

Company: Anadarko Petroleum Corp.  
 Well: HSR-Karliik 12-12A  
 API: 05-123-20311  
 Rig Name: Production/Coretech  
 Location: Weld County, Colorado  
 Latitude: 40.151, Longitude: -104.847  
 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: 10/31/2013 / 11:01

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	0.207	298.137	100.000	0.085	-0.160	0.085	0.181	298.137	0.207
200.000	0.246	324.174	199.999	0.345	-0.445	0.345	0.563	307.785	0.109
300.000	0.254	46.391	299.998	0.672	-0.410	0.672	0.787	328.618	0.329
400.000	0.061	72.195	399.998	0.841	-0.199	0.841	0.864	346.725	0.201
500.000	0.248	62.497	499.998	0.958	0.044	0.958	0.959	2.641	0.188
600.000	0.108	74.626	599.997	1.082	0.327	1.082	1.131	16.792	0.144
700.000	0.236	351.368	699.997	1.311	0.386	1.311	1.366	16.424	0.247
800.000	0.200	36.321	799.996	1.655	0.459	1.655	1.717	15.498	0.170
900.000	0.099	154.137	899.996	1.717	0.600	1.717	1.819	19.251	0.261
1000.000	0.237	317.592	999.996	1.793	0.498	1.793	1.860	15.520	0.333
1100.000	0.317	262.498	1099.995	1.909	0.084	1.909	1.911	2.511	0.266
1200.000	0.099	233.640	1199.994	1.822	-0.260	1.822	1.840	351.870	0.235
1300.000	0.391	279.916	1299.993	1.829	-0.666	1.829	1.947	339.995	0.330
1400.000	0.466	298.782	1399.990	2.084	-1.359	2.084	2.488	326.900	0.159
1500.000	0.379	292.045	1499.987	2.404	-2.021	2.404	3.141	319.940	0.100
1600.000	0.529	264.245	1599.984	2.482	-2.787	2.482	3.732	311.685	0.262
1700.000	0.710	279.537	1699.979	2.538	-3.857	2.538	4.617	303.348	0.244
1800.000	0.740	277.322	1799.971	2.723	-5.108	2.723	5.789	298.060	0.042
1900.000	0.829	287.581	1899.961	3.024	-6.438	3.024	7.113	295.157	0.166
2000.000	0.810	289.999	1999.951	3.484	-7.792	3.484	8.535	294.090	0.039
2100.000	0.829	313.041	2099.941	4.219	-8.985	4.219	9.926	295.155	0.328
2200.000	0.925	336.934	2199.930	5.456	-9.830	5.456	11.243	299.031	0.375
2300.000	1.162	339.272	2299.913	7.147	-10.505	7.147	12.706	304.229	0.241
2400.000	1.224	342.272	2399.891	9.113	-11.189	9.113	14.431	309.161	0.088
2500.000	0.967	349.579	2499.873	10.961	-11.667	10.961	16.008	313.211	0.293
2600.000	0.911	358.554	2599.860	12.585	-11.840	12.585	17.279	316.748	0.157
2700.000	1.103	339.918	2699.844	14.284	-12.191	14.284	18.779	319.522	0.377
2800.000	0.947	356.163	2799.829	16.013	-12.577	16.013	20.362	321.854	0.328
2900.000	0.796	344.787	2899.817	17.509	-12.814	17.509	21.697	323.800	0.229
3000.000	0.760	331.756	2999.808	18.763	-13.311	18.763	23.005	324.649	0.180
3100.000	0.448	337.461	3099.802	19.709	-13.774	19.709	24.045	325.051	0.317
3200.000	0.375	286.324	3199.800	20.162	-14.238	20.162	24.683	324.771	0.361
3300.000	0.299	252.818	3299.798	20.177	-14.801	20.177	25.024	323.737	0.207
3400.000	0.267	219.369	3399.797	19.920	-15.199	19.920	25.056	322.657	0.166

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	0.230	218.950	3499.796	19.583	-15.473	19.583	24.958	321.688	0.037
3600.000	0.165	164.316	3599.796	19.289	-15.560	19.289	24.782	321.108	0.190
3700.000	0.163	16.965	3699.796	19.286	-15.479	19.286	24.730	321.249	0.315
3800.000	0.052	96.807	3799.795	19.417	-15.393	19.417	24.778	321.594	0.162
3900.000	0.204	146.340	3899.795	19.263	-15.249	19.263	24.569	321.634	0.175
4000.000	0.542	200.745	3999.793	18.673	-15.318	18.673	24.152	320.637	0.455
4100.000	0.867	215.308	4099.785	17.613	-15.922	17.613	23.744	317.886	0.368
4200.000	1.467	244.030	4199.765	16.436	-17.511	16.436	24.016	313.186	0.821
4300.000	1.433	245.964	4299.733	15.366	-19.804	15.366	25.066	307.808	0.060
4400.000	1.392	243.382	4399.703	14.312	-22.031	14.312	26.272	303.009	0.076
4500.000	1.375	256.813	4499.674	13.495	-24.285	13.495	27.782	299.060	0.324
4600.000	1.254	249.247	4599.648	12.833	-26.476	12.833	29.422	295.860	0.211
4700.000	0.541	269.670	4699.635	12.443	-27.971	12.443	30.614	293.982	0.770
4800.000	0.515	45.316	4799.633	12.756	-28.123	12.756	30.881	294.399	0.978
4900.000	0.812	83.968	4899.627	13.147	-27.099	13.147	30.120	295.881	0.521
5000.000	1.163	86.760	4999.612	13.279	-25.381	13.279	28.645	297.618	0.354
5100.000	1.758	104.693	5099.579	12.947	-22.884	12.947	26.293	299.500	0.743
5200.000	2.008	105.301	5199.525	12.096	-19.710	12.096	23.126	301.537	0.251
5300.000	3.245	104.034	5299.418	10.947	-15.275	10.947	18.792	305.629	1.238
5400.000	4.231	106.465	5399.204	9.215	-8.991	9.215	12.875	315.706	0.999
5500.000	4.792	103.091	5498.894	7.224	-1.385	7.224	7.355	349.146	0.620
5600.000	5.697	98.804	5598.475	5.518	7.588	5.518	9.382	53.973	0.986
5700.000	6.230	95.410	5697.934	4.247	17.894	4.247	18.391	76.648	0.639
5800.000	7.109	88.368	5797.258	3.912	29.481	3.912	29.740	82.442	1.199
5900.000	9.008	86.350	5896.266	4.586	43.480	4.586	43.722	83.979	1.919
6000.000	10.949	86.473	5994.749	5.669	60.773	5.669	61.037	84.671	1.941
6100.000	11.659	88.960	6092.809	6.436	80.355	6.436	80.612	85.420	0.862
6200.000	12.586	90.089	6190.578	6.603	101.353	6.603	101.568	86.273	0.956
6300.000	12.733	87.156	6288.148	7.133	123.256	7.133	123.462	86.688	0.659
6400.000	11.934	84.506	6385.840	8.670	144.556	8.670	144.815	86.568	0.979
6500.000	11.860	89.064	6483.694	9.828	165.123	9.828	165.415	86.594	0.942
6600.000	11.588	91.037	6581.608	9.814	185.440	9.814	185.700	86.971	0.484
6700.000	9.457	95.336	6679.922	8.868	203.665	8.868	203.858	87.507	2.270
6800.000	8.417	98.603	6778.707	7.009	219.082	7.009	219.194	88.168	1.157
6900.000	6.131	95.948	6877.896	5.360	231.632	5.360	231.694	88.674	2.310
7000.000	4.780	102.794	6977.442	3.884	241.008	3.884	241.039	89.077	1.497
7100.000	2.660	100.763	7077.225	2.528	247.351	2.528	247.364	89.414	2.124
7200.000	1.387	91.083	7177.161	2.072	250.841	2.072	250.849	89.527	1.314
7300.000	1.539	97.143	7277.129	1.882	253.383	1.882	253.390	89.574	0.217
7400.000	1.394	103.870	7377.096	1.423	255.897	1.423	255.901	89.681	0.225
7500.000	1.062	111.184	7477.073	0.797	257.942	0.797	257.944	89.823	0.367
7600.000	0.743	119.260	7577.060	0.145	259.372	0.145	259.372	89.968	0.342
7700.000	0.842	100.305	7677.051	-0.303	260.661	-0.303	260.661	90.067	0.279

HORIZONTAL DISPLACEMENT IS  
260.661 FEET AT 90.067 DEGREES