A Study on the Effect of the State-of-Knowledge Correlation on Interfacing System Loss-of-Coolant Accident Frequency (12055)
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Although it is well known that the effect of the state-of-knowledge correlation (SOKC) can be significant especially in calculating interfacing system loss-of-coolant accident (ISLOCA) frequency that involves rupture of multiple valves, it is difficult to find published studies on the effect of the SOKC on ISLOCA frequency. In this study, the effect of the SOKC on ISLOCA frequency was examined. The results of the study showed that the effect of the SOKC on ISLOCA frequency depends on several factors: the number of components, the size of error factor, and probability distributions assumed for component failures (lognormal, beta, or gamma distribution). Also, the results imply that when the SOKC is taken into account, the use of the beta and gamma distributions is better than the use of the lognormal distribution because the former does not distort the mean failure probabilities without regard to the number of components and the size of error factor.

Component Repair Times Obtained from MSPI Data (12331)
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Information concerning times to repair or restore equipment to service given a failure is valuable to probabilistic risk assessments (PRAs). Examples of such uses in modern PRAs include estimation of the probability of failing to restore a failed component within a specified time period (typically tied to recovering a mitigating system before core damage occurs at nuclear power plants) and the determination of mission times for support system initiating event (SSIE) fault tree models. Information on equipment repair or restoration times applicable to PRA modeling is limited and dated for U.S. commercial nuclear power plants. However, the Mitigating Systems Performance Index (MSPI) program covering all U.S. commercial nuclear power plants provides up-to-date information on restoration times for a limited set of component types. This article describes the MSPI program data available and analyzes the data to obtain median and mean component restoration times as well as non-restoration cumulative probability curves.

Development, Implementation, and Impact of Convolution Factors for Offsite Power Recovery in Dominion PRA Models (12342)
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A station blackout is the result of onsite AC power failure following a loss of offsite power. Failure to reenergize an emergency AC bus by recovering offsite power to restore core cooling and inventory control will result in eventual damage to the core. While some SBO cutsets model an immediate failure of onsite AC power following loss of offsite power, other cutsets model time-dependent failures, such as the failure of an emergency diesel generator to run. In cases such as these, the time at which the station blackout starts is delayed, and the time available to recover offsite power is prolonged, resulting in a lower probability of recovery failure. The failure probability of onsite power increases with time, and the failure probability of offsite power recovery decreases with time. Convolving these failure events by accounting for the different combinations of failure probabilities allows the dependence between these events to be modeled. Modeling this dependence can result in significant risk benefit from modeling the actual risk and is easily achieved by using convolution factors to adjust the frequency of existing cutsets modeling these events as independent failures.