



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

ACRSR-2096

October 14, 2004

Mr. Luis A. Reyes  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

SUBJECT: REVIEW OF ACR-700 PRE-APPLICATION SAFETY ASSESSMENT REPORT

Dear Mr. Reyes:

During the 516<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, October 7-9, 2004, we met with representatives of the NRC staff and Atomic Energy of Canada Limited (AECL) Technologies to discuss the staff's pre-application safety assessment report (PASAR) for the 700 MWe advanced CANDU reactor (ACR-700). We also had the benefit of the document referenced.

## CONCLUSION

The staff has done an excellent job on its pre-application review of the "focus topics" for which the staff identified technical, regulatory, and policy issues. We agree with the staff's assessment of these issues. The PASAR will provide excellent guidance for the subsequent certification process.

## DISCUSSION

We have used the PASAR to help identify areas for our own review in order to satisfy the statutory requirement of performing a safety review of any design certification. These areas are listed below. The list is provided to alert the applicant and staff to the issues of most interest to ACRS at this time and to help in scheduling our reviews.

1. Thermal Hydraulics: Analysis of design basis accidents (DBAs) and development of acceptance criteria; experimental validation of the CATHENA computer code.
2. Reactor Kinetics: Determination of the coolant void reactivity (CVR) coefficient; uncertainty analysis and acceptance criteria for CVR.
3. PRA: Probabilistic risk assessment quality; risk-informed selection of DBAs; relationship among DBA, limited core damage, and severe accidents; risk acceptance criteria.
4. Severe Accidents: Research on core melt progression, heat transfer, and fission product release and speciation; results of ACR-700 simulations using the MELCOR computer code; the staff's assessment of the MAAP4-CANDU computer code; fuel/coolant interaction experiments, modeling, and accident progression; severe accident source term phenomenology; hydrogen catalytic converters; hydrogen stratification in containment.

5. Long-Term Cooling: Provisions for long-term cooling following a LOCA.
6. Software: Functionality and reliability of software; PRA treatment of software failures.
7. Materials: Materials monitoring methods for complex piping systems; delayed hydride cracking and irradiation-enhanced creep in zirconium alloys; fatigue behavior of zirconium alloys; degradation kinetics; dissimilar metal weld anomalies.
8. Fire Protection: Compliance with U.S. regulatory requirements; fire risk assessment.
9. On-line Refueling: Regulatory requirements and risk implications.

We look forward to continuing to participate in the certification review of the ACR-700.

Sincerely,

**/RA/**

Mario V. Bonaca  
Chairman

Reference:

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Pre-application Safety Assessment Report Related to the Advanced CANDU Reactor 700 MWe, dated September 2004.

5. Long-Term Cooling: Provisions for long-term cooling following a LOCA.
6. Software: Functionality and reliability of software; PRA treatment of software failures.
7. Materials: Materials monitoring methods for complex piping systems; delayed hydride cracking and irradiation-enhanced creep in zirconium alloys; fatigue behavior of zirconium alloys; degradation kinetics; dissimilar metal weld anomalies.
8. Fire Protection: Compliance with U.S. regulatory requirements; fire risk assessment.
9. On-line Refueling: Regulatory requirements and risk implications.

We look forward to continuing to participate in the certification review of the ACR-700.

Sincerely,

Mario V. Bonaca  
Chairman

Reference:

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Pre-application Safety Assessment Report Related to the Advanced CANDU Reactor 700 MWe, dated September 2004.

**DOCUMENT NAME: C:\ORPCheckout\FileNET\ML042890129.wpd**

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" =  
Copy with attachment/enclosure "N" = No copy

Accession #: ML042890129

OFFICE	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y		
NAME	MZeftawy		MSnodderly		JFlack		JLarkins			
DATE	10/13/04		10/13/04		10/13/04		10/14/04			

OFFICIAL RECORD COPY