18 TECHNICAL SPECIFICATIONS EVALUATION

18.1 Conduct of Review

The staff reviewed the proposed technical specifications and the bases for the Idaho Spent Fuel (ISF) Facility to ensure they are defined and justified appropriately. The technical specifications must be supported by the technical disciplines reviewed in this Safety Evaluation Report (SER). Technical specifications define the conditions deemed necessary and sufficient for safe operation and include approved contents, limiting conditions for operation, surveillance requirements, design features, and administrative controls.

The review considered how the information in the Safety Analysis Report (SAR) (Foster Wheeler Environmental Corporation, 2003a) addresses the following regulatory requirements:

- 10 CFR §72.26 requires the inclusion of technical specifications in accordance with the requirements of §72.44 and a summary statement of the bases and justifications for these technical specifications.

- 10 CFR §72.44(c) requires that the technical specifications include requirements in the following categories: (i) functional and operating limits and monitoring instruments and limiting condition settings, (ii) limiting conditions, (iii) surveillance requirements, (iv) design features, and (v) administrative controls.

- 10 CFR §72.44(d) requires that the technical specifications include requirements for (i) establishing operating procedures for control of effluents, (ii) maintaining and using equipment in the radioactive waste treatment systems to meet the requirements of §72.104, and (iii) submitting an annual report on radionuclides release to the environment in liquid and gaseous effluents to the U.S. Nuclear Regulatory Commission in accordance with §72.4.

18.1.1 Approved Contents

Approved contents consider limits on the types of fuel to be stored and the handling and storage conditions necessary to protect the integrity of the stored fuel, protect employees against occupational exposure, and guard against the uncontrolled release of radioactive materials. The approved contents limits included in the revised ISF Facility technical specifications are listed in Table 18-1. The table lists the section of this SER that documents the acceptability for each limit reviewed.

The approved spent nuclear fuel (SNF) limits included in the ISF Facility technical specifications are listed in Table 18-2. Materials to be stored include (i) Peach Bottom fuel elements; (ii) Training, Research, and Isotope reactors built by General Atomics (TRIGA)fuel elements; and (iii) Shippingport fuel reflector modules and reflector rods. Descriptions of the materials to be stored are provided in Section 3.1.1, “Materials to be Stored;” of the SAR and Appendix D of the License Application (Foster Wheeler Environmental Corporation, 2003b). Weights of the loaded canisters are listed in Table 4.2-6, Section 4.2.3.3.1, of the SAR (Foster Wheeler Environmental Corporation, 2003a). The decay heat load for the ISF is provided in Appendix D of the License Application (Foster Wheeler Environmental Corporation, 2003b) and is shown as Table 18-3.

Table 18-1. ISF Facility Technical Specifications

Technical Specification Item	Technical Specification Description	Associated SER Sections
2.1	Materials to be stored	4.1.1, 7.1.1 , 8.1.2
2.2	Decay heat load for ISF facility vaults	6.1.1

Table 18-2. Characteristics of materials to be stored

Fuel Characteristic	Peach Bottom Fuel	Shippingport Fuel Modules	TRIGA Fuel
Cladding	Graphite	Zircaloy-4	Aluminum or stainless steel
Maximum fuel enrichment	16 w/o uranium enriched to 93.15 percent U-235	Not applicable (unenriched nonfissile ThO_2)	9 w/o uranium enriched to 20 percent U-235
Maximum decay heat per canister	33 W [113 Btu/hr]	10 W [34 Btu/hr]	36 W [123 Btu/hr]
Fuel design	High temperature gas cooled with graphite moderation	Light water breeder reactor ThO_2 type IV/V reflector	Light water cooled, graphite or water-reflected reactor
Maximum burnup	900 effective full power days 72,717 MWd/MTHM	30,000 effective full power hours	Not specified
Number of fuel elements, reflector rods, or reflector modules per ISF canister	10	127 loose rods 1 reflector module (up to 228 reflector rods)	108

Table 18-3. Heat load for the ISF Facility

Vault	Storage Tube Heat Load, W [Btu/hr]	Number of Storage Tubes	Heat Load, W [Btu/hr]	Vault Heat Load, W [Btu/hr]
1	40 [136]	76	3,040 [10,373]	6,160 [21,019]
	120 [409]	26	3,120 [10,646]	
2	40 [136]	132	5,280 [18,016]	6,720 [22,930]
	120 [409]	12	1,440 [4,913]	
			Total	12,880 [43,948]

Based on its review of the information presented, the staff concludes that the approved contents limits listed in Tables 18-1, 18-2, and 18-3 are those placed on fuel to be stored at the ISF Facility and are necessary to: (i) protect the integrity of the stored fuel, (ii) protect employees against occupational exposure, and (iii) guard against uncontrolled release of radioactive materials. The staff concludes, therefore, that the proposed ISF Facility technical specifications are in compliance with 10 CFR §72.44(c)(1)(i).

18.1.2 Limiting Conditions/Surveillance Requirements

Limiting Conditions for Operation (LCO) are the lowest functional capability or performance levels of equipment required for safe operation. Surveillance Requirements (SR) provide for (i) inspection and test activities to ensure the necessary integrity of required systems is maintained, (ii) confirmation that operation of the ISF Facility is within the required functional and operating limits, and (iii) confirmation that the limiting conditions required for safe storage are met. The LCOs and SRs included in the ISF Facility technical specifications are listed in Table 18-4. This table also lists the section of the SER that documents the acceptability for each LCO and SR.

The staff confirmed that the limiting conditions listed in Table 18-4 specify the lowest functional capability for that equipment required for safe operation. In addition, the staff confirmed that the SRs listed in Table 18-4 provide for necessary inspection and testing, confirm operation within appropriate functional and operating limits, and confirm that limiting conditions for safe storage are met. The staff concludes that the ISF Facility technical specifications are in compliance with 10 CFR §72.44(c)(2) and §72.44(c)(3).

Table 18-4. Limiting Conditions for Operation/Surveillance Requirements

Technical Specification Item	Limiting Condition for Operation	Associated Surveillance Requirement	Associated SER Section
LCO 3.1.1	Leak rate of ISF canisters	SR 3.1.1	9.1.2
LCO 3.2.1	Leak rate for storage tubes	SR 3.2.1.1 SR 3.2.1.2	9.1.2 5.1.1.2
LCO 3.2.2	Storage vault heat removal system	SR 3.2.2	3.1.1, 3.1.2.2, 4.1, 6.1.1
LCO 3.3.1	Only one type of fuel present in FPA	SR 3.3.1.1 SR 3.3.1.2	4.1.3, 3.1.2 8.1.3.1
LCO 3.3.2	Criticality monitoring system shall be operable	SR 3.3.2.1 SR 3.3.2.2	3.1 8.1.1
LCO 3.4.1	HVAC system shall be operable	SR 3.4.1.1 SR 3.4.1.2 SR 3.4.1.3	3.1.3

18.1.3 Design Features

The design features portion of the technical specifications includes items that would have a significant effect on safety if altered or modified, such as materials of construction or geometric arrangements. The design features included in the ISF Facility technical specifications are listed in Table 18-5. The table also lists the section of this SER that documents acceptability for each design feature.

Table 18-6 lists the applicable codes for the ISF storage tubes, ISF canisters, and ISF baskets. Materials used in the construction for the storage tubes, canisters, and baskets are specified in Section II of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (American Society of Mechanical Engineers, 1998a). Storage tubes are constructed to the requirements of Class 2 vessels, and canisters are constructed to the requirements of Class 1 vessels (American Society of Mechanical Engineers, 1998b).

The staff confirmed that the design features listed in Tables 18-5 and 18-6 are those that, if altered, would have a significant effect on safety. The staff concludes that the ISF Facility technical specifications are in compliance with 10 CFR §72.44(c)(4).

Table 18-5. Design Features for the ISF Facility

Technical Specification	Design Feature	Associated SER Section
4.1.1	Criticality control	8.1.3
4.1.2	Materials	5.1, 6.1.2
4.2	Codes and standards	5.1
4.2.1	Alternatives to codes, standard and criteria	5.1
4.2.2	Construction/fabrication alternatives to codes, standards and criteria	5.1
4.3.1	ISF Facility cranes and trolleys	5.1.4
4.3.2	Lifting devices	5.1
4.3.3	Peach Bottom transfer cask	5.1.1.3

Table 18-6. Codes governing ISF Facility storage components

Storage Component	Applicable Codes	Edition/ Years	Application	
			Design	Fabrication
Storage Tube	ASME B&PV* Code Section II ASME B&PV Code Section III, Division 1, Subsection NCA, NC, and Appendix F ASME B&PV Code Section V ASME B&PV Code Section IX	1998 with 2000 addenda	Yes	Yes
ISF Canister	ASME B&PV Code Section II ASME B&PV Code Section III, Division 1, Subsection NCA, NB, and Appendix F ASME B&PV Code Section V ASME B&PV Code Section IX	1998 with 2000 addenda	Yes	Yes
ISF Basket	ASME B&PV Code Section II ASME B&PV Code Section III, Division 1, Subsection NCA, NF, NG, and Appendix F	1998 with 2000 addenda	Yes	No, in accordance with ISF Facility Quality Program Plan
*ASME B&PV—ASME International Boiler and pressure vessel				

18.1.4 Administrative Controls

The administrative controls portion of the technical specifications includes controls on the organization and management, recordkeeping, review, and audit and reporting processes necessary to ensure the operations involved in the storage of SNF at the ISF Facility are performed in a safe manner. The administrative controls included in the ISF Facility technical specifications are listed in Table 18-7. The table also lists the section of the SER that documents the acceptability for each design feature technical specification.

The staff confirmed that the administrative controls listed in Table 18-7 are those necessary to ensure the operations involved in the storage of SNF at the ISF Facility are performed in a safe manner. The staff concludes that the ISF Facility technical specifications are in compliance with 10 CFR §72.44(c)(5) and §72.44(d)(3).

Table 18-7. Administrative Controls for the ISF Facility

Technical Specification Item	Administrative Control	Associated SER Section
5.1.1	Responsibility for facility operation	10.1.1
5.1.2	Changes to structures, systems, and components important to safety	10.1.1
5.2.1	Onsite and offsite organizations	10.1.1
5.3.1	ISF Facility staff qualifications	10.1.4
5.4.1	Written procedures	10.1.3
5.5.1	Technical specification bases control	10.1.1
5.5.2	Radioactive effluent control program	14.1
5.5.3	Fuel handling program	3.1.2, 5.1, 9.1
5.5.4	Fire protection program	6.1.5
5.5.5	Radiation protection program	11.1

18.1.5 License Conditions

10 CFR §72.44 requires that each license issued in accordance with 10 CFR Part 72 includes license conditions that pertain to the design, construction, and operation of the facility, or any other conditions that the U.S. Nuclear Regulatory Commission may include as it deems appropriate. In addition, 10 CFR §72.44 specifies certain license conditions that apply to each license issued in accordance with 10 CFR Part 72 whether or not the conditions are explicitly stated in the license. Those conditions are specified in 10 CFR §72.44(b)(1)–(b)(6) and are binding on the ISF Facility license but are not explicitly restated in the ISF Facility License. 10 CFR §72.44(a) and (c) require that the license issued include license conditions that pertain to design, construction, operation, and technical specifications. Table 18-8 provides a matrix between each license condition and the staff's review of the condition.

Table 18-8. License Conditions for the ISF Facility

License Condition Description	Associated SER Section
Nature of material to be stored at the ISF Facility	4.1
Maximum amount of stored material	4.1.3.1
Cask contents	4.1, 5.1
Technical specifications	18.1, Chapter 8
Financial assurance	Chapter 17
Physical security plan controls	10.1.6

18.2 Evaluation Findings

After reviewing the information provided by the applicant regarding the technical specifications for the proposed ISF Facility, based on the regulation itself, appropriate regulatory guides, applicable codes and standards, and accepted practices, the staff made the following two findings:

- The license conditions and Technical Specifications for the ISF Facility identify the necessary limits and restrictions regarding the handling and storage of the SNF to satisfy the requirements of 10 CFR §72.44(c) and (d).

- The proposed Technical Specifications provide reasonable assurance that the ISF Facility will allow safe storage of SNF.

18.3 References

American Society of Mechanical Engineers. *Boiler and Pressure Vessel Code Section II Materials*. New York City, NY: American Society of Mechanical Engineers. 1998a.

American Society of Mechanical Engineers. *Boiler and Pressure Vessel Code Section III Rules for Construction of Nuclear Facility Components*. New York City, NY: American Society of Mechanical Engineers. 1998b.

Foster Wheeler Environmental Corporation. *Idaho Spent Fuel Facility Safety Analysis Report*. ISF–FW–RPT–0033. Docket 72-25. Amendment 03. Morris Plains, NJ: Foster Wheeler Environmental Corporation. November 2003a.

Foster Wheeler Environmental Corporation. *Idaho Spent Fuel Facility License Application. Appendix D, Proposed Technical Specifications*. ISF–FW–RPT–0034. Docket 72-25. Amendment 03. Morris Plains, NJ: Foster Wheeler Environmental Corporation. November 2003b.