

IRSN, the French national public service scientific and technical expert in the assessment of nuclear and radiological risks

IRSN FACT SHEETS

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www.irsn.fr

IRSN is a State-owned industrial and commercial establishment (EPIC) created by French law no. 2001-398 of May 9, 2001, 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.

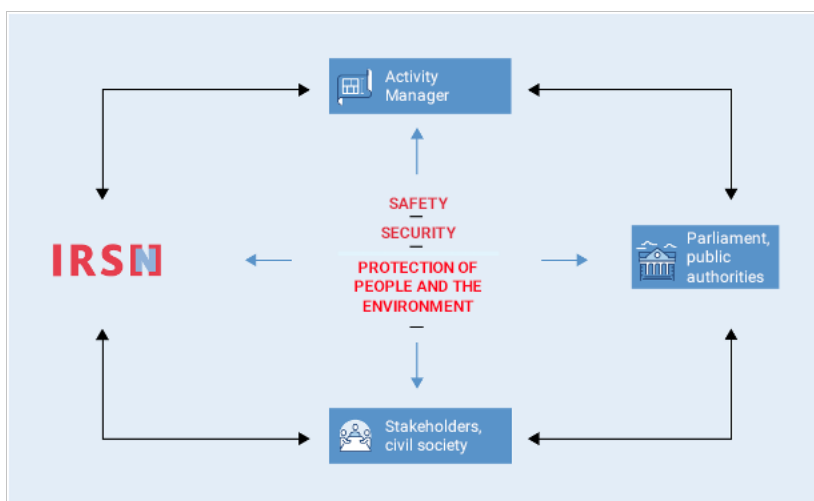
As a public expert, IRSN advances scientific knowledge to manage all nuclear and radiation risks. Through its research, methods, and interactions with all stakeholders, IRSN assesses these risks and their consequences independently. It thus contributes to their prevention, detection, and the limitation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

As a public expert in the assessment of nuclear and radiological risks, IRSN contributes, through its research and expertise, to the development and implementation of public policies on prevention and protection against ionizing radiation risks in the energy, environment, and health sectors.

Inform public decisions

IRSN, an independent scientific and technical expert

The national organization for nuclear safety, security, and protection of persons against ionizing radiation is based on four pillars with clearly defined roles and responsibilities:



Activity managers (operators)

implement the processes (industry, research, medical sector, defense, etc.) and are responsible for the safety of their facilities or activities.

Parliament and the public authorities

control and decide. IRSN carries out research and assessments to inform public decisions.

Stakeholders and society

contribute, through their vigilance, to managing nuclear and radiological risks.

The nuclear and radiological risk governance system, of which IRSN is part, is structured according to a principle of separation of risk assessment and management functions. Assessments are carried out by IRSN, the public expert, risk management and decisions relating to the means to manage them are the responsibility of the authorities and government departments. Therefore, IRSN's mission is to inform, through its scientific and technical expertise, public decision-making on nuclear safety and radiation protection. This nuclear and radiological risk assessment and management organization was defined by law in 2001 and reaffirmed in 2015 in the law on the Energy Transition for Green Growth. It is also applied in other areas, in France and Europe, such as health risks.

⇒ **This system provides the expert with the framework for an independent, impartial, and reliable assessment.**

Multi-disciplinary and technical complementarity for assessments

The use of ionizing radiation in France is diversified (industry including the nuclear power sector as a whole, defense sector, medical sector, research sector, etc.). Ionizing radiation also occurs naturally (radon, cosmic radiation, etc.). The range of associated risks is wide (technological risks, health risks, environmental risks, etc.). In connection with this variety, various government departments or authorities are in charge of managing these risks, each within a defined scope.

Contact
Emmanuelle Mur
Tel. +33(0)1 58 35 96 71

Registered office
31, av. de la Division Leclerc
92260 Fontenay-aux-Roses

Information to society: a few figures

194 opinions and reports published on www.irsn.fr in 2020.

104 responses to requests from CLIs and associations in 2020.

11 IRSN assistance missions to CLIs in 2020.

240 scientific papers published annually in peer-reviewed journals, on average.

Within this plural system, IRSN provides its expertise to these various public decision-makers. Its positioning, the scope of its tasks, and the spectrum of its skills favor:

- **synergies**, illustrated, in particular, by the complementary nature of research/expertise which allows, through research on nuclear safety and radiation protection, the development and acquisition of knowledge for expertise;
- **cross-functionality and consistency** in assessing the risk, whether in the civilian or defense sectors, or in the various areas of use of ionizing radiation (nuclear power, medical, research, natural, etc.);
- **efficiency**: beyond the cross-functionality and consistency of approaches, the system provides, in an optimized manner and within a single structure, a significant assessment capability that can be adapted to different situations, including those relating to nuclear or radiological emergencies, and enabling expertise to be made available to all the State's services, both at national and regional level.

An expert in interaction with the environment

IRSN values interactions with all stakeholders in nuclear safety and security as well as radiation protection, business managers, authorities and public authorities, and society, in France, Europe, and internationally. These interactions are established:

- **during assessment processes:**
 - with the authorities and public authorities with which the assessment's outline and questions are defined,
 - with those in charge of activities in the context of a joint scientific and technical dialog,
- **during research**, which is based on national, European, and international cooperation and partnerships. In line with the commitments made in the State-IRSN Objectives and Performance Contract (COP) for 2019-2023, IRSN has undertaken to develop its structural partnerships based on three types of cooperation:
 - with nuclear sector stakeholders: safety and radiation protection technical bodies, manufacturers,
 - with academia: French National Centre for Scientific Research (CNRS), Paris-Saclay University, Gustave-Roussy Institute, etc.
- **with civil society** (see below *A public expert serving society*)
- **with its foreign counterparts**. IRSN, an internationally recognized stakeholder, has a conscious international strategy based on three types of partnerships:
 - at European level, with ETSO (European Technical Safety Organizations Network), a network of European 'IRSNs', and the European Commission, in particular by responding to its calls for assessments or research projects,
 - at international level, with the IAEA, an international multilateral reference body for all IRSN missions,
 - at bilateral level, through relationships with some partners, notably in Europe, Japan, and the U.S.A.

A public expert serving society

At a time when environmental democracy is gaining ground, as shown by IRSN's annual *Barometer of the perception of risks and security by the French people*, civil society claims more transparency and wants to actively participate in risk assessment ahead of political decision-making, thus contributing, through citizen vigilance, to managing these risks.

The opening up of the Institute's work to society stakeholders aims to build a shared understanding of nuclear and radiation risks, the associated challenges, and the mechanisms to deal with them. It is in this spirit – and in accordance with a commitment made in the COP for 2019-2023 – that a committee named ODISCÉ was created in 2021, tasked with advising IRSN on new dialogs to be undertaken in order to enhance the robustness of its assessment work by including questions from society.

In the same logic, IRSN is pursuing a set of actions aimed at:

- **informing society**, via its website (on which it publishes, in particular, the opinions resulting from its technical assessment work, the main results of its research programs, etc.), its publications (*Barometer of the perception of risks and security by the French people*, *Repères* magazine, etc.), and its contribution to public debates or monitoring committees (such as that dedicated to the monitoring of tritium in the Loire river);
- **enhancing the technical competence of Local Information Committees (CLIs) and the National Association of Local Information Committees and Commissions (Anccli) members**, in the context of technical dialogs;
- **involving each citizen in their radiation protection** through the development of participatory science projects (such as OpenRadiation), by giving elements of practical radiation protection culture, in particular to young people, through initiatives, such as the *Rencontres lycéennes de la radioprotection*, an annual international gathering of school students involved in radiation protection workshops).
- **deploying collaborative research** to experiment with various methodological approaches to research on health and the environment.

IRSN's main challenges in the coming years

IRSN will face several challenges in the coming years, in all its fields (industrial, health, defense, research, etc.).

Nuclear safety

As a public expert on nuclear and radiological risks, IRSN must contribute, over time and through its independent assessment, to the safe operation of civil and defense nuclear facilities in a country where they are central and where major projects are being studied or under construction:

- the lifetime extension of the second largest nuclear fleet in the world;
- the safety assessment of new reactors: EPR, small modular reactors (SMR), international experimental thermonuclear fusion reactor (Iter), etc.
- the safety assessment of future nuclear fuel cycle facilities, including spent fuel and waste management: centralized pool for the storage of spent fuels, geological storage of high-level and intermediate-level long-lived waste (Cigeo), etc.
- future nuclear propulsion programs (submarines launching third generation missiles, aircraft carriers, etc.).

IRSN will also continue its involvement in the convergence of technical approaches and practices for nuclear safety at European and international level.

Environment

IRSN's regular radiation monitoring of the environment (air, water, food, etc.) is based on networks of remote sensing beacons and environment sampling stations, permanently installed at specific points in the country, as close as possible to nuclear facilities or outside their influence.

In addition to this regular monitoring, IRSN carries out dedicated studies:

- either at regional level: radiological studies summarize the knowledge of the levels of natural and artificial radioactivity in a particular region, territory, or catchment area;
- or focused on the environment close to nuclear facilities: radiological studies of sites to deepen knowledge on the radiological impact of a nuclear facility on its immediate surroundings, to realistically assess – through specific measurements combined with modeling – the exposure of neighboring populations and to involve civil society stakeholders in the study and the report.

For the coming years, IRSN's main challenges in this field are as follows:

- optimize existing regular monitoring networks to keep them in operational condition;
- maintain a culture of flexibility and responsiveness: better manage the transition between a normal situation and an emergency situation through procedures the effectiveness of which are regularly proven in exercises;
- maintain a metrological point of contact role through the development of methods to remain cutting edge, the maintenance of a set of accreditations, and participation in national and international comparison exercises;
- explicitly contribute to public policies by making available, in particular, environmental characterization and impact assessment data from its monitoring program or some of its studies;
- shift from regional radiation studies to site radiation studies;
- reconsider the monitoring strategy in particular situations such as radiological events, nuclear or health emergencies, etc.
- take advantage of the most advanced technologies – such as digital tools – to turn them into productivity levers and adapt its technical platform (new sampling systems, automation of measurement systems, etc.).

Health

Today, IRSN contributes, through its research and expertise, to the development of public policies on prevention and protection in the field of health.

The use of ionizing radiation on patients, for diagnostic or therapeutic purposes, in particular to treat cancer, is increasing:

- 80 million radiological examinations, 1.5 million diagnosis examinations, 15,000 therapeutic procedures in nuclear medicine, and 4.1 million radiotherapy sessions are carried out each year in France. Increasing numbers;
- techniques using ionizing radiation are evolving rapidly, personalized medicine practices are developing, innovative treatments (for example, to treat the 5-10% of patients who have developed sequelae from their radiotherapy treatment) are emerging.

Find out more
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As such, with strong societal expectations, IRSN's assessments must adapt to the associated risks, the importance and nature of which change.

For example, in the field of research, in partnership with APHP (the university hospital trust operating in Paris and its surroundings), IRSN has undertaken a clinical study aimed at demonstrating the effectiveness of cell therapy in treating the side effects of radiotherapy.

The Institute also contributes to European strategic actions such as the European Cancer Control Plan or, internationally, provides assistance to WHO and IAEA as a contributing center for these bodies.

In the field of radiation or nuclear emergency management

IRSN provides support to the authorities in the event of a nuclear or radiological emergency, promptly providing assessment capabilities and dedicated technical resources.

IRSN's technical response system to emergency situations is based on two complementary tools, the Technical Crisis Center (TCC), devoted to the technical assessment (diagnostics and prognosis) of accident situations, and a fleet of around twenty vehicles equipped with measurement and communication resources, ready to be dispatched on site for measuring the radiation status of the environment and people. This system also relies on all the means of the fixed laboratories implemented as part of permanent radiation protection monitoring as well as on continuous monitoring of the environment using measurement networks (Teleray and Hydroteleray beacons, OPERA-Air aerosol collection stations, etc.) which allow it to detect and analyze any increase in radiation levels in the environment.

Research and assessment means

For many years, IRSN has worked in a context marked by an ever-increasing demand for expertise on increasingly complex subjects in its various fields, due to increased questioning and societal involvement and the emergence of scientific challenges in terms of nuclear safety, security, and radiation protection of people and the environment.

⇒ **In response to these various challenges, IRSN's role is set to increase rather than decrease.**

As such, in order to have the capacity to respond and to fully perform all of its missions, IRSN primarily relies on its experts and researchers, within the limit of its employment allowances, while maintaining the balance of assessment and research activities necessary for the sustainability of risk assessments.

Within the current budgetary framework, IRSN has, in conjunction with the public and governmental authorities:

- implemented expert assessment efficiency measures;
- strengthened control of expenditure, in particular the payroll, with the desire to increase external revenue, limited by its ability to mobilize the necessary human resources within the employment allowances.

However, as the Court of Auditors notes, these measures do not ensure the Institute's sustainability: *"IRSN's budgetary sustainability will largely depend on the level and nature of its resources. The supervisory authorities must therefore deal with this issue in order to guarantee the Institute's ability to perform its missions in the long term"* (order from the Court of Auditors of June 25, 2021).

Five key priorities for IRSN's future

1. Under France's energy policy, respond to new requests for safety assessments related to the development or launch of new industrial projects, while ensuring the continuation of those associated with the fleet in operation.
2. Building on the feedback from recent emergency situations, ensure that its emergency response system is up to the challenge, in particular by renewing the dedicated resources.
3. Maintain at state of the art or develop the scientific and technical legacy constituted in the years following the Institute's creation.
4. Preserve and adapt its digital infrastructure, in a rapidly changing sector, in particular among the Institute's contacts (operators, public and governmental authorities) and aging assets.
5. Ensure the Institute's attractiveness, in a context of tension on the labor market, in particular in the prospect of strong demand from manufacturers for trades which are also those of IRSN.