THE EVOLUTION OF THOUGHTS FROM ICRP 46 CONCEPT OF POTENTIAL EXPOSURE

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STRUCTURE OF THE PRESENTATION

- EVOLUTION of ICRP SYSTEM: RP07
- ICRP MAIN PUBLICATIONS ON POTENTIAL EXPOSURE and WASTE DISPOSAL
- ICRP 81

❑ Why ICRP Recommendations ?

- To take account of new biological and physical information and of trends in the setting of radiation safety standards;
- To improve and streamline the presentation of the recommendations.

❑ Main concern

- To maintain as much stability in the recommendations as is consistent with the new scientific information.

RP06: FOCUS ON ICRP MAIN MESSAGE

Continuum of risks (LNT)

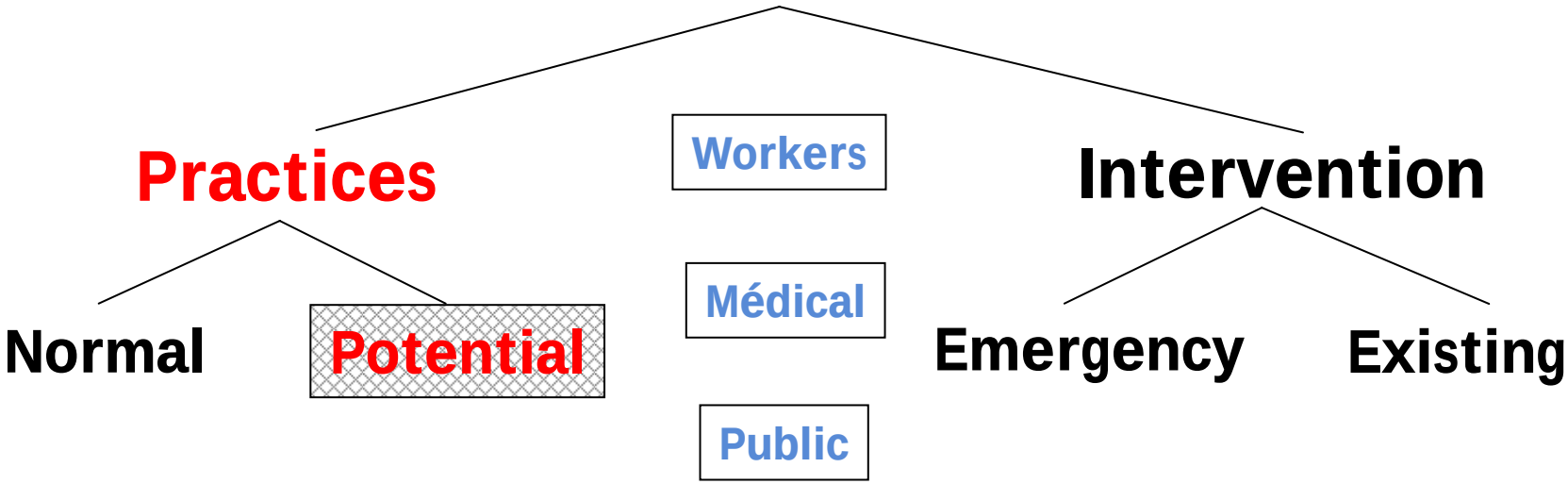
The risk each of us is ready to accept is dependent on the context of the exposure

- **International guidance is needed**

- **The scale of source-related (protection levels constraints or reference levels)**

- **On the basis of existing ICRP quantified values**

PROTECTION RULES FROM ICRP 60



Justification of practices

Justification / **Optimisation**

Optimisation of protection

Constraints

Intervention levels

Individual dose limits

+ Δ

- Δ

PRACTICES and INTERVENTION in ICRP 60

Practices

Limit

Constraints

Optimisation

Intervention

Optimisation

Intervention Level

What happens below the intevention level?

No further optimisation?

TYPES OF EXPOSURE SITUATIONS

Replacing 'practice' and 'intervention' with three exposure situations:

- **Planned exposure:** planned introduction and operation of sources or planned work with sources including potential exposures.

- **Emergency exposure:** unexpected situations that occur during the operation of a practice requiring urgent action.

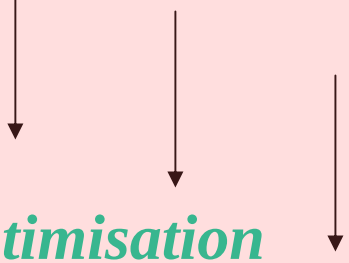
- **Existing exposure:** situations that already exist when a decision on control has to be taken, including natural background radiation and residues from past practices.

OPTIMISATION IN CONJUNCTION WITH SOURCE-RELATED RESTRICTIONS

Planned exposure situations

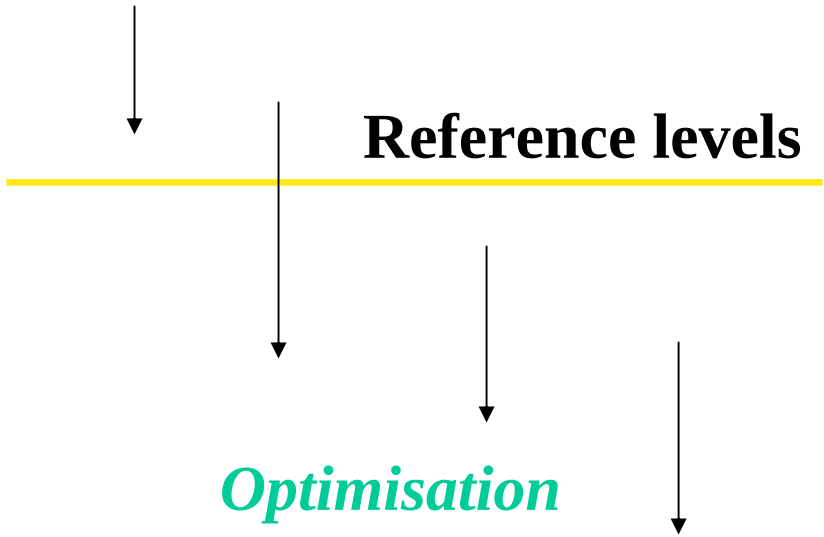
Dose limit

Dose constraint



Optimisation

Existing and emergencies exposure situations



FRAMEWORK FOR DOSE CONSTRAINTS

BANDS OF PROJECTED DOSE	CHARACTERISTICS AND REQUIREMENTS
20 - 100 mSv	Exceptional situations. Benefit on a case-by-case basis. Information, training and individual monitoring of workers, assessment of public doses.
1 - 20 mSv	Individual direct or indirect benefit. Information, training and either individual monitoring or assessment.
0.01 - 1 mSv	Societal benefit (not individual). No information, training or individual monitoring. Assessment of doses for compliance.

Protection from a source in all situations and the use, in planned situations only, of individual-related dose limits

Dose Limits	Constraints and Reference Levels
	
From all regulated sources in planned situations	From a single source in all exposure situations

Fig. 2 (extract from RP07). Dose limits compared with dose constraints and reference levels to protect members of the public or workers.

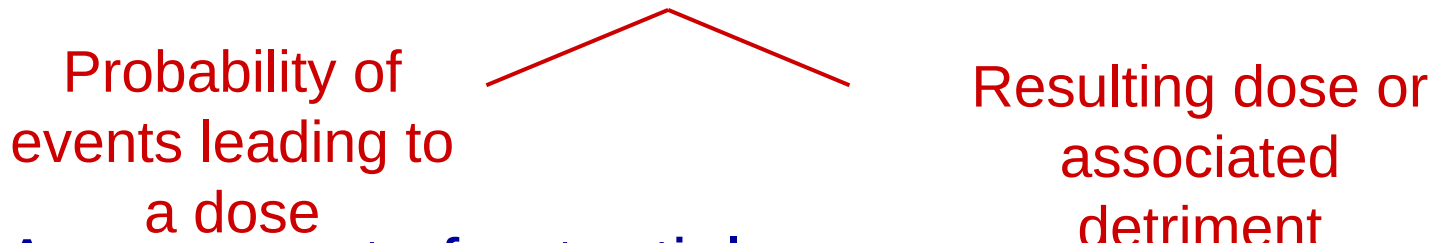
THE PRINCIPLES OF RADIOLOGICAL PROTECTION IN THE 2006 RECOMMENDATIONS

- Source related:
  - Justification (to introduce new sources or to reduce existing exposures)
  - Optimisation in conjunction with dose / **risk constraints** or reference levels

- Individual related:
  - Individual limits (only for planned exposures)

RP07: POTENTIAL EXPOSURES, PART OF PLANNED SITUATIONS

- Result from:
  - Deviation from planned operating procedures and accidents
  - Loss of control of radiation sources
  - Malevolent events
- Two terms should be considered:



- Assessment of potential exposures
  - Scenarios, associated probabilities, resulting doses, acceptability criteria, optimisation

WASTE DISPOSAL & POTENTIAL EXPOSURES

1985: ICRP 46
Disposal of solid radioactive waste

1990: ICRP 60

1992: ICRP 64
Potential exposure
A conceptual framework

1996: ICRP 76
Potential exposure
Application to select Radiations Sources

1997: ICRP 77
Disposal of radioactive waste

1999: ICRP 82
Protection of the Public in situations of Prolonged Radiation Exposure

1999: ICRP 81
Radiation Protection Recommendations as applied to the Disposal of Solid Long-Lived Radioactive Waste

RP07

CONCEPT OF POTENTIAL EXPOSURE

ICRP 64 INSAG 1995

- can affect a large number of people
- involves other possible detriments
- mechanisms involved are complex

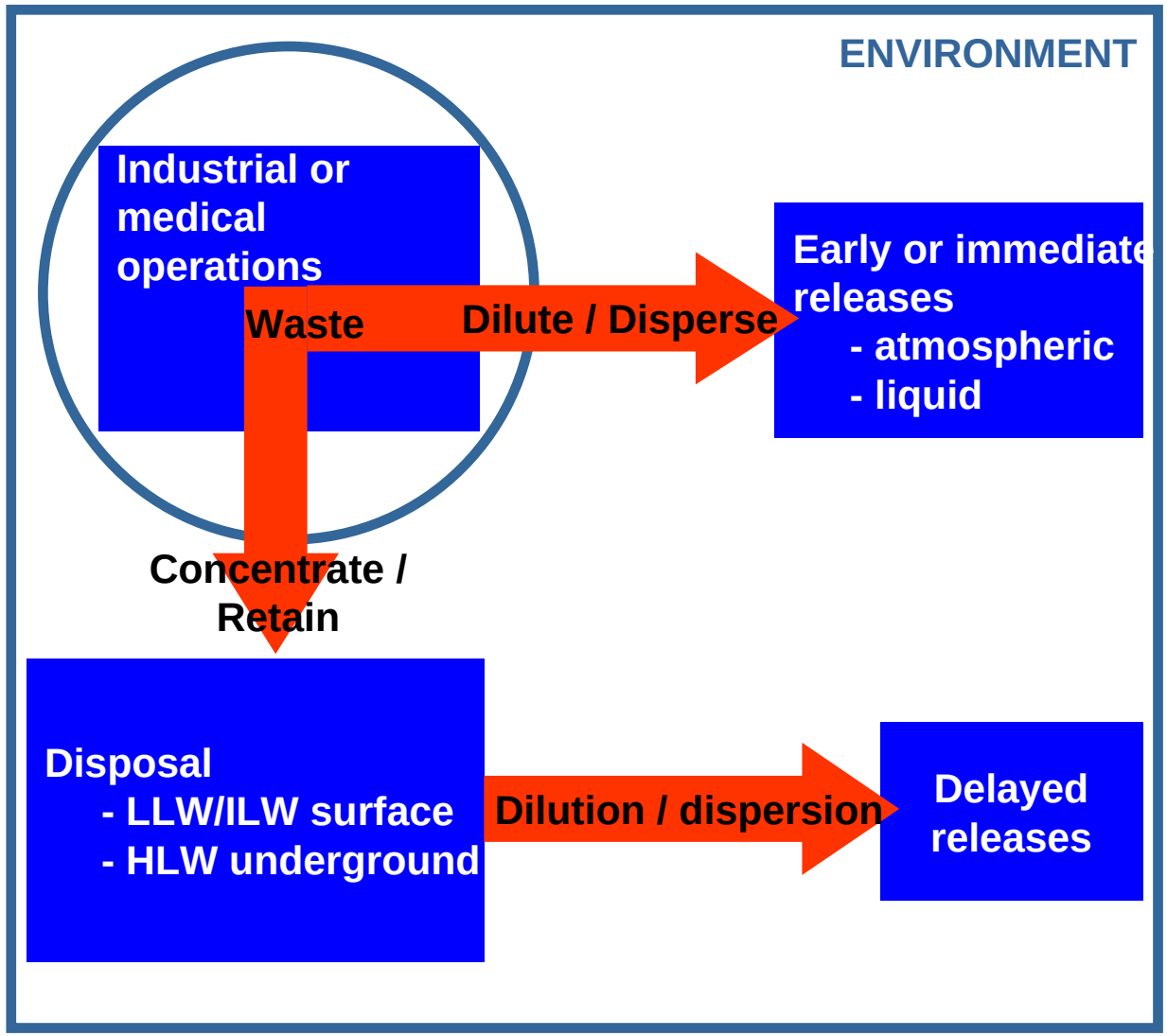
ICRP 76

- primarly affect individuals
  - who are also subject to the normal exposures
  - in the practices (occupation / public / patients)
- number of individuals is small
- health detriment to the directly exposed persons
- process of occurrence is simple

ICRP 46 and 81

- can occur in the far future and

STRATEGIES FOR WASTE DISPOSAL



PUBLIC EXPOSURE ISSUE

RECOMMENDATIONS (2)

ICRP 77

- PUBLIC EXPOSURE ISSUE
- JUSTIFICATION
  - PART OF A PRACTICE
- OPTIMISATION
  - JUDGEMENTAL
  - COLLECTIVE DOSE
  - CONSTRAINTS (0.3 mSv/y)
- LIMITS
- POTENTIAL EXPOSURE
- RELEVANT QUANTITIES (protection of future generations)

APPLICATION OF COMMISSION RECOMMENDATIONS TO THE DISPOSAL OF LONG-LIVED SOLID RADIOACTIVE WASTE

- Future generations
- Critical group
- Potential exposure

- Optimisation
- Technical and managerial principles
- Compliance with RP principles

SHORT CONCLUSION

«Provided the appropriate constraint has been satisfied for natural processes, that reasonable measures has been taken to reduce the likelihood of inadvertent H.I and that sound engineering and managerical principles has been followed the RP requirements can be considered satisfied.»

FRAMEWORK

❑ FUTURE GENERATIONS

- **same level of protection / current generations relationship dose and risk with detriment estimates of doses and risks / indicators**

- **passive system institutional control / confidence / likelihood intrusion shallow land disposal / mill tailings / steps to preserve choices for future generations**

❑ CRITICAL GROUP

- **Hypothetical / reasonably conservative - coherence with biosphere / stylised approaches**

❑ POTENTIAL EXPOSURE

METHODOLOGICAL OPTIONS