



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

February 4, 2002

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: USNRC Docket No. 72-1014  
HI-STORM 100 Certificate of Compliance 1014  
Alternatives to Codes and Standards

References: 1. Holtec Project 5014  
2. NRC Inspection Report 72-1014/01-201  
3. Holtec Response to Inspection Report 72-1014/01-201, dated November 21, 2001  
4. Holtec letter to NRC, Supplemental Response to NRC Inspection Report 72-1014/01-201, dated December 31, 2001  
5. Holtec letter to NRC, Code Alternatives for HI-STAR 100 System, dated February 4, 2002

Dear Sir:

Pursuant to the provisions of Section 3.3.2 of Appendix B to the HI-STORM 100 Certificate of Compliance (CoC), we hereby request NRC approval of a number of new and revised alternatives to the ASME Code for the design and fabrication of the certified components of the HI-STORM 100 System. This request is a result of a review of our design and fabrication documents for the certified HI-STORM components, and, along with Reference 5, completes Corrective Action IV.c for Violation E in the Reference 3 inspection report response. The list of new and revised Code alternatives is contained in Table 1 of the attached. Revisions to previously approved Code alternatives are shown in italic/strikeout format in the table for clarity. For completely new Code alternatives listed in Table 1, the italic/strikeout format is not used. The component serial numbers to which these alternatives apply are provided in Table 2 of the attached.

The proposed new alternatives include verbiage that provides a logical connection between the organizations contemplated by the Code (e.g., Certificate Holder, Owner, Designer, Inspector, etc.) for a Code-stamped vessel and those associated with a Part 72 Certificate of Compliance (e.g., CoC Holder, Cask User, Fabricator). These proposed new alternatives are included to avoid confusion in the use of the ASME Code to design and fabricate cask components.

This expanded set of Code alternatives increases the rigor and specificity in invoking the Code in the HI-STORM 100 CoC. These Code exceptions apply to HI-STORM 100 Systems already in service and/or through the fabrication process, as well as future casks scheduled to be fabricated prior to approval of our upcoming amendment request, which will include these new and revised Code alternatives as permanent changes to the CoC. These alternatives, individually and as a whole, provide an acceptable level of quality and safety for the design, fabrication, and operation of HI-STORM 100 System components.

None of these alternatives are safety significant or required an associated change to a design drawing, nor did any drawing changes made under the provisions of 10 CFR 72.48 after issuance of the HI-STORM 100 CoC create the need for new Code alternatives. This request is required solely to make the Code alternatives table in the CoC (and FSAR) consistent with the design drawings

*NM5501 public*



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900  
Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Document ID 5014448  
Page 2 of 3

contained in the FSAR approved during the NRC review and initial certification of the HI-STORM 100 System. A similar request to amend the list of ASME Code alternatives for the HI-STAR 100 System (Docket 72-1008) is being provided concurrently under separate cover (Reference 5). Upon approval of these additional alternatives to the ASME Code, Table 2.2.15 of the HI-STORM 100 FSAR will be updated in accordance with 10 CFR 72.248 and Holtec Quality Procedure 19.4.

Approval of these new and revised Code alternatives is necessary to support upcoming fuel loading campaigns at Dresden Station and Fitzpatrick Plant, the first of which is scheduled to begin in early March, 2002. Therefore, we respectfully request review and approval of these Code alternatives by March 4, 2002. Approval later than March 4, 2002 will have differing impacts, depending on the magnitude of the delay. As a result of schedule and prior commitments at Dresden Station for this year, availability of their personnel to perform cask loading activities is limited to a period between March 4, 2002 and ending on April 30, 2002, after which cask loading activities would cease for the remainder 2002. Specifically, Dresden Unit 3 (D-3) currently has full core discharge (FCD) capability. D-3 will lose FCD capability after its next refueling outage (October, 2002) if at least four casks are not loaded by April, 2002. In addition, delays beyond early April would reduce Fitzpatrick Plant's ability to efficiently handle the arrival of new fuel shipments in support of the Fall, 2002 refueling outage. Significant delays would require postponement of the Fitzpatrick fuel loading campaign to after the fall 2002 refueling outage resulting in loss of full core offload capability.

If you have any questions or require additional information, please contact the undersigned at (856) 797-0900, extension 668.

Sincerely,

Brian Gutherman, P.E.  
Licensing Manager

Approved:

K.P. Singh, P.E., Ph.D.  
President and CEO



**HOLTEC**  
INTERNATIONAL

Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Document ID 5014448  
Page 3 of 3

**Concurrence:**

  
B. GILLIGAN  
Manufacturing

  
Quality Assurance

emcc: Mr. Timothy Kobetz, USNRC (with attachment)  
Mr. Paul Narbut, USNRC (with attachment)  
Holtec Group 1 (with attachment)  
HUG Group N (with attachment)  
HUG Licensing Committee (with attachment)

Document ID: 5014448

Attachment: Proposed revised HI-STORM 100 System ASME Code alternatives



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
 ATTN: Document Control Desk  
 Document ID 5014448  
 Attachment  
 Page 1 of 6

**Table 1**

**PROPOSED NEW AND REVISED ASME CODE ALTERNATIVES  
 FOR THE HI-STORM 100 SYSTEM**

Component	Reference ASME Code Section/Article	Code Requirement	Exception, Justification, & Compensatory Measures
MPC, MPC basket assembly, HI-STORM overpack steel structure, and HI-TRAC transfer cask steel structure.	Subsection NCA	General Requirements. Requires preparation of a Design Specification, Design Report, Overpressure Protection Report, Certification of Construction Report, Data Report, and other administrative controls for an ASME Code stamped vessel.	<p>Because the MPC, overpack, and transfer cask are not ASME Code stamped vessels, none of the specifications, reports, certificates, or other general requirements specified by NCA are required. In lieu of a Design Specification and Design Report, the HI-STORM FSAR includes the design criteria, service conditions, and load combinations for the design and operation of the HI-STORM 100 System as well as the results of the stress analyses to demonstrate that applicable Code stress limits are met. Additionally, the fabricator is not required to have an ASME-certified QA program. All important-to-safety activities are governed by the NRC-approved Holtec QA program.</p> <p>Because the cask components are not certified to the Code, the terms "Certificate Holder" and "Inspector" are not germane to the manufacturing of NRC-certified cask components. To eliminate ambiguity, the responsibilities assigned to the Certificate Holder in the various articles of Subsections NB, NG, and NF of the Code, as applicable, shall be interpreted to apply to the NRC Certificate of Compliance (CoC) holder (and by extension, to the component fabricator) if the requirement must be fulfilled. Requirements that are not germane to meeting the applicable Code stress limits are not applicable to its certification for cask use under 10 CFR 72. The Code term "Inspector" means the QA/QC personnel of the CoC holder and its vendors assigned to oversee and inspect the manufacturing process.</p>



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
 ATTN: Document Control Desk  
 Document ID 5014448  
 Attachment  
 Page 2 of 6

Component	Reference ASME Code Section/Article	Code Requirement	Exception, Justification, & Compensatory Measures
MPC basket supports and lift lugs	NB-1130	<p>NB-1132.2(d) requires that the first connecting weld of a nonpressure-retaining structural attachment to a component shall be considered part of the component unless the weld is more than 2t from the pressure-retaining portion of the component, where t is the nominal thickness of the pressure-retaining material.</p> <p>NB-1132.2(e) requires that the first connecting weld of a welded nonstructural attachment to a component shall conform to NB-4430 if the connecting weld is within 2t from the pressure-retaining portion of the component.</p>	<p>The MPC basket supports (nonpressure-retaining structural attachment) and lift lugs (nonstructural attachments used exclusively for lifting an empty MPC) are welded to the inside of the pressure-retaining MPC shell, but are not designed in accordance with Subsection NB. The basket supports and associated attachment welds are designed to satisfy the stress limits of Subsection NG and the lift lugs and associated attachment welds are designed to satisfy the stress limits of Subsection NF, as a minimum. These attachments and their welds are shown by analysis to meet the respective stress limits for their service conditions. Likewise, non-structural items, such as shield plugs, spacers, etc. if used, can be attached to pressure-retaining parts in the same manner.</p>
MPC	NB-2000	Requires materials to be supplied by ASME-approved material supplier.	<p>Materials will be supplied by Holtec-approved suppliers with Certified Material Test Reports (CMTRs) in accordance with NB-2000 requirements. <i>Material procured commercially and dedicated for use in important-to-safety applications in accordance with the NRC-approved Holtec QA Program is an acceptable alternative to using suppliers from Holtec's Approved Vendors List (AVL).</i></p>
MPC, MPC basket assembly, HI-STORM overpack, and HI-TRAC transfer cask	NB-3100 NG-3100 NF-3100	Provides requirements for determining design loading conditions, such as pressure, temperature, and mechanical loads.	These requirements are not applicable. The HI-STORM FSAR, serving as the Design Specification, establishes the service conditions and load combinations for the storage system.
MPC	NB-3350	NB-3352.3 requires, for Category C joints, that the minimum dimensions of the welds and throat thickness shall be as shown in Figure NB-4243-1.	<p>Due to MPC basket-to-shell interface requirements, the MPC shell-to-baseplate weld joint design (designated Category C) is different than any of the representative configurations depicted in Figure NB-4243-1. The structural weld is designed as a full penetration weld that receives VT and RT or UT, as well as final surface PT examinations. Because the MPC shell design thickness is considerably larger than the minimum thickness required by the Code, a reinforcing fillet weld that would intrude into the MPC cavity space is not included. Not including this fillet weld provides for a higher quality radiographic examination of the full penetration weld.</p>



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
 ATTN: Document Control Desk  
 Document ID 5014448  
 Attachment  
 Page 3 of 6

Component	Reference ASME Code Section/Article	Code Requirement	Exception, Justification, & Compensatory Measures
MPC, HI-STORM overpack steel structure, HI-TRAC transfer cask steel structure	NB-4220 NF-4220	Requires certain forming tolerances to be met for cylindrical, conical, or spherical shells of a vessel.	The cylindricity measurements on the rolled shells are not specifically recorded in the shop travelers, as would be the case for a Code-stamped pressure vessel. Rather, the requirements on inter-component clearances (such as the MPC-to-transfer cask) are guaranteed through fixture-controlled manufacturing. The fabrication specification and shop procedures ensure that all dimensional design objectives, including inter-component annular clearances are satisfied. The dimensions required to be met in fabrication are chosen to meet the functional requirements of the dry storage components. Thus, although the post-forming Code cylindricity requirements are not evaluated for compliance directly, they are indirectly satisfied (actually exceeded) in the final manufactured components.
MPC basket assembly	NG-2000	Requires materials to be supplied by ASME-approved material supplier.	Materials will be supplied by Holtec-approved suppliers with Certified Material Test Reports (CMTRs) in accordance with NG-2000 requirements. <i>Material procured commercially and dedicated for use in important-to-safety applications in accordance with the NRC-approved Holtec QA Program is an acceptable alternative to using suppliers from Holtec's Approved Vendors List (AVL).</i>
MPC basket assembly	NG-4420	NG-4427(a) requires a fillet weld in any single continuous weld may be less than the specified fillet weld dimension by not more than 1/16 inch, provided that the total undersize portion of the weld does not exceed 10 percent of the length of the weld. Individual undersize weld portions shall not exceed 2 inches in length.	Modify the Code requirement (intended for core support structures) with the following text prepared to accord with the geometry and stress analysis imperatives for the fuel basket: For the longitudinal MPC basket fillet welds, the following criteria apply: 1) The specified fillet weld throat dimension must be maintained over at least 92 percent of the total weld length. All regions of undersized weld must be less than 3 inches long and separated from each other by at least 9 inches. 2) Areas of undercuts and porosity beyond that allowed by the applicable ASME Code shall not exceed 1/2 inch in weld length. The total length of undercut and porosity over any 1-foot length shall not exceed 2 inches. 3) The total weld length in which items (1) and (2) apply shall not exceed a total of 10 percent of the overall weld length. The limited access of the MPC basket panel longitudinal fillet welds makes it difficult to perform effective repairs of these welds and creates the potential for causing additional damage to the basket assembly (e.g., to the neutron absorber and its sheathing) if repairs are attempted. The acceptance criteria provided in the foregoing have been established to comport with the objectives of the basket design and preserve the margins demonstrated in the supporting stress analysis.



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
 ATTN: Document Control Desk  
 Document ID 5014448  
 Attachment  
 Page 4 of 6

Component	Reference ASME Code Section/Article	Code Requirement	Exception, Justification, & Compensatory Measures
HI-STORM overpack steel structure	NF-2000	Requires materials to be supplied by ASME-approved material supplier.	Materials will be supplied by Holtec-approved suppliers with Certified Material Test Reports (CMTRs) in accordance with NF-2000 requirements. <i>Material procured commercially and dedicated for use in important-to-safety applications in accordance with the NRC-approved Holtec QA Program is an acceptable alternative to using suppliers from Holtec's Approved Vendors List (AVL).</i>
HI-TRAC transfer cask steel structure	NF-2000	Requires materials to be supplied by ASME-approved material supplier.	Materials will be supplied by Holtec-approved suppliers with Certified Material Test Reports (CMTRs) in accordance with NF-2000 requirements. <i>Material procured commercially and dedicated for use in important-to-safety applications in accordance with the NRC-approved Holtec QA Program is an acceptable alternative to using suppliers from Holtec's Approved Vendors List (AVL).</i>
MPC, MPC basket assembly, HI-STORM overpack steel structure, and HI-TRAC transfer cask steel structure	NB-4120 NG-4120 NF-4120	NB-4121.2, NG-4121.2, and NF-4121.2 provide requirements for repetition of tensile or impact tests for material subjected to heat treatment during fabrication or installation.	In-shop operations of short duration that apply heat to a component, such as plasma cutting of plate stock, welding, machining, coating, and pouring of lead are not, unless explicitly stated by the Code, defined as heat treatment operations.  For the steel parts in the HI-STORM 100 System components, the duration for which a part exceeds the off-normal temperature limit defined in Chapter 2 of the FSAR shall be limited to 24 hours in a particular manufacturing process (such as the HI-TRAC lead pouring process).
Overpack baseplate and lid top plate	NF-4441	Requires special examinations or requirements for welds where a primary member of thickness 1 inch or greater is loaded to transmit loads in the through thickness direction.	The large margins of safety in these welds under loads experienced during lifting operations or accident conditions are quite large. The overpack baseplate welds to the inner shell, pedestal shell, and radial plates are only loaded during lifting conditions and have a <del>minimum</del> large safety factors of $> 12$ during lifting. <i>Likewise, the top lid plate to lid shell weld has a large structural margin under the inertia loads imposed during a non-mechanistic tipover event. safety factor <math>&gt; 6</math> under a deceleration of <math>45 g^2s</math>.</i>
HI-STORM overpack steel structure and HI-TRAC transfer cask steel structure	NF-3256 NF-3266	Provides requirements for welded joints	Welds for which no structural credit is taken are identified as "Non-NF" welds in the design drawings by an "*". These non-structural welds are specified in accordance with the pre-qualified welds of AWS D1.1. These welds shall be made by welders and weld procedures qualified in accordance with AWS D1.1 or ASME Section IX.  <i>Welds for which structural credit is taken in the safety analyses shall meet the stress limits for NF-3256.2, but are not required to meet the joint configuration requirements specified in these Code articles. The geometry of the joint designs in the cask structures are based on the fabricability and accessibility of the joint, not generally contemplated by this Code section governing supports.</i>



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
 ATTN: Document Control Desk  
 Document ID 5014448  
 Attachment  
 Page 5 of 6

Component	Reference ASME Code Section/Article	Code Requirement	Exception, Justification, & Compensatory Measures
HI-STORM overpack and HI-TRAC transfer cask	NF-3320 NF-4720	NF-3324.6 and NF-4720 provide requirements for bolting	<p>These Code requirements are applicable to linear structures wherein bolted joints carry axial, shear, as well as rotational (torsional) loads. The overpack and transfer cask bolted connections in the structural load path are qualified by design based on the design loadings defined in the FSAR. Bolted joints in these components see no shear or torsional loads under normal storage conditions. Larger clearances between bolts and holes may be necessary to ensure shear interfaces located elsewhere in the structure engage prior to the bolts experiencing shear loadings (which occur only during side impact scenarios).</p> <p>Bolted joints that are subject to shear loads in accident conditions are qualified by appropriate stress analysis. Larger bolt-to-hole clearances help ensure more efficient operations in making these bolted connections, thereby minimizing time spent by operations personnel in a radiation area. Additionally, larger bolt-to-hole clearances allow interchangeability of the lids from one particular fabricated cask to another.</p>



Holtec Center, 555 Lincoln Drive West, Marlton, NJ 08053

Telephone (856) 797-0900

Fax (856) 797-0909

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Document ID 5014448  
Attachment  
Page 6 of 6

**Table 2**

**HI-STORM COMPONENTS TO WHICH THE REVISED/NEW CODE  
ALTERNATIVES APPLY**

<b>COMPONENT NAME</b>	<b>COMPONENT SERIAL NUMBER</b>
MPC-68/68F/68FF	1021-1 thru 68, 90 thru 98, and 101 thru 104
MPC-24/24E/24EF	1022-1 thru 6, 9, 14, and 43
MPC-32	1023-1 thru 7
HI-STORM Overpack	1024-1 thru 77 and 119 thru 133
125-Ton HI-TRAC Transfer Cask	1025-1 thru 8
100-Ton HI-TRAC Transfer Cask	1026-1