

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Spike State CC / 6-13
 Location: S-6 T-4N R-63W
 Rig Name: Production
 State/County: Colorado / Weld County
 Latitude: 40.34, Longitude: -104.49
 GRID North is 0.65 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: 3/25/2011 / 10:31

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	0.62	252.56	100.00	-0.16	-0.52	-0.16	0.54	252.56	0.62
200.00	0.38	277.37	199.99	-0.28	-1.36	-0.28	1.39	258.23	0.32
300.00	0.17	91.25	299.99	-0.24	-1.54	-0.24	1.56	260.97	0.54
400.00	0.28	235.72	399.99	-0.39	-1.60	-0.39	1.65	256.38	0.43
500.00	0.12	240.96	499.99	-0.58	-1.90	-0.58	1.98	253.03	0.16
600.00	0.43	176.72	599.99	-1.00	-1.97	-1.00	2.21	243.00	0.39
700.00	0.39	179.78	699.99	-1.72	-1.95	-1.72	2.60	228.54	0.04
800.00	0.43	190.36	799.99	-2.44	-2.01	-2.44	3.16	219.58	0.09
900.00	0.42	156.71	899.98	-3.14	-1.94	-3.14	3.69	211.61	0.25
1000.00	0.35	207.23	999.98	-3.75	-1.93	-3.75	4.22	207.20	0.33
1100.00	0.16	67.42	1099.98	-3.97	-1.94	-3.97	4.41	206.01	0.48
1200.00	0.35	301.05	1199.98	-3.75	-2.07	-3.75	4.28	208.81	0.47
1300.00	0.51	286.53	1299.98	-3.47	-2.75	-3.47	4.43	218.42	0.19
1400.00	0.33	331.87	1399.98	-3.09	-3.31	-3.09	4.53	226.99	0.36
1500.00	0.30	339.76	1499.97	-2.59	-3.54	-2.59	4.39	233.80	0.05
1600.00	0.41	258.95	1599.97	-2.41	-3.99	-2.41	4.66	238.82	0.47
1700.00	0.36	247.96	1699.97	-2.60	-4.63	-2.60	5.31	240.70	0.09
1800.00	0.38	238.36	1799.97	-2.89	-5.21	-2.89	5.96	240.96	0.06
1900.00	0.22	283.26	1899.97	-3.02	-5.68	-3.02	6.43	241.98	0.27
2000.00	0.41	277.41	1999.97	-2.93	-6.22	-2.93	6.88	244.76	0.19
2100.00	0.27	285.36	2099.96	-2.82	-6.80	-2.82	7.36	247.47	0.14
2200.00	0.39	239.81	2199.96	-2.93	-7.32	-2.93	7.89	248.20	0.28
2300.00	0.45	234.30	2299.96	-3.33	-7.93	-3.33	8.60	247.25	0.07
2400.00	0.68	205.82	2399.95	-4.09	-8.51	-4.09	9.44	244.35	0.35
2500.00	0.61	215.28	2499.95	-5.05	-9.07	-5.05	10.38	240.90	0.13
2600.00	0.84	242.22	2599.94	-5.82	-10.02	-5.82	11.59	239.85	0.40
2700.00	0.78	241.42	2699.93	-6.49	-11.27	-6.49	13.00	240.07	0.06
2800.00	0.96	222.87	2799.92	-7.43	-12.43	-7.43	14.48	239.15	0.33
2900.00	0.97	225.99	2899.91	-8.63	-13.62	-8.63	16.12	237.63	0.05
3000.00	0.75	253.20	2999.89	-9.41	-14.85	-9.41	17.58	237.64	0.46
3100.00	1.10	244.27	3099.88	-10.01	-16.34	-10.01	19.16	238.49	0.38
3200.00	0.51	261.23	3199.87	-10.50	-17.64	-10.50	20.53	239.24	0.63
3300.00	0.30	295.37	3299.87	-10.45	-18.31	-10.45	21.09	240.28	0.31
3400.00	0.44	332.91	3399.87	-10.00	-18.73	-10.00	21.23	241.91	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	0.44	343.51	3499.86	-9.29	-19.01	-9.29	21.16	243.96	0.08
3600.00	0.37	274.16	3599.86	-8.90	-19.44	-8.90	21.38	245.40	0.46
3700.00	0.42	271.22	3699.86	-8.87	-20.12	-8.87	21.99	246.22	0.06
3800.00	0.58	285.96	3799.86	-8.72	-20.98	-8.72	22.72	247.43	0.20
3900.00	0.69	280.17	3899.85	-8.47	-22.06	-8.47	23.64	248.99	0.13
4000.00	0.54	290.19	3999.84	-8.20	-23.10	-8.20	24.52	250.45	0.19
4100.00	1.37	257.56	4099.83	-8.30	-24.71	-8.30	26.07	251.44	0.95
4200.00	1.87	246.75	4199.79	-9.20	-27.38	-9.20	28.88	251.43	0.59
4300.00	1.48	248.32	4299.75	-10.32	-30.07	-10.32	31.79	251.06	0.40
4400.00	1.17	243.13	4399.72	-11.26	-32.18	-11.26	34.09	250.72	0.33
4500.00	1.21	230.49	4499.70	-12.39	-33.91	-12.39	36.10	249.93	0.26
4600.00	0.93	200.32	4599.68	-13.82	-35.00	-13.82	37.63	248.46	0.62
4700.00	0.63	201.97	4699.67	-15.08	-35.49	-15.08	38.56	246.97	0.30
4800.00	0.48	215.55	4799.67	-15.93	-35.93	-15.93	39.31	246.09	0.20
4900.00	0.31	212.68	4899.67	-16.49	-36.32	-16.49	39.89	245.58	0.17
5000.00	0.70	179.62	4999.66	-17.33	-36.46	-17.33	40.37	244.58	0.48
5100.00	0.22	196.63	5099.66	-18.12	-36.51	-18.12	40.76	243.60	0.50
5200.00	0.32	266.20	5199.66	-18.32	-36.84	-18.32	41.14	243.56	0.32
5300.00	0.33	228.39	5299.66	-18.53	-37.34	-18.53	41.68	243.60	0.21
5400.00	0.24	198.47	5399.65	-18.92	-37.62	-18.92	42.11	243.30	0.17
5500.00	0.29	231.05	5499.65	-19.28	-37.88	-19.28	42.51	243.03	0.16
5600.00	0.99	210.87	5599.65	-20.18	-38.52	-20.18	43.49	242.35	0.73
5700.00	1.84	190.34	5699.62	-22.51	-39.26	-22.51	45.25	240.17	0.98
5800.00	2.74	180.79	5799.53	-26.48	-39.58	-26.48	47.62	236.21	0.97
5900.00	3.33	167.58	5899.40	-31.71	-38.99	-31.71	50.25	230.88	0.91
6000.00	2.61	154.44	5999.26	-36.60	-37.38	-36.60	52.31	225.61	0.98
6100.00	1.85	145.86	6099.19	-39.99	-35.49	-39.99	53.47	221.59	0.83
6200.00	1.58	121.29	6199.14	-42.04	-33.41	-42.04	53.70	218.47	0.77
6300.00	1.41	95.66	6299.11	-42.88	-31.00	-42.88	52.91	215.87	0.68
6400.00	1.03	96.98	6399.09	-43.11	-28.89	-43.11	51.89	213.83	0.39
6500.00	0.78	90.55	6499.07	-43.22	-27.31	-43.22	51.13	212.29	0.26
6600.00	0.15	332.41	6599.07	-43.11	-26.69	-43.11	50.71	211.76	0.86

HORIZONTAL DISPLACEMENT IS 50.71 FEET AT 211.76 DEGREES									
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