



Company/Rig: Noble Energy/ CoreTech
WELL/API#: HSR-Guttersen State 4-14/05-123-19142
DECLINATION: 8.27 Degrees
TD AS DRILLED: 7045 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.23054, Longitude: -104.52573
Grid North = True North -0.63 degs (NAD 27)
Grid Convergence Applied = -0.63 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4781 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/21/2015 / 10:07

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt

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	0.298	332.665	100.000	0.231	-0.120	0.231	0.260	332.665	0.298
200.000	0.216	320.705	199.999	0.608	-0.358	0.608	0.706	329.493	0.098
300.000	0.187	7.128	299.998	0.917	-0.458	0.917	1.024	333.471	0.161
400.000	0.419	29.727	399.997	1.396	-0.256	1.396	1.419	349.607	0.256
500.000	0.685	46.774	499.992	2.123	0.361	2.123	2.153	9.639	0.310
600.000	1.424	78.105	599.975	2.788	2.012	2.788	3.438	35.812	0.911
700.000	1.592	76.720	699.940	3.363	4.580	3.363	5.682	53.707	0.172
800.000	1.434	74.337	799.905	4.020	7.137	4.020	8.191	60.607	0.171
900.000	1.209	65.993	899.879	4.787	9.305	4.787	10.464	62.775	0.296
1000.000	1.067	61.741	999.859	5.657	11.088	5.657	12.448	62.970	0.165
1100.000	1.030	58.737	1099.842	6.564	12.676	6.564	14.275	62.624	0.066
1200.000	0.867	63.930	1199.829	7.363	14.125	7.363	15.929	62.467	0.184
1300.000	0.875	55.545	1299.817	8.128	15.434	8.128	17.444	62.228	0.128
1400.000	0.575	43.065	1399.809	8.927	16.407	8.927	18.678	61.450	0.338
1500.000	0.319	20.235	1499.806	9.554	16.845	9.554	19.366	60.439	0.307
1600.000	0.134	21.803	1599.805	9.924	16.985	9.924	19.672	59.703	0.185
1700.000	0.320	45.054	1699.804	10.230	17.226	10.230	20.035	59.295	0.204
1800.000	0.550	1.488	1799.802	10.908	17.437	10.908	20.567	57.971	0.387

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	0.824	341.079	1899.795	12.068	17.216	12.068	21.024	54.970	0.363
2000.000	1.111	356.522	1999.780	13.716	16.924	13.716	21.784	50.976	0.385
2100.000	1.328	6.626	2099.758	15.835	16.999	15.835	23.232	47.030	0.305
2200.000	1.694	8.980	2199.723	18.446	17.363	18.446	25.332	43.268	0.371
2300.000	1.586	17.681	2299.682	21.224	18.014	21.224	27.838	40.323	0.271
2400.000	0.886	3.453	2399.658	23.314	18.481	23.314	29.751	38.403	0.759
2500.000	0.456	2.318	2499.651	24.483	18.544	24.483	30.713	37.140	0.430
2600.000	0.244	61.385	2599.650	24.983	18.746	24.983	31.234	36.884	0.391
2700.000	0.203	47.296	2699.649	25.205	19.063	25.205	31.602	37.102	0.068
2800.000	0.277	45.135	2799.648	25.495	19.365	25.495	32.016	37.218	0.075
2900.000	0.561	56.855	2899.645	25.934	19.946	25.934	32.717	37.565	0.295
3000.000	0.608	55.915	2999.640	26.499	20.796	26.499	33.685	38.124	0.047
3100.000	0.732	69.709	3099.633	27.018	21.834	27.018	34.737	38.943	0.203
3200.000	0.932	97.902	3199.623	27.127	23.239	27.127	35.720	40.585	0.449
3300.000	1.253	110.626	3299.605	26.631	25.067	26.631	36.572	43.268	0.401
3400.000	1.699	115.741	3399.572	25.601	27.426	25.601	37.518	46.970	0.465
3500.000	1.678	112.265	3499.528	24.403	30.116	24.403	38.762	50.982	0.105
3600.000	1.268	89.295	3599.496	23.862	32.577	23.862	40.381	53.778	0.711
3700.000	1.202	70.897	3699.473	24.219	34.674	24.219	42.295	55.067	0.400
3800.000	1.217	73.439	3799.451	24.864	36.683	24.864	44.316	55.870	0.056
3900.000	1.481	78.138	3899.423	25.433	38.966	25.433	46.531	56.868	0.286
4000.000	1.608	99.689	3999.387	25.462	41.613	25.462	48.785	58.538	0.591
4100.000	1.786	104.975	4099.343	24.824	44.502	24.824	50.957	60.847	0.237
4200.000	2.129	82.933	4199.286	24.649	47.851	24.649	53.827	62.746	0.821
4300.000	2.506	76.902	4299.205	25.373	51.825	25.373	57.703	63.914	0.449
4400.000	2.769	74.361	4399.099	26.520	56.281	26.520	62.216	64.770	0.288
4500.000	3.001	80.206	4498.972	27.617	61.186	27.617	67.130	65.708	0.374
4600.000	2.475	85.354	4598.858	28.237	65.917	28.237	71.710	66.811	0.580
4700.000	2.287	95.002	4698.772	28.238	70.057	28.238	75.534	68.047	0.442
4800.000	2.352	104.210	4798.690	27.560	74.034	27.560	78.998	69.582	0.378
4900.000	3.070	100.645	4898.578	26.561	78.655	26.561	83.019	71.340	0.737
5000.000	3.425	84.784	4998.419	26.338	84.262	26.338	88.282	72.642	0.962
5100.000	2.549	89.994	5098.282	26.610	89.460	26.610	93.334	73.435	0.916
5200.000	1.097	110.305	5198.230	26.278	92.581	26.278	96.239	74.154	1.567
5300.000	0.653	173.615	5298.220	25.380	93.542	25.380	96.924	74.820	0.993
5400.000	0.311	326.577	5398.218	25.040	93.456	25.040	96.753	75.001	0.941
5500.000	0.524	229.950	5498.216	24.973	92.957	24.973	96.253	74.963	0.639
5600.000	0.613	227.640	5598.211	24.318	92.212	24.318	95.365	75.226	0.092
5700.000	0.912	205.602	5698.203	23.240	91.473	23.240	94.379	75.745	0.414
5800.000	0.988	209.686	5798.189	21.773	90.702	21.773	93.278	76.501	0.102

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	0.671	190.448	5898.178	20.448	90.168	20.448	92.458	77.223	0.418
6000.000	1.171	149.055	5998.166	18.996	90.587	18.996	92.557	78.157	0.801
6100.000	0.622	144.110	6098.154	17.680	91.431	17.680	93.124	79.056	0.553
6200.000	0.665	136.864	6198.147	16.817	92.146	16.817	93.668	79.657	0.092
6300.000	0.628	122.008	6298.141	16.103	93.008	16.103	94.391	80.178	0.171
6400.000	0.953	112.903	6398.131	15.488	94.239	15.488	95.503	80.667	0.348
6500.000	0.852	107.043	6498.119	14.947	95.716	14.947	96.876	81.125	0.137
6600.000	0.623	110.917	6598.111	14.535	96.934	14.535	98.018	81.472	0.234