Projected Receipts of Domestic and Foreign Research Reactor Fuels

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Used Nuclear Fuel Program Manager
DOE-Savannah River

Nuclear Materials Committee
December 10, 2013
• To provide information on future fuel receipts which fulfills a Nuclear Materials Programs work plan item.

• Discuss the Principles of Understanding between the State of South Carolina and DOE. This is an action from the response to recommendation #300 subpart #2.
Savannah River Site
Waste and Material Flow Path

This depiction of SRS activities shows only the general scope of the major facilities and missions. It does not represent all processes or all materials flow.

Off-Site Disposal
e.g., Clive, Utah,
Three Rivers Landfill

LLW, MW & HW

Area Completion Projects
On SRS Disposition
Soil and Groundwater D&D
In-Situ
Off SRS Disposition

LLW

C & D Landfill

Off-Site Treatment & Disposal Facilities
WIPP
HWMMW
Rubble

E/N-Area
LLW Storage/Disposal
MW Storage
TRU Waste Storage

MOX Product
KAMS/KIS

Irradiated Lithium
Targets

Tritium
Reservoirs

238-F

Excess Pu
Consolidation

Surplus Unirradiated
HEU Consolidation

Gap Pu

Non-A SNF
To INL

AI SNF
To INL

Domestic Reactor
Fuel

Used Foreign Research
 reactor Fuel

Low-Enriched
Uranium Solution

Liquid HEU
From Canada

Analytical Labs
SRNL

Work for Others


Legend

Product Leaving Site
Waste Disposal On Site
Process Materials Input
On-Site Flow of Materials and Waste

HLW Tank
Active Tank Closure
Closed Tank
EM Facilities
NNSA Facilities

ACRONYMS
AI – Aluminum
ARF – Actinide Removal Process
CDP – Construction and Demolition
C&D – Commingling and Disposition
CER – Community Environmental Relief
CIMF – Extreme Waste Processing Facility
CIP – Excess Energy Utilization
CWBF – Class Waste Storage Building
KAMS – Area Material Storage Facility
PWS – PWR Waste Separation
LLW – Low Level Wastes
HEU – Highly Enriched Uranium
HLW – High Level Wastes
HW – Hazardous Wastes
INL – Idaho National Laboratory
MCU – Modular Cask Site Solvent Extraction Unit
MOX – Mixed Oxides
MW – Mixed Wastes
PBF – Savannah River Processing Facility
SCL – Savannah River Plant
SINR – Savannah Ignition Reactor
SWPF – Salt Waste Processing Facility
TRNL – Savannah River Site
WIPP – Waste Isolation Pilot Plant
HS – Waste Satisfaction Building

Federal Repository

Saltstone

Saltstone

SLDF

SDU Future

GWBF

GWBF

Interim Storage

Recycle
Waste
DOE – Department of Energy
DRR – Domestic Research Reactor
FRR – Foreign Research Reactor
HFIR – High Flux Isotope Reactor
MIT – Massachusetts Institute of Technology
MURR – Missouri University Research Reactor
SC – South Carolina
SCDHEC – South Carolina Department of Environmental Control
SRE – Sodium Reactor Experiment fuel
SRS – Savannah River Site
UNF – Used Nuclear Fuel
### Current inventory as of 9/30/13

<table>
<thead>
<tr>
<th></th>
<th>FY 2012</th>
<th>FY 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ending Inventory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bundles</td>
<td>3197</td>
<td>3165</td>
</tr>
<tr>
<td>Cores</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td><strong>New Receipts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>59 (bundles)</td>
<td>11 (bundles)</td>
</tr>
<tr>
<td><strong>Removed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRE</td>
<td>9 (bundles)</td>
<td>43 (bundles)</td>
</tr>
<tr>
<td>FRR/DRR</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HFIR</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
## Projected FY14 Inventory Changes

### Receipts:

<table>
<thead>
<tr>
<th>Type of UNF</th>
<th>Location</th>
<th>Projected Receipts (bundles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRR</td>
<td>3 Casks - Anticipated but subject to change</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Canada (1)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>United Kingdom (1)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Switzerland (1)</td>
<td>4</td>
</tr>
<tr>
<td>DRR</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>MURR (3)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>MIT (1)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

### Removals:

<table>
<thead>
<tr>
<th>Type of UNF</th>
<th>Projected Bundles to be Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRE</td>
<td>95</td>
</tr>
<tr>
<td>FRR/DRR</td>
<td>125 (assumes funding available for 5 dissolution batches)</td>
</tr>
<tr>
<td>HFIR</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>220</strong></td>
</tr>
</tbody>
</table>
Projected Basin Capacity

DRAFT

EBS Bundle Positions Filled by Base FRR/DRR plus Receipt Scenarios

Assumption with AROD:
- Process 1000 Bundles
- FY14 - FY18

Assumption all Cases:
- Process 147 Bundles of SRE and Hi-Al FY13 - FY14

Inventory at the End of each Fiscal Year

Most Probable Inventory with AROD: FRR/DRR + UK Gap + NRU/NRX
Maximum Inventory with AROD: FRR/DRR + UK Gap + NRU/NRX + SA Gap
Most Probable Inventory without AROD: FRR/DRR + UK Gap + NRU/NRX
Maximum Inventory without AROD: FRR/DRR + UK Gap + NRU/NRX + SA Gap

EBS Current Capacity 3650

7/24/2013
Principles of Understanding

- 1980 Agreement between the State of South Carolina and DOE which is administered by SCDHEC. It acknowledges the need for mutual cooperation in the safe transport of radioactive waste.

- Signed by Governor Richard Riley and the Acting Under Secretary of Energy Worth Bateman on October 30, 1980.

- It applies to all shipments of radioactive waste by or for DOE, to or from any waste disposal/storage site located in South Carolina. Also includes shipments of non-commercial and foreign spent nuclear fuel to SRS.

- DOE accepts responsibility for shipments and takes action in response to claims, actions, or proceedings brought against DOE due to radiological injury or damage to persons or property.
Principles of Understanding (cont)

• Principles do not apply to shipments under National Security or Defense.

• Submitted annually by January 1, to the Commissioner of SCDHEC

• Submitted Information includes:
  • Name and address of DOE Shipper
  • Written certification that each DOE shipper has current disposal license and waste acceptance criteria
  • Written certification that justifies the radioactive waste shipped will be generated from its national security or defense functions.
  • Inspection requirements at SRS to ensure no violations of packaging and transportation requirements.
Overall inventory was reduced in FY2013 to below the FY2012 inventory total.

The Amended Record of Decision allows the continued use of L-basin without additional costs for new storage racks.

Projections show that FY2014 inventory will be reduced to below FY2013 inventory total.

Principles of Understanding is the mechanism that notifies SCDHEC of the wastes and UNF that is coming into and out of SRS.