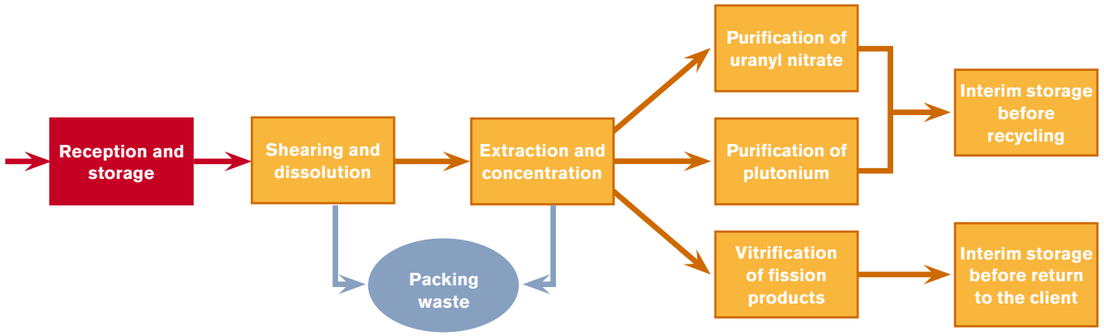
Reprocessing : the whole story



Mildly radioactive waste packed in CBF-C containers.

ACR: packing ion-exchange resins

Water purification systems in the pools contain ion-exchange resins that must be extracted after use and stored in tanks. The main function of the Resin Packing Facility (ACR) is to cement these resins before they are packed.

The ACR receives casks of empty drums and resins from the tanks.

After physico-chemical and radiological analysis, the resin solutions are concentrated then pre-processed using reagents. They are then mixed with cement and cast into drums.

Stored in casks until the cement has set, the drums are trailered back to AD2 facility. They are then put in Metallic Fibre-Concrete Containers (CBF-C).

AREVA NC
Établissement de La Hague
50444 Beaumont-Hague cedex
Tél. : +33 (0)2 33 02 64 00
Fax : +33 (0)2 33 02 66 11

Bertaud & Associés - Nantes B 316 844 323 00022 - Photos : AREVA NC - M. Ascani, P. Lesage, S. Jezequel.

REPROCESSING NUCLEAR FUEL

TO, NPH AND HAO FACILITIES

Unloading and storing in ponds

AREVA

Two unloading techniques: dry or wet

The choice of unloading procedure depends on the type of container used during transportation and the characteristics of the fuel being unloaded. The dry unloading process (TO facility), which involves connecting the container to the unloading cell, only receives the MARK II, or equivalent, container families.
The wet unloading procedure (NPH facility) can receive and unload all types of container, including small packing units used to transport fuel from research reactors (HAO facility).
Whatever the unloading procedure, the fuel is placed in baskets and then transferred to inter-connecting storage pools.

Placing a fuel element in a storage basket.

Dry unloading

1/ Receiving and checking the container

The container arrives horizontally on a trailer. It immediately undergoes a radiological examination and its protective cover is checked before unloading. It is then tipped into a vertical position and transferred to an automatic trolley to be taken to the storage ponds.

2/ Preparing the container before unloading

This operation consists in making sure there are no ruptured fuel units (i.e. that are no longer watertight), in adjusting the depression in the container's internal cavity, and in fitting the adapters needed for watertight docking to the interim-storage pond.

3/ Unloading the fuel

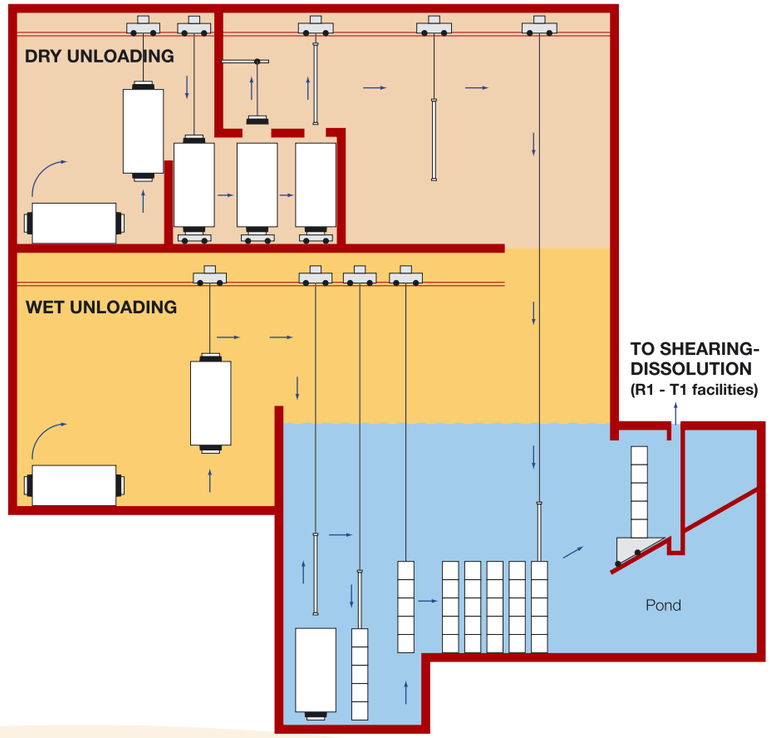
After the container has been docked and opened, the fuel is unloaded and identified automatically, unit by unit, then rinsed with water until it cools to 80°C. Once it has been ascertained that the fuel units are intact, they are placed in a basket and transferred to the storage pools.

4/ Interim-storage pond

The fuel remains in the storage pool in nine metres of water for between three and five years, during which time its radioactivity decreases. There are four metres of water between the fuel and the surface to provide biological protection. The demineralised water is constantly cooled and filtered within the same pond.

5/ Preparing the container after unloading

Sealed up again and released from the discharge cell, the empty container is sent to the preparation unit before it can depart. The docking elements are disassembled and stopper fittings put back. The internal cavity is emptied, rinsed and dried, checked for watertightness, non-contamination and irradiation, then the shock absorbent covers are replaced and the container released to collect a new load from the reactor.



Unloading under water

1/ Receiving and checking the container

The container arrives horizontally on a trailer and is checked for contamination and irradiation. Once its protective covers have been dismantled and checked, it is placed vertically and transferred to the preparation cell.

2/ Preparing the container before unloading

A protective skirt is first of all put in place to avoid external contamination of the container's cooling fins when it is submerged in the unloading pond. The container's cavity is then filled with water which circulates to bring the temperature of the fuel elements down and to reveal any ruptured elements. After the stopper's retaining screw has been undone and partly removed, the container is immersed in the unloading pond.

3/ Unloading the fuel

Once the stopper has been removed, the fuel elements are extracted from their container, identified and deposited in a basket that takes them to the storage pond.

4/ Storage in ponds

Placed in nine metres of water, the fuel remains in the storage pond for between three and five years, during which time its radioactivity decreases. There are four metres of water between the fuel and the surface to provide biological protection. The demineralised water is constantly cooled and filtered within the same pond.

5/ Preparing the container after unloading

The stopper is replaced and the empty container transferred to a preparation unit before departure. It is placed under a cloche for external decontamination by washing with high-pressure water.

The internal cavity is emptied, rinsed and dried, and checked for watertightness. A second external wash is carried out. The container is then transferred to a chamber for radiological examination and then the shock-absorbent cover is put together again. The container is now ready to be sent out again.

Underwater unloading.

Using poles in the ponds.

The container docks.

Remote handling.

Pond E.

T0 Control room.