

Radiological Protection
2022

Building a Framework for Post-Nuclear Accident Recovery Preparedness

National-Level Guidance



NEA Workshop on Preparedness for Post-Nuclear Accident Recovery

French approach on preparedness for Post-Nuclear Accident waste management, remediation and decontamination

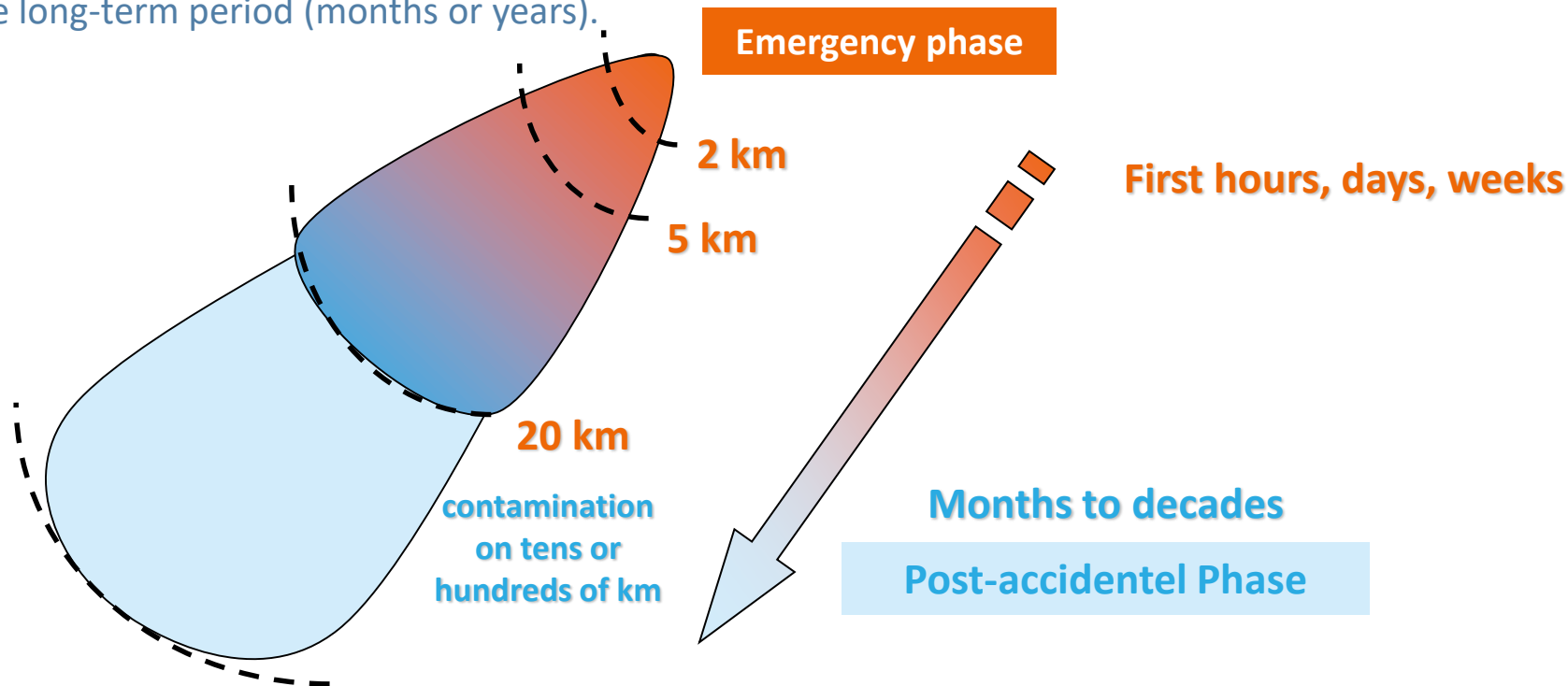
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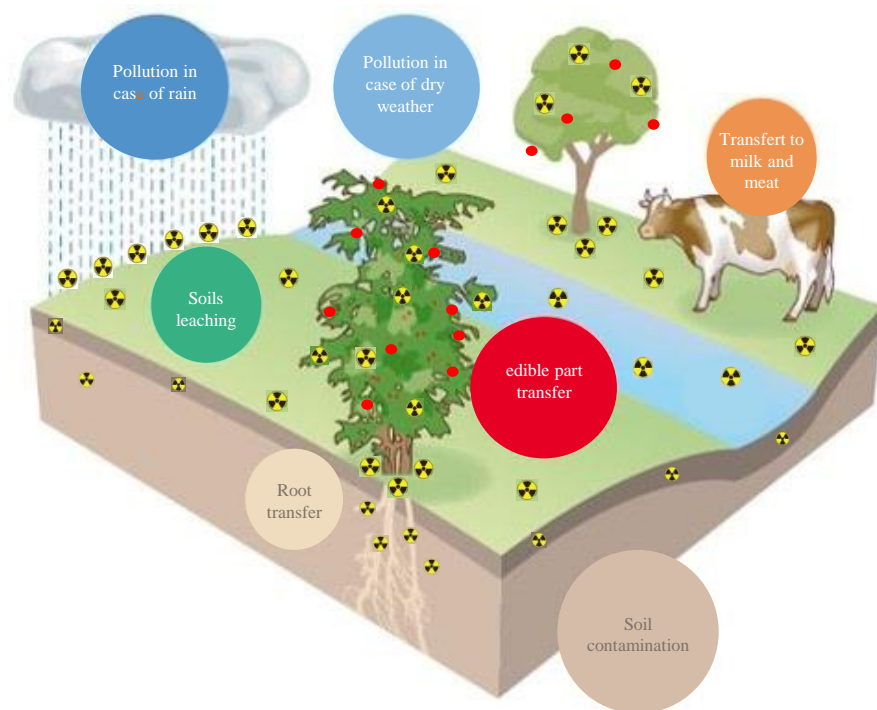
The post-accident phase consists of:

- the transition period (lasting from a few weeks to a few months after the radioactive releases),
- the long-term period (months or years).



What happens after a radioactive releases?

- Carried by the winds, radionuclides are deposited in the environment more or less quickly, more or less far and with a varying concentration
- Rain or snow accelerate deposits. The heaviest elements (uranium for example) fall quickly, others are more easily dispersed (iodine, cesium)
- Radioactive elements are deposited on plants, on the ground, on buildings, on surface water, etc.
- Gradually, they penetrate the soil and plants
- They will be found throughout the environment: soils and sediments of bodies of water, plants (leaves, fruits, roots), animals (game, fish), mushrooms, etc.
- The further away from the accident location, the lower the contamination



CODIRPA, the steering committee for the management of the post-accident phase of a nuclear accident

CODIRPA was set up by ASN in 2005:

- It is a pluralist structure, involving: local and national administrations, institutional experts, operators, elected officials, associations, local information committees, representatives of foreign radiation protection authorities, etc.
- It includes thematic working groups: waste, aquatic environments, etc.

Main objectives:

- Protect the population against the dangers of ionizing radiation
- Provide support to populations affected by the consequences of the accident (health, psychological, legal, financial, etc.)
- Reclaim the territories economically and socially affected





7 points clés dans les recommandations du CODIRPA (2022) :

- Mise en place d'un zonage évolutif pour protéger la population
- Prise en charge médicale et psychologique, suivi dosimétrique, suivi épidémiologique, soutien financier
- Caractérisation et surveillance radiologique de l'environnement, des denrées alimentaires et des eaux de boisson
- Mise en place d'une démarche spécifique de gestion de l'eau du robinet
- Mise en place d'une nouvelle gouvernance fondée sur la vigilance et la participation active des personnes concernées
- Formation et information de la population
- Mise en place d'actions de réduction de la contamination et gestion des déchets radioactifs

Waste management, remediation and contamination reduction

- Definition of zoning (exclusion zone, no consumption zone, no commercialization zone...)
- Initiate early waste management actions: immobilize waste
 - On this purpose, a section has been created by decree No. 2014-996 of September 2, 2014 : section 2798 is dedicated to temporary facility for the transit of radioactive waste resulting from a nuclear or radiological accident.
- Initiate actions to manage the consequences of the accident and reduce the contamination
 - Improving the radiological situation of the environment
- Define and implement an initial program of measurements of radiological contamination of the environment (expertise program, control, and definition of differentiated measurements according to post-accident zoning)

Contamination reduction (1/2)

Targeted decontamination actions can be implemented in all the areas to promote the reconquest of contaminated territories



CODIRPA recommendations (2022)

Key point n°7 - Reduction of contamination and management of radioactive waste

Actions to improve the radiological situation in the built environment should be undertaken as soon as possible after the end of accidental releases for greater efficiency. Depending on the type of radionuclides present, the actions aim to reduce the contamination (γ and β emitters) or fix it (α emitters). In the first case, the objective is to decrease the external exposure of the population; in the second case, the aim is to limit internal exposure by involuntary ingestion and by inhalation of suspended particles.

No return to a completely contamination-free situation (REX Fukushima and Chernobyl)

Three categories of solutions are mainly considered:

- operations to reduce contamination of the built environment, to be carried out by specialized companies in the public or private sectors
- the use of techniques for fixing or stabilizing contamination, aimed at limiting the risks of inhalation or skin contamination, to be carried out by specialized companies in the public and private sectors
- cleaning the interior of homes, to be carried out by individuals

Contamination reduction (2/2)

CODIRPA recommendations (2022)

Key point n°7 - Reduction of contamination and management of radioactive waste



At the beginning (transition phase):

- Targeted contamination reduction operations are gradually implemented as soon as the results of radiological characterization measurements of the environment are known.
- Prioritization of the reduction of contamination in the consumption prohibition zone initially, according to the population density and the presence of ERP
- actions to reduce the contamination of agricultural land and natural environments are not to be initiated immediately and are studied and implemented later if necessary. In any case, actions are to be proportionate to the associated hazards.

On the long term :

- Define and prioritize actions to improve the radiological quality of environments (cleaning strategy)
- Mobilize competent actors
- Organize and plan the intervention of the teams
- Provide residents with the information needed to implement simple cleaning actions

Radioactive waste management

CODIRPA recommendations (2022)

Key point n°7 - Reduction of contamination and management of radioactive waste



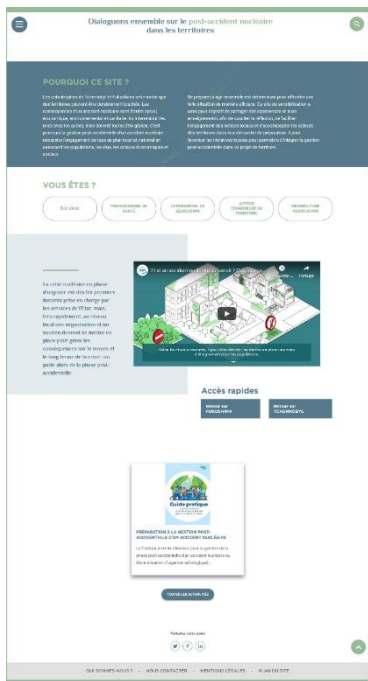
- Contamination reduction actions for agricultural land and natural environments are not to be initiated immediately and are studied and implemented later if necessary. In any cases, actions are to be proportionate to the associated hazards.
- Depending on the location, the nature of the materials to be decontaminated, ... contamination reduction actions will be different. They generate radioactive waste not usually produced by nuclear installations, and in greater volumes.
- A large influx of radioactive waste requires the implementation of temporary management solutions (mainly section 2798 ICPE storage space) which will be gradually replaced by permanent management solutions.

« Contamination reduction and Waste management » Working Group (2020-2024)

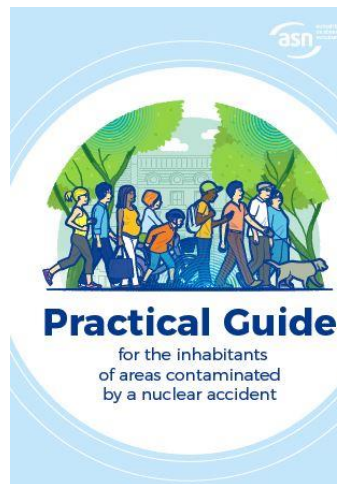
- **Mandate:** Propose the strategy to reduce environmental radioactive contamination, taking into account the multiple factors associated with it, such as:
 - its financial cost,
 - the gain of decontamination actions in terms of reducing the exposure of populations,
 - the volume of waste generated and its processing methods,
 - the radiological impact for the people responsible for carrying them out.
- **Subjects discussed:**
 - Validated dimensioning accident scenario
 - 4 types of contaminated areas (urban, agricultural, aquatic and forest)
 - Different contamination reduction techniques
- **Discussions in order to:**
 - Propose sets of decontamination actions with different objectives (limit the quantity of waste, worker exposure, optimize decontamination efficiency, etc.) / "assessment criterion" sub-group
 - Propose a guide to help to choose the best remediation scenario

Links to CODIRPA documents

<https://post-accident-nucleaire.fr>
<https://www.asn.fr/l-asn-informe/post-accident>



<https://www.asn.fr/l-asn-informe/post-accident/les-documents-d-accompagnement#guide-recommandations-pour-la-gestion-post-accidentelle-d-un-accident-nucleaire>



<https://post-accident-nucleaire.fr/preparation-la-gestion-post-accidentelle-dun-accident-nucleaire>



<https://post-accident-nucleaire.fr/sites/default/files/2022-01/ASN-Reponses%20CODIRPA%20-%2021%20dec%202020interactif.pdf>

Thanks for your attention !

Any questions ?

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