Update on CERCLA* Waste Disposal Capacity for the Oak Ridge Reservation

Presentation to the
Oak Ridge Site Specific Advisory Board

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*Comprehensive Environmental Response, Compensation, and Liability Act of 1980
• Engineered landfill with six disposal cells
• Capacity 2.18 million cubic yards (equivalent to ~872,000 pickup truck loads)
• 43 acre footprint under final cover
EMWMF Fiscal Year 2015 status: 66% full

- Remaining ETTP cleanup projected to fill EMWMF
- Future Y-12 and ORNL facilities cleanup will require disposal capacity approximately equivalent to that of EMWMF
- Safe and compliant operation of EMWMF for almost 13 years, since 2002
  - No detected migration of contaminants throughout 13 years of quarterly groundwater monitoring
On-Site CERCLA disposal is key to safe, cost effective remediation

• Provided capacity for disposal of ETTP cleanup debris and soils
  – K-25 (44 acre building); K-33 (32 acre building), etc.

• Cost effectiveness
  – Avoided an estimated half a billion dollars in off-site disposal costs to date
  – Maintains jobs in East Tennessee

• Public, environmental, and worker risk reduction
  – Eliminated 130,000,000 driving miles
  – Reduces greenhouse gas emissions
  – Reduces waste handling needs and thus worker exposures

K-25 Building before demolition

After demolition
### Waste that is acceptable in an on-site facility

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<tr>
<th>Waste acceptable for on-site disposal</th>
<th>Waste not acceptable for on-site disposal</th>
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<td>• Low level radioactive waste (LLW)</td>
<td>• Higher activity LLW; High level waste</td>
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<td>• LLW mixed with hazardous constituents</td>
<td>• Waste from non-ORR generators</td>
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<td>• Asbestos, PCBs</td>
<td>• Spent fuel</td>
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<td>• Building demolition debris</td>
<td>• Transuranic waste</td>
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<td>• Scrap equipment</td>
<td>• Liquids</td>
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<td>• Personal protective equipment</td>
<td>• Other waste that does not meet an on-site waste acceptance criteria (WAC)</td>
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<td>• Classified waste</td>
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#### Volume 1
- Portion of CERCLA waste that meets ORR industrial landfill WAC.

#### Volume 2
- Portion of CERCLA waste that meets EMWMF WAC and would meet a future on-site disposal facility WAC.
  (sets capacity of future on-site facility)

#### Volume 3
- Portion of CERCLA waste that does not meet on-site facilities WAC must be disposed off-site.

WAC determines division
Additional disposal capacity is needed to complete Oak Ridge Cleanup Program

- Sequencing of baseline waste forecast indicates EMWMF at capacity in Fiscal Year 2024
- Based on program funding assumption of $420M/yr
- New disposal capacity (2.2 M yd$^3$) needed to support completion of cleanup
  [New disposal cell conceptual design 2.5 M yd$^3$]

EMWMF Reaches Capacity

EMWMF Capacity - 2.18 M

Cumulative Volume, cubic yards

 FY13 | FY15 | FY17 | FY19 | FY21 | FY23 | FY25 | FY27 | FY29 | FY31 | FY33 | FY35 | FY37 | FY39 | FY41 | FY43

EMWMF | EMWMF Uncertainty, 25% | New Capacity | New Capacity Uncertainty, 25%
DOE is evaluating future waste disposal alternatives in RI/FS

• No action
  – No ORR-wide coordinated disposal strategy
  – CERCLA waste disposal determined on an individual project basis

• On-site disposal
  – Construct and operate a new on-site landfill [aka Environmental Management Disposal Facility (EMDF)]

• Off-site disposal
  – Transportation to approved off-site disposal facilities (Nevada National Security Site [NNSS] and Energy Solutions facility in Utah)
Benefits of on-site waste disposal

- **COST SAVINGS**: Projected ~ $1 billion* in savings for on-site disposal versus off-site disposal over lifecycle
- **ACCELERATES CLEANUP**: Allows more funds to be directed to cleanup
- **REDUCES PUBLIC RISK**: Reduces transportation risk and carbon emissions
- **REDUCES PROGRAM RISK**: Allows control of waste disposal availability (not relying on multiple states to allow pass through, continued waste acceptance by, and operation of, off-site facilities)

![Transportation Risk Chart](chart.png)

*Based on preliminary D3 RI/FS results; *Based on D2 RI/FS Statistics
16 ORR sites evaluated as part of initial screening for on-site disposal

Siting considerations: topography and hydrology, available capacity, future land use
Focus of site evaluation narrowed to East Bear Creek Valley

Previous conclusions about East Bear Creek Valley hold true for future siting

- Historic and current waste management area
- Most compatible with future land use
- Most favorable for isolation from public
- Restricted access reduces vehicular impacts to local community
- Consistent with stakeholder input during siting of EMWMF and proposed EMDF
Initial analysis results – best alternative site is East Bear Creek Valley

- Sufficient capacity for projected volumes (phased construction will allow for a reduction in footprint if necessary)
- Proximity to existing EMWMF infrastructure and dedicated Haul Road is cost effective
- Located adjacent to brownfield areas and compatible with future land use plans
- Conceptual design accommodates hydrology of site using engineered features to control surface water and ground water
- Operational start needed by FY 2022; allows for 2 years of overlapping operation with existing EMWMF
Proposed on-site disposal facility protectiveness features

- Environmental protectiveness through:
  - Siting requirements
  - Design/construction/closure regulations
  - Waste acceptance criteria
  - Operations plans
  - Path to closure

Layers of conservatism ensure additional protectiveness

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<th>RCRA/TSCA, DOE landfill design requirements</th>
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<td>Engineered features to manage site hydrology</td>
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| Fate & transport modeling to 1,000 yrs & more:
  - Assumes cap and liner materials fail
  - Considers hundreds of contaminants
  - Develop preliminary waste acceptance criteria |
| Resident farmer used for risk model |
Limited Phase I characterization ongoing at proposed EMDF site

Data to be reported in RI/FS and used in RI/FS modeling
Projected activity dates are dependent on funding availability, regulatory approvals, and adjustments for operational capacity needs.

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**CERCLA Documents to ROD**
- Remedial Investigation/Feasibility Study (RI/FS)
- Proposed Plan (PP)
- Record of Decision (ROD)
- Feasibility Study, Water Mgmt

**Early Actions**
- Phase I Characterization
- Phase II Char. Planning/Procure.
- Phase II Characterization
- Baseline Monitoring

**Design**
- Composite Analysis/DOE Order 435 Crosswalk/Reviews
- Remedial Design Work Plan
- Procurement, RDR/RAWP, & Other Documents

**Site Development/Construction**
- Construction Planning/Procure.
- Site Development
- Construct Cells 1 & 2
- Operations Mobilization/Readiness Assessment

**DOE HQ Approval**
- Prepare/Submit CD-0,1,2,3,4
- HQ Review/Approval

Review and approvals under CERCLA. Appendix E milestones.
On-site disposal has allowed the Oak Ridge Cleanup work to proceed safely and efficiently over the last decade.

Additional capacity will be needed to support future cleanup activities.

On-site disposal is still safer and more cost effective than off-site disposal.

Many potential locations for a new disposal facility on the ORR considered.

Preferred location is in an area of past and current waste management operations/brownfield, adjacent to Y-12, isolated from public, and utilizes existing infrastructure.

ROD needed by FY 2016 to allow for un-interrupted on-site disposal.

Public and stakeholder involvement and consultation will continue to be a key part of the process.