



Company: Noble Energy
Lease/Well: CPC-Mark/#35-02

Location:

Rig Name: Production

State/County: Colorado/Weld

Latitude: 40.27, Longitude: -104.62

GRID North is 0.57 Degrees East of True North

VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Elevation : 4780 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run02-02_ed.ut

Minimum Curvature Method

Report Date/Time: 6/30/2011 / 16:21

Vaughn Energy Services

Fort Worth, Texas

817-741-3610

Mark Havens

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	0.62	191.74	100.00	-0.53	-0.11	-0.53	0.54	191.74	0.62
200.00	0.51	199.55	199.99	-1.47	-0.37	-1.47	1.52	194.02	0.13
300.00	0.19	171.36	299.99	-2.05	-0.49	-2.05	2.11	193.45	0.35
400.00	0.27	163.43	399.99	-2.44	-0.40	-2.44	2.47	189.30	0.08
500.00	0.24	143.89	499.99	-2.83	-0.21	-2.83	2.84	184.27	0.09
600.00	0.11	144.72	599.99	-3.08	-0.03	-3.08	3.08	180.63	0.13
700.00	0.31	143.34	699.99	-3.37	0.18	-3.37	3.38	176.88	0.20
800.00	0.35	132.19	799.99	-3.80	0.57	-3.80	3.84	171.41	0.07
900.00	0.46	131.04	899.98	-4.27	1.10	-4.27	4.41	165.50	0.11
1000.00	0.60	133.03	999.98	-4.89	1.79	-4.89	5.21	159.87	0.14
1100.00	0.70	134.16	1099.97	-5.67	2.61	-5.67	6.25	155.26	0.09
1200.00	0.80	148.25	1199.96	-6.69	3.42	-6.69	7.51	152.95	0.21
1300.00	0.94	147.30	1299.95	-7.97	4.23	-7.97	9.02	152.07	0.14
1400.00	0.81	148.51	1399.94	-9.26	5.04	-9.26	10.55	151.46	0.13
1500.00	0.76	151.09	1499.93	-10.45	5.73	-10.45	11.92	151.27	0.06
1600.00	0.91	153.49	1599.92	-11.74	6.40	-11.74	13.38	151.39	0.15
1700.00	0.63	154.35	1699.91	-12.94	7.00	-12.94	14.71	151.61	0.28
1800.00	0.56	168.09	1799.91	-13.92	7.33	-13.92	15.73	152.21	0.16
1900.00	0.27	176.40	1899.90	-14.63	7.45	-14.63	16.41	153.01	0.30
2000.00	0.34	174.84	1999.90	-15.16	7.49	-15.16	16.91	153.71	0.07
2100.00	0.18	176.85	2099.90	-15.61	7.53	-15.61	17.33	154.26	0.16
2200.00	0.20	187.74	2199.90	-15.95	7.51	-15.95	17.63	154.78	0.04
2300.00	0.37	193.47	2299.90	-16.43	7.41	-16.43	18.03	155.73	0.17
2400.00	0.32	206.50	2399.90	-17.00	7.21	-17.00	18.46	157.01	0.09
2500.00	0.49	210.03	2499.90	-17.62	6.87	-17.62	18.91	158.69	0.17
2600.00	0.66	210.68	2599.89	-18.48	6.36	-18.48	19.55	161.00	0.16
2700.00	0.58	215.02	2699.89	-19.39	5.78	-19.39	20.23	163.39	0.09
2800.00	0.55	219.97	2799.88	-20.17	5.18	-20.17	20.83	165.59	0.05
2900.00	0.47	229.94	2899.88	-20.80	4.56	-20.80	21.30	167.63	0.13
3000.00	0.39	267.10	2999.87	-21.08	3.91	-21.08	21.44	169.50	0.28
3100.00	0.50	271.03	3099.87	-21.09	3.13	-21.09	21.32	171.55	0.11
3200.00	0.33	274.21	3199.87	-21.06	2.41	-21.06	21.20	173.47	0.17
3300.00	0.04	338.22	3299.87	-21.01	2.11	-21.01	21.12	174.26	0.32
3400.00	0.36	344.59	3399.87	-20.68	2.02	-20.68	20.78	174.43	0.33

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	0.40	356.71	3499.86	-20.03	1.91	-20.03	20.12	174.55	0.09
3600.00	0.32	49.70	3599.86	-19.50	2.10	-19.50	19.61	173.85	0.33
3700.00	0.47	19.38	3699.86	-18.94	2.45	-18.94	19.09	172.64	0.25
3800.00	0.48	15.74	3799.86	-18.15	2.70	-18.15	18.35	171.55	0.03
3900.00	0.48	12.70	3899.85	-17.34	2.90	-17.34	17.58	170.50	0.03
4000.00	0.40	11.66	3999.85	-16.59	3.06	-16.59	16.87	169.54	0.08
4100.00	0.46	10.53	4099.85	-15.85	3.21	-15.85	16.17	168.56	0.06
4200.00	0.40	27.36	4199.84	-15.15	3.44	-15.15	15.53	167.20	0.14
4300.00	0.33	29.69	4299.84	-14.58	3.75	-14.58	15.06	165.59	0.07
4400.00	0.34	32.07	4399.84	-14.07	4.05	-14.07	14.65	163.94	0.02
4500.00	0.27	27.53	4499.84	-13.61	4.32	-13.61	14.28	162.40	0.08
4600.00	0.23	66.98	4599.84	-13.33	4.61	-13.33	14.10	160.93	0.17
4700.00	0.28	72.31	4699.84	-13.18	5.03	-13.18	14.10	159.11	0.06
4800.00	0.33	82.43	4799.84	-13.06	5.55	-13.06	14.19	156.98	0.07
4900.00	0.21	88.23	4899.84	-13.02	6.01	-13.02	14.34	155.21	0.13
5000.00	0.36	80.92	4999.83	-12.97	6.50	-12.97	14.50	153.37	0.16
5100.00	0.27	88.40	5099.83	-12.91	7.04	-12.91	14.70	151.39	0.10
5200.00	0.40	97.50	5199.83	-12.95	7.62	-12.95	15.02	149.53	0.14
5300.00	0.28	103.42	5299.83	-13.05	8.20	-13.05	15.41	147.85	0.12
5400.00	0.35	101.53	5399.83	-13.17	8.74	-13.17	15.81	146.42	0.07
5500.00	0.46	102.29	5499.83	-13.32	9.44	-13.32	16.32	144.68	0.11
5600.00	0.71	103.20	5599.82	-13.54	10.43	-13.54	17.10	142.39	0.25
5700.00	1.30	105.62	5699.80	-13.99	12.13	-13.99	18.52	139.08	0.59
5800.00	1.21	120.08	5799.78	-14.83	14.13	-14.83	20.48	136.37	0.33
5900.00	1.16	158.38	5899.76	-16.30	15.42	-16.30	22.44	136.58	0.78
6000.00	1.42	178.30	5999.74	-18.48	15.83	-18.48	24.33	139.41	0.52
6100.00	1.65	211.48	6099.70	-20.94	15.12	-20.94	25.83	144.18	0.90
6200.00	1.58	219.95	6199.66	-23.23	13.48	-23.23	26.85	149.87	0.25
6300.00	0.77	213.74	6299.64	-24.84	12.22	-24.84	27.69	153.80	0.82
6400.00	0.48	183.82	6399.63	-25.82	11.82	-25.82	28.40	155.40	0.43
6500.00	0.41	179.10	6499.63	-26.60	11.80	-26.60	29.10	156.08	0.08
6600.00	0.73	70.17	6599.63	-26.75	12.41	-26.75	29.48	155.11	0.95
6700.00	0.96	69.74	6699.62	-26.24	13.79	-26.24	29.64	152.28	0.22
6800.00	1.17	42.30	6799.60	-25.20	15.26	-25.20	29.46	148.80	0.55
6900.00	1.22	26.03	6899.58	-23.49	16.41	-23.49	28.65	145.05	0.34
7000.00	1.24	305.40	6999.56	-21.90	16.00	-21.90	27.12	143.86	1.59
7050.00	2.00	302.23	7049.54	-21.12	14.82	-21.12	25.80	144.95	1.52
HORIZONTAL DISPLACEMENT IS 25.80 FEET AT 144.95 DEGREES									