



Company/Rig: NOBLE ENERGY / PRODUCTION
WELL/API#: WELLS RANCH BB 12-06 / 05-123-30149
DECLINATION: 8.21 DEGREES
TD AS DRILLED: 6765 FEET
COUNTY/STATE: WELD / COLORADO
VS-Azi: 0.000 Degrees
Latitude: 40.41564, Longitude: -104.38749
Grid Convergence Applied = -0.72 degs (NAD 27)
Grid North = True North -0.72 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4652

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/2/2015 / 13:32

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: NORMAN COWAN / API 05-123-30149

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	0.158	196.015	100.000	-0.133	-0.038	-0.133	0.138	196.015	0.158
200.000	0.362	112.092	199.999	-0.384	0.216	-0.384	0.441	150.621	0.379
300.000	0.587	178.427	299.996	-1.015	0.523	-1.015	1.141	152.744	0.552
400.000	0.604	158.883	399.991	-2.018	0.727	-2.018	2.145	160.198	0.203
500.000	0.465	104.315	499.987	-2.611	1.310	-2.611	2.921	153.349	0.506
600.000	0.782	112.890	599.981	-2.977	2.332	-2.977	3.782	141.919	0.329
700.000	0.873	147.892	699.971	-3.887	3.366	-3.887	5.142	139.112	0.505
800.000	0.687	171.288	799.962	-5.124	3.861	-5.124	6.416	143.002	0.365
900.000	0.414	203.548	899.958	-6.048	3.808	-6.048	7.147	147.806	0.403
1000.000	0.645	188.478	999.953	-6.935	3.580	-6.935	7.805	152.695	0.268
1100.000	0.450	193.248	1099.949	-7.875	3.407	-7.875	8.580	156.602	0.200
1200.000	0.583	121.585	1199.946	-8.524	3.751	-8.524	9.312	156.248	0.614
1300.000	0.636	148.812	1299.940	-9.265	4.472	-9.265	10.288	154.236	0.291
1400.000	0.562	66.392	1399.936	-9.543	5.209	-9.543	10.872	151.374	0.791
1500.000	0.647	69.097	1499.931	-9.145	6.185	-9.145	11.041	145.927	0.089
1600.000	0.572	68.503	1599.925	-8.761	7.177	-8.761	11.325	140.677	0.075
1700.000	0.346	136.499	1699.922	-8.797	7.849	-8.797	11.790	138.261	0.546
1800.000	0.222	40.961	1799.922	-8.870	8.184	-8.870	12.068	137.305	0.429

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	0.470	192.214	1899.921	-9.125	8.224	-9.125	12.284	137.973	0.673
2000.000	0.458	251.105	1999.918	-9.655	7.759	-9.655	12.386	141.216	0.457
2100.000	0.499	271.209	2099.915	-9.776	6.944	-9.776	11.991	144.610	0.172
2200.000	0.350	339.020	2199.912	-9.481	6.399	-9.481	11.439	145.983	0.490
2300.000	0.630	26.988	2299.909	-8.706	6.540	-8.706	10.888	143.086	0.474
2400.000	0.884	27.197	2399.900	-7.529	7.142	-7.529	10.378	136.511	0.254
2500.000	0.619	3.531	2499.892	-6.303	7.528	-6.303	9.819	129.940	0.403
2600.000	0.376	29.594	2599.888	-5.478	7.724	-5.478	9.469	125.348	0.326
2700.000	0.461	27.042	2699.885	-4.834	8.069	-4.834	9.406	120.926	0.087
2800.000	0.658	358.923	2799.881	-3.901	8.241	-3.901	9.118	115.334	0.332
2900.000	0.918	357.154	2899.871	-2.528	8.191	-2.528	8.572	107.150	0.261
3000.000	0.243	3.447	2999.865	-1.516	8.164	-1.516	8.303	100.518	0.677
3100.000	0.284	179.959	3099.865	-1.552	8.176	-1.552	8.322	100.746	0.527
3200.000	0.438	162.182	3199.863	-2.164	8.294	-2.164	8.571	104.623	0.189
3300.000	0.947	168.625	3299.855	-3.338	8.574	-3.338	9.201	111.275	0.514
3400.000	1.718	185.913	3399.828	-5.640	8.582	-5.640	10.270	123.311	0.861
3500.000	1.587	177.858	3499.786	-8.514	8.480	-8.514	12.017	135.117	0.267
3600.000	2.145	172.812	3599.733	-11.755	8.766	-11.755	14.663	143.288	0.582
3700.000	2.631	167.440	3699.646	-15.852	9.499	-15.852	18.480	149.069	0.534
3800.000	2.324	168.098	3799.553	-20.076	10.416	-20.076	22.618	152.578	0.308
3900.000	2.166	174.892	3899.476	-23.943	11.003	-23.943	26.350	155.319	0.309
4000.000	1.954	201.677	3999.414	-27.409	10.541	-27.409	29.366	158.964	0.976
4100.000	1.649	211.128	4099.364	-30.225	9.168	-30.225	31.585	163.127	0.425
4200.000	1.238	236.570	4199.333	-32.052	7.522	-32.052	32.923	166.793	0.751
4300.000	1.376	267.370	4299.308	-32.702	5.421	-32.702	33.149	170.588	0.707
4400.000	0.565	303.216	4399.294	-32.487	3.809	-32.487	32.710	173.313	0.975
4500.000	0.662	292.410	4499.288	-31.997	2.862	-31.997	32.125	174.888	0.150
4600.000	0.936	291.039	4599.278	-31.483	1.566	-31.483	31.522	177.153	0.275
4700.000	1.317	268.858	4699.259	-31.213	-0.346	-31.213	31.215	180.635	0.572
4800.000	0.906	285.173	4799.241	-31.029	-2.258	-31.029	31.111	184.162	0.515
4900.000	0.553	304.866	4899.233	-30.546	-3.417	-30.546	30.737	186.383	0.428
5000.000	0.303	285.884	4999.230	-30.198	-4.068	-30.198	30.471	187.671	0.284
5100.000	0.497	187.238	5099.228	-30.556	-4.377	-30.556	30.867	188.151	0.620
5200.000	0.272	259.970	5199.226	-31.027	-4.665	-31.027	31.376	188.551	0.491
5300.000	0.440	263.847	5299.224	-31.110	-5.280	-31.110	31.555	189.633	0.169
5400.000	0.497	340.931	5399.222	-30.741	-5.804	-30.741	31.284	190.691	0.585
5500.000	0.190	278.716	5499.220	-30.306	-6.109	-30.306	30.916	191.396	0.442
5600.000	0.100	114.923	5599.220	-30.318	-6.194	-30.318	30.944	191.546	0.287
5700.000	0.422	158.950	5699.219	-30.698	-5.982	-30.698	31.276	191.027	0.357
5800.000	0.667	213.635	5799.215	-31.527	-6.172	-31.527	32.125	191.077	0.545

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	0.726	253.348	5899.208	-32.193	-7.102	-32.193	32.967	192.440	0.476
6000.000	0.319	260.830	5999.204	-32.419	-7.984	-32.419	33.388	193.835	0.411
6100.000	0.750	216.303	6099.199	-32.991	-8.646	-32.991	34.105	194.686	0.568
6200.000	0.804	196.290	6199.190	-34.192	-9.231	-34.192	35.416	195.108	0.275
6300.000	0.953	132.392	6299.181	-35.426	-8.814	-35.426	36.506	193.971	0.938
6400.000	0.829	196.366	6399.171	-36.680	-8.403	-36.680	37.630	192.904	0.950
6450.000	0.817	228.345	6449.166	-37.264	-8.772	-37.264	38.283	193.246	0.907