



Company: Anadarko Petroleum
 Well: UPRR 41 Pan Am Unit H 1
 API: 05-123-14386
 Rig Name: Production/ Warrior
 State/County: Colorado/Weld
 Latitude: 40.208, Longitude: -104.965
 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: h gyro-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 1/21/2014 / 15:13

VAUGHN ENERGY SERVICES
 HENDERSON, COLORADO
 303-853-4976
 SEAN BRATT

| 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 | 0.318 | 319.299 | 99.999 | 0.210 | -0.181 | 0.210 | 0.278 | 319.299 | 0.318 |
| 200.000 | 0.498 | 292.599 | 199.997 | 0.588 | -0.763 | 0.588 | 0.964 | 307.600 | 0.257 |
| 300.000 | 0.592 | 300.829 | 299.992 | 1.020 | -1.609 | 1.020 | 1.905 | 302.374 | 0.122 |
| 400.000 | 0.557 | 309.631 | 399.987 | 1.595 | -2.427 | 1.595 | 2.904 | 303.310 | 0.095 |
| 500.000 | 0.300 | 322.868 | 499.985 | 2.114 | -2.959 | 2.114 | 3.636 | 305.536 | 0.273 |
| 600.000 | 0.207 | 333.760 | 599.984 | 2.484 | -3.197 | 2.484 | 4.049 | 307.850 | 0.105 |
| 700.000 | 0.214 | 155.262 | 699.983 | 2.477 | -3.199 | 2.477 | 4.046 | 307.751 | 0.421 |
| 800.000 | 0.294 | 139.457 | 799.982 | 2.113 | -2.954 | 2.113 | 3.632 | 305.571 | 0.106 |
| 900.000 | 0.348 | 169.144 | 899.981 | 1.619 | -2.730 | 1.619 | 3.174 | 300.675 | 0.173 |
| 1000.000 | 0.378 | 167.686 | 999.979 | 0.999 | -2.603 | 0.999 | 2.788 | 290.999 | 0.031 |
| 1100.000 | 0.301 | 206.343 | 1099.977 | 0.442 | -2.649 | 0.442 | 2.686 | 279.463 | 0.236 |
| 1200.000 | 0.367 | 218.924 | 1199.976 | -0.043 | -2.967 | -0.043 | 2.967 | 269.168 | 0.098 |
| 1300.000 | 0.491 | 239.282 | 1299.973 | -0.511 | -3.537 | -0.511 | 3.573 | 261.774 | 0.195 |
| 1400.000 | 0.671 | 256.644 | 1399.968 | -0.866 | -4.475 | -0.866 | 4.558 | 259.053 | 0.250 |
| 1500.000 | 1.197 | 279.619 | 1499.954 | -0.826 | -6.075 | -0.826 | 6.130 | 262.255 | 0.636 |
| 1600.000 | 1.491 | 289.532 | 1599.927 | -0.217 | -8.331 | -0.217 | 8.334 | 268.511 | 0.374 |
| 1700.000 | 1.578 | 288.014 | 1699.891 | 0.644 | -10.867 | 0.644 | 10.886 | 273.394 | 0.096 |
| 1800.000 | 1.588 | 292.705 | 1799.853 | 1.605 | -13.455 | 1.605 | 13.550 | 276.803 | 0.130 |
| 1900.000 | 1.744 | 293.398 | 1899.811 | 2.744 | -16.130 | 2.744 | 16.362 | 279.656 | 0.158 |
| 2000.000 | 1.818 | 294.438 | 1999.762 | 4.005 | -18.971 | 4.005 | 19.389 | 281.921 | 0.080 |
| 2100.000 | 1.780 | 291.607 | 2099.713 | 5.233 | -21.859 | 5.233 | 22.477 | 283.464 | 0.096 |
| 2200.000 | 1.854 | 298.262 | 2199.663 | 6.571 | -24.728 | 6.571 | 25.586 | 284.882 | 0.223 |
| 2300.000 | 1.379 | 289.737 | 2299.623 | 7.743 | -27.285 | 7.743 | 28.363 | 285.844 | 0.532 |
| 2400.000 | 1.250 | 287.890 | 2399.597 | 8.485 | -29.456 | 8.485 | 30.653 | 286.069 | 0.135 |
| 2500.000 | 1.167 | 286.824 | 2499.574 | 9.115 | -31.469 | 9.115 | 32.762 | 286.153 | 0.086 |
| 2600.000 | 1.294 | 281.580 | 2599.551 | 9.636 | -33.550 | 9.636 | 34.906 | 286.025 | 0.169 |
| 2700.000 | 1.179 | 272.308 | 2699.528 | 9.904 | -35.684 | 9.904 | 37.033 | 285.512 | 0.230 |
| 2800.000 | 1.031 | 262.947 | 2799.509 | 9.835 | -37.605 | 9.835 | 38.869 | 284.657 | 0.233 |
| 2900.000 | 1.034 | 256.221 | 2899.493 | 9.510 | -39.374 | 9.510 | 40.506 | 283.578 | 0.121 |
| 3000.000 | 1.195 | 248.682 | 2999.474 | 8.916 | -41.222 | 8.916 | 42.175 | 282.204 | 0.217 |
| 3100.000 | 1.248 | 238.617 | 3099.452 | 7.970 | -43.122 | 7.970 | 43.853 | 280.471 | 0.221 |
| 3200.000 | 1.353 | 243.947 | 3199.426 | 6.884 | -45.112 | 6.884 | 45.635 | 278.677 | 0.160 |
| 3300.000 | 1.425 | 244.662 | 3299.397 | 5.834 | -47.297 | 5.834 | 47.656 | 277.031 | 0.074 |
| 3400.000 | 1.897 | 253.147 | 3399.354 | 4.821 | -50.005 | 4.821 | 50.237 | 275.507 | 0.531 |
| 3500.000 | 1.843 | 260.139 | 3499.301 | 4.066 | -53.173 | 4.066 | 53.328 | 274.373 | 0.234 |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 3600.000 | 1.629 | 263.423 | 3599.255 | 3.628 | -56.169 | 3.628 | 56.286 | 273.696 | 0.235 |
| 3700.000 | 1.291 | 258.961 | 3699.223 | 3.250 | -58.687 | 3.250 | 58.777 | 273.169 | 0.356 |
| 3800.000 | 1.155 | 258.193 | 3799.200 | 2.828 | -60.780 | 2.828 | 60.845 | 272.664 | 0.138 |
| 3900.000 | 1.119 | 255.443 | 3899.180 | 2.376 | -62.711 | 2.376 | 62.756 | 272.170 | 0.065 |
| 4000.000 | 0.644 | 209.452 | 3999.169 | 1.641 | -63.933 | 1.641 | 63.954 | 271.470 | 0.816 |
| 4100.000 | 0.932 | 189.464 | 4099.160 | 0.349 | -64.343 | 0.349 | 64.344 | 270.311 | 0.394 |
| 4200.000 | 0.927 | 217.678 | 4199.147 | -1.093 | -64.972 | -1.093 | 64.981 | 269.036 | 0.453 |
| 4300.000 | 0.933 | 210.515 | 4299.134 | -2.435 | -65.880 | -2.435 | 65.925 | 267.883 | 0.116 |
| 4400.000 | 1.218 | 231.993 | 4399.117 | -3.791 | -67.130 | -3.791 | 67.237 | 266.768 | 0.488 |
| 4500.000 | 1.422 | 230.335 | 4499.090 | -5.237 | -68.923 | -5.237 | 69.122 | 265.654 | 0.208 |
| 4600.000 | 1.273 | 222.699 | 4599.063 | -6.846 | -70.632 | -6.846 | 70.963 | 264.464 | 0.233 |
| 4700.000 | 1.235 | 228.970 | 4699.039 | -8.370 | -72.198 | -8.370 | 72.681 | 263.387 | 0.142 |
| 4800.000 | 1.306 | 240.225 | 4799.014 | -9.643 | -74.000 | -9.643 | 74.626 | 262.575 | 0.259 |
| 4900.000 | 0.998 | 237.396 | 4898.994 | -10.678 | -75.722 | -10.678 | 76.472 | 261.973 | 0.313 |
| 5000.000 | 0.817 | 222.681 | 4998.982 | -11.671 | -76.939 | -11.671 | 77.819 | 261.374 | 0.293 |
| 5100.000 | 0.631 | 230.515 | 5098.974 | -12.545 | -77.847 | -12.545 | 78.852 | 260.845 | 0.210 |
| 5200.000 | 0.885 | 250.672 | 5198.965 | -13.151 | -79.001 | -13.151 | 80.088 | 260.549 | 0.365 |
| 5300.000 | 0.733 | 238.263 | 5298.955 | -13.743 | -80.274 | -13.743 | 81.442 | 260.285 | 0.231 |
| 5400.000 | 0.412 | 249.309 | 5398.950 | -14.207 | -81.155 | -14.207 | 82.389 | 260.070 | 0.338 |
| 5500.000 | 0.649 | 260.631 | 5498.946 | -14.427 | -82.051 | -14.427 | 83.309 | 260.028 | 0.258 |
| 5600.000 | 0.638 | 352.301 | 5598.941 | -13.967 | -82.684 | -13.967 | 83.855 | 260.412 | 0.924 |
| 5700.000 | 1.432 | 25.403 | 5698.925 | -12.286 | -82.223 | -12.286 | 83.136 | 261.501 | 0.962 |
| 5800.000 | 0.891 | 23.403 | 5798.904 | -10.445 | -81.378 | -10.445 | 82.046 | 262.686 | 0.542 |
| 5900.000 | 0.246 | 55.987 | 5898.899 | -9.611 | -80.891 | -9.611 | 81.460 | 263.224 | 0.696 |
| 6000.000 | 0.235 | 216.189 | 5998.899 | -9.656 | -80.834 | -9.656 | 81.409 | 263.188 | 0.474 |
| 6100.000 | 0.839 | 212.998 | 6098.894 | -10.436 | -81.354 | -10.436 | 82.021 | 262.690 | 0.605 |
| 6200.000 | 0.714 | 216.821 | 6198.885 | -11.549 | -82.127 | -11.549 | 82.935 | 261.995 | 0.135 |
| 6300.000 | 0.774 | 234.094 | 6298.876 | -12.444 | -83.047 | -12.444 | 83.975 | 261.478 | 0.231 |
| 6400.000 | 0.757 | 224.663 | 6398.867 | -13.311 | -84.059 | -13.311 | 85.107 | 261.002 | 0.127 |
| 6500.000 | 0.901 | 201.467 | 6498.857 | -14.513 | -84.812 | -14.513 | 86.044 | 260.290 | 0.362 |
| 6600.000 | 0.986 | 241.459 | 6598.845 | -15.656 | -85.855 | -15.656 | 87.271 | 259.666 | 0.650 |
| 6700.000 | 1.105 | 233.069 | 6698.828 | -16.646 | -87.382 | -16.646 | 88.953 | 259.214 | 0.194 |
| 6800.000 | 2.062 | 239.739 | 6798.789 | -18.132 | -89.707 | -18.132 | 91.521 | 258.573 | 0.973 |
| 6900.000 | 2.681 | 220.513 | 6898.704 | -20.817 | -92.780 | -20.817 | 95.087 | 257.354 | 0.999 |
| 7000.000 | 2.328 | 198.950 | 6998.611 | -24.516 | -94.959 | -24.516 | 98.072 | 255.524 | 0.999 |
| 7100.000 | 2.556 | 187.496 | 7098.520 | -28.648 | -95.909 | -28.648 | 100.097 | 253.369 | 0.538 |
| 7200.000 | 2.291 | 202.745 | 7198.432 | -32.703 | -96.973 | -32.703 | 102.339 | 251.364 | 0.695 |

HORIZONTAL DISPLACEMENT IS

102.339 FEET AT 251.364 DEGREES