



Company: PDC Energy
Well: Buffalo Garden #31-13
API: 05-123-21561
Rig Name: Production / VESSI
State/County: Colorado/Weld
Latitude: 40.144, Longitude: -104.949
Directions are relative to True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hagyar-de_01.ut
Minimum Curvature Method
Report Date/Time: 11/4/2014 / 13:08

VES Survey International
Henderson, Colorado
303-853-4976
Kevin McDowell

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	0.841	157.310	99.996	-0.677	0.283	-0.677	0.734	157.310	0.841
200.000	0.789	163.158	199.986	-2.012	0.765	-2.012	2.153	159.176	0.098
300.000	0.671	179.486	299.978	-3.257	0.970	-3.257	3.398	163.413	0.238
400.000	0.845	170.195	399.970	-4.569	1.101	-4.569	4.700	166.453	0.212
500.000	0.731	200.236	499.960	-5.894	1.006	-5.894	5.979	170.317	0.423
600.000	1.095	198.556	599.948	-7.398	0.481	-7.398	7.414	176.280	0.364
700.000	1.501	223.380	699.923	-9.256	-0.722	-9.256	9.284	184.462	0.684
800.000	1.734	211.578	799.883	-11.496	-2.414	-11.496	11.747	191.858	0.406
900.000	1.732	213.522	899.837	-14.045	-4.041	-14.045	14.615	196.050	0.059
1000.000	1.652	220.471	999.794	-16.402	-5.811	-16.402	17.400	199.509	0.220
1100.000	1.551	225.736	1099.755	-18.443	-7.716	-18.443	19.992	202.703	0.179
1200.000	1.519	227.442	1199.719	-20.284	-9.662	-20.284	22.468	205.469	0.056
1300.000	1.550	234.039	1299.683	-21.975	-11.733	-21.975	24.911	208.099	0.179
1400.000	1.177	241.163	1399.655	-23.265	-13.727	-23.265	27.013	210.543	0.409
1500.000	1.237	249.797	1499.632	-24.133	-15.640	-24.133	28.758	212.946	0.191
1600.000	1.081	265.734	1599.612	-24.576	-17.593	-24.576	30.224	215.598	0.357
1700.000	1.255	287.511	1699.592	-24.316	-19.578	-24.316	31.218	218.839	0.473
1800.000	1.269	298.717	1799.568	-23.455	-21.594	-23.455	31.881	222.635	0.247
1900.000	1.502	297.270	1899.538	-22.322	-23.730	-22.322	32.579	226.750	0.235
2000.000	1.570	284.134	1999.503	-21.387	-26.223	-21.387	33.839	230.799	0.358
2100.000	1.724	268.432	2099.462	-21.094	-29.054	-21.094	35.904	234.020	0.475
2200.000	1.301	253.015	2199.427	-21.467	-31.643	-21.467	38.238	235.847	0.583
2300.000	1.205	264.407	2299.404	-21.901	-33.775	-21.901	40.254	237.039	0.266
2400.000	1.121	274.422	2399.383	-21.928	-35.797	-21.928	41.979	238.510	0.219
2500.000	1.233	267.525	2499.362	-21.899	-37.847	-21.899	43.726	239.946	0.180
2600.000	1.057	259.797	2599.342	-22.109	-39.830	-22.109	45.555	240.966	0.234
2700.000	1.013	258.743	2699.326	-22.445	-41.604	-22.445	47.273	241.654	0.048
2800.000	0.965	256.162	2799.311	-22.819	-43.289	-22.819	48.935	242.205	0.065
2900.000	0.823	244.946	2899.299	-23.324	-44.758	-23.324	50.470	242.475	0.225
3000.000	0.911	234.465	2999.287	-24.090	-46.055	-24.090	51.975	242.387	0.181
3100.000	0.751	215.557	3099.277	-25.086	-47.083	-25.086	53.349	241.952	0.315
3200.000	0.963	238.134	3199.266	-26.063	-48.178	-26.063	54.776	241.588	0.395
3300.000	1.080	246.146	3299.250	-26.888	-49.754	-26.888	56.554	241.613	0.184
3400.000	0.841	248.384	3399.236	-27.539	-51.298	-27.539	58.223	241.771	0.241
3500.000	0.959	263.402	3499.224	-27.906	-52.812	-27.906	59.731	242.148	0.263

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
3600.000	0.905	245.383	3599.211	-28.331	-54.361	-28.331	61.300	242.473	0.297
3700.000	0.880	243.135	3699.199	-29.007	-55.764	-29.007	62.857	242.518	0.043
3800.000	1.161	230.628	3799.183	-29.997	-57.233	-29.997	64.617	242.340	0.357
3900.000	1.499	240.897	3899.156	-31.276	-59.159	-31.276	66.917	242.136	0.412
4000.000	2.119	240.341	3999.106	-32.826	-61.907	-32.826	70.072	242.065	0.620
4100.000	3.018	241.547	4099.004	-34.995	-65.829	-34.995	74.553	242.004	0.901
4200.000	2.847	243.738	4198.873	-37.349	-70.371	-37.349	79.668	242.043	0.205
4300.000	2.097	242.325	4298.779	-39.297	-74.218	-39.297	83.979	242.100	0.753
4400.000	2.010	244.910	4398.715	-40.890	-77.426	-40.890	87.561	242.160	0.127
4500.000	2.110	246.837	4498.651	-42.358	-80.707	-42.358	91.148	242.308	0.122
4600.000	1.666	249.750	4598.596	-43.586	-83.764	-43.586	94.425	242.510	0.455
4700.000	1.382	272.550	4698.561	-44.035	-86.333	-44.035	96.914	242.975	0.663
4800.000	1.370	295.920	4798.533	-43.459	-88.612	-43.459	98.696	243.875	0.557
4900.000	0.897	300.095	4898.514	-42.544	-90.364	-42.544	99.879	244.788	0.480
5000.000	1.054	312.940	4998.499	-41.526	-91.715	-41.526	100.677	245.640	0.268
5100.000	0.912	306.721	5098.485	-40.423	-93.026	-40.423	101.429	246.513	0.177
5200.000	0.822	283.564	5198.473	-39.779	-94.361	-39.779	102.403	247.141	0.359
5300.000	0.410	308.919	5298.468	-39.386	-95.337	-39.386	103.153	247.553	0.484
5400.000	0.768	286.968	5398.462	-38.965	-96.257	-38.965	103.844	247.961	0.416
5500.000	0.674	313.272	5498.455	-38.367	-97.326	-38.367	104.615	248.485	0.340
5600.000	0.737	281.819	5598.447	-37.832	-98.384	-37.832	105.407	248.967	0.387
5700.000	0.688	332.080	5698.441	-37.170	-99.294	-37.170	106.023	249.477	0.607
5800.000	0.865	299.331	5798.432	-36.270	-100.233	-36.270	106.593	250.107	0.470
5900.000	0.955	335.906	5898.420	-35.139	-101.231	-35.139	107.156	250.857	0.577
6000.000	0.920	335.293	5998.407	-33.650	-101.907	-33.650	107.319	251.727	0.037
6100.000	0.893	310.197	6098.394	-32.418	-102.838	-32.418	107.826	252.504	0.395
6200.000	0.960	295.828	6198.382	-31.549	-104.187	-31.549	108.859	253.153	0.241
6300.000	1.051	310.460	6298.366	-30.589	-105.639	-30.589	109.979	253.851	0.272
6400.000	0.471	307.349	6398.357	-29.745	-106.664	-29.745	110.733	254.418	0.582
6500.000	0.674	293.832	6498.352	-29.258	-107.528	-29.258	111.438	254.779	0.243
6600.000	0.771	299.746	6598.344	-28.686	-108.651	-28.686	112.374	255.210	0.122
6700.000	0.249	292.356	6698.340	-28.269	-109.436	-28.269	113.029	255.516	0.525
6800.000	0.144	354.367	6798.339	-28.062	-109.650	-28.062	113.183	255.645	0.221
6900.000	0.375	328.205	6898.338	-27.658	-109.835	-27.658	113.263	255.866	0.254
7000.000	0.631	301.569	6998.334	-27.092	-110.476	-27.092	113.749	256.222	0.340
7100.000	0.462	299.289	7098.330	-26.606	-111.297	-26.606	114.433	256.555	0.170
7200.000	0.696	324.242	7198.325	-25.916	-112.004	-25.916	114.963	256.972	0.339
7300.000	0.501	66.493	7298.321	-25.248	-111.958	-25.248	114.770	257.292	0.940
7400.000	0.337	120.019	7398.319	-25.221	-111.302	-25.221	114.124	257.232	0.405
7500.000	0.534	32.264	7498.317	-24.974	-110.799	-24.974	113.579	257.298	0.620
7600.000	0.762	32.752	7598.311	-24.021	-110.191	-24.021	112.779	257.702	0.228
7700.000	0.803	327.359	7698.303	-22.872	-110.209	-22.872	112.557	258.276	0.846
HORIZONTAL DISPLACEMENT IS 112.557 FEET AT 258.276 DEGREES									