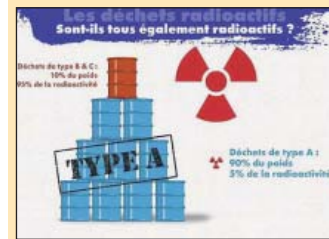


Solutions for low and intermediate-level radioactive waste

Low-level waste



SOCODEI processes "type A" radioactive waste, or short-lived* low-activity materials.

This category represents only about 5% of the total radioactivity, but accounts for 90% of the total radioactive waste mass. The remaining type B and C waste represent 95% of the radioactivity and 10% of the total mass of radioactive waste produced in France.

* materials with a radioactive half-life not exceeding about 30 years.



SOCODEI key figures

Capital
1,6 M€

Shareholders
EDF : 51%
COGEMA : 49%

Centraco investment
260 M€

SOCODEI 2004 sales
86 M€

SOCODEI personnel
52 persons

A regional economic actor
350 employees at the CENTRACO site

Procurement: 40 M€ per year,
(50% within the region)
Local taxes: 3 M€

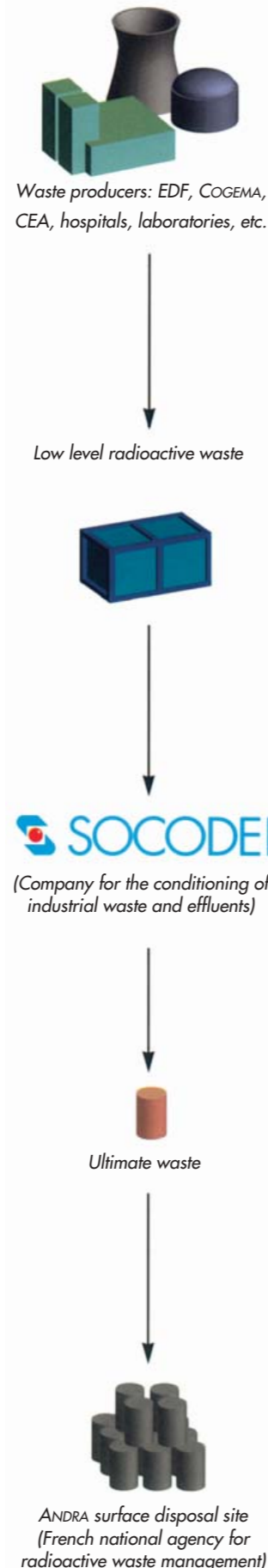
Waste management was initially imposed by legislation and has become a vital concern for industrial firms in limiting environmental impact. The objective is to avoid disposal of all but "ultimate" waste forms, i.e. waste that cannot be reused and has been suitably processed.

EDF and COGEMA, the major producers of nuclear waste in France, have squarely addressed this requirement. As a joint subsidiary of EDF (51%) and COGEMA (49%), SOCODEI was assigned the task of designing, financing, building and operating optimized waste management facilities. SOCODEI thus proposes solutions for a wide range of industrial wastes in compliance with applicable standards and with environmental protection. From waste collection on the production site to shipment of ultimate waste form to the disposal site, SOCODEI offers its customers a comprehensive line of services.

Solutions on a European scale

At the CENTRACO plant in France, SOCODEI is licensed to process low-level radioactive waste from foreign suppliers under the same safety conditions as those applicable to French waste. Specific processing campaigns ensure the traceability of the ultimate waste forms, which are systematically returned to the producing country.

SOCODEI is also using mobile machines in Belgium to condition medium-level process waste managed by the Belgian national organization for radioactive waste and enriched fissile materials (ONDRAF).



Mise à jour : Agence CASSONADE - PHOTOS : SOCODEI - PATRICK LANDMANNI - PATRICK LEFÈVRE - DANIEL MARRÉ - JEAN-MAIRE TAILLAT / ANDRA - PASCAL BOURGUIGNON

SOCODEI IN ITS ENVIRONMENT

SOCODEI contributes to environmental protection by waste volume reduction and conditioning.

By its very nature, our waste treatment activity serves the environment and we have a duty to be exemplary in the execution of this activity. To further underline its good industrial practice, SOCODEI initiated an environmental management plan in 2003 which has led to ISO 14001 certification. This is recognition for the company's continuous progress in favour of the environment. Such measures also translate the EDF group's drive to work within the scope of sustainable development. In parallel to this SOCODEI also obtained ISO 9001:2000 certification in 2005 further to its management programme towards continuous performance improvement.

CENTRACO : a clean plant

The equipment at the CENTRACO plant is designed to minimize off-site discharges. Like any French basic nuclear installation, CENTRACO meets the strict standards and monitoring requirements imposed by the Nuclear Safety authorities (DGSNR). Two containment barriers separate the radioactive material from the environment. Building design provisions ensure that even in the event of a malfunction, any population exposure would never exceed 1 milliSievert (the annual exposure limit for inhabitants near nuclear facilities).

Releases from CENTRACO are regulated by a permit from the Ministries of Industry, of the Environment and of Public Health. The radiological filtration and chemical decontamination performance is sufficient to ensure compliance with very stringent limits. The filters are continuously monitored and the stack releases are analyzed to verify the required performance.

The only liquid waste released by CENTRACO arises from the flue-gas treatment and its radioactivity level is comparable to the natural background level. It is treated by chemical neutralization and filtration before transfer to the Marcoule liquid waste treatment plant and release into the Rhône River.

SOCODEI is responsible for these releases and for environmental monitoring. It has contracted these surveillance tasks to the relevant departments responsible for the entire Marcoule site whose services ensures immediate detection of any abnormal radioactivity in the vicinity of the site.

All the data are transmitted to the French Ministry of Health, to local authorities and to the Local Information Commission.

Low-level radioactive waste under close surveillance

From collection to final disposal by ANDRA, the waste processed by SOCODEI is continuously monitored. Before acceptance for processing, the waste must comply with specific requirements concerning radioactivity, physical and chemical composition, and prior conditioning.



VISIT CENTRACO !

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SOCODEI

Waste processing to protect the environment



Ingot casting



Metal cutting



Melting furnace



Pouring a melt



Tubes produced by centrifugation

MELTING FACILITY

Metal waste forms...

These are metallic structures, valves and pumps from maintenance and dismantling operations on nuclear installations.

Melting process

The melting unit has all the facilities required for preparing waste prior to processing (sorting, cutting and sizing).

The resulting scrap metal is then melted in an induction-heated electric furnace at 1600°C. Pollution is minimal, as this technology produces only small quantities of process off-gases, and ensures excellent homogenizing of the melt both thus enabling optimal definition of the end product characteristics.

The off-gas is collected by means of a dedicated ventilation system and purified across bag filters and HEPA filters before it is released to atmosphere.

Foundry products

Waste that meets the metallic criteria is recycled by means of manufacture of radiological protection equipment used to contain other medium level waste products, used by the Mercure units.

Centrifugation, cutting and assembly equipment is available at CENTRACO for this purpose. Molten metal is poured into a centrifuge to produce a tube, which is then cut to length and fitted with a bottom and a flange.

Waste that fails to meet re-use criteria is melted down into ingots that are sent as ultimate waste to the Andra surface disposal site (CSA or CSTFA) low to medium level radioactive waste repository.



SOCODEI is the owner and nuclear supervisor of the CENTRACO plant, and is thus responsible for the safety and radioprotection of the facilities. SOCODEI supervises all the operational and monitoring activities.

CENTRACO is a low-level waste processing facility in Codolet, in southern France.

• **Its primary objective is waste volume reduction.**

• **CENTRACO ensures that the ultimate waste packages are compatible with ANDRA specifications.**



Ultimate waste is shipped to the ANDRA surface disposal site (French national agency for radioactive waste management)

INCINERATION FACILITY

Combustible waste...

The facility processes solid waste resulting from human intervention in restricted areas (gloves, shoe covers and coveralls), as well as liquid waste (rinsing solutions, oils and solvents), ion exchange resins from nuclear facilities.

Hospital and laboratory radioactive waste is also incinerated.

Incineration process

Depending on the type of containers (metal or plastic), waste is either directly incinerated or first repackaged at CENTRACO. The incinerator is a three-chamber static furnace similar to a conventional industrial unit, but includes design enhancements to comply with nuclear operating requirements, particularly for radioactive containment.

The flue-gas treatment system is particularly effective, meeting both chemical and nuclear requirements to achieve maximum purification. The flue-gas is first cooled and filtered across banks of bag filters and very high-efficiency particle filters. The resulting off-gas is chemically purified in two scrubbing columns to eliminate chlorine and sulfur dioxide, and finally in a catalytic converter to eliminate nitrogen oxides and dioxins.

The gas treatment system fully complies with the strictest and most recent standards applicable to incinerator discharge streams.

Final waste conditioning

The incineration ashes and residue are encapsulated in a hydraulic binder in a room-temperature inactivation process. The ultimate waste packages are shipped to the Andra surface disposal site.



Storage before reconditioning



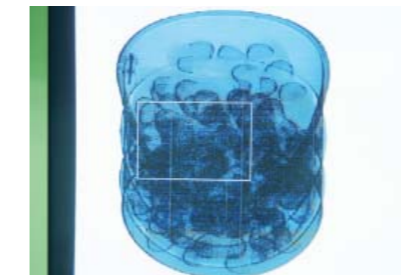
RX control



incineration furnace



Bag filters



RX scan of incinerable solid waste



ON SITE CONDITIONING

In addition to the CENTRACO facility at Codolet, SOCODEI provides mobile machines for use in nuclear facilities directly on the production sites : some types of waste are unsuitable for transportation because of their radiological or physical and chemical properties. Each mobile unit is designed to condition waste of various types.



Low and intermediate-level process waste...

Process waste includes ion exchangers used at nuclear power plants to purify the primary cooling system fluids.

Other process waste include concentrated liquid waste evaporation residues after volume reduction. Like all radioactive waste forms, they must be conditioned in compliance with stringent specifications prior to shipment to the Andra surface disposal site.

The Mercure machines

The process is designed to encapsulate ion exchangers in an epoxy resin matrix. The final waste is packaged in a concrete container lined with steel radiological shielding.

Encapsulating evaporator concentrates


Concentrates are encapsulated in cement grout inside concrete containers.



Mercurie 1



Conditioning machine



Fabrication of concrete containers

The prefabrication firm CDB is a joint subsidiary of SOCODEI (51%) and SOGEA construction (49%).

Its production is mainly oriented towards radioactive waste packaging :

- reinforced concrete containers
- drymix filler.

The filler consists of dry aggregates, cement and additives, premixed in unit portions and packaged in flexible containers.

They are used to prepare concrete for containers, as well as concrete and cement mortar used for encapsulating, grouting and sealing radioactive waste at nuclear sites. These are the containers used by the Mercure unit.

CDB also fabricates reinforced concrete pylons for aerial power lines, and operates an alluvial quarry.

