ICRP System of Protection

Present and Future

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Outline

- System of Protection
- Current Work
- Unified Approach

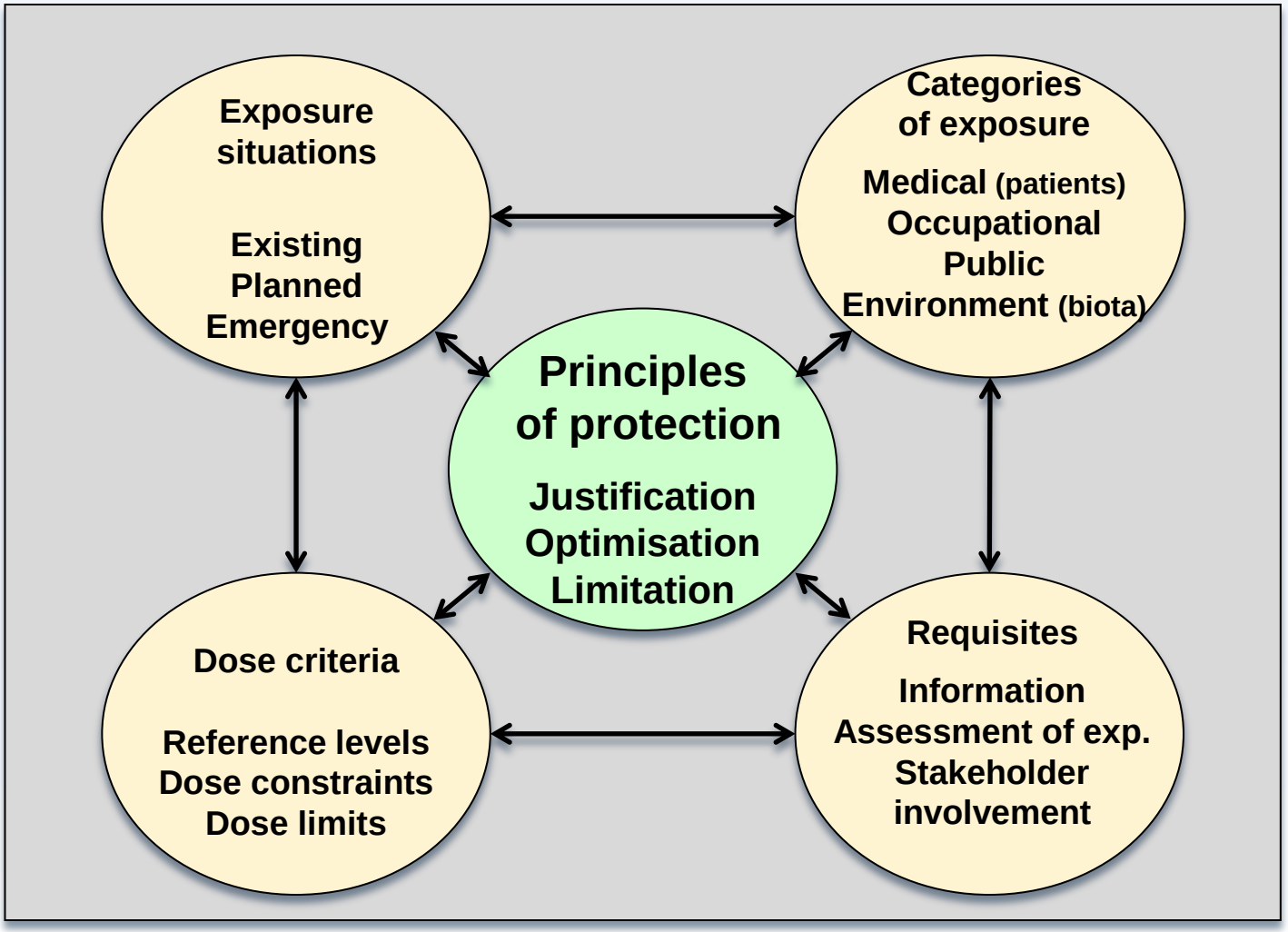
This presentation has neither been approved nor endorsed by the Main Commission of ICRP

The views and thoughts in this presentation are my personal opinions, representing the ICRP, and are not intended to represent those of my employer, the U.S. Nuclear Regulatory Commission

From the Beginning

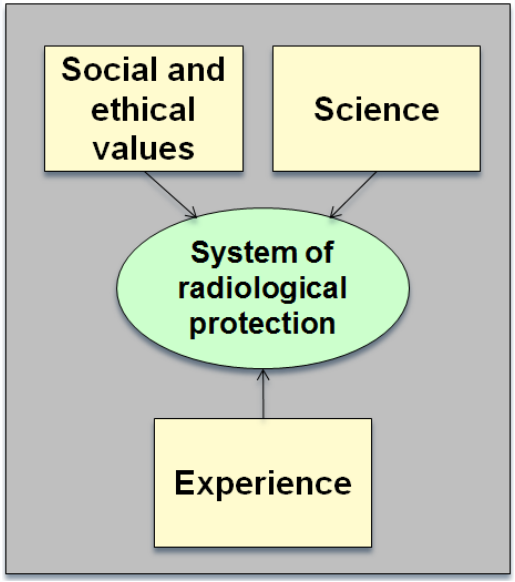
- **Occupational protection has been a driving force in ICRP's foundation and work from the very beginning**
- **Protection Objectives**
  - Prevent Deterministic
  - Stochastic ALARA
    - Genetic
    - Cancer
    - Non-cancer

System of Protection



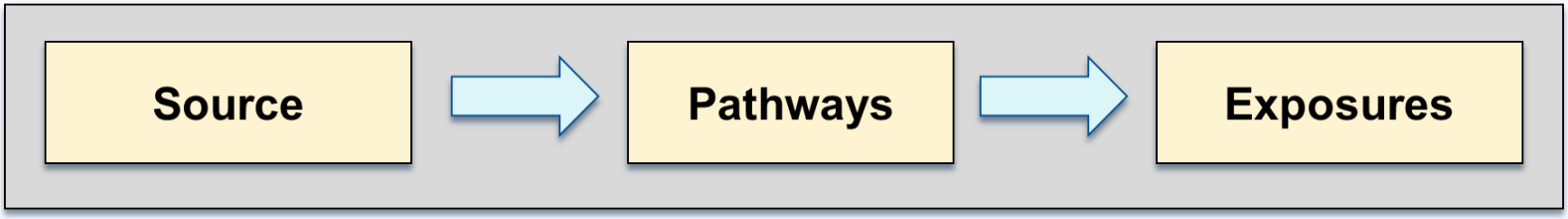
Foundations

- **Social and Ethical Values**
  - Beneficence
  - Prudence
  - Justice
  - Dignity
  - Reasonableness
  - Tolerability
    - Peaceful
    - Vigilant
    - Reaction
  - Conservation/biodiversity/ sustainability
- **Science**
  - Epidemiology
  - Radiobiology
  - Anatomy
  - Physiology
  - Metrology
  - ……
- **Experience**
  - Hiroshima/Nagasaki
  - Nuclear Installations
  - Industrial/Medical
  - Chernobyl
  - Fukushima
  - ……



Exposure Situations

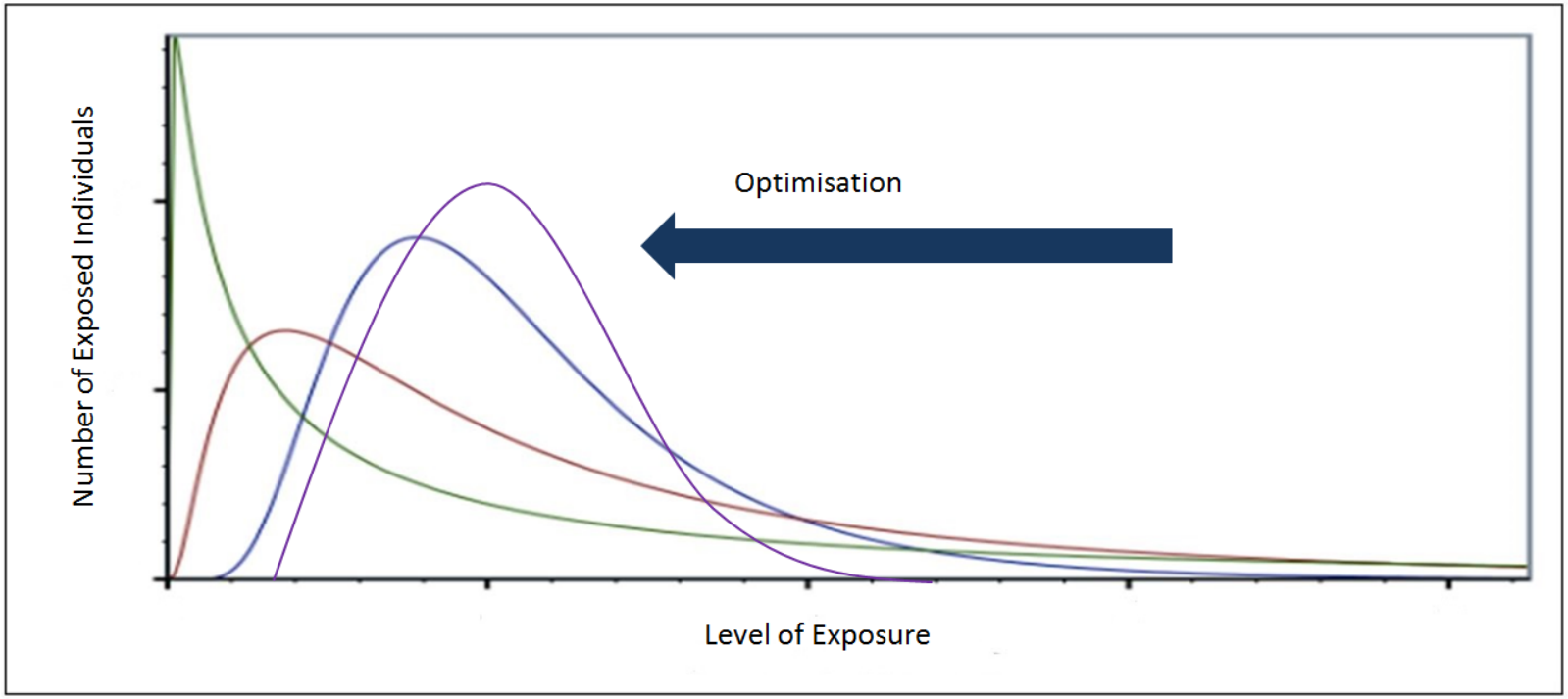
- **The process causing human exposures from natural and man-made sources**



- **"Protection can be achieved by taking action at the source, or at points in the exposure pathways, and occasionally by modifying the location or characteristics of the exposed individuals." ICRP103, § 169**

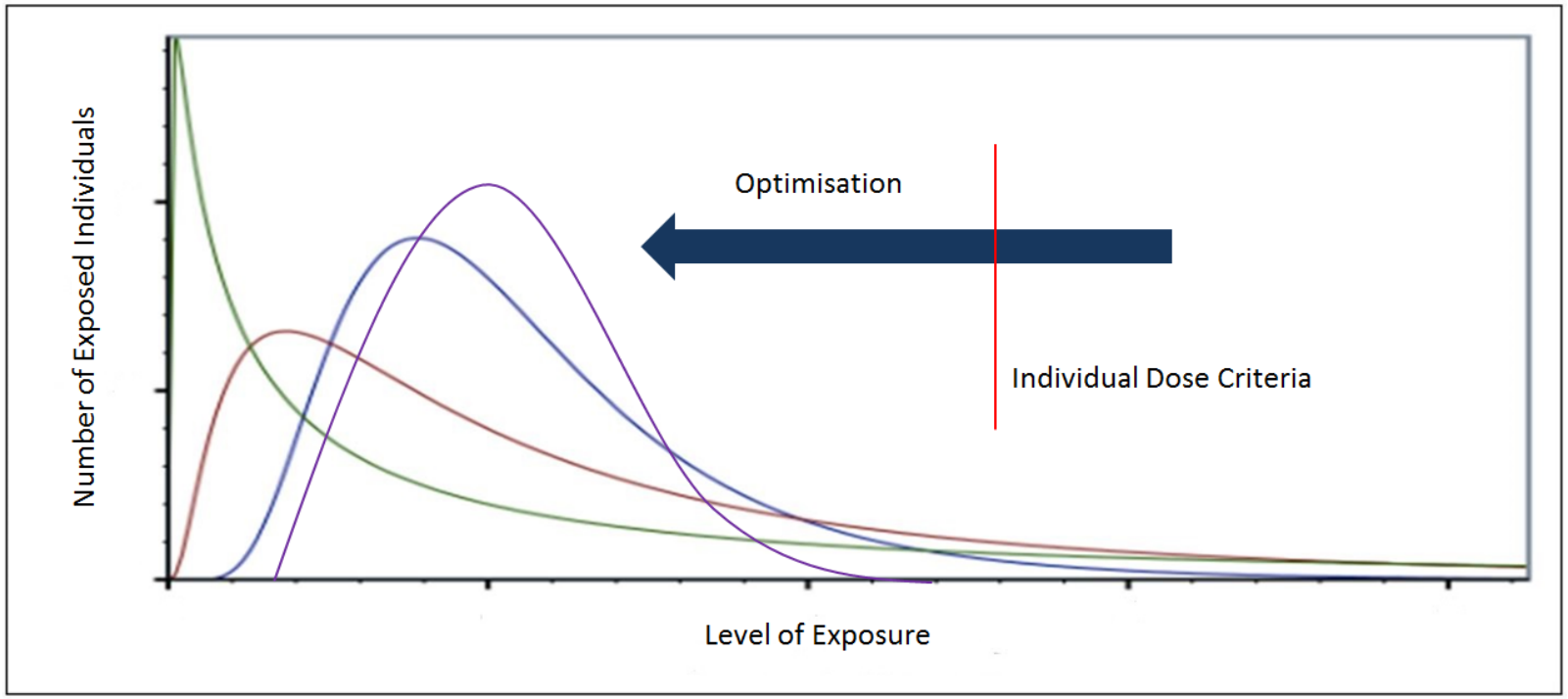
Optimization

- **Shift exposures towards lower values**
- **Influence the entire dose distribution**



Dose Criteria

- **Reduce inequity**
- **Identify exposures which warrant specific attention to reduce their magnitude**



Radon

- **Publication 126 in press**
  - Recommended approach:
    - No distinction between smokers and non-smokers
    - Apply to all buildings whatever use
    - Graded approach in work places based on optimization
      1. Action on concentration (derived RL) 300 $Bq.m^{-3}$
      2. Action on dose (dose RL) 10 mSv/y
      3. Manage as occupational exposure

NORM

- **TG76 Work in Progress**
  - Wide range of industrial practices, many of which are not intended to specifically use the radioactive properties of the material
  - Lack of awareness in many fields that radiation protection may be an issue
  - Approach:
    - Characterize
    - Justify controls
    - Optimize protection

Emergencies

- **TG93 Updates to Publications 109 and 111**
  - Who are responders?
    - Licensee employees and contractors
    - Offsite professionals (fire and rescue, etc.)
    - Other workers (transportation drivers, electrical contractors…)
    - Members of the public
- **What Factors are important?**
    - Phases (early, intermediate, late)
    - Training and preparation
    - Location (on/off-site)

Transition from Emergency

Emergency Exposure Situation

- Reference level in or below the 20-100 mSv/year range
- Protection actions to reduce and maintain exposure ALARA driven by urgency
- Training, dosimetry, tracking

Existing Exposure Situation

- Reference level in or below the 1-20 mSv/year range
- Protection actions to reduce and maintain exposure ALARA driven by information and controls
- Training, dosimetry, tracking
- Stakeholder Involvement

Unified Approach

- **Occupational Exposure can occur in any exposure situation**
- **Characterisation of the situation is a prerequisite for action**
- **Justification of establishing control is necessary**
- **If control justified, exposures are managed by optimisation of protection using restriction on individual doses to reduce inequity, identify exposures which warrant specific attention to reduce their magnitude, and to guide reduction in the entire dose distribution ALARA**

Unified Approach

- **Individual Criteria selected in, or below, bands recommended in Publication 103:**
  - 1-20 mSv/y band for existing and planned, as appropriate
  - 20-100 for emergencies, if necessary
- **The basic requisites of information and assessment of exposures to be applied commensurate with risks**
- **For regulatory convenience, the authority may manage the exposures with tools normally associated with planned exposure situation, using a graded approach**

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