



State-of-the-Art Reactor Consequence Analyses (SOAR CA)

**Briefing for Commissioner's Technical Assistants
December 20, 2006**

Office of Nuclear Reactor Regulation
Office of Nuclear Regulatory Research
Office of Nuclear Security and Incident Response



Agenda

- **Overview**
- **Status**
- **Communication**
- **Industry Feedback**
- **Accomplishments**



Overview

OBJECTIVE

- Realistic evaluation of severe accident progression, radiological releases and offsite consequences
- Develop a faster-than-real-time tool to assist in decision-making in the event of off normal events



Overview - Continued

Background

- NUREG/CR-2239 (1982 Sandia Siting Study)
- Improvements Since 1982
 - Modeling (PRA, MELCOR, MACCS)
 - Plant Performance
 - Plant Modifications
 - Severe Accident Research
 - Additional Mitigating Measures
 - Emergency Preparedness Improvements



Overview - Continued

Approach

Use detailed integral modeling of plant systems, radionuclide transport and deposition, and release pathways (i.e., PRA, MELCOR, MACCS)

- Select scenarios using existing PRA information
- Estimate accident progression and fission product release to environment using MELCOR
- Estimate offsite radiological consequences using MACCS



Overview - continued

Approach – Continued

- Account for plant improvements
- Account for recent developed mitigation strategies
- Use risk communication techniques



Overview - Continued

Potential Uses

- **Safety-Related Decision Making**
- **New Reactor Licensing at New Sites**
- **Emergency Preparedness and Emergency Response**
- **Regulatory analysis for backfitting decisions**
- **Generic safety issues**
- **Communication with the public**
- **Insight for future regulatory and research activities**



Overview - Continued

Schedule

- Three-year project
 - 1st year: Westinghouse 4-loop, large dry containment, GE Mark I, and GE Mark III plants
 - 2nd year: GE Mark II, Ice Condenser, and other Westinghouse plants
 - 3rd year: B&W and CE plants
- Six plants selected as lead plants
 - Provide Mixture of Population Densities
 - Westinghouse 4-loop, large dry containment
 - Diablo Canyon, Salem, Seabrook
 - GE Mark I
 - Duane Arnold, Fermi, Peach Bottom

All plant results will be released at the completion of project



Status

- **Codes Improvements**
- **Accident Scenario Selection for Plant**
- **Request for Plant Information**
- **Communication Plan**



Communication Plan

- **Communication Package**
 - **Communication Plan**
 - **WEB Page**
 - **Fact Sheet**
 - **Press Release**
 - **Links**
 - **Contact Us**
 - **Frequently Asked Questions and Answers**
 - **Meetings Notices**
 - **Meeting Summaries**
 - **Presentations**
 - **Probabilistic Risk Analysis and Severe Accident Modeling**
 - **Related Information**



Communications

- **ACRS briefing - September 2006**
- **Public meeting - September 2006**
- **Announce 6 lead plants – September 2006**
- **Drop-in visits/calls with lead plant staff – October 2006**
- **Public meeting with NEI and lead plant staff - October 2006**
- **Communication plan – December 2006**
- **ACRS briefing – December 2006**
- **Commissioner Assistant briefing – December 2006**



Industry Feedback

- Support the project in concept
- Questioned the degree to which the analyses are plant-specific
- Concerned about the presentation of results
- Concerned with aggressive schedule
- Agreed with the concept of lead plants
- Concerned with the selection of the six lead plants
- NEI letter dated Nov. 29, 2006



Accomplishments

- **Identification of Code Improvements**
- **Communication Plan**
- **Plant Groupings**
- **Scenario Selection Process**
- **Public Meetings**
- **Lead Plants Selection**



Other Items

- **Treatment of dose and dose effects**
- **Use of sheltering as a protective action**
- **Use of the B.5.b Initiative mitigation strategies**
- **Terminology - Consequence Analyses versus Risk Analysis**
- **Information collection from licensees**
 - OMB requirements
 - Through industry participation
- **Industry participation i.e., peer reviews**
- **Communication of assessment results**



August 15 2006 Briefing

- **Path to elevate land contamination to Commission**
- **Discussion of EP and B.5.b information**
- **Pierson, NMSS on conservatism used in recent fuel cycle facility event analysis – to avoid same mistake**
- **Basis for not evaluating seismic scenario involving destruction of roads and bridges**