

WM '11 Disposition of DOE High Activity Mixed Waste

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Current DOE Problematic Wastes

- Problematic wastes are those either without a current treatment or disposal path, have no available funding for disposition, or have not yet been generated.
- DOE EM's WIMs Database identifies MLLW with yellow or red status flags indicating problem for disposition:
 - High activity MLLW (> Class A or RH);
 - Labpacks
 - Sealed Sources
 - Reactives
 - Gloveboxes with high SCO (GTCC);
 - PCBs;
 - Sodium bearing wastes.
- EFCOG WM Working Group is working with DOE and site generators to ensure that there is an exchange of information for these wastes.

Problematic Wastes - Factors Affecting Acceptance at Perma-Fix

- Radioactive Materials License Capacity:
 - Special Nuclear Material gram limitations
 - Transuranic isotopes/radionuclide concentration limitations
 - Dose rate & contamination control limitations
- RCRA and TSCA Permit Limitations:
 - Codes and/or concentrations authorized
 - Waste matrices
- Available Processes and Time Needed to Treat:
 - How many processes needed to meet regulatory standards and disposal criteria
 - Waste matrices and complications of making the constituents “available” for treatment
- Personnel and Equipment
 - Training
 - Capital investment for new equipment

Problematic Wastes - Factors Affecting Acceptance at Perma-Fix

- Characterization
 - Is there ample information available to ship and accept? Process Knowledge adequate?
 - If sampling is needed, are there resources available at generator site?
 - Availability of qualified/approved Laboratories
- Transportation
 - Logistics (rail vs truck)
 - Container and conveyance needs/availability
- Disposal Sites
 - Can waste be treated to meet appropriate disposal WAC?
 - Profile approval process – information needed, approval time
 - Capacity and work load at disposal site



Problematic Wastes Received at Perma-Fix in 2010

- TRU wastes;
- 10 – 100 nCi/g wastes;
- High Activity and High Dose Wastes;
- PCBs;
- “Special” Mixed Wastes:
 - Labpacks;
 - Sodium bearing wastes;
 - Pyrophorics (e.g., DU/Th chips)
 - Mercury wastes



Research & Development

TRU Waste Repackaging

- Perma-Fix can receive TRU (>100 nCi/g) wastes for cutting/sizing, sorting and repackaging into WIPP acceptable containers, however there are challenges:
 - Rad license limits – TRU isotopes are limiting for acceptance;
 - Contamination control;
 - Personnel protection;
 - WIPP requirements and documentation.



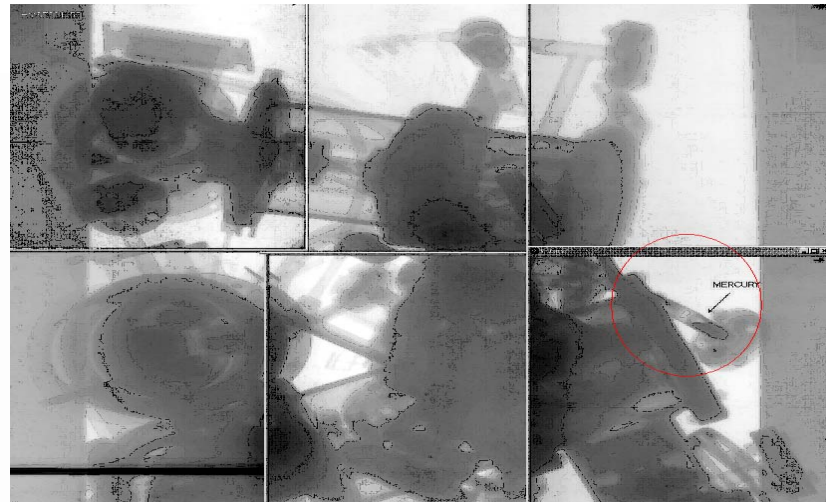
High Tritium Containing Wastes

- Perma-Fix can combust high curie content H3 waste at DSSI;
- This can be challenging due to:
 - Hazardous constituents (metals, Hg)
 - Legacy waste with minimal information requires sampling/verification;
 - Wide range of H3 concentrations;
 - Sealed containers;
 - Contamination control



Equipment Containing High H3

- Perma-Fix had to build capability (H3 Capture System) to manage high H3 wastes (lithium metal, gold traps, zeolite beds, pumps).
- Challenges included:
 - Characterization
 - Preventing Tritium Release
 - Removal of RCRA constituents (e.g., Elemental Hg) for treatment



Tritium Capture System

- HEPA filtration system to remove particulates
- Carbon bed to remove hydrocarbons/mercury
- Catalyst bed to convert H^2/H^3 molecules to water
- Condenser to remove bulk water from the air
- Air released through TEG bubbler drums to remove residual tritium
- Majority of air recycled back to glovebox
- Double containment (Glovebox and enclosure at negative pressure)



High Activity & High Dose Wastes

- Controlling the spread of contamination in the facility and protecting personnel (mobile TRU radionuclides, Tc99);
- Use remote cutting and handling equipment and shielding for contamination control and minimization of employee exposure
- High Activity labpacks have also been dispositioned typically using our DSSI Combustion Facility.



Summary

- The market place will add technologies and capabilities to address most problematic MLLW but will funding be available for low volume/high cost wastes?
- There are still some problematic MLLW that represent a challenge (e.g., Sodium and other reactives, dioxins/furans, etc.) that collaboration between generators and processors may be able to address;
- The EFCOG WM Working Group can be a resource to generators with these wastes so please contact us if we can help facilitate resolution. Renee Echols – rechols@perma-fix.com, 865-599-4064.