

INNOVATION IN THE DESIGN OF THE USED FUEL STORAGE SYSTEM

Hervé ISSARD, Justo GARCIA

TN International (AREVA group) Saint-Quentin-en-Yvelines, France

Abstract.

Spent fuel storage is a common issue in all countries with nuclear reactors. To face the challenge of an efficient and optimised dry storage system with higher fuel characteristics (more enrichment, burn-up, shorter cooling time), the 3 keys of success are industrial experience, safety and licensing experience and innovation.

Having accumulated more than 40 years of experience in the different fields of the design and manufacture of shipping and/or interim storage containers for radioactive materials and acting at all stages in the fuel cycle, AREVA Logistics Business Unit, through its entities TN International in France, Transnuclear Inc. in the USA and Transnuclear Ltd. in Japan, has developed the leading dry storage systems of spent fuel in use today.

Thus AREVA Logistics Business Unit has developed the TN[®]24 family of cask for both transport and storage of spent nuclear fuel. Many different versions have been designed to accommodate different quantities and types of fuel, ranging from 21 PWR assemblies to 97 BWR assemblies. These dual-purpose casks have been sold in Europe (Belgium, Switzerland, Germany and Italy), in the United States and in Japan to safely perform the interim storage of used fuel elements. In parallel, the NUHOMS[®] system has been developed mainly for the US market: the spent fuel assemblies are stored inside a canister which is placed inside a concrete storage overpack. These two types of storage products were perfectly suited to their respective markets.

Facing the current international trend towards expanding Spent Fuel Interim Storage capabilities and the unpredictable market prices of steel large forged components, AREVA Logistics Business Unit has launched an extensive innovation process to create the new generation of dry interim storage systems:

- the TN[®]DUO cask is an innovative and cost effective dual purpose cask,
- the TN[®]NOVA system is an innovative canister system based on the NUHOMS[®] canister stored inside a metallic overpack.

These two innovative solutions can naturally be transported to the storage facilities as well as other sites such as reprocessing facilities or geological repositories depending of the national strategy for the back-end of the nuclear fuel cycle.

Experiences in the filed of the licensing, operating and innovation, allow to offer highly efficient interim storage systems. The new dry storage systems minimize costs and provide certainty in the licensing and supply chain of storage systems. These existing and innovative solutions match the requirements of the Japanese industry.