

**CERTIFICATE OF COMPLIANCE  
FOR RADIOACTIVE MATERIAL PACKAGES**

1.	a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NIIMRFR	PAGE	PAGES
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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
  - b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.
3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

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| a. ISSUED TO ( <i>Name and Address</i> )<br>Holtec International<br>Holtec Center<br>One Holtec Drive<br>Marlton, NJ 08053 | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION<br>Holtec International Report No. HI-2146214. <i>Safety Analysis Report on the HI-STAR 190 Cask System</i><br>Revision 0, dated TBD. |
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4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

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(a) Packaging

- (1) Model No.: HI-STAR 190 System
- (2) Description

The HI-STAR 190 System is a canister system comprising a Multi-Purpose Canister (MPC) inside of an overpack designed for both storage and transportation (with impact limiters) of irradiated nuclear fuel. The HI-STAR 190 System consists of interchangeable MPCs that house the spent nuclear fuel and an overpack that provides the containment boundary, helium retention boundary, gamma and neutron radiation shielding, and heat rejection capability. The outer diameter of the overpack of the HI-STAR 190 is approximately 107 inches without impact limiters and approximately 128 inches with impact limiters. Maximum gross weight for transportation (including overpack, MPC, fuel, and impact limiters) is nominally 417,000 pounds. Specific tolerances germane to the safety analyses are called out in the drawings listed below.

**Multi-Purpose Canister**

There are two Multi-Purpose Canister (MPC) models designated as the MPC-37 and MPC-89. Both MPCs are designed to have identical exterior dimensions. The two digits after the MPC designate the number of reactor fuel assemblies for which the respective MPCs are designed. The MPC-37 is designed to contain up to 37 Pressurized Water Reactor (PWR) fuel assemblies; and the MPC-89 is designed to contain up to 89 Boiling Water Reactor (BWR) fuel assemblies.

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5.(a)(2) Description (continued)

The HI-STAR 190 MPC is a welded cylindrical structure with flat ends. Each MPC is an assembly consisting of a honeycombed fuel basket, baseplate, canister shell, lid, and closure ring. The outer diameter and cylindrical height of each generic MPC is fixed. A steel spacer is used with the shorter MPCs to ensure the MPC-overpack interface is bounded by the generic design. The fuel basket designs vary based on the MPC model.

**Overpack**

The HI-STAR 190 overpack is a multi-layer steel cylinder with a welded baseplate and bolted lid (closure plate). The inner shell of the overpack forms an internal cylindrical cavity for housing the MPC. The outer surface of the overpack inner shell is buttressed with intermediate shells for radiation shielding. The overpack closure plate incorporates a dual O-ring design to ensure its containment function. The containment system consists of the overpack inner shell, bottom plate, top flange, top closure plate, top closure inner O-ring seal, vent port plug and seal, and drain port plug and seal.

**Impact Limiters**

The HI-STAR 190 overpack is fitted with two impact limiters fabricated of aluminum honeycomb completely enclosed by an all-welded austenitic stainless steel skin. The two impact limiters are identical on the top and bottom and are attached to the overpack with 16 bolts.

(3) Drawings

The package shall be constructed and assembled in accordance with the following drawings or figures in Holtec International Report No. HI-2146214, *Safety Analysis Report for the Holtec HI-STAR 190 Cask System*, Revision 0:

- |                                |                                   |
|--------------------------------|-----------------------------------|
| (a) HI-STAR 190 Cask Assembly  | Drawing 9841, Sheets 1-5, Rev. 0  |
| (b) MPC-37 Enclosure Vessel    | Drawing 6505, Sheets 1-4, Rev. 10 |
| (c) MPC-37 Fuel Basket         | Drawing 6506, Sheet 1, Rev. 11    |
| (d) MPC-89 Fuel Basket         | Drawing 6507, Sheet 1, Rev. 10    |
| (e) MPC-89 Enclosure Vessel    | Drawing 6512, Sheets 1-3, Rev. 12 |
| (f) HI-STAR 190 Impact Limiter | Drawing 9848, Sheets 1-3, Rev. 0  |

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- (g) Damaged Fuel Container (DFC) Drawing 10234, Sheets 1-5, Rev. 0
- (h) HI-STAR 190 MPC Spacer Ring Drawing 9849, Sheet 1, Rev. 0

5.(b) Contents

(1) Type, Form, and Quantity of Material

- (a) PWR and BWR fuel assemblies meeting the specifications and requirements provided in Conditions 5.b(1)(b) through 5.b.(1)(e) and with the characteristics listed in Tables 7.C.1, 7.C.2, and 7.C.3 of the application are authorized for transportation.
- (b) Damaged fuel assemblies and fuel debris meeting the configurations described in Table 7.C.5 for PWR and Table 7.C.6 for BWR are authorized for transportation.
- (c) The post-irradiation minimum cooling time, maximum burnup, maximum decay heat load, and minimum initial enrichment per assembly are listed in Tables 7.C.8 and 7.C.10 for MPC-37 and MPC-89 respectively.
- (d) For those spent fuel assemblies that need to meet the burnup requirements specified in Table 7.C.4 of the application, a burnup verification shall be performed in accordance with Appendix 7.D of the application
- (e) Allowable heat load patterns for loading are identified in Table 7.C.7 for MPC-37 and Table 7.C.9 for MPC-89, with the cell identification shown in Figures 7.C.1 and 7.C.2.

(2) Maximum Quantity of Material Per Package

37 PWR fuel assemblies in the MPC-37 or 89 BWR fuel assemblies in the MPC-89

5 (c) Criticality Safety Index (CSI)= 0.0

6. In addition to the requirements of Subpart G of 10 CFR Part 71:

- (a) Each package shall be both prepared for shipment and operated in accordance with detailed written operating procedures. Procedures for both preparation and operation shall be developed. At a minimum, those procedures shall include the provisions provided in Chapter 7 of the HI-STAR 190 SAR.

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- (b) All acceptance tests and maintenance shall be performed in accordance with detailed written procedures. Procedures for acceptance testing and maintenance shall be developed and shall include the provisions provided in Chapter 8 of the HI-STAR SAR.
9. The personnel barrier shall be installed and remain installed while transporting the package if necessary to meet package surface temperature and/or package dose rates requirements.
10. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.
11. Transport by air of fissile material is not authorized.
13. Expiration Date: TBD

REFERENCES:

Holtec International Report No. HI-2146214, *Safety Analysis Report for the HI-STAR 190 Cask System*, Revision 0.

COMMISSION

FOR THE U.S. NUCLEAR REGULATORY

TBD

Date: TBD

