



Company/Rig: Noble Energy/ CoreTech  
WELL/API#: Wardlaw 35-22/05-123-18537  
DECLINATION: 8.23 Degrees  
TD AS DRILLED: 6954 Feet  
COUNTY/STATE: Weld/Colorado  
Latitude: 40.449, Longitude: -104.525  
GRID North is 0.630 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4631 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 4/21/2015 / 15:35

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt

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	0.169	268.025	100.000	-0.005	-0.148	-0.005	0.148	268.025	0.169
200.000	0.259	114.596	200.000	-0.104	-0.090	-0.104	0.138	220.812	0.417
300.000	0.273	134.806	299.999	-0.366	0.284	-0.366	0.463	142.154	0.094
400.000	0.392	164.026	399.997	-0.863	0.547	-0.863	1.022	147.597	0.203
500.000	0.410	187.208	499.994	-1.546	0.597	-1.546	1.657	158.899	0.162
600.000	0.137	145.412	599.993	-2.000	0.620	-2.000	2.094	162.779	0.321
700.000	0.139	184.230	699.993	-2.219	0.679	-2.219	2.321	162.991	0.092
800.000	0.135	185.285	799.993	-2.458	0.659	-2.458	2.544	164.986	0.005
900.000	0.202	201.971	899.992	-2.738	0.582	-2.738	2.799	167.992	0.082
1000.000	0.228	201.200	999.992	-3.087	0.445	-3.087	3.119	171.803	0.026
1100.000	0.551	169.966	1099.989	-3.745	0.457	-3.745	3.773	173.050	0.375
1200.000	0.409	182.014	1199.986	-4.576	0.528	-4.576	4.606	173.421	0.173
1300.000	0.312	91.944	1299.984	-4.942	0.787	-4.942	5.004	170.949	0.515
1400.000	0.359	57.472	1399.983	-4.783	1.323	-4.783	4.963	164.536	0.204
1500.000	0.367	90.021	1499.981	-4.615	1.908	-4.615	4.994	157.542	0.204
1600.000	0.434	94.471	1599.978	-4.645	2.606	-4.645	5.326	150.705	0.074
1700.000	0.471	114.851	1699.975	-4.847	3.356	-4.847	5.895	145.297	0.164
1800.000	0.451	154.139	1799.972	-5.373	3.901	-5.373	6.640	144.024	0.310
1900.000	0.814	179.717	1899.966	-6.438	4.076	-6.438	7.619	147.661	0.451

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	1.158	183.499	1999.951	-8.156	4.018	-8.156	9.092	153.777	0.350
2100.000	1.524	166.193	2099.924	-10.457	4.273	-10.457	11.296	157.772	0.542
2200.000	1.820	149.426	2199.882	-13.116	5.399	-13.116	14.183	157.628	0.569
2300.000	1.772	136.608	2299.833	-15.607	7.269	-15.607	17.217	155.027	0.404
2400.000	1.802	133.355	2399.785	-17.810	9.475	-17.810	20.174	151.988	0.106
2500.000	1.420	130.504	2499.745	-19.695	11.560	-19.695	22.837	149.588	0.390
2600.000	1.063	129.731	2599.721	-21.092	13.216	-21.092	24.891	147.930	0.357
2700.000	0.892	128.544	2699.707	-22.170	14.538	-22.170	26.512	146.746	0.173
2800.000	1.211	120.600	2799.690	-23.193	16.056	-23.193	28.209	145.306	0.350
2900.000	1.249	128.337	2899.667	-24.407	17.821	-24.407	30.221	143.865	0.170
3000.000	1.239	108.700	2999.644	-25.430	19.700	-25.430	32.168	142.236	0.424
3100.000	1.482	93.507	3099.616	-25.856	22.015	-25.856	33.958	139.587	0.433
3200.000	1.677	69.869	3199.579	-25.431	24.679	-25.431	35.437	135.860	0.674
3300.000	2.174	71.681	3299.522	-24.332	27.854	-24.332	36.984	131.139	0.501
3400.000	3.163	70.957	3399.412	-22.835	32.262	-22.835	39.526	125.291	0.989
3500.000	3.633	68.158	3499.237	-20.757	37.810	-20.757	43.133	118.765	0.499
3600.000	3.724	68.280	3599.030	-18.376	43.768	-18.376	47.469	112.775	0.091
3700.000	3.170	65.453	3698.849	-16.026	49.300	-16.026	51.839	108.008	0.580
3800.000	2.924	63.798	3798.708	-13.751	54.103	-13.751	55.823	104.260	0.261
3900.000	2.365	66.185	3898.601	-11.791	58.279	-11.791	59.460	101.438	0.569
4000.000	1.873	72.395	3998.532	-10.464	61.725	-10.464	62.606	99.621	0.542
4100.000	1.453	80.102	4098.490	-9.752	64.532	-9.752	65.264	98.593	0.476
4200.000	1.048	81.256	4198.466	-9.395	66.684	-9.395	67.343	98.019	0.405
4300.000	1.305	74.421	4298.445	-8.950	68.686	-8.950	69.266	97.424	0.292
4400.000	0.861	84.760	4398.427	-8.575	70.531	-8.575	71.050	96.932	0.484
4500.000	0.784	116.671	4498.417	-8.814	71.890	-8.814	72.429	96.990	0.458
4600.000	0.957	182.744	4598.408	-9.955	72.462	-9.955	73.143	97.823	0.960
4700.000	0.542	256.679	4698.401	-10.899	71.961	-10.899	72.782	98.612	0.961
4800.000	1.275	299.587	4798.389	-10.459	70.533	-10.459	71.304	98.434	0.952
4900.000	1.583	332.005	4898.359	-8.690	68.917	-8.690	69.463	97.187	0.851
5000.000	1.423	327.588	4998.325	-6.422	67.603	-6.422	67.908	95.427	0.197
5100.000	1.248	322.491	5098.298	-4.510	66.275	-4.510	66.428	93.893	0.211
5200.000	2.110	311.297	5198.254	-2.431	64.228	-2.431	64.274	92.168	0.918
5300.000	1.862	297.406	5298.194	-0.468	61.403	-0.468	61.405	90.437	0.540
5400.000	1.672	311.659	5398.147	1.249	58.870	1.249	58.884	88.784	0.477
5500.000	1.374	319.010	5498.112	3.124	56.994	3.124	57.080	86.863	0.356
5600.000	1.595	322.653	5598.078	5.135	55.364	5.135	55.601	84.701	0.240
5700.000	2.116	312.080	5698.026	7.479	53.149	7.479	53.673	81.991	0.621
5800.000	2.009	321.657	5797.961	10.090	50.692	10.090	51.687	78.743	0.360
5900.000	1.732	322.676	5897.908	12.666	48.689	12.666	50.309	75.418	0.279

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6000.000	1.817	319.364	5997.860	15.071	46.740	15.071	49.110	72.128	0.133
6100.000	1.427	320.936	6097.820	17.241	44.923	17.241	48.118	69.003	0.392
6200.000	1.346	305.889	6197.791	18.897	43.186	18.897	47.139	66.368	0.372
6300.000	1.515	321.101	6297.760	20.614	41.404	20.614	46.252	63.532	0.414
6400.000	1.242	315.591	6397.731	22.417	39.816	22.417	45.693	60.620	0.304
6500.000	1.653	313.661	6497.699	24.187	38.014	24.187	45.057	57.533	0.414
6600.000	1.736	326.330	6597.655	26.444	36.131	26.444	44.774	53.800	0.383
6700.000	0.990	352.201	6697.627	28.560	35.174	28.560	45.309	50.924	0.950