



Company/Rig: NOBLE ENERGY/ CORETECH
 WELL/API#: LARSON USX AA 19-5/05-123-24331
 DECLINATION: 8.24 Degrees
 TD AS DRILLED: 7,384 FEET
 COUNTY/STATE: WELD/COLORADO
 VS-Azi: 0.000 Degrees
 Latitude: 40.47339, Longitude: -104.48679
 Grid North = True North -0.65 degs (NAD 27)
 Grid Correction Applied = -0.65 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4,649 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 10/27/2015 / 09:02

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
 NORTH REFERENCE: GRID
 HENDERSON, COLORADO
 303-853-4976

Surveyor: LEVI SHELDON / Larson USX AA 19-5

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	0.354	76.692	99.999	0.071	0.301	0.071	0.309	76.692	0.354
200.000	0.355	32.783	199.998	0.403	0.769	0.403	0.868	62.351	0.265
300.000	0.384	89.907	299.996	0.664	1.272	0.664	1.435	62.430	0.354
400.000	0.379	86.011	399.994	0.688	1.937	0.688	2.056	70.456	0.026
500.000	0.200	128.223	499.992	0.603	2.405	0.603	2.479	75.932	0.267
600.000	0.278	180.432	599.992	0.252	2.540	0.252	2.553	84.329	0.221
700.000	0.887	212.627	699.986	-0.642	2.121	-0.642	2.216	106.836	0.669
800.000	0.744	198.091	799.976	-1.910	1.502	-1.910	2.430	141.820	0.251
900.000	1.380	189.707	899.959	-3.714	1.098	-3.714	3.873	163.536	0.654
1000.000	1.258	185.148	999.932	-5.995	0.796	-5.995	6.047	172.435	0.161
1100.000	1.338	184.737	1099.906	-8.251	0.601	-8.251	8.273	175.833	0.080
1200.000	1.112	191.837	1199.884	-10.364	0.306	-10.364	10.369	178.310	0.271
1300.000	1.069	185.628	1299.865	-12.243	0.015	-12.243	12.243	179.929	0.126
1400.000	0.902	189.141	1399.851	-13.948	-0.201	-13.948	13.950	180.827	0.178
1500.000	0.856	187.149	1499.839	-15.466	-0.419	-15.466	15.472	181.553	0.055
1600.000	0.516	196.243	1599.832	-16.640	-0.638	-16.640	16.652	182.197	0.355
1700.000	0.308	311.631	1699.830	-16.894	-0.965	-16.894	16.921	183.270	0.706
1800.000	0.272	3.242	1799.829	-16.478	-1.153	-16.478	16.518	184.002	0.255

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
1900.000	0.485	359.946	1899.827	-15.818	-1.140	-15.818	15.859	184.121	0.214
2000.000	0.657	17.469	1999.822	-14.848	-0.968	-14.848	14.879	183.730	0.243
2100.000	0.888	6.321	2099.813	-13.530	-0.710	-13.530	13.549	183.006	0.275
2200.000	1.008	353.143	2199.799	-11.886	-0.730	-11.886	11.909	183.515	0.248
2300.000	1.356	353.745	2299.778	-9.837	-0.964	-9.837	9.884	185.598	0.349
2400.000	1.786	345.070	2399.740	-7.155	-1.494	-7.155	7.309	191.798	0.490
2500.000	1.605	346.651	2499.696	-4.286	-2.219	-4.286	4.827	207.372	0.187
2600.000	1.622	349.892	2599.657	-1.531	-2.791	-1.531	3.183	241.254	0.093
2700.000	1.787	350.805	2699.612	1.401	-3.288	1.401	3.574	293.080	0.168
2800.000	1.677	347.614	2799.567	4.370	-3.851	4.370	5.825	318.609	0.146
2900.000	1.734	353.492	2899.522	7.302	-4.337	7.302	8.493	329.294	0.184
3000.000	1.888	345.488	2999.473	10.400	-4.921	10.400	11.506	334.678	0.296
3100.000	1.496	345.696	3099.429	13.260	-5.657	13.260	14.416	336.898	0.392
3200.000	1.049	342.607	3199.404	15.399	-6.253	15.399	16.620	337.900	0.453
3300.000	0.962	9.634	3299.389	17.099	-6.386	17.099	18.253	339.522	0.477
3400.000	1.105	13.827	3399.373	18.863	-6.015	18.863	19.799	342.314	0.162
3500.000	1.152	19.579	3499.353	20.746	-5.448	20.746	21.450	345.287	0.122
3600.000	1.071	7.626	3599.335	22.619	-4.987	22.619	23.162	347.567	0.245
3700.000	1.192	9.743	3699.315	24.570	-4.687	24.570	25.013	349.200	0.129
3800.000	1.344	8.728	3799.291	26.755	-4.333	26.755	27.103	350.801	0.153
3900.000	1.392	21.433	3899.262	29.045	-3.711	29.045	29.281	352.719	0.307
4000.000	1.766	48.570	3999.226	31.196	-2.111	31.196	31.267	356.128	0.825
4100.000	2.358	67.571	4099.162	33.001	0.946	33.001	33.014	1.642	0.897
4200.000	3.173	75.499	4199.045	34.479	5.527	34.479	34.919	9.108	0.899
4300.000	3.114	78.239	4298.894	35.725	10.866	35.725	37.341	16.918	0.161
4400.000	2.919	74.795	4398.756	36.947	15.982	36.947	40.255	23.392	0.266
4500.000	2.761	79.766	4498.633	38.042	20.810	38.042	43.362	28.679	0.293
4600.000	2.507	87.380	4598.527	38.570	25.364	38.570	46.163	33.329	0.432
4700.000	2.462	87.535	4698.433	38.763	29.695	38.763	48.829	37.454	0.045
4800.000	2.044	93.460	4798.356	38.747	33.621	38.747	51.300	40.948	0.478
4900.000	2.011	90.775	4898.294	38.616	37.155	38.616	53.588	43.896	0.101
5000.000	1.768	97.888	4998.239	38.381	40.438	38.381	55.752	46.495	0.337
5100.000	1.864	99.083	5098.189	37.912	43.572	37.912	57.757	48.974	0.103
5200.000	1.643	104.405	5198.142	37.299	46.566	37.299	59.663	51.306	0.274
5300.000	1.765	117.402	5298.098	36.234	49.322	36.234	61.201	53.698	0.404
5400.000	1.829	108.009	5398.049	35.031	52.207	35.031	62.871	56.138	0.301
5500.000	1.038	122.902	5498.018	34.046	54.485	34.046	64.248	58.000	0.868
5600.000	1.080	114.383	5598.001	33.164	56.105	33.164	65.174	59.412	0.163
5700.000	1.157	120.139	5697.981	32.268	57.837	32.268	66.229	60.842	0.136
5800.000	1.259	127.833	5797.959	31.087	59.578	31.087	67.201	62.445	0.191

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
5900.000	1.565	156.770	5897.930	29.159	60.984	29.159	67.597	64.446	0.765
6000.000	1.091	176.466	5997.903	26.954	61.581	26.954	67.222	66.361	0.651
6100.000	0.990	201.609	6097.887	25.201	61.322	25.201	66.299	67.659	0.463
6200.000	1.098	209.620	6197.871	23.565	60.530	23.565	64.956	68.728	0.182
6300.000	1.507	212.515	6297.845	21.623	59.350	21.623	63.166	69.982	0.414
6400.000	1.856	198.069	6397.802	18.975	58.140	18.975	61.158	71.925	0.546
6500.000	1.847	193.340	6497.750	15.868	57.266	15.868	59.424	74.513	0.153
6600.000	2.425	175.430	6597.681	12.191	57.063	12.191	58.351	77.940	0.876
6700.000	2.836	174.802	6697.576	7.618	57.456	7.618	57.959	82.447	0.412