

위험도에 근거한 안전주입탱크 허용정지시간 연장 Risk-Informed Evaluation of an Extension to Accumulator Completion Times

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요약

울진 5,6호기의 기술지침서에 기술된 안전주입탱크의 허용정지시간은 너무 엄격하여 운전의 유연성이 없을 뿐 아니라 정비시간이 불충분하여 완벽한 정비가 어려운 실정이다. 본 논문에서는 이런 애로사항을 타개하기 위하여 기술지침서의 완화를 위험도를 근간으로 분석하여 타당성을 제시하였다. 분석 결과 현행 1시간으로 되어 있는 허용정지시간을 안전주입탱크의 봉산농도 기준치 미달 혹은 초과 시에는 72시간, 그 이외의 경우 예를 들면 기기고장일 경우에는 24시간으로 연장했을 경우 위험도 증가는 매우 미미하였으며 Regulatory Guide 1.174에서 제시한 허용기준에 충분히 만족되는 것으로 나타났다.

Modeling and Measuring the Effects of Imprecision using Fuzzy Theory and Bayesian Theory

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Abstract

This study presents two approaches for evaluating the imprecision inherent in the PRA. Current PRA methodology uses expert opinion in the assessment of rare event probabilities. The problem is that these probabilities may be difficult to estimate even though reasonable engineering judgment is applied. This occurs because expert opinion under incomplete knowledge and limited data is inherently imprecise and uncertain in the analysis of severe accident management. In this case, the concept of uncertainty about a probability value, namely the high-order uncertainty, would be both intuitively appealing and potentially useful. This analysis considers first an accident management as a decision problem (i.e., "applying a strategy" vs. "do nothing") and uses an influence diagram. Then, the analysis applies two approaches to evaluate imprecise node probabilities in the influence diagram: "a fuzzy probability" and "an interval-valued subjective probability". For the propagation of subjective probabilities, the analysis uses the Monte-Carlo simulation. In case of fuzzy probabilities, the fuzzy logic is applied to propagate them. We believe that these approaches can allow us to understand uncertainties associated with severe accident management strategy since they offer additional information regarding the impact from imprecise input data.