



Company/Rig: Noble Energy Inc/Production
WELL/API#: Menoni B30-8/05-123-13423
DECLINATION: 8.22 Degrees
TD AS DRILLED: 7069'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.37188, Longitude: -104.58562
Grid North = True North -0.59 degs (NAD 27)
Grid Correction Applied = -0.59 degs



DEPTH REFERENCE : RKB=GL/Elevation=4696'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 6/8/2016 / 13:47

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Menoni B30-8

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
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.242	224.041	100.000	-0.152	-0.147	-0.152	0.211	224.041	0.242
200.000	0.195	234.491	199.999	-0.402	-0.432	-0.402	0.590	227.035	0.062
300.000	0.158	264.314	299.999	-0.515	-0.708	-0.515	0.875	233.974	0.097
400.000	0.409	313.914	399.997	-0.281	-1.102	-0.281	1.138	255.690	0.329
500.000	0.291	326.769	499.995	0.179	-1.499	0.179	1.509	276.804	0.141
600.000	0.464	307.691	599.993	0.639	-1.958	0.639	2.060	288.070	0.211
700.000	0.351	303.265	699.991	1.055	-2.535	1.055	2.745	292.588	0.116
800.000	0.313	317.332	799.989	1.423	-2.976	1.423	3.299	295.559	0.090
900.000	0.307	309.573	899.988	1.795	-3.367	1.795	3.816	298.053	0.042
1000.000	0.231	335.608	999.987	2.149	-3.657	2.149	4.241	300.434	0.142
1100.000	0.353	354.006	1099.985	2.638	-3.772	2.638	4.603	304.968	0.153
1200.000	0.365	11.886	1199.983	3.256	-3.739	3.256	4.958	311.051	0.112
1300.000	0.454	8.459	1299.981	3.959	-3.615	3.959	5.361	317.598	0.092
1400.000	0.438	21.050	1399.978	4.707	-3.420	4.707	5.818	324.000	0.099
1500.000	0.485	25.228	1499.975	5.446	-3.102	5.446	6.268	330.332	0.058
1600.000	0.460	41.853	1599.971	6.128	-2.654	6.128	6.678	336.578	0.139
1700.000	0.453	46.934	1699.968	6.696	-2.098	6.696	7.017	342.603	0.041
1800.000	0.795	40.967	1799.962	7.490	-1.355	7.490	7.611	349.746	0.348

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
1900.000	0.873	66.453	1899.952	8.317	-0.202	8.317	8.320	358.608	0.376
2000.000	1.211	86.231	1999.935	8.691	1.551	8.691	8.828	10.118	0.489
2100.000	1.373	106.551	2099.910	8.419	3.754	8.419	9.218	24.033	0.483
2200.000	1.694	128.581	2199.875	7.156	6.058	7.156	9.376	40.250	0.665
2300.000	1.840	145.662	2299.828	4.909	8.119	4.909	9.488	58.845	0.544
2400.000	1.724	148.827	2399.780	2.295	9.804	2.295	10.069	76.823	0.152
2500.000	1.682	159.570	2499.736	-0.368	11.095	-0.368	11.101	91.898	0.322
2600.000	1.421	166.439	2599.699	-2.949	11.898	-2.949	12.258	103.920	0.320
2700.000	1.366	170.874	2699.670	-5.331	12.378	-5.331	13.478	113.302	0.121
2800.000	1.289	178.133	2799.643	-7.633	12.604	-7.633	14.735	121.198	0.185
2900.000	1.086	189.288	2899.622	-9.693	12.488	-9.693	15.808	127.818	0.307
3000.000	0.929	195.789	2999.606	-11.408	12.114	-11.408	16.640	133.282	0.194
3100.000	0.800	204.341	3099.595	-12.825	11.606	-12.825	17.296	137.856	0.182
3200.000	0.513	218.224	3199.588	-13.812	11.041	-13.812	17.683	141.362	0.326
3300.000	0.413	271.579	3299.585	-14.154	10.404	-14.154	17.566	143.682	0.425
3400.000	0.506	293.354	3399.582	-13.969	9.638	-13.969	16.971	145.396	0.196
3500.000	0.676	299.254	3499.577	-13.505	8.717	-13.505	16.074	147.159	0.180
3600.000	1.331	299.415	3599.561	-12.647	7.191	-12.647	14.548	150.376	0.655
3700.000	1.632	295.207	3699.528	-11.470	4.891	-11.470	12.469	156.905	0.320
3800.000	1.749	296.297	3799.484	-10.187	2.234	-10.187	10.429	167.629	0.121
3900.000	0.912	301.115	3899.456	-9.100	0.185	-9.100	9.102	178.834	0.844
4000.000	0.160	351.837	3999.451	-8.550	-0.516	-8.550	8.566	183.451	0.820
4100.000	0.486	89.855	4099.450	-8.411	-0.112	-8.411	8.412	180.760	0.532
4200.000	1.091	104.920	4199.440	-8.655	1.232	-8.655	8.742	171.897	0.634
4300.000	1.293	108.727	4299.419	-9.262	3.221	-9.262	9.806	160.826	0.217
4400.000	1.362	107.038	4399.392	-9.973	5.426	-9.973	11.354	151.450	0.080
4500.000	1.586	105.812	4499.359	-10.698	7.895	-10.698	13.296	143.576	0.226
4600.000	2.248	101.817	4599.302	-11.477	11.146	-11.477	15.999	135.839	0.675
4700.000	2.403	101.787	4699.220	-12.307	15.118	-12.307	19.494	129.148	0.156
4800.000	1.675	104.766	4799.156	-13.108	18.583	-13.108	22.741	125.197	0.736
4900.000	1.268	98.778	4899.123	-13.649	21.090	-13.649	25.122	122.910	0.434
5000.000	1.221	129.667	4999.100	-14.498	23.004	-14.498	27.191	122.221	0.664
5100.000	1.250	147.514	5099.077	-16.098	24.410	-16.098	29.240	123.405	0.384
5200.000	1.369	154.759	5199.051	-18.099	25.505	-18.099	31.275	125.361	0.203
5300.000	1.370	156.874	5299.023	-20.279	26.484	-20.279	33.356	127.442	0.051
5400.000	1.433	147.170	5398.993	-22.429	27.632	-22.429	35.589	129.067	0.245
5500.000	1.772	148.139	5498.954	-24.793	29.126	-24.793	38.249	130.406	0.340
5600.000	1.799	138.120	5598.905	-27.275	30.990	-27.275	41.284	131.352	0.313
5700.000	1.355	144.460	5698.867	-29.407	32.726	-29.407	43.997	131.942	0.477
5800.000	1.298	146.732	5798.840	-31.316	34.035	-31.316	46.250	132.618	0.077

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
5900.000	1.123	146.320	5898.818	-33.079	35.200	-33.079	48.304	133.221	0.175
6000.000	0.972	121.525	5998.802	-34.339	36.466	-34.339	50.089	133.279	0.473
6100.000	0.619	122.922	6098.792	-35.076	37.643	-35.076	51.452	132.978	0.353
6200.000	0.600	116.042	6198.786	-35.599	38.567	-35.599	52.485	132.709	0.076
6300.000	0.553	105.649	6298.781	-35.959	39.502	-35.959	53.418	132.312	0.114
6400.000	0.557	110.783	6398.777	-36.262	40.421	-36.262	54.303	131.895	0.050
6500.000	0.544	102.060	6498.772	-36.534	41.340	-36.534	55.170	131.468	0.085
6600.000	0.477	121.835	6598.768	-36.853	42.158	-36.853	55.995	131.158	0.187
6700.000	0.695	97.601	6698.763	-37.153	43.114	-37.153	56.913	130.753	0.325
6800.000	0.544	97.381	6798.757	-37.294	44.186	-37.294	57.821	130.165	0.151