



Company/Rig: NOBLE ENERGY / PRODUCTION

WELL/API#: KASTNER 41-3 / 05-123-23386

DECLINATION: 8.32 DEGREES

TD AS DRILLED: 7292 FEET

COUNTY/STATE: WELD / COLORADO

Latitude: 40.522, Longitude: -104.643

GRID North is 0.550 Degrees East of True North

VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4843 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/17/2015 / 09:05

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: NORMAN COWAN

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	0.238	218.866	100.000	-0.162	-0.130	-0.162	0.208	218.866	0.238
200.000	0.345	219.349	199.998	-0.556	-0.452	-0.556	0.717	219.069	0.106
300.000	0.157	210.646	299.997	-0.907	-0.712	-0.907	1.153	218.145	0.191
400.000	0.163	293.825	399.997	-0.967	-0.913	-0.967	1.330	223.332	0.213
500.000	0.304	277.882	499.996	-0.873	-1.306	-0.873	1.571	236.222	0.154
600.000	0.397	300.137	599.994	-0.663	-1.868	-0.663	1.982	250.449	0.163
700.000	0.459	301.217	699.992	-0.282	-2.510	-0.282	2.526	263.596	0.063
800.000	0.364	280.454	799.989	-0.016	-3.165	-0.016	3.165	269.705	0.176
900.000	0.426	259.682	899.987	-0.025	-3.843	-0.025	3.843	269.622	0.155
1000.000	0.415	290.438	999.984	0.034	-4.548	0.034	4.548	270.434	0.223
1100.000	0.372	281.446	1099.982	0.225	-5.205	0.225	5.210	272.478	0.075
1200.000	0.218	281.190	1199.981	0.326	-5.709	0.326	5.718	273.273	0.154
1300.000	0.285	301.450	1299.980	0.493	-6.108	0.493	6.128	274.616	0.111
1400.000	0.475	0.381	1399.978	1.037	-6.317	1.037	6.402	279.324	0.409
1500.000	0.119	283.415	1499.976	1.476	-6.415	1.476	6.583	282.953	0.463
1600.000	0.178	236.810	1599.976	1.414	-6.646	1.414	6.795	282.014	0.130
1700.000	0.265	272.219	1699.975	1.338	-7.007	1.338	7.134	280.811	0.158
1800.000	0.218	248.657	1799.974	1.278	-7.416	1.278	7.525	279.777	0.109
1900.000	0.159	298.434	1899.974	1.274	-7.714	1.274	7.819	279.380	0.167

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	0.152	31.968	1999.974	1.452	-7.766	1.452	7.901	280.593	0.226
2100.000	0.494	56.890	2099.972	1.800	-7.335	1.800	7.552	283.791	0.363
2200.000	0.545	80.398	2199.968	2.115	-6.504	2.115	6.839	288.016	0.218
2300.000	0.784	67.875	2299.961	2.452	-5.401	2.452	5.932	294.419	0.278
2400.000	0.694	79.633	2399.953	2.819	-4.173	2.819	5.035	304.041	0.176
2500.000	0.765	83.196	2499.945	3.007	-2.914	3.007	4.187	315.898	0.085
2600.000	0.718	82.659	2599.937	3.166	-1.630	3.166	3.561	332.763	0.048
2700.000	1.045	85.089	2699.925	3.324	-0.100	3.324	3.325	358.275	0.329
2800.000	0.988	110.785	2799.909	3.096	1.615	3.096	3.492	27.546	0.455
2900.000	0.949	122.807	2899.895	2.341	3.117	2.341	3.899	53.093	0.207
3000.000	0.745	155.263	2999.885	1.302	4.086	1.302	4.288	72.329	0.512
3100.000	0.770	149.764	3099.876	0.130	4.696	0.130	4.698	88.416	0.077
3200.000	1.143	155.613	3199.862	-1.360	5.447	-1.360	5.614	104.016	0.385
3300.000	0.856	145.849	3299.847	-2.886	6.278	-2.886	6.910	114.690	0.333
3400.000	0.768	139.856	3399.837	-4.017	7.129	-4.017	8.183	119.397	0.122
3500.000	0.642	137.509	3499.829	-4.942	7.940	-4.942	9.352	121.900	0.130
3600.000	0.390	130.510	3599.825	-5.576	8.577	-5.576	10.230	123.029	0.259
3700.000	0.180	5.204	3699.824	-5.640	8.850	-5.640	10.494	122.511	0.516
3800.000	0.636	1.107	3799.821	-4.929	8.875	-4.929	10.152	119.046	0.456
3900.000	1.144	346.211	3899.809	-3.404	8.648	-3.404	9.293	111.487	0.554
4000.000	1.321	348.113	3999.786	-1.306	8.172	-1.306	8.276	99.082	0.182
4100.000	1.380	344.388	4099.758	0.982	7.610	0.982	7.674	82.648	0.106
4200.000	1.363	340.904	4199.730	3.266	6.897	3.266	7.631	64.663	0.085
4300.000	1.124	341.655	4299.706	5.321	6.199	5.321	8.170	49.363	0.239
4400.000	0.738	328.707	4399.693	6.802	5.556	6.802	8.783	39.243	0.437
4500.000	0.545	291.441	4499.687	7.526	4.779	7.526	8.915	32.414	0.449
4600.000	0.459	303.879	4599.683	7.923	4.004	7.923	8.877	26.808	0.139
4700.000	0.477	290.731	4699.680	8.294	3.282	8.294	8.920	21.591	0.109
4800.000	0.619	312.380	4799.675	8.805	2.494	8.805	9.152	15.814	0.249
4900.000	0.532	291.122	4899.670	9.337	1.662	9.337	9.484	10.090	0.229
5000.000	0.570	323.227	4999.666	9.903	0.931	9.903	9.946	5.368	0.307
5100.000	0.675	315.287	5099.660	10.720	0.218	10.720	10.722	1.167	0.136
5200.000	1.006	320.694	5199.649	11.817	-0.752	11.817	11.841	356.359	0.339
5300.000	0.387	330.851	5299.641	12.791	-1.472	12.791	12.876	353.433	0.628
5400.000	0.292	129.566	5399.641	12.924	-1.441	12.924	13.004	353.639	0.668
5500.000	1.097	113.692	5499.632	12.377	-0.368	12.377	12.383	358.297	0.820
5600.000	1.097	100.787	5599.614	11.814	1.448	11.814	11.902	6.990	0.246
5700.000	0.955	111.354	5699.598	11.331	3.165	11.331	11.765	15.605	0.236
5800.000	0.683	141.042	5799.588	10.564	4.316	10.564	11.412	22.221	0.495
5900.000	0.679	160.259	5899.581	9.543	4.891	9.543	10.723	27.133	0.227

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	0.558	194.856	5999.576	8.515	4.966	8.515	9.857	30.249	0.385
6100.000	0.644	195.353	6099.570	7.502	4.692	7.502	8.849	32.022	0.087
6200.000	0.818	202.160	6199.562	6.299	4.274	6.299	7.612	34.157	0.194
6300.000	0.876	251.090	6299.553	5.390	3.282	5.390	6.310	31.334	0.703
6400.000	1.082	286.150	6399.539	5.405	1.652	5.405	5.652	16.993	0.622
6500.000	0.996	320.319	6499.523	6.337	0.190	6.337	6.339	1.715	0.616
6600.000	0.541	26.585	6599.516	7.428	-0.154	7.428	7.430	358.812	0.923
6700.000	1.309	60.639	6699.503	8.410	1.053	8.410	8.476	7.134	0.912
6800.000	2.165	75.483	6799.456	9.443	3.876	9.443	10.208	22.316	0.960
6900.000	2.687	91.375	6899.367	9.861	8.048	9.861	12.728	39.219	0.847
7000.000	3.138	100.968	6999.239	9.284	13.078	9.284	16.038	54.630	0.663
7050.000	3.167	98.571	7049.163	8.817	15.787	8.817	18.083	60.816	0.270