Improving and Evolving CANDU

AECL provides the research that underpins the CANDU Business. This includes improvements to current reactors, to the effectiveness and safety of the CANDU product at home and abroad, and to the evolution of advanced reactors that will keep Canada at the forefront well into the future. This is done in competition with other suppliers as they too hone their product for the international marketplace. The reactors of the next century will perform even more efficiently and reliably while maintaining their high standards of safe operation. Key components of CANDU reactors are the fuel elements, the pressure tubes that contain them and the coolant environment in which they operate.

The success of the CANDU Business, both domestically and in the international sales arena, is founded on the use of research reactors to test and demonstrate materials and components and ensure their reliability before they are deployed in new CANDU designs. This is the basis for AECL's evolutionary design strategy for CANDU. Innovations are introduced only when proven through exhaustive testing.

Meeting Long-Term Commitments

Ongoing development of CANDU technology is needed to meet increasingly rigorous customer and public demands for further enhanced performance and safety. Current CANDU owners and potential customers expect a long-term commitment by AECL to maintain the R&D necessary to ensure the continuing viability of operating CANDU reactors, and the development of advanced CANDU designs. These will feature more passive safety systems, lower capital and operating costs, greater reliability, easier maintenance, longer plant life, and the ability to exploit CANDU's fuel cycle flexibility.

Exploiting Fuel Cycle Flexibility

The advanced CANFLEX fuel bundle—the optimal carrier for new fuel cycles in CANDU—is a telling current example: It is the result of a 15-year analytical and experimental program.

CANDU Reactors completed or under construction world-wide

* 600 MWe class units and above

CANDU's unique neutron-efficient design allows a variety of nuclear fuels to be used. To date the simplest—a once-through uranium dioxide fuel cycle—has been effectively employed. But the development of new fuels and fuel cycles, which is dependent on individual customer requirements, will be a key to CANDU's ability to compete in the future.

All new fuel designs need to be rigorously tested, from individual elements through to full-scale bundle tests in a research reactor that provides the correct irradiation environment. This critical application has been demonstrated over five decades in NRU and other research reactors. The CNF will provide an essential test bed for improved fuel designs. In particular, it will provide the ability to test fuel in horizontal full-diameter CANDU channels, and to duplicate the same effects as are encountered in the horizontal channels of a CANDU reactor.