



U.S. DEPARTMENT OF **ENERGY**

Waste Materials and Disposition Update Environmental Management Site-Specific Advisory Board Chairs' Meeting June 15, 2011

Shirley J. Olinger
EM Associate Principal Deputy
for Corporate Operations



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DOE's Waste Management Priorities

- Continue to manage waste inventories in a safe and compliant manner.
- Address high risk waste in a cost-effective manner.
- Maintain and optimize current disposal capability for future generations.
- Develop future disposal capacity in a complex environment.
- Promote the development of treatment and disposal alternatives in the commercial sector.
- Review current policies and directives and provide needed oversight.



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Goal #3 Disposition 90% of TRU Waste by 2015



- All Legacy TRU waste to WIPP by 2020, except for Hanford
- 65% Legacy TRU disposed to date; 90% by 2015

Completed Legacy TRU Sites

- ✓ Teledyne-Brown
- ✓ ARCO
- ✓ Energy Technology Engineering Center
- ✓ University of Missouri Research Reactor
- ✓ Lawrence Berkeley National Laboratory
- ✓ US Army Materiel Command
- ✓ Lovelace Respiratory Research Institute
- ✓ Rocky Flats Environmental Technology Site
- ✓ Mound
- ✓ Brookhaven National Laboratory
- ✓ Knolls Atomic Power Laboratory-Nuclear Fuel Services
- ✓ Fernald
- ✓ Battelle Columbus Laboratories
- ✓ AREVA (Framatome)
- ✓ General Electric Vallecitos Nuclear Center
- ✓ Nevada Test Site
- ✓ Lawrence Livermore National Laboratory (Site 300)
- ✓ Separations Process Research Unit



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TRU Waste Disposition Updates

- TRU waste processing and disposal efforts continue to be accelerated through the *American Recovery and Reinvestment Act*
 - FY 2010 marked significant TRU shipping accomplishments with 1,128 contact-handled and remote-handled shipments.
 - FY 2011 shipment goal is 1,475 CH-TRU, RH-TRU, and intersite shipments
- In FY 12, the primary focus of the National TRU Program will be:
 - Toward completion of the Savannah River Site's legacy TRU in FY13
 - Continuing accelerated shipments from Idaho
 - And, shipments from Los Alamos in support of the Consent Decree milestone to close Area G in 2015
- Recertification Application approved by EPA November 18, 2010, and Hazardous Waste Permit Renewal Application approved by the New Mexico Environmental Department November 30, 2010
- TRUPACT-III, for large box waste, has been certified by NRC
 - First TRUPACT-III shipments from SRS will begin in August



Disposal Operations: Contact-&-Remote Handled TRU Waste



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The WIPP Transportation System: Safest shipping containers on the road



Nuclear Regulatory Commission certified



“...The [WIPP transportation] system is safer than that employed for any other hazardous material in the U.S....”

National Academy of Sciences, WIPP Panel



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What's New in LLW/MLLW Disposition

- The *American Recovery and Reinvestment Act* provides needed funding in FY 2011 for solid waste disposition, soil and groundwater remediation, and facility decontamination and decommissioning projects
- Recent update to waste forecasts confirmed that FY 2010 was a peak for disposal volumes, due largely to ARRA funded project.
- Onsite disposal facilities continue to accept the vast majority of the wastes generated by EM activities
 - New onsite disposal cells being considered for Paducah and Portsmouth
- Continued operations of the NNSS disposal facility is critical to meet complex-wide needs, especially for those wastes that cannot be disposed at commercial facilities
- **Recent developments and changes...**
 - Complex-wide treatment contract(s) were awarded in July 2010, and several task orders have been awarded
 - A new competitive acquisition for commercial disposal services has recently been initiated
 - WCS Federal Disposal Facility in Texas under construction and expected to begin operations in early 2012.



New Mixed Waste Disposal Cell in Nevada



Workers place the first container of mixed low-level waste in the new MWDU.



Workers test the leachate collection system.



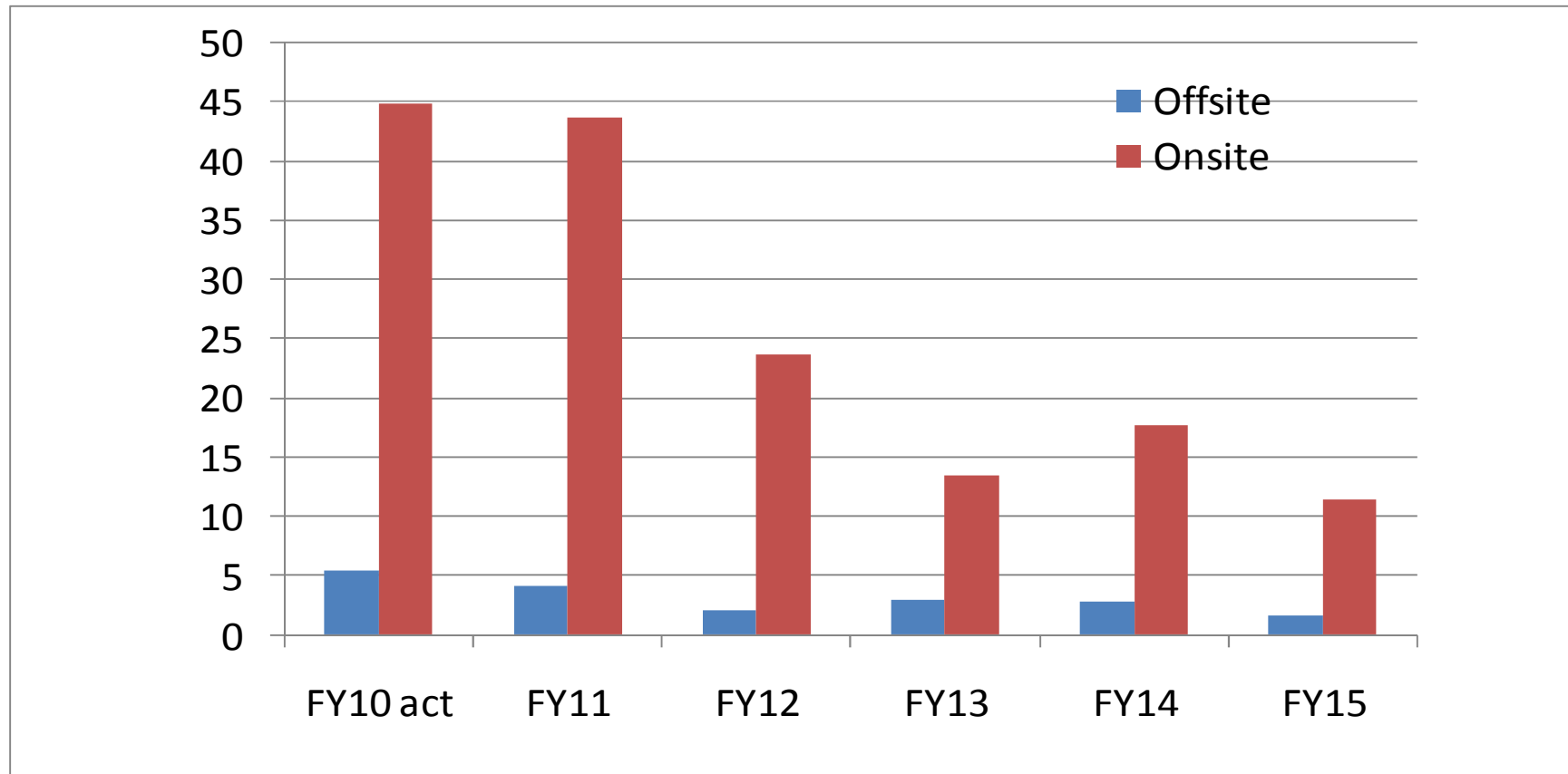
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LLW/MLLW Disposal Forecast Trends

(millions of cubic feet)



Source: 2011 WIMS data; excludes "TBD" streams



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Update on Savannah River Site (SRS) DU Oxide Disposition

- SRS DU oxide was determined to be excess to mission needs, and plans undertaken to dispose of oxides as waste
 - Originally, 35,800 containers
 - Four successful shipment campaigns from FY03-FY08
- DOE had planned to dispose of remaining SRS DU oxide at Clive
 - First of three planned rail shipments completed in December 2009
 - These DU oxides remain in storage at Clive pending outcome of site-performance assessment/regulatory action
- Nevada Site Office conducted special analysis to determine the acceptability of the waste stream for shallow land burial
- Due to Utah regulatory developments, balance of SRS inventory redirected to NNSS after extensive coordination with Nevada
 - Approximately 9,400 containers remained at SRS in December 2010
 - Shipments began by truck in January 2011 and are expected to be completed by the end of FY11

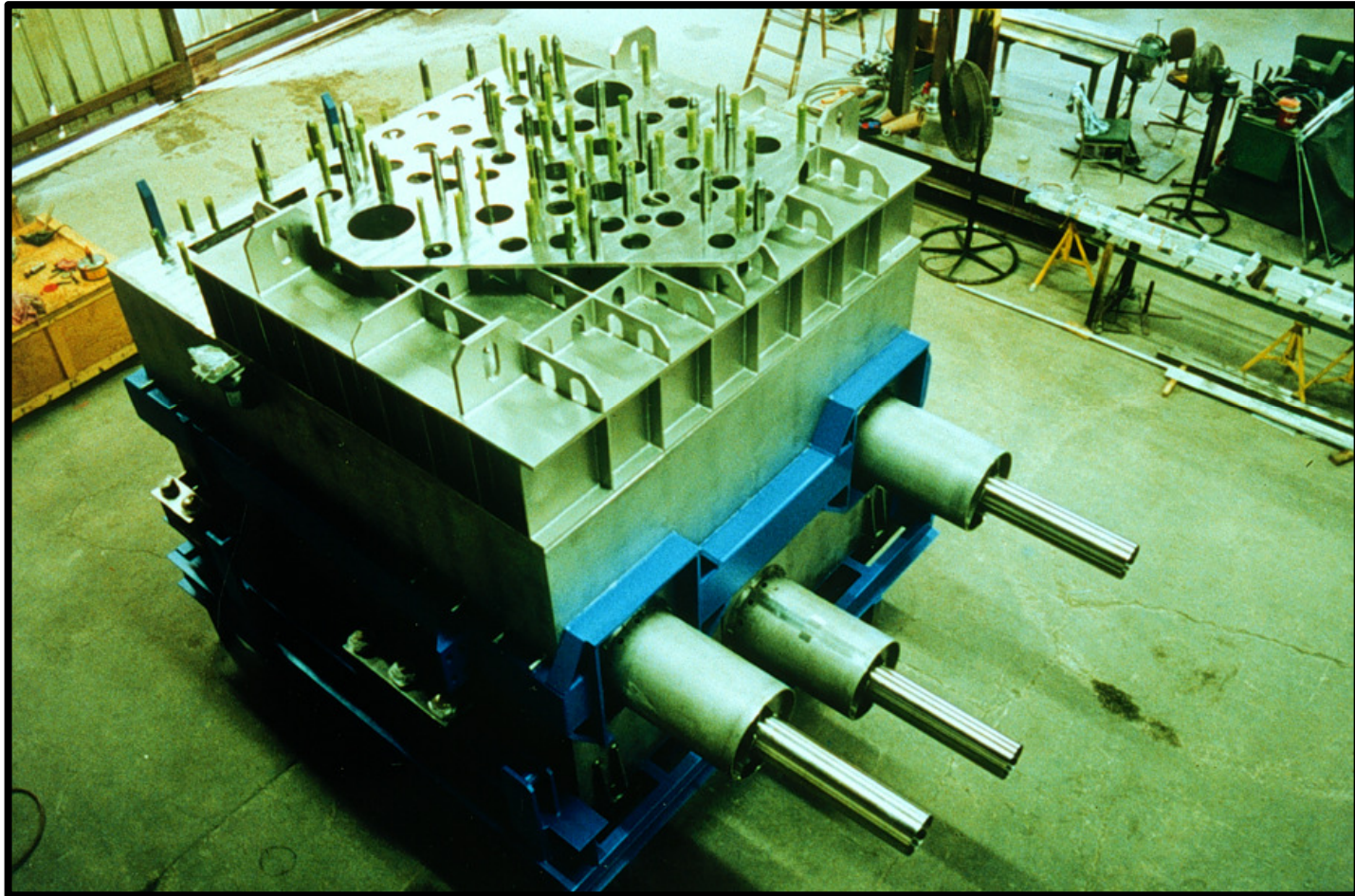


DOE is process its first Waste Incidental to Reprocessing Determination under DOE O 435.1

- DOE's has published a Draft Waste Incidental to Reprocessing (WIR) Evaluation for the melter equipment used to vitrify HLW at the West Valley Demonstration Project.
 - ✓ "Incidental waste" refers to radioactive waste that is incidental to the operations of managing HLW; i.e., it comes from or has been touched by HLW
 - ✓ An evaluation must be made to determine if this particular waste material is incidental to the operations of managing HLW (DOE Manual 435.1-1, Section II.B.2(a) criteria)
 - ✓ If it is incidental, it is non-HLW and per DOE requirements must be managed as LLW or TRU waste based on the waste's specific radioisotopic inventory
 - ✓ The WIR evaluation determines if the waste material is, or it is not, incidental to the reprocessing of HLW
- Conducted 45 day public comment period, which ended April 28, 2011; WIR Determination being finalized in light of NRC and public comments
- Following WIR Determination, final disposal decisions can proceed



The Melter



10' x 10' x 10' ft. ~ 53 tons



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Summary of the Greater-than-Class C LLW Disposal Environmental Impact Statement

- Draft EIS published and shared with Congress in February 2011
 - 120-day public comment period (ends 6/27/11)
 - Nine public hearings conducted in April/May at each of the proposed sites and in Washington, DC
 - Meetings also held with CABS and regulators
- Proposed Disposal Methods: deep geologic repository, intermediate depth borehole; enhanced near-surface trench and above-grade vault
- Proposed Disposal Locations: Hanford, INL, LANL, WIPP/WIPP vicinity, NNSS, SRS, and generic commercial locations
- DOE does not have a Preferred Alternative; to be included in Final EIS based on public comment
- Goal is to issue Final EIS in 2012
- Before issuing ROD, DOE must submit a Report to Congress describing disposal alternatives and await Congress' action

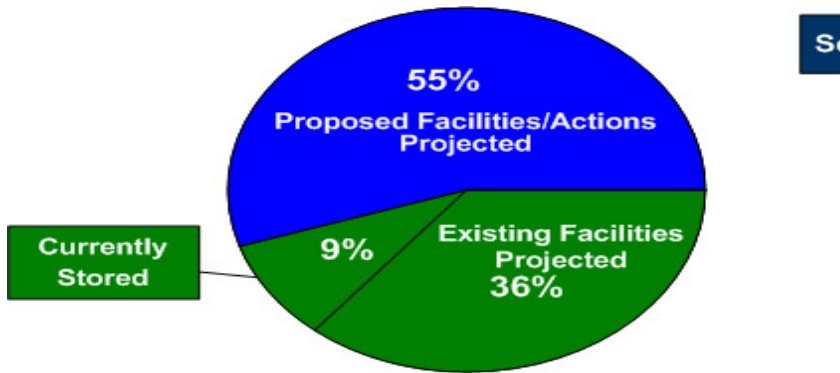


GTCC Waste Inventory

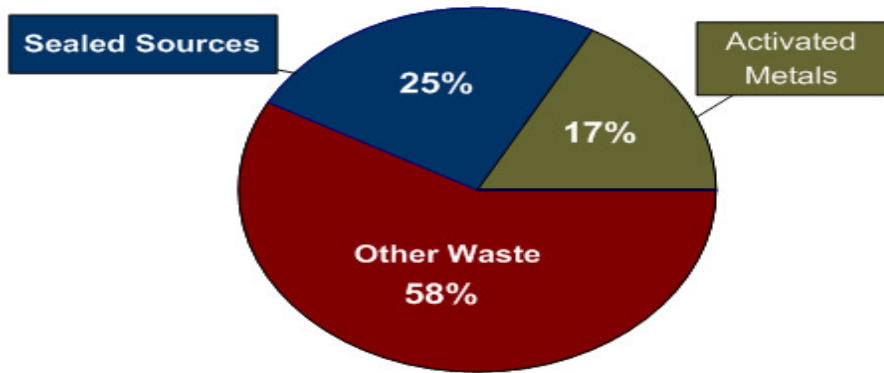
- GTCC Low-Level Radioactive Waste (LLRW): Most hazardous of the four U.S. Nuclear Regulatory Commission (NRC) classes of commercial LLRW
- GTCC-like Waste: DOE generated or owned LLRW or transuranic waste with characteristics similar to GTCC LLRW and no identified path for disposal
- Approximately 12,000 cubic meters (m³) with ~160 million curies (MCi)
 - 8,800 m³ (75%) is GTCC LLRW; 2,800 m³ (25%) is GTCC-like waste
 - Relatively small volume 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: 2,000 m³ with 160 MCi
 - Sealed sources: 2,900 m³ with 2.0 MCi
 - Other Waste: 6,700 m³ with 1.3 MCi



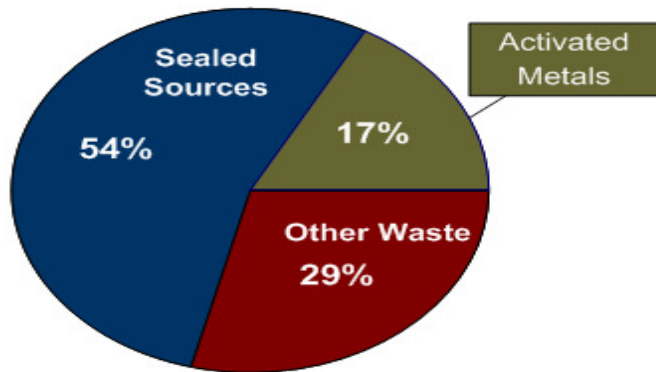
GTCC Waste Inventory



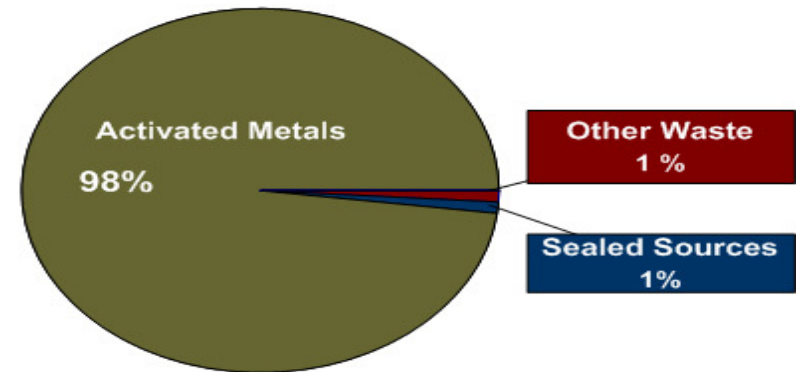
Total Volume of Waste = 11,600 m³
 Stored & Projected (existing facilities) = 5,200 m³
 Projected (proposed facilities/actions) = 6,400 m³



Total Volume by Waste Type
 Activated Metals: 2,000 m³
 Sealed Sources: 2,900 m³
 Other Waste: 6,700 m³



Total Volume of Stored & Projected Waste (existing facilities)
 Activated Metals: 890 m³
 Sealed Sources: 2,800 m³
 Other Waste: 1,550 m³

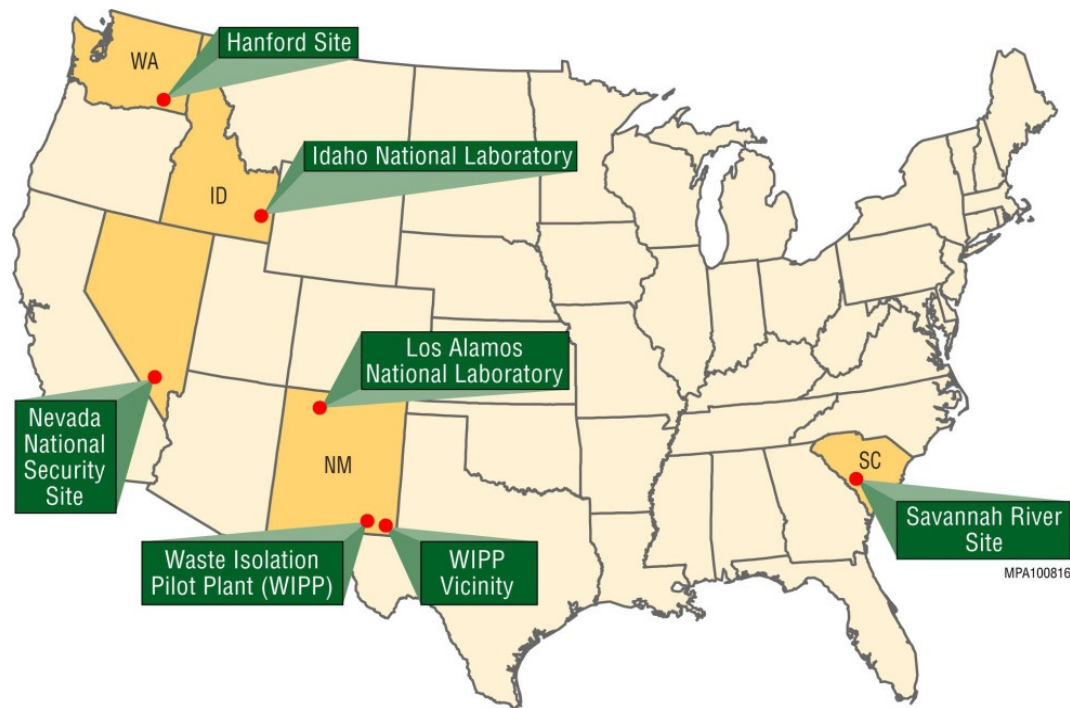


Waste Type Curies for Total Waste Volume
 Activated Metals: 160 MCi
 Sealed Sources: 2 MCi
 Other Waste: 1MCi



Proposed Disposal Locations

- Six DOE sites with existing radioactive waste disposal operations and federal land in the WIPP vicinity
- Generic commercial facilities in four NRC regions across the U.S. (Region I-Northeast, Region II-Southeast, Region III-Midwest, and Region IV-West)



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Alternatives Evaluated

1. No Action (continue current storage practices)
2. Geologic Repository at WIPP
3. Boreholes at Hanford, INL, LANL, NNSS, WIPP Vicinity, and generic commercial location in Region IV (west)
4. Trenches at Hanford, INL, LANL, NNSS, 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)

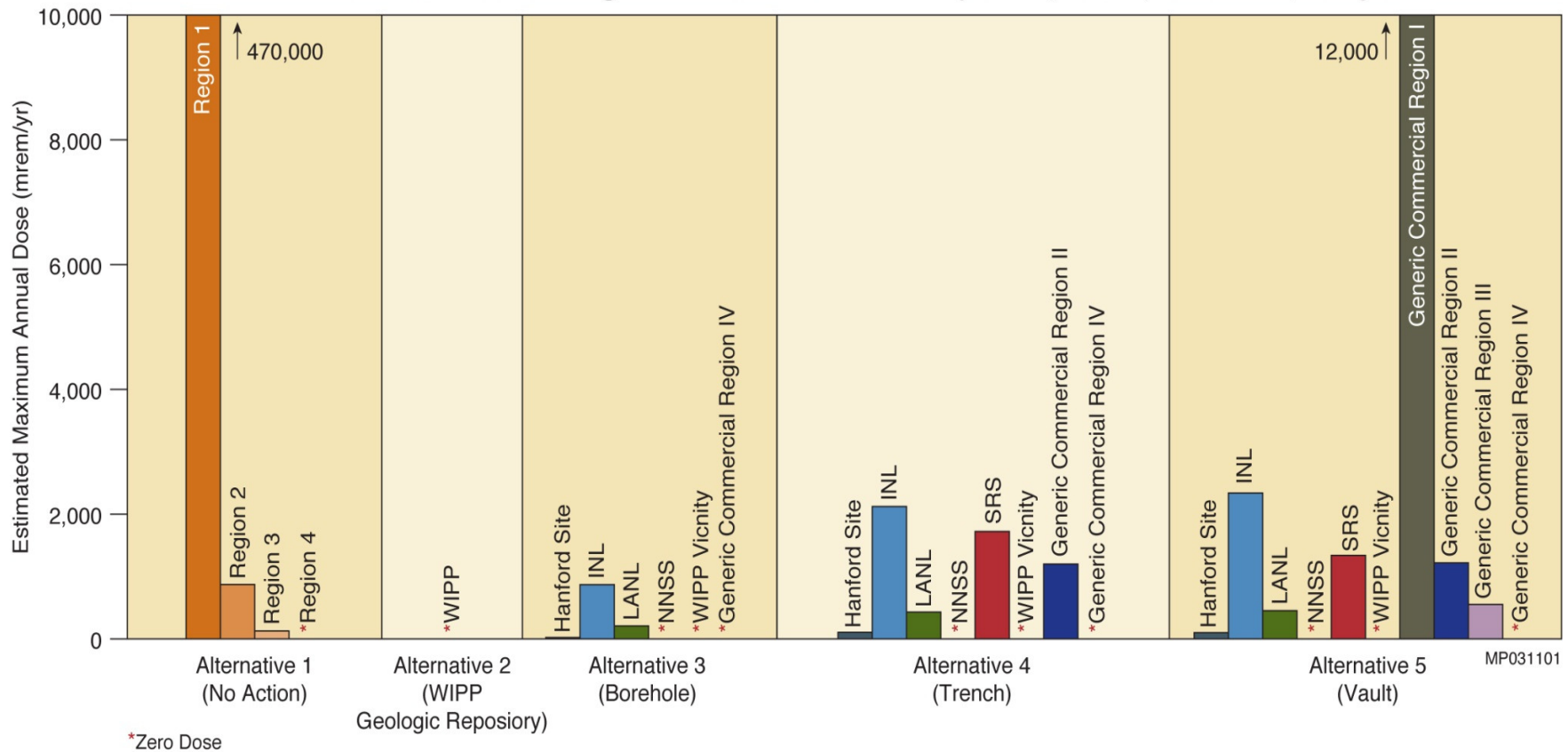
DOE Does Not Have A Preferred Alternative

- Preferred alternative(s) to be developed for Final EIS in consideration of public comments on Draft EIS
- Combination of alternatives might be appropriate



Potential Human Health Doses Based on Entire Waste Inventory

Maximum Estimated Long-Term Human Health Impacts (Doses) within 10,000 years

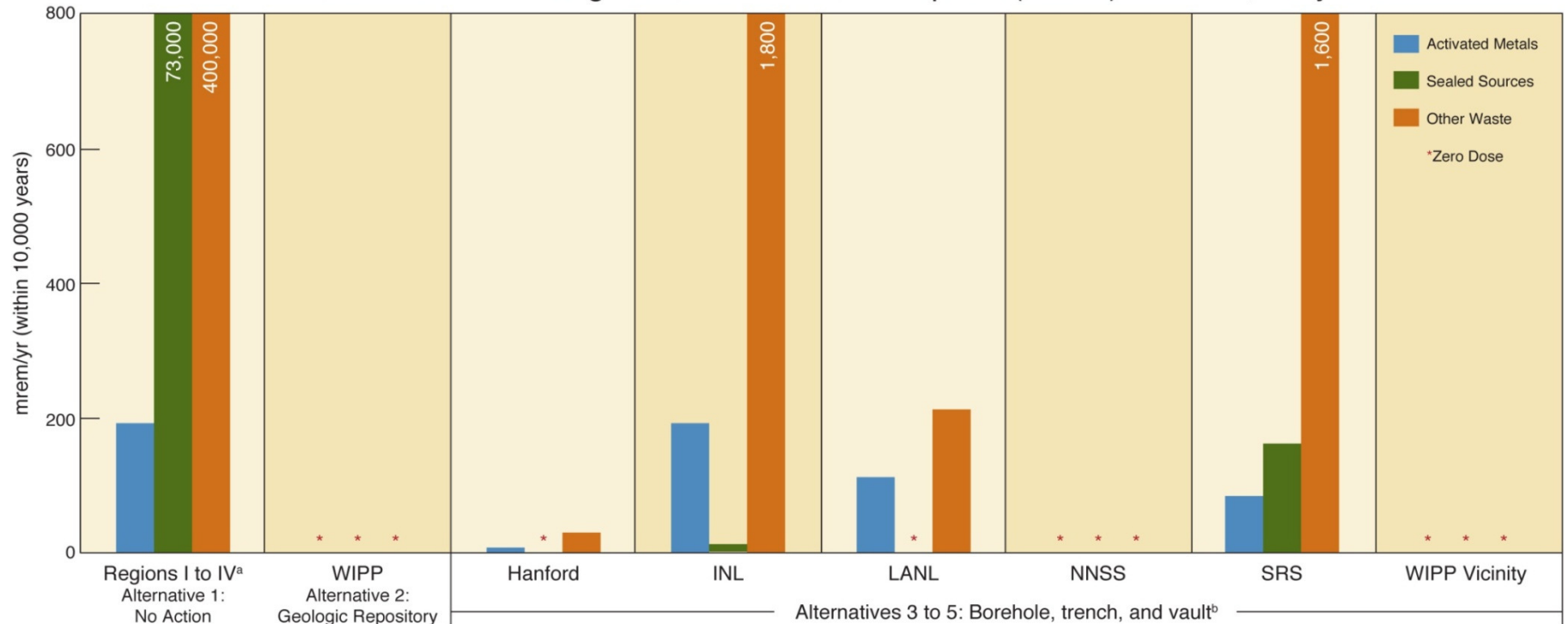


- Estimated doses for sites arid regions are lower than sites in humid regions (INL estimates incorporate fractured basalt assumptions)
- Potential impacts for alternatives should be used in a comparative manner given the simplifying assumptions and uncertainties
- Sensitivity analysis performed for critical input parameters to address uncertainties



Potential Human Health Doses by Waste Type

Maximum Estimated Long-Term Human Health Impacts (Doses) within 10,000 years



^a No action dose estimates range from zero for all waste types in Region IV to the estimates shown for Region I.

^b Average doses for borehole, trench, and vault

- Other Waste (which is primarily transuranic waste) has significantly higher doses than activated metals and sealed sources where shown
- NNSS, WIPP, and WIPP Vicinity have no doses; Hanford has lower dose estimates as compared to LANL, SRS, and INL



Considerations for Preferred Alternative(s) for Final EIS

- Public comments on Draft GTCC EIS
- Waste type considerations: radionuclide inventory, waste form stability, physical characteristics, and availability for disposal
- Disposal method considerations: inadvertent human intrusion, construction and operational experience, post-closure care, and cost
- Disposal location considerations: potential human health impacts (including cumulative impacts); cultural resources and tribal concerns; laws, regulations, and other requirements

Preferred alternative could be a combination of two or more alternatives, based on the considerations below



Next Steps for the EIS

- Public Comments due June 27, 2011
- Develop Final EIS with preferred alternative in consideration of public comments on Draft EIS
- Issue Final EIS
- Issue Report to Congress and await Congressional action
- Issue Record of Decision
- Implement selected alternative or alternatives
 - Some alternatives may require new or modification to existing federal legislation for implementation



EM's New Mercury Management Project

- *The Mercury Export Ban Act of 2008* requires DOE to provide storage and long-term management of mercury (non-radioactive) generated in the U.S.
 - Final EIS published in January 2011
 - Sites analyzed in the EIS are Hanford (WA); INL (ID); Grand Junction (CO); Hawthorne (NV); SRS (SC); Andrews (TX); and Kansas City (MO)
 - WCS facility in Andrews, TX is Preferred Alternative
- Critical Milestones
 - DOE issued Interim Guidance on operating the proposed mercury facility – 11/14/09
 - DOE published Draft EIS – 01/29/10
 - Final EIS – 1/28/11
 - Final Record of Decision and selection of mercury storage site(s) - Summer 2011
 - Mercury storage facility ready to accept mercury – 01/01/13
 - Ban on export of mercury from the U.S. effective – 01/01/13
 - DOE mercury storage facility operating under RCRA permit – 01/01/15
- Outreach
 - Public hearings at nine locations: 2/23/10 – 3/9/10
 - Public comment period: 1/29/10 – 3/30/10



DOE Order 435.1, Radioactive Waste Management

- EM has initiated a multi-year effort to update DOE Order 435.1
 - Targeted to complete in 2012
- Developed methodologies for updating Order 435.1
 - Established chapter-specific “Core Teams”
 - Review of input from Complex-Wide Review Completed in 2010
 - Currently revising language in Order and supporting documents
 - Public review expected in early FY12
- Public meeting held in Phoenix on March 4 on DOE’s efforts to update O 435.1 and NRC actions related to 10 CFR Part 61
 - Included a joint DOE/NRC Panel discussion to respond to and explain agencies’ positions, future plans, and specific views regarding the LLW management framework
 - Addressed public and stakeholder suggestions and comments



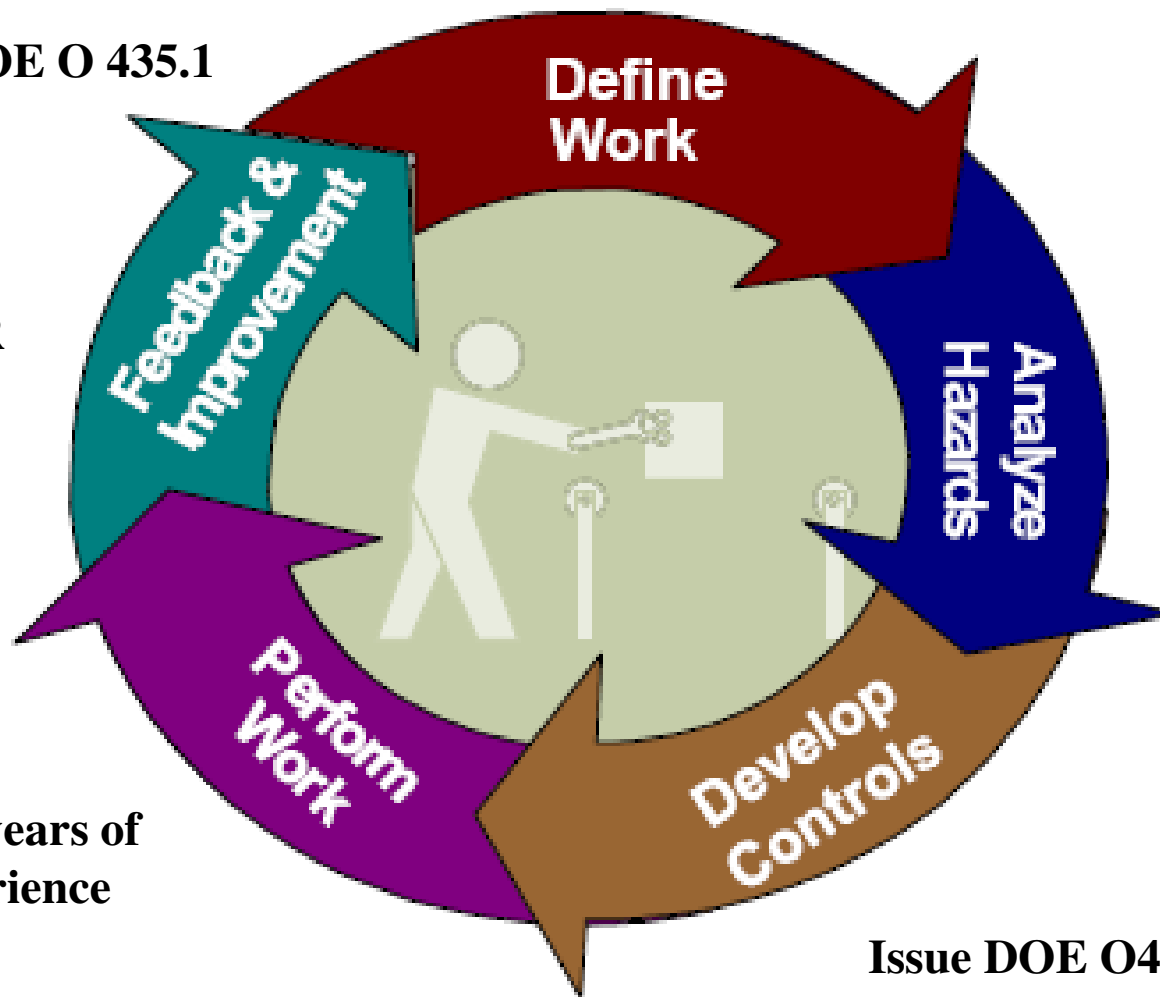
EM is continuously improving DOE Order 435.1, *Radioactive Waste Management Order*

DNFSB 94-2

Update DOE O 435.1

2010 CWR

>10 years of
experience



1996 CWR

Issue DOE O435.1
1999

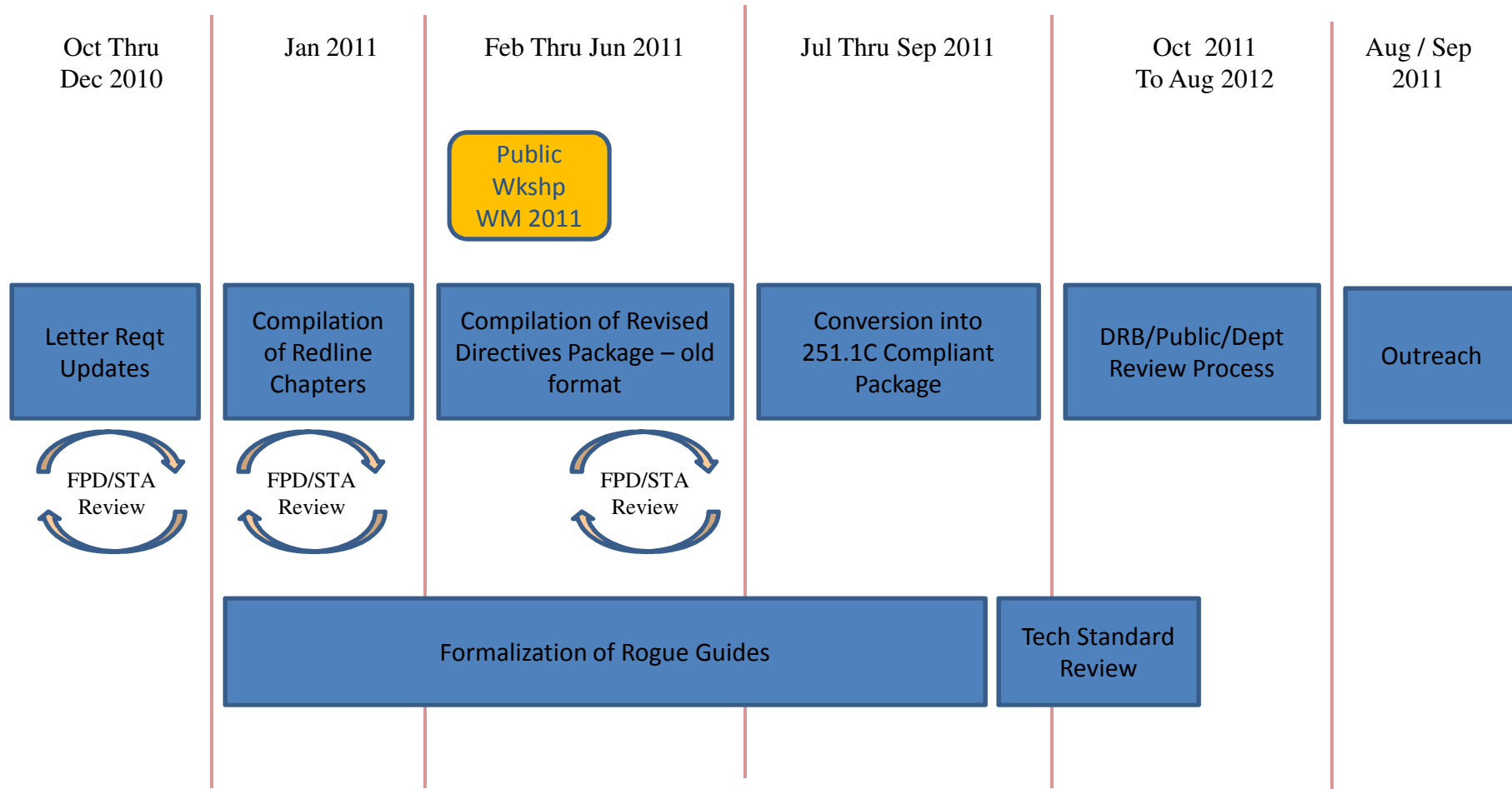


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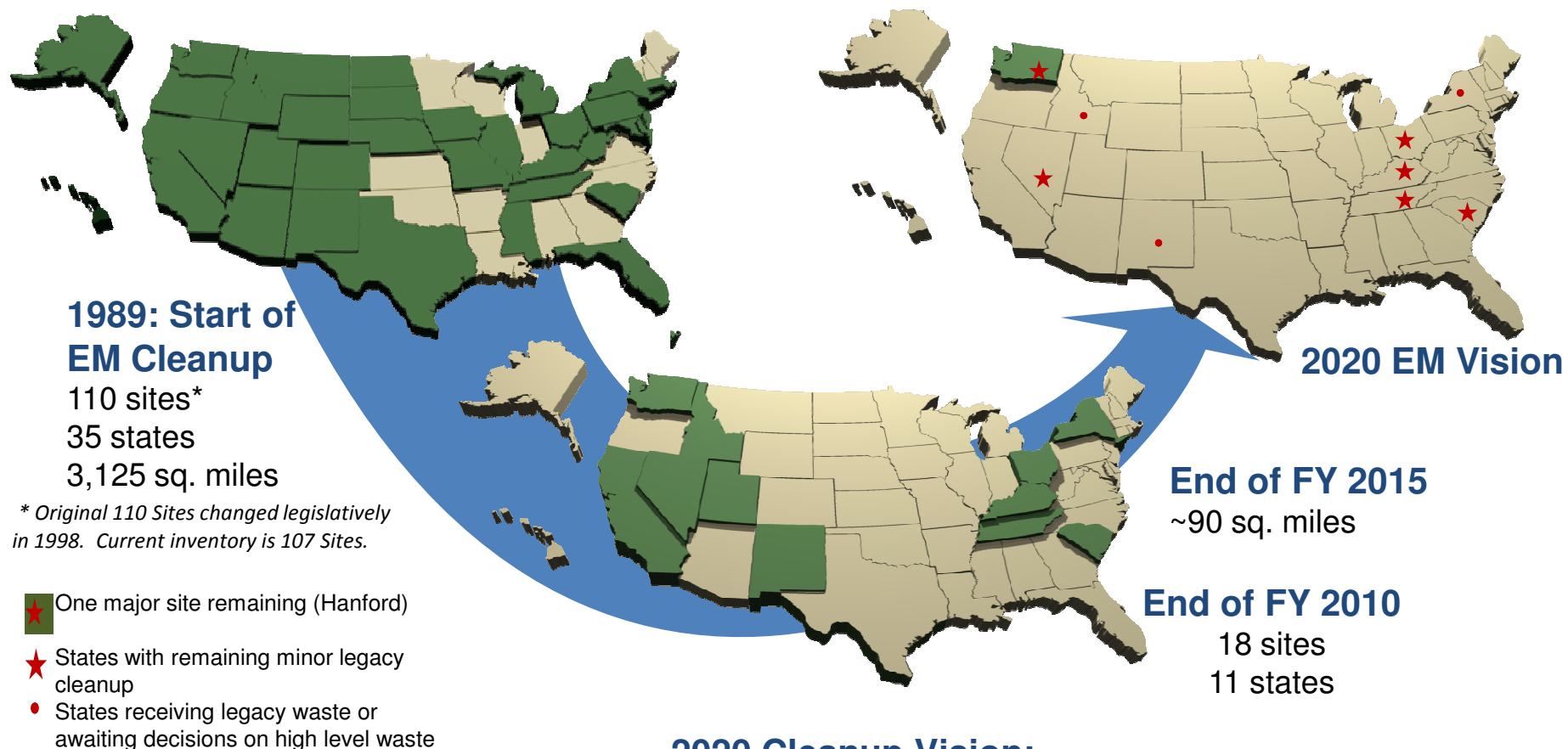
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Current Schedule for DOE Order 435.1 Update



EM's National Cleanup Progress: A Sound Investment



2020 Cleanup Vision:

By 2020, EM legacy cleanup will be virtually completed. Hanford will be the only large site remaining. Minor cleanup will remain at Savannah River, Portsmouth, and Oak Ridge.



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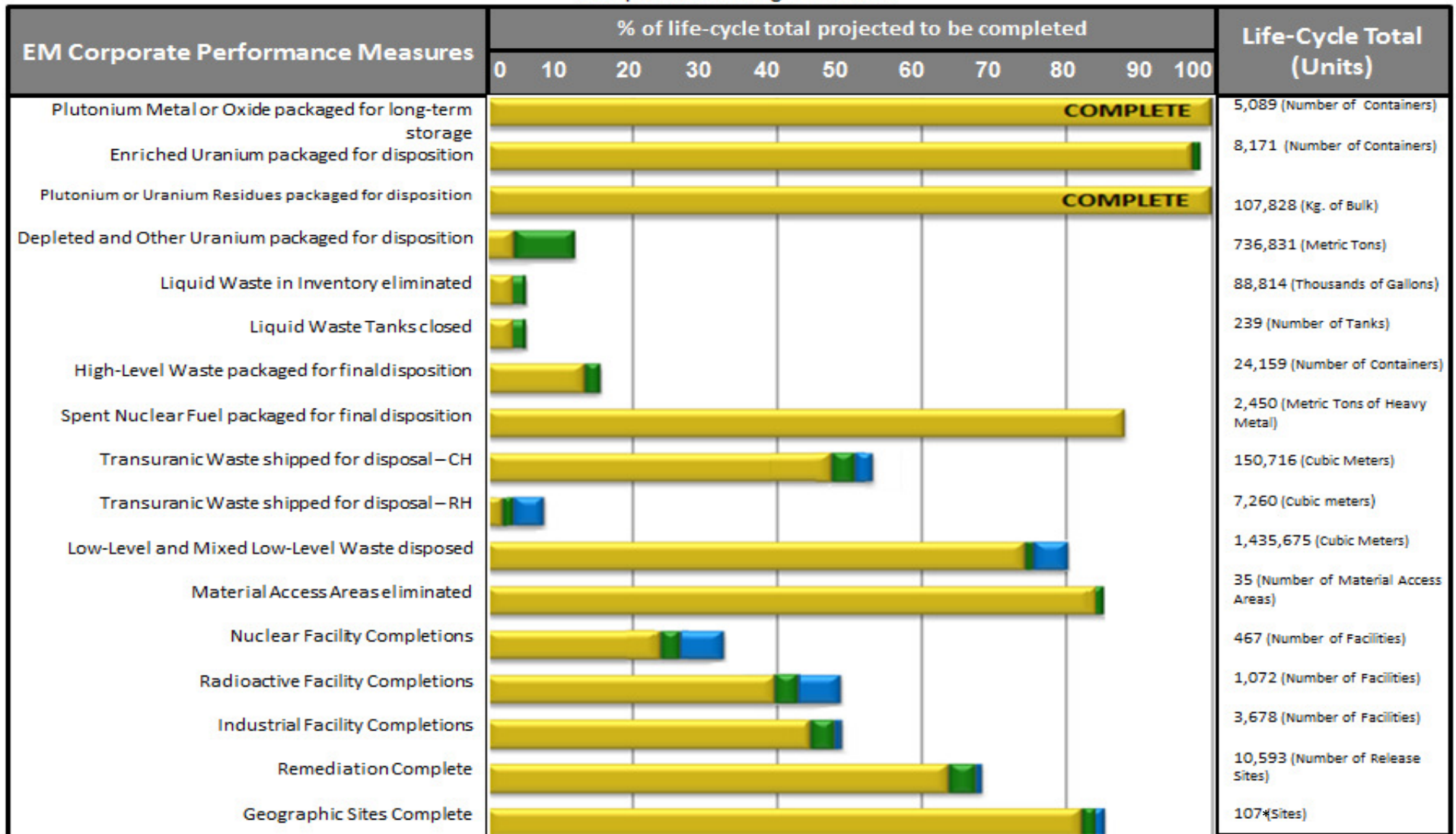
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End – Backup Follows.....



Corporate Performance Metric Life-Cycle Chart

Completions through FY 2012



Legend

- EM Actuals to Date (including FY 2010 Actuals for both ARRA and BASE)
- FY 2011 and FY 2012 Targets - BASE
- FY 2011 and FY 2012 Targets - ARRA



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* Original 110 Sites changed legislatively in 1998. Current inventory is 107 Sites.

. . . and making real progress . . .

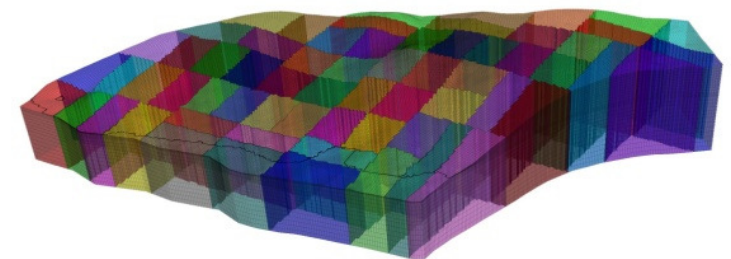
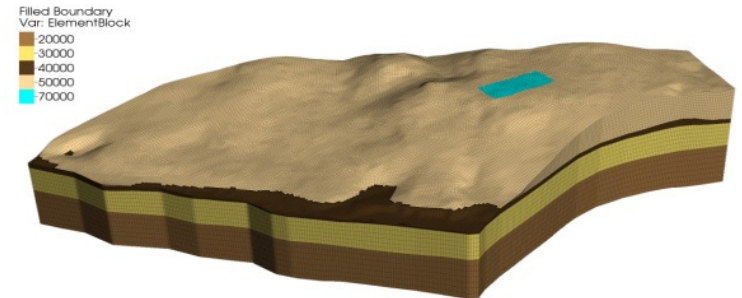
Recovery Act Success

- **Demolition Debris and Soil** – Permanently disposed 1,220,031 cubic meters of debris and soil, which is enough to fill 488 Olympic swimming pools
- **Facility Completions** – Completed demolition or cleanup of 180 of 261 facilities.
- **TRU Waste** – Dispositioned 2,959 cubic meters of transuranic waste. This waste has been removed from sites' inventories
- **Low-Level Waste/Mixed Low-Level Waste** – Disposed 78,925 cubic meters of low-level and mixed low-level waste, equal to 379,087 55-gallon drums
- **Groundwater Wells** – Installed 448 remediation and monitoring wells
- **Mill Tailings** – Disposed close to 2.2 million tons of uranium mill tailings, surpassing the goal for disposal of the tailings with Recovery Act funding at the Moab Site in Utah



Goal 2 : Advanced Simulation Capability for EM

- Completed ASCEM Phase I Demonstration
- Completed draft Platform requirements documents; significant progress on Platform Design document
- Completed refactoring the HPC build system, began developing better Third-Party Library support
- Developed time-dependent Richards' model for flow in the vadose zone
- Refactoring the mesh infrastructure, improving flexibility and generalizing interfaces
- Initiated development of the FY 2011 Phase 2 demonstration plan
- Contacted end users for updated recommendations for the ASCEM development team and conducted face-to-face meetings
- Received written guidance from DOE Richland Operations to proceed with use of BC Cribs for the Phase II Demonstration
- Presented ASCEM to and begun discussions with LANL, NNSS, Paducah, Portsmouth, and West Valley personnel on early adoption of ASCEM capability



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