



Company/Rig: Noble Energy Inc/Production
WELL/API#: Happy Amigo C 1-25/05-123-25302
DECLINATION: 8.15 Degrees
TD AS DRILLED: 6876 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.35738, Longitude: -104.50349
Grid North = True North -0.64 degs (NAD 27)
Grid Correction Applied = -0.64 degs



DEPTH REFERENCE : RKB=GL/Elevation=4615'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 8/29/2016 / 14:48

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Happy Amigo C 1-25

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	0.483	215.613	99.999	-0.343	-0.246	-0.343	0.422	215.613	0.483
200.000	0.399	192.435	199.996	-1.026	-0.566	-1.026	1.172	208.892	0.196
300.000	0.399	192.557	299.993	-1.707	-0.717	-1.707	1.851	202.792	0.001
400.000	0.445	225.576	399.991	-2.318	-1.070	-2.318	2.553	204.779	0.244
500.000	0.732	235.349	499.986	-2.954	-1.873	-2.954	3.498	212.385	0.303
600.000	0.731	227.879	599.977	-3.745	-2.872	-3.745	4.719	217.487	0.095
700.000	0.764	230.906	699.969	-4.592	-3.862	-4.592	6.001	220.063	0.052
800.000	1.074	243.171	799.956	-5.436	-5.216	-5.436	7.534	223.817	0.366
900.000	1.021	237.448	899.939	-6.338	-6.803	-6.338	9.298	227.026	0.117
1000.000	1.066	241.289	999.923	-7.264	-8.370	-7.264	11.082	229.044	0.083
1100.000	1.070	241.938	1099.905	-8.150	-10.010	-8.150	12.908	230.846	0.013
1200.000	1.029	242.599	1199.889	-9.003	-11.631	-9.003	14.709	232.259	0.043
1300.000	1.058	249.159	1299.872	-9.745	-13.292	-9.745	16.482	233.753	0.123
1400.000	1.081	245.856	1399.855	-10.460	-15.016	-10.460	18.300	235.140	0.066
1500.000	0.626	239.074	1499.843	-11.126	-16.345	-11.126	19.772	235.757	0.465
1600.000	0.642	212.848	1599.837	-11.878	-17.118	-11.878	20.835	235.244	0.288

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	0.857	188.168	1699.829	-13.088	-17.528	-13.088	21.875	233.251	0.383
1800.000	1.435	179.088	1799.809	-15.080	-17.614	-15.080	23.188	229.431	0.604
1900.000	1.783	179.381	1899.769	-17.888	-17.577	-17.888	25.079	224.498	0.348
2000.000	1.934	179.836	1999.716	-21.132	-17.556	-21.132	27.473	219.719	0.152
2100.000	2.030	179.750	2099.657	-24.590	-17.543	-24.590	30.207	215.505	0.095
2200.000	2.136	177.226	2199.591	-28.222	-17.445	-28.222	33.179	211.722	0.140
2300.000	2.356	175.663	2299.514	-32.133	-17.200	-32.133	36.447	208.158	0.228
2400.000	2.418	173.549	2399.427	-36.279	-16.807	-36.279	39.983	204.857	0.108
2500.000	2.281	172.002	2499.343	-40.346	-16.293	-40.346	43.512	201.991	0.151
2600.000	2.116	170.219	2599.269	-44.136	-15.703	-44.136	46.846	199.585	0.179
2700.000	1.762	168.803	2699.212	-47.463	-15.091	-47.463	49.804	197.638	0.357
2800.000	1.663	173.056	2799.167	-50.412	-14.617	-50.412	52.488	196.169	0.161
2900.000	1.667	163.716	2899.125	-53.249	-14.033	-53.249	55.067	194.764	0.271
3000.000	2.415	168.540	2999.061	-56.710	-13.207	-56.710	58.228	193.109	0.767
3100.000	4.990	179.920	3098.845	-63.126	-12.782	-63.126	64.407	191.447	2.666
3200.000	5.117	188.338	3198.458	-71.888	-13.422	-71.888	73.131	190.576	0.752
3300.000	4.998	194.322	3298.069	-80.522	-15.147	-80.522	81.934	190.653	0.541
3400.000	4.331	201.039	3397.738	-88.267	-17.580	-88.267	90.001	191.264	0.861
3500.000	4.173	201.716	3497.463	-95.172	-20.282	-95.172	97.309	192.030	0.166
3600.000	4.103	200.902	3597.202	-101.894	-22.905	-101.894	104.436	192.669	0.091
3700.000	3.781	202.371	3696.965	-108.285	-25.436	-108.285	111.232	193.219	0.338
3800.000	2.762	201.120	3796.801	-113.581	-27.559	-113.581	116.877	193.638	1.021
3900.000	2.452	197.202	3896.698	-117.872	-29.059	-117.872	121.401	193.849	0.358
4000.000	1.559	197.008	3996.635	-121.216	-30.090	-121.216	124.895	193.941	0.893
4100.000	1.307	198.494	4096.604	-123.598	-30.849	-123.598	127.390	194.014	0.255
4200.000	0.922	195.442	4196.585	-125.455	-31.425	-125.455	129.331	194.063	0.389
4300.000	0.433	174.618	4296.578	-126.606	-31.604	-126.606	130.491	194.016	0.539
4400.000	0.645	71.434	4396.575	-126.803	-31.035	-126.803	130.545	193.753	0.855
4500.000	0.852	63.345	4496.566	-126.290	-29.837	-126.290	129.767	193.293	0.232
4600.000	0.891	69.698	4596.555	-125.687	-28.444	-125.687	128.865	192.752	0.104
4700.000	0.770	61.829	4696.544	-125.100	-27.122	-125.100	128.006	192.233	0.165
4800.000	0.622	67.175	4796.537	-124.572	-26.030	-124.572	127.262	191.802	0.162
4900.000	0.491	53.741	4896.532	-124.108	-25.184	-124.108	126.638	191.471	0.184
5000.000	0.267	18.863	4996.530	-123.635	-24.764	-123.635	126.091	191.326	0.312
5100.000	0.342	70.898	5096.529	-123.317	-24.407	-123.317	125.709	191.195	0.275
5200.000	0.309	62.010	5196.527	-123.093	-23.887	-123.093	125.389	190.982	0.060
5300.000	0.291	116.919	5296.526	-123.081	-23.423	-123.081	125.290	190.775	0.277
5400.000	0.492	100.065	5396.524	-123.271	-22.774	-123.271	125.357	190.467	0.229
5500.000	0.349	77.628	5496.521	-123.281	-22.055	-123.281	125.238	190.143	0.215

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	0.582	91.529	5596.518	-123.229	-21.250	-123.229	125.048	189.784	0.258
5700.000	0.532	142.945	5696.514	-123.613	-20.462	-123.613	125.295	189.399	0.486
5800.000	0.627	150.963	5796.509	-124.463	-19.916	-124.463	126.046	189.091	0.125
5900.000	0.589	117.976	5896.503	-125.182	-19.197	-125.182	126.646	188.718	0.347
6000.000	0.241	110.381	5996.500	-125.497	-18.546	-125.497	126.860	188.406	0.351
6100.000	0.582	47.762	6096.498	-125.228	-17.973	-125.228	126.511	188.167	0.518
6200.000	0.931	28.214	6196.489	-124.170	-17.212	-124.170	125.358	187.892	0.429
6300.000	0.632	31.133	6296.480	-122.983	-16.543	-122.983	124.090	187.661	0.302
6400.000	0.921	28.143	6396.471	-121.802	-15.879	-121.802	122.832	187.428	0.292
6500.000	0.699	34.561	6496.461	-120.591	-15.154	-120.591	121.539	187.162	0.240
6600.000	0.894	42.960	6596.451	-119.517	-14.276	-119.517	120.367	186.812	0.227