



***United States
Nuclear Regulatory Commission***

An Overview of Benchmarking of Plant-Specific Risk Models for Significance Determination Process (SDP)

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BACKGROUND

- **SECY 99-007, “Recommendations for Reactor Oversight Process Improvements,” January 1999**
- **SECY 99-007A, March 1999 described the Significance Determination Process (SDP) Methodology**
- **Seven Cornerstone SDPs Developed Since April 2000**

RISK-INFORMED INSPECTION NOTEBOOKS (Phase 2 SDP Notebooks)

- **Development of Phase 2 SDP Notebooks**
 - **Allow NRC Inspectors to Determine Initial Risk Characterization of Inspection Findings**
 - **Provide Inspectors with Updated Plant-Specific Risk Insights**
- **71 Revision 0 SDP Notebooks Developed for all U.S. Commercial Nuclear Power Plants**
- **Trial Use Indicated the Need to Benchmark and Update Risk Information in SDP Notebooks**

BENCHMARKING ACTIVITIES

- **Main Objectives**
 - **Ensure Risk Insights Are Not Missing from SDP Worksheets**
 - **Assure Risk Characterization Results from Using SDP Notebook Are Consistent with Licensee's PRA Model**
- **Benchmarking Activities Conducted by Team of NRC Staff and Contractors**
- **Benchmarking Project Initiated Since April 2001**

BENCHMARKING PROCESS

- **Prepare Benchmarking Plan**
- **Obtain Overview of Licensee's PRA Model**
- **Identify a Set of PRA Basic Events and their Associated Risk Achievement Worth (RAW) Values**
- **Assess Risk Significance of Hypothetical Inspection Findings using Licensee's PRA Basic Event RAW Values versus SDP Notebook Model**
- **Revise SDP Notebook Worksheets, and Re-Assess the Hypothetical Case Studies**
- **Prepare Benchmarking Report and Rev. 1 SDP Notebook**

LESSONS LEARNED FROM EARLY ACTIVITIES

- **Results from Benchmarking of Nine SDP Notebooks**
 - **Matching Significance Determinations Increased from 56% to 75% of Hypothetical Cases**
 - **Underestimations Decreased from 13% to 5 %**
 - **Overestimations Decreased from 30% to 20%**
- **Primary Causes of Discrepancies**
 - **Differences in PRA Modeling and Data Assumptions**
 - **Consideration of External Event Initiators**
- **Guidance to NRC Inspectors to Discuss Added Significance of External Event Contributions with Licensee Staff**

CONCLUSIONS

- **Systematic Approach for Benchmarking Process**
- **Lessons Learned**
 - **Resolve Problems with Revision 0 SDP Notebooks**
 - **Define Consistent Fixes**
- **Additional Insights**
 - **Improve Technical Quality**
 - **Provide Valuable Information to NRC Staff Users**