



Company/Rig: Noble Energy / Production  
Well/API#: Reba A 31-03 / 05-123-21881  
Declination: 8.31  
TD As Drilled: 7058 Feet  
County/State: Weld / Colorado  
Latitude: 40.448, Longitude: -104.596  
GRID North is 0.580 Degrees East of True North  
VS-Azi: 0.000 Degrees



Depth Reference : RKB = GL Elevation = 4649 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 1/5/2015 / 15:14

Lat & Long Verified by Handheld GPS At Wellhead

North Reference : Grid

Henderson, CO

303-853-4976

Surveyor: Jordan Rolando

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	0.636	308.192	99.998	0.343	-0.436	0.343	0.555	308.192	0.636
200.000	0.364	331.318	199.994	0.965	-1.025	0.965	1.408	313.280	0.333
300.000	0.385	332.815	299.992	1.543	-1.331	1.543	2.038	319.219	0.023
400.000	0.357	322.632	399.990	2.090	-1.674	2.090	2.678	321.308	0.072
500.000	0.287	305.457	499.988	2.483	-2.067	2.483	3.231	320.222	0.119
600.000	0.249	305.688	599.987	2.755	-2.448	2.755	3.685	318.382	0.038
700.000	0.323	292.630	699.986	2.990	-2.885	2.990	4.155	316.033	0.099
800.000	0.344	285.163	799.984	3.178	-3.435	3.178	4.679	312.772	0.048
900.000	0.347	279.342	899.982	3.305	-4.023	3.305	5.207	309.404	0.035
1000.000	0.520	251.819	999.980	3.213	-4.753	3.213	5.737	304.059	0.266
1100.000	0.567	235.683	1099.975	2.792	-5.592	2.792	6.250	296.536	0.160
1200.000	0.682	232.944	1199.969	2.155	-6.476	2.155	6.825	288.404	0.119
1300.000	0.900	226.452	1299.960	1.255	-7.521	1.255	7.624	279.471	0.235
1400.000	0.778	229.540	1399.949	0.273	-8.607	0.273	8.611	271.814	0.130
1500.000	0.716	240.224	1499.941	-0.478	-9.666	-0.478	9.678	267.167	0.152
1600.000	1.049	237.169	1599.929	-1.285	-10.977	-1.285	11.052	263.325	0.336
1700.000	1.101	235.543	1699.911	-2.324	-12.538	-2.324	12.751	259.498	0.060
1800.000	1.046	237.618	1799.893	-3.356	-14.100	-3.356	14.494	256.611	0.067
1900.000	1.148	237.102	1899.875	-4.389	-15.712	-4.389	16.314	254.392	0.102

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
2000.000	0.979	245.179	1999.858	-5.292	-17.329	-5.292	18.119	253.018	0.225
2100.000	1.111	243.863	2099.841	-6.078	-18.975	-6.078	19.924	252.239	0.134
2200.000	1.120	244.366	2199.822	-6.928	-20.726	-6.928	21.853	251.518	0.013
2300.000	1.036	273.132	2299.805	-7.301	-22.510	-7.301	23.664	252.030	0.542
2400.000	1.239	291.537	2399.786	-6.855	-24.419	-6.855	25.363	254.320	0.416
2500.000	1.370	293.802	2499.760	-5.975	-26.518	-5.975	27.183	257.302	0.140
2600.000	1.443	290.797	2599.730	-5.046	-28.789	-5.046	29.228	260.058	0.104
2700.000	1.493	292.154	2699.697	-4.108	-31.172	-4.108	31.441	262.493	0.061
2800.000	1.414	292.671	2799.665	-3.141	-33.516	-3.141	33.663	264.646	0.080
2900.000	0.992	304.231	2899.643	-2.179	-35.370	-2.179	35.437	266.475	0.485
3000.000	0.997	307.791	2999.628	-1.159	-36.774	-1.159	36.792	268.196	0.062
3100.000	0.786	314.511	3099.615	-0.144	-37.951	-0.144	37.951	269.782	0.236
3200.000	1.006	325.681	3199.603	1.062	-38.935	1.062	38.949	271.562	0.280
3300.000	1.152	343.920	3299.586	2.753	-39.709	2.753	39.804	273.966	0.371
3400.000	1.387	346.345	3399.561	4.896	-40.273	4.896	40.569	276.931	0.241
3500.000	1.646	353.333	3499.526	7.499	-40.725	7.499	41.410	280.433	0.318
3600.000	1.855	353.170	3599.479	10.532	-41.085	10.532	42.413	284.378	0.209
3700.000	1.794	347.843	3699.429	13.669	-41.607	13.669	43.795	288.187	0.180
3800.000	1.704	351.729	3799.382	16.671	-42.150	16.671	45.327	291.580	0.149
3900.000	1.794	336.569	3899.336	19.579	-42.987	19.579	47.235	294.488	0.470
4000.000	1.842	326.279	3999.286	22.352	-44.501	22.352	49.799	296.669	0.329
4100.000	2.348	320.140	4099.219	25.260	-46.706	25.260	53.099	298.406	0.553
4200.000	2.964	318.310	4199.111	28.763	-49.738	28.763	57.456	300.041	0.622
4300.000	3.374	324.888	4298.958	33.101	-53.150	33.101	62.615	301.914	0.547
4400.000	3.436	319.132	4398.782	37.774	-56.804	37.774	68.217	303.624	0.347
4500.000	3.633	318.270	4498.592	42.406	-60.874	42.406	74.188	304.862	0.204
4600.000	3.785	329.666	4598.384	47.619	-64.650	47.619	80.294	306.374	0.751
4700.000	3.618	331.525	4698.175	53.241	-67.821	53.241	86.223	308.133	0.206
4800.000	2.978	327.850	4798.009	58.214	-70.708	58.214	91.589	309.465	0.673
4900.000	2.561	331.177	4897.892	62.371	-73.167	62.371	96.144	310.446	0.447
5000.000	2.266	337.929	4997.804	66.160	-74.987	66.160	100.001	311.422	0.409
5100.000	1.744	334.877	5097.742	69.370	-76.376	69.370	103.177	312.248	0.532
5200.000	1.189	325.430	5197.709	71.602	-77.610	71.602	105.595	312.694	0.603
5300.000	1.099	327.395	5297.689	73.264	-78.716	73.264	107.536	312.946	0.098
5400.000	0.913	295.888	5397.674	74.421	-79.950	74.421	109.227	312.949	0.575
5500.000	0.830	287.070	5497.663	74.981	-81.360	74.981	110.642	312.664	0.158
5600.000	0.550	269.948	5597.656	75.193	-82.532	75.193	111.650	312.336	0.345
5700.000	0.502	244.961	5697.651	75.008	-83.409	75.008	112.175	311.964	0.232
5800.000	0.427	237.040	5797.648	74.619	-84.119	74.619	112.446	311.575	0.098
5900.000	0.345	223.453	5897.646	74.198	-84.639	74.198	112.557	311.239	0.122

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
6000.000	0.389	195.007	5997.644	73.651	-84.934	73.651	112.420	310.931	0.185
6100.000	0.241	161.624	6097.642	73.123	-84.955	73.123	112.091	310.719	0.230
6200.000	0.350	175.108	6197.641	72.619	-84.863	72.619	111.693	310.554	0.128
6300.000	0.299	174.769	6297.640	72.056	-84.813	72.056	111.289	310.351	0.051
6400.000	0.299	178.521	6397.638	71.535	-84.783	71.535	110.929	310.156	0.020
6500.000	0.412	130.974	6497.636	71.038	-84.504	71.038	110.397	310.052	0.305
6600.000	0.444	151.414	6597.634	70.462	-84.047	70.462	109.676	309.975	0.155
6700.000	0.609	147.518	6697.629	69.673	-83.576	69.673	108.808	309.816	0.169
6750.000	0.485	154.458	6747.627	69.258	-83.342	69.258	108.363	309.727	0.282