

# ICRP

国際放射線防護委員会

## ICRP and Recommendations on Post-Accident Protection

Presentation to the Japanese Cabinet Office

Tokyo – 2011 November 28

Christopher Clement CHP  
ICRP Scientific Secretary

ICRP

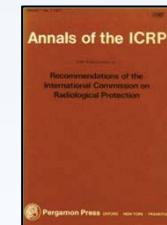
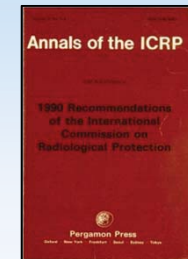
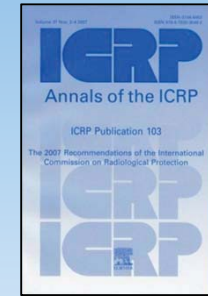
INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

# Overview

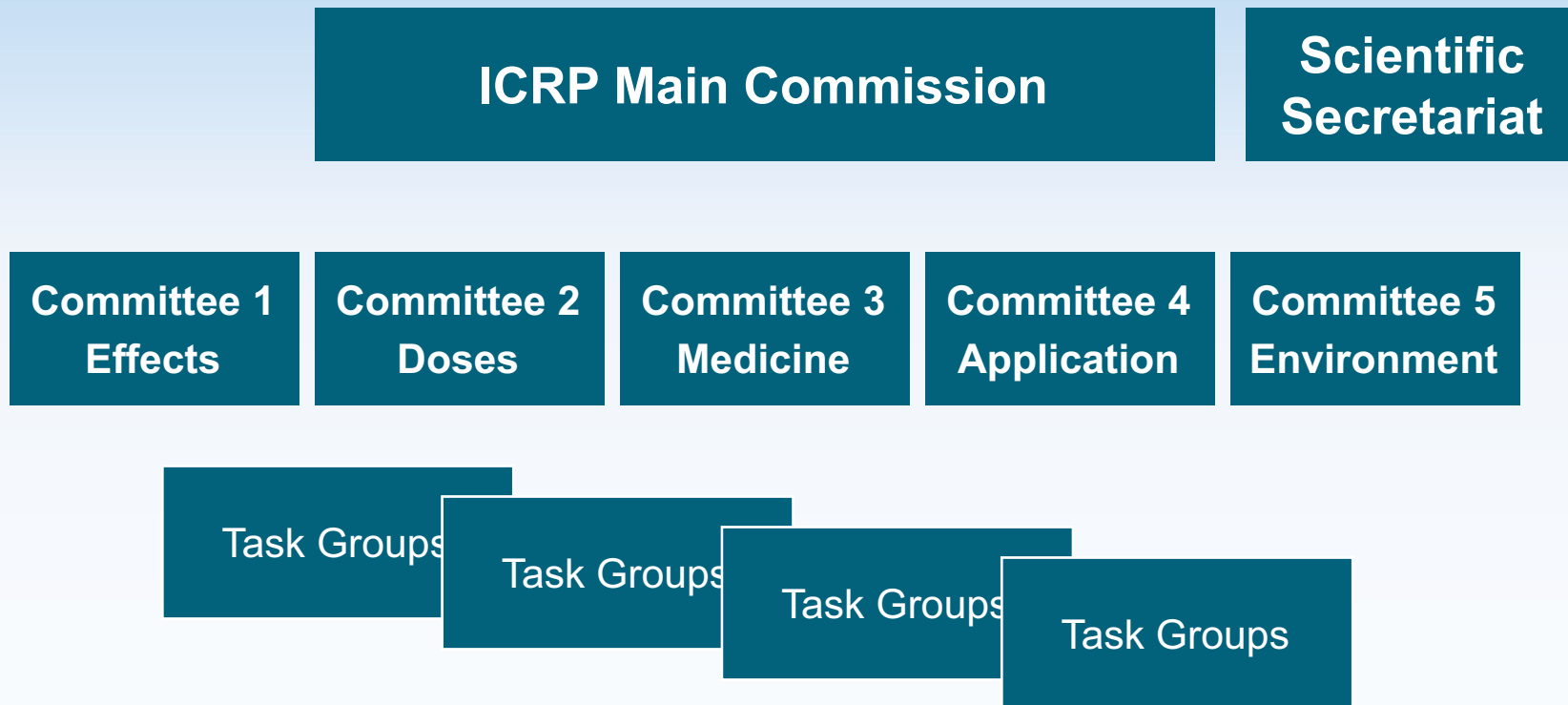
- International Commission on Radiological Protection
- ICRP recommendations on post-accident radiological protection
- ICRP and actions taken in Japan

# International Commission on Radiological Protection

- Established in 1928
- Independent recommendations on radiological protection for the public benefit
- System of radiological protection: basis for standards, legislation, guidance, programmes and practice worldwide
- Science, values, and experience



# ICRP Structure



**An independent, international community of experts in radiological protection**

More than 240 experts in radiological protection science and policy

from 33 countries and six continents

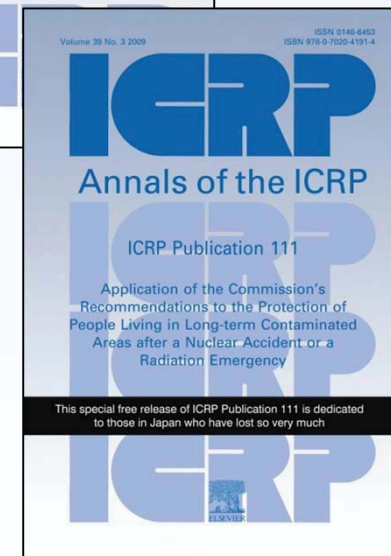
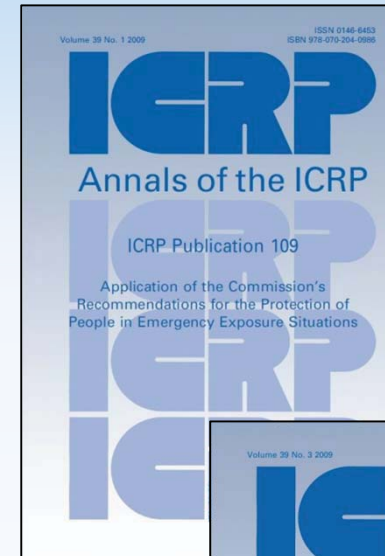
# ICRP Recommendations on Post-accident Radiological Protection

(ICRP Publications 109 and 111)

# ICRP Publications 109 & 111

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

Publication 111: Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas after a Nuclear Accident or a Radiation Emergency  
Free release: April 4, 2011



# Complex Problem

- Many factors: health, environmental, economic, social, psychological, cultural, ethical, political, etc.
- One key is effectively involving the local population and professionals in management of the situation
- Authorities at national and local levels create conditions and provide means to involve and empower the population

# Protection Strategy

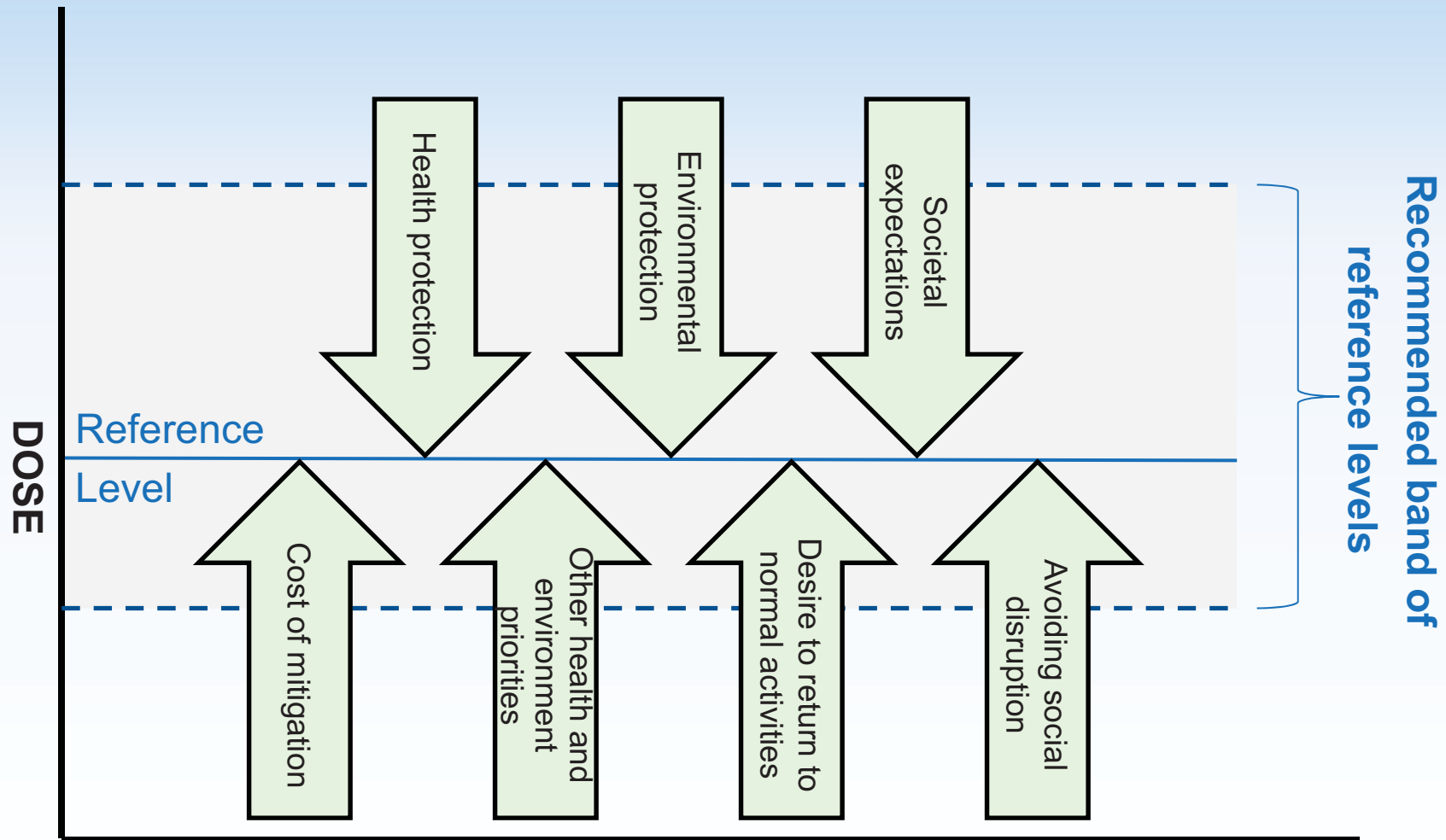
- Protection strategy = many protective actions
- Optimise the entire protection strategy, not only individual protective actions
- Protective actions are implemented:
  - centrally
  - locally by authorities, experts, and professionals
  - as self-help actions with the support of authorities



# Reference Levels

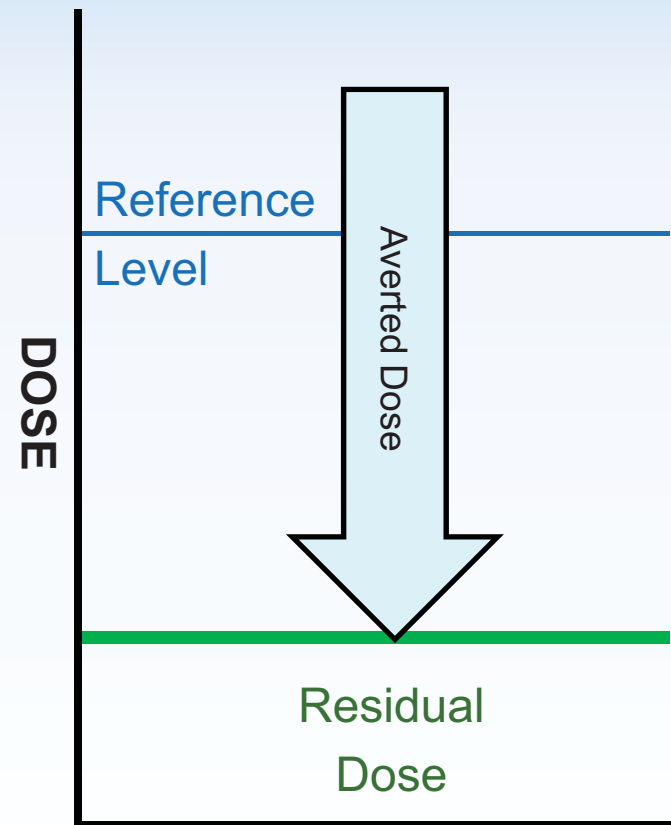
- Optimisation is guided by reference levels (timeframes shown are relevant to Fukushima)
- Protection of public:
  - emergency exposure situation (months): 20–100 mSv
  - existing exposure situation (few years): lower end of 1–20 mSv per year
  - long-term (decade or more): 1 mSv per year
- Values of reference levels and timeframe will vary from place to place depending on local conditions

# Selection of Reference Levels

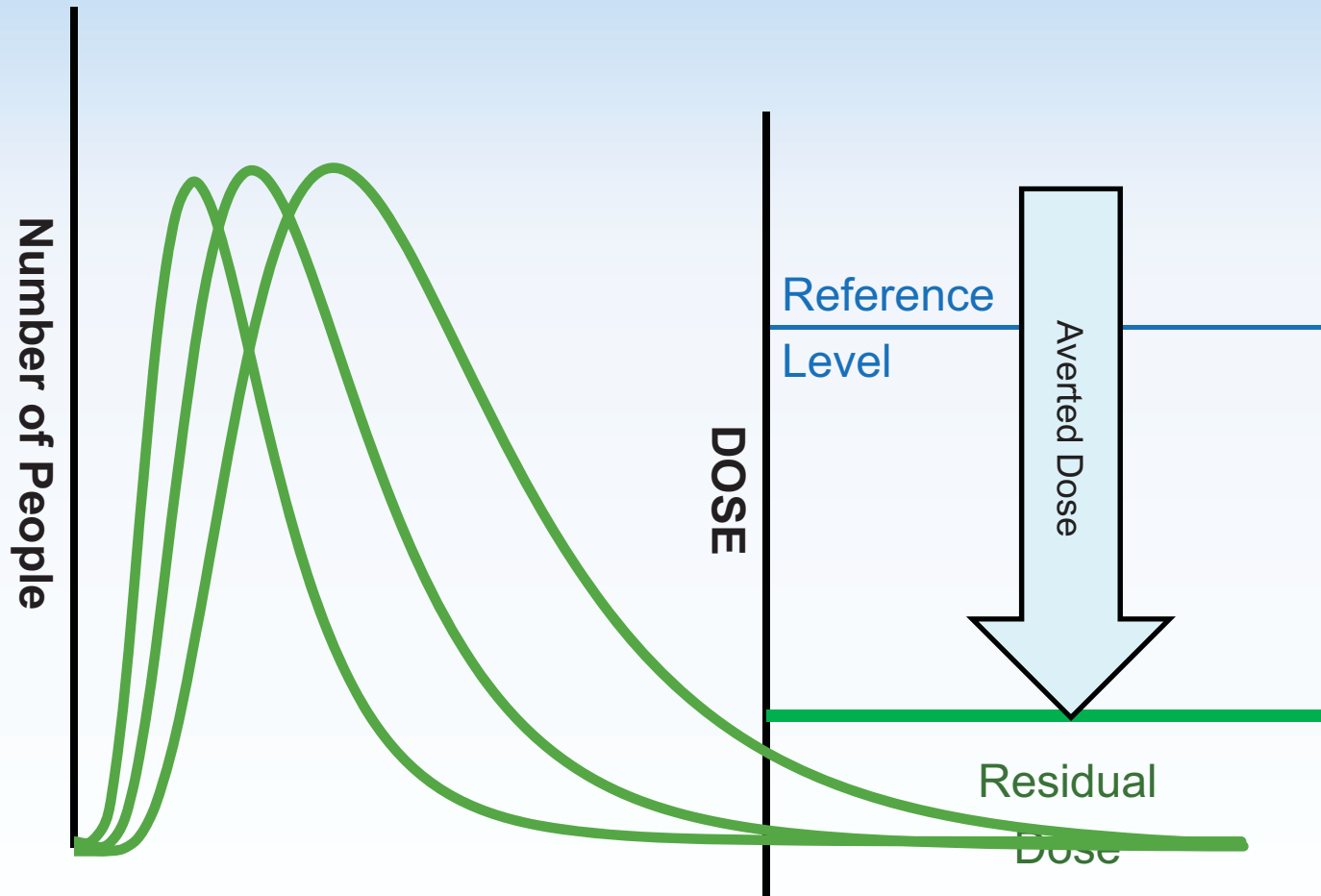


# Optimisation of Protection

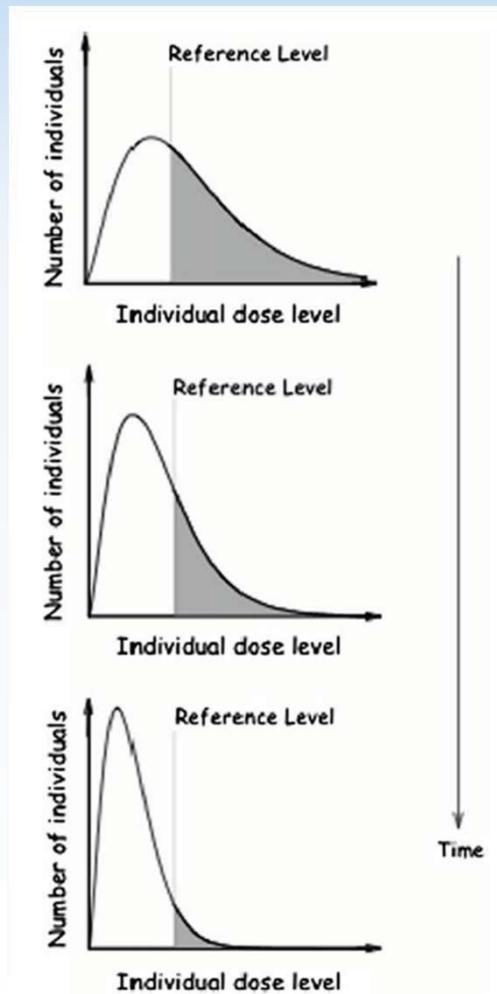
- **Balance** radiation and other **risks** with **benefits**
- Take actions to reduce doses below reference levels



# Residual Dose over Time



# Residual Dose over Time



- Focus on the most exposed people
- Actions taken will decrease doses

# Exposure Situations

## Planned Exposure Situation

involves the planned operation of sources

## Emergency Exposure Situation

unexpected and requires urgent action

## Existing Exposure Situation

exists when a decision on control has to be taken

# Transition

## Emergency Exposure Situation

- Actions driven by urgency
- Potentially high levels of exposure
- Centralized decision making
- Reference levels in the range of 20-100 mSv

Management  
Decision

## Existing Exposure Situation

- Actions for longer-term management
- Optimisation to improve living conditions
- More decentralized strategies
- Reference levels in lower part of 1-20 mSv/year

# Deciding on Transition

- Good knowledge of the radiological situation: environment, foodstuff, goods and people
- Organised national and local authorities adapted to the situation
- Means to involve local authorities, professionals and population in decisions and actions for rehabilitation
- Different areas may transition at different times



# Return from Evacuation

- Decision to allow return rests with authorities
- Consistent with reference levels for existing exposure situations
- Ability to provide:
  - protection against potential health consequences
  - sustainable living conditions including respectable lifestyles and livelihoods
- Individual choice

# Actions by Authorities

- Cleaning buildings, soils and vegetation
- Monitoring environment and produce
- Waste management
- Surveillance
- Information, guidance, instruction and equipment (e.g. for measurements)
- Specific information for specialised groups

# Self-Help Actions

## **Local professionals and population monitoring:**

- Dose rates in living areas
- Local foodstuff
- Internal exposure of themselves and people for whom they have responsibility (children, elderly)

***To help adapt habits to maintain exposure as low as reasonably achievable***

## **Facilitated by authorities providing:**

- Conditions and means for monitoring
- General information on the exposure situation
- Information on ways to reduce doses
- Local forums involving the population and experts

# Monitoring Effectiveness

- Establish a monitoring record keeping system
  - Particularly important to identify groups at risk
- Provide health surveillance
- Establish health registries
- Be prepared to modify protection strategy

# Commodities

- Interests of local producers, local consumers, and other consumers
- Long-term restrictions affect sustainable development: objective is to improve radiological quality
- Optimise in production, processing, and distribution
- Help consumers make appropriate choices
- Derived reference levels in Bq/kg or Bq/L important, particularly for foodstuffs

# ICRP and Actions Taken in Japan

# ICRP and Actions Taken in Japan

- ICRP does not comment on the actions taken by governments or others except whether ICRP recommendations are followed in general
- ICRP actions
  - To help the Japanese government and people
  - To learn lessons to improve the system of protection

March 21, 2011

### **Fukushima Nuclear Power Plant Accident**

The International Commission on Radiological Protection (ICRP) does not normally comment on events in individual countries. However, we wish to express our deepest sympathy to those in Japan affected by the recent tragic events there. Our thoughts are with them.

Throughout we have kept and continue to keep abreast of events as they unfold, particularly those at the Fukushima Nuclear Power plant, through some of our Japanese colleagues and information being provided by national and international organisations and professional societies.

We hope that the current effort to regain control of the situation will soon be successful and that our recent recommendations on radiological protection in emergency situations and for contaminated territories have and will prove helpful in dealing with the present and future circumstances.

The Commission continues to recommend optimisation and the use of reference levels to ensure an adequate degree of protection with respect to exposure to ionising radiation in emergency and existing exposure situations.

For the protection of the public during emergencies the Commission continues to recommend that national authorities set reference levels for the highest planned residual dose in the band of 20 to 100 millisieverts (mSv) (ICRP 2007, Table 8).

When the radiation source is under control contaminated areas may remain. Authorities will often implement all necessary protective measures to allow people to continue to live there rather than abandoning these areas. In this case the Commission continues to recommend choosing reference levels in the band of 1 to 20 mSv per year, with the long-term goal of reducing reference levels to 1 mSv per year (ICRP 2009b, paragraphs 48-50).

The Commission continues to recommend reference levels of 500 to 1000 mSv to avoid the occurrence of severe deterministic injuries for rescue workers involved in an emergency exposure situation. This means that it will be justified to expend

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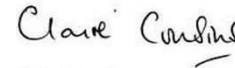
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significant resources, both at the planning stage and during the response, if required, in order to reduce expected exposures to below these levels (ICRP 2007, Table 8 and ICRP 2009a, paragraph e).

Furthermore, the Commission continues to recommend no dose restrictions for life-saving efforts by informed volunteers if the benefit to others outweighs rescuer's risk (ICRP 2007, Table 8).

We are closely following the tremendous efforts of the professionals in Japan dealing with this difficult situation and, during our upcoming meeting in Seoul, are planning to review lessons learned in relation to our recommendations on emergency exposure situations.

On behalf of the International Commission on Radiological Protection,



Claire Cousins  
ICRP Chair



Christopher Clement  
ICRP Scientific Secretary

### **References**

- ICRP, 2007. The 2007 Recommendations of the International Commission on Radiological Protection. ICRP Publication 103, Ann ICRP 37 (2-4).
- ICRP, 2009a. Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations. ICRP Publication 109, Ann ICRP 39 (1).
- ICRP, 2009b. Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas after a Nuclear Accident or a Radiation Emergency. ICRP Publication 111, Ann ICRP 39 (3).

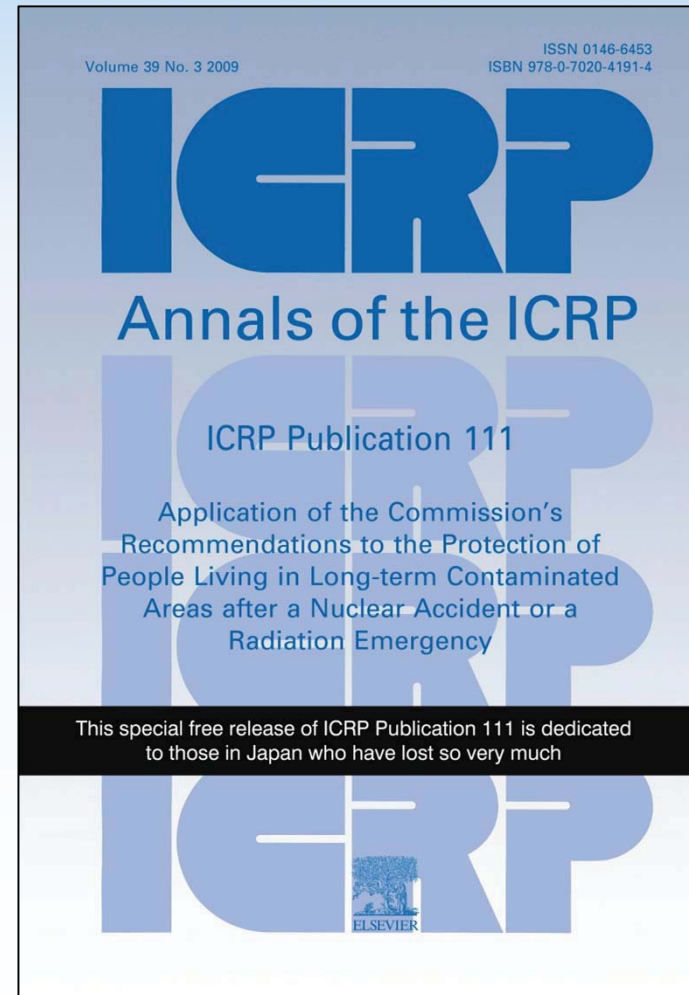
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# ICRP Publication 111

Application of the  
Commission's  
Recommendations to the  
Protection of People  
Living in Long-term  
Contaminated Areas after  
a Nuclear Accident or a  
Radiation Emergency

**Free release: April 4, 2011**



# ICRP Task Group 84

- ICRP Main Commission Task Group established on initial lessons from the NPP accident in Japan, chaired by ICRP Vice-chair Abel González
- Initial lessons learned:
  - Relevant to the System of Radiological Protection
  - Related to efforts carried out to protect people against exposure during and after the Fukushima Daiichi accident
- Report due to be finalised late 2012
  - Recommendations to MC for follow up, including potential improvements to the system of radiological protection

# TG 84 Lessons Learned

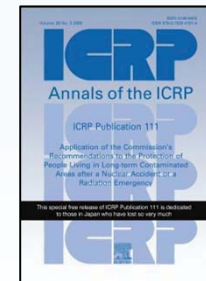
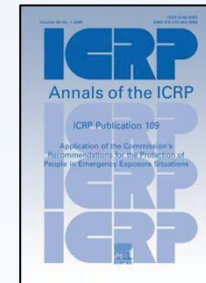
- For ICRP, to improve our system of protection
- Not directed at Japanese Government or TEPCO
- Eleven issues have been identified, work is ongoing
- Final report within one year

# TG 84 Identified Issues

- Inconsistent agreements on radioactivity in consumer products
- Lack of guidance for remediation of 'contaminated' territories and the disposal of 'contaminated' rubble
- Lack of recommendations on environmental monitoring following a large accidental release of radioactive materials
- Confusion on radiation protection quantities and units
- System for restricting internal exposure misunderstood
- Detriment-adjusted nominal risk coefficients are misinterpreted
- Dose limits, constraints and reference levels are misunderstood
- Lack of radiation protection recommendations for rescuers
- Communicating radiation protection approaches is a challenge
- Parents feel that the children are not properly protected
- Stigma of those affected by the accident

# Additional Actions

- Longer-term effort to reflect on lessons learned related to the Fukushima Daiichi accident by reviewing:
  - ICRP *Publication 109*, Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations
  - ICRP *Publication 111*, Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas after a Nuclear Accident or a Radiation Emergency



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