



COMPANY/RIG: Noble Energy/Production/CoreTech
WELL/API: Firestien 30-12/05-123-25979
DECLINATION: 8.27 Degrees
TD AS DRILLED: 7301 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.46359, Longitude: -104.81868
Grid North = True North -0.44 degs (NAD 27)
Grid Correction Applied = -0.44 degs



DEPTH REFERENCE : RKB = GL Elevation = 4735

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 3/30/2017 / 15:09

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Firestien 30-12

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	0.360	346.477	99.999	0.306	-0.073	0.306	0.314	346.477	0.360
200.000	0.384	350.049	199.997	0.941	-0.205	0.941	0.963	347.718	0.033
300.000	0.150	332.441	299.996	1.387	-0.323	1.387	1.424	346.874	0.244
400.000	0.407	267.816	399.995	1.490	-0.740	1.490	1.663	333.602	0.369
500.000	0.436	271.367	499.992	1.485	-1.475	1.485	2.093	315.200	0.039
600.000	0.629	270.547	599.988	1.500	-2.404	1.500	2.834	301.955	0.193
700.000	0.512	275.599	699.983	1.549	-3.398	1.549	3.734	294.502	0.128
800.000	0.682	288.819	799.978	1.784	-4.406	1.784	4.753	292.047	0.218
900.000	0.643	284.377	899.971	2.116	-5.513	2.116	5.905	290.995	0.065
1000.000	0.679	306.245	999.964	2.605	-6.534	2.605	7.035	291.738	0.253
1100.000	0.834	313.760	1099.956	3.459	-7.538	3.459	8.294	294.649	0.183
1200.000	0.795	306.717	1199.946	4.377	-8.619	4.377	9.667	296.921	0.107
1300.000	0.806	301.232	1299.936	5.156	-9.776	5.156	11.053	297.807	0.077
1400.000	0.918	284.268	1399.925	5.718	-11.154	5.718	12.534	297.142	0.277
1500.000	1.015	278.359	1499.910	6.044	-12.806	6.044	14.161	295.265	0.139
1600.000	0.945	279.582	1599.896	6.310	-14.496	6.310	15.809	293.524	0.073

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
1700.000	0.826	284.669	1699.884	6.630	-16.006	6.630	17.325	292.499	0.142
1800.000	0.726	296.377	1799.875	7.094	-17.271	7.094	18.671	292.329	0.187
1900.000	0.621	338.094	1899.868	7.878	-18.041	7.878	19.686	293.590	0.489
2000.000	0.598	18.571	1999.863	8.876	-18.077	8.876	20.138	296.150	0.422
2100.000	0.491	42.226	2099.859	9.688	-17.622	9.688	20.110	298.800	0.247
2200.000	0.287	91.837	2199.857	9.998	-17.084	9.998	19.794	300.336	0.376
2300.000	0.472	128.926	2299.855	9.731	-16.513	9.731	19.167	300.509	0.299
2400.000	0.574	174.296	2399.851	8.974	-16.143	8.974	18.469	299.069	0.414
2500.000	0.460	172.051	2499.847	8.078	-16.037	8.078	17.957	296.734	0.115
2600.000	0.368	193.908	2599.844	7.368	-16.059	7.368	17.669	294.646	0.181
2700.000	0.529	290.540	2699.842	7.218	-16.569	7.218	18.073	293.540	0.679
2800.000	1.372	301.900	2799.828	8.013	-18.018	8.013	19.719	293.975	0.859
2900.000	1.400	300.296	2899.798	9.262	-20.089	9.262	22.121	294.751	0.048
3000.000	1.672	297.010	2999.762	10.540	-22.444	10.540	24.796	295.157	0.286
3100.000	1.952	299.946	3099.712	12.053	-25.219	12.053	27.951	295.545	0.295
3200.000	1.842	296.322	3199.657	13.616	-28.135	13.616	31.257	295.824	0.162
3300.000	1.130	281.442	3299.624	14.524	-30.543	14.524	33.820	295.433	0.804
3400.000	0.834	274.845	3399.609	14.781	-32.234	14.781	35.462	294.635	0.317
3500.000	0.797	257.939	3499.599	14.698	-33.639	14.698	36.710	293.601	0.242
3600.000	0.960	254.627	3599.587	14.330	-35.127	14.330	37.937	292.193	0.170
3700.000	1.125	250.012	3699.570	13.773	-36.857	13.773	39.346	290.490	0.186
3800.000	1.348	247.275	3799.547	12.983	-38.864	12.983	40.976	288.472	0.230
3900.000	1.349	237.533	3899.520	11.897	-40.942	11.897	42.636	286.202	0.229
4000.000	1.510	214.611	3999.489	10.180	-42.684	10.180	43.881	283.414	0.590
4100.000	1.604	208.655	4099.452	7.868	-44.103	7.868	44.800	280.115	0.187
4200.000	1.716	196.987	4199.411	5.208	-45.212	5.208	45.511	276.571	0.355
4300.000	1.560	201.574	4299.370	2.510	-46.150	2.510	46.218	273.114	0.203
4400.000	0.916	223.633	4399.346	0.666	-47.202	0.666	47.207	270.808	0.790
4500.000	0.493	270.193	4499.339	0.088	-48.184	0.088	48.184	270.105	0.679
4600.000	0.628	336.192	4599.336	0.591	-48.836	0.591	48.839	270.693	0.621
4700.000	0.498	322.521	4699.331	1.437	-49.321	1.437	49.342	271.668	0.186
4800.000	0.427	295.379	4799.328	1.941	-49.922	1.941	49.960	272.227	0.228
4900.000	0.717	262.164	4899.323	2.015	-50.879	2.015	50.918	272.268	0.429
5000.000	0.681	242.103	4999.315	1.652	-52.024	1.652	52.050	271.819	0.246
5100.000	0.619	238.299	5099.309	1.090	-53.009	1.090	53.021	271.178	0.076
5200.000	0.687	243.613	5199.302	0.539	-54.006	0.539	54.009	270.572	0.091
5300.000	0.501	215.725	5299.297	-0.082	-54.798	-0.082	54.798	269.914	0.338
5400.000	0.438	211.833	5399.294	-0.762	-55.255	-0.762	55.261	269.210	0.071
5500.000	0.807	171.205	5499.288	-1.783	-55.349	-1.783	55.378	268.155	0.554

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
5600.000	0.825	170.446	5599.278	-3.189	-55.122	-3.189	55.214	266.689	0.021
5700.000	0.514	221.417	5699.272	-4.235	-55.299	-4.235	55.461	265.620	0.641
5800.000	0.457	221.595	5799.268	-4.869	-55.860	-4.869	56.072	265.018	0.057
5900.000	0.706	255.165	5899.263	-5.325	-56.720	-5.325	56.969	264.636	0.412
6000.000	0.620	254.710	5999.257	-5.626	-57.837	-5.626	58.110	264.445	0.086
6100.000	0.808	257.759	6099.249	-5.918	-59.048	-5.918	59.344	264.277	0.191
6200.000	0.634	248.737	6199.241	-6.268	-60.252	-6.268	60.577	264.061	0.207
6300.000	0.590	227.794	6299.235	-6.814	-61.149	-6.814	61.527	263.641	0.227
6400.000	0.589	243.671	6399.230	-7.388	-61.991	-7.388	62.430	263.203	0.163
6500.000	0.827	232.948	6499.223	-8.051	-63.028	-8.051	63.540	262.720	0.271
6600.000	0.975	241.251	6599.210	-8.895	-64.350	-8.895	64.962	262.130	0.197
6700.000	1.028	218.651	6699.195	-10.005	-65.656	-10.005	66.414	261.336	0.396
6800.000	1.102	234.923	6799.178	-11.258	-67.003	-11.258	67.942	260.462	0.310
6900.000	1.043	236.694	6899.161	-12.311	-68.551	-12.311	69.648	259.819	0.068
7000.000	0.912	238.549	6999.146	-13.226	-69.991	-13.226	71.229	259.299	0.135