

IRSN

INSTITUT
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ET DE SÛRETÉ NUCLÉAIRE

Securing the transport of nuclear or radioactive material

French approach

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International Maritime Organisation,
4, Albert Embankment - London

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Système de management
de la qualité IRSN certifié

Malicious acts in transport of radioactive or nuclear materials

Scenarios :

- Theft or diversion of nuclear material :
 - *proliferation*
 - *manufacture of an improvised nuclear explosive device*

- Theft or diversion of radioactive material *with intent to cause contamination or subsequent irradiation : dirty bomb, hidden irradiating source in a public place*

- Sabotage that could endanger human health or the environment by the immediate or rapid release of radioactivity

- *Specific context*
 - *Multiple modes transfers : Air, road, sea*
 - *Multiple actors (carriers, shipper , crew members...)*
 - *Public area*
 - *High frequency of transport*
 - *Mobility of certain high consequence RAM packages*

Basis reference

Security of Rad. Sources



Security of Nuclear Mat. (transport included)



« high consequence RAM »

Directive 2003/122/Euratom (HASS)



Ongoing work :

- Draft of the security standards for RAM in use, in storage or in transport including the sabotage threat
- Revision of standards for nuclear material including the sabotage threat

Security WG's Methodology

- Definition of an activity threshold beyond which the security of radioactive sources must be enhanced
- Considering all the radioactive sources used in France with activity higher than the threshold and grouping of these sources into families
- Assessment of the vulnerability of these radioactive source families with regard to malicious acts

Security WG's Methodology

- Definition of « coherent » families as far as security is concerned, based on :
 - *Radionuclide*
 - *Use: radiography, gauge, irradiation device, ...*
 - *Similar devices : operation and distribution*
- Identification of 31 families grouping various devices :
 - *7 selected radio nuclides - mainly Co60, Cs137, Am241 and Ir192*
 - *Families containing frequently used devices (hundreds of units)*
 - *Families containing unique devices*
 - *Fixed use, mobile use, removable, ...*

HASS Transport in France (2006)

Family	Type of device	Annual number of transport	Code of Conduct category
Very high dose rate sources	6 industrials irradiators 4 fixed/multi-beam teletherapy (gamma knife) sources	13	1 (1000-D) (Extremely dangerous)
Laboratory dose rate sources	50 cobaltotherapy devices 70 laboratory irradiators	19	2 (10-D) (Very dangerous)
High/medium brachytherapy sources	30 brachytherapy devices	240	2 (10-D) to 3 (1-D)
Mobile sources	565 industrial gamma radiography sources (gammagraphy)	86685 (1685 reloading and 85000 transfers on site)	2 (10-D) to 3 (1-D)
Other sealed sources	Densité and thickness Gauges Well logging sources	30	3 (1-D) (Dangerous)

Key points of the draft regulation

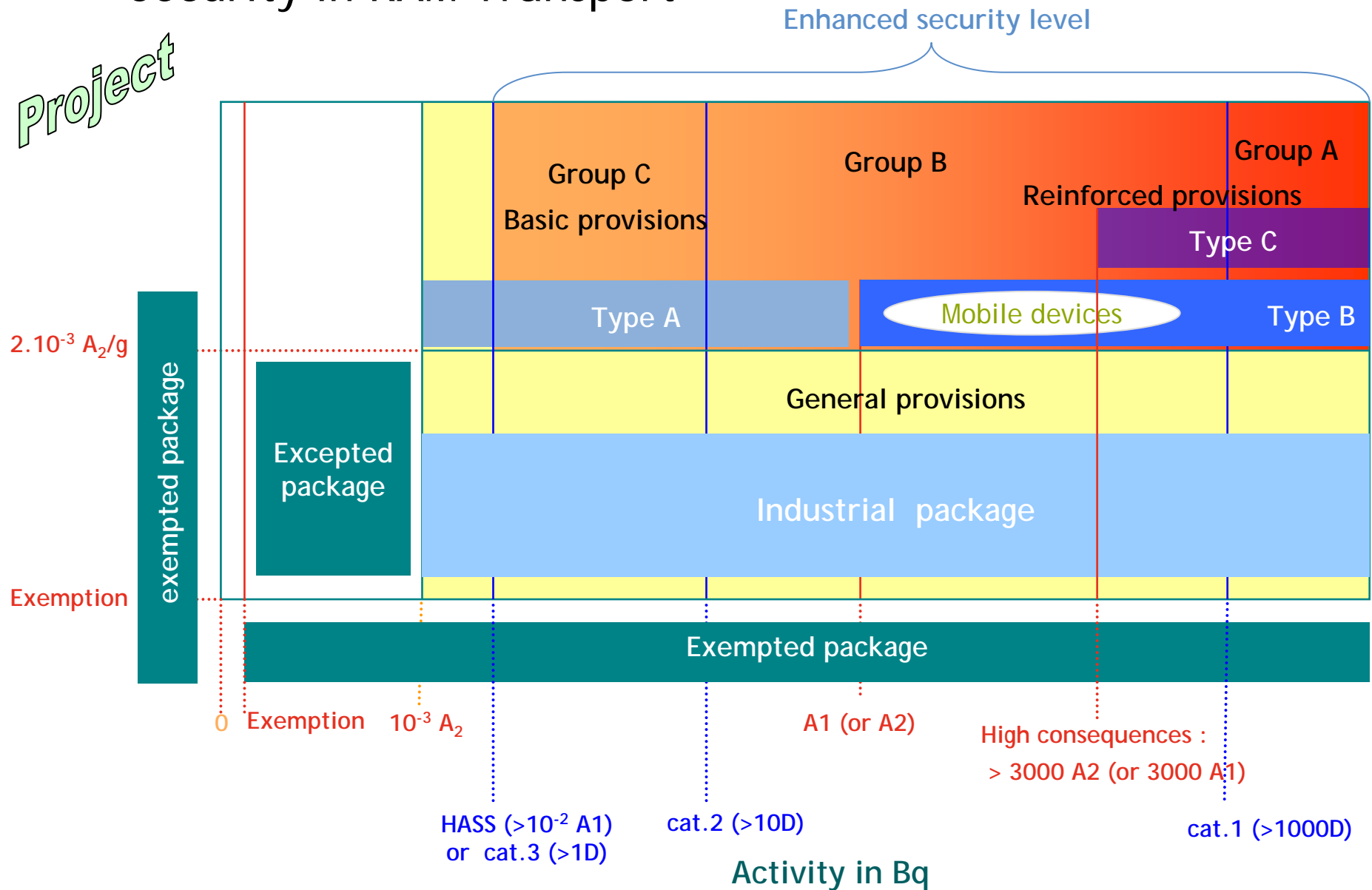
Project

- Graded approach :
 - *General security measures*
 - *3 groups of protection (A, B, C)*
 - *Specific protection provisions for mobile sources and removable sources*
- Prescriptive approach :
 - *Despite the usual French “performance based approach” implemented for security and safety, especially for HASS a more prescriptive approach may be adopted*
- 2 sets of requirements :
 - *Timely follow-up of HASS*
 - *Security (i.e. Physical protection)*
- Scope :
 - *Radioactive sources in facilities*
 - *And during transport*

Group of protection	A	B	C
Threshold	AIEA cat. 1	AIEA cat. 2	“Euratom HASS” Or cat. 3

Security in RAM Transport

Project



Conclusions

Approach strongly based on IAEA Guidance

The enhanced security for a larger range of operators

Security culture development

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