

Management of Waste in a Nuclear or Radiological Emergency

Chris Mogg

Radioactive Substances Regulation Advisor, Environment Agency

Adam Lang

Radiological and Nuclear Hazards Scientific Officer, Defra

18th February 2020



Department
for Environment
Food & Rural Affairs



Environment
Agency

What we will cover...

The key international safety standards relating to waste management in emergencies

Progress made by the EGRM – how we are working together to enhance our preparedness

The UK approach...

- Where are we now
- Where do we want to be in the future


Concluding remarks

Introduction – international context


IAEA Safety Standards
for protecting people and the environment

Prepared by the IAEA
for a Nuclear Radiological Arrangement

Jointly sponsored by the
FAO, IAEA, ICAO, ILO, OECD/NEA, PAHO, CERN




General Safety Requirements
No. GSR P-1




IAEA Safety Standards
for protecting people and the environment

Arrangement for a Nuclear Radiological Termination

Jointly sponsored by the
FAO, IAEA, ICAO, ILO, INFCIRC/225




General Safety Requirements
No. GSG-1



IAEA TECDOC

Management of Waste or Radiological



17.1.2014 EN Official Journal of the European Union L 13/1

II
(Non-legislative acts)

DIRECTIVES

COUNCIL DIRECTIVE 2013/59/EURATOM
of 5 December 2013
laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Articles 31 and 32 thereof,

Having regard to the proposal from the European Commission, drawn up after having obtained the opinion of a group of persons appointed by the Scientific and Technical Committee from among scientific experts in the Member States, and after having consulted the European Economic and Social Committee,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the European Economic and Social Committee,

Whereas:

- (1) Point (b) of Article 2 of the Euratom Treaty provides for the establishment of uniform safety standards to protect the health of workers and of the general public. Article 30 of the Euratom Treaty defines "basic standards" for the protection of the health of workers and the general public against the dangers arising from ionising radiations.
- (2) In order to perform its task, the Community laid down basic standards for the first time in 1959 by means of Directives of 2 February 1959 laying down the basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation⁽¹⁾. The Directives have been revised
- (3) Directive 96/29/Euratom establishes the basic safety standards. The provisions of that Directive apply to normal and emergency situations and have been supplemented by more specific legislation.
- (4) Council Directive 97/43/Euratom⁽²⁾, Council Directive 89/618/Euratom⁽³⁾, Council Directive 90/641/Euratom⁽⁴⁾ and Council Directive 2003/122/Euratom⁽⁵⁾ cover different specific aspects complementary to Directive 96/29/Euratom.
- (5) As recognised by the Court of Justice of the European Union in its case-law, the tasks imposed on the Community by point (b) of Article 2 of the Euratom Treaty to lay down uniform safety standards to protect the health of workers and the general public does not preclude, unless explicitly stated in the standards, a Member State from providing for more stringent measures of protection. As this Directive provides for minimum rules, Member States should be free to adopt or maintain more stringent measures in the subject-matter covered by this Directive, without prejudice to the free movement of goods and services in the internal market as defined by the case-law of the Court of Justice.
- (6) The Group of Experts appointed by the Scientific and Technical Committee has advised that the basic safety

⁽¹⁾ Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionising radiation in relation to medical exposure, and repealing Directive 84/466/Euratom [OJ L 180, 9.7.1997, p. 22].

⁽²⁾ Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to

IAEA GSR Part 7 – Requirement 15

“The Government shall ensure that radioactive waste is managed safely and effectively in a nuclear or radiological emergency”

5.84. The national policy and strategy for radioactive waste management shall apply for radioactive waste generated in a nuclear or radiological emergency, with account taken of paras 5.85 to 5.88.

5.85: Protection Strategy must take account of managing wastes in emergencies

5.86: Identification, Characterisation and Categorisation of wastes

5.87: Detailed arrangements for:
Characterisation
Categorisation
Avoid Mixing
Minimisation
Predisposal
Storage
Non-rad wastes

5.88: How to manage contaminated human and animal remains

NEA Expert Group for Recovery Management (EGRM) Feedback

- Second EGRM Meeting held in the UK in October 2019 – focussed on Waste Management in Emergencies
- Opportunity to share how members had addressed the IAEA GSR Part 7 Requirements
- Identified common areas for improvement – Policy, Planning (characterisation, temporary storage, transport etc), Legislation, Exercising
- How to manage wastes as part of the wider emergency response and recovery process

NEA EGRM forward look...

NEA Recovery Framework – Waste Management guidance

Developing a matrix of international and national best-practice, guidance, plans, policy, legislation and tools

Review of how to deliver recovery exercises, including how to test waste management plans

The screenshot displays the EPA website interface. At the top, there is a navigation bar with links for 'Deutsch', 'Sitemap', 'FAQ', 'Glossary', and 'Cc'. Below this, the EPA logo and the text 'United States Environmental Protection Agency' are visible. The main content area is divided into two columns. The left column features a section titled 'IONISING RADIATION' with a sub-header 'Environmental Radioactivity - Medicine - Occupational Radiation Protection - Nuclear Hazards Defence' and a red radiation symbol icon. The right column shows a section titled 'Waste Estimation Support Tool (WEST)' with a sub-header 'Management of waste from a radiological dispersal device (RDD) incident would likely constitute a large part of the remediation cost and effort. The U.S. EPA's RDD Waste'. A search bar is located in the top right corner, and a 'CONTACT US' link is visible in the bottom right corner.

Deutsch Sitemap FAQ Glossary Cc An official website of the United States government.

TOPICS NEWS MEDIA CENTRE THE BFS

IONISING RADIATION
Environmental Radioactivity - Medicine - Occupational Radiation Protection - Nuclear Hazards Defence

EPA United States Environmental Protection Agency

Environmental Topics Laws & Regulations About EPA Search EPA

Related Topics: [Homeland Security Research](#) CONTACT US

Waste Estimation Support Tool (WEST)
Management of waste from a radiological dispersal device (RDD) incident would likely constitute a large part of the remediation cost and effort. The U.S. EPA's RDD Waste

Decision support systems RODOS

page > Topics > Ionising radiation > Nuclear accident management > What does BFS do in an emergency? > Federal Radiological Situation Centre
on support systems RODOS

Conn



Department
for Environment
Food & Rural Affairs

OFFICIAL

UK Approach to Waste Management in Nuclear or Radiological Emergencies

Dr Adam Lang, Defra



Forestry Commission
England



Environment
Agency

Current UK Waste Management Arrangements

- Guidance:
 - Nuclear Emergency Planning & Response Guidance (NEP&R) – Part 3 Recovery
 - Defra CBRN waste guidance
 - Strategic National Guidance (SNG):
Decontamination of buildings, infrastructure & open environments
- Potentially significant variation in the nature / scale of an incident so a flexible approach to guidance is taken

Current UK Waste Management Arrangements



Public Health
England

Protecting and improving the nation's health

**UK Recovery Handbooks for
Radiation Incidents 2015**

Drinking Water Supplies Handbook

Version 4.2



Public Health
England

Protecting and improving the nation's health

**UK Recovery Handbooks for
Radiation Incidents 2015**

Food Production Systems Handbook

Version 4.1



Public Health
England

Protecting and improving the nation's health

**UK Recovery Handbooks for
Radiation Incidents 2015**

Inhabited Areas Handbook

Version 4.1



Current UK Waste Management Arrangements

- UK Recovery Handbooks for Radiation Incidents v4:
 - An analysis of the factors influencing recovery (including waste management)
 - Compendia of comprehensive state-of-the-art datasheets for 78 management options
 - Decision-aiding frameworks for each environment
 - Worked examples and look up-tables
 - Supporting scientific / technical information

Current UK Waste Management Arrangements

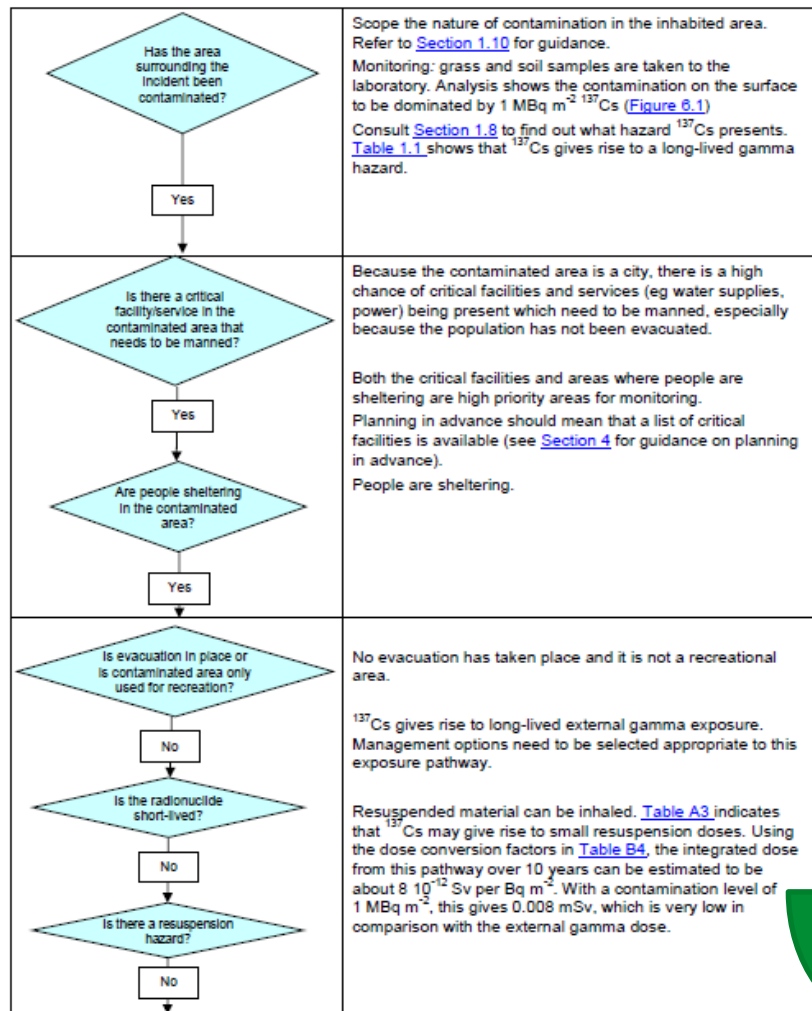


Table 5.13 Quantities and types of waste produced by the management options

Management option	Waste arising kg m ⁻² unless otherwise stated	Type of waste material produced
Restrict access		
Control workforce access (1)	None	
Impose restrictions on transport (2)	None	
Permanent relocation from residential areas (3)	None	
Restrict public access (4)	None	
Temporary relocation from residential areas (5)	None	
Remediation		
Collection of leaves (6)	5 10 ⁻¹	Leaves, pine needles and pinecones
Cover grass/soil with clean soil/asphalt (7)	None	
Demolish/dismantle and dispose of contaminated material (8)	7 10 ¹	Rubble
	2 10 ¹ - 5 10 ¹	Roofing material
	2 10 ¹ - 3 10 ¹	Flooring
	5 10 ¹	Fixtures
Fix and strip coatings (9)	1	Rubber-like material
Grass cutting and removal (10)	< 1 10 ⁻³ amount depends on height and density of grass	Grass
Manual and mechanical digging (11)	None	
Modify operation/cleaning of ventilation systems (12)	5 10 ⁻² - 1 10 ⁻¹	Solid waste (dry from filters, wet sludge from pressure washing)
Natural attenuation (with monitoring) (13)	None	
Ploughing methods (14)	None	



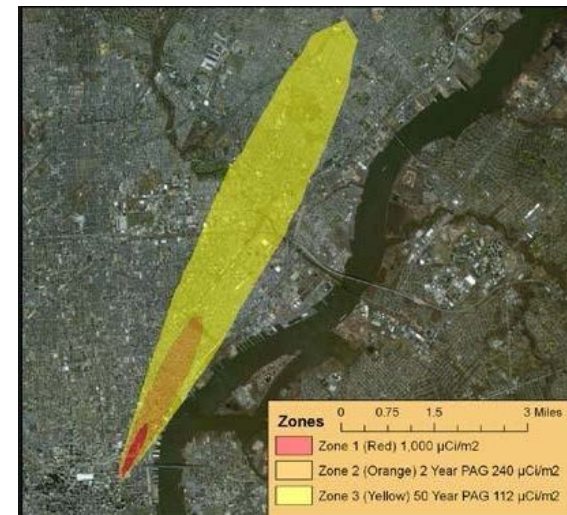
Current UK Waste Management Arrangements

Table 6.2 Selection table of management options for soils and vegetation (all options)

When to apply	Early (E) days-weeks	Medium-Long (M/L) (months - years)
Restrict access		
Control workforce access (1)		
Permanent relocation from residential areas (3)		
Restrict public access (4)		
Temporary relocation from residential areas (5)		
Remediation		
Collection of leaves (6)		
Cover grass/soil with clean soil/asphalt (7)		
Grass cutting and removal (10)		
Manual and mechanical digging (11)		
Natural attenuation (with monitoring) (13)		
Ploughing methods (14)		
Snow/ice removal (18)		
Tie-down (23)		
Topsoil and turf removal (24)		
Tree and shrub pruning and removal (27)		
Key:		
	Recommended with few constraints	
	Recommended but requires further evaluation to overcome some constraints	
	Economic or social constraints exist, requiring full analysis and consultation period.	
	Technical or logistical constraints may exist, or the option may only be appropriate on a site specific basis	

Current UK Waste Management Arrangements

- Software Tools:
 - Consequences of Decontamination Options (CONDO)
 - Real-time On-line Decision Support System (RODOS)
 - **Waste Estimation Support Tool (WEST)**
- Defra CBRN Framework (contracts):
 - Currently under review to ensure it is flexible enough to cope with a range of potential scenarios



Review of current arrangements

- Undertaken a comprehensive review of UK waste management arrangements:
 - IAEA IRRS Mission (2019)
 - EGRM Preparation (2019)
 - Chemical Incident Lessons Learned Report (2018)
 - National Nuclear Recovery Capabilities Report (2016)
- Areas for improvement:
 - Modelling waste volumes, storage and transport
 - Policy for waste management in emergencies
 - Updated recovery handbooks



Waste Management Project UK

- Project split into 2 parts:

Review and develop policy, strategy and legislation for the management of wastes in emergencies

Produce a UK radioactive waste management in emergencies plan

Concluding Remarks

- Preparing radioactive waste management plans is inherently complex and challenging
- Exercising recovery plans is a key part of preparedness to better understand these challenges
- Need more practical guidance – focus on the “**how**” rather than the “why”
- Share UK experience, learning and outputs with the NEA EGRM to inform the Recovery Framework

