2.2.8 Fuel Handling System

1.0 Description

The fuel handling system (FHS) provides for handling of fuel assemblies from the time new fuel assemblies are received at the plant site until the spent fuel assemblies are stored in the spent fuel pool. The FHS handles and transfers fuel assemblies across the containment. The system provides a means of receiving, inspecting, and storing new fuel assemblies. The spent fuel assemblies are stored in the underwater storage racks in the spent fuel pool. The main pieces of equipment used for fuel handling operations are the refueling machine, fuel transfer tube facility, new fuel elevator, spent fuel machine, auxiliary crane, and fuel storage racks.

The FHS provides the following safety related functions:

- Maintains fuel assemblies in a subcritical array.
- Facilitates cooling of the irradiated fuel assemblies to avoid overheating.
- Provides for safe handling of heavy loads (i.e., loads weighing more than one fuel assembly and its handling device) to prevent a load drop in a critical area.
- Maintains its portion of the containment isolation.

2.0 Arrangement

2.1 The location of the FHS equipment and components is as listed in Table 2.2.8-1—FHS Equipment Mechanical Design.

3.0 Mechanical Design Features

3.1 Deleted.

3.2 Components identified as Seismic Category I in Table 2.2.8-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.2.8-1.

3.3 Deleted.

3.4 Components listed in Table 2.2.8-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.

3.5 Components listed in Table 2.2.8-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.

3.6 Pressure boundary welds on components listed in Table 2.2.8-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.

3.7 Components listed in Table 2.2.8-1 as ASME Code Section III retain pressure boundary integrity at design pressure.

3.8 The new and spent fuel storage racks maintain the effective neutron multiplication factor less than the required limits during normal operations, during and after design basis seismic events, and during and after design basis dropped fuel assembly accidents.

4.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.2.8-2 lists the FHS ITAAC.

Table 2.2.8-1—FHS Equipment Mechanical Design

Description	Tag Number[1]	Location	ASME Code Section III	Function	Seismic Category
New Fuel Elevator	FCD10	Fuel Building (UFA)	N/A	N/A	N/A
Spent Fuel Machine	FCD01	Fuel Building (UFA)	N/A	N/A	N/A
Transfer Tube and Blind Flange (Fuel Transfer Tube Facility)	FCJ05	Fuel Building (UFA) and Reactor Building (UJA)	Yes	Containment isolation	I
Transfer Tube gate valve and expansion joints	FCJ05	Fuel Building (UFA) and Reactor Building (UJA)	Yes	Leak tightness	I
Mechanism (Fuel Transfer Tube Facility)	FCJ01	Fuel Building (UFA) and Reactor Building (UJA)	N/A	N/A	N/A
Refueling Machine	FCB01	Reactor Building (UJA)	N/A	N/A	N/A
Spent Fuel Cask Transfer Facility penetration including loading pit bottom cover.	FCJ12	Fuel Building (UFA)	N/A	Leak tightness	I
New Fuel Storage Racks	FAA01	Fuel Building (UFA)	N/A	Fuel storage	I
Spent Fuel Storage Racks	FAB02	Fuel Building (UFA)	N/A	Fuel storage	I

1) Equipment tag numbers are provided for information only and are not part of the certified design.

Table 2.2.8-2—Fuel Handling System ITAAC (4 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The location of the FHS equipment and components is as listed in Table 2.2.8-1.	An inspection will be performed of the location of the equipment listed in Table 2.2.8-1.	The equipment listed in Table 2.2.8-1 is located as listed in Table 2.2.8-1.
3.1	Deleted.	Deleted.	Deleted.
3.2	Components identified as Seismic Category I in Table 2.2.8-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.2.8-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the components identified as Seismic Category I in Table 2.2.8-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the Seismic Category I components identified in Table 2.2.8-1 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category I components identified in Table 2.2.8-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.2.8-1 including the time required to perform the listed function. b. Inspection reports exist and conclude that the Seismic Category I components identified in Table 2.2.8-1, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
3.3	Deleted.	Deleted.	Deleted.
3.4	Components listed in Table 2.2.8-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.	Inspections will be performed for the existence of ASME Code Section III Design Reports.	ASME Code Section III Design Reports (NCA-3550) exist for components listed as ASME Code Section III in Table 2.2.8-1.

Table 2.2.8-2—Fuel Handling System ITAAC (4 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.5	Components listed in Table 2.2.8-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.	Inspections will be performed to verify that the design report has been revised to reflect as-built deviations from the design if applicable.	For components listed as ASME Code Section III in Table 2.2.8-1, the as-built component satisfies design requirements of ASME Code Section III as demonstrated in the Design Report (NCA-3550).
3.6	Pressure boundary welds on components listed in Table 2.2.8-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.	Inspections of pressure boundary welds will be performed to verify that welding is performed in accordance with ASME Code Section III requirements.	For components listed as ASME Code Section III in Table 2.2.8-1, ASME Code Section III Data Reports (NCA-8000) exist and conclude that pressure boundary welding has been performed in accordance with ASME Code Section III.
3.7	Components listed in Table 2.2.8-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure.	Hydrostatic tests will be performed on the components.	For components listed as ASME Code Section III in Table 2.2.8-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.

Table 2.2.8-2—Fuel Handling System ITAAC (4 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.8	The new and spent fuel storage racks maintain the effective neutron multiplication factor less than the required limits during normal operations, during and after design basis seismic events, and during and after design basis dropped fuel assembly accidents.	Inspections will be performed to verify key design features of the fuel storage racks.	Inspection reports and poison plate manufacturer reports verify the following fuel storage racks features: • Region 1 rack cell pitch is consistent with rack model inputs of the criticality evaluation. • Region 2 rack cell pitch is consistent with rack model inputs of the criticality evaluation. • B_4C content (areal density) of metal matrix composite (MMC) neutron absorber plates for Region 1 racks is consistent with rack model inputs of the criticality evaluation. • B_4C content (areal density) of MMC neutron absorber plates for Region 2 racks is consistent with rack model inputs of the criticality evaluation. • The number of MMC neutron absorber plates installed between storage cells in Region 1 racks agrees with design drawings. • The number of MMC neutron absorber plates installed between storage cells in Region 2 racks agrees with design drawings. • The layout of fuel storage racks in the spent fuel pool agrees with design drawings.

Table 2.2.8-2—Fuel Handling System ITAAC (4 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			• The layout of fuel storage racks in the new fuel storage vault agrees with design drawings.

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