

Radioactive waste management: IRSN serving risk prevention

IRSN FACT SHEETS

September 2021
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A national regulatory framework now a reference for the European framework

In France, the management of radioactive materials and waste was governed by three successive laws:

- Law no. 91-1381 of December 30, 1991** on research into the management of radioactive waste (Bataille Law). It provided a legal framework for the creation of underground research laboratories for deep geological disposal and conferred on Andra the status of public institution of an industrial and commercial nature (EPIC) independent from waste producers;
- French Program Law no. 2006-739 of June 28, 2006** on the sustainable management of radioactive materials and waste. It established the development of the French national radioactive materials and waste management plan (PNGMDR) and set a timetable for research on high-level and intermediate-level long-lived waste;
- French Law no. 2016-1015 of July 25, 2016** specifying the terms of creation of a reversible deep geological repository for high-level and intermediate-level long-lived waste has set the conditions for the reversibility of deep geological repositories.

Radioactive waste: very different radiological and physicochemical characteristics

Substances containing natural or artificial radionuclides the activity or concentration of which justifies radiation protection control and for which no further use is planned or envisaged, radioactive waste is classified in different categories (source: Andra/2020 National Inventory of Radioactive Materials and Waste).

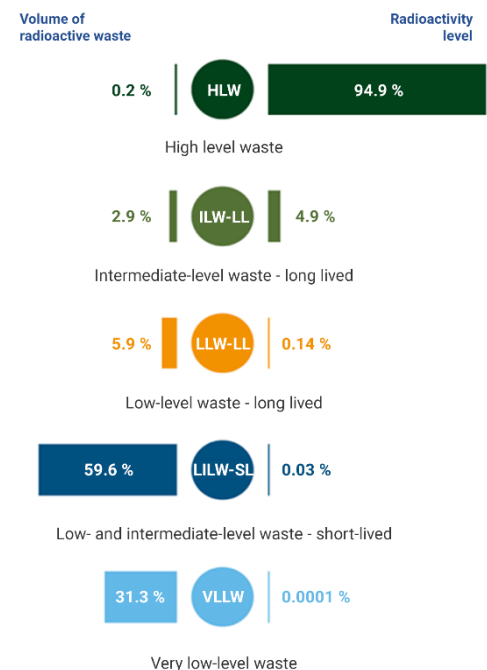
IRSN's role in the safe management of radioactive waste

IRSN's assessments focus on the characterization of waste and its packaging, in particular with regard to the suitability of the waste packages produced according to the specifications of the disposal facilities likely to receive them, as well as the conditions for storing these packages and transporting them to disposal facilities.

The acceptability of this waste at disposal facilities that exist or are in the planning stage is examined from a safety perspective, both as regards the service lives of these facilities and their capacity to contain radioactivity in the long term. Issues relating, in particular, to the risks of fire and explosion in operation as well as those linked, in the long term, to the mobility of radionuclides in the geosphere form the basis of the Institute's expertise on radioactive waste management.

Research in support of assessments

- As a public expert in nuclear and radiological risks, IRSN defines and implements research programs intended to develop the knowledge and skills necessary for credible and independent technical assessments.
- With that in mind, IRSN focuses its efforts on the following areas:
 - tests and methodological developments intended to provide an opinion on the quality of the data acquired by operators;
 - experimental research and modeling to understand fundamental mechanisms that could impact safety;
 - tests aimed at exploring the technical difficulties of implementing various safety barriers – such as seals intended for permanent closure of a disposal facility or the containment systems for waste packages – in order to assess their effectiveness;
 - development of a simulation capacity for disposal behavior.



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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 the 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 the limitation of their possible effects, in order to protect the population and the environment.

- IRSN continues its research into the safety of deep geological repositories using its underground research laboratory in Tournemire (southern France). Due to its geological configuration and the nature of the rocks, this experimental site has broad similarities to that studied by Andra in Bure (northeast France).
- At Fontenay-aux-Roses (near Paris), IRSN also runs a laboratory called LUTECE, dedicated to characterizing samples (mass spectrometry, gamma spectrometry, imaging, mechanical tests, etc.) as part of its research programs on the safety of deep disposal of radioactive waste and on the transfer of pollutants into surface soils in the environment of mining and polluted sites.

Assessment and research conducted in dialog with civil society

- As part of its initiative to open up to society, since 2012, IRSN has set up continuous technical exchanges on the disposal of high-level and intermediate-level long-lived waste (see box below) in cooperation with the National Association of Local Information Committees and Commissions (ANCCLI) and the Bure Local Information and Monitoring Committee (CLIS). They enrich the Institute's assessments by integrating the views of civil society and its questions. In addition, IRSN is pursuing an approach aimed at associating society with the development of radioactive waste research programs.
- IRSN also participates in public debates and consultations on the Cigéo project and the French national radioactive materials and waste management plan (PNGMDR) (see box below). The aim is to provide information from its assessments and research to enable the population to form its own opinion and, ultimately, to inform public decision-making.
- IRSN is also involved in pluralist working groups on radioactive waste management issues. Since their creation, the Institute has participated in the monitoring group for studies carried out under the PNGMDR as well as in the plan's steering committee. In 2020, it also participated in a working group of the High Committee for Transparency and Information on Nuclear Security (HCTISN) which issued recommendations on public information and participation regarding ANDRA's recent consultation on the Cigéo project.

The example of technical exchanges on the disposal of high-level and intermediate-level long-lived waste

- Organization of seminars on management solutions, disposal reversibility, risks in operation, transportation of waste packages, Cigéo safety options, and health effects.
- Experimenting with innovative dialog approaches to include civil society's concerns and questions during the review of Cigéo project's safety options:
 - creation of a pluralist discussion group,
 - design of new methods of interaction with civil society for investigating future projects with major social implications.
- Currently, the discussion group's work is ongoing with a view to reviewing the future request for authorisation to build the Cigéo deep geological repository.

Some key figures

9 years of technical exchange
7 seminars (cumulative participation: 700 people)
7 discussion group meetings

The example of the public debate on the fifth PNGMDR held from April to September 2019

Multiple contributions from IRSN specifically regarding radioactive waste:

- Submission of a report summarizing research carried out on alternatives to the geological disposal of high-level and intermediate-level long-lived waste.
- Participation in public meetings, topical meetings, a workshop for young people bringing together students to think about the management of radioactive waste using serious game participation tools, the process of clarifying technical controversies, etc.
- Online posting of topical and didactic sheets, articles, podcasts, etc.

Some key figures

6 months of support
1 IRSN report
23 public events