



Company: Noble Energy
Rig: Production
API # 05-123-34089
Date: 7/20/13
Surveyor: Brian Brewbaker
VS: 0.000
Lat : 40.54602
Long: -104.543

Well: Richter USX AB 27-65HN
Location: Weld County, Colorado
North Reference: GRID
Convergence: Grid north is 0.62 degrees East of
Declination: 8.47
Depth Reference: Ground Level
Elevation: 4902
Total Depth as Drilled: 11082

Lat & Long obtained by handheld GPS at wellhead

HA Gyro Survey Calculations

| Depth | Inc | AzG | N/-S | E/-W | TVD | DL | VS | CD | Cbrg |
|----------|-------|---------|-------|-------|----------|-------|-------|-------|--------|
| 30.000 | 0.660 | 62.230 | 0.081 | 0.153 | 29.999 | 2.200 | 0.081 | 0.173 | 62.230 |
| 60.000 | 0.475 | 71.187 | 0.201 | 0.423 | 59.998 | 0.683 | 0.201 | 0.469 | 64.596 |
| 90.000 | 0.526 | 76.324 | 0.274 | 0.675 | 89.997 | 0.228 | 0.274 | 0.728 | 67.923 |
| 120.000 | 0.547 | 68.731 | 0.358 | 0.942 | 119.995 | 0.247 | 0.358 | 1.008 | 69.182 |
| 150.000 | 0.547 | 66.161 | 0.468 | 1.207 | 149.994 | 0.082 | 0.468 | 1.294 | 68.798 |
| 180.000 | 0.629 | 76.204 | 0.565 | 1.498 | 179.992 | 0.438 | 0.565 | 1.601 | 69.322 |
| 210.000 | 0.526 | 82.552 | 0.622 | 1.794 | 209.991 | 0.405 | 0.622 | 1.899 | 70.868 |
| 240.000 | 0.352 | 92.052 | 0.637 | 2.023 | 239.990 | 0.626 | 0.637 | 2.121 | 72.522 |
| 270.000 | 0.246 | 112.276 | 0.609 | 2.175 | 269.990 | 0.494 | 0.609 | 2.258 | 74.348 |
| 300.000 | 0.221 | 62.606 | 0.612 | 2.286 | 299.989 | 0.658 | 0.612 | 2.366 | 75.020 |
| 330.000 | 0.264 | 76.464 | 0.654 | 2.404 | 329.989 | 0.240 | 0.654 | 2.492 | 74.774 |
| 360.000 | 0.174 | 77.308 | 0.681 | 2.516 | 359.989 | 0.299 | 0.681 | 2.606 | 74.863 |
| 390.000 | 0.282 | 74.705 | 0.710 | 2.631 | 389.989 | 0.360 | 0.710 | 2.725 | 74.899 |
| 420.000 | 0.108 | 154.342 | 0.704 | 2.715 | 419.989 | 0.943 | 0.704 | 2.805 | 75.461 |
| 450.000 | 0.015 | 340.356 | 0.682 | 2.726 | 449.989 | 0.408 | 0.682 | 2.810 | 75.947 |
| 480.000 | 0.263 | 25.126 | 0.748 | 2.754 | 479.988 | 0.842 | 0.748 | 2.853 | 74.798 |
| 510.000 | 0.207 | 23.073 | 0.860 | 2.804 | 509.988 | 0.189 | 0.860 | 2.933 | 72.942 |
| 540.000 | 0.136 | 25.206 | 0.943 | 2.840 | 539.988 | 0.236 | 0.943 | 2.993 | 71.643 |
| 570.000 | 0.226 | 39.457 | 1.021 | 2.893 | 569.988 | 0.333 | 1.021 | 3.068 | 70.570 |
| 600.000 | 0.183 | 49.183 | 1.098 | 2.967 | 599.988 | 0.185 | 1.098 | 3.164 | 69.699 |
| 630.000 | 0.121 | 66.520 | 1.142 | 3.032 | 629.988 | 0.255 | 1.142 | 3.240 | 69.372 |
| 660.000 | 0.198 | 49.741 | 1.188 | 3.101 | 659.987 | 0.297 | 1.188 | 3.321 | 69.044 |
| 690.000 | 0.251 | 55.657 | 1.258 | 3.195 | 689.987 | 0.193 | 1.258 | 3.434 | 68.505 |
| 720.000 | 0.379 | 26.261 | 1.384 | 3.293 | 719.987 | 0.675 | 1.384 | 3.572 | 67.199 |
| 750.000 | 0.410 | 9.133 | 1.579 | 3.354 | 749.986 | 0.404 | 1.579 | 3.707 | 64.785 |
| 780.000 | 0.272 | 13.885 | 1.754 | 3.388 | 779.986 | 0.468 | 1.754 | 3.815 | 62.625 |
| 810.000 | 0.268 | 33.687 | 1.882 | 3.444 | 809.985 | 0.310 | 1.882 | 3.924 | 61.349 |
| 840.000 | 0.353 | 28.808 | 2.021 | 3.527 | 839.985 | 0.298 | 2.021 | 4.065 | 60.190 |
| 870.000 | 0.430 | 35.652 | 2.194 | 3.638 | 869.984 | 0.301 | 2.194 | 4.248 | 58.909 |
| 900.000 | 0.457 | 39.077 | 2.378 | 3.779 | 899.983 | 0.126 | 2.378 | 4.465 | 57.817 |
| 930.000 | 0.457 | 43.816 | 2.557 | 3.937 | 929.982 | 0.126 | 2.557 | 4.695 | 56.994 |
| 960.000 | 0.520 | 27.429 | 2.764 | 4.083 | 959.981 | 0.508 | 2.764 | 4.930 | 55.897 |
| 990.000 | 0.329 | 40.614 | 2.951 | 4.201 | 989.980 | 0.710 | 2.951 | 5.134 | 54.920 |
| 1020.000 | 0.510 | 24.999 | 3.137 | 4.314 | 1019.980 | 0.708 | 3.137 | 5.334 | 53.976 |
| 1050.000 | 0.516 | 22.856 | 3.383 | 4.423 | 1049.978 | 0.067 | 3.383 | 5.568 | 52.591 |
| 1080.000 | 0.438 | 20.581 | 3.615 | 4.516 | 1079.977 | 0.267 | 3.615 | 5.784 | 51.324 |

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|----------|--------|---------|----------|---------|----------|-------|----------|---------|---------|
| 1110.000 | 0.556 | 30.615 | 3.847 | 4.630 | 1109.976 | 0.486 | 3.847 | 6.020 | 50.276 |
| 1140.000 | 0.488 | 39.024 | 4.072 | 4.785 | 1139.975 | 0.340 | 4.072 | 6.283 | 49.602 |
| 1170.000 | 0.767 | 26.397 | 4.351 | 4.954 | 1169.973 | 1.031 | 4.351 | 6.594 | 48.710 |
| 1200.000 | 0.607 | 29.496 | 4.669 | 5.122 | 1199.971 | 0.548 | 4.669 | 6.931 | 47.648 |
| 1230.000 | 0.630 | 23.705 | 4.958 | 5.266 | 1229.969 | 0.222 | 4.958 | 7.233 | 46.726 |
| 1260.000 | 0.513 | 28.061 | 5.228 | 5.396 | 1259.968 | 0.414 | 5.228 | 7.513 | 45.906 |
| 1290.000 | 0.614 | 35.254 | 5.478 | 5.552 | 1289.966 | 0.408 | 5.478 | 7.799 | 45.386 |
| 1320.000 | 0.614 | 22.052 | 5.758 | 5.705 | 1319.965 | 0.470 | 5.758 | 8.105 | 44.736 |
| 1350.000 | 0.550 | 32.480 | 6.028 | 5.842 | 1349.963 | 0.411 | 6.028 | 8.395 | 44.105 |
| 1380.000 | 0.155 | 72.967 | 6.161 | 5.959 | 1379.962 | 1.478 | 6.161 | 8.571 | 44.042 |
| 1410.000 | 0.586 | 205.197 | 6.034 | 5.932 | 1409.962 | 2.333 | 6.034 | 8.462 | 44.511 |
| 1440.000 | 1.139 | 193.722 | 5.606 | 5.796 | 1439.958 | 1.922 | 5.606 | 8.063 | 45.956 |
| 1470.000 | 1.585 | 211.996 | 4.964 | 5.505 | 1469.950 | 2.058 | 4.964 | 7.413 | 47.959 |
| 1500.000 | 2.509 | 209.341 | 4.040 | 4.964 | 1499.931 | 3.095 | 4.040 | 6.400 | 50.859 |
| 1530.000 | 2.820 | 202.683 | 2.787 | 4.357 | 1529.898 | 1.460 | 2.787 | 5.172 | 57.401 |
| 1560.000 | 3.578 | 212.686 | 1.318 | 3.567 | 1559.851 | 3.129 | 1.318 | 3.803 | 69.724 |
| 1590.000 | 4.519 | 205.587 | -0.536 | 2.551 | 1589.776 | 3.547 | -0.536 | 2.607 | 101.862 |
| 1620.000 | 5.219 | 200.341 | -2.881 | 1.567 | 1619.668 | 2.764 | -2.881 | 3.280 | 151.462 |
| 1650.000 | 5.679 | 199.266 | -5.562 | 0.603 | 1649.533 | 1.571 | -5.562 | 5.594 | 173.814 |
| 1680.000 | 6.107 | 199.473 | -8.467 | -0.419 | 1679.374 | 1.428 | -8.467 | 8.478 | 182.833 |
| 1710.000 | 7.015 | 198.900 | -11.705 | -1.544 | 1709.177 | 3.035 | -11.705 | 11.806 | 187.516 |
| 1740.000 | 7.230 | 198.125 | -15.232 | -2.725 | 1738.946 | 0.786 | -15.232 | 15.474 | 190.143 |
| 1770.000 | 8.065 | 196.235 | -19.047 | -3.901 | 1768.679 | 2.905 | -19.047 | 19.442 | 191.574 |
| 1800.000 | 8.685 | 197.852 | -23.223 | -5.183 | 1798.359 | 2.211 | -23.223 | 23.795 | 192.582 |
| 1830.000 | 9.022 | 197.725 | -27.620 | -6.594 | 1828.001 | 1.127 | -27.620 | 28.396 | 193.427 |
| 1860.000 | 9.304 | 197.473 | -32.174 | -8.038 | 1857.618 | 0.947 | -32.174 | 33.163 | 194.027 |
| 1890.000 | 9.626 | 195.704 | -36.901 | -9.445 | 1887.210 | 1.448 | -36.901 | 38.091 | 194.357 |
| 1920.000 | 9.783 | 194.920 | -41.779 | -10.780 | 1916.781 | 0.683 | -41.779 | 43.147 | 194.469 |
| 1950.000 | 9.855 | 193.719 | -46.736 | -12.045 | 1946.341 | 0.724 | -46.736 | 48.263 | 194.453 |
| 1980.000 | 10.723 | 194.326 | -51.934 | -13.345 | 1975.858 | 2.915 | -51.934 | 53.621 | 194.411 |
| 2010.000 | 10.737 | 194.847 | -57.339 | -14.751 | 2005.334 | 0.327 | -57.339 | 59.206 | 194.427 |
| 2040.000 | 10.788 | 196.196 | -62.737 | -16.251 | 2034.806 | 0.857 | -62.737 | 64.807 | 194.522 |
| 2070.000 | 11.466 | 195.909 | -68.301 | -17.851 | 2064.242 | 2.266 | -68.301 | 70.595 | 194.647 |
| 2100.000 | 11.537 | 196.697 | -74.042 | -19.530 | 2093.640 | 0.575 | -74.042 | 76.574 | 194.777 |
| 2130.000 | 11.729 | 196.428 | -79.840 | -21.255 | 2123.024 | 0.665 | -79.840 | 82.621 | 194.907 |
| 2160.000 | 12.402 | 195.562 | -85.868 | -22.981 | 2152.361 | 2.322 | -85.868 | 88.890 | 194.983 |
| 2190.000 | 12.492 | 195.716 | -92.095 | -24.724 | 2181.656 | 0.322 | -92.095 | 95.356 | 195.028 |
| 2220.000 | 12.456 | 196.320 | -98.323 | -26.512 | 2210.947 | 0.451 | -98.323 | 101.835 | 195.091 |
| 2250.000 | 12.067 | 196.114 | -104.441 | -28.292 | 2240.263 | 1.306 | -104.441 | 108.205 | 195.157 |
| 2280.000 | 12.039 | 194.069 | -110.489 | -29.923 | 2269.602 | 1.427 | -110.489 | 114.469 | 195.154 |
| 2310.000 | 11.550 | 201.113 | -116.326 | -31.765 | 2298.970 | 5.065 | -116.326 | 120.585 | 195.274 |
| 2340.000 | 11.743 | 199.891 | -121.998 | -33.886 | 2328.352 | 1.043 | -121.998 | 126.617 | 195.523 |
| 2370.000 | 11.882 | 202.182 | -127.728 | -36.090 | 2357.717 | 1.630 | -127.728 | 132.729 | 195.778 |
| 2400.000 | 11.636 | 201.199 | -133.409 | -38.350 | 2387.087 | 1.056 | -133.409 | 138.812 | 196.038 |
| 2430.000 | 11.442 | 198.711 | -139.048 | -40.399 | 2416.481 | 1.780 | -139.048 | 144.798 | 196.201 |
| 2460.000 | 12.126 | 191.786 | -144.952 | -41.997 | 2445.850 | 5.232 | -144.952 | 150.913 | 196.158 |
| 2490.000 | 12.146 | 192.092 | -151.122 | -43.302 | 2475.180 | 0.225 | -151.122 | 157.204 | 195.989 |

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|----------|--------|---------|----------|----------|----------|-------|----------|---------|---------|
| 2520.000 | 11.695 | 199.728 | -157.071 | -44.990 | 2504.535 | 5.463 | -157.071 | 163.387 | 195.983 |
| 2550.000 | 11.660 | 198.751 | -162.803 | -46.991 | 2533.914 | 0.670 | -162.803 | 169.449 | 196.100 |
| 2580.000 | 11.745 | 197.098 | -168.592 | -48.863 | 2563.290 | 1.154 | -168.592 | 175.531 | 196.163 |
| 2610.000 | 11.393 | 199.201 | -174.309 | -50.735 | 2592.681 | 1.831 | -174.309 | 181.543 | 196.228 |
| 2640.000 | 11.871 | 199.399 | -180.018 | -52.735 | 2622.065 | 1.600 | -180.018 | 187.583 | 196.328 |
| 2670.000 | 12.307 | 199.715 | -185.938 | -54.838 | 2651.399 | 1.469 | -185.938 | 193.856 | 196.432 |
| 2700.000 | 12.186 | 202.541 | -191.873 | -57.131 | 2680.717 | 2.038 | -191.873 | 200.198 | 196.581 |
| 2730.000 | 12.586 | 197.341 | -197.917 | -59.319 | 2710.019 | 3.948 | -197.917 | 206.616 | 196.684 |
| 2760.000 | 12.898 | 200.148 | -204.181 | -61.446 | 2739.281 | 2.311 | -204.181 | 213.227 | 196.749 |
| 2790.000 | 12.959 | 202.543 | -210.431 | -63.889 | 2768.520 | 1.797 | -210.431 | 219.916 | 196.889 |
| 2820.000 | 13.206 | 201.011 | -216.737 | -66.408 | 2797.742 | 1.420 | -216.737 | 226.682 | 197.035 |
| 2850.000 | 13.462 | 200.933 | -223.197 | -68.884 | 2826.933 | 0.854 | -223.197 | 233.585 | 197.151 |
| 2880.000 | 13.103 | 198.656 | -229.681 | -71.219 | 2856.131 | 2.114 | -229.681 | 240.469 | 197.228 |
| 2910.000 | 13.063 | 200.045 | -236.087 | -73.469 | 2885.352 | 1.057 | -236.087 | 247.255 | 197.286 |
| 2940.000 | 13.514 | 202.416 | -242.513 | -75.968 | 2914.549 | 2.358 | -242.513 | 254.133 | 197.393 |
| 2970.000 | 13.215 | 195.253 | -249.062 | -78.207 | 2943.739 | 5.604 | -249.062 | 261.052 | 197.433 |
| 3000.000 | 12.464 | 201.025 | -255.392 | -80.270 | 2972.990 | 4.951 | -255.392 | 267.710 | 197.448 |
| 3030.000 | 12.194 | 200.182 | -261.388 | -82.525 | 3002.298 | 1.081 | -261.388 | 274.106 | 197.522 |
| 3060.000 | 12.216 | 198.128 | -267.378 | -84.605 | 3031.620 | 1.450 | -267.378 | 280.444 | 197.559 |
| 3090.000 | 12.339 | 195.468 | -273.484 | -86.448 | 3060.934 | 1.929 | -273.484 | 286.822 | 197.542 |
| 3120.000 | 11.878 | 199.409 | -279.485 | -88.329 | 3090.267 | 3.154 | -279.485 | 293.111 | 197.539 |
| 3150.000 | 12.158 | 199.889 | -285.368 | -90.430 | 3119.609 | 0.991 | -285.368 | 299.353 | 197.583 |
| 3180.000 | 12.135 | 198.541 | -291.328 | -92.507 | 3148.938 | 0.949 | -291.328 | 305.663 | 197.616 |
| 3210.000 | 12.406 | 197.286 | -297.395 | -94.467 | 3178.252 | 1.267 | -297.395 | 312.038 | 197.622 |
| 3240.000 | 12.383 | 197.284 | -303.543 | -96.381 | 3207.553 | 0.077 | -303.543 | 318.477 | 197.616 |
| 3270.000 | 12.012 | 191.159 | -309.678 | -97.941 | 3236.877 | 4.485 | -309.678 | 324.796 | 197.550 |
| 3300.000 | 12.213 | 190.469 | -315.861 | -99.121 | 3266.209 | 0.826 | -315.861 | 331.048 | 197.423 |
| 3330.000 | 12.046 | 193.129 | -322.030 | -100.409 | 3295.540 | 1.944 | -322.030 | 337.321 | 197.317 |
| 3360.000 | 11.746 | 193.222 | -328.051 | -101.818 | 3324.896 | 1.001 | -328.051 | 343.489 | 197.243 |
| 3390.000 | 11.663 | 190.003 | -334.010 | -103.044 | 3354.272 | 2.194 | -334.010 | 349.543 | 197.145 |
| 3420.000 | 12.152 | 190.953 | -340.096 | -104.170 | 3383.626 | 1.756 | -340.096 | 355.692 | 197.030 |
| 3450.000 | 12.238 | 191.282 | -346.314 | -105.392 | 3412.950 | 0.368 | -346.314 | 361.996 | 196.926 |
| 3480.000 | 12.125 | 187.772 | -352.554 | -106.440 | 3442.274 | 2.497 | -352.554 | 368.272 | 196.800 |
| 3510.000 | 12.300 | 191.143 | -358.811 | -107.484 | 3471.596 | 2.447 | -358.811 | 374.564 | 196.676 |
| 3540.000 | 11.281 | 189.150 | -364.844 | -108.568 | 3500.963 | 3.659 | -364.844 | 380.655 | 196.572 |
| 3570.000 | 10.665 | 192.246 | -370.454 | -109.624 | 3530.414 | 2.840 | -370.454 | 386.333 | 196.484 |
| 3600.000 | 10.743 | 192.132 | -375.900 | -110.800 | 3559.892 | 0.269 | -375.900 | 391.890 | 196.423 |
| 3630.000 | 10.368 | 195.358 | -381.237 | -112.103 | 3589.385 | 2.332 | -381.237 | 397.377 | 196.386 |
| 3660.000 | 9.521 | 189.328 | -386.289 | -113.220 | 3618.935 | 4.473 | -386.289 | 402.539 | 196.336 |
| 3690.000 | 9.335 | 194.819 | -391.089 | -114.245 | 3648.530 | 3.060 | -391.089 | 407.434 | 196.284 |
| 3720.000 | 9.616 | 196.304 | -395.846 | -115.570 | 3678.121 | 1.241 | -395.846 | 412.372 | 196.276 |
| 3750.000 | 9.458 | 201.767 | -400.541 | -117.188 | 3707.707 | 3.062 | -400.541 | 417.332 | 196.308 |
| 3780.000 | 9.584 | 202.670 | -405.134 | -119.064 | 3737.293 | 0.650 | -405.134 | 422.268 | 196.377 |
| 3810.000 | 9.696 | 203.884 | -409.749 | -121.050 | 3766.870 | 0.774 | -409.749 | 427.255 | 196.458 |
| 3840.000 | 9.284 | 206.419 | -414.226 | -123.150 | 3796.459 | 1.957 | -414.226 | 432.145 | 196.557 |
| 3870.000 | 9.216 | 207.076 | -418.533 | -125.320 | 3826.069 | 0.418 | -418.533 | 436.892 | 196.669 |
| 3900.000 | 9.845 | 202.326 | -423.044 | -127.388 | 3855.655 | 3.354 | -423.044 | 441.808 | 196.758 |

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| 3930.000 | 10.595 | 205.108 | -427.914 | -129.532 | 3885.179 | 2.993 | -427.914 | 447.090 | 196.841 |
| 3960.000 | 11.099 | 200.579 | -433.115 | -131.718 | 3914.644 | 3.300 | -433.115 | 452.701 | 196.915 |
| 3990.000 | 12.075 | 201.912 | -438.730 | -133.904 | 3944.032 | 3.373 | -438.730 | 458.709 | 196.973 |
| 4020.000 | 12.826 | 200.428 | -444.762 | -136.237 | 3973.326 | 2.721 | -444.762 | 465.160 | 197.031 |
| 4050.000 | 12.924 | 198.194 | -451.069 | -138.447 | 4002.572 | 1.690 | -451.069 | 471.838 | 197.063 |
| 4080.000 | 13.762 | 194.078 | -457.718 | -140.362 | 4031.763 | 4.221 | -457.718 | 478.756 | 197.049 |
| 4110.000 | 13.778 | 193.335 | -464.655 | -142.054 | 4060.901 | 0.592 | -464.655 | 485.884 | 196.999 |
| 4140.000 | 13.868 | 193.681 | -471.624 | -143.728 | 4090.032 | 0.408 | -471.624 | 493.038 | 196.949 |
| 4170.000 | 14.472 | 191.813 | -478.786 | -145.346 | 4119.119 | 2.526 | -478.786 | 500.362 | 196.887 |
| 4200.000 | 14.493 | 192.420 | -486.122 | -146.921 | 4148.166 | 0.511 | -486.122 | 507.839 | 196.816 |
| 4230.000 | 14.631 | 191.570 | -493.500 | -148.488 | 4177.202 | 0.848 | -493.500 | 515.355 | 196.746 |
| 4260.000 | 14.536 | 192.419 | -500.889 | -150.058 | 4206.236 | 0.780 | -500.889 | 522.883 | 196.677 |
| 4290.000 | 13.530 | 191.943 | -507.999 | -151.594 | 4235.340 | 3.375 | -507.999 | 530.136 | 196.616 |
| 4320.000 | 12.493 | 191.805 | -514.609 | -152.984 | 4264.569 | 3.459 | -514.609 | 536.867 | 196.556 |
| 4350.000 | 12.427 | 190.510 | -520.959 | -154.237 | 4293.863 | 0.957 | -520.959 | 543.312 | 196.492 |
| 4380.000 | 10.428 | 191.562 | -526.793 | -155.370 | 4323.267 | 6.702 | -526.793 | 549.228 | 196.433 |
| 4410.000 | 10.286 | 185.800 | -532.118 | -156.184 | 4352.779 | 3.484 | -532.118 | 554.566 | 196.358 |
| 4440.000 | 9.926 | 190.030 | -537.329 | -156.905 | 4382.314 | 2.749 | -537.329 | 559.769 | 196.278 |
| 4470.000 | 9.568 | 187.074 | -542.349 | -157.663 | 4411.881 | 2.049 | -542.349 | 564.801 | 196.209 |
| 4500.000 | 8.213 | 185.666 | -546.956 | -158.181 | 4441.520 | 4.575 | -546.956 | 569.370 | 196.130 |
| 4530.000 | 8.423 | 178.283 | -551.285 | -158.327 | 4471.205 | 3.626 | -551.285 | 573.570 | 196.024 |
| 4560.000 | 7.558 | 192.258 | -555.410 | -158.680 | 4500.916 | 7.065 | -555.410 | 577.632 | 195.945 |
| 4590.000 | 6.861 | 181.117 | -559.129 | -159.134 | 4530.680 | 5.195 | -559.129 | 581.334 | 195.887 |
| 4620.000 | 6.401 | 192.547 | -562.553 | -159.532 | 4560.481 | 4.650 | -562.553 | 584.737 | 195.833 |
| 4650.000 | 5.558 | 178.149 | -565.638 | -159.849 | 4590.319 | 5.712 | -565.638 | 587.791 | 195.780 |
| 4680.000 | 5.084 | 193.429 | -568.383 | -160.110 | 4620.191 | 4.964 | -568.383 | 590.504 | 195.732 |
| 4710.000 | 4.639 | 174.303 | -570.884 | -160.299 | 4650.085 | 5.573 | -570.884 | 592.962 | 195.684 |
| 4740.000 | 4.980 | 183.267 | -573.391 | -160.252 | 4679.980 | 2.746 | -573.391 | 595.364 | 195.615 |
| 4770.000 | 6.012 | 183.756 | -576.259 | -160.430 | 4709.841 | 3.445 | -576.259 | 598.174 | 195.557 |
| 4800.000 | 4.307 | 183.448 | -578.951 | -160.600 | 4739.719 | 5.686 | -578.951 | 600.813 | 195.504 |
| 4830.000 | 5.473 | 185.326 | -581.500 | -160.801 | 4769.609 | 3.925 | -581.500 | 603.323 | 195.458 |
| 4860.000 | 3.544 | 189.641 | -583.839 | -161.089 | 4799.515 | 6.526 | -583.839 | 605.654 | 195.425 |
| 4890.000 | 3.932 | 199.903 | -585.720 | -161.594 | 4829.451 | 2.573 | -585.720 | 607.602 | 195.424 |
| 4920.000 | 2.615 | 197.564 | -587.340 | -162.151 | 4859.402 | 4.412 | -587.340 | 609.312 | 195.434 |
| 4950.000 | 2.755 | 181.130 | -588.713 | -162.372 | 4889.369 | 2.599 | -588.713 | 610.694 | 195.419 |
| 4980.000 | 1.301 | 195.079 | -589.763 | -162.475 | 4919.350 | 5.082 | -589.763 | 611.734 | 195.402 |
| 5010.000 | 1.102 | 164.050 | -590.369 | -162.484 | 4949.344 | 2.236 | -590.369 | 612.321 | 195.388 |
| 5040.000 | 0.363 | 222.492 | -590.717 | -162.469 | 4979.341 | 3.209 | -590.717 | 612.652 | 195.378 |
| 5070.000 | 1.011 | 199.604 | -591.036 | -162.622 | 5009.339 | 2.304 | -591.036 | 613.000 | 195.384 |
| 5100.000 | 0.338 | 233.144 | -591.339 | -162.782 | 5039.337 | 2.510 | -591.339 | 613.335 | 195.391 |
| 5130.000 | 0.531 | 164.178 | -591.526 | -162.815 | 5069.336 | 1.724 | -591.526 | 613.523 | 195.389 |
| 5160.000 | 0.976 | 239.996 | -591.787 | -162.998 | 5099.334 | 3.300 | -591.787 | 613.824 | 195.399 |
| 5190.000 | 0.662 | 206.434 | -592.070 | -163.296 | 5129.331 | 1.868 | -592.070 | 614.176 | 195.419 |
| 5220.000 | 0.931 | 317.533 | -592.045 | -163.538 | 5159.329 | 4.406 | -592.045 | 614.217 | 195.442 |
| 5250.000 | 0.271 | 30.661 | -591.805 | -163.666 | 5189.328 | 2.969 | -591.805 | 614.019 | 195.459 |
| 5280.000 | 1.340 | 335.473 | -591.425 | -163.776 | 5219.325 | 4.019 | -591.425 | 613.682 | 195.478 |
| 5310.000 | 1.146 | 74.759 | -591.027 | -163.632 | 5249.320 | 6.327 | -591.027 | 613.260 | 195.475 |

| | | | | | | | | | |
|----------|--------|---------|----------|----------|----------|--------|----------|---------|---------|
| 5340.000 | 1.247 | 65.487 | -590.812 | -163.046 | 5279.314 | 0.726 | -590.812 | 612.897 | 195.428 |
| 5370.000 | 0.237 | 90.011 | -590.677 | -162.687 | 5309.311 | 3.453 | -590.677 | 612.671 | 195.399 |
| 5400.000 | 1.558 | 87.581 | -590.660 | -162.217 | 5339.307 | 4.405 | -590.660 | 612.530 | 195.357 |
| 5430.000 | 0.867 | 54.248 | -590.510 | -161.626 | 5369.300 | 3.200 | -590.510 | 612.229 | 195.307 |
| 5460.000 | 1.380 | 112.820 | -590.517 | -161.109 | 5399.295 | 3.956 | -590.517 | 612.100 | 195.260 |
| 5490.000 | 1.698 | 80.818 | -590.587 | -160.337 | 5429.285 | 3.007 | -590.587 | 611.964 | 195.189 |
| 5520.000 | 0.861 | 106.802 | -590.581 | -159.682 | 5459.277 | 3.327 | -590.581 | 611.788 | 195.130 |
| 5550.000 | 1.791 | 84.479 | -590.601 | -159.000 | 5489.269 | 3.488 | -590.601 | 611.629 | 195.068 |
| 5580.000 | 1.158 | 70.939 | -590.457 | -158.247 | 5519.259 | 2.394 | -590.457 | 611.295 | 195.003 |
| 5610.000 | 0.866 | 46.247 | -590.201 | -157.796 | 5549.254 | 1.727 | -590.201 | 610.931 | 194.969 |
| 5640.000 | 2.088 | 62.521 | -589.792 | -157.148 | 5579.244 | 4.264 | -589.792 | 610.369 | 194.920 |
| 5670.000 | 1.830 | 81.151 | -589.466 | -156.190 | 5609.227 | 2.277 | -589.466 | 609.808 | 194.841 |
| 5700.000 | 1.241 | 41.076 | -589.148 | -155.503 | 5639.217 | 3.963 | -589.148 | 609.324 | 194.786 |
| 5730.000 | 1.773 | 83.985 | -588.854 | -154.828 | 5669.207 | 4.028 | -588.854 | 608.869 | 194.731 |
| 5760.000 | 2.088 | 82.131 | -588.731 | -153.825 | 5699.190 | 1.070 | -588.731 | 608.495 | 194.643 |
| 5790.000 | 0.849 | 115.898 | -588.753 | -153.083 | 5729.180 | 4.868 | -588.753 | 608.329 | 194.575 |
| 5820.000 | 0.531 | 356.614 | -588.711 | -152.892 | 5759.179 | 4.005 | -588.711 | 608.241 | 194.558 |
| 5850.000 | 0.983 | 46.454 | -588.395 | -152.713 | 5789.176 | 2.527 | -588.395 | 607.890 | 194.550 |
| 5880.000 | 1.418 | 53.083 | -587.995 | -152.230 | 5819.170 | 1.522 | -587.995 | 607.382 | 194.515 |
| 5910.000 | 1.470 | 20.062 | -587.411 | -151.801 | 5849.161 | 2.741 | -587.411 | 606.708 | 194.490 |
| 5940.000 | 0.721 | 343.302 | -586.869 | -151.724 | 5879.155 | 3.303 | -586.869 | 606.164 | 194.495 |
| 5970.000 | 0.667 | 70.188 | -586.629 | -151.614 | 5909.154 | 3.184 | -586.629 | 605.904 | 194.491 |
| 6000.000 | 1.900 | 27.055 | -586.126 | -151.223 | 5939.146 | 4.951 | -586.126 | 605.320 | 194.467 |
| 6030.000 | 0.756 | 66.661 | -585.605 | -150.815 | 5969.138 | 4.678 | -585.605 | 604.714 | 194.442 |
| 6060.000 | 1.458 | 31.118 | -585.200 | -150.436 | 5999.133 | 3.168 | -585.200 | 604.227 | 194.417 |
| 6090.000 | 0.483 | 72.166 | -584.834 | -150.119 | 6029.128 | 3.796 | -584.834 | 603.794 | 194.396 |
| 6120.000 | 1.496 | 357.473 | -584.405 | -150.016 | 6059.124 | 4.818 | -584.405 | 603.352 | 194.397 |
| 6150.000 | 1.898 | 65.594 | -583.808 | -149.581 | 6089.114 | 6.431 | -583.808 | 602.666 | 194.371 |
| 6180.000 | 0.210 | 82.186 | -583.595 | -149.074 | 6119.108 | 5.658 | -583.595 | 602.334 | 194.329 |
| 6210.000 | 1.471 | 3.179 | -583.203 | -148.998 | 6149.104 | 4.818 | -583.203 | 601.936 | 194.331 |
| 6240.000 | 1.945 | 54.236 | -582.521 | -148.563 | 6179.092 | 5.109 | -582.521 | 601.167 | 194.307 |
| 6270.000 | 1.709 | 68.080 | -582.057 | -147.735 | 6209.077 | 1.662 | -582.057 | 600.513 | 194.242 |
| 6300.000 | 0.596 | 318.063 | -581.774 | -147.424 | 6239.073 | 6.644 | -581.774 | 600.162 | 194.220 |
| 6330.000 | 1.933 | 30.300 | -581.221 | -147.273 | 6269.066 | 6.138 | -581.221 | 599.589 | 194.219 |
| 6360.000 | 3.230 | 80.385 | -580.643 | -146.185 | 6299.038 | 8.268 | -580.643 | 598.762 | 194.131 |
| 6390.000 | 6.300 | 83.379 | -580.312 | -143.716 | 6328.931 | 10.264 | -580.312 | 597.843 | 193.910 |
| 6420.000 | 9.913 | 92.560 | -580.237 | -139.500 | 6358.628 | 12.757 | -580.237 | 596.771 | 193.518 |
| 6450.000 | 12.366 | 96.269 | -580.703 | -133.726 | 6388.061 | 8.515 | -580.703 | 595.902 | 192.968 |
| 6480.000 | 14.536 | 90.927 | -581.115 | -126.767 | 6417.237 | 8.326 | -581.115 | 594.781 | 192.306 |
| 6510.000 | 16.344 | 95.188 | -581.558 | -118.798 | 6446.154 | 7.113 | -581.558 | 593.567 | 191.545 |
| 6540.000 | 18.016 | 95.949 | -582.420 | -109.979 | 6474.815 | 5.621 | -582.420 | 592.713 | 190.693 |
| 6570.000 | 19.390 | 97.582 | -583.558 | -100.428 | 6503.230 | 4.901 | -583.558 | 592.137 | 189.765 |
| 6600.000 | 21.161 | 98.562 | -585.022 | -90.137 | 6531.370 | 6.010 | -585.022 | 591.925 | 188.759 |
| 6630.000 | 22.505 | 93.558 | -586.184 | -79.050 | 6559.220 | 7.650 | -586.184 | 591.490 | 187.680 |
| 6660.000 | 24.171 | 95.935 | -587.176 | -67.210 | 6586.765 | 6.378 | -587.176 | 591.010 | 186.530 |
| 6690.000 | 26.229 | 100.442 | -589.013 | -54.578 | 6613.911 | 9.374 | -589.013 | 591.536 | 185.294 |

True North