

## **NUREG/CR-7160, Risk Informing Emergency Preparedness Oversight Significance Quantification Process: Proof of Concept**

### **Objective**

This project took advantage of advances in the science of nuclear plant accident analysis to identify a viable technical basis to risk inform the emergency preparedness (EP) regulatory regimen. The project identified severe accident scenarios that could be used to quantify the protection provided by nuclear plant EP programs as well as the contribution of individual program elements. The project provided a quantitative technique 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, the NUREG/CR provided a technique to determine the significance of program elements, e.g., quantifying the impact of a loss of public notification capability in specific areas.

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 regimens, a plan change that does not significantly affect the public health metric would be acceptable.

### **Approach**

Accident scenarios were selected to provide a “proof of concept” study. The study estimated the value of EP and examined the value of certain program elements. The staff identified total

population dose as a metric for quantifying the value of EP conditional upon the severe accidents identified for regulatory purposes. The method uses the MACCS2 Consequence Model to assess EP in response to the identified accident scenarios.

The project contributes to a SECY paper due 12/31/13, with a recommendation regarding the benefits of changing the EP regulatory regimen.

**Progress**

Complete.