



Company/Rig: Noble Energy/ CoreTech
 WELL/API#: HSR-Josh-Hurl 12-32/05-123-16968
 DECLINATION: 8.22 Degrees
 TD AS DRILLED: 7140 Feet
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.35391, Longitude: -104.58073
 Grid North = True North -0.59 degs (NAD 27)
 Grid Correction Applied = -0.59 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4775 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 6/7/2016 / 08:43

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

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

Surveyor: Sean Bratt / HSR-Josh-Hurl 12-32

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	0.979	302.904	99.995	0.464	-0.717	0.464	0.854	302.904	0.979
200.000	0.511	288.704	199.986	1.071	-1.857	1.071	2.144	299.979	0.500
300.000	0.305	260.158	299.984	1.169	-2.542	1.169	2.798	294.698	0.284
400.000	0.294	246.440	399.983	1.021	-3.039	1.021	3.206	288.569	0.072
500.000	0.408	195.526	499.981	0.575	-3.370	0.575	3.418	279.691	0.319
600.000	0.421	175.198	599.978	-0.133	-3.434	-0.133	3.437	267.775	0.147
700.000	0.454	179.321	699.975	-0.896	-3.399	-0.896	3.515	255.238	0.046
800.000	0.540	183.207	799.972	-1.762	-3.420	-1.762	3.848	242.742	0.092
900.000	0.557	181.986	899.967	-2.718	-3.464	-2.718	4.403	231.877	0.020
1000.000	0.577	191.284	999.962	-3.697	-3.579	-3.697	5.146	224.069	0.094
1100.000	0.595	199.109	1099.957	-4.681	-3.847	-4.681	6.059	219.416	0.082
1200.000	0.612	205.683	1199.952	-5.653	-4.249	-5.653	7.071	216.929	0.071
1300.000	0.642	210.015	1299.946	-6.619	-4.760	-6.619	8.153	215.723	0.056
1400.000	0.801	215.859	1399.938	-7.671	-5.450	-7.671	9.410	215.394	0.175
1500.000	0.790	215.145	1499.928	-8.801	-6.257	-8.801	10.798	215.408	0.015
1600.000	0.846	216.639	1599.918	-9.957	-7.094	-9.957	12.226	215.468	0.060
1700.000	0.771	210.731	1699.908	-11.128	-7.879	-11.128	13.635	215.297	0.112
1800.000	0.692	209.350	1799.900	-12.233	-8.518	-12.233	14.907	214.851	0.081

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	0.801	173.818	1899.892	-13.454	-8.739	-13.454	16.043	213.005	0.467
2000.000	1.026	171.115	1999.879	-15.033	-8.526	-15.033	17.282	209.558	0.229
2100.000	1.396	152.312	2099.857	-16.996	-7.821	-16.996	18.709	204.711	0.539
2200.000	1.541	151.383	2199.824	-19.255	-6.611	-19.255	20.358	198.950	0.147
2300.000	1.735	155.815	2299.783	-21.816	-5.347	-21.816	22.462	193.772	0.231
2400.000	1.317	158.036	2399.747	-24.262	-4.297	-24.262	24.640	190.044	0.422
2500.000	0.838	159.910	2499.729	-26.014	-3.617	-26.014	26.265	187.915	0.480
2600.000	1.141	159.354	2599.714	-27.633	-3.014	-27.633	27.797	186.225	0.303
2700.000	1.447	153.052	2699.689	-29.691	-2.091	-29.691	29.764	184.028	0.337
2800.000	1.538	153.838	2799.655	-32.021	-0.927	-32.021	32.035	181.657	0.093
2900.000	1.448	162.081	2899.621	-34.428	0.054	-34.428	34.428	179.910	0.233
3000.000	1.310	177.750	2999.592	-36.773	0.487	-36.773	36.776	179.241	0.400
3100.000	1.184	210.125	3099.570	-38.808	0.014	-38.808	38.808	179.979	0.706
3200.000	1.261	241.861	3199.548	-40.221	-1.475	-40.221	40.248	182.100	0.673
3300.000	1.236	271.530	3299.526	-40.711	-3.524	-40.711	40.863	184.947	0.640
3400.000	1.050	273.917	3399.506	-40.620	-5.516	-40.620	40.993	187.734	0.191
3500.000	1.107	267.455	3499.488	-40.600	-7.396	-40.600	41.268	190.324	0.134
3600.000	1.390	258.420	3599.464	-40.886	-9.549	-40.886	41.987	193.146	0.344
3700.000	1.585	259.155	3699.430	-41.390	-12.096	-41.390	43.121	196.290	0.196
3800.000	1.657	254.613	3799.390	-42.034	-14.848	-42.034	44.580	199.455	0.147
3900.000	1.650	255.093	3899.349	-42.788	-17.634	-42.788	46.279	202.397	0.016
4000.000	1.283	286.448	3999.317	-42.842	-20.098	-42.842	47.322	205.133	0.868
4100.000	1.128	329.450	4099.297	-41.677	-21.672	-41.677	46.975	207.474	0.895
4200.000	1.080	349.449	4199.279	-39.903	-22.345	-39.903	45.733	209.248	0.386
4300.000	1.110	4.698	4299.261	-38.012	-22.438	-38.012	44.140	210.553	0.292
4400.000	1.222	11.536	4399.240	-36.002	-22.146	-36.002	42.268	211.597	0.179
4500.000	1.134	357.984	4499.219	-33.968	-21.967	-33.968	40.452	212.891	0.291
4600.000	0.895	355.292	4599.204	-32.201	-22.066	-32.201	39.036	214.421	0.244
4700.000	0.654	323.222	4699.195	-30.965	-22.472	-30.965	38.260	215.969	0.486
4800.000	0.629	319.846	4799.189	-30.089	-23.168	-30.089	37.974	217.596	0.046
4900.000	0.648	315.218	4899.182	-29.268	-23.919	-29.268	37.799	219.258	0.055
5000.000	0.585	303.918	4999.177	-28.582	-24.741	-28.582	37.803	220.880	0.137
5100.000	0.613	312.968	5099.171	-27.933	-25.556	-27.933	37.860	222.455	0.099
5200.000	0.462	319.547	5199.167	-27.262	-26.208	-27.262	37.817	223.871	0.163
5300.000	0.462	328.546	5299.164	-26.611	-26.680	-26.611	37.683	225.075	0.072
5400.000	0.586	338.944	5399.159	-25.789	-27.075	-25.789	37.392	226.393	0.156
5500.000	0.614	333.293	5499.154	-24.833	-27.500	-24.833	37.053	227.917	0.065
5600.000	0.586	225.397	5599.151	-24.713	-28.105	-24.713	37.424	228.674	0.970
5700.000	0.405	153.993	5699.148	-25.389	-28.314	-25.389	38.030	228.117	0.596
5800.000	0.725	89.980	5799.144	-25.706	-27.526	-25.706	37.663	226.957	0.658

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	1.096	59.839	5899.131	-25.226	-26.066	-25.226	36.274	225.939	0.594
6000.000	1.240	53.553	5999.111	-24.102	-24.369	-24.102	34.275	225.315	0.192
6100.000	1.539	52.079	6099.081	-22.634	-22.439	-22.634	31.872	224.752	0.301
6200.000	1.844	48.635	6199.038	-20.746	-20.173	-20.746	28.937	224.197	0.321
6300.000	2.036	29.266	6298.981	-18.134	-18.097	-18.134	25.619	224.942	0.679
6400.000	2.152	41.759	6398.915	-15.184	-15.978	-15.184	22.042	226.461	0.470
6500.000	1.613	58.810	6498.861	-13.054	-13.523	-13.054	18.796	226.012	0.772
6600.000	1.287	61.099	6598.829	-11.782	-11.336	-11.782	16.350	223.895	0.331
6700.000	1.277	73.351	6698.804	-10.920	-9.285	-10.920	14.334	220.375	0.274
6800.000	1.413	99.647	6798.778	-10.808	-7.002	-10.808	12.878	212.940	0.626
6850.000	1.650	110.987	6848.760	-11.169	-5.723	-11.169	12.549	207.130	0.767