

# Working Group 3

## Economic and technical factors, and endpoints of optimisation

14th EAN Workshop

“ALARA in Existing Exposure Situations”

Dublin, Ireland 4-6 September 2012

## WG3: Economic and technical factors. Endpoints of optimisation

- How should the “ALARA process” work in practice?
  - a selection from several options based on predicted residual dose?
  - A single or repeated process?
- How practical is this for Rn in homes, or cosmic rays?
- Is there a role for CBA? If so, what is the cost of the man-Sv? And should this be adjusted, eg for different stakeholders such as home owners?
- How do you determine that exposures are ALARA, ie when do you stop? Is this limited by the practicalities of measurement and dose assessment?

## Optimisation is a process

- To keep individual doses, number of the people exposed and likelihood of potential exposure ALARA
- Below DC or RL
- On-going, cyclical (evaluation of the ES, identification of the possible options, selection of the best option under the prevailing circumstances, implementation, review), continuous, forward-looking, iterative, systematic, structured

## Starting point of the process

- In Planned ES, starting point = set the dose constraint (DC)
- In Existing ES, need for characterisation of the situation before setting reference levels (who is exposed, when, where, how...?)
- DC and RL are situation related and predetermined
- Frame (ICRP 103, Table 5): 3 bands + rational (controllability, benefit, requirements)
- Typically band 1-20 for Existing ES

## The process – RP System

- Frame of mind: always questioning
- ICRP 101 Part 2: broadening the process (equity, RP culture, stakeholder involvement)
- Quantitative + qualitative methods
- Requires commitment at all levels
- Graded approach; transparency; traceability
- Best option = specific to the ES
- Decision aiding tools: BATNEEC, CBA, value of man-Sv
- Dialogue: between professionals, with stakeholders
- Long-term perspective

## The process - Discussion

- Existing ES affect day to day life; many challenges: protective actions from authorities complemented with self-help protective actions; responsibility shared (multiple decision makers); many stakeholders; preservation of dignity
- Radiation often is not the only risk; could be conflict between different risks
- Representative person may be each individual
- Need to develop dialogue, awareness of people (Radon), RP culture, right to know: information, campaigns, training?
- Risk perception: less we know the risk, more we are afraid of; need to persuade (Rn) vs need to explain that source deletion is not possible or relevant

## The process – Discussion (continued)

- Science generally not sufficient (no evidence, need for values)
- Plurality (sources of information, sources of measurements)
- Mandatory requirements are generally not the solution (Rn)
- CBA generally not used
- CEA for Rn (WHO model, IRL): for strategy (set the RL) not for situation
- Cost should include information, waste...
- Workers: either occupationally exposed (classified) or managed as members of the public

## Endpoint of the process – RP System

- Normally, no predetermined endpoint
- Clearance fits for materials, not for exposure situations
- Case by case basis: residual dose specific to the ES
- Could be close or well below the RL
- Optimisation is not minimisation
- Emergency and Existing ES: tend to levels of exposure comparable with those in normal situations



## Endpoint of the process - Discussion

- The risk we are ready to take is depending on the circumstances
- Depending of the available budget
- The question who is paying is not fundamental in practice
- Societal and political pressure
- Dialogue is needed
- Numbers cannot be the starting point of the dialogue
- The perception of the ES shall be shared (e.g. experience with aircrews)
- More legal responsibility (employer, landlord...) leads to more enforcement (but not a smaller residual dose)

## Endpoint of the process – Discussion (continued)

- Some countries set endpoints: D using  $10 \mu\text{Sv/a}$ ; UK with clean-up criteria
- Combination RL + endpoint may be confusing
- What is the relationship between RL and endpoint?
- What if residual dose  $>$  endpoint?
- What if residual dose  $>$  RL? It depends on experience

## Our key conclusions and recommendations

- How should the “ALARA process” work in practice?
  - a selection from several options based on predicted residual dose? A single or repeated process? (Could be)
- How practical is this for Rn in homes, or cosmic rays? (Yes)
  - Mainly a **practical** process
  - **Characterisation** of the situation is a crucial point, including who is responsible for what?
  - Consider what **existing DC and RL** are relevant
  - How can I reduce doses, risks? (**options**)
  - Considering resources, other factors, use of tools,
  - The process should be **shared** with stakeholders
  - Incorporation of **values** beside science

## Our key conclusions and recommendations

Is there a role for CBA? If so, what is the cost of the man-Sv?  
And should this be adjusted, eg for different stakeholders such as home owners?

CBA is just a tool, not the solution, but it and other tools (CEA, MAUA, etc) may be used as they provide **structure** to the process, providing **traceability** and **rationality**.

We are not prepared to put a number on the man-Sv (right now)

## Our key conclusions and recommendations

How do you determine that exposures are ALARA, ie when do you stop? Is this limited by the practicalities of measurement and dose assessment?

- Optimisation is not minimisation
- Try to remove all detectable contamination... wrong ! 9
- The process is iterative (both when planning the intervention and when undertaking the radiation actions - we have to be ready for the unexpected)
- Must consider the uncertainty in predictive dose assessment