



Company/Rig: Noble Energy/Production/CoreTech
WELL/API#: CARLSON 23-2F/05-123-15366
DECLINATION: 8.18 Degrees
TD AS DRILLED: 7354'
COUNTY/STATE: WELD/COLORADO
VS-Azi: 0.000 Degrees
Latitude: 40.30337, Longitude: -104.74216
Grid North = True North -0.49 degs (NAD 27)
Grid Correction Applied = -0.49 degs



Depth Reference : RKB=SURFACE ELEVATION=4720'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: run2-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 6/20/2017 / 14:04

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

COMMERCE CITY, COLORADO

303-853-4976

Surveyor: JAY HINMAN / Carlson 23-2F

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	0.258	37.876	100.000	0.178	0.138	0.178	0.225	37.876	0.258
200.000	0.246	294.929	199.999	0.446	0.082	0.446	0.453	10.387	0.394
300.000	0.136	116.469	299.999	0.484	-0.007	0.484	0.484	359.164	0.382
400.000	0.104	57.461	399.999	0.480	0.176	0.480	0.511	20.102	0.121
500.000	0.503	280.178	499.998	0.607	-0.179	0.607	0.633	343.521	0.584
600.000	0.200	329.224	599.996	0.834	-0.701	0.834	1.089	319.967	0.401
700.000	0.539	301.229	699.994	1.228	-1.192	1.228	1.711	315.845	0.374
800.000	0.426	302.660	799.990	1.672	-1.907	1.672	2.536	311.244	0.114
900.000	0.405	304.395	899.987	2.073	-2.512	2.073	3.257	309.526	0.024
1000.000	0.632	264.290	999.983	2.218	-3.353	2.218	4.020	303.482	0.415
1100.000	0.372	282.190	1099.980	2.231	-4.219	2.231	4.772	297.875	0.301
1200.000	0.504	282.603	1199.977	2.396	-4.964	2.396	5.512	295.760	0.132
1300.000	0.640	272.650	1299.972	2.517	-5.951	2.517	6.462	292.929	0.168
1400.000	0.496	254.392	1399.967	2.427	-6.926	2.427	7.339	289.309	0.229
1500.000	0.459	279.622	1499.963	2.377	-7.738	2.377	8.095	287.077	0.212
1600.000	0.507	284.087	1599.960	2.552	-8.562	2.552	8.934	286.596	0.061

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	0.602	271.828	1699.955	2.676	-9.517	2.676	9.886	285.707	0.152
1800.000	0.714	269.358	1799.949	2.686	-10.665	2.686	10.998	284.136	0.115
1900.000	0.545	283.748	1899.943	2.792	-11.750	2.792	12.077	283.367	0.230
2000.000	0.402	277.907	1999.939	2.953	-12.559	2.953	12.902	283.233	0.150
2100.000	0.426	267.850	2099.937	2.988	-13.278	2.988	13.610	282.680	0.076
2200.000	0.154	231.519	2199.935	2.890	-13.755	2.890	14.056	281.864	0.315
2300.000	0.330	23.495	2299.935	3.070	-13.746	3.070	14.085	282.591	0.472
2400.000	0.401	20.633	2399.933	3.662	-13.508	3.662	13.995	285.170	0.073
2500.000	0.404	10.733	2499.930	4.336	-13.319	4.336	14.007	288.034	0.069
2600.000	0.360	37.264	2599.928	4.932	-13.063	4.932	13.963	290.684	0.180
2700.000	0.408	4.768	2699.926	5.537	-12.843	5.537	13.986	293.320	0.220
2800.000	0.427	358.498	2799.923	6.264	-12.824	6.264	14.272	296.033	0.049
2900.000	0.399	351.695	2899.921	6.981	-12.884	6.981	14.653	298.450	0.056
3000.000	0.402	349.069	2999.918	7.669	-13.000	7.669	15.094	300.538	0.019
3100.000	0.364	354.216	3099.916	8.329	-13.099	8.329	15.523	302.452	0.051
3200.000	0.347	335.016	3199.914	8.920	-13.259	8.920	15.980	303.931	0.120
3300.000	0.641	325.702	3299.910	9.657	-13.702	9.657	16.763	305.175	0.304
3400.000	0.752	327.463	3399.903	10.672	-14.370	10.672	17.899	306.599	0.113
3500.000	0.716	333.310	3499.895	11.783	-15.004	11.783	19.078	308.145	0.083
3600.000	0.360	252.851	3599.891	12.249	-15.585	12.249	19.822	308.167	0.747
3700.000	0.505	250.988	3699.889	12.013	-16.302	12.013	20.250	306.388	0.146
3800.000	0.617	254.288	3799.884	11.724	-17.237	11.724	20.846	304.221	0.116
3900.000	0.437	286.090	3899.880	11.684	-18.122	11.684	21.562	302.810	0.337
4000.000	0.599	255.304	3999.876	11.657	-18.995	11.657	22.286	301.537	0.316
4100.000	0.773	276.033	4099.869	11.595	-20.171	11.595	23.266	299.892	0.300
4200.000	0.625	290.509	4199.861	11.857	-21.353	11.857	24.424	299.043	0.229
4300.000	0.685	326.449	4299.855	12.547	-22.194	12.547	25.495	299.480	0.408
4400.000	0.864	342.946	4399.846	13.766	-22.746	13.766	26.587	301.182	0.284
4500.000	0.689	333.110	4499.837	15.023	-23.239	15.023	27.672	302.880	0.220
4600.000	0.634	325.513	4599.830	16.015	-23.824	16.015	28.707	303.910	0.103
4700.000	0.258	329.730	4699.827	16.665	-24.251	16.665	29.425	304.497	0.377
4800.000	0.220	140.785	4799.827	16.711	-24.243	16.711	29.444	304.579	0.477
4900.000	0.165	147.610	4899.826	16.440	-24.044	16.440	29.127	304.362	0.060
5000.000	0.081	118.825	4999.826	16.284	-23.905	16.284	28.924	304.263	0.102
5100.000	0.462	138.909	5099.825	15.946	-23.578	15.946	28.464	304.072	0.387
5200.000	0.388	198.869	5199.822	15.322	-23.422	15.322	27.989	303.192	0.429
5300.000	0.260	262.512	5299.821	14.972	-23.757	14.972	28.081	302.221	0.358
5400.000	0.507	243.335	5399.819	14.744	-24.377	14.744	28.489	301.168	0.274
5500.000	1.048	306.583	5499.811	15.091	-25.506	15.091	29.636	300.611	0.936

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	0.451	5.190	5599.803	16.028	-26.205	16.028	30.718	301.452	0.899
5700.000	0.420	52.928	5699.800	16.641	-25.877	16.641	30.766	302.745	0.354
5800.000	0.481	93.847	5799.797	16.834	-25.165	16.834	30.277	303.780	0.320
5900.000	0.570	123.098	5899.793	16.534	-24.330	16.534	29.416	304.199	0.279
6000.000	0.765	99.905	5999.787	16.148	-23.255	16.148	28.312	304.775	0.330
6100.000	1.019	136.831	6099.775	15.384	-21.989	15.384	26.836	304.978	0.614
6200.000	1.199	129.991	6199.757	14.063	-20.578	14.063	24.924	304.347	0.223
6300.000	1.155	142.164	6299.736	12.594	-19.158	12.594	22.927	303.320	0.253
6400.000	1.040	144.680	6399.717	11.058	-18.016	11.058	21.139	301.542	0.125
6500.000	1.466	157.254	6499.693	9.139	-16.997	9.139	19.298	298.265	0.504
6600.000	1.276	141.287	6599.665	7.091	-15.806	7.091	17.324	294.161	0.425
6700.000	1.598	138.486	6699.633	5.178	-14.186	5.178	15.102	290.053	0.330
6800.000	2.199	140.939	6799.578	2.644	-12.053	2.644	12.340	282.375	0.607
6830.000	2.276	142.340	6829.555	1.726	-11.326	1.726	11.457	278.664	0.315