



Company: Noble Energy
Rig: Production / CoreTech
API # 05-123-25439
Date: 10/17/2013
Surveyor: CJ Hines
VS: 0.000
Lat : 40.484
Long: -104.501

Well: Lapp #13-31
Location: Weld County, Colorado
North Reference: GRID
Convergence: Grid north is 0.65 Deg East of True
Declination: 8.41
Depth Reference: Ground Level
Elevation: 4649
Total Depth as Drilled: 6975

Lat & Long obtained by handheld GPS at wellhead

MS Gyro Survey Calculations

| Depth | Inc | AzG | N/-S | E/-W | TVD | DL | VS | CD | Cbrg |
|----------|-------|---------|---------|--------|----------|-------|---------|--------|---------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 100.000 | 0.496 | 96.580 | -0.050 | 0.430 | 99.999 | 0.496 | -0.050 | 0.433 | 96.580 |
| 200.000 | 0.266 | 71.510 | -0.026 | 1.080 | 199.997 | 0.279 | -0.026 | 1.081 | 91.355 |
| 300.000 | 0.200 | 85.257 | 0.063 | 1.474 | 299.996 | 0.087 | 0.063 | 1.476 | 87.572 |
| 400.000 | 0.461 | 91.692 | 0.065 | 2.050 | 399.994 | 0.263 | 0.065 | 2.051 | 88.182 |
| 500.000 | 0.688 | 101.285 | -0.064 | 3.040 | 499.989 | 0.246 | -0.064 | 3.041 | 91.213 |
| 600.000 | 0.608 | 107.196 | -0.339 | 4.136 | 599.983 | 0.105 | -0.339 | 4.150 | 94.681 |
| 700.000 | 0.657 | 104.930 | -0.643 | 5.196 | 699.976 | 0.055 | -0.643 | 5.236 | 97.056 |
| 800.000 | 0.635 | 103.687 | -0.922 | 6.289 | 799.970 | 0.026 | -0.922 | 6.356 | 98.341 |
| 900.000 | 0.728 | 122.464 | -1.394 | 7.363 | 899.963 | 0.241 | -1.394 | 7.494 | 100.722 |
| 1000.000 | 0.801 | 117.885 | -2.062 | 8.517 | 999.954 | 0.095 | -2.062 | 8.763 | 103.611 |
| 1100.000 | 0.715 | 118.451 | -2.687 | 9.684 | 1099.945 | 0.086 | -2.687 | 10.050 | 105.505 |
| 1200.000 | 0.707 | 99.619 | -3.087 | 10.841 | 1199.938 | 0.233 | -3.087 | 11.272 | 105.894 |
| 1300.000 | 0.732 | 125.592 | -3.562 | 11.968 | 1299.930 | 0.324 | -3.562 | 12.487 | 106.572 |
| 1400.000 | 0.921 | 106.523 | -4.162 | 13.258 | 1399.920 | 0.331 | -4.162 | 13.896 | 107.427 |
| 1500.000 | 0.833 | 108.525 | -4.621 | 14.717 | 1499.908 | 0.094 | -4.621 | 15.426 | 107.432 |
| 1600.000 | 0.540 | 86.962 | -4.827 | 15.877 | 1599.901 | 0.385 | -4.827 | 16.595 | 106.910 |
| 1700.000 | 0.470 | 81.746 | -4.743 | 16.754 | 1699.897 | 0.084 | -4.743 | 17.412 | 105.807 |
| 1800.000 | 0.369 | 116.448 | -4.828 | 17.448 | 1799.895 | 0.268 | -4.828 | 18.104 | 105.466 |
| 1900.000 | 0.298 | 48.879 | -4.800 | 17.932 | 1899.893 | 0.376 | -4.800 | 18.563 | 104.986 |
| 2000.000 | 0.320 | 336.241 | -4.374 | 18.015 | 1999.892 | 0.366 | -4.374 | 18.539 | 103.647 |
| 2100.000 | 0.331 | 10.322 | -3.834 | 17.955 | 2099.891 | 0.191 | -3.834 | 18.360 | 102.055 |
| 2200.000 | 0.184 | 315.566 | -3.436 | 17.894 | 2199.890 | 0.271 | -3.436 | 18.221 | 100.868 |
| 2300.000 | 0.502 | 255.691 | -3.429 | 17.358 | 2299.888 | 0.439 | -3.429 | 17.693 | 101.176 |
| 2400.000 | 0.742 | 232.266 | -3.934 | 16.421 | 2399.882 | 0.345 | -3.934 | 16.886 | 103.472 |
| 2500.000 | 0.899 | 238.647 | -4.739 | 15.238 | 2499.872 | 0.181 | -4.739 | 15.958 | 107.274 |
| 2600.000 | 0.885 | 238.051 | -5.556 | 13.913 | 2599.860 | 0.017 | -5.556 | 14.981 | 111.768 |
| 2700.000 | 1.001 | 232.646 | -6.494 | 12.563 | 2699.846 | 0.146 | -6.494 | 14.143 | 117.336 |
| 2800.000 | 1.158 | 213.020 | -7.871 | 11.318 | 2799.829 | 0.399 | -7.871 | 13.786 | 124.817 |
| 2900.000 | 1.436 | 204.788 | -9.857 | 10.242 | 2899.803 | 0.334 | -9.857 | 14.215 | 133.900 |
| 3000.000 | 1.832 | 196.812 | -12.525 | 9.255 | 2999.763 | 0.456 | -12.525 | 15.573 | 143.539 |
| 3100.000 | 2.048 | 192.492 | -15.799 | 8.406 | 3099.705 | 0.260 | -15.799 | 17.896 | 151.985 |
| 3200.000 | 1.461 | 216.648 | -18.566 | 7.258 | 3199.659 | 0.932 | -18.566 | 19.934 | 158.647 |
| 3300.000 | 0.774 | 253.404 | -19.782 | 5.850 | 3299.641 | 0.960 | -19.782 | 20.629 | 163.525 |
| 3400.000 | 0.975 | 301.348 | -19.532 | 4.476 | 3399.630 | 0.734 | -19.532 | 20.038 | 167.093 |
| 3500.000 | 1.431 | 345.502 | -17.880 | 3.437 | 3499.610 | 0.998 | -17.880 | 18.208 | 169.120 |

| | | | | | | | | | |
|----------|-------|---------|---------|---------|----------|-------|---------|--------|---------|
| 3600.000 | 1.814 | 331.684 | -15.278 | 2.373 | 3599.570 | 0.545 | -15.278 | 15.461 | 171.170 |
| 3700.000 | 2.449 | 333.819 | -11.967 | 0.680 | 3699.500 | 0.640 | -11.967 | 11.987 | 176.748 |
| 3800.000 | 2.919 | 335.551 | -7.732 | -1.317 | 3799.391 | 0.477 | -7.732 | 7.843 | 189.664 |
| 3900.000 | 2.968 | 332.956 | -3.108 | -3.548 | 3899.259 | 0.142 | -3.108 | 4.716 | 228.783 |
| 4000.000 | 2.833 | 335.994 | 1.455 | -5.730 | 3999.131 | 0.205 | 1.455 | 5.912 | 284.251 |
| 4100.000 | 2.368 | 340.444 | 5.660 | -7.427 | 4099.027 | 0.506 | 5.660 | 9.338 | 307.309 |
| 4200.000 | 2.007 | 351.753 | 9.340 | -8.370 | 4198.955 | 0.561 | 9.340 | 12.541 | 318.135 |
| 4300.000 | 1.846 | 350.632 | 12.662 | -8.883 | 4298.898 | 0.165 | 12.662 | 15.468 | 324.948 |
| 4400.000 | 1.529 | 349.084 | 15.562 | -9.398 | 4398.855 | 0.320 | 15.562 | 18.180 | 328.872 |
| 4500.000 | 0.762 | 318.802 | 17.373 | -10.089 | 4498.835 | 0.953 | 17.373 | 20.089 | 329.855 |
| 4600.000 | 1.037 | 278.835 | 18.012 | -11.420 | 4598.823 | 0.667 | 18.012 | 21.327 | 327.623 |
| 4700.000 | 1.432 | 263.610 | 18.011 | -13.556 | 4698.800 | 0.510 | 18.011 | 22.543 | 323.034 |
| 4800.000 | 2.030 | 266.354 | 17.760 | -16.565 | 4798.754 | 0.604 | 17.760 | 24.286 | 316.994 |
| 4900.000 | 2.088 | 258.822 | 17.294 | -20.120 | 4898.690 | 0.276 | 17.294 | 26.531 | 310.681 |
| 5000.000 | 1.908 | 252.454 | 16.439 | -23.494 | 4998.629 | 0.286 | 16.439 | 28.674 | 304.982 |
| 5100.000 | 1.673 | 243.020 | 15.275 | -26.382 | 5098.580 | 0.376 | 15.275 | 30.485 | 300.071 |
| 5200.000 | 1.601 | 230.406 | 13.723 | -28.759 | 5198.540 | 0.367 | 13.723 | 31.865 | 295.508 |
| 5300.000 | 1.414 | 234.209 | 12.111 | -30.836 | 5298.505 | 0.212 | 12.111 | 33.129 | 291.442 |
| 5400.000 | 0.980 | 209.690 | 10.646 | -32.260 | 5398.484 | 0.662 | 10.646 | 33.972 | 288.264 |
| 5500.000 | 0.645 | 203.652 | 9.388 | -32.910 | 5498.474 | 0.345 | 9.388 | 34.222 | 285.921 |
| 5600.000 | 0.905 | 196.384 | 8.114 | -33.358 | 5598.464 | 0.277 | 8.114 | 34.331 | 283.672 |
| 5700.000 | 1.024 | 192.305 | 6.484 | -33.771 | 5698.450 | 0.138 | 6.484 | 34.388 | 280.868 |
| 5800.000 | 1.032 | 197.661 | 4.753 | -34.235 | 5798.434 | 0.096 | 4.753 | 34.563 | 277.904 |
| 5900.000 | 1.217 | 195.972 | 2.874 | -34.800 | 5898.415 | 0.188 | 2.874 | 34.919 | 274.721 |
| 6000.000 | 1.274 | 193.120 | 0.771 | -35.345 | 5998.391 | 0.084 | 0.771 | 35.353 | 271.249 |
| 6100.000 | 1.505 | 190.334 | -1.604 | -35.833 | 6098.362 | 0.241 | -1.604 | 35.869 | 267.437 |
| 6200.000 | 1.519 | 186.610 | -4.213 | -36.221 | 6198.327 | 0.099 | -4.213 | 36.465 | 263.366 |
| 6300.000 | 1.408 | 186.809 | -6.749 | -36.519 | 6298.294 | 0.112 | -6.749 | 37.138 | 259.529 |
| 6400.000 | 1.214 | 185.822 | -9.023 | -36.772 | 6398.268 | 0.195 | -9.023 | 37.863 | 256.213 |
| 6500.000 | 1.180 | 182.780 | -11.106 | -36.930 | 6498.246 | 0.072 | -11.106 | 38.564 | 253.262 |
| 6600.000 | 1.561 | 185.534 | -13.490 | -37.111 | 6598.218 | 0.386 | -13.490 | 39.487 | 250.023 |
| 6700.000 | 1.869 | 185.609 | -16.469 | -37.402 | 6698.173 | 0.309 | -16.469 | 40.867 | 246.235 |

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