8 Decommissioning of basic nuclear installations and the low-level, long-lived waste disposal project

Decommissioning is a general term covering all technical or administrative activities performed after shutdown of a nuclear installation and designed to take it to a predetermined final state. These activities may in particular include equipment disassembly operations, clean-up of premises and soil, dismantling of civil engineering structures, treatment, packaging, removal and disposal of waste, whether or not radioactive.

Many nuclear installations were built between 1950 and 1980 and a large number of them have been gradually shut down and then decommissioned, particularly in the past fifteen years. In 2008, about thirty nuclear installations of all types (power generating or research reactors, laboratories, fuel reprocessing plant, waste treatment installations, etc.), were shut down or were undergoing decommissioning in France. The safety and radiation protection of the decommissioning operations on these installations have gradually become key issues for ASN.

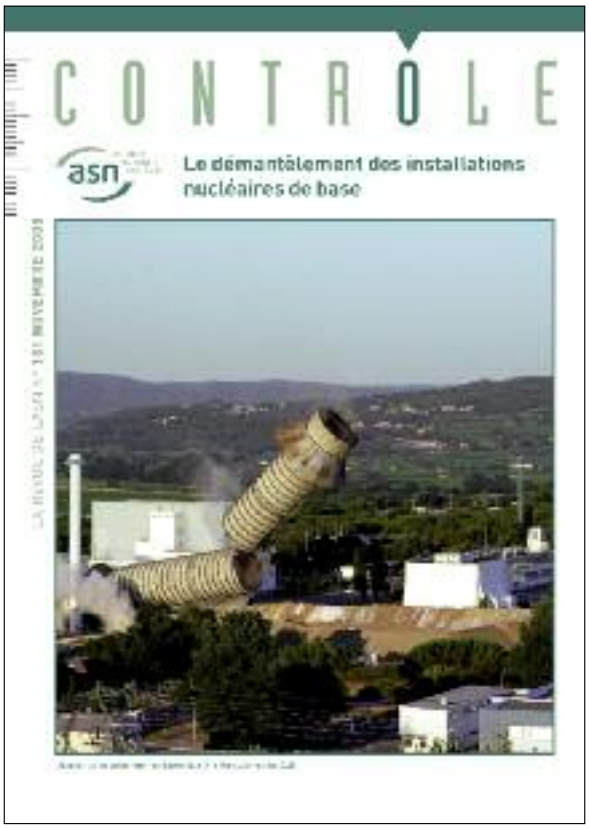
The legal framework of decommissioning

It was only in 1990 that the regulatory framework for basic nuclear installations was modified to include the final shutdown and decommissioning phases. ASN then focused efforts on enhancing this regulatory framework. It in particular ensured that the two Acts passed in 2006 concerning nuclear matters (Nuclear Transparency and Security Act of 13 June 2006, referred to as the "TSN Act", and the Sustainable Management of Radioactive Materials and Waste Act of 28 June 2006, referred to as the "Waste Act") take account of the key decommissioning issues.

ASN now considers that the legal framework for decommissioning is therefore able to deal with the main issues involved in decommissioning operations:

– Provision must be made for decommissioning as of the creation of a nuclear installation: a licensee of a basic nuclear installation is required to produce a decommissioning plan for this installation, as early as the creation phase. This plan is updated throughout the life of the installation. This decommissioning plan must act as a reference document to allow the best possible preparation of decommissioning, well ahead of time.
– Decommissioning is considered to be a phase in the life of a nuclear installation and has to be authorised accordingly: the specific nature of the decommissioning phase, in particular from the nuclear safety and radiation protection viewpoint, requires that it takes place in compliance with specific safety requirements, after authorisation has been granted by decree. The regulation procedure for obtaining this authorisation involves consultation of the stakeholders: the public (systematic public inquiry), the government departments concerned and the local information committee (CLI). ASN is particularly attentive to ensuring that no decommissioning operation is started before these consultations have been held and the decree authorising final shutdown and decommissioning has been published.
– For all the waste produced by decommissioning, a disposal solution is available, or will be available in the medium-term: decommissioning of a nuclear installation requires available management solutions for the disposal of all the waste generated by the decommissioning operations, or at the very least interim storage of it. There are operational disposal solutions for very low level (VLL) waste and short-lived low-level or intermediate-level (LIL) waste in France. Certain long-lived low-level and long-lived intermediate or high-level waste do not currently have an operational disposal solution, but the Waste Act makes provision for disposal solutions for this waste in the medium-term.
– Financing for decommissioning of any nuclear installation, whatever the time-frame, is built around long-term financial resources: Article 20 of the Waste Act set up a system for securing funding for the financial cost involved in the decommissioning of nuclear installations and management of the radioactive waste. The nuclear licensees are thus required to constitute a ring-fenced portfolio of assets tailored to the decommissioning and waste management costs that they have evaluated. These assets are untouchable, even in the event of bankruptcy of the company. ASN periodically advises the Government regarding compliance with this requirement.

Decommissioning of the Brennilis power plant, shut down since 1985 – removal of pipe lagging in room 605 of the effluent treatment station – January 1998



ASN "Contrôle" review n° 181 devoted to BNI decommissioning – November 2008

ASN DECOMMISSIONING POLICY

In parallel with this legal framework, ASN has developed a policy with regard to several aspects of decommissioning, in particular decommissioning strategies and the final states of the installations following decommissioning.

With regard to decommissioning strategies, ASN considers that the nuclear licensees must undertake decommissioning of their installations as rapidly as possible after shutting them down. ASN in fact considers that the deferred decommissioning strategy which consists in delaying decommissioning of the installations in order to take advantage of radioactive decay entails a number of risks, particularly technical and operational risks. It has been shown that the level of uncertainty increases with time: loss of information concerning the installation's construction and operating conditions, aggravated by retirement of the personnel who were familiar with the installation. Conversely, ASN considers that the conditions have now been met in France to allow immediate decommissioning: appropriate legal framework (see above), mastery of the technical issues and availability of the necessary expertise. At the instigation of ASN, all of France's main nuclear licensees (EDF, CEA, AREVA) have now opted for the immediate decommissioning strategy.

With regard to the final state of the installation following decommissioning, ASN requires the use of decommissioning practices designed to achieve a final state in which all hazardous materials, including those that are not radioactive, have been removed from the nuclear installation. Achieving this goal requires complete clean-up of the installation's civil works. In a guide referenced SD3-DEM-02, ASN specifies the methodologies to be used to achieve this complete clean-up. ASN will issue a decision delicensing a basic nuclear installation only if its final state meets the objective described above.

CONSULTING THE PUBLIC ABOUT ASN POLICY

In 2008, ASN produced a draft document presenting its policy for decommissioning and delicensing of basic nuclear installations in France. The purpose of this document is to clarify ASN's position regarding the main issues involved in the closure and decommissioning of nuclear installations, particularly with regard to:

– how to inform the public, before and throughout the decommissioning process;
– the various possible decommissioning strategies;
– the final state of the installations following decommissioning, along with the delicensing procedures.

In addition to the traditional consultation of the usual stakeholders (associations, institutions, licensees), ASN wished to broaden its policy of transparency by enabling the citizens to obtain information about and submit their comments on the draft document presenting ASN's decommissioning policy for basic nuclear installations in France. Anyone interested could therefore post a contribution on ASN's website from 1 April to 30 June 2008. This approach to the consultation attracted considerable interest, with 260 comments received, 4,000 visits and 1500 downloads of the draft document.

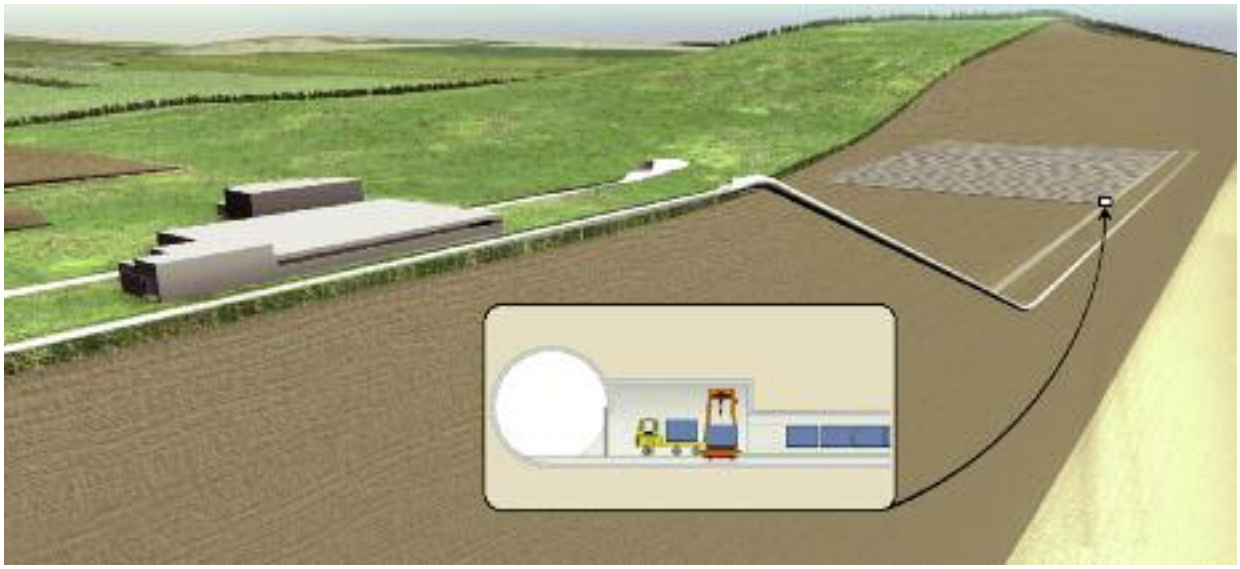
During the summer of 2008, ASN produced a new version of the draft document presenting its policy for decommissioning of nuclear installations, taking account of the public's contributions. This document will shortly be presented to the High Committee for Transparency and Information on Nuclear Security (HCTISN) before publication of its final version. ASN also informed the French National Public Debates Commission (CNDP) that it was in favour of organising a public debate on the subject of decommissioning, as had been requested by a number of associations.

Considering the importance of this subjet, ASN therefore decided to devote an issue of Contrôle magazine to the main issues involved in the decommissioning of nuclear installations. This issue was published in November 2008 and can be downloaded from the ASN website.

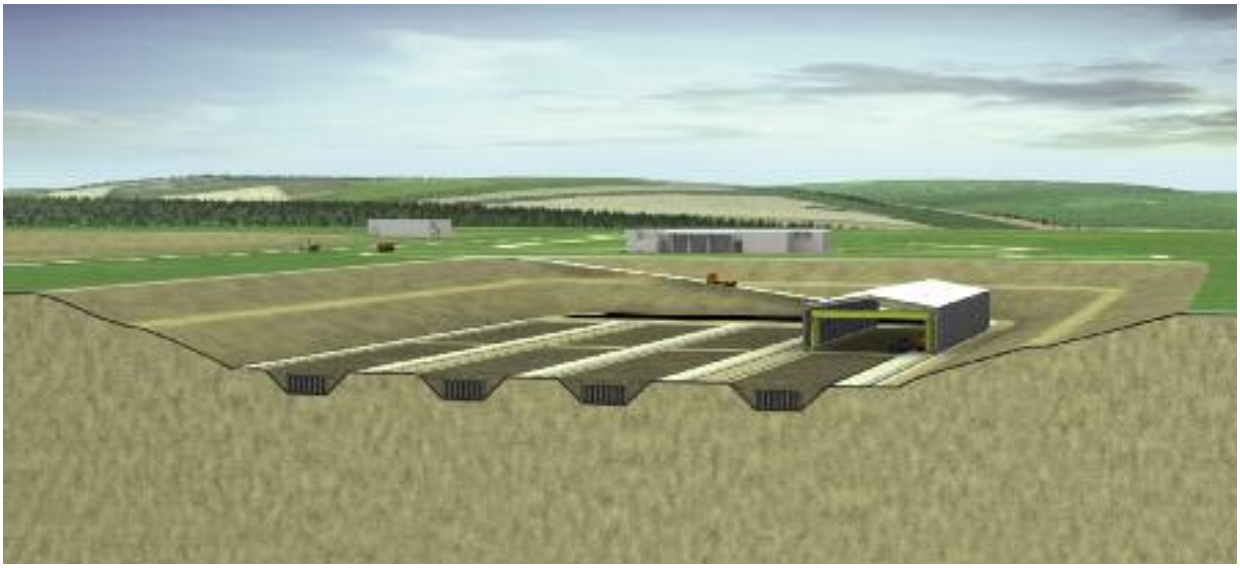
THE PARTICULAR CASE OF DECOMMISSIONING OF EDF'S GAS-COOLED REACTORS AND THE PLANNED REPOSITORY FOR LONG-LIVED LOW-LEVEL WASTE

In April 2001, at the instigation of ASN, EDF decided to adopt a new decommissioning strategy for all its nuclear reactors

Diagrams illustrating the two configuration options for the future ANDRA LL-LL waste site



Configuration with dug into a hillside



Configuration with excavated on flat ground

that had been finally shutdown, based on immediate decommissioning. It therefore anticipates complete decommissioning of these reactors by the year 2025. The reactors concerned are the Superphénix fast neutron reactor, the heavy water reactor at Brennilis, the PWR in Chooz and the 6 gas-cooled reactors (GCR) at Bugey 1, Saint-Laurent A1 and A2, Chinon A1, A2 and A3.

The decommissioning of the GCR reactors however remains dependent on the availability of a disposal solution for the large quantities of graphite waste contained in the cores of these reactors. This graphite waste falls into the category of long-lived low-level waste for which there is at present no disposal solution. The Waste Act requires that ANDRA open a disposal facility for this waste before 2013.

ANDRA however has already made it known that it will be unable to comply with this deadline and today does not expect the repository to be ready before 2019. To achieve this, it began in 2008 to look for a site for this repository. After receiving applications from about forty communes[1], ANDRA conducted a geological analysis of the candidate communes with a view to selecting the sites on which more detailed investigation would be carried out. On 15 January 2009, ASN

1. Smallest administrative subdivision administered by a mayor and a municipal council.

submitted its opinion to the Minister for Energy concerning ANDRA's analysis report. It will be up to the Minister for Energy to announce the list of selected sites.

For the GCR reactors, being able to comply with the immediate decommissioning strategy will depend on the availability of the LL-LL waste repository. Furthermore, and more particularly with regard to these reactors, owing to the uncertainty surrounding the current state of the internal structures of the reactor vessels and how they are likely to evolve in the coming years, it would appear to be even clearer that from the safety standpoint, decommissioning as early as possible would be preferable. ASN is therefore maintaining an extremely close watch on the process being carried out by ANDRA to achieve commissioning of the LL-LL waste repository within the specified time-frame. Depending on this commissioning date, EDF will conduct a periodic safety review of the installations concerned and may require reinforcement of the internal structures of the vessels or the creation of an interim storage facility for the graphite waste.