Waste Management and Site Interdependencies
National Governors’ Association
Federal Facilities Task Force Spring Meeting
Idaho Falls, ID

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Office of Environmental Management

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Waste and Material Disposition and Site Interdependencies

• Key Accomplishments

• Waste and Material Overviews
  • High Level Waste (HLW)
  • Transuranic Waste (TRU)
  • Low-Level and Mixed Low-Level Radioactive Waste (LLW/MLLW)
  • Other

• Other Strategic and Programmatic Activities
  • Greater than Class C LLW Environmental Impact Statement (EIS)
  • Mercury (Storage) Supplemental EIS
  • Revision of DOE Order 435.1, Radioactive Waste Management
  • Blue Ribbon Commission on America’s Nuclear Energy Future
EM Mission Units Work Closely Together to Ensure Mission Completion at Sites

• Office of Site Restoration (EM-10)
  Soil and Ground Remediation
  D&D & Facility Engineering
  Compliance
  
  *Champion for Oak Ridge, Richland, Portsmouth, Paducah*

• Office of Tank Waste and Nuclear Materials (EM-20)
  Waste Processing
  Nuclear Materials Disposition
  Waste Treatment Plant/Office of River Protection

  *Champion for Savannah River, Office of River Protection*

• Office of Waste Management (EM-30)
  Disposal Operations
  Disposition Planning and Policy
  Packaging and Transportation

  *Champion for Idaho, Carlsbad/WIPP, LANL, other NNSA sites, West Valley, other small sites*
• Ensuring disposition paths are defined and available for all EM-generated waste streams

• Providing leadership in waste management policy for all Departmental programs and sites

• Optimizing use of existing disposal assets – including the Waste Isolation Pilot Plant (WIPP), NNSS, and onsite facilities at DOE sites

• Promoting compliant and cost-effective use of commercial wastes treatment and disposal services

• Preserving strong transportation safety record and providing needed services and packages

• Developing and recommending disposition alternatives for certain materials

• Fulfilling statutory responsibilities related to commercial LLW management
Recent Program Accomplishments

- Continued progress towards removal of Los Alamos TRU waste, in accord with Framework Agreement
- Submitted WIPP Hazardous Waste Facility permit modification for Hanford tank waste
- Supported development of the Department’s *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, in response to the Blue Ribbon Commission’s recommendations
- Continued joint-planning effort with Office of Nuclear Energy on research and development for disposal of heat generating waste in a generic salt repository
- Published waste incidental reprocessing determinations for West Valley components
- Awarded national LLW/MLLW disposal ID/IQ contracts
- Assisted NNSA in issuance of the NNSS site-wide EIS
FY 13 Waste Management Priorities

- Continue implementation of the LANL Framework Agreement
  - Continue progress on “3706 Campaign”
- Optimize TRU waste shipments to WIPP
  - LANL, Idaho, Savannah River, ANL
- Idaho:
  - Sustaining performance of AMWTP, processing sludge waste, and resuming Accelerated Retrieval Project
- Oak Ridge:
  - Continue efforts to disposition U^{233} inventory, continue design of sludge processing capability, continue processing of legacy TRU in anticipation of FY 14 shipments
- Publish final GTCC LLW EIS
- Continue to improve production rates at the Depleted Uranium Hexafluoride (DUF6) conversion plants
- Safely transport 650,000 tons of mill tailings from the Moab project to Crescent Junction for disposal
FY 14 Waste Management Priorities

- Idaho: Start treatment of sodium bearing waste, continue CH and RH TRU projects
- Los Alamos: Work toward completion of the 3706 Campaign; continue planning for below-ground TRU
- Carlsbad: Continue optimized TRU program: LANL, INL, OR and potentially SRS
- Oak Ridge: Continue disposition of $^{233}$U inventory, resume certification and shipment TRU waste
- Office of River Protection: Continue planning for TRU waste retrieval
- Portsmouth/Paducah: Continue operation of DUF6 Conversion Plants
- Portsmouth/Paducah: Records of Decision regarding on-site disposal facilities
- Savannah River: Disposition non-MOXable plutonium
- West Valley: Begin planning for disposition of WIR components
High Level Waste Management Overview

Hanford –
176M curies; 55M gallons
177 Tanks; ~9,700 canisters
(projected)

Idaho –
37M curies, 900K gallons
15 tanks (11 closed); ~3,590-5,090 canisters (projected)

Savannah River Site – 292M curies; 37M gallons
51 Tanks (4 closed)
~3,600 canisters (2013); ~7,580 (total projected)

West Valley Demonstration Project– ~25M curies in 275 canisters
4 tanks
Hanford Waste Treatment Plant

- High-Level Waste Facility
- Pretreatment Facility
- Analytical Laboratory
- Low-Activity Waste Facility
- Balance of Facilities
Significant completion of:

- Steam Plant
- Laboratory
- Outfitting Laboratory
Savannah River Site Liquid Waste

**Waste Storage/Retrieval**
- Tank Farms
- Salt Processing
- Sludge Processing

**Processing**
- Defense Waste Processing Facility
- Actinide Removal Process
- Modular CSSX Unit
- Salt Waste Processing Facility — future
- Small Column Ion Exchange — future

**Disposal**
- High Level Waste Canisters
- Final Disposition
- Low Level Waste

**Closure**
- Tank Closure
- Saltstone Production Facility
Salt Waste Processing Facility

- Operations Deck (139’) Complete
- Low Roof (154’) Complete
- Cold Chemical Area (CCA)
  - Pumps Set
  - Tanks Set
  - Roof / Siding
- Alpha Finishing Facility (AFF)
  - Structural Steel
  - O/H Crane Set
  - Pumps Set
- Decontaminated Salt Solution (DSS) Line
- Diesel Generator Pads
- North Facility Support Area (NFSA)
  - MCCs Set
  - Air Handlers Set
  - Roof / Siding
  - Bus Supports
  - Fire Proofing
- Chillers Set
- Walls to 176’ Complete
- Crane Rails
- Pipe Racks
- Large ASME Tank Set
- Eastern Facility Support Area (EFSA)
The Transuranic Waste Challenge: How EM is Getting the Job Done Today

National Transuranic Waste Shipment Program

Waste Isolation Pilot Plant – Carlsbad, NM
TRU Waste Disposal Summary

Volume of waste disposed at WIPP as of 5/22/13: 86,736 m³

Contact-handled: 86,406 m³
Remote-handled: 330 m³

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Waste Disposed by Calendar Year
(In cubic meters)
Los Alamos TRU Waste Update

• LANL Framework Agreement remains a priority
  • Negotiated in early 2012, commits to the removal of 3,706 cubic meters of above-grade combustible TRU by end of June 2014
  • First year goal to remove 800 cubic meters was exceeded; current year efforts on track, but requires substantial increase in remediation and shipping rates
• Continued progress in FY 13
  • March 2013 on schedule 1,456 cubic meters of 2,600 cubic meter FY 13 goal
  • 39 percent of 3,706 cubic meter campaign (June 2014) goal achieved
### Advanced Mixed Waste Treatment Project:
- Characterize, treat, re-package, and ship legacy CH-TRU and MLLW waste from Rocky Flats and other DOE sites for offsite disposal in accordance with 1995 Settlement Agreement (Estimated to be 65,000 m³)
- Shipping metrics (legacy CH-TRU and MLLW)
  - ~40,000 m³ to date ~50% CH-TRU and 50% MLLW
  - FY 13 Target = 4,500 m³ (Site Treatment Plan milestone)
  - WIPP’s primary shipper of CH-TRU
    - Average 6 to 12 shipments per week
- Meeting all compliance milestones
- All remaining legacy CH TRU to be shipped out of Idaho no later than 12/31/2018

### Remote-Handled (RH) TRU Disposition:
- Characterize, treat, re-package, and ship legacy RH-TRU waste for offsite disposal in accordance with 1995 Settlement Agreement
- Small percentage of legacy TRU is RH
- WIPP’s primary shipper of RH-TRU
  - Average 2 shipments per week
- Part of remaining legacy inventory requires special treatment to remove sodium
  - DOE to install sodium distillation system in existing onsite facilities
- All remaining legacy RH TRU to be shipped out of Idaho no later than 12/31/2018
Idaho Accelerated Retrieval Projects (ARPs)

- **Objective:** Safely exhume targeted waste at the Subsurface Disposal Area, package and ship offsite for disposal
- Completed 3.11 acres out of 5.69 acres (55%)
  - Exhumations complete at 6 of 9 ARPs
  - Only one enclosure remains to be constructed (ARP IX)
  - Working to resume exhumations this year
- Accelerating TRU shipments from Idaho by processing sludge from AMWTP in ARP V enclosure
  - ~1,400 drums out of ~6,000 drums processed to date

Newly constructed ARP VIII enclosure is 3 times larger than other ARP enclosures

Exhumations conducted using special excavators and telescopic forklifts
• To date AMWTP has received, validated, treated and shipped ~600m³ from 15 sites
• DOE Record of Decision allows more than 8,700m³ to be shipped to AMWTP from other complex sites

Inspecting shipment received from G.E. Vallecitos Nuclear Center, CA
Lawrence Livermore National Laboratory waste
Processing Hanford waste in AMWTP Treatment Facility
December 14, 2012: DOE announced in the Federal Register the Notice of Availability for the Tank Closure & Waste Management Environmental Impact Statement at the Hanford Site

March 11, 2013: DOE announced preferred alternative in the Federal Register its to retrieve, treat, package, characterize and certify certain Hanford tank waste for disposal at the Waste Isolation Pilot Plant (WIPP), subject to a number of conditions.

April 8, 2013: DOE Submitted a Class 2 permit modification to the Waste Isolation Pilot Plant Hazardous Waste Facility Permit to the State of New Mexico Environment Department

Additional Actions Required:

- Formally characterize the waste as defense-related mixed TRU waste
  - EIS identified 20 tanks for classification as mixed TRU – 3.1 million gallons
  - Potentially 11 tanks CH TRU/9 RH TRU
- Issuance of Record of Decision (ROD) which incorporates the basis for the TRU determination
- Obtain appropriate permits at WIPP and at Hanford and ensure that Waste Acceptance Criteria and all other applicable regulatory requirements have been met.
- Develop and acquire needed retrieval and processing capabilities
5,000 m³ Certified and Ready to ship
Made possible with American Recovery and Reinvestment Act (ARRA) funding

145 m³ remaining to be remediated and certified in FY13 if funding provided

500 m³ planned for disposal in FY13 if funding provided

5,158 m³ Total Status as of 4/29/2013
• Most legacy LLW/MLLW inventories have been eliminated
  ▪ Remaining legacy LLW streams are primarily small and challenging
  ▪ LLW/MLLW is mainly generated from decontamination and decommissioning and environmental restoration or ongoing missions

• NNSS remains the only accessible DOE regional disposal site for LLW/MLLW; Hanford remains unavailable to other DOE sites

• Actual disposed volumes in FY 2013 are lagging forecast disposal volumes
  ▪ FY 13 is a difficult year to plan, due to budget uncertainties and sequestration impacts

• Valuable contributions from the EFCOG waste management working group are promoting integration across the complex

• Marketplace is adjusting to emerging disposal options and decreasing waste volumes
DOE LLW/MLLW Generators & Waste Disposal

- CERCLA Disposal Facility
- Regional LLW/MLLW Facility
- LLW Operations Disposal Facility
- MLLW Operations Disposal Facility
- DOE Generator Site Without On-site Disposal
- Commercial LLW/MLLW Operations Disposal Facility accessible to DOE
- Closed CERCLA Site
- Commercial Byproduct (11e(2)) Disposal

Map of DOE LLW/MLLW Generators & Waste Disposal locations in the United States.
• FY 13 Plan to dispose of 36,750 cubic meters (1.3 million cubic feet) of LLW/MLLW from onsite and offsite generators
• Through May 19, a total of 14,653 cubic meters (518,3019 cubic feet) disposed
• In FY 13 begin disposal of Consolidated Edison Uranium Solidification Process material from Oak Ridge
Commercial Disposition Options

• DOE policy supports consideration of commercial disposition options in addition to DOE options, when compliant, cost effective, and in the best interest of the U.S. government

• **EnergySolutions (Clive, Utah)**
  - Accept Class A LLW and MLLW; 11e(2); NORM
  - Offers rail access, onsite treatment, and favorable bulk waste handling and disposal

• **Waste Control Specialists LLC (Andrews County, Texas)**
  - Multiple disposal facilities/licenses
    - Hazardous/exempt; 11e(2); NORM
    - Texas Compact Class A, B and C LLW – non-DOE waste
    - Federal Waste Facility Class A, B, and C LLW/MLLW – DOE waste
  - Offers onsite rail access, onsite treatment and storage capabilities
• BLDD provides DOE complex-wide forecast of LLW/MLLW disposition
  ▪ Longer-range forecast vs. NNSS near term operational forecast
• Source for forecast data used for multiple information requests and analyses
• Provides summary rolled-up waste information, including highlighting problematic waste streams
• FY 13 data has been reviewed and is loaded on the public WIMSs website at www.emwims.org/
• Trends continue to show decreasing waste forecast, with majority of waste volume disposed at site where generated
Forecast Complex-wide LLW/MLLW Disposal Forecasts Continue Downward Trend

(millions of cubic feet)

FY11 Actual | FY12 Actual | FY13 | FY14 | FY15
---|---|---|---|---
OnSite | | | | |
Commercial | | | | |
NNSS | | | | |
TBD | | | | |
• The LLW Policy Amendments Act of 1985 assigned to the Federal Government the responsibility for disposal of Greater-than-Class C (GTCC) LLW resulting from NRC-licensed activities
• DOE is evaluating disposal options for GTCC LLW and DOE “GTCC-like” LLW, which does not have a current disposal option
• GTCC LLW and GTCC-like LLW represent relatively small volume (~400,000 ft³), but high activity
  • Less than 10% of total volume currently in storage; most waste will not be generated for several decades
• Three Waste Types
  • Activated metals: 71,000 ft³ with 160 Mci
    • Majority of waste will not be generated for decades --decommissioning
  • Sealed sources: 100,000 ft³ with 2.0 Mci
    • Present National Security Concern
  • Other Waste: 240,000 ft³ with 1.3 Mci
    • Over 50% may never be generated
GTCC—Disposal Alternatives Evaluated

1. No Action: Continue current storage/management practices

2. Geologic Repository at Waste Isolation Pilot Plant (WIPP)

3. Boreholes at Hanford, Idaho National Laboratory (INL), Los Alamos National Laboratory (LANL), Nevada National Security Site (NNSS), WIPP Vicinity, and generic commercial location in Region IV (west)

4. Trenches at Hanford, INL, LANL, NNSS, Savannah River Site (SRS), WIPP Vicinity and generic commercial location in Regions II and IV (southeast and west)

5. Vaults at Hanford, INL, LANL, NNSS, SRS, WIPP Vicinity, and generic commercial location in Regions I-IV (northeast, southeast, midwest, and west)

Draft GTCC EIS did not contain a preferred alternative (preferred alternative to be included in Final GTCC EIS).
In accordance with Section 631 of EPAct & Section (3)(b)(1)(D) of Low-Level Radioactive Waste Policy Amendments Act, the Report to Congress will:

- Propose actions to ensure safe disposal of such identified radioactive wastes
- Describe alternatives under consideration
- Identify the Federal and non-Federal options for disposal
- Describe projected costs
- Identify options for ensuring that the beneficiaries of the activities resulting from the generation of GTCC waste bear all reasonable costs of disposing of such wastes
- Identify statutory authority required for disposal of GTCC waste
• Draft Supplement to the 2011 Environmental Impact Statement for Long Term Management and Storage of Elemental Mercury (SEIS) evaluates additional locations near WIPP for storage facility (April 19, 2013)

• 45-day public comment period ends June 3 – Hearings were held in New Mexico earlier this month

• Final EIS expected in September - At this time no change in Preferred Alternative (Waste Control Specialists site, Andrews, TX)

• Export of mercury banned as of Jan. 1, 2013 (Mercury Export Ban Act (MEBA)) - DOE required to site and operate storage facility for mercury generated in US. DOE has received five notifications so far from private facilities that can store Hg as allowed under MEBA until DOE ready to receive mercury
Update of DOE 435.1, Continuing the ISMS Feedback Loop

Update DOE O 435.1

DNFSB 94-2

2010 CWR

>10 years of experience

1996 CWR

Issue DOE O435.1 1999
• Proposed updates to Order 435.1 and associated guides are being reviewed by DOE General Counsel

• Major Proposed Changes:
  • Consolidation of duplicate requirements into General Requirements
  • Addressing waste consolidation (blending) as a positive, even necessary, action
  • Substantial alignment of 435.1 Waste Incidental to Reprocessing (WIR) evaluation with 3116 waste determination process
  • Increased specificity on wastes eligible for WIR Citation designation
  • Development of Technical Standard capturing all requirements and authorities associated with authorizing new LLW disposal facilities.

• Next Steps:
  • Release for 60 day public review and comment period (mid-summer)
  • At least 2 webinars for public meetings half-way through comment period
  • Response to public comments (late Summer/early Fall)
  • Final editing and Submission to DOE Approval system (REVCOM) (Fall).
Blue Ribbon Commission Related Activities

• The *Strategy for the Management and Disposal of UNF and HLW* Released Jan. 11, 2013
  • Serves as a statement of Administration policy regarding the importance of addressing the disposition of UNF and HLW, lays out the overall design of a system to address that issue, and outlines of the reforms needed to implement such a system.
  • Presents a response to the BRC recommendations. It also responds to direction in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act 2012, to develop a strategy for the management of UNF and HLW.
  • Represents an initial basis for discussions among the Administration, Congress and other stakeholders on a sustainable path forward for disposal of nuclear waste.

• The BRC report and recommendations provide a starting point for this Strategy. The Administration endorses the key principles that underpin the BRC’s recommendations.
Key Elements of the BRC Implementation Strategy

- System Design
  - Pilot interim storage facility
  - Consolidated interim storage facility
  - Geologic repository
  - Transportation system designed, regulated, and executed for safe and secure interstate shipping

- Consent-based Facilities Siting
  - Agreement at multiple jurisdictional levels
  - Open and transparent communication of benefits and risks
  - Mutually agreed upon off-ramps

- Governance & Funding
  - A new organization, empowered with the authority to succeed
  - Timely access to sufficient funding
  - Fees collected; applied to their intended purpose
Activities within existing Congressional authorization:

- Conducting disposal-related research and development work on various geologic media, thermal scenarios, and disposal containers
- The Office of Nuclear Energy and the Office of Environmental Management (EM) are collaborating and have:
  - Embarked on review of past studies related to potential disposal of heat-generating wastes in salt
  - Developed a re-entry plan to drill back and obtain data from past in-situ heater tests at WIPP in the 1980’s
  - Developed new coupled models (thermo, mechanical, hydro)
  - Expanded temperature range of known physical properties of salt with focused laboratory studies
- EM continues to mine access drifts and install infrastructure using existing resources, to prepare for planned heater test which can inform future disposition plans