

**VES**

VAUGHN ENERGY SERVICES

Company: Noble Energy

Lease/Well: Kate Red / D29-14

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 : Ground LEvel

## DRILLOG GYRO SURVEY CALCULATIONS

Filename: outrun\_ed.ut

Minimum Curvature Method

Report Date/Time: 12/11/2010 / 22:52

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	0.24	220.40	100.00	-0.16	-0.13	-0.16	0.21	220.40	0.24
200.00	0.21	263.37	200.00	-0.34	-0.45	-0.34	0.56	233.10	0.16
300.00	0.14	302.25	300.00	-0.29	-0.73	-0.29	0.78	248.07	0.13
400.00	0.11	302.18	400.00	-0.18	-0.91	-0.18	0.92	258.88	0.03
500.00	0.26	332.03	500.00	0.07	-1.09	0.07	1.10	273.77	0.17
600.00	0.35	337.03	600.00	0.55	-1.32	0.55	1.43	292.66	0.09
700.00	0.12	342.64	700.00	0.93	-1.47	0.93	1.74	302.41	0.22
800.00	0.37	359.83	799.99	1.36	-1.50	1.36	2.03	312.19	0.26
900.00	0.25	341.48	899.99	1.89	-1.57	1.89	2.46	320.29	0.16
1000.00	0.35	352.37	999.99	2.40	-1.68	2.40	2.93	324.98	0.11
1100.00	0.17	353.94	1099.99	2.85	-1.74	2.85	3.34	328.61	0.18
1200.00	0.35	358.38	1199.99	3.30	-1.76	3.30	3.74	331.89	0.18
1300.00	0.15	353.59	1299.99	3.73	-1.78	3.73	4.13	334.42	0.20
1400.00	0.31	7.98	1399.99	4.13	-1.76	4.13	4.49	336.89	0.18
1500.00	0.24	15.73	1499.99	4.60	-1.67	4.60	4.89	340.09	0.08
1600.00	0.25	55.41	1599.99	4.92	-1.43	4.92	5.13	343.79	0.17
1700.00	0.24	93.58	1699.98	5.03	-1.05	5.03	5.14	348.25	0.16
1800.00	0.24	111.30	1799.98	4.94	-0.65	4.94	4.99	352.53	0.07
1900.00	0.21	117.40	1899.98	4.78	-0.29	4.78	4.79	356.50	0.03
2000.00	0.25	122.45	1999.98	4.58	0.06	4.58	4.58	0.73	0.05
2100.00	0.21	130.44	2099.98	4.34	0.38	4.34	4.36	5.05	0.05
2200.00	0.29	156.28	2199.98	3.99	0.63	3.99	4.04	8.92	0.14
2300.00	0.31	193.63	2299.98	3.49	0.66	3.49	3.56	10.77	0.19
2400.00	0.35	229.48	2399.98	3.03	0.37	3.03	3.05	6.91	0.21
2500.00	0.15	245.29	2499.98	2.77	0.01	2.77	2.77	0.24	0.21
2600.00	0.22	265.52	2599.98	2.70	-0.31	2.70	2.72	353.55	0.10
2700.00	0.20	280.93	2699.98	2.72	-0.67	2.72	2.80	346.08	0.06
2800.00	0.25	289.76	2799.97	2.83	-1.06	2.83	3.02	339.51	0.06
2900.00	0.20	334.15	2899.97	3.06	-1.34	3.06	3.34	336.33	0.18
3000.00	0.27	3.17	2999.97	3.45	-1.40	3.45	3.72	337.85	0.13
3100.00	0.21	22.24	3099.97	3.85	-1.32	3.85	4.07	341.05	0.10
3200.00	0.10	18.15	3199.97	4.10	-1.22	4.10	4.28	343.37	0.11
3300.00	0.42	19.33	3299.97	4.53	-1.08	4.53	4.66	346.65	0.32
3400.00	0.21	28.30	3399.97	5.04	-0.87	5.04	5.11	350.24	0.21

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	0.42	34.90	3499.97	5.50	-0.57	5.50	5.53	354.10	0.21
3600.00	0.47	6.97	3599.96	6.21	-0.31	6.21	6.22	357.17	0.22
3700.00	0.58	17.97	3699.96	7.11	-0.10	7.11	7.11	359.19	0.15
3800.00	0.60	357.58	3799.96	8.12	0.03	8.12	8.12	0.24	0.21
3900.00	0.62	353.41	3899.95	9.18	-0.05	9.18	9.18	359.68	0.05
4000.00	0.86	344.96	3999.94	10.43	-0.31	10.43	10.44	358.32	0.26
4100.00	0.64	336.83	4099.93	11.67	-0.72	11.67	11.69	356.46	0.24
4200.00	0.85	336.18	4199.92	12.86	-1.24	12.86	12.92	354.49	0.21
4300.00	1.12	312.17	4299.91	14.19	-2.26	14.19	14.37	350.94	0.49
4400.00	1.03	281.46	4399.89	15.03	-3.87	15.03	15.52	345.57	0.57
4500.00	1.15	269.61	4499.88	15.20	-5.75	15.20	16.25	339.27	0.26
4600.00	0.63	246.02	4599.86	14.97	-7.26	14.97	16.64	334.12	0.63
4700.00	0.30	232.17	4699.86	14.58	-7.97	14.58	16.62	331.34	0.34
4800.00	0.59	196.02	4799.86	13.93	-8.32	13.93	16.22	329.13	0.39
4900.00	0.87	136.53	4899.85	12.88	-7.94	12.88	15.13	328.34	0.77
5000.00	0.79	81.80	4999.84	12.42	-6.74	12.42	14.13	331.52	0.77
5100.00	0.59	64.71	5099.83	12.74	-5.59	12.74	13.91	336.29	0.28
5200.00	0.67	82.48	5199.83	13.03	-4.55	13.03	13.81	340.74	0.21
5300.00	0.53	108.92	5299.82	12.96	-3.54	12.96	13.43	344.71	0.30
5400.00	0.58	143.31	5399.82	12.41	-2.81	12.41	12.72	347.26	0.33
5500.00	0.85	189.55	5499.81	11.27	-2.63	11.27	11.57	346.87	0.62
5600.00	1.00	246.60	5599.80	10.19	-3.56	10.19	10.79	340.76	0.90
5700.00	1.19	298.10	5699.78	10.33	-5.28	10.33	11.60	332.93	0.97
5800.00	0.69	353.77	5799.77	11.42	-6.26	11.42	13.03	331.26	0.99
5900.00	1.10	43.90	5899.76	12.71	-5.66	12.71	13.92	335.98	0.84
6000.00	1.87	48.97	5999.73	14.47	-3.77	14.47	14.95	345.40	0.78
6100.00	1.35	37.44	6099.69	16.48	-1.82	16.48	16.58	353.68	0.61
6200.00	0.38	25.01	6199.67	17.71	-0.97	17.71	17.74	356.88	0.98
6300.00	0.68	137.69	6299.67	17.58	-0.43	17.58	17.58	358.60	0.89
6400.00	0.56	239.54	6399.67	16.90	-0.45	16.90	16.90	358.46	0.96
6500.00	0.43	262.59	6499.66	16.60	-1.25	16.60	16.65	355.71	0.24
6600.00	0.18	201.41	6599.66	16.40	-1.67	16.40	16.49	354.17	0.38
6700.00	0.67	213.71	6699.66	15.77	-2.05	15.77	15.90	352.58	0.49
6800.00	0.98	182.97	6799.65	14.43	-2.42	14.43	14.63	350.47	0.53
6900.00	0.74	156.44	6899.64	12.98	-2.21	12.98	13.17	350.34	0.46

<div> HORIZONTAL DISPLACEMENT IS  13.17 FEET AT 350.34 DEGREES </div>
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