N53. ONTARIO HYDRO PROPOSES CANNING AND BURYING CANDU REACTORS

Decommissioning plans use a "deferred dismantling" approach that involves three stages: shutting down and thorough decontamination; storage and surveillance; and dismantling and disposal. It is assumed that it takes 40y for completing these activities (30y for storage and 10y for dismantling and disposal). This approach conforms to mainstream thinking, which involves piece-by-piece dismantling of the reactor units and associated plants, cutting and packaging of all components, and finally transporting and disposing of radioactive waste in an off-site disposal facility.

In 1986 Ontario Hydro presented an alternative decommissioning concept which involves "canning" the reactor in its biological shield tank, removing it as well as other major components as a single piece, and burying them in the underlying bedrock. This virtually eliminates the major tasks of piece-by-piece dismantling of components, their cutting and packaging, and off-site transport and disposal.

Ontario Hydro developed this concept has been developed for its Bruce reactors. The Bruce reactors have 1-in.-thick "bottle-shaped" carbon steel shield tanks that hold and contain the reactors. All penetrations and openings can easily be welded shut with steel plates. Once the primary heat transport system feeders are disconnected from the reactor, even the large reactor faces, where 480 fuel channels protrude, can be sealed by welding two large dishes, to complete the encapsulation. Lugs can be welded to the shield tank for attaching lifting jacks which can be supported by the reactor building super-structure. A burial vault is prepared under each reactor unit. A shaft is built below the reactor vault by controlled blasting of the substructure and the foundations below the reactor, while the reactor is supported by the lifting jacks. Each reactor "package" is lowered into the burial vault along with other large-sealed components and immobilized in situ with a grout backfill. Once all radioactive material is buried, wrecking crews decommission the balance of plant and level and restore the reactor site.

The advantages of this approach are little or no transport of radioactive materials off site; reduced need for sophisticated remote cutting and handling equipment and procedures; reduced radiation doses to crews; and no need for developing large off-site disposal vaults for decommissioning wastes.

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