

Company: Noble Energy

Lease/Well: Hamilton F / 25-21

API: 05-123-26656

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld County

Latitude: 40.369, Longitude: -104.611

GRID North is 0.570 Degrees East of True North

VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 1/24/2013 / 09:03

Vaughn Energy Services

Henderson Colorado

303-853-4976

Norman Cowan

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	0.210	134.824	100.000	-0.129	0.130	-0.129	0.183	134.824	0.210
200.000	0.311	138.049	199.999	-0.461	0.442	-0.461	0.638	136.197	0.102
300.000	0.166	357.632	299.998	-0.518	0.618	-0.518	0.806	129.991	0.452
400.000	0.467	253.918	399.997	-0.486	0.220	-0.486	0.534	155.659	0.532
500.000	0.802	252.301	499.991	-0.812	-0.838	-0.812	1.167	225.916	0.335
600.000	1.257	228.389	599.975	-1.753	-2.325	-1.753	2.912	232.982	0.617
700.000	1.072	234.979	699.954	-3.019	-3.911	-3.019	4.941	232.341	0.228
800.000	1.283	221.047	799.933	-4.400	-5.413	-4.400	6.976	230.894	0.354
900.000	1.295	218.806	899.908	-6.125	-6.857	-6.125	9.194	228.225	0.052
1000.000	1.222	216.279	999.884	-7.865	-8.196	-7.865	11.359	226.178	0.092
1100.000	0.984	207.614	1099.865	-9.485	-9.224	-9.485	13.231	224.200	0.290
1200.000	0.975	209.145	1199.851	-10.990	-10.037	-10.990	14.883	222.405	0.028
1300.000	0.994	208.849	1299.836	-12.493	-10.870	-12.493	16.560	221.026	0.020
1400.000	0.867	219.245	1399.823	-13.839	-11.767	-13.839	18.165	220.375	0.211
1500.000	0.536	219.188	1499.815	-14.787	-12.541	-14.787	19.389	220.302	0.331
1600.000	0.371	211.481	1599.812	-15.426	-13.006	-15.426	20.177	220.135	0.175
1700.000	0.393	224.633	1699.810	-15.947	-13.416	-15.947	20.840	220.075	0.090
1800.000	0.465	248.548	1799.807	-16.339	-14.035	-16.339	21.540	220.662	0.191
1900.000	0.727	258.031	1899.802	-16.619	-15.033	-16.619	22.410	222.132	0.279
2000.000	1.149	269.463	1999.788	-16.760	-16.657	-16.760	23.629	224.823	0.460
2100.000	1.176	265.305	2099.767	-16.854	-18.682	-16.854	25.161	227.946	0.088
2200.000	1.283	264.344	2199.744	-17.048	-20.819	-17.048	26.908	230.687	0.109
2300.000	1.580	255.483	2299.713	-17.504	-23.268	-17.504	29.117	233.047	0.370
2400.000	1.338	261.695	2399.681	-18.018	-25.758	-18.018	31.435	235.027	0.289
2500.000	1.419	264.548	2499.652	-18.304	-28.146	-18.304	33.575	236.963	0.106
2600.000	1.416	263.764	2599.621	-18.556	-30.607	-18.556	35.793	238.773	0.020
2700.000	1.862	246.672	2699.581	-19.334	-33.328	-19.334	38.530	239.881	0.657
2800.000	1.869	239.942	2799.528	-20.794	-36.231	-20.794	41.774	240.147	0.219
2900.000	1.614	254.902	2899.482	-21.978	-39.003	-21.978	44.769	240.599	0.519
3000.000	1.675	253.463	2999.441	-22.761	-41.764	-22.761	47.563	241.410	0.073
3100.000	1.359	264.976	3099.406	-23.281	-44.346	-23.281	50.085	242.301	0.438
3200.000	1.123	300.525	3199.384	-22.887	-46.371	-22.887	51.711	243.731	0.790
3300.000	0.948	339.698	3299.369	-21.614	-47.502	-21.614	52.188	245.534	0.713
3400.000	1.398	21.857	3399.349	-19.706	-47.335	-19.706	51.273	247.398	0.942

HORIZONTAL DISPLACEMENT IS
63.468 FEET AT 199.898 DEGREES