



COMPANY/RIG: Noble Energy/Production/VES
WELL/API: Rothe State B 36-09/05-123-19214
DECLINATION: 8.14 Degrees
TD AS DRILLED: 6812 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.35405, Longitude: -104.49007
Grid North = True North -0.65 degs (NAD 27)
Grid Correction Applied = -0.65 degs



DEPTH REFERENCE : RKB = GL Elevation = 4591

DRILLOG GYRO SURVEY CALCULATIONS

Filename: gyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 8/22/2016 / 15:51

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Rothe State B 36-09

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	0.319	271.809	99.999	0.009	-0.278	0.009	0.278	271.809	0.319
200.000	0.251	167.864	199.999	-0.196	-0.510	-0.196	0.546	248.933	0.450
300.000	0.352	178.663	299.997	-0.717	-0.457	-0.717	0.850	212.481	0.116
400.000	0.131	61.774	399.997	-0.970	-0.349	-0.970	1.031	199.778	0.427
500.000	0.649	46.062	499.994	-0.523	0.159	-0.523	0.547	163.061	0.524
600.000	0.442	61.784	599.990	0.052	0.907	0.052	0.909	86.720	0.253
700.000	0.595	20.981	699.986	0.720	1.433	0.720	1.604	63.340	0.389
800.000	0.438	53.634	799.982	1.432	1.927	1.432	2.401	53.396	0.327
900.000	0.723	33.336	899.977	2.186	2.582	2.186	3.383	49.755	0.347
1000.000	0.580	50.691	999.970	3.033	3.320	3.033	4.497	47.588	0.242
1100.000	0.591	47.280	1099.965	3.704	4.091	3.704	5.518	47.843	0.037
1200.000	0.499	53.919	1199.961	4.310	4.822	4.310	6.467	48.206	0.112
1300.000	0.744	49.682	1299.955	4.986	5.668	4.986	7.549	48.662	0.250
1400.000	0.553	9.177	1399.949	5.883	6.240	5.883	8.576	46.690	0.483
1500.000	0.431	6.279	1499.945	6.733	6.358	6.733	9.260	43.362	0.124
1600.000	0.762	54.263	1599.940	7.495	6.939	7.495	10.214	42.795	0.572

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
1700.000	0.779	56.667	1699.931	8.257	8.047	8.257	11.530	44.263	0.036
1800.000	0.622	76.979	1799.924	8.753	9.145	8.753	12.659	46.253	0.291
1900.000	0.963	87.410	1899.914	8.914	10.513	8.914	13.783	49.708	0.369
2000.000	0.920	117.745	1999.901	8.578	12.063	8.578	14.802	54.584	0.494
2100.000	0.590	109.058	2099.892	8.036	13.260	8.036	15.505	58.782	0.348
2200.000	0.857	153.622	2199.885	7.198	14.079	7.198	15.812	62.920	0.602
2300.000	0.679	178.406	2299.876	5.936	14.427	5.936	15.601	67.636	0.373
2400.000	0.573	159.804	2399.870	4.874	14.616	4.874	15.408	71.557	0.228
2500.000	0.692	133.234	2499.864	3.992	15.229	3.992	15.743	75.311	0.313
2600.000	0.670	173.085	2599.858	2.998	15.739	2.998	16.022	79.216	0.465
2700.000	0.677	166.036	2699.851	1.844	15.952	1.844	16.058	83.407	0.083
2800.000	0.614	213.849	2799.845	0.825	15.796	0.825	15.818	87.009	0.526
2900.000	0.664	200.862	2899.839	-0.161	15.292	-0.161	15.293	90.602	0.153
3000.000	0.219	263.070	2999.836	-0.725	14.896	-0.725	14.914	92.786	0.594
3100.000	0.175	136.160	3099.836	-0.858	14.812	-0.858	14.837	93.317	0.353
3200.000	0.560	329.607	3199.835	-0.548	14.671	-0.548	14.681	92.137	0.732
3300.000	1.164	327.514	3299.823	0.731	13.878	0.731	13.898	86.985	0.605
3400.000	1.607	351.040	3399.794	2.973	13.114	2.973	13.447	77.226	0.712
3500.000	1.524	331.532	3499.758	5.527	12.262	5.527	13.450	65.735	0.537
3600.000	1.207	312.540	3599.730	7.408	10.852	7.408	13.140	55.679	0.549
3700.000	1.226	290.279	3699.708	8.491	9.073	8.491	12.427	46.897	0.470
3800.000	1.092	323.216	3799.688	9.625	7.499	9.625	12.202	37.923	0.669
3900.000	1.300	351.781	3899.667	11.511	6.766	11.511	13.352	30.448	0.623
4000.000	1.390	16.455	3999.641	13.797	6.948	13.797	15.447	26.730	0.582
4100.000	1.582	354.422	4099.608	16.334	7.157	16.334	17.834	23.663	0.598
4200.000	1.895	14.189	4199.563	19.311	7.429	19.311	20.690	21.041	0.671
4300.000	1.850	33.818	4299.510	22.254	8.732	22.254	23.906	21.424	0.640
4400.000	1.453	18.853	4399.469	24.795	10.040	24.795	26.751	22.044	0.583
4500.000	1.506	27.534	4499.436	27.161	11.057	27.161	29.325	22.152	0.230
4600.000	1.497	44.125	4599.402	29.264	12.575	29.264	31.851	23.253	0.433
4700.000	1.313	59.373	4699.372	30.786	14.470	30.786	34.017	25.175	0.415
4800.000	0.812	58.570	4799.355	31.739	16.061	31.739	35.571	26.841	0.501
4900.000	0.916	20.579	4899.344	32.857	16.947	32.857	36.970	27.283	0.571
5000.000	0.775	49.717	4999.333	34.042	17.743	34.042	38.389	27.529	0.447
5100.000	0.848	32.387	5099.324	35.104	18.655	35.104	39.754	27.987	0.255
5200.000	0.188	77.466	5199.319	35.765	19.212	35.765	40.599	28.244	0.728
5300.000	0.526	232.088	5299.318	35.519	19.010	35.519	40.286	28.157	0.701
5400.000	0.842	191.020	5399.311	34.515	18.508	34.515	39.164	28.201	0.564
5500.000	1.075	151.508	5499.298	32.969	18.815	32.969	37.960	29.712	0.684

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
5600.000	0.726	160.689	5599.286	31.547	19.472	31.547	37.073	31.684	0.377
5700.000	0.725	122.582	5699.278	30.609	20.214	30.609	36.681	33.441	0.473
5800.000	0.415	117.423	5799.273	30.102	21.069	30.102	36.742	34.989	0.314
5900.000	0.333	114.369	5899.271	29.815	21.655	29.815	36.849	35.991	0.085
6000.000	0.494	59.830	5999.269	29.912	22.292	29.912	37.305	36.696	0.405
6100.000	0.470	343.170	6099.266	30.521	22.546	30.521	37.945	36.454	0.598
6200.000	0.202	151.118	6199.265	30.759	22.513	30.759	38.117	36.201	0.669
6300.000	0.466	51.753	6299.264	30.856	22.917	30.856	38.435	36.602	0.537
6400.000	0.265	123.506	6399.263	30.979	23.429	30.979	38.841	37.100	0.458
6500.000	0.308	131.989	6499.261	30.671	23.822	30.671	38.836	37.837	0.060
6550.000	0.406	193.497	6549.261	30.409	23.881	30.409	38.666	38.144	0.749