

VES

VAUGHN ENERGY SERVICES

Company: NOBLE ENERGY
 Lease/Well: NATIONAL HOG FARMS/ #12-21
 Location:
 Rig Name: PRODUCTION
 State/County: COLORADO/WELD COUNTY
 Latitude: 40.38
 GRID North is 0.69 Degrees East of True North
 VS-Azi: 0.00 Degrees

GTI

GYRO TECHNOLOGIES INC

FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : GL

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: run1-01.ut

Minimum Curvature Method

Report Date/Time: 5/19/2011 / 09:53

Vaughn Energy Services

Rifle, Colorado

303-489-9231

Jay Hinman

National Hog Farms 12-21/05-123-20809

| 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 | 0.69 | 10.48 | 100.00 | 0.59 | 0.11 | 0.59 | 0.60 | 10.48 | 0.69 |
| 200.00 | 0.77 | 22.68 | 199.99 | 1.80 | 0.48 | 1.80 | 1.86 | 14.86 | 0.18 |
| 300.00 | 0.62 | 38.54 | 299.98 | 2.84 | 1.07 | 2.84 | 3.04 | 20.67 | 0.25 |
| 400.00 | 1.02 | 42.24 | 399.97 | 3.92 | 2.00 | 3.92 | 4.40 | 27.07 | 0.40 |
| 500.00 | 1.19 | 44.26 | 499.95 | 5.32 | 3.32 | 5.32 | 6.27 | 31.99 | 0.18 |
| 600.00 | 1.14 | 43.49 | 599.93 | 6.78 | 4.73 | 6.78 | 8.27 | 34.89 | 0.05 |
| 700.00 | 1.34 | 33.04 | 699.91 | 8.48 | 6.05 | 8.48 | 10.42 | 35.50 | 0.30 |
| 800.00 | 1.26 | 26.84 | 799.88 | 10.44 | 7.18 | 10.44 | 12.68 | 34.52 | 0.16 |
| 900.00 | 1.30 | 29.94 | 899.86 | 12.41 | 8.25 | 12.41 | 14.90 | 33.61 | 0.08 |
| 1000.00 | 1.36 | 28.80 | 999.83 | 14.44 | 9.39 | 14.44 | 17.22 | 33.03 | 0.06 |
| 1100.00 | 1.22 | 25.71 | 1099.81 | 16.44 | 10.42 | 16.44 | 19.46 | 32.38 | 0.16 |
| 1200.00 | 1.18 | 30.44 | 1199.78 | 18.28 | 11.41 | 18.28 | 21.55 | 31.96 | 0.10 |
| 1300.00 | 1.17 | 25.16 | 1299.76 | 20.10 | 12.36 | 20.10 | 23.60 | 31.60 | 0.11 |
| 1400.00 | 1.08 | 34.66 | 1399.74 | 21.80 | 13.33 | 21.80 | 25.55 | 31.45 | 0.21 |
| 1500.00 | 0.80 | 49.68 | 1499.73 | 23.03 | 14.41 | 23.03 | 27.16 | 32.03 | 0.37 |
| 1600.00 | 0.58 | 69.69 | 1599.72 | 23.66 | 15.42 | 23.66 | 28.24 | 33.09 | 0.32 |
| 1700.00 | 0.45 | 74.74 | 1699.72 | 23.94 | 16.27 | 23.94 | 28.95 | 34.21 | 0.14 |
| 1800.00 | 0.26 | 88.30 | 1799.72 | 24.05 | 16.88 | 24.05 | 29.38 | 35.06 | 0.20 |
| 1900.00 | 0.77 | 97.91 | 1899.71 | 23.96 | 17.77 | 23.96 | 29.83 | 36.56 | 0.51 |
| 2000.00 | 1.26 | 107.42 | 1999.70 | 23.54 | 19.48 | 23.54 | 30.56 | 39.61 | 0.52 |
| 2100.00 | 1.32 | 109.10 | 2099.67 | 22.83 | 21.63 | 22.83 | 31.45 | 43.45 | 0.07 |
| 2200.00 | 1.41 | 114.45 | 2199.64 | 21.95 | 23.84 | 21.95 | 32.40 | 47.36 | 0.16 |
| 2300.00 | 1.51 | 116.65 | 2299.61 | 20.85 | 26.14 | 20.85 | 33.43 | 51.43 | 0.12 |
| 2400.00 | 1.42 | 113.51 | 2399.58 | 19.76 | 28.45 | 19.76 | 34.64 | 55.22 | 0.12 |
| 2500.00 | 1.22 | 119.65 | 2499.55 | 18.74 | 30.51 | 18.74 | 35.81 | 58.45 | 0.25 |
| 2600.00 | 0.95 | 122.25 | 2599.53 | 17.77 | 32.14 | 17.77 | 36.72 | 61.06 | 0.27 |
| 2700.00 | 0.77 | 131.89 | 2699.52 | 16.88 | 33.34 | 16.88 | 37.37 | 63.14 | 0.23 |
| 2800.00 | 0.86 | 127.18 | 2799.51 | 15.98 | 34.43 | 15.98 | 37.96 | 65.10 | 0.11 |
| 2900.00 | 0.80 | 128.93 | 2899.50 | 15.09 | 35.57 | 15.09 | 38.64 | 67.01 | 0.06 |
| 3000.00 | 0.92 | 128.05 | 2999.49 | 14.16 | 36.75 | 14.16 | 39.38 | 68.93 | 0.13 |
| 3100.00 | 1.30 | 138.93 | 3099.47 | 12.81 | 38.12 | 12.81 | 40.22 | 71.43 | 0.43 |
| 3200.00 | 2.20 | 140.97 | 3199.42 | 10.46 | 40.08 | 10.46 | 41.42 | 75.37 | 0.91 |
| 3300.00 | 2.57 | 145.72 | 3299.34 | 7.12 | 42.55 | 7.12 | 43.14 | 80.50 | 0.41 |
| 3400.00 | 2.54 | 155.08 | 3399.24 | 3.26 | 44.74 | 3.26 | 44.86 | 85.83 | 0.42 |

| <i>Measured Depth FT</i> | <i>Incl Angle Deg</i> | <i>Drift Direction Deg</i> | <i>TVD FT</i> | <i>+N/-S FT</i> | <i>+E/-W FT</i> | <i>Vertical Section FT</i> | <i>Closure Distance FT</i> | <i>Closure Direction Deg</i> | <i>Dogleg Severity Deg/100</i> |
|----------------------------------|-------------------------------|------------------------------------|-------------------|---------------------|---------------------|------------------------------------|------------------------------------|--------------------------------------|--|
| 3500.00 | 2.54 | 159.22 | 3499.14 | -0.82 | 46.46 | -0.82 | 46.47 | 91.01 | 0.18 |
| 3600.00 | 2.57 | 161.30 | 3599.04 | -5.01 | 47.97 | -5.01 | 48.23 | 95.96 | 0.10 |
| 3700.00 | 2.55 | 158.95 | 3698.94 | -9.20 | 49.48 | -9.20 | 50.33 | 100.53 | 0.11 |
| 3800.00 | 2.02 | 148.16 | 3798.86 | -12.77 | 51.21 | -12.77 | 52.78 | 104.00 | 0.67 |
| 3900.00 | 1.73 | 131.59 | 3898.81 | -15.27 | 53.27 | -15.27 | 55.41 | 106.00 | 0.61 |
| 4000.00 | 1.48 | 122.76 | 3998.77 | -16.97 | 55.48 | -16.97 | 58.02 | 107.01 | 0.35 |
| 4100.00 | 1.29 | 117.38 | 4098.74 | -18.19 | 57.56 | -18.19 | 60.37 | 107.53 | 0.23 |
| 4200.00 | 1.21 | 114.34 | 4198.72 | -19.14 | 59.52 | -19.14 | 62.53 | 107.82 | 0.10 |
| 4300.00 | 0.99 | 102.08 | 4298.70 | -19.75 | 61.33 | -19.75 | 64.43 | 107.85 | 0.33 |
| 4400.00 | 1.57 | 96.88 | 4398.67 | -20.10 | 63.54 | -20.10 | 66.64 | 107.55 | 0.60 |
| 4500.00 | 2.20 | 105.45 | 4498.62 | -20.78 | 66.75 | -20.78 | 69.91 | 107.29 | 0.68 |
| 4600.00 | 2.52 | 126.83 | 4598.54 | -22.61 | 70.36 | -22.61 | 73.90 | 107.81 | 0.93 |
| 4700.00 | 2.00 | 145.42 | 4698.46 | -25.37 | 73.12 | -25.37 | 77.39 | 109.13 | 0.89 |
| 4800.00 | 1.82 | 174.24 | 4798.41 | -28.38 | 74.27 | -28.38 | 79.51 | 110.92 | 0.97 |
| 4900.00 | 1.30 | 200.36 | 4898.37 | -31.03 | 74.03 | -31.03 | 80.27 | 112.74 | 0.86 |
| 5000.00 | 1.51 | 219.15 | 4998.34 | -33.12 | 72.80 | -33.12 | 79.98 | 114.46 | 0.50 |
| 5100.00 | 2.21 | 221.00 | 5098.29 | -35.60 | 70.70 | -35.60 | 79.16 | 116.73 | 0.70 |
| 5200.00 | 2.45 | 226.04 | 5198.20 | -38.54 | 67.90 | -38.54 | 78.07 | 119.58 | 0.32 |
| 5300.00 | 2.72 | 216.94 | 5298.10 | -41.92 | 64.93 | -41.92 | 77.29 | 122.85 | 0.49 |
| 5400.00 | 3.08 | 213.45 | 5397.97 | -46.06 | 62.02 | -46.06 | 77.26 | 126.60 | 0.40 |
| 5500.00 | 3.20 | 212.15 | 5497.82 | -50.66 | 59.06 | -50.66 | 77.81 | 130.63 | 0.14 |
| 5600.00 | 3.23 | 207.06 | 5597.67 | -55.54 | 56.29 | -55.54 | 79.07 | 134.61 | 0.29 |
| 5700.00 | 3.43 | 207.97 | 5697.50 | -60.69 | 53.60 | -60.69 | 80.97 | 138.55 | 0.20 |
| 5800.00 | 3.43 | 204.21 | 5797.32 | -66.06 | 50.98 | -66.06 | 83.44 | 142.34 | 0.23 |
| 5900.00 | 3.59 | 199.94 | 5897.13 | -71.73 | 48.68 | -71.73 | 86.69 | 145.84 | 0.30 |
| 6000.00 | 3.96 | 192.00 | 5996.92 | -78.05 | 46.90 | -78.05 | 91.05 | 149.00 | 0.64 |
| 6100.00 | 4.19 | 200.47 | 6096.66 | -84.85 | 44.90 | -84.85 | 96.00 | 152.11 | 0.64 |
| 6200.00 | 4.51 | 210.44 | 6196.38 | -91.67 | 41.63 | -91.67 | 100.68 | 155.58 | 0.82 |
| 6300.00 | 4.94 | 216.71 | 6296.04 | -98.51 | 37.06 | -98.51 | 105.25 | 159.38 | 0.67 |
| 6400.00 | 5.72 | 218.96 | 6395.60 | -105.83 | 31.36 | -105.83 | 110.38 | 163.49 | 0.81 |
| 6500.00 | 6.41 | 218.61 | 6495.04 | -114.07 | 24.74 | -114.07 | 116.72 | 167.76 | 0.70 |
| 6590.00 | 6.77 | 211.63 | 6584.45 | -122.51 | 18.82 | -122.51 | 123.95 | 171.26 | 0.97 |

HORIZONTAL DISPLACEMENT IS
123.95 FEET AT 171.26 DEGREES