

7248 Number: 863	Revision: 0	Equipment Certificate No : 1014	Affected Component: HI-STORM Concrete
Project No.: 5014	User Distribution Complete: YES	Source Document Type: ECO	
Date: 10/30/2007	FSAR Text Change Req'd: YES NO	Source Document No: 149	Affected Document: HI-STORM FSAR, REV. 5
Site Specific: NO		72.48 Type : Full Evaluation	

**Summary
of 72.48
Evaluation:**

There are no malfunctions associated with the HI-STORM system so no malfunction likelihood, consequences or results can be increased. The structural integrity and shielding of the HI-STORM is maintained, so no accident consequences can be increased. Methods of handling and operating the cask systems are not affected, so no new accidents can be created. Cask system temperatures, including fuel cladding, are not increased and MPC internal pressures are not increased, so no fission product boundary limit is exceeded. No new evaluation methods are used.

**Description
of
Change:**

HI-STORM FSAR 2002444, Rev.5

The requirements on HI-STORM shielding concrete discussed in Appendix 1.D is proposed to be revised. No critical properties of the concrete will change due to these changes to Appendix 1.D.

The changes are as follows:

- [1] Clarified concrete aggregate grading requirements and sieve testing. Other aggregate testing requirements have been revised.
- [2] The concrete compressive strength tests requirements have been revised to include a condition that if the concrete strength exceeds the minimum required strength at an earlier time, it can be used as the official break test data in lieu of waiting for 28-day break results.
- [3] Additional editorial changes in the text to implement the above changes.

72.48 Screening/Evaluation Approval
Deferred:

YES NO

Assigned to
(For Internal Use only): KK

Review by SAR Chapter Authors (Password Controlled Signatures)

Chapters 1,2,9,12,13	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 10	Chapter 11
T.Morin	J.Zhai	D.Majumda	K.Cummings	*	*	*	K.Cummings	E.Rosenbaum
11/14/2007	12/12/2007	11/26/2007	11/20/2007				12/7/2007	11/26/2007

Review by SAR Chapter Reviewers (Password Controlled Signatures)

Chapters 1,2,9,12,13	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 10	Chapter 11
K.Niyogi	*	*	*	*	*	*	*	*
12/20/2007								

Password Controlled Signatures:

PREPARER:	REVIEWER:
K.Niyogi	A.Fecht
12/20/2007	12/20/2007

Double Click on the link below to
access the 72.48 screening checklist

N:\PDOXWIN\WORKING\7248\863.DOC

72.48 Applicability/Screening/Evaluation Close Out:

STATUS : OPEN Close

View a 72.48	Filter by Certificate No.	Filter by Affected Document No.	HI-STORM Living FSAR
Filter by Review Date**	Filter by date	Filter by Source Document No.	HI-STAR Living FSAR
Create New 72.48	Revise 72.48	Filter by Open 72.48s	Guidance Document

** This filter button lists all reviewed open and closed 72.48s for which the user distribution is not complete.

Exit

72.48 SCREENING/EVALUATION FORM

72.48 SCREENING/EVALUATION NUMBER: _____ 863 _____

AFFECTED DRY STORAGE SYSTEM DOCUMENT(S)
(List By Specific Drawing, BOM, Procedure, and/or FSAR Section Number):

HI-STORM FSAR, HI-2002444 Rev. 5: Appendix 1.D

SECTION I. DESCRIPTION OF PROPOSED ACTIVITY

HI-STORM FSAR, HI- 2002444, Rev.5

The requirements for HI-STORM shielding concrete discussed in Appendix 1.D are proposed to be revised.

The changes are as follows:

[1] Clarified concrete aggregate grading requirements and sieve testing. Other aggregate testing requirements have been revised.

[2] The concrete compressive strength tests requirements have been revised to include a condition that if the concrete strength exceeds the minimum required strength at an earlier time, it can be used as the official break test data in lieu of waiting for 28-day break results.

[3] Additional editorial changes in the text to implement the above changes.

Table 9.1.2 Structural Item b) change "ASTM C39" to "Appendix 1.D" to encompass all of the acceptable tests shown in Table 1.D.2 for compressive strength.

No critical properties of the concrete will change due to these changes to Appendix 1.D.

The changes to Appendix 1.D have no impact on HI-STORM structural evaluation.

If the response is "YES", check "No" for Question 'b' and proceed to Section III to perform a full 72.48 evaluation. If the response is "NO", proceed to Question 'b'.

b. Is the proposed activity a test or experiment not described in the FSAR? List specific FSAR sections and active 72.48 screenings and evaluations reviewed, as applicable.

YES _____ NO X _____

Basis:

Question II.a is answered "YES"

If the response is "YES", proceed to Section III to perform a full 72.48 evaluation. If the response to 'a' and 'b' are both "NO", STOP. The proposed activity may be implemented without further evaluation.

SECTION III. 72.48 Evaluation

- a. Will the proposed activity result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR? Refer to Section B 4.3.1 of Reference [3.7] for guidance.

YES _____ NO X _____

Basis:

The accidents evaluated in Chapter 11 of the HI-STORM FSAR are all caused by natural phenomenon (i.e., extreme temperature, flood, etc.) or forces external to the HI-STORM (i.e., fire, handling accidents, etc.). The proposed changes do not alter the design of the HI-STORM in a way that would affect its handling characteristics, so the frequency of occurrence of cask handling accidents will not be increased. There is no mechanism for the proposed change to affect either natural phenomenon or other accident initiators (flood, fire, explosion, lightning, etc.)

- b. Will the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of a system, structure, or component (SSC) important to safety previously evaluated in the FSAR? Refer to Section B 4.3.2 of Reference [3.7] for guidance.

YES _____ NO X _____

Basis:

The HI-STORM 100 System is a totally passive storage cask design and will remain so after these proposed changes are implemented. The proposed changes will not require changes in any methods of operation or operating procedures. There are, therefore, no malfunctions associated with the HI-STORM 100S overpack so no malfunction frequency can be increased.

- c. Will the proposed activity result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR? Refer to Section B 4.3.3 of Reference [3.7] for guidance.

YES _____ NO X _____

Basis:

Section 11.1 of the HI-STORM FSAR presents off-normal condition evaluations and Section 11.2 of the HI-STORM FSAR presents accident evaluations. None of the evaluated off-normal conditions or accidents is shown to cause unacceptable damage to the overpack or affect the MPC or contained fuel.

The site boundary dose due to a fire surrounding the HI-TRAC transfer cask remains the same because the proposed changes affect neither the transfer cask nor the MPC. The site boundary direct radiation doses from the HI-STORM overpack after a fire are not calculated in the FSAR because the shielding provided by the overpack was determined to be essentially unaffected by the fire. Therefore, the consequences are the same.

The site boundary effluent doses due to a confinement boundary leak previously analyzed for the HI-STORM 100 System remain applicable. The proposed changes to the overpack concrete requirements do not affect the MPC. The confinement boundary design remains unchanged. The assumed source terms, release fractions, leak rate, meteorology, occupancy factors, breathing rate and dose conversion factors currently discussed in the FSAR remain unchanged.

The HI-STORM FSAR does not define any accidents which significantly effect the shielding of the HI-STORM system. Therefore, the accident dose rate is the same as the normal condition dose rate.

The critical characteristics of the plain concrete in the HI-STORM overpack are: (i) its density and (ii) its compressive strength. The proposed changes to the overpack concrete requirements include removing all aggregate testing except for grading and sieve testing. Based on the discussion in Attachment A to ECO-5014-149, it is clear that aggregate testing is definitely important for outdoor structures that are expected to experience normal weathering effects and also for reinforced concrete structures and concrete used in road surfaces subject to compressive and bending loads. However, in the present application, concrete is enclosed in the shells of the overpack, there are no weathering effects, and the concrete is not subject to large compressive loads where it is required to maintain its integrity. Therefore these tests are not applicable to the plain concrete used in the HI-STORM body.

Some of the aggregate tests that are proposed to be removed provide indirect indications of the strength and density of concrete. However, since direct tests for strength and density (28 day compressive strength test and wet density test) are conducted, the aggregates tests become secondary. The concrete in each batch is tested for strength and density. These tests are sufficient to guarantee the required critical characteristics. Hence, the proposed changes do not change the shielding capabilities of the HI-STORM 100, therefore the dose rates will remain the same.

The compressive strength of the plain concrete used in the HI-STORM 100 is required to be tested to confirm the minimum 28-day concrete strength has been met. It is proposed to allow a condition that if the concrete strength exceeds the minimum required strength at an earlier time, it can be used as the official break test data in lieu of waiting for 28-day break

results. The compressive strength of concrete is universally observed to increase monotonically with time of curing as cited in Concrete Manual, 8th Edition, US Bureau of Proclamation, Denver, Colorado, 1975. Therefore, once the concrete strength exceeds the minimum required strength, it will not decrease in strength over time. This conclusion is also supported by numerous tests conducted for Holtec casks. Hence, the proposed change to accept compressive strength tests before the required 28 days does not change the structural integrity of the HI-STORM 100.

The proposed changes will not reduce the structural integrity of the HI-STORM Overpack below acceptable limits or reduce the structural integrity of the MPC confinement boundary, or fuel basket, and will not reduce the shielding effectiveness or thermal performance of the cask. The fuel basket will continue to maintain the neutron absorber panels in their correct position and maintain the fuel assemblies in a sub-critical configuration. The shielding concrete will remain within the confines of the storage overpack. The confinement boundary will not be subjected to any increased or previously unevaluated loadings under all previously evaluated conditions, including accidents. This ensures that there will be no increase in the consequences (i.e., controlled area boundary dose) of any previously evaluated accident.

- d. **Will the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the FSAR? Refer to Section B 4.3.4 of Reference [3.7] for guidance.**

YES _____ NO X _____

Basis:

The HI-STORM 100 System is a totally passive storage cask design and will remain so after these proposed changes are implemented. The proposed activity will not require changes in any methods of operation or operating procedures. There are, therefore, no malfunctions associated with the overpack so no malfunction consequences can be increased.

- e. **Will the proposed activity create a possibility for an accident of a different type than any previously evaluated in the FSAR? Refer to Section B 4.3.5 of Reference [3.7] for guidance.**

YES _____ NO X _____

Basis:

The proposed changes have been evaluated to ensure that the design functions of systems, structures, and components (SSCs) important to safety will still be performed as discussed in the FSAR. The overpack has been confirmed to be able to withstand all applicable load combinations with acceptable safety margins. No changes in operating procedures or methods of handling the overpack or component thereof are proposed or required by the proposed changes. Therefore, there is no possibility for an accident of a different type than any previously evaluated.

- f. **Will the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the FSAR? Refer to Section B 4.3.6 of Reference [3.7] for guidance.**

YES _____ NO _____ X _____

Basis:

The HI-STORM System is completely passive in its operation, including the HI-STORM overpack. The proposed changes will not require changes in any methods of operation or operating procedures. There are, therefore, no malfunctions associated with the overpack so no malfunction results can be changed.

- g. **Will the proposed activity result in a design basis limit for a fission product barrier being exceeded or altered as described in the FSAR? Refer to Section B 4.3.7 of Reference [3.7] for guidance.**

YES _____ NO _____ X _____

Basis:

The fission product barriers in the HI-STORM System are the cladding of intact fuel assemblies and the MPC enclosure vessel. The proposed changes do not directly affect either of these barriers. The critical design basis limit for the fuel cladding is temperature. The critical design basis limits for the MPC enclosure vessel are temperature and internal pressure. Since the material properties pertinent to thermal performance of HI-STORM system are not changing for the concrete, the proposed changes will have no effect on the temperature of the HI-STORM components and the pressure within the enclosure vessel barrier.

- h. **Will the proposed activity result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses? Refer to Section B 4.3.8 of Reference [3.7] for guidance.**

YES _____ NO _____ X _____

Basis:

Not Applicable.

If the responses to questions 'a' through 'g' are all "No" or "N/A", as applicable, the proposed activity may be implemented without obtaining an amendment to the license or CoC. Ensure that all proposed changes to the FSAR to reflect implementation of the proposed activity are made in the electronic FSAR files on the Holtec network.