CANDU 6 Evolution

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ABSTRACT

AECL's main product line is based on two single unit CANDU nuclear power plant designs; CANDU 6 and CANDU 9, each of which is based on successfully operating CANDU plants.

The 700 MWe rated CANDU 6 nuclear power plant has an outstanding operating performance record since the startup of the first four CANDU 6 units in 1983. The CANDU 6 units have a lifetime capacity factor of 84%, and have frequently achieved world number 1 ranking on an annual basis. An additional three units are under construction at the Wolsong site in South Korea, while the Cernavoda-1 CANDU 6 unit recently started up in Romania--Europe's latest nuclear power plant to come into operation. Discussions have been successful in obtaining agreement to proceed with a further 2-unit CANDU 6 plant in China, at the Qinshan site in Zhejang province.

AECL's CANDU development program is based upon evolutionary improvement. The evolutionary design approach ensures the maximum degree of operational proven-ness. It also allows successful features of today's plants to be retained while incorporating improvements as they develop to the appropriate level of design maturity. This approach is particularly appropriate for the CANDU design concept, because of the highly modular nature of the pressure-tube reactor design, and because of the clear separation of systems and functions in the CANDU design philosophy.

The CANDU 6 Development Program has been recently focussed on a set of evolutionary changes designed to comply with updated licensing and safety requirements, reduce cost and improve functionality. Areas of proposed change include:

1.System changes to simplify design, improve functionality and reduce cost.

2.Changes to improve the seismic response of the plant.

3.Changes to update control functionality and reduce costs of operation.

4.Changes to allow modest increases in power output while increasing operating margins.

The balance of this paper will describe these improvements in detail along with a discussion of Program direction for the future.