COMPANY/RIG: Noble Energy/Production/CoreTech

WELL/API: Vetting 1-26/05-123-12717

DECLINATION: 8.23 Degrees

TD AS DRILLED: 7075 Feet

COUNTY/STATE: Weld/Colorado

VS-Azi: 0.000 Degrees

Latitude: 40.37558, Longitude: -104.62273

Grid North = True North -0.57 degs (NAD 27)

Grid Correction Applied = -0.57 degs

DEPTH REFERENCE : RKB = GL Elevation = 4641

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 6/23/2016 / 09:24

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Vetting 1-26

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	0.311	89.508	100.000	0.002	0.271	0.002	0.271	89.508	0.311
200.000	0.320	93.712	199.998	-0.013	0.821	-0.013	0.821	90.938	0.025
300.000	0.434	176.397	299.996	-0.410	1.124	-0.410	1.196	110.021	0.506
400.000	0.379	173.210	399.994	-1.116	1.187	-1.116	1.629	133.241	0.059
500.000	0.401	170.856	499.992	-1.790	1.282	-1.790	2.202	144.403	0.027
600.000	0.553	176.016	599.988	-2.617	1.371	-2.617	2.954	152.356	0.157
700.000	0.459	173.604	699.984	-3.496	1.449	-3.496	3.785	157.491	0.096
800.000	0.505	176.992	799.981	-4.335	1.517	-4.335	4.592	160.715	0.055
900.000	0.384	182.580	899.978	-5.110	1.525	-5.110	5.333	163.386	0.128
1000.000	0.465	196.954	999.975	-5.833	1.391	-5.833	5.997	166.586	0.133
1100.000	0.475	207.353	1099.972	-6.589	1.083	-6.589	6.678	170.671	0.086
1200.000	0.484	213.525	1199.968	-7.310	0.659	-7.310	7.339	174.850	0.053
1300.000	0.322	224.811	1299.966	-7.861	0.227	-7.861	7.865	178.343	0.180
1400.000	0.328	239.682	1399.964	-8.205	-0.218	-8.205	8.208	181.518	0.084
1500.000	0.368	223.131	1499.962	-8.584	-0.684	-8.584	8.611	184.558	0.108
1600.000	0.370	219.679	1599.960	-9.067	-1.110	-9.067	9.135	186.981	0.022
1700.000	0.211	203.574	1699.959	-9.485	-1.390	-9.485	9.586	188.339	0.177
1800.000	0.336	239.778	1799.958	-9.802	-1.718	-9.802	9.951	189.940	0.208

VES Survey Date: 6/20/2016

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	0.195	269.845	1899.957	-9.950	-2.142	-9.950	10.178	192.147	0.194
2000.000	0.194	277.679	1999.956	-9.928	-2.480	-9.928	10.233	194.023	0.027
2100.000	0.262	275.458	2099.955	-9.883	-2.875	-9.883	10.293	196.218	0.069
2200.000	0.287	257.094	2199.954	-9.917	-3.347	-9.917	10.467	198.647	0.091
2300.000	0.393	246.872	2299.952	-10.108	-3.906	-10.108	10.836	201.127	0.121
2400.000	0.879	224.284	2399.946	-10.792	-4.757	-10.792	11.794	203.786	0.538
2500.000	1.382	216.612	2499.926	-12.309	-6.011	-12.309	13.698	206.030	0.524
2600.000	1.461	218.253	2599.896	-14.278	-7.520	-14.278	16.137	207.774	0.089
2700.000	1.616	223.380	2699.860	-16.304	-9.277	-16.304	18.758	209.641	0.207
2800.000	1.588	222.752	2799.820	-18.346	-11.186	-18.346	21.487	211.373	0.033
2900.000	1.676	224.545	2899.780	-20.406	-13.153	-20.406	24.278	212.805	0.102
3000.000	1.358	229.296	2999.745	-22.221	-15.078	-22.221	26.854	214.158	0.342
3100.000	0.986	249.513	3099.724	-23.295	-16.782	-23.295	28.711	215.769	0.551
3200.000	0.686	263.482	3199.713	-23.664	-18.183	-23.664	29.843	217.537	0.361
3300.000	0.823	246.358	3299.705	-24.021	-19.436	-24.021	30.899	218.977	0.263
3400.000	1.047	227.349	3399.692	-24.928	-20.766	-24.928	32.444	219.796	0.380
3500.000	0.954	212.421	3499.677	-26.250	-21.884	-26.250	34.176	219.818	0.276
3600.000	0.989	201.099	3599.662	-27.758	-22.641	-27.758	35.821	219.204	0.195
3700.000	1.007	198.996	3699.647	-29.394	-23.238	-29.394	37.470	218.329	0.041
3800.000	0.856	207.613	3799.634	-30.886	-23.870	-30.886	39.035	217.698	0.206
3900.000	0.842	214.303	3899.623	-32.155	-24.630	-32.155	40.504	217.452	0.100
4000.000	0.868	228.364	3999.612	-33.265	-25.611	-33.265	41.982	217.593	0.211
4100.000	0.696	230.744	4099.603	-34.153	-26.647	-34.153	43.318	217.963	0.175
4200.000	0.759	231.392	4199.595	-34.950	-27.635	-34.950	44.555	218.333	0.063
4300.000	0.803	232.716	4299.585	-35.788	-28.709	-35.788	45.880	218.737	0.047
4400.000	0.948	229.812	4399.574	-36.746	-29.899	-36.746	47.373	219.134	0.152
4500.000	1.208	226.054	4499.556	-38.011	-31.290	-38.011	49.233	219.460	0.269
4600.000	1.267	222.247	4599.532	-39.561	-32.792	-39.561	51.385	219.655	0.101
4700.000	1.289	227.995	4699.508	-41.132	-34.371	-41.132	53.602	219.883	0.130
4800.000	0.944	223.060	4799.489	-42.486	-35.769	-42.486	55.538	220.094	0.358
4900.000	0.712	235.764	4899.478	-43.437	-36.845	-43.437	56.959	220.305	0.295
5000.000	0.802	239.937	4999.469	-44.137	-37.964	-44.137	58.218	220.700	0.106
5100.000	0.542	252.480	5099.462	-44.630	-39.020	-44.630	59.283	221.163	0.298
5200.000	0.617	260.979	5199.457	-44.857	-40.003	-44.857	60.103	221.726	0.114
5300.000	0.607	264.693	5299.452	-44.990	-41.062	-44.990	60.912	222.386	0.041
5400.000	0.767	290.698	5399.445	-44.803	-42.216	-44.803	61.559	223.297	0.346
5500.000	0.499	253.683	5499.439	-44.689	-43.260	-44.689	62.198	224.070	0.476
5600.000	0.386	210.125	5599.436	-45.103	-43.848	-45.103	62.903	224.192	0.345
5700.000	0.865	117.899	5699.432	-45.747	-43.350	-45.747	63.024	223.458	0.961
5800.000	1.089	59.986	5799.419	-45.625	-41.860	-45.625	61.919	222.535	0.966

VES Survey Date: 6/20/2016

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	1.735	31.401	5899.390	-43.858	-40.248	-43.858	59.527	222.543	0.937
6000.000	2.840	15.397	5999.309	-40.177	-38.802	-40.177	55.855	224.002	1.266
6100.000	2.953	359.271	6099.183	-35.212	-38.177	-35.212	51.936	227.313	0.820
6200.000	2.169	1.478	6199.083	-30.745	-38.161	-30.745	49.005	231.143	0.790
6300.000	1.741	24.916	6299.026	-27.475	-37.472	-27.475	46.465	233.750	0.898
6400.000	1.261	48.786	6398.992	-25.373	-36.004	-25.373	44.046	234.827	0.779
6500.000	1.028	53.343	6498.972	-24.113	-34.457	-24.113	42.056	235.016	0.250
6600.000	1.520	72.662	6598.947	-23.182	-32.472	-23.182	39.898	234.476	0.647

VES Survey Date: 6/20/2016