

IRSN

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Enhancing nuclear safety

Emergency, Preparedness and Response: an important stake for IRSN

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Executive Director for EP&R



Contents

About IRSN

- Role in case of an emergency
- Organization
- Emergency developments
- International activities
- Conclusion



IRSN (consistency with IAEA-TECDOC-1835)

- **A public body with industrial and commercial activities**, is placed under the joint authority of the Ministries of Defense, Environment, Energy, Research, and Health.
- National public expert for research and technical support on radiation protection and nuclear safety risks
- 1800 employees, including more than 1000 specialists: researchers, Ph.D. students, post-docs and engineers
- A budget of €300 million, with 40% devoted to research
- 8 establishments in France, including 3 major sites: Fontenay-aux-Roses, Cadarache and Le Vésinet
- Our values : Knowledge, independence, proximity

1

Assess the risks induced by the emergency situation and potential consequences:

- ▶ Diagnostic & Prognostic of the accident
- ▶ Diagnostic & Prognostic of the consequences
- ▶ Use of measurements to characterise the consequence into environment and on people
- ▶ Adapt the organic environment monitoring mission

2

Provide a technical expertise and support to public authorities and medical/health organisations

3

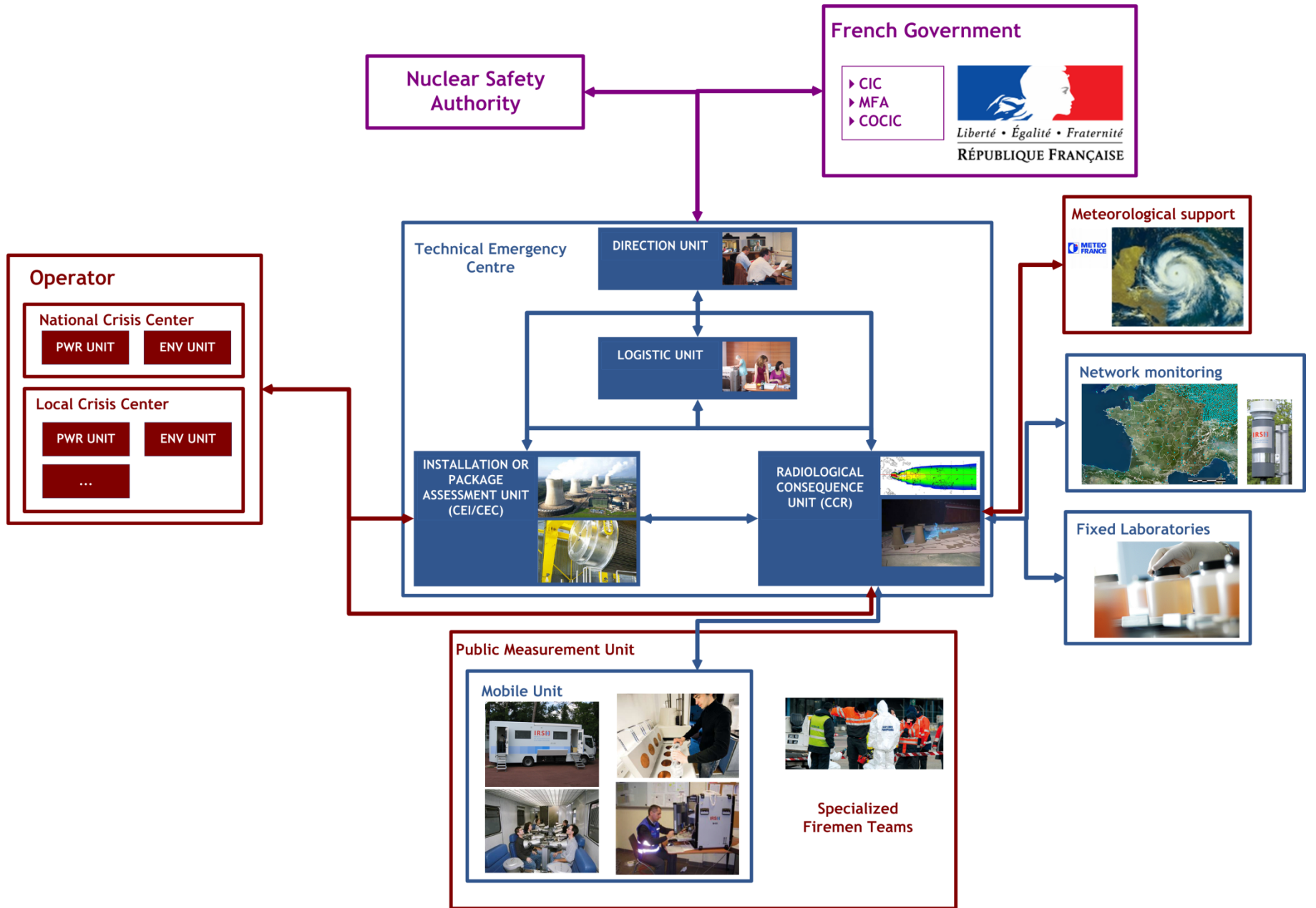
Be a source of technical and scientific information which support the action of public authorities

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Emergency Mobile Means



Human impact assessment

- 4 light trucks (800 p/d)
- 2 heavy trucks (80 p/d)
- 4 shelters (1600 p/d)



Emergency Mobile Means



Environment impact assessment

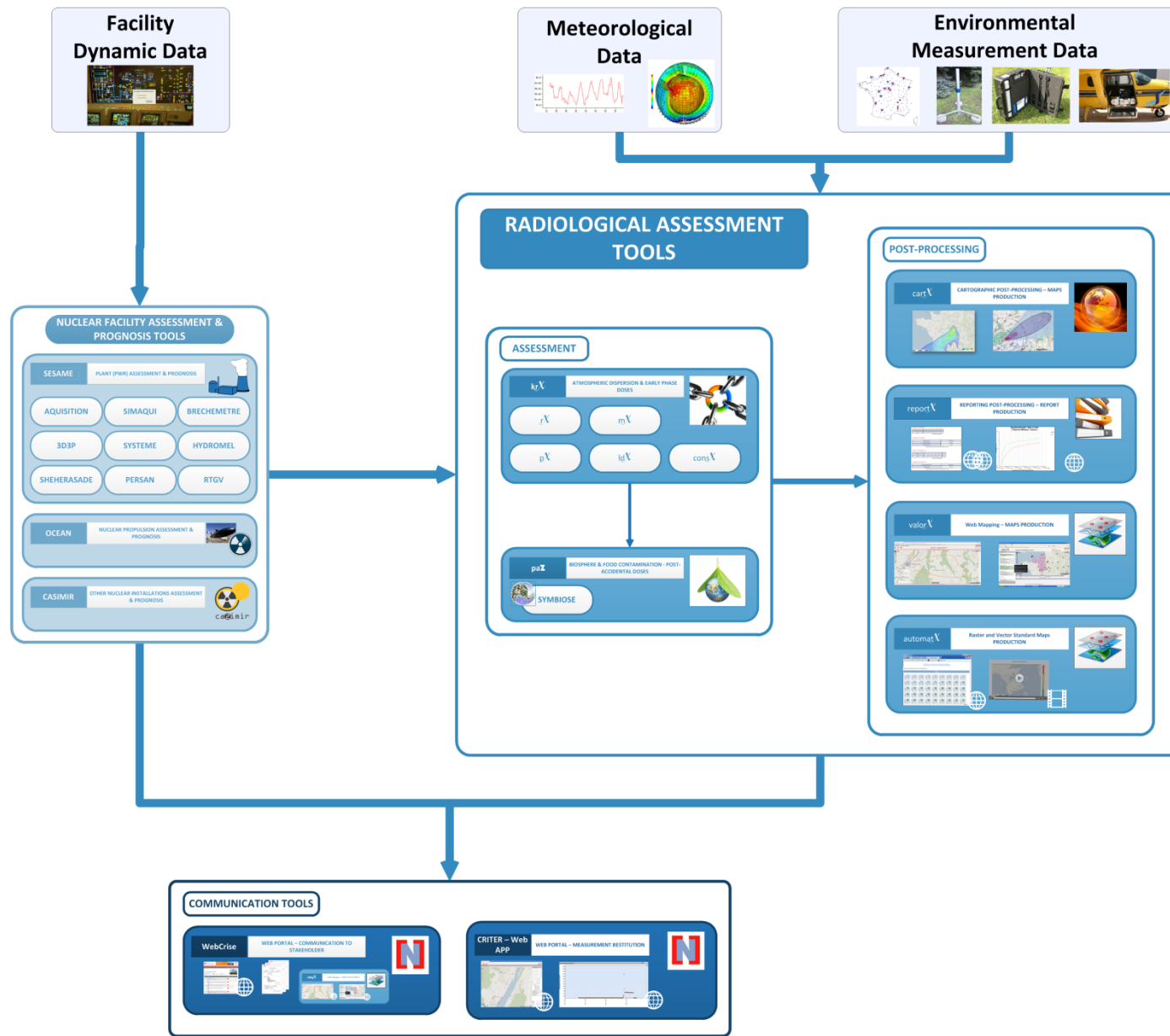
- 1 metrological light truck
- 4 light trucks for intervention
- 3 mobile lab trucks (1200 meas./d)
- 1 light trucks for transportation crisis



Technical Emergency Centre



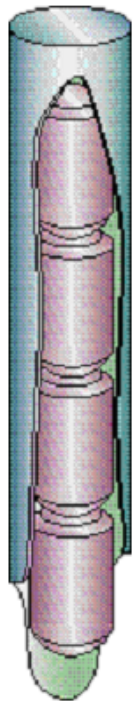
- ▶ Activation in less than 1 hour
- ▶ Complete the initial team (10 to 25 p.)
- ▶ First expertise in less than 1 hour
- ▶ 200 m² dedicated to a crisis
- ▶ 25 m³ of specific documentation
- ▶ A dozen of specific softwares



Principles and logic of the method

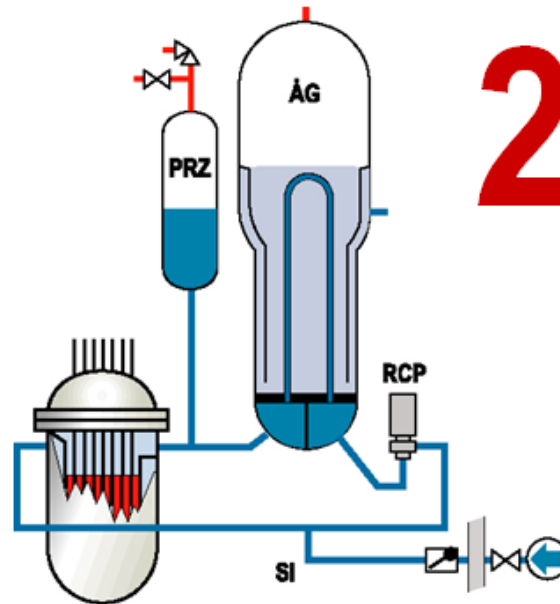
► 3 safety barriers

FUEL AND CLADDING



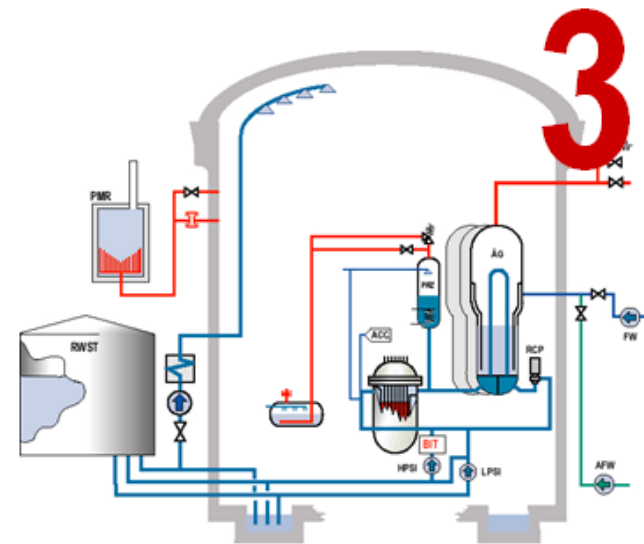
1

**PRIMARY SYSTEM ENVELOPE
BOTH INSIDE AND OUTSIDE CONT.**



2

**REACTOR BUILDING AND ITS
EXTENSIONS**



3

A grid as a support to the methodology

Site:	Unit:	Date: 2015-01-09	Time: 08:20	Visa:	Sender:	Receiver:
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FORM "DIAGNOSIS-PROGNOSIS"

INSTALLATION OPERATION

#

STATUS AT ____:____	DIAGNOSIS		PROGNOSIS		
	Barriers status	Safety functions status	Safety functions control systems	Forecast of systems availability	Forecast of safety functions status
CLAD - FUEL No clad failure <input type="checkbox"/> Clads failures <input type="checkbox"/> Core melt <input type="checkbox"/>	Reactivity control RCS water inventory RCS heat removal	Safety functions control systems	Forecast of systems availability RCS water inventory RCS heat removal	Forecast of safety functions status Reactivity control RCS water inventory RCS heat removal	CLAD - FUEL No clad failure <input type="checkbox"/> Clads failures at ____:____ <input type="checkbox"/> Core melt at ____:____ <input type="checkbox"/>
PRIMARY SYSTEM Intact <input type="checkbox"/> Doubtful <input type="checkbox"/> Primary break <input type="checkbox"/> <input type="checkbox"/> inside containment <input type="checkbox"/> PZR relief lines <input type="checkbox"/> outside containment <input type="checkbox"/> SGTR	RCS heat removal	Safety functions control systems	Forecast of systems availability RCS heat removal	Forecast of safety functions status RCS heat removal	PRIMARY SYSTEM Intact <input type="checkbox"/> Doubtful <input type="checkbox"/> Primary break <input type="checkbox"/> <input type="checkbox"/> inside containment <input type="checkbox"/> PZR relief lines op. at ____:____ <input type="checkbox"/> outside containment <input type="checkbox"/> SGTR isolated at ____:____
CONTAINMENT Normal leak <input type="checkbox"/> Doubtful <input type="checkbox"/> Direct leak <input type="checkbox"/> <input type="checkbox"/> penetration <input type="checkbox"/> PTR tank <input type="checkbox"/> secondary system Leak to aux. buildings <input type="checkbox"/> <input type="checkbox"/> penetration <input type="checkbox"/> connected system U5 system On <input type="checkbox"/>	Containment (isolation systems efficiency, atmosphere composition control) RB heat removal	Safety functions control systems	Forecast of systems availability Containment (isolation systems efficiency, atmosphere composition control) RB heat removal	Forecast of safety functions status Containment (isolation systems efficiency, atmosphere composition control) RB heat removal	CONTAINMENT Normal leak <input type="checkbox"/> Doubtful <input type="checkbox"/> Direct leak <input type="checkbox"/> <input type="checkbox"/> penetration <input type="checkbox"/> PTR tank <input type="checkbox"/> sec. system isolated at ____:____ Leak to aux. buildings <input type="checkbox"/> <input type="checkbox"/> penetration <input type="checkbox"/> conn. sys. isolated at ____:____ U5 the ____:____ at ____:____ <input type="checkbox"/>

3D/3P

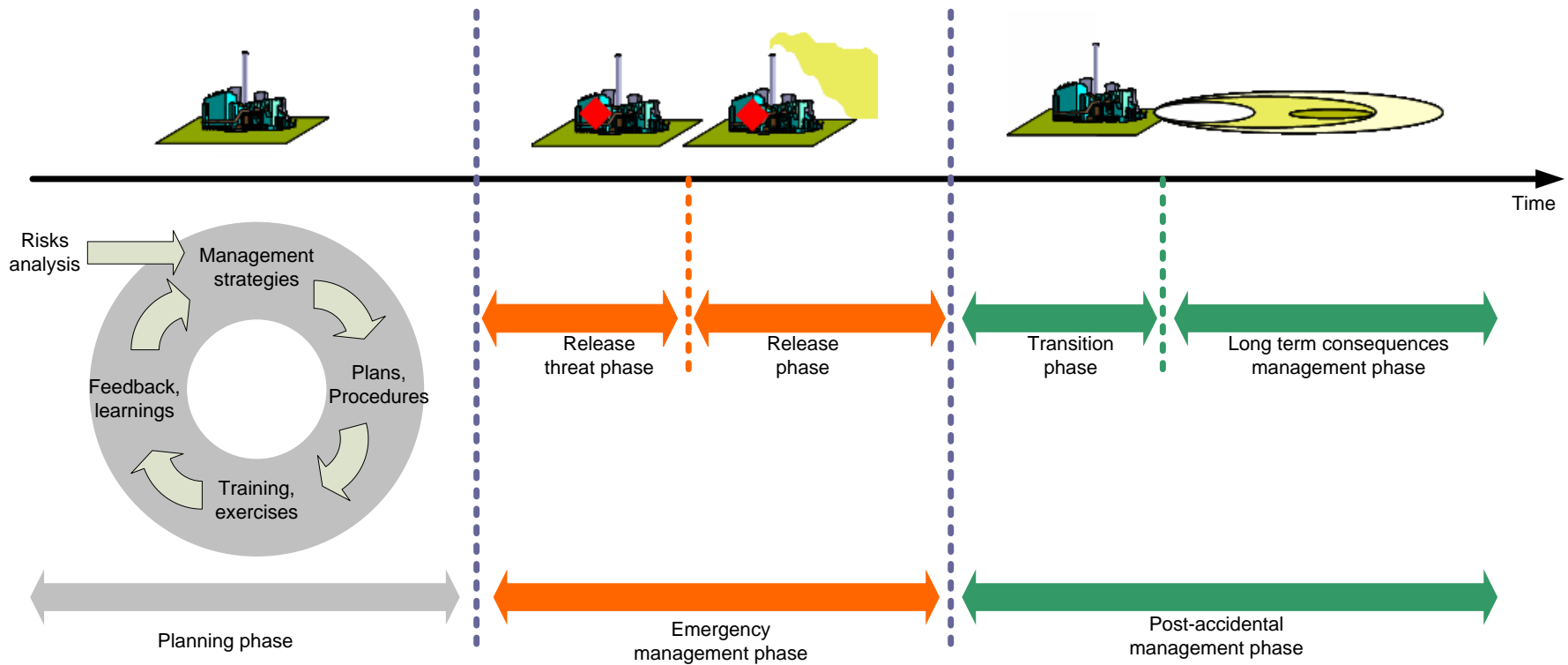
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Phases of emergency preparedness and response



The French post-accidental doctrine: a priority for IRSN

■ **Three basic objectives:**

- to protect the populations from the dangers of ionising radiations
- to provide support to the populations victim to the consequences of the accident
- to regain the territories affected, from the economic and social standpoint

■ **Six key points:**

- delineation of a zoning of the contaminated areas, which constitutes the framework for the implementation of the measures of protection
- implementation of medical and psychological care, dosimetric monitoring, epidemiological follow-up, financial support, and compensation for the damages incurred
- characterization of the radiological situation and levels of contamination of foodstuffs and waters
- early establishment of a specific approach for the management of tap water
- establishment of a new governance based on the watchfulness and the involvement of all stakeholders
- gradually replace the temporary management solutions selected at the exit from the emergency phase with lasting management solutions

- Currently, IRSN is working on evolutions of the French doctrine and on a methodology to perform radioactive measurements in the environment to quickly establish a map of the ground contamination
- IRSN works on a methodology combining airborne and ground measurements using airplanes, helicopters, drones, cars, motorcycles, pedestrians to establish as fast as possible a map of the ground contamination.



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- IRSN plays a driving role in advancing nuclear safety, radiation protection and emergency, preparedness and response in an international context.
- IRSN has 2 main priorities for its international activities.
 - **Europe:** necessity to harmonise the countermeasures, since an accident occurring in Europe would also have consequences in every European country indeed. So, IRSN supports the strengthening of the European TSOs and their network ETSON, in the field of EP&R.
 - **IAEA:** IRSN intends to enhance its capability to support the agency in case of a nuclear. In this regard, IRSN will reinforce its collaboration with the IAEA Incident Emergency Center.

- preventing or managing a radiological or nuclear emergency may be thought of as the ultimate purpose of IRSN.
- IRSN dedicates a lot of effort to the continuous improvement of Emergency, Preparedness and Response.
- A high priority is given to enhance the IRSN's emergency strategy specifically regarding the post-accident management and the development of international activities.
- **Propositions to enhance EP&R:**
 - Complete IAEA-TECDOC-1835 with EP&R issues?
 - Need of a specific EP&R TSO forum?

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Enhancing nuclear safety

Thank you for your attention



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