Risk-Informed Regulation

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Abstract

In assessing safety for nuclear facilities, regulators have traditionally used a deterministic approach. New techniques for assessing nuclear or radiological risks make it possible for regulators to incorporate risk insights into their regulations. By "risk-informing" the regulatory processes, independent bodies tasked with protecting the health and safety of the public can focus on those design and operational issues most important to safety. Such an approach is a move away from prescriptive regulations that were based on conservative engineering judgments toward regulations focused on issues that contribute significantly to safety.

Despite the availability of probabilistic risk assessment (PRA) tools, organisations often struggle with how to best use this capability. Most international regulations are still based largely on deterministic analyses that were developed without the benefit of quantitative or measurable estimates of risk. PRA considers issues of risk in a more comprehensive manner by examining a wider spectrum of initiating events and their frequency, and considers the likelihood of events in a rigorous and comprehensive manner. In some countries, nuclear regulators are actively moving toward increasing the use of risk insights in a variety of strategic arenas, including risk-informed technical specifications (operating limits and conditions), in-service inspection and testing, programs, and assessment and enforcement actions. A risk-informed approach enhances the traditional deterministic approach by explicitly considering a broader range of safety challenges, focusing resources on the basis of risk significance, considering a broader range of counter measures to mitigate challenges, and explicitly identifying and quantifying uncertainties in analyses.