

March 25, 2004

ORGANIZATION: ATOMIC ENERGY OF CANADA LIMITED (AECL)

SUBJECT: SUMMARY OF MEETING HELD ON MARCH 4 AND 5, 2004, TO
DISCUSS ACR-700 CLASS 1 PRESSURE BOUNDARY DESIGN

The Nuclear Regulatory Commission (NRC) hosted a public meeting and a closed meeting with Atomic Energy of Canada Limited (AECL) on March 4 and 5, 2004, at the U.S. Nuclear Regulatory Commission (NRC) Headquarters in Rockville, MD. The purpose of this meeting was to discuss the Advanced CANDU Reactor (ACR-700) class 1 pressure boundary design and pressure tube issues. For a list of meeting attendees refer to Enclosure 1.

AECL provided the NRC staff with the following presentations:

- Reactor Coolant pressure boundary and applicable codes and standards
- Qualification by testing of pressure tubes
- Pressure tube integrity
- In-service inspection and surveillance
- Class 1 pressure boundary compliance with General Design Criteria (GDC)-4, GDC-14, and GDC-15
- Load combinations and stress limits for the pressure boundary design
- Pressure boundary materials

During the presentations, the NRC staff asked whether the major components in the pressure boundary satisfy the U.S. regulations for Class 1. AECL responded that the principal pressure boundary components such as steam generators, pressurizer, reactor coolant pumps, piping and headers were designed to Class 1 using the American Society of Mechanical Engineering (ASME) Code, Section III. However the ASME Code does not address the pressure tube material and the pressure tube to end fitting rolled joints. When the NRC staff suggested that AECL pursue the ASME Code process for pressure tube material and rolled joints fabrication, AECL replied that the ASME Code adjudication process takes 2 to 3 years and it will be too late for the ACR-700 design certification. The NRC staff stated that for each specific exception to ASME Code, AECL must provide the approach to meet the equivalent level of safety requirements specified in the ASME Code.

During the GDC compliance presentation, AECL proposes to use the 2001 Edition up to and including the 2003 Addenda of the ASME Boiler and Pressure Vessel Code, Section III for the design of piping systems in the ACR-700. The NRC staff cautioned that if this Edition and Addenda are used, several issues will need to be addressed in conjunction with the design certification review. First, AECL will need to ensure that earthquake cycles for fatigue evaluation and seismic anchor motions due to a safe shutdown earthquake are adequately accounted for in the piping design criteria consistent with the design criteria used for the previously certified advanced light water reactor standard plant designs when the operating basis earthquake is eliminated. This might require a modification to the piping design rules in the 2001 Edition of the ASME Code, Section III. Secondly, in order to meet GDC-2, the piping

functional capability must be assured using the new Code rules in the 2001 Edition by evaluating the effect of the new B2 indices (See NUREG-1367). Lastly, the NRC staff has not yet incorporated by reference the 2001 Edition up to and including the 2003 Addenda into 10 CFR 50.55a. The proposed rule issued in the *Federal Register* (69 FR 879) included several modifications and limitations on the use of the 2001 Edition up to and including the 2003 Addenda for piping seismic design in NB-3000. AECL must meet any modifications and limitations on the 2001 Edition and Addenda related to piping design when the final rule is issued later this year.

After the public meeting, a closed meeting was convened to discuss the proprietary data on load combinations and stress limits and irradiation effects of pressure tubes. NRC staff requested that AECL provide additional analyses and assessments to validate the irradiation creep and environmental fatigue on pressure tubes. Due to a lack of data on the ACR-700, it was agreed that a monitoring program may be required to obtain the data on irradiation effects.

Additional details on the material covered in this meeting may be accessed through the ADAMS system under Accession No. ML040690160. If you do not have access to ADAMS or if there are problems in accessing the handouts located in ADAMS, contact the NRC Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr@nrc.gov.

Members of the public were in attendance but did not make public comments.

/RA/

James Kim, Project Manager
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Project No. 722

Enclosures: As stated

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ADAMS ACCESSION NUMBER: ML040820663-Package
ML040820672-Meeting Summary
ML040690160-Handouts

OFFICE	PM:RNRP	SC:RNRP
NAME	JKim	LDudes
DATE	3/22/04	3/25/04

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ACR-700 Pressure Tube Meeting
March 4 and 5, 2004

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ACR-700

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