

ICRP

Recommendations and international standards

**where we come from,
where we might get ...**

Augustin Janssens
janssens@pt.lu

International (and Euratom) Basic Safety Standards

- *Radiation protection and safety of radiation sources: IAEA safety standards series no. GSR part 3, STI/PUB/1578, Vienna (2014)*
- *Council Directive 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation*

Broadly in line with ICRP 103 (2007) ..., but:

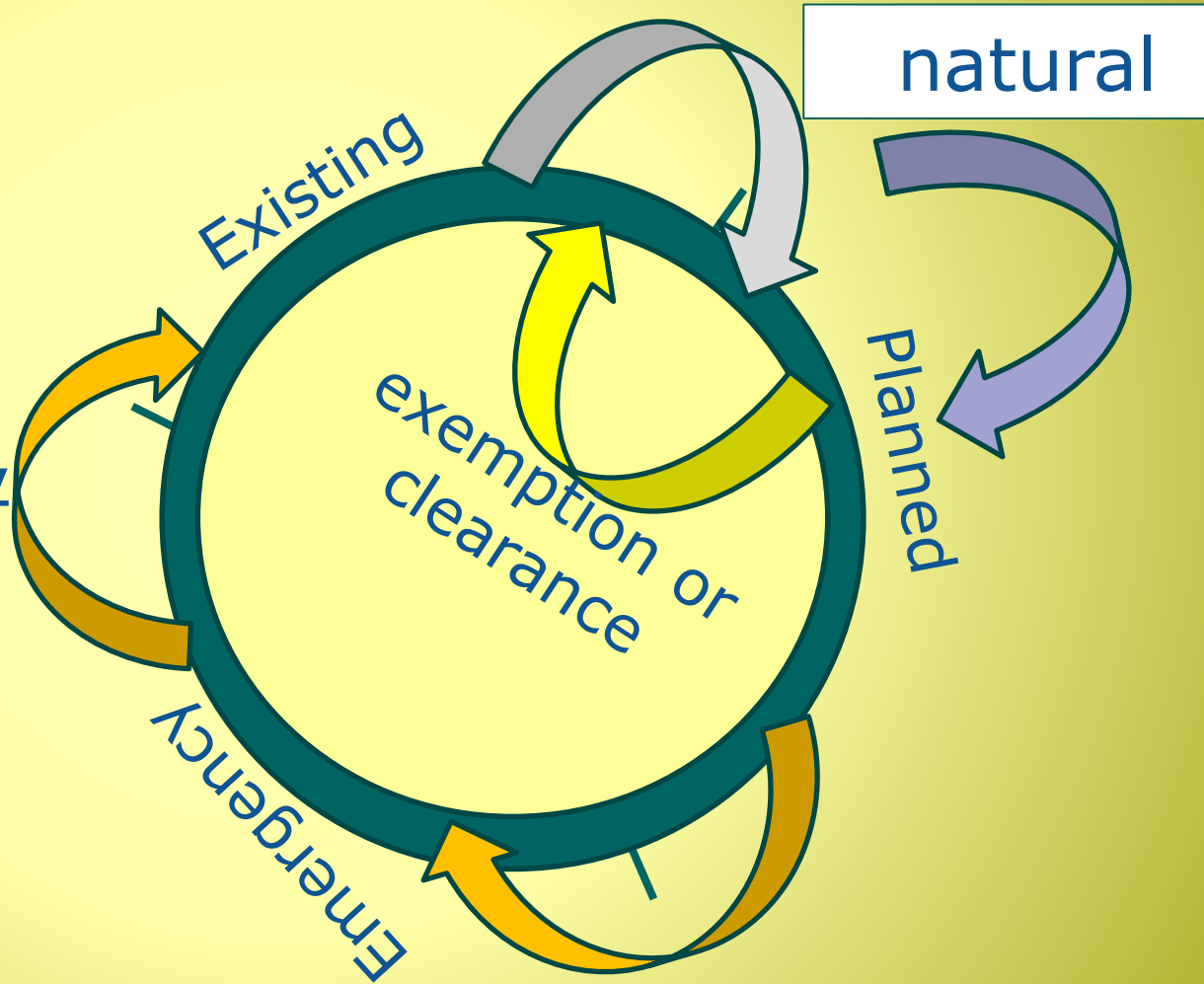
- *Occupational exposures involving natural radiation sources regulated as planned exposure situations*
- *Dosimetric criteria for exemption and clearance without any guidance of ICRP*

Challenges for new general ICRP recommendations

- *Distinguish principles and regulations*
- *Transparency of science and ethical choices, principles and values*
- *Provide a coherent approach to the concept of « tolerability of exposures » and the application of dose limits*
- *Facilitate communication with stakeholders*
- *Avoid complexity while preserving good protection*

Exposure situations (Euratom BSS)

- *Existing*
- *Planned*
An activity introducing a source or modifying an exposure pathway that needs to be kept under a regime of regulatory control and enforcement
- *Emergency*

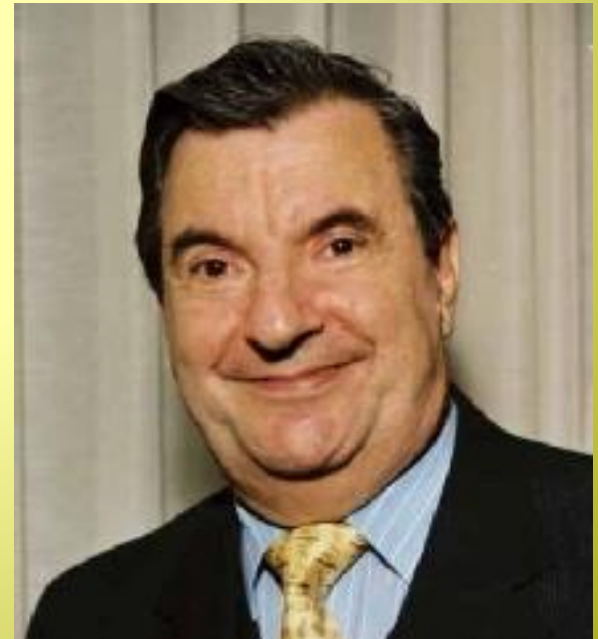
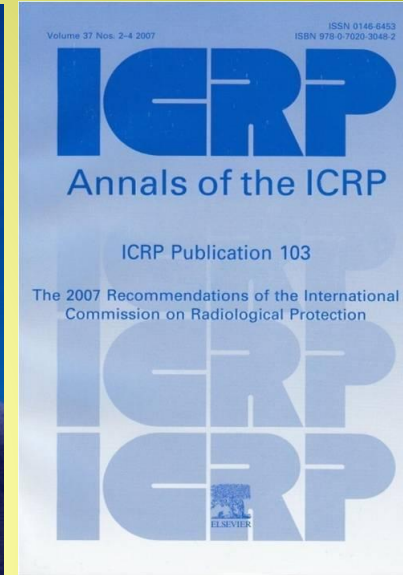
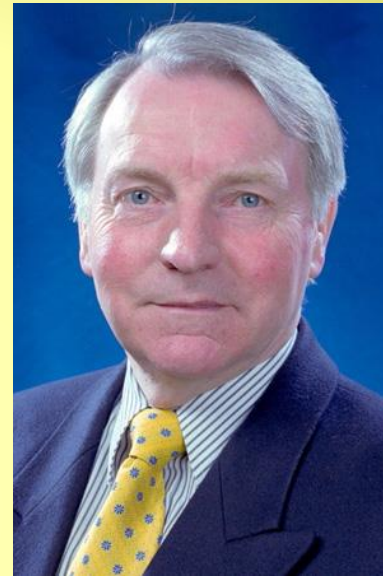


Exemption criteria

Publication 60 referred to international guidance on this matter but neither referred explicitly to the 10 $\mu\text{Sv/y}$ value nor discussed a possible radiological basis for it.

Publication 103 addressed neither exemption nor clearance in the final draft.

Publication 104 provided a thorough overview of related developments, but failed to offer guidance on how trivial individual doses fit in the overall radiation protection system.



Exemption criteria in EBSS

The general criteria for the exemption of practices from notification or authorisation or for the clearance of materials from authorised practices are as follows:

(a) the radiological risks to individuals caused by the practice are sufficiently low, as to be of no regulatory concern; (b) ...

For compliance with (a), it shall be demonstrated that

- workers should not be classified as exposed workers, and*
- the following criteria for the exposure of members of the public are met in all feasible circumstances:*

For artificial radionuclides:

The effective dose expected to be incurred by a member of the public due to the exempted practice is of the order of 10 μ Sv or less in a year.

For naturally-occurring radionuclides:

The dose increment, allowing for the prevailing background radiation from natural radiation sources, liable to be incurred by an individual due to the exempted practice is of the order of 1 mSv or less in a year.

Ethical basis of exemption criteria

- ***Dosimetric criteria:***
 - 1 mSv/y for workers and for natural radiation sources,
 - 10 μ Sv/y for artificial radionuclides, for members of the public (originally 10-100 μ Sv/y)
- ***Criteria for exemption and clearance relate to the concept of justification***
 - no relation to the concept of “tolerability”
 - nuclide-specific assessment, dosimetric criteria are merely a benchmark
 - transparency and traceability of the practice

Ethical Foundations of the System of Radiological Protection

Annals of the ICRP

ICRP PUBLICATION 138

Ethical Foundations of the System of Radiological Protection

Editor-in-Chief
C.H. CLEMENT

Associate Editor
H. OGINO

Authors on behalf of ICRP

K-W. Cho, M-C. Cantone, C. Kurihara-Saio, B. Le Guen,
N. Martinez, D. Oughton, T. Schneider, R. Toohey, F. Zölzer

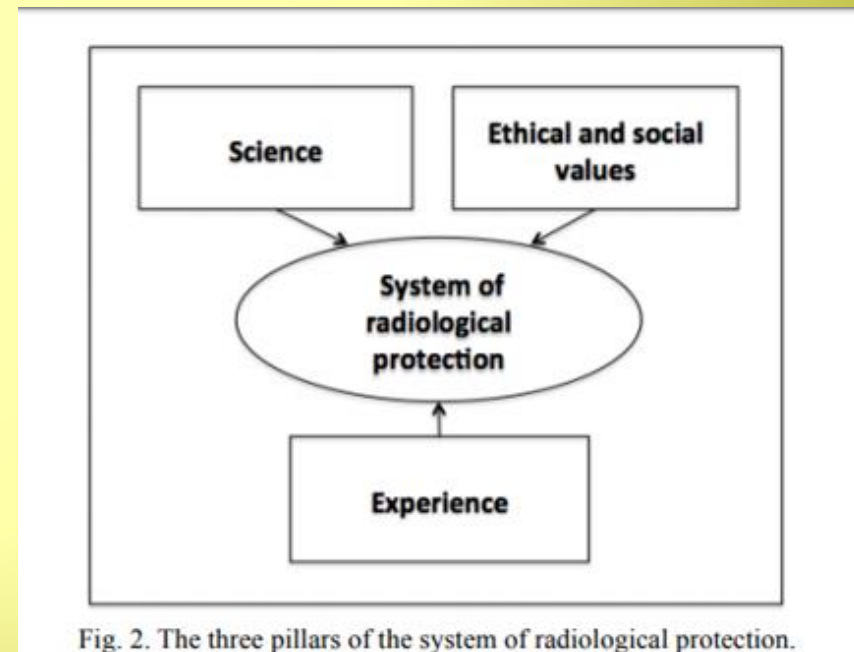
PUBLISHED FOR

The International Commission on Radiological Protection

by

 SAGE

Publication 138



The ethical values underpinning the system

- *The system of radiation protection relies on the **principles** of Justification, Optimisation and Limitation*
- *The system relies on four **core ethical values**:*
 - **Beneficence and non-maleficence**
 - **Prudence**
 - **Justice**
 - **Dignity**
- ***Procedural values** allocating responsibilities to those involved in the radiological protection process such as:*
 - **accountability**
 - **transparency**
 - **inclusiveness (stakeholder participation)**

Justice

- *Distributive justice: fairness in the distribution of advantages and disadvantages among groups of people*
 - **it is the role of *dose constraints and reference levels* to reduce the range of exposure to individuals**
 - **would constraints affect the shape of the dose distribution?**
 - **relevance at very low doses? (hypothetical individuals)**
- *The principle of equal rights guarantees equal treatment for all with regard to higher levels of exposure.*
 - **It is the role of *dose limits* to ensure that all members of the public, and all occupationally exposed workers, do not exceed the level of risk deemed tolerable by society and recognised in law.**

Dose limits

*“The principle of **limitation** ... declares that individual exposures should not exceed the dose limits recommended by the Commission. It applies only to planned exposure situations, other than medical exposure of patients or exposure of non-human biota.”*

- *Same « tolerable » level of exposure for*
 - **All categories of exposure?**
 - No dose limits for medical exposures
 - Dose limit for public exposures at 1 mSv/y, versus 20 mSv/year for workers
 - **All exposure situations?**
 - Currently dose limits apply only to planned exposure situations
 - BSS apply dose limits to occupational exposure to radon
 - Failure to explain absence of dose limits in emergency exposure situations
- *What is then the meaning of the public exposure limit?*
 - **Related to “tolerability” or to “serenity”?**
 - **A specific constraint?**
 - (not related to distributive justice)

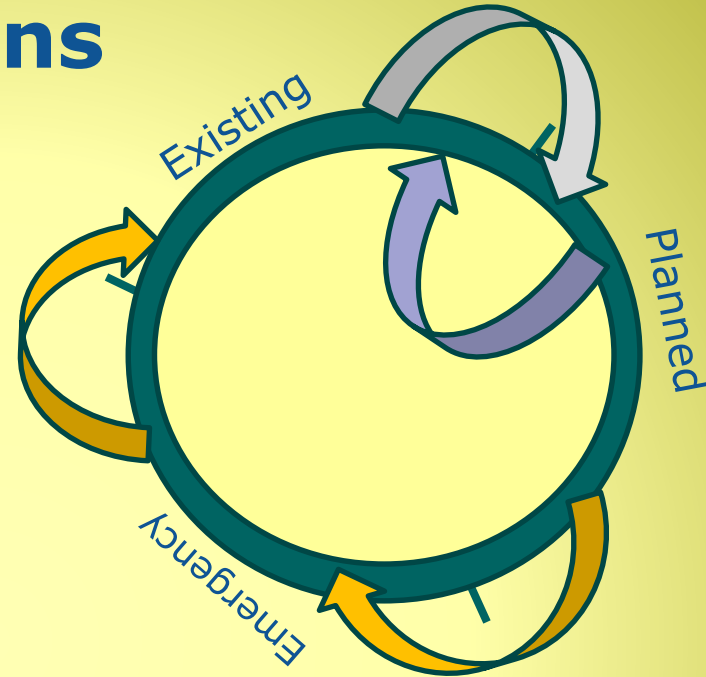
Tolerability of low doses

- *Do dose limits to members of the public relate to the concept of "tolerability"?*
- *If not, then what?*
 - **Threshold for "exposed workers"**
Above which workers are educated, trained, monitored, and bear responsibility for their own exposure (behavior to avoid unnecessary exposures)
 - **Hence: benchmark for "quiescence" or "serenity" (below which there is "peace of mind")**
- *This benchmark is not related to "regulatory concern"*
 - **Need for trust in a responsible, vigilant authority**
 - **Legitimate concern among stakeholders**
justification of the practice, collective dose, concern for the environment
- *But: no or less concern for individual exposures*

Public exposure constraints based on ethical value of « Dignity »

- *Publication 138*
 - **Individuals need to be empowered to manage their exposures, for instance in a post-accidental situation**
- *It may also be contrary to human dignity to oblige people to adjust their individual behavior*
 - **to protect themselves against a risk imposed by others**
- *This new ethical basis explains better why it applies only in planned exposure situations*
 - **Any threshold (1mSv/y?) should not be labeled a “limit” (possibly a constraint?)**
 - **In this way it is easier to explain higher, acceptable exposures in an emergency or existing exposure situation, and it is**
 - **coherent with the long-term objective in a post-accidental, existing exposure situation**

Exposure situations



- *Planned*
 - tolerability of exposures is reflected in dose limits for workers
- *Emergency*
 - intolerable exposures in the vicinity of the accident site
- *Existing*
 - dose limits apply to workers exposed to natural radiation sources or intervening in post-accidental remediation
 - long-term objective for the overall population, to achieve quiescence

- ✓ any « level of tolerability » should be the same for all exposure situations
- ✓ occupational exposures are always subject to regulatory control, as appropriate subject to dose limits
- ✓ the concept of quiescence can be met if doses are below 1 mSv/y

Take-away points

- *Reconsider the definitions and properties of "exposure situations"*
- *Provide an ethical basis for exemption and clearance*
- *Simplify the concept of "tolerability of exposures"*
- *For members of the public, explore the concept of "quiescence", with a dose constraint at 1 mSv/y*
- *Review the ethical basis of protection:*
 - *Elaborate the ethical basis of dose limits*
 - *Dignity as a basis of "quiescence"?*
 - *Allow for other societal values in the management of exposure situations (solidarity)*
 - *Use the ethical principles and values as a tool for more convincing communication with stakeholders*