



Company: PDC Energy
Well: Becker 15-9 I
API#: 05-123-24877
Rig Name: Production / V.E.S.
State/County: Colorado / Weld County
Latitude: 40.251, Longitude: -104.575
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: 7/10/2014 / 16:11

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	0.540	164.452	99.999	-0.454	0.126	-0.454	0.471	164.452	0.540
200.000	0.523	194.565	199.994	-1.350	0.138	-1.350	1.357	174.166	0.277
300.000	0.257	13.133	299.993	-1.573	0.074	-1.573	1.575	177.303	0.780
400.000	0.543	113.108	399.992	-1.541	0.561	-1.541	1.640	159.991	0.640
500.000	0.901	111.795	499.984	-2.019	1.727	-2.019	2.657	139.451	0.358
600.000	1.758	130.358	599.956	-3.304	3.626	-3.304	4.905	132.339	0.948
700.000	2.329	125.125	699.892	-5.466	6.456	-5.466	8.459	130.251	0.600
800.000	2.104	136.338	799.818	-7.962	9.385	-7.962	12.307	130.312	0.487
900.000	1.688	127.066	899.763	-10.178	11.827	-10.178	15.604	130.714	0.516
1000.000	1.979	139.117	999.712	-12.371	14.133	-12.371	18.783	131.198	0.482
1100.000	1.621	129.343	1099.663	-14.573	16.357	-14.573	21.907	131.700	0.471
1200.000	1.080	138.145	1199.635	-16.172	18.079	-16.172	24.257	131.813	0.577
1300.000	1.040	120.415	1299.618	-17.334	19.491	-17.334	26.084	131.647	0.329
1400.000	0.500	123.911	1399.609	-18.037	20.636	-18.037	27.408	131.155	0.542
1500.000	0.415	112.886	1499.605	-18.421	21.332	-18.421	28.185	130.812	0.122
1600.000	0.380	95.353	1599.603	-18.593	21.996	-18.593	28.801	130.208	0.126
1700.000	0.450	88.145	1699.600	-18.611	22.718	-18.611	29.368	129.325	0.088
1800.000	0.448	90.572	1799.597	-18.602	23.501	-18.602	29.973	128.363	0.019
1900.000	0.188	167.648	1899.596	-18.766	23.927	-18.766	30.408	128.108	0.445
2000.000	0.613	69.838	1999.594	-18.742	24.464	-18.742	30.818	127.456	0.665
2100.000	0.650	52.179	2099.588	-18.210	25.414	-18.210	31.265	125.623	0.197
2200.000	0.396	42.141	2199.584	-17.606	26.094	-17.606	31.478	124.008	0.269
2300.000	0.191	104.280	2299.583	-17.390	26.488	-17.390	31.686	123.287	0.350
2400.000	0.122	71.572	2399.582	-17.398	26.750	-17.398	31.910	123.039	0.110
2500.000	0.971	89.848	2499.577	-17.362	27.699	-17.362	32.690	122.080	0.855
2600.000	0.403	60.072	2599.570	-17.184	28.851	-17.184	33.580	120.779	0.652
2700.000	0.522	72.026	2699.566	-16.868	29.589	-16.868	34.059	119.687	0.152
2800.000	0.277	91.240	2799.564	-16.733	30.263	-16.733	34.581	118.939	0.276
2900.000	0.315	76.617	2899.563	-16.674	30.772	-16.674	34.999	118.452	0.084
3000.000	0.413	115.186	2999.561	-16.764	31.366	-16.764	35.565	118.123	0.258
3100.000	0.361	88.795	3099.558	-16.911	32.007	-16.911	36.200	117.850	0.184
3200.000	0.578	9.001	3199.556	-16.406	32.401	-16.406	36.318	116.855	0.625
3300.000	1.410	339.553	3299.541	-14.755	32.050	-14.755	35.283	114.720	0.950
3400.000	1.782	312.739	3399.503	-12.547	30.479	-12.547	32.960	112.375	0.824

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	1.725	308.883	3499.456	-10.547	28.165	-10.547	30.075	110.529	0.131
3600.000	1.733	319.704	3599.411	-8.448	26.015	-8.448	27.353	107.991	0.326
3700.000	1.863	326.905	3699.362	-5.933	24.149	-5.933	24.867	103.803	0.261
3800.000	1.660	322.711	3799.314	-3.418	22.384	-3.418	22.643	98.683	0.240
3900.000	1.673	320.731	3899.272	-1.135	20.582	-1.135	20.613	93.158	0.059
4000.000	1.529	312.586	3999.233	0.898	18.676	0.898	18.697	87.248	0.269
4100.000	1.893	309.692	4099.188	2.856	16.422	2.856	16.669	80.135	0.374
4200.000	1.594	305.939	4199.142	4.727	14.025	4.727	14.800	71.374	0.320
4300.000	1.987	318.614	4299.093	6.844	11.753	6.844	13.600	59.788	0.555
4400.000	2.241	313.496	4399.025	9.490	9.189	9.490	13.210	44.077	0.317
4500.000	2.892	298.453	4498.926	12.037	5.553	12.037	13.256	24.763	0.931
4600.000	2.768	314.095	4598.805	14.920	1.601	14.920	15.005	6.124	0.780
4700.000	3.341	329.531	4698.664	19.112	-1.611	19.112	19.179	355.181	0.998
4800.000	3.330	316.219	4798.496	23.721	-5.099	23.721	24.262	347.869	0.773
4900.000	3.493	308.689	4898.320	27.722	-9.486	27.722	29.300	341.109	0.476
5000.000	3.420	305.977	4998.138	31.378	-14.278	31.378	34.474	335.533	0.179
5100.000	3.646	318.538	5097.949	35.513	-18.797	35.513	40.181	332.108	0.804
5200.000	3.808	318.495	5197.738	40.383	-23.103	40.383	46.524	330.226	0.163
5300.000	3.995	324.395	5297.506	45.702	-27.332	45.702	53.252	329.119	0.443
5400.000	3.730	312.796	5397.281	50.745	-31.747	50.745	59.858	327.969	0.823
5500.000	2.910	304.122	5497.113	54.379	-36.236	54.379	65.346	326.322	0.959
5600.000	2.361	293.436	5597.007	56.622	-40.227	56.622	69.457	324.608	0.735
5700.000	2.586	301.686	5696.914	58.626	-44.036	58.626	73.323	323.089	0.421
5800.000	1.941	286.049	5796.836	60.280	-47.583	60.280	76.797	321.713	0.887
5900.000	1.659	286.340	5896.787	61.155	-50.600	61.155	79.375	320.395	0.282
6000.000	1.550	306.199	5996.749	62.361	-53.081	62.361	81.893	319.596	0.564
6100.000	1.478	292.780	6096.714	63.659	-55.362	63.659	84.365	318.988	0.361
6200.000	0.809	308.113	6196.694	64.595	-57.106	64.595	86.218	318.521	0.730
6300.000	1.277	328.559	6296.677	65.981	-58.243	65.981	88.010	318.564	0.591
6400.000	1.148	307.759	6396.655	67.546	-59.617	67.546	90.092	318.568	0.456
6500.000	1.097	331.036	6496.637	68.997	-60.873	68.997	92.011	318.580	0.456
6600.000	0.711	341.149	6596.624	70.422	-61.537	70.422	93.520	318.852	0.416
HORIZONTAL DISPLACEMENT IS 93.520 FEET AT 318.852 DEGREES									