

Company: Anadarko Petroleum Corp.

Well: HSR-Roth 6-18

API: 05-123-16869

Rig Name: Production/Coretech

State/County: Colorado/Weld

Latitude: 40.228, Longitude: -104.935

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: 1/6/2014 / 15:45

Vaughn Energy Services

Henderson, CO

303-853-4976

Levi Sheldon

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	0.257	213.935	100.000	-0.186	-0.125	-0.186	0.224	213.935	0.257
200.000	0.217	213.851	199.999	-0.529	-0.356	-0.529	0.637	213.910	0.040
300.000	0.081	191.288	299.998	-0.755	-0.475	-0.755	0.892	212.161	0.146
400.000	0.170	234.606	399.998	-0.910	-0.609	-0.910	1.095	213.815	0.124
500.000	0.142	246.378	499.998	-1.045	-0.843	-1.045	1.343	218.904	0.043
600.000	0.218	206.630	599.997	-1.264	-1.042	-1.264	1.638	219.484	0.142
700.000	0.350	217.312	699.996	-1.677	-1.312	-1.677	2.129	218.036	0.142
800.000	0.333	238.544	799.994	-2.072	-1.745	-2.072	2.709	220.108	0.127
900.000	0.369	232.280	899.993	-2.420	-2.248	-2.420	3.303	222.881	0.053
1000.000	0.451	228.699	999.990	-2.877	-2.798	-2.877	4.014	224.202	0.086
1100.000	0.509	232.552	1099.986	-3.408	-3.447	-3.408	4.847	225.330	0.066
1200.000	0.606	234.151	1199.982	-3.988	-4.229	-3.988	5.812	226.681	0.098
1300.000	0.643	231.935	1299.976	-4.643	-5.099	-4.643	6.897	227.679	0.044
1400.000	0.575	224.604	1399.970	-5.347	-5.893	-5.347	7.957	227.785	0.103
1500.000	0.651	237.103	1499.964	-6.012	-6.722	-6.012	9.019	228.192	0.153
1600.000	0.590	245.613	1599.959	-6.533	-7.668	-6.533	10.074	229.570	0.110
1700.000	0.519	240.295	1699.954	-6.971	-8.531	-6.971	11.017	230.749	0.088
1800.000	0.591	270.828	1799.949	-7.188	-9.440	-7.188	11.865	232.715	0.300
1900.000	0.745	274.580	1899.943	-7.128	-10.603	-7.128	12.777	236.088	0.160
2000.000	0.803	274.008	1999.933	-7.027	-11.950	-7.027	13.863	239.542	0.058
2100.000	0.976	270.501	2099.921	-6.971	-13.501	-6.971	15.194	242.691	0.182
2200.000	1.144	268.519	2199.904	-6.989	-15.351	-6.989	16.867	245.520	0.172
2300.000	1.192	266.844	2299.883	-7.072	-17.388	-7.072	18.771	247.866	0.059
2400.000	1.209	266.766	2399.862	-7.189	-19.480	-7.189	20.764	249.743	0.017
2500.000	1.218	265.047	2499.839	-7.341	-21.593	-7.341	22.806	251.224	0.038
2600.000	1.232	260.859	2599.816	-7.603	-23.713	-7.603	24.902	252.222	0.090
2700.000	1.238	262.304	2699.793	-7.919	-25.844	-7.919	27.030	252.965	0.032
2800.000	1.016	259.810	2799.774	-8.220	-27.787	-8.220	28.978	253.521	0.227
2900.000	0.668	275.092	2899.763	-8.325	-29.240	-8.325	30.403	254.108	0.411
3000.000	0.425	325.487	2999.759	-7.968	-30.031	-7.968	31.070	255.141	0.515
3100.000	0.557	347.167	3099.755	-7.188	-30.350	-7.188	31.189	256.675	0.225
3200.000	0.690	355.134	3199.749	-6.115	-30.508	-6.115	31.115	258.667	0.159
3300.000	0.840	344.791	3299.740	-4.807	-30.752	-4.807	31.125	261.116	0.203
3400.000	1.150	343.939	3399.725	-3.134	-31.222	-3.134	31.379	264.267	0.310

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	1.764	341.095	3499.692	-0.713	-31.999	-0.713	32.007	268.723	0.618
3600.000	1.973	343.376	3599.639	2.392	-32.990	2.392	33.076	274.148	0.221
3700.000	1.494	342.948	3699.593	5.288	-33.865	5.288	34.275	278.875	0.479
3800.000	1.219	347.814	3799.565	7.574	-34.471	7.574	35.294	282.392	0.298
3900.000	0.972	27.680	3899.548	9.365	-34.302	9.365	35.557	285.270	0.782
4000.000	0.382	38.997	3999.541	10.375	-33.698	10.375	35.259	287.112	0.603
4100.000	0.320	228.855	4099.540	10.450	-33.699	10.450	35.282	287.228	0.699
4200.000	0.581	223.470	4199.537	9.898	-34.258	9.898	35.659	286.115	0.264
4300.000	0.538	237.645	4299.532	9.279	-35.003	9.279	36.212	284.848	0.144
4400.000	0.426	310.378	4399.529	9.269	-35.682	9.269	36.867	284.561	0.578
4500.000	0.480	314.257	4499.526	9.802	-36.266	9.802	37.567	285.125	0.062
4600.000	0.643	331.119	4599.521	10.586	-36.837	10.586	38.328	286.033	0.230
4700.000	0.725	336.050	4699.514	11.655	-37.365	11.655	39.140	287.325	0.101
4800.000	0.641	343.248	4799.507	12.770	-37.783	12.770	39.882	288.674	0.120
4900.000	0.613	351.514	4899.501	13.835	-38.023	13.835	40.462	289.994	0.095
5000.000	0.478	358.440	4999.497	14.781	-38.113	14.781	40.879	291.197	0.150
5100.000	0.502	5.837	5099.493	15.634	-38.080	15.634	41.165	292.320	0.067
5200.000	0.471	1.916	5199.489	16.480	-38.022	16.480	41.440	293.433	0.045
5300.000	0.508	24.992	5299.486	17.292	-37.821	17.292	41.587	294.570	0.199
5400.000	0.659	31.890	5399.481	18.182	-37.330	18.182	41.522	295.969	0.166
5500.000	1.037	12.359	5499.470	19.554	-36.833	19.554	41.701	297.963	0.471
5600.000	1.168	8.330	5599.451	21.447	-36.491	21.447	42.327	300.443	0.153
5700.000	1.340	10.568	5699.427	23.605	-36.129	23.605	43.157	303.159	0.179
5800.000	1.366	13.280	5799.399	25.915	-35.641	25.915	44.066	306.022	0.069
5900.000	1.821	17.564	5899.360	28.590	-34.887	28.590	45.106	309.334	0.469
6000.000	1.858	43.987	5999.311	31.271	-33.282	31.271	45.668	313.216	0.841
6100.000	1.925	47.518	6099.256	33.572	-30.917	33.572	45.639	317.357	0.134
6200.000	1.976	62.040	6199.199	35.514	-28.156	35.514	45.321	321.592	0.495
6300.000	1.679	58.313	6299.148	37.092	-25.387	37.092	44.948	325.610	0.320
6400.000	0.766	73.041	6399.124	38.056	-23.502	38.056	44.728	328.303	0.958
6500.000	0.334	51.871	6499.120	38.431	-22.633	38.431	44.600	329.505	0.471
6600.000	0.309	216.811	6599.119	38.395	-22.565	38.395	44.535	329.557	0.637
6700.000	0.139	203.895	6699.118	38.069	-22.776	38.069	44.362	329.109	0.176
6800.000	0.232	230.093	6799.118	37.828	-22.980	37.828	44.261	328.721	0.124
6900.000	0.247	183.235	6899.117	37.482	-23.148	37.482	44.054	328.301	0.191
7000.000	0.274	113.327	6999.116	37.172	-22.941	37.172	43.681	328.320	0.300
7100.000	0.490	67.259	7099.114	37.243	-22.326	37.243	43.422	329.058	0.359
HORIZONTAL DISPLACEMENT IS 43.422 FEET AT 329.058 DEGREES									