

**VES**

VAUGHN ENERGY SERVICES

Company: Noble Energy  
 Lease/Well: Donovan D / 2-3JI  
 Location: S-2 T-3N R-64W

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

Latitude: 40.26, Longitude: -104.52  
 GRID North is 0.63 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: 5/2/2011 / 12:34

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	0.57	130.62	100.00	-0.33	0.38	-0.33	0.50	130.62	0.57
200.00	0.87	126.44	199.99	-1.10	1.37	-1.10	1.76	128.81	0.30
300.00	0.41	147.29	299.98	-1.86	2.18	-1.86	2.86	130.46	0.51
400.00	0.28	162.97	399.98	-2.39	2.44	-2.39	3.42	134.37	0.16
500.00	0.38	121.47	499.98	-2.79	2.80	-2.79	3.95	134.97	0.25
600.00	0.50	175.23	599.98	-3.40	3.12	-3.40	4.61	137.49	0.41
700.00	0.35	161.78	699.98	-4.12	3.25	-4.12	5.25	141.76	0.18
800.00	0.50	142.64	799.97	-4.76	3.61	-4.76	5.97	142.82	0.20
900.00	0.59	173.92	899.97	-5.61	3.93	-5.61	6.85	145.03	0.31
1000.00	0.37	163.61	999.96	-6.44	4.07	-6.44	7.62	147.69	0.23
1100.00	0.60	150.20	1099.96	-7.21	4.42	-7.21	8.46	148.45	0.25
1200.00	0.62	159.44	1199.96	-8.16	4.87	-8.16	9.51	149.17	0.10
1300.00	0.63	164.87	1299.95	-9.20	5.21	-9.20	10.57	150.50	0.06
1400.00	0.55	176.68	1399.94	-10.22	5.38	-10.22	11.55	152.24	0.14
1500.00	0.55	175.94	1499.94	-11.18	5.44	-11.18	12.44	154.05	0.01
1600.00	0.48	167.22	1599.94	-12.07	5.57	-12.07	13.29	155.24	0.11
1700.00	0.54	151.67	1699.93	-12.89	5.88	-12.89	14.17	155.47	0.15
1800.00	0.36	130.34	1799.93	-13.52	6.35	-13.52	14.93	154.83	0.24
1900.00	0.38	77.45	1899.93	-13.65	6.92	-13.65	15.30	153.13	0.33
2000.00	0.40	79.14	1999.92	-13.51	7.59	-13.51	15.49	150.69	0.03
2100.00	0.93	45.27	2099.92	-12.87	8.51	-12.87	15.43	146.54	0.63
2200.00	1.69	58.14	2199.89	-11.53	10.34	-11.53	15.48	138.12	0.81
2300.00	1.79	60.43	2299.84	-9.98	12.95	-9.98	16.34	127.62	0.12
2400.00	1.93	60.78	2399.79	-8.38	15.78	-8.38	17.87	117.98	0.15
2500.00	1.16	64.19	2499.75	-7.12	18.16	-7.12	19.51	111.40	0.78
2600.00	0.89	62.71	2599.74	-6.32	19.77	-6.32	20.75	107.73	0.27
2700.00	1.02	67.16	2699.72	-5.62	21.28	-5.62	22.01	104.79	0.15
2800.00	0.93	51.69	2799.71	-4.77	22.74	-4.77	23.23	101.84	0.28
2900.00	0.64	56.30	2899.70	-3.95	23.84	-3.95	24.16	99.42	0.30
3000.00	0.41	64.39	2999.70	-3.49	24.63	-3.49	24.87	98.07	0.23
3100.00	0.24	136.31	3099.70	-3.48	25.09	-3.48	25.34	97.90	0.41
3200.00	0.48	196.46	3199.69	-4.03	25.12	-4.03	25.44	99.12	0.41
3300.00	1.13	249.69	3299.68	-4.77	24.08	-4.77	24.55	101.21	0.92
3400.00	0.99	261.94	3399.67	-5.23	22.30	-5.23	22.91	103.21	0.26

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	0.50	333.54	3499.66	-4.96	21.25	-4.96	21.82	103.14	0.96
3600.00	0.54	324.38	3599.66	-4.19	20.78	-4.19	21.20	101.39	0.09
3700.00	0.60	325.56	3699.65	-3.38	20.22	-3.38	20.50	99.49	0.06
3800.00	0.08	47.61	3799.65	-2.90	19.97	-2.90	20.18	98.27	0.59
3900.00	0.39	116.66	3899.65	-3.01	20.33	-3.01	20.55	98.42	0.37
4000.00	0.44	132.58	3999.65	-3.42	20.92	-3.42	21.20	99.29	0.12
4100.00	0.58	139.53	4099.64	-4.07	21.53	-4.07	21.91	100.69	0.15
4200.00	0.62	143.14	4199.64	-4.88	22.18	-4.88	22.72	102.42	0.06
4300.00	0.72	124.36	4299.63	-5.67	23.03	-5.67	23.72	103.84	0.24
4400.00	0.66	154.61	4399.62	-6.55	23.80	-6.55	24.68	105.39	0.37
4500.00	0.68	150.59	4499.62	-7.59	24.34	-7.59	25.49	107.32	0.05
4600.00	0.79	132.15	4599.61	-8.57	25.14	-8.57	26.56	108.83	0.26
4700.00	0.91	150.38	4699.60	-9.73	26.05	-9.73	27.80	110.48	0.29
4800.00	0.82	152.64	4799.59	-11.05	26.77	-11.05	28.96	112.43	0.09
4900.00	0.64	149.58	4899.58	-12.17	27.38	-12.17	29.97	113.97	0.18
5000.00	0.87	158.89	4999.57	-13.36	27.94	-13.36	30.97	115.56	0.25
5100.00	0.67	158.99	5099.56	-14.62	28.42	-14.62	31.96	117.22	0.19
5200.00	0.56	167.65	5199.55	-15.64	28.74	-15.64	32.72	118.56	0.15
5300.00	0.40	151.08	5299.55	-16.42	29.01	-16.42	33.33	119.51	0.21
5400.00	0.28	152.23	5399.55	-16.94	29.29	-16.94	33.84	120.04	0.12
5500.00	0.37	106.58	5499.55	-17.25	29.72	-17.25	34.36	120.13	0.27
5600.00	0.78	122.27	5599.54	-17.71	30.61	-17.71	35.36	120.05	0.43
5700.00	1.26	128.19	5699.53	-18.75	32.05	-18.75	37.13	120.33	0.49
5800.00	0.72	117.63	5799.51	-19.72	33.47	-19.72	38.85	120.51	0.57
5900.00	0.59	141.32	5899.50	-20.42	34.35	-20.42	39.96	120.73	0.30
6000.00	0.43	148.26	5999.50	-21.14	34.87	-21.14	40.77	121.23	0.17
6100.00	0.17	203.04	6099.50	-21.59	35.01	-21.59	41.13	121.66	0.36
6200.00	0.14	110.26	6199.50	-21.77	35.06	-21.77	41.27	121.83	0.22
6300.00	0.24	164.61	6299.50	-22.01	35.24	-22.01	41.55	121.99	0.20
6400.00	0.20	227.41	6399.50	-22.33	35.16	-22.33	41.66	122.42	0.23
6500.00	0.30	171.13	6499.50	-22.71	35.08	-22.71	41.79	122.92	0.25
6600.00	0.26	233.15	6599.50	-23.10	34.94	-23.10	41.88	123.48	0.29
6700.00	0.10	130.08	6699.50	-23.30	34.82	-23.30	41.90	123.78	0.30
6800.00	0.18	311.71	6799.50	-23.25	34.77	-23.25	41.83	123.77	0.28
HORIZONTAL DISPLACEMENT IS 41.83 FEET AT 123.77 DEGREES									