

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy
 Lease/Well: Spike State GWS C / 24-4
 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: 6/5/2011 / 01:26

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	0.48	17.67	100.00	0.40	0.13	0.40	0.42	17.67	0.48
200.00	0.33	18.95	200.00	1.07	0.35	1.07	1.12	18.00	0.15
300.00	0.38	77.33	299.99	1.41	0.76	1.41	1.60	28.47	0.35
400.00	0.18	113.82	399.99	1.42	1.23	1.42	1.88	41.00	0.26
500.00	0.11	57.73	499.99	1.41	1.46	1.41	2.03	46.05	0.15
600.00	0.11	7.97	599.99	1.55	1.55	1.55	2.20	45.02	0.09
700.00	0.07	345.13	699.99	1.71	1.55	1.71	2.30	42.26	0.05
800.00	0.05	315.31	799.99	1.80	1.50	1.80	2.34	39.90	0.04
900.00	0.07	246.56	899.99	1.81	1.42	1.81	2.30	38.16	0.07
1000.00	0.08	205.10	999.99	1.72	1.34	1.72	2.18	37.85	0.05
1100.00	0.15	195.66	1099.99	1.53	1.27	1.53	1.99	39.71	0.07
1200.00	0.30	208.88	1199.99	1.18	1.11	1.18	1.62	43.35	0.16
1300.00	0.25	201.64	1299.99	0.74	0.90	0.74	1.17	50.54	0.06
1400.00	0.39	243.75	1399.99	0.39	0.51	0.39	0.64	52.91	0.27
1500.00	0.34	244.77	1499.99	0.11	-0.07	0.11	0.13	328.71	0.05
1600.00	0.42	286.37	1599.99	0.08	-0.69	0.08	0.69	276.88	0.28
1700.00	0.09	27.50	1699.98	0.26	-1.00	0.26	1.03	284.40	0.44
1800.00	0.41	39.59	1799.98	0.60	-0.74	0.60	0.95	309.22	0.32
1900.00	0.38	75.27	1899.98	0.96	-0.19	0.96	0.98	348.83	0.24
2000.00	1.14	42.10	1999.97	1.78	0.80	1.78	1.95	24.18	0.85
2100.00	1.53	72.69	2099.95	2.92	2.75	2.92	4.01	43.23	0.80
2200.00	1.49	106.08	2199.91	2.96	5.27	2.96	6.05	60.71	0.87
2300.00	1.36	109.92	2299.88	2.19	7.64	2.19	7.95	73.99	0.16
2400.00	1.18	110.56	2399.86	1.43	9.72	1.43	9.82	81.64	0.18
2500.00	0.90	120.91	2499.84	0.66	11.36	0.66	11.37	86.66	0.33
2600.00	0.54	150.46	2599.83	-0.16	12.26	-0.16	12.27	90.72	0.51
2700.00	0.43	154.14	2699.83	-0.90	12.66	-0.90	12.69	94.08	0.12
2800.00	0.55	141.93	2799.83	-1.62	13.12	-1.62	13.22	97.02	0.16
2900.00	0.63	153.33	2899.82	-2.48	13.66	-2.48	13.89	100.30	0.14
3000.00	0.61	151.12	2999.81	-3.44	14.17	-3.44	14.58	103.65	0.03
3100.00	0.96	158.87	3099.80	-4.69	14.73	-4.69	15.46	107.68	0.37
3200.00	1.46	164.43	3199.78	-6.71	15.37	-6.71	16.77	113.58	0.51
3300.00	1.85	164.22	3299.74	-9.50	16.16	-9.50	18.74	120.45	0.39
3400.00	1.70	176.96	3399.69	-12.53	16.67	-12.53	20.86	126.93	0.42

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	1.23	203.31	3499.66	-15.00	16.33	-15.00	22.17	132.58	0.81
3600.00	1.15	204.96	3599.64	-16.90	15.48	-16.90	22.92	137.50	0.09
3700.00	1.17	213.21	3699.62	-18.65	14.50	-18.65	23.63	142.14	0.17
3800.00	1.30	204.96	3799.60	-20.53	13.47	-20.53	24.55	146.74	0.22
3900.00	1.38	230.22	3899.57	-22.33	12.07	-22.33	25.38	151.61	0.59
4000.00	1.59	239.97	3999.54	-23.79	9.94	-23.79	25.78	157.32	0.33
4100.00	1.65	242.32	4099.50	-25.15	7.46	-25.15	26.24	163.47	0.09
4200.00	1.58	253.45	4199.46	-26.21	4.87	-26.21	26.66	169.48	0.32
4300.00	1.50	259.81	4299.42	-26.84	2.26	-26.84	26.93	175.20	0.19
4400.00	1.47	250.57	4399.39	-27.50	-0.24	-27.50	27.50	180.51	0.24
4500.00	1.13	286.62	4499.36	-27.64	-2.40	-27.64	27.75	184.95	0.87
4600.00	0.58	280.85	4599.35	-27.27	-3.83	-27.27	27.54	188.00	0.55
4700.00	0.10	181.34	4699.35	-27.26	-4.33	-27.26	27.60	189.03	0.60
4800.00	0.36	148.71	4799.35	-27.61	-4.17	-27.61	27.92	188.60	0.28
4900.00	0.14	172.06	4899.35	-27.99	-4.00	-27.99	28.28	188.12	0.24
5000.00	0.35	140.04	4999.35	-28.35	-3.78	-28.35	28.60	187.59	0.25
5100.00	0.76	136.91	5099.34	-29.07	-3.13	-29.07	29.24	186.15	0.40
5200.00	1.19	153.43	5199.33	-30.48	-2.22	-30.48	30.56	184.16	0.51
5300.00	1.19	135.65	5299.31	-32.15	-1.02	-32.15	32.17	181.82	0.37
5400.00	1.42	121.38	5399.28	-33.55	0.77	-33.55	33.55	178.69	0.40
5500.00	1.90	138.66	5499.24	-35.44	2.92	-35.44	35.56	175.29	0.69
5600.00	1.94	140.57	5599.18	-37.99	5.09	-37.99	38.33	172.36	0.07
5700.00	1.98	140.10	5699.12	-40.62	7.28	-40.62	41.27	169.85	0.05
5800.00	1.82	158.46	5799.07	-43.43	8.97	-43.43	44.35	168.33	0.63
5900.00	1.44	178.89	5899.03	-46.17	9.58	-46.17	47.15	168.28	0.69
6000.00	1.02	187.86	5999.01	-48.30	9.48	-48.30	49.22	168.90	0.47
6100.00	0.68	199.54	6099.00	-49.74	9.16	-49.74	50.58	169.57	0.37
6200.00	0.44	161.04	6198.99	-50.66	9.09	-50.66	51.47	169.83	0.44
6300.00	0.46	166.41	6298.99	-51.41	9.30	-51.41	52.25	169.74	0.05
6400.00	0.39	164.79	6398.98	-52.13	9.49	-52.13	52.99	169.69	0.07
6500.00	0.54	186.16	6498.98	-52.94	9.53	-52.94	53.79	169.80	0.23
6600.00	0.43	205.81	6598.98	-53.74	9.31	-53.74	54.55	170.17	0.20
6700.00	0.65	179.33	6698.97	-54.65	9.16	-54.65	55.41	170.49	0.33
HORIZONTAL DISPLACEMENT IS 55.41 FEET AT 170.49 DEGREES									