SOCIÉTÉ FRANÇAISE DE RADIOPROTECTION

SFRP
Société Française de Radioprotection

SFRP-IRPA workshop on reasonableness in the implementation of the ALARA principle
Introduction of the workshop

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Société affiliée à IRPA

Origin of the workshop

- Setting up a SFRP working group to respond to the letter from IRPA on the evolution of the system of radiological protection
- Main conclusions:
  - The key issue is to assess what is reasonable taking into account economic and societal factors;
  - The process of negotiations and the quest for reasonableness would benefit to be further discussed and shared, both at the national and international levels, with all concerned stakeholders;
  - The management of public health in a comprehensive manner should be considered in the context of the implementation of ALARA.

Aim of the workshop

- To further address these challenges SFRP proposed to engage, within IRPA activities, a reflection on:
  - The practical implementation of the ALARA approach with a focus on what is judged "reasonable"
  - The development of holistic risk management approaches to better integrate different risks

- The aim would be to prepare a document on the lessons learned from the sharing of experience

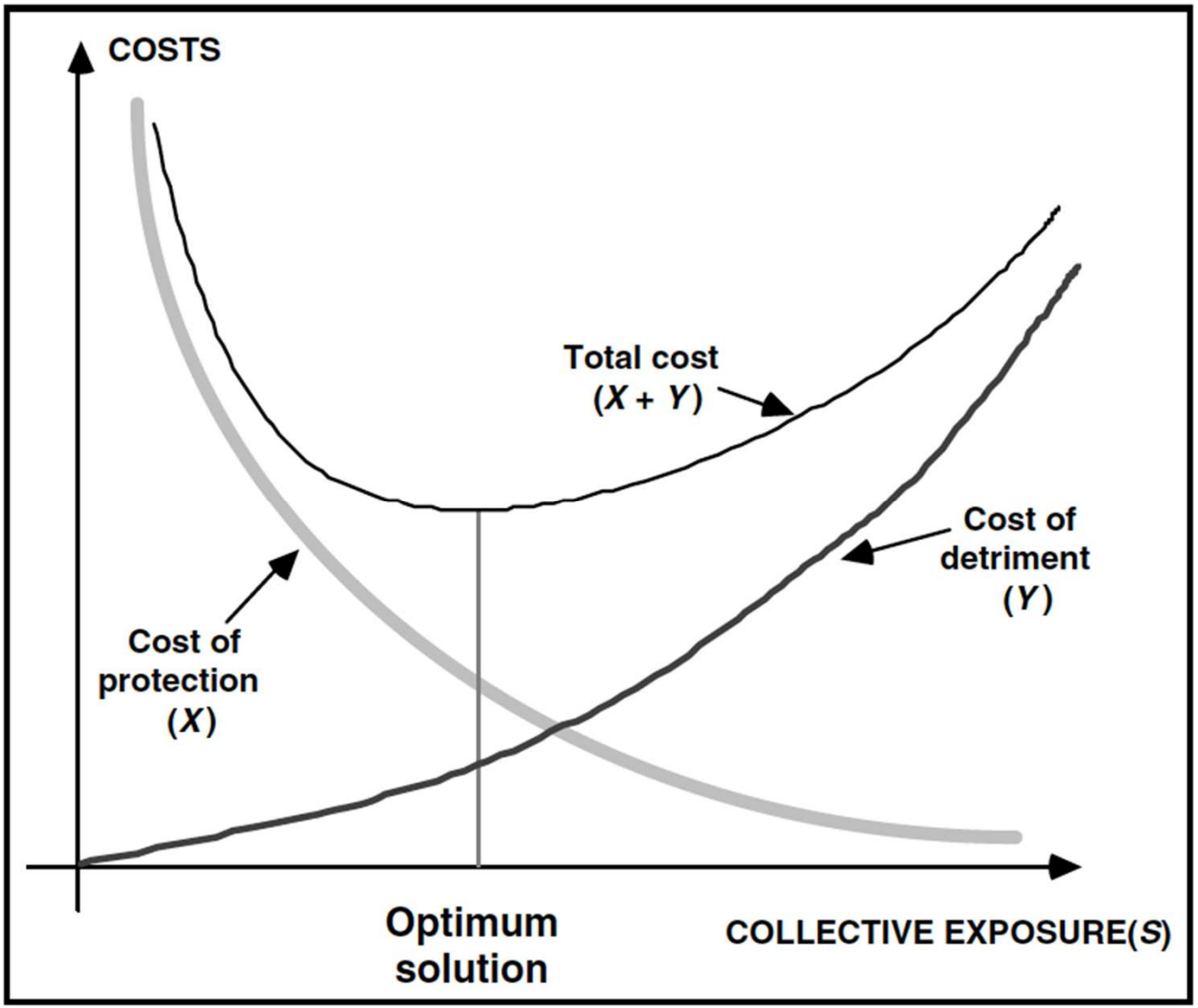
Introduction of the cost-benefit analysis

ICRP Publication 22, 1973

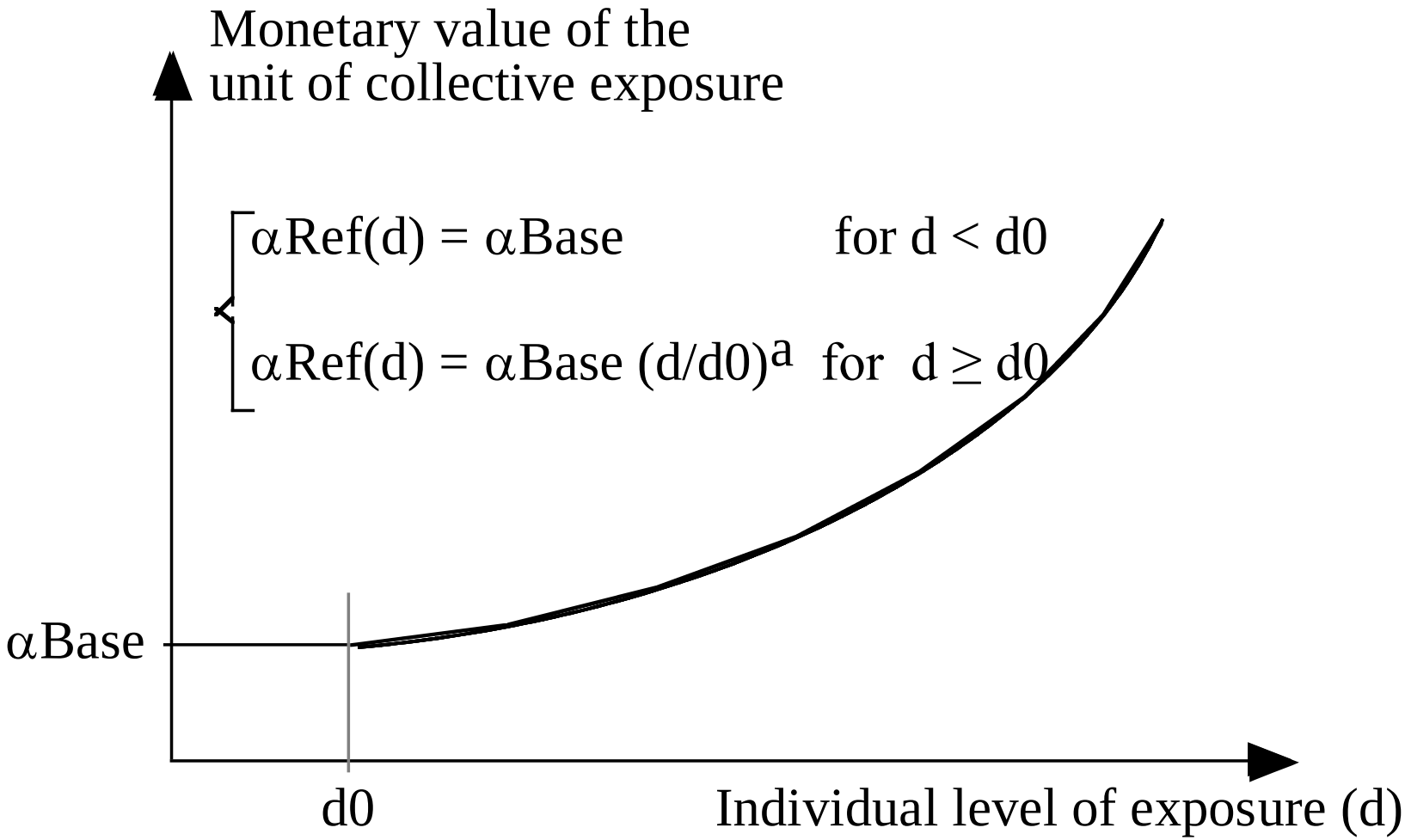
"It is then helpful to express the population dose not only in man-rems, but also in **social and economic terms**, for example, in terms of **detriment or monetary units**, so that the advantage of a **reduction in collective dose** can be **compared directly** with the **detriment or cost** of achieving this reduction." (§ 18)

- Necessity to balance risk and benefit
- Introduction of the monetary values of the person-Sv

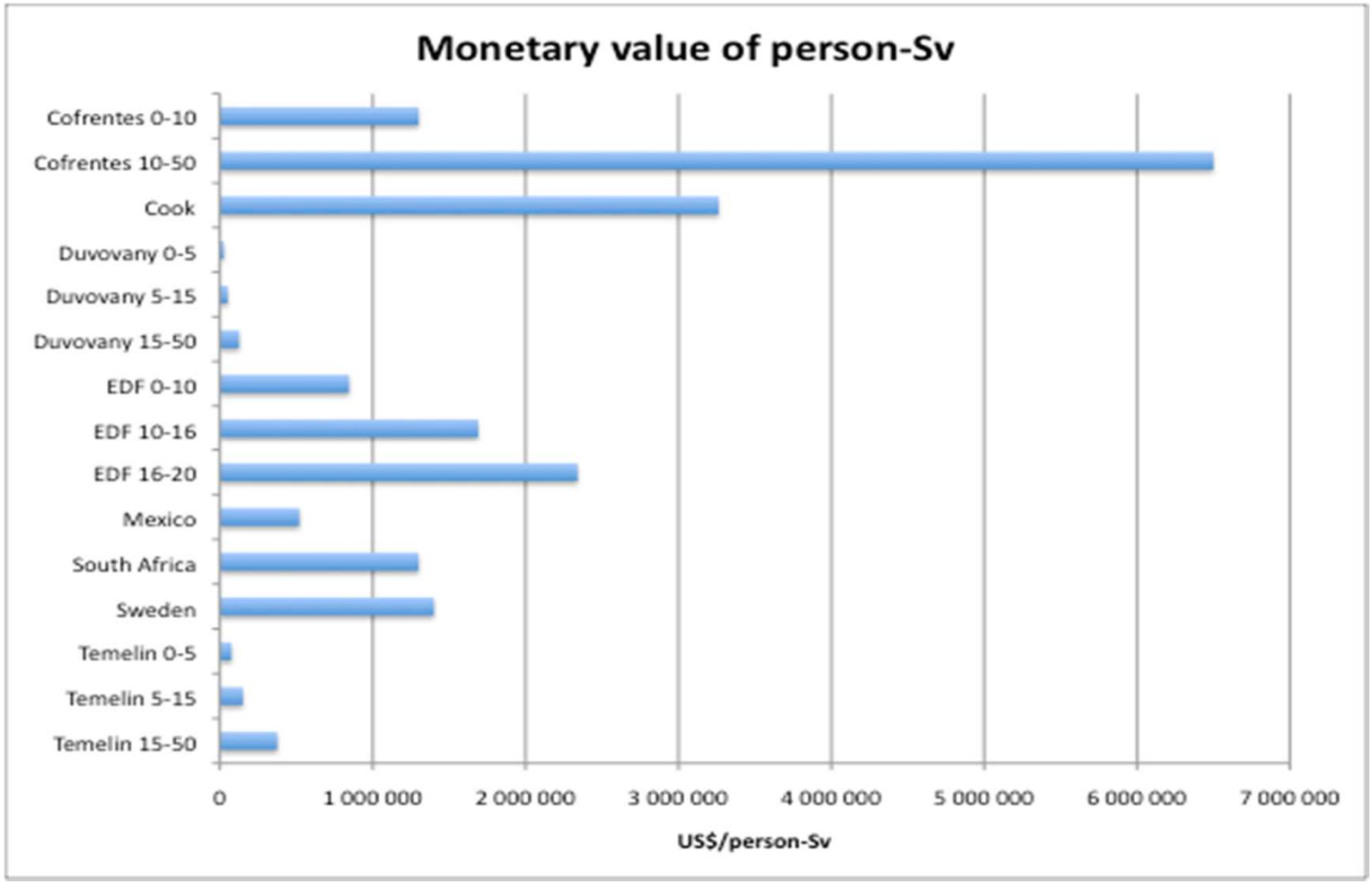
Economic rationality and cost-benefit analysis



Monetary value of the person-Sv



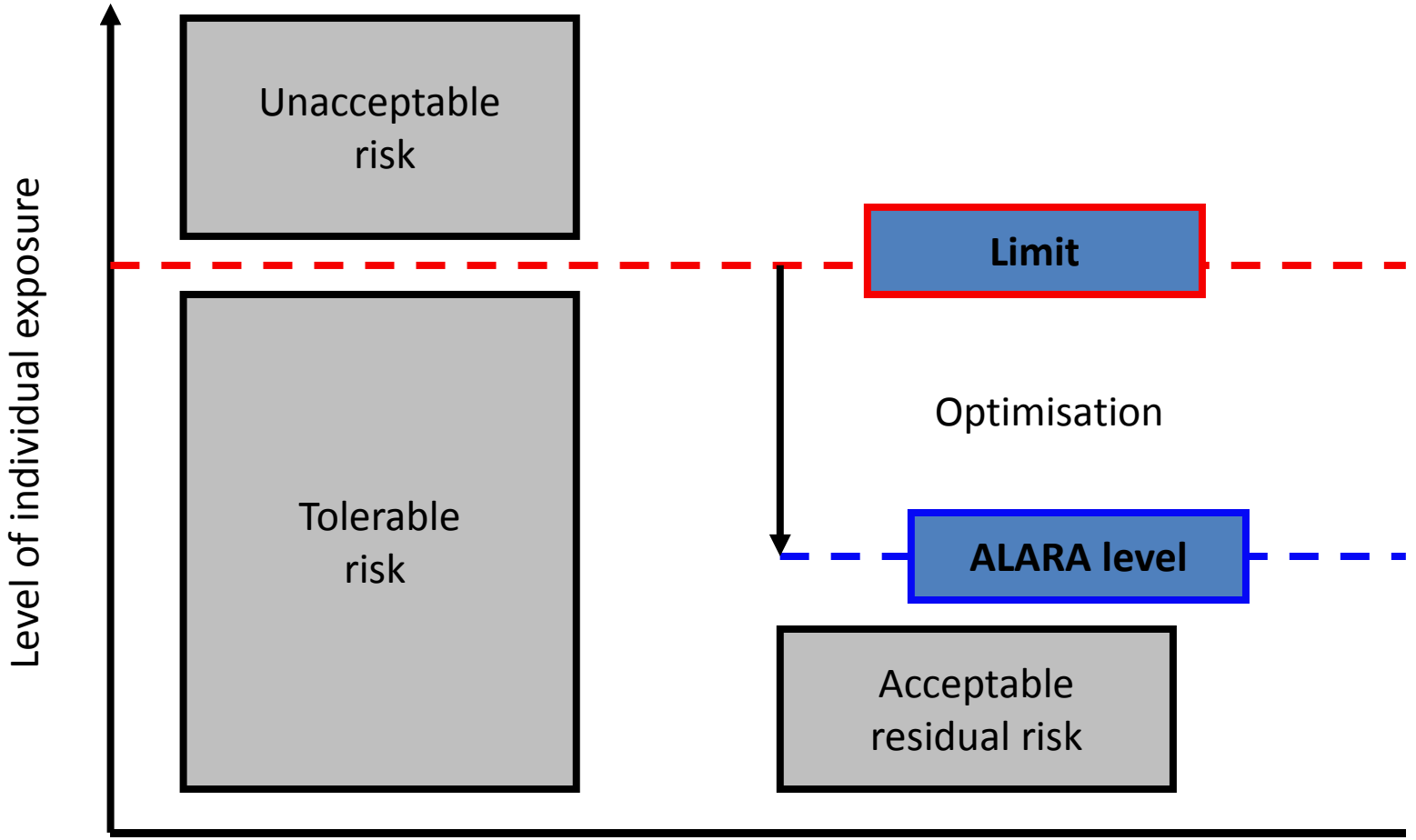
Example of monetary values adopted by utilities
Data from ISOE (2010)



Model of tolerability in Publication 60, 1991 (1)

- **Unacceptable risk**
  - *'The first word is "unacceptable", which is used to indicate that the exposure would, in the Commission's view,* ***not be acceptable on any reasonable basis in the normal operation*** *of any practice of which the use was a matter of choice. Such exposures* ***might have to be accepted in abnormal situations****, such as those during accidents'*
- **Tolerable risk**
  - *'Exposures that are* ***not unacceptable*** *are then subdivided into those that are* ***"tolerable"****, meaning that they are* ***not welcome but can reasonably be tolerated*** *[…]'.*
- **Acceptable risk**
  - *' […] and* ***"acceptable"****, meaning that they* ***can be accepted without further improvement*** *i.e. when the protection has been optimised'.*

Model of tolerability in Publication 60, 1991 (2)



Stakeholder involvement (1)

- The "**reasonable**" can **not be defined universally** and therefore refers to the characteristics of the exposure situation
- One of the key challenges: to develop evaluation procedures for **deliberation among stakeholders on what is reasonable**
- Importance of fostering the **emergence of informed and advised stakeholders (radiological protection culture)** allowing them to make effective decisions for their **own protection and well-being** while weighing up the individual and collective dimensions

Stakeholder involvement (2)

Societal considerations and values (according ICRP, Pub 101, 2006)

- Equity
- Ability to control (measurement, health surveillance, etc.)
- Sustainability
- Intergenerational considerations
- Individual benefit
- Social benefit
- Level of information/knowledge held by those exposed
- Social trust

Some issues at stake for the application in nuclear industry (1)

- ***For occupational exposures:***
  - Significant reduction of the highest individual exposures since ICRP Publication 60, notably with reduction of dose limits
  - Average individual dose rather low, but distribution of doses depends on the categories of workers
  - Optimisation process largely driven in the 80s and 90s by cost-benefit analysis
  - Monetary values of the person-Sv still used for selecting options of protection in some cases
  - How to integrate and quantify the different components in the optimisation process?
  - How to organise the deliberation on reasonableness?
  - How to develop a holistic approach?

Some issues at stake for the application in nuclear industry (2)

- ***For public exposures:***
  - Induced by discharges of nuclear installations
  - Individual exposures in the range of µSv per year for the representative person
  - Debate on the calculation and use of collective dose
  - Management largely driven by the Best Available Technology (depending on the countries: expressed in activity/Bq or dose/mSv)
  - Role of optimisation to be addressed:
    - Which criteria?
    - Who is deciding about the optimised level?
    - How to involve the public in this process?

Some issues at stake for the application in medical sector

- ***For medical staff:***
  - Generally coping with high individual doses in interventional radiology/cardiology, with a link between occupational and patient exposure
  - Focus during the last decade on the development of radiological protection culture among the medical staff (including the different categories of personnel)
- ***For patients:***
  - Dose limit not applicable but, in principle, optimisation should be at the core of the protection strategy
  - How to evaluate/judge the balance between benefit and detriment?
  - How the patients could be involved in this process?

Some issues at stake for the application in existing exposure situations (1)

- ***For exposure to radon :***
  - Individual doses due to chronic exposures, potentially significant
  - Dependant from the natural background, the building and its use
  - Optimisation driven by adoption of reference levels
  - Individual decision to implement protective actions largely relies on economic factors
- ***For legacy sites:***
  - Doses also due to chronic exposures
  - Main focus on decontamination of the site
  - How far to go?
    - Decision to be made on residual contamination
    - How to decide and who is involved? Considerations on resources limitation

Some issues at stake for the application in existing exposure situations (2)

- ***For post-accident situations:***
  - For responders:
    - How far to accept the introduction of flexibility in the individual exposures?
    - How to judge the optimum level in such circumstances?
    - Who could be involved and how to introduce a dynamic process of improvement of the situations?
  - For the public:
    - Limited use of cost-benefit analysis for the selection of the protection strategies
    - Importance of considering the human dimensions for the selection of protection strategies and the long term exposures
    - Combination of individual and collective decisions: How to define the optimal level and who has to be involved in this evaluation?

Proposal for engaging the reflection

- Review the **current practices** in implementing ALARA
  - R**espective roles of decision-aiding techniques** and **stakeholders** in establishing reasonable levels of protection.
  - Reflection on ethical and societal values that underpin the concept of reasonableness.
- Share examples of ALARA implementation in different fields of activities
  - who were the stakeholders,
  - what was the decision making process (inside/outside the facility; ±deliberative),
  - what were the priorities (risk; societal demand…),
  - any use of decision aiding techniques or tools,
  - any issues related to the search or meaning of « reasonable »

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Looking for a fruitful workshop

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