



Company/Rig: NOBLE ENERGY/CORETECH  
WELL/API#: KERBS USX A15-12D/05-123-33908  
DECLINATION: 8.23 DEGREES  
TD AS DRILLED: 7820 FEET  
COUNTY/STATE: WELD/COLORADO  
VS-Azi: 0.000 Degrees  
Latitude: 40.48952, Longitude: -104.53687  
Grid Convergence Applied = -0.62 degs (NAD 27)  
Grid North = True North -0.62 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4797 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 4/27/2015 / 15:06

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: KEVIN MCDOWELL

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	0.889	264.833	99.996	-0.070	-0.773	-0.070	0.776	264.833	0.889
200.000	0.803	272.724	199.985	-0.106	-2.246	-0.106	2.248	267.287	0.144
300.000	1.450	259.401	299.965	-0.306	-4.190	-0.306	4.201	265.824	0.694
400.000	3.947	253.207	399.847	-1.533	-8.729	-1.533	8.863	260.038	2.510
500.000	5.980	250.694	499.467	-4.250	-16.941	-4.250	17.466	255.917	2.044
600.000	6.984	253.457	598.826	-7.703	-27.686	-7.703	28.738	254.451	1.052
700.000	9.042	254.319	697.845	-11.559	-41.081	-11.559	42.676	254.285	2.060
800.000	10.918	245.435	796.333	-17.620	-57.261	-17.620	59.911	252.896	2.422
900.000	12.180	238.489	894.311	-27.072	-74.869	-27.072	79.613	250.121	1.876
1000.000	12.512	240.712	991.999	-37.885	-93.310	-37.885	100.708	247.903	0.580
1100.000	13.563	235.784	1089.423	-49.778	-112.455	-49.778	122.979	246.124	1.529
1200.000	14.700	230.537	1186.400	-64.436	-131.948	-64.436	146.841	243.972	1.712
1300.000	16.277	222.824	1282.775	-82.782	-151.273	-82.782	172.442	241.311	2.591
1400.000	18.079	223.243	1378.310	-104.366	-171.431	-104.366	200.701	238.667	1.806
1500.000	19.657	217.389	1472.942	-129.037	-192.278	-129.037	231.563	236.135	2.462
1600.000	21.353	214.952	1566.605	-157.325	-212.923	-157.325	264.740	233.540	1.899
1700.000	22.220	221.266	1659.474	-186.464	-235.828	-186.464	300.639	231.667	2.497
1800.000	22.496	215.353	1751.968	-216.284	-259.372	-216.284	337.717	230.176	2.266

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	23.062	213.800	1844.169	-248.164	-281.337	-248.164	375.148	228.585	0.825
2000.000	25.969	208.878	1935.154	-283.623	-302.814	-283.623	414.895	226.874	3.551
2100.000	27.486	215.981	2024.490	-321.481	-326.953	-321.481	458.528	225.484	3.534
2200.000	29.663	221.187	2112.318	-358.787	-356.814	-358.787	506.008	224.842	3.306
2300.000	31.283	220.006	2198.503	-397.299	-389.802	-397.299	556.590	224.454	1.727
2400.000	33.808	219.626	2282.792	-438.622	-424.242	-438.622	610.221	224.045	2.533
2500.000	34.474	229.215	2365.619	-478.566	-463.444	-478.566	666.188	224.080	5.418
2600.000	33.047	222.155	2448.786	-517.284	-503.190	-517.284	721.653	224.209	4.173
2700.000	33.764	219.741	2532.269	-558.867	-539.257	-558.867	776.615	223.977	1.510
2800.000	36.427	223.125	2614.088	-601.917	-577.330	-601.917	834.035	223.806	3.297
2900.000	37.188	231.252	2694.201	-642.527	-621.223	-642.527	893.733	224.034	4.925
3000.000	38.434	219.147	2773.314	-685.609	-664.476	-685.609	954.771	224.103	7.516
3100.000	37.785	221.166	2852.000	-732.777	-704.265	-732.777	1016.342	223.863	1.405
3200.000	38.623	221.908	2930.581	-779.067	-745.277	-779.067	1078.139	223.730	0.956
3300.000	36.524	220.013	3009.836	-825.092	-785.263	-825.092	1139.041	223.583	2.396
3400.000	36.935	215.779	3089.996	-872.267	-821.968	-872.267	1198.533	223.300	2.565
3500.000	35.928	215.256	3170.452	-920.601	-856.470	-920.601	1257.397	222.933	1.054
3600.000	33.148	226.533	3252.904	-963.419	-893.293	-963.419	1313.830	222.837	6.961
3700.000	30.048	222.563	3338.078	-1000.68	-930.083	-1000.68	1366.169	222.906	3.732
3800.000	28.322	228.128	3425.395	-1034.96	-964.691	-1034.96	1414.842	222.987	3.214
3900.000	27.371	225.558	3513.818	-1066.89	-998.769	-1066.89	1461.438	223.111	1.532
4000.000	25.332	222.735	3603.425	-1098.71	-1029.70	-1098.71	1505.804	223.143	2.393
4100.000	26.889	231.148	3693.249	-1128.62	-1061.84	-1128.62	1549.610	223.254	4.013
4200.000	28.776	220.517	3781.731	-1161.12	-1095.12	-1161.12	1596.086	223.324	5.302
4300.000	28.736	211.149	3869.444	-1200.02	-1123.20	-1200.02	1643.661	223.106	4.503
4400.000	29.892	220.112	3956.680	-1239.67	-1151.71	-1239.67	1692.099	222.893	4.534
4500.000	31.116	221.220	4042.838	-1278.16	-1184.79	-1278.16	1742.819	222.829	1.347
4600.000	30.761	223.418	4128.613	-1316.17	-1219.39	-1316.17	1794.221	222.814	1.184
4700.000	27.730	221.011	4215.860	-1352.31	-1252.25	-1352.31	1843.059	222.800	3.250
4800.000	26.666	220.366	4304.802	-1386.97	-1282.05	-1386.97	1888.735	222.749	1.104
4900.000	26.034	231.754	4394.469	-1417.67	-1313.84	-1417.67	1932.861	222.823	5.087
5000.000	25.369	223.907	4484.601	-1446.70	-1345.94	-1446.70	1975.975	222.934	3.465
5100.000	27.170	222.043	4574.271	-1479.09	-1376.09	-1479.09	2020.228	222.934	1.980
5200.000	28.130	226.060	4662.858	-1512.41	-1408.35	-1512.41	2066.601	222.960	2.097
5300.000	24.603	223.797	4752.443	-1543.80	-1439.75	-1543.80	2110.971	223.003	3.667
5400.000	20.439	227.796	4844.802	-1570.57	-1467.10	-1570.57	2149.205	223.049	4.435
5500.000	18.076	222.644	4939.206	-1593.72	-1490.55	-1593.72	2182.126	223.084	2.908
5600.000	14.951	222.365	5035.070	-1614.66	-1509.76	-1614.66	2210.546	223.077	3.126
5700.000	16.063	223.580	5131.428	-1634.22	-1527.99	-1634.22	2237.280	223.076	1.159
5800.000	15.517	218.934	5227.658	-1654.65	-1545.93	-1654.65	2264.457	223.055	1.377

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	13.327	219.621	5324.501	-1673.93	-1561.69	-1673.93	2289.308	223.013	2.197
6000.000	12.527	227.720	5421.974	-1690.11	-1577.07	-1690.11	2311.624	223.018	1.979
6100.000	13.057	228.688	5519.492	-1704.86	-1593.57	-1704.86	2333.674	223.068	0.572
6200.000	12.173	219.154	5617.087	-1720.50	-1608.72	-1720.50	2355.437	223.077	2.259
6300.000	12.385	216.321	5714.801	-1737.31	-1621.73	-1737.31	2376.606	223.029	0.639
6400.000	11.953	218.655	5812.554	-1754.04	-1634.55	-1754.04	2397.583	222.980	0.654
6500.000	12.958	218.861	5910.199	-1770.86	-1648.05	-1770.86	2419.093	222.943	1.006
6600.000	13.550	213.388	6007.539	-1789.37	-1661.53	-1789.37	2441.832	222.878	1.386
6700.000	13.436	215.839	6104.779	-1808.57	-1674.78	-1808.57	2464.919	222.800	0.583
6800.000	11.378	209.997	6202.442	-1826.53	-1686.52	-1826.53	2486.076	222.718	2.409
6900.000	9.392	215.055	6300.802	-1841.76	-1696.14	-1841.76	2503.788	222.643	2.183
7000.000	8.013	203.440	6399.656	-1854.83	-1703.60	-1854.83	2518.462	222.566	2.227
7100.000	7.965	193.695	6498.690	-1867.96	-1708.01	-1867.96	2531.121	222.439	1.354
7200.000	8.117	204.470	6597.712	-1881.12	-1712.58	-1881.12	2543.919	222.315	1.513
7300.000	7.751	200.133	6696.756	-1893.88	-1717.82	-1893.88	2556.888	222.209	0.702
7400.000	6.042	195.980	6796.029	-1905.27	-1721.59	-1905.27	2567.863	222.101	1.779
7500.000	4.854	192.535	6895.576	-1914.46	-1723.96	-1914.46	2576.273	222.003	1.231