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Development of a generic approach for the active dosimeters to be used by the emergency services during a radiological or nuclear emergency in Belgium

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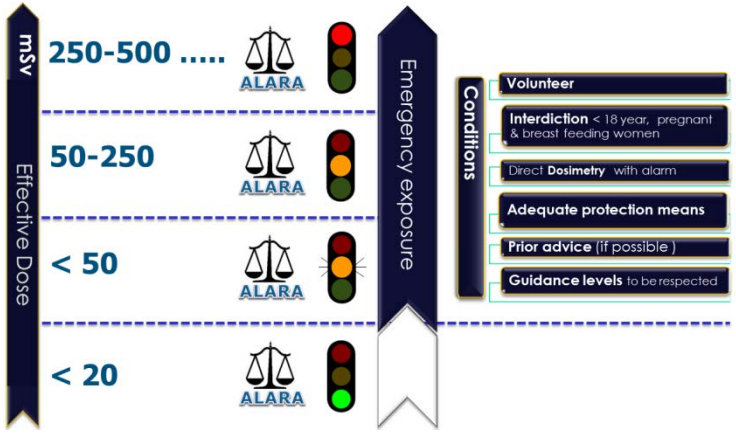
Introduction – General context

- **Adequate protection of the rescuers during nuclear/radiological emergency**: one of the key issue
- Various types of protections to be considered, including active dosimeters
- **Large diversity of equipment, instruments & procedures** due to isolated initiatives and lack of explicit/clear national guidelines to coordinate the purchases
- **Result : lack of coherence AND risk of operational difficulties, confusion and misunderstanding** in case of intervention by different teams using different equipment, instruments and procedures.
- Shortcomings confirmed during response exercises. As a result, the Federal authorities created a **dedicated working group to fix this issue**.

Dedicated WG : working methods & outcomes

- **Multidisciplinary** group launched in **2010**
- **Objectives** assigned:
  - Assessment of specific risks related to nuclear/radiological emergency
  - Comparison with missions/tasks to be fulfilled
  - Deduction of expected appropriate protection means
- **Working method**
  - Missions/tasks of each emergency service compiled
  - Specific radiological situations were defined in accordance to the Belgian regulatory framework



  - Comparison of missions/tasks and each of these situations with special consideration of required protection means (ALARA)

Dedicated WG : working methods & outcomes (cont.)

- **Outcomes**
  - Listing of tables for each emergency service with status of missions/tasks and associated appropriate protection equipment
  - Special attention to the acceptance by rescuers but also by population
  - Need to develop operational schemes for the dosimeters identified

Mission/Type d'intervention	Discipline	SITUATION EXPOSITION			
		I	II	III	IV
Maintien de l'ordre					
• Mettre en oeuvre l'évacuation • 'Encadrement' presse (NA pour Hypoth. D)	D3	Type 1 disponible	Après évaluation		
• Installer et signalere périmètre • Mettre en oeuvre la mise à l'abri	D3	Type 1 disponible	Après évaluation → Type 1	NA	
• Contrôler périmètre • Gérer évacuation spontanée • Protéger structures (ex. PC-Ops) • Aider les victimes	D3	Type 1 disponible	NA		
• Surveiller (site / maisons) • Maintenir lieux (p.ex. enquête judiciaire)	D3	Type 1 disponible	Après évaluation → à distance	À distance (heli/ drone/...) → Effectif pour enq. jud. après évaluation	
Circulation					
• Dégager les voies d'accès et d'évacuation • Régler dans et en limite de périmètre	D3	Type 1 disponible	Après évaluation		
• Gérer véhicules de secours • Escorter et estafettes	D3	Type 1 disponible	NA		
Autres					
• Assister d'autres disciplines	D3	Type 1 disponible	Après évaluation		
• Identifier victimes décédées (DVI)	D3	Type 1 disponible	NA		

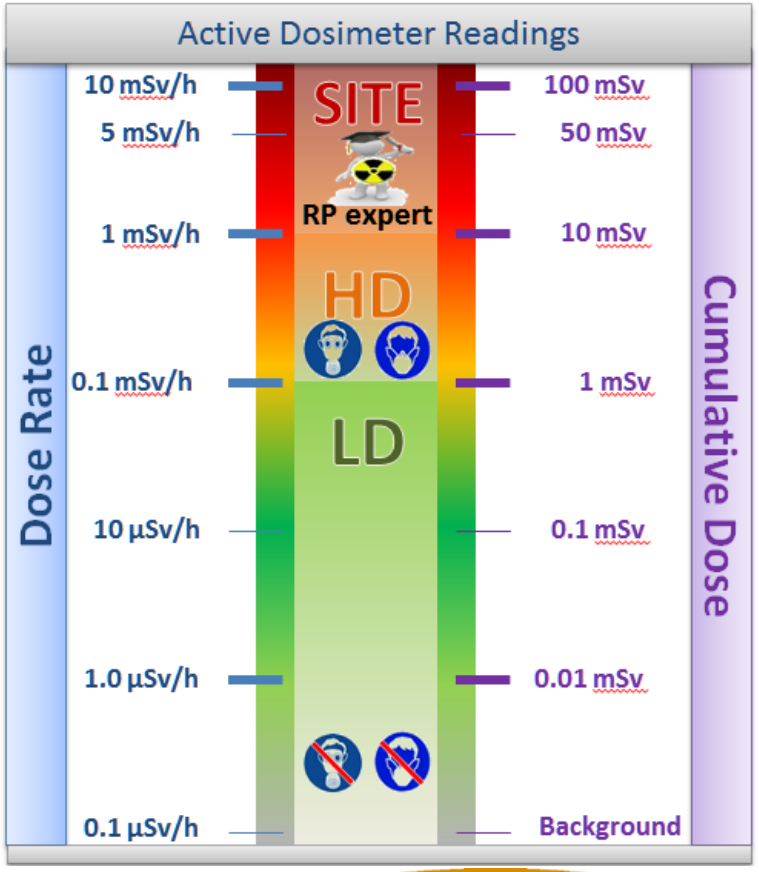
(NA : pas d'application / SDV : sauvegarde de vies)

Generic operational schemes for active dosimeters

- **Aim:** provide ALL emergency services with generic electronic dosimeters (active) together with instructions & reaction schemes (in function of ambient dose rate or cumulative dose as measured by the dosimeter)
- **Challenges:** Technical functionalities & limitations of electronic dosimeter to be taken into account:
  - Pre-alarm / alarm thresholds for dose rate & cumulative dose used
  - Correlation between ambient gamma dose rate and effective dose to be evaluated (using estimated maximal intervention duration)
- **Process:** First proposals made by the WG in close collaboration with the concerned emergency services (via representatives in the WG) progressively tested during workshops and response exercises (2012-2014 period)

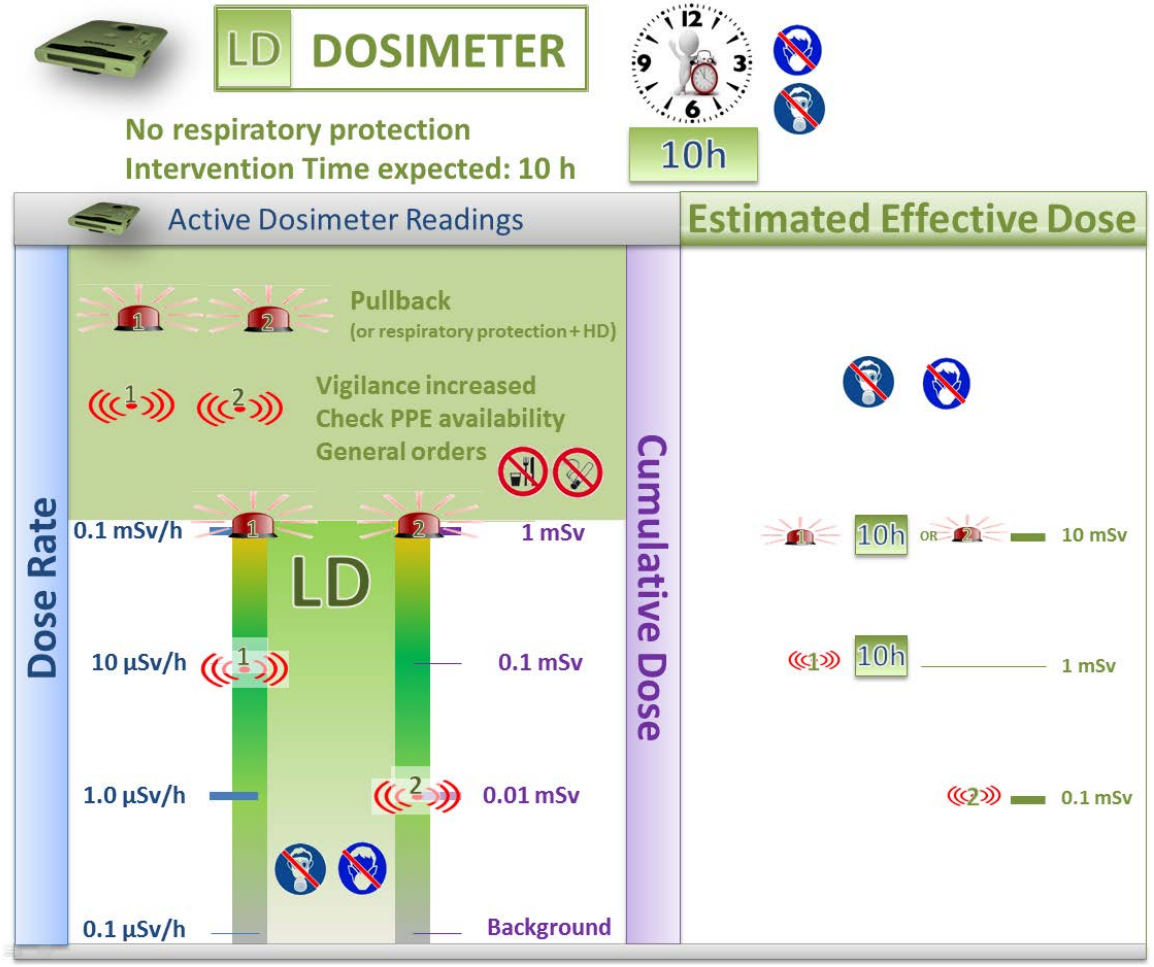
Generic operational schemes for active dosimeters (cont.)

- **Concrete results**
  - 3 types of dosimeters & schemes considered
  - Pre-alarms/alarms threshold adjusted for each of them
- **LD "Low Dose"**
  - Basic scheme **without** respiratory protection
- **HD "High Dose"**
  - Scheme **WITH** respiratory protection
- **SITE** *(still to be developed)*
  - For intervention **on-site** and with **support** of RP-expert of the licensee



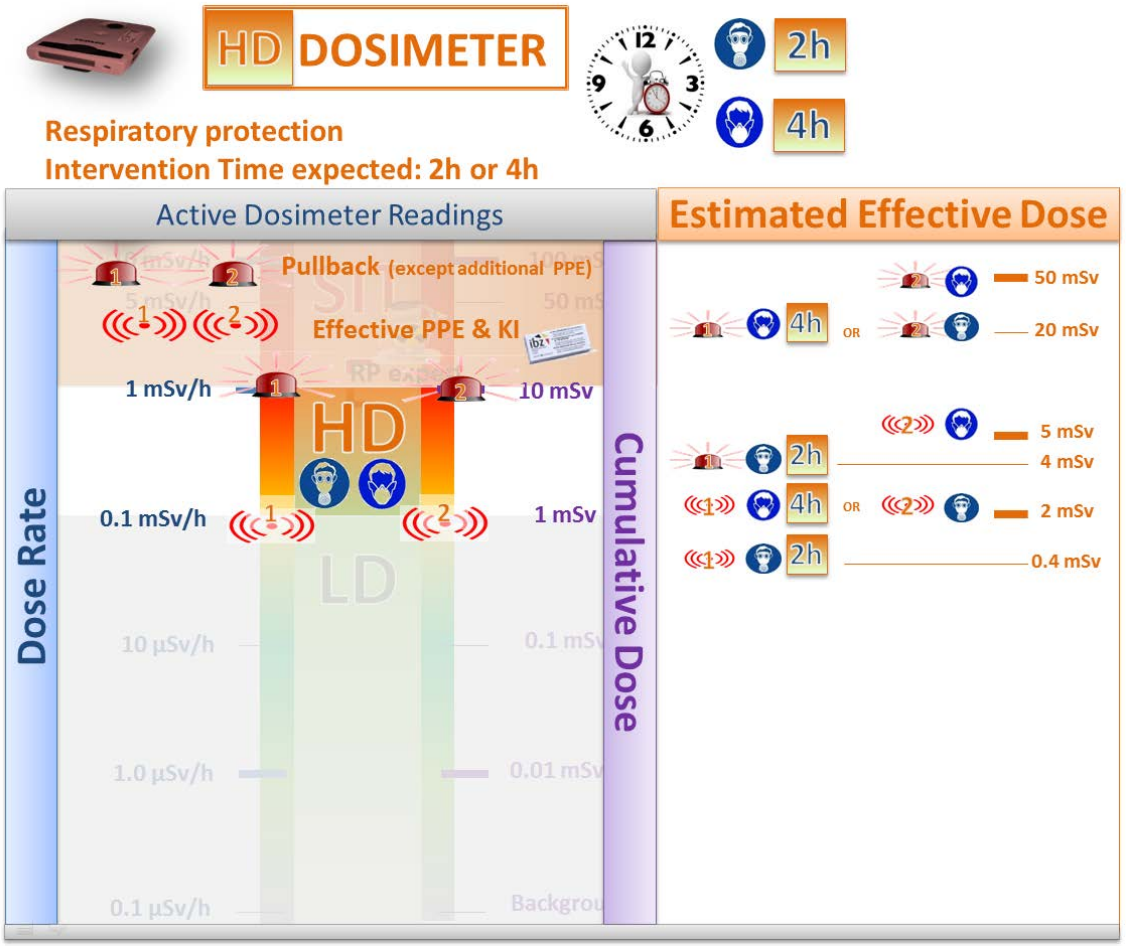
Generic operational schemes for active dosimeters (cont.)

- **LD "Low Dose" operational scheme**



Generic operational schemes for active dosimeters (cont.)

- **HD "High Dose" operational scheme**



Perspectives

- **First REX:** appreciated by the concerned emergency services
- **Next steps:** Consolidation of the approach through
  - development of fact sheets and practical instructions
  - nationwide implementation (purchase, pre-settings of pre-alarms & alarms)
  - progressive incorporation of the approach (outcomes, results, materials…) in the certified training courses of the emergency services and intervening personnel
  - Development of the SITE operational scheme (in collaboration with the licensees)

Conclusions

- Lack of coherence and large diversity of equipment, instrument and procedures to be corrected by the **development** of a **generic approach** aiming to reach **comprehensive arrangements** for the protection of emergency workers
- **Operational schemes developed to support these arrangements**
  - with generic pre-alarms & alarms thresholds (dose rate & cumulative dose)
  - to be spread & implemented nationwide
- With the implementation of this holistic approach (and despite some limitation), **acceptability & common understanding** should be **improved** with expected **enhancement** of the **global response** to a **nuclear** or **radiological emergency** in **Belgium**.

For your attention