



# Disposition of Low-Activity Waste within the Department of Energy

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**Christine Gelles**

Director, Office of Disposal Operations  
Office of Environmental Management  
US Department of Energy (DOE)

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**EM** Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

# Overview of DOE and related requirements

- o DOE self regulates most site cleanup and waste management activities under Atomic Energy Act authorities
  - DOE Orders and accompanying manuals and guides comprise the requirements for DOE activities
- o DOE Order 435.1, *Radioactive Waste Management*, guides DOE's management of radioactive wastes
  - Where wastes also contain hazardous constituents, RCRA regulations apply
- o DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, guides clearance of DOE real and personal property and ensures potential exposures to members of the public are as low as is reasonably achievable
  - This order is currently under revision and will be superseded by DOE Order 458.1
- o Draft DOE Guide 441.1-XX, *Implementation Guide for the Control and Release of Property with Residual Radioactive Material*
  - This guide will also be updated

DOE's Office of Environmental Management (EM) has undertaken an intensive effort to strengthen its implementation of the requirements related to use of "authorized limits" for real and personal property management

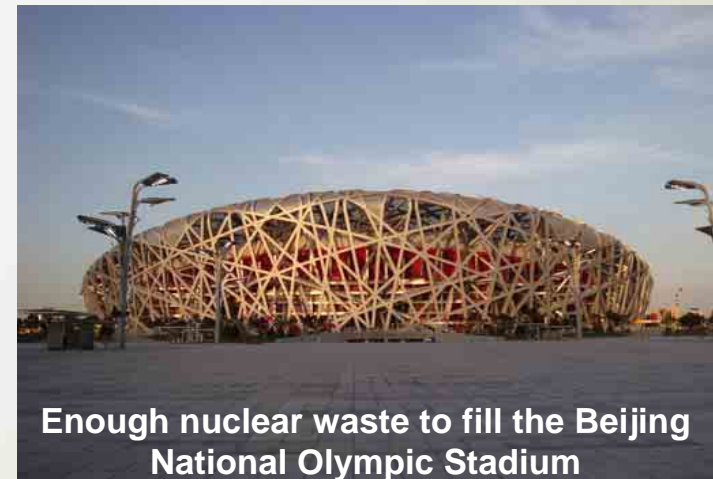


**EM** Environmental Management

safety ♦ performance ♦ cleanup ♦ closure

# ***EM's waste and materials disposition scope is significant***

- o Liquid tank waste (HLW and “low activity waste”) and other HLW streams
  - 88 million gallons of liquid waste, stored in over 200 tanks
  - Also, calcined HLW and cesium and strontium capsules
- o Transuranic (TRU) waste
  - Future TRU will be generated by DOE mission activities
  - ~157,000 m<sup>3</sup> legacy wastes managed as TRU waste
- o Low-Level Waste and Mixed Low-Level Waste (LLW/MLLW)
  - Majority of legacy wastes disposed – over 1 million m<sup>3</sup> disposed to date
  - DOE mission activities and EM cleanup generate LLW/MLLW wastes
- o DOE owned and managed spent nuclear fuel (SNF)
- o EM managed surplus nuclear materials



# *Waste disposal is a significant cost element*

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- o Much of the waste and material generated through site cleanup is high volume, with low (or no) radioactivity
  - Contaminated Soil
  - Demolition debris
  - Scrap metal and surplus equipment from radiological areas
- o Opportunities exist to minimize waste, streamline disposition plans and reduce cost... freeing up resources to address higher risk activities
- o EM endeavors to optimize project plans, including consideration of strategies to disposition low-activity materials and wastes
  - Authorized release and disposal (via DOE Order)
  - Transfer for future release and disposal (commercial service)



## *DOE Order 5400.5, Radiation Protection of the Public and the Environment...*

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- o Is the Department's primary radiation protection standard that establishes the regulatory framework used to protect the public and the environment from undue risk of radiation associated with DOE operations
- o Established standards and requirements consistent with other national standards, and national and international radiation protection recommendations
- o First issued in 1990 and last revised in 1993, DOE 5400.5 remains effective and continues to provide an ample degree of protection

This Order and DOE's oversight processes provide the same function for DOE's facility that NRC's regulations and licensing processes provide for commercial facilities/civilian facilities.

# Key Requirements of DOE Order 5400.5

- o DOE and Contractors:
  - Maintain radiation exposures to members of the public within established limits
  - Maintain potential exposures to members of the public as low as is reasonably achievable
  - Control clearance of DOE real and personal property
  - Assure that DOE facilities have the capabilities, consistent with the types of operations conducted, to monitor routine and non-routine releases and to assess doses to members of the public
  - Protect the environment from radioactive contamination to the extent practical



## Dose Limits, Constraints and Goals

- o DOE's dose limit for protection of the public is 100 mrem/yr from all sources and pathways
  - The dose limit for any single source or pathway is 25 mrem/yr.
  - In the development of authorized limits, the goal should be to maintain doses from a release to a few mrem/yr or less, and for personal property, the goal should be to control doses to 1 mrem/yr or less





# Draft Guide: DOE G 441.1-XX

## Approach

- o Material may be released for disposal under derived authorized limits and measurement protocols for release by DOE field office managers without additional approval if:
  - Applicable criteria for onsite or offsite landfills as appropriate are addressed
  - Based on a realistic, but reasonably conservative assessment of potential doses, releases from the material are demonstrated to not exceed 1 mrem per year or a collective dose of more than 10 person rem;
  - A procedure is in place to maintain records of releases consistent with DOE Order 5400.5, and
  - A copy of documentation is archived, and provided to DOE Headquarters at least 40 days prior to the authorized limits becoming effective



# Summary of pending revision – DOE Order 458.1

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- o Clearance of property will include
  - Specific requirements for independent verification program
  - Clearer delineation of authorized limits processes and requirements
  - Provision for use of current pre-approved limits until they are revised
  - Process to update pre-approved authorized limits
  - Clarification that use restriction and institutional controls are part of authorized limits
  - Clearance of environmental restoration, decommissioning and other cleanup material
  - Explicit public notification requirements

# Summary of pending revision – DOE Order 458.1

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- No major changes to basic radiation protection principles and objectives of original Order
  - Uses dose limits to protect the public and the environment
  - Requires that doses be as low as reasonably achievable
  - Sets out requirements for DOE operations that protect public and the environment from undue radiation
    - All sources, all pathways dose limit (100 mrem/yr)
    - ALARA process (optimization)
  - Includes specific requirement for
    - Controlling wastes and liquid effluents
    - Controlling air emissions and protecting drinking water systems
    - Environmental protection and monitoring
    - Controlling and clearing property
- Reinforces flexibility in implementing requirements and focuses on a graded approach
- Effectively integrates up-to-date approach to radiation protection programs into an overall systems approach to the management of site operations

# *Past low-activity disposition actions*

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- o Brookhaven National Lab – Peconic River Sediment disposal at commercial Subtitle D landfill (NY); other D&D debris
- o Paducah – on site disposal for soil and debris (KY)
- o Ashtabula Site cleanup –contract award assumed use of commercial Subtitle C landfill for soil and debris
- o Battelle Columbus Lab cleanup– D&D rubble transferred to commercial firm for release and disposal (TN)

# *Future opportunities*

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- o SPRU – possible disposition of cleanup soils and debris
- o Portsmouth Gaseous Diffusion Plant – release of lube oils and pyranol for hazardous incineration (previously planned for incineration at TSCA Incinerator as PCB MLLW)
- o DOE's draft MLLW Disposition RFP includes line items for disposition of lower activity materials and wastes via DOE authorized limits or via qualified commercial “bulk survey for release” providers

# Contact information

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Christine Gelles, Director  
Office of Disposal Operations, EM-12  
301.903.1669  
[christine.gelles@em.doe.gov](mailto:christine.gelles@em.doe.gov)

Gene Chou, EM-12  
301.903.7159  
[gene.chou@em.doe.gov](mailto:gene.chou@em.doe.gov)

W. Alexander Williams, EM-23  
Office of D&D and Facility Engineering  
301.903.8149  
[alexander.williams@em.doe.gov](mailto:alexander.williams@em.doe.gov)