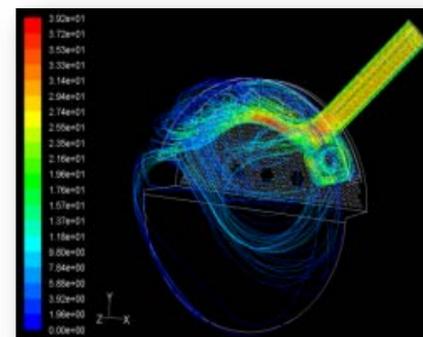
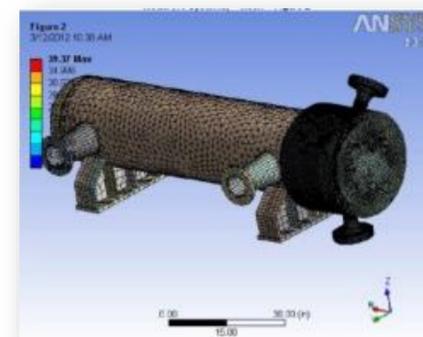
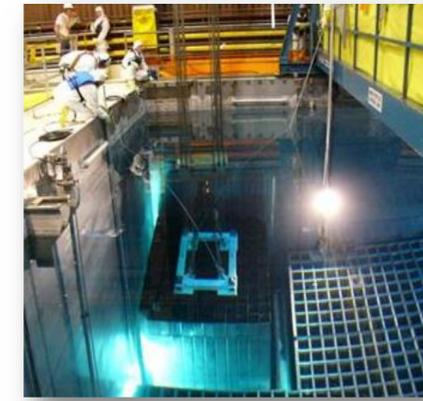




## Pre-Decisional Enforcement Conference Inspection Report 07201014/2022-201



# Agenda

- Background
- Additional Information on Apparent Violations
- Safety Significance of Apparent Violations
- Holtec Corrective Actions
- Path Forward for Any Remaining Compliance Issues

# Background

- Both HI-STORM FW and HI-STORM 100 systems employ canisters with baskets made of the Metamic-HT material
  - ✓ HI-STORM 100 System – MPC-68M, MPC-32M
  - ✓ HI-STORM FW System – MPC-37, MPC-89
- Original design of these canisters used Friction Stir Welds (FSW) at the corners to ensure dimensional fixity to the basket cells.
- The FSW process, however, leads to weld shrinkage-induced deformation in the corner cells (which is unavoidable in all welded baskets).
- To overcome this problem, Holtec developed the Continuous Basket Shim (CBS) variants of these canisters
  - ✓ CBS variants use bolted shims to control the basket's configuration
  - ✓ The CBS variant eliminates welding-induced warpage and enhances the dimensional fidelity of the cellular fuel storage cavities.

# CBS Baskets



# Timeline of Events

- Prior to May 13, 2020 - Holtec performed design review evaluation via 72.48 to modify four FSW-based basket designs for the MPC 68M, 32M, 89 and 37 canisters.
  - ✔ Evaluation performed to change previous welded baskets and shim design provided for basket stability
  - ✔ Replace the original design with a bolted shim arrangement (“CBS” design upgrade) which provides equivalent level of stability.
- December 2022 - NRC staff performed a Part 72 fabrication inspection of Holtec International’s Advanced Manufacturing Division (AMD), including a sample of 72.48 evaluations.
- April 21, 2023 - NRC debriefed Holtec on three apparent violations of 10 CFR 72.48.
  - ✔ NRC Staff posited potential Violations related to CBS basket design modification, focusing on presumed changes in methodology that would have led the 72.48 process to a license amendment request.
- August 30, 2023 - NRC exited with Holtec with three Apparent Violations being considered for escalated enforcement.
- September 12, 2023 - NRC issued Inspection Report 07201014/2022-201 with choice letter to Holtec
- October 26, 2023 – Pre-decisional Enforcement Conference with NRC and Holtec

# Apparent Violations

- Additional information on the three apparent violations and the nine specific issues raised in the inspection report is presented in the next slides
- Most concerns are associated with Criterion 8 on Method of Evaluation in 72.48 evaluation
- Holtec followed principles in Reg Guide 3.72 which endorses NEI 12-04 which differentiates between “*elements of a methodology*” and “*inputs to the methodology.*” NEI 12-04 states that:
  - ✔ Physical / geometrical changes to a model should not be considered methodology changes, but input changes
  - ✔ Methodology is the calculational framework as described in NEI 12-04

# Additional Information on Apparent Violations

## Apparent Violation A:

Per 10CFR 72.48(c)(2)(viii), “Changes, tests, and experiments,” requires, in part, that “a certificate holder shall obtain a CoC amendment pursuant to 10 CFR 72.244, prior to implementing a proposed change that would result in a departure from a method of evaluation described in the [Final Safety Analysis Report], (FSAR) as updated used in establishing the design bases or in the safety analyses.”

Contrary to the above, the certificate holder Holtec International (Holtec) failed to obtain a Certificate of Compliance (CoC) amendment pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 72.244, prior to implementing proposed changes that would result in a departure from a method of evaluation (MOE) described in the FSAR used in establishing the design bases or in the safety analyses.

Specifically, from November 6, 2020, to July 19, 2021, Holtec made design changes to four multi-purpose canister (MPC) fuel baskets from the standard MPC-68M, 32M, 89, and 37 baskets to the MPC-68M-continuous basket shims (CBS), MPC-32M-CBS, MPC-89-CBS, and MPC-37-CBS basket variants that resulted in a departure from methods of evaluation described in the FSARs (as updated) used in establishing the design bases and failed to submit CoC amendment applications prior to implementing the changes.

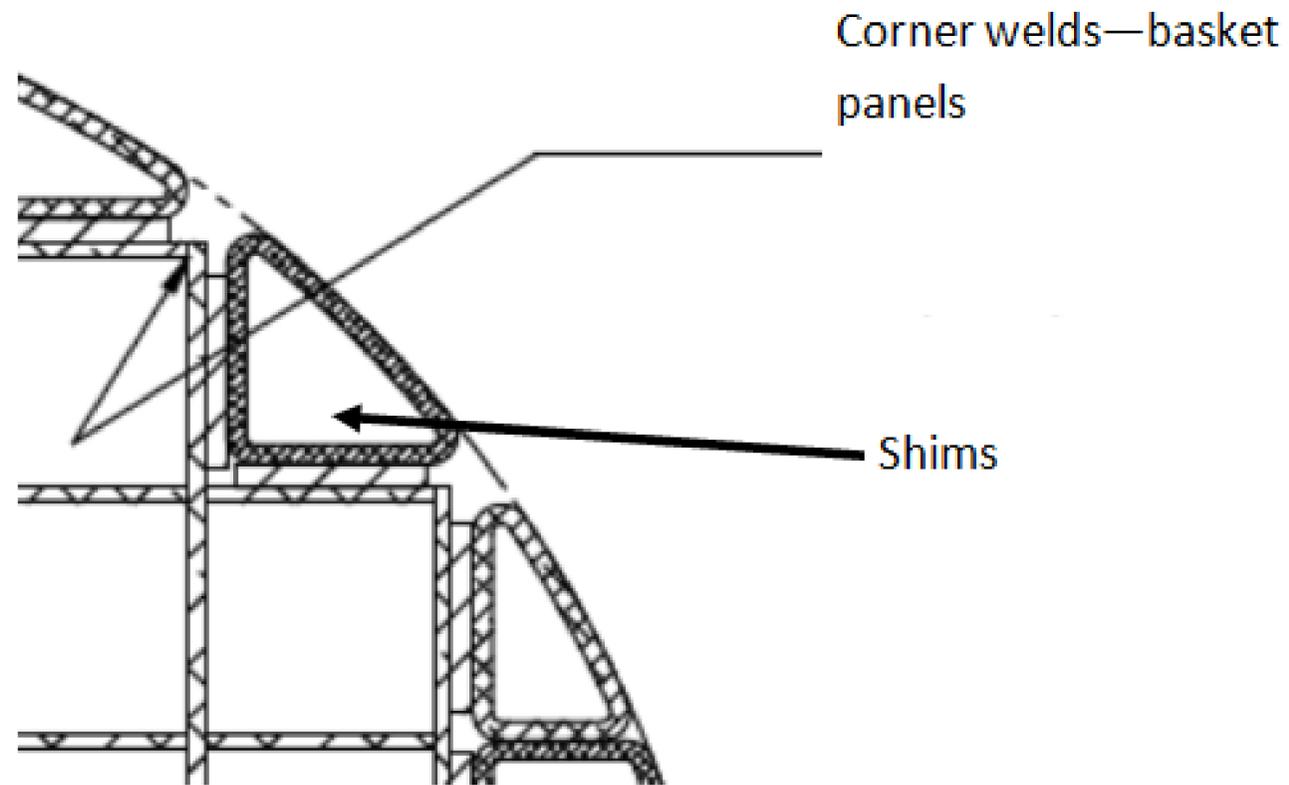
# Additional Information on Apparent Violations

## Apparent Violation A (Cont'd)

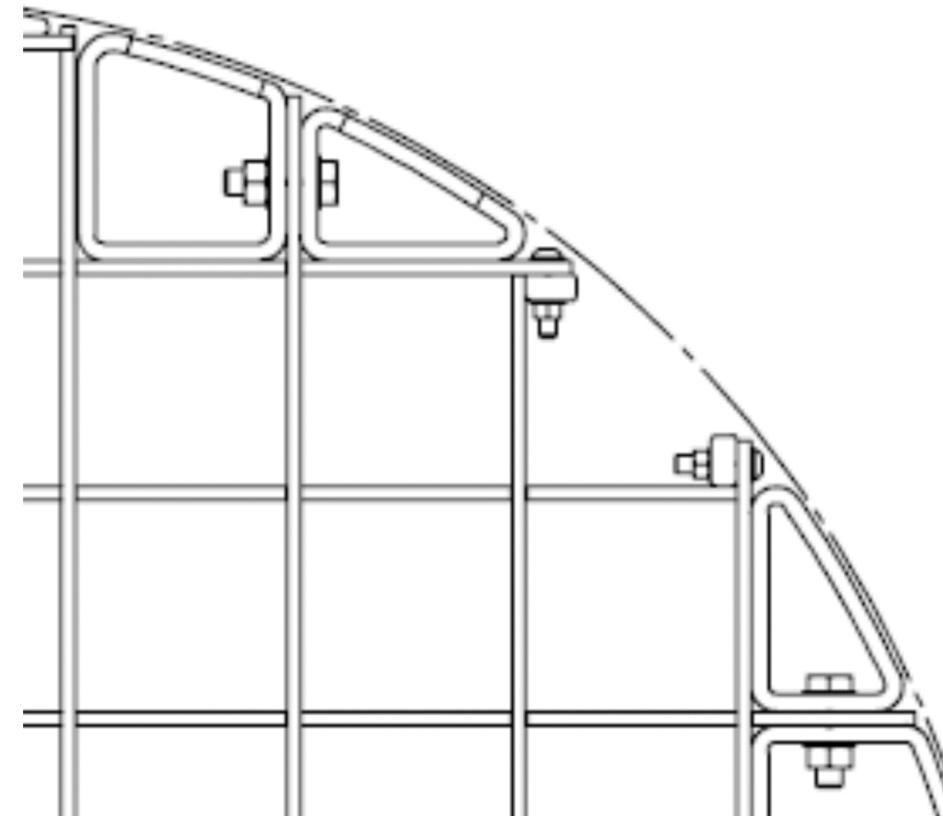
- “1) As described in FSAR revision 22, section 3.III.4.4.3.1(iii), Holtec tied the nodes of the shim to the basket panel at the bolt hole locations to replicate bolted connections at the bolt hole locations the resultant of which changed the way the connections are modeled between the fuel basket and the shims in the FEA model and did not explicitly model the new bolts. Holtec implemented the modification and revised FSAR revision 21, section 3.III.4.4.3.1 (original design) in which the **corner welds between the standard basket and shims** were modeled by bonding the corner elements and assigning them the elastic material properties of the weld, effectively modeling the welds in the FEA. **The team considered this an element change because it was a change to the overall FEA model associated with the tip-over analysis”**

# MPC-68M Versions

## ■ Original Design



## ■ CBS Basket Variant



Sketches for illustrative purposes only

# Additional Information on Apparent Violations

## ■ Response to Item 1

- ✓ The corner welds described in FSAR Revision 21 are between intersecting Metamic panels within the actual basket structure, there are no welds between “the standard basket and shims”
- ✓ Holtec uses NEI 12-04 as 72.48 program basis, as endorsed by NRC in Reg Guide 3.72
- ✓ NEI 12-04 specifically discusses dimensional changes as input changes which are different than methodology which is “calculational framework” which tend to involve a mathematical expression
- ✓ Holtec modeled the accurate dimensional and physical changes that occurred with the CBS design change and **did not** change the calculational framework of the analysis
- ✓ Previously established understanding of NRC guidance was that a change to the FEA model to accord with geometric changes was not automatically considered a change to the methodology
  - Definition of “method of evaluation” in NEI-12-04 is based on “calculational framework”
  - Examples of mathematical models that would be a change in methodology are methods of heat transfer and material performance – not geometrical changes

# Additional Information on Apparent Violations

## Apparent Violation A Item 2:

- “2) As described in FSAR revision 22 section 3.III.4.4.3.1(iii), the impact load between the fuel basket and the shims is directly transferred between shims and the horizontal basket panel adjacent to them without inducing shear in the bolts. Additionally, for the modified design, calculation HI-201787-Rev 39, supplement 79, evaluates the bolts for solid shims using an applied 60-g bounding lateral deceleration load from the weight of the basket and fuel assembly, the resultant of which changed the way the strength evaluation was performed for the connections between the fuel basket and the shims. Previously, for the standard basket design, Holtec evaluated **basket welds** using outputs from the FEA to determine the applied moment and shear load as documented in attachment 2 to supplement 65 of Holtec calculation HI-201787-Rev 38. **The team considered this a new or different MOE because Holtec changed the calculational framework on how to evaluate the shims.**”

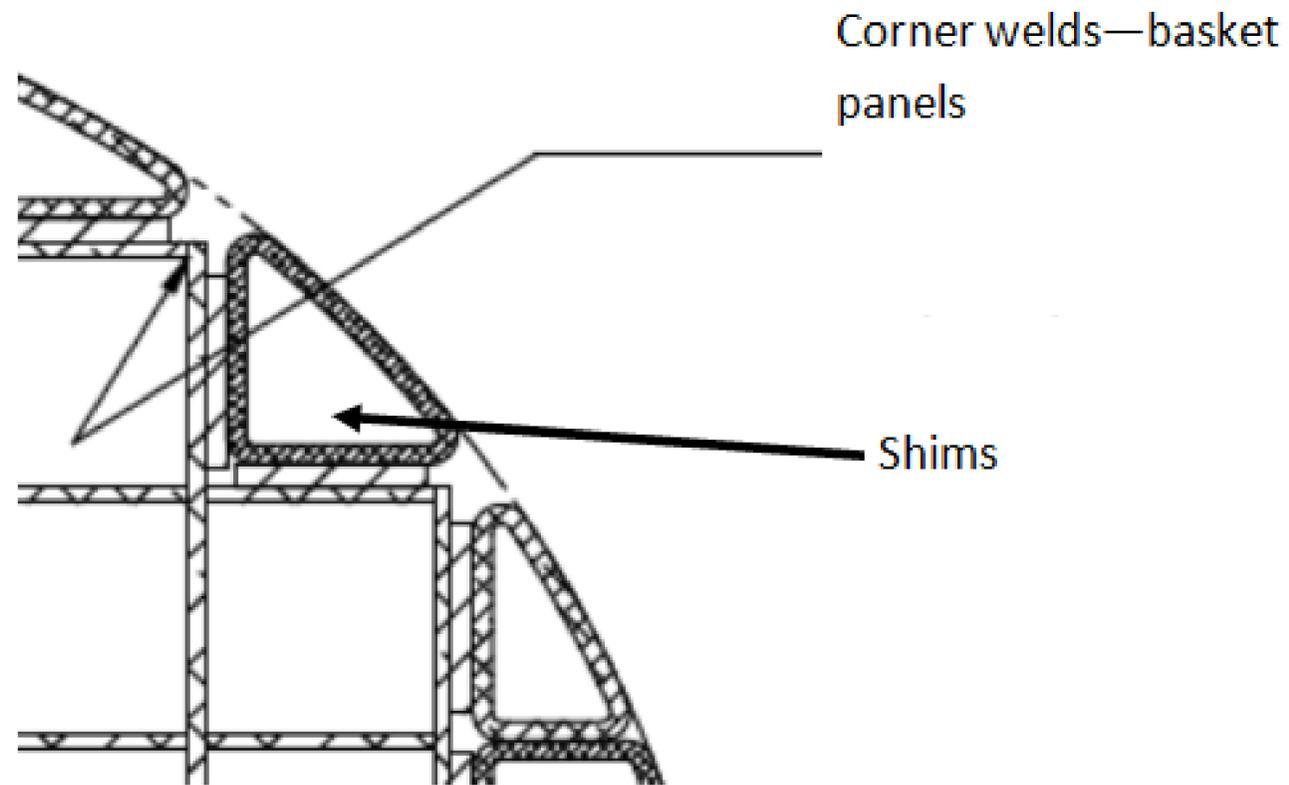
# Additional Information on Apparent Violations

## ■ Response to Item 2

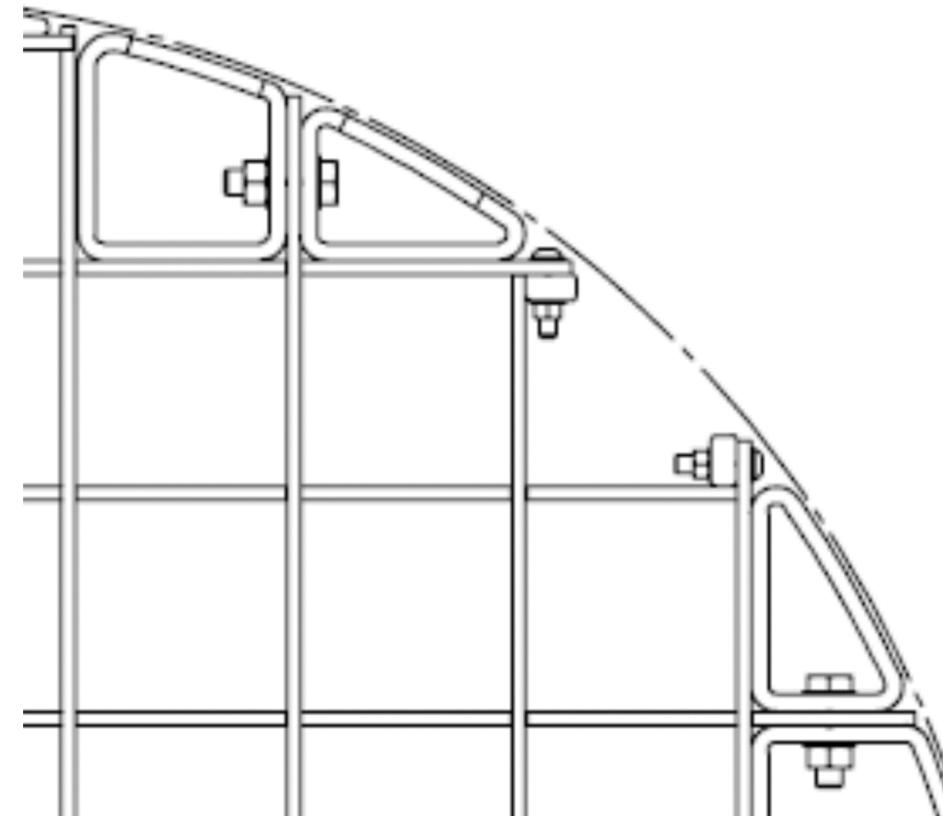
- ✓ As in item 1, this is a direct result of the change in geometry of the basket/shim configuration
  - The corner welds described in FSAR Revision 21 are between intersecting Metamic panels within the actual basket structure
  - There are no welds between “the standard basket and shims”
- ✓ For the standard (FSW-based) basket design, there is no physical connection between the fuel basket and the shims
- ✓ Evaluation performed for friction stir welds used direct outputs from the ANSYS simulation
  - Friction Stir Welds were an integral part of the standard basket design - not the shims
- ✓ Bolts are a separate physical component
  - A separate analysis was performed as necessary to demonstrate their suitability for the solid shims
- ✓ Not considered a change in methodology - if welds still existed they would have been analyzed using the previously established method
- ✓ Since the CBS basket introduced a different component it was analyzed using a bounding load consistent with the FEA model framework

# MPC-68M Versions

## ■ Original Design



## ■ CBS Basket Variant



Sketches for illustrative purposes only

# Additional Information on Apparent Violations

## Item # 3; Apparent violation A

- “3) As described in section 3.III.4.4.3.1(ii) of FSAR revision 22, Holtec used a bilinear material model (which required calculating a tangent modulus for plastic behavior) to define the material stress-strain curve for the basket shims in the CBS FEA, the resultant of which changed the way material property models were developed for the basket shims. In the original design, as described in section 3.III.4.4.4.3.1 of FSAR revision 21, Holtec described the material model for the basket shims as elastic with no plastic deformation in the shims. The team considered this an element change because it was a **change to the mathematical model associated with the material performance of the shims.**”

# Additional Information on Apparent Violations

## ■ Response to Item 3

- ✔ This item was explicitly addressed in the revised 72.48 evaluations provided to the NRC via the audit-related SharePoint site on May 23, 2023
- ✔ While the original MPC-68M analysis did use an elastic material model, the use of a bilinear material model in the MPC-68M-CBS analysis meets both criteria in NEI 12-04 to NOT be considered a change in methodology
  - MPC-32M, which was licensed in the same docket as the MPC-68M, used a bilinear material model for the shims in the tipover analysis from the time of its initial approval.
  - Analysis of both canisters is the same, with the same scenario applied, therefore this meets the NEI 12-04 definition of “approved for the intended function.”
- ✔ Additionally, Holtec performed a run with the CBS style shims using an elastic material model and demonstrated that the results are essentially the same as the bilinear model, meeting the first criteria in NEI 12-04.
  - This was provided to the NRC on May 23, 2023
    - NEI 12-04, Section 6.8: (c)(2)(viii). In general, licensees or CoC holders can make changes to MOEs without first obtaining a license amendment or cask CoC amendment in two ways:
      1. Changing one or more elements of the MOE, provided the results are essentially the same as, or more conservative than, previous results or

# Additional Information on Apparent Violations

## Item #4; Apparent Violation A:

- “4) As described in supplement 79 of HI-2012787 revision 39, Holtec modified the way in which a structural integrity tip-over/side drop analysis for the CBS basket shims was performed by comparing the stress in the shims to the ultimate stress. In the original design, as stated in FSAR revision 21, section 2.III.0.1.i, the basket shims are designed to remain below the yield limit of the selected aluminum alloy. **The team considered this a different MOE because it was a change to how the analysis was applied and was outside the conditions and limitations in which Holtec received NRC approval.”**

# Additional Information on Apparent Violations

## ■ Response to Item 4

- ✓ Primary stresses in the standard basket shims, as well as the CBS basket shims, remain below the material yield strength during non-mechanistic tipover
- ✓ Only *peak stresses* are compared to the material ultimate strength in the supporting calculation package (supplement 79 of HI-2012787)
- ✓ The same calculation package indicates that this is “conservative as primary membrane plus bending stress is lower”.
- ✓ This is not a different MOE because the primary stresses in the CBS basket shims still remain below yield, just as in the standard shims and described in the FSAR.
  - The additional comparison performed in the calculation package does not replace that demonstration.

# Additional Information on Apparent Violations

## Apparent Violation A; Item 5:

- “5) As described in FSAR revision 22, section 3.III.6.2, structural analysis of the CBS basket design was performed using FEA code engineering simulation software ANSYS, version 17 in lieu of ANSYS version 11.0, which was used to analyze the standard basket design. In addition, Holtec did not compare the results of the previous version to the current version to determine if the revised software produces comparable results. **The team considered this an element change because Holtec adopted a later version of the ANSYS code.”**

# Additional Information on Apparent Violations

## ■ Response to Item 5

- ✓ For ANSYS Rev 17, the results have been shown to be essentially the same between the two codes, thus meeting the second criteria in NEI 12-04
- ✓ Holtec's QA program mandates that a new version of a Code be requalified to establish its validity before use in any safety-significant project
  - The code is run and shows the same results
  - HI-2012627 provides this QA qualification for ANSYS
- ✓ The Holtec quality validation process for computer codes is well established
- ✓ Rev 17 is a valid edition of the Code – fully compliant with Holtec QA.
- ✓ We recognize that this could have been more clearly documented within the 72.48 evaluation

# Additional Information on Apparent Violations

## Apparent Violation A; Item 6:

- “6) As described in appendix E.1 of HI-2188448-R3, the impact load between the fuel basket and the shims is directly transferred between the shims and the horizontal basket panel adjacent to them without inducing shear in the bolts. For the standard basket design, Holtec evaluated the welds using an applied 100-g bounding fuel deceleration load in appendix C of HI-218848-R3 (as referenced in HI-STORM FSAR revision 23, section 3.II.4.4.2(ii)). The team considered this a different MOE because **Holtec changed the way the strength evaluation was performed for the connections between the fuel basket and the shims by using a different assumption, which was inconsistent with the previous licensing basis assumptions.** (similar to AV A.2)

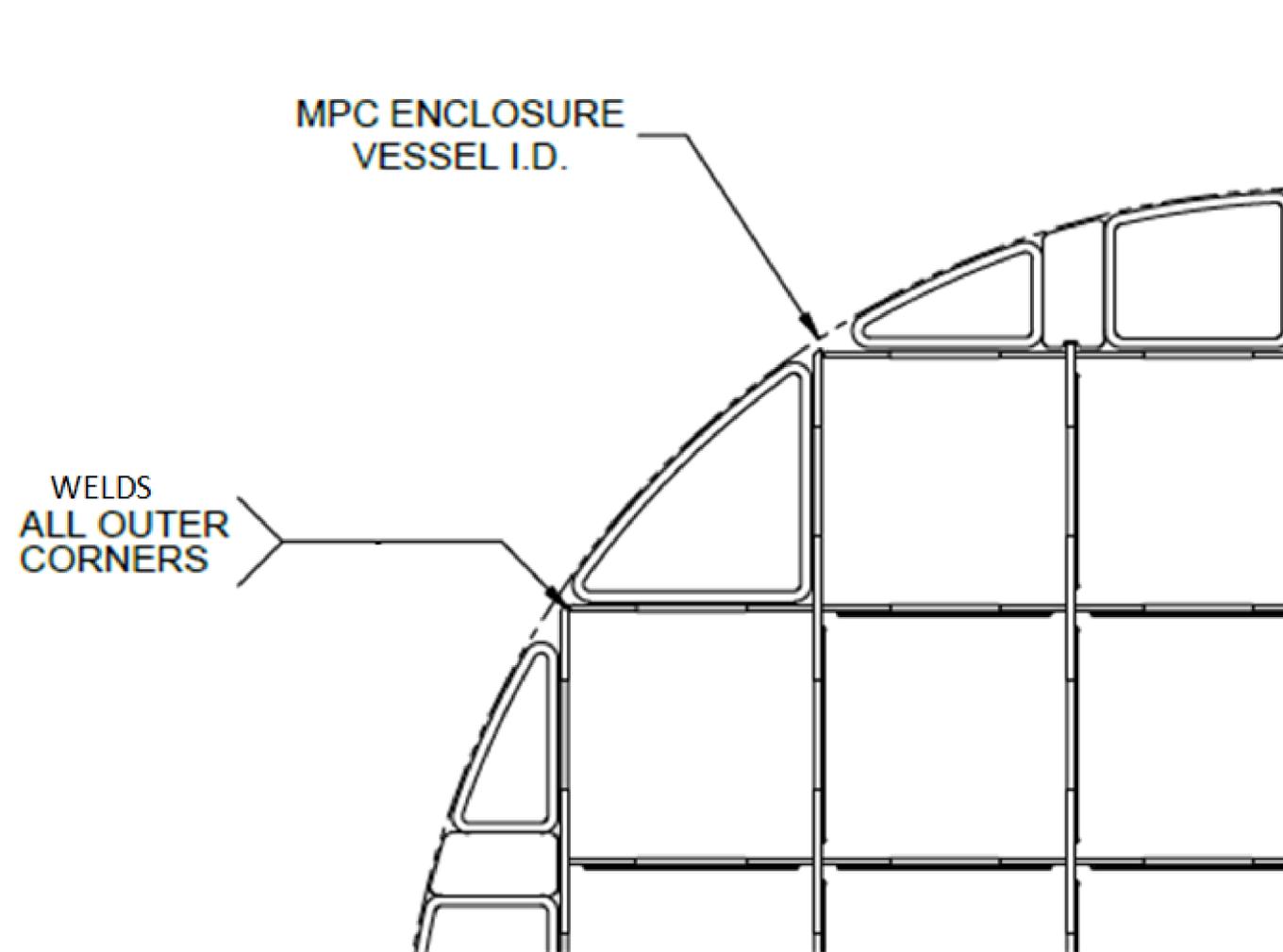
# Additional Information on Apparent Violations

## ■ Response to Item 6

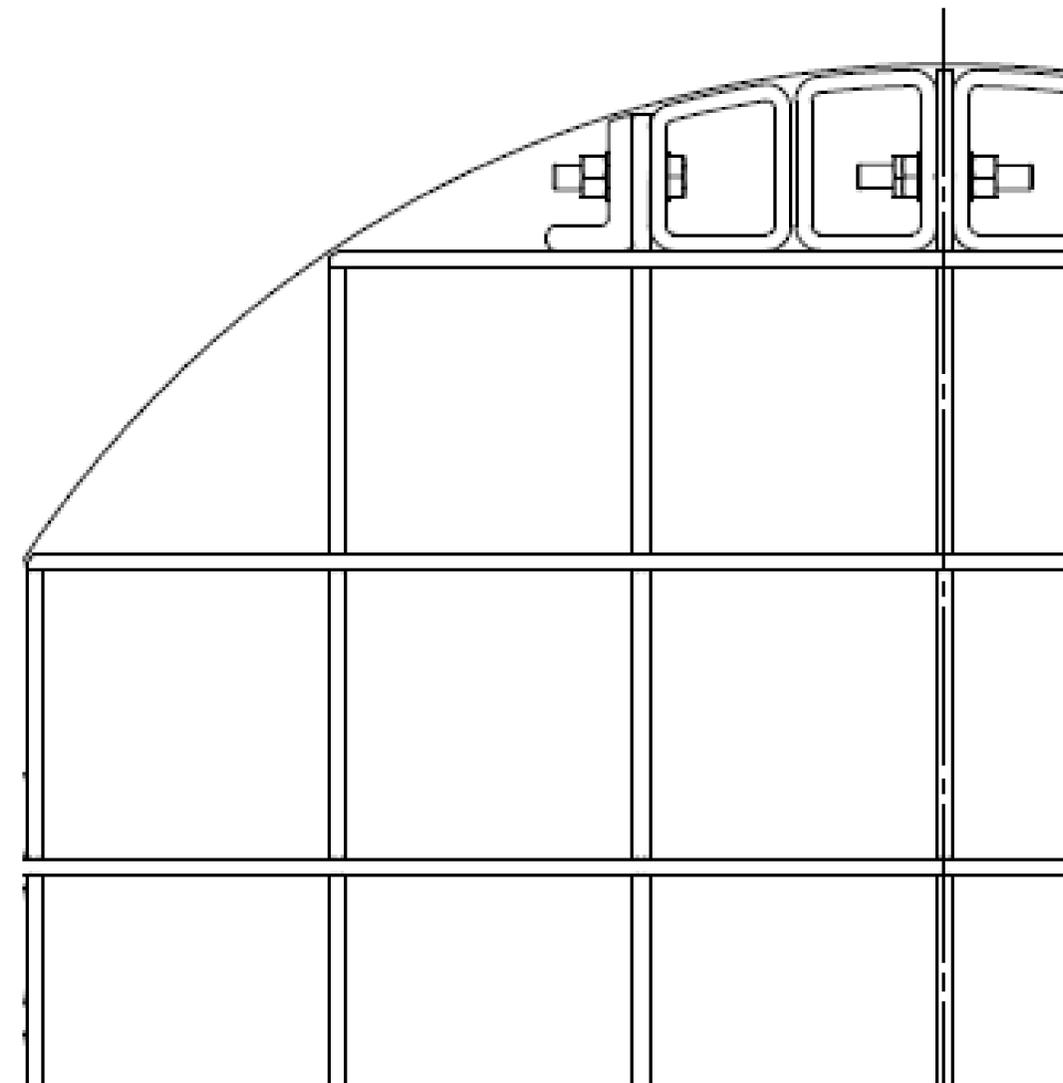
- ✔ Similar to item 2, this is a direct result of the change in the basket/shim geometry
  - The corner welds described in the FSAR are between intersecting Metamic panels within the actual basket structure, there are no welds between “the standard basket and shims”
- ✔ For the standard basket design, there is no physical connection between the fuel basket and the shims, and therefore there is no FSAR method for evaluating basket-to-shim connections
- ✔ The evaluation performed for the Friction Stir Welds used direct outputs from the ANSYS simulation because those were an integral part of the standard basket (not the shims)
- ✔ This was not a change in methodology - if basket welds still existed they would have been analyzed the using previously established method
- ✔ Since the CBS basket variant introduced a different component (bolted shims), the bolts were analyzed using a bounding load consistent with the FEA model framework

# MPC-32M Variants

## ■ Original



## ■ CBS Basket Variant



Sketches for illustrative purposes only

# Additional Information on Apparent Violations

## Apparent Violation A; Item #7:

- “7) As described in appendix N of HI-2094353, “Analysis of Non-Mechanistic Tip-Over Event of Loaded HI-STORM FW Storage Cask,” Holtec used a nodal constraint to tie the shims to the basket panels at the bolt hole locations, the resultant of which changed the way that the connections are modeled between the fuel basket and the shims in the FEA model. In addition, Holtec did not model the bolts for the CBS design. **Previously, Holtec modeled the corner welds between the standard basket and shims** by bonding the corner elements and assigning them the elastic material properties of the weld, effectively modeling the welds in the FEA. The team considered this an element change because it was a change to the overall FEA model associated with the tip-over analysis. (similar to AV A.1)

# Additional Information on Apparent Violations

## ■ Response to Item 7

- ✓ As stated in the response to Item 1, corner welds are between intersecting Metamic basket panels, not between “the standard basket and shims” as described in the inspection report
- ✓ Holtec uses NEI 12-04 as the guidance for executing the 72.48 program, as endorsed by NRC in Reg Guide 3.72
- ✓ NEI 12-04 specifically discusses dimensional changes as input changes which are different than methodology which is “computational framework” which tend to involve a mathematical expression
- ✓ Holtec modeled the accurate dimensional and physical changes that occurred with the CBS basket variant design change and did not change the computational framework of the analysis
- ✓ NRC guidance states that a change to the FEA model itself is not automatically considered a change to the methodology
  - Definition of “method of evaluation” in NEI-12-04 is based on “computational framework”
  - Examples of mathematical models that would be a change in methodology are methods of heat transfer and material performance – not geometrical changes

# Additional Information on Apparent Violations

## Apparent violation A; Item 8:

- “8) FSAR HI-2114830, revision 7, section 3.4.4.1.4b, states that lateral deflections from the tip-over analysis of the CBS basket comply with the deflection criterion in FSAR table 2.2.11. However, Holtec did not include lateral deflections of the CBS fuel basket design of the FSAR. Instead, Holtec documented that the maximum local plastic strains of the 89-CBS basket reached the rupture strain and depicted small plastic deformation in the active fuel region. For the 37-CBS basket, Holtec reported the maximum local plastic strains and provided figures of the maximum plastic strains, which showed small plastic deformation in the active fuel region of the MPC 37-CBS basket. Despite these results, Holtec incorrectly concluded that the fuel baskets did not experience any permanent deformation in the active fuel region in appendix N of HI-2094353. **The team considered this a different MOE because Holtec stated there was no plastic deformation. However, the changes being considered now show plastic deformation.**

# Additional Information on Apparent Violations

## ■ Response to Item 8

- ✓ We submit that this is NOT a change in methodology – the results in the FSAR for the MPC-37-CBS basket are the same as those presented for the original design of the MPC-37
- ✓ The Holtec FSAR presented strain results in figures for the MPC-37
- ✓ For the MPC-37-CBS basket figures were also included in the FSAR to show strain results throughout the basket
- ✓ For both the original and CBS basket designs, the FSAR figures support the **same conclusion** that the basket meets the structural basket criteria

# MPC-37 Variants

## ■ Original FSAR Results

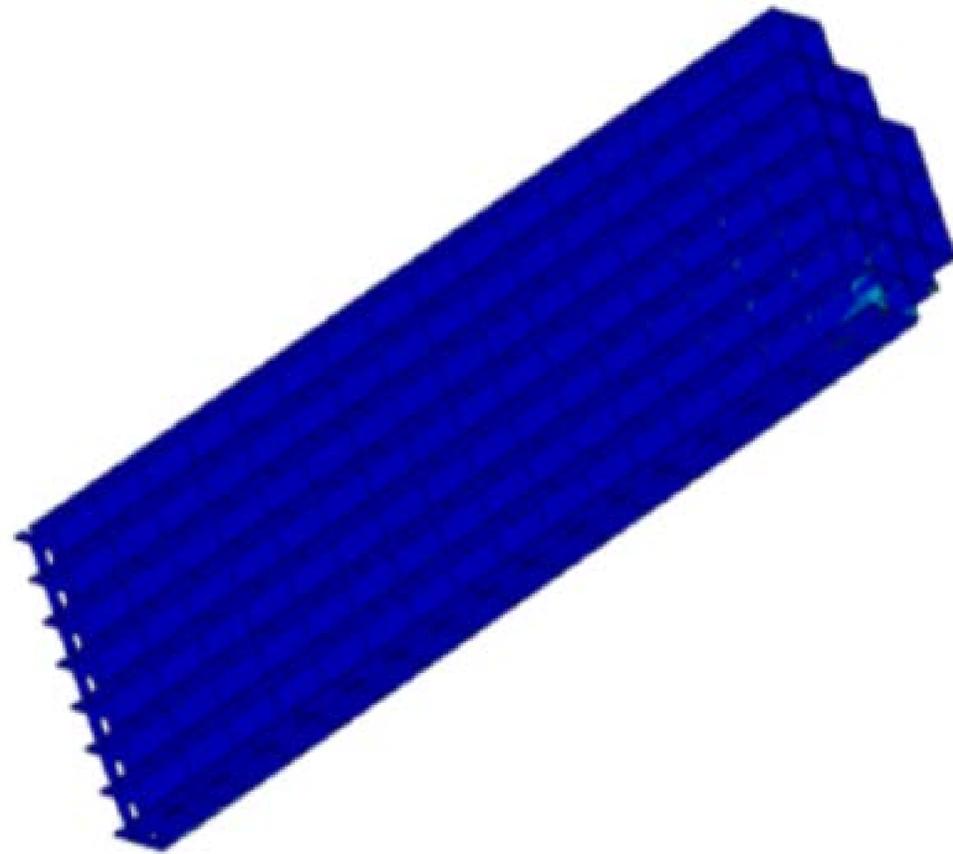


Figure 3.4.15A: Maximum Plastic Strain – MPC-37 Fuel Basket

## ■ CBS Basket Variant FSAR Results

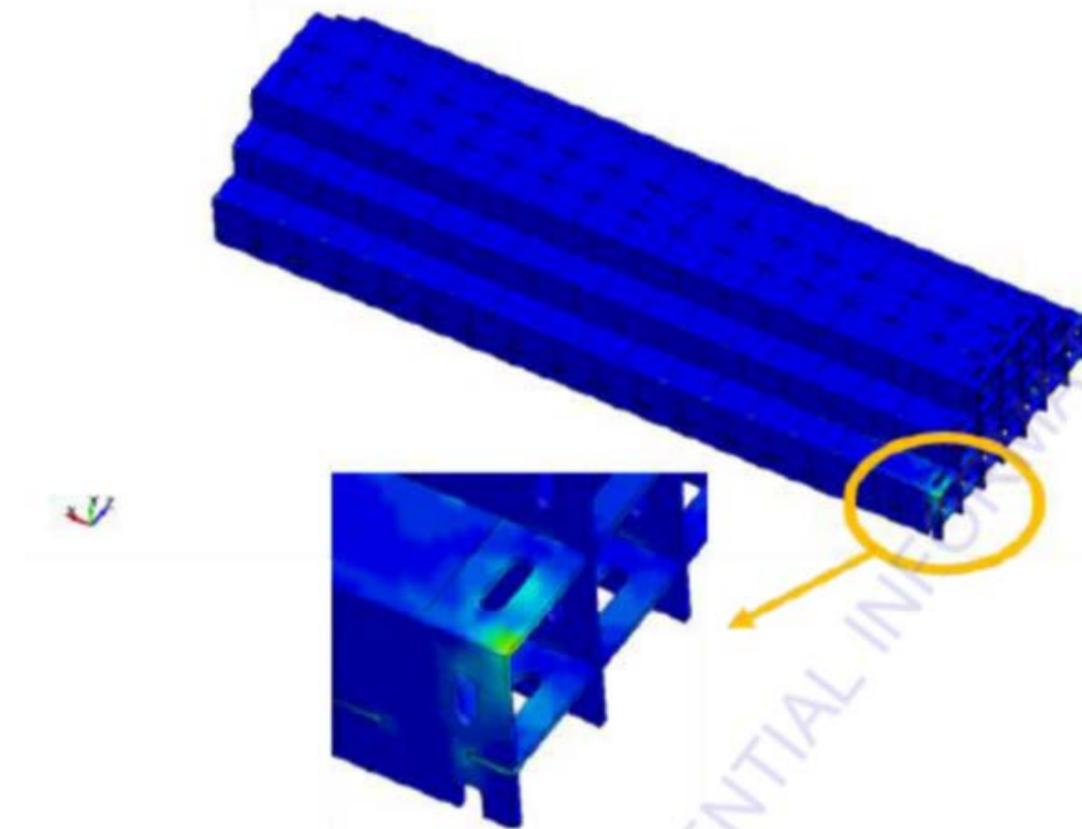


Figure 3.4.15D: Maximum Plastic Strain – MPC-37 Fuel Basket (with HI-STORM FW Version F Design)

# Additional Information on Apparent Violations

## Apparent Violation A; Item 9:

- “9) Holtec made changes to the cold gap assumptions (i.e., requiring a cold gap be maintained to no cold gap) and did not provide justification for the FSAR conclusion that the combined radial gap between the basket, the shims, and the enclosure vessel is sized to prevent distortion in basket panels, as described in FSAR revision 7, section 3.1.2.2.a, Design Basis Loads and Load Combinations. However, appendix V of Holtec calculation HI-2094400, states that the differential thermal expansion closed the radial cold gap between the fuel basket and the MPC vessel for the MPC 89-CBS, therefore, there are unanalyzed interference stresses. The staff **considers this a new assumption in the MOE because this change was outside the conditions and limitations in which Holtec received NRC approval.**

# Additional Information on Apparent Violations

## ■ Response to Item 9

- ✓ The Holtec FSAR, Paragraph 3.1.1(i) addresses the allowance for basket-to-shell interference
- ✓ The allowance for interference was not addressed in the 72.48 evaluations for the CBS baskets because it existed prior to these design modifications:

- **Differential Thermal Expansion (DTE):** The stress arising from the differential thermal expansion between the fuel basket and the MPC shell is mitigated by providing a prescribed nominal gap at their interface locations. The radial gap is selected to produce modest local compatibility stresses at the basket panel-to-shell junction which are classified as peak stresses in NB-3213.11 and NB-3213.13(b) that produce no significant distortion, and are important only in determining the cyclic fatigue life of the component. The magnitude of the peak stress will vary at the different basket panel-to-shell interface locations and with the canister's heat generation rate. At low heat loads and ambient conditions, a positive gap will exist at most interface locations. The progressive reduction in the gap with increasing heat load ensures improved heat transmission across the basket-to-shell interface which enhances the thermal capacity.

# Additional Information on Apparent Violations

## ■ Apparent Violation B

Per 10 CFR 72.48(d)(1), “Changes, tests, and experiments,” requires, in part, that the licensee and certificate holder shall maintain records of changes in the facility or spent fuel storage cask design, of changes in procedures, and tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for the determination that the change does not require a CoC amendment pursuant to paragraph (c)(2) of this section.

Contrary to the above, Holtec failed to maintain records of changes in the spent fuel storage cask design made pursuant to paragraph (c) of 10 CFR 72.48 that included a written evaluation which provided the bases for the determination that the change does not require a CoC amendment pursuant to 10 CFR 72.48(c)(2).

Specifically, for the MPC 68M-CBS, MPC 32M-CBS, MPC 89-CBS, and MPC 37-CBS variants, as of February 17, 2021, July 19, 2021, May 13, 2020, and November 6, 2020, Holtec’s written evaluations failed to provide an adequate bases for the determination that incorporation of the CBS design fuel basket variants did not require a CoC amendment. Holtec did not clearly and thoroughly discuss the impacts on departures from elements of the methods of evaluation (MOEs) described in the FSARs for the original design (all-welded stainless steel fuel basket) that were affected by the changes to the CBS design fuel basket variants (MPC 68M-CBS, MPC 32M-CBS, MPC 89-CBS, and MPC 37-CBS). The impacted elements included the demonstration of the design criteria of the fuel basket; mathematical model associated with material performance and tip-over analysis; calculational framework on connections between fuel basket and shims; use of revised version of software; new assumptions, etc

# Additional Information on Apparent Violations

## ■ Response to Apparent Violation B

- ✔ Holtec appreciates the NRC staff's position that additional clarity in the 72.48 evaluations could have assisted the staff to better understand the changes to the CBS baskets
- ✔ To improve clarity, Holtec revised the four 72.48 evaluations and provided to the NRC via the audit-related SharePoint site on May 23, 2023
- ✔ The conclusion in the revised 72.48 evaluations were further reinforced by the additional information contained in the revised 72.48 documentations.

# Additional Information on Apparent Violations

## ■ Apparent Violation C

Per 10 CFR 72.146(c), “Design control,” requires, in part, that a certificate holder shall subject design changes, including field changes, to design control measures commensurate with those applied to the original design. Changes in the conditions specified in the license or CoC require prior NRC approval.

Contrary to the above, Holtec failed to subject design changes, including field changes, to design control measures commensurate with those applied to the original basket design.

Specifically, in four examples prior to February 17, 2021, July 19, 2021, May 13, 2020, and November 6, 2020, Holtec failed to subject design changes from the MPC 68M, 32M, 89, and 37 standard basket designs to the MPC 68M-CBS, 32M-CBS, 89-CBS, and 37-CBS basket variants to design control measures commensurate with those applied to the original design, and made changes in the conditions specified in the license that required prior NRC approval.

Holtec failed to perform adequate tip-over calculations and to model the basket shim bolts for the four CBS basket variants. In addition, material strength assumptions were different, the deflection design criteria of the fuel baskets were not demonstrated, and thermal expansion interference was not calculated in the CBS baskets.

# Additional Information on Apparent Violations

## ■ Response to Apparent Violation C

- ✓ As discussed in the response Item 9 (AV A), Holtec submits that the revised analyses for the CBS style baskets were controlled in a manner commensurate with the original Metamic-HT Friction Stir Welded baskets
- ✓ The technical evaluations were accurate for the revised physical configuration, and the methodology used is consistent with NRC position as indicated by prior NRC approvals
- ✓ Holtec evaluated the full scope of safety analyses (thermal, criticality, structural, shielding) from the standard basket for all CBS basket variants
- ✓ Additionally, the tip over analysis is described throughout both the HI-STORM 100 and HI-STORM FW FSARs as *non-mechanistic* and it is demonstrated that no credible events could tip over the cask

# Safety Significance of Apparent Violations

- NRC Enforcement Policy 6.1 (c)(6) - Severity Level III includes (for 50.59s) “the licensee fails to obtain prior Commission approval for an activity or change that has a consequence evaluated by the SDP as having low-to-moderate or greater safety significance”
- **No safety significance is associated with this design change**
- Safety function of the fuel basket is to maintain the fuel in a subcritical arrangement
  - ✔ Structural analyses demonstrate that the basket meets the existing FSAR acceptance criterion (deflection based) – no reduction in margin for CBS basket variants compared to standard basket designs
  - ✔ Criticality analyses use a bounding version of that criterion and show there is *no risk* of loss of subcriticality.
- Analysis methodology referenced in the AVs relates to the non-mechanistic tip over
  - ✔ Existing FSAR demonstrates that under *any* credible event the system does NOT tip over
- **Methodology addressed in the apparent violations is the analysis of a *non-credible* event and as such, has no safety significance**

# Corrective Actions

- Root cause evaluation performed to evaluate 72.48 program gaps
- Immediate Corrective Actions
  - ✔ Revised 72.48 Evaluations in May 2023 and shared with NRC - COMPLETE
  - ✔ Extent of condition review to identify any similar 72.48 evaluations - COMPLETE
- Future Corrective Actions
  - ✔ Create a 72.48 Review Committee procedure – Drafted, Pilot in progress
  - ✔ Implementation of 72.48 Review Committee comprised of technical experts for complex 72.48s
  - ✔ Qualified staff to attend industry-sponsored 72.48 training
  - ✔ Internal training for technical staff on methods of evaluation

# Path to Compliance

- Should NRC concur that a change to methodology did not occur, then the revised 72.48 evaluations restores compliance with AV B
- If NRC were to maintain AV A and AV C, then
  - ✓ Immediate compliance may be restored via licensee submittal of exemption requests
    - MPC-32M-CBS – 1 site impacted
    - MPC-37-CBS – 7 sites impacted
    - MPC-68M-CBS – 6 sites impacted
    - MPC-89-CBS – 8 sites impacted
  - ✓ HI-STORM FW License Amendment Request #7 may provide a path to address compliance issue

# Path to Compliance

- HI-STORM FW Amendment 7 scope includes MPCs with CBS-style basket design
  - ✓ NRC review of Amendment 7 in progress
  - ✓ Amendment 7 may have the technical issues addressed such that it can be used as the NRC approved methodology for the CBS-style basket
    - Revising the existing 72.48 evaluations to include Amendment 7 would restore compliance
  - ✓ Once Amendment 7 is issued, gap analysis will evaluate Amendment 7 SER versus any outstanding compliance gaps that may be identified
    - License amendment(s) submitted as necessary to cover the full scope

# Concluding Observations on Apparent Violations

- The modification from Friction Stir Welded to CBS basket variants improves the fabrication of the Fuel Baskets, enhanced the dimensional fidelity of the storage cells and meets existing FSAR design criteria.
- Holtec modeled the accurate dimensional and physical changes that occurred with the CBS design change and **did not** change the calculational framework of the analysis
- Rev 17 of ANSYS used in the structural evaluation was appropriately validated in accordance with Holtec's long-established QA process.
- Holtec revised the four 72.48 evaluations and provided to the NRC via the audit-related SharePoint site on May 23, 2023
- We respectfully submit that our presentation of additional information regarding the apparent violations provides the needed clarity and obviates the need for any enforcement action.

# Thank You



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