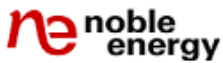


Company/ Rig: Noble Energy/Production/VES
 Well/API: Bluffs Red W 5-5/05-123-16592
 Declination: 8.62'
 TD as Drilled:
 County/State: Weld/Colorado
 Latitude: 40.169, Longitude: -104.807
 GRID North is 0.450 Degrees East of True North
 VS-Azi: 0.000 Degrees



Depth Reference : RKB = Ground Level

DRILLOG MV GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 4/16/2013 / 08:26

Lat & Long Obtained by Handheld GPS at Wellhead

North Reference: Grid

Henderson, Colorado

303-853-4976

Surveyor: Justin Williams

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	****
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.050	192.867	100.000	-0.043	-0.010	-0.043	0.044	192.867	0.050
200.000	0.158	352.249	200.000	0.052	-0.038	0.052	0.064	323.615	0.206
300.000	0.080	144.738	300.000	0.132	-0.017	0.132	0.133	352.846	0.232
400.000	0.101	127.228	400.000	0.022	0.094	0.022	0.096	77.113	0.035
500.000	0.423	109.717	499.998	-0.156	0.511	-0.156	0.535	106.997	0.328
600.000	0.644	92.206	599.994	-0.302	1.420	-0.302	1.452	102.020	0.273
700.000	0.966	74.695	699.984	-0.102	2.795	-0.102	2.796	92.083	0.401
800.000	0.887	57.185	799.971	0.540	4.258	0.540	4.292	82.770	0.292
900.000	0.808	39.674	899.961	1.502	5.358	1.502	5.565	74.336	0.269
1000.000	1.097	26.619	999.947	2.901	6.238	2.901	6.879	65.057	0.359
1100.000	1.093	34.839	1099.929	4.540	7.211	4.540	8.521	57.809	0.157
1200.000	1.056	44.226	1199.911	5.983	8.399	5.983	10.312	54.536	0.180
1300.000	1.020	53.612	1299.895	7.171	9.758	7.171	12.110	53.688	0.174
1400.000	1.198	62.998	1399.876	8.174	11.406	8.174	14.032	54.374	0.254
1500.000	1.400	72.385	1499.850	9.018	13.502	9.018	16.237	56.260	0.293
1600.000	1.509	81.771	1599.818	9.576	15.970	9.576	18.621	59.050	0.262
1700.000	1.187	91.158	1699.791	9.744	18.309	9.744	20.740	61.978	0.389
1800.000	1.584	100.544	1799.761	9.470	20.703	9.470	22.766	65.419	0.455
1900.000	1.299	109.930	1899.730	8.831	23.127	8.831	24.756	69.101	0.369

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	0.872	112.343	1999.712	8.155	24.896	8.155	26.198	71.863	0.429
2100.000	0.768	107.614	2099.701	7.663	26.239	7.663	27.335	73.720	0.124
2200.000	0.779	95.277	2199.692	7.398	27.555	7.398	28.531	74.972	0.167
2300.000	0.790	82.939	2299.683	7.420	28.915	7.420	29.852	75.608	0.169
2400.000	0.801	70.602	2399.673	7.737	30.258	7.737	31.232	75.657	0.171
2500.000	0.811	58.265	2499.664	8.341	31.519	8.341	32.604	75.177	0.174
2600.000	0.822	45.927	2599.654	9.213	32.637	9.213	33.912	74.237	0.176
2700.000	0.833	33.590	2699.643	10.318	33.555	10.318	35.105	72.908	0.178
2800.000	0.844	21.252	2799.633	11.610	34.224	11.610	36.140	71.262	0.181
2900.000	0.855	8.915	2899.622	13.033	34.607	13.033	36.980	69.363	0.183
3000.000	0.900	357.856	2999.610	14.555	34.693	14.555	37.622	67.241	0.175
3100.000	0.871	351.017	3099.598	16.090	34.545	16.090	38.108	65.025	0.110
3200.000	0.840	346.093	3199.587	17.552	34.250	17.552	38.486	62.866	0.080
3300.000	0.810	341.169	3299.577	18.933	33.846	18.933	38.781	60.778	0.077
3400.000	0.779	336.245	3399.567	20.224	33.344	20.224	38.998	58.762	0.075
3500.000	0.749	331.321	3499.558	21.420	32.756	21.420	39.138	56.819	0.072
3600.000	0.718	326.397	3599.550	22.515	32.096	22.515	39.205	54.950	0.070
3700.000	0.688	321.473	3699.542	23.507	31.375	23.507	39.204	53.158	0.068
3800.000	0.657	316.549	3799.536	24.393	30.606	24.393	39.138	51.445	0.065
3900.000	0.627	311.625	3899.529	25.173	29.803	25.173	39.011	49.814	0.063
4000.000	0.583	304.481	3999.524	25.824	28.974	25.824	38.813	48.290	0.087
4100.000	0.611	287.790	4099.518	26.275	28.047	26.275	38.432	46.868	0.176
4200.000	0.636	270.641	4199.513	26.445	26.984	26.445	37.782	45.579	0.187
4300.000	0.660	253.491	4299.506	26.287	25.878	26.287	36.887	44.550	0.195
4400.000	0.684	236.341	4399.499	25.793	24.829	25.793	35.802	43.909	0.202
4500.000	0.708	219.191	4499.492	24.984	23.943	24.984	34.604	43.781	0.209
4600.000	0.732	202.041	4599.484	23.913	23.313	23.913	33.396	44.271	0.216
4700.000	0.756	184.891	4699.476	22.664	23.017	22.664	32.302	45.442	0.223
4800.000	0.780	167.741	4799.467	21.342	23.105	21.342	31.453	47.272	0.230
4900.000	0.804	150.591	4899.458	20.066	23.594	20.066	30.973	49.620	0.237
5000.000	0.838	136.169	4999.448	18.927	24.445	18.927	30.916	52.250	0.209
5100.000	0.828	139.971	5099.437	17.846	25.416	17.846	31.056	54.925	0.056
5200.000	0.802	142.646	5199.427	16.736	26.306	16.736	31.178	57.535	0.046
5300.000	0.776	145.321	5299.418	15.622	27.116	15.622	31.294	60.053	0.045
5400.000	0.750	147.996	5399.409	14.510	27.849	14.510	31.402	62.480	0.044
5500.000	0.724	150.671	5499.400	13.403	28.505	13.403	31.499	64.817	0.043
5600.000	0.698	153.345	5599.393	12.307	29.089	12.307	31.585	67.067	0.042
5700.000	0.672	152.020	5699.385	11.244	29.637	11.244	31.699	69.223	0.030
5800.000	0.646	148.695	5799.379	10.244	30.206	10.244	31.896	71.266	0.046
5900.000	0.620	151.370	5899.373	9.287	30.758	9.287	32.130	73.200	0.039
6000.000	0.582	157.517	5999.367	8.342	31.212	8.342	32.308	75.036	0.075
6100.000	0.573	145.700	6099.362	7.460	31.688	7.460	32.554	76.752	0.119

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
6200.000	0.606	133.971	6199.357	6.680	32.350	6.680	33.033	78.333	0.125
6300.000	0.640	132.200	6299.351	5.938	33.144	5.938	33.672	79.843	0.039
6400.000	0.673	123.513	6399.345	5.239	34.047	5.239	34.448	81.253	0.105
6500.000	0.706	128.783	6499.337	4.528	35.018	4.528	35.309	82.632	0.072
6600.000	0.740	136.054	6599.329	3.677	35.946	3.677	36.134	84.159	0.098
6700.000	0.773	142.325	6699.321	2.678	36.807	2.678	36.904	85.838	0.089
6800.000	0.807	150.596	6799.311	1.531	37.565	1.531	37.596	87.666	0.119
6900.000	0.840	159.866	6899.301	0.229	38.163	0.229	38.163	89.656	0.137
7000.000	0.881	171.679	6999.290	-1.219	38.526	-1.219	38.546	91.813	0.182
7100.000	0.937	149.585	7099.277	-2.685	39.051	-2.685	39.144	93.933	0.353