

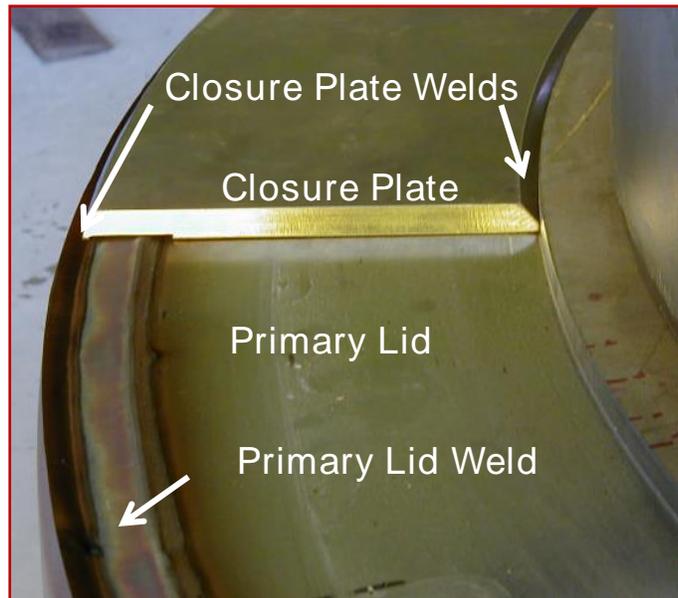
# Holtec's Double Wall Canister for Extended Service Life of a Spent Nuclear Fuel Dry Storage Facility



The Multi-Purpose Canister (MPC) has been the workhorse for the dry spent fuel storage industry in the United States since the mid-90s. The MPC is an all-welded stainless steel container with the final closure lid welded to the shell after the fuel is loaded inside. The field weld (lid-to-shell) is given an extra layer of protection by welding a closure ring or plate that completely envelops the primary MPC lid weld (see figure below). Hundreds of Holtec MPCs have been deployed across the U.S. and overseas without a single report of in-storage leakage. However, some utilities may wish for the added protection of a second barrier, as adopted by Energoatom in Ukraine and EDF in the United Kingdom.

As its name implies, the Double Wall Canister (DWC) consists of two pressure vessels, one enclosed inside the other, each independently qualified to serve as a competent Confinement Boundary for the contained radioactive materials. The DWC offers several crucial operational advantages over a single wall multi-purpose canister that are now propelling its use in the industry, namely:

- The interior stainless steel shell is completely isolated from the environment and, therefore, from the contaminants that are needed to cause SCC and other environmental degradation mechanisms, such as pitting;
- The exterior stainless steel shell has substantially reduced tensile stresses during normal service because the interior shell is serving as the pressure boundary; this minimizes the potential for corrosion of the exterior vessel exposed to the environment;
- In the very unlikely event that corrosion or some other form of damage from a beyond-design-basis accident does occur and results in through-wall cracking of the exterior vessel (there is no technical basis for this since all of these effects are considered in the design), there will still be no release to the environment because the inner shell maintains the confinement boundary. A damaged canister can be loaded into a transfer or transport cask and taken into the fuel building or hot cell for reloading of the fuel into a new DWC – all without any release to the environment.
- The external dimensions of the DWC have been engineered to be compatible with other Holtec casks and ancillaries. Therefore, any current MPC user can switch to the DWC design without incurring a significant switching cost. Several Holtec clients have either adopted (viz. Ukraine's Chernobyl dry storage project) or are in the process of making the DWC their standard canister design. In addition, the material of the two canister confinement boundaries may be different to meet specific client needs, each selected for the appropriate environmental condition (such as use of duplex stainless steel).



MPC Field Welds – State-of-the-Art

- In 2008, Holtec International manufactured a full-size prototype and performed extensive instrumented thermal–hydraulic tests to validate the thermal performance of the Double Wall Canister. Holtec has since produced hundreds of DWC’s for our projects in Ukraine and United Kingdom. In essence, the Double Wall Canister provides a practical and proven means to extend the service life of the spent fuel waste package stored in aggressive environments.

