ACR-1000: OPERATOR-BASED DEVELOPMENT

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ABSTRACT

Atomic Energy of Canada Limited (AECL) has adapted the successful features of CANDU®* reactors to establish Generation III+ Advanced CANDU Reactor ™ (ACR™) technology. The ACR-1000™ nuclear power plant is an evolutionary product, starting with the strong base of CANDU reactor technology, coupled with thoroughly-demonstrated innovative features to enhance economics, safety, operability and maintainability.

The ACR-1000 benefits from AECL's continuous-improvement approach to design, that enabled the traditional CANDU 6 product to compile an exceptional track record of on-time, on budget product delivery, and also reliable, high capacity-factor operation. The ACR-1000 engineering program has completed the basic plant design and has entered detailed pre-project engineering and formal safety analysis to prepare the preliminary (non-project-specific) safety case. The engineering program is strongly operator-based, and encompasses much more than traditional pre-project design elements. A team of utility-experienced operations and maintenance experts is embedded in the engineering team, to ensure that all design decisions, at the system and the component level, are taken with the owner-operator interest in mind. The design program emphasizes formal review of operating feedback, along with extensive operator participation in program management and execution.

Design attention is paid to layout and access of equipment, to component and material selection, and to ensuring maximum ability for on-line maintenance. This enables the ACR-1000 to offer a three-year interval between scheduled maintenance outages, with a standard 21-day outage duration. SMART CANDU™ technology allows on-line monitoring and diagnostics to further enhance plant operation. Modules of the Advanced CANDU SMART technologies are already being back-fitted to current CANDU plants.

As well as reviewing the ACR-1000 design features and their supporting background, the paper describes the status of main program elements, engineering, R&D, and demonstration and experience feedback.
