

**U.S.NRC**

United States Nuclear Regulatory Commission

*Protecting People and the Environment*

**Office of Nuclear  
Regulatory Research  
Programs, Performance,  
and Future Plans**

**Bill Borchardt**

**Executive Director for Operations**

**February 18, 2010**

# **AGENDA**

**Program Overview - Brian Sheron**

**State-of-the-Art Reactor**

**Consequence Analysis (SOARCA) -  
Jennifer Uhle**

**Analysis of Cancer Risk in**

**Populations Living Near Nuclear  
Power Facilities - Jennifer Uhle**

**Advanced Reactor Research -  
Jennifer Uhle**

**Probabilistic Risk Assessment -  
Christiana Lui**

# **AGENDA (continued)**

**Human Reliability Analysis -  
Christiana Lui**

**Life Beyond 60 Research - Michael  
Case**

**Long-Term Research - James Lyons**

**RES Results from the OIG Safety  
Culture and Climate Survey - Mary  
Muessle**

**RES Focus Areas - Mary Muessle**

**Closing Remarks - Brian Sheron**

# **Program Overview**

- **Accomplishments FY 2009**
  - **Provided regulatory offices with all requested work products**
  - **Issued all agency and congressionally mandated reports, e.g. Abnormal Occurrence Report**
  - **Made progress in resolving open generic issues**
  - **Developed numerous regulatory guidance documents**
  - **Conducted numerous knowledge management activities, e.g. TMI-2 seminar**

# **Program Overview (continued)**

- **Challenges**

- **Program**

- **Developing new staff**

- **Staying connected**

- **Technical**

- **Defining needed long-term spent fuel storage research**

- **SOARCA**

- **Level 3 PRA**

# **State-of-the-Art Reactor Consequence Analysis (SOARCA)**

- **Background**
  - **Evaluate best estimate consequences of selected scenarios**
  - **Uses modern computer modeling programs and evaluation techniques**
- **Status/Accomplishments**
  - **Initial technical analysis completed**
  - **Radioactive releases are smaller and occur later than previously estimated**
  - **Report currently undergoing peer review by independent panel**

# **SOARCA (continued)**

- **Challenges**
  - **Public review and comment on SOARCA**
  - **Communication of SOARCA results to all stakeholders**
- **Policy Issues**
  - **Options for follow-on work**
  - **Regulatory insights**

# **Analysis of Cancer Risk in Populations Living Near Nuclear Power Facilities**

- **Background**
  - **Update 1990 NCI study**
- **Accomplishments**
  - **Developed initial study methodology**
  - **Established peer-review committee**
  - **Established communication team**
  - **Issued sources sought notice**

# **Analysis of Cancer Risk (continued)**

- **Challenges**
  - **Communication to ensure a shared understanding with stakeholders**
- **Next Steps**
  - **Develop communication tools to facilitate public outreach**

# **Advanced Reactor Research**

- **Background**

- **Anticipate advanced reactor design submittals**

- **Status/Accomplishments**

- **Collaborative interactions with DOE**
- **Initiated research and infrastructure development for NGNP licensing review**
- **Began low-level efforts on small modular reactors**

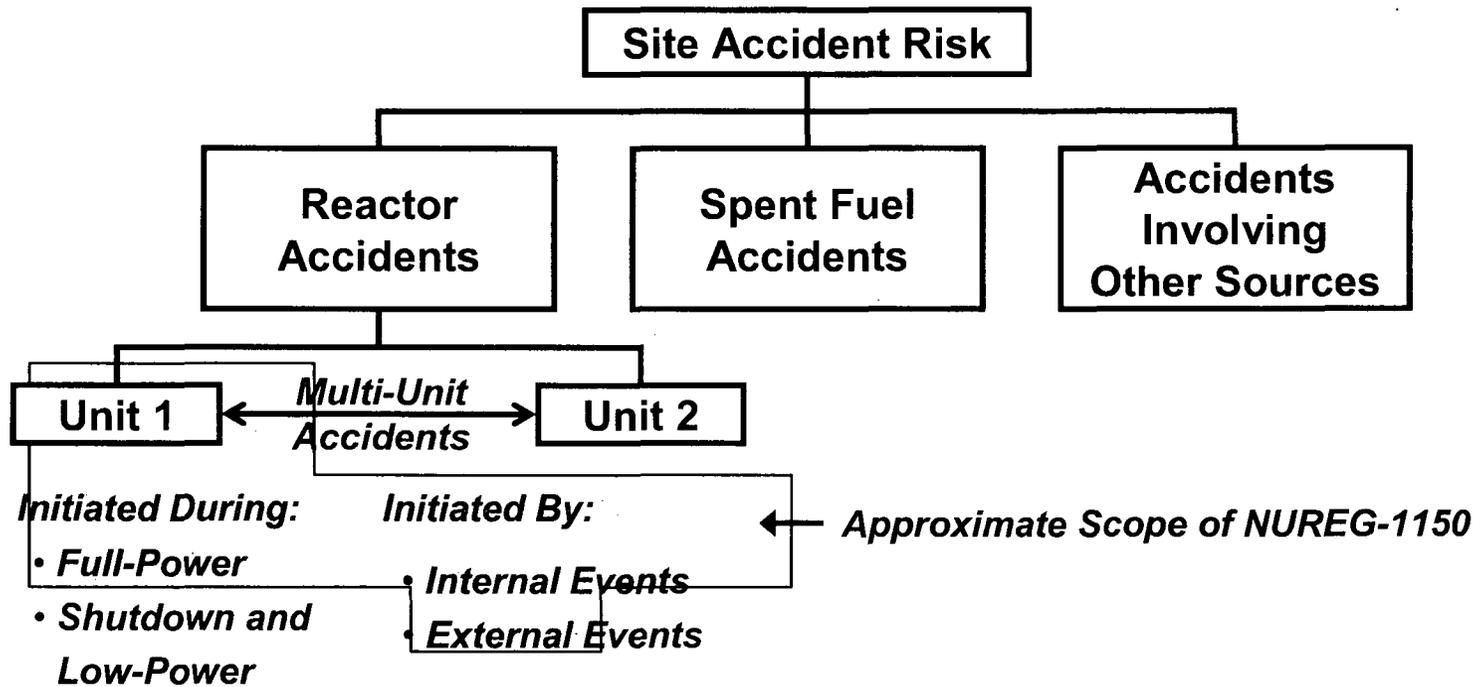
# **Advanced Reactor Research (continued)**

- **Challenges**
  - **Uncertainty in design type**
  - **Short time horizon**
- **Next Steps**
  - **Continue to research technical safety issues and develop infrastructure**
  - **Coordinate with NRO and interact with DOE**

# **Probabilistic Risk Assessment (PRA)**

- **Background**
  - **Substantial new developments since NUREG-1150**
  - **SOARCA insights**
  - **Need for “Risk Analysis Tool Box”**
- **Status/Accomplishments**
  - **Identified project goals**

# New Level 3 PRA



# **New Level 3 PRA (continued)**

- **Challenges**

- **Best approach – resources and priority**
- **Need for industry cooperation**

- **Next Steps**

- **Develop scoping study to formulate project plan**
- **Commission guidance**

# **Human Reliability Analysis (HRA)**

- **Background**
  - **Human element highly influential in safety**
- **Status/Accomplishments**
  - **Past work led to current regulatory tools and actions**
  - **Ongoing research to integrate HRA into routine regulatory assessments**

# **HRA (continued)**

- **Challenges**

- **Quantity and quality of data**
- **Evolving design detail for:**
  - **Advanced control rooms**
  - **New concept of operations**

- **Next Steps**

- **Continue international and domestic partnership**
- **Integrate insights into regulatory guidance**

# **Life Beyond 60 Research**

- **Background**
  - **NRC regulations do not prevent subsequent license renewal past 60 years**
- **Status/Accomplishments**
  - **Scoping efforts identified focus areas**
  - **NRR user need request developed to provide basis for key future activities**

# **Life Beyond 60 Research (continued)**

- **Challenges**
  - **Timely modification to regulatory framework**
- **Next Steps**
  - **Begin assessment of potential modification to regulatory framework**
  - **Develop an expanded materials degradation assessment**
  - **Develop a catalog of results from licensee implementation of aging management programs**

# **Long-Term Research**

- **Background**
  - **Scoping in nature**
    - **Are there safety issues involved?**
    - **Who needs to address them?**
    - **When do they need to be addressed?**
  - **Fundamental insights for >5 years in the future**
- **Status/Accomplishments**
  - **First plan defined in 2007, implemented in 2009, updated yearly**
  - **Projects funded in FY 2009 and FY 2010**

# **Long-Term Research (continued)**

- **Challenges**
  - **Not getting too far ahead of the industry**
- **Policy Issues/Next Steps**
  - **Resource allocation process will follow Commission direction**

# **RES Results from the OIG Safety Culture and Climate Survey**

- **Background - Results of survey**
- **Status/Accomplishments**
  - **Analysis of the survey results**
  - **Strengths in RES**
    - **Working environment**
    - **Building teamwork/respect**
    - **Work/Life balance**
    - **Fair performance evaluation**
    - **Effective communication by supervisors**

# **RES Results from the OIG Safety Culture and Climate Survey (continued)**

- **Challenges**
  - **Staying connected**
  - **Communication and Empowerment**
  - **Training and development**
  - **Quality Focus**



# Focus Areas 2009

## Stay Connected & Maintain Relationships w/Stakeholders

- ▶ Reach Out to Customers to Overcome Distance
- ▶ Utilize Technology to Maintain Relationships
- ▶ Share Success Stories & Best Practices

## Maintain High Technical Quality

- ▶ Develop Standardized Research Plans
- ▶ Develop Life-Cycle Project Coordination Process
- ▶ Collect Feed Back on Research Products

## Five Focus Areas

- ▶ Maintain High Technical Quality
- ▶ Emphasize Project Management & Fiscal Awareness
- ▶ Optimize Performance of Corporate Support
- ▶ Stay Connected & Maintain Relationships w/Stakeholders
- ▶ Promote Self-Development & Well-Being

## Promote Self-Development & Well-Being

- ▶ Develop and Maintain Knowledge Management Notebook
- ▶ Form an Employee Network Group Church Street Information, Living and Learning (CHILL)

## Emphasize Project Management & Fiscal Awareness

- ▶ Optimize ROMA Capabilities
- ▶ Maintain Current Contracting Templates on the Web
- ▶ Apply Lean Six Sigma to Contracting Processes

## Optimize Performance of Corporate Support

- ▶ Adapt Electronic Document and Action Tracking System to RES Tracking Systems
- ▶ Establish Central Location for Up-To-Date Guidance For Processes and Procedures

# **Closing Remarks**

- **Priorities for FY 2010**
- **Provide regulatory offices with tools and information needed to assure public health and safety**
- **Agencywide collaboration and strong coordination**

# Acronyms

- **DOE - U.S. Department of Energy**
- **FY - Fiscal Year**
- **HRA - Human Reliability Analysis**
- **NCI - U.S. National Cancer Institute**
- **NGNP - Next Generation Nuclear Plant**
- **NRC - U.S. Nuclear Regulatory Commission**
- **NRO - Office of New Reactors**

## **Acronyms (continued)**

- **OIG - Office of Inspector General**
- **PRA - Probabilistic Risk Assessment**
- **RES - Office of Nuclear Regulatory Research**
- **SECY - Office of the Secretary**
- **SOARCA - State-of-the-Art Reactor Consequence Analysis**
- **TMI - Three Mile Island**