

**VES**

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Gemini B / 31-14

Location: S-31 T-5N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.35, Longitude: -104.59

GRID North is 0.59 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: 4/11/2011 / 20:20

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	0.32	200.69	100.00	-0.26	-0.10	-0.26	0.28	200.69	0.32
200.00	0.32	152.57	200.00	-0.77	-0.07	-0.77	0.78	185.33	0.26
300.00	0.11	330.45	300.00	-0.94	0.01	-0.94	0.94	179.43	0.42
400.00	0.34	301.26	400.00	-0.70	-0.29	-0.70	0.76	202.61	0.26
500.00	0.19	309.35	500.00	-0.44	-0.68	-0.44	0.81	237.09	0.15
600.00	0.15	210.24	600.00	-0.45	-0.88	-0.45	0.99	243.01	0.27
700.00	0.18	159.60	700.00	-0.71	-0.89	-0.71	1.14	231.35	0.15
800.00	0.52	205.12	799.99	-1.27	-1.02	-1.27	1.63	218.94	0.41
900.00	0.47	230.53	899.99	-1.94	-1.53	-1.94	2.47	218.35	0.22
1000.00	0.46	217.51	999.99	-2.52	-2.09	-2.52	3.27	219.76	0.11
1100.00	0.49	217.36	1099.98	-3.18	-2.60	-3.18	4.11	219.28	0.03
1200.00	0.49	232.30	1199.98	-3.78	-3.20	-3.78	4.96	220.24	0.13
1300.00	0.43	235.22	1299.98	-4.26	-3.85	-4.26	5.74	222.11	0.06
1400.00	0.11	337.94	1399.98	-4.39	-4.20	-4.39	6.07	223.69	0.47
1500.00	0.08	336.81	1499.97	-4.25	-4.26	-4.25	6.01	225.08	0.03
1600.00	0.27	241.80	1599.97	-4.30	-4.49	-4.30	6.22	226.29	0.29
1700.00	0.58	187.69	1699.97	-4.91	-4.77	-4.91	6.85	224.16	0.48
1800.00	0.61	191.35	1799.97	-5.94	-4.94	-5.94	7.73	219.76	0.05
1900.00	0.88	192.99	1899.96	-7.21	-5.22	-7.21	8.90	215.91	0.26
2000.00	0.68	215.86	1999.95	-8.43	-5.74	-8.43	10.20	214.24	0.36
2100.00	0.64	152.98	2099.94	-9.41	-5.83	-9.41	11.07	211.81	0.68
2200.00	0.60	166.25	2199.94	-10.41	-5.46	-10.41	11.75	207.66	0.15
2300.00	0.67	154.62	2299.93	-11.45	-5.08	-11.45	12.53	203.91	0.15
2400.00	0.85	146.60	2399.92	-12.60	-4.42	-12.60	13.36	199.32	0.20
2500.00	0.88	141.62	2499.91	-13.83	-3.53	-13.83	14.27	194.34	0.08
2600.00	0.95	143.18	2599.90	-15.09	-2.56	-15.09	15.31	189.63	0.07
2700.00	1.05	144.19	2699.88	-16.50	-1.53	-16.50	16.57	185.29	0.10
2800.00	0.96	150.15	2799.87	-17.97	-0.57	-17.97	17.98	181.83	0.13
2900.00	1.00	156.42	2899.85	-19.50	0.19	-19.50	19.50	179.43	0.11
3000.00	0.72	161.28	2999.84	-20.89	0.74	-20.89	20.90	177.96	0.28
3100.00	0.75	164.10	3099.83	-22.12	1.13	-22.12	22.15	177.09	0.04
3200.00	0.18	181.19	3199.83	-22.90	1.30	-22.90	22.94	176.75	0.58
3300.00	0.52	141.25	3299.83	-23.41	1.58	-23.41	23.46	176.13	0.40
3400.00	0.34	160.92	3399.83	-24.04	1.96	-24.04	24.12	175.33	0.23

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	0.93	85.73	3499.82	-24.26	2.87	-24.26	24.43	173.26	0.90
3600.00	1.35	85.60	3599.80	-24.11	4.86	-24.11	24.59	168.61	0.42
3700.00	1.59	82.40	3699.77	-23.83	7.41	-23.83	24.96	162.73	0.25
3800.00	1.61	81.34	3799.73	-23.44	10.17	-23.44	25.55	156.54	0.04
3900.00	1.71	81.18	3899.69	-23.00	13.04	-23.00	26.44	150.46	0.09
4000.00	1.60	76.81	3999.64	-22.45	15.87	-22.45	27.49	144.75	0.16
4100.00	2.03	83.34	4099.59	-21.93	18.99	-21.93	29.01	139.10	0.48
4200.00	1.99	93.56	4199.53	-21.83	22.49	-21.83	31.34	134.14	0.36
4300.00	2.00	94.72	4299.47	-22.08	25.96	-22.08	34.08	130.38	0.04
4400.00	1.71	106.19	4399.42	-22.64	29.14	-22.64	36.90	127.85	0.48
4500.00	1.64	105.90	4499.38	-23.45	31.94	-23.45	39.63	126.28	0.06
4600.00	1.95	106.39	4599.33	-24.32	34.95	-24.32	42.58	124.83	0.30
4700.00	2.37	109.31	4699.26	-25.48	38.54	-25.48	46.20	123.47	0.44
4800.00	2.54	110.65	4799.16	-26.95	42.57	-26.95	50.38	122.34	0.18
4900.00	2.47	111.53	4899.07	-28.52	46.65	-28.52	54.68	121.44	0.08
5000.00	2.14	115.67	4998.99	-30.12	50.33	-30.12	58.66	120.90	0.37
5100.00	2.04	115.22	5098.92	-31.69	53.62	-31.69	62.28	120.58	0.10
5200.00	1.24	128.16	5198.88	-33.11	56.08	-33.11	65.12	120.56	0.87
5300.00	1.37	133.44	5298.85	-34.60	57.80	-34.60	67.36	120.91	0.18
5400.00	1.54	144.73	5398.82	-36.52	59.44	-36.52	69.76	121.57	0.33
5500.00	1.60	116.39	5498.79	-38.24	61.47	-38.24	72.39	121.88	0.77
5600.00	0.98	110.37	5598.76	-39.16	63.53	-39.16	74.63	121.65	0.63
5700.00	1.39	88.39	5698.74	-39.42	65.54	-39.42	76.49	121.03	0.60
5800.00	1.28	76.64	5798.71	-39.13	67.84	-39.13	78.32	119.98	0.29
5900.00	0.86	88.04	5898.69	-38.85	69.68	-38.85	79.78	119.14	0.47
6000.00	0.66	100.84	5998.69	-38.93	71.00	-38.93	80.97	118.74	0.26
6100.00	0.51	86.83	6098.68	-39.01	72.01	-39.01	81.90	118.45	0.21
6200.00	0.53	104.63	6198.68	-39.11	72.91	-39.11	82.74	118.21	0.16
6300.00	0.11	161.90	6298.67	-39.32	73.39	-39.32	83.26	118.18	0.48
6400.00	0.16	133.06	6398.67	-39.50	73.53	-39.50	83.47	118.25	0.08
6500.00	0.09	217.50	6498.67	-39.67	73.58	-39.67	83.59	118.33	0.18
6600.00	0.19	143.07	6598.67	-39.86	73.63	-39.86	83.73	118.43	0.19
6700.00	0.19	326.65	6698.67	-39.86	73.64	-39.86	83.73	118.43	0.38
6800.00	0.08	167.83	6798.67	-39.78	73.56	-39.78	83.63	118.41	0.26
6900.00	0.09	16.61	6898.67	-39.77	73.60	-39.77	83.66	118.38	0.16
7000.00	0.17	358.36	6998.67	-39.54	73.62	-39.54	83.56	118.24	0.09
<div> <div>HORIZONTAL DISPLACEMENT IS</div> <div>83.56 FEET AT 118.24 DEGREES</div> </div>									