



COMPANY/RIG: Noble Energy/Production/CoreTech  
WELL/API: Vetting PM F 26-7/05-123-14061  
DECLINATION: 8.23 Degrees  
TD AS DRILLED: 7170 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.37206, Longitude: -104.62751  
Grid North = True North -0.56 degs (NAD 27)  
Grid Correction Applied = -0.56 degs



DEPTH REFERENCE : RKB = GL Elevation = 4642

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 6/23/2016 / 10:01

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Vetting PM F 26-7

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	0.078	328.576	100.000	0.058	-0.036	0.058	0.068	328.576	0.078
200.000	0.182	317.331	200.000	0.233	-0.179	0.233	0.294	322.544	0.106
300.000	0.274	324.021	299.999	0.543	-0.427	0.543	0.691	321.862	0.096
400.000	0.378	313.295	399.997	0.963	-0.807	0.963	1.257	320.033	0.120
500.000	0.299	314.084	499.996	1.370	-1.234	1.370	1.844	317.993	0.079
600.000	0.320	315.576	599.994	1.751	-1.617	1.751	2.383	317.283	0.023
700.000	0.488	323.728	699.992	2.294	-2.064	2.294	3.086	318.017	0.178
800.000	0.522	318.530	799.988	2.979	-2.618	2.979	3.966	318.689	0.057
900.000	0.327	314.177	899.985	3.520	-3.125	3.520	4.707	318.400	0.198
1000.000	0.307	328.084	999.983	3.946	-3.471	3.946	5.256	318.663	0.079
1100.000	0.190	345.314	1099.982	4.334	-3.655	4.334	5.670	319.856	0.138
1200.000	0.113	96.889	1199.982	4.482	-3.599	4.482	5.749	321.234	0.254
1300.000	0.218	113.337	1299.982	4.395	-3.327	4.395	5.512	322.875	0.114
1400.000	0.178	90.084	1399.981	4.319	-2.997	4.319	5.258	325.244	0.089
1500.000	0.192	95.338	1499.981	4.304	-2.675	4.304	5.067	328.134	0.022
1600.000	0.309	106.080	1599.980	4.213	-2.249	4.213	4.776	331.906	0.126
1700.000	0.315	121.005	1699.978	3.997	-1.754	3.997	4.365	336.301	0.081
1800.000	0.395	124.444	1799.976	3.661	-1.235	3.661	3.864	341.358	0.082

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
1900.000	0.436	142.949	1899.974	3.163	-0.722	3.163	3.244	347.141	0.140
2000.000	0.536	178.191	1999.970	2.392	-0.478	2.392	2.439	348.696	0.309
2100.000	0.584	195.894	2099.966	1.435	-0.603	1.435	1.556	337.202	0.179
2200.000	0.863	189.066	2199.958	0.201	-0.861	0.201	0.884	283.123	0.291
2300.000	1.030	192.687	2299.944	-1.420	-1.177	-1.420	1.844	219.669	0.178
2400.000	0.898	191.622	2399.930	-3.064	-1.533	-3.064	3.426	206.573	0.133
2500.000	0.972	196.470	2499.916	-4.645	-1.931	-4.645	5.030	202.573	0.108
2600.000	1.042	188.851	2599.901	-6.357	-2.311	-6.357	6.764	199.981	0.151
2700.000	0.859	190.566	2699.887	-7.992	-2.589	-7.992	8.400	197.948	0.186
2800.000	0.650	187.311	2799.879	-9.290	-2.798	-9.290	9.703	196.761	0.213
2900.000	0.442	165.914	2899.874	-10.226	-2.776	-10.226	10.596	195.190	0.288
3000.000	0.381	164.365	2999.871	-10.920	-2.593	-10.920	11.224	193.357	0.061
3100.000	0.417	184.442	3099.869	-11.604	-2.531	-11.604	11.877	192.307	0.144
3200.000	0.372	163.102	3199.867	-12.278	-2.465	-12.278	12.523	191.353	0.153
3300.000	0.548	153.006	3299.864	-13.014	-2.154	-13.014	13.191	189.397	0.192
3400.000	1.541	148.863	3399.846	-14.591	-1.242	-14.591	14.644	184.863	0.996
3500.000	2.348	150.274	3499.787	-17.522	0.470	-17.522	17.528	178.464	0.808
3600.000	2.428	152.378	3599.700	-21.177	2.467	-21.177	21.320	173.354	0.118
3700.000	2.392	163.504	3699.613	-25.054	4.042	-25.054	25.378	170.836	0.468
3800.000	1.939	182.122	3799.542	-28.746	4.572	-28.746	29.108	170.963	0.831
3900.000	1.514	201.102	3899.497	-31.670	4.034	-31.670	31.925	172.742	0.707
4000.000	1.258	211.086	3999.468	-33.842	2.991	-33.842	33.974	174.949	0.351
4100.000	1.724	245.082	4099.436	-35.416	1.061	-35.416	35.432	178.285	0.979
4200.000	2.100	271.336	4199.382	-36.007	-2.136	-36.007	36.070	183.394	0.943
4300.000	1.952	285.804	4299.320	-35.500	-5.607	-35.500	35.940	188.975	0.531
4400.000	2.159	293.698	4399.256	-34.279	-8.970	-34.279	35.433	194.665	0.350
4500.000	2.145	306.405	4499.186	-32.411	-12.202	-32.411	34.632	200.629	0.476
4600.000	2.138	319.635	4599.117	-29.879	-14.916	-29.879	33.395	206.529	0.493
4700.000	2.072	323.920	4699.049	-26.997	-17.189	-26.997	32.004	212.485	0.171
4800.000	1.948	336.422	4798.988	-23.978	-18.933	-23.978	30.552	218.295	0.455
4900.000	2.063	335.869	4898.927	-20.778	-20.349	-20.778	29.083	224.403	0.117
5000.000	2.058	328.395	4998.862	-17.606	-22.026	-17.606	28.197	231.364	0.269
5100.000	2.160	306.413	5098.796	-14.957	-24.484	-14.957	28.691	238.579	0.810
5200.000	1.779	286.458	5198.738	-13.399	-27.489	-13.399	30.581	244.014	0.779
5300.000	2.106	270.964	5298.681	-12.928	-30.814	-12.928	33.416	247.239	0.616
5400.000	2.559	257.337	5398.599	-13.387	-34.829	-13.387	37.313	248.976	0.713
5500.000	2.768	246.266	5498.491	-14.848	-39.218	-14.848	41.934	249.263	0.554
5600.000	2.511	241.476	5598.385	-16.865	-43.352	-16.865	46.517	248.742	0.338
5700.000	1.908	229.159	5698.311	-19.000	-46.536	-19.000	50.266	247.790	0.764
5800.000	1.776	209.029	5798.261	-21.444	-48.548	-21.444	53.073	246.169	0.657

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
5900.000	2.064	198.975	5898.205	-24.501	-49.885	-24.501	55.577	243.842	0.442
6000.000	1.703	204.248	5998.151	-27.558	-51.081	-27.558	58.041	241.653	0.400
6100.000	2.036	198.315	6098.097	-30.600	-52.249	-30.600	60.550	239.645	0.385
6200.000	1.888	207.671	6198.039	-33.745	-53.572	-33.745	63.315	237.793	0.352
6300.000	2.121	200.465	6297.978	-36.938	-54.985	-36.938	66.240	236.107	0.343
6400.000	2.250	197.661	6397.905	-40.543	-56.227	-40.543	69.320	234.207	0.167
6500.000	2.324	195.154	6497.825	-44.370	-57.353	-44.370	72.512	232.273	0.124
6600.000	2.257	196.789	6597.745	-48.212	-58.452	-48.212	75.769	230.484	0.093
6700.000	2.119	197.984	6697.673	-51.855	-59.591	-51.855	78.994	228.971	0.146
6800.000	1.752	206.734	6797.616	-54.979	-60.850	-54.979	82.008	227.901	0.470
6900.000	1.295	204.438	6897.580	-57.373	-62.005	-57.373	84.476	227.222	0.461