

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Spike State GWS C / 24-5
 Location: S-24 T-4N R-64W
 Rig Name: Production
 State/County: Colorado / Weld County
 Latitude: 40.30, Longitude: -104.51
 GRID North is 0.64 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: 4/21/2011 / 22:41

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	0.15	183.07	100.00	-0.13	-0.01	-0.13	0.13	183.07	0.15
200.00	0.29	117.91	200.00	-0.39	0.21	-0.39	0.44	151.41	0.27
300.00	0.22	101.53	300.00	-0.54	0.62	-0.54	0.83	131.00	0.10
400.00	0.25	86.31	400.00	-0.57	1.03	-0.57	1.18	118.78	0.07
500.00	0.15	78.64	500.00	-0.53	1.38	-0.53	1.48	110.88	0.10
600.00	0.34	75.38	600.00	-0.43	1.80	-0.43	1.85	103.28	0.19
700.00	0.23	72.58	699.99	-0.29	2.28	-0.29	2.30	97.24	0.12
800.00	0.25	115.92	799.99	-0.33	2.67	-0.33	2.69	96.96	0.18
900.00	0.19	95.43	899.99	-0.44	3.03	-0.44	3.06	98.20	0.10
1000.00	0.24	74.63	999.99	-0.40	3.40	-0.40	3.42	96.67	0.09
1100.00	0.22	105.04	1099.99	-0.39	3.78	-0.39	3.80	95.93	0.12
1200.00	0.18	12.19	1199.99	-0.29	4.01	-0.29	4.02	94.18	0.29
1300.00	0.29	124.43	1299.99	-0.28	4.24	-0.28	4.25	93.80	0.39
1400.00	0.20	245.07	1399.99	-0.50	4.29	-0.50	4.32	96.61	0.42
1500.00	0.14	278.81	1499.99	-0.55	4.01	-0.55	4.04	97.84	0.11
1600.00	0.36	275.78	1599.99	-0.50	3.57	-0.50	3.60	97.99	0.22
1700.00	0.61	295.20	1699.99	-0.24	2.77	-0.24	2.78	95.02	0.29
1800.00	1.00	320.22	1799.98	0.65	1.73	0.65	1.85	69.37	0.52
1900.00	1.04	298.60	1899.96	1.76	0.38	1.76	1.80	12.27	0.38
2000.00	1.10	308.37	1999.94	2.79	-1.17	2.79	3.02	337.28	0.20
2100.00	1.02	347.65	2099.93	4.26	-2.11	4.26	4.75	333.60	0.72
2200.00	0.90	345.06	2199.91	5.89	-2.51	5.89	6.40	336.94	0.13
2300.00	0.61	15.12	2299.90	7.16	-2.57	7.16	7.60	340.24	0.48
2400.00	0.64	31.09	2399.90	8.14	-2.15	8.14	8.42	345.24	0.18
2500.00	0.75	72.04	2499.89	8.82	-1.23	8.82	8.91	352.04	0.50
2600.00	0.76	71.95	2599.88	9.23	0.02	9.23	9.23	0.15	0.01
2700.00	0.68	65.78	2699.87	9.68	1.20	9.68	9.76	7.07	0.11
2800.00	0.78	82.34	2799.87	10.02	2.42	10.02	10.30	13.57	0.23
2900.00	0.56	64.26	2899.86	10.32	3.53	10.32	10.91	18.90	0.30
3000.00	0.29	76.41	2999.86	10.60	4.23	10.60	11.41	21.75	0.28
3100.00	0.02	172.96	3099.86	10.64	4.48	10.64	11.55	22.82	0.30
3200.00	0.32	297.83	3199.86	10.76	4.24	10.76	11.56	21.50	0.32
3300.00	0.43	289.55	3299.85	11.01	3.64	11.01	11.60	18.31	0.12
3400.00	0.62	338.78	3399.85	11.64	3.10	11.64	12.04	14.90	0.47

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	0.71	336.34	3499.84	12.71	2.65	12.71	12.98	11.79	0.10
3600.00	0.64	323.53	3599.84	13.73	2.07	13.73	13.88	8.57	0.17
3700.00	0.59	303.77	3699.83	14.46	1.31	14.46	14.52	5.18	0.22
3800.00	0.60	308.14	3799.83	15.07	0.47	15.07	15.08	1.79	0.05
3900.00	0.95	317.06	3899.82	16.00	-0.50	16.00	16.01	358.20	0.36
4000.00	0.81	309.83	3999.80	17.06	-1.61	17.06	17.13	354.61	0.17
4100.00	0.62	329.14	4099.80	17.98	-2.43	17.98	18.14	352.30	0.30
4200.00	0.55	347.68	4199.79	18.91	-2.81	18.91	19.12	351.54	0.20
4300.00	0.26	290.58	4299.79	19.46	-3.13	19.46	19.71	350.87	0.46
4400.00	0.49	283.82	4399.79	19.64	-3.75	19.64	19.99	349.18	0.23
4500.00	0.70	188.24	4499.78	19.14	-4.26	19.14	19.61	347.46	0.89
4600.00	0.63	184.53	4599.78	17.99	-4.39	17.99	18.52	346.29	0.08
4700.00	0.97	224.44	4699.77	16.84	-5.02	16.84	17.57	343.40	0.63
4800.00	1.02	234.35	4799.75	15.72	-6.33	15.72	16.95	338.06	0.18
4900.00	0.73	260.81	4899.74	15.10	-7.68	15.10	16.94	333.03	0.49
5000.00	0.49	252.01	4999.74	14.87	-8.72	14.87	17.23	329.61	0.25
5100.00	0.24	115.37	5099.74	14.64	-8.93	14.64	17.15	328.61	0.69
5200.00	0.70	13.27	5199.73	15.15	-8.60	15.15	17.42	330.41	0.79
5300.00	0.70	26.75	5299.73	16.29	-8.19	16.29	18.23	333.33	0.16
5400.00	0.75	63.43	5399.72	17.13	-7.33	17.13	18.64	336.85	0.46
5500.00	0.71	69.08	5499.71	17.65	-6.16	17.65	18.69	340.76	0.08
5600.00	0.88	95.62	5599.70	17.80	-4.82	17.80	18.44	344.86	0.40
5700.00	0.67	29.53	5699.69	18.23	-3.76	18.23	18.62	348.33	0.86
5800.00	0.73	82.03	5799.69	18.83	-2.84	18.83	19.04	351.41	0.62
5900.00	0.33	75.93	5899.68	18.99	-1.93	18.99	19.09	354.20	0.40
6000.00	0.65	100.35	5999.68	18.96	-1.09	18.96	18.99	356.71	0.37
6100.00	0.77	125.22	6099.67	18.47	0.02	18.47	18.47	0.05	0.33
6200.00	0.65	87.48	6199.66	18.11	1.13	18.11	18.15	3.57	0.47
6300.00	0.67	90.10	6299.66	18.13	2.29	18.13	18.28	7.19	0.04
6400.00	0.70	122.52	6399.65	17.81	3.39	17.81	18.12	10.77	0.38
6500.00	0.48	119.33	6499.64	17.27	4.27	17.27	17.79	13.88	0.22
6600.00	0.15	332.88	6599.64	17.18	4.58	17.18	17.78	14.92	0.61
6700.00	0.40	282.57	6699.64	17.37	4.17	17.37	17.87	13.51	0.33
6800.00	0.51	267.14	6799.64	17.43	3.39	17.43	17.75	10.99	0.16
HORIZONTAL DISPLACEMENT IS 17.75 FEET AT 10.99 DEGREES									