

VES

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Kate Red / D 29-11

Location: S-29 T-3N R-64W

Rig Name: Production

State/County: Colorado / Weld County

Latitude: 40.19, Longitude: -104.58

GRID North is 0.60 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: outrun_ed.ut

Minimum Curvature Method

Report Date/Time: 2/5/2011 / 19:24

Vaughn Energy Services

Fort Worth, Texas

817-741-3610

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	259.33	100.00	-0.03	-0.13	-0.03	0.14	259.33	0.15
200.00	0.13	239.74	200.00	-0.11	-0.36	-0.11	0.37	253.73	0.06
300.00	0.14	249.62	300.00	-0.20	-0.57	-0.20	0.61	250.39	0.03
400.00	0.14	289.34	400.00	-0.21	-0.81	-0.21	0.83	255.62	0.10
500.00	0.16	295.18	500.00	-0.11	-1.04	-0.11	1.05	264.12	0.02
600.00	0.14	253.29	600.00	-0.09	-1.29	-0.09	1.29	266.19	0.11
700.00	0.14	283.77	700.00	-0.09	-1.53	-0.09	1.53	266.54	0.08
800.00	0.07	271.02	800.00	-0.06	-1.71	-0.06	1.71	267.93	0.07
900.00	0.18	296.09	900.00	0.01	-1.92	0.01	1.92	270.23	0.12
1000.00	0.26	299.72	1000.00	0.19	-2.26	0.19	2.26	274.82	0.09
1100.00	0.40	309.40	1100.00	0.52	-2.72	0.52	2.77	280.90	0.14
1200.00	0.52	308.26	1199.99	1.03	-3.35	1.03	3.50	287.05	0.13
1300.00	0.60	315.04	1299.99	1.68	-4.08	1.68	4.41	292.40	0.10
1400.00	0.49	308.94	1399.98	2.32	-4.78	2.32	5.32	295.90	0.12
1500.00	0.47	295.92	1499.98	2.77	-5.48	2.77	6.14	296.80	0.11
1600.00	0.57	296.64	1599.98	3.17	-6.29	3.17	7.04	296.74	0.10
1700.00	0.57	301.45	1699.97	3.65	-7.16	3.65	8.04	297.03	0.05
1800.00	0.57	318.42	1799.97	4.29	-7.92	4.29	9.01	298.43	0.17
1900.00	0.49	329.96	1899.96	5.03	-8.47	5.03	9.85	300.73	0.13
2000.00	0.33	321.94	1999.96	5.63	-8.86	5.63	10.50	302.45	0.17
2100.00	0.49	326.58	2099.96	6.22	-9.27	6.22	11.16	303.84	0.16
2200.00	0.57	335.77	2199.95	7.02	-9.71	7.02	11.98	305.88	0.12
2300.00	0.46	326.70	2299.95	7.81	-10.13	7.81	12.79	307.62	0.14
2400.00	0.45	325.91	2399.94	8.47	-10.57	8.47	13.55	308.70	0.01
2500.00	0.73	329.98	2499.94	9.35	-11.11	9.35	14.52	310.07	0.29
2600.00	1.00	334.92	2599.93	10.69	-11.80	10.69	15.92	312.17	0.28
2700.00	1.09	340.70	2699.91	12.38	-12.49	12.38	17.58	314.76	0.14
2800.00	1.24	351.14	2799.89	14.35	-12.97	14.35	19.34	317.90	0.26
2900.00	1.08	6.47	2899.87	16.36	-13.03	16.36	20.91	321.46	0.35
3000.00	1.08	11.83	2999.85	18.21	-12.73	18.21	22.22	325.04	0.10
3100.00	0.94	22.93	3099.84	19.88	-12.22	19.88	23.34	328.43	0.24
3200.00	0.79	39.45	3199.83	21.17	-11.47	21.17	24.07	331.56	0.29
3300.00	0.72	12.99	3299.82	22.31	-10.89	22.31	24.82	333.98	0.35
3400.00	0.95	358.10	3399.81	23.74	-10.78	23.74	26.07	335.59	0.32

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	0.93	345.08	3499.79	25.36	-11.01	25.36	27.65	336.53	0.21
3600.00	0.89	329.33	3599.78	26.82	-11.62	26.82	29.23	336.57	0.25
3700.00	0.89	324.54	3699.77	28.11	-12.46	28.11	30.75	336.09	0.07
3800.00	0.90	338.79	3799.76	29.48	-13.20	29.48	32.29	335.88	0.22
3900.00	0.63	321.31	3899.75	30.63	-13.82	30.63	33.61	335.71	0.35
4000.00	1.02	318.81	3999.74	31.73	-14.75	31.73	34.99	335.07	0.39
4100.00	1.44	311.52	4099.71	33.23	-16.27	33.23	37.00	333.91	0.45
4200.00	1.43	301.47	4199.68	34.71	-18.28	34.71	39.23	332.23	0.25
4300.00	1.30	300.25	4299.65	35.94	-20.33	35.94	41.29	330.51	0.13
4400.00	1.19	306.38	4399.63	37.13	-22.15	37.13	43.23	329.18	0.17
4500.00	1.15	311.79	4499.61	38.42	-23.73	38.42	45.16	328.29	0.12
4600.00	0.67	296.64	4599.60	39.35	-25.01	39.35	46.62	327.56	0.53
4700.00	0.63	285.22	4699.59	39.75	-26.06	39.75	47.53	326.75	0.14
4800.00	0.51	243.48	4799.59	39.70	-26.99	39.70	48.00	325.79	0.42
4900.00	0.54	165.80	4899.58	39.04	-27.27	39.04	47.62	325.06	0.66
5000.00	0.73	73.84	4999.58	38.76	-26.55	38.76	46.98	325.59	0.92
5100.00	0.52	71.11	5099.57	39.08	-25.51	39.08	46.67	326.87	0.21
5200.00	0.06	149.82	5199.57	39.18	-25.05	39.18	46.51	327.40	0.51
5300.00	0.25	98.03	5299.57	39.11	-24.81	39.11	46.31	327.61	0.22
5400.00	0.84	339.69	5399.57	39.77	-24.85	39.77	46.89	328.00	0.99
5500.00	0.80	337.84	5499.56	41.11	-25.37	41.11	48.30	328.32	0.05
5600.00	1.55	314.71	5599.54	42.71	-26.60	42.71	50.31	328.08	0.87
5700.00	1.94	292.10	5699.49	44.30	-29.13	44.30	53.02	326.67	0.78
5800.00	1.49	271.86	5799.45	44.98	-31.99	44.98	55.19	324.57	0.75
5900.00	1.69	250.16	5899.41	44.52	-34.68	44.52	56.43	322.08	0.63
6000.00	2.55	249.64	5999.34	43.24	-38.15	43.24	57.67	318.58	0.86
6100.00	1.64	242.88	6099.27	41.81	-41.51	41.81	58.92	315.21	0.94
6200.00	0.75	247.16	6199.25	40.91	-43.39	40.91	59.63	313.31	0.90
6300.00	0.37	186.73	6299.24	40.33	-44.03	40.33	59.71	312.49	0.65
6400.00	0.43	15.86	6399.24	40.37	-43.97	40.37	59.69	312.56	0.80
6500.00	0.89	312.23	6499.24	41.25	-44.44	41.25	60.64	312.87	0.80
6600.00	0.69	297.87	6599.23	42.05	-45.55	42.05	61.99	312.72	0.28
6700.00	0.76	312.92	6699.22	42.79	-46.57	42.79	63.24	312.58	0.21
6725.00	0.79	317.41	6724.22	43.03	-46.80	43.03	63.58	312.59	0.26
HORIZONTAL DISPLACEMENT IS 63.58 FEET AT 312.59 DEGREES									