



COMPANY/RIG: Noble Energy/Production/CoreTech  
WELL/API: Burbach 15-23/05-123-25080  
DECLINATION: 8.14 Degrees  
TD AS DRILLED: 7409 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.48967, Longitude: -104.77163  
Grid North = True North -0.47 degs (NAD 27)  
Grid Correction Applied = -0.47 degs



DEPTH REFERENCE : RKB = GL Elevation = 4785

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 3/16/2018 / 14:51

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS/ Burbach 15-23/ API 05-123-25080

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	0.754	61.133	99.997	0.318	0.576	0.318	0.658	61.133	0.754
200.000	0.449	59.186	199.991	0.836	1.489	0.836	1.708	60.686	0.305
300.000	0.336	55.927	299.989	1.201	2.068	1.201	2.392	59.858	0.116
400.000	0.387	80.674	399.987	1.420	2.644	1.420	3.001	61.767	0.163
500.000	0.365	98.217	499.985	1.429	3.293	1.429	3.590	66.541	0.117
600.000	0.366	100.198	599.983	1.327	3.923	1.327	4.141	71.309	0.013
700.000	0.382	101.229	699.981	1.206	4.564	1.206	4.720	75.201	0.017
800.000	0.404	111.106	799.979	1.014	5.219	1.014	5.317	79.007	0.071
900.000	0.424	122.028	899.976	0.691	5.862	0.691	5.902	83.280	0.081
1000.000	0.424	140.380	999.973	0.210	6.411	0.210	6.415	88.128	0.135
1100.000	0.627	145.764	1099.969	-0.528	6.955	-0.528	6.975	94.339	0.209
1200.000	0.528	142.069	1199.964	-1.344	7.546	-1.344	7.665	100.096	0.105
1300.000	0.455	165.821	1299.960	-2.092	7.927	-2.092	8.198	104.784	0.215
1400.000	0.527	142.748	1399.957	-2.843	8.302	-2.843	8.775	108.901	0.209
1500.000	0.335	156.075	1499.954	-3.476	8.699	-3.476	9.368	111.781	0.215
1600.000	0.304	196.481	1599.952	-3.998	8.742	-3.998	9.613	114.575	0.223
1700.000	0.280	199.140	1699.951	-4.483	8.587	-4.483	9.687	117.569	0.028
1800.000	0.284	237.583	1799.950	-4.847	8.298	-4.847	9.610	120.289	0.186

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	0.233	267.916	1899.949	-4.987	7.886	-4.987	9.330	122.308	0.144
2000.000	0.307	301.588	1999.948	-4.854	7.455	-4.854	8.896	123.068	0.172
2100.000	0.539	290.639	2099.945	-4.548	6.786	-4.548	8.169	123.827	0.244
2200.000	0.496	281.348	2199.941	-4.297	5.922	-4.297	7.316	125.964	0.094
2300.000	0.583	289.724	2299.937	-4.040	5.018	-4.040	6.442	128.834	0.117
2400.000	0.537	289.098	2399.932	-3.715	4.097	-3.715	5.530	132.200	0.046
2500.000	0.486	278.912	2499.928	-3.496	3.236	-3.496	4.763	137.215	0.104
2600.000	0.650	284.809	2599.923	-3.285	2.268	-3.285	3.992	145.379	0.175
2700.000	0.543	283.438	2699.918	-3.030	1.258	-3.030	3.281	157.448	0.108
2800.000	0.665	276.059	2799.912	-2.859	0.220	-2.859	2.867	175.591	0.144
2900.000	0.754	284.107	2899.904	-2.637	-0.994	-2.637	2.818	200.661	0.133
3000.000	0.795	277.158	2999.895	-2.390	-2.321	-2.390	3.332	224.153	0.103
3100.000	0.910	280.749	3099.884	-2.156	-3.789	-2.156	4.359	240.363	0.127
3200.000	1.057	282.406	3199.870	-1.810	-5.470	-1.810	5.761	251.695	0.150
3300.000	1.108	267.902	3299.852	-1.647	-7.337	-1.647	7.519	257.349	0.278
3400.000	1.545	257.140	3399.825	-1.982	-9.617	-1.982	9.819	258.353	0.502
3500.000	1.367	261.923	3499.793	-2.450	-12.113	-2.450	12.358	258.565	0.215
3600.000	0.737	270.459	3599.775	-2.613	-13.937	-2.613	14.180	259.383	0.647
3700.000	0.871	286.326	3699.766	-2.394	-15.310	-2.394	15.496	261.113	0.258
3800.000	1.090	280.842	3799.751	-2.001	-16.973	-2.001	17.090	263.275	0.238
3900.000	1.812	278.168	3899.718	-1.598	-19.472	-1.598	19.538	265.309	0.725
4000.000	1.773	273.651	3999.669	-1.275	-22.581	-1.275	22.617	266.769	0.147
4100.000	1.608	267.416	4099.626	-1.239	-25.525	-1.239	25.556	267.220	0.247
4200.000	1.847	247.383	4199.581	-1.923	-28.415	-1.923	28.480	266.129	0.645
4300.000	1.603	224.595	4299.537	-3.538	-30.884	-3.538	31.086	263.464	0.722
4400.000	1.519	223.143	4399.500	-5.501	-32.773	-5.501	33.231	260.471	0.093
4500.000	1.618	216.618	4499.463	-7.602	-34.521	-7.602	35.348	257.581	0.204
4600.000	1.653	223.740	4599.422	-9.777	-36.361	-9.777	37.652	254.949	0.206
4700.000	1.723	214.040	4699.379	-12.065	-38.200	-12.065	40.060	252.471	0.294
4800.000	1.743	232.282	4799.334	-14.242	-40.245	-14.242	42.690	250.512	0.550
4900.000	1.067	252.240	4899.304	-15.456	-42.335	-15.456	45.068	249.943	0.825
5000.000	1.128	270.177	4999.286	-15.737	-44.206	-15.737	46.924	250.404	0.347
5100.000	0.709	280.603	5099.273	-15.620	-45.798	-15.620	48.389	251.167	0.449
5200.000	0.223	331.427	5199.269	-15.335	-46.500	-15.335	48.963	251.748	0.594
5300.000	0.347	320.331	5299.268	-14.931	-46.786	-14.931	49.111	252.301	0.135
5400.000	0.123	74.511	5399.267	-14.669	-46.877	-14.669	49.118	252.624	0.413
5500.000	0.596	105.935	5499.265	-14.783	-46.273	-14.783	48.577	252.283	0.495
5600.000	0.804	125.506	5599.258	-15.334	-45.202	-15.334	47.732	251.262	0.314
5700.000	0.325	132.618	5699.253	-15.934	-44.421	-15.934	47.193	250.268	0.483
5800.000	0.713	150.146	5799.248	-16.666	-43.903	-16.666	46.959	249.213	0.415

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	0.883	122.552	5899.239	-17.620	-42.943	-17.620	46.418	247.691	0.415
6000.000	1.026	103.650	5999.225	-18.246	-41.424	-18.246	45.264	246.228	0.343
6100.000	1.532	93.957	6099.200	-18.550	-39.220	-18.550	43.386	244.688	0.549
6200.000	3.695	81.871	6199.091	-18.186	-34.697	-18.186	39.174	242.339	2.220
6300.000	3.434	72.584	6298.898	-16.834	-28.650	-16.834	33.230	239.562	0.633
6400.000	2.771	45.589	6398.756	-14.246	-24.065	-14.246	27.966	239.376	1.584
6500.000	2.329	22.872	6498.660	-10.682	-21.549	-10.682	24.051	243.631	1.094
6600.000	1.941	353.613	6598.593	-7.127	-20.947	-7.127	22.127	251.209	1.141
6700.000	1.698	333.622	6698.544	-4.117	-21.794	-4.117	22.180	259.303	0.675
6800.000	1.234	322.648	6798.511	-1.934	-23.106	-1.934	23.186	265.216	0.540
6900.000	1.205	317.762	6898.488	-0.299	-24.466	-0.299	24.468	269.300	0.108
7000.000	1.331	295.954	6998.464	0.988	-26.217	0.988	26.236	272.158	0.495
7100.000	1.287	304.330	7098.438	2.129	-28.188	2.129	28.269	274.320	0.196