The CNF will supply the conditions to test full-diameter CANDU pressure tubes in conditions of controlled chemistry, temperature and pressure.

Pressure Tube Materials—Key to Improved Economics

The reactor lifetime, and consequently the contribution of capital to the cost of electricity, depends on the performance of the zirconium-alloy pressure tubes that are the heart of CANDU. These pressure tubes are required to maintain their integrity over 30 to 40 years in an environment of radiation, pressure, temperature and corrosion. Their ability to attain, or exceed, their design life has a direct impact on the overall economics of the reactor, and therefore the cost of the electricity generated.

An ongoing, advanced R&D program is necessary to understand and solve the interdisciplinary issues involved in developing enhanced pressure tube materials. And a key requirement is a source of fast neutrons, intense enough to provide an accelerated lifetime test, and capable of reproducing the environmental conditions found in a power reactor. The CNF will supply the conditions to test full-diameter CANDU pressure tubes in conditions of controlled chemistry, temperature and pressure.

The CNF and the CANDU Business Strategy

The CNF was designed specifically to meet CANDU irradiation requirements identified by AECL for at least the next 30 years. These requirements are clearly aligned with AECL's overall CANDU development strategy:

- to further enhance reactor safety
- to enhance reactor economics
- to fully exploit fuel cycle flexibility

The CNF incorporates in-core experimental facilities to test the basic fuels and materials, components, and coolant chemistry of the CANDU reactor. It provides the ability to change and substitute new experimental facilities when required, including postulated advanced reactor conditions. No other foreign reactor will be available in the next century that can meet the conditions required to test CANDU fuels and pressure tubes, and to deliver a safe, reliable and cost-effective product.

In-core testing in a research reactor was an essential component of AECL's 15-year program to develop the new advanced CANFLEX fuel bundle.