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Waste Management/Disposition at East Tennessee Technology Park

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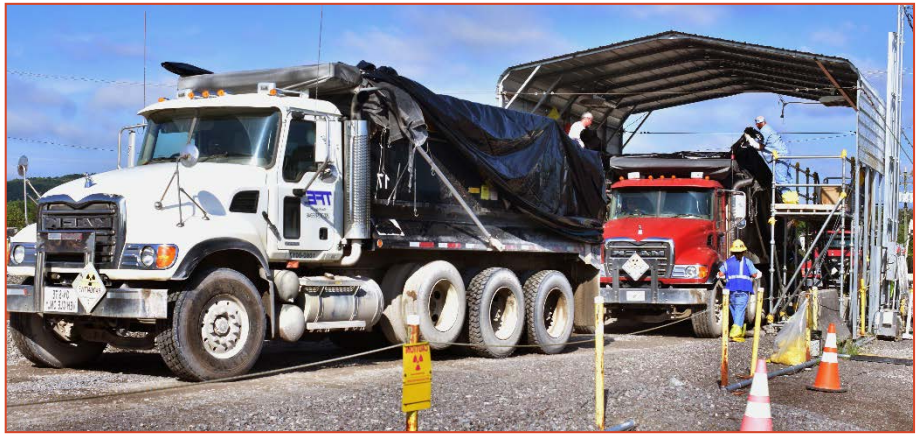

About ETTP

- **40 years of uranium enrichment**
- **Radioactive and chemical contaminants in buildings, soil, sediment, and groundwater**
- **Classified items**
- **No Path To Disposal (NPTD) inventory**
- **21+ million cubic feet of waste**

The Approach

- Sound characterization
- Disposition path based on characterization results
- Specified packaging
- Waste acceptance criteria evaluated for selected repository
- Waste shipped immediately upon generation
- No double handling or storage

Waste Management Program

- Recycle/Reuse
- Dispose at ORR Landfill
- Dispose at EMWMF
- Dispose at NNSS
- Treat/Dispose Commercially

Increasing Strategic Preference

Differentiators

- **Onsite waste disposal with dedicated haul road**
- **“Blue Pipe” waste segregation**
- **Truck loading optimization**
- **Reusable waste containers**
- **“Pack As You Go”**

Onsite Disposal

- **Environmental Management Waste Management Facility**
  - **Receives CERCLA-listed waste (i.e., Low-level, RCRA, TSCA, Mixed)**
  - **Approximately 85 percent of all ETTP cleanup waste disposed at EMWMF**
  - **Capacity adequate for remainder of ETTP cleanup**

Onsite Disposal (cont.)

- **Oak Ridge Reservation Landfill**
  - **Three additional landfills accommodating classified, sanitary and construction debris waste**
  - **Classified cell recently expanded to accommodate waste from former barrier production facility**
  - **Established new waste route between ETTP and ORRLF to**
    - **Accommodate heavier volumes of sanitary waste**
    - **Avoid public highways and eliminate traffic through Oak Ridge National Laboratory**

Accomplishments*

AUG 2011-DEC 2016	LOADS	VOLUME (yd³)
EMWMF (waste)	48,473	455,406
ORR Landfill	4,703	47,933
Other – Onsite	6,699	151,337
Energy Sol – Utah	129	2,009
NNSS	898	29,986
Other – Offsite	738	6,988
	61,640	693,648
EMWMF (clean fill)	12,004	156,845

*UCOR Contract Cumulative

Initial NPTD Waste Inventory

Waste Category	Quantity		Reason for "No Path" Designation
	Volume (m^3)	# Containers	
Classified F027 Mixed LLW Debris	5.8	11	F027 Listing, Classified
Classified PCB LLW Debris	9.4	4	PCBs, Classified
Reactive Mixed LLW Returns	0.8	4	Reactivity Characteristic
Classified Mixed LLW Liquids/Debris/Soils	18.3	27	Classified MLLW
Mercury Mixed LLW Debris Returns	15.2	34	Mercury, Organics
Dioxin/Furan Mixed LLW Liquids and Debris	15.8	61	Underlying Hazardous Constituents (UHCs)

NPTD Disposition Approach

- **Revisit historical waste characterization information; thoroughly understand the waste**
- **Review the regulatory framework – what's allowed and what's not allowed**
- **Revisit current available treatment technologies and disposal options**
- **Fill data gaps**
- **Reclassify and re-characterize**

NPTD Status

Waste Category	Reason for "No Path" Designation	Path Identified	Status
Classified F027 Mixed LLW Debris	F027 Listing, Classified	NNSS	☑
Classified PCB LLW Debris	PCBs, Classified	NNSS	☑
Reactive Mixed LLW Returns	Reactivity Characteristic	M&EC, NNSS	☑
Classified Mixed LLW Liquids/Debris/Soils	Classified MLLW	M&EC, NNSS	☑
Mercury Mixed LLW Debris Returns	Mercury, Organics	NNSS	☑
Dioxin/Furan Mixed LLW Liquids and Debris	UHCs	29 to M&EC, 31 awaiting results of treatability study	In process
Sodium and Lithium Hydride shields (material for recovery)	Reactivity Characteristic	22 to M&EC, 38 TBD	In process

Remaining Challenges

- **Dioxin and Furan Waste**
  - **Problem:**
    - **Includes both solidand liquid phase dioxin/furan F and U hazardous waste codes**
    - **Technology exists to treat the primary waste, however the secondary liquids have no treatment/disposal path**


K-1065 Waste Storage Facility

  - **Solution:**
    - **Re-characterize and remove Dioxin and Furan codes, which opened path for 29 of 60 to Perma-Fix's Diversified Scientific Services, Inc. (DSSI) for incineration**
  - **Status:**
    - **Treatability study under way for remaining 31 containers**

Remaining Challenges (cont.)

- **Sodium and Lithium Shields**
  - **Problem:**
    - **Large, odd-shaped items containing bulk sodium metal or lithium hydride**
    - **Extremely reactive resulting in two Type B investigations occurring within the DOE complex as a result of uncontrolled reactions**
  - **Solution:**
    - **Working with several vendors to determine safe, cost-effective disposition path**
  - **Status:**
    - **Perma-Fix treating 22 of small shields that fit into their treatment unit; searching paths for remaining shields**

Remaining Challenges (cont.)

- **Mercury-bearing Waste**
  - **Mainly soil and/or debris contaminated with mercury at Y-12 National Security Complex**
  - **Sensitivity with stakeholders for Land Disposal Restriction (LDR) compliant mercury waste to be disposed of onsite**
  - **Separation of elemental mercury from soil/debris**
    - **Amalgamation for radioactive elemental mercury and RMERC* for non-radioactive elemental mercury**
    - **RMERC or macro for debris under alternative treatment standard for debris**
    - **RMERC or stabilization under alternative treatment standard for soil**
  - **Controlling the release of mercury during deactivation and demolition**
  - **Industrial Hygiene challenges**
    - **Vapors**

*RMERC - Retorting or roasting in a thermal processing unit capable of volatilizing mercury and subsequently condensing the volatilized mercury for recovery

Remaining Challenges (cont.)

- **High Activity Waste generated at Oak Ridge National Laboratory**
  - **No hot-cell and/or facility capabilities for handling/characterization**
  - **Difficult to make DOT-compliant for shipment to potential treatment, storage, disposal, and recycling facilities (TSDRF)**
  - **Shutdown of Materials and Energy Corporation (M&EC) South Bay Facility eliminates the path previously used for this type of waste**

Complex-wide Challenges

- **Sodium shields and other sodium-bearing waste can be found at other DOE sites**
- **Eventual loss of M&EC South Bay will impact complex with processing high activity waste**
- **Due to lack of waste destined for several specific treatment technologies, TSDRF's are considering eliminating for business reasons**
  - **Could result in no treatment technology available and orphan waste being generated**