



Briefing on RES Programs, Performance, and Plans

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Agenda

Overview

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**Programs &
Performance**

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**Commission
Decisions &
Summary**

Brian Sheron

Key Messages

- **Develop technical bases to support regulatory decisions**
 - **Develop technical tools, data, and analytical models**
 - **Conduct confirmatory research and analyses**
- **Provide in-house technical expertise to regulatory offices and the Regions**

Key Messages

- **Anticipate NRC's future needs**
 - **Develop technical infrastructure for advanced reactor licensing reviews**
 - **Support new reactor licensing**
 - **Develop Regulatory Guides to provide acceptable methods for designing digital I&C systems**
 - **Develop Long-Term Research Plan**

DFERR Program Areas

- **Materials science**
- **Digital I&C and electrical engineering**
- **Nuclear fuel behavior under accident conditions**
- **Health physics**
- **Environmental transport**
- **Structural engineering**
- **Seismology**

Program Accomplishments

- **Completed research on PWR sump performance**
- **Developed technical basis for revisions to 10 CFR 50.46a fuel clad acceptance criteria for LOCA**
- **Developed technical foundation for regulatory improvements in digital I&C**

Program Accomplishments

- **Developed technical basis for guidance on the implementation of 10CFR20.1406, “Minimization of Contamination”**
- **Developed technical basis for the evaluation of materials fatigue-related operability issues**
- **Completed technical review of bio-remediation proposal at Cimarron site**

Issues and Path Forward

- **Proactive materials degradation assessment**
- **Integrated digital I&C and human-machine interface**
- **Reactor license renewal -- life beyond 60**

DRASP Program Areas

- **New and advanced reactors infrastructure development**
- **Thermal-hydraulics, severe accidents, reactor physics, and safety analyses**
- **Probabilistic risk assessment**
- **Human factors and reliability**
- **Fire research**
- **Accident Sequence Precursor analyses**
- **Generic Safety Issues**

Program Accomplishments

- **Supported NRO on ESBWR review**
- **Completed high-priority regulatory guides**
- **Completed Technology Neutral Framework**
- **Established an MOU with DOE to address NGNP licensing strategy**
- **Obtained French data for burnup credit**

Program Accomplishments

- **Endorsed PRA quality standards**
- **Supported safety culture inspections**
- **Improved generic safety issue program**
- **Streamlined accident sequence precursor assessments**

Program Accomplishments

- **Issued industry trend report**
- **Completed major fire research activities**

Issues and Path Forward

- **Improved RIRIP**
- **External events SPAR models**
- **Expanding workload regarding new and advanced reactors**
- **Monitoring DOE progress on GNEP**
- **Non-LWR PRA data and methods**

Program Accomplishments

Human Capital

- **Strategic approach to critical staffing needs**
- **Recruitment**
 - **49 new employees in FY 2006**
 - **Depth of experience**
 - **Breadth of technical expertise**
- **Training**
 - **Partnering with experienced staff**
 - **Training in technical specialty and contract management**

Program Accomplishments

Human Capital

- **Knowledge Management and Transfer**
 - **HTGR Community of Practice**
 - **Document capture, preservation, and sharing**
 - **Research monthly technical seminars**

Challenges and Plans

- **Continuing to fill critical and specialized skill gaps**
- **Knowledge management**

Commission Decisions

- **NAS study**
- **Technology neutral framework / Part 53 ANPR**
- **Integrated long-range research plan**
- **Expanded program on state-of-the-art reactor consequence analyses (SOARCA)**

Summary

- **RES is helping position the agency to address future regulatory challenges through forward-looking research.**
- **In-house expertise supports NRC's licensing and regulatory activities.**

Acronyms

- **ANPR** **Advanced Notice of Proposed Rulemaking**
- **ASME** **American Society of Mechanical Engineers**
- **ASP** **Accident Sequence Precursor**
- **CAROLFIRE** **Cable Response to Live Fire**
- **DFERR** **Division of Fuel, Engineering, and Radiological Research**
- **DOE** **Department of Energy**
- **DRASP** **Division of Risk Assessment and Special Projects**
- **EPR** **Evolutionary Pressurized Reactor**
- **ESBWR** **Economic Simplified Boiling Water Reactor**
- **FY** **Fiscal Year**
- **GNEP** **Global Nuclear Energy Partnership**
- **HTGR** **High-Temperature Gas-Cooled Reactor**
- **I&C** **Instrumentation and Control**
- **IRSN** **Institut de Radioprotection et de Sûreté Nucléaire**

Acronyms

- **LOCA** **Loss-of-Coolant Accident**
- **LWR** **Light-Water Reactor**
- **MOU** **Memorandum of Understanding**
- **NDE** **Non-Destructive Examination**
- **NFPA** **National Fire Protection Association**
- **NGNP** **Next Generation Nuclear Power**
- **PBMR** **Pebble Bed Modular Reactor**
- **PRA** **Probabilistic risk assessment**
- **PWR** **Pressurized Water Reactor**
- **RIRIP** **Risk-Informed Regulation Implementation Plan**
- **SOARCA** **State-of-the-Art Reactor Consequence Analysis**
- **SPAR** **Standardized Plant Analysis Risk model**
- **TRACE** **TRAC/RELAP5 Advanced Computing Engine**
- **V & V** **Verification and Validation**