

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: National Hog Farm / 34-21
 Location: S-21 T-5N R-63W
 Rig Name: Production
 State/County: Colorado / Weld County
 Latitude: 40.38, Longitude: -104.44
 GRID North is 0.69 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: 6/13/2011 / 19:40

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	0.88	29.35	100.00	0.67	0.38	0.67	0.77	29.35	0.88
200.00	0.53	34.74	199.99	1.72	1.02	1.72	2.00	30.59	0.36
300.00	0.54	41.64	299.98	2.45	1.59	2.45	2.92	33.02	0.07
400.00	0.47	46.66	399.98	3.09	2.20	3.09	3.79	35.55	0.09
500.00	0.36	57.57	499.98	3.54	2.77	3.54	4.49	38.07	0.13
600.00	0.38	72.14	599.98	3.81	3.35	3.81	5.07	41.34	0.09
700.00	0.35	66.35	699.97	4.03	3.94	4.03	5.64	44.38	0.04
800.00	0.41	70.62	799.97	4.27	4.56	4.27	6.25	46.89	0.06
900.00	0.34	60.86	899.97	4.54	5.17	4.54	6.88	48.69	0.09
1000.00	0.21	45.25	999.97	4.81	5.55	4.81	7.35	49.10	0.16
1100.00	0.27	19.59	1099.97	5.16	5.76	5.16	7.73	48.15	0.12
1200.00	0.22	46.15	1199.97	5.52	5.98	5.52	8.14	47.31	0.12
1300.00	0.22	308.25	1299.97	5.77	5.97	5.77	8.30	46.00	0.33
1400.00	0.32	331.25	1399.96	6.13	5.69	6.13	8.36	42.87	0.15
1500.00	0.06	267.68	1499.96	6.37	5.50	6.37	8.42	40.82	0.30
1600.00	0.28	69.13	1599.96	6.46	5.68	6.46	8.60	41.34	0.34
1700.00	0.31	356.26	1699.96	6.81	5.89	6.81	9.01	40.84	0.35
1800.00	0.14	44.18	1799.96	7.17	5.96	7.17	9.32	39.72	0.24
1900.00	0.43	56.35	1899.96	7.47	6.35	7.47	9.80	40.40	0.29
2000.00	1.03	73.95	1999.95	7.92	7.53	7.92	10.93	43.55	0.64
2100.00	1.00	75.44	2099.94	8.39	9.24	8.39	12.48	47.75	0.04
2200.00	0.77	69.98	2199.92	8.84	10.71	8.84	13.89	50.48	0.24
2300.00	0.56	1.56	2299.92	9.56	11.36	9.56	14.84	49.92	0.77
2400.00	0.80	347.97	2399.91	10.73	11.23	10.73	15.53	46.29	0.29
2500.00	0.94	346.80	2499.90	12.21	10.89	12.21	16.37	41.73	0.14
2600.00	1.00	344.56	2599.89	13.85	10.47	13.85	17.37	37.09	0.08
2700.00	0.98	337.45	2699.87	15.49	9.91	15.49	18.39	32.63	0.13
2800.00	1.08	345.71	2799.86	17.19	9.35	17.19	19.57	28.55	0.18
2900.00	1.21	347.92	2899.84	19.14	8.90	19.14	21.10	24.94	0.13
3000.00	0.38	2.27	2999.82	20.50	8.69	20.50	22.27	22.97	0.84
3100.00	1.55	121.10	3099.81	20.14	9.86	20.14	22.42	26.10	1.77
3200.00	4.38	132.54	3199.67	16.85	13.84	16.85	21.81	39.39	2.88
3300.00	6.73	134.99	3299.19	10.13	20.80	10.13	23.13	64.04	2.35
3400.00	7.79	137.80	3398.39	0.96	29.50	0.96	29.51	88.13	1.12

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	8.24	123.32	3497.42	-8.00	40.04	-8.00	40.83	101.29	2.06
3600.00	7.92	131.22	3596.43	-16.48	51.22	-16.48	53.80	107.83	1.16
3700.00	6.85	133.90	3695.60	-25.15	60.70	-25.15	65.70	112.51	1.13
3800.00	5.41	133.53	3795.03	-32.54	68.41	-32.54	75.76	115.43	1.44
3900.00	3.66	134.51	3894.71	-38.02	74.11	-38.02	83.29	117.16	1.76
4000.00	1.82	126.57	3994.59	-41.20	77.65	-41.20	87.90	117.95	1.87
4100.00	1.03	138.47	4094.56	-42.82	79.52	-42.82	90.31	118.30	0.83
4200.00	0.52	188.65	4194.55	-43.94	80.05	-43.94	91.32	118.76	0.81
4300.00	0.16	273.11	4294.55	-44.38	79.84	-44.38	91.35	119.07	0.53

HORIZONTAL DISPLACEMENT IS
91.35 FEET AT 119.07 DEGREES