

Company: Anadarko Petroleum

Well: HSR-Irwin 4-1A

API#: 05-123-15147

Rig Name: Production / VES

State/County: Colorado/Weld

Latitude: 40.259, Longitude: -104.732

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_7150-de_01.ut

Minimum Curvature Method

Report Date/Time: 1/31/2014 / 15:59

Vaughn Energy Services

Henderson, Colorado

866-835-8333

Brian Brewbaker

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	0.143	63.038	100.000	0.056	0.111	0.056	0.124	63.038	0.143
200.000	0.076	164.564	200.000	0.049	0.240	0.049	0.244	78.492	0.175
300.000	0.078	358.799	300.000	0.052	0.256	0.052	0.261	78.438	0.153
400.000	0.162	58.879	400.000	0.193	0.376	0.193	0.422	62.785	0.141
500.000	0.172	34.346	499.999	0.391	0.582	0.391	0.701	56.122	0.072
600.000	0.353	33.371	599.998	0.772	0.836	0.772	1.138	47.278	0.181
700.000	0.522	37.546	699.995	1.391	1.283	1.391	1.892	42.700	0.172
800.000	0.482	28.596	799.991	2.121	1.762	2.121	2.758	39.718	0.088
900.000	0.683	39.848	899.986	2.948	2.345	2.948	3.767	38.504	0.230
1000.000	0.490	44.325	999.981	3.711	3.026	3.711	4.789	39.191	0.197
1100.000	0.748	53.360	1099.975	4.407	3.849	4.407	5.851	41.131	0.275
1200.000	0.724	55.169	1199.967	5.158	4.892	5.158	7.109	43.483	0.033
1300.000	0.973	56.002	1299.956	5.994	6.115	5.994	8.563	45.572	0.249
1400.000	0.783	59.127	1399.944	6.820	7.406	6.820	10.067	47.359	0.196
1500.000	1.019	57.371	1499.931	7.650	8.741	7.650	11.616	48.809	0.238
1600.000	0.991	57.605	1599.916	8.593	10.220	8.593	13.352	49.945	0.029
1700.000	0.763	67.718	1699.904	9.308	11.566	9.308	14.847	51.174	0.275
1800.000	0.797	86.682	1799.895	9.601	12.876	9.601	16.062	53.291	0.259
1900.000	0.599	127.294	1899.888	9.324	13.987	9.324	16.810	56.310	0.519
2000.000	0.403	128.652	1999.884	8.788	14.677	8.788	17.107	59.088	0.197
2100.000	0.507	165.200	2099.881	8.141	15.064	8.141	17.123	61.614	0.302
2200.000	0.752	174.767	2199.875	7.059	15.237	7.059	16.793	65.143	0.266
2300.000	0.782	201.100	2299.867	5.769	15.051	5.769	16.119	69.030	0.351
2400.000	0.904	221.070	2399.856	4.537	14.287	4.537	14.990	72.383	0.316
2500.000	1.015	246.686	2499.842	3.592	12.956	3.592	13.444	74.506	0.439
2600.000	1.048	263.421	2599.827	3.136	11.234	3.136	11.663	74.402	0.302
2700.000	1.086	269.585	2699.809	3.025	9.378	3.025	9.854	72.125	0.121
2800.000	1.207	277.855	2799.789	3.162	7.388	3.162	8.036	66.830	0.205
2900.000	1.170	260.675	2899.768	3.140	5.337	3.140	6.192	59.528	0.357
3000.000	1.513	271.720	2999.741	3.014	3.010	3.014	4.260	44.960	0.428
3100.000	1.467	271.005	3099.707	3.077	0.411	3.077	3.104	7.608	0.050
3200.000	1.535	279.647	3199.673	3.323	-2.189	3.323	3.980	326.629	0.236
3300.000	1.709	282.487	3299.633	3.870	-4.965	3.870	6.295	307.937	0.192
3400.000	2.096	291.682	3399.578	4.868	-8.120	4.868	9.467	300.944	0.491

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	2.008	287.059	3499.513	6.058	-11.494	6.058	12.992	297.791	0.187
3600.000	2.045	291.315	3599.451	7.220	-14.831	7.220	16.495	295.958	0.155
3700.000	2.056	293.377	3699.387	8.580	-18.139	8.580	20.066	295.315	0.075
3800.000	2.331	298.890	3799.314	10.274	-21.566	10.274	23.888	295.474	0.346
3900.000	2.123	299.838	3899.238	12.178	-24.953	12.178	27.766	296.015	0.211
4000.000	2.267	297.825	3999.165	14.023	-28.309	14.023	31.592	296.352	0.163
4100.000	2.225	285.913	4099.089	15.478	-31.924	15.478	35.479	295.866	0.468
4200.000	2.048	285.124	4199.019	16.477	-35.516	16.477	39.152	294.888	0.179
4300.000	2.252	274.690	4298.949	17.104	-39.199	17.104	42.768	293.573	0.441
4400.000	2.274	276.726	4398.871	17.497	-43.128	17.497	46.542	292.082	0.083
4500.000	2.461	274.109	4498.786	17.883	-47.240	17.883	50.512	290.734	0.216
4600.000	2.379	281.302	4598.697	18.443	-51.417	18.443	54.624	289.733	0.314
4700.000	2.504	286.802	4698.606	19.481	-55.542	19.481	58.860	289.328	0.265
4800.000	2.038	308.944	4798.529	21.230	-59.016	21.230	62.719	289.786	0.984
4900.000	2.188	316.011	4898.461	23.721	-61.724	23.721	66.126	291.022	0.300
5000.000	1.642	305.761	4998.405	25.932	-64.213	25.932	69.251	291.991	0.642
5100.000	1.614	303.009	5098.365	27.536	-66.557	27.536	72.028	292.476	0.083
5200.000	1.469	305.574	5198.329	29.049	-68.780	29.049	74.663	292.897	0.161
5300.000	1.440	305.243	5298.297	30.520	-70.849	30.520	77.142	293.305	0.030
5400.000	1.074	294.725	5398.272	31.637	-72.726	31.637	79.309	293.510	0.431
5500.000	0.927	299.310	5498.257	32.424	-74.282	32.424	81.050	293.581	0.167
5600.000	0.991	311.357	5598.243	33.392	-75.637	33.392	82.680	293.820	0.211
5700.000	0.911	310.889	5698.229	34.484	-76.887	34.484	84.266	294.156	0.081
5800.000	0.745	319.278	5798.219	35.497	-77.912	35.497	85.618	294.494	0.206
5900.000	1.035	310.430	5898.207	36.575	-79.024	36.575	87.078	294.837	0.320
6000.000	0.799	288.411	5998.194	37.381	-80.372	37.381	88.640	294.943	0.420
6100.000	0.574	300.417	6098.187	37.855	-81.466	37.855	89.831	294.923	0.265
6200.000	0.547	270.187	6198.183	38.110	-82.375	38.110	90.764	294.827	0.294
6300.000	0.451	259.049	6298.179	38.037	-83.240	38.037	91.519	294.558	0.136
6400.000	0.174	283.540	6398.177	37.998	-83.774	37.998	91.989	294.398	0.301
6500.000	0.264	28.342	6498.177	38.236	-83.812	38.236	92.122	294.523	0.352
6600.000	0.505	38.164	6598.175	38.785	-83.431	38.785	92.005	294.933	0.249
6700.000	0.412	95.625	6698.172	39.097	-82.801	39.097	91.567	295.276	0.448
6800.000	0.436	124.839	6798.169	38.844	-82.131	38.844	90.854	295.312	0.215
6900.000	0.288	73.586	6898.167	38.698	-81.577	38.698	90.290	295.378	0.341
7000.000	0.329	161.928	6998.166	38.496	-81.247	38.496	89.905	295.352	0.431
7100.000	0.171	162.166	7098.165	38.081	-81.112	38.081	89.606	295.149	0.158
7150.000	0.389	134.263	7148.165	37.891	-80.968	37.891	89.395	295.079	0.502

HORIZONTAL DISPLACEMENT IS
89.395 FEET AT 295.079 DEGREES