



Company/Rig: Noble Energy Inc/Production
WELL/API#: Hamilton 25-11B/05-123-16495
DECLINATION: 8.22 Degrees
TD AS DRILLED: 7107'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.36828, Longitude: -104.61449
Grid North = True North -0.57 degs (NAD 27)
Grid Correction Applied = -0.57 degs



DEPTH REFERENCE : RKB=GL/Elevation=4671'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/28/2016 / 08:25

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / API 05-123-16495

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	0.120	192.168	100.000	-0.102	-0.022	-0.102	0.105	192.168	0.120
200.000	0.114	133.998	200.000	-0.273	0.027	-0.273	0.275	174.278	0.114
300.000	0.154	125.497	299.999	-0.421	0.208	-0.421	0.469	153.640	0.045
400.000	0.257	141.263	399.999	-0.674	0.458	-0.674	0.815	145.771	0.117
500.000	0.237	168.883	499.998	-1.052	0.639	-1.052	1.231	148.737	0.120
600.000	0.342	155.578	599.997	-1.527	0.802	-1.527	1.725	152.290	0.123
700.000	0.554	161.612	699.994	-2.257	1.078	-2.257	2.501	154.475	0.217
800.000	0.667	182.457	799.988	-3.297	1.205	-3.297	3.510	159.919	0.247
900.000	0.732	177.704	899.981	-4.516	1.206	-4.516	4.674	165.051	0.087
1000.000	0.861	191.755	999.971	-5.890	1.078	-5.890	5.988	169.625	0.233
1100.000	1.042	191.105	1099.957	-7.517	0.750	-7.517	7.555	174.302	0.181
1200.000	1.110	193.167	1199.939	-9.352	0.354	-9.352	9.359	177.830	0.079
1300.000	1.310	191.487	1299.917	-11.415	-0.094	-11.415	11.416	180.471	0.203
1400.000	1.265	197.408	1399.892	-13.589	-0.652	-13.589	13.604	182.746	0.140
1500.000	1.481	199.945	1499.863	-15.857	-1.423	-15.857	15.920	185.127	0.224
1600.000	1.655	208.192	1599.826	-18.344	-2.546	-18.344	18.520	187.901	0.285

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
1700.000	1.719	211.202	1699.782	-20.900	-4.005	-20.900	21.281	190.849	0.109
1800.000	1.919	220.042	1799.732	-23.465	-5.860	-23.465	24.186	194.021	0.344
1900.000	2.007	212.510	1899.674	-26.223	-7.878	-26.223	27.381	196.720	0.272
2000.000	1.937	211.989	1999.615	-29.133	-9.714	-29.133	30.710	198.440	0.072
2100.000	1.878	213.819	2099.559	-31.928	-11.521	-31.928	33.943	199.842	0.085
2200.000	1.860	203.817	2199.506	-34.775	-13.089	-34.775	37.156	200.626	0.326
2300.000	1.716	203.956	2299.457	-37.628	-14.352	-37.628	40.272	200.878	0.145
2400.000	1.739	206.330	2399.412	-40.356	-15.633	-40.356	43.278	201.175	0.075
2500.000	1.493	211.056	2499.372	-42.833	-16.979	-42.833	46.075	201.623	0.280
2600.000	1.445	209.283	2599.339	-45.048	-18.267	-45.048	48.611	202.073	0.067
2700.000	1.153	210.892	2699.314	-47.011	-19.400	-47.011	50.857	202.425	0.294
2800.000	1.122	215.450	2799.294	-48.673	-20.485	-48.673	52.808	202.825	0.096
2900.000	1.111	221.541	2899.275	-50.196	-21.696	-50.196	54.684	203.375	0.119
3000.000	1.006	233.248	2999.258	-51.447	-23.042	-51.447	56.371	204.127	0.240
3100.000	1.047	238.202	3099.242	-52.453	-24.522	-52.453	57.902	205.056	0.098
3200.000	1.013	233.612	3199.226	-53.459	-26.010	-53.459	59.451	205.945	0.089
3300.000	1.119	251.940	3299.209	-54.286	-27.650	-54.286	60.922	206.992	0.355
3400.000	0.980	236.902	3399.192	-55.056	-29.295	-55.056	62.365	208.017	0.307
3500.000	0.993	222.043	3499.177	-56.167	-30.592	-56.167	63.957	208.575	0.255
3600.000	1.069	245.815	3599.162	-57.192	-32.023	-57.192	65.547	209.245	0.431
3700.000	0.976	247.258	3699.146	-57.904	-33.659	-57.904	66.976	210.169	0.096
3800.000	0.966	246.841	3799.131	-58.564	-35.219	-58.564	68.339	211.022	0.012
3900.000	0.935	288.432	3899.119	-58.638	-36.768	-58.638	69.212	212.089	0.675
4000.000	1.093	239.662	3999.105	-58.862	-38.366	-58.862	70.261	213.096	0.850
4100.000	1.471	233.413	4099.080	-60.108	-40.219	-60.108	72.323	213.787	0.402
4200.000	1.656	229.296	4199.042	-61.816	-42.345	-61.816	74.929	214.412	0.216
4300.000	1.990	230.874	4298.992	-63.853	-44.787	-63.853	77.995	215.046	0.338
4400.000	2.427	238.134	4398.917	-66.067	-47.932	-66.067	81.623	215.961	0.518
4500.000	2.589	241.342	4498.822	-68.268	-51.713	-68.268	85.643	217.144	0.215
4600.000	3.175	235.748	4598.695	-70.910	-55.984	-70.910	90.346	218.291	0.649
4700.000	3.930	230.290	4698.502	-74.658	-60.909	-74.658	96.352	219.209	0.826
4800.000	4.249	228.462	4798.248	-79.303	-66.318	-79.303	103.378	219.904	0.345
4900.000	4.663	226.433	4897.945	-84.561	-72.036	-84.561	111.085	220.427	0.443
5000.000	4.489	231.710	4997.627	-89.788	-78.053	-89.788	118.971	221.000	0.455
5100.000	3.837	229.765	5097.363	-94.374	-83.679	-94.374	126.129	221.562	0.667
5200.000	3.096	232.319	5197.179	-98.186	-88.370	-98.186	132.098	221.988	0.756
5300.000	2.137	230.773	5297.074	-101.016	-91.952	-101.016	136.600	222.311	0.961
5400.000	1.802	210.917	5397.015	-103.544	-94.205	-103.544	139.985	222.296	0.755
5500.000	1.290	187.518	5496.980	-106.010	-95.160	-106.010	142.455	221.913	0.803

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
5600.000	1.861	159.318	5596.943	-108.645	-94.734	-108.645	144.146	221.087	0.946
5700.000	2.255	147.271	5696.879	-111.819	-93.097	-111.819	145.501	219.780	0.583
5800.000	2.316	138.678	5796.799	-114.991	-90.699	-114.991	146.456	218.265	0.348
5900.000	2.184	117.683	5896.724	-117.394	-87.678	-117.394	146.522	216.755	0.830
6000.000	2.081	99.671	5996.656	-118.584	-84.201	-118.584	145.437	215.377	0.675
6100.000	2.530	89.059	6096.575	-118.852	-80.205	-118.852	143.383	214.012	0.618
6200.000	3.173	83.711	6196.451	-118.513	-75.247	-118.513	140.383	212.413	0.695
6300.000	3.205	74.456	6296.297	-117.461	-69.803	-117.461	136.636	210.722	0.515
6400.000	2.979	61.295	6396.152	-115.463	-64.831	-115.463	132.419	209.313	0.743
6500.000	1.817	27.407	6496.068	-112.808	-61.821	-112.808	128.637	208.724	1.786
6600.000	1.403	356.670	6596.030	-110.178	-61.163	-110.178	126.016	209.036	0.942
6700.000	1.235	346.391	6696.004	-107.908	-61.487	-107.908	124.197	209.675	0.289
6800.000	1.207	329.823	6795.981	-105.950	-62.271	-105.950	122.894	210.444	0.353
6900.000	0.870	21.941	6895.967	-104.335	-62.516	-104.335	121.631	210.930	0.961