



COMPANY/RIG: Noble Energy/Production/CoreTech
WELL/API: Zehnder B05-23/05-123-32916
DECLINATION: 8.25 Degrees
TD AS DRILLED: 7029 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.42503, Longitude: -104.56811
Grid North = True North -0.60 degs (NAD 27)
Grid Correction Applied = -0.60 degs



DEPTH REFERENCE : RKB = GL Elevation = 4627

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 1/11/2016 / 14:57

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Zehnder B05-23

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	0.470	244.312	99.999	-0.178	-0.370	-0.178	0.410	244.312	0.470
200.000	0.440	242.371	199.996	-0.534	-1.079	-0.534	1.204	243.693	0.033
300.000	0.371	322.086	299.994	-0.456	-1.619	-0.456	1.682	254.263	0.523
400.000	1.108	330.439	399.985	0.641	-2.295	0.641	2.383	285.596	0.743
500.000	1.211	303.451	499.965	2.064	-3.653	2.064	4.196	299.464	0.550
600.000	1.077	300.044	599.945	3.117	-5.348	3.117	6.190	300.232	0.150
700.000	1.043	302.571	699.928	4.077	-6.929	4.077	8.039	300.475	0.057
800.000	1.247	301.673	799.908	5.139	-8.622	5.139	10.037	300.795	0.204
900.000	1.253	300.325	899.884	6.262	-10.492	6.262	12.219	300.831	0.030
1000.000	1.171	296.546	999.862	7.271	-12.350	7.271	14.331	300.487	0.114
1100.000	1.204	300.375	1099.840	8.259	-14.171	8.259	16.402	300.234	0.086
1200.000	0.842	296.963	1199.824	9.124	-15.733	9.124	18.187	300.111	0.367
1300.000	0.965	285.379	1299.812	9.680	-17.200	9.680	19.736	299.372	0.220
1400.000	0.635	260.453	1399.802	9.812	-18.558	9.812	20.992	297.866	0.473
1500.000	0.633	280.594	1499.796	9.821	-19.647	9.821	21.965	296.561	0.222
1600.000	0.495	220.537	1599.792	9.594	-20.471	9.594	22.607	295.112	0.577
1700.000	0.385	254.420	1699.790	9.176	-21.075	9.176	22.986	293.527	0.277
1800.000	0.839	265.990	1799.784	9.034	-22.128	9.034	23.901	292.209	0.468

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	1.049	279.159	1899.770	9.129	-23.762	9.129	25.455	291.016	0.301
2000.000	1.060	284.324	1999.753	9.503	-25.561	9.503	27.271	290.394	0.096
2100.000	0.781	303.757	2099.740	10.111	-27.024	10.111	28.853	290.513	0.415
2200.000	1.099	335.960	2199.727	11.365	-27.981	11.365	30.201	292.106	0.605
2300.000	1.497	338.773	2299.702	13.459	-28.845	13.459	31.830	295.014	0.403
2400.000	1.215	349.875	2399.674	15.721	-29.504	15.721	33.431	298.050	0.384
2500.000	1.224	352.041	2499.651	17.823	-29.838	17.823	34.756	300.850	0.047
2600.000	1.303	352.721	2599.627	20.008	-30.130	20.008	36.169	303.586	0.080
2700.000	1.374	354.503	2699.599	22.329	-30.389	22.329	37.711	306.307	0.082
2800.000	1.352	356.130	2799.571	24.699	-30.584	24.699	39.312	308.924	0.045
2900.000	1.204	1.004	2899.546	26.927	-30.645	26.927	40.794	311.305	0.183
3000.000	1.062	12.099	2999.527	28.883	-30.432	28.883	41.957	313.504	0.261
3100.000	0.867	26.428	3099.513	30.466	-29.901	30.466	42.688	315.536	0.308
3200.000	0.774	34.553	3199.503	31.700	-29.182	31.700	43.087	317.369	0.149
3300.000	0.524	87.111	3299.497	32.280	-28.342	32.280	42.956	318.717	0.617
3400.000	0.871	148.427	3399.490	31.655	-27.487	31.655	41.924	319.031	0.771
3500.000	1.788	151.487	3499.463	29.637	-26.345	29.637	39.654	318.366	0.919
3600.000	1.949	151.190	3599.409	26.777	-24.781	26.777	36.484	317.217	0.161
3700.000	2.324	134.253	3699.341	23.872	-22.509	23.872	32.811	316.683	0.731
3800.000	2.242	141.200	3799.261	20.933	-19.831	20.933	28.835	316.548	0.289
3900.000	1.541	140.912	3899.206	18.365	-17.758	18.365	25.547	315.963	0.701
4000.000	1.079	228.656	3999.188	16.700	-17.617	16.700	24.274	313.469	1.846
4100.000	1.910	270.717	4099.156	16.099	-19.990	16.099	25.666	308.846	1.324
4200.000	2.829	273.665	4199.069	16.277	-24.119	16.277	29.098	304.014	0.926
4300.000	2.402	282.860	4298.965	16.901	-28.624	16.901	33.242	300.560	0.597
4400.000	1.113	282.361	4398.916	17.576	-31.616	17.576	36.173	299.070	1.288
4500.000	0.857	233.604	4498.903	17.340	-33.168	17.340	37.427	297.600	0.846
4600.000	0.888	203.121	4598.892	16.183	-34.074	16.183	37.722	295.405	0.460
4700.000	1.315	243.898	4698.875	14.965	-35.409	14.965	38.442	292.911	0.866
4800.000	1.791	276.390	4798.840	14.634	-37.993	14.634	40.714	291.066	0.982
4900.000	1.416	300.435	4898.801	15.434	-40.612	15.434	43.446	290.809	0.762
5000.000	0.527	282.387	4998.786	16.159	-42.126	16.159	45.119	290.986	0.929
5100.000	0.391	149.329	5098.785	15.964	-42.402	15.964	45.308	290.631	0.844
5200.000	0.644	160.230	5198.780	15.142	-42.038	15.142	44.682	289.809	0.270
5300.000	1.060	197.431	5298.770	13.731	-42.125	13.731	44.306	288.054	0.671
5400.000	1.131	227.715	5398.752	12.184	-43.132	12.184	44.820	285.775	0.576
5500.000	1.101	220.480	5498.734	10.790	-44.486	10.790	45.776	283.633	0.144
5600.000	1.171	204.081	5598.714	9.126	-45.527	9.126	46.432	281.335	0.331
5700.000	0.822	200.757	5698.699	7.522	-46.198	7.522	46.806	279.248	0.353
5800.000	0.471	163.573	5798.693	6.456	-46.336	6.456	46.784	277.932	0.530

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	0.458	164.469	5898.689	5.676	-46.113	5.676	46.461	277.018	0.015
6000.000	0.541	165.271	5998.686	4.835	-45.886	4.835	46.140	276.015	0.083
6100.000	0.241	139.774	6098.683	4.218	-45.630	4.218	45.824	275.281	0.340
6200.000	0.275	144.713	6198.682	3.861	-45.355	3.861	45.520	274.866	0.041
6300.000	0.244	137.923	6298.681	3.507	-45.074	3.507	45.210	274.449	0.044
6400.000	0.125	27.593	6398.681	3.446	-44.881	3.446	45.013	274.391	0.311
6500.000	0.104	118.249	6498.681	3.500	-44.750	3.500	44.887	274.472	0.164
6600.000	0.057	32.790	6598.681	3.499	-44.644	3.499	44.781	274.481	0.114
6700.000	0.516	90.416	6698.679	3.537	-44.167	3.537	44.308	274.579	0.488
6750.000	0.199	96.240	6748.678	3.526	-43.855	3.526	43.997	274.597	0.636