Perspectives on Mixed Waste Treatment

By

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MWT Operations

- Clive Mixed Waste Treatment and Disposal
  - Stabilization and Amalgamation (Hg)
  - Solidification
  - Vacuum Thermal Desorption (VTD)
  - Macroencapsulation
- Bear Creek Waste Treatment and Processing
  - Macroencapsulation
  - Stabilization and Amalgamation (Hg)

Current Outlook

- Lots of Treatment Capacity
- Intermittent Funding Availability/Priority

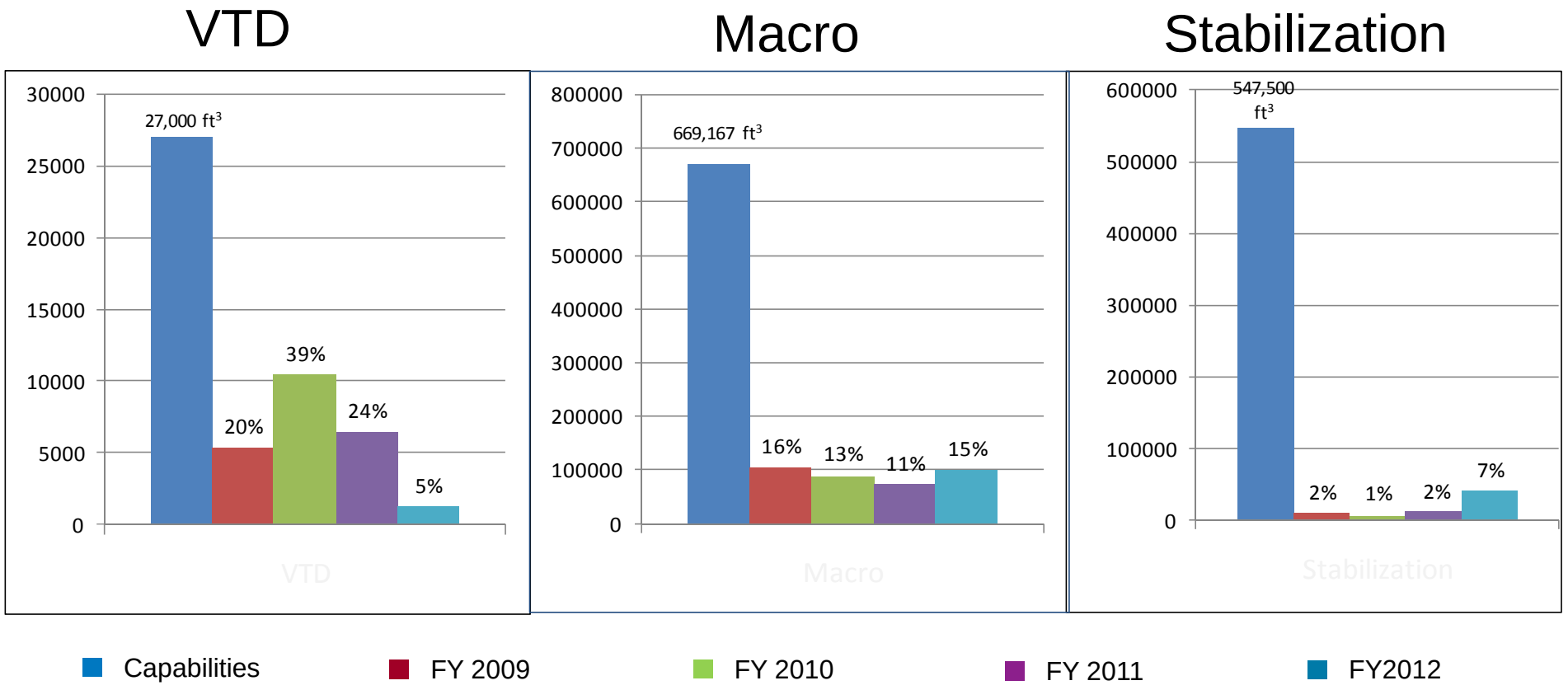
A Decade ago plenty of waste
For Mixed Waste Treatment

Recently not so much

Treatment Capabilities

ENERGYSOLUTIONS

Clive MWT Estimated Capabilities



PCB Treatment Capabilities at Clive

- ANY type of PCBs – No limits, No restrictions: 1,000,000 ppm
- Approval to shred PCB Large Capacitors (and other waste contaminated with PCBs)
- Approval to drain and flush PCB Transformers
- Aqueous incidental PCB liquids may be solidified and disposed
  - EPA Region 8 Coordinated Approval Jan 28, 2010 (for above three items)
- Now may receive air and water reactive wastes (previously restricted)

Mercury Treatment Capabilities at Clive

- Waste arrives in debris form, elemental Hg form, or in switches, thermometers, etc., and is sorted out for appropriate treatment
- Macroencapsulation
  - Encapsulation of radioactive Hg debris in a jacket of inert inorganic material, significantly reducing leachability of toxic constituents
  - Waste arrives in debris matrix, left in its shipping container and filled with a controlled low-strength material to create a monolith
  - Options allow for size-reduction, sort/seg, or repackaging
  - Containers transferred to the landfill and placed on risers; forms set up around the lot, which can vary with vault size, and poured with proprietary “Macro Mix” (batched at a plant on-site)

Mercury Treatment Capabilities at Clive (cont.)

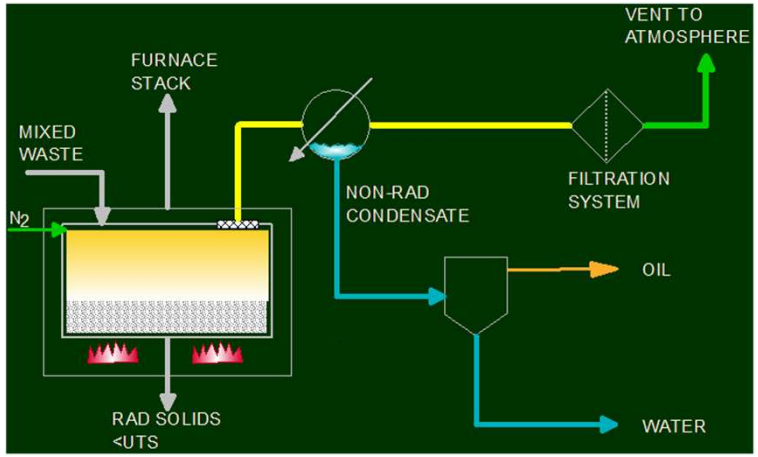
ENERGYSOLUTIONS

- Amalgamation
  - Elemental Hg contaminated with radioactive materials must be treated via amalgamation per 40 CFR 268.40
  - Energy*Solutions* treats both Low (< 260 ppm Hg) and High Subcategory Hg waste (≥ 260 ppm Hg)
  - Process
    - Step 1: Elemental Hg is amalgamated in a small volume mixer (adding chemicals with Hg and mixing)
    - Step 2: Stabilize Hg to meet the characteristic standard of 0.2 mg/L (treatment in a large volume mixer, adding reagents to make hazardous constituents insoluble)
    - Samples are collected and verified to ensure that waste meets the characteristic standard

Mercury Treatment Capabilities at Clive (cont.)

ENERGYSOLUTIONS

- Vacuum Assisted Thermal Desorption (VTD)
  - Used to separate organic, PCB, mercury, and other volatile compounds from bulk waste matrices
  - Process uses heat to vaporize volatile compounds and then condenses these compounds into a holding tank for incineration or other destructive treatment



Looking Ahead

- Treatment Capacity continues to not be an issue
- Significant Hg treatment capacity exists
- All subcategories:
- Elemental
  - Must meet characteristic concentration (0.2 mg/L TCLP)
  - Use a proprietary 2-step process (AMLGM – STABL)
- Low Subcategory (<260 mg/kg total mercury)
  - Must meet UTS (0.025 mg/L TCLP)
- High Subcategory (>260 mg/kg total mercury)
  - Variance from State of Utah to perform Stabilization-type treatment
  - Must meet characteristic concentration (0.2 mg/L TCLP)
  - Variance renewed annually (per rule)
- Renewed 10 times since November, 2001

Mercury Treatment Capabilities at Bear Creek

ENERGYSOLUTIONS

- Macroencapsulation
  - Augments capability at Clive
  - Stabilization/solidification treatment of radioactive mercury debris to meet Utah Land Disposal Restrictions for Clive
  - Macroencapsulation is used to treat debris contaminated with low-subcategory (< 260 ppm Hg) or high-subcategory mercury (≥ 260 ppm Hg)
  - Stabilized waste form analyzed post-treatment to ensure TCLP results are < 0.2 mg/L Hg per Clive's variance from State of Utah
- Amalgamation
  - Augments capability at Clive
  - Permitted, but to date has not been used to treat customer waste

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