

July 30, 2003

Our File: 108US-013210-021-001  
Your File: Project No. 722

U.S. Nuclear Regulatory Commission,  
Document Control Desk,  
Washington, D.C. 20555

Attention: Ms. B. Sosa  
Project Manager, ACR

**References:**

5. "A Plan for the Pre-Application Review of the Advanced CANDU Reactor (ACR), September 26, 2002.
6. Letter V. Langman to B. Sosa, "Further to the ACR Pre-Application Plan – Detailed Deliverables and Schedule for Focus Topics", December 18, 2002.
7. Letter V. Langman to B. Sosa, "RAI for ACR-700 Physics and Fuel Related Data", June 15, 2003.
8. Letter V. Langman to B. Sosa, "Technical Description of the ACR-700", July 15, 2003.

**Re: Phase 2 of ACR Pre-Application Review**

As per the discussions at our drop-in meeting of July 17, 2003, and consistent with the intent of our ACR Pre-application Review Plan (Reference 1), the ACR pre-application review is now moving into Phase 2. The planned series of meetings held to familiarize the NRC staff with the ACR design and the technology base associated with the ACR has been completed as per the objective of Phase 1. During Phase 1 the NRC staff was provided extensive documentation. This included reports and code information supporting the applicability and validation of the physics and the thermal hydraulics computer codes that will be used in the ACR safety analysis, which support the successful conclusion of Focus Topics #3 and #9 shown in Reference 2. We also provided the NRC detailed fuel and physics data you requested (Reference 3) in support of your review related to Focus Topic #9. Most recently, we provided the NRC staff with the "ACR Technical Description" (Reference 4). We would expect that the staff's review of this report will identify issues of particular US licensing interest in order that we may prepare an application for ACR Standard design Certification that best meets the staff's needs.

Based on feedback from the Phase 1 review efforts, allowing for potential NRC resource limitations, and given that the ACR Design Control Document will be submitted to the NRC for review in the Fall 2004, AECL has revised the submission scope and schedule for Phase 2 of the ACR Pre-Application Review (please see Table 1). Table 1 supersedes Attachment 2 of Reference 2. As discussed in our July 17<sup>th</sup> drop-in meeting, AECL requests that if there is a

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conflict in NRC review resource availability, priority should be placed on the following key Focus Topics in order to obtain timely NRC acceptance as outlined in Reference 2:

- Focus Topic #1 – Class 1 pressure boundary design
- Focus Topic #3 – Computer codes and validation adequacy
- Focus Topic # 8 – On-power fueling
- Focus Topic #9 – Confirmation of negative void reactivity

The relationship between the Phase 2 submissions and the Focus Topics discussed in Reference 2 is shown in Table 1. The Focus Topics, and the desired outcome for each, are provided in Table 2. In addition to the aforementioned four key Focus Topics, once further NRC review resources become available, AECL requests that the NRC continue to review the submissions related to the remaining Focus Topics (i.e., #2, #4, #5, #6, #11, #12). Note that there will be no further submissions for Focus Topic #7 since information on the control and safety systems is provided in the ACR Technical Description. For all the Focus Topics discussed in Reference 2, where NRC acceptance is not obtained during Phase 2 of the Pre-Application Review, AECL requests that the NRC staff provide their technical feedback/observations, their requirements for additional information and a schedule for their further review which would lead to successful closure of the remaining focus topics. It is also requested (Reference 1) that the NRC provide cost and schedule estimates for the Standard Design Certification review of the ACR-700 by July 30, 2004.

As discussed, there is a review meeting planned on CANFLEX fuel and on-power fueling, currently scheduled for September 4 – 5, 2003. As agreed at our July 17<sup>th</sup> drop-in, the remaining familiarization meetings that were proposed in Reference 2 are not required. As such, they have been dropped from Phase 2. However, AECL staff continue to be available at any time to meet with the NRC staff to discuss any technical issues or questions on the ACR-700 that may arise during Phase 2.

We request NRC's feedback on the acceptability of our proposed approach to Phase 2 of the ACR pre-application review by August 29, 2003, or earlier if possible.

Please call me at (905) 823-9060, extension 6543, if you have any questions regarding this letter or the requests we have made.

Sincerely,

A handwritten signature in cursive script that reads 'Vince Langman' followed by a horizontal line.

Vince J. Langman  
ACR Licensing Manager

cc. S. Collins (NRC), J. Lyons (NRC)

**Table 1 – Submissions Scope and Schedule for Phase 2 of ACR Pre-Application Review**

<b>Report</b>	<b>Submission Date</b>	<b>Related to Focus Topic</b>
Safety Basis for ACR	August 04, 2003	# 2
ACR PRA Methodology and Scope	August 04, 2003	# 11
Safety Analysis Computer Code Qualification – Status and Plans	August 15, 2003	# 12
Safety Analysis, Initial Conditions and Standard Assumptions	August 15, 2003	# 2
Technology of Fuel Channels	August 15, 2003	# 1 – Key Focus Topic
Technology of On-Power Fueling	September 12, 2003	# 8 – Key Focus Topic
ACR Severe Accident Progression	September 12, 2003	# 4
Safety Analysis Basis reports: <ul style="list-style-type: none"> <li>- trip coverage</li> <li>- fuel and fuel channels</li> <li>- thermal hydraulics (including physics)</li> <li>- containment</li> </ul>	September 15, 2003	# 2
ACR Anticipatory R&D	September 30, 2003	# 12
Severe Accident Assessment and Mitigation	October 15, 2003	# 4
ACR Design Assist PRA Results	October 31, 2003	# 11
Severe Accidents R&D Program	November 14, 2003	# 4
ACR design codes and standards	December 01, 2003	# 6
Safety Design Guides	December 01, 2003	# 5
CANFLEX fuel design for ACR	January 15, 2004	# 8 – Key Focus Topic
R&D Status Report	January 30, 2004	# 12
Report on safety analysis code validation methodology (compared to DG-1120)	February 27, 2004	# 3 – Key Focus Topic

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Table 2 – Summary of Focus Topics and Desired Outcomes

**1. Class 1 pressure boundary design**

Desired outcome: The NRC staff accepts the principle design features of the ACR RCS pressure boundary (i.e., the use of Zr-2.5wt%Nb pressure tubes, rolled joints, closure plugs, 403 SS end fittings, and fueling machines as components of a Class 1 pressure boundary).

**2. Design basis accidents and acceptance criteria**

Desired outcome: The NRC staff accepts the definition of ACR design basis accidents and the associated ACR safety acceptance criteria.

**3. Computer codes and validation adequacy**

Desired outcome: The NRC staff accepts the computer codes used in ACR safety analysis and the adequacy of their validation as sufficient for the purpose of providing a safety analysis for the ACR in the US.

**4. Severe accident definition and adequacy of supporting R&D**

Desired outcome: The NRC staff accepts the definition of severe accidents for the ACR and considers the nature and extent of R&D support provided by the existing and planned R&D program to be sufficient to support the licensing of the ACR in the US.

**5. Design philosophy and safety-related systems**

Desired outcome: The NRC staff accepts the ACR safety design philosophy and the ACR treatment of safety-related systems, including the approach to seismic considerations.

**6. Canadian design codes and standards**

Desired outcome: The NRC staff accepts the use of Canadian design codes and standards to address the CANDU-unique features of the ACR.

**7. Distributed control systems and safety critical software**

Desired outcome: The NRC staff accepts ACR distributed digital control systems and safety critical software.

**8. On-power fueling (including safeguards)**

Desired outcome: The NRC staff accepts the ACR CANFLEX fuel design and the process of on-power refueling. The NRC staff has no significant safeguards issues with on-power refueling for the ACR.

**9. Confirmation of negative void reactivity**

Desired outcome: The NRC staff accepts that the ACR has a negative void reactivity.

**10. Preparation for Standard Design Certification Docketing**

Desired outcome: The NRC staff will have a good understanding of the safety aspects of the ACR and have identified any issues that could pose a risk to, or a delay in, licensing the ACR in the US.

**11. ACR PRA methodology**

Desired outcome: The NRC staff accepts AECL's PRA methodology as sufficient for the purpose of assessing the ACR for licensing in the US.

**12. ACR technology base**

Desired outcome: The NRC staff finds the technology base for the ACR to be comprehensive and essentially complete.