November 20, 2003

Mr. Vince Langman
ACR Licensing Manager
Atomic Energy of Canada Limited (AECL) Technology, Inc.
481 North Frederick Avenue, Suite 405
Gaithersburg, Maryland 20877

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION - ACR-700 PRE-APPLICATION PIRT PROCESS REVIEW

Dear Mr. Langman:

The Nuclear Regulatory Commission (NRC) staff has commenced the Phenomena Investigation Ranking Table (PIRT) process on October 30 and 31, 2003, in support of the ongoing pre-application review activities for the ACR-700 design. As a result of this PIRT process review, the panel members have determined that additional information is necessary to support the upcoming PIRT review meeting scheduled for December 11 and 12, 2003.

The requests for additional information (RAIs) are included in the enclosure. The topics covered in these RAIs include: the reactor thermal hydraulics review, the assessment of the negative void reactivity, and the ACR severe accidents. An advanced copy of the RAIs were sent to you via electronic mail on November 19, 2003.

AECL's response to the RAIs should be submitted directly to Mr. David Diamond for distribution of information to PIRT panel members. His address is:

Building 130
Brookhaven National Laboratory
P.O. Box 5000
Upton, N.Y. 11973-5000

If you have any questions or comments concerning this matter, you may contact the undersigned at (301) 415-4125 or jsk@nrc.gov.

Sincerely,

/RA/

James Kim, ACR Project Manager
New Reactors Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Project No. 722

Enclosure: As stated
cc: See next page

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*See previous concurrence
ADAMS ACCESSION NUMBER: ML033230120

OFFICE	PM:RNRP	SC:RNRP*
NAME	JKim	LDudes
DATE	11/19/03	11/19/03

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Distribution for Request For Additional Information Dated November 20, 2003

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DBessette	OGC	ACRS/ACNW

Request for Additional Information from AECL
to Support PIRT Preparation

Thermal Hydraulic Subpanel

Four AECL presentations during the 2nd PIRT Meeting (December)

1. RD14, RD14M, RD14 - ACR programs overview (design description, instrumentation description, matrix of experiments, scaling)

2. Main supporting separate effects programs overview (CWIT, LASH, etc.) - design description, instrumentation description, matrix of experiments, scaling

3. Experimental results and analyses relevant to critical break

4. Relatively detailed description of ACR-700 design with specific emphasis on the reactor coolant system, secondary system, and emergency cooling system

Severe Accident Subpanel

Three AECL presentations during the next PIRT meeting.

1. Severe accident phenomena and modeling for single channel and whole core (MAAP4-CANDU)

2. Single channel degradation and propagation to multi-channel (this presentation is also requested by the thermal-hydraulics subpanel)

3. Fission products release and transport phenomena

The documents are to be provided as soon as reasonably possible, preferably by the 2nd PIRT meeting in December.

1. Validation document on fuel and fuel channel

2. Validation document on fission products release and transport

3. Validation document on containment phenomena

4. Single channel events section of the safety analysis reports for existing CANDU reactors

Available References

1. Leung et al., Critical Heat Flux and Pressure Drop for a CANFLEX Bundle String Inside an Axially non-uniform Flow Channel, 6th Int. Conf. On CANDU Fuel, Niagara Falls, Canada, 1999 September 26-30.

2. Report SL-104, COG-98-311, 1999

3. ARD-TT-116, COG-88-87, 1989

4. ARD-TD-175, COG-88-189, 1989

5. AECL-8156, November 1983. Latest revision preferred

6. AECL-7813, January 1984. Latest revision preferred

7. WNRE-385, June 1980. Latest revision preferred

8. CRNL-1187, September 1984. Latest data preferred

9. AECL-7754, October 1982. Latest data preferred

10. ACR Fuel Channel, 10810-31100-DR-001, Rev. 0, Jan. 2003

11. ACR-700 Emergency Coolant Injection System, 10810-34320-DR-001, Rev. 1, 2003.

Documents When Available

1. Recriticality analysis in case of whole core slumping

2. AECL Identification and Ranking Tables for Limited and Severe Core Damage Accident Phenomenology for ACR-700.

3. Pressure channel ageing and replacement analysis

4. Assessment of hydrogen production, transport, and management

5. Water chemistry, design, and performance data for the reserve water tank

6. Molten fuel moderator interaction (MFMI) test data and report

7. Lead test assembly (LTA) data for fuel performance (may be addressed later in the licensing domain.

8. References (6), (7), (8), and (9) in ACR 108-126810-LS-001 Rev. 0. Latest data preferred.

Physics Subpanel

Two AECL presentations

1. Coolant void reactivity phenomenology and parametric sensitivities, preferably in terms of computed neutron balances, spectral and spatial effects, and nuclide reaction contributions. For example, provide insights similar to the balance chart format of Prof.

Downar's first PIRT meeting handout, and the 1995 ANS paper by J.J. Whitlock, W.J. Garland, M.S. Milgram on "Effects Contributing to Positive Coolant Void Reactivity in CANDU."

2. Existing and planned nuclear experiments and how AECL will use them for validating the predictions of CVR and other important nuclear phenomena in ACR-700. Technical basis (including "validation") for the ZED-2 zone buckling methods and their associated measurement and extrapolation uncertainties.

Reports

1. Update of the document "ACR-700 Reactor Physics Design" (ACR-700 10810-03300-ASD-001) that reflects the latest fuel and core design information.

2. Report that would allow full-core MCNP modeling of the direct measurements (e.g., foil activations, rather than inferred core and zone bucklings) made in the ZED-2 experiments. (Longer term when available)

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 16th 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. Vince Langman
Licensing Manager
Atomic Energy of Canada Limited
2251 Speakman Drive
Mississauga, Ontario
Canada L5K 1B2

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