

Company: Anadarko Petroleum Corp.
 Well: HSR-Spilman 9-35
 API: 05-123-17025
 Rig Name: Production/Warrior
 Location: Weld County, Colorado
 Latitude: 40.266, Longitude: -104.737
 Directions are relative to True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hagyro-de_01_mrg.ut

Minimum Curvature Method

Report Date/Time: 4/11/2014 / 13:06

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	0.259	46.781	100.000	0.155	0.165	0.155	0.226	46.781	0.259
200.000	0.179	126.863	199.999	0.216	0.455	0.216	0.504	64.614	0.289
300.000	0.221	264.548	299.999	0.104	0.388	0.104	0.402	75.055	0.374
400.000	0.309	186.703	399.998	-0.182	0.165	-0.182	0.246	137.868	0.340
500.000	0.431	259.435	499.996	-0.519	-0.237	-0.519	0.571	204.495	0.450
600.000	0.135	106.450	599.996	-0.622	-0.494	-0.622	0.794	218.457	0.555
700.000	0.589	248.231	699.994	-0.846	-0.858	-0.846	1.205	225.417	0.700
800.000	0.183	186.441	799.992	-1.195	-1.353	-1.195	1.805	228.563	0.528
900.000	0.476	308.560	899.991	-1.094	-1.696	-1.094	2.018	237.182	0.594
1000.000	0.504	281.988	999.987	-0.743	-2.451	-0.743	2.561	253.129	0.227
1100.000	0.226	297.716	1099.985	-0.560	-3.056	-0.560	3.107	259.613	0.293
1200.000	0.675	233.206	1199.982	-0.821	-3.703	-0.821	3.792	257.498	0.612
1300.000	0.252	319.289	1299.980	-1.007	-4.317	-1.007	4.433	256.870	0.704
1400.000	0.845	289.594	1399.975	-0.593	-5.155	-0.593	5.189	263.436	0.639
1500.000	0.561	328.004	1499.968	0.070	-6.110	0.070	6.110	270.653	0.535
1600.000	0.957	307.513	1599.959	0.993	-7.032	0.993	7.101	278.042	0.473
1700.000	0.999	276.614	1699.945	1.602	-8.560	1.602	8.708	280.602	0.522
1800.000	1.374	313.798	1799.925	2.532	-10.291	2.532	10.598	283.825	0.836
1900.000	1.797	303.493	1899.886	4.228	-12.464	4.228	13.161	288.736	0.508
2000.000	1.455	308.243	1999.846	5.879	-14.769	5.879	15.896	291.705	0.367
2100.000	1.576	298.863	2099.811	7.328	-16.970	7.328	18.485	293.357	0.275
2200.000	1.562	334.776	2199.776	9.226	-18.755	9.226	20.902	296.192	0.967
2300.000	0.636	315.311	2299.757	10.853	-19.727	10.853	22.515	298.819	0.986
2400.000	0.715	355.524	2399.750	11.869	-20.165	11.869	23.399	300.481	0.470
2500.000	0.393	346.865	2499.746	12.825	-20.292	12.825	24.005	302.294	0.332
2600.000	0.249	164.464	2599.745	12.950	-20.312	12.950	24.088	302.519	0.641
2700.000	0.175	190.828	2699.744	12.590	-20.282	12.590	23.872	301.830	0.120
2800.000	0.454	81.203	2799.743	12.500	-19.920	12.500	23.517	302.109	0.539
2900.000	0.820	348.050	2899.739	13.261	-19.677	13.261	23.728	303.978	0.959
3000.000	0.955	2.395	2999.727	14.794	-19.790	14.794	24.709	306.780	0.259
3100.000	0.654	10.411	3099.717	16.188	-19.652	16.188	25.461	309.479	0.320
3200.000	1.171	323.416	3199.705	17.570	-20.158	17.570	26.740	311.076	0.868
3300.000	1.370	341.029	3299.681	19.521	-21.155	19.521	28.786	312.699	0.436
3400.000	1.359	317.015	3399.654	21.519	-22.353	21.519	31.027	313.911	0.568

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	1.549	314.822	3499.621	23.339	-24.120	23.339	33.563	314.058	0.197
3600.000	1.444	302.923	3599.587	24.977	-26.136	24.977	36.152	313.700	0.327
3700.000	1.511	300.131	3699.554	26.324	-28.335	26.324	38.676	312.893	0.098
3800.000	1.522	317.436	3799.520	27.964	-30.374	27.964	41.286	312.635	0.456
3900.000	1.591	304.983	3899.483	29.738	-32.410	29.738	43.986	312.539	0.345
4000.000	1.936	291.664	3999.436	31.158	-35.117	31.158	46.947	311.581	0.533
4100.000	2.289	310.879	4099.369	33.088	-38.196	33.088	50.535	310.901	0.786
4200.000	1.666	320.173	4199.309	35.511	-40.637	35.511	53.966	311.149	0.699
4300.000	1.971	328.551	4299.259	38.095	-42.465	38.095	57.048	311.895	0.404
4400.000	2.268	308.710	4399.192	40.800	-44.906	40.800	60.673	312.257	0.787
4500.000	1.885	321.387	4499.127	43.322	-47.477	43.322	64.271	312.380	0.596
4600.000	1.966	310.498	4599.070	45.720	-49.807	45.720	67.610	312.550	0.374
4700.000	1.711	290.956	4699.020	47.368	-52.506	47.368	70.715	312.055	0.672
4800.000	2.612	281.622	4798.948	48.361	-56.132	48.361	74.092	310.747	0.964
4900.000	3.597	279.324	4898.800	49.329	-61.460	49.329	78.808	308.751	0.993
5000.000	3.456	268.133	4998.612	49.739	-67.568	49.739	83.901	306.358	0.702
5100.000	2.577	271.375	5098.472	49.695	-72.828	49.695	88.168	304.308	0.895
5200.000	1.639	277.338	5198.404	49.931	-76.494	49.931	91.348	303.134	0.962
5300.000	0.985	259.917	5298.377	49.963	-78.759	49.963	93.270	302.390	0.759
5400.000	0.331	196.009	5398.371	49.536	-79.685	49.536	93.827	301.867	0.890
5500.000	0.161	178.195	5498.370	49.118	-79.760	49.118	93.671	301.626	0.184
5600.000	0.286	194.598	5598.369	48.736	-79.818	48.736	93.521	301.408	0.139
5700.000	0.119	283.230	5698.369	48.518	-79.983	48.518	93.548	301.241	0.307
5800.000	0.330	250.382	5798.368	48.445	-80.355	48.445	93.829	301.085	0.239
5900.000	0.102	211.007	5898.367	48.272	-80.672	48.272	94.012	300.895	0.259
6000.000	0.330	253.972	5998.367	48.117	-80.994	48.117	94.209	300.713	0.264
6100.000	0.325	215.438	6098.365	47.806	-81.435	47.806	94.431	300.415	0.216
6200.000	0.327	120.390	6198.364	47.431	-81.353	47.431	94.171	300.243	0.481
6300.000	0.459	88.136	6298.362	47.300	-80.707	47.300	93.546	300.373	0.253
6400.000	0.328	95.034	6398.359	47.288	-80.021	47.288	92.949	300.581	0.140
6500.000	0.529	135.451	6498.357	46.934	-79.412	46.934	92.245	300.584	0.351
6600.000	0.311	147.599	6598.354	46.376	-78.943	46.376	91.558	300.433	0.234
6700.000	0.187	100.987	6698.353	46.116	-78.638	46.116	91.163	300.389	0.228
6800.000	0.049	202.509	6798.353	46.046	-78.495	46.046	91.004	300.396	0.202
6900.000	0.146	140.709	6898.353	45.907	-78.431	45.907	90.878	300.341	0.131
7000.000	0.201	95.261	6998.352	45.792	-78.175	45.792	90.599	300.360	0.143
7100.000	0.291	79.698	7098.352	45.821	-77.750	45.821	90.248	300.513	0.112
7200.000	0.233	86.650	7198.350	45.879	-77.297	45.879	89.887	300.691	0.066
7250.000	0.419	114.683	7248.350	45.808	-77.030	45.808	89.621	300.739	0.479
HORIZONTAL DISPLACEMENT IS 89.621 FEET AT 300.739 DEGREES									