

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Harless / 17-2
 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 / 20:37

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	0.65	224.80	100.00	-0.40	-0.40	-0.40	0.56	224.80	0.65
200.00	0.21	338.88	200.00	-0.63	-0.86	-0.63	1.07	233.69	0.76
300.00	0.06	153.44	300.00	-0.51	-0.90	-0.51	1.04	240.33	0.27
400.00	0.31	189.92	400.00	-0.83	-0.92	-0.83	1.24	228.10	0.26
500.00	0.70	244.45	499.99	-1.36	-1.52	-1.36	2.03	228.23	0.57
600.00	0.11	210.89	599.99	-1.70	-2.12	-1.70	2.71	231.19	0.61
700.00	0.19	184.32	699.99	-1.95	-2.18	-1.95	2.93	228.10	0.11
800.00	0.14	294.76	799.99	-2.07	-2.30	-2.07	3.10	227.97	0.28
900.00	0.68	254.83	899.99	-2.18	-2.98	-2.18	3.69	233.86	0.58
1000.00	0.21	198.56	999.98	-2.51	-3.62	-2.51	4.40	235.25	0.59
1100.00	0.62	266.84	1099.98	-2.71	-4.22	-2.71	5.02	237.25	0.58
1200.00	0.54	262.18	1199.97	-2.81	-5.23	-2.81	5.94	241.77	0.10
1300.00	0.22	221.89	1299.97	-3.02	-5.83	-3.02	6.56	242.63	0.40
1400.00	0.26	217.50	1399.97	-3.34	-6.09	-3.34	6.95	241.28	0.04
1500.00	0.50	267.83	1499.97	-3.53	-6.67	-3.53	7.55	242.08	0.39
1600.00	0.35	217.49	1599.97	-3.80	-7.30	-3.80	8.22	242.52	0.39
1700.00	0.37	287.80	1699.97	-3.94	-7.79	-3.94	8.73	243.18	0.42
1800.00	0.58	306.08	1799.96	-3.54	-8.52	-3.54	9.22	247.43	0.26
1900.00	0.55	318.57	1899.96	-2.88	-9.25	-2.88	9.68	252.70	0.13
2000.00	0.63	308.81	1999.95	-2.18	-9.99	-2.18	10.22	257.71	0.12
2100.00	0.62	302.29	2099.95	-1.54	-10.87	-1.54	10.98	261.92	0.07
2200.00	0.42	271.05	2199.94	-1.25	-11.70	-1.25	11.77	263.91	0.34
2300.00	0.50	290.34	2299.94	-1.09	-12.47	-1.09	12.52	265.00	0.17
2400.00	0.55	315.56	2399.93	-0.60	-13.22	-0.60	13.23	267.41	0.23
2500.00	0.83	348.95	2499.93	0.46	-13.69	0.46	13.70	271.92	0.48
2600.00	0.96	346.71	2599.92	1.99	-14.02	1.99	14.16	278.08	0.14
2700.00	1.00	354.25	2699.90	3.68	-14.31	3.68	14.77	284.42	0.13
2800.00	0.91	7.55	2799.89	5.33	-14.29	5.33	15.25	290.46	0.24
2900.00	0.69	344.15	2899.88	6.70	-14.35	6.70	15.84	295.01	0.39
3000.00	0.85	354.06	2999.87	8.02	-14.59	8.02	16.65	298.78	0.21
3100.00	0.79	349.10	3099.86	9.43	-14.80	9.43	17.55	302.51	0.09
3200.00	0.48	353.36	3199.85	10.52	-14.98	10.52	18.30	305.08	0.31
3300.00	0.61	355.09	3299.85	11.46	-15.07	11.46	18.94	307.26	0.13
3400.00	0.20	10.67	3399.84	12.17	-15.08	12.17	19.38	308.89	0.42

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	0.22	2.22	3499.84	12.53	-15.04	12.53	19.58	309.80	0.04
3600.00	0.07	261.80	3599.84	12.72	-15.09	12.72	19.74	310.12	0.24
3700.00	0.31	197.94	3699.84	12.45	-15.23	12.45	19.68	309.26	0.29
3800.00	0.25	192.69	3799.84	11.98	-15.37	11.98	19.48	307.94	0.06
3900.00	0.14	181.68	3899.84	11.64	-15.42	11.64	19.32	307.05	0.12
4000.00	0.23	216.56	3999.84	11.36	-15.54	11.36	19.25	306.16	0.14
4100.00	0.19	238.50	4099.84	11.11	-15.80	11.11	19.32	305.10	0.09
4200.00	0.24	254.62	4199.84	10.97	-16.14	10.97	19.52	304.19	0.07
4300.00	0.30	188.16	4299.84	10.65	-16.38	10.65	19.54	303.04	0.30
4400.00	0.25	227.30	4399.84	10.25	-16.57	10.25	19.49	301.73	0.19
4500.00	0.32	171.63	4499.84	9.83	-16.69	9.83	19.37	300.49	0.27
4600.00	0.29	186.15	4599.84	9.30	-16.68	9.30	19.09	299.14	0.08
4700.00	0.38	169.67	4699.83	8.72	-16.64	8.72	18.79	297.65	0.14
4800.00	0.52	206.35	4799.83	7.98	-16.78	7.98	18.59	295.44	0.31
4900.00	0.60	189.81	4899.83	7.07	-17.07	7.07	18.48	292.48	0.18
5000.00	0.44	214.51	4999.82	6.23	-17.38	6.23	18.47	289.73	0.27
5100.00	0.38	223.32	5099.82	5.68	-17.83	5.68	18.71	287.66	0.09
5200.00	0.48	217.53	5199.82	5.10	-18.31	5.10	19.01	285.57	0.11
5300.00	0.23	237.29	5299.81	4.66	-18.73	4.66	19.31	283.97	0.28
5400.00	0.24	291.74	5399.81	4.63	-19.10	4.63	19.65	283.63	0.22
5500.00	0.23	267.82	5499.81	4.70	-19.50	4.70	20.06	283.56	0.10
5600.00	0.21	265.65	5599.81	4.68	-19.88	4.68	20.43	283.24	0.02
5700.00	0.32	275.87	5699.81	4.69	-20.35	4.69	20.88	282.99	0.11
5800.00	0.34	288.06	5799.81	4.81	-20.90	4.81	21.45	282.97	0.07
5900.00	0.33	262.99	5899.81	4.87	-21.47	4.87	22.01	282.78	0.15
6000.00	0.25	249.20	5999.81	4.76	-21.96	4.76	22.47	282.22	0.11
6100.00	0.11	108.43	6099.81	4.65	-22.08	4.65	22.56	281.89	0.34
6200.00	0.27	103.68	6199.81	4.56	-21.76	4.56	22.24	281.84	0.16
6300.00	0.14	103.47	6299.81	4.48	-21.41	4.48	21.87	281.82	0.12
6400.00	0.46	323.73	6399.80	4.78	-21.53	4.78	22.05	282.51	0.58
6500.00	0.94	325.86	6499.80	5.78	-22.23	5.78	22.97	284.58	0.47
6600.00	1.23	328.09	6599.78	7.37	-23.25	7.37	24.40	287.59	0.30
6700.00	1.78	315.57	6699.74	9.39	-24.91	9.39	26.62	290.66	0.63
6800.00	2.33	320.20	6799.68	12.06	-27.30	12.06	29.84	293.84	0.58
6900.00	3.22	318.30	6899.56	15.72	-30.47	15.72	34.29	297.30	0.89

HORIZONTAL DISPLACEMENT IS 34.29 FEET AT 297.30 DEGREES
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