Equation A-2 is independently applied to determine the value of the confidence parameter l. In each case, the calculated estimates of demand *D* and capacity *C* are determined using steps 3 and 4, respectively. If the procedures of Chapter 4 are used to determine either demand or median capacity estimates, then the corresponding values of the demand factors g and resistance factors f should also be determined in accordance with the procedures of Chapter 4. If the procedures of this appendix are used to determine median demand, or capacity, then the corresponding demand and resistance factors should be determined in accordance with the applicable procedures of this appendix.

6. **Evaluate confidence**. The confidence obtained with regard to the ability of the structure to meet the performance objective is determined using the lowest of the l values determined in accordance with step 5 above, back-calculated from the equation:

$$l = e^{-b_{UT}\left(K_x - \frac{k}{2b} b_{UT}\right)} \tag{A-3}$$

where:

b = a coefficient relating the incremental change in demand (drift, force, or deformation) to an incremental change in ground shaking intensity, at the hazard level of interest, typically taken as having a value of 1.0,

b_{UT} = an uncertainty measure equal to the vector sum of the logarithmic standard deviation of the variations in demand and capacity resulting from uncertainty,

k = the slope of the hazard curve, in ln-ln coordinates, at the hazard level of interest, i.e., the ratio of incremental change in S_{aT1} to incremental change in annual probability of exceedance (refer to Section A.3.2),

K_X = standard Gaussian variate associated with probability x of not being exceeded as a function of number of standard deviations above or below the mean found in standard probability tables.

Table A-1 provides a solution for this equation, for various values of the parameters, k, l, and b_{UT}.

The values of the parameter b_{UT} used in Equation A-3 and Table A-1 are used to account for the uncertainties inherent in the estimation of demands and capacities. Uncertainty enters the process through a variety of assumptions that are made in the performance evaluation process, including, for example, assumed values of damping, structural period, properties used in structural modeling, and strengths of materials. Assuming that the amount of uncertainty introduced by each of the assumptions can be characterized, the parameter b_{UT} can be calculated using the equation:

$$b_{UT} = \sqrt{\sum_i b_{ui}^2} \tag{A-4}$$

where: b_{ui} are the standard deviations of the natural logarithms of the variation in demand or capacity resulting from each of these various sources of uncertainty. Sections A.4, A.5 and A.6 indicate how to determine b_{ui} values associated with demand estimation, beam-column connection assembly behavior, and building global stability capacity prediction, respectively.