



COMPANY/RIG: Noble Energy/Production/CoreTech
 WELL/API: Starman USX A 17-23/05-123-24630
 DECLINATION: 8.14 Degrees
 TD AS DRILLED: 7235'
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.48258, Longitude: -104.56885
 Grid North = True North -0.60 degs (NAD 27)
 Grid Correction Applied = -0.60 degs



DEPTH REFERENCE : RKB = GL Elevation = 4783'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut
 Minimum Curvature Method
 Report Date/Time: 2/23/2017 / 09:20

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
 NORTH REFERENCE: GRID
 HENDERSON, COLORADO
 303-853-4976

Surveyor: JUSTIN WILLIAMS / Starman-USX A 17-23

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	0.472	315.199	99.999	0.293	-0.291	0.293	0.412	315.199	0.472
200.000	0.423	285.687	199.996	0.685	-0.937	0.685	1.160	306.177	0.233
300.000	0.337	297.719	299.994	0.922	-1.553	0.922	1.806	300.693	0.117
400.000	0.440	316.272	399.991	1.336	-2.079	1.336	2.471	302.730	0.161
500.000	0.261	322.153	499.990	1.793	-2.484	1.793	3.063	305.830	0.182
600.000	0.338	331.872	599.988	2.233	-2.762	2.233	3.552	308.953	0.092
700.000	0.437	14.568	699.986	2.863	-2.806	2.863	4.008	315.575	0.297
800.000	1.163	32.863	799.976	4.084	-2.159	4.084	4.620	332.142	0.761
900.000	1.197	25.121	899.955	5.883	-1.164	5.883	5.997	348.804	0.163
1000.000	1.208	31.510	999.933	7.727	-0.170	7.727	7.729	358.738	0.134
1100.000	1.119	29.534	1099.912	9.476	0.862	9.476	9.515	5.198	0.097
1200.000	1.117	19.387	1199.893	11.245	1.667	11.245	11.368	8.433	0.198
1300.000	0.915	17.746	1299.877	12.925	2.234	12.925	13.117	9.807	0.205
1400.000	0.873	20.722	1399.865	14.398	2.747	14.398	14.658	10.802	0.062
1500.000	0.867	12.210	1499.854	15.850	3.177	15.850	16.165	11.333	0.129
1600.000	0.701	7.734	1599.844	17.196	3.419	17.196	17.532	11.246	0.177

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	0.431	351.535	1699.839	18.174	3.446	18.174	18.497	10.737	0.312
1800.000	0.501	341.793	1799.836	18.960	3.254	18.960	19.238	9.739	0.106
1900.000	0.296	292.270	1899.834	19.473	2.879	19.473	19.685	8.408	0.382
2000.000	0.251	317.258	1999.833	19.732	2.490	19.732	19.889	7.193	0.126
2100.000	0.421	307.853	2099.831	20.119	2.052	20.119	20.223	5.823	0.177
2200.000	0.411	314.712	2199.828	20.596	1.507	20.596	20.651	4.185	0.051
2300.000	0.510	302.773	2299.825	21.089	0.878	21.089	21.108	2.384	0.138
2400.000	0.222	291.644	2399.823	21.402	0.323	21.402	21.405	0.865	0.295
2500.000	0.118	314.349	2499.823	21.545	0.069	21.545	21.546	0.185	0.123
2600.000	0.068	163.255	2599.823	21.560	0.013	21.560	21.560	0.035	0.180
2700.000	0.120	223.205	2699.822	21.428	-0.041	21.428	21.428	359.890	0.104
2800.000	0.087	247.068	2799.822	21.322	-0.182	21.322	21.323	359.510	0.053
2900.000	0.138	17.917	2899.822	21.407	-0.215	21.407	21.408	359.424	0.205
3000.000	0.418	29.245	2999.821	21.839	0.000	21.839	21.839	360.000	0.284
3100.000	0.560	53.329	3099.817	22.449	0.570	22.449	22.456	1.454	0.247
3200.000	0.838	43.322	3199.810	23.273	1.463	23.273	23.319	3.598	0.303
3300.000	0.334	45.481	3299.804	24.009	2.173	24.009	24.107	5.171	0.505
3400.000	0.144	244.336	3399.804	24.159	2.267	24.159	24.265	5.361	0.472
3500.000	0.751	232.730	3499.800	23.707	1.632	23.707	23.764	3.939	0.611
3600.000	1.330	230.770	3599.783	22.577	0.212	22.577	22.578	0.537	0.579
3700.000	1.631	216.650	3699.750	20.701	-1.536	20.701	20.758	355.756	0.471
3800.000	1.540	223.070	3799.712	18.578	-3.303	18.578	18.870	349.919	0.199
3900.000	1.683	220.450	3899.673	16.480	-5.173	16.480	17.272	342.573	0.161
4000.000	1.295	207.760	3999.639	14.362	-6.652	14.362	15.828	335.148	0.507
4100.000	1.164	204.271	4099.616	12.436	-7.596	12.436	14.572	328.583	0.151
4200.000	0.964	205.771	4199.599	10.753	-8.379	10.753	13.632	322.072	0.202
4300.000	0.673	220.309	4299.588	9.548	-9.125	9.548	13.207	316.298	0.355
4400.000	0.472	251.098	4399.583	8.967	-9.894	8.967	13.352	312.185	0.360
4500.000	0.656	292.836	4499.579	9.055	-10.811	9.055	14.102	309.951	0.437
4600.000	1.087	310.126	4599.567	9.889	-12.064	9.889	15.599	309.343	0.500
4700.000	1.680	307.092	4699.538	11.384	-13.958	11.384	18.012	309.201	0.597
4800.000	1.838	296.196	4799.491	12.976	-16.566	12.976	21.043	308.071	0.369
4900.000	1.782	299.748	4899.441	14.455	-19.354	14.455	24.156	306.755	0.125
5000.000	1.549	293.395	4999.399	15.763	-21.944	15.763	27.019	305.690	0.297
5100.000	1.374	297.772	5099.366	16.858	-24.245	16.858	29.530	304.812	0.207
5200.000	1.398	281.665	5199.337	17.663	-26.500	17.663	31.847	303.684	0.389
5300.000	1.380	286.242	5299.308	18.247	-28.852	18.247	34.137	302.311	0.112
5400.000	1.359	284.692	5399.280	18.884	-31.155	18.884	36.432	301.222	0.043
5500.000	0.982	274.539	5499.259	19.253	-33.156	19.253	38.341	300.142	0.429

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	0.710	266.340	5599.248	19.281	-34.629	19.281	39.635	299.109	0.297
5700.000	0.770	256.024	5699.239	19.080	-35.899	19.080	40.654	297.990	0.146
5800.000	0.741	269.458	5799.231	18.911	-37.198	18.911	41.729	296.949	0.179
5900.000	0.479	289.682	5899.225	19.046	-38.238	19.046	42.719	296.477	0.335
6000.000	0.638	301.763	5999.220	19.480	-39.106	19.480	43.689	296.480	0.197
6100.000	0.788	338.770	6099.213	20.414	-39.828	20.414	44.755	297.137	0.474
6200.000	0.756	345.970	6199.204	21.695	-40.237	21.695	45.713	298.332	0.102
6300.000	0.277	17.193	6299.200	22.566	-40.325	22.566	46.210	299.231	0.539
6400.000	0.585	182.492	6399.198	22.287	-40.276	22.287	46.031	298.958	0.856
6500.000	0.912	170.942	6499.190	20.991	-40.173	20.991	45.326	297.588	0.358
6600.000	0.884	167.684	6599.178	19.451	-39.883	19.451	44.373	295.999	0.058
6700.000	0.998	161.575	6699.164	17.871	-39.443	17.871	43.303	294.375	0.152
6800.000	1.295	159.719	6799.144	15.985	-38.776	15.985	41.942	292.403	0.299
6900.000	0.768	149.249	6899.128	14.349	-38.042	14.349	40.658	290.666	0.557