Low Level Radioactive and Mixed Waste Management Options

Prepared By

Subcommittee of the

ASME Radwaste Systems Committee
Low Level Radioactive and Mixed Waste Management Options

Radioactive Waste*

- Mixed Waste (MW)
- TSCA and Radioactive Waste (Asbestos, PCB's)
- Low-Level Radioactive Waste (LLRW)

*Greater than Class C (GTCC) and Spent Fuel are not within this chart's scope
<table>
<thead>
<tr>
<th>LLRW Processing Options</th>
<th>ATG</th>
<th>Duratek</th>
<th>US-Ecology</th>
<th>Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incineration/Thermal</td>
<td>★</td>
<td>★</td>
<td></td>
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<tr>
<td>Supercompaction</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Decontamination</td>
<td>★</td>
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<tr>
<td>Solidification/</td>
<td>★</td>
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<tr>
<td>Stabilization</td>
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<tr>
<td>Metals Processing</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Storage for Decay</td>
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<td></td>
<td>★</td>
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<tr>
<td>Repackaging</td>
<td>★</td>
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</tbody>
</table>
TSCA Mixed Waste Treatment Options

Does Waste Contain PCB's?
- Yes → Is PCB Contamination >50 ppm?
  - Yes → Is the Material Bulk Clean-Up Waste?
    - Yes → Is PCB Contamination from Coatings, Paint, Plastics, etc?
      - Yes → Disposal at Envirocare
      - No → No Outlet Exists for Treatment/Disposal
    - No → No Outlet Exists for Treatment/Disposal
  - No → Treat as LLRW
- No → Treat as LLRW
## LLRW and MW Disposal Options

<table>
<thead>
<tr>
<th>Location</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Barnwell</td>
<td>- Accessible to all generators for LLRW</td>
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<tr>
<td></td>
<td>- Can bury most LLRW waste streams</td>
</tr>
<tr>
<td></td>
<td>- Highest cost option</td>
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<tr>
<td></td>
<td>- By 2008 will only be available to Atlantic Compact Generators</td>
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<tr>
<td>Envirocare</td>
<td>- Difficult for small generators to deal with directly</td>
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<td></td>
<td>- Easily accessed through a waste processor</td>
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<tr>
<td></td>
<td>- Only permitted mixed waste disposal in the U.S.</td>
</tr>
<tr>
<td>US Ecology Richland</td>
<td>- Can only bury LLRW from NW and Rocky Mountain Compacts</td>
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<td></td>
<td>- Can accept NORM/NARM from throughout the U.S.</td>
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<td></td>
<td>- Can accept certain sealed sources.</td>
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<tr>
<td>Waste Control Specialists</td>
<td>- Burial of NORM waste</td>
</tr>
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<td></td>
<td>- May store LLRW for indefinite periods</td>
</tr>
<tr>
<td></td>
<td>- Treatment and storage of mixed and TSCA waste</td>
</tr>
<tr>
<td></td>
<td>- Attempting to license LLRW disposal</td>
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</tbody>
</table>
LLRW Waste Management Options

Low-Level Radioactive Waste

- DAW
- Biological
- Liquids or Evaporator Concentrates
- Soil / Concrete Rubble
- Sealed Sources
- Metal
- Resins/Sludges
LLRW Waste Management Options for DAW

DAW

- Short half-life
  - Yes: Store on site
  - No: Combustible

- Combustible
  - Yes: ATG or Duratek Thermal Processing
  - No: Supercompaction

- Supercompaction
  - ATG, Duratek, US Ecology, RACE

- Store on site
  - Yes: Medical waste incinerator
  - No: Commercial Disposal

- Commercial Disposal
  - GIC

- Storage at WCS or Generator's Site

- Barnwell

- Envirocare
LLRW Waste Management Options for Sealed Sources

Sealed Sources

- Ra-226
  - Yes → <50 uCi → Yes → Barnwell
  - No

- Transuranic
  - Yes → <50 uCi → Yes → Barnwell
  - No

- Other
  - Yes → <1 uCi/cc
    - Yes → Barnwell
    - No → Stabilize
LLRW Waste Management Options for Biological

- Biological
  - Short half-life
    - Yes: Decay on site
    - No: ATG or Duratek Thermal Treatment
      - Yes: Envirocare
      - No: Barnwell

- Medical waste incinerator
LLRW Waste Management Options for Metals

**Metal**
- Decontaminate for free release
  - Yes → Scrap dealer
  - No → Metal Melt, Directed Disposal (GIC), Volume Reduction

**Metal Melt**
- *Duratek*

**Directed Disposal (GIC)**

**Volume Reduction**
- *ATG*
- *Duratek*
  - *ESBC*
- *Storvik*
- *RACE*
- *Alaron*
LLRW Waste Management Options for Liquids or Evaporator Concentrates

1. Evaporator Concentrates Processing
   - Nukem or Duratek
   - UF/RO Reject

2. LIQUID
   - Sanitary Disposal
     - Yes → Sewer
     - No → Decay
       - Yes → Sewer
       - No → Solidification

3. Solidification
   - Disposal
     - Barnwell or Envirocare

4. Thermal Processing
   - ATG or Duratek

5. Impact Services, Permit NW
   - Zs BC
LLRW Waste Management Options for Resins or Sludges

RESIN OR SLUDGES

GIC for Directed Disposal

Yes → Directed Disposal

No → Resin to Studsvik

Decay and/or Process for Disposal by Dewatering in a HIC or Solidification

Yes → Class A or below to Envirocare for Disposal

No → > Barnwell Disposal
LLRW Waste Management Options for Soils

Soil

Less than truckload quantities

No

Yes

Soil Washing Or Thermal Desorption (Organics)

Profile for direct disposal

Overfill material at a waste processor facility

Disposal