



Company/Rig: NOBLE ENERGY/CORETECH
WELL: SOUTHARD I 12-6
DECLINATION: 8.4 DEGREES
TD AS DRILLED: 7412 FEET
COUNTY/STATE: WELD/COLORADO
Latitude: 40.504, Longitude: -104.727
GRID North is 0.500 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=GLSURFACE ELEVATION=4801FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 11/14/2014 / 12:43

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	0.569	220.075	99.998	-0.380	-0.320	-0.380	0.496	220.075	0.569
200.000	0.476	206.124	199.994	-1.132	-0.822	-1.132	1.399	215.973	0.157
300.000	0.632	186.447	299.990	-2.053	-1.067	-2.053	2.314	207.455	0.244
400.000	1.182	181.960	399.977	-3.631	-1.164	-3.631	3.813	197.771	0.554
500.000	1.744	214.833	499.945	-5.911	-2.068	-5.911	6.262	199.285	0.988
600.000	2.035	220.627	599.891	-8.507	-4.094	-8.507	9.441	205.696	0.348
700.000	2.183	214.617	699.823	-11.423	-6.332	-11.423	13.061	209.001	0.266
800.000	2.210	213.092	799.750	-14.606	-8.467	-14.606	16.882	210.100	0.064
900.000	2.408	222.245	899.669	-17.776	-10.931	-17.776	20.868	211.590	0.418
1000.000	2.360	216.698	999.583	-20.982	-13.574	-20.982	24.990	212.901	0.235
1100.000	2.584	212.031	1099.490	-24.544	-16.000	-24.544	29.298	213.101	0.301
1200.000	2.507	212.623	1199.391	-28.296	-18.374	-28.296	33.739	212.998	0.082
1300.000	2.547	218.221	1299.294	-31.883	-20.928	-31.883	38.138	213.281	0.250
1400.000	2.486	217.969	1399.197	-35.339	-23.637	-35.339	42.515	213.777	0.061
1500.000	2.290	225.003	1499.111	-38.462	-26.385	-38.462	46.642	214.450	0.352
1600.000	1.997	239.947	1599.041	-40.748	-29.306	-40.748	50.192	215.724	0.629
1700.000	2.151	230.801	1698.976	-42.807	-32.269	-42.807	53.607	217.010	0.365
1800.000	1.909	239.206	1798.913	-44.845	-35.154	-44.845	56.982	218.093	0.383
1900.000	2.125	243.259	1898.852	-46.532	-38.241	-46.532	60.230	219.414	0.259

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
2000.000	1.610	254.657	1998.798	-47.738	-41.251	-47.738	63.092	220.831	0.633
2100.000	1.063	257.939	2098.771	-48.304	-43.513	-48.304	65.013	222.013	0.552
2200.000	0.153	285.686	2198.764	-48.462	-44.548	-48.462	65.826	222.591	0.930
2300.000	0.218	305.131	2298.764	-48.316	-44.832	-48.316	65.912	222.858	0.090
2400.000	0.120	202.207	2398.763	-48.303	-45.027	-48.303	66.035	222.990	0.271
2500.000	0.250	192.070	2498.763	-48.613	-45.112	-48.613	66.320	222.861	0.134
2600.000	0.569	225.772	2598.760	-49.173	-45.514	-49.173	67.004	222.787	0.387
2700.000	0.707	240.947	2698.754	-49.819	-46.409	-49.819	68.086	222.970	0.217
2800.000	0.936	257.007	2798.744	-50.302	-47.745	-50.302	69.353	223.506	0.323
2900.000	0.917	255.529	2898.731	-50.686	-49.315	-50.686	70.718	224.215	0.031
3000.000	0.397	231.828	2998.724	-51.100	-50.362	-51.100	71.747	224.584	0.576
3100.000	0.440	222.626	3098.721	-51.597	-50.895	-51.597	72.474	224.608	0.080
3200.000	0.439	224.950	3198.719	-52.150	-51.425	-52.150	73.241	224.599	0.018
3300.000	0.940	188.850	3298.711	-53.231	-51.822	-53.231	74.290	224.231	0.640
3400.000	0.613	227.142	3398.703	-54.405	-52.340	-54.405	75.494	223.892	0.595
3500.000	0.621	331.057	3498.699	-54.295	-52.994	-54.295	75.870	224.305	0.971
3600.000	0.889	255.319	3598.693	-54.017	-54.006	-54.017	76.384	224.994	0.950
3700.000	1.029	277.837	3698.679	-54.092	-55.646	-54.092	77.604	225.812	0.399
3800.000	1.100	309.490	3798.663	-53.359	-57.277	-53.359	78.280	227.028	0.585
3900.000	1.243	320.693	3898.642	-51.909	-58.705	-51.909	78.363	228.516	0.269
4000.000	1.379	311.209	3998.616	-50.277	-60.297	-50.277	78.508	230.178	0.255
4100.000	1.174	320.244	4098.591	-48.696	-61.857	-48.696	78.725	231.789	0.286
4200.000	0.758	358.340	4198.577	-47.247	-62.532	-47.247	78.374	232.926	0.743
4300.000	0.744	23.090	4298.569	-45.988	-62.296	-45.988	77.432	233.565	0.322
4400.000	0.696	22.635	4398.561	-44.830	-61.808	-44.830	76.354	234.046	0.048
4500.000	0.602	25.182	4498.555	-43.794	-61.350	-43.794	75.377	234.480	0.099
4600.000	0.388	55.275	4598.551	-43.125	-60.848	-43.125	74.581	234.674	0.329
4700.000	0.641	179.413	4698.549	-43.492	-60.564	-43.492	74.563	234.317	0.918
4800.000	1.618	184.848	4798.528	-45.458	-60.678	-45.458	75.817	233.160	0.981
4900.000	2.260	191.246	4898.471	-48.799	-61.182	-48.799	78.259	231.424	0.677
5000.000	2.354	195.945	4998.390	-52.707	-62.130	-52.707	81.475	229.691	0.211
5100.000	2.210	202.200	5098.311	-56.467	-63.423	-56.467	84.917	228.321	0.288
5200.000	1.726	204.399	5198.251	-59.623	-64.773	-59.623	88.037	227.371	0.490
5300.000	1.576	190.051	5298.210	-62.348	-65.635	-62.348	90.528	226.471	0.438
5400.000	1.641	204.531	5398.171	-65.005	-66.470	-65.005	92.972	225.638	0.411
5500.000	1.417	196.248	5498.136	-67.495	-67.410	-67.495	95.392	224.964	0.314
5600.000	1.912	175.318	5598.094	-70.345	-67.620	-70.345	97.575	223.869	0.776
5700.000	1.317	197.182	5698.055	-73.106	-67.824	-73.106	99.722	222.854	0.846
5800.000	1.037	209.897	5798.034	-74.989	-68.614	-74.989	101.643	222.458	0.381
5900.000	0.954	205.278	5898.019	-76.526	-69.421	-76.526	103.322	222.213	0.116

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
6000.000	0.734	221.356	5998.008	-77.760	-70.200	-77.760	104.759	222.075	0.321
6100.000	0.371	205.657	6098.003	-78.532	-70.763	-78.532	105.710	222.021	0.390
6200.000	0.703	162.973	6197.999	-79.410	-70.723	-79.410	106.338	221.688	0.499
6300.000	0.647	161.626	6297.992	-80.533	-70.366	-80.533	106.944	221.145	0.058
6400.000	0.521	164.111	6397.987	-81.507	-70.063	-81.507	107.481	220.682	0.128
6500.000	0.510	133.569	6497.983	-82.251	-69.616	-82.251	107.758	220.244	0.272
6600.000	0.810	143.846	6597.976	-83.129	-68.877	-83.129	107.955	219.644	0.321
6700.000	0.891	109.368	6697.966	-83.957	-67.726	-83.957	107.869	218.892	0.510
6800.000	0.724	136.472	6797.956	-84.673	-66.558	-84.673	107.701	218.170	0.412
6900.000	0.735	132.633	6897.948	-85.565	-65.651	-85.565	107.849	217.498	0.050
7000.000	1.360	139.243	6997.931	-86.898	-64.405	-86.898	108.163	216.544	0.635
7100.000	3.052	135.591	7097.853	-89.699	-61.767	-89.699	108.908	214.552	1.697