



Company: Noble Energy  
Well: Kallas 4-41  
API #: 05-123-20099  
Rig Name: Production/Lightning  
State/County: Colorado/Weld  
Latitude: 40.340, Longitude: -104.662  
GRID North is 0.540 Degrees East of True North  
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: kallas4-41-01\_ed.ut  
Minimum Curvature Method  
Report Date/Time: 12/14/2011 / 08:53

Vaughn Energy Services  
Henderson, Colorado  
866-835-8333  
James Proulx

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	0.173	203.062	100.000	-0.139	-0.059	-0.139	0.151	203.062	0.173
200.000	0.042	202.687	200.000	-0.312	-0.133	-0.312	0.339	203.021	0.131
300.000	0.086	191.448	300.000	-0.419	-0.162	-0.419	0.449	201.077	0.045
400.000	0.090	212.480	399.999	-0.559	-0.219	-0.559	0.601	201.366	0.032
500.000	0.056	253.648	499.999	-0.639	-0.308	-0.639	0.710	205.705	0.061
600.000	0.113	254.672	599.999	-0.679	-0.450	-0.679	0.815	213.512	0.057
700.000	0.125	292.359	699.999	-0.664	-0.646	-0.664	0.926	224.207	0.078
800.000	0.170	314.767	799.999	-0.518	-0.852	-0.518	0.997	238.706	0.073
900.000	0.190	248.437	899.998	-0.474	-1.112	-0.474	1.209	246.896	0.198
1000.000	0.238	218.437	999.998	-0.698	-1.395	-0.698	1.560	243.417	0.120
1100.000	0.293	203.571	1099.997	-1.096	-1.627	-1.096	1.962	236.044	0.087
1200.000	0.381	219.655	1199.995	-1.586	-1.941	-1.586	2.507	230.755	0.128
1300.000	0.474	185.800	1299.992	-2.253	-2.195	-2.253	3.146	224.252	0.264
1400.000	0.468	173.556	1399.989	-3.071	-2.191	-3.071	3.772	215.514	0.101
1500.000	0.443	186.667	1499.986	-3.860	-2.190	-3.860	4.438	209.575	0.107
1600.000	0.370	229.898	1599.983	-4.451	-2.482	-4.451	5.097	209.146	0.307
1700.000	0.395	197.377	1699.981	-4.989	-2.832	-4.989	5.737	209.586	0.216
1800.000	0.299	194.372	1799.980	-5.570	-3.000	-5.570	6.327	208.306	0.098
1900.000	0.301	339.022	1899.979	-5.578	-3.159	-5.578	6.410	209.525	0.571
2000.000	0.495	348.505	1999.977	-4.909	-3.339	-4.909	5.937	214.222	0.204
2100.000	0.283	359.277	2099.974	-4.239	-3.428	-4.239	5.452	218.963	0.223
2200.000	0.364	60.724	2199.973	-3.837	-3.154	-3.837	4.967	219.423	0.338
2300.000	0.697	88.631	2299.969	-3.667	-2.269	-3.667	4.313	211.751	0.412
2400.000	0.619	86.268	2399.962	-3.618	-1.123	-3.618	3.788	197.243	0.083
2500.000	0.353	76.238	2499.958	-3.509	-0.285	-3.509	3.521	184.647	0.278
2600.000	0.206	66.490	2599.957	-3.364	0.178	-3.364	3.369	176.964	0.154
2700.000	0.069	28.040	2699.957	-3.240	0.371	-3.240	3.261	173.459	0.158
2800.000	0.260	319.509	2799.956	-3.014	0.252	-3.014	3.024	175.218	0.244
2900.000	0.405	298.506	2899.955	-2.672	-0.206	-2.672	2.680	184.416	0.187
3000.000	0.439	291.709	2999.952	-2.361	-0.873	-2.361	2.518	200.293	0.060
3100.000	0.425	276.554	3099.949	-2.177	-1.598	-2.177	2.701	216.273	0.115
3200.000	0.583	283.412	3199.945	-2.017	-2.461	-2.017	3.182	230.664	0.168
3300.000	0.250	269.664	3299.943	-1.900	-3.174	-1.900	3.700	239.091	0.345
3400.000	0.498	312.507	3399.941	-1.608	-3.713	-1.608	4.046	246.580	0.357

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	0.556	266.158	3499.937	-1.347	-4.517	-1.347	4.714	253.394	0.418
3600.000	0.532	264.995	3599.932	-1.420	-5.463	-1.420	5.645	255.430	0.026
3700.000	0.491	267.841	3699.928	-1.477	-6.354	-1.477	6.523	256.916	0.048
3800.000	0.588	277.301	3799.924	-1.428	-7.291	-1.428	7.429	258.920	0.131
3900.000	0.545	282.380	3899.919	-1.261	-8.264	-1.261	8.359	261.326	0.066
4000.000	0.264	299.927	3999.916	-1.044	-8.927	-1.044	8.988	263.330	0.304
4100.000	0.772	304.624	4099.912	-0.546	-9.681	-0.546	9.696	266.770	0.510
4200.000	1.318	298.636	4199.895	0.388	-11.245	0.388	11.252	271.975	0.556
4300.000	2.156	282.968	4299.849	1.361	-14.087	1.361	14.153	275.518	0.955
4400.000	2.124	292.776	4399.779	2.501	-17.629	2.501	17.806	278.073	0.367
4500.000	1.765	289.761	4499.722	3.739	-20.787	3.739	21.121	280.196	0.374
4600.000	1.130	268.242	4599.690	4.229	-23.222	4.229	23.604	280.321	0.825
4700.000	1.088	259.272	4699.671	4.022	-25.140	4.022	25.460	279.090	0.179
4800.000	0.512	271.329	4799.661	3.856	-26.520	3.856	26.799	278.273	0.597
4900.000	0.509	253.588	4899.657	3.741	-27.393	3.741	27.647	277.776	0.158
5000.000	0.349	250.731	4999.654	3.515	-28.106	3.515	28.325	277.128	0.162
5100.000	0.449	265.763	5099.652	3.385	-28.784	3.385	28.982	276.708	0.144
5200.000	0.518	241.181	5199.648	3.139	-29.570	3.139	29.736	276.059	0.216
5300.000	0.556	211.342	5299.644	2.507	-30.218	2.507	30.322	274.742	0.279
5400.000	0.448	217.365	5399.640	1.782	-30.708	1.782	30.759	273.322	0.120
5500.000	0.819	224.277	5499.634	0.960	-31.444	0.960	31.458	271.748	0.379
5600.000	0.493	230.306	5599.627	0.173	-32.274	0.173	32.274	270.308	0.334
5700.000	1.238	245.153	5699.615	-0.555	-33.585	-0.555	33.589	269.053	0.772
5800.000	1.755	247.552	5799.581	-1.594	-35.980	-1.594	36.016	267.464	0.521
5900.000	1.378	243.287	5899.544	-2.719	-38.470	-2.719	38.566	265.957	0.395
6000.000	1.891	235.727	5999.503	-4.189	-40.907	-4.189	41.121	264.153	0.556
6100.000	1.953	239.174	6099.446	-5.991	-43.734	-5.991	44.142	262.200	0.131
6200.000	1.806	230.326	6199.393	-7.870	-46.409	-7.870	47.072	260.376	0.325
6300.000	2.132	236.543	6299.334	-9.901	-49.174	-9.901	50.160	258.616	0.389
6400.000	2.087	229.616	6399.266	-12.106	-52.112	-12.106	53.500	256.922	0.259
6500.000	2.664	238.660	6499.180	-14.494	-55.483	-14.494	57.345	255.360	0.686
6600.000	2.846	233.075	6599.065	-17.194	-59.453	-17.194	61.889	253.870	0.324
6700.000	3.789	236.814	6698.896	-20.494	-64.203	-20.494	67.395	252.296	0.967
6800.000	4.509	239.446	6798.633	-24.301	-70.354	-24.301	74.433	250.944	0.745
6820.000	4.575	238.212	6818.571	-25.121	-71.709	-25.121	75.982	250.694	0.588

<div> HORIZONTAL DISPLACEMENT IS  75.982 FEET AT 250.694 DEGREES </div>
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