



ACR Pre-Application Scope, Rationale and Expectations

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TECHNOLOGIES INC.



ACR Pre-Application Review

SCOPE

- **Phase 1: June 2002 to August 2003**
 - Establish CANDU-specific focus topics
 - Extensive technical familiarization meetings
 - Reports submitted for NRC review in support of focus topics, including understanding of ACR technology base
 - Respond to NRC staff RAIs



ACR Pre-Application Review

SCOPE

- **Phase 2: September 2003 to September 2004**
 - Further technical meetings on focus topics
 - Participate in NRC PIRT meetings for ACR
 - Additional reports being submitted for NRC review
 - Respond to NRC staff RAIs



ACR Pre-Application Review

RATIONALE

- **Focus the pre-application review effort on the CANDU-specific aspects of the ACR design that are not easily addressed by the current NRC regulations**
- **Deal with focus topics that:**
 - **Are inherent to the ACR design (i.e., design aspects that cannot and should not be changed)**
 - **Have prohibitively large monetary and/or schedule impacts if proposed AECL positions not accepted by the NRC staff**



Focus Topics for Pre-Application Review

- 1. Class 1 pressure boundary design (key)**
- 2. Design basis accidents and acceptance criteria**
- 3. Computer codes and validation adequacy (key)**
- 4. Severe accident definition and adequacy of supporting R&D**
- 5. Design philosophy and safety-related systems**
- 6. Canadian design codes and standards**
- 7. Distributed control systems and safety critical software**



Focus Topics for Pre-Application Review (continued)

- 8. On-power fueling (including fuel design) (key)**
- 9. Confirmation of negative void reactivity (key)**
- 10. Preparation for Standard Design Certification Docketing**
- 11. ACR PRA Methodology**
- 12. ACR Technology Base**



NRC Familiarization Complete

ACR Familiarization Meetings

- **Design and Technology Base (September 25, 26, 2002)**
- **Physics (December 4-5, 2003)**
- **Fuel Channels (December 4-5, 2003)**
- **Quality Assurance (December 4-5, 2003)**
- **Thermal Hydraulics (February 5-6, 2003)**
- **Constructability (February 24-25, 2003)**
- **Safety Design Philosophy (March 27, 2003)**



NRC Familiarization Complete

ACR Familiarization Meetings (continued)

- **Severe Accidents and PRA (May 6-8, 2003)**
- **Analysis Methodology and Computer Codes (May 15-16, 2003)**
- **Details of RD-14M Results (June 4-5, 2003)**
- **On-Power Fueling (September 3, 2003)**
- **CANFLEX Fuel Design (September 4, 2003)**



Information Submitted During Pre-Application

- **ACR Technical Basis Document**
- **ACR Technical Description**
- **PRA Methodology for ACR**
 - **Generic PRA Methodology**
 - **PRA Methodology for ACR**
- **Safety Analysis Basis**
- **Initial Conditions and Standard Assumptions**
- **ACR Anticipatory R&D**
- **Technology of fuel channels**
- **Technology of on-power fueling**



Information Submitted During Pre-Application

- **Safety Computer Code Validation**
 - Manuals and validation reports for CATHENA (TH) and physics codes
 - CATHENA code, input deck and description
 - Physics code suite
 - Safety Analysis Computer Code Qualification – Status & Plan
- **Severe accidents**
 - MFMI test program
 - Severe accident progression in ACR
 - Severe accident R&D program



Information Submitted During Pre-Application

- **ACR Safety Analysis**
 - **Safety analysis methods (trip coverage, fuel and fuel channel, containment and thermal hydraulics, including physics)**
- **System classification (i.e., safety related systems, definition and design requirements)**
 - **ACR approach to safety related systems**
- **Comparison of 10CFR50 Appendix B and ASME NQA-1-1994 Requirements versus CSA N286 Series of Standards**
- **Identification and Initial Assessment of USNRC GSIs Applicable to ACR**



ACR Pre-Application Review

EXPECTATIONS

- **NRC staff will identify whether there are any impediments to licensing the ACR in the US**
- **Success paths identified for any unresolved pre-application focus topics**
- **Assessment of the completeness of AECL's R&D programs that exist, or are proposed/planned, in support of the ACR**
- **Provide estimates of cost and schedule for the NRC's Design Certification review of the ACR**



ACR Pre-Application Review

EXPECTATIONS

- **Parallel ongoing licensing reviews of the ACR offer an excellent opportunity for regulatory synergy between the CNSC and the NRC**
 - **Common major documents for review**
 - **Similar time frames for reviews**
 - **Co-operation between internationally-respected, well-established, mature regulatory bodies (i.e., avoid overlap of effort)**
- **Opportunity to integrate the extensive licensing experience of the CNSC and the NRC to develop a common North American technical basis for licensing the ACR-700 in both Canada and the US**



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