



Company: Anadarko Petroleum
 Well: Tom L Russell Unit C-True 1
 API #: 05-123-11333
 Rig Name: Production/VES
 State/County: Colorado/Weld
 Latitude: 40.105, Longitude: -104.927
 Directions are relative to True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB= Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: tomlrussellunitc-true1-de_01.ut

Minimum Curvature Method

Report Date/Time: 4/17/2014 / 12:04

Vaughn Energy Services
 Henderson, Colorado
 303-853-4976
 Mark Simmons

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N-S FT | +E-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|------------|------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | **** |
| 100.000 | 0.484 | 333.849 | 99.999 | 0.379 | -0.186 | 0.379 | 0.422 | 333.849 | 0.484 |
| 200.000 | 0.382 | 52.675 | 199.997 | 0.960 | -0.107 | 0.960 | 0.966 | 353.646 | 0.555 |
| 300.000 | 0.778 | 84.504 | 299.992 | 1.227 | 0.834 | 1.227 | 1.484 | 34.201 | 0.496 |
| 400.000 | 1.002 | 98.244 | 399.980 | 1.167 | 2.375 | 1.167 | 2.646 | 63.837 | 0.308 |
| 500.000 | 1.412 | 95.002 | 499.957 | 0.934 | 4.467 | 0.934 | 4.564 | 78.193 | 0.415 |
| 600.000 | 1.924 | 80.229 | 599.915 | 1.111 | 7.349 | 1.111 | 7.433 | 81.401 | 0.665 |
| 700.000 | 1.934 | 60.071 | 699.859 | 2.238 | 10.466 | 2.238 | 10.703 | 77.929 | 0.675 |
| 800.000 | 1.760 | 90.882 | 799.810 | 3.056 | 13.464 | 3.056 | 13.806 | 77.210 | 0.995 |
| 900.000 | 1.148 | 64.589 | 899.778 | 3.463 | 15.904 | 3.463 | 16.276 | 77.717 | 0.890 |
| 1000.000 | 0.977 | 114.277 | 999.763 | 3.542 | 17.586 | 3.542 | 17.939 | 78.613 | 0.906 |
| 1100.000 | 1.039 | 130.607 | 1099.748 | 2.601 | 19.052 | 2.601 | 19.228 | 82.225 | 0.293 |
| 1200.000 | 0.900 | 140.192 | 1199.734 | 1.407 | 20.243 | 1.407 | 20.292 | 86.023 | 0.213 |
| 1300.000 | 1.064 | 150.095 | 1299.719 | -0.001 | 21.209 | -0.001 | 21.209 | 90.002 | 0.235 |
| 1400.000 | 0.900 | 143.429 | 1399.704 | -1.436 | 22.140 | -1.436 | 22.186 | 93.712 | 0.199 |
| 1500.000 | 0.744 | 156.714 | 1499.694 | -2.664 | 22.864 | -2.664 | 23.019 | 96.645 | 0.245 |
| 1600.000 | 0.750 | 175.890 | 1599.686 | -3.913 | 23.168 | -3.913 | 23.496 | 99.586 | 0.249 |
| 1700.000 | 0.635 | 190.245 | 1699.678 | -5.110 | 23.116 | -5.110 | 23.674 | 102.466 | 0.207 |
| 1800.000 | 0.703 | 195.619 | 1799.672 | -6.246 | 22.853 | -6.246 | 23.691 | 105.287 | 0.092 |
| 1900.000 | 0.810 | 205.719 | 1899.663 | -7.473 | 22.381 | -7.473 | 23.596 | 108.465 | 0.171 |
| 2000.000 | 0.883 | 216.542 | 1999.652 | -8.729 | 21.616 | -8.729 | 23.311 | 111.990 | 0.175 |
| 2100.000 | 1.031 | 231.766 | 2099.638 | -9.904 | 20.451 | -9.904 | 22.723 | 115.840 | 0.293 |
| 2200.000 | 1.403 | 247.012 | 2199.616 | -10.939 | 18.618 | -10.939 | 21.593 | 120.436 | 0.490 |
| 2300.000 | 1.567 | 258.942 | 2299.582 | -11.679 | 16.149 | -11.679 | 19.929 | 125.874 | 0.349 |
| 2400.000 | 1.693 | 277.494 | 2399.543 | -11.748 | 13.343 | -11.748 | 17.778 | 131.364 | 0.540 |
| 2500.000 | 1.878 | 270.485 | 2499.494 | -11.542 | 10.240 | -11.542 | 15.430 | 138.420 | 0.286 |
| 2600.000 | 1.918 | 293.534 | 2599.441 | -10.860 | 7.067 | -10.860 | 12.957 | 146.945 | 0.759 |
| 2700.000 | 2.040 | 276.494 | 2699.382 | -9.990 | 3.764 | -9.990 | 10.676 | 159.354 | 0.599 |
| 2800.000 | 2.033 | 291.524 | 2799.320 | -9.138 | 0.346 | -9.138 | 9.145 | 177.834 | 0.533 |
| 2900.000 | 1.896 | 291.062 | 2899.261 | -7.893 | -2.848 | -7.893 | 8.391 | 199.841 | 0.137 |
| 3000.000 | 1.611 | 300.755 | 2999.214 | -6.579 | -5.600 | -6.579 | 8.640 | 220.404 | 0.410 |
| 3100.000 | 1.416 | 296.538 | 3099.179 | -5.308 | -7.914 | -5.308 | 9.529 | 236.147 | 0.225 |
| 3200.000 | 1.309 | 296.744 | 3199.151 | -4.243 | -10.039 | -4.243 | 10.898 | 247.090 | 0.107 |
| 3300.000 | 1.447 | 291.935 | 3299.122 | -3.257 | -12.230 | -3.257 | 12.656 | 255.087 | 0.180 |
| 3400.000 | 1.348 | 300.011 | 3399.092 | -2.197 | -14.419 | -2.197 | 14.586 | 261.336 | 0.220 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N-S FT | +E-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|------------|------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 3500.000 | 1.499 | 306.974 | 3499.061 | -0.823 | -16.482 | -0.823 | 16.503 | 267.143 | 0.229 |
| 3600.000 | 1.800 | 311.759 | 3599.020 | 1.010 | -18.699 | 1.010 | 18.726 | 273.092 | 0.332 |
| 3700.000 | 2.078 | 309.572 | 3698.963 | 3.211 | -21.268 | 3.211 | 21.509 | 278.586 | 0.287 |
| 3800.000 | 2.027 | 313.376 | 3798.898 | 5.581 | -23.951 | 5.581 | 24.592 | 283.116 | 0.145 |
| 3900.000 | 2.106 | 318.870 | 3898.834 | 8.180 | -26.445 | 8.180 | 27.681 | 287.187 | 0.213 |
| 4000.000 | 1.952 | 308.266 | 3998.771 | 10.619 | -28.991 | 10.619 | 30.875 | 290.116 | 0.405 |
| 4100.000 | 1.999 | 322.427 | 4098.712 | 13.056 | -31.392 | 13.056 | 33.999 | 292.582 | 0.489 |
| 4200.000 | 2.100 | 321.462 | 4198.648 | 15.871 | -33.597 | 15.871 | 37.157 | 295.286 | 0.106 |
| 4300.000 | 2.204 | 321.685 | 4298.578 | 18.813 | -35.930 | 18.813 | 40.558 | 297.636 | 0.104 |
| 4400.000 | 2.507 | 334.366 | 4398.494 | 22.293 | -38.069 | 22.293 | 44.116 | 300.354 | 0.601 |
| 4500.000 | 2.697 | 340.548 | 4498.391 | 26.483 | -39.798 | 26.483 | 47.804 | 303.642 | 0.339 |
| 4600.000 | 2.823 | 330.335 | 4598.276 | 30.842 | -41.800 | 30.842 | 51.947 | 306.421 | 0.507 |
| 4700.000 | 2.370 | 337.855 | 4698.173 | 34.896 | -43.799 | 34.896 | 56.001 | 308.546 | 0.566 |
| 4800.000 | 2.056 | 328.408 | 4798.099 | 38.339 | -45.518 | 38.339 | 59.513 | 310.107 | 0.480 |
| 4900.000 | 1.347 | 344.888 | 4898.054 | 41.002 | -46.764 | 41.002 | 62.194 | 311.244 | 0.854 |
| 5000.000 | 1.070 | 351.300 | 4998.032 | 43.061 | -47.212 | 43.061 | 63.900 | 312.367 | 0.308 |
| 5100.000 | 1.099 | 341.170 | 5098.014 | 44.891 | -47.662 | 44.891 | 65.475 | 313.285 | 0.194 |
| 5200.000 | 1.205 | 335.537 | 5197.994 | 46.756 | -48.407 | 46.756 | 67.301 | 314.006 | 0.155 |
| 5300.000 | 1.097 | 347.072 | 5297.974 | 48.646 | -49.057 | 48.646 | 69.087 | 314.759 | 0.255 |
| 5400.000 | 0.918 | 334.094 | 5397.959 | 50.299 | -49.621 | 50.299 | 70.656 | 315.389 | 0.289 |
| 5500.000 | 0.965 | 326.642 | 5497.945 | 51.723 | -50.434 | 51.723 | 72.241 | 315.723 | 0.131 |
| 5600.000 | 1.008 | 328.183 | 5597.930 | 53.174 | -51.361 | 53.174 | 73.928 | 315.994 | 0.051 |
| 5700.000 | 1.029 | 315.142 | 5697.915 | 54.557 | -52.458 | 54.557 | 75.686 | 316.124 | 0.232 |
| 5800.000 | 0.964 | 332.165 | 5797.900 | 55.937 | -53.484 | 55.937 | 77.392 | 316.285 | 0.302 |
| 5900.000 | 1.135 | 321.567 | 5897.883 | 57.457 | -54.492 | 57.457 | 79.187 | 316.517 | 0.258 |
| 6000.000 | 1.136 | 325.795 | 5997.863 | 59.053 | -55.665 | 59.053 | 81.153 | 316.692 | 0.084 |
| 6100.000 | 1.828 | 304.429 | 6097.830 | 60.774 | -57.538 | 60.774 | 83.690 | 316.567 | 0.874 |
| 6200.000 | 2.109 | 302.146 | 6197.771 | 62.655 | -60.410 | 62.655 | 87.035 | 316.045 | 0.292 |
| 6300.000 | 2.179 | 304.245 | 6297.701 | 64.703 | -63.540 | 64.703 | 90.685 | 315.520 | 0.106 |
| 6400.000 | 2.412 | 302.980 | 6397.621 | 66.919 | -66.876 | 66.919 | 94.607 | 315.018 | 0.238 |
| 6500.000 | 2.496 | 304.812 | 6497.529 | 69.307 | -70.429 | 69.307 | 98.812 | 314.540 | 0.115 |
| 6600.000 | 2.425 | 299.877 | 6597.437 | 71.604 | -74.052 | 71.604 | 103.009 | 314.037 | 0.223 |
| 6700.000 | 1.931 | 308.112 | 6697.365 | 73.698 | -77.212 | 73.698 | 106.738 | 313.666 | 0.583 |
| 6800.000 | 1.755 | 310.242 | 6797.313 | 75.727 | -79.706 | 75.727 | 109.944 | 313.534 | 0.189 |
| 6900.000 | 1.233 | 318.789 | 6897.279 | 77.526 | -81.584 | 77.526 | 112.544 | 313.539 | 0.567 |
| 7000.000 | 1.162 | 328.599 | 6997.257 | 79.200 | -82.821 | 79.200 | 114.595 | 313.720 | 0.217 |
| 7100.000 | 1.361 | 338.418 | 7097.233 | 81.170 | -83.786 | 81.170 | 116.656 | 314.091 | 0.293 |
| 7200.000 | 1.391 | 352.037 | 7197.204 | 83.475 | -84.391 | 83.475 | 118.701 | 314.688 | 0.328 |
| 7300.000 | 1.331 | 353.162 | 7297.176 | 85.830 | -84.697 | 85.830 | 120.583 | 315.381 | 0.066 |
| 7400.000 | 1.402 | 12.132 | 7397.148 | 88.179 | -84.578 | 88.179 | 122.184 | 316.194 | 0.456 |
| 7500.000 | 1.268 | 352.803 | 7497.121 | 90.472 | -84.460 | 90.472 | 123.769 | 316.969 | 0.467 |
| 7600.000 | 1.230 | 354.631 | 7597.098 | 92.638 | -84.699 | 92.638 | 125.522 | 317.564 | 0.055 |
| 7700.000 | 1.106 | 16.949 | 7697.077 | 94.629 | -84.518 | 94.629 | 126.878 | 318.230 | 0.468 |
| 7800.000 | 0.940 | 356.245 | 7797.062 | 96.371 | -84.290 | 96.371 | 128.032 | 318.826 | 0.402 |
| 7900.000 | 1.000 | 0.342 | 7897.047 | 98.063 | -84.339 | 98.063 | 129.342 | 319.303 | 0.092 |

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| <div> HORIZONTAL DISPLACEMENT IS 129.342 FEET AT 319.303 DEGREES </div> |
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