

DECOMMISSIONING
OF THE VANDELLÓS I
NUCLEAR POWER PLANT
“From nuclear power plant to technology centre”



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centro
tecnológico
mestral

VANDELLÓS I

NUCLEAR

POWER

PLANT

The Vandellós I Nuclear Power Plant, located in the municipal area of Vandellòs i l'Hospitalet de l'Infant (Tarragona), began its operation in February 1972. The reactor used natural uranium as fuel, graphite as a neutron moderator and carbon dioxide as a coolant, with a capacity of 480 MWe.

In February 1998, Enresa took over the ownership of the site in order to undertake the first decommissioning of a nuclear power plant in Spain.



OBJECTIVE

OF

DECOMMISSIONING

The project, designed by Enresa and approved by the Ministry of Industry and Energy involved decommissioning to Level 2, in accordance with International Atomic Energy Agency (IAEA) terminology. This process, carried out between March 1998 and June 2003, involved the dismantling and removal of all the structures, systems and components external to the reactor box. The reactor was confined and must remain sealed for 25 years, until the radioactivity of its internal structures has decayed naturally, before Level 3 decommissioning may be undertaken with guarantees of safety for the workers and the environment.

Address:

“Ctra. N-340, km. 1123,7
Apartado de correos 51
43890

L'HOSPITALET DE L'INFANT
(Tarragona)

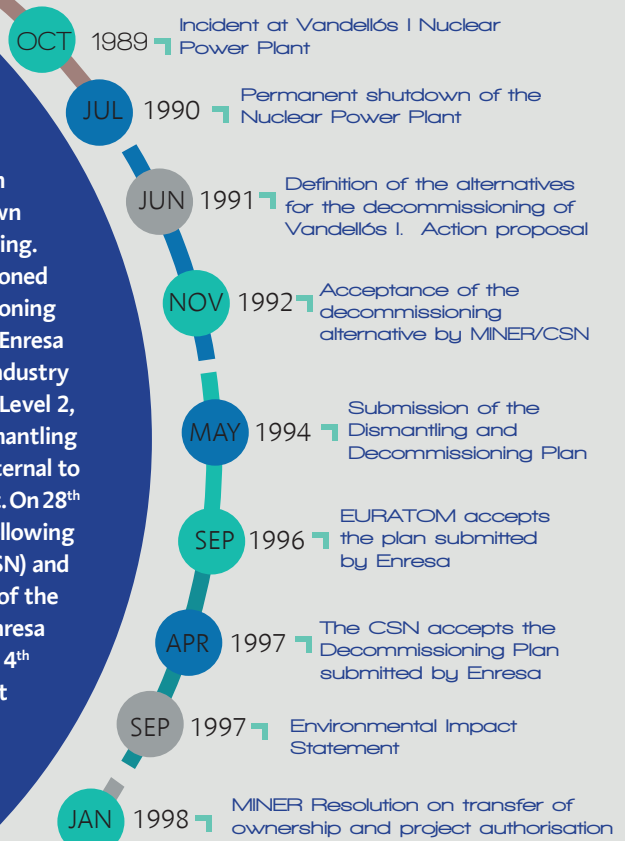
www.enresa.es”

THE FIRST

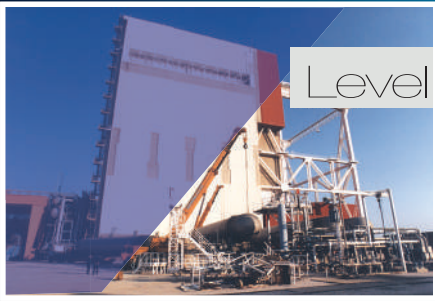
DECOMMISSIONING OF A NUCLEAR POWER PLANT

The Vandellós I Nuclear Power Plant was shut down on 19th October 1989 as a result of the fire in the turbine area. In July 1990, the Ministry of Industry and Energy issued a Ministerial Order establishing the conditions under which HIFRENSA should maintain the plant in safe shutdown mode and undertake the first level of decommissioning. The aforementioned Ministerial Order also commissioned Enresa to draw up a Dismantling and Decommissioning Plan (PDC) for the nuclear power plant. In May 1994, Enresa submitted the PDC for Vandellós I to the Ministry of Industry and Energy. This project set out decommissioning to Level 2, according to IAEA terminology, consisting of the dismantling and removal of all the structures and components external to the reactor box, except those ensuring its confinement. On 28th January 1998, the Ministry of Industry and Energy, following a favourable report by the Nuclear Safety Council (CSN) and an environmental impact statement by the Ministry of the Environment, approved the PDC for Vandellós I and Enresa became the operator responsible for the facility on 4th February. Vandellós I was the first nuclear power plant dismantled in this country and was also one of the first experiences at world level of the decommissioning of a commercial high-power NPP.

PROJECT PARAMETERS - BACKGROUND



DISMANTLING



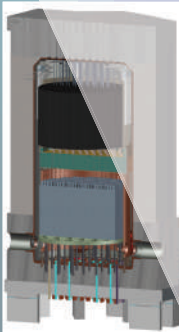
Level 1



Level 2

Level 1 decommissioning, during the period 1991 to 1997 by HIFRENESA, consisted of unloading and removal of fuel from the reactor to France, waste conditioning and pre-conditioning of graphite.

Level 2 decommissioning was carried out by Enresa between February 1998 and June 2003, releasing most of the site and designating the remainder as a regulated area, with the reactor box confined and covered by a newly built weatherproof protective structure.



With Level 2 complete, the site remains in the surveillance and maintenance phase, under the responsibility of Enresa. This latency phase will continue for 25 years, in order to reduce the activity of the internal structures of the reactor by 95%.

Completed latency period, around 2028, the last level of decommissioning will begin, involving the removal of the reactor box and its internal structures, and the subsequent release of the entire site.



WASTE

AND MATERIAL

MANAGEMENT

“Only 2% of the 96,629 tonnes of materials managed by the end of the project was radioactive waste.”

96,629 tonnes of materials were managed during the decommissioning. 88% of this amount came from non-radiological areas. 90.7% from this conventional material comprised concrete rubble generated from the demolition of buildings, which was used for

the restoration of land on the site, and 9.3% scrap and ferrous materials, which was sent to recycling plants. 10% of all the material, originating in radiological areas, could be managed as conventional waste following a rigorous clearance process.

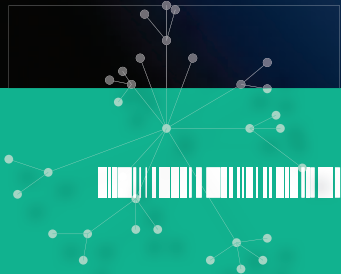
MESTRAL

After Level 2 decommissioning and in order to strengthen the presence of Enresa during the latency period, it was decided to create the Mestral Technology Centre, based on three pillars: institutional monitoring of the facility, training and research.

1 Institutional monitoring of a passive and static facility, involving minimal maintenance and continuous surveillance of slow-evolution parameters such as temperature, humidity and the internal atmospheric pressure of the reactor. Every five years, a leak test is carried out to check the confinement of the reactor box and also a visual inspection using a camera to determine the possible corrosion of the reactor box internal structures.

2 Promotion of research, development and innovation through the Mestral Technology Centre's cooperation with universities and research centres, in order to improve know-how gained during the decommissioning process. Highly specialised projects are undertaken, each pioneering within in its field.

3 Training and information related to nuclear power plant decommissioning and radioactive waste management, involving visits from all types of groups. The Mestral Technology Centre has also organised 25 international workshops on decommissioning.



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