

**DOE-STD-3009 Hazard and Accident Analysis for  
Non-reactor Nuclear Facilities at Sandia National Laboratories**

Jeffrey A. Mahn  
Sandia National Laboratories  
Albuquerque, NM  
505/844-9995  
[jamahn@sandia.gov](mailto:jamahn@sandia.gov)

One objective of this paper is to demonstrate how the use of appropriate consequence evaluation criteria in conjunction with generic likelihood of occurrence data can produce relatively non-controversial hazard analysis results for non-reactor nuclear facility Safety Analysis Reports (SAR). An additional objective is to demonstrate a means for deriving readily defensible accident sequence frequencies, thereby enabling the screening of potentially incredible events ( $< 10^{-6}$  per year) from the design basis accident envelope.

Although DOE-STD-3009-94 addresses and even encourages use of a qualitative binning technique for deriving and ranking non-reactor nuclear facility risks, DOE reviewers invariably want to see more details associated with consequence or likelihood of occurrence bin assignments addressed in the text of the SAR. The display of hazard analysis data in simple worksheet format generally results in questions about not only the assumptions behind the data, but the bases for the assumptions themselves. And “engineering judgment” may not be considered to be an acceptable answer to such questions. This is especially true where the criteria for “qualitative” binning of likelihood of occurrence involves numerical ranges. Oftentimes reviewers want to see some sort of calculation or at least a discussion of event frequencies or failure probabilities to support likelihood of occurrence bin assignments. This may become a significant point of contention for events that have been binned as incredible ( $< 10^{-6}$  per year).

Generic likelihood of occurrence data has been used successfully in performing SAR hazard and accident analyses for two non-reactor nuclear facilities at Sandia National Laboratories. Use of such data can avoid many of the DOE reviewer questions that will inevitably arise from strictly qualitative analyses, while not significantly increasing the overall burden on the analyst.

