



Company/Rig: NOBLE ENERGY/CORETECH  
WELL/API#: BRUNNER 14-33/05-123-21573  
DECLINATION: 8.23 DEGREES  
TD AS DRILLED: 7025 FEET  
COUNTY/STATE: WELD/COLORADO  
VS-Azi: 0.000 Degrees  
Latitude: 40.48006, Longitude: -104.52430  
Grid Convergence Applied = -0.63 degs (NAD 27)  
Grid North = True North -0.63 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4711 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut  
Minimum Curvature Method  
Report Date/Time: 4/27/2015 / 11:22

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID  
HENDERSON, COLORADO  
303-853-4976

Surveyor: KEVIN MCDOWELL

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	0.620	105.960	99.998	-0.149	0.520	-0.149	0.541	105.960	0.620
200.000	0.679	142.413	199.992	-0.767	1.401	-0.767	1.597	118.686	0.410
300.000	0.366	148.333	299.988	-1.508	1.930	-1.508	2.449	127.998	0.317
400.000	0.384	143.646	399.986	-2.049	2.296	-2.049	3.078	131.749	0.036
500.000	0.440	149.870	499.983	-2.651	2.688	-2.651	3.775	134.610	0.071
600.000	0.437	150.849	599.980	-3.316	3.066	-3.316	4.516	137.246	0.008
700.000	0.491	152.963	699.977	-4.031	3.447	-4.031	5.304	139.470	0.057
800.000	0.505	148.184	799.973	-4.787	3.874	-4.787	6.158	141.022	0.044
900.000	0.458	156.683	899.970	-5.529	4.264	-5.529	6.983	142.359	0.085
1000.000	0.403	160.507	999.967	-6.228	4.540	-6.228	7.707	143.908	0.063
1100.000	0.446	130.755	1099.964	-6.813	4.952	-6.813	8.423	143.988	0.222
1200.000	0.462	134.526	1199.961	-7.350	5.534	-7.350	9.200	143.020	0.034
1300.000	0.423	153.776	1299.958	-7.964	5.985	-7.964	9.962	143.075	0.153
1400.000	0.285	131.493	1399.956	-8.460	6.334	-8.460	10.568	143.175	0.192
1500.000	0.316	143.760	1499.955	-8.847	6.684	-8.847	11.088	142.929	0.071
1600.000	0.311	138.029	1599.953	-9.271	7.028	-9.271	11.634	142.835	0.032
1700.000	0.209	146.756	1699.952	-9.625	7.310	-9.625	12.086	142.786	0.109
1800.000	0.247	158.888	1799.951	-9.979	7.487	-9.979	12.476	143.119	0.062

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	0.199	157.392	1899.951	-10.341	7.632	-10.341	12.853	143.572	0.048
2000.000	0.476	149.906	1999.949	-10.861	7.907	-10.861	13.434	143.944	0.279
2100.000	0.875	146.484	2099.942	-11.857	8.537	-11.857	14.610	144.246	0.401
2200.000	1.205	154.136	2199.925	-13.439	9.417	-13.439	16.410	144.981	0.357
2300.000	1.557	155.563	2299.896	-15.622	10.438	-15.622	18.788	146.252	0.354
2400.000	1.580	158.477	2399.858	-18.142	11.506	-18.142	21.483	147.617	0.083
2500.000	1.348	153.551	2499.826	-20.478	12.535	-20.478	24.010	148.527	0.264
2600.000	0.706	142.302	2599.809	-22.018	13.436	-22.018	25.794	148.608	0.670
2700.000	0.228	160.064	2699.806	-22.693	13.880	-22.693	26.601	148.547	0.493
2800.000	0.429	123.574	2799.804	-23.087	14.260	-23.087	27.136	148.298	0.280
2900.000	0.650	114.178	2899.800	-23.526	15.089	-23.526	27.949	147.325	0.238
3000.000	0.850	95.979	2999.791	-23.835	16.344	-23.835	28.901	145.561	0.309
3100.000	1.073	72.639	3099.777	-23.633	17.975	-23.633	29.692	142.743	0.446
3200.000	0.779	21.931	3199.766	-22.723	19.123	-22.723	29.699	139.918	0.836
3300.000	0.666	32.938	3299.758	-21.605	19.693	-21.605	29.233	137.652	0.178
3400.000	0.661	18.665	3399.751	-20.571	20.193	-20.571	28.826	135.531	0.165
3500.000	0.357	19.825	3499.747	-19.731	20.484	-19.731	28.441	133.928	0.304
3600.000	0.333	174.274	3599.747	-19.727	20.618	-19.727	28.535	133.734	0.673
3700.000	0.495	184.817	3699.744	-20.447	20.611	-20.447	29.032	134.770	0.178
3800.000	0.361	228.564	3799.741	-21.086	20.338	-21.086	29.296	136.034	0.342
3900.000	0.690	241.499	3899.737	-21.582	19.573	-21.582	29.135	137.795	0.347
4000.000	0.693	197.115	3999.730	-22.447	18.865	-22.447	29.322	139.956	0.523
4100.000	0.864	218.657	4099.721	-23.614	18.216	-23.614	29.824	142.353	0.336
4200.000	0.584	259.301	4199.714	-24.297	17.245	-24.297	29.795	144.634	0.567
4300.000	0.532	349.497	4299.711	-23.935	16.660	-23.935	29.163	145.160	0.791
4400.000	0.491	328.157	4399.707	-23.115	16.349	-23.115	28.313	144.728	0.194
4500.000	0.720	249.649	4499.703	-22.969	15.535	-22.969	27.729	145.929	0.786
4600.000	1.009	184.980	4599.693	-24.064	14.869	-24.064	28.288	148.288	0.956
4700.000	1.964	190.768	4699.659	-26.625	14.473	-26.625	30.304	151.473	0.966
4800.000	1.969	200.698	4799.600	-29.916	13.545	-29.916	32.839	155.639	0.340
4900.000	1.921	177.644	4899.544	-33.197	13.007	-33.197	35.654	158.604	0.779
5000.000	1.299	172.655	4999.504	-35.996	13.221	-35.996	38.348	159.832	0.637
5100.000	0.456	135.748	5099.492	-37.406	13.644	-37.406	39.816	159.961	0.974
5200.000	0.984	63.501	5199.485	-37.308	14.690	-37.308	40.095	158.508	0.950
5300.000	1.247	51.961	5299.466	-36.254	16.315	-36.254	39.756	155.771	0.344
5400.000	1.135	40.680	5399.445	-34.832	17.818	-34.832	39.125	152.909	0.259
5500.000	1.140	14.130	5499.426	-33.116	18.706	-33.116	38.034	150.539	0.523
5600.000	0.921	1.495	5599.410	-31.348	18.970	-31.348	36.641	148.820	0.315
5700.000	0.826	11.113	5699.398	-29.838	19.130	-29.838	35.443	147.334	0.174
5800.000	0.600	24.631	5799.390	-28.654	19.487	-28.654	34.653	145.781	0.280

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	0.467	41.449	5899.386	-27.872	19.976	-27.872	34.291	144.371	0.204
6000.000	0.205	354.293	5999.384	-27.389	20.228	-27.389	34.049	143.552	0.361
6100.000	0.611	33.411	6099.382	-26.765	20.504	-26.765	33.716	142.546	0.471
6200.000	0.654	50.681	6199.376	-25.958	21.239	-25.958	33.540	140.710	0.195
6300.000	0.659	348.020	6299.370	-25.035	21.562	-25.035	33.040	139.263	0.683
6400.000	0.827	33.766	6399.363	-23.872	21.843	-23.872	32.358	137.541	0.598
6500.000	0.442	331.038	6499.358	-22.935	22.058	-22.935	31.820	136.117	0.738
6600.000	0.814	11.358	6599.352	-21.901	22.010	-21.901	31.050	134.857	0.556
6700.000	0.790	13.984	6699.342	-20.536	22.317	-20.536	30.327	132.620	0.043
6750.000	0.262	28.778	6749.340	-20.101	22.455	-20.101	30.138	131.833	1.082