



August 21, 2013

John Goshen, P.E., Project Manager – Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards

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

Subject: Holtec International HI-STORM 100 Cask System, USNRC Docket No. 72-1014,
License Revision Request (1014-8 R1)

Reference(s): [1] HI-STORM FW License Amendment Request # 2 (Holtec Letter 5018026 from Stefan Anton (Holtec) to John Goshen (NRC) dated July 31, 2013)
[2] Acceptance Review letter for Amendment Request 10 to Holtec International HI-STORM 100 Cask System (Letter from John Goshen (NRC) to Stefan Anton (Holtec) dated May 21, 2012)
[3] HI-STORM 100 License Amendment Request # 10 (Holtec Letter 5014736 from Tammy S. Morin (Holtec) to John Goshen (NRC) dated March 9, 2012)
[4] HI-STORM FW License Amendment Request # 1 (Holtec Letter 5018019 from Tammy S. Morin (Holtec) to John Goshen (NRC) dated October 13, 2011)
[5] HI-STORM 100 Final Safety Analysis Report (FSAR) Revision 11 Submittal (Holtec Letter 5014756 from Stefan Anton (Holtec) to John Goshen (NRC) dated August 16, 2013)

Dear Mr. Goshen:

Holtec International herein submits this request to revise Certificate of Compliance (CoC) for Amendment # 8 of the HI-STORM 100 Dry Cask Storage System. The four changes requested in this revision include:

1. Changes to burnup and cooling time limits for Thimble Plug Devices (TPDs)
2. Changes to Metamic-HT testing requirements
3. Changes to Minimum Guarantee Values (MGVs) for Metamic-HT, and
4. Update to fuel definitions/classifications to include CILC fuel for storage in the MPC-68M

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A summary of the proposed changes and justifications, with detailed references to the CoC, Technical Specifications (TS) and the FSAR sections are provided in Attachment 1.

The updated fuel definitions/classifications to include CILC fuel is currently under NRC review in the HI-STORM FW docket (72-1032) [4].

It should also be noted that the fuel definitions update to include CILC fuel was previously requested in Amendment 10 (LAR 1014-10) [3], which has been stymied because of longer-than-expected review of the thermal analyses for Amendment 9 (LAR 1014-9). Further, thermal reviews and our responses on LAR #9 have rendered the thermal analyses submitted in LAR # 10 obsolete. Therefore, we request that SFST close out the review effort on LAR# 10 and consider the definitions/classifications updates as part of this revision request instead. The fuel definitions update was accepted for technical review without the supporting criticality calculation package in Amendment 10 [2]. Therefore, the criticality calculation package is not included with this submittal. If the calculation package is deemed necessary to the review process by NRC staff, the calculation package will be submitted by Holtec upon request.

With respect to Change # 2, the revised testing and fabrication requirements are identical to the Metamic-HT changes previously submitted to the NRC as part of FW Amendment 2 submittal (LAR 1032-2) [1].

With respect to Change # 3, similar changes to the MGVs were accomplished for the HI-STORM FW MPC Storage System (Docket 72-1032). The Engineering Change Order (ECO) process, supported by a 72.48 evaluation was used to ensure prior NRC approval was not required for MGV changes. In an effort to provide customers regulatory assurance of the validity of these changes, Holtec has elected to submit the MGVs changes through the amendment process for the HI-STORM 100 Docket.

Attachments 2 and 3 contain marked-up non-proprietary and proprietary FSAR changes, respectively. HI-STORM 100 FSAR Rev. 11 is the baseline for the marked-up FSAR changes. It consists of changes from the approved Amendment 8 and ECOs from Holtec's QA process. The HI-STORM 100 FSAR Rev. 11 was submitted to the NRC on August 16, 2013 [5]. Attachment 4 contains marked-up CoC and TS (Appendices A & B) changes. Amendment 8 CoC and TS Appendices A and B are the baselines for the marked-up CoC and TS changes.



Attachment 5 is the HI-STORM 100S Version B Shielding Analysis (HI-2033074) to support the thimble plugs calculations. Attachment 6 contains the Structural Calculation Package for MPC (HI-2012787) to support changes to the structural data affected by the MGVs changes. Attachment 7 is the MPC-68M fuel basket licensing drawing (# 7195), revision 5 with changes related to the revised fabrication requirements and clarifications. Attachments 3, 5, 6 and 7 are proprietary, therefore Attachment 8 is an affidavit requesting that information in Attachments 3, 5, 6 and 7 be withheld from public disclosure.

The HI-STORM 100U is not affected by this licensing action. As such, Appendices A-100U & B-100 of the CoC are not affected.

With three of the four changes requested in this letter currently under NRC review or approved under Holtec's QA process via an ECO and a 72.48, Holtec believes these circumstances facilitate NRC's treatment of this request as a revision to Amendment 8 (72-1014). A review period comparable to that of an amendment is expected, and should that time frame become unattainable, this licensing action will be changed to an amendment request.

If you have any questions, then please contact me at 856-797-0900 ext. 3663.

Sincerely,

A handwritten signature in black ink, appearing to read "Debraj Mitra-Majumdar".

Debabrata Mitra-Majumdar
Director, Engineering Analysis
Holtec International

cc: Michele Sampson, USNRC (letter only)
Marlton (via email)
HUG Licensing Subcommittee (via email)



List of Attachments

Attachment 1: Summary of Proposed Changes to the CoC, TS (Appendices A & B) and FSAR (8 pages)

Attachment 2: HI-STORM 100 FSAR, Rev. 11.A proposed changes (74 pages)

Attachment 3: HI-STORM 100 FSAR, Rev. 11.A, Supplement 1.III (General description of the MPC-68M) marked-up sections (Holtec Proprietary Information) (12 pages)

Attachment 4: Revision 1 to 72-1014 CoC 1014 and TS (Appendices A & B) marked-up sections (29 pages)

Attachment 5: Holtec Report HI-2033074, Revision 5: HI-STORM 100S Version B Shielding Analysis; Appendix J: Maximum of TPDs Curies for Old MPC-24 with 140 lb/cuft Concrete) (Holtec Proprietary Information) (30 pages)

Attachment 6: Holtec Report HI-2012787, Rev. 15: Structural Calculation Package for MPC; Supplement 54: Finite Element Analysis of MPC-68M Fuel Basket Rev. 2, and Supplement 55: Crack Propagation in MPC-68M Fuel Basket Rev.1) (Holtec Proprietary Information) (54 pages)

Attachment 7: Licensing Drawing # 7195, Proposed Revision 5: MPC-68M fuel basket assembly and list of changes (Holtec Proprietary Information) (3 pages)

Attachment 8: Affidavit Pursuant to 10 CFR 2.390 to Withhold Information from Public Disclosure (5 pages)

AFFIDAVIT PURSUANT TO 10 CFR 2.390

I, Debabrata Mitra-Majumdar, being duly sworn, depose and state as follows:

- (1) I have reviewed the information described in paragraph (2) which is sought to be withheld, and am authorized to apply for its withholding.
- (2) The information sought to be withheld are Attachments 3, 5, 6 and 7 to Holtec Letter 5014755, which contains Holtec Proprietary information.
- (3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

AFFIDAVIT PURSUANT TO 10 CFR 2.390

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- (4) Some examples of categories of information which fit into the definition of proprietary information are:
- a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;
 - b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.
 - c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;
 - d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;
 - e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a, 4.b and 4.e above.

- (5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as

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proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed descriptions of analytical approaches and methodologies not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed by Holtec International. A substantial effort has been expended by Holtec International to develop this information. Release of this information would improve a competitor's position because it would enable Holtec's competitor to copy our technology and offer it for sale in competition with our company, causing us financial injury.

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- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

AFFIDAVIT PURSUANT TO 10 CFR 2.390

STATE OF NEW JERSEY)
)
COUNTY OF BURLINGTON)

ss:

Debabrata Mitra-Majumdar, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Marlton, New Jersey, this 21st day of August, 2013.

Debabrata Mitra-Majumdar
Director, Engineering Analysis
Holtec International

Subscribed and sworn before me this 21st day of August, 2013.

MARIA C. MASSI
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 26, 2015

ATTACHMENT 1 TO HOLTEC LETTER 5014755
1014-8 REV. 1
SUMMARY OF PROPOSED CHANGES (SOPC)

There are four proposed changes in this revision to Amendment #8;

- (1) Change Burnup/Cooling Time limits for Thimble Plug Devices (TPDs),
- (2) Change Metamic-HT testing requirements,
- (3) Change Metamic-HT MGVs, and
- (4) Update fuel definitions/classifications to include CILC fuel as undamaged fuel in MPC-68M.

Proposed Change # 1

1. TS Appendix B; Table 2.1-8 is modified by changing the Burnup/Cooling time limits for TPDs.

Reason for Proposed Change # 1

Currently, cooling times for TPDs exposed to typical burnups are very long, preventing many TPDs from being stored in MPCs. The proposed change substantially reduces the required cooling times, so that a larger population of TPDs can be stored, providing greater flexibility to the users.

Justification for Proposed Change # 1

Shielding Justification

Shorter cooling times result in higher source terms and hence increased dose rates from the TPDs. However, even with the selected shorter cooling times, the dose rates from TPDs at the site boundary are still bounded by those from BPRAs, so site boundary calculations with BPRAs continue to bound both the presence of BPRAs and TPDs. Shielding analysis has been revised accordingly. HI-STORM FSAR Section 5.4.6 (Attachment 2 to Holtec Letter 5014755) is updated to discuss this in more detail.

Structural Justification

The irradiation history of TPDs is not considered in any of the structural analyses. The structural analyses are therefore not affected by this change.

Thermal Justification

The irradiation history of TPDs is not considered in any of the thermal analyses. The thermal analyses are therefore not affected by this change. However, the shortened cooling time increases the decay heat from the TPDs slightly. This needs to be considered when calculating the cell heatload for comparison with the applicable limit.

Criticality

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The presence or irradiation history of TPDs is not considered in any of the criticality analyses. The criticality analyses are therefore not affected by this change.

Confinement

The irradiation history of TPDs is not considered in the confinement evaluation. The confinement evaluation is therefore not affected by this change.

Proposed Change # 2

1. Appendix B of CoC: Section 3.2.9: Neutron Absorber Tests: Removed reference to Section 9.III.2.2 of the HI-STORM 100 FSAR and added revised testing requirements for Metamic-HT.
2. The following changes to the Metamic-HT testing requirements were made to the HI-STORM FSAR Sections 9.III.1.1, 9.III.1.3, 9.III.2.1 and 9.III.2.2, Tables 9.III.1 – 9.III.3:
 - a) Remove testing using 1 inch beam.
 - b) Removing fabrication testing of Charpy, and Lateral Expansion.
 - c) Revised fabrication testing requirements
 1. Revised weld test procedures
 2. Removed the thermal conductivity testing requirement
 - d) Changed failed MGV re-testing criteria by requiring only the failed property to be re-tested (not all MGVs), added ability to conduct 100% testing of an MGV property within a lot if it fails re-testing.

Reason for Proposed Change # 2

The reason for this change is two-fold. First, the changes to the Metamic-HT testing requirements to improve testing processes or ease undue burden. Some testing requirements were overly conservative and created a lengthy testing process, while others did not impact safety analysis. Second, for clarity, the reference in CoC Appendix B to the FSAR is replaced by an explicit list of testing requirements.

Note that these are the same change submitted for Amendment 2 of HI-STORM FW System (Docket 72-1032), per Holtec letter no. 5018026 dated July 31, 2013.

Justification for Proposed Change # 2

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- a) The requirement for the use of a 1-inch beam is an undue burden. Comparison testing for Metamic Classic has shown that the areal density results from a 1-inch beam and that from a roughly 0.5-inch beam are essentially identical. This is confirmed by SFST Interim Staff Guidance-23 which concludes that a beam between 1 cm and 2.54 cm is acceptable for qualification and acceptance testing of neutron absorbing materials.

- b) Charpy and lateral expansion testing is removed from fabrication testing as these properties are not relied upon in safety analysis.

- c) Removal of thermal conductivity testing, as justified in the FSAR, is due to the fact that this property has little variability in Metamic-HT when fabricated according to the manufacturing manual. The weld testing procedures were revised to provide clarification for the requirements.

- d) Changes in the re-testing language were made to bring it into line with general fabrication good practice.

Structural Justification

None of the proposed changes have any impact on the structural capability of the Metamic-HT basket since they are not used in any safety analysis.

Thermal Justification

None of the thermal properties of Metamic-HT have been reduced and therefore the thermal safety evaluation is not affected by the proposed changes.

Shielding Justification

The proposed changes have no impact on the shielding capabilities of the basket.

Criticality Justification

The proposed changes do not impact the neutronic properties on the Metamic-HT baskets nor do they affect the configuration of the baskets. Therefore the proposed changes have no effect on the reactivity performance of the basket.

Confinement

The proposed changes have no impact on the confinement performance of the MPC.

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Proposed Change # 3

1. FSAR changes; Certain Minimum Guaranteed Values (MGVs) of the thermal-physical properties of Metamic-HT used for the MPC-68M basket are revised. Some of these revised values are used in the structural analyses of the baskets.
2. FSAR changes; The fragmented text matter on Metamic-HT in the FSAR is reorganized and rewritten to clarify the role of each thermo-physical property and to enhance ease of user compliance with the FSAR. A new Section 1.III.2.4 is created, which includes the information from Appendices 1.III.A and 1.III.B. Appendices 1.III.A and 1.III.B are deleted. Related editorial changes are made in Section 2.III.0.1 and Table 4.III.1.

Reason for Proposed Change # 3

This is the same change as that made by Holtec to the HI-STORM FW system (Docket 72-1032) under 72.48 evaluation. It has been included here as a change submitted for NRC review for completeness of the Metamic-HT characterization in combination with Proposed Change #2.

Justification for Proposed Change # 3

Structural Justification

Structural evaluations that use values proposed to be changed (non-mechanistic tip-over) have been re-performed with the new values. The results of the re-evaluations are presented in Supplement 3.III of the revised FSAR and show that sufficient margins are retained when using the revised values and that all acceptance criteria for the baskets are met. Structural analysis has been revised to incorporate these changes.

Thermal Justification

Since none of the thermal properties of Metamic-HT are changed the thermal safety evaluation is not affected by the proposed changes.

Confinement Justification

The proposed changes have no nexus to the confinement performance of the MPC.

Criticality Justification

The proposed changes do not impact the neutronic properties of the Metamic-HT baskets nor do they affect the configuration of the baskets (appropriate spacing between fuel assemblies is

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maintained under all design basis conditions). Therefore the proposed changes have no effect on the reactivity performance of the basket.

Shielding Justification

As the density of the basket material remains unchanged, there is no effect on the shielding performance of the system.

Operations Justification

A review of the fuel loading and unloading operations indicates that the proposed change has no effect on the short term operations described in the FSAR.

Manufacturing Justification

The manufacturing procedures and inspections set down in the FSAR remain unaffected by the proposed change.

Materials Justification

Because the chemical constituents and manufacturing processes used in the production of Metamic-HT are unaffected by the proposed changes, the conclusions reached in Chapter 1 of the FSAR with respect to the suitability of all cask materials in the HI-STORM system, including Metamic-HT, remain valid.

Radiation Protection Justification

The proposed changes apply to the internals of the MPC, and therefore, they have no effect on the radiation protection features of the system.

Accident Evaluation Justification

The universe of potential accidents during short term operations and during long term storage considered in the FSAR have been revisited to determine whether the proposed change could conceivably precipitate a new type of accident, or aggravate an existing postulated accident. As the proposed changes have been shown to meet all applicable acceptance criteria prescribed in the FSAR, the conclusion on both of the above counts is an unequivocal "no".

Proposed Change #4

Add definition of UNDAMAGED FUEL ASSEMBLY, GROSSLY BREACHED SPENT FUEL ROD and REPAIRED/RECONSTITUTED FUEL ASSEMBLY. This is to extend undamaged fuel in the MPC-68M to include low enriched and channeled BWR with potential cladding

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defects larger than pinhole leaks or hairline cracks but without gross breaches, and to clarify that repaired or reconstituted assemblies are also covered by the undamaged fuel definition. All related changes are provided in the marked copy of the CoC/TS and noted here:

1. Appendix A, Section 1.1 Definitions; a definition of GROSSLY BREACHED SPENT FUEL ROD is added to the table.
2. Appendix A, Section 1.1 Definitions; a definition of REPAIRED/RECONSTITUTED FUEL ASSEMBLY is added to the table.
3. Appendix A, Section 1.1 Definitions; the definition of UNDAMAGED FUEL ASSEMBLY is added to the table.
4. Appendix B, Section 2.1.1.a, "UNDAMAGED FUEL ASSEMBLIES" is added to the paragraph.
5. Appendix B, Section 2.1.3, "or UNDAMAGED FUEL ASSEMBLIES" is added to the paragraph.
6. Appendix B, Table 2.1-1, Section VI; "INTACT FUEL ASSEMBLIES" is changed to "UNDAMAGED FUEL ASSEMBLIES" in all places.
7. Appendix B, Table 2.1-3; Note 16 is modified. "INTACT FUEL ASSEMBLIES" is changed to "UNDAMAGED FUEL ASSEMBLIES" in all places.
8. Appendix B, Table 2.1-3; Note 19 is added.
9. Appendix B, Table 2.4-1; "or Undamaged" is added to the column label for "Intact Fuel Assemblies".
10. Appendix B, Section 2.4.2; "or Undamaged" is added to the parenthetical statement "(Intact Fuel only)".
11. Appendix B, Section 3.2.7; "or undamaged" is added to the paragraph.

Note:

- This change was originally submitted with the Amendment Request 10 to the HI-STORM 100 System. It has been included here since the Amendment 10 request has been withdrawn.
- Essentially the same request was included as Change # 3 in Amendment Request 1 to the HI-STORM FW System (see Holtec letter No. 5018019 dated October 13, 2011).

Reason for Proposed Change #4

Adding the definition of undamaged fuel assemblies, grossly breached spent fuel rod, and repaired/reconstituted fuel assembly provides further clarity to the user and consistency with the guidance on classifying fuel given in ISG-1 Revision 2. In addition, these definitions will serve

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some BWR users who have older, low enriched, channeled BWR fuel with potential cladding defects that they wish to load in the MPC-68M. With this proposed change they can load the fuel without damaged fuel containers and without restriction on amount or location in the MPC-68M.

Justification for Proposed Change #4

ISG-1 Revision 2 provides functional/performance based guidance for classifying fuel as either undamaged or damaged. In accordance with the ISG, undamaged fuel may contain some cladding defects, as long as the fuel is protected from high temperatures and oxidation, and does not contain gross cladding breaches. The HI-STORM 100 System requires backfilling with helium and is shown to keep the peak cladding temperature of the fuel below the limits in ISG-11 Revision 3; therefore fuel is protected during storage against conditions that would lead to gross ruptures. As long as the fuel does not already contain a gross breach, there is no means to release fragments during storage. In addition, fuel that contains an assembly defect may be considered undamaged per ISG-1 Revision 2 if it can still meet fuel-specific and system related functions; therefore repaired and/or reconstituted assemblies, as proposed in the definition as part of this change, are considered undamaged.

For channeled BWR fuel, inspections to classify the fuel cladding as undamaged in accordance with the currently approved definition may be prohibitive from a cost, ALARA, or safety perspective. A particular subset of fuel, as described and analyzed in proposed FSAR Subsection 6.III.4.4, is shown to remain subcritical even if there was significant cladding damage and rearrangement of the fuel rods inside the channel. Therefore, if it can be determined that this fuel does not have gross cladding breaches, can be handled by normal means, and has enrichment less than or equal to 3.3 wt%, then it does not require a damaged fuel container nor is it limited to certain basket locations in the MPC-68M.

Note that this change will not be incorporated in the 100U and no changes are proposed to Appendix A-100U or B-100U. This change will only affect the MPC-68M.

Marked copies of the following FSAR sections and supplements are included with this submission: 1.III, 2.III and 6.III.

Structural

Undamaged fuel, per the discussion above, has no credible risk of rupture, as it is protected during storage against conditions that would lead to gross rupture.

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Thermal

There is no thermal impact of this change.

Criticality

Criticality evaluation was performed. The effect was found to be within the design basis for the system.

Shielding

The effect of this change on shielding is negligible.