

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: State A / 36-13
 Location: S-36 T-6N R-64W

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

Latitude: 40.44, Longitude: -104.51
 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: outrun_ed.ut
 Minimum Curvature Method
 Report Date/Time: 3/16/2011 / 20:34

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	0.69	110.10	100.00	-0.21	0.56	-0.21	0.60	110.10	0.69
200.00	0.70	76.58	199.99	-0.27	1.72	-0.27	1.74	98.96	0.40
300.00	0.96	90.41	299.98	-0.14	3.15	-0.14	3.15	92.47	0.33
400.00	0.77	89.46	399.97	-0.14	4.66	-0.14	4.66	91.66	0.19
500.00	0.72	92.33	499.96	-0.15	5.97	-0.15	5.97	91.48	0.06
600.00	0.77	104.74	599.95	-0.35	7.25	-0.35	7.26	92.77	0.17
700.00	0.73	114.65	699.94	-0.79	8.47	-0.79	8.51	95.30	0.14
800.00	0.58	107.20	799.94	-1.20	9.54	-1.20	9.61	97.18	0.17
900.00	1.00	98.40	899.93	-1.48	10.89	-1.48	10.99	97.74	0.43
1000.00	1.00	91.14	999.91	-1.63	12.63	-1.63	12.73	97.34	0.13
1100.00	1.00	98.69	1099.90	-1.77	14.36	-1.77	14.47	97.04	0.13
1200.00	0.82	92.64	1199.88	-1.94	15.94	-1.94	16.05	96.94	0.20
1300.00	0.96	104.12	1299.87	-2.18	17.47	-2.18	17.60	97.10	0.22
1400.00	1.04	111.81	1399.86	-2.72	19.12	-2.72	19.31	98.09	0.15
1500.00	1.01	114.26	1499.84	-3.41	20.76	-3.41	21.04	99.34	0.05
1600.00	0.88	126.63	1599.83	-4.23	22.18	-4.23	22.58	100.81	0.24
1700.00	0.71	146.39	1699.82	-5.21	23.14	-5.21	23.72	102.69	0.32
1800.00	0.77	169.06	1799.81	-6.38	23.61	-6.38	24.46	105.13	0.29
1900.00	1.33	170.22	1899.79	-8.18	23.93	-8.18	25.29	108.87	0.56
2000.00	1.35	192.14	1999.77	-10.47	23.88	-10.47	26.08	113.68	0.51
2100.00	1.88	204.32	2099.73	-13.12	22.96	-13.12	26.44	119.75	0.63
2200.00	1.95	225.07	2199.67	-15.82	21.08	-15.82	26.35	126.89	0.69
2300.00	2.09	235.60	2299.61	-18.05	18.37	-18.05	25.75	134.50	0.40
2400.00	2.16	250.53	2399.54	-19.71	15.09	-19.71	24.82	142.56	0.56
2500.00	2.12	262.00	2499.47	-20.59	11.48	-20.59	23.58	150.86	0.43
2600.00	2.17	277.92	2599.40	-20.59	7.77	-20.59	22.01	159.32	0.60
2700.00	2.14	285.33	2699.33	-19.84	4.10	-19.84	20.25	168.32	0.28
2800.00	2.44	290.49	2799.25	-18.60	0.31	-18.60	18.60	179.05	0.37
2900.00	2.55	294.01	2899.16	-16.95	-3.72	-16.95	17.35	192.37	0.19
3000.00	2.10	310.06	2999.08	-14.86	-7.15	-14.86	16.50	205.70	0.79
3100.00	2.21	318.72	3099.01	-12.24	-9.83	-12.24	15.69	218.76	0.34
3200.00	2.13	323.59	3198.93	-9.29	-12.20	-9.29	15.34	232.72	0.20
3300.00	1.64	329.72	3298.88	-6.56	-14.03	-6.56	15.48	244.94	0.53
3400.00	1.44	336.53	3398.84	-4.17	-15.25	-4.17	15.81	254.70	0.27

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	1.44	325.86	3498.81	-1.98	-16.45	-1.98	16.57	263.15	0.27
3600.00	1.73	324.08	3598.77	0.29	-18.05	0.29	18.05	270.91	0.29
3700.00	1.73	322.51	3698.73	2.70	-19.85	2.70	20.03	277.76	0.05
3800.00	1.82	327.43	3798.68	5.24	-21.62	5.24	22.25	283.62	0.18
3900.00	1.70	319.71	3898.63	7.71	-23.44	7.71	24.68	288.22	0.27
4000.00	2.00	299.82	3998.58	9.71	-25.91	9.71	27.67	290.55	0.70
4100.00	2.13	285.98	4098.52	11.09	-29.21	11.09	31.24	290.79	0.51
4200.00	2.41	279.56	4198.44	11.95	-33.06	11.95	35.15	289.87	0.38
4300.00	2.73	271.77	4298.34	12.37	-37.51	12.37	39.50	288.26	0.47
4400.00	3.00	271.40	4398.22	12.51	-42.50	12.51	44.30	286.40	0.27
4500.00	2.58	257.17	4498.10	12.07	-47.31	12.07	48.83	284.32	0.80
4600.00	2.67	252.71	4597.99	10.88	-51.74	10.88	52.87	281.88	0.22
4700.00	2.69	251.46	4697.88	9.44	-56.19	9.44	56.97	279.54	0.06
4800.00	2.51	265.59	4797.78	8.53	-60.59	8.53	61.19	278.01	0.66
4900.00	1.68	268.92	4897.71	8.33	-64.24	8.33	64.78	277.39	0.84
5000.00	1.53	284.13	4997.67	8.63	-67.00	8.63	67.56	277.34	0.45
5100.00	0.92	314.01	5097.65	9.51	-68.88	9.51	69.53	277.86	0.87
5200.00	1.75	338.39	5197.63	11.49	-70.01	11.49	70.95	279.32	0.99
5300.00	2.53	352.55	5297.56	15.10	-70.86	15.10	72.45	282.03	0.94
5400.00	3.32	2.47	5397.42	20.18	-71.02	20.18	73.84	285.86	0.93
5500.00	3.35	13.37	5497.26	25.92	-70.22	25.92	74.85	290.26	0.63
5600.00	2.42	6.71	5597.13	30.87	-69.30	30.87	75.86	294.01	0.99
5700.00	1.81	359.56	5697.06	34.55	-69.06	34.55	77.22	296.57	0.67
5800.00	1.64	6.99	5797.01	37.54	-68.90	37.54	78.47	298.59	0.28
5900.00	1.15	41.62	5896.99	39.71	-68.06	39.71	78.80	300.26	0.95
6000.00	0.87	29.86	5996.97	41.12	-67.02	41.12	78.63	301.53	0.35
6100.00	0.77	39.79	6096.96	42.29	-66.21	42.29	78.57	302.57	0.17
6200.00	0.38	17.63	6196.96	43.13	-65.68	43.13	78.57	303.29	0.44
6300.00	0.89	33.14	6296.95	44.09	-65.16	44.09	78.67	304.09	0.53
6400.00	0.95	33.65	6396.94	45.43	-64.27	45.43	78.71	305.25	0.06
6500.00	1.07	36.83	6496.92	46.86	-63.26	46.86	78.72	306.53	0.14
6600.00	0.85	54.45	6596.91	48.04	-62.09	48.04	78.51	307.73	0.37
6700.00	0.63	43.97	6696.90	48.87	-61.11	48.87	78.24	308.65	0.26
6800.00	0.61	47.55	6796.89	49.62	-60.33	49.62	78.12	309.44	0.04
6900.00	0.14	49.44	6896.89	50.06	-59.85	50.06	78.02	309.91	0.47

<div> HORIZONTAL DISPLACEMENT IS 78.02 FEET AT 309.91 DEGREES </div>
