

IRSN

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Faire avancer la sûreté nucléaire

Integrated approach for workers protection in industries involving NORM

Hélène CAPLIN

© IRSN

➔ New regulation (July 1st, 2018)

Modification of the Environment Code

- Introduction of a list of NORM-related industries



Modification of the Labour Code

- Taking into account all the risks
- Starting point is protection strategies already implemented by industries involving NORM to manage other workplace hazards and then assessing, after characterisation, the need for any further action for protection against radiation



➔ Graded approach to implement provisions against all the risks

➤ Risks encountered in industries involving NORM

■ Risks related to products, emissions and waste

- Chemical risks
- Fire and/or explosive risks (notion of ATEX zones)

■ Mechanical risks

- Risks of tripping, bumping or other disruption of movement
- Risks related to mechanical handling, to work equipment

■ Physical risks

- Risks related to the physical workload
- Risks of falling from height, risks related to collapses and falling objects
- Risks related to electricity, to thermal environment, lighting environment, noise
- Risks related to ionizing radiations (including radon)

■ Others

- Risks related to internal circulation of vehicles

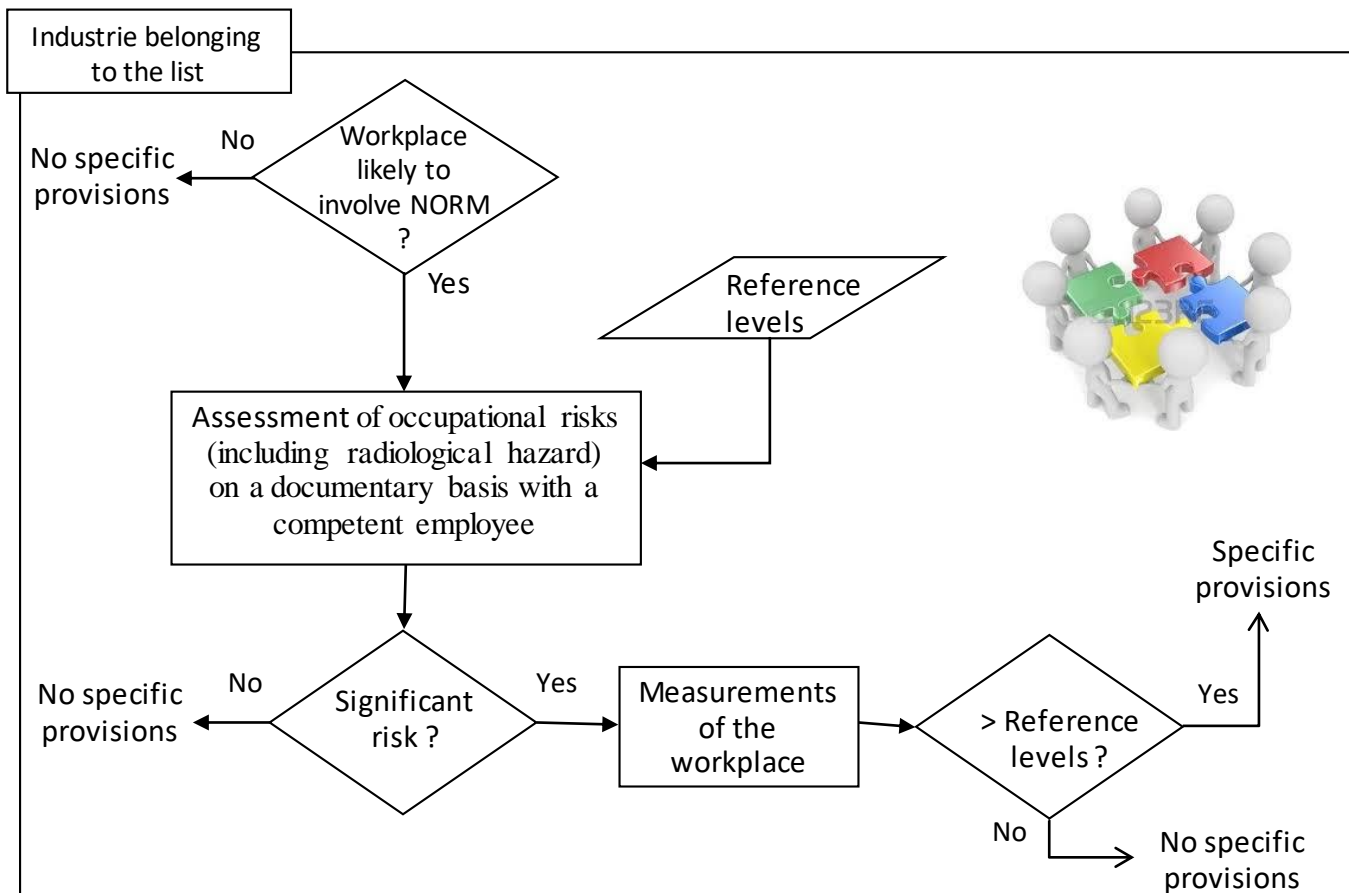
■ Main principles to implement provisions for risks management

- Avoid risks
- Evaluate the risks that can't be avoided
- Fight risks at the source
- Adapt the work to humans
- Take into account the evolution of the technique
- Substitute what is dangerous for what is less hazardous
- Plan prevention
- Take collective protective measures
- Giving the right instructions to workers

➔ **These principles are consistent with the principles of radiation protection (justification, optimisation and limitation)**

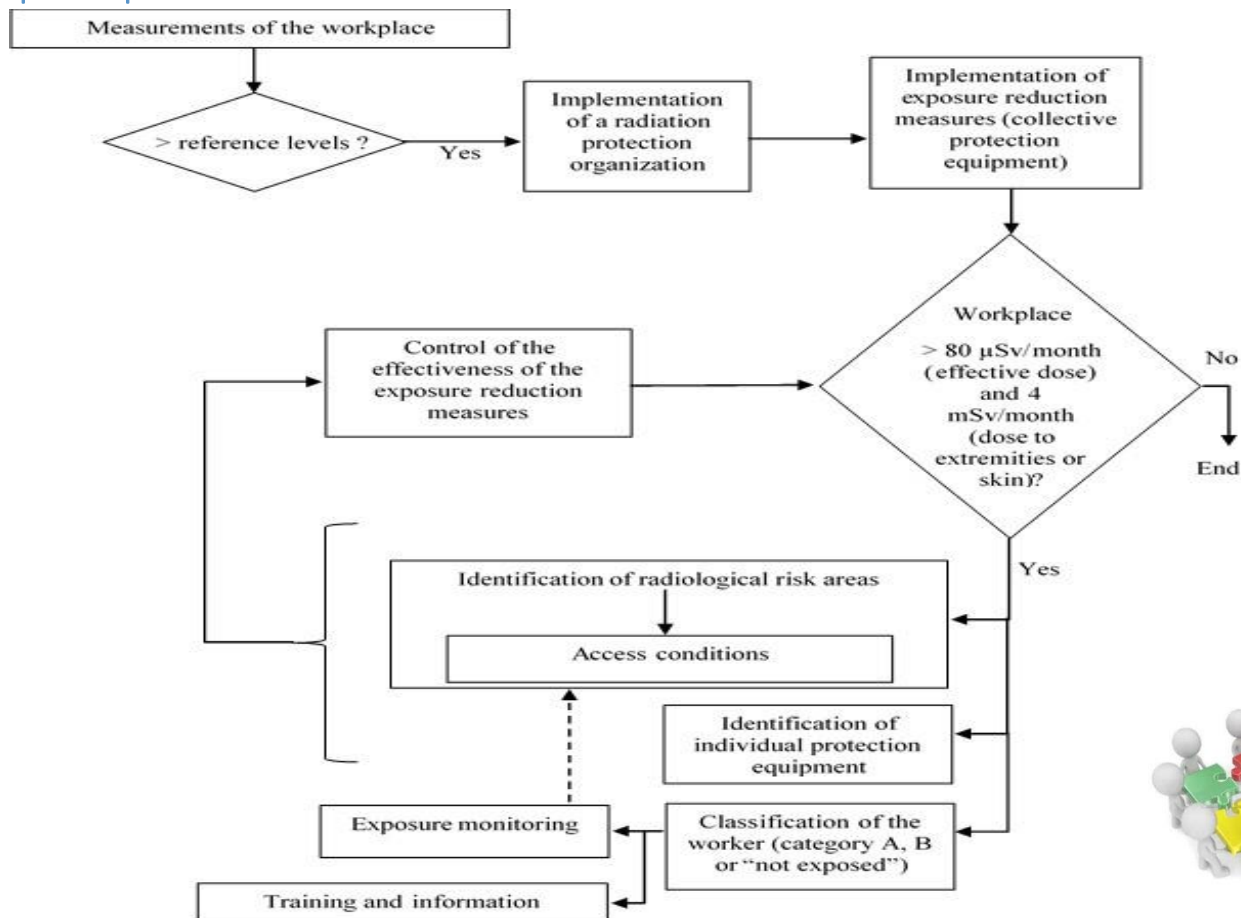
Risks management

Illustration for the graded approach of the risks management



Risks management – Radiological risk

Specific provisions



➤ Collective/personal protective equipment



- Ensure that the implementation of a collective protective equipment against the radiological risk will not degrade the protection against other risks on the concerned workplace or on neighbouring workplaces
 - Ensure that all the personal protective equipment that a worker must wear to protect himself against all risks does not hinder the work to be done, leading de facto to a deterioration of the protection of the worker against some other risks
- **A reflection must be carried out on the compatibility of some equipment against several risks.**

➔ Radiological zoning (1/2)

- The access to the delimited areas is restricted to the classified workers (category A or B)
- A “not-exposed” worker can access to a supervised area, a green controlled area and a radon area if he is authorized by the employer, based on the individual assessment of the risk
- A “not-exposed” worker can also access to a yellow controlled area if it is previously justified. The employer puts in place special provisions, including reinforced information



➤ Radiological zoning (2/2)

- The existing facilities involving NORM are not designed taking into account the radiological risks
 - Radiological zoning as panther stains

■ Human and organisational factors

- A reflection must be carried out on the organisation of the workplaces taking into account all the risks (not only radiological risks)
- A reflection must be carried out on the terms of access to supervised / controlled areas and the survey of workers entering these areas

Chemical toxicity of Uranium

- Uranium presents a radiological toxicity **and** a chemical toxicity
 - Chemical toxicity is not really considered
- ➔ **To optimize the workers protection, it may be necessary to take into account the chemical hazard in addition to the radiological hazard**

➤ Chemical risk management

■ Exposure pathways

- Inhalation
- Percutaneous route
- Ingestion

■ In France, occupational exposure levels (OELs) only for inhalation

- Concentration in the air of a chemical compound that can breathe a person for a determined time
- No OELs for the other exposure pathways
 - Normal operation: hygienic provisions prevent skin contact and ingestion
 - Accidental ingestion: only procedures for securing the victim

■ No OEL for Uranium in France

- IRSN has realised an overview study of foreign values
 - Occupational Safety and Health Administration (OSHA)
 - World Health organisation (WHO)

➔ **Reference value for workers is 0.05 mg/m³.**



It shall be kept in mind that OELs meet minimum prevention objectives and that exposure shall be as low as reasonably achievable.

Conclusions

- Many questions from operators for the implementation of the Labour Code in the Health, Safety and Environment (HSE) policy of their plants
- Different issues including:
 - Supervision of providers involved in maintenance of multiple facilities
 - Occupational protection during decommissioning
- ➔ It would be necessary to help them with different actions (from authorities and IRSN)



Thank you for your attention