



Company: PDC Energy
 Well: Guttersen 33-8
 API: 05-123-26315
 Rig Name: Production/VES
 Location: Weld County, Colorado
 Latitude: 40.238, Longitude: -104.459
 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: hgyro-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 7/29/2014 / 14:04

VES Survey International
 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	0.204	136.628	100.000	-0.130	0.122	-0.130	0.178	136.628	0.204
200.000	0.033	290.907	200.000	-0.249	0.218	-0.249	0.331	138.793	0.234
300.000	0.042	31.404	300.000	-0.207	0.210	-0.207	0.295	134.605	0.058
400.000	0.073	85.630	400.000	-0.171	0.293	-0.171	0.339	120.254	0.060
500.000	0.212	82.368	499.999	-0.142	0.540	-0.142	0.558	104.686	0.138
600.000	0.653	99.824	599.996	-0.214	1.284	-0.214	1.302	99.469	0.455
700.000	0.948	122.204	699.987	-0.752	2.545	-0.752	2.654	106.464	0.425
800.000	1.023	131.990	799.972	-1.791	3.909	-1.791	4.300	114.610	0.184
900.000	1.129	142.004	899.954	-3.164	5.179	-3.164	6.069	121.422	0.215
1000.000	1.078	145.940	999.936	-4.720	6.313	-4.720	7.882	126.785	0.091
1100.000	1.085	141.931	1099.918	-6.245	7.424	-6.245	9.701	130.072	0.076
1200.000	1.077	143.926	1199.900	-7.750	8.561	-7.750	11.548	132.154	0.039
1300.000	0.999	138.136	1299.884	-9.159	9.696	-9.159	13.338	133.368	0.131
1400.000	0.885	147.823	1399.870	-10.462	10.689	-10.462	14.957	134.385	0.195
1500.000	0.789	130.861	1499.860	-11.566	11.621	-11.566	16.396	134.864	0.264
1600.000	0.654	139.473	1599.852	-12.451	12.513	-12.451	17.652	134.857	0.174
1700.000	0.264	123.924	1699.848	-13.013	13.075	-13.013	18.447	134.864	0.406
1800.000	0.362	146.180	1799.847	-13.403	13.441	-13.403	18.982	134.919	0.154
1900.000	0.327	115.261	1899.845	-13.787	13.875	-13.787	19.561	134.817	0.187
2000.000	0.366	143.269	1999.843	-14.165	14.325	-14.165	20.146	134.679	0.172
2100.000	0.259	160.370	2099.842	-14.634	14.592	-14.634	20.665	135.082	0.141
2200.000	0.033	115.807	2199.842	-14.859	14.694	-14.859	20.897	135.320	0.236
2300.000	0.431	70.104	2299.841	-14.743	15.074	-14.743	21.085	134.365	0.409
2400.000	0.787	63.151	2399.835	-14.305	16.040	-14.305	21.492	131.727	0.363
2500.000	0.949	68.600	2499.823	-13.693	17.424	-13.693	22.160	128.163	0.181
2600.000	1.010	75.778	2599.809	-13.174	19.048	-13.174	23.160	124.669	0.137
2700.000	1.038	89.533	2699.793	-12.950	20.808	-12.950	24.509	121.897	0.247
2800.000	1.098	85.501	2799.776	-12.868	22.669	-12.868	26.066	119.582	0.096
2900.000	0.808	88.086	2899.762	-12.769	24.328	-12.769	27.475	117.694	0.293
3000.000	0.854	69.816	2999.751	-12.489	25.731	-12.489	28.602	115.890	0.268
3100.000	0.516	62.076	3099.744	-12.021	26.829	-12.021	29.399	114.135	0.349
3200.000	0.612	56.604	3199.739	-11.516	27.673	-11.516	29.973	112.594	0.110
3300.000	0.248	76.323	3299.736	-11.170	28.329	-11.170	30.452	111.520	0.388
3400.000	0.208	155.383	3399.736	-11.285	28.615	-11.285	30.759	111.523	0.292

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	0.210	54.242	3499.735	-11.343	28.839	-11.343	30.990	111.470	0.323
3600.000	0.207	35.477	3599.735	-11.088	29.093	-11.088	31.134	110.864	0.068
3700.000	0.346	50.321	3699.733	-10.749	29.430	-10.749	31.331	110.064	0.155
3800.000	0.397	26.293	3799.731	-10.245	29.816	-10.245	31.527	108.964	0.162
3900.000	0.397	50.371	3899.729	-9.714	30.236	-9.714	31.758	107.811	0.166
4000.000	0.418	20.548	3999.727	-9.152	30.631	-9.152	31.969	106.635	0.211
4100.000	0.272	49.951	4099.725	-8.657	30.940	-8.657	32.128	105.632	0.225
4200.000	0.223	73.266	4199.724	-8.449	31.308	-8.449	32.428	105.103	0.111
4300.000	0.027	108.847	4299.724	-8.400	31.516	-8.400	32.616	104.925	0.202
4400.000	0.184	177.978	4399.724	-8.569	31.544	-8.569	32.687	105.197	0.176
4500.000	0.311	199.647	4499.723	-8.984	31.458	-8.984	32.716	105.939	0.155
4600.000	0.655	181.879	4599.719	-9.811	31.348	-9.811	32.848	107.379	0.372
4700.000	1.273	183.240	4699.704	-11.492	31.267	-11.492	33.312	110.180	0.618
4800.000	2.089	179.119	4799.660	-14.423	31.232	-14.423	34.401	114.787	0.825
4900.000	2.756	169.194	4899.571	-18.606	31.711	-18.606	36.766	120.402	0.785
5000.000	2.975	165.589	4999.446	-23.481	32.807	-23.481	40.344	125.592	0.284
5100.000	2.810	172.721	5099.319	-28.426	33.764	-28.426	44.136	130.094	0.396
5200.000	1.938	177.467	5199.232	-32.547	34.149	-32.547	47.175	133.624	0.893
5300.000	1.408	187.976	5299.189	-35.453	34.053	-35.453	49.158	136.153	0.611
5400.000	1.250	193.140	5399.163	-37.731	33.635	-37.731	50.547	138.285	0.198
5500.000	0.855	206.074	5499.146	-39.464	33.059	-39.464	51.481	140.047	0.459
5600.000	0.612	198.487	5599.137	-40.641	32.562	-40.641	52.076	141.298	0.262
5700.000	0.204	174.155	5699.135	-41.324	32.410	-41.324	52.517	141.893	0.434
5800.000	0.165	149.162	5799.134	-41.624	32.502	-41.624	52.811	142.015	0.088
5900.000	0.245	144.626	5899.133	-41.922	32.700	-41.922	53.167	142.045	0.082
6000.000	0.038	67.647	5999.133	-42.083	32.854	-42.083	53.389	142.021	0.239
6100.000	0.275	97.023	6099.133	-42.100	33.123	-42.100	53.568	141.806	0.242
6200.000	0.293	108.763	6199.132	-42.212	33.603	-42.212	53.953	141.479	0.061
6300.000	0.440	116.707	6299.129	-42.467	34.188	-42.467	54.518	141.164	0.155
6400.000	0.242	140.159	6399.128	-42.801	34.666	-42.801	55.079	140.995	0.238
6500.000	0.539	125.478	6499.125	-43.237	35.185	-43.237	55.744	140.862	0.311
6600.000	0.902	139.964	6599.117	-44.113	36.075	-44.113	56.985	140.724	0.403
6700.000	0.585	122.138	6699.109	-44.987	37.013	-44.987	58.257	140.554	0.389
6800.000	0.520	114.905	6799.104	-45.450	37.857	-45.450	59.151	140.208	0.095
6900.000	0.605	102.058	6899.099	-45.751	38.785	-45.751	59.979	139.711	0.151
6950.000	0.329	119.633	6949.098	-45.877	39.167	-45.877	60.322	139.511	0.615
HORIZONTAL DISPLACEMENT IS 60.322 FEET AT 139.511 DEGREES									