



Company: Anadarko Petroleum  
 Well: HSR Harmon 12-36  
 API #: 05-123-15276  
 Rig Name: Production/CoreTech  
 State/County: Colorado/Weld  
 Latitude: 40.267, Longitude: -104.733  
 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: survey\_7150-de\_01.ut

Minimum Curvature Method

Report Date/Time: 1/22/2014 / 16:09

Vaughn Energy Services  
 Henderson, Colorado  
 866-835-8333  
 Randy Holcomb

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	0.501	23.793	99.999	0.400	0.176	0.400	0.437	23.793	0.501
200.000	0.395	330.566	199.996	1.100	0.184	1.100	1.116	9.469	0.412
300.000	0.330	18.319	299.994	1.674	0.105	1.674	1.677	3.581	0.299
400.000	0.368	315.477	399.993	2.177	-0.030	2.177	2.177	359.206	0.366
500.000	0.139	231.585	499.992	2.331	-0.350	2.331	2.357	351.450	0.380
600.000	0.480	241.203	599.990	2.054	-0.812	2.054	2.209	338.426	0.344
700.000	0.574	223.882	699.986	1.491	-1.526	1.491	2.134	314.343	0.184
800.000	0.576	261.022	799.981	1.052	-2.369	1.052	2.592	293.947	0.366
900.000	0.450	215.974	899.978	0.656	-3.096	0.656	3.165	281.957	0.410
1000.000	0.368	194.240	999.975	0.027	-3.406	0.027	3.406	270.448	0.174
1100.000	0.489	258.071	1099.973	-0.373	-3.903	-0.373	3.920	264.546	0.465
1200.000	0.547	209.863	1199.969	-0.875	-4.558	-0.875	4.641	259.137	0.426
1300.000	0.500	217.834	1299.965	-1.633	-5.063	-1.633	5.320	252.121	0.086
1400.000	0.318	256.680	1399.963	-2.042	-5.601	-2.042	5.962	249.969	0.322
1500.000	0.459	243.701	1499.961	-2.283	-6.230	-2.283	6.635	249.872	0.165
1600.000	0.881	252.863	1599.953	-2.687	-7.324	-2.687	7.801	249.850	0.435
1700.000	0.923	257.002	1699.941	-3.095	-8.844	-3.095	9.370	250.711	0.078
1800.000	0.659	249.629	1799.931	-3.476	-10.168	-3.476	10.745	251.124	0.283
1900.000	0.928	257.082	1899.922	-3.857	-11.495	-3.857	12.125	251.450	0.288
2000.000	0.965	265.455	1999.908	-4.105	-13.124	-4.105	13.751	252.630	0.143
2100.000	0.873	277.367	2099.895	-4.074	-14.718	-4.074	15.272	254.527	0.211
2200.000	0.765	272.252	2199.885	-3.950	-16.141	-3.950	16.617	256.248	0.130
2300.000	0.886	283.791	2299.875	-3.740	-17.559	-3.740	17.953	257.977	0.205
2400.000	1.160	298.631	2399.859	-3.070	-19.199	-3.070	19.443	260.914	0.379
2500.000	1.162	303.208	2499.839	-2.030	-20.936	-2.030	21.034	264.462	0.093
2600.000	1.040	301.646	2599.820	-0.998	-22.557	-0.998	22.579	267.466	0.126
2700.000	0.616	314.600	2699.809	-0.145	-23.712	-0.145	23.713	269.650	0.460
2800.000	0.837	302.345	2799.801	0.623	-24.712	0.623	24.720	271.445	0.268
2900.000	0.822	287.471	2899.791	1.229	-26.012	1.229	26.042	272.705	0.215
3000.000	0.884	292.626	2999.780	1.741	-27.409	1.741	27.464	273.635	0.099
3100.000	1.015	285.616	3099.766	2.276	-28.974	2.276	29.063	274.492	0.175
3200.000	0.897	279.137	3199.752	2.639	-30.600	2.639	30.714	274.930	0.160
3300.000	1.307	275.313	3299.734	2.869	-32.509	2.869	32.636	275.044	0.416
3400.000	1.575	276.754	3399.702	3.137	-35.010	3.137	35.150	275.119	0.270

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	1.275	274.494	3499.671	3.385	-37.484	3.385	37.637	275.161	0.305
3600.000	1.451	274.935	3599.643	3.582	-39.855	3.582	40.016	275.135	0.177
3700.000	1.480	254.699	3699.611	3.350	-42.362	3.350	42.494	274.521	0.516
3800.000	1.444	242.931	3799.578	2.436	-44.730	2.436	44.796	273.117	0.302
3900.000	1.312	238.881	3899.549	1.270	-46.832	1.270	46.849	271.554	0.164
4000.000	1.330	247.536	3999.523	0.235	-48.885	0.235	48.886	270.275	0.200
4100.000	1.053	254.503	4099.501	-0.454	-50.843	-0.454	50.845	269.488	0.312
4200.000	0.184	265.847	4199.494	-0.711	-51.889	-0.711	51.894	269.215	0.873
4300.000	0.223	278.994	4299.494	-0.692	-52.242	-0.692	52.247	269.241	0.060
4400.000	0.429	332.627	4399.492	-0.329	-52.606	-0.329	52.607	269.641	0.347
4500.000	0.573	329.068	4499.488	0.432	-53.036	0.432	53.037	270.467	0.147
4600.000	0.728	325.779	4599.482	1.386	-53.650	1.386	53.668	271.480	0.159
4700.000	0.943	321.828	4699.471	2.558	-54.516	2.558	54.576	272.687	0.223
4800.000	1.057	320.849	4799.456	3.920	-55.607	3.920	55.745	274.033	0.115
4900.000	1.229	316.851	4899.436	5.418	-56.922	5.418	57.179	275.437	0.190
5000.000	1.246	309.270	4999.413	6.888	-58.497	6.888	58.901	276.716	0.165
5100.000	1.230	297.373	5099.390	8.070	-60.292	8.070	60.830	277.624	0.257
5200.000	1.137	287.630	5199.368	8.864	-62.191	8.864	62.819	278.112	0.221
5300.000	1.123	278.857	5299.349	9.316	-64.105	9.316	64.779	278.268	0.173
5400.000	1.054	273.700	5399.331	9.526	-65.991	9.526	66.675	278.214	0.120
5500.000	1.121	264.546	5499.313	9.492	-67.883	9.492	68.543	277.960	0.186
5600.000	0.987	262.485	5599.296	9.287	-69.710	9.287	70.326	277.588	0.140
5700.000	0.982	254.545	5699.281	8.946	-71.390	8.946	71.948	277.142	0.136
5800.000	0.994	207.429	5799.268	7.948	-72.615	7.948	73.049	276.246	0.790
5900.000	0.903	261.925	5899.256	7.068	-73.794	7.068	74.132	275.471	0.872
6000.000	0.887	254.774	5999.244	6.754	-75.321	6.754	75.623	275.124	0.113
6100.000	0.834	247.443	6099.233	6.271	-76.740	6.271	76.996	274.672	0.122
6200.000	0.768	246.871	6199.223	5.729	-78.029	5.729	78.239	274.199	0.066
6300.000	0.825	245.889	6299.213	5.171	-79.302	5.171	79.471	273.731	0.058
6400.000	0.760	259.397	6399.204	4.755	-80.611	4.755	80.751	273.376	0.197
6500.000	0.857	255.120	6499.194	4.441	-81.985	4.441	82.105	273.101	0.114
6600.000	0.863	260.609	6599.183	4.126	-83.451	4.126	83.553	272.831	0.083
6700.000	0.828	251.419	6699.172	3.773	-84.878	3.773	84.962	272.545	0.140
6800.000	0.950	258.552	6799.160	3.378	-86.376	3.378	86.442	272.240	0.164
6900.000	1.025	259.515	6899.145	3.051	-88.068	3.051	88.120	271.984	0.077
7000.000	0.824	245.630	6999.132	2.592	-89.602	2.592	89.640	271.657	0.299
7100.000	0.482	225.524	7099.126	2.000	-90.558	2.000	90.580	271.265	0.407
7150.000	0.320	204.428	7149.124	1.726	-90.765	1.726	90.782	271.089	0.433

HORIZONTAL DISPLACEMENT IS  
90.782 FEET AT 271.089 DEGREES