

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Booth / C35-27
 Location: S-35 T-4N R-64W

Rig Name: Production
 State/County: Colorado / Weld County

Latitude: 40.28
 GRID North is 0.64 Degrees East of True North
 VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES, INC

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: inrun_ed.ut

Minimum Curvature Method

Report Date/Time: 2/22/2011 / 12:30

Vaughn Energy Services
 Denver, CO
 720-215-1841
 Robert Davis

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **** |
| 100.00 | 0.60 | 308.74 | 100.00 | 0.33 | -0.41 | 0.33 | 0.52 | 308.74 | 0.60 |
| 200.00 | 0.51 | 330.59 | 199.99 | 1.04 | -1.03 | 1.04 | 1.47 | 315.23 | 0.23 |
| 300.00 | 0.08 | 277.97 | 299.99 | 1.44 | -1.32 | 1.44 | 1.96 | 317.42 | 0.47 |
| 400.00 | 0.34 | 8.75 | 399.99 | 1.74 | -1.35 | 1.74 | 2.20 | 322.21 | 0.35 |
| 500.00 | 0.53 | 301.67 | 499.99 | 2.27 | -1.70 | 2.27 | 2.84 | 323.24 | 0.50 |
| 600.00 | 0.24 | 11.82 | 599.99 | 2.72 | -2.05 | 2.72 | 3.40 | 323.01 | 0.50 |
| 700.00 | 0.49 | 74.04 | 699.99 | 3.04 | -1.59 | 3.04 | 3.43 | 332.35 | 0.44 |
| 800.00 | 0.86 | 0.62 | 799.98 | 3.90 | -1.17 | 3.90 | 4.08 | 343.31 | 0.86 |
| 900.00 | 0.64 | 11.97 | 899.97 | 5.20 | -1.05 | 5.20 | 5.30 | 348.62 | 0.26 |
| 1000.00 | 0.43 | 62.03 | 999.97 | 5.92 | -0.60 | 5.92 | 5.95 | 354.24 | 0.49 |
| 1100.00 | 0.65 | 346.49 | 1099.96 | 6.65 | -0.40 | 6.65 | 6.66 | 356.59 | 0.68 |
| 1200.00 | 0.41 | 25.49 | 1199.96 | 7.52 | -0.37 | 7.52 | 7.53 | 357.15 | 0.42 |
| 1300.00 | 0.79 | 355.14 | 1299.95 | 8.53 | -0.28 | 8.53 | 8.53 | 358.12 | 0.48 |
| 1400.00 | 0.88 | 352.65 | 1399.94 | 9.97 | -0.44 | 9.97 | 9.98 | 357.50 | 0.10 |
| 1500.00 | 0.75 | 12.23 | 1499.93 | 11.37 | -0.39 | 11.37 | 11.38 | 358.01 | 0.30 |
| 1600.00 | 0.51 | 357.34 | 1599.93 | 12.46 | -0.28 | 12.46 | 12.46 | 358.73 | 0.29 |
| 1700.00 | 0.41 | 359.53 | 1699.92 | 13.27 | -0.30 | 13.27 | 13.27 | 358.70 | 0.10 |
| 1800.00 | 0.57 | 0.10 | 1799.92 | 14.12 | -0.30 | 14.12 | 14.13 | 358.77 | 0.15 |
| 1900.00 | 0.64 | 269.02 | 1899.92 | 14.61 | -0.86 | 14.61 | 14.63 | 356.65 | 0.86 |
| 2000.00 | 1.38 | 276.08 | 1999.90 | 14.72 | -2.61 | 14.72 | 14.95 | 349.96 | 0.75 |
| 2100.00 | 1.33 | 261.75 | 2099.87 | 14.68 | -4.96 | 14.68 | 15.50 | 341.35 | 0.34 |
| 2200.00 | 1.39 | 273.73 | 2199.85 | 14.60 | -7.32 | 14.60 | 16.33 | 333.38 | 0.29 |
| 2300.00 | 1.60 | 289.34 | 2299.81 | 15.14 | -9.84 | 15.14 | 18.05 | 326.98 | 0.46 |
| 2400.00 | 1.92 | 293.08 | 2399.76 | 16.25 | -12.69 | 16.25 | 20.62 | 322.01 | 0.34 |
| 2500.00 | 2.07 | 293.47 | 2499.70 | 17.63 | -15.89 | 17.63 | 23.74 | 317.97 | 0.15 |
| 2600.00 | 1.99 | 296.36 | 2599.64 | 19.12 | -19.11 | 19.12 | 27.03 | 315.02 | 0.13 |
| 2700.00 | 1.96 | 300.61 | 2699.58 | 20.77 | -22.14 | 20.77 | 30.35 | 313.17 | 0.15 |
| 2800.00 | 2.11 | 303.42 | 2799.52 | 22.65 | -25.15 | 22.65 | 33.84 | 312.01 | 0.18 |
| 2900.00 | 2.61 | 320.38 | 2899.43 | 25.42 | -28.13 | 25.42 | 37.92 | 312.10 | 0.85 |
| 3000.00 | 2.62 | 326.04 | 2999.33 | 29.06 | -30.86 | 29.06 | 42.39 | 313.28 | 0.26 |
| 3100.00 | 2.02 | 313.60 | 3099.25 | 32.17 | -33.41 | 32.17 | 46.38 | 313.92 | 0.78 |
| 3200.00 | 1.48 | 291.37 | 3199.20 | 33.85 | -35.89 | 33.85 | 49.33 | 313.33 | 0.86 |
| 3300.00 | 0.56 | 304.39 | 3299.19 | 34.60 | -37.49 | 34.60 | 51.01 | 312.70 | 0.94 |
| 3400.00 | 0.38 | 90.31 | 3399.19 | 34.87 | -37.56 | 34.87 | 51.25 | 312.88 | 0.90 |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 3500.00 | 1.23 | 85.40 | 3499.17 | 34.96 | -36.16 | 34.96 | 50.29 | 314.03 | 0.85 |
| 3600.00 | 1.22 | 88.83 | 3599.15 | 35.06 | -34.03 | 35.06 | 48.86 | 315.86 | 0.07 |
| 3700.00 | 1.41 | 76.79 | 3699.13 | 35.37 | -31.77 | 35.37 | 47.54 | 318.06 | 0.34 |
| 3800.00 | 1.39 | 76.31 | 3799.10 | 35.94 | -29.40 | 35.94 | 46.43 | 320.72 | 0.02 |
| 3900.00 | 1.88 | 60.76 | 3899.06 | 37.02 | -26.79 | 37.02 | 45.70 | 324.12 | 0.66 |
| 4000.00 | 1.96 | 59.26 | 3999.00 | 38.70 | -23.89 | 38.70 | 45.48 | 328.32 | 0.09 |
| 4100.00 | 1.79 | 55.40 | 4098.95 | 40.46 | -21.13 | 40.46 | 45.65 | 332.42 | 0.21 |
| 4200.00 | 1.66 | 39.79 | 4198.90 | 42.46 | -18.92 | 42.46 | 46.49 | 335.99 | 0.49 |
| 4300.00 | 1.29 | 26.48 | 4298.87 | 44.58 | -17.49 | 44.58 | 47.89 | 338.58 | 0.51 |
| 4400.00 | 1.11 | 27.36 | 4398.85 | 46.45 | -16.54 | 46.45 | 49.31 | 340.40 | 0.17 |
| 4500.00 | 1.14 | 19.60 | 4498.83 | 48.25 | -15.76 | 48.25 | 50.76 | 341.91 | 0.15 |
| 4600.00 | 1.49 | 26.89 | 4598.80 | 50.35 | -14.84 | 50.35 | 52.49 | 343.58 | 0.39 |
| 4700.00 | 2.23 | 39.83 | 4698.75 | 53.01 | -13.00 | 53.01 | 54.58 | 346.22 | 0.85 |
| 4800.00 | 1.92 | 34.67 | 4798.68 | 55.88 | -10.80 | 55.88 | 56.92 | 349.06 | 0.36 |
| 4900.00 | 1.96 | 42.85 | 4898.62 | 58.51 | -8.68 | 58.51 | 59.15 | 351.56 | 0.28 |
| 5000.00 | 1.77 | 39.12 | 4998.57 | 60.96 | -6.55 | 60.96 | 61.31 | 353.87 | 0.22 |
| 5100.00 | 1.43 | 41.48 | 5098.53 | 63.09 | -4.75 | 63.09 | 63.27 | 355.69 | 0.35 |
| 5200.00 | 1.43 | 39.16 | 5198.50 | 64.99 | -3.14 | 64.99 | 65.07 | 357.23 | 0.06 |
| 5300.00 | 1.54 | 36.97 | 5298.47 | 67.03 | -1.55 | 67.03 | 67.05 | 358.68 | 0.13 |
| 5400.00 | 1.53 | 39.72 | 5398.43 | 69.13 | 0.11 | 69.13 | 69.13 | 0.10 | 0.07 |
| 5500.00 | 1.48 | 37.44 | 5498.40 | 71.18 | 1.75 | 71.18 | 71.20 | 1.41 | 0.08 |
| 5600.00 | 1.40 | 51.04 | 5598.37 | 72.97 | 3.49 | 72.97 | 73.06 | 2.74 | 0.35 |
| 5700.00 | 1.60 | 54.94 | 5698.33 | 74.54 | 5.58 | 74.54 | 74.75 | 4.28 | 0.22 |
| 5800.00 | 1.53 | 54.77 | 5798.30 | 76.11 | 7.81 | 76.11 | 76.51 | 5.86 | 0.07 |
| 5900.00 | 1.36 | 44.19 | 5898.26 | 77.73 | 9.72 | 77.73 | 78.34 | 7.13 | 0.32 |
| 6000.00 | 1.30 | 35.61 | 5998.24 | 79.50 | 11.21 | 79.50 | 80.29 | 8.02 | 0.21 |
| 6100.00 | 1.35 | 42.49 | 6098.21 | 81.29 | 12.66 | 81.29 | 82.27 | 8.85 | 0.17 |
| 6200.00 | 1.48 | 49.48 | 6198.18 | 83.00 | 14.44 | 83.00 | 84.25 | 9.87 | 0.21 |
| 6300.00 | 1.26 | 47.45 | 6298.15 | 84.58 | 16.24 | 84.58 | 86.13 | 10.87 | 0.22 |
| 6400.00 | 1.26 | 53.29 | 6398.13 | 85.99 | 17.93 | 85.99 | 87.84 | 11.78 | 0.13 |
| 6500.00 | 1.05 | 58.40 | 6498.11 | 87.12 | 19.59 | 87.12 | 89.30 | 12.67 | 0.23 |
| 6600.00 | 0.62 | 66.47 | 6598.10 | 87.82 | 20.88 | 87.82 | 90.27 | 13.37 | 0.44 |
| 6700.00 | 1.53 | 50.35 | 6698.08 | 88.89 | 22.40 | 88.89 | 91.67 | 14.15 | 0.95 |
| 6800.00 | 1.93 | 46.44 | 6798.03 | 90.91 | 24.65 | 90.91 | 94.19 | 15.17 | 0.42 |
| 6900.00 | 1.43 | 56.72 | 6897.99 | 92.76 | 26.92 | 92.76 | 96.58 | 16.19 | 0.58 |
| 7000.00 | 1.55 | 55.18 | 6997.95 | 94.22 | 29.08 | 94.22 | 98.60 | 17.15 | 0.12 |
| 7100.00 | 1.76 | 50.74 | 7097.91 | 95.96 | 31.38 | 95.96 | 100.96 | 18.11 | 0.25 |
| 7200.00 | 1.50 | 42.60 | 7197.87 | 97.90 | 33.45 | 97.90 | 103.46 | 18.87 | 0.35 |

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| HORIZONTAL DISPLACEMENT IS 103.46 FEET AT 18.87 DEGREES | | | | | | | | | |
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