

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Ryann State C / 16-1
 Location: S-16 T-4N R-64W
 Rig Name: Production
 State/County: Colorado / Weld County
 Latitude: 40.32, Longitude: -104.55
 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: 5/5/2011 / 22:15

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	0.21	116.08	100.00	-0.08	0.17	-0.08	0.18	116.08	0.21
200.00	0.39	115.35	200.00	-0.31	0.64	-0.31	0.71	115.72	0.18
300.00	0.52	139.85	300.00	-0.80	1.25	-0.80	1.48	122.83	0.23
400.00	0.99	201.35	399.99	-1.95	1.22	-1.95	2.31	147.96	0.87
500.00	1.06	214.96	499.97	-3.51	0.38	-3.51	3.54	173.83	0.25
600.00	1.32	204.41	599.95	-5.32	-0.62	-5.32	5.36	186.70	0.34
700.00	1.36	206.69	699.92	-7.43	-1.64	-7.43	7.61	192.41	0.07
800.00	1.45	202.08	799.89	-9.67	-2.65	-9.67	10.02	195.30	0.14
900.00	1.52	202.71	899.86	-12.07	-3.64	-12.07	12.61	196.76	0.08
1000.00	1.52	200.72	999.82	-14.54	-4.62	-14.54	15.25	197.62	0.05
1100.00	1.50	205.18	1099.79	-16.96	-5.64	-16.96	17.87	198.40	0.12
1200.00	1.62	203.86	1199.75	-19.43	-6.77	-19.43	20.58	199.21	0.13
1300.00	1.64	212.93	1299.71	-21.92	-8.12	-21.92	23.38	200.32	0.26
1400.00	1.82	209.10	1399.67	-24.51	-9.67	-24.51	26.35	201.52	0.22
1500.00	1.49	207.05	1499.62	-27.05	-11.03	-27.05	29.21	202.18	0.34
1600.00	1.49	223.50	1599.59	-29.15	-12.51	-29.15	31.72	203.23	0.43
1700.00	1.65	223.16	1699.55	-31.15	-14.39	-31.15	34.31	204.80	0.16
1800.00	1.92	225.65	1799.51	-33.37	-16.58	-33.37	37.26	206.42	0.28
1900.00	2.13	220.47	1899.44	-35.95	-18.98	-35.95	40.66	207.83	0.28
2000.00	1.92	218.15	1999.38	-38.68	-21.22	-38.68	44.12	208.75	0.23
2100.00	1.32	221.60	2099.34	-40.86	-23.02	-40.86	46.90	209.40	0.60
2200.00	1.30	221.46	2199.31	-42.58	-24.54	-42.58	49.14	209.96	0.03
2300.00	1.27	227.18	2299.29	-44.18	-26.11	-44.18	51.32	210.58	0.13
2400.00	1.27	225.80	2399.26	-45.71	-27.72	-45.71	53.46	211.23	0.03
2500.00	1.54	228.90	2499.23	-47.37	-29.52	-47.37	55.81	211.94	0.28
2600.00	1.69	232.12	2599.19	-49.15	-31.70	-49.15	58.49	212.82	0.17
2700.00	1.93	238.24	2699.14	-50.95	-34.30	-50.95	61.42	213.95	0.31
2800.00	2.05	245.77	2799.08	-52.57	-37.36	-52.57	64.49	215.40	0.29
2900.00	1.99	244.93	2899.02	-54.04	-40.57	-54.04	67.57	216.90	0.06
3000.00	2.06	246.92	2998.96	-55.48	-43.80	-55.48	70.69	218.29	0.10
3100.00	1.77	261.10	3098.90	-56.43	-46.99	-56.43	73.43	219.78	0.55
3200.00	1.81	269.93	3198.85	-56.67	-50.09	-56.67	75.63	221.48	0.28
3300.00	1.74	272.94	3298.81	-56.59	-53.18	-56.59	77.66	223.22	0.12
3400.00	2.24	280.52	3398.75	-56.16	-56.62	-56.16	79.75	225.23	0.57

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	2.99	275.02	3498.64	-55.57	-61.14	-55.57	82.62	227.73	0.79
3600.00	3.18	275.80	3598.50	-55.06	-66.49	-55.06	86.33	230.37	0.19
3700.00	3.58	279.04	3698.32	-54.29	-72.33	-54.29	90.44	233.11	0.44
3800.00	3.83	277.91	3798.11	-53.34	-78.72	-53.34	95.09	235.88	0.26
3900.00	4.15	279.37	3897.87	-52.29	-85.60	-52.29	100.31	238.58	0.34
4000.00	4.41	277.40	3997.59	-51.21	-92.98	-51.21	106.15	241.16	0.30
4100.00	4.63	276.07	4097.28	-50.29	-100.81	-50.29	112.66	243.49	0.24
4200.00	4.57	276.98	4196.96	-49.38	-108.78	-49.38	119.46	245.59	0.10
4300.00	4.49	274.18	4296.65	-48.61	-116.63	-48.61	126.35	247.38	0.24
4400.00	4.06	276.93	4396.37	-47.89	-124.04	-47.89	132.97	248.89	0.47
4500.00	3.84	283.65	4496.13	-46.68	-130.81	-46.68	138.89	250.36	0.51
4600.00	3.11	275.90	4595.95	-45.61	-136.76	-45.61	144.16	251.56	0.87
4700.00	2.74	273.23	4695.82	-45.20	-141.84	-45.20	148.87	252.33	0.39
4800.00	2.48	268.58	4795.71	-45.12	-146.40	-45.12	153.19	252.87	0.33
4900.00	2.53	283.02	4895.62	-44.67	-150.71	-44.67	157.19	253.49	0.63
5000.00	2.57	271.45	4995.52	-44.12	-155.10	-44.12	161.25	254.12	0.52
5100.00	2.69	269.09	5095.42	-44.10	-159.68	-44.10	165.66	254.56	0.16
5200.00	2.75	271.52	5195.30	-44.07	-164.43	-44.07	170.23	254.99	0.13
5300.00	2.37	274.82	5295.20	-43.84	-168.88	-43.84	174.48	255.45	0.41
5400.00	2.59	273.24	5395.11	-43.53	-173.20	-43.53	178.58	255.89	0.23
5500.00	1.95	274.20	5495.03	-43.28	-177.15	-43.28	182.36	256.27	0.64
5600.00	2.11	275.13	5594.97	-42.99	-180.68	-42.99	185.72	256.61	0.16
5700.00	2.00	272.08	5694.90	-42.77	-184.25	-42.77	189.15	256.93	0.15
5800.00	2.29	269.17	5794.83	-42.73	-187.99	-42.73	192.79	257.19	0.31
5900.00	1.83	259.62	5894.77	-43.05	-191.56	-43.05	196.33	257.33	0.57
6000.00	1.59	252.86	5994.73	-43.74	-194.45	-43.74	199.31	257.32	0.31
6100.00	1.31	222.04	6094.70	-45.00	-196.54	-45.00	201.63	257.10	0.82
6200.00	1.75	202.80	6194.66	-47.26	-197.90	-47.26	203.47	256.57	0.67
6300.00	2.35	196.55	6294.60	-50.63	-199.08	-50.63	205.42	255.73	0.63
6400.00	3.14	192.37	6394.48	-55.27	-200.25	-55.27	207.74	254.57	0.82
6500.00	3.88	192.29	6494.29	-61.26	-201.56	-61.26	210.66	253.09	0.74
6600.00	3.01	194.59	6594.11	-67.11	-202.94	-67.11	213.75	251.70	0.89
6700.00	2.01	193.95	6694.01	-71.35	-204.02	-71.35	216.14	250.72	0.99
HORIZONTAL DISPLACEMENT IS 216.14 FEET AT 250.72 DEGREES									