

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Moriah / 17-15
 Location: S-17 T-4N R-64W
 Rig Name: Production
 State/County: Colorado / Weld County
 Latitude: 0.00, Longitude: 0.00
 GRID North is 0.00 Degrees West 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: 2/18/2011 / 20:30

Vaughn Energy Services
 Fort Worth, Texas
 817-741-3610
 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	0.97	239.28	100.00	-0.43	-0.73	-0.43	0.84	239.28	0.97
200.00	1.01	249.63	199.98	-1.17	-2.28	-1.17	2.56	242.83	0.18
300.00	0.97	253.64	299.97	-1.71	-3.91	-1.71	4.27	246.36	0.08
400.00	0.78	258.09	399.95	-2.09	-5.39	-2.09	5.78	248.79	0.20
500.00	0.73	273.60	499.95	-2.19	-6.69	-2.19	7.04	251.86	0.21
600.00	0.81	276.86	599.94	-2.07	-8.03	-2.07	8.29	255.56	0.09
700.00	0.75	268.59	699.93	-2.00	-9.38	-2.00	9.59	257.98	0.13
800.00	0.78	264.95	799.92	-2.07	-10.71	-2.07	10.91	259.04	0.06
900.00	0.80	268.62	899.91	-2.15	-12.09	-2.15	12.28	259.91	0.05
1000.00	0.85	259.73	999.90	-2.30	-13.52	-2.30	13.72	260.35	0.14
1100.00	0.93	258.91	1099.89	-2.59	-15.05	-2.59	15.27	260.24	0.07
1200.00	1.01	266.07	1199.87	-2.80	-16.72	-2.80	16.96	260.48	0.15
1300.00	1.07	260.05	1299.86	-3.03	-18.53	-3.03	18.77	260.72	0.12
1400.00	0.87	276.45	1399.84	-3.10	-20.20	-3.10	20.44	261.27	0.34
1500.00	0.88	269.40	1499.83	-3.03	-21.73	-3.03	21.94	262.07	0.11
1600.00	0.78	279.59	1599.82	-2.92	-23.17	-2.92	23.35	262.82	0.18
1700.00	0.95	277.38	1699.81	-2.70	-24.67	-2.70	24.82	263.76	0.18
1800.00	0.83	264.88	1799.80	-2.66	-26.22	-2.66	26.35	264.21	0.23
1900.00	0.51	258.95	1899.79	-2.81	-27.38	-2.81	27.52	264.15	0.32
2000.00	0.47	263.12	1999.78	-2.94	-28.22	-2.94	28.38	264.05	0.05
2100.00	0.46	258.79	2099.78	-3.07	-29.03	-3.07	29.19	263.96	0.04
2200.00	0.44	227.97	2199.78	-3.41	-29.71	-3.41	29.91	263.46	0.24
2300.00	0.24	167.90	2299.78	-3.87	-29.96	-3.87	30.21	262.64	0.38
2400.00	0.63	98.71	2399.77	-4.16	-29.37	-4.16	29.67	261.94	0.59
2500.00	0.84	70.39	2499.77	-3.99	-28.14	-3.99	28.42	261.92	0.42
2600.00	0.96	80.04	2599.75	-3.60	-26.62	-3.60	26.86	262.29	0.19
2700.00	0.74	84.14	2699.74	-3.39	-25.15	-3.39	25.38	262.32	0.23
2800.00	0.65	92.63	2799.74	-3.35	-23.95	-3.35	24.18	262.03	0.13
2900.00	0.41	140.47	2899.73	-3.65	-23.16	-3.65	23.44	261.04	0.48
3000.00	0.41	168.53	2999.73	-4.28	-22.86	-4.28	23.26	259.39	0.20
3100.00	0.56	176.69	3099.73	-5.13	-22.76	-5.13	23.33	257.31	0.16
3200.00	0.59	172.94	3199.72	-6.13	-22.67	-6.13	23.48	254.88	0.04
3300.00	0.58	174.22	3299.72	-7.14	-22.55	-7.14	23.66	252.44	0.02
3400.00	0.79	170.10	3399.71	-8.32	-22.39	-8.32	23.88	249.61	0.22

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	0.68	147.23	3499.70	-9.49	-21.95	-9.49	23.91	246.61	0.31
3600.00	0.99	126.81	3599.69	-10.51	-20.94	-10.51	23.43	243.35	0.43
3700.00	1.09	111.35	3699.67	-11.37	-19.35	-11.37	22.45	239.56	0.30
3800.00	1.29	80.90	3799.65	-11.54	-17.35	-11.54	20.84	236.37	0.65
3900.00	0.41	53.27	3899.64	-11.15	-15.96	-11.15	19.47	235.05	0.95
4000.00	0.68	306.02	3999.64	-10.59	-16.15	-10.59	19.31	236.74	0.89
4100.00	1.61	301.55	4099.62	-9.51	-17.83	-9.51	20.20	241.92	0.94
4200.00	2.16	298.45	4199.56	-7.87	-20.68	-7.87	22.13	249.16	0.56
4300.00	2.15	322.82	4299.49	-5.48	-23.48	-5.48	24.11	256.87	0.91
4400.00	2.08	345.41	4399.43	-2.22	-25.07	-2.22	25.17	264.93	0.83
4500.00	2.84	358.51	4499.34	2.01	-25.59	2.01	25.67	274.50	0.94
4600.00	3.01	343.50	4599.21	7.01	-26.40	7.01	27.32	284.86	0.78
4700.00	2.38	333.15	4699.10	11.38	-28.09	11.38	30.30	292.05	0.80
4800.00	1.85	314.59	4799.03	14.36	-30.17	14.36	33.41	295.45	0.86
4900.00	1.57	312.93	4898.98	16.42	-32.32	16.42	36.26	296.93	0.28
5000.00	1.30	326.10	4998.95	18.29	-33.96	18.29	38.57	298.31	0.43
5100.00	0.84	328.01	5098.94	19.86	-34.98	19.86	40.22	299.58	0.46
5200.00	0.48	308.97	5198.93	20.75	-35.69	20.75	41.29	300.17	0.42
5300.00	0.44	336.85	5298.93	21.36	-36.17	21.36	42.01	300.56	0.23
5400.00	0.53	282.25	5398.92	21.81	-36.77	21.81	42.75	300.67	0.45
5500.00	0.76	239.99	5498.92	21.57	-37.80	21.57	43.52	299.72	0.52
5600.00	0.83	240.39	5598.91	20.88	-39.01	20.88	44.24	298.16	0.07
5700.00	0.72	236.84	5698.90	20.18	-40.16	20.18	44.95	296.68	0.12
5800.00	0.78	231.83	5798.89	19.42	-41.22	19.42	45.57	295.22	0.09
5900.00	1.06	229.12	5898.88	18.39	-42.45	18.39	46.27	293.43	0.28
6000.00	1.32	221.66	5998.85	16.93	-43.92	16.93	47.07	291.08	0.30
6100.00	1.69	212.95	6098.82	14.83	-45.49	14.83	47.84	288.06	0.43
6200.00	2.34	202.11	6198.76	11.70	-47.06	11.70	48.49	283.96	0.76
6300.00	2.77	193.31	6298.66	7.45	-48.38	7.45	48.95	278.76	0.58
6400.00	1.87	184.30	6398.58	3.48	-49.06	3.48	49.18	274.05	0.97
6500.00	0.92	176.05	6498.55	1.05	-49.13	1.05	49.14	271.23	0.97
6600.00	0.22	98.81	6598.54	0.22	-48.88	0.22	48.88	270.26	0.89
6700.00	0.97	90.28	6698.53	0.19	-47.84	0.19	47.84	270.23	0.75
6800.00	1.87	108.28	6798.50	-0.32	-45.45	-0.32	45.45	269.59	0.99
6900.00	2.76	112.14	6898.42	-1.74	-41.67	-1.74	41.71	267.61	0.90

<div> HORIZONTAL DISPLACEMENT IS 41.71 FEET AT 267.61 DEGREES </div>
