Treat your waste directly at the source **with our customised on-site services**

We design, manufacture and operate mobile **packaging units adapted to each type of waste**

Cyclife France offers a treatment service for your radioactive waste, directly on your production sites thanks to mobile treatment and packaging units operated by its expert staff.

Our services for the design and operation of mobile machines

To meet the most complex requirements, we have designed, manufactured and commissioned mobile units which we temporarily set up and operate directly at our customers' radioactive waste producing sites. Each mobile machine packages different types of waste.

- **MERCURE: Mobile conditioning unit for Ion exchange resins (IER) from the Pressurised Water Reactor's (PWR) primary circuit.** The process used by Cyclife France on the MERCURE machines coats the IER with an Epoxy Resin matrix. The final waste is packaged in a concrete container, reinforced with integrated steel radiation shields, manufactured at Centraco. Since their commissioning in 1996 and 2002, the MERCURE machines have packaged almost 5,000 m^3 of IER.
- **UM2B: Mobile unit for encapsulating radioactive sludge.** The Cyclife France teams encapsulate radioactive sludge produced on nuclear sites, using a cement matrix, and then package it in concrete containers, using the various modules of the UM2B.
- **UMIS: Mobile on-site intervention unit.** This mobile unit makes it possible to bring historical containers holding various bulk waste into compliance with transport regulations (ADR). On average, almost 100 containers are processed each year at customer sites.
- **UMC: Mobile unit for encapsulating radioactive concentrates.** This mobile unit implements a process for encapsulating liquid waste, such as boron concentrates from the evaporator treatment of waste effluents, directly on the production sites using a hydraulic binder.
- **UMB: Mobile plugging unit.** It is used to close low-level radioactive waste containers. The plugs are made of the same concrete as the containers. The durable, waterproof packages are then stored.

At Cyclife France, we create innovative solutions for managing nuclear waste for you and for a responsible and sustainable nuclear industry.

Cyclife in France has processed more than 95,000 tons of waste in 30 years. Our added value? Turnkey solutions, cost optimisation and volume reduction.

Our on-site services

In addition to the mobile machines, we also provide expert and specialist personnel to carry out waste processing services such as inventories, characterisation, sorting, size reduction and dismantling, or packaging of waste directly on your production sites.

Our teams also work on our customers' radioactive waste production sites, offering supervision and coordination services for nuclear sites such as:

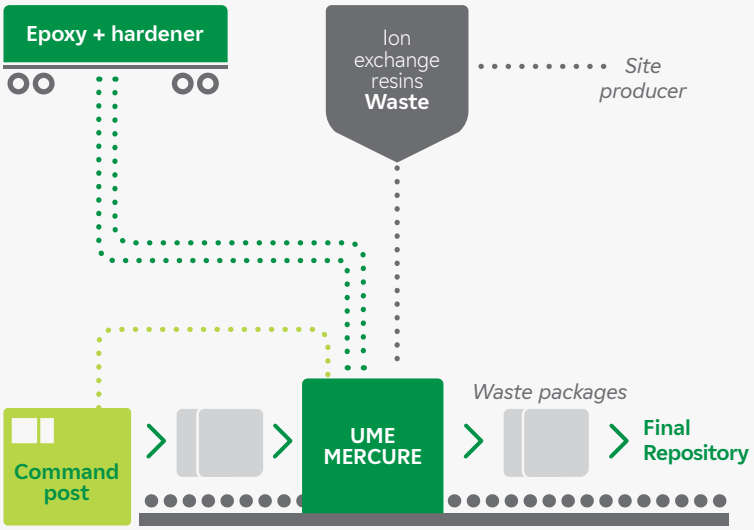
- Cleaning of tanks and retention areas
- Cleaning and disposal of sump sludge
- Sampling and radiological and chemical characterisation of the UNGG reactor core
- Loading, transport and unloading of boron concentrates
- Chemical decontamination
- Sampling of steam generator

We guarantee the **compliance of the final packages according to the acceptance specifications** of your country's storage facility for the final repository of your radioactive waste.

Acceptance criteria

The wastes taken in charge by our on-site services are:

MERCURE in operation at a production site



MERCURE

Physico-chemical nature:

- Polystyrenic, phenolic, acrylic or formophenolic skeleton
- In the form of balls or grains with a diameter of between 0.3 and 1.2 mm
- Cationic or anionic nature
- Chemical loading of borates, lithium, iron, cobalt, nickel, chromium, sodium and calcium

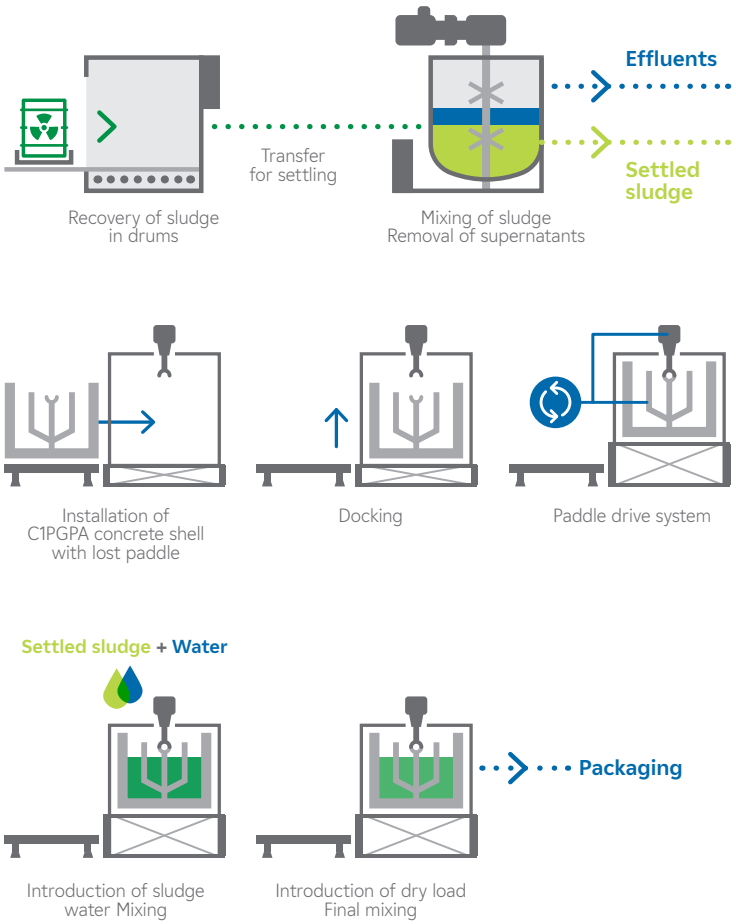
Radionuclides accepted:

- Co58, Co60, Ag110m, Mn54, Co57, Cs134, Cs137... (non exhaustive list)

Radiological criteria:

- Total specific activity of βγ emitters < 13,500 GBq/m^3

Mobile sludge encapsulating suit

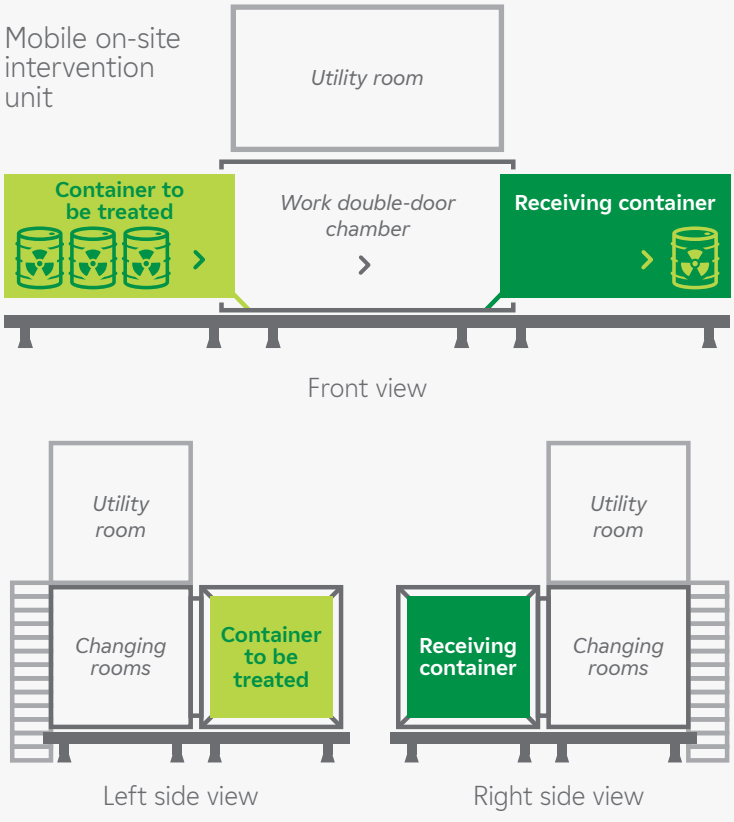


UM2B

Handling of FA/MA sludge packaged in 200l metal or 120l HDPE drums.

- Incorporation rate approx. 30%
- Development of a specific approval on the basis of a physico-chemical composition of the sludge that is encompassing and conservative
- Labile contamination of drums < 0.4 Bq/cm^2
- Main contaminating radionuclides:
  58Co and 60Co but also potentially:
  54Mn, 110mAg, 124Sb, 125Sb, 134Cs and 137Cs

Mobile on-site intervention unit

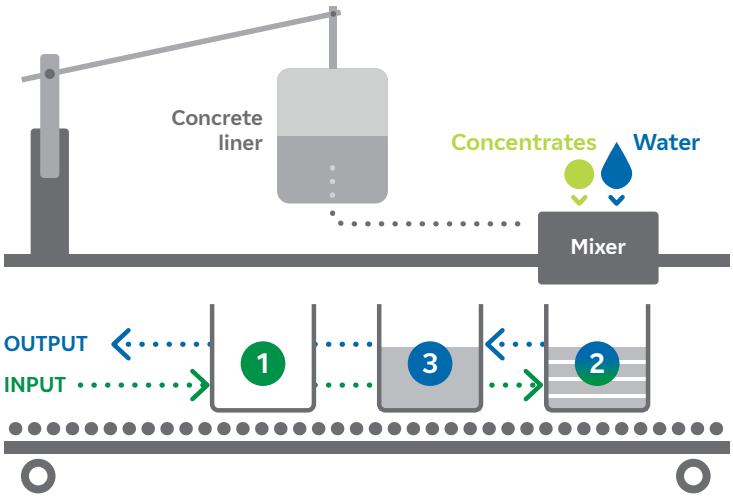


UMIS

Handling of containers holding waste or tools:

- External labile contamination of containers < 0.4 Bq/cm^2
- Labile contamination of primary packaging and tools inside containers < 4 Bq/cm^2
- Container contact dose equivalent rate < 2 mSv/h

Mobile encapsulating unit
for radioactive concentrates



UMC

Physico-chemical nature:

- Boron concentration < 30,000 ppm
- Molar ratio sodium / boron between 0.20 and 0.25
- Dry extract < 300 g/l
- Phosphate content < 20 g/l
- Temperature between 45°C and 55°C

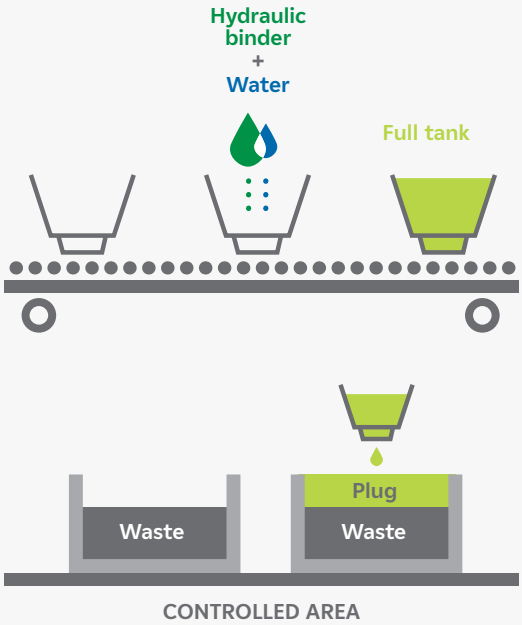
Radionuclides accepted:

- Co58, Co60, Ag110m, Mn54, Co57, Cs134, Cs137... (non exhaustive list)

Radiological criteria:

- Total activity of βγ emitters < 37 GBq/t (coating threshold)
- The mass activity of each radionuclide must remain below the coating threshold.

Mobile
plugging unit



UMB

- C1 or C4 concrete shells
- Pre-dosed load type PC1440 or PC 4440 for F44Adj formulation
- Clearance height of package before plugging: 13 cm minimum
- Minimum plug thickness: 11 cm
- DDD package contact at all points: less than or equal to 2 mSv/h

Our customer references

EDF — Packaging services for IER (250m³ / year) with the MERCURE units, boron concentrates with the UMC and radioactive sludge with the UM2B, as well as use of the UMIS.

ELECTRABEL — Packaging of IER with the MERCURE machine (previous generation).

NEUTRONS FOR SOCIETY — Max Von Laue Institute - Paul Langevin: IER packaging service with the MERCURE machine.

A question or a project?
Contact us!

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