Radiation Protection Principles

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ICRP Recommendations

1990: Recommendations of ICRP

- form basis for current national and international protection standards

2007: Recommendations of ICRP

- being introduced into national and international protection standards

Cancer risks at low doses

- Issue considered in depth in ICRP Publication 99
  - weight of evidence suggests that, at doses below about 100 mSv, it is plausible to assume that cancer risk will rise in direct proportion to an increase in the equivalent dose in the relevant organs and tissues

- For radiological protection purposes, ICRP judge it prudent to adopt this linear non-threshold model

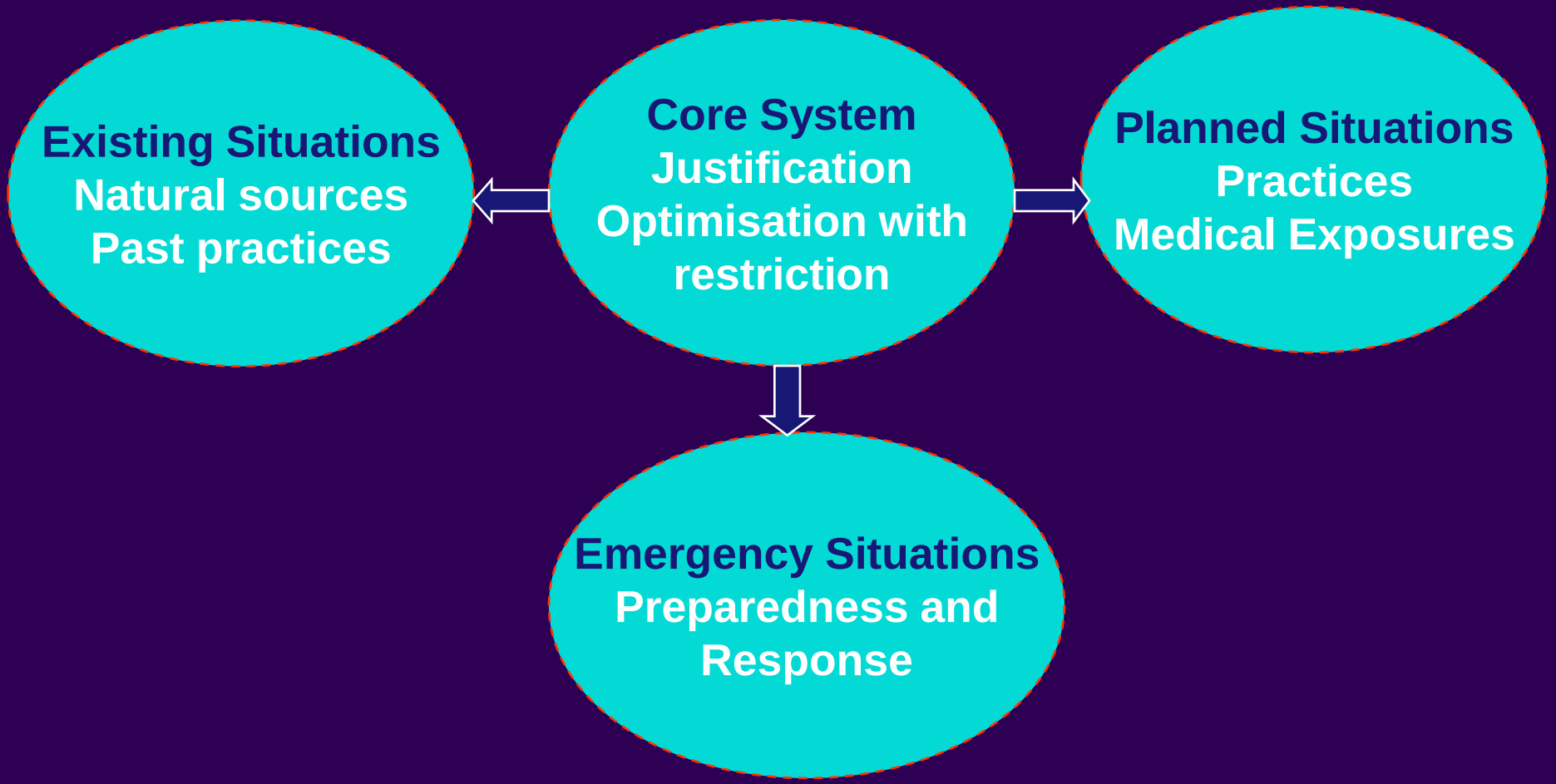
- However, uncertainties in the assessment of risks at low doses are recognised

ICRP System of Protection

Key Points

- System of Protection applies to all sources and exposures, including natural
- Application of the system will depend upon the characteristics of the exposure situation
- There will be a level of dose (or risk) which should not be exceeded. This will depend on the situation - a constraint/ reference level
- Three categories of exposure: occupational, public and medical

ICRP System of Protection



Planned Exposure Situations
Annual Dose Limits

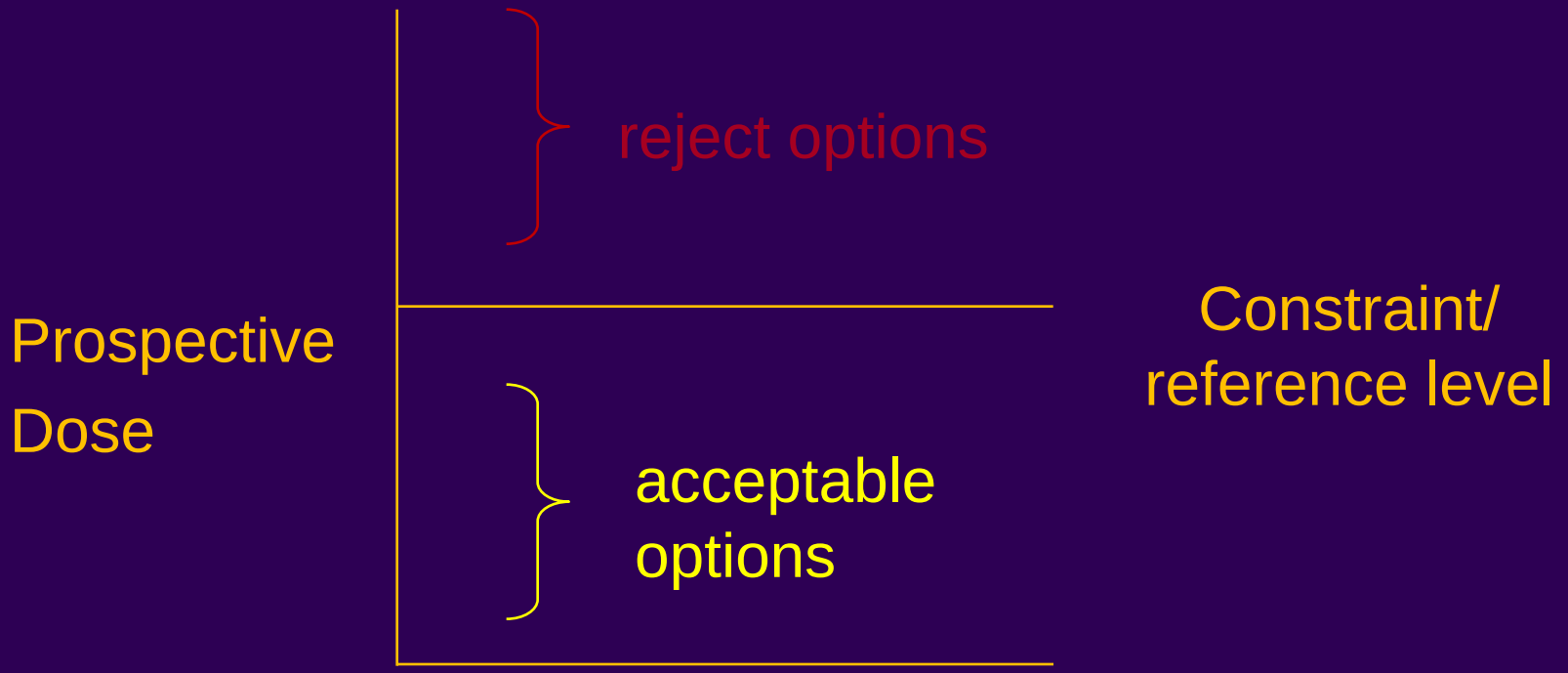
Type of Limit	Occupational	Public
Effective Dose	20 mSv+	1 mSv
Equivalent Dose		
Lens of Eye	20 mSv*	15 mSv
Skin (1 cm^2 av.)	500 mSv	50 mSv
Hands and Feet	500 mSv	-

+ averaged over defined periods of 5 years

* Statement on Tissue Reactions

2007 Recommendations

Optimisation



Constraints and reference levels are an integral part of optimisation

Framework for Dose Constraints/ Reference levels

BANDS OF PROJECTED DOSE	CHARACTERISTICS
20 - 100 mSv	Individuals exposed to sources that are not controllable or actions to reduce doses disproportionately disruptive. Action usually taken on exposure pathways. Emergency Exposure Situation
1 - 20 mSv	Individual direct or indirect benefit. Exposures may be controlled at source or by action on exposure pathways. Public – Existing Exposure Situation Occupational – Planned Exposure Situation
Up to 1 mSv	Societal benefit (not individual). Action usually taken at source where radiological protection requirements can be planned in advance Public – Planned Exposure Situation

Emergency Situations

Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations – Publication 109.

Includes:

Emergency Preparedness

Emergency Response

The Use of Reference Level

- The reference level is a *planning tool* to define the level of dose which it is planned not to exceed and below which protection should be optimised.
- The reference level represents the level of dose where protection is almost always warranted (*justification*).
- Once an emergency situation has occurred (emergency response) the reference level can be used as a *benchmark* for assessing the effectiveness of protection strategies.

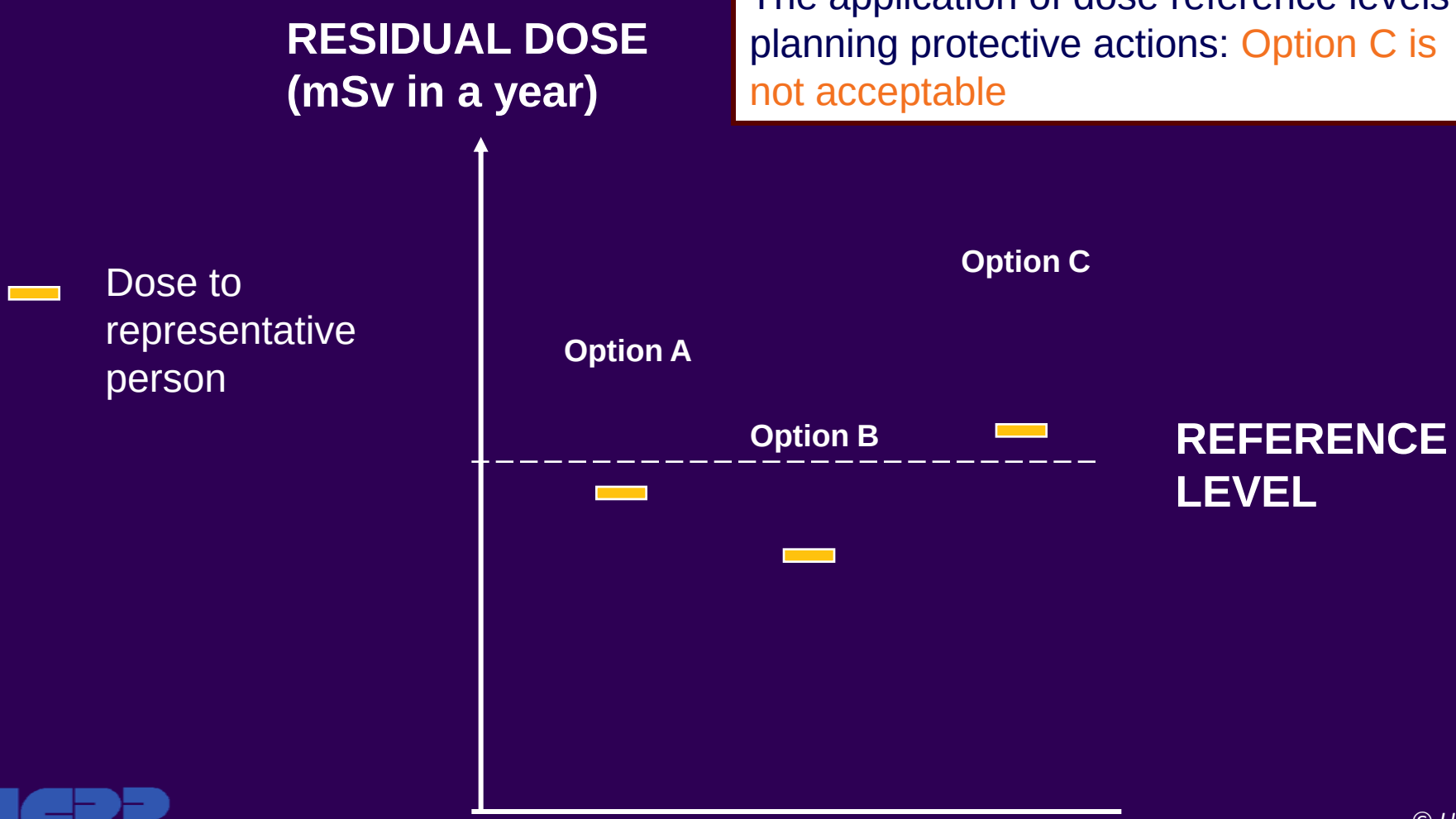
The chosen value of the reference level will depend upon the circumstances of the exposure situation.

Planning: Optimisation below reference levels

- Consider each option of a protection measure on its own merits.
- Consider simultaneously doses that would be incurred via all exposure pathways, some subject to protective actions and some not.
- Develop optimised protection strategy considering all relevant exposure pathways and protection measures with the objective that the residual dose is below the reference level.
- Develop triggers for activating different parts of protection strategy.

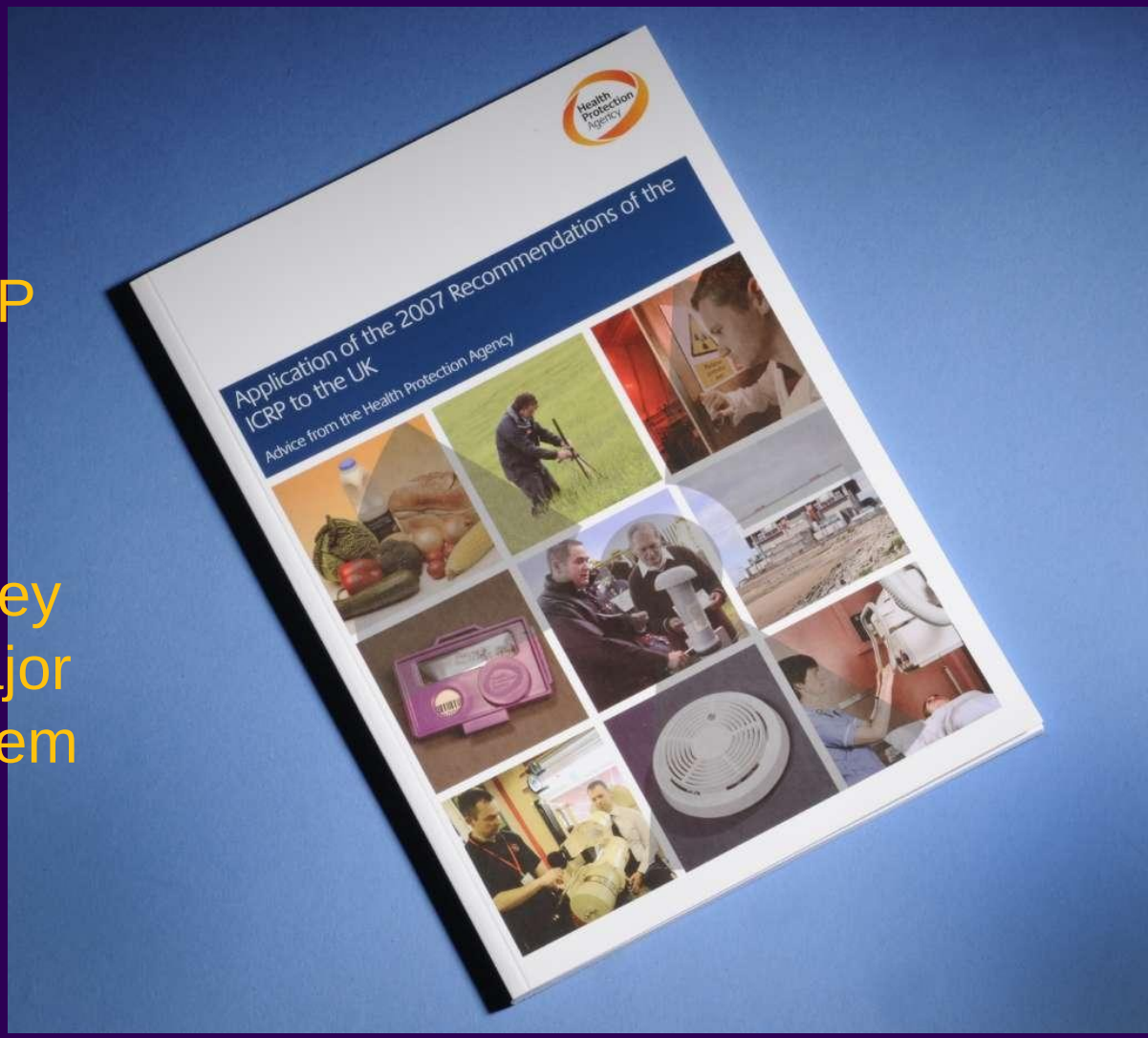
Optimisation during planning

The application of dose reference levels in planning protective actions: Option C is not acceptable



UK HPA Response to ICRP

- Welcomed new ICRP Recommendations
- Overall considers they do not imply any major changes to UK System of Protection



Thank you