

Company: NOBLE ENERGY

Well: STEPHENS J 31-09

API: 05-123-23297

Rig Name: PRODUCTION/VES

State/County: COLORADO/WELD

Latitude: 40.354, Longitude: -104.816

GRID North is 0.440 Degrees East of True North

VS-Azi: 0.000 Degrees

**FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB = GROUND LEVEL

**DRILLOG HA GYRO SURVEY CALCULATIONS**

Filename: run01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 2/20/2013 / 14:23

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

866-835-8333

NICK KULA

DEPTH REFERENCE=GROUND LEVEL

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	0.280	239.333	100.000	-0.125	-0.211	-0.125	0.245	239.333	0.280
200.000	0.403	258.457	199.998	-0.320	-0.766	-0.320	0.830	247.317	0.166
300.000	1.240	269.847	299.987	-0.393	-2.193	-0.393	2.228	259.830	0.849
400.000	1.178	291.787	399.965	-0.015	-4.230	-0.015	4.230	269.801	0.464
500.000	0.914	343.080	499.950	1.130	-5.416	1.130	5.533	281.782	0.936
600.000	0.268	32.246	599.945	2.090	-5.524	2.090	5.906	290.727	0.766
700.000	0.746	189.189	699.943	1.645	-5.503	1.645	5.744	286.645	0.998
800.000	0.392	220.531	799.938	0.743	-5.829	0.743	5.877	277.259	0.459
900.000	0.374	108.692	899.937	0.378	-5.743	0.378	5.755	273.763	0.635
1000.000	0.894	181.434	999.931	-0.507	-5.453	-0.507	5.476	264.693	0.860
1100.000	0.800	183.390	1099.920	-1.983	-5.514	-1.983	5.860	250.216	0.098
1200.000	1.662	179.609	1199.896	-4.131	-5.545	-4.131	6.914	233.317	0.865
1300.000	1.028	180.990	1299.868	-6.478	-5.551	-6.478	8.531	220.592	0.634
1400.000	0.837	205.533	1399.855	-8.034	-5.881	-8.034	9.957	216.204	0.438
1500.000	1.710	218.723	1499.830	-9.857	-7.129	-9.857	12.165	215.876	0.915
1600.000	1.275	221.398	1599.796	-11.856	-8.798	-11.856	14.764	216.579	0.440
1700.000	2.089	224.174	1699.752	-13.997	-10.804	-13.997	17.682	217.662	0.817
1800.000	2.196	234.969	1799.682	-16.404	-13.642	-16.404	21.336	219.748	0.417
1900.000	2.179	238.009	1899.609	-18.511	-16.823	-18.511	25.014	222.266	0.117
2000.000	2.699	232.087	1999.519	-20.965	-20.293	-20.965	29.178	224.067	0.577
2100.000	2.885	237.709	2099.400	-23.756	-24.278	-23.756	33.967	225.623	0.331
2200.000	3.188	239.665	2199.260	-26.505	-28.805	-26.505	39.144	227.382	0.321
2300.000	3.111	239.215	2299.109	-29.298	-33.537	-29.298	44.532	228.859	0.081
2400.000	2.782	250.205	2398.977	-31.509	-38.152	-31.509	49.481	230.447	0.652
2500.000	3.086	257.489	2498.846	-32.914	-43.063	-32.914	54.201	232.609	0.481
2600.000	3.193	253.951	2598.696	-34.267	-48.368	-34.267	59.276	234.684	0.221
2700.000	3.378	247.830	2698.532	-36.149	-53.773	-36.149	64.794	236.089	0.396
2800.000	3.409	243.786	2798.357	-38.574	-59.169	-38.574	70.633	236.898	0.241
2900.000	3.713	248.164	2898.164	-41.092	-64.842	-41.092	76.766	237.637	0.408

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
3000.000	3.588	252.561	2997.961	-43.234	-70.833	-43.234	82.984	238.602	0.306
3100.000	3.331	259.035	3097.779	-44.724	-76.670	-44.724	88.761	239.744	0.467
3200.000	2.470	263.592	3197.650	-45.517	-81.664	-45.517	93.493	240.866	0.891
3300.000	1.975	269.902	3297.575	-45.761	-85.529	-45.761	97.001	241.852	0.552
3400.000	1.053	257.693	3397.539	-45.960	-88.150	-45.960	99.412	242.463	0.971
3500.000	1.456	249.454	3497.515	-46.601	-90.238	-46.601	101.560	242.687	0.441
3600.000	2.405	243.028	3597.457	-47.999	-93.297	-47.999	104.920	242.775	0.971
3700.000	3.215	245.984	3697.336	-50.092	-97.728	-50.092	109.818	242.862	0.823
3800.000	3.350	237.230	3797.173	-52.814	-102.746	-52.814	115.525	242.796	0.519
3900.000	2.944	236.076	3897.022	-55.829	-107.334	-55.829	120.985	242.519	0.411
4000.000	2.596	226.430	3996.905	-58.823	-111.106	-58.823	125.716	242.102	0.581
4100.000	1.479	260.588	4096.844	-60.595	-114.019	-60.595	129.121	242.012	1.604
4200.000	0.763	319.219	4196.827	-60.302	-115.727	-60.302	130.496	242.478	1.262
4300.000	1.714	330.031	4296.802	-58.502	-116.910	-58.502	130.730	243.417	0.975
4400.000	2.250	345.874	4396.743	-55.302	-118.136	-55.302	130.439	244.915	0.762
4500.000	2.260	2.022	4496.667	-51.428	-118.545	-51.428	129.220	246.547	0.633
4600.000	2.087	22.690	4596.596	-47.778	-117.773	-47.778	127.095	247.919	0.798
4700.000	2.368	45.711	4696.522	-44.655	-115.592	-44.655	123.918	248.878	0.930
4800.000	2.438	65.368	4796.436	-42.326	-112.180	-42.326	119.900	249.328	0.823
4900.000	2.095	73.715	4896.358	-40.927	-108.493	-40.927	115.956	249.332	0.475
5000.000	1.300	54.751	4996.314	-39.760	-105.813	-39.760	113.036	249.406	0.963
5100.000	1.038	78.133	5096.294	-38.920	-104.001	-38.920	111.044	249.483	0.539
5200.000	0.994	36.366	5196.280	-38.035	-102.600	-38.035	109.423	249.660	0.725
5300.000	0.960	48.964	5296.265	-36.787	-101.454	-36.787	107.917	250.070	0.217
5400.000	0.356	21.557	5396.258	-35.947	-100.708	-35.947	106.931	250.356	0.664
5500.000	0.514	29.657	5496.255	-35.268	-100.371	-35.268	106.387	250.640	0.169
5600.000	0.730	58.080	5596.250	-34.542	-99.609	-34.542	105.428	250.875	0.370
5700.000	1.353	30.171	5696.233	-33.185	-98.475	-33.185	103.916	251.377	0.786
5800.000	1.111	54.884	5796.211	-31.607	-97.089	-31.607	102.104	251.968	0.578
5900.000	1.217	75.463	5896.191	-30.782	-95.268	-30.782	100.118	252.094	0.429
6000.000	1.343	86.064	5996.166	-30.436	-93.071	-30.436	97.921	251.892	0.268
6100.000	1.384	73.367	6096.138	-30.009	-90.745	-30.009	95.579	251.701	0.304
6200.000	1.663	99.325	6196.103	-29.899	-88.157	-29.899	93.089	251.265	0.736
6300.000	1.879	84.608	6296.056	-29.980	-85.093	-29.980	90.220	250.592	0.502
6400.000	1.733	91.669	6396.006	-29.870	-81.950	-29.870	87.224	249.974	0.266
6500.000	1.615	98.461	6495.964	-30.121	-79.045	-30.121	84.590	249.140	0.231
6600.000	1.784	73.824	6595.921	-29.895	-76.157	-29.895	81.814	248.568	0.744
6700.000	1.623	67.349	6695.877	-28.916	-73.354	-28.916	78.848	248.486	0.251
6800.000	1.703	86.740	6795.836	-28.286	-70.564	-28.286	76.022	248.156	0.566
6900.000	1.540	110.289	6895.797	-28.667	-67.820	-28.667	73.630	247.087	0.681
7000.000	1.566	79.685	6995.762	-28.888	-65.216	-28.888	71.328	246.108	0.820
7100.000	2.094	85.640	7095.711	-28.505	-62.050	-28.505	68.284	245.327	0.560
7200.000	2.310	101.036	7195.638	-28.752	-58.251	-28.752	64.960	243.730	0.628
7250.000	2.622	101.121	7245.591	-29.165	-56.140	-29.165	63.264	242.548	0.623

HORIZONTAL DISPLACEMENT IS 63.264 FEET AT 242.548 DEGREES
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