



Company: Anadarko Petroleum  
 Well: Ft St Vrain 20  
 API: 05-123-15650  
 Rig Name: Production/ CoreTech  
 State/County: Colorado/Weld  
 Latitude: 40.238, Longitude: -104.893  
 Directions are relative to 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: 11/6/2013 / 15:20

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

303-853-4976

SEAN BRATT

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	0.308	263.241	100.000	-0.032	-0.267	-0.032	0.269	263.241	0.308
200.000	0.247	308.493	199.998	0.071	-0.703	0.071	0.706	275.736	0.221
300.000	0.373	272.839	299.997	0.221	-1.197	0.221	1.217	280.448	0.225
400.000	0.228	286.729	399.996	0.294	-1.712	0.294	1.737	279.742	0.162
500.000	0.501	252.332	499.994	0.218	-2.319	0.218	2.329	275.378	0.339
600.000	0.401	253.571	599.991	-0.013	-3.072	-0.013	3.072	269.748	0.100
700.000	0.566	267.842	699.987	-0.131	-3.901	-0.131	3.903	268.075	0.203
800.000	0.663	260.831	799.981	-0.242	-4.966	-0.242	4.972	267.211	0.123
900.000	0.550	263.699	899.976	-0.387	-6.014	-0.387	6.026	266.320	0.117
1000.000	0.607	248.850	999.971	-0.631	-6.985	-0.631	7.013	264.841	0.160
1100.000	0.706	258.969	1099.964	-0.940	-8.084	-0.940	8.138	263.369	0.152
1200.000	0.875	242.490	1199.955	-1.410	-9.365	-1.410	9.471	261.437	0.281
1300.000	1.018	280.951	1299.942	-1.594	-10.915	-1.594	11.030	261.692	0.638
1400.000	1.107	279.988	1399.925	-1.258	-12.738	-1.258	12.800	264.362	0.090
1500.000	1.019	294.790	1499.908	-0.717	-14.496	-0.717	14.514	267.167	0.287
1600.000	0.980	285.532	1599.893	-0.116	-16.127	-0.116	16.127	269.589	0.166
1700.000	1.241	298.127	1699.874	0.624	-17.905	0.624	17.916	271.995	0.356
1800.000	1.307	297.903	1799.849	1.668	-19.868	1.668	19.937	274.798	0.066
1900.000	1.136	304.445	1899.826	2.762	-21.693	2.762	21.868	277.255	0.220
2000.000	1.492	306.403	1999.800	4.095	-23.557	4.095	23.911	279.861	0.358
2100.000	1.536	307.431	2099.765	5.682	-25.669	5.682	26.290	282.481	0.052
2200.000	1.453	304.137	2199.731	7.208	-27.783	7.208	28.702	284.544	0.119
2300.000	1.516	308.588	2299.698	8.744	-29.866	8.744	31.120	286.319	0.132
2400.000	1.555	301.317	2399.662	10.274	-32.059	10.274	33.665	287.770	0.198
2500.000	1.724	307.118	2499.621	11.887	-34.417	11.887	36.412	289.054	0.237
2600.000	1.749	302.124	2599.575	13.606	-36.909	13.606	39.337	290.236	0.153
2700.000	1.810	301.754	2699.527	15.249	-39.544	15.249	42.382	291.087	0.063
2800.000	1.675	306.718	2799.481	16.954	-42.058	16.954	45.347	291.954	0.203
2900.000	1.460	309.124	2899.443	18.631	-44.218	18.631	47.983	292.848	0.225
3000.000	0.959	282.564	2999.421	19.617	-46.023	19.617	50.029	293.086	0.739
3100.000	1.258	249.161	3099.403	19.408	-47.866	19.408	51.651	292.071	0.699
3200.000	1.958	243.671	3199.363	18.260	-50.423	18.260	53.627	289.907	0.716
3300.000	1.860	260.433	3299.309	17.233	-53.554	17.233	56.259	287.837	0.565
3400.000	1.054	279.152	3399.276	17.109	-56.063	17.109	58.615	286.971	0.926
3500.000	0.775	337.900	3499.265	17.882	-57.225	17.882	59.954	287.353	0.929

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
3600.000	1.009	350.480	3599.253	19.376	-57.625	19.376	60.795	288.585	0.304
3700.000	0.820	352.552	3699.240	20.953	-57.863	20.953	61.540	289.906	0.192
3800.000	0.688	67.290	3799.234	21.894	-57.402	21.894	61.436	290.878	0.921
3900.000	1.579	89.803	3899.214	22.131	-55.470	22.131	59.722	291.750	0.980
4000.000	2.075	97.191	3999.163	21.909	-52.296	21.909	56.700	292.731	0.548
4100.000	1.975	107.685	4099.101	21.159	-48.858	21.159	53.243	293.416	0.384
4200.000	1.550	112.619	4199.053	20.115	-45.968	20.115	50.177	293.634	0.451
4300.000	1.267	114.774	4299.023	19.132	-43.716	19.132	47.719	293.636	0.288
4400.000	0.937	109.609	4399.004	18.394	-41.942	18.394	45.798	293.681	0.344
4500.000	0.875	117.977	4498.992	17.762	-40.498	17.762	44.222	293.682	0.146
4600.000	0.736	120.419	4598.982	17.079	-39.270	17.079	42.823	293.504	0.143
4700.000	0.619	116.877	4698.975	16.509	-38.234	16.509	41.646	293.354	0.124
4800.000	0.487	111.441	4798.970	16.109	-37.356	16.109	40.682	293.327	0.142
4900.000	0.483	136.924	4898.967	15.646	-36.673	15.646	39.871	293.105	0.214
5000.000	0.514	134.966	4998.963	15.021	-36.067	15.021	39.070	292.610	0.036
5100.000	0.316	207.601	5098.961	14.460	-35.877	14.460	38.682	291.951	0.517
5200.000	0.379	223.897	5198.959	13.978	-36.234	13.978	38.836	291.095	0.116
5300.000	0.538	246.049	5298.956	13.549	-36.892	13.549	39.301	290.167	0.235
5400.000	0.257	273.390	5398.953	13.372	-37.545	13.372	39.855	289.604	0.331
5500.000	0.715	133.928	5498.951	12.952	-37.320	12.952	39.503	289.140	0.926
5600.000	0.409	182.772	5598.947	12.163	-36.887	12.163	38.841	288.249	0.542
5700.000	0.906	187.091	5698.940	11.022	-37.002	11.022	38.609	286.588	0.499
5800.000	0.574	238.615	5798.932	9.977	-37.527	9.977	38.831	284.888	0.709
5900.000	0.634	223.759	5898.927	9.316	-38.337	9.316	39.453	283.659	0.167
6000.000	0.653	216.733	5998.921	8.461	-39.061	8.461	39.966	282.222	0.081
6100.000	0.348	293.383	6098.918	8.125	-39.680	8.125	40.503	281.572	0.665
6200.000	0.428	184.815	6198.916	7.873	-39.991	7.873	40.758	281.138	0.632
6300.000	0.483	239.346	6298.914	7.286	-40.384	7.286	41.036	280.228	0.420
6400.000	0.350	245.957	6398.911	6.947	-41.026	6.947	41.610	279.611	0.141
6500.000	0.518	244.627	6498.908	6.629	-41.713	6.629	42.237	279.030	0.168
6600.000	0.500	245.048	6598.904	6.251	-42.517	6.251	42.974	278.365	0.018
6700.000	0.462	244.315	6698.901	5.893	-43.275	5.893	43.675	277.754	0.039
6800.000	0.410	241.482	6798.898	5.547	-43.953	5.547	44.302	277.193	0.056
6900.000	0.291	260.999	6898.896	5.337	-44.518	5.337	44.837	276.836	0.167
7000.000	0.239	219.155	6998.895	5.135	-44.901	5.135	45.194	276.524	0.196
HORIZONTAL DISPLACEMENT IS 45.194 FEET AT 276.524 DEGREES									