

**VES**

VAUGHN ENERGY SERVICES

Company: Noble Energy  
 Lease/Well: Mick D / 18-19  
 Location: S-18 T-3N R-64W

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

Latitude: 40.23, Longitude: -104.60  
 GRID North is 0.58 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: 4/21/2011 / 15:21

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	0.23	41.92	100.00	0.15	0.13	0.15	0.20	41.92	0.23
200.00	0.01	308.05	200.00	0.30	0.25	0.30	0.39	40.16	0.23
300.00	0.17	328.73	300.00	0.44	0.17	0.44	0.47	20.99	0.16
400.00	0.48	321.13	400.00	0.89	-0.17	0.89	0.91	349.00	0.31
500.00	0.51	312.39	499.99	1.52	-0.77	1.52	1.70	333.21	0.08
600.00	0.52	322.15	599.99	2.18	-1.38	2.18	2.58	327.74	0.09
700.00	0.57	325.80	699.99	2.95	-1.93	2.95	3.52	326.75	0.06
800.00	0.51	326.63	799.98	3.72	-2.45	3.72	4.46	326.63	0.06
900.00	0.50	331.21	899.98	4.48	-2.91	4.48	5.34	327.01	0.04
1000.00	0.55	323.91	999.97	5.25	-3.40	5.25	6.26	327.06	0.08
1100.00	0.54	325.42	1099.97	6.03	-3.96	6.03	7.21	326.75	0.02
1200.00	0.42	322.40	1199.96	6.71	-4.45	6.71	8.05	326.47	0.12
1300.00	0.59	337.27	1299.96	7.48	-4.87	7.48	8.92	326.92	0.21
1400.00	0.63	338.16	1399.96	8.46	-5.27	8.46	9.97	328.07	0.04
1500.00	0.46	321.94	1499.95	9.28	-5.72	9.28	10.91	328.35	0.23
1600.00	0.45	310.68	1599.95	9.85	-6.26	9.85	11.68	327.55	0.09
1700.00	0.66	309.48	1699.94	10.47	-7.00	10.47	12.60	326.23	0.21
1800.00	0.66	287.69	1799.94	11.01	-7.99	11.01	13.60	324.03	0.25
1900.00	0.81	275.74	1899.93	11.25	-9.24	11.25	14.56	320.62	0.21
2000.00	0.91	306.93	1999.92	11.80	-10.58	11.80	15.85	318.14	0.47
2100.00	0.71	286.10	2099.91	12.46	-11.81	12.46	17.17	316.52	0.35
2200.00	0.79	295.62	2199.90	12.93	-13.03	12.93	18.36	314.76	0.15
2300.00	0.47	263.70	2299.89	13.18	-14.07	13.18	19.28	313.14	0.46
2400.00	0.22	303.69	2399.89	13.24	-14.63	13.24	19.74	312.14	0.34
2500.00	0.34	315.21	2499.89	13.56	-15.00	13.56	20.22	312.10	0.14
2600.00	0.06	303.86	2599.89	13.80	-15.26	13.80	20.57	312.12	0.28
2700.00	0.25	9.92	2699.89	14.04	-15.27	14.04	20.74	312.61	0.23
2800.00	0.28	357.88	2799.89	14.50	-15.24	14.50	21.03	313.57	0.06
2900.00	0.36	311.70	2899.89	14.95	-15.48	14.95	21.52	313.99	0.26
3000.00	0.49	56.69	2999.89	15.39	-15.35	15.39	21.74	315.07	0.68
3100.00	1.25	72.06	3099.87	15.96	-13.96	15.96	21.20	318.84	0.78
3200.00	1.39	74.98	3199.85	16.61	-11.75	16.61	20.35	324.74	0.16
3300.00	1.92	78.82	3299.80	17.25	-8.93	17.25	19.43	332.63	0.54
3400.00	2.22	80.10	3399.74	17.91	-5.38	17.91	18.70	343.29	0.30

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	1.34	82.50	3499.69	18.40	-2.30	18.40	18.54	352.86	0.88
3600.00	1.02	83.35	3599.67	18.65	-0.26	18.65	18.66	359.22	0.32
3700.00	1.05	68.03	3699.65	19.10	1.48	19.10	19.16	4.44	0.28
3800.00	1.01	74.64	3799.64	19.68	3.18	19.68	19.93	9.19	0.13
3900.00	1.00	71.31	3899.62	20.19	4.86	20.19	20.77	13.53	0.06
4000.00	0.23	5.53	3999.61	20.67	5.70	20.67	21.44	15.42	0.92
4100.00	0.52	280.48	4099.61	20.96	5.28	20.96	21.61	14.13	0.55
4200.00	0.79	292.12	4199.61	21.30	4.19	21.30	21.71	11.13	0.31
4300.00	0.96	283.37	4299.59	21.75	2.74	21.75	21.92	7.17	0.21
4400.00	0.87	275.29	4399.58	22.02	1.17	22.02	22.05	3.04	0.16
4500.00	1.06	295.93	4499.57	22.49	-0.42	22.49	22.50	358.94	0.39
4600.00	0.69	289.63	4599.56	23.10	-1.82	23.10	23.17	355.51	0.39
4700.00	0.76	293.04	4699.55	23.56	-2.99	23.56	23.75	352.77	0.08
4800.00	0.71	268.06	4799.54	23.80	-4.22	23.80	24.17	349.94	0.32
4900.00	0.96	286.45	4899.53	24.01	-5.65	24.01	24.67	346.76	0.37
5000.00	1.12	285.35	4999.51	24.51	-7.40	24.51	25.60	343.20	0.15
5100.00	1.21	266.66	5099.49	24.71	-9.40	24.71	26.43	339.18	0.39
5200.00	1.04	264.60	5199.47	24.56	-11.36	24.56	27.06	335.19	0.18
5300.00	1.01	258.42	5299.46	24.30	-13.12	24.30	27.61	331.64	0.12
5400.00	1.12	252.45	5399.44	23.83	-14.91	23.83	28.11	327.96	0.16
5500.00	1.23	256.79	5499.42	23.29	-16.89	23.29	28.77	324.05	0.14
5600.00	1.23	238.50	5599.40	22.48	-18.85	22.48	29.34	320.02	0.39
5700.00	1.16	233.00	5699.37	21.31	-20.57	21.31	29.62	316.01	0.13
5800.00	0.52	232.08	5799.36	20.42	-21.74	20.42	29.83	313.20	0.64
5900.00	0.26	223.03	5899.36	19.98	-22.25	19.98	29.91	311.92	0.27
6000.00	0.21	131.74	5999.36	19.69	-22.27	19.69	29.73	311.49	0.34
6100.00	0.38	93.20	6099.36	19.55	-21.80	19.55	29.28	311.89	0.25
6200.00	0.97	97.65	6199.35	19.42	-20.63	19.42	28.33	313.27	0.59
6300.00	1.49	77.03	6299.33	19.60	-18.53	19.60	26.97	316.61	0.67
6400.00	0.99	42.54	6399.31	20.52	-16.68	20.52	26.45	320.90	0.87
6500.00	0.96	349.64	6499.29	21.98	-16.25	21.98	27.33	323.52	0.87
6600.00	1.13	344.55	6599.28	23.75	-16.66	23.75	29.01	324.95	0.19
6700.00	0.98	296.96	6699.26	25.09	-17.69	25.09	30.70	324.81	0.86
6800.00	0.57	286.56	6799.25	25.62	-18.93	25.62	31.85	323.54	0.44
6900.00	0.79	303.46	6899.25	26.14	-19.98	26.14	32.90	322.61	0.30
7000.00	0.68	312.58	6999.24	26.93	-21.00	26.93	34.15	322.05	0.16
<div> <div>HORIZONTAL DISPLACEMENT IS</div> <div>34.15 FEET AT 322.05 DEGREES</div> </div>									