



Company: NOBLE ENERGY  
 Lease/Well: DIGGEN STATE/D16-23  
 Location:  
 Rig Name: PRODUCTION  
 State/County: COLORADO/WELD  
 Latitude: 40.82  
 GRID North is 0.89 Degrees West of True North  
 VS-Azi: 0.00 Degrees



**FIELD COPY ONLY (NOT DEFINITIVE)**

**DRILLOG MS GYRO SURVEY CALCULATIONS**

Filename: msgyro\_run02-01.ut  
 Minimum Curvature Method  
 Report Date/Time: 1/3/2011 / 11:58

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	0.27	202.15	100.00	-0.22	-0.09	-0.22	0.24	202.15	0.27
200.00	0.26	208.34	200.00	-0.64	-0.29	-0.64	0.70	204.12	0.03
300.00	0.23	236.18	300.00	-0.95	-0.56	-0.95	1.10	210.53	0.12
400.00	0.37	240.81	400.00	-1.21	-1.01	-1.21	1.58	219.64	0.14
500.00	0.45	253.53	499.99	-1.49	-1.67	-1.49	2.23	228.34	0.12
600.00	0.35	235.88	599.99	-1.77	-2.30	-1.77	2.90	232.47	0.16
700.00	0.74	256.50	699.99	-2.09	-3.18	-2.09	3.81	236.73	0.44
800.00	0.53	258.12	799.98	-2.34	-4.27	-2.34	4.87	241.31	0.21
900.00	0.77	267.47	899.97	-2.46	-5.39	-2.46	5.93	245.46	0.26
1000.00	0.60	267.18	999.97	-2.52	-6.59	-2.52	7.05	249.08	0.17
1100.00	0.80	261.97	1099.96	-2.64	-7.80	-2.64	8.23	251.30	0.20
1200.00	0.70	268.14	1199.95	-2.76	-9.10	-2.76	9.50	253.14	0.13
1300.00	0.48	290.11	1299.95	-2.63	-10.10	-2.63	10.43	255.38	0.31
1400.00	0.53	273.58	1399.94	-2.46	-10.95	-2.46	11.22	257.33	0.15
1500.00	0.45	291.88	1499.94	-2.29	-11.78	-2.29	12.00	259.02	0.17
1600.00	0.46	305.60	1599.93	-1.90	-12.47	-1.90	12.62	261.32	0.11
1700.00	0.55	305.56	1699.93	-1.39	-13.19	-1.39	13.26	263.98	0.08
1800.00	0.59	312.38	1799.93	-0.77	-13.96	-0.77	13.98	266.85	0.08
1900.00	0.62	300.61	1899.92	-0.15	-14.80	-0.15	14.80	269.43	0.13
2000.00	0.37	298.19	1999.92	0.28	-15.55	0.28	15.56	271.04	0.26
2100.00	0.41	196.21	2099.92	0.09	-15.94	0.09	15.94	270.32	0.60
2200.00	0.51	181.67	2199.91	-0.70	-16.05	-0.70	16.06	267.50	0.16
2300.00	0.78	148.82	2299.91	-1.73	-15.71	-1.73	15.81	263.71	0.45
2400.00	0.61	126.36	2399.90	-2.63	-14.93	-2.63	15.16	260.01	0.32
2500.00	0.75	115.86	2499.89	-3.23	-13.91	-3.23	14.28	256.91	0.19
2600.00	0.69	107.24	2599.88	-3.70	-12.74	-3.70	13.27	253.82	0.12
2700.00	0.68	96.74	2699.88	-3.95	-11.57	-3.95	12.23	251.17	0.13
2800.00	0.65	103.13	2799.87	-4.15	-10.43	-4.15	11.22	248.32	0.08
2900.00	0.65	98.16	2899.86	-4.36	-9.32	-4.36	10.28	244.94	0.06
3000.00	1.09	84.30	2999.85	-4.34	-7.81	-4.34	8.94	240.94	0.49
3100.00	1.45	93.64	3099.83	-4.33	-5.60	-4.33	7.08	232.32	0.41
3200.00	1.39	127.26	3199.80	-5.14	-3.37	-5.14	6.15	213.25	0.82
3300.00	1.44	144.27	3299.77	-6.90	-1.67	-6.90	7.10	193.59	0.42
3400.00	0.77	155.57	3399.75	-8.54	-0.65	-8.54	8.57	184.37	0.70

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	0.44	243.20	3499.74	-9.33	-0.72	-9.33	9.36	184.39	0.87
3600.00	0.52	285.16	3599.74	-9.38	-1.50	-9.38	9.50	189.08	0.35
3700.00	0.57	335.96	3699.74	-8.81	-2.14	-8.81	9.07	193.65	0.47
3800.00	0.63	328.70	3799.73	-7.89	-2.63	-7.89	8.32	198.40	0.10
3900.00	0.54	346.59	3899.73	-6.97	-3.02	-6.97	7.59	203.44	0.20
4000.00	0.41	264.52	3999.72	-6.54	-3.49	-6.54	7.41	208.04	0.63
4100.00	0.28	272.97	4099.72	-6.57	-4.09	-6.57	7.74	211.91	0.14
4200.00	0.16	276.99	4199.72	-6.54	-4.47	-6.54	7.92	214.38	0.13
4300.00	0.13	278.94	4299.72	-6.50	-4.72	-6.50	8.04	216.00	0.02
4400.00	0.45	318.51	4399.72	-6.19	-5.10	-6.19	8.02	219.49	0.36
4500.00	0.30	315.58	4499.72	-5.70	-5.55	-5.70	7.96	224.19	0.15
4600.00	0.13	359.24	4599.72	-5.41	-5.73	-5.41	7.88	226.68	0.23
4700.00	0.59	110.35	4699.72	-5.48	-5.25	-5.48	7.59	223.81	0.65
4800.00	1.18	136.63	4799.70	-6.40	-4.06	-6.40	7.58	212.37	0.70
4900.00	1.51	148.70	4899.68	-8.28	-2.67	-8.28	8.70	197.86	0.43
5000.00	1.44	146.95	4999.64	-10.46	-1.30	-10.46	10.54	187.07	0.08
5100.00	1.48	143.72	5099.61	-12.55	0.15	-12.55	12.56	179.30	0.09
5200.00	1.62	149.28	5199.57	-14.81	1.64	-14.81	14.90	173.69	0.21
5300.00	1.53	118.82	5299.54	-16.66	3.53	-16.66	17.03	168.04	0.83
5400.00	1.04	103.56	5399.51	-17.52	5.59	-17.52	18.39	162.32	0.59
5500.00	0.81	85.85	5499.50	-17.68	7.17	-17.68	19.08	157.92	0.37
5600.00	0.63	67.27	5599.49	-17.42	8.38	-17.42	19.33	154.30	0.29
5700.00	0.57	57.15	5699.49	-16.94	9.31	-16.94	19.33	151.21	0.13
5800.00	0.41	343.73	5799.48	-16.32	9.62	-16.32	18.95	149.48	0.60
5900.00	0.36	2.68	5899.48	-15.66	9.54	-15.66	18.34	148.66	0.14
6000.00	0.17	112.08	5999.48	-15.40	9.69	-15.40	18.20	147.83	0.45
6100.00	0.06	41.15	6099.48	-15.42	9.86	-15.42	18.30	147.39	0.16
6200.00	0.08	208.78	6199.48	-15.44	9.86	-15.44	18.32	147.43	0.14
6300.00	0.03	50.25	6299.48	-15.49	9.85	-15.49	18.36	147.55	0.11
6400.00	0.21	179.47	6399.48	-15.66	9.87	-15.66	18.51	147.79	0.23
6500.00	0.08	117.34	6499.48	-15.88	9.93	-15.88	18.73	147.99	0.19
6600.00	0.41	172.48	6599.48	-16.27	10.03	-16.27	19.11	148.33	0.37
6700.00	0.27	118.03	6699.48	-16.73	10.28	-16.73	19.64	148.42	0.34
HORIZONTAL DISPLACEMENT IS 19.64 FEET AT 148.42 DEGREES									