

COMMISSION MEETING SLIDES/EXHIBITS

**BRIEFING ON RES
PROGRAMS AND PERFORMANCE**

THURSDAY, MAY 10, 2001



Reactor Safety Research

Dr. Dana A. Powers
Advisory Committee on
Reactor Safeguards

ACRS Report on Reactor Safety Research

- **Identify new research directions to better help the agency meet its mission obligations**
- **Examine the ongoing research programs**

Future Research Directions

**Research staff is very aware of
challenges coming in the future**

- **Risk-informing license renewal**
- **Performance-based fire protection**
- **Pressurized thermal shock issues**
- **New technologies for existing plants**
- **Extended fuel burnup and MOX**
- **New reactor technologies**

ACRS Suggestions

- **Synergisms among regulatory actions**
 - **License renewal**
 - **Power uprates**
 - **Extended fuel burnup**
 - **Best estimate analyses**
- **Formal decisionmaking methods**
- **‘Clean Sheet’ revision of regulations for future reactor designs**

Current Programs

- **ACRS considered . . .**
 - **Is the work needed for NRC's independent examination of a regulatory issue?**
 - **Has the work progressed sufficiently to make regulatory decisions?**
 - **Should the program be modified to better meet agency needs?**

AREAS

- **PRA**
- **Human Factors**
- **Fuel**
- **Materials/Metallurgy**
- **Thermal Hydraulics**
- **Analysis and Evaluation of Operational Data**
- **Spent Fuel Storage**
- **Severe Accidents**
- **Fire Protection**
- **Digital I&C**
- **Civil/Seismic**
- **Criticality Safety**
- **Radiation Effects**

Some Well Organized and Well Conducted Research Programs

- **Thermal Hydraulics Research**
 - Technically strong & important mission
- **Confirmatory Fuel Research**
 - Well leveraged
 - May need additional resources
- **Environmentally assisted cracking**
 - Well leveraged
 - Preserving an important competency

Outstanding Example of Research Organization

- **Pressurized Thermal Shock Initiative**
 - **Probabilistic fracture mechanics**
 - **PRA**
 - **Thermal hydraulics**

Excellent Research Planning

- **Fire Protection Research**
- **Digital Instrumentation & Control (I&C)**
- **Analysis and Evaluation of Operational Data**

Legacy Data Preservation

- **Criticality data**
- **Should there be similar efforts in the thermal hydraulic and severe accident areas?**

Areas to Strengthen

- **Strategies to match the good tactics**
 - **Scope and depth of PRA capabilities**
 - **Dissemination of PRA technologies to the line organizations and the Regions**
- **Human factors and human reliability research**
 - **Objectives**
 - **Coordination**

Role and Future Direction of Nuclear Regulatory Research

**Dr. Kenneth Rogers, Chairman
Expert Panel
May 10, 2001**

Expert Panel

Role and Direction of Nuclear Regulatory Research

- **John Ahearne**
- **William H. Bohlke**
- **Robert J. Budnitz**
- **David Helwig**
- **J. Aloysius Hogan**
- **Paul Leventhal**
- **Michel Livolant**
- **David Lochbaum**
- **Jane C. S. Long**
- **William D. Magwood, IV**
- **Alexander Marion**
- **Theodore U. Marston**
- **Dominic J. Monetta**
- **Kenneth L. Mossman**
- **Thomas Murley**
- **Harold B. Ray**
- **Edward Scherer**
- **Kristine L. Svinicki**
- **Andrew R. Wheeler**
- **Kenneth C. Rogers,
Chairman**
- **Raymond W. Durante,
Project Coordinator**

Is NRC Spending Enough on Research?

- **Research, particularly anticipatory research, is underfunded by \$4M-\$12M**
- **10%-20% of RES budget too little for emerging issues**
- **RES budget may be too low to maintain its core technical capabilities**
- **RES should expand its technical capabilities & contractor services**

Is NRC Doing the Right Research?

- **Not enough anticipatory, materials & waste research**
- **Gaps in technical capabilities can come from present emphasis on user needs**
- **More work is needed on PRA utilization, methods and data**
- **ACNW should produce a list of unfunded but “must do” projects**

Is NRC Doing the Right Research?

- **Special skills of RES should be used to review waste management programs**
- **Research prioritization process needs greater NRR-NMSS coordination**
- **A large fraction of NRC research costs should come from general funds appropriated by Congress**

Is NRC Research Using the Right People?

- **NRC cannot rely entirely on the national labs**
- **The most qualified organizations must be used**
- **Independence must be maintained**
- **Contracting with non governmental organizations must be made easier**
- **University teams good for anticipatory research**

Is NRC Research Using the Right People?

- **More collaborations with DOE & other qualified organizations to extend NRC dollars**
- **Use cross training to avoid isolation of in house researchers**
- **RES should reassess unfunded but needed research & the competencies & funds required to carry them out**
- **Every two to three years do broad based expert review of all NRC research**

Recommendation 1

- **NRC must maintain and support a used, useful, reliable and respected Office of Nuclear Regulatory Research that is an unassailable source of technical information and support for regulatory actions.**

Recommendation 2

- **RES must support the other Program offices & they should be required to coordinate their activities with RES e.g., planning new work, establishing technical objectives of studies and assessing validity of data and analyses.**

Recommendation 2

- **RES should be allowed to initiate anticipatory technical studies without approval by other Program offices, but with their input and cognizance wherever possible.**

Recommendation 2

- **RES must be able to do and be seen as able to do independent verification of data which NRC will rely on for regulatory action.**

Recommendation 2

- **RES must institute and maintain a comprehensive and effective communications program to make available their plans and activities.**

Recommendation 3

- **RES must continue to grow its cooperative efforts with other organizations e.g., DOE, EPRI, industry, academia, public interest groups and international organizations.**

Recommendation 3

- **RES must seek out and wherever possible, utilize facilities, equipment and resources available from these entities and maximize the use of technical data and results already developed.**

Recommendation 3

- **RES, in cooperation with and supported by the Commission, must establish procedures to accomplish this while fully retaining the decision making independence of RES.**

Recommendation 4

- **A clear understandable definition of what research at NRC includes and does not include and its value to safety must be established by the Commission, accepted by the staff and Program offices and effectively conveyed to all stakeholders.**

Recommendation 4

- **Continuing efforts must be made through research to eliminate unnecessary regulatory burdens on stakeholders while focusing on areas that will produce benefits through safer and more efficient operations.**

Recommendation 4

- **Charges to licensees for research costs should be on the basis of identifiable value to the efficient and effective regulation of those licensees.**



United States Nuclear Regulatory Commission

Views on Assessments of Office of Nuclear Regulatory Research

**Ashok C. Thadani, Director
Office of Nuclear Regulatory
Research**

May 10, 2001

Outline

- **Background**
- **Common Themes**
- **Expert Panel Report**
- **ACRS Report**
- **DOE Laboratories Report**
- **Summary**

Common Themes

- **Maintain core competency**
- **Conduct research for future challenges e.g., advanced reactors, revised regulatory structure**
- **Consider synergistic effects**
- **Improve and expand PRA use**
- **Improve communications**

Expert Panel Report

- **Improve infrastructure**
- **Increase anticipatory and cooperative research**
- **Expand contractor base**

The Chairman's Three Questions

- **Is RES funded at the right level?**
- **Is RES doing the right research?**
- **Is RES using the right performers?**

ACRS Report

- **Scope of assessment**
- **Additional research**
- **Recommendations for closure**
- **RES plans**

DOE Laboratories Report

- **RES requested views in Oct. 1999**
- **Identifies needs for additional safety research**
- **Some technical areas deserve careful evaluation**

Summary

- **Value of assessments**
- **Will consider recommendations**
- **Commission directions**
- **Make appropriate adjustments**