 835.86 | 229.71 | 2.53 |
| | | | | | | | | | |
| 3313.00 | 21.40 | 229.80 | 3163.97 | -548.24 | -646.46 | 847.62 | 847.64 | 229.70 | 2.04 |
| 3344.00 | 21.30 | 227.70 | 3192.84 | -555.68 | -654.95 | 858.90 | 858.92 | 229.69 | 2.49 |
| 3376.00 | 21.00 | 227.50 | 3222.69 | -563.47 | -663.48 | 870.44 | 870.46 | 229.66 | .96 |
| 3408.00 | 20.80 | 227.20 | 3252.58 | -571.20 | -671.87 | 881.85 | 881.86 | 229.63 | .71 |
| 3439.00 | 21.10 | 228.50 | 3281.53 | -578.64 | -680.09 | 892.93 | 892.94 | 229.61 | 1.78 |
| | | | | | | | | | |
| 3471.00 | 20.90 | 227.60 | 3311.41 | -586.30 | -688.62 | 904.39 | 904.41 | 229.59 | 1.19 |
| 3503.00 | 20.50 | 227.70 | 3341.34 | -593.92 | -696.98 | 915.70 | 915.71 | 229.56 | 1.25 |
| 3534.00 | 19.80 | 226.30 | 3370.44 | -601.21 | -704.79 | 926.37 | 926.38 | 229.53 | 2.74 |
| 3565.00 | 20.30 | 225.70 | 3399.56 | -608.59 | -712.43 | 936.98 | 936.99 | 229.49 | 1.74 |
| 3595.00 | 20.40 | 227.30 | 3427.69 | -615.77 | -720.00 | 947.40 | 947.40 | 229.46 | 1.88 |
| | | | | | | | | | |
| 3626.00 | 20.70 | 226.20 | 3456.72 | -623.23 | -727.93 | 958.27 | 958.27 | 229.43 | 1.58 |
| 3658.00 | 20.40 | 225.30 | 3486.68 | -631.06 | -735.97 | 969.48 | 969.48 | 229.39 | 1.36 |
| 3690.00 | 20.90 | 227.60 | 3516.63 | -638.83 | -744.15 | 980.75 | 980.75 | 229.35 | 2.98 |
| 3722.00 | 21.20 | 225.03 | 3546.49 | -646.77 | -752.46 | 992.23 | 992.23 | 229.32 | 3.03 |
| 3753.00 | 21.30 | 225.20 | 3575.39 | -654.70 | -760.42 | 1003.43 | 1003.43 | 229.27 | .38 |
| | | | | | | | | | |
| 3784.00 | 20.80 | 225.00 | 3604.32 | -662.56 | -768.31 | 1014.54 | 1014.54 | 229.23 | 1.63 |
| 3814.00 | 20.40 | 226.00 | 3632.40 | -669.96 | -775.84 | 1025.07 | 1025.07 | 229.19 | 1.78 |
| 3846.00 | 20.50 | 228.23 | 3662.38 | -677.57 | -784.03 | 1036.24 | 1036.24 | 229.17 | 2.45 |
| 3878.00 | 21.80 | 229.10 | 3692.23 | -685.19 | -792.70 | 1047.78 | 1047.79 | 229.16 | 4.18 |
| 3910.00 | 21.70 | 232.23 | 3721.95 | -692.70 | -801.87 | 1059.63 | 1059.64 | 229.18 | 3.64 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | True Vertical Depth | N-S FT | E-W FT | Vertical Section FT | C L O S U R E | | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 3941.00 | 22.20 | 232.50 | 3750.70 | -699.78 | -811.04 | 1071.20 | 1071.20 | 229.21 | 1.65 |
| 3973.00 | 21.80 | 233.40 | 3780.37 | -707.00 | -820.61 | 1083.17 | 1083.17 | 229.25 | 1.63 |
| 4005.00 | 21.70 | 234.30 | 3810.09 | -714.00 | -830.18 | 1094.99 | 1094.99 | 229.30 | 1.09 |
| 4035.00 | 21.70 | 234.80 | 3837.97 | -720.43 | -839.22 | 1106.03 | 1106.03 | 229.36 | .62 |
| 4066.00 | 22.00 | 234.30 | 3866.74 | -727.12 | -848.62 | 1117.52 | 1117.52 | 229.41 | 1.14 |
| 4098.00 | 22.00 | 236.00 | 3896.41 | -733.97 | -858.45 | 1129.45 | 1129.45 | 229.47 | 1.99 |
| 4129.00 | 21.50 | 235.70 | 3925.20 | -740.42 | -867.96 | 1140.86 | 1140.87 | 229.53 | 1.65 |
| 4160.00 | 20.90 | 234.40 | 3954.11 | -746.84 | -877.15 | 1152.01 | 1152.03 | 229.59 | 2.46 |
| 4192.00 | 20.50 | 232.80 | 3984.04 | -753.55 | -886.25 | 1163.29 | 1163.31 | 229.63 | 2.16 |
| Last Nevis MWD Surveys | | | | | | | | | |
| 4223.00 | 20.90 | 230.50 | 4013.04 | -760.35 | -894.84 | 1174.24 | 1174.26 | 229.65 | 2.92 |
| Projection to TD | | | | | | | | | |
| 4283.00 | 21.60 | 227.80 | 4068.96 | -774.58 | -911.28 | 1195.98 | 1196.00 | 229.64 | 2.01 |