

IRSN's contribution to the fifth national radioactive materials and waste management plan

Principles and objectives of the PNGMDR

Principles

- Reduction of the quantity and harmfulness of radioactive waste.
- Interim storage, in dedicated facilities, of radioactive materials awaiting processing and of final radioactive waste awaiting disposal.
- Disposal in a deep geological layer of final radioactive waste that cannot, for reasons of nuclear safety or radiation protection, be disposed of in surface or shallow-land facilities.

Objectives

- Review existing methods of management of radioactive materials and waste, and the technical solutions adopted.
- Identify the estimated needs of storage or disposal facilities (necessary capacities, storage durations).
- Define the overall objectives to be achieved and the main deadlines to be met, taking into account the priorities defined.
- Determine the objectives to be achieved for radioactive waste awaiting final management.
- Organize the implementation of research and studies on the management of radioactive materials and waste.
- Ensure the compatibility of the recommended radioactive waste and material management solutions with the guidelines of the multi-annual energy programming (PPE)

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The French national radioactive materials and waste management plan (PNGMDR)

In France, the management of radioactive materials and waste is governed by a national plan resulting from the application of the program law of June 28, 2006 on the sustainable management of radioactive materials and waste. The objectives of the latter are defined in Article L. 542-1-2 of the French Environment Code. First released in 2007, this plan was updated in 2010, 2013, and 2016. Its fifth version is expected to cover a period of five years.

The fifth PNGMDR

■ Key challenges

The fifth PNGMDR defines the actions to be taken in the field of radioactive material and waste management. However, it is part of a longer time frame at the end of which several important decisions are expected to be made, such as:

- the status of radioactive material management, with regard to reuse prospects and, for spent nuclear fuels, the need for new storage capacity by 2030,
- the need for additional disposal capacity to accommodate very low-level waste (VLLW) by the end of 2028 and the conditions for the reuse of certain VLLW,
- the definition of a strategy for the management of low-level long-lived waste (LLW-LL), in view of the significant heterogeneity of this waste,
- management of high-level and intermediate-level long-lived waste (HL-ILW-LL), including the implementation of the Cigéo geological disposal project and the development of alternative management options to this type of disposal,
- management of old uranium mines, legacy repositories as well as waste identified as requiring specific work to enable their management,
- cross-cutting ethics, governance, territories, and economy issues related to the management of radioactive materials and waste.

■ Development based on public participation

For the first time, the development of the fifth PNGMDR was the subject of a public debate organized by the French National Commission for Public Debate (CNDP), which took place from April 17 to September 25, 2019. Considering the lessons learned from this debate, the French Ministry of Ecological Transition (MTE) and the French Nuclear Safety Authority (ASN) published the directions of the next plan in a decision dated February 21, 2021. Prior to consultation of the draft plan with the population, a pluralist consultation, in particular in the form of a "guidance" committee, was organized by the MTE from September 2020 to April 2021.

IRSN's contribution to the development and implementation of the PNGMDR

The Institute is involved at several levels of its development and implementation, including:

■ Assessment of PNGMDR deliverables and the publication of notices

Available on the Institute's website, these notices cover topics, such as the challenges of decommissioning nuclear facilities, radioactive waste management methods, or risk management relating to former uranium mines. Sixteen notices and reports were published by IRSN between 2009 and 2019.

■ Participation in the PNGMDR Implementation Monitoring Working Group

As part of follow-up meetings, IRSN presented notably work on issues, such as the harmfulness of waste.

■ Scientific and technical advice to the PNGMDR "guidance" committee

IRSN provides scientific and technical advice to inform the committee on the areas within the Institute's scope.

IRSN is a French State-owned industrial and commercial establishment (EPIC) the missions, status, and operation of which are determined by Articles L592-45 to L592-49 and R592-39 to R592-61 of the French Environment Code. IRSN is under the joint supervision of the French Minister for the Environment, the French Minister of Defense, and the French Ministers of Energy, Research, and Health.

As a public expert, IRSN advances scientific knowledge to manage all nuclear and radiation risks. Through its research, methods, and interactions with all stakeholders, IRSN assesses these risks and their consequences independently. It thus contributes to their prevention, detection, and limitation of their possible effects, in order to protect the population and the environment.

Key figures of IRSN's participation in the public debate

6 months of support

40 experts from 10 of the Institute's units

2 reports

23 public events organized by the French National Commission for Public Debate (CPDP)

IRSN's contribution to the public debate on the fifth PNGMDR

IRSN experts contributed to the various stages of the public debate on the fifth PNGMDR by providing information from their assessments and research with a view to enabling everyone to form their own opinion and, ultimately, to inform public decision.

■ Reporting

On May 15, 2019, IRSN submitted to Chantal Jouanno, chairwoman of the CNDP, two reports drawn up at her request:

- **the first is an analysis of the possibilities of dry storage of spent nuclear fuel.** In particular, it concerns the compatibility of certain mixed oxide (MOX) and enriched reprocessed uranium (ERU) fuels, currently stored underwater, with dry storage. It also discusses possible developments in current transport and dry storage concepts and the target values for the maximum thermal output of the associated spent fuels;
- **the second is an international overview of research into alternatives to the geological disposal of HL-ILW-LL waste.** It identifies the main alternatives to geological disposal, explored worldwide, to ensure the long-term management of these categories of waste. Among other things, it provides historical and scientific information to assess the context in which the various options emerged and were explored. It also identifies technical and societal issues to which these options are associated.

■ A multifaceted contribution

In addition to the production of these reports, IRSN's contribution was made according to different methods, depending on the context and the audience concerned:

- involvement in the process of clarification of technical controversies implemented by the CNDP. This brought together representatives of the various stakeholders: waste producers, Andra, IRSN, as well as associations and non-institutional experts;
- participation in all public debate events: four general public meetings, thirteen topical meetings, two "café-philos"-type discussion fora, a round table, an opening meeting, and a debriefing and closing meeting;
- provision of *serious games*, developed under the European SITEX project coordinated by IRSN, for a 'Next generation workshop' bringing together around fifty students invited to think about long-term radioactive waste management solutions;
- posting, on the IRSN website (www.irsn.fr), of documents on the knowledge and prevention of risks related to radioactive waste management: topical and summary information sheets, articles, etc.;
- production of six podcasts to explain the technical issues of the debate;
- organization of a press trip, including a visit to several Swiss nuclear waste and spent fuel management facilities as well as to IRSN's underground research laboratory in Tournemire (southern France).

Key lessons learned from the public debate: IRSN's point of view

Four key lessons were learned from the public debate on the fifth PNGMDR:

- **the contribution of novel debate methods**, such as the process of clarification of controversies and the 'Next generation workshop'. The first allowed the diversity of participants to be expressed in the development of arguments on some of the topics discussed, the second allowed the debate to be opened up and expression to be broadened beyond the stakeholders already involved in these subjects;
- **the relevance of creating the conditions for public appropriation of the information and data made available to it.** This can be done, among other things, by opening up expertise, in particular that of IRSN, and by maintaining a lasting and open dialog between the various stakeholders;
- **the major concerns expressed by participants in the public debate on certain technical themes:** health and environmental impacts, alternative options to underwater spent fuel storage and the Cigéo disposal project, as well as the impacts of climate change;
- **the importance of creating pluralistic dialogs** where stakeholders discuss and identify their points of agreement and disagreement and what remains to be investigated, both at national and regional levels.