Overview of Publication 159

Radiological Protection in Surface and Near Surface Disposal of Solid Radioactive Waste

March 19, 2026
ICRP Webinar

John Takala
ICRP TG 97 Chair

ICRP

Background

- **To prepare a publication that describes and clarifies the application of the Commission's recommendations relevant to surface and near surface disposal of radioactive waste**
  - **Protection of the public and workers (Publications 101 & 103)**
  - **Protection of the environment (Publication 124)**
- **The report will be a companion to ICRP Publication 122 - *Radiological Protection in Geological Disposal of Long-lived Solid Radioactive Waste***

Background

- ICRP Publication 122 was published in 2013
- The editorial noted it is part of ongoing engagement with the waste management community and there will be future work on this broad topic
- TG 97 (Radiological Protection in Surface and Near-Surface Disposal of Solid Radioactive Waste) was the next obvious work
- Other relevant ICRP work with implications to waste disposal include Publication 138 *Ethical Foundations of the System of Radiological Protection* and ongoing work on environmental protection

TG 97 Goals and Objectives

- Provide recommendations for how the fundamental radiation protection principles are to be applied over the life cycle of surface and near surface disposal including transition from planned exposure to existing exposure situation in the case of a loss of institutional control
- Explore the application of the graded approach in implementing protection principles and advice in all facets of a facility's life cycle, based on hazard posed and degree of waste isolation
- Consult with regulators, implementers and relevant stakeholder's concerning the practical implementation of the Commission's recommendations
- Creation of a new standalone ICRP Publication that complements Publication 122 without unnecessary duplication
- Consideration of Publications 46, 77, and 81 and recent international experience

Publication 159 Introduction

- **All exposure situations offer the prospect of generating waste**
- **The management of a (near)surface facility largely follows the principles and practices applicable for a planned exposure situation**
  - Note after a disruptive event an existing exposure situation may be considered
- **Appropriate consideration for timeframes and uncertainties**
- **The recommendation applies to the design, construction, operational, closure and post-closure phases of disposal**
- **Does not explicitly consider predisposal management and no specific guidance on siting is provided**

Overview of Radioactive Waste and (Near)Surface Disposal

- Waste types
- Management Options for (Near)Surface Disposal
- Phases of a (Near)Surface Disposal Facility

The application of the System of Radiological Protection to (Near)Surface Disposal of Radioactive Waste

- Principles of RP System and ethical considerations
- Exposure situations
- Dose and risk concepts
- Representative person
- Optimization of protection
- Protection of the environment

Principles of the radiological protection system and ethical considerations

- The core ethical values (beneficence/non-maleficence, prudence, justice, dignity) and the procedural values (accountability, transparency, inclusiveness) are important in near-surface radioactive waste management

- They highlight the radiological protection and societal-economic issues associated with the longer-term dimensions of the hazard from radioactive waste

- This ethical framework offers another lens to assess a situation beyond the technical options and in some instances could be the discriminating factor in choosing a course of action

Principles of the radiological protection system and ethical considerations

- **Strong links between ICRP principles and ethics**
  - Optimisation – prudence, justice
  - Dose limitation – dignity
- **Not only outcomes important, but how the processes are conducted**
  - The three procedural values mutually reinforcing
- **Accountability – for those in charge to those impacted and for the present generation to future ones**
- **Transparency – accessibility of information and decision making**
- **Inclusiveness – stakeholder involvement**

Implementation of the System of Radioprotection to the phases of a (Near)Surface Disposal Facility

- Pre-operational phase
- Operational phase
- Post-closure phase
- Protection in particular circumstances

Main Points

- **The ICRP System of Radiological Protection is applied to the surface and near-surface disposal of solid radioactive waste in the context of a planned exposure situation with appropriate considerations of the time frames and related uncertainties. Possible exposures to humans and the environment associated with the expected evolution of the near-surface disposal facility included in the design basis are considered as planned exposure situations.**
- **Optimisation of protection is essential throughout all life phases of a surface and near-surface disposal facility, and is of particular importance in the design phase as this will determine the performance of the facility in the operational and post-closure phases.**

Main Points

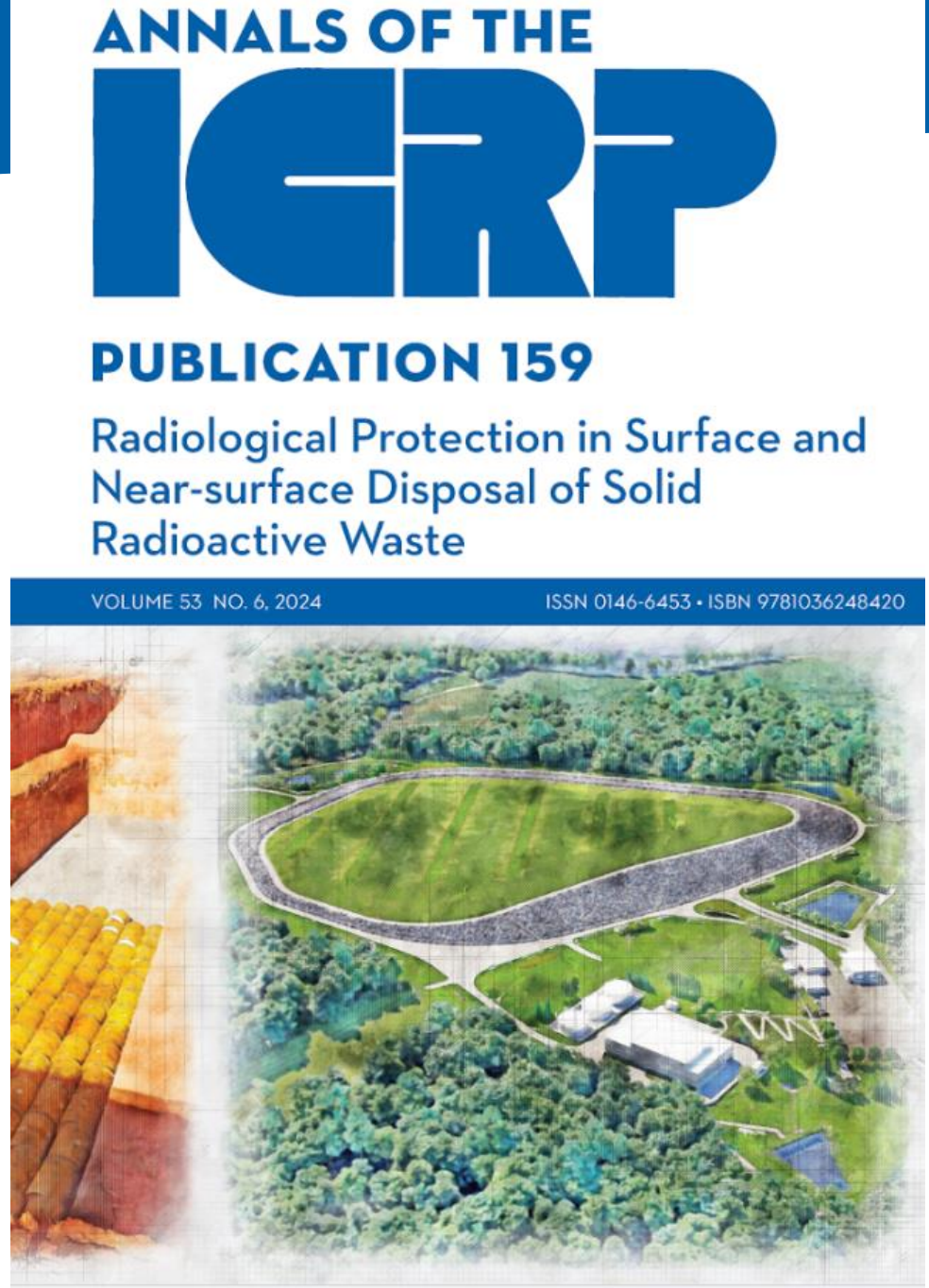
- **Optimisation of protection when applied to the development and implementation of a surface and near-surface disposal system has to be understood in the broadest sense as an iterative, systematic, and transparent evaluation of protective options for keeping impacts to humans and the environment as low as reasonably achievable.**
- **Appropriate mechanisms for formal and structured dialogue between the regulator and operator and with stakeholders should be established as early as possible in the process. The inclusion of ethical values in the dialogue is important, and can be useful at promoting a shared understanding.**

Main Points

- **The uncertainties associated with future exposures must consider both the magnitude and the likelihood of occurrence. Scenarios involving human intrusion require special consideration.**

Conclusion

- **Thanks to my fellow TG members, ICRP reviewers and those who commented on the document during the public consultation process**



TG 97 Visit to Fukushima Area

Members

- John Takala, Canada (Chair)
- Thiagan Pather, South Africa
- Christepher McKenney, USA
- Jean-Paul Minon, Belgium
- Francois Besnus, France
- Behnam Taebi, Netherlands
- Philip Metcalf, South Africa
- Carl-Magnus Larsson, MC
- Takeshi Limbo, Japan
- Gloria Kwong, OECD
- Andrew Orrell, USA

C4 Critical Reviewers

- Eduardo Gallego
- Analia Canoba

MC Critical Reviewers

- Kunwoo Cho
- Jacques Lochard

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