



Company/Rig: Noble Energy Inc/Production  
WELL/API#: Kerksiek USX A18-25/05-123-32655  
DECLINATION: 8.21 Degrees  
TD AS DRILLED: 7167'  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.48211, Longitude: -104.59664  
Grid North = True North -0.58 degs (NAD 27)  
Grid Correction Applied = -0.58 degs



DEPTH REFERENCE : RKB=GL/Elevation=4680'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 8/16/2016 / 10:05

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Kerksiek USX A18-25

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	0.844	113.965	99.996	-0.299	0.673	-0.299	0.737	113.965	0.844
200.000	1.068	105.387	199.982	-0.846	2.245	-0.846	2.399	110.643	0.265
300.000	0.826	120.905	299.969	-1.463	3.761	-1.463	4.036	111.253	0.351
400.000	1.013	133.760	399.956	-2.445	5.018	-2.445	5.582	115.973	0.278
500.000	0.928	132.281	499.942	-3.601	6.256	-3.601	7.218	119.925	0.089
600.000	0.942	139.614	599.928	-4.772	7.387	-4.772	8.794	122.859	0.120
700.000	0.322	155.494	699.922	-5.653	8.036	-5.653	9.825	125.124	0.638
800.000	0.495	127.871	799.919	-6.173	8.493	-6.173	10.500	126.011	0.257
900.000	0.426	154.146	899.916	-6.773	8.996	-6.773	11.260	126.973	0.220
1000.000	0.240	154.429	999.915	-7.295	9.248	-7.295	11.779	128.267	0.186
1100.000	0.304	164.650	1099.913	-7.740	9.409	-7.740	12.183	129.440	0.080
1200.000	0.370	155.220	1199.912	-8.288	9.614	-8.288	12.693	130.763	0.086
1300.000	0.406	151.251	1299.909	-8.891	9.920	-8.891	13.321	131.871	0.045
1400.000	0.343	133.650	1399.907	-9.409	10.307	-9.409	13.956	132.392	0.130
1500.000	0.322	140.364	1499.906	-9.832	10.703	-9.832	14.533	132.571	0.045
1600.000	0.317	114.660	1599.904	-10.163	11.133	-10.163	15.075	132.393	0.142

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	0.061	341.284	1699.904	-10.228	11.368	-10.228	15.292	131.980	0.362
1800.000	0.350	304.458	1799.903	-10.005	11.099	-10.005	14.943	132.034	0.303
1900.000	0.274	271.835	1899.902	-9.825	10.607	-9.825	14.458	132.806	0.190
2000.000	0.364	350.246	1999.900	-9.503	10.314	-9.503	14.025	132.658	0.410
2100.000	0.610	331.589	2099.897	-8.722	10.007	-8.722	13.275	131.076	0.289
2200.000	1.071	35.423	2199.888	-7.493	10.296	-7.493	12.734	126.044	0.971
2300.000	1.485	35.833	2299.863	-5.680	11.596	-5.680	12.913	116.096	0.414
2400.000	1.694	47.741	2399.824	-3.635	13.449	-3.635	13.932	105.126	0.390
2500.000	1.231	43.649	2499.791	-1.864	15.285	-1.864	15.398	96.954	0.475
2600.000	0.858	36.845	2599.775	-0.488	16.475	-0.488	16.482	91.697	0.392
2700.000	0.572	39.933	2699.767	0.494	17.244	0.494	17.251	88.361	0.289
2800.000	0.858	53.606	2799.759	1.320	18.166	1.320	18.214	85.844	0.331
2900.000	1.032	66.609	2899.745	2.122	19.596	2.122	19.710	83.820	0.275
3000.000	1.050	81.236	2999.729	2.619	21.328	2.619	21.488	82.999	0.266
3100.000	0.862	113.919	3099.716	2.454	22.922	2.454	23.053	83.890	0.568
3200.000	0.664	63.026	3199.708	2.412	24.126	2.412	24.246	84.292	0.680
3300.000	1.119	3.505	3299.698	3.649	24.702	3.649	24.970	81.596	0.970
3400.000	1.621	5.678	3399.669	6.032	24.901	6.032	25.622	76.383	0.504
3500.000	2.106	14.713	3499.616	9.217	25.508	9.217	27.122	70.134	0.566
3600.000	2.245	17.582	3599.544	12.861	26.567	12.861	29.516	64.167	0.177
3700.000	2.272	23.417	3699.466	16.548	27.946	16.548	32.478	59.368	0.231
3800.000	2.131	29.666	3799.392	19.983	29.654	19.983	35.759	56.025	0.278
3900.000	2.090	28.091	3899.324	23.208	31.433	23.208	39.072	53.561	0.071
4000.000	1.463	15.857	3999.276	26.044	32.641	26.044	41.758	51.413	0.730
4100.000	0.961	22.268	4099.254	28.048	33.307	28.048	43.544	49.899	0.519
4200.000	0.532	7.647	4199.245	29.285	33.687	29.285	44.637	48.999	0.466
4300.000	0.408	355.051	4299.242	30.100	33.718	30.100	45.199	48.245	0.161
4400.000	0.489	308.870	4399.239	30.722	33.355	30.722	45.348	47.354	0.359
4500.000	0.101	169.842	4499.238	30.902	33.039	30.902	45.239	46.914	0.569
4600.000	0.600	128.893	4599.236	30.486	33.462	30.486	45.267	47.664	0.528
4700.000	1.186	138.599	4699.223	29.381	34.554	29.381	45.357	49.626	0.603
4800.000	1.557	120.834	4799.195	27.909	36.405	27.909	45.872	52.525	0.560
4900.000	1.382	149.535	4899.163	26.174	38.182	26.174	46.292	55.570	0.748
5000.000	1.123	130.255	4999.140	24.501	39.542	24.501	46.517	58.216	0.491
5100.000	0.585	118.181	5099.128	23.627	40.740	23.627	47.095	59.889	0.564
5200.000	0.514	72.368	5199.124	23.522	41.618	23.522	47.805	60.526	0.433
5300.000	0.255	158.247	5299.122	23.451	42.128	23.451	48.215	60.897	0.557
5400.000	0.709	358.738	5399.120	23.864	42.196	23.864	48.477	60.510	0.952
5500.000	1.095	13.463	5499.108	25.411	42.405	25.411	49.436	59.068	0.447

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	1.289	2.491	5599.086	27.464	42.677	27.464	50.750	57.237	0.299
5700.000	1.035	340.668	5699.066	29.440	42.427	29.440	51.640	55.243	0.506
5800.000	1.493	338.156	5799.042	31.501	41.643	31.501	52.215	52.894	0.462
5900.000	1.535	325.573	5899.007	33.816	40.401	33.816	52.685	50.070	0.334
6000.000	1.401	337.708	5998.974	36.051	39.180	36.051	53.242	47.381	0.338
6100.000	1.823	313.431	6098.936	38.276	37.561	38.276	53.627	44.460	0.793
6200.000	2.063	324.031	6198.878	40.826	35.349	40.826	54.003	40.887	0.432
6300.000	2.521	315.056	6298.798	43.840	32.738	43.840	54.714	36.751	0.580
6400.000	2.662	315.842	6398.696	47.062	29.567	47.062	55.579	32.139	0.146
6500.000	3.122	319.928	6498.569	50.812	26.196	50.812	57.167	27.274	0.504
6600.000	3.337	324.621	6598.410	55.269	22.758	55.269	59.771	22.380	0.341
6700.000	2.817	336.946	6698.267	59.903	20.111	59.903	63.188	18.558	0.839
6800.000	1.956	335.884	6798.179	63.721	18.451	63.721	66.339	16.149	0.861