

February 4, 2004

Mr. V. J. Langman  
ACR Licensing Manager  
AECL Technologies Inc.  
481 North Frederick Avenue, Suite 405  
Gaithersburg, MD 20877

SUBJECT: ADVANCED CANDU REACTOR (ACR-700) - PHASE 2 OF PRE-APPLICATION  
REVIEW

Dear Mr. Langman:

This letter is provided in response to Atomic Energy of Canada, Limited (AECL) Technologies' letters dated July 30 and December 5, 2003. The AECL Technologies' July 30, 2003, letter requested U.S. Nuclear Regulatory Commission (NRC) feedback on the acceptability of AECL's proposed approach to Phase 2 of the ACR pre-application review and the December 5, 2003, letter revised the submission schedule for Phase 2. The NRC has reviewed your request in the July 30 and December 5, 2003, letters and concurs with the statement that the ACR pre-application review is now moving into Phase 2.

The objective of Phase 1 of the pre-application review was to conduct a series of familiarization meetings designed to provide the staff with a general overview of the ACR design. Phase 1 of the ACR pre-application review has been completed. The objective of Phase 2 is to provide more specific and detailed information about the ACR design to facilitate the staff's review of the focus topics. You requested feedback to AECL by July 30, 2004, to support the application for standard design certification.

The NRC further accepts Table 1 of AECL's July 30, 2003, letter as the scope for Phase 2 of the ACR pre-application review. In addition, given limited NRC resources, AECL has requested that priority be given to the following focus topics (FT) during Phase 2 of the pre-application:

- 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 NRC agrees that these focus topics are key areas in the ACR pre-application review. The high temperature material issues associated with the Class 1 pressure boundary design review is of particular interest to the staff and has been highlighted as a priority area within the FT1 pre-application review. The staff is currently planning on providing feedback to AECL on all planned submittals for pre-application review. If resources are limited during the pre-application review, priority will be given to reports associated with key focus topics as identified above and the following additional focus topics:

Focus Topic #4 - Severe accident definition and adequacy of supporting R&D  
Focus Topic #11 - ACR PRA methodology  
Focus Topic #6 - Canadian codes and standards  
Focus Topic #7 - Distributed control systems and safety critical software  
Focus Topic #2 - Design basis accidents and acceptance criteria

The staff's review of the Canadian codes and standards, FT6, is focused on the quality assurance (QA) area. The design codes and standards portion of this review extend to the codes and standards associated with the review of the Class 1 pressure boundary design, FT1.

By letter dated December 5, 2003, AECL Technologies revised the submission schedule for some of the Phase 2 technical reports. The planned submission date for several reports supporting key focus topics, as identified in Attachment 2 of AECL's December 5, 2003, letter, does not allow sufficient time for the staff to complete a detailed safety review by the requested date of July 30, 2004. A period of six months is required for the staff to review each report and based on the latest estimate the completion date for the staff review will be September 30, 2004, subject to AECL meeting their planned Phase 2 submission schedule.

The NRC recommends listing the CANFLEX fuel design for the ACR report separately from focus topic (FT#8), on-power fueling. The fuel design is considered a key focus topic and pre-application review priority will be given accordingly. A new focus topic (FT#13), CANFLEX fuel design, will be added to the list of focus topics included in the pre-application review scope and it will also be added to the list of key focus topics identified above.

In addition, the NRC further recommends that AECL Technologies' desired outcome for FT#8, be limited to the process of on-power fueling since the safeguards issues will not be part of the pre-application review.

As part of an international cooperation effort between the USNRC and the Canadian Nuclear Safety Commission (CNSC), the staff is planning to conduct a cooperative review of the ACR-700 QA program with CNSC. The planned activities include development of QA review plans, the conduct of QA reviews, and the development of reports. These activities are beyond the scope of the pre-application QA review requested by AECL. The USNRC requests AECL Technologies' approval to proceed with the QA efforts that are beyond the pre-application review. It is noted that CNSC and USNRC staff coordination and planning activities will not be fee billable to AECL Technologies; however, QA program review, including development of review plans, conduct of the reviews and documentation of these reviews will be billed to AECL. Reports written during the pre-application phase will be included in the NRC report to be issued at the end of pre-application.

The NRC's pre-application review for the ACR design will include a review of the reports submitted during Phase 1 and Phase 2, resources permitting. The staff's review will result in the development of a Pre-Application Safety Assessment Report (PASAR) for the ACR design. The planned issued date for the PASAR will be September 30, 2004, or six months after the last Phase 2 report is received from AECL. The six-month review period includes concurrence by Office of General Counsel (OGC) and a presentation to the Advisory Committee on Reactor Safeguards (ACRS) scheduled for September 2004.

For each key focus topic and additional focus topic reviewed, the PASAR will include the following sections:

1. Review Scope: Discussion on what reports were reviewed and what guidance it was reviewed against, to the extent that the guidance exists.
2. Technical Issues: Discussion of technical issues identified that will require further data, tests, inspections, analyses, or codes.
3. Regulatory Issues: Discussion of regulatory issues, such as rules, rulemaking, or exemptions that will need to be resolved.
4. Policy Issues: Discussion of policy issues that will need Commission guidance for resolution.
5. Conclusion: Discussion on the feasibility of design certification and the impacts of the issues evaluated.
6. Schedule and Resources: An estimate of the resources required and schedule for completing the review of the specific focus topic area will be provided.

The PASAR will provide feedback, staff observations, requirements for additional information, identification of policy issues, and identification of areas that must be addressed by AECL during the design certification phase to allow the USNRC to complete the ACR-700 design safety determination. In addition, Phase 2 of the pre-application will also result in providing to AECL Technologies, by September 30, 2004, the cost and schedule estimates for the completion of the focus topics reviewed during pre-application. The cost and schedule estimate for completion of the standard design certification review of the ACR-700 will be provided following an initial review of the design certification application anticipated in fall 2004.

The outcome of the pre-application review for each of the focus topics, subject to the priority identified in the July 30, 2003, letter will feed into the standard design certification review. Any incomplete pre-application review work will be rolled over into the ACR-700 design certification review. To facilitate this process the format of the PASAR will follow that of subsequent safety evaluation reports (SER), to the extent practical, given the schedule constraints. The PASAR will identify licensing issues associated with the pre-application focus topics that must be resolved in order to obtain a design certification for the ACR-700.

V. Langman

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If you have any questions regarding this letter or if you require further clarification, please don't hesitate to contact me at 301-415-2375.

Sincerely,

**/RA/**

Belkys Sosa, Project Manager  
New Reactors Section  
New, Research and Test Reactors Program  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Project No. 722

cc w/encl: See next page

V. Langman

- 4 -

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cc w/encl: See next page

ADAMS ACCESSION NUMBER: ML032750547

\*See previous concurrence

OFFICE	PM:RNRP	BC:SRXB*	BC:SPLB*	BC:EMEB*	BC:IROB*
NAME	BSosa	JWermiel	JHannon	EImbro	WBeckner
DATE	1/29/04	1/15/04	1/15/04	1/15/04	1/26/04
OFFICE	BC:EMCB*	SC:RNRP*	RES	PD:RNRP	
NAME	WBateman	LDudes	FEltawila	JLyons	
DATE	1/16/04	1/27/04	1/29/04	2/3/04	

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Distribution for Letter to V. J. Langman dated February 4, 2004

Hard Copy

RNRP R/F	JWermiel
LDudes	JHannon
BSosa	WBateman
JLyons	Elmbro
WBeckner	FEltawila

E-Mail:

PUBLIC	M. Stutzke	E. Throm	A. Thadani
J. Dyer	P. Sekerak	W. Jensen	C. Green
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DE Branch Chiefs	H. Scott	P. Clifford	ACRS/ACNW
DE Section Chiefs	J. Ridgely	U. Shoop	S. Jones
OGC	D. Bessette	J. Kim	D. Thatcher
D. Trimble	J. Bongarra		

ACR-700

cc:

Mr. Charles Brinkman  
Westinghouse Electric Co.  
Washington Operations  
12300 Twinbrook Parkway, Suite 330  
Rockville, MD 20852

Mr. Thomas P. Miller  
U.S. Department of Energy  
NE-20, Rm. A286  
Headquarters - Germantown  
19901 Germantown Road  
Germantown, MD 20874-1290

Mr. David Lochbaum  
Nuclear Safety Engineer  
Union of Concerned Scientists  
1707 H Street, NW, Suite 600  
Washington, DC 20006-3919

Mr. Paul Gunter  
Nuclear Information & Resource Service  
1424 16<sup>th</sup> Street, NW, Suite 404  
Washington, DC 20036

Mr. James Riccio  
Greenpeace  
702 H Street, NW, Suite 300  
Washington, DC 20001

Mr. Ron Simard  
Nuclear Energy Institute  
Suite 400  
1776 I Street, NW  
Washington, DC 20006-3708

Patricia Campbell  
Winston & Strawn  
1400 L Street, NW  
Washington, DC 20005

Mr. Paul Leventhal  
Nuclear Control Institute  
1000 Connecticut Avenue, NW  
Suite 410  
Washington, DC 20036

Mr. Jack W. Roe  
SCIENTECH, INC.  
910 Clopper Road  
Gaithersburg, MD 20878

Mr. David Ritter  
Research Associate on Nuclear Energy  
Public Citizens Critical Mass Energy  
and Environmental Program  
215 Pennsylvania Avenue, SE  
Washington, DC 20003

Mr. James F. Mallay, Director  
Regulatory Affairs  
FRAMATOME, ANP  
3315 Old Forest Road  
Lynchburg, VA. 24501

Mr. Tom Clements  
6703 Gude Avenue  
Takoma Park, MD 20912

Mr. Victor G. Snell  
Director of Safety and Licensing  
Atomic Energy of Canada Limited  
2251 Speakman Drive  
Mississauga, Ontario  
Canada L5K 1B2

Mr. Glenn R. George  
PA Consulting Group  
130 Potter Street  
Haddonfield, NJ 08033

J. Alan Beard  
GE Nuclear Energy  
13113 Chestnut Oak Drive  
Darnestown, MD 20878-3554

Mr. James Blyth  
Canadian Nuclear Safety Commission  
280 Slater Street, Station B  
P.O. Box 1046  
Ottawa, Ontario  
K1P 5S9

Mr. Gary Wright, Manager  
Office of Nuclear Facility Safety  
Illinois Department of Nuclear Safety  
1035 Outer Park Drive  
Springfield, IL 62704

Dr. Gail H. Marcus  
U.S. Department of Energy  
Room 5A-143  
1000 Independence Ave., SW  
Washington, DC 20585

Mr. Ronald P. Vijuk  
Manager of Passive Plant Engineering  
AP1000 Project  
Westinghouse Electric Company  
P. O. Box 355  
Pittsburgh, PA 15230-0355

Dr. Greg Rzentkowski  
Canadian Nuclear Safety Commission  
P.O. Box 1046, Station 'B'  
280 Slater Street,  
Ottawa, ON, K1P 5S9  
Canada

Mr. Ed Wallace, General Manager  
Projects  
PBMR Pty LTD  
PO Box 9396  
Centurion 0046  
Republic of South Africa

Mr. John Polcyn, President  
AECL Technologies Inc.  
481 North Frederick Avenue  
Suite 405  
Gaithersburg, MD 20877