

Risk Informing Emergency Preparedness Oversight Proof of Concept

Objective

This project takes advantage of advances in the science of nuclear plant accident analysis to determine if a viable technical basis can be developed to risk inform the emergency preparedness (EP) regulatory regimen. The project has identified severe accident scenarios that will be used to quantify the protection provided by nuclear plant EP programs as well as the contribution of individual program elements. If successful the project will provide quantitative techniques to assess the risk impact of emergency plan changes on a site-specific basis. By “risk inform” the staff means risk to the public conditional upon a severe accident and not risk of core damage as the term is typically used within NRC. This study supports a broader effort to create a risk informed and performance based regulatory regimen for EP.

Applications

Risk informed EP oversight would make it possible to quantify the protection provided by EP programs and maintain specific protective goals such as:

- In a severe nuclear plant accident there will be no early fatalities among the public that follow protective action direction.
- In a severe nuclear plant accident public exposure to radiation will be minimized among the public that follows protective action direction.

Additionally, it would be possible to determine the significance of certain program elements, e.g., quantifying the impact of a loss of public notification capability within two miles of the plant versus a loss beyond eight miles of the plant.

Quantifying the value of EP program elements in conjunction with developing a performance based regulatory structure would provide a method to assess the acceptability of emergency plan changes. Similar to the 10 CFR 50.59 regimen, a plan change that does not significantly affect the public health metric would be acceptable.

Approach

Accident scenarios have been selected to provide a “proof of concept” study that will be documented in a NUREG/CR. The study will estimate the value of EP and examine the value of certain program elements. The staff has identified total population dose as a metric for quantifying the value of EP conditional upon the severe accidents identified for regulatory purposes. The project will examine the potential of this tool for significance determination by using the MACCS2 Consequence Model to assess EP in response to the identified accident scenarios.

The staff will develop a SECY paper with recommendations regarding the potential for the technique to support a change in the regulatory regimen.

Progress

The project is complete and a NUREG/CR is in final review. However, the NRC response to Fukushima necessitated reallocation of resources within NSIR and the SECY paper on a conceptual risk informed and performance based EP oversight regimen will be delayed until late 2013.