



Company: NOBLE ENERGY
 Lease/Well: PATRIOT/B 16-16
 Location:
 Rig Name: PRODUCTION
 State/County: COLORADO/WELD
 Latitude: 40.22
 GRID North is 0.75 Degrees West of True North
 VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run03-01_ed.ut

Minimum Curvature Method

Report Date/Time: 1/3/2011 / 11:26

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	0.12	311.88	100.00	0.07	-0.08	0.07	0.10	311.88	0.12
200.00	0.19	38.84	200.00	0.27	-0.05	0.27	0.27	349.26	0.22
300.00	0.13	328.58	300.00	0.49	-0.01	0.49	0.49	359.31	0.19
400.00	0.23	339.38	400.00	0.77	-0.13	0.77	0.79	350.12	0.10
500.00	0.16	50.10	500.00	1.05	-0.10	1.05	1.05	354.78	0.23
600.00	0.30	359.47	600.00	1.40	0.01	1.40	1.40	0.43	0.23
700.00	0.50	5.34	700.00	2.10	0.05	2.10	2.10	1.32	0.20
800.00	0.42	183.40	799.99	2.16	0.07	2.16	2.16	1.77	0.91
900.00	0.47	31.35	899.99	2.14	0.26	2.14	2.16	6.84	0.86
1000.00	0.46	71.45	999.99	2.62	0.85	2.62	2.75	17.97	0.32
1100.00	0.33	141.83	1099.99	2.52	1.41	2.52	2.89	29.13	0.47
1200.00	0.54	200.02	1199.99	1.86	1.42	1.86	2.34	37.40	0.46
1300.00	0.73	196.60	1299.98	0.81	1.08	0.81	1.35	53.16	0.20
1400.00	0.71	205.14	1399.97	-0.36	0.64	-0.36	0.73	119.73	0.11
1500.00	0.70	126.31	1499.97	-1.29	0.87	-1.29	1.55	146.00	0.90
1600.00	0.84	147.76	1599.96	-2.27	1.75	-2.27	2.87	142.31	0.32
1700.00	0.73	132.31	1699.95	-3.32	2.62	-3.32	4.23	141.74	0.24
1800.00	1.05	170.00	1799.94	-4.66	3.25	-4.66	5.68	145.08	0.65
1900.00	1.49	178.66	1899.91	-6.87	3.44	-6.87	7.68	153.38	0.48
2000.00	1.68	174.00	1999.87	-9.63	3.63	-9.63	10.29	159.36	0.22
2100.00	1.51	163.89	2099.83	-12.35	4.14	-12.35	13.03	161.45	0.32
2200.00	1.48	160.57	2199.80	-14.84	4.94	-14.84	15.64	161.58	0.09
2300.00	1.37	165.93	2299.77	-17.21	5.66	-17.21	18.12	161.80	0.18
2400.00	1.04	167.03	2399.75	-19.25	6.15	-19.25	20.21	162.27	0.33
2500.00	0.56	159.92	2499.74	-20.59	6.52	-20.59	21.60	162.42	0.49
2600.00	0.50	89.34	2599.73	-21.04	7.12	-21.04	22.21	161.29	0.61
2700.00	0.57	173.41	2699.73	-21.53	7.62	-21.53	22.84	160.52	0.72
2800.00	1.04	162.34	2799.72	-22.89	7.95	-22.89	24.23	160.85	0.49
2900.00	1.01	160.86	2899.71	-24.59	8.51	-24.59	26.02	160.90	0.04
3000.00	0.96	158.80	2999.69	-26.21	9.11	-26.21	27.74	160.84	0.06
3100.00	0.59	133.37	3099.68	-27.34	9.78	-27.34	29.04	160.32	0.50
3200.00	0.10	220.65	3199.68	-27.76	10.10	-27.76	29.54	160.01	0.59
3300.00	0.65	22.98	3299.68	-27.30	10.26	-27.30	29.16	159.40	0.75
3400.00	0.91	2.99	3399.67	-25.98	10.53	-25.98	28.03	157.94	0.37

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	0.75	32.80	3499.66	-24.64	10.92	-24.64	26.95	156.09	0.45
3600.00	0.76	17.01	3599.65	-23.46	11.47	-23.46	26.11	153.94	0.21
3700.00	1.09	51.86	3699.64	-22.24	12.41	-22.24	25.47	150.84	0.63
3800.00	0.68	95.88	3799.63	-21.71	13.74	-21.71	25.70	147.68	0.76
3900.00	0.39	20.97	3899.62	-21.46	14.45	-21.46	25.87	146.05	0.69
4000.00	0.27	124.06	3999.62	-21.28	14.76	-21.28	25.90	145.25	0.52
4100.00	0.45	63.84	4099.62	-21.24	15.31	-21.24	26.18	144.21	0.39
4200.00	0.56	26.06	4199.62	-20.63	15.87	-20.63	26.03	142.42	0.34
4300.00	0.80	6.95	4299.61	-19.50	16.17	-19.50	25.33	140.33	0.33
4400.00	0.88	15.82	4399.60	-18.07	16.46	-18.07	24.44	137.66	0.15
4500.00	0.88	47.45	4499.59	-16.81	17.24	-16.81	24.08	134.27	0.48
4600.00	0.45	58.47	4599.58	-16.08	18.15	-16.08	24.24	131.54	0.45
4700.00	0.49	50.72	4699.58	-15.60	18.82	-15.60	24.44	129.66	0.07
4800.00	0.53	38.72	4799.57	-14.97	19.43	-14.97	24.53	127.61	0.11
4900.00	0.50	55.36	4899.57	-14.36	20.08	-14.36	24.69	125.58	0.15
5000.00	0.45	56.32	4999.57	-13.90	20.77	-13.90	24.99	123.79	0.05
5100.00	0.62	77.65	5099.56	-13.56	21.62	-13.56	25.53	122.10	0.26
5200.00	0.29	107.23	5199.56	-13.52	22.39	-13.52	26.16	121.13	0.39
5300.00	0.76	185.17	5299.55	-14.26	22.58	-14.26	26.70	122.28	0.75
5400.00	1.12	178.85	5399.54	-15.90	22.54	-15.90	27.58	125.20	0.37
5500.00	1.35	185.09	5499.52	-18.05	22.45	-18.05	28.81	128.80	0.27
5600.00	2.22	172.01	5599.47	-21.14	22.62	-21.14	30.96	133.07	0.95
5700.00	3.03	176.81	5699.36	-25.70	23.03	-25.70	34.51	138.13	0.84
5800.00	4.01	176.22	5799.17	-31.82	23.41	-31.82	39.51	143.66	0.98
5900.00	4.85	176.77	5898.87	-39.53	23.88	-39.53	46.19	148.87	0.84
6000.00	5.40	178.34	5998.47	-48.46	24.25	-48.46	54.19	153.41	0.57
6100.00	4.80	170.27	6098.08	-57.29	25.10	-57.29	62.55	156.35	0.94
6200.00	4.34	164.67	6197.76	-65.07	26.80	-65.07	70.37	157.61	0.64
6300.00	4.65	155.87	6297.45	-72.42	29.46	-72.42	78.18	157.86	0.76
6400.00	5.31	153.33	6397.08	-80.25	33.20	-80.25	86.85	157.53	0.69
6500.00	4.99	162.85	6496.67	-88.54	36.56	-88.54	95.79	157.57	0.91
6600.00	4.19	161.63	6596.35	-96.16	38.99	-96.16	103.77	157.93	0.81
6700.00	3.45	165.06	6696.13	-102.54	40.92	-102.54	110.40	158.25	0.77
HORIZONTAL DISPLACEMENT IS 110.40 FEET AT 158.25 DEGREES									