

**ACRS MEETING WITH
THE U.S. NUCLEAR
REGULATORY
COMMISSION**

JUNE 2, 2004

OVERVIEW

Mario V. Bonaca
ACRS Chairman

LICENSE RENEWAL

- **Streamlined ACRS review of license renewal applications**
- **Reviewed three applications since October 2003 and plan to review another three during the remainder of CY 2004**

LICENSE RENEWAL (Cont'd)

- **Will review six applications in CY 2005**
- **Will review updates to Generic License Renewal Guidance documents (SRP, GALL, and Reg. Guide)**

10 CFR 50.69

- **Held a Subcommittee meeting in February 2004 to discuss:**
 - **Resolution of public and ACRS comments on the proposed 10 CFR 50.69**
 - **NEI implementation guidance document, Revision D**
- **Plan to review the draft final 10 CFR 50.69 in June 2004**

ACR-700 DESIGN

- **Held a Subcommittee meeting with AECL representatives and staff in January 2004 to discuss the ACR-700 design**
- **Plan to review the staff's Safety Assessment Report**
- **Plan to tour the Chalk River facility**

EARLY SITE PERMIT APPLICATIONS

- **Plan to review staff's SERs on ESP applications**
- **Anticipate review of one SER in late CY 2004**

FUTURE ACTIVITIES

- **Risk-Informed and Performance-Based Regulation**
- **Materials and Metallurgy**
- **Advanced Reactor Designs**
- **Resolution of GSIs**
- **Revisions to SRP**
- **High-Burnup Fuel Issues**

FUTURE ACTIVITIES (Cont'd)

- **Use of MOX Fuel in Commercial Reactors**
- **Safeguards and Security Matters**
- **Assessment of Research Quality**
- **Core Power Upgrades**
- **License Renewal Applications**

FUTURE ACTIVITIES (Cont'd)

- **Fire Protection**
- **Human Factors and Human Reliability Assessment**
- **Operating Plant Issues**

PWR SUMP PERFORMANCE

John D. Sieber

PRECURSOR EVENTS

- **TMI-2**
- **Perry-1 (two events)**
- **Limerick (two events)**
- **Barsebäck Event**

TECHNICAL ISSUES

- **Debris Generation**
 - **Break size**
 - **Zone of influence**
 - **Materials**
- **Debris Transport**
 - **Analytical methods**
 - **Debris interception**

TECHNICAL ISSUES (Cont'd)

- **Head Loss**
 - **Screen sizing**
- **Chemical Effects**

ACRS ISSUES

- **Limitations of the present knowledge base**
- **Maturity of the technical content of RG 1.82, Rev. 3**
- **Adequacy of industry guidance**
- **Use of risk information**

ACRS ISSUES (Cont'd)

- **Alternative solutions, if uncertainties are too large**
- **Need for additional research**

PRA QUALITY FOR DECISIONMAKING

George E. Apostolakis

PRA QUALITY FOR DECISIONMAKING

- **The NRC staff has developed a practical strategy that would encourage the development of guidance documents necessary to implement the Commission's phased approach to PRA quality**

PRA QUALITY (Cont'd)

- **The phased approach is contingent on the availability of guidance documents (i.e., consensus standards and regulatory guides)**

PRA QUALITY (Cont'd)

- **The staff should be prepared to develop guidance documents independently, if consensus standards are not developed in a timely manner to meet the Commission's deadline for achieving Phase 3**

PRA QUALITY (Cont'd)

- **It is more appropriate to refer to the technical adequacy of PRA for a specific regulatory decision rather than its quality**

PRA QUALITY (Cont'd)

- **An application that uses a PRA scope greater than that for which guidance documents exist should not be given low-priority staff review**
- **Proactive licensees should not be discouraged from pushing the boundaries of the state of the practice**

PRA QUALITY (Cont'd)

- **Licensees should be encouraged to address in their application the relevant technical issues, as discussed in the December 18, 2003 SRM**
- **The staff should give high priority to these reviews**

PRA QUALITY (Cont'd)

- **Development of guidance on how to perform sensitivity and uncertainty analyses should receive a higher priority in the action plan**

RISK-INFORMING
10 CFR 50.46

William J. Shack

Risk-Informing 10 CFR 50.46

- **The risk-informed revision to 10 CFR 50.46 should permit a wide range of applications**
- **RG 1.174 is appropriate for evaluating the acceptability of changes proposed under a revised rule**

RISK-INFORMING 10 CFR 50.46 (Cont'd)

- **Explicit criteria for mitigative capability should be developed to ensure that sufficient defense-in-depth is maintained as plant changes are made**

RISK-INFORMING

10 CFR 50.46 (Cont'd)

- **The appropriate metric for the design basis maximum break size is the LOCA initiating event frequency**
- **It is possible and desirable to make generic definitions of maximum break size applicable to categories of plants**

RISK-INFORMING

10 CFR 50.46 (Cont'd)

- **The number and kind of plant changes allowable will depend on the scope and technical detail of the licensee's PRA**

RISK-INFORMING

10 CFR 50.46 (Cont'd)

- **If a limited scope PRA is used, contributions to the total risk and the change in risk from the omitted portions of the PRA must be estimated**
- **A convincing demonstration that the resulting changes in risk are small enough is needed**

RISK-INFORMING 10 CFR 50.46 (Cont'd)

- **The results of the expert elicitation for the frequency of LOCA events are not yet final**
- **The results need to be peer reviewed**
- **The process is well structured and the expert panel has an appropriate range of expertise**

RISK-INFORMING 10 CFR 50.46 (Cont'd)

- **The results will help provide a technical basis for the selection of the maximum break size**
- **Will review the draft final NUREG report on LOCA frequencies**

ACRS 2004 REPORT ON NRC SAFETY RESEARCH PROGRAM

Dana A. Powers

SCOPE

- **Research projects dealing with the safety of existing plants**

CONSIDERATIONS

- **Programmatic justification**
- **Technical approach**
- **Progress of the work**

GENERAL OBSERVATIONS

- **NRC has a well-focused, well-planned Safety Research Program**
- **Research effort may well be near the minimum needed to support regulatory activities**
- **Resources for exploratory research are minimal and may limit the agency's ability to anticipate future needs**

HIGHLIGHTS

- **High-burnup fuel research for reactivity-initiated accidents**
- **PRA research in support of ROP**
- **Rejuvenation of human factors research**
- **Realism in severe accident analysis**

SOME PROJECTS HAVE ACHIEVED SUCCESS

- **Realistic structural capacity of existing reactor containments**
- **Seismic engineering of existing reactors**

EXPERTISE BEING MAINTAINED

- **Neutronic Analysis**
- **Criticality Safety**
- **Radiation Effects**
- **Reactor Fuels**

ADDITIONAL EFFORTS NEEDED

- **Independent analysis and evaluation of operational data**
- **Fire safety research**
- **PWR sump blockage issue**
- **Integration of TRACE code into regulatory process**

ADDITIONAL PLANNING NEEDED

- **ACRS supports plans to examine the utility of a proactive materials degradation initiative at NRC**
- **RES should examine activities in pressure vessel embrittlement**

QUALITY OF RESEARCH PROGRAMS

- **RES is required to have an independent evaluation of the quality of its research programs**
- **At the request of RES, the ACRS has agreed to this major undertaking**

ESBWR PRE-APPLICATION REVIEW

Thomas S. Kress

BACKGROUND

- **Analytical methods and supporting experimental data for LBLOCA and containment scenarios**
- **Based on previous work done for SBWR**

CONCLUSION AND OBSERVATIONS

- **TRACG computer code is acceptable for analyzing ESBWR response to a LOCA scenario**
- **Large design margins (core never uncovers)**
- **Many conservative assumptions**

FUTURE USE OF TRACG

- **Code application and input assumptions for licensing**
- **Degree of conservatism**
- **Sources of margin**
- **Scaling evaluation assessment**
- **Vacuum breaker performance**

INTERIM REVIEW OF THE AP1000 DESIGN

Thomas S. Kress

THE AP1000 DESIGN

- **Completed the Phase-2 pre-application review -- ACRS report dated March 14, 2002 concluded that:**
 - **The staff has made a competent and thorough review of the Phase-2 issues**
 - **ACRS agrees that the proposal by Westinghouse to use Design Acceptance Criteria (DAC) for the piping should be approved**

AP1000 (Cont'd)

- **On March 17, 2004, the ACRS issued an interim letter to the EDO commenting on several technical areas**
- **Will hold further discussions with the Staff and Westinghouse in June 2004**

AP1000 (Cont'd)

- **ACRS reviews have not addressed security matters related to the design**
- **ACRS will review FSER in July 2004**

ACRONYMS

ACR	Advanced CANDU Reactor
ACRS	Advisory Committee on Reactor Safeguards
ADS	Automatic Depressurization System
AECL	Atomic Energy of Canada Limited
CFR	Code of Federal Regulations
CY	Calendar Year
DAC	Design Acceptance Criteria
DSER	Draft Safety Evaluation Report
EDO	Executive Director for Operations
ESBWR	Economic Simplified Boiling Water Reactor
ESP	Early Site Permit
FSER	Final Safety Evaluation Report
FCI	Fuel-Coolant Interaction
GALL	Generic Aging Lessons Learned Report
I&C	Instrumentation and Control

ACRONYMS (Cont'd)

LBLOCA	Large break Loss-of- Coolant Accident
MOX	Mixed Oxide
NRC	Nuclear Regulatory Commission
PRA	Probabilistic Risk Assessment
PWR	Pressurized Water Reactor
RES	Office of Nuclear Regulatory Research
RG	Regulatory Guide
ROP	Reactor Oversight Process
SBWR	Simplified Boiling Water Reactor
SER	Safety Evaluation Report
SRM	Staff Requirements Memorandum
SRP	Standard Review Plan
TMI	Three Mile Island