

**VES**

VAUGHN ENERGY SERVICES

Company: Noble Energy  
 Lease/Well: Rohr / 15-414  
 Location: S-15 T-4N R-64W

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

Latitude: 40.32, Longitude: -104.54  
 GRID North is 0.62 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: 5/11/2011 / 11:22

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	0.36	188.22	100.00	-0.31	-0.05	-0.31	0.31	188.22	0.36
200.00	0.07	131.72	200.00	-0.67	-0.04	-0.67	0.67	183.62	0.33
300.00	0.32	152.81	300.00	-0.95	0.13	-0.95	0.96	172.11	0.25
400.00	0.16	116.13	400.00	-1.26	0.38	-1.26	1.32	163.19	0.21
500.00	0.16	262.04	500.00	-1.34	0.37	-1.34	1.39	164.76	0.30
600.00	0.37	242.68	600.00	-1.51	-0.06	-1.51	1.51	182.31	0.23
700.00	0.39	217.86	699.99	-1.93	-0.56	-1.93	2.01	196.19	0.17
800.00	0.43	239.95	799.99	-2.39	-1.10	-2.39	2.63	204.66	0.16
900.00	0.47	244.90	899.99	-2.75	-1.79	-2.75	3.28	213.11	0.06
1000.00	0.40	241.49	999.99	-3.09	-2.48	-3.09	3.96	218.67	0.07
1100.00	0.45	249.58	1099.98	-3.40	-3.15	-3.40	4.64	222.85	0.07
1200.00	0.42	247.94	1199.98	-3.67	-3.86	-3.67	5.33	226.42	0.03
1300.00	0.49	253.52	1299.98	-3.93	-4.61	-3.93	6.06	229.54	0.08
1400.00	0.39	244.25	1399.97	-4.20	-5.33	-4.20	6.78	231.74	0.12
1500.00	0.18	205.61	1499.97	-4.49	-5.70	-4.49	7.26	231.78	0.27
1600.00	0.14	151.51	1599.97	-4.74	-5.71	-4.74	7.42	230.33	0.15
1700.00	0.33	154.26	1699.97	-5.10	-5.53	-5.10	7.52	227.31	0.19
1800.00	0.65	166.11	1799.97	-5.91	-5.27	-5.91	7.91	221.74	0.33
1900.00	1.31	161.60	1899.95	-7.54	-4.77	-7.54	8.92	212.35	0.66
2000.00	1.42	138.23	1999.92	-9.54	-3.59	-9.54	10.19	200.62	0.56
2100.00	1.49	133.44	2099.89	-11.35	-1.83	-11.35	11.50	189.13	0.14
2200.00	1.51	155.94	2199.86	-13.45	-0.35	-13.45	13.45	181.48	0.58
2300.00	1.60	145.01	2299.82	-15.79	0.99	-15.79	15.82	176.42	0.31
2400.00	2.56	142.08	2399.76	-18.70	3.16	-18.70	18.96	170.39	0.97
2500.00	3.21	136.40	2499.63	-22.49	6.47	-22.49	23.40	163.95	0.71
2600.00	3.15	125.76	2599.48	-26.13	10.63	-26.13	28.21	157.85	0.59
2700.00	3.08	117.98	2699.33	-28.99	15.24	-28.99	32.75	152.28	0.43
2800.00	2.72	116.67	2799.20	-31.31	19.72	-31.31	37.01	147.80	0.37
2900.00	2.41	122.10	2899.10	-33.50	23.62	-33.50	40.99	144.81	0.39
3000.00	1.74	125.36	2999.03	-35.49	26.64	-35.49	44.38	143.11	0.69
3100.00	1.08	150.35	3099.00	-37.19	28.34	-37.19	46.76	142.68	0.89
3200.00	0.81	180.70	3198.99	-38.71	28.80	-38.71	48.25	143.35	0.56
3300.00	0.68	218.86	3298.98	-39.88	28.42	-39.88	48.97	144.52	0.50
3400.00	0.82	240.35	3398.97	-40.69	27.43	-40.69	49.08	146.01	0.31

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	0.81	243.59	3498.96	-41.36	26.18	-41.36	48.95	147.66	0.05
3600.00	0.92	256.55	3598.95	-41.86	24.77	-41.86	48.64	149.38	0.23
3700.00	1.05	245.88	3698.94	-42.42	23.15	-42.42	48.33	151.37	0.22
3800.00	1.06	243.95	3798.92	-43.20	21.49	-43.20	48.25	153.55	0.04
3900.00	1.28	241.24	3898.90	-44.14	19.69	-44.14	48.33	155.96	0.23
4000.00	1.39	252.05	3998.87	-45.05	17.56	-45.05	48.35	158.70	0.27
4100.00	1.57	251.50	4098.84	-45.85	15.10	-45.85	48.28	161.77	0.19
4200.00	1.74	245.08	4198.80	-46.93	12.43	-46.93	48.55	165.17	0.25
4300.00	1.86	258.54	4298.75	-47.89	9.46	-47.89	48.82	168.82	0.44
4400.00	2.09	249.90	4398.69	-48.84	6.17	-48.84	49.23	172.80	0.38
4500.00	2.58	238.62	4498.61	-50.64	2.54	-50.64	50.70	177.13	0.67
4600.00	2.74	245.41	4598.50	-52.80	-1.56	-52.80	52.82	181.69	0.35
4700.00	2.89	230.27	4698.38	-55.41	-5.67	-55.41	55.70	185.84	0.76
4800.00	2.25	217.20	4798.28	-58.58	-8.80	-58.58	59.24	188.54	0.86
4900.00	2.12	208.65	4898.21	-61.77	-10.87	-61.77	62.72	189.98	0.35
5000.00	1.29	196.75	4998.16	-64.47	-12.08	-64.47	65.60	190.61	0.90
5100.00	0.61	183.88	5098.15	-66.08	-12.44	-66.08	67.25	190.66	0.71
5200.00	0.61	179.86	5198.14	-67.15	-12.48	-67.15	68.30	190.53	0.04
5300.00	0.38	172.32	5298.14	-68.01	-12.43	-68.01	69.14	190.36	0.23
5400.00	0.36	211.39	5398.14	-68.61	-12.55	-68.61	69.75	190.37	0.25
5500.00	0.29	235.39	5498.14	-69.02	-12.92	-69.02	70.22	190.60	0.15
5600.00	0.12	210.48	5598.14	-69.26	-13.18	-69.26	70.50	190.78	0.18
5700.00	0.45	90.15	5698.14	-69.35	-12.85	-69.35	70.53	190.49	0.52
5800.00	0.48	90.10	5798.13	-69.35	-12.03	-69.35	70.39	189.84	0.03
5900.00	0.43	39.60	5898.13	-69.07	-11.38	-69.07	70.00	189.35	0.39
6000.00	0.53	319.21	5998.13	-68.43	-11.44	-68.43	69.38	189.49	0.62
6100.00	0.42	331.91	6098.12	-67.76	-11.92	-67.76	68.80	189.97	0.15
6200.00	0.52	13.81	6198.12	-66.99	-11.98	-66.99	68.06	190.14	0.35
6300.00	0.50	324.62	6298.12	-66.20	-12.13	-66.20	67.30	190.38	0.42
6400.00	0.50	337.43	6398.11	-65.43	-12.55	-65.43	66.63	190.86	0.11
6500.00	0.34	334.72	6498.11	-64.76	-12.85	-64.76	66.02	191.22	0.17
6600.00	0.33	331.14	6598.11	-64.24	-13.11	-64.24	65.57	191.54	0.02
6700.00	0.19	76.01	6698.11	-63.95	-13.08	-63.95	65.27	191.56	0.42
HORIZONTAL DISPLACEMENT IS 65.27 FEET AT 191.56 DEGREES									