Disposal Innovations for Large Components Onsite at Savannah River Site

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• Licensed under DOE O 435.1 / Disposal Authorization Statement
  – Performance Assessment drives most disposal requirements
    • Generic disposal limits for each radionuclide of concern (specific to each disposal unit)
    • Packaging requirements and void space
    • Distribution of key radionuclides
    • Depth to groundwater

• ELLWF Disposal Units Include
  – Low Activity Waste (LAW) Vaults
  – Intermediate Level Waste (ILV) Vaults
  – Component in Grout (CIG) Trenches
  – Engineered Trenches (ETs)
  – Slit Trenches (STs)
• **Proposed waste receipts into ELLWF**
  – Checked against the WAC and generic isotope PA limits
  – Then routed to the most optimal disposal unit.
  – > 75% of all waste disposed goes into the Slit Trenches.

• **Slit Trenches (STs)**
  – Multiple STs are operational at the same time
    • *Balance curie disposal within the trench volume*
    • *Avoid using all allowable curies within a small fraction of the trench volume*
  – Trench segments are excavated as needed to allow for disposal and placement of soil cover in short time frame.
  – Containerized waste is craned into trench.
  – Loose bulk waste is pushed into trench.
Aerial of Slit Trench Disposal
Normal Slit Trench Disposal
What if it isn’t normal (non-routine)?

• Not all proposed waste receipts meet the generic disposal limits
  – Can the waste be disposed on site with additional analysis, or
  – Does the waste need to be disposed off site?

• For on site disposal…
  – A Unreviewed Disposal Question Evaluation (UDQE) and/or a Special Analysis (SA) is developed
  – UDQE or SA may determine waste meets existing PA limits
  – SA may set new limits (e.g., special waste form) and/or define mitigative actions such as grouting, additional containment, etc.
  – SA requires approval by DOE-SR
Examples of Non-Routine LLW Disposal

- HWCTR Process Vessel
- Tall Used Equipment Boxes
- Reactor Heat Exchangers
Examples of Non-Routine LLW Disposal

• HWCTR Process Vessel – did not meet generic isotope disposal limits for multiple isotopes
  – SA: new special waste form limits for the isotopes of concern
    • Grout below and above the midpoint of the vessel required.

• Tall Boxes – met generic isotope limits, but boxes were too tall for dimensions of STs (20’ deep = 16’ waste + 4’ soil cover).
  – UDQE: allowed an additional 10’ deeper in the ST footprint
    • Did not challenge PA due to the geology in the area; sufficient depth to water table
    • Drive-in ramp had to be constructed to allow boxes to be driven in

• Heat Exchangers – multiple issues with on site disposal
  – Initial characterization indicated they did not meet the WAC
  – Each ~25’ long, ~12’ dia. and weighed 120,000 - 190,000 lbs
  – Equipment stand off limits (25 ft) posed operational challenges
Examples of Non-Routine LLW Disposal

- **Heat Exchangers – continued**
  - No funding was available for off site disposal
  - Additional data was gathered and the heat exchangers were recharacterized (30 of 49 met generic disposal limits)
  - SA for remaining 19 Heat Exchangers (H-3 and C-14):
    - *Generic PA limits were based on assumptions that*…
      - each contaminant is instantaneously available for transport by groundwater, and
      - no credit is taken for subsurface hydraulic barriers (e.g. the container)
    - *SA took credit for*…
      - the structure of the heat exchangers as a hydraulic barrier, and
      - that much of the contamination was embedded in the metal and would only become mobile through corrosion
    - *Some of the flanges and drain ports would require preparatory work before disposal*
  - Was able to utilize the trench used for the Tall Box campaign
Tall Used Equipment Box Disposal
Reactor Heat Exchanger Disposal
Questions or Comments?

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