

April 27, 2004

ORGANIZATION: ATOMIC ENERGY OF CANADA LIMITED (AECL)

SUBJECT: SUMMARY OF MEETING HELD ON APRIL 6 AND 7, 2004, TO
DISCUSS ACR-700 DESIGN BASIS AND SEVERE ACCIDENTS

The Nuclear Regulatory Commission (NRC) hosted a public meeting with Atomic Energy of Canada Limited (AECL) on April 6 and 7, 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) design basis and severe accidents. For a list of meeting attendees refer to Enclosure 1.

AECL provided the NRC staff with the following presentations:

- ACR-700 Safety Design and Safety Features
- Loss of Coolant Accident (LOCA) with Loss of Emergency Core Cooling (ECC)
- Fission Product Release and Transport Codes
- Methodology for Atmospheric Dispersion and Dose for Site Selection
- Description of Dose Calculations for Selected Accident Scenarios
- Overview of Severe Accidents Analysis (for Level II PSA) and Mitigation Provisions

During the presentations, AECL indicated that the number of fuel channels has increased from 284 to 292 due to a core optimization and the shield tank was replaced with the stainless steel lined reactor vault to increase an independent source of water. In response to the NRC staff's question on the hypothetical and bounding site meteorological parameters to be used in the selection of a suitable site for ACR-700, AECL provided two options for the methodologies for determining compliance with US accident siting criteria for Exclusion Area Boundary (EAB) and Low Population Zone (LPZ):

Option 1:

- a) For accidents in Regulatory Guide (RG) 1.183 applicable to ACR-700, determine release characteristics in 1 hour time steps by radionuclide using AECL accident codes
- b) Use Atmospheric Dispersion and Dose Analysis Method (ADDAM) with the accident specific characteristics and site data from 3 representative sites to calculate dose distributions and demonstrate compliance with EAB and LPZ dose limit

Option 2:

- a) For accidents in RG 1.183 applicable to ACR-700, determine release characteristics in 1 hour time steps by radionuclide using AECL accident codes

- b) Using dose limits in RG 1.183 and accident specific source terms to determine hypothetical x/Q at EAB and LPZ for defined EAB and LPZ radii. Choose maximum EAB and LPZ x/Q as hypothetical limiting
- c) Using site specific data from 3 representative sites, calculate representative x/Q s at EAB and LPZ for defined EAB and LPZ radii

After the presentations, NRC staff stated that the fission product transport and aerosol behavior computer codes (SOURCE, SOPHAEROS, SMART) used by AECL need to be independently validated during the design certification review since NRC staff has not used these codes. The NRC staff also identified a possible regulatory and/or policy issue on the radiological consequences of accidents assessments. Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.34 clearly states that the fission product release assumed for the radiological consequences of accidents should be based upon a major accident, hypothesized for purposes of site analysis or postulated from considerations of possible accidental events. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release into the containment of appreciable quantities of fission products. However, AECL does not assume the fuel melting for the radiological consequences analyses. NRC staff stated that either an exemption or exception to 10 CFR 50.34 may be required during the design certification review.

Additional details on the material covered in this meeting may be accessed through the ADAMS system under Accession No. ML041070353. 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/

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Project No. 722

Enclosures: As stated

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- b) Using dose limits in RG 1.183 and accident specific source terms to determine hypothetical x/Q at EAB and LPZ for defined EAB and LPZ radii. Choose maximum EAB and LPZ x/Q as hypothetical limiting
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Project No. 722

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OFFICE	PM:RNRP	SC:RNRP*
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DATE	4/26/04	4/26/04

*See previous concurrence **OFFICIAL RECORD COPY**

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ACR-700 Design Basis and Severe Accidents Meeting
April 6 and 7, 2004

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ACR-700

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ACR-700 Design Basis and Severe Accidents Meeting
April 6 and 7, 2004

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