

# Fort Calhoun (41.52° N, 96.08° E), Control Point Hazard

| SA (g)   | AFE 0.5 Hz   | AFE 1 Hz     | AFE 2.5 Hz   | AFE 5 Hz     | AFE 10 Hz    | AFE 25 Hz    | AFE 100 Hz   |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0.001000 | 4.194964e-03 | 6.119390e-03 | 8.442813e-03 | 8.852061e-03 | 8.908758e-03 | 8.749199e-03 | 8.128727e-03 |
| 0.001122 | 4.192787e-03 | 6.119377e-03 | 8.442811e-03 | 8.852061e-03 | 8.908758e-03 | 8.749199e-03 | 8.128727e-03 |
| 0.001259 | 4.136701e-03 | 6.116140e-03 | 8.442776e-03 | 8.852061e-03 | 8.908758e-03 | 8.749199e-03 | 8.128727e-03 |
| 0.001413 | 4.050074e-03 | 6.068399e-03 | 8.442301e-03 | 8.852061e-03 | 8.908758e-03 | 8.749199e-03 | 8.128727e-03 |
| 0.001585 | 3.928487e-03 | 5.963259e-03 | 8.438934e-03 | 8.852060e-03 | 8.908757e-03 | 8.749199e-03 | 8.128727e-03 |
| 0.001778 | 3.797971e-03 | 5.779706e-03 | 8.425625e-03 | 8.852059e-03 | 8.908561e-03 | 8.749196e-03 | 8.128727e-03 |
| 0.001995 | 3.646531e-03 | 5.540393e-03 | 8.393662e-03 | 8.852050e-03 | 8.903947e-03 | 8.748816e-03 | 8.128727e-03 |
| 0.002239 | 3.479811e-03 | 5.288326e-03 | 8.339235e-03 | 8.851990e-03 | 8.882821e-03 | 8.735040e-03 | 8.128701e-03 |
| 0.002512 | 3.312248e-03 | 5.036291e-03 | 8.259928e-03 | 8.851579e-03 | 8.842668e-03 | 8.652997e-03 | 8.124262e-03 |
| 0.002818 | 3.147118e-03 | 4.787133e-03 | 8.151304e-03 | 8.848558e-03 | 8.774991e-03 | 8.532830e-03 | 8.065576e-03 |
| 0.003162 | 2.983372e-03 | 4.541695e-03 | 8.012595e-03 | 8.833304e-03 | 8.677708e-03 | 8.396167e-03 | 7.895444e-03 |
| 0.003548 | 2.820582e-03 | 4.300252e-03 | 7.846843e-03 | 8.791760e-03 | 8.558184e-03 | 8.238694e-03 | 7.663616e-03 |
| 0.003981 | 2.657544e-03 | 4.062876e-03 | 7.655955e-03 | 8.720419e-03 | 8.418448e-03 | 8.058349e-03 | 7.410338e-03 |
| 0.004467 | 2.493999e-03 | 3.829200e-03 | 7.440396e-03 | 8.621714e-03 | 8.256784e-03 | 7.855028e-03 | 7.132549e-03 |
| 0.005012 | 2.329082e-03 | 3.598905e-03 | 7.201424e-03 | 8.497878e-03 | 8.071771e-03 | 7.627788e-03 | 6.830867e-03 |
| 0.005623 | 2.162928e-03 | 3.371248e-03 | 6.941503e-03 | 8.350360e-03 | 7.862276e-03 | 7.376183e-03 | 6.507354e-03 |
| 0.006310 | 1.995475e-03 | 3.145655e-03 | 6.663403e-03 | 8.179441e-03 | 7.627609e-03 | 7.100063e-03 | 6.163878e-03 |
| 0.007079 | 1.827414e-03 | 2.921354e-03 | 6.369542e-03 | 7.984705e-03 | 7.367413e-03 | 6.800845e-03 | 5.802514e-03 |
| 0.007943 | 1.659866e-03 | 2.697985e-03 | 6.061906e-03 | 7.765504e-03 | 7.082134e-03 | 6.480169e-03 | 5.426376e-03 |
| 0.008913 | 1.494514e-03 | 2.475370e-03 | 5.742228e-03 | 7.521315e-03 | 6.772869e-03 | 6.140408e-03 | 5.039603e-03 |
| 0.010000 | 1.333545e-03 | 2.253857e-03 | 5.412178e-03 | 7.252051e-03 | 6.441365e-03 | 5.784863e-03 | 4.646782e-03 |
| 0.011220 | 1.179212e-03 | 2.034346e-03 | 5.073505e-03 | 6.958069e-03 | 6.090173e-03 | 5.417062e-03 | 4.252743e-03 |
| 0.012589 | 1.032394e-03 | 1.818184e-03 | 4.728121e-03 | 6.640254e-03 | 5.722484e-03 | 5.041857e-03 | 3.862768e-03 |
| 0.014125 | 8.943636e-04 | 1.607414e-03 | 4.378181e-03 | 6.300026e-03 | 5.342325e-03 | 4.663590e-03 | 3.481878e-03 |
| 0.015849 | 7.670791e-04 | 1.404266e-03 | 4.026149e-03 | 5.939468e-03 | 4.954088e-03 | 4.287667e-03 | 3.115152e-03 |
| 0.017783 | 6.504438e-04 | 1.211892e-03 | 3.674808e-03 | 5.561397e-03 | 4.562779e-03 | 3.918164e-03 | 2.766764e-03 |
| 0.019953 | 5.449279e-04 | 1.033413e-03 | 3.327250e-03 | 5.169413e-03 | 4.173302e-03 | 3.559953e-03 | 2.440348e-03 |
| 0.022387 | 4.502292e-04 | 8.707770e-04 | 2.986818e-03 | 4.767874e-03 | 3.790720e-03 | 3.216256e-03 | 2.138291e-03 |
| 0.025119 | 3.671392e-04 | 7.254577e-04 | 2.656992e-03 | 4.361752e-03 | 3.419578e-03 | 2.890452e-03 | 1.862284e-03 |
| 0.028184 | 2.953579e-04 | 5.968476e-04 | 2.341212e-03 | 3.956557e-03 | 3.064108e-03 | 2.584257e-03 | 1.611242e-03 |
| 0.031623 | 2.344203e-04 | 4.845242e-04 | 2.042764e-03 | 3.557966e-03 | 2.727600e-03 | 2.297386e-03 | 1.371884e-03 |
| 0.035481 | 1.834631e-04 | 3.880238e-04 | 1.764664e-03 | 3.171594e-03 | 2.412754e-03 | 2.004004e-03 | 1.137043e-03 |
| 0.039811 | 1.417140e-04 | 3.066089e-04 | 1.509399e-03 | 2.802559e-03 | 2.120895e-03 | 1.691773e-03 | 9.314194e-04 |
| 0.044668 | 1.080657e-04 | 2.390069e-04 | 1.278556e-03 | 2.455300e-03 | 1.848928e-03 | 1.410858e-03 | 7.594901e-04 |
| 0.050119 | 8.140331e-05 | 1.838538e-04 | 1.072875e-03 | 2.133201e-03 | 1.594880e-03 | 1.168034e-03 | 6.174144e-04 |
| 0.056234 | 6.061465e-05 | 1.396340e-04 | 8.925192e-04 | 1.838623e-03 | 1.362066e-03 | 9.604486e-04 | 5.010272e-04 |
| 0.063096 | 4.464326e-05 | 1.048879e-04 | 7.368116e-04 | 1.572702e-03 | 1.151491e-03 | 7.847918e-04 | 4.062192e-04 |
| 0.070795 | 3.254443e-05 | 7.801734e-05 | 6.040425e-04 | 1.334876e-03 | 9.654776e-04 | 6.376040e-04 | 3.293401e-04 |
| 0.079433 | 2.349455e-05 | 5.754788e-05 | 4.919333e-04 | 1.123006e-03 | 8.047691e-04 | 5.153929e-04 | 2.671302e-04 |
| 0.089125 | 1.685452e-05 | 4.212289e-05 | 3.981138e-04 | 9.360367e-04 | 6.676432e-04 | 4.147999e-04 | 2.168029e-04 |
| 0.100000 | 1.204108e-05 | 3.070136e-05 | 3.202516e-04 | 7.738035e-04 | 5.515775e-04 | 3.326437e-04 | 1.760144e-04 |
| 0.112202 | 8.573668e-06 | 2.236284e-05 | 2.561357e-04 | 6.352500e-04 | 4.540088e-04 | 2.659856e-04 | 1.424033e-04 |
| 0.125893 | 6.088473e-06 | 1.631758e-05 | 2.037753e-04 | 5.185053e-04 | 3.725008e-04 | 2.121449e-04 | 1.134018e-04 |
| 0.141254 | 4.319010e-06 | 1.193258e-05 | 1.614109e-04 | 4.211741e-04 | 3.047799e-04 | 1.687655e-04 | 8.841332e-05 |
| 0.158489 | 3.062037e-06 | 8.761851e-06 | 1.274590e-04 | 3.407378e-04 | 2.487447e-04 | 1.338840e-04 | 6.859623e-05 |

|          |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0.177828 | 2.170940e-06 | 6.486929e-06 | 1.004809e-04 | 2.747712e-04 | 2.025135e-04 | 1.059433e-04 | 5.298906e-05 |
| 0.199526 | 1.539809e-06 | 4.857893e-06 | 7.918706e-05 | 2.209939e-04 | 1.644446e-04 | 8.360793e-05 | 4.063784e-05 |
| 0.223872 | 1.093992e-06 | 3.684149e-06 | 6.244589e-05 | 1.772818e-04 | 1.330738e-04 | 6.573373e-05 | 3.082928e-05 |
| 0.251189 | 7.813939e-07 | 2.832208e-06 | 4.928766e-05 | 1.417177e-04 | 1.071257e-04 | 5.140850e-05 | 2.311379e-05 |
| 0.281838 | 5.617799e-07 | 2.206412e-06 | 3.891364e-05 | 1.127547e-04 | 8.563355e-05 | 3.993511e-05 | 1.718023e-05 |
| 0.316228 | 4.079414e-07 | 1.741001e-06 | 3.070389e-05 | 8.927163e-05 | 6.797406e-05 | 3.080894e-05 | 1.265048e-05 |
| 0.354813 | 2.998697e-07 | 1.388685e-06 | 2.418635e-05 | 7.037246e-05 | 5.364870e-05 | 2.359764e-05 | 9.202476e-06 |
| 0.398107 | 2.234487e-07 | 1.117361e-06 | 1.898329e-05 | 5.522784e-05 | 4.211200e-05 | 1.793669e-05 | 6.587322e-06 |
| 0.446684 | 1.687592e-07 | 9.044269e-07 | 1.481143e-05 | 4.310978e-05 | 3.284705e-05 | 1.352902e-05 | 4.637453e-06 |
| 0.501187 | 1.289730e-07 | 7.342046e-07 | 1.149812e-05 | 3.344378e-05 | 2.541642e-05 | 1.012660e-05 | 3.216606e-06 |
| 0.562341 | 9.949043e-08 | 5.964739e-07 | 8.912940e-06 | 2.577024e-05 | 1.947918e-05 | 7.509821e-06 | 2.189431e-06 |
| 0.630957 | 7.725297e-08 | 4.839250e-07 | 6.903111e-06 | 1.969922e-05 | 1.479478e-05 | 5.491040e-06 | 1.459014e-06 |
| 0.707946 | 6.022319e-08 | 3.912876e-07 | 5.321838e-06 | 1.492527e-05 | 1.115408e-05 | 3.941967e-06 | 9.540183e-07 |
| 0.794328 | 4.703710e-08 | 3.148106e-07 | 4.068596e-06 | 1.121822e-05 | 8.337099e-06 | 2.774164e-06 | 6.141385e-07 |
| 0.891251 | 3.678046e-08 | 2.518257e-07 | 3.083131e-06 | 8.366921e-06 | 6.150608e-06 | 1.909829e-06 | 3.888591e-07 |
| 1.000000 | 2.876924e-08 | 2.003808e-07 | 2.320887e-06 | 6.170607e-06 | 4.460507e-06 | 1.281889e-06 | 2.415578e-07 |
| 1.122019 | 2.247232e-08 | 1.589275e-07 | 1.738908e-06 | 4.473457e-06 | 3.174349e-06 | 8.359638e-07 | 1.477736e-07 |
| 1.258925 | 1.750681e-08 | 1.259520e-07 | 1.296335e-06 | 3.175396e-06 | 2.212017e-06 | 5.276441e-07 | 8.945291e-08 |
| 1.412538 | 1.358137e-08 | 9.992557e-08 | 9.605226e-07 | 2.207440e-06 | 1.502561e-06 | 3.209935e-07 | 5.359113e-08 |
| 1.584893 | 1.047544e-08 | 7.938745e-08 | 7.073220e-07 | 1.504578e-06 | 9.905088e-07 | 1.878292e-07 | 3.177945e-08 |
| 1.778279 | 8.028422e-09 | 6.308562e-08 | 5.182851e-07 | 1.004321e-06 | 6.320935e-07 | 1.050494e-07 | 1.862806e-08 |
| 1.995262 | 6.117390e-09 | 5.004991e-08 | 3.785281e-07 | 6.546324e-07 | 3.898010e-07 | 5.468408e-08 | 1.069842e-08 |
| 2.238721 | 4.631302e-09 | 3.955212e-08 | 2.756192e-07 | 4.154522e-07 | 2.320289e-07 | 2.523420e-08 | 5.939369e-09 |
| 2.511886 | 3.473521e-09 | 3.105597e-08 | 1.997528e-07 | 2.564851e-07 | 1.332844e-07 | 9.790964e-09 | 3.085983e-09 |
| 2.818383 | 2.569563e-09 | 2.417142e-08 | 1.437000e-07 | 1.543607e-07 | 7.386676e-08 | 3.071280e-09 | 1.376309e-09 |
| 3.162278 | 1.871290e-09 | 1.861808e-08 | 1.022952e-07 | 9.091421e-08 | 3.929695e-08 | 7.359472e-10 | 4.605649e-10 |
| 3.548134 | 1.344270e-09 | 1.419189e-08 | 7.198779e-08 | 5.258248e-08 | 1.994582e-08 | 1.079733e-10 | 1.019282e-10 |
| 3.981072 | 9.552168e-10 | 1.071851e-08 | 5.022824e-08 | 2.998453e-08 | 9.636473e-09 | 7.628596e-12 | 1.226245e-11 |
| 4.466836 | 6.721280e-10 | 8.025096e-09 | 3.478360e-08 | 1.697366e-08 | 4.451065e-09 | 2.282970e-13 | 5.566609e-13 |
| 5.011872 | 4.681881e-10 | 5.953328e-09 | 2.371815e-08 | 9.591350e-09 | 1.926467e-09 | 2.735630e-15 | 7.243378e-15 |
| 5.623413 | 3.439751e-10 | 4.556961e-09 | 1.700078e-08 | 6.265481e-09 | 1.052130e-09 | 1.367829e-15 | 3.621699e-15 |
| 6.309573 | 2.197621e-10 | 3.160593e-09 | 1.028340e-08 | 2.939612e-09 | 1.777925e-10 | 2.798993e-20 | 1.965413e-20 |

## Fort Calhoun (41.52° N, 96.08° E), Response Spectra

| Frequency (Hz) | UHRS 1E-4 (g) | GMRS (g) | UHRS 1E-5 (g) |
|----------------|---------------|----------|---------------|
| 0.500000       | 0.046099      | 0.054046 | 0.106499      |
| 0.561009       | 0.050632      | 0.059474 | 0.117251      |
| 0.629463       | 0.054773      | 0.064392 | 0.126972      |
| 0.706269       | 0.057898      | 0.068091 | 0.134280      |
| 0.792447       | 0.060261      | 0.070915 | 0.139870      |
| 0.889140       | 0.062150      | 0.073341 | 0.144754      |
| 0.997631       | 0.064233      | 0.076257 | 0.150737      |
| 1.000000       | 0.064278      | 0.076321 | 0.150870      |
| 1.122019       | 0.067080      | 0.083104 | 0.166032      |
| 1.258925       | 0.072692      | 0.094468 | 0.191004      |
| 1.412538       | 0.084021      | 0.114645 | 0.234643      |
| 1.584893       | 0.100008      | 0.141605 | 0.292516      |

|            |          |          |          |
|------------|----------|----------|----------|
| 1.778279   | 0.113707 | 0.166307 | 0.346339 |
| 1.995262   | 0.127952 | 0.193230 | 0.405642 |
| 2.238721   | 0.150459 | 0.226072 | 0.473986 |
| 2.500000   | 0.178241 | 0.257204 | 0.533835 |
| 2.805046   | 0.206857 | 0.292878 | 0.604995 |
| 3.147313   | 0.236428 | 0.324654 | 0.665522 |
| 3.531344   | 0.251712 | 0.351595 | 0.723832 |
| 3.962233   | 0.278519 | 0.381563 | 0.781725 |
| 4.445698   | 0.293729 | 0.393776 | 0.802391 |
| 4.988156   | 0.299021 | 0.406417 | 0.830998 |
| 5.000000   | 0.299257 | 0.406779 | 0.831760 |
| 5.610092   | 0.301760 | 0.406214 | 0.828590 |
| 6.294627   | 0.288756 | 0.389274 | 0.794324 |
| 7.062688   | 0.272967 | 0.378426 | 0.777606 |
| 7.924466   | 0.270790 | 0.373177 | 0.765680 |
| 8.891397   | 0.264400 | 0.360903 | 0.738727 |
| 9.976312   | 0.260199 | 0.359828 | 0.738931 |
| 10.000000  | 0.260237 | 0.359943 | 0.739198 |
| 11.220185  | 0.247978 | 0.338195 | 0.692096 |
| 12.589254  | 0.226502 | 0.309499 | 0.633676 |
| 14.125375  | 0.207796 | 0.284959 | 0.583956 |
| 15.848932  | 0.196154 | 0.268949 | 0.551124 |
| 17.782794  | 0.188135 | 0.260493 | 0.535105 |
| 19.952623  | 0.185577 | 0.254918 | 0.522612 |
| 22.387211  | 0.182891 | 0.246759 | 0.503621 |
| 25.000000  | 0.177920 | 0.238051 | 0.484832 |
| 28.050461  | 0.178596 | 0.233486 | 0.472791 |
| 31.473135  | 0.178479 | 0.229345 | 0.462407 |
| 35.313439  | 0.176972 | 0.226717 | 0.456762 |
| 39.622330  | 0.175924 | 0.223449 | 0.449213 |
| 44.456985  | 0.174787 | 0.219755 | 0.440663 |
| 49.881558  | 0.173814 | 0.216428 | 0.432945 |
| 55.968028  | 0.171000 | 0.211586 | 0.422590 |
| 62.797161  | 0.167046 | 0.206314 | 0.411873 |
| 70.459573  | 0.162206 | 0.200852 | 0.401227 |
| 79.056942  | 0.156148 | 0.194287 | 0.388581 |
| 88.703347  | 0.149175 | 0.187440 | 0.375807 |
| 99.526793  | 0.142360 | 0.181366 | 0.364887 |
| 100.000000 | 0.133433 | 0.170906 | 0.344303 |