

December 10, 2002

Our File: 115-01321-021-002

Your File: Project No. 722

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

Attention: Mr. R. Pascarelli,  
Project Manager, ACR

Reference: 1. Letter to S.J. Collins from R. Van Adel, June 19, 2002

Re: **Proprietary Documentation in Support of the ACR Pre-Application Review –  
Generic CANDU Probabilistic Safety Assessment (PSA)**

In support of the NRC's pre-application review of the ACR (Reference 1), you will find on the enclosed CD two proprietary reports which describe the methodology used for the PSA of CANDU reactors, and the results of the reference analysis for the CANDU 6 and CANDU 9 reactors.

The reports listed in Attachment 1 contain proprietary information of the type that AECL normally maintains in confidence and withholds from public disclosure. The reports have been handled and classified as proprietary to AECL as cited in the affidavit provided in Attachment 2. Therefore, it is requested that the AECL proprietary reports listed in Attachment 1, and contained on the enclosed CD, be handled by the USNRC on a confidential basis and be withheld, in their entirety, from public disclosure in accordance with the provisions of 10CFR2.790 and 9.17.

As described in Attachment 3, the two proprietary PSA reports are being provided in order for the NRC staff to review the PSA methodology, which is being applied to the ACR. These PSA reports also provide the NRC staff with background information on the key generic features of a CANDU PSA.

If you have any questions on this letter and/or the enclosed information please contact the undersigned at (905) 823-9060 extension 6543.

Yours sincerely,



Vince J. Langman  
ACR Licensing Manager

  
ZZZZ  
See Attached  
List

Attached List

File Center .....1 Paper Copy And 1 CD

Walton Jensen.....3 Paper Copy's And 3 CD's

Per Belkys Sosa Do not give Paper Copy's Or CD's  
out unless you go threw her.....415-2375

**/Attachments**

1. Proprietary PSA Reports in Support of ACR Pre-Application Review
2. AECL Proprietary Information Affidavit
3. Background on the Generic CANDU Probabilistic Safety Assessment

**/Enclosure**

1. One CD containing copies of the proprietary PSA reports

**Attachment 1**

**Proprietary PSA Reports in Support of ACR Pre-Application Review**

(Letter to R. Pascarelli from V. Langman, "Proprietary Documentation in Support of the ACR Pre-Application Review – Generic CANDU Probabilistic Safety Assessment (PSA)", December 10, 2002)

1. "Generic CANDU Probabilistic Safety Assessment – Methodology", Report 91-03660-AR-001, Revision 0, Controlled, July 2002.
2. "Generic CANDU Probabilistic Safety Assessment – Reference Analysis", Report 91-03660-AR-002, Revision 0, Controlled, July 2002.

ATTACHMENT 2  
APPLICATION FOR THE NUCLEAR REGULATORY COMMISSION'S WITHHOLDING  
FROM PUBLIC DISCLOSURE  
OF PROPRIETARY AECL REPORTS

10 C.F.R. § 2.790  
AFFIDAVIT OF KEN HEDGES

I, Ken Hedges, Vice-President, AECL Technologies Inc., do hereby affirm and state:

1. I am the Vice-President, Technology for AECL Technologies Inc., and have been delegated the function of reviewing the proprietary information sought to be withheld from public disclosure, and am authorized to apply for its withholding on behalf of AECL Technologies Inc.
2. In the attached letter R. Pascarelli from V. Langman, "Proprietary Documentation in Support of the ACR Pre-Application Review – Generic CANDU Probabilistic Safety Assessment (PSA)", dated December 10, 2002, and Enclosure 1 to that letter, AECL Technologies Inc. is providing information in support of the Nuclear Regulatory Commission's (NRC) pre-application review of the Advanced CANDU Reactor (ACR). The documents included in Enclosure 1 constitute proprietary commercial information that should be held in confidence by the NRC pursuant to 10 CFR §§ 2.790(a)(4) and 9.17(a)(4), because of one, or more, of the following reasons:
  - i. This information is confidential and has been held in confidence by AECL, which is the parent company of AECL Technologies Inc. The information is contained in AECL reports or other documents that are normally held in confidence in accordance with AECL's procedures for the protection of information. The reports or other documents are part of AECL's comprehensive safety and technology base for the CANDU design, and their commercial value extends beyond the original development costs, which in themselves are considerable.
  - ii. The information is contained in CANDU Owners Group Inc. (COG) reports that are held in confidence by both AECL and the Canadian nuclear utilities that participate in research and development programs via COG. There is a rational basis for holding the reports in confidence since the information contains sensitive technical and/or commercial information relating to the supporting research, design and/or operation of CANDU reactors. Also, COG reports are only distributed to participants in COG research and development programs. These participants expend significant amounts of money to fund the COG research and development programs, which produce the information described in these reports. Additionally, public disclosure by the NRC of the information contained in COG

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reports, which are supplied in confidence by COG to AECL, could jeopardize the future availability of such information to AECL. AECL is contractually obligated to COG and to other participants in COG programs to maintain the confidentiality of such reports. AECL relies, in part, on COG reports to improve the safety, operability and maintainability of the ACR, and to help develop and recommend improvements to enhance the safety, operability and maintainability of existing CANDU plants. COG would be reluctant to provide such information to AECL, and could move to restrict AECL Technologies' ability to provide such reports to the NRC, if there was a possibility that the NRC might make the information publicly available, after being supplied to the NRC by AECL Technologies Inc. AECL would suffer harm to its commercial business and competitive position if it did not have access to these reports and was unable to improve existing and future designs. Further, other participants in COG research and development programs would be reluctant to enter into such programs in which AECL was a participant; those participants enter into and fund such programs with the expectation that the results will remain confidential to COG and program participants; if there is a possibility that information generated in such programs would become publicly available through AECL Technologies' provision of COG reports to the NRC. For the same reason, disclosure of such reports by the NRC would also hinder the ability of the NRC to receive similar reports in the future from AECL Technologies, since COG would likely withhold such reports from AECL.

- iii. This information is being transmitted to the NRC in confidence.
- iv. This information is generally not available in public sources and could not be gathered readily from other publicly available information.
- v. Public disclosure of this information would create substantial harm to the competitive position of AECL by disclosing sensitive commercial information about the design and/or operation of CANDU reactors and/or the ACR to other parties whose commercial interests may be adverse to those of AECL. Also, the information contained in these reports has been developed at significant cost to AECL (the parent company of AECL Technologies).

3. Accordingly, AECL Technologies Inc. requests that the information provided in Enclosure 1 be withheld from public disclosure pursuant to the policy reflected in §§ 2.790(a)(4) and 9.17(a)(4).



Ken Hedges, ~~Vice-President~~, AECL Technologies Inc.

Subscribed and sworn before me on this 12<sup>th</sup> day of Dec., 2002.

  
Notary Public

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**Attachment 3**

**Background on the Generic CANDU Probabilistic Safety Assessment**

(Letter to R. Pascarelli from V. Langman, "Proprietary Documentation in Support of the ACR Pre-Application Review – Generic CANDU Probabilistic Safety Assessment (PSA)", December 10, 2002)

AECL produced the Generic CANDU Probabilistic Safety Assessment (GPSA) with the purpose of defining the scope and the methodology to be applied to the PSAs of future projects. As part of the GPSA a reference analysis was also developed for critical sequences of CANDU 6 and CANDU 9 systems based on insights gained from AECL's experience with previous PSAs, in particular the Wolsong 2/3/4 PSA.

The methodology is covered in the first report, 91-03660-AR-001, and the reference analysis for CANDU 6 and CANDU 9 is provided in the second report, 91-03660-AR-002.

The scope of the GPSA includes Level 1 with both internal and external events, and Level 2 with the analysis of severe core damage progression and containment response.

The methodology for both Level 1 and Level 2 PSAs uses approaches consistent with international standards and practices. For Level 1 PSA, major enhancements areas in the GPSA relative to previous CANDU PSAs are human reliability analysis, common cause failure analysis and external event analysis. The Level 2 PSA uses the MAAP4 CANDU code, which is an adaptation of the original MAAP code developed by EPRI to the CANDU pressure tube reactor.

The reference analysis of CANDU 6 and CANDU 9 provides the framework of the detailed analysis to be implemented in PSAs of future AECL projects. The reference analysis was developed with a two-pronged approach: to cover accident sequences that past experience had shown to be the major contributors to severe core damage, and to concentrate on analysis areas, such as external events and severe core damage progression, which had received limited treatment in previous AECL PSAs.

The following are examples of the important findings from the reference analysis.

- For internal events at power it is shown that the dominant sequences are loss of end shield and loss of Class IV electrical power.
- For seismic events, the contribution of failure modes is greatly affected by the hazard curve. Because of the large uncertainties in seismic hazard input, a PSA-based seismic margin assessment may be considered instead of a seismic PSA.
- For shutdown events, the results indicate that the loss of service water event with the reactor coolant system drained to the reactor headers is the dominant contributor to the severe core damage frequency.
- Preliminary results of the MAAP4 CANDU analysis of CANDU 6 showed long failure times for calandria vessel and containment for severe core damage sequences stemming from station blackout and large LOCA. These results, which are due to the presence of large, passive heat sinks (i.e., the moderator and shield tank water), confirm that there is

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sufficient time for the operator to arrest the accident progression by administering accident management measures.

The GPSA methodology is currently being applied to the probabilistic safety assessment of the Advanced CANDU Reactor (ACR) design. The current stage of the application of the GPSA to the ACR focuses on design assist PSA analyses. The objectives of these analyses are to establish design targets for the reliability of the mitigating systems, to set requirements for prevention and mitigation of severe accidents, and to assess the design adequacy of the ACR safety features.

The ACR PSA will be a Level 1 and 2 PSA, inclusive of internal and external events, at-power and shutdown states, and severe core damage. PSA-based seismic margin analysis will be performed for seismic events.

The two GPSA reports are being provided in order for the NRC staff to review the PSA methodology, which is being applied to the ACR. The GPSA reports also provide the NRC staff with background information on the key generic features of a CANDU PSA.