

Task Order 12 – Standardized Transportation, Aging, and Disposal Canister Feasibility Study

Appendix D Performance Requirements

RPT-3008859-000

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REVISION LOG

Rev.	Date	Affected Pages	Revision Description

D.0 Performance Requirements

The AREVA Team identified performance requirements identified associated with those functions described in the main body of the report. The following sections list the details of those performance requirements.

D.1 Receive UNF

STAD is loaded at the reactor site with UNF (including GTCC waste).

- Must not exceed capacity at the utility site, typically 125 tons maximum.
 - Some sites are rated between 70 and 100 tons.
- Shall accommodate a wide range of fuel, site, and environmental characteristics.
- Shall accommodate all fuel configurations (length, etc., with the exception of STP UNF).
- Shall meet criticality requirements (Part 71 and Part 72).
- Shall be compatible with fuel pool chemistry.
- Shall be capable of holding canned damaged fuel.
- Shall have the ability to mix fuel heat loads to accommodate a range of reactor fuel.
- Shall receive fuel no greater than 62 GWd/MTU (fuel assembly average); assumed for purposes of evaluation; may be expanded later during maturation.
- Shall be no greater than five without fuel.
- Shall be capable of supporting material and control and accountability process.

D.2 Store UNF at Utility Site

STAD is stored at reactor site for a short duration to accommodate transportation strategy, utility schedules, and unplanned delays.

- Shall be able to be licensed at the reactor site (40-year license cycle).
- Shall be qualified for vertical or horizontal storage (one design).
- Shall be qualified for dry storage at the utility site.
- Shall be stored no more than 20 years (assumed for evaluation purposes).

D.3 Transport UNF to CSF

STAD is transported to CSF by normal conveyances.

- Shall be capable of intermodal transportation.

D.3.1 Transport UNF by Rail

- Shall meet all transportation requirements when used with an overpack system.
 - Criticality
 - Structural integrity
- Railcar shall meet requirements of AAR Specification (S-2043).

D.3.2 Transport UNF by Road

- Shall meet all transportation requirements.
 - Criticality
 - Structural integrity
 - Gross weight limit

D.3.3 Transport UNF by Barge

- Shall meet all transportation requirements.
 - Criticality
 - Structural integrity

D.4 Store UNF at CSF

STAD is stored at CSF prior to shipment to the repository.

D.4.1 Receive UNF

STAD is loaded at CSF with UNF from non-STAD CSF storage.

- Shall accommodate a wide range of fuel, site, and environmental characteristics.
- Shall accommodate all fuel configurations (length, etc. with the exceptions of STP UNF).
- Must not exceed crane capacity at the CSF site.
- Shall meet criticality requirements (Part 71 and Part 72).
- Shall be compatible with fuel pool chemistry.
- Shall be capable of holding canned damaged fuel.
- Shall have the ability to mix fuel heat loads to accommodate a range of reactor fuel.
- Shall be capable of supporting material and control and accountability process.

D.4.2 Store UNF at CSF

STAD is stored at CSF.

- Shall have a minimum 100-year storage life at CSF.
- Shall utilize CSF equipment.
 - Overpacks
 - Handling
- Shall be qualified for vertical or horizontal storage.

D.4.3 Remove UNF from Storage

STAD is removed from storage and may be opened for fuel inspection (R&D) or readied for transportation to repository.

- Shall be qualified for multiple storage and transport cycles.
- Shall be capable of maintaining fuel integrity in the event it is to be opened.
- Shall be capable of being monitored for aging management program activities.
- Shall not preclude the ability to open the STAD to retrieve fuel for R&D.

D.5 Transportation to Repository

STAD is transported to CSF by transportation conveyances.

- Shall be capable of intermodal transportation.

D.5.1 Transport UNF by Rail

- Shall meet all transportation requirements when used with an overpack system.
 - Criticality
 - Structural integrity
- Railcar shall meet requirements of AAR specification (S-2043).

D.5.2 Transport UNF by Road

- Shall meet all transportation requirements.
 - Criticality
 - Structural integrity
 - Gross weight limit

D.5.3 Transport UNF by Barge

- Shall meet all transportation requirements.
 - Criticality
 - Structural integrity

D.6 Dispose of UNF

STAD undergoes final emplacement at repository.

D.6.1 Stage at UNF Repository

STAD is staged at repository prior to moving to final disposal.

- Shall be qualified for vertical or horizontal storage.
- Shall be emplaced in the repository within design life of the STAD.

D.6.2 Transport and Emplace UNF

STAD is moved through repository system and emplaced.

- STAD shall have the capability to be inserted into an overpack if needed.

D.6.3 Store UNF at Disposal Location

STAD is stored at final disposal location.

- The STAD and overpack shall, in combination, meet the future repository performance objectives.

D.7 General Requirements

The Team identified general requirements as listed in Table D-1.

Table D-1. General Requirements

Requirement Source	General Requirement
10 CFR Part 60	Disposal of High-Level Radioactive Wastes in Geologic Repositories
10 CFR Part 71	Packaging and Transportation of Radioactive Material
10 CFR Part 72	Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, and Reactor- Related Greater than Class C Waste
10 CFR Part 50	Domestic Licensing of Production and Utilization Facilities
10 CFR Part 20	Standards for Protection Against Radiation
10 CFR Part 73	Physical Protection of Plants and Materials
AAR Guidelines	Weight Limit for Railcar Shipment
DOT	Limits for trucks to carry over public highways