



COMPANY/RIG: Noble Energy/Production/VES
WELL/API: Winters 5-3/05-123-21389
DECLINATION: 8.07 Degrees
TD AS DRILLED: 7154 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.42994, Longitude: -104.65709
Grid North = True North -0.54 degs (NAD 27)
Grid Correction Applied = -0.54 degs



DEPTH REFERENCE : RKB = GL Elevation = 4650

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hgyrosurvey.ut
Minimum Curvature Method
Report Date/Time: 4/4/2018 / 09:35

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976

Surveyor: JUSTIN WILLIAMS/Winters 5-3/API 05-123-21389

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	0.162	330.531	100.000	0.123	-0.070	0.123	0.141	330.531	0.162
200.000	0.296	345.361	199.999	0.496	-0.204	0.496	0.536	337.608	0.145
300.000	0.230	36.704	299.998	0.906	-0.149	0.906	0.919	350.633	0.235
400.000	0.200	310.712	399.998	1.181	-0.162	1.181	1.192	352.207	0.294
500.000	0.373	3.080	499.996	1.620	-0.276	1.620	1.643	350.324	0.297
600.000	0.168	337.058	599.995	2.080	-0.316	2.080	2.104	351.366	0.234
700.000	0.300	346.691	699.995	2.470	-0.433	2.470	2.508	350.050	0.137
800.000	0.211	355.665	799.994	2.908	-0.508	2.908	2.952	350.101	0.098
900.000	0.205	26.100	899.993	3.252	-0.443	3.252	3.282	352.245	0.109
1000.000	0.237	32.054	999.992	3.587	-0.255	3.587	3.597	355.940	0.039
1100.000	0.188	89.959	1099.992	3.763	0.019	3.763	3.763	0.289	0.210
1200.000	0.253	73.768	1199.991	3.825	0.395	3.825	3.845	5.899	0.090
1300.000	0.348	79.842	1299.989	3.940	0.907	3.940	4.043	12.959	0.100
1400.000	0.570	89.787	1399.986	3.996	1.703	3.996	4.343	23.090	0.235
1500.000	0.796	79.823	1499.979	4.120	2.884	4.120	5.029	34.994	0.254
1600.000	0.782	83.418	1599.970	4.321	4.246	4.321	6.058	44.497	0.051
1700.000	0.508	91.459	1699.963	4.388	5.367	4.388	6.932	50.729	0.288
1800.000	0.807	114.919	1799.957	4.080	6.448	4.080	7.630	57.676	0.397

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	0.841	132.650	1899.946	3.286	7.627	3.286	8.304	66.691	0.256
2000.000	1.133	124.153	1999.932	2.233	8.985	2.233	9.258	76.041	0.326
2100.000	1.497	135.399	2099.905	0.748	10.720	0.748	10.746	86.009	0.445
2200.000	1.710	138.057	2199.866	-1.292	12.635	-1.292	12.701	95.837	0.225
2300.000	1.904	131.290	2299.816	-3.497	14.880	-3.497	15.285	103.227	0.288
2400.000	1.980	140.690	2399.759	-5.931	17.223	-5.931	18.215	109.001	0.327
2500.000	1.837	139.501	2499.704	-8.486	19.358	-8.486	21.136	113.671	0.149
2600.000	1.397	139.719	2599.664	-10.634	21.187	-10.634	23.706	116.654	0.440
2700.000	1.146	140.413	2699.639	-12.335	22.612	-12.335	25.757	118.612	0.252
2800.000	0.923	139.433	2799.623	-13.717	23.773	-13.717	27.446	119.985	0.223
2900.000	0.806	151.383	2899.611	-14.946	24.634	-14.946	28.813	121.247	0.214
3000.000	0.517	142.328	2999.605	-15.921	25.246	-15.921	29.847	122.236	0.306
3100.000	0.624	164.279	3099.600	-16.802	25.669	-16.802	30.679	123.207	0.241
3200.000	1.072	161.221	3199.588	-18.211	26.118	-18.211	31.840	124.887	0.450
3300.000	0.842	152.813	3299.574	-19.750	26.755	-19.750	33.255	126.435	0.268
3400.000	0.374	58.574	3399.570	-20.234	27.369	-20.234	34.036	126.476	0.947
3500.000	1.188	19.616	3499.561	-19.087	27.996	-19.087	33.883	124.286	0.928
3600.000	1.676	23.669	3599.529	-16.771	28.931	-16.771	33.440	120.101	0.498
3700.000	1.460	33.164	3699.492	-14.365	30.215	-14.365	33.456	115.428	0.337
3800.000	1.631	30.534	3799.455	-12.073	31.635	-12.073	33.860	110.888	0.185
3900.000	1.427	31.243	3899.420	-9.783	33.004	-9.783	34.423	106.510	0.206
4000.000	0.882	27.322	3999.399	-8.035	34.003	-8.035	34.939	103.295	0.550
4100.000	0.700	13.867	4099.390	-6.758	34.502	-6.758	35.158	101.082	0.259
4200.000	0.717	350.294	4199.382	-5.548	34.543	-5.548	34.986	99.124	0.290
4300.000	0.749	330.735	4299.374	-4.361	34.118	-4.361	34.396	97.284	0.251
4400.000	0.794	346.444	4399.365	-3.117	33.636	-3.117	33.780	95.295	0.215
4500.000	1.002	4.406	4499.353	-1.572	33.541	-1.572	33.578	92.684	0.348
4600.000	1.406	18.119	4599.331	0.466	33.990	0.466	33.993	89.215	0.494
4700.000	2.050	24.876	4699.285	3.255	35.124	3.255	35.274	84.706	0.674
4800.000	2.025	11.785	4799.222	6.607	36.237	6.607	36.835	79.667	0.465
4900.000	2.132	3.118	4899.157	10.194	36.699	10.194	38.089	74.476	0.332
5000.000	1.399	8.910	4999.109	13.257	36.989	13.257	39.293	70.283	0.754
5100.000	0.860	23.120	5099.089	15.153	37.473	15.153	40.421	67.984	0.603
5200.000	0.888	42.489	5199.078	16.414	38.291	16.414	41.661	66.797	0.295
5300.000	1.065	73.576	5299.064	17.249	39.706	17.249	43.291	66.520	0.550
5400.000	1.629	69.933	5399.036	17.999	41.933	17.999	45.632	66.769	0.570
5500.000	2.400	65.119	5498.973	19.368	45.167	19.368	49.144	66.790	0.789
5600.000	2.509	57.913	5598.882	21.411	48.921	21.411	53.401	66.362	0.327
5700.000	1.608	59.612	5698.816	23.284	51.986	23.284	56.962	65.873	0.903
5800.000	1.158	65.066	5798.787	24.419	54.112	24.419	59.367	65.712	0.469

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	0.857	60.645	5898.771	25.212	55.680	25.212	61.122	65.639	0.310
6000.000	0.761	59.808	5998.761	25.913	56.907	25.913	62.529	65.517	0.097
6100.000	0.556	68.629	6098.755	26.424	57.933	26.424	63.674	65.482	0.229
6200.000	0.380	51.097	6198.751	26.809	58.642	26.809	64.480	65.432	0.225
6300.000	0.495	42.116	6298.749	27.338	59.191	27.338	65.199	65.210	0.134
6400.000	0.391	7.474	6398.746	27.997	59.525	27.997	65.780	64.811	0.282
6500.000	0.590	1.752	6498.742	28.850	59.585	28.850	66.202	64.165	0.205
6600.000	0.368	17.557	6598.738	29.671	59.697	29.671	66.664	63.572	0.257
6700.000	0.552	31.257	6698.735	30.389	60.044	30.389	67.297	63.156	0.214
6800.000	0.681	64.863	6798.730	31.054	60.833	31.054	68.301	62.957	0.377
6900.000	0.587	79.168	6898.724	31.403	61.875	31.403	69.387	63.091	0.183