



Company: NOBLE ENERGY
 Well: WELLS RANCH USX AA 35-12
 API: 05-123-25052
 Rig Name: PRODUCTION
 State/County: COLORADO/WELD
 Latitude: 40.442, Longitude: -104.411
 GRID North is 0.700 Degrees East of True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Service Company : VAUGHN ENERGY SERVICES

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01_ed.ut

Minimum Curvature Method

Report Date/Time: 8/2/2011 / 22:09

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

866-835-8333

NICK CAMPBELL

DEPTH REFERENCE=GROUND LEVEL

| 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 | 0.463 | 54.853 | 99.999 | 0.232 | 0.330 | 0.232 | 0.404 | 54.853 | 0.463 |
| 200.000 | 0.136 | 63.312 | 199.997 | 0.518 | 0.766 | 0.518 | 0.925 | 55.937 | 0.328 |
| 300.000 | 0.779 | 7.118 | 299.994 | 1.246 | 0.957 | 1.246 | 1.571 | 37.526 | 0.712 |
| 400.000 | 0.708 | 11.949 | 399.986 | 2.524 | 1.169 | 2.524 | 2.782 | 24.848 | 0.095 |
| 500.000 | 0.961 | 4.234 | 499.975 | 3.964 | 1.359 | 3.964 | 4.191 | 18.918 | 0.276 |
| 600.000 | 1.253 | 355.271 | 599.956 | 5.890 | 1.330 | 5.890 | 6.038 | 12.728 | 0.339 |
| 700.000 | 1.465 | 348.971 | 699.928 | 8.234 | 0.996 | 8.234 | 8.294 | 6.895 | 0.259 |
| 800.000 | 1.156 | 354.055 | 799.902 | 10.492 | 0.647 | 10.492 | 10.512 | 3.527 | 0.330 |
| 900.000 | 1.277 | 352.233 | 899.879 | 12.598 | 0.392 | 12.598 | 12.605 | 1.781 | 0.127 |
| 1000.000 | 1.635 | 348.413 | 999.847 | 15.099 | -0.045 | 15.099 | 15.099 | 359.828 | 0.371 |
| 1100.000 | 1.857 | 338.871 | 1099.801 | 18.007 | -0.916 | 18.007 | 18.031 | 357.089 | 0.365 |
| 1200.000 | 1.947 | 330.578 | 1199.746 | 20.998 | -2.334 | 20.998 | 21.128 | 353.657 | 0.289 |
| 1300.000 | 1.666 | 351.159 | 1299.697 | 23.915 | -3.392 | 23.915 | 24.154 | 351.926 | 0.702 |
| 1400.000 | 2.026 | 333.397 | 1399.646 | 26.932 | -4.407 | 26.932 | 27.290 | 350.706 | 0.672 |
| 1500.000 | 2.303 | 333.278 | 1499.574 | 30.307 | -6.102 | 30.307 | 30.915 | 348.616 | 0.277 |
| 1600.000 | 2.436 | 339.534 | 1599.489 | 34.092 | -7.749 | 34.092 | 34.962 | 347.195 | 0.291 |
| 1700.000 | 2.069 | 324.416 | 1699.412 | 37.551 | -9.542 | 37.551 | 38.745 | 345.742 | 0.695 |
| 1800.000 | 1.544 | 338.546 | 1799.363 | 40.273 | -11.085 | 40.273 | 41.771 | 344.610 | 0.685 |
| 1900.000 | 1.638 | 334.744 | 1899.324 | 42.820 | -12.188 | 42.820 | 44.520 | 344.112 | 0.141 |
| 2000.000 | 1.376 | 336.708 | 1999.290 | 45.215 | -13.272 | 45.215 | 47.122 | 343.641 | 0.267 |
| 2100.000 | 1.007 | 316.327 | 2099.268 | 46.953 | -14.354 | 46.953 | 49.098 | 343.001 | 0.556 |
| 2200.000 | 1.068 | 333.578 | 2199.252 | 48.424 | -15.376 | 48.424 | 50.806 | 342.384 | 0.317 |
| 2300.000 | 1.214 | 329.980 | 2299.232 | 50.175 | -16.320 | 50.175 | 52.763 | 341.982 | 0.162 |
| 2400.000 | 1.022 | 326.688 | 2399.213 | 51.837 | -17.340 | 51.837 | 54.661 | 341.505 | 0.202 |
| 2500.000 | 1.039 | 311.895 | 2499.197 | 53.188 | -18.505 | 53.188 | 56.316 | 340.817 | 0.266 |
| 2600.000 | 1.107 | 315.089 | 2599.180 | 54.478 | -19.862 | 54.478 | 57.986 | 339.969 | 0.090 |
| 2700.000 | 1.125 | 308.364 | 2699.161 | 55.771 | -21.313 | 55.771 | 59.704 | 339.086 | 0.132 |
| 2800.000 | 1.229 | 311.847 | 2799.140 | 57.095 | -22.881 | 57.095 | 61.509 | 338.161 | 0.126 |
| 2900.000 | 1.456 | 317.767 | 2899.112 | 58.751 | -24.534 | 58.751 | 63.668 | 337.335 | 0.266 |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 3000.000 | 1.326 | 314.126 | 2999.083 | 60.498 | -26.218 | 60.498 | 65.935 | 336.569 | 0.157 |
| 3100.000 | 1.197 | 326.733 | 3099.059 | 62.176 | -27.622 | 62.176 | 68.036 | 336.047 | 0.305 |
| 3200.000 | 1.471 | 313.206 | 3199.032 | 63.928 | -29.130 | 63.928 | 70.252 | 335.503 | 0.416 |
| 3300.000 | 0.894 | 311.565 | 3299.010 | 65.325 | -30.650 | 65.325 | 72.158 | 334.865 | 0.578 |
| 3400.000 | 0.751 | 271.890 | 3399.000 | 65.864 | -31.888 | 65.864 | 73.177 | 334.166 | 0.574 |
| 3500.000 | 1.245 | 230.951 | 3498.986 | 65.201 | -33.388 | 65.201 | 73.252 | 332.884 | 0.838 |
| 3600.000 | 1.728 | 236.312 | 3598.952 | 63.680 | -35.486 | 63.680 | 72.900 | 330.871 | 0.502 |
| 3700.000 | 1.853 | 238.231 | 3698.903 | 61.993 | -38.115 | 61.993 | 72.773 | 328.416 | 0.138 |
| 3800.000 | 2.657 | 237.540 | 3798.825 | 59.898 | -41.445 | 59.898 | 72.838 | 325.320 | 0.805 |
| 3900.000 | 2.643 | 249.102 | 3898.719 | 57.831 | -45.554 | 57.831 | 73.618 | 321.772 | 0.534 |
| 4000.000 | 2.981 | 259.534 | 3998.599 | 56.537 | -50.265 | 56.537 | 75.650 | 318.361 | 0.613 |
| 4100.000 | 3.789 | 263.996 | 4098.424 | 55.719 | -56.109 | 55.719 | 79.074 | 314.800 | 0.849 |
| 4200.000 | 3.938 | 272.906 | 4198.198 | 55.547 | -62.824 | 55.547 | 83.859 | 311.482 | 0.618 |
| 4300.000 | 4.645 | 278.855 | 4297.917 | 56.345 | -70.254 | 56.345 | 90.057 | 308.730 | 0.835 |
| 4400.000 | 5.522 | 281.603 | 4397.523 | 57.935 | -78.968 | 57.935 | 97.941 | 306.266 | 0.910 |
| 4500.000 | 6.460 | 280.819 | 4496.976 | 59.959 | -89.206 | 59.959 | 107.484 | 303.907 | 0.942 |
| 4600.000 | 6.285 | 275.468 | 4596.359 | 61.537 | -100.181 | 61.537 | 117.571 | 301.561 | 0.619 |
| 4700.000 | 6.146 | 271.716 | 4695.771 | 62.219 | -110.980 | 62.219 | 127.231 | 299.276 | 0.429 |
| 4800.000 | 5.234 | 268.064 | 4795.278 | 62.225 | -120.890 | 62.225 | 135.964 | 297.236 | 0.981 |
| 4900.000 | 4.834 | 267.977 | 4894.892 | 61.922 | -129.659 | 61.922 | 143.686 | 295.528 | 0.399 |
| 5000.000 | 4.618 | 273.386 | 4994.552 | 62.011 | -137.889 | 62.011 | 151.191 | 294.214 | 0.495 |
| 5100.000 | 3.677 | 271.510 | 5094.289 | 62.333 | -145.113 | 62.333 | 157.934 | 293.246 | 0.951 |
| 5200.000 | 2.623 | 271.937 | 5194.137 | 62.495 | -150.606 | 62.495 | 163.057 | 292.536 | 1.054 |
| 5300.000 | 1.634 | 270.818 | 5294.067 | 62.593 | -154.318 | 62.593 | 166.529 | 292.078 | 0.990 |
| 5400.000 | 0.768 | 266.933 | 5394.044 | 62.577 | -156.412 | 62.577 | 168.466 | 291.805 | 0.869 |
| 5500.000 | 0.109 | 250.913 | 5494.040 | 62.510 | -157.172 | 62.510 | 169.146 | 291.689 | 0.664 |
| 5600.000 | 0.368 | 229.378 | 5594.039 | 62.270 | -157.505 | 62.270 | 169.368 | 291.571 | 0.269 |
| 5700.000 | 0.793 | 175.082 | 5694.035 | 61.371 | -157.690 | 61.371 | 169.211 | 291.265 | 0.651 |
| 5800.000 | 0.085 | 29.833 | 5794.032 | 60.746 | -157.594 | 60.746 | 168.896 | 291.080 | 0.864 |
| 5900.000 | 0.627 | 104.343 | 5894.030 | 60.674 | -157.027 | 60.674 | 168.341 | 291.126 | 0.610 |
| 6000.000 | 0.646 | 169.444 | 5994.025 | 59.985 | -156.393 | 59.985 | 167.502 | 290.984 | 0.685 |
| 6100.000 | 0.696 | 161.467 | 6094.018 | 58.855 | -156.097 | 58.855 | 166.824 | 290.658 | 0.106 |
| 6200.000 | 0.090 | 73.806 | 6194.015 | 58.301 | -155.829 | 58.301 | 166.378 | 290.513 | 0.698 |
| 6300.000 | 0.527 | 119.163 | 6294.014 | 58.098 | -155.352 | 58.098 | 165.860 | 290.505 | 0.469 |
| 6400.000 | 0.327 | 92.213 | 6394.011 | 57.863 | -154.665 | 57.863 | 165.134 | 290.512 | 0.279 |
| 6500.000 | 0.469 | 94.485 | 6494.008 | 57.820 | -153.972 | 57.820 | 164.471 | 290.582 | 0.143 |
| 6600.000 | 0.478 | 117.467 | 6594.005 | 57.596 | -153.194 | 57.596 | 163.663 | 290.605 | 0.189 |
| 6700.000 | 0.551 | 137.877 | 6694.001 | 57.047 | -152.502 | 57.047 | 162.822 | 290.510 | 0.196 |

HORIZONTAL DISPLACEMENT IS
162.822 FEET AT 290.510 DEGREES