

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Thompson / 28-14

Location: S-28 T-4N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.28, Longitude: -104.56

GRID North is 0.61 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: 2/7/2011 / 15:02

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	0.17	329.97	100.00	0.13	-0.07	0.13	0.15	329.97	0.17
200.00	0.13	350.05	200.00	0.37	-0.17	0.37	0.41	335.59	0.06
300.00	0.43	271.15	300.00	0.49	-0.56	0.49	0.75	311.42	0.42
400.00	0.19	284.31	400.00	0.54	-1.09	0.54	1.22	296.39	0.24
500.00	0.41	178.95	500.00	0.23	-1.25	0.23	1.27	280.26	0.50
600.00	0.62	176.24	599.99	-0.68	-1.21	-0.68	1.38	240.80	0.22
700.00	0.28	169.68	699.99	-1.46	-1.13	-1.46	1.85	217.66	0.34
800.00	0.76	196.73	799.98	-2.34	-1.28	-2.34	2.67	208.58	0.53
900.00	0.90	176.46	899.97	-3.76	-1.42	-3.76	4.02	200.65	0.32
1000.00	1.07	185.99	999.96	-5.48	-1.47	-5.48	5.67	195.00	0.24
1100.00	1.04	191.69	1099.94	-7.30	-1.75	-7.30	7.51	193.48	0.11
1200.00	1.10	189.38	1199.92	-9.14	-2.09	-9.14	9.37	192.89	0.07
1300.00	1.21	196.81	1299.90	-11.09	-2.55	-11.09	11.38	192.96	0.19
1400.00	1.16	203.60	1399.88	-13.02	-3.26	-13.02	13.42	194.05	0.15
1500.00	0.90	207.82	1499.87	-14.64	-4.03	-14.64	15.19	195.39	0.26
1600.00	0.96	209.17	1599.85	-16.07	-4.81	-16.07	16.77	196.65	0.06
1700.00	0.50	224.97	1699.85	-17.10	-5.52	-17.10	17.97	197.88	0.50
1800.00	0.31	197.56	1799.84	-17.67	-5.91	-17.67	18.63	198.49	0.27
1900.00	0.74	135.72	1899.84	-18.39	-5.54	-18.39	19.20	196.77	0.65
2000.00	0.91	112.14	1999.83	-19.15	-4.35	-19.15	19.64	192.81	0.38
2100.00	1.00	104.48	2099.82	-19.66	-2.78	-19.66	19.86	188.03	0.15
2200.00	0.91	105.56	2199.80	-20.10	-1.17	-20.10	20.13	183.33	0.09
2300.00	1.17	118.99	2299.79	-20.80	0.49	-20.80	20.81	178.65	0.35
2400.00	1.22	125.41	2399.76	-21.91	2.25	-21.91	22.03	174.15	0.14
2500.00	1.27	136.13	2499.74	-23.32	3.88	-23.32	23.64	170.56	0.24
2600.00	0.94	153.84	2599.72	-24.86	5.01	-24.86	25.35	168.61	0.47
2700.00	0.90	163.76	2699.71	-26.34	5.59	-26.34	26.93	168.03	0.16
2800.00	0.96	171.72	2799.70	-27.92	5.93	-27.92	28.55	168.02	0.14
2900.00	0.81	168.81	2899.68	-29.44	6.18	-29.44	30.09	168.14	0.15
3000.00	1.17	179.16	2999.67	-31.16	6.34	-31.16	31.80	168.51	0.40
3100.00	1.00	194.76	3099.65	-33.02	6.13	-33.02	33.59	169.49	0.34
3200.00	1.37	208.31	3199.63	-34.92	5.34	-34.92	35.33	171.31	0.47
3300.00	1.65	222.70	3299.60	-37.04	3.79	-37.04	37.23	174.16	0.47
3400.00	1.80	212.79	3399.55	-39.42	1.96	-39.42	39.47	177.15	0.33

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	2.30	205.13	3499.49	-42.56	0.26	-42.56	42.56	179.66	0.56
3600.00	2.69	207.26	3599.39	-46.46	-1.67	-46.46	46.49	182.06	0.40
3700.00	2.92	206.81	3699.27	-50.82	-3.89	-50.82	50.97	184.38	0.24
3800.00	3.13	204.76	3799.13	-55.57	-6.19	-55.57	55.92	186.35	0.23
3900.00	3.28	212.93	3898.98	-60.46	-8.89	-60.46	61.10	188.36	0.48
4000.00	3.43	216.85	3998.80	-65.25	-12.24	-65.25	66.39	190.62	0.27
4100.00	3.63	218.33	4098.61	-70.13	-15.99	-70.13	71.93	192.85	0.21
4200.00	3.55	217.56	4198.42	-75.06	-19.84	-75.06	77.64	194.81	0.09
4300.00	3.85	211.59	4298.21	-80.38	-23.49	-80.38	83.74	196.29	0.49
4400.00	3.49	207.52	4398.00	-85.94	-26.66	-85.94	89.98	197.23	0.44
4500.00	3.65	203.46	4497.81	-91.56	-29.33	-91.56	96.15	197.76	0.29
4600.00	3.38	191.64	4597.62	-97.37	-31.19	-97.37	102.24	197.76	0.77
4700.00	2.97	194.48	4697.47	-102.76	-32.43	-102.76	107.76	197.52	0.44
4800.00	2.74	191.41	4797.35	-107.61	-33.55	-107.61	112.72	197.32	0.27
4900.00	2.00	200.23	4897.26	-111.59	-34.63	-111.59	116.84	197.24	0.82
5000.00	1.14	217.57	4997.22	-114.01	-35.84	-114.01	119.52	197.45	0.98
5100.00	0.54	212.94	5097.21	-115.20	-36.70	-115.20	120.91	197.67	0.60
5200.00	0.42	35.21	5197.21	-115.30	-36.75	-115.30	121.01	197.68	0.96
5300.00	1.38	39.68	5297.20	-114.07	-35.77	-114.07	119.55	197.41	0.97
5400.00	2.00	41.36	5397.15	-111.83	-33.84	-111.83	116.84	196.84	0.62
5500.00	1.03	40.83	5497.12	-109.83	-32.10	-109.83	114.43	196.29	0.97
5600.00	1.09	35.57	5597.10	-108.38	-30.95	-108.38	112.71	195.94	0.11
5700.00	0.97	32.42	5697.08	-106.89	-29.94	-106.89	111.00	195.65	0.13
5800.00	1.12	47.03	5797.07	-105.50	-28.77	-105.50	109.36	195.26	0.31
5900.00	0.92	15.25	5897.05	-104.06	-27.85	-104.06	107.72	194.98	0.59
6000.00	0.62	30.68	5997.04	-102.82	-27.36	-102.82	106.39	194.90	0.36
6100.00	0.45	13.87	6097.04	-101.97	-26.99	-101.97	105.48	194.82	0.23
6200.00	0.65	25.10	6197.03	-101.08	-26.65	-101.08	104.53	194.77	0.22
6300.00	0.70	319.53	6297.03	-100.11	-26.81	-100.11	103.63	194.99	0.73
6400.00	0.67	322.77	6397.02	-99.17	-27.56	-99.17	102.93	195.53	0.04
6500.00	0.66	281.67	6497.01	-98.59	-28.48	-98.59	102.62	196.11	0.47
6600.00	0.51	298.00	6597.01	-98.26	-29.43	-98.26	102.58	196.68	0.22
6700.00	0.29	289.62	6697.01	-97.97	-30.07	-97.97	102.48	197.06	0.23
6800.00	0.20	357.09	6797.01	-97.71	-30.31	-97.71	102.31	197.23	0.28
6900.00	0.38	53.39	6897.00	-97.35	-30.06	-97.35	101.88	197.16	0.31

<div> HORIZONTAL DISPLACEMENT IS 101.88 FEET AT 197.16 DEGREES </div>
