THE DECOMMISSIONING OF THE DOEL AND TIHANGE POWER PLANTS: **A NEW INDUSTRIAL CHALLENGE IN COMPLETE SAFETY**

The decommissioning will be a very large industrial and environmental project in Belgium. As a nuclear operator, it is our responsibility to see this through to a successful conclusion in a safe, humane, and environmentally friendly manner.

The decommissioning consists of the safe removal of all radioactive materials in the facility and preparing the site for new uses. This project is a challenging, innovative undertaking which will be executed under strict safety procedures.

Our mission is to tackle this challenge professionally, as we have always done in the past, with the ambition of becoming a strong benchmark in decommissioning.

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EUROPEAN EXPERIENCE

The approach taken at Doel and Tihange for decommissioning the plants is based on IAEA guidelines and feedback from other plants that have already been dismantled or are currently being dismantled, such as Obrigheim, Neckarwestheim, Mühleberg, Fessenheim, Ringhals and José Cabrera.

Their experience helps us determine the measures to be taken during the various phases of decommissioning. But also regarding the temporary storage and handling of spent fuel elements.

We can also rely on experience from the dismantling of BR3 at SCK CEN (Study Centre for Nuclear Energy) in Mol.

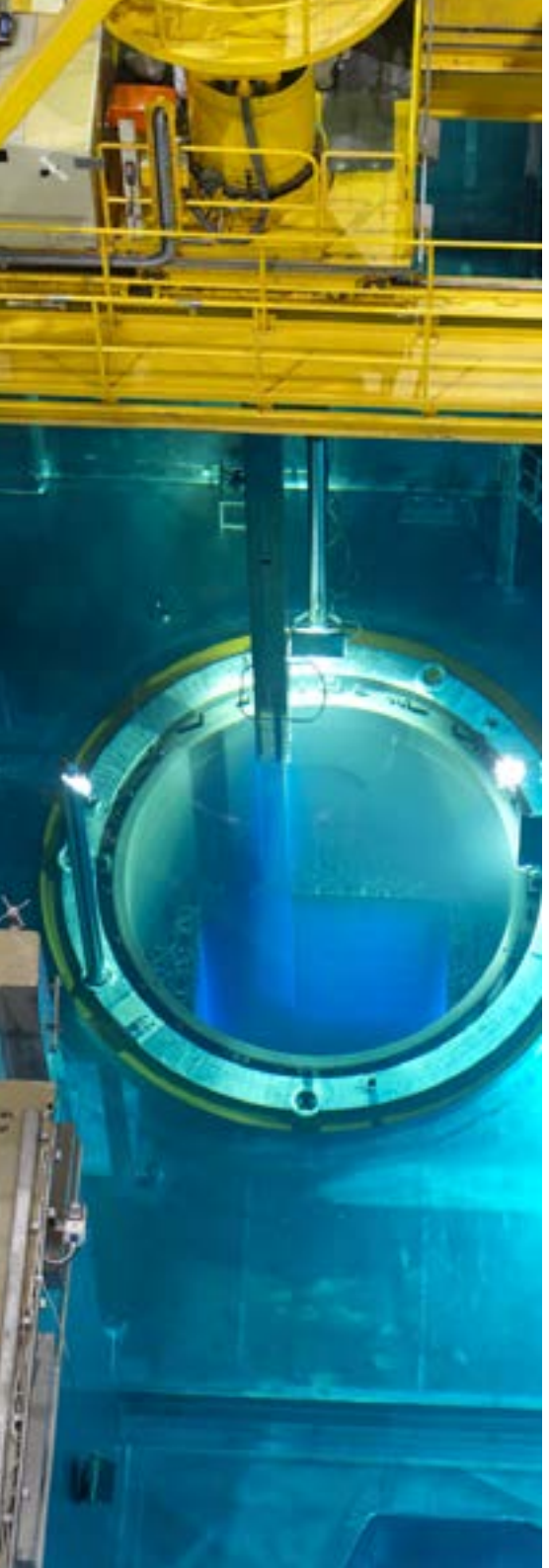
FUNDING

Since 1975, financial provisions have been accrued to cover the cost of dismantling. These funds come from the sale of electricity generated by nuclear energy. The provisions are managed by **Synatom**, under the supervision of the Nuclear Facilities Commission, which relies on the opinions issued by ONDRAF/NIRAS.

Future dismantling expenditures are regularly reassessed, taking into account current economic data, technological advances, and regulatory changes.

WASTE

Decommissioning a nuclear power plant leads to waste. 98% is conventional waste (concrete and metals), which will be recycled and recovered as much as possible. The remaining radioactive waste will be sorted, treated, and packaged before being transported for temporary storage. Depending on the type of waste, this will be on site or at Belgoprocess



DECOMMISSIONING

After construction and operation, decommissioning is the final part of the life cycle of our nuclear power plants. This phase includes all administrative and technical measures taken from the time the decision is made to permanently shut down the units, until the site is cleared for new industrial activities.

The Post Operational Phase (POP) is covered by the operating license. Next, **FANC** has to issue a dismantling license to cover the dismantling. Demolition and soil remediation will begin once the plants are no longer under nuclear control.

POST OPERATIONAL PHASE

Fase 1

Unloading the reactor and transferring the spent fuel elements to the fuel pools for cooling.

Fase 2

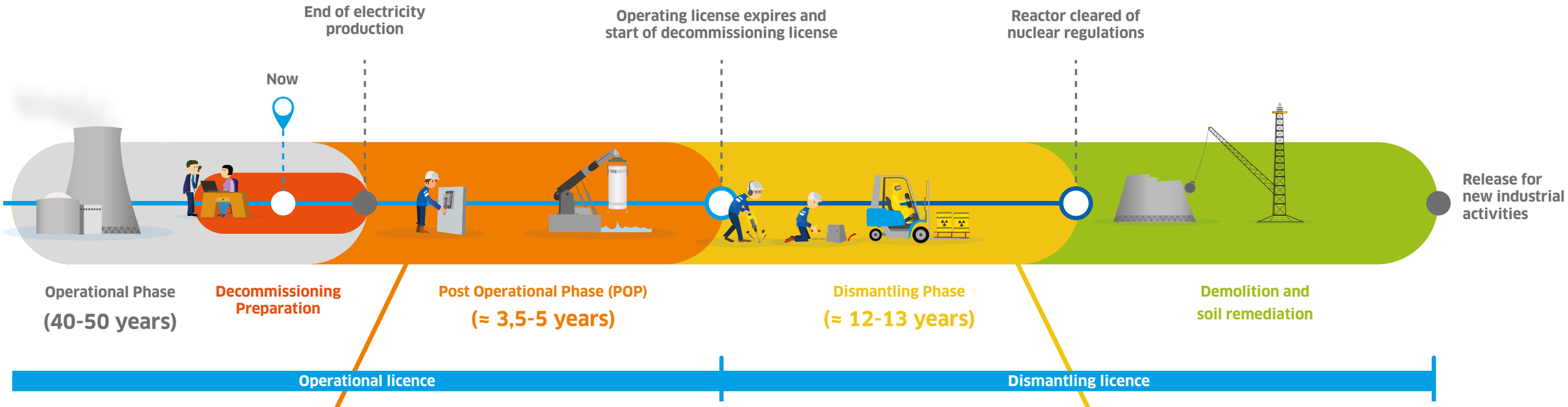
Removing radioactive particles from the primary circuit.

Fase 3

Transfer of the fuel elements to temporary storage buildings (DE-SF² at Tihange and SCG-SF² at Doel).

Fase 4

Removal of filters and resins. Final quenching of circuits, fuel pools, disposal of waste, liquid waste, and hazardous products.



POST OPERATIONAL PHASE (POP)

THE PURPOSE OF THE POST OPERATIONAL PHASE IS TO PREPARE THE PLANT FOR DISMANTLING.

The Post Operational Phase (POP) of the nuclear facility will begin as soon as the reactor is permanently shut down. The goal of this phase is to remove all nuclear fuel, hazardous materials, and liquids from the plants. The waste generated during the POP is processed at the nuclear sites. Spent fuel elements are gradually removed to the temporary storage buildings (DE-SF² in Tihange and SCG-SF² in Doel).

The POP activities are covered by the existing operating license and the permits (safety report and technical specifications) will evolve in line with the condition of the installations. The planning for the Post Operational Phase is divided into four activities that extend over several years. At the end of the POP, dismantling can start, after the **FANC** has issued the proper license.

DID YOU KNOW?

ALSO DURING THE POST OPERATIONAL PHASE NUCLEAR SAFETY IS OUR TOP PRIORITY.

Several circuits, systems, and equipment guarantee a safe operation of the plant. These systems take care of i.e. cooling the fuel elements, containment of radioactive materials, and protection from ionising radiation. This is called the **nuclear island**.

During the various stages of the Post Operational Phase, the nuclear risks reduce, e.g. as soon as the nuclear fision stops, or while the fuel elements cool down in the fuel pools. As such we can gradually take circuits and systems out of service. Deciding which systems are no longer needed without impacting nuclear safety is one of the main tasks during the preparation of the Post Operational Phase.

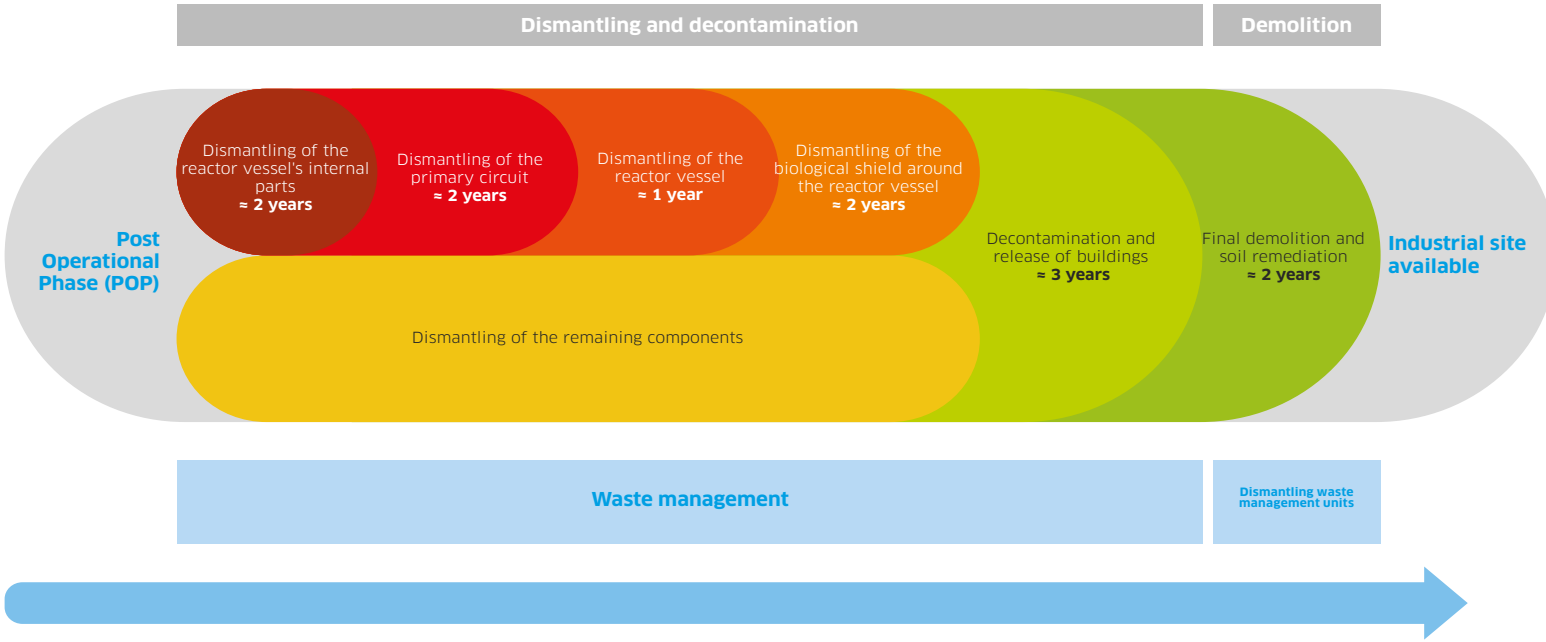
DISMANTLING PHASE

DISMANTLING CONSISTS OF 7 PHASES, INCLUDING THE DISMANTLING OF ALL NUCLEAR AND NON-NUCLEAR EQUIPMENT.

This phase mainly includes the removal of large pieces of equipment such as the reactor vessel, steam generators and the biological shield around the vessel.

All decommissioning activities are subject to safety regulations issued by FANC. Dismantling will generate waste that must be disposed of immediately or treated on-site before being sent to **Belgoprocess**.

DISMANTLING PHASE



LEXICON

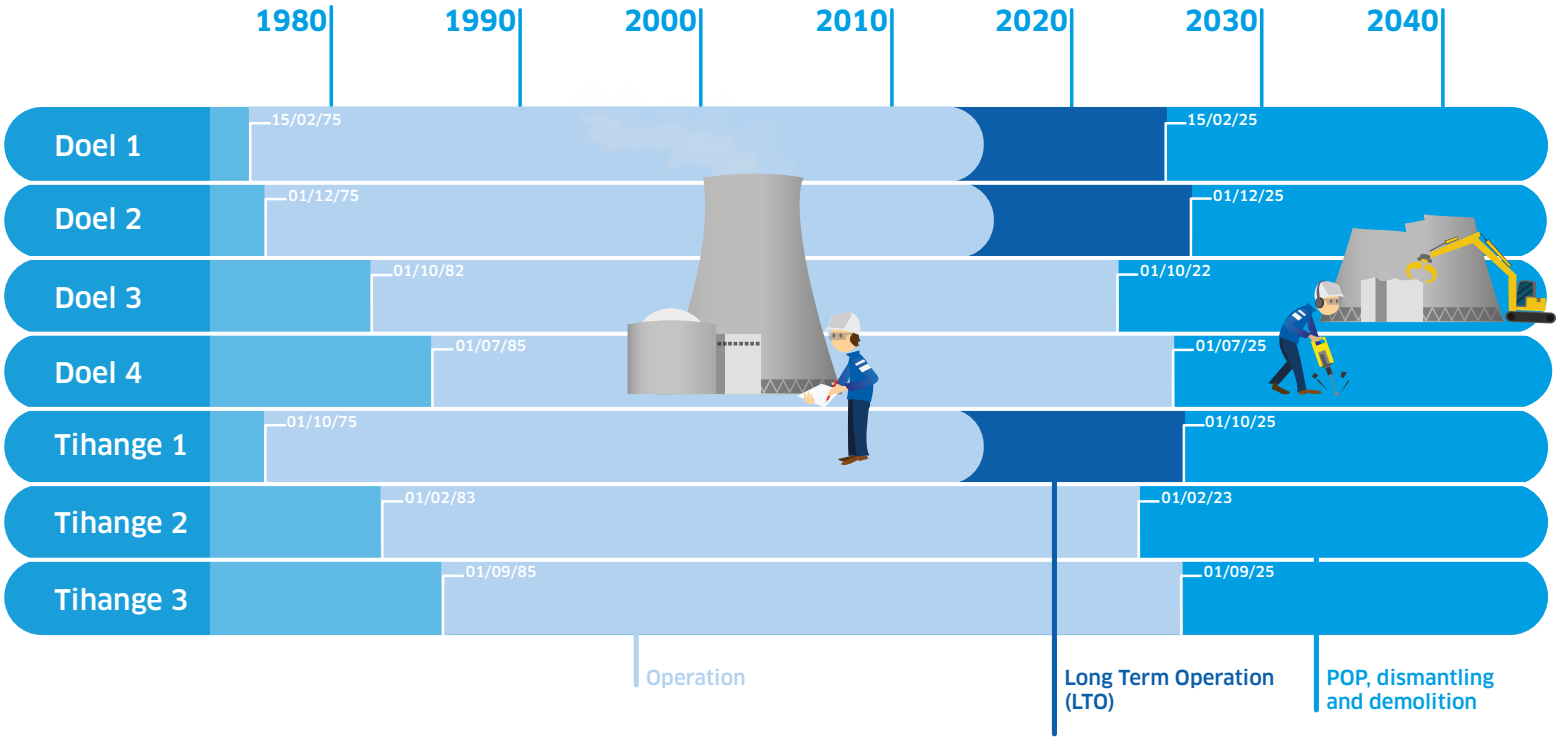
BELGOPROCESS is a subsidiary of ONDRAF/NIRAS (National Organization for Radioactive Waste and Enriched Fissile Materials), which is responsible for the treatment and storage of Belgian radioactive waste. At the Dessel and Mol sites, Belgoprocess processes radioactive waste from nuclear power plants, the industrial sector, hospitals, laboratories, and dismantling operations.

The **FEDERAL AGENCY FOR NUCLEAR CONTROL** (FANC) is responsible for ensuring that the public, workers, and the environment are effectively protected against the danger of ionizing radiation.

SYNATOM is a private company and a subsidiary of Electrabel that plays an essential role in the Belgian nuclear sector. This company ensures the supply of Belgian nuclear power plants with fuel elements and the management of part of their life cycle (interim waste management).

The **SAFETY REPORT** contains the **TECHNICAL SPECIFICATIONS** which guarantee the safe operation of the nuclear powerplants at all times. The FANC closely monitors the correct application of these rules which are part of the operational licence.

KEY DATES



CONCLUSION

Not only the operation but also the decommissioning of nuclear power plants requires nuclear professionals willing to invest in ambitious, complex, and innovative projects. Inspired by our pride and professionalism, we will tackle this new industrial challenge in a safe, responsible, and professional manner.

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