Risk Informing Emergency Preparedness Oversight: Identification of Bounding Scenarios

Objective:

This project takes advantage of advances in the science of nuclear plant accident analysis to determine if it is possible to develop a technical basis to risk inform the EP regulatory structure. If successful, the techniques developed can be used to quantify the protection provided by nuclear plant EP programs and develop techniques for risk informing requirements on a site-specific basis.

Applications:

Risk informed EP oversight would make it possible to quantify the protection provided by EP programs (e.g., as opposed to ad hoc efforts) and state protective goals such as:

- o In a severe nuclear plant accident there will be no early fatalities among the public that follow protective action direction.
- o In a severe nuclear plant accident there will be no measurable increase in cancer fatalities among the public that follows protective action direction.

Additionally, it would be possible to determine the significance of program elements in terms of health consequences avoided, e.g., stratifying the loss of public notification capability within 2 miles of the plant versus a loss beyond 8 miles of the plant.

Approach:

In order to risk inform EP, accident scenarios must be selected that are credible and appropriate for use. Analysis is being performed using the NRC SPAR models and analysis of potential hostile action.

The project will perform analyses to support staff development of a technical basis to risk inform NPP EP. It will determine whether a spectrum of credible accidents that bound emergency response efforts to protect public health and safety can be developed and if so, develop that spectrum. The project will review existing probabilistic risk analyses to identify credible bounding scenarios and determine whether a spectrum of credible accident scenarios that represent hostile action can be developed and if so develop that spectrum. If successful the project will perform calculations using the MACCS2 Consequence Model to assess health consequences of various accident scenarios.

Progress:

This is a multi-year development effort initiated in mid-2010. The completion schedule is dependent upon funding. However, progress is being made in 2010 and the staff is hopeful that full funding will allow the project to be finished late in 2011.

Tasks

1. Review Probabilistic Risk Assessment (PRA) Documents (currently working)
2. Hostile Action Based Scenarios (currently working)
3. Review relevant similar analyses (late 2011 pending funding)
4. Identify credible severe accident scenarios and demonstrate use with MACCS2 (late 2011 pending funding)