



Health Physics Annual Meeting, Spokane, July 2022.

IRPA perspective on the Review of the System of Radiological Protection

Sigurður M Magnússon

Icelandic Radiation Safety Authority.

*Chair, IRPA Task Group on the Review of the System
of Radiological Protection*



International Radiation Protection Association (IRPA)

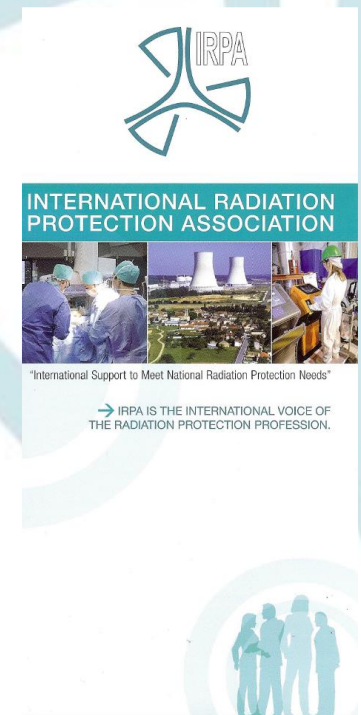
**The international professional association for
RP professionals since 1965**

53 Associate Societies

68 countries

over 18 000 individual members

*Enormous resources of practical knowledge
and experience in radiation protection
including scientists, operators, regulators,
medical practitioners and advisors.*



Covering a multicultural background, large and small societies



IRPA Strategic Plan 2021-24

The primary objective of IRPA is to provide a medium to promote co-operation for the protection of people and the environment from ionizing and non-ionizing radiation.

Several ongoing activities further the primary objective directly:

- Supporting the organization of regional and international congresses
- Supporting existing Associate Societies and creation of new Societies
- Maintaining active connections with all Associate Societies and relevant international organizations



IRPA Strategic Plan 2021-24

Priorities for the 2021-24 Term:

- **To contribute perspectives of the RP professionals to the revision of the System of Radiological Protection.**
- To promote sustainability and excellence for the radiation protection profession
- To ensure IRPA is an inclusive and collaborative organisation
- To encourage deeper engagement with the public on radiation protection issues, including risk communication



Effectiveness of the RP System

- In 2015 IRPA consulted with the Associate Societies on the broad effectiveness of the RP system and its ability to be widely communicated and understood by interested parties.
- A summary of the outcome “ IRPA Consultation: is the system of protection fit for purpose and can it be readily communicated ? ” Views of the radiation protection professionals.
 - Journal of Radiological Protection 38 (2018)



Reasonableness in optimization

- One of the key issues to emerge from the 2015 consultation was “reasonableness in optimization”.
- In 2020 IRPA consulted Associate Societies and International Organisations on Reasonableness in Optimisation of Radiation Protection:
 - A paper “ IRPA Perspective on ‘Reasonableness’ in the Optimisation of Radiation Protection “ was published in 2021 and is available on IRPA website.



Reasonableness in optimization



IRPA
INTERNATIONAL RADIATION PROTECTION ASSOCIATION

IRPA PERSPECTIVE ON 'REASONABLENESS'
IN THE OPTIMISATION
OF RADIATION PROTECTION



[https://www.irpa.net/docs/
IRPA% 20Perspective.pdf](https://www.irpa.net/docs/IRPA%20Perspective.pdf)

1. Introduction and Background

2. Fundamental Considerations and Context

2.1. Radiation Protection Principles

2.2 Dose Response Model: LNT/Threshold

2.3 Ethical Values

2.4 Context of risks and natural background exposure

3. Principal Underpinning Factors for 'Reasonableness'

3.1. Judgement Call

3.2. Proportionality

3.3. Stakeholder Engagement

3.4. Holistic 'All Hazards' Approach

3.5. Avoidance of Over-Conservatism

3.6. Value for Society – Optimal Use of Societal Resources

3.7. De Minimis Approach

3.8. Alignment with Radiation Safety Culture



Reasonableness in optimization

- The outcomes of these two IRPA consultations are an important input to the revision of the RP system.
- They provide the perspective of the professionals who must live with the RP system in their daily activities.



Task Group on the Review of the System of Radiological Protection

- Established in July 2021 to facilitate active IRPA involvement in the review process proposed by ICRP.
 - Sigurdur Magnusson, IRPA EC, chair
 - Bernard Le-Guen, IRPA president, vice chair
 - Claire-Louise Chapple, IRPA EC, vice chair
- The Task Group has 30 members from 20 AS representing thousands of RP professionals from all regions of the world.



Task Group on the Review of the System of Radiological Protection

- IRPA AS represented on the TG ICRP.
 - **16 National Societies:** Argentina, Austria, Belgium, Brazil, Cameroon, Cuba, France, Ghana, Israel, Italy, Korea, Japan, Netherlands, Spain, UK, US.
 - **4 Regional Societies:** Australasian Radiation Protection Society (ARPS), Eastern African Association for Radiation Protection (EAAARP), German-Swiss Society for Radiation Protection and the Nordic Society for Radiation Protection (NSFS).
- First task of the TG was to provide feedback on the ICRP “fit for purpose” paper.



Task Group on the Review of the System of Radiological Protection

- Feedback was received from 16 AS.
- Initial review of feedback was presented at the ICRP workshop on The Future of Radiological Protection, 19-20 October 2021.
- Revised feedback based on the “fit for purpose paper”, the ICRP workshop and further reflections was requested from the TG before end of 2021.
- Revised feedback was received from 10 AS.



Task Group on the Review of the System of Radiological Protection

- Initial review of revised feedback was presented at the first IRPA North American Regional Congress in February 2022.
- In the feedback received there are many general reflections but few focusing on specific examples of difficulties/challenges encountered in practical applications of the RP System.
- Members of the TG were asked to share specific examples before 1 July 2022. Feedback was received from 7 AS.



Task Group on the Review of the System of Radiological Protection

Five key areas, emerge from a review of the feedback received from the AS.

- The process – general issues.
- The system – general issues.
- Optimization/reasonableness.
- Individual risk assessment.
- Exposure situations.

There are several other issues raised as well !



The Process/The System – general issues.

- IRPA welcomes open and transparent stakeholder engagement in the revision process.
- Stability in recommendations is required.
- Any change in recommendations must be justified, have a net positive benefit and be implementable in the regulatory framework in a reasonable way.
- Impact assessment of proposed changes is needed.



The System – general issues.

- The main concerns of the professionals refer to the conservatism and complexity of the RP system and applications in the regulatory framework.
- There is a major concern that the RP system has become overly conservative and that applications in the regulatory framework are even more conservative.
- The increasing complexity of the RP system and the resulting challenge to its communication, both with professionals and public, is a major concern.



The System – general issues.

- The importance of communicating with the public on radiation and risk is stressed
 - the use of the context of natural background and its variability may improve the communication of radiation risk and is encouraged.
- There is a need for more practical guidance due to the complexity of the RP System.
- Proposed changes may not increase the complexity of the system



The System – general issues.

- There is strong support for ethics basis for the RP System .
- ICRP should consider how the WHO definition of health can be incorporated into the RP System.
- There is a need for further clarification of ICRP intentions regarding the protection of the environment.



Optimization - reasonableness

- There is very strong support for a holistic approach to optimization, and for recommendations to
 - stress that optimisation is not minimisation
 - promote use of reasonable caution avoiding undue conservatism
 - include non-radiation effects in risk/benefit consideration
- Practical recommendations for holistic approach to optimisation are needed.

And

- Then there is the LNT



And on the LNT.....

- There needs to be a balance in managing risks at low doses so that the regulatory efforts and financial burden is commensurate with comparable risks in other industries.
- There is a concern that the LNT approach leads to unreasonable efforts at low doses.
- Can LNT be improved in the light of new research results? Are there alternative models that are tested and can be used?



And more on the LNT

- Almost all AS support continued use of LNT as pragmatic/conservative approach while recognizing uncertainties and challenge at low doses.
- One AS proposes that the introduction of a low dose threshold be investigated, e.g., between 1 and 5 mSv, with planned exposures below this threshold subject to no regulatory governance.
- One AS strongly disputes statements made regarding evidence for and use of LNT in radiation protection.



Effective dose/Risk estimation

- There is support for introducing age and gender specific weighting factors in effective dose calculation.
- There is a need to address ethical and practical difficulties in implementation of individual risk estimates in the regulatory framework.
- There is a need to review how risk is defined, due to multiple considerations in definition of detriment.
- More elaboration on uncertainties involved in estimating radiation dose and the total detriment is needed.



Exposure situations

There is a need for further guidance and clarification:

- of the three types of exposure situations and their application since many exposure scenarios do not fit neatly into one of these.
- on the transition between exposure situations, in particular the transition from an emergency exposure situation to an existing exposure situation, following a nuclear accident
- the application of the concepts of limits, reference levels and constraints in different exposure situations.



Examples of challenges encountered in practical applications of the RP System.

- An initial review of specific challenges confirms that the RP system and its application in the regulatory framework is robust and fit for purpose but has become overly complex and conservative.
- Some specific challenges reported are due to the System but others are due to application in the regulatory framework.



Examples of challenges encountered in practical applications of the RP System.

- Challenges due to conservatism of the System include decrease in dose limits for the lens of the eye and use of LNT in the region of a few mSv pr year or lower
 - The overriding issue with the current RP system is its complexity and because of this, there is a need for more practical guidance
 - The basic need for the revised recommendation is to give guidance on if or when the LNT approach stops to be adequate as basis for protection measures.



Examples of challenges encountered in practical applications of the RP System.

- Challenges due to conservative application of the RP System include practical applications of ALARA, clearance, legacy sites, use of lead aprons and shielding assessments.
 - There is a need for proper regulatory mechanisms through which the case for reasonableness can push back against over conservatism and properly hold it to account for the decisions it can drive.



Examples of challenges encountered in practical applications of the RP System.

- **Exposure situations:**
 - The Japan Health Physics Society will establish a TG on exposure situations and categories. This TG will discuss proposals for improvement measures based on the difficulties and challenges encountered during the response to the Fukushima Daiichi Nuclear Power Plant accident.
 - Many exposure scenarios do not fit well into one of the three categories.
 - Radiological situation during and after a distant nuclear accident.
 - Norm industries
 - Unforeseen presence of radioactive material in the environment in small but non-exempted quantities.



Some additional issues.

- Comparison of chemical and radiation exposures should be provided.
- Consideration of the combined effects of radiation and chemical exposure should be provided, especially at low doses.



In conclusion

- IRPA welcomes the inclusive approach taken by ICRP in revising the general recommendations.
- The RP System is fit for purpose but has become overly complex and conservative.
- IRPA will participate actively in the revision process as the international voice of the RP profession providing the perspective of RP professionals.



Opportunities to discuss the future ICRP recommendation

The screenshot shows the website for the 6th African IRPA Congress. At the top left is the IRPA logo and the text "6th African IRPA Congress 10-13 October, 2022 Accra - Ghana". Navigation links include Home, Program, Call For Papers, Registration, Local Info, and Sponsors. The main banner features the text "Welcome to AFRIRPA06 6th African IRPA Congress" and the theme "Embracing Radiation Protection Education and Safety Culture Accra - Ghana". A "Read more" button is present. To the right is a graphic of the African continent with a stylized IRPA logo and the text "AFRIRPA 06 10 - 13 October, 2022 Accra - Ghana". Below this are five small thumbnail images.

The banner for the XII Congreso Regional IRPA de Protección Radiológica y Seguridad Nuclear features a row of five landscape images: a desert canyon, a field of purple flowers, a road through a valley, an ice cave, and a glacier. Below the images is the text "XII Congreso Regional IRPA de Protección Radiológica y Seguridad Nuclear" and "Protección Radiológica: adaptándonos a nuevos escenarios 23 al 27 de Octubre 2022 Santiago, Chile." The IRPA logo is in the bottom right corner.

- There will also be an Asia/Oceania IRPA Regional Congress in India, February 2023.



Opportunities to discuss the future ICRP recommendation

**The IRPA16 International Congress hosted
by the US HPS in Orlando, Florida.**



- **For information see: www.irpa.net**

Thank you very much !