U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Briefing on RES Programs, Performance, and Plans

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Agenda

Overview	Brian Sheron
Programs & Performance	Mark Cunningham Farouk Eltawila Mabel Lee
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**