



Company: PDC Energy
Well: Emily 24-19
API#: 05-123-21763
Rig Name: Production / V.E.S.
State/County: Colorado / Weld County
Latitude: 40.378, Longitude: -104.594
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: 4/22/2014 / 15:39

Vaughn Energy Services
Henderson CO.
303-853-4976
Norman Cowan

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	0.577	218.183	99.998	-0.396	-0.311	-0.396	0.504	218.183	0.577
200.000	0.323	238.109	199.995	-0.941	-0.862	-0.941	1.276	222.495	0.295
300.000	0.421	210.345	299.993	-1.407	-1.287	-1.407	1.906	222.447	0.203
400.000	0.465	234.482	399.990	-1.960	-1.803	-1.960	2.663	222.610	0.190
500.000	0.362	277.047	499.988	-2.157	-2.447	-2.157	3.262	228.606	0.315
600.000	0.545	261.965	599.985	-2.185	-3.232	-2.185	3.902	235.944	0.217
700.000	0.476	252.803	699.981	-2.374	-4.100	-2.374	4.738	239.929	0.107
800.000	0.477	276.615	799.977	-2.449	-4.910	-2.449	5.487	243.492	0.197
900.000	0.266	270.012	899.975	-2.401	-5.556	-2.401	6.053	246.628	0.214
1000.000	0.382	268.752	999.974	-2.408	-6.122	-2.408	6.578	248.525	0.115
1100.000	0.557	262.735	1099.970	-2.477	-6.937	-2.477	7.366	250.350	0.182
1200.000	0.468	284.057	1199.966	-2.439	-7.816	-2.439	8.187	252.666	0.209
1300.000	0.434	276.812	1299.963	-2.295	-8.588	-2.295	8.889	255.037	0.066
1400.000	0.406	237.047	1399.961	-2.443	-9.261	-2.443	9.578	255.223	0.287
1500.000	0.720	206.244	1499.956	-3.199	-9.837	-3.199	10.344	251.983	0.425
1600.000	0.925	207.959	1599.946	-4.476	-10.493	-4.476	11.408	246.899	0.207
1700.000	0.839	236.623	1699.934	-5.592	-11.483	-5.592	12.772	244.036	0.445
1800.000	0.852	237.221	1799.923	-6.397	-12.719	-6.397	14.238	243.300	0.015
1900.000	1.059	263.516	1899.910	-6.904	-14.263	-6.904	15.846	244.171	0.479
2000.000	1.130	265.982	1999.892	-7.077	-16.165	-7.077	17.646	246.355	0.085
2100.000	1.034	269.732	2099.874	-7.151	-18.051	-7.151	19.416	248.390	0.119
2200.000	1.193	277.708	2199.855	-7.015	-19.985	-7.015	21.181	250.658	0.222
2300.000	0.473	288.474	2299.844	-6.745	-21.409	-6.745	22.446	252.514	0.734
2400.000	0.370	299.494	2399.841	-6.455	-22.082	-6.455	23.006	253.705	0.131
2500.000	0.520	325.956	2499.838	-5.920	-22.617	-5.920	23.379	255.332	0.251
2600.000	0.386	308.830	2599.835	-5.333	-23.133	-5.333	23.740	257.019	0.189
2700.000	0.406	289.599	2699.833	-5.003	-23.729	-5.003	24.251	258.094	0.134
2800.000	0.408	284.855	2799.830	-4.793	-24.407	-4.793	24.873	258.890	0.034
2900.000	0.478	311.559	2899.827	-4.425	-25.063	-4.425	25.451	259.988	0.215
3000.000	0.345	287.999	2999.825	-4.055	-25.662	-4.055	25.980	261.020	0.212
3100.000	0.114	316.113	3099.824	-3.891	-26.017	-3.891	26.306	261.495	0.251
3200.000	0.316	46.618	3199.823	-3.629	-25.885	-3.629	26.138	262.019	0.337
3300.000	0.983	74.347	3299.816	-3.208	-24.858	-3.208	25.065	262.646	0.718
3400.000	1.899	79.020	3399.784	-2.661	-22.406	-2.661	22.563	263.227	0.923

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	2.098	76.239	3499.723	-1.910	-19.000	-1.910	19.096	264.260	0.221
3600.000	1.686	60.518	3599.669	-0.750	-15.941	-0.750	15.959	267.305	0.659
3700.000	1.523	72.008	3699.630	0.384	-13.397	0.384	13.402	271.643	0.360
3800.000	1.410	63.820	3799.597	1.337	-11.029	1.337	11.110	276.914	0.238
3900.000	1.389	50.832	3899.568	2.646	-8.985	2.646	9.366	286.407	0.317
4000.000	1.161	15.070	3999.544	4.389	-7.782	4.389	8.935	299.423	0.812
4100.000	1.453	345.352	4099.519	6.593	-7.839	6.593	10.244	310.066	0.727
4200.000	1.246	325.886	4199.492	8.720	-8.770	8.720	12.367	314.837	0.500
4300.000	0.928	311.933	4299.474	10.162	-9.982	10.162	14.244	315.511	0.412
4400.000	0.980	293.544	4399.461	11.044	-11.369	11.044	15.850	314.171	0.309
4500.000	1.123	295.218	4499.444	11.803	-13.039	11.803	17.588	312.153	0.146
4600.000	1.245	315.540	4599.423	12.997	-14.686	12.997	19.611	311.507	0.435
4700.000	0.867	8.082	4699.408	14.522	-15.341	14.522	21.124	313.428	0.995
4800.000	0.912	41.911	4799.396	15.863	-14.703	15.863	21.629	317.173	0.519
4900.000	0.803	47.462	4899.385	16.929	-13.655	16.929	21.750	321.110	0.137
5000.000	0.635	48.387	4999.377	17.771	-12.724	17.771	21.857	324.397	0.169
5100.000	0.406	51.598	5099.373	18.359	-12.033	18.359	21.951	326.759	0.231
5200.000	0.337	51.279	5199.371	18.763	-11.526	18.763	22.020	328.439	0.069
5300.000	0.290	52.229	5299.369	19.102	-11.096	19.102	22.091	329.847	0.047
5400.000	0.032	309.057	5399.369	19.274	-10.918	19.274	22.152	330.471	0.299
5500.000	0.062	13.690	5499.369	19.344	-10.926	19.344	22.217	330.541	0.056
5600.000	0.525	201.006	5599.368	18.970	-11.078	18.970	21.967	329.716	0.587
5700.000	0.990	187.384	5699.359	17.686	-11.353	17.686	21.016	327.303	0.495
5800.000	0.929	185.673	5799.345	16.022	-11.544	16.022	19.748	324.228	0.067
5900.000	0.715	233.769	5899.336	14.847	-12.127	14.847	19.170	320.758	0.698
6000.000	1.032	271.127	5999.325	14.496	-13.531	14.496	19.830	316.973	0.635
6100.000	1.624	275.057	6099.297	14.639	-15.843	14.639	21.570	312.738	0.598

<div> HORIZONTAL DISPLACEMENT IS 21.570 FEET AT 312.738 DEGREES </div>
