



Disposal of Low-Activity Radioactive Waste Resulting from a Radiological Dispersal Device (RDD)

Planning, Preparedness and Considerations in Decision-Making

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Overview of Presentation

- RDD Waste Management Challenges
- U.S. Policy Framework for Incidents
- Planning
- Decision Support Tools
- Technical Documents
- Guidance



2

RDD Waste Management Challenges

Wide-scale radiological incidents present significant and unique circumstances for waste management

- Significant waste volumes
- Time and public pressures for action (days vs. years)
- Logistical and resource limitations (e.g., sampling)
- Coordination of multiple agencies/activities

Waste volumes likely to drive decision-making

- Could overwhelm existing capacity (see Japan)
- Need to be considered in early planning
 - Most waste likely to be relatively lightly contaminated
 - Be aware of all potential disposal options



3

U.S. Policy Framework for Incidents

The National Response Framework (NRF) describes the responsibilities for chemical, biological, radiological, and nuclear (CBRN) incidents

- Nuclear/Radiological Incident Annex assigns lead roles:
 - NRC for release from licensed materials or facilities
 - DOE/DOD for DOE/DOD facilities or nuclear weapons
 - DHS for deliberate attacks involving nuclear facilities/materials
 - EPA for incidents of foreign origin

EPA is the coordinating agency for oil and hazardous materials response (i.e., long-term cleanup) under NRF Emergency Support Function #10

- Events as disparate as 9/11, anthrax, Katrina, BP spill



4

Planning – Previous Experience

What can be learned from non-radiological events?

- World Trade Center (2001)
 - ~2.16 million cubic meters of debris in small urban footprint
 - Careful sorting for human remains, personal effects, evidence
 - Local disposal in re-opened landfill across river
- Anthrax (2001)
 - Postal facilities and office buildings
 - Small waste volume, problematic disposal
- Hurricane Katrina (2005)
 - ~88 million cubic meters of debris over ~230,000 square km
 - ~36 million pounds of rotten meat and other food
 - 350,000 automobiles and 60,000 vessels
 - Opposition to local disposal from overburdened communities



5

Decision Support Tools – WEST

EPA has developed a method to generate first-order estimates of potential waste volumes

- Waste Estimation Support Tool (WEST) can be used for planning and response to radiological incidents
- Use commercially available software/databases
 - Plume maps generated by DOE (IMAAC/NARAC)
 - Building information by census tract
 - Satellite imagery, GIS, LIDAR
- Adjust parameters based on decontamination strategy
- Conduct sensitivity analysis on results
- Applied in several exercises and paper scenarios



6

Decision Support Tools – I-WASTE

I-WASTE is an EPA tool to assist planners and responders in managing incident-related waste

- Multiple scenarios available, including RDD
- Calculators to estimate mass and volume of waste
 - Databases of standardized building contents
 - Office buildings, schools, theaters, shopping malls, residences, hotels, hospitals
- Database of disposal facility information
- Access to contaminant/decontaminant information
- Guidance for worker safety, packaging and storage, and transportation
- Applied for natural disasters (e.g., Hurricane Katrina)



7

Decision Support Tools - Planning

State and local officials will be primarily responsible for making decisions related to local disposal

- Some states will be more prepared than others
- Planning ahead will help frame decision needs

EPA has begun developing a support tool

- Intended to be web-based and interactive
- Seeking feedback from states on concept to address
 - Waste types and quantities
 - Sampling and analysis
 - Waste management strategies/options, facilities, tracking
 - Transportation
 - Community outreach



8

Technical Documents

CBR Disposal

- A significant incident is likely to result in waste volumes exceeding current disposal capacity
 - Can new CBR capacity be developed quickly?
- EPA workshop convened experts to consider CBR technical issues to support policy decisions (e.g., siting)
 - Report at <http://www.epa.gov/nhsrsrc/pubs.html> (2012)

Field Technologies

- EPA developed a standard operating guideline for application of decon/cleanup technologies in the field
 - Subject matter expert workshop to evaluate and assign qualitative rankings of selected attributes (e.g., throughput)
 - Report at <http://www.epa.gov/nhsrsrc/pubs.html> (2013)



9

Technical Documents – Low-Activity Waste

EPA has considered the potential use of hazardous waste landfills for disposal of “low-activity” waste

- Modeling effort over past several years
 - Scenarios include workers, intruders, long-term performance
- Technical reports undergoing peer review
- Provides a technical basis for determining protectiveness
 - Criteria for characterization and disposal over range of options
- Local disposal likely to be controversial
 - State and local officials must have confidence that the proposed action will protect public health
 - Likely to raise equity issues (undue burden)
 - Technical basis for decisions must be transparent and allow examination by stakeholders



10

Guidance – PAG Manual

EPA responsible for issuing Protective Action Guides (PAG) Manual (44 CFR 351.22)

- Guidance on protective actions in emergencies
- Current document issued 1992
 - Focused on nuclear plant emergencies as most important
 - Addresses only early and intermediate phases
- Efforts to update have been controversial
 - Addressing late phase/recovery (e.g., cleanup)
 - Drinking water
- Planning guidance for cleanup and waste disposal
 - Proposes overall framework for decision-making
 - <http://www.epa.gov/radiation/rert/pags.html> for more information on 2013 proposal



11
