

Risk Inform Emergency Action Levels

Objectives

The objective of the SUPPORT PROJECT TO RISK INFORM EMERGENCY ACTION was to explore the feasibility of using PRA to provide risk insights about emergency action levels (EALs) schemes. The effort involved the use of a probabilistic risk analysis (PRA) approach to evaluate whether selected EALs in a given Emergency Classification (EC) are risk consistent.

Description

This study was the first effort to apply PRA methodology to EAL schemes. Peach Bottom, Surry and Sequoyah were selected as the pilot plants as they represent, respectively, 1) boiling water reactors with a Mark I containment, 2) pressurized water reactors (PWRs) with a large dry containment, and 3) PWRs with an ice condenser containment. The EAL threshold conditions, as stated in plant-specific emergency plan documents, were evaluated using NRC Standardized Plant Analysis Risk models for these plants. Conditional core damage probability (CCDP) was used as the risk metric to evaluate each EAL scenario and the CCDP results served as a means to compare and evaluate EAL scenarios that are in the same EC. This study compared the CCDP values for EALs that are in the same EC to determine their consistency.

Summary of Results

The results of this study provided risk insights to be considered when developing future risk informed emergency planning (EP) regulatory activities. The results of the study showed that the current EAL schemes, in general, appropriately reflect plant risk increases as the EC severity increases. However, the results also identified some inconsistencies. These insights can be applied to enhance EAL schemes in the future. Nevertheless, it is important to note that regulatory decisions for EP are complex and should be made considering a combination of deterministic and risk insights.

Final Documentation

The details of this study are documented in [NUREG/CR-7154, "Risk Informing Emergency Preparedness Oversight: Evaluation of Emergency Action Levels — A Pilot Study of Peach Bottom, Surry and Sequoyah"](#), published in January, 2013. (ADAMS accession numbers: ML13031A500, ML13031A501). Additionally, RES performed a Level 2 PRA study to analyze emergency scenarios involving Peach Bottom EAL's associated with fission product barriers. This was exploratory in nature, but it demonstrated the capability to apply Level 2 PRA to certain EALs. The insights gained were documented in a white paper titled "[Feasibility Study of Risk Informing Emergency Preparedness Using Level 2 PRA: A Pilot Study Using Peach Bottom Level 2 SPAR Models](#)" (ADAMS accession number: ML13142A387).