



Company: Noble Energy
Well: Bluffs Red W 5-5
API: 05-123-16592
Rig Name: Production/VES
Location: Weld County, Colorado
Latitude: 40.169, Longitude: -104.807
GRID North is 0.450 Degrees East of True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MV GYRO SURVEY CALCULATIONS

Filename: bluffs red w 5-5 904-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/28/2013 / 11:21

Vaughn Energy Services
Henderson, CO.
Justin Williams
303-853-4976

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	0.456	255.702	99.999	-0.098	-0.386	-0.098	0.398	255.702	0.456
200.000	0.442	322.448	199.996	0.109	-1.007	0.109	1.013	276.189	0.494
300.000	0.021	357.816	299.995	0.433	-1.243	0.433	1.316	289.221	0.425
400.000	0.128	297.896	399.995	0.504	-1.342	0.504	1.434	290.574	0.119
500.000	0.463	340.713	499.994	0.938	-1.575	0.938	1.833	300.777	0.379
600.000	0.714	27.191	599.989	1.874	-1.423	1.874	2.353	322.781	0.519
700.000	0.988	5.250	699.978	3.287	-1.060	3.287	3.453	342.132	0.421
800.000	0.896	34.176	799.965	4.792	-0.542	4.792	4.822	353.552	0.479
900.000	0.783	33.244	899.955	6.010	0.272	6.010	6.017	2.594	0.113
1000.000	1.146	9.735	999.941	7.568	0.816	7.568	7.612	6.156	0.529
1100.000	0.933	358.391	1099.924	9.367	0.962	9.367	9.416	5.866	0.295
1200.000	1.282	9.297	1199.905	11.284	1.120	11.284	11.340	5.669	0.406
1300.000	0.848	4.680	1299.888	13.126	1.361	13.126	13.196	5.921	0.442
1400.000	1.426	11.139	1399.868	15.085	1.662	15.085	15.176	6.288	0.591
1500.000	1.188	28.428	1499.842	17.218	2.396	17.218	17.384	7.923	0.458
1600.000	1.408	15.001	1599.817	19.317	3.208	19.317	19.581	9.429	0.374
1700.000	1.170	29.973	1699.792	21.388	4.036	21.388	21.766	10.686	0.411
1800.000	1.536	21.809	1799.764	23.517	5.044	23.517	24.052	12.106	0.412
1900.000	1.293	29.311	1899.733	25.744	6.094	25.744	26.456	13.317	0.305
2000.000	0.800	60.096	1999.717	27.076	7.251	27.076	28.030	14.993	0.731
2100.000	0.657	123.129	2099.710	27.111	8.336	27.111	28.363	17.092	0.771
2200.000	0.707	166.035	2199.704	26.199	8.965	26.199	27.690	18.890	0.501
2300.000	0.853	204.049	2299.695	24.920	8.811	24.920	26.432	19.471	0.526
2400.000	0.305	218.285	2399.690	24.031	8.342	24.031	25.438	19.144	0.562
2500.000	0.580	234.401	2499.687	23.527	7.765	23.527	24.776	18.266	0.299
2600.000	0.517	243.881	2599.682	23.034	6.949	23.034	24.059	16.787	0.110
2700.000	0.177	170.226	2699.680	22.683	6.570	22.683	23.615	16.154	0.497
2800.000	0.648	232.748	2799.678	22.188	6.146	22.188	23.024	15.483	0.588
2900.000	0.330	269.712	2899.674	21.844	5.409	21.844	22.504	13.907	0.433
3000.000	1.214	241.271	2999.665	21.334	4.192	21.334	21.742	11.117	0.938
3100.000	1.302	243.291	3099.640	20.314	2.248	20.314	20.438	6.315	0.099
3200.000	0.921	284.980	3199.623	20.011	0.457	20.011	20.016	1.307	0.868
3300.000	0.049	183.376	3299.619	20.176	-0.322	20.176	20.178	359.085	0.932
3400.000	0.054	260.501	3399.619	20.125	-0.372	20.125	20.129	358.942	0.065

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
3500.000	0.317	157.447	3499.618	19.862	-0.312	19.862	19.864	359.100	0.333
3600.000	0.242	209.723	3599.617	19.423	-0.311	19.423	19.426	359.083	0.255
3700.000	0.246	260.208	3699.616	19.203	-0.627	19.203	19.213	358.130	0.208
3800.000	0.143	225.307	3799.616	19.079	-0.927	19.079	19.101	357.218	0.152
3900.000	0.555	215.537	3899.614	18.597	-1.297	18.597	18.642	356.010	0.415
4000.000	0.329	263.005	3999.611	18.168	-1.864	18.168	18.263	354.143	0.412
4100.000	0.473	221.214	4099.609	17.822	-2.421	17.822	17.986	352.264	0.316
4200.000	0.458	238.531	4199.605	17.303	-3.034	17.303	17.567	350.054	0.141
4300.000	0.333	172.718	4299.603	16.806	-3.338	16.806	17.134	348.765	0.443
4400.000	0.628	236.023	4399.600	16.212	-3.756	16.212	16.641	346.957	0.563
4500.000	0.479	252.388	4499.596	15.779	-4.608	15.779	16.438	343.720	0.216
4600.000	0.304	212.466	4599.594	15.429	-5.149	15.429	16.265	341.544	0.314
4700.000	0.385	30.113	4699.593	15.495	-5.123	15.495	16.320	341.705	0.690
4800.000	0.493	35.512	4799.590	16.137	-4.704	16.137	16.808	343.747	0.116
4900.000	1.309	35.072	4899.577	17.422	-3.798	17.422	17.831	347.702	0.815
5000.000	1.334	44.472	4999.550	19.187	-2.327	19.187	19.327	353.086	0.218
5100.000	1.405	46.390	5099.522	20.863	-0.624	20.863	20.872	358.287	0.084
5200.000	1.193	46.085	5199.496	22.430	1.013	22.430	22.453	2.587	0.212
5300.000	1.037	64.660	5299.477	23.539	2.581	23.539	23.680	6.257	0.391
5400.000	0.244	19.963	5399.471	24.126	3.471	24.126	24.375	8.187	0.880
5500.000	0.418	264.857	5499.470	24.294	3.180	24.294	24.501	7.458	0.567
5600.000	0.689	290.865	5599.465	24.475	2.254	24.475	24.579	5.262	0.363
5700.000	0.283	0.807	5699.462	24.936	1.696	24.936	24.994	3.890	0.649
5800.000	0.237	88.849	5799.461	25.187	1.905	25.187	25.259	4.326	0.362
5900.000	0.125	14.646	5899.461	25.297	2.139	25.297	25.387	4.834	0.236
6000.000	1.030	79.077	5999.455	25.572	3.049	25.572	25.753	6.800	0.982
6100.000	0.735	130.763	6099.445	25.324	4.417	25.324	25.706	9.894	0.814
6200.000	0.633	219.469	6199.440	24.478	4.552	24.478	24.898	10.534	0.959
6300.000	0.926	268.608	6299.431	24.032	3.393	24.032	24.270	8.035	0.701
6400.000	0.401	248.913	6399.425	23.886	2.258	23.886	23.993	5.401	0.565
6500.000	0.377	295.166	6499.422	23.900	1.634	23.900	23.956	3.912	0.306
6600.000	0.752	258.060	6599.418	23.904	0.695	23.904	23.915	1.664	0.506
6700.000	0.712	311.327	6699.411	24.179	-0.414	24.179	24.183	359.019	0.657
6800.000	0.720	351.588	6799.403	25.211	-0.973	25.211	25.229	357.790	0.493
6900.000	0.211	331.183	6899.400	25.993	-1.153	25.993	26.019	357.460	0.527
7000.000	0.449	351.913	6999.398	26.542	-1.297	26.542	26.574	357.202	0.263
21.3' Ellipse of Uncertainty									
7100.000	0.937	270.189	7099.392	26.933	-2.170	26.933	27.020	355.394	0.979
HORIZONTAL DISPLACEMENT IS 27.020 FEET AT 355.394 DEGREES									