



Company/Rig: NOBLE ENERGY/ PRODUCTION  
WELL/API#: HARSH H 26-15 / 05-123-23085  
DECLINATION: 8.31 DEGREES  
TD AS DRILLED: 7972 FEET  
COUNTY/STATE: WELD/COLORADO  
Latitude: 40.191, Longitude: -104.628  
GRID North is 0.560 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION= 4861 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 12/12/2014 / 14:33

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JORDAN ROLANDO

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	0.477	41.623	99.999	0.311	0.277	0.311	0.416	41.623	0.477
200.000	0.394	26.972	199.996	0.929	0.709	0.929	1.169	37.354	0.138
300.000	0.449	144.469	299.995	0.916	1.093	0.916	1.426	50.023	0.722
400.000	0.444	144.214	399.992	0.283	1.548	0.283	1.573	79.641	0.006
500.000	0.477	64.071	499.989	0.151	2.149	0.151	2.154	85.991	0.594
600.000	0.739	139.836	599.985	-0.160	2.939	-0.160	2.943	93.115	0.774
700.000	0.837	151.064	699.975	-1.292	3.708	-1.292	3.926	109.207	0.183
800.000	0.794	159.924	799.965	-2.582	4.299	-2.582	5.015	120.985	0.133
900.000	0.916	168.533	899.954	-4.016	4.696	-4.016	6.179	130.537	0.177
1000.000	0.856	168.032	999.942	-5.530	5.010	-5.530	7.462	137.826	0.061
1100.000	0.877	165.720	1099.931	-7.002	5.353	-7.002	8.814	142.601	0.041
1200.000	0.909	203.934	1199.920	-8.468	5.220	-8.468	9.948	148.349	0.585
1300.000	1.057	190.140	1299.905	-10.101	4.736	-10.101	11.156	154.880	0.278
1400.000	1.084	209.756	1399.888	-11.830	4.104	-11.830	12.521	160.865	0.366
1500.000	0.996	211.512	1499.871	-13.392	3.181	-13.392	13.764	166.640	0.093
1600.000	1.126	201.651	1599.854	-15.046	2.364	-15.046	15.231	171.072	0.223
1700.000	0.939	209.753	1699.838	-16.670	1.595	-16.670	16.746	174.535	0.237
1800.000	0.854	207.553	1799.826	-18.042	0.844	-18.042	18.062	177.323	0.091
1900.000	0.812	224.718	1899.815	-19.206	0.000	-19.206	19.206	179.999	0.252

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
2000.000	0.411	274.729	1999.810	-19.680	-0.855	-19.680	19.698	182.487	0.632
2100.000	0.921	335.050	2099.804	-18.922	-1.551	-18.922	18.985	184.686	0.801
2200.000	1.266	341.748	2199.786	-17.144	-2.236	-17.144	17.289	187.430	0.367
2300.000	1.199	351.918	2299.763	-15.059	-2.729	-15.059	15.304	190.272	0.228
2400.000	0.559	14.732	2399.751	-13.550	-2.752	-13.550	13.827	191.480	0.717
2500.000	0.566	16.226	2499.746	-12.604	-2.490	-12.604	12.848	191.174	0.016
2600.000	0.519	75.487	2599.742	-12.016	-1.913	-12.016	12.168	189.047	0.538
2700.000	0.431	96.205	2699.739	-11.943	-1.101	-11.943	11.994	185.267	0.192
2800.000	0.499	101.430	2799.735	-12.070	-0.300	-12.070	12.074	181.425	0.081
2900.000	0.879	66.999	2899.728	-11.857	0.833	-11.857	11.886	175.981	0.546
3000.000	1.132	38.050	2999.714	-10.779	2.148	-10.779	10.991	168.729	0.559
3100.000	1.189	33.096	3099.693	-9.132	3.324	-9.132	9.718	160.001	0.116
3200.000	1.684	16.879	3199.662	-6.856	4.317	-6.856	8.102	147.805	0.636
3300.000	1.568	15.560	3299.621	-4.133	5.111	-4.133	6.572	128.961	0.122
3400.000	1.545	15.239	3399.585	-1.515	5.832	-1.515	6.025	104.558	0.025
3500.000	1.319	32.179	3499.554	0.760	6.799	0.760	6.841	83.623	0.477
3600.000	1.576	62.670	3599.523	2.365	8.634	2.365	8.952	74.679	0.801
3700.000	1.930	57.657	3699.476	3.898	11.278	3.898	11.933	70.935	0.385
3800.000	1.661	47.153	3799.427	5.784	13.763	5.784	14.929	67.205	0.424
3900.000	1.571	35.850	3899.388	7.881	15.629	7.881	17.503	63.241	0.331
4000.000	1.444	21.755	3999.354	10.162	16.899	10.162	19.719	58.980	0.391
4100.000	1.599	36.378	4099.319	12.455	18.193	12.455	22.048	55.604	0.417
4200.000	1.952	51.913	4199.271	14.630	20.361	14.630	25.072	54.303	0.594
4300.000	2.379	63.448	4299.200	16.608	23.559	16.608	28.824	54.817	0.608
4400.000	3.096	58.715	4399.085	18.938	27.723	18.938	33.574	55.662	0.751
4500.000	3.214	58.156	4498.934	21.820	32.412	21.820	39.073	56.052	0.122
4600.000	2.954	50.213	4598.789	24.948	36.774	24.948	44.438	55.847	0.499
4700.000	1.974	46.069	4698.696	27.792	39.995	27.792	48.703	55.205	0.995
4800.000	1.765	20.791	4798.644	30.427	41.782	30.427	51.687	53.937	0.843
4900.000	1.619	22.757	4898.600	33.169	42.875	33.169	54.207	52.274	0.157
5000.000	1.567	48.145	4998.563	35.383	44.440	35.383	56.805	51.473	0.702
5100.000	1.571	39.131	5098.526	37.359	46.323	37.359	59.511	51.114	0.247
5200.000	1.659	44.482	5198.486	39.455	48.202	39.455	62.291	50.699	0.175
5300.000	1.192	27.323	5298.455	41.412	49.694	41.412	64.688	50.194	0.628
5400.000	1.231	26.011	5398.433	43.302	50.643	43.302	66.632	49.468	0.047
5500.000	1.260	27.632	5498.409	45.241	51.624	45.241	68.643	48.770	0.046
5600.000	1.377	346.112	5598.385	47.382	51.846	47.382	70.235	47.576	0.941
5700.000	1.183	349.423	5698.360	49.562	51.368	49.562	71.380	46.025	0.207
5800.000	0.795	308.663	5798.346	51.010	50.637	51.010	71.876	44.790	0.779
5900.000	1.007	320.691	5898.334	52.124	49.539	52.124	71.909	43.543	0.283

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
6000.000	0.546	326.602	5998.324	53.201	48.720	53.201	72.139	42.482	0.468
6100.000	0.603	306.500	6098.319	53.912	48.035	53.912	72.207	41.701	0.208
6200.000	0.574	296.393	6198.314	54.447	47.163	54.447	72.034	40.900	0.107
6300.000	0.594	270.432	6298.309	54.674	46.196	54.674	71.577	40.195	0.263
6400.000	0.317	293.573	6398.306	54.789	45.424	54.789	71.170	39.661	0.327
6500.000	0.479	269.203	6498.303	54.894	44.752	54.894	70.824	39.189	0.231
6600.000	0.571	278.688	6598.299	54.963	43.842	54.963	70.307	38.578	0.126
6700.000	0.099	287.637	6698.297	55.065	43.267	55.065	70.030	38.159	0.473
6800.000	0.098	9.201	6798.297	55.175	43.198	55.175	70.074	38.058	0.129
6900.000	0.810	107.744	6898.294	55.045	43.885	55.045	70.398	38.564	0.830
7000.000	1.518	121.589	6998.273	54.135	45.687	54.135	70.837	40.162	0.757
7050.000	1.849	126.526	7048.251	53.308	46.899	53.308	71.002	41.341	0.721