of fissile material from those cells. DFI storage locations are limited to the same locations allowed for DFCs in the MPC-68M. The limiting design characteristics for damaged fuel assemblies and restrictions on the number and location of damaged fuel containers authorized for loading in each MPC model are provided in Section 2.1.9. Dresden Unit 1 fuel assemblies contained in Transnuclear-designed damaged fuel canisters and one Dresden Unit 1 thoria rod canister have been approved for storage directly in the HI-STORM 100 System without re-packaging (see Figures 2.1.2 and 2.1.2A).

MPC contents classified as fuel debris are required to be stored in DFCs. The basket designs for the standard and "F" model MPCs are identical. The lid and shell designs of the "F" models are unique in that the upper shell portion of the canister is thickened for additional strength needed to qualify as a secondary containment, which used to be required under hypothetical accident conditions of transportation under 10 CFR 71. Figure 2.1.9 shows the details of the differences between the standard and "F" model MPC shells. These details are common for both the PWR and BWR series MPC models.

2.1.3.1 Damaged Fuel Isolator

For the MPC-68M, if the damaged fuel assembly can be handled by normal means and its structural integrity is such that geometric rearrangement of fuel is not expected, then the device known as the Damaged Fuel Isolator (DFI) can be used in place of the DFC. Like the DFC, the DFI prevents the migration of fissile material in bulk or coarse particulate form from the nuclear fuel stored in its cellular storage cavity. The DFI can be used only if the fuel can be handled by normal means but is classified as damaged because of physical defect, viz., a breach in the fuel cladding or a structural failure in the grid strap assembly, etc., as explained in ISG-1. Damaged fuel stored utilizing the DFI may contain missing or partial fuel rods and/or fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks as long as the fuel assembly can be handled by normal means.

The DFI is made up of two end caps that, along with the four basket cell walls, comprise the fuel isolation space. The essential attributes of the DFI are:

1. The bottom cap is an open prismatic box with a flat baseplate which fits inside the storage cell space with a small clearance (for ease of installation).
   [Withheld in Accordance with 10 CFR 2.390]

   The sidewalls of the bottom cap have perforations or wire mesh to permit transmigration of gases but not fuel fragments or gross particulates and is equipped with a permeable barrier against the storage cell walls for sequestration of coarse particulate matter. Figure 2.1.10 illustrates the features of the DFI end cap.
2. The top cap is anatomically similar to the bottom cap as illustrated in Figure 2.1.10.
   [Withheld in Accordance with 10 CFR 2.390]

[Withheld in Accordance with 10 CFR 2.390]

3. Both caps have engineered features to enable them to be remotely installed in any storage cell in which a fuel assembly needs to be isolated. Both caps are geometrically constrained to prevent their ejection from the storage cavity during a postulated accident event.
4. The design configuration of the DFI is common for all Light Water Reactor fuel.

[Withheld in Accordance with 10 CFR 2.390]

2.1.4 Deleted

2.1.5 Structural Parameters for Design Basis SNF

The main physical parameters of an SNF assembly applicable to the structural evaluation are the fuel assembly length, envelope (cross sectional dimensions), and weight. These parameters, which define the mechanical and structural design, are specified in Section 2.1.9. The centers of gravity reported in

[Withheld in Accordance with 10 CFR 2.390]

FIGURE 2.1.10: DAMAGED FUEL ISOLATOR TOP/BOTTOM CAP ASSEMBLY (TYPICAL)

[Withheld in Accordance with 10 CFR 2.390]

FIGURE 2.1.10 (CONTINUED): DAMAGED FUEL ISOLATOR IN BASKET CELL (TYPICAL)

TABLE 2.2.6

MATERIALS AND COMPONENTS OF THE HI-STORM 100 SYSTEM
MPC [1,2]

Primary Function	Component [3]	Safety Class [4]	Codes/Standards (as applicable to component)	Material	Strength (ksi)	Special Surface Finish/Coating	Contact Matl. (if dissimilar)
Structural Integrity	Vent Shield Block Spacer	C	Non-code	Alloy X	See Appendix 1.A	NA	NA
Operations	Vent and Drain Tube	C	Non-code	S/S	Per ASME Section II	Thread area surface hardened	NA
Operations	Vent & Drain Cap	C	Non-code	S/S	Per ASME Section II	NA	NA
Operations	Vent & Drain Cap Seal Washer	NITS	Non-code	Aluminum	NA	NA	Aluminum/SS
Operations	Vent & Drain Cap Seal Washer Bolt	NITS	Non-code	Aluminum	NA	NA	NA
Operations	Reducer	NITS	Non-code	Alloy X	See Appendix 1.A	NA	NA
Operations	Drain Line	NITS	Non-code	Alloy X	See Appendix 1.A	NA	NA
Operations	Damaged Fuel Container	C	ASME Section III; Subsection NG	S/S (Primarily 304 S/S)	See Appendix 1.A	NA	NA
Operations	Damaged Fuel Isolator	C	ASME Section III; Subsection NF	S/S[7]	NA	NA	NA
Operations	Drain Line Guide Tube	NITS	Non-code	S/S	NA	NA	NA

Notes:
1) There are no known residuals on finished component surfaces
2) All welding processes used in welding the components shall be qualified in accordance with the requirements of ASME Section IX. All welds shall be made using welders qualified in accordance with ASME Section IX. Weld material shall meet the requirements of ASME Section II and the applicable Subsection of ASME Section III.
3) Component nomenclature taken from Bill of Materials in Chapter 1.
4) A, B, and C denote important to safety classifications as described in the Holtec QA Program. NITS stands for Not Important to Safety.
5) For details on Alloy X material, see Appendix 1.A. It is also noted that duplex stainless steel shall not be used for the fabrication of MPC baskets and internal components..
6) Must be Type 304, 304LN, 316, or 316 LN with tensile strength $\geq$ 75 ksi, yield strength $\geq$ 30 ksi and chemical properties per ASTM A554.
7) Corrosion resistant alloy steel eg. 304 stainless steel, Monel, etc.

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Table 2.2.7
HI-STORM 100 ASME BOILER AND PRESSURE VESSEL CODE APPLICABILITY

HI-STORM 100 Component	Material Procurement	Design	Fabrication	Inspection**
Overpack steel structure	Section II, Section III, Subsection NF, NF-2000	Section III, Subsection NF, NF-3200	Section III, Subsection NF, NF-4000	Section III, Subsection NF, NF-5350, NF-5360 and Section V
Anchor Studs for HI-STORM 100A	Section II, Section III, Subsection NF, NF-2000*	Section III, Subsection NF, NF-3300	NA	NA
MPC confinement boundary	Section II, Section III, Subsection NB, NB-2000	Section III, Subsection NB, NB-3200	Section III, Subsection NB, NB-4000	Section III, Subsection NB, NB-5000 and Section V
MPC fuel basket	Section II, Section III, Subsection NG, NG-2000; core support structures (NG-1121)	Section III, Subsection NG, NG-3300 and NG-3200; core support structures (NG-1121)	Section III, Subsection NG, NG-4000; core support structures (NG-1121)	Section III, Subsection NG, NG-5000 and Section V; core support structures (NG-1121)
HI-TRAC Trunnions	Section II, Section III, Subsection NF, NF-2000	ANSI N14.6	Section III, Subsection NF, NF-4000	See Chapter 9
MPC basket supports (Angled Plates)	Section II, Section III, Subsection NG, NG-2000; internal structures (NG-1122)	Section III, Subsection NG, NG-3300 and NG-3200; internal structures (NG-1122)	Section III, Subsection NG, NG-4000; internal structures (NG-1122)	Section III, Subsection NG, NG-5000 and Section V; internal structures (NG-1122)
HI-TRAC steel structure	Section II, Section III, Subsection NF, NF-2000	Section III, Subsection NF, NF-3300	Section III, Subsection NF, NF-4000	Section III, Subsection NF, NF-5360 and Section V
Damaged fuel container	Section II, Section III, Subsection NG, NG-2000	Section III, Subsection NG, NG-3300 and NG-3200	Section III, Subsection NG, NG-4000	Section III, Subsection NG, NG-5000 and Section V
Damaged fuel isolator	Section II material compositions	Section III, Subsection NF, NF-3300	Section III, Subsection NF, NF-4000	Section III, Subsection NF, NF-5360 and Section V
Overpack concrete	ACI 349 as specified by Appendix 1.D	ACI 349 and ACI 318.1-89(92) as specified by Appendix 1.D	ACI 349 as specified by Appendix 1.D	ACI 349 as specified by Appendix 1.D

* Except impact testing shall be determined based on service temperature and material type.
** Section V applies to Code welds only unless otherwise noted.