

LAR 9261-5

**ATTACHMENT 4
to Holtec Letter 5014666**

**SUMMARY OF PROPOSED
CHANGES - Updated**

SUMMARY OF PROPOSED CHANGES – Updated

The changes proposed in this LAR can be broadly divided into three categories:

- **Category I - HB Changes:** These are changes that introduce the Humboldt Bay version of the HI-STAR system (HI-STAR HB and MPC-HB). These changes do not affect the currently approved HI-STAR system. The supporting SAR portions are predominantly organized in the form of supplements to the existing SAR chapters.
- **Category II - Supporting Changes:** These are generic changes that are necessary to support the HI-STAR HB, but also apply to the other HI-STAR versions. An example is the addition of the Metamic neutron absorber, which is used in the HI-STAR HB and will also be qualified for the other MPCs in the SAR.
- **Category III - Other Changes:** These are minor changes not directly related to the HI-STAR HB that are included in this LAR.

The changes are summarized and discussed below by category. For each individual change, the corresponding modifications to CoC, SAR and drawings are addressed together, as applicable.

~~Most~~ Some licensing drawings have undergone several revisions since the latest revision that was approved for transport. This is due to the fact that Holtec maintains a single licensing drawing for each component for both storage and transportation. Only the changes made in the last revision are marked on the drawing by revision symbols. To support the review of these drawings, a detailed listing of all changes in every drawing revision is provided in Attachment 5 to Holtec Letter 5014666. The detailed descriptions are directly based on the engineering change orders (ECOs) that were used to create the drawing revisions.

CATEGORY I – PROPOSED CHANGES TO INTRODUCE THE HI-STAR HB

Proposed Change No. 1.

The following changes to the CoC are a result of the addition of HI-STAR 100 Version HB for use at Humboldt Bay.

- CoC Section 5.(a)(2) Description; Addition of text, “The HI-STAR 100 System includes the HI-STAR 100 Version HB (also referred to as HI-STAR HB).”
- CoC Section 5.(a)(2) Multi- Purpose Canister, Paragraph 1; Modifications to text to include the Multi-Purpose Canister for use at HB (also referred to as MPC-HB).

- CoC Section 5.(a)(3) Addition of Licensing Drawings for HI-STAR HB and MPC-HB
- CoC Section 5.(b)(1)(b), Damaged Fuel Containers; addition of text “1.I.1” in the definition of Damaged Fuel Containers.
- *CoC Section 5.(b)(1)(b), Addition of definition for Undamaged Fuel Assembly.*
- CoC Section 7; Addition of text, “..., except for the HI-STAR HB, where the gross weight shall not exceed 187,200 pounds.”
- CoC Appendix A, Table A.1 Section II. A.1; Addition of text, “..., except assembly classes 6x6D and 7x7C,...”
- CoC Appendix A, Table A.1 “Fuel Assembly Limits”; Addition of Section VI for MPC-HB.
- CoC Appendix A, Table A.3, “BWR Fuel Assembly Characteristics (Note 1)”; Addition of Assembly Classes 6x6D and 7x7C.

Reason for Change

The fuel assemblies for Humboldt Bay (HB) are shorter than typical BWR fuel assemblies; therefore a new shorter version of HI-STAR 100 was designed specifically for use at HB. The design was approved for storage under a site-specific license (USNRC Docket 72-27). The design includes a HI-STAR HB overpack, an MPC-HB basket assembly, and an MPC-HB enclosure vessel. The shorter design results in a reduced gross weight. Additionally, a HB specific Damaged Fuel Container (DFC) has been designed and fuel class arrays 6x6D and 7x7C have been characterized and analyzed for the HI-STAR HB. . *The undamaged fuel assembly definition is added to address the Humboldt Bay fuel assemblies which have limited inspection records to show they fully meet the definition of intact fuel. Results of supporting analysis of these assemblies are discussed in the Supplements, as applicable.*

Justification for Change

Structural, thermal, containment, shielding, and criticality evaluations have been performed that demonstrate that the HI-STAR HB system meets or exceeds the regulatory requirements. In general, the HB specific evaluations are located in Supplement I to each chapter. Specifically, the chapters and supplements address the following:

- Supplement 1.I: Contains a description of HI-STAR HB and its allowable contents. Two new fuel class arrays (6x6D and 7x7C) are used to characterize the HB fuel. These are only qualified for loading into the MPC-HB. Note that HB fuel is not an addition to the CoC. HB fuel was already qualified for the MPC-68/68F as assembly classes 6x6C and 7x7A, although the definitions differ slightly from the new classes 6x6D and 7x7C. Classes 6x6C and 7x7A are maintained in the SAR; however, for clarity, all references to Humboldt Bay fuel in the generic MPC-68/68F have been removed from the SAR.
- Supplement 2.I: The majority of the structural analyses performed for the generic HI-STAR bound the HI-STAR HB due to the lower weight of the latter. The noted exception is the analysis of the impact limiters for the HI-STAR HB

documented in this supplement. The re-analysis is required to account for the revised crush strength of the crushable material in the impact limiters, which is necessary due to the reduced weight of this system.

- Supplement 3.I: Thermal analysis specifically performed for the HI-STAR HB show the temperatures are well below the regulatory limits due to the low heat load (2 kW) of the system.
- Supplement 4.I: Presents the containment analysis for the HI-STAR HB.
- Supplement 5.I: The HB fuel is bounded by the design basis fuel. This is demonstrated in this supplement by a simple comparison of source terms. Therefore, no HB specific dose rate evaluations are performed.
- Supplement 6.I: The supplement presents the criticality evaluation, which is identical to the evaluation performed for the HI-STAR HB storage license, except for the addition of evaluations specifically requested in 10CFR71.
- Supplements 7.I and 8.I: The operations, acceptance tests and maintenance for the HI-STAR HB are principally the same as for the generic HI-STAR.

CATEGORY II – PROPOSED GENERIC CHANGES SUPPORTING THE HI-STAR HB

Proposed Change No. 2.

Change Package Identification Number of HI-STAR 100 System from B(U)F-85 to B(U)F-96 in the CoC and Chapter 1 of the Proposed SAR Revision 13 (SAR).

Reason for Change

The use of packages identified as B(U)F-85 is limited to systems manufactured up to the end of 2006 per 10CFR71.19. The HI-STAR HB and any future generic HI-STAR Systems therefore require the new B(U)F-96 identification number.

Justification for Change

The HI-STAR design already meets the requirements associated with the B(U)F-96 designation. Therefore, no design changes are necessary. However, the following changes were made in the SAR to support the new designation:

- Chapter 4 (Containment Analyses) is updated to reflect the revised A_2 values in Appendix A to 10CFR71. The leakage test requirements remain unchanged.
- Editorial changes were made in Chapter 1 and 6 to clearly distinguish between the Criticality Safety Index (CSI) and the Transport Index (TI).
- The requirements for a secondary containment on plutonium shipments are removed. See Proposed Change No. 3 below for details.

Note that the HI-STAR system already complies with the deep immersion requirements in 10CFR71.61, as discussed in Section 2.7.5

Proposed Change No. 3.

In CoC Section 5.(a)(2); elimination of text, “BWR fuel debris may be shipped only in the MPC-68F”; “PWR spent fuel assemblies classified as fuel debris may be loaded only in MPC-24EF”; and “For the HI-STAR 100 System transporting fuel debris in a MPC-68F or MPC-24EF, the MPC provides the second inner container, in accordance with 10CFR 71.63. The MPC pressure boundary is a welded enclosure constructed entirely of a stainless steel alloy.”

Throughout the SAR, all references to the MPC as the secondary containment boundary have been removed. Additionally, the requirement for helium leak testing of the MPC has been removed, since the MPC is no longer a containment boundary.

Reason for Change

This updates the CoC to be consistent with the change to 10CFR71.63 dated January 26, 2004; wherein requirements for a separate inner container placed within an outer package for plutonium shipments were removed. Additionally, this permits usage of a “non-F” MPC enclosure design for an MPC-HB that contains fuel debris.

Justification for Change

This is an editorial change. No modifications to the design and no additional design analyses are required to support this change.

Note that this change in the regulations would now permit transportation of fuel debris in the “non-F” canisters such as the MPC-68 and MPC-24E. However, since the focus of this LAR is the introduction of the HI-STAR HB, no such change is proposed here. The F-canister design and designation is retained, and approved fuel debris is limited to the F-canisters.

Proposed Change No. 4.

Changes were made to the SAR and the Licensing Drawings to add Metamic as a neutron absorber. Specifically:

- ~~Drawings list Metamic as acceptable neutron absorber, and specify the minimum B-10 loading.~~
- Text previously referring to Boral was changed to “neutron absorber”, except in the cases where the specific properties of Boral were discussed.
- A description of the material Metamic is provided in Section 1.2.1.4.1.2,
- Acceptance Testing requirements for Metamic are provided in Section 8.1.5.5.2.
- ~~An analysis demonstrating the Metamic is equivalent to Boral from a criticality perspective is presented in Section 6.4.12~~

Reason for Change

Metamic is an advanced neutron absorber material that is already approved by the NRC for use in storage per Amendment #2 to CoC 1014. Metamic is the only neutron absorber used in the proposed MPC-HB.

Justification for Change

The required technical justifications and acceptance criteria are specified in the SAR.

CATEGORY III – OTHER PROPOSED GENERIC CHANGES

Proposed Change No. 5.

CoC Section 5.(b).(1).(b), and SAR Table 1.01: modifications to text in the definition of Damaged Fuel Assemblies and Fuel Debris.

The damaged fuel definition is changed to:

Damaged Fuel Assembly is a fuel assembly with known or suspected cladding defects, as determined by a review of records, greater than pinhole leaks or hairline cracks, empty fuel rod locations that are not filled with dummy fuel rods, *missing structural components such as grid spacers*, whose structural integrity has been impaired such that geometric rearrangement of fuel or gross failure of the cladding is expected *based on engineering evaluations*, or that cannot be handled by normal means. Fuel assemblies that cannot be handled by normal means due to fuel cladding damage are considered FUEL DEBRIS.

In the fuel debris definition, the following text is added at the end of the first sentence:

“including containers and structures supporting these parts.”

Reason for Change

Changes are made for consistency with the corresponding definitions in the HI-STORM Storage CoC (72-1014). The damaged fuel definition is identical to the definition proposed in LAR 1014-3. The change in the fuel debris definition is based on the change to this definition proposed in LAR 1014-4. No other changes in the SAR are necessary to support this proposed change.

Justification for Change

Editorial

Proposed Change No. 6.

The content of CoC Section 6.(a) is deleted and replaced by a direct reference to SAR Chapter 7. Chapter 7 of the SAR is presented as a complete revision eliminating much of the detail that was present in Revision 11 of the SAR. The revised Chapter is written in accordance with Regulatory Guide 7.9. In the revision of Chapter 7, the following modifications are proposed:

- Change the closure plate bolt torque from 2895 ft-lbs to 2000 ft-lbs

Reason for Change

Changes made to remove unnecessary duplication and details from the CoC and SAR.

Justification for Change

Editorial, except for the change to the bolt torque:

- Results of the structural evaluations in Chapter 2 had already been revised in an earlier revision of the SAR to show the bolt torque of 2000 ft-lbs is sufficient. Therefore, no further changes to the SAR are required for this change.

Proposed Change No. 7.

The content of CoC Section 6.(b) is deleted and replaced by a direct reference to SAR Chapter 8. Chapter 8 of the SAR is presented as a complete revision eliminating much of the detail that was present in Revision 11 of the SAR. The revised Chapter is written in accordance with Regulatory Guide 7.9. In the revision of Chapter 8, the following modifications are proposed:

- ~~Remove shielding effectiveness test requirement after fabrication and as part of the maintenance program.~~
- Remove the thermal acceptance test and thermal periodic tests.
- Dimensional and B-10 loading requirements that are specified on the licensing drawings are not repeated in Chapter 8.

Reason for Change

Changes made to remove unnecessary duplication and details from the CoC and SAR and remove redundant test requirements.

Justification for Change

Editorial, except for the changes to the test requirements:

- ~~Shielding Effectiveness Test and periodic shielding test: Manufacturing procedures ensure that the shielding material is manufactured to the specifications and installed properly during fabrication. Radiological surveys required by 10CFR71 are performed at loading and prior to every shipment to ensure dose rates are acceptable. Therefore, a shielding effectiveness test is not considered necessary.~~
- Thermal acceptance test: The first fabricated HI-STAR overpack was both thermally tested and He leakage tested as documented in Holtec International Document Package DOC-5014-034. The tests confirm the heat transfer properties of HI-STAR as predicted in the Thermal Evaluation of the SAR. Therefore, a thermal acceptance test is no longer required.
- ~~Periodic Thermal Test: The thermal analyses are considered sufficient to demonstrate that the thermal performance of the cask is acceptable, and are confirmed by thermal tests performed on the first fabricated HI-STAR. Further,~~

~~there is no credible way for the thermal performance to degrade over time. Therefore, it is concluded that a periodic thermal test is not required. Note that there are other NRC approved transport casks that require neither a thermal acceptance test nor a periodic thermal test.~~

Proposed Change No. 8.

CoC Appendix A, Table A.1 Sections II.A.1.d.i, II.A.2.d, III.A.1.d, III.A.2.d, III.A.3.d;
Changes in minimum enrichment from 1.8 wt% ²³⁵U to 1.45 wt% ²³⁵U.

Reason for Change

This change is in response to a client need where at least one fuel assembly has a minimum enrichment of 1.45 wt% ²³⁵U.

Justification for Change

Analysis is provided in Chapter 5 of the SAR.

Proposed Change No. 9.

Deleted

CoC Appendix A, Table A.2; Replace "Zr" with "SS" for the 14x14E Fuel Assembly Array/Class clad material.

Reason for Change

The 14x14E Fuel Assembly Array/Class used at Indian Point I is clad with stainless steel not zircaloy and is analyzed as such.

Justification for Change

Editorial correction.

Proposed Change No. 10.

CoC Appendix A, Table A.7; Addition to table as follows:

Post-irradiation Cooling Time (years)	Assembly Burnup (MWD/MTU)	Assembly Minimum Enrichment (wt. % U-235)
≥ 5	$\leq 10,000$	≥ 0.7
≥ 7	$\leq 20,000$	≥ 1.35

Reason for Change

This change is in response to a client need where instances of lower enriched fuel assemblies have been identified.

Justification for Change

Analysis is provided in Chapter 5 of proposed SAR Rev. 13.

Proposed Change No. 11.

Allow the use of SA 350 LF3 as an alternate material to SA 203A for HI-STAR Inner Containment Shell and Port Cover Plate.

Reason for Change

Manufacturing Flexibility

Justification for Change

The factor of safety calculated in structural evaluations discussed in Section 2.6 allows for the use of SA 350 LF3 as an alternate material to SA 203A in the HI-STAR Inner Containment Shell and Port Cover Plate. The factor of safety calculated for SA 350 LF3 is reduced by seven percent when compared to SA 203A. Safety Factors remain acceptable for both normal and hypothetical accident conditions.

Proposed Change No. 12.

Change the material requirement for the removable shear ring (Chapter 1, Table 1.3.3) from "SA 203A" to "Carbon Steel".

Reason for Change

Manufacturing Flexibility

Justification for Change

In its current form, the removable shear ring fulfills no structural function, and is only used for additional temporary shielding. A specific steel designation is therefore not required.

Proposed Change No. 13.

The shielding results for dose locations 5 and 6 for normal conditions have been updated in Chapter 5.

Justification for Change

A discrepancy was identified in the shielding models of the impact limiters. The ribs shown in Figure 5.3.12 were inadvertently modeled thicker than the 0.5 inches indicated on the figure. The models have been revised and all affected calculations re-performed. The results for the affected dose locations, 5 and 6, have been updated in the SAR. This only affects normal condition when the impact limiters are present. The change in the results is minimal and all previously acceptable burnup and cooling times and conclusions are unaffected.

Proposed Change No. 14.

Deleted

~~Changes were made to the generic MPC basket drawings to permit~~

- ~~• Two shorter neutron absorber panels instead on a single long absorber panel, with a limited gap between the two panels.~~
- ~~• Panels with a reduced panels width over a limited length of the panel.~~

Reason for Change

Manufacturing Flexibility

Justification for Change

~~Criticality calculations in Chapter 6, Section 6.4.13, show that the proposed changes have a negligible effect on the reactivity of the system and are therefore acceptable. Other analyses of the HI STAR system are unaffected by this change.~~

Proposed Change No. 15.

For clarification, a discussion regarding moderate burnup fuel and temperature limits was added in Section 3.2

Reason/Justification for Change

Editorial

Proposed Change No. 16.

In Chapter 4, the isotopic fuel composition for Trojan Fuel was updated in Table 4.2.2

Reason for Change

Values had been incorrectly transferred from calculations to the table. Results and calculations are not affected by this change.

Justification for Change

Editorial

LAR 9261-5

ATTACHMENT 5

to

Holtec Letter 5014666

**LICENSING DRAWING CHANGES -
Updated**

Detailed Changes to Licensing Drawings

Changes have been made to some of the licensing drawings in Section 1.4 of the SAR. Only the latest revision of the drawing is provided in the SAR even if there was more than one revision since the last approval. This appendix details all changes made to the drawings from one revision to the next, and provides justifications for all changes. Changes are categorized as **Editorial** (No change to design); **Minor** (Analysis in the SAR not affected); or **SAR Change** (drawing changes either resulted from or in a change to the HI-STAR SAR Revision 11 and are proposed in Revision 13).

DRAWING 3913 HI-STAR 100 OVERPACK

Revision 7 - Approved for Transport in Certificate of Compliance (CoC) 9261 Revision 4

Revision 8 changes (ECO 1020-50):

- a. Sheet 2; delete 80 ½" +/- 0.06" B.C. dimension from the main view.
- b. Sheet 3; delete the callout to the buttress plate attachment hole and change the callout for the closure plate short bolt hole from 1 5/8-8 UNC X 2 7/8" MIN. LG. to 1 5/8-8 UN X 2 7/8" MIN. LG.
- c. Sheet 4; Change callout for the closure plate long bolt hole in the top flange from 1 5/8-8 UNC X 3 7/8" (NOM.) DP. to 1 5/8-8 UN X 3 7/8" (NOM.) DP.
- d. Sheet 5; Change callout to the buttress plate attachment hole from 80 ½" +/- 1/8" B.C. to 80 ½" +/- 0.06" B.C.

Justification:

- a. & d. **Editorial;** All necessary details of the buttress plate attachment holes will now be specified in one callout on sheet 5 rather than spread throughout the drawing. Additionally, the tolerance on the attachment hole bolt circle was incorrectly specified as +/- 1/8" on Sheet 5, therefore the tolerance is changed to the correct tolerance of +/- 0.06". Note that all HI-STARs manufactured in past have been fabricated in accordance with the design/fabrication drawings which have a tighter tolerance of +/- 0.03". This change has no adverse impact on HI-STARs fabricated in the past.
- b. & c. **Editorial;** The drawings incorrectly detailed the closure plate bolt threads as UNC. The drawing now reflects the actual threads (UN) that are used.

Revision 9 changes (ECO 1020-48):

- a. Sheet 2: Allow use of SA 350LF3 as an alternative to SA 203E for the HI-STAR inner shell (containment boundary).
- b. Sheet 4: Add new note 2 which reads "Overpack Serial No. 1020-001 and 1020-003: Shear ring height is 5 3/8" and intermediate shells are 3/8" shorter. This deviation is acceptable (SMDR-71188-14)"

Justification:

- a. **SAR Change;** SA 350LF3 is an acceptable material for the containment boundary. The top lid, top flange and bottom plate are already made of SA 350LF3. The structural and

- thermal analysis use bounding physical properties as inputs. See SAR Proposed Change No. 6.
- b. **Minor**; this deviation does not affect the design criteria of the HI-STAR 100 overpack. The overall shielding of the MPC has not been affected and the overall internal overpack height dimension of 191 1/8" Nom is maintained since the intermediate shells of the overpack have been reduced in height by 3/8". Maintaining the overall height and strength of the overpack preserves the integrity of the structural evaluations.

DRAWING 3923 MPC ENCLOSURE VESSEL

Revision 14 - Approved for Transport in CoC 9261 Revision 4

Revision 15 changes (ECO 1023-42):

- e. Sheet 5, Upper Fuel Spacer Upper Plate: Added an optional 3/4-10UNC threaded thru hole for both the PWR and BWR upper fuel spacers.
- f. Sheet 5, Upper PWR Fuel Spacer Assembly: Indicated that the upper fuel spacer lower plate is optional.
- g. Sheet 3: Replaced "Max." with "Ref." on the 190-5/16" dimension. Added a dimension from the top of the baseplate to the top of the shell. This dimension shall be 187-7/16" Max.

Justification:

- a. **Editorial**: the replacement of the thru hole in the upper fuel spacer plate with a threaded hole will impose stricter requirements to ensure better workmanship of the final assembly.
- b. **Editorial**; the lower plate of the upper fuel spacer is not required for PWR fuel without control components. For PWR fuel with control components, it may be possible for the control component to go into the pipe (Item 22). Therefore, the lower plate should be optional.
- c. **Editorial**; the changes were made to fabrication drawing to eliminate the potential for an undersized condition in the shell, baseplate, and lid assembly. The overall height of 190-5/16", controlled by the inner shell height, which has a tolerance, is a built up dimension and is appropriately labeled "Ref.". There have been no changes to the content of material in the licensing drawing.

Revision 16 changes (ECOs 1021-77 and 1021-83):

- a. Sheet 1 and Sheet 7: Add new sheet (sheet 7) for incorporation of optional MPC lid (SMDR #1269 and SMDR# 1364). Optional lid diameter to be 65.8 min. with 3/4" deep by 30 degree weld prep. (Same weld prep as on sheet 4 detail E used for the MPC-68). Add note 1 "The optional lid design shown on this sheet may be used with the MPC-68 provided the MPC-68 shell is modified, as shown on Detail D, (Sheet 3) with a 1" upper shell thickness (SMDR 1269 and SMDR 1364)."

- b. Sheet 3: Remove requirement and mention of secondary containment including note 4 and references to note 4.
- c. Sheet 3, Section C-C: Added "Thk." to the 2-1/2" baseplate dimension.
- d. Sheet 3, Detail D & Sheet 4, Detail E: Added "-32F" to the label for the detail of the F style MPCs.
- e. Sheet 4, MPC Lid: Deleted the 3/8" callout for the closure ring depth.
- f. Sheet 4, Detail E: Added "Nom." to the callout for the closure ring depth (2 places).

Justification:

- a. **Minor**; the proposed change is justified via SMDR 1269 and SMDR 1364 and associated 72.48. The total amount of metal in the area of the lid is not reduced by the proposed change, as the reduced diameter of the MPC lid is compensated for by the increased thickness at the top of the MPC shell (the interface between the MPC lid and shell is simply moved radially inward). It is noted that the proposed lid diameter and required MPC shell configuration are the same as is already approved for the MPC-68F design, although the affected MPCs will remain under MPC-68 designation. As a consequence of the proposed lid diameter reduction, the minimum stress area of the lid-to-shell weld will be reduced from 157.28 in² to 155.04 in². The structural evaluation conservatively evaluates a 5/8" J-groove weld instead of the actual 3/4" J-groove, with a stress area of 132.29 in². As the actual weld stress area will continue to exceed the weld stress area credited in the analysis, no safety factor is reduced and the proposed change is therefore not adverse. The weight of the MPC is unchanged.
- b. **SAR Change**; the secondary containment of fuel debris is no longer required by 10CFR71. See SAR Proposed Change No. 2.
- c.,e.,f. **Editorial**; the 2-1/2" dimension specifies a thickness and is therefore labeled as such. The 3/8" dimension in the MPC Lid view is redundant since that same dimension is already called out in Detail E. The 3/8" dimension is given for information and is therefore appropriately labeled "Nom."
- d. **Editorial**; the 32F is approved for storage. Note that the MPC-32 and MPC-32F are currently not approved for transportation.

DRAWING 3925 MPC-24E/EF FUEL BASKET ASSEMBLY

No changes submitted.

~~Revision 5 - Approved for Transport in CoC 9261 Revision 4~~

~~Revision 6 changes (ECO 1022-68):~~

- a. ~~Sheet 2, Note 1 and 2: Specified 155-7/8" as a minimum for the length of the neutron absorber.~~
- b. ~~Sheet 2, Basket Elevation View: Added a dimension for the radius of the mouseholes. The dimension shall be typical for the top and bottom of the basket and the tolerance shall be +/- 1/2".~~
- c. ~~Sheet 3, Coordinate D3: Removed "Nom." from the 10.85 +/- .25 dimension.~~

d. Sheet 4, Wide and Thin Shim: Replaced the tolerance on the height with "Nom".

Justification:

- a. **Minor**; Ensures alignment of the active fuel region with the neutron absorber region during fabrication as assumed in the criticality analysis.
- b. **Editorial**; this dimension was inadvertently omitted from previous drawing revisions.
- c. **Editorial**; this dimension is inspected and verified during the fabrication process.
- d. **Editorial**; the heights of the shims are shown in the licensing drawings for information and are appropriately labeled Nom.

Revision 7 changes (ECO 1022-67):

- a. Sheet 1, Note 11: Addition of "~~Both Boral and Metamic are approved for use as a neutron absorber~~"
- b. Sheet 1, Note 11: Replaced "Boral" with "neutron absorber" in three instances.
- c. Sheet 2: Addition of Note 7 "~~Metamic to be 0.106" (Nom.) THK. X 7 1/2" Wide MIN. x 155 7/8" MIN. (156" Nom.) Lg. The minimum Metamic-¹⁰B loading is 0.0310 g/cm² with a minimum B₄C loading 31.5% and maximum 33%. Metamic is not required to be passivated. Sheathing 0.06" (Nom.) THK.~~"
- d. Sheet 2: Addition of Note 8 "~~Metamic to be 0.106" (Nom.) THK. X 6 1/4" Wide MIN. x 155 7/8" MIN. (156" Nom.) Lg. The minimum Metamic-¹⁰B loading is 0.0310 g/cm² with a minimum B₄C loading 31.5% and maximum 33%. Metamic is not required to be passivated. Sheathing 0.06" (Nom.) THK.~~"
- e. Sheet 2, Coordinates C8, B8, and A3: Replaced three instances of "Boral" with "neutron absorber"
- f. Sheet 3, Note 4: Replaced two instances of "Boral" with "neutron absorber"
- g. Sheet 3, Coordinate C7: Replaced two instances of "Boral" with "neutron absorber" in the Minimum Weld Length dimensions.
- h. Sheet 1, Note 19: "~~Neutron absorber panels may be a single piece or two pieces as long as the total length indicated is maintained and the gap between the panels is maintained at less than 1/4".~~"
- i. Sheet 1, Note 20: "~~Neutron absorber panels may have a reduction in width of up to 1/32" over a length of no more than 12" provided the average width of the panel is no less than the minimum specified.~~"

Justification:

- a. thru g. **SAR Change**; the drawing is changed where necessary so that either Boral or Metamic may be used as a neutron absorber. See Attachment 1, Proposed Change No. 4
- h. & i. **SAR Change**; the change provides flexibility during manufacturing. Criticality analysis shows this is acceptable (see Attachment 1, Proposed Change No. 14).

DRAWING 3926 MPC-24 FUEL BASKET ASSEMBLY

No changes submitted.

Revision 5 — Approved for Transport in CoC 9261 Revision 4

Revision 6 changes (ECO 1022-58):

- a. Sheet 2, Coordinate C8: Deleted "Boral" and added "& Note 4"
- b. Sheet 2, Coordinate B8: Deleted "Boral" and added "& Note 5"
- c. Sheet 3, Coordinate C7: Replaced "Boral" with "neutron absorber"
- d. Sheet 1, General Note 10: Addition of "Both Boral and Metamic are approved for use as a neutron absorber"; Replaced "Boral" with "neutron absorber" in two instances.
- e. Sheet 2: Addition of note 4: "Metamic to be 0.106" (Nom.) THK. X 7 1/2" Wide MIN. x 155 7/8" MIN. (156" Nom.) Lg. The minimum Metamic ¹⁰B loading is 0.0310 g/cm² with a minimum B₄C loading 31.5% and maximum 33%. Metamic is not required to be passivated. Sheathing 0.06" (Nom.) THK."
- f. Sheet 2: Addition of note 5: "Metamic to be 0.106" (Nom.) THK. X 6 1/4" Wide MIN. x 155 7/8" MIN. (156" Nom.) Lg. The minimum Metamic ¹⁰B loading is 0.0310 g/cm² with a minimum B₄C loading 31.5% and maximum 33%. Metamic is not required to be passivated. Sheathing 0.06" (Nom.) THK."
- g. Sheet 3, Note 2: Replaced two instances of "Boral" with "neutron absorber"

Justification:

- a. g. **SAR Change**; the drawing is changed where necessary so that either Boral or Metamic may be used as a neutron absorber. See Attachment 1, Proposed Change No. 4.

Revision 7 changes (ECO 1022-59):

- a. Sheet 2, Note 4 & 5: Change thickness callout from 0.075" to 0.077".
- b. Sheet 1, Note 10: Replace the word Boral and with neutron absorber in the statement "Boral damage of up to...".

Justification:

- a. & b. **SAR Change**; the drawing is changed where necessary so that either Boral or Metamic may be used as a neutron absorber. See Attachment 1, Proposed Change No. 4.

Revision 8 changes (ECO 1022-68):

- a. Sheet 2, Note 1 and 2: Specifying a minimum length for the neutron absorber of 155 7/8 inches
- b. Sheet 4, Wide and Thin Shim: Replaced the tolerance on the height with "Nom".

Justification:

- a. **Minor**; ensures alignment of the active fuel region with the neutron absorber region during fabrication as assumed in the criticality analysis.
- b. **Editorial**; the heights of the shims are shown in the licensing drawings for information and are appropriately labeled Nom.

Revision 9 changes (ECO 1022-67):

- a. Sheet 1, Note 19: "Neutron absorber panels may be a single piece or two pieces as long as the total length indicated is maintained and the gap between the panels is maintained at less than 1/4"."
- b. Sheet 1, Note 20: "Neutron absorber panels may have a reduction in width of up to 1/32" over a length of no more than 12" provided the average width of the panel is no less than the minimum specified."

Justification:

- a. & b. **SAR Change;** the change provides flexibility during manufacturing. Criticality analysis shows this is acceptable (see Attachment 1, Proposed Change No. 14).

DRAWING 3927 MPC-32 FUEL BASKET ASSEMBLY

No changes submitted.

Revision 6 in SAR Rev. 11 — not approved for transport.

Revision 7 changes (ECO 1023-33):

- a. Sheet 1: Add sheet 5 and change title on sheet 4 under package contents.
- b. Sheet 2, cross sectional view of MPC-32: Replace v channel angled supports with basket support plates.
- c. Sheet 4: Label page "standard construction".
- d. Sheet 4, detail d,e: Revise to show basket supports that consist of two parallel plates welded onto the mpc inner shell. Fillet welds connecting the plates to the mpc shell shall be full length and have 1/8" dimension. Shim and support block are positioned in between plates and welded in place. Fillet welds shall be full length, 5/32" dimension, and are located between inside edge of shim and outside edge of plates. Show that VT is required for fillet welds. Tack weld is located between inside edge of plates and block support to read "optional quantity, size, and weld location for support block to be determined by fabricator". Show item details for basket plate support (a), (b), (c) and shim. Basket support plate (c) dimensions are 1/4" thk x 3 5/8" nom x 168 1/2" nom. Basket support plate (b) dimensions are 1/4" thk x 4" nom x 168 1/2" nom. Basket support plate (a) dimensions are 1/4" thk x 5" nom x 168 1/2" nom. Shim dimensions are as reqd thk x 1" nom x 168 1/2" nom. Move v-channel angled supports to sheet 5 and label "optional construction." Change label of detail e to detail g and 5/32 weld location to be between c channel and shim. Move angle support (b), angle support (a), and shim assembly to sheet 5.
- e. Sheet 4: Change inner shell to basket support plate (a) shim dimension from 5.2" to 5.4". Change inner shell to basket support plate(c) shim from 3.6" to 3.9".

Justification:

- a. thru d. **Minor;** These changes are designed to update the current licensing drawing in order to incorporate an additional basket support design. The original design is maintained. The additional design provides the same level of basket support as the original design.

- e. ~~Minor~~; This change is due to the change in geometry of the fuel basket supports. In previous drawing revisions there exists a 1/4" clearance between the fuel basket and shim. By making this change, the governing dimension between the shim and fuel basket in drawing 3753 remains the same.

Revision 8 changes (ECO 1023-31):

- a. Sheet 2, C8: Delete "Boral". Add "Note 3".
b. Sheet 2, Notes: Add Note 3 to read "Metamic may be used as an alternative to Boral following final NRC approval of CoC 1014 Amendment #2. Metamic to be 0.101" (Nom) THK X 7 1/2" WIDE MIN X 155 7/8" MIN (156" Nom) LG. The minimum Metamic-¹⁰B loading is 0.0310 g/cm², with a minimum B₄C loading of 31.5% and maximum of 33%. Metamic is not required to be passivated. Sheathing 0.035" THK".
c. Sheet 3, D3: Replace "Boral" with "Neutron absorber" (2 places).
d. Sheet 1, General Note 10: Replace "Boral" with "Neutron absorber".

Justification:

- a. thru d. See justification for ECO 1023-43 (a. thru c.) below

Revision 9 changes (ECO 1023-32):

- a. Sheet 2, Note 3: Change thickness call out on Metamic to 0.106"
b. Sheet 1, Note 10: replace "Boral" with "neutron absorber"

Justification:

- a. & b. See justification for ECO 1023-43 (a. thru c.) below

Revision 10 changes (ECO 1023-45):

- a. Sheet 2, Note 1: Specified a minimum length for the neutron absorber

Justification:

- a. ~~Minor~~; ensures alignment of the active fuel region with the neutron absorber region as assumed in the criticality analysis during fabrication.

Revision 11 changes (ECO 1023-46):

- a. ~~Sheet 4, Detail D & E: For the 1/8" fillet weld between the support plates and the MPC shell, specified a 1-8 stitch pattern.~~
b. Sheet 4, Detail D & E: Indicated that the support block is optional

Justification:

- a. ~~Minor~~; this change is made to be consistent with the MPC-68 design, which specifies a 1-8" stitch pattern for the weld between the MPC shell and the fuel basket support plates.
b. ~~Editorial~~; these changes are made to show how the fuel basket supports are actually assembled and to keep the drawing consistent with the delivered product. Use of the blocks (Item 29) is currently optional and is determined by the fabricator. Because the

fabricator elects not to utilize the blocks, they are deleted. The associated tack welds are also deleted.

~~Revision 12 changes (ECO 1023-43):~~

- a. ~~Sheet 1, Note 10: Add to beginning "Both Boral and Metamic are approved for use as neutron absorbers"~~
- b. ~~Sheet 2, Note 3: Delete the words "Metamic may be used as an alternative to Boral following final NRC approval of CoC 1014 Amendment #2."~~
- c. ~~Sheet 2, Basket Elevation View, Coordinate A3: Change "Boral" to "neutron absorber"~~
- d. ~~Sheet 1, Note 18: "Neutron absorber panels may be a single piece or two pieces as long as the total length indicated is maintained and the gap between the panels is maintained at less than 1/4"~~
- e. ~~Sheet 1, Note 19: "Neutron absorber panels may have a reduction in width of up to 1/32" over a length of no more than 12" provided the average width of the panel is no less than the minimum specified."~~

Justification:

- a. thru c. ~~SAR Change; this justification encompasses all of the changes that were made to the drawings to reflect the NRC approval of the use of Metamic as a neutron absorber in Amendment #2 to CoC 1014. Non-specific references to Boral were changed to "neutron absorber" and additional notes were added to specify dimensions for Metamic. See Attachment 1, Proposed Change No. 4.~~
- d. & e. ~~SAR Change; the change provides flexibility during manufacturing. Criticality analysis shows this is acceptable (see Attachment 1, Proposed Change No. 14).~~

DRAWING 3928 MPC-68/68F/68FF FUEL BASKET

No changes submitted.

Revision 5 - Approved for Transport in CoC 9261 Revision 4

Revision 6 changes (ECO 1021-64):

- a. ~~Sheet 2, plan view: Replace v-channel angled supports with parallel flat plate supports.~~
- b. ~~Sheet 4: Change "cross sectional view of mpc 68 basket support structure (new design)" to "cross sectional view of mpc 68 basket support structure (standard construction)".~~
- c. ~~Sheet 4, detail c: Revise to show plate basket support that consists of two parallel plates welded onto the MPC inner shell. Fillet welds shall be intermittent (1-8), 1/8 dimension, and are located between MPC inner shell and outside edge of plates. Shim assembly and block support are positioned in between plates and welded in place. Fillet welds shall be full length, 5/32 dimension, and are located between inside edge of shim assembly and outside edge of flat plates. Show that VT is required for the fillet welds. Tack weld is located between inside edge of plates and block support to read "optional quantity and weld location for support block to be determined by fabricator".~~
- d. ~~Sheet 4: Move angle basket support and detail c to right side of vertical dividing line. Change "detail c (typ of 8)" to "detail c (typ of 8) (optional design)".~~

- e. Sheet 4: Change "cross sectional view of MPC 68 basket support structure (old design)" to "cross sectional view of MPC 68 basket support structure (optional construction)".
- f. Sheet 4, note 4: Change "basket support to basket support dimensions are common to the new and old designs" to "basket support to basket support dimensions are common to the standard construction and optional construction".

Justification:

- a. thru f. **Minor**; These changes are designed to update the current licensing drawing in order to incorporate an additional basket support design. The original design is maintained. The additional design provides the same level of basket support as the original design.

Revision 7 changes (ECO 1021 62):

- a. Sheet 2, B8: Delete "Boral". Add "and Note 6".
- b. Sheet 2, Notes: Add Note 6 to read, "Metamic may be used as an alternative to Boral following final NRC approval of CoC 1014 Amendment #2. Metamic to be 0.101" (Nom) THK X 4.75 wide MIN X 155 7/8" MIN (156" Nom) LG. For MPC 68 the minimum Metamic B10 loading is 0.0310 g/cm² with a minimum B₄C loading of 31.5% and maximum OF 33%. Metamic is not required to be passivated".
- c. Sheet 3, D2: Replace "Boral" With "neutron absorber".
- d. Sheet 3, C2: Replace "Boral" with "neutron absorber".
- e. Sheet 1, General Note 10: Replace "Boral" with "neutron absorber".

Justification:

- a. thru e. See justification for ECO 1021-78 (a. thru e.) below.

Revision 8 changes (ECO 1021 63):

- c. Sheet 2, Note 6: Change thickness call out on Metamic to 0.106".
- d. Sheet 1, Note 10: replace "Boral" with "neutron absorber".

Justification:

- a. & b. See justification for ECO 1021-78 (a. thru e.) below.

Revision 9 changes (ECO 1021 80):

- a. Sheet 2, Note 1: Specified a minimum length for the neutron absorber
- b. Sheet 4, Wide and Thin Shim: Replaced the tolerance on the height with "Nom".

Justification:

- a. **Minor**; ensures alignment of the active fuel region with the neutron absorber region as assumed in the criticality analysis during fabrication.
- b. **Editorial**; the heights of the shims are shown in the licensing drawings for information and are appropriately labeled Nom.

Revision 10 changes (ECO 1021 78):

September 30, 2008

- a. Sheet 1, Note 10: Add to beginning "Both Boral and Metamic are approved for use as neutron absorbers"
- b. Sheet 2, Note 6: Delete the words "Metamic may be used as an alternative to Boral following final NRC approval of CoC 1014 Amendment #2."; Add to end "Sheathing 0.075" (NOM.) THK."
- c. Sheet 2, Basket Elevation View, Coordinate A3: Change "Boral" to "neutron absorber"
- d. Sheet 1, Note 18: "Neutron absorber panels may be a single piece or two pieces as long as the total length indicated is maintained and the gap between the panels is maintained at less than 1/4"."
- e. Sheet 1, Note 19: "Neutron absorber panels may have a reduction in width of up to 1/32" over a length of no more than 12" provided the average width of the panel is no less than the minimum specified."

Justification:

- a. thru c. ~~SAR Change~~; this justification encompasses all of the changes that were made to the drawings to reflect the use of Metamic as a neutron absorber. Non-specific references to Boral were changed to "neutron absorber" and additional notes were added to specify dimensions for Metamic. See Attachment 1, Proposed Change No. 4.
- d. & e. ~~Minor~~; this change provides flexibility during manufacturing. Criticality analysis shows this is acceptable (see Attachment 1, Proposed Change No. 14).

DRAWING 3930 HI-STAR 100 ASSEMBLY FOR TRANSPORT

Revision 1 - Approved for Transport in CoC 9261 Revision 4

Revision 2 changes (ECO 1020-51):

- a. Sheet 2: Revise Note 3 to include the gross weight of the HI-STAR HB Package as follows "HI-STAR PACKAGE GROSS WEIGHT: 282,200 LBS MAX. (187,200 LBS MAX. FOR HI-STAR HB PACKAGE)."
- b. Sheet 2: Add note 5 to include the overall nominal length of the HI-STAR HB Package as follows "HI-STAR HB PACKAGE OVERALL NOMINAL LENGTH: 230 1/16." Also add "(See Note 5)" underneath the existing overall length value of 305 7/8".

Justification:

- a. **SAR Change**; incorporation of HI-STAR HB specific information to support SAR.
- b. **SAR Change**; incorporation of HI-STAR HB specific information to support SAR.

DRAWING 5014-C1765 HI-STAR IMPACT LIMITER

Sheet 1 of 7 (E.I.D. 4420) Rev. 2 - Approved for Transport in CoC 9261 Revision 4

Revision 3 changes (ECO 1027-64):

- a. Modify the descriptions of the BOM items 5, 19, 24, 25 and 26 to include the word "enclosure" between the material thickness and the current item name. For example, the description of BOM item 5 becomes "1/8 THK. ENCLOSURE ANNULAR DISK".
- b. Add SA-240 TYPE 304 as optional material for BOM item 19 (Enclosure).
- c. Add note 8 to read as follows "THE FOLLOWING ARE HI-STAR HB IMPACT LIMITER CRUSH STRENGTHS:" and add table of nominal crush strength to honeycomb section type. TYPE 1 = 1050 PSI, TYPE 1 (OUTER LAYER) = 390 PSI, TYPE 2 = 390 PSI, TYPES 3, 4A AND 5 = 1200 PSI, TYPE 4B (OUTER LAYER) = 575 PSI.

Justification:

- a. **Editorial;** the enclosure or "skin" of the impact limiter is made of BOM items 3 & 4 in addition to the ones mentioned in the proposed change.
- b. **Minor;** Item 19 does not make up the honeycomb and has insignificant structural importance in comparison to the "backbone components" (BOM Items 2, 6, 8, 9 and 14). The change in structural material properties will have a negligible impact on structural calculations.
- c. **SAR Change;** The HI-STAR 100 Version HB or HI-STAR HB may use the same top and bottom impact limiters as the generic HI-STAR 100 with the crush strengths adjusted as required by structural simulations (HI-2063486).

Revision 4 changes (ECO 5014-160)

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"".*
- b. *Change "NOMINAL CRUSH STRENGTH (PSI)" to "NOMINAL CRUSH STRENGTH* (PSI)" in table below note 8.*
- c. *Add the following footnote below the crush strength table: "* MANUFACTURING TOLERANCE FOR ALL HONEYCOMB SECTION TYPES IS +/- 15%"*

Justification:

- a. **Editorial;** these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.
- b. **Editorial;** An analyzed tolerance is added to the crush strengths specified for manufacturing flexibility.
- c. **Editorial;** Same as b.

Sheet 2 of 7 (E.I.D. 4421) Rev. 2 – Approved for Transport in CoC 9261 Revision 4

Revision 3 changes (ECO 5014-160):

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"".*

Justification:

- a. **Editorial;** these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.

Sheet 3 of 7 (E.I.D. 4798) Rev. 1 – Approved for Transport in CoC 9261 Revision 4

Revision 2 changes (ECO 1027-64):

- a. Revise note 3 to indicate that the optional unidirectional impact limiter crush strength (for section types 2 and 5) are not applicable to the HI-STAR HB. Insert the words "(EXCEPT FOR HI-STAR HB)".

Justification:

- a. **SAR Change;** The analysis performed specifically for the HI-STAR HB impact limiter does not allow for optional unidirectional crush strengths for section types 2 and 5.

Revision 3 changes (ECO 5014-146)

- a. *Modify the crush strength of the uniform Al honeycomb material and provide a crush strength for uniform Al honeycomb for HB.*

Justification:

- a. *Editorial; The crush strengths were made consistent with actual test data.*

Revision 4 changes (ECO 5014-160)

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"".*
- b. *Change note 3 to read "AS AN OPTION FOR HI-STAR 100, ALUMINUM SECTION TYPES 2 AND 5 MAY BE REPLACED IN FULL BY UNI-DIRECTIONAL MATERIAL IN EVERY SECTION WITH A CRUSH STRENGTH NOT TO EXCEED 1458 PSI AND NOT LESS THAN 1196 PSI."*
- c. *Change note 4 to read "AS AN OPTION FOR HI-STAR HB, ALUMINUM SECTION TYPES 2 AND 5 MAY BE REPLACED IN FULL BY UNI-DIRECTIONAL MATERIAL IN EVERY SECTION WITH A CRUSH STRENGTH OF 694 PSI (+/- 15% TOLERANCE)."*

Justification:

- a. *Editorial; these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.*
- b. *Editorial; The modification to the note explicitly provides the crush strength of the sections, with tolerance, for HI-STAR 100 if the option for uniform crush strength is chosen.*
- c. *Editorial; The modification to the note explicitly provides the crush strength of the sections, with tolerance, for HI-STAR HB if the option for uniform crush strength is chosen.*

Sheet 4 of 7 (E.I.D. 4422) Rev. 2 – Approved for Transport in CoC 9261 Revision 4

Revision 3 changes (ECO 1027-64):

- a. Show all around full pen flush groove weld between BOM items 2 and 14.

Justification:

- a. **Editorial;** this weld is the same weld used for the bottom impact limiter and joining the same two BOM items.

Revision 4 changes (ECO 5014-160)

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"."*

Justification:

- a. *Editorial; these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.*

**Sheet 5 of 7 (E.I.D. 6116) Rev. 1 – Approved for Transport in CoC 9261 Revision 4
Revision 2 changes (ECO 5014-160)**

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"."*
b. *Added "EID 6116" to the title block.*

Justification:

- a. *Editorial; these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.*
b. *Editorial; this drawing sheet pre-dates the Holtec Database System and since no changes have been made after its implementation the drawing was never assigned an electronic identification number (EID). This number tracks the review and approval signatures of the drawing in the database.*

**Sheet 6 of 7 (E.I.D. 5372) Rev.1 – Approved for Transport in CoC 9261 Revision 4
Revision 2 changes (ECO 5014-146)**

- a. *Modify the crush strengths of the individual Al honeycomb material sections for HI-STAR 100.*

Justification:

- a. *Editorial; The crush strengths were made consistent with actual test data.*

Revision 3 changes (ECO 5014-160)

- a. *Modify the title of the drawing to eliminate "CoC No. 9261, "Appendix B"."*
b. *Section Type 3 - Change Cross Core from "2580" to "2583"*
c. *Section Type 1 - Change Cross Core from "1940" to "1943" (2 places)*
d. *Section Type 1 - Change Uni-Directional from "780" to "783" (2 places)*
e. *Section Type 5 - Change Cross Core from "2580" to "2583"*
f. *Section Type 4 - Change Section A Cross Core from "2580" to "2583"*
g. *Section Type 4 - Change Section B Uni-Directional from "1230" to "1231"*
h. *Section Type 4, Note 2 - Change note to read "The average crush strength for each Cross-Core Section Type shall not exceed the specified value"*
i. *Section Type 4 - Add Note 3 to read "The average crush strength for all Uni-directional Sections (Type 1 and Type 2) shall not exceed the specified value"*
j. *Section Type 4 - Add Note 4 to read "All crush strength values are based on 1/4 scale drop tests (Ref. HI-981891)"*
k. *Section Type 4 - Add Note 5 to read "The average crush strength for each Section Type shall not be less than 82% of the specified value"*
l. *Section Type 2, Change Uni-Directional from "780" to "783"*

Justification:

- a. **Editorial**; these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.
- b. through l. – **Minor**; crush strengths and notes revised to align the analysis with the requirements for the material.

**Sheet 7 of 7 (E.I.D. 6117) Rev. 0 – Approved for Transport in CoC 9261 Revision 4
Revision 1 changes (ECO 5014-160)**

- a. Modify the title of the drawing to eliminate “CoC No. 9261, “Appendix B””.
- b. Added “EID 6117” to the title block.

Justification:

- a. **Editorial**; these drawings are listed in the CoC Section 5(a)(3) and provided in the SAR. They are not a part of Appendix B to CoC 9261.
- b. **Editorial**; this drawing sheet pre-dates the Holtec Database System and since no changes have been made after its implementation the drawing was never assigned an electronic identification number (EID). This number tracks the review and approval signatures of the drawing in the database.

LAR 9261-5

ATTACHMENT 6

to

Holtec Letter 5014666

**List of Proposed CoC and SAR Changes
Specific to 2nd RAI Response**

Attachment 6 to Holtec Letter 5014666
List of CoC/TS and SAR text changes specific to second RAI response

CoC/TS changes

Changes made to bring CoC and Appendix A in-line with Amendment 5 since the original submittal was based on Amendment 4 with some minor editorial suggestions:

CoC page 3 modified drawing revision numbers.

CoC page 5 added definition for undamaged fuel assembly.

CoC/TS page A-ii added "and/or UNDAMAGED" after "INTACT" for row containing MPC-HB.

CoC/TS Page A-20 and A-21 added "and/or UNDAMAGED" after "INTACT" in all places.

TS Page A-21, Note 3 of Table A.1 Section VI, added the limit of 1.5 kg of stainless steel clad per cask.

Chapter 1

Page 1.0-3 added ECO 5014-160 (Impact Limiter changes) to ancillary equipment, deleted ECOs affecting fuel baskets since we are reverting back to the already approved drawings which do not contain Metamic for the generic fuel basket designs.

Page 1.0-9 added definition for undamaged fuel assembly

Page 1.2-10 added statement after 1.2.1.4.1 to explicitly state in which baskets Metamic or Boral will be used.

Page 1.2-13 corrected reference to subsection 9.1.5.3 and Chapter 9. Correct reference is subsection 8.1.5.5.2 and Chapter 8, respectively.

Page 1.2-14 removed reference to Table 1.2.37. Minor editorial changes to discussion on Metamic.

Page 1.2-30 minor editorial changes to discussion on Metamic.

Page 1.2-32 deleted reference to Table 1.2.37 which has been deleted.

Page 1.2-35 changed values for minimum B10 loading in Metamic (2nd row of Table 1.2.3) to N/A. Minimum B¹⁰ loading for Metamic in HB is presented in Supplement 1.1.

Page 1.2-40 changed the clad material for the 14x14E to Zr per RAI #5-2 of initial RAI on this LAR.

Page 1.2-76 deleted Table 1.2.37.

Page 1.4-1 drawings 3925, 3926, 3927, 3928 were reverted back to the approved revisions which do not contain Metamic. Impact Limiter drawing sheet revisions updated to reflect latest changes.

Page 1.1-3 added clarifying text to section 1.1.2.3.2 regarding HB fuel as undamaged.

Page 1.1-4 changed revision of drawing 4103 to Rev. 5.

Page 1.1-5 added "and/or undamaged" after "intact" for clarification. (3 places).

Page 1.1-9 added "and/or undamaged" after "intact" for clarification. (4 places).

Page 1.I-10 added "or undamaged" after "intact" in Note 3.

Page 1.I-10 added "A maximum of 1.5 kg of stainless steel clad is allowed per cask." to Note 4.

Chapter 2

Page 2.4-2, 1st full paragraph, deleted "Boral" before "neutron absorber material". Metamic may also react with water and requires monitoring along with purging or exhausting during the MPC lid-to-shell weld.

Page 2.I-1 contains minor editorial changes.

Page 2.I-7 added sentence at the end of subsection 2.I.6.7 to point reader to Table 2.I.7.2.

Pages 2.1-9 through 2.1-12 was revised to provide the results for the free-drop using the structural analysis methodology approved for HI-STAR 100.

Section 2.I.9 added discussion on undamaged fuel.

Page 2.I-13 references 2.I.7.1 and 2.I.7.2 were modified.

Page 2.I-16 Tables 2.I.7.1 through 2.I.7.3 were modified.

Figures 2.I.7.1 through 2.I.7.5 were deleted.

Chapter 3

Page 3.1-1 deleted the parenthetical "(Boral or Metamic)". Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.2-1, 1st paragraph, deleted the parenthetical "(Boral or Metamic)". Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.2-1, 2nd paragraph is modified to eliminate the specific reference to Boral and Metamic since Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.2-2 modified last two sentences of last paragraph. Changes language about Holtite-A and periodic thermal tests in response to RAI 3-1.

Page 3.2-10 deleted footnote for the table. The neutron absorber is already described in Chapter 1.

Page 3.4-1, 1st paragraph, deleted "Boral or Metamic". Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.4-3, 2nd full paragraph, deleted the parenthetical "(Boral or Metamic)". Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.4-4, 1st paragraph, deleted the parenthetical "(Boral or Metamic)". Chapter 1 provides the descriptions of the neutron absorbers.

Page 3.7-2, reference 3.3.8, editorial change "Rode" to "Rod"

Section 3.I.4.1.1 added discussion on thermal evaluation of undamaged fuel.

Chapter 4

Page 4.2-1 first paragraph, editorial, deleted "s" from "vessels" and added "s" to "remain"

Section 4.1 modified for new definition of undamaged fuel, specifically the assumption that 100% of the fuel rods under normal condition will contain a breach. This change modifies results in the tables but does not affect the leakage rate acceptance criteria.

Chapter 5

Subsection 5.3.2, 2nd paragraph is deleted. Since this paragraph was the only change proposed in Revision 13, deleting this paragraph results in this section reverting back to the latest SAR revision, which is Revision 10. This Section is no longer included in the LAR.

Subsection 5.1.2 added additional text for the stainless steel cladding limit of 1.5 kg.

Subsection 5.1.3 added additional text for discussion of Metamic.

Subsection 5.1.4.2 added additional text to discuss the accident condition with undamaged fuel.

Chapter 6

Page 6.1-3, last paragraph on page is modified to update discussion on Boral and Metamic.

Page 6.2-2, last paragraph on page is modified to update discussion on Boral and Metamic.

Page 6.2-4, first paragraph on page is modified to update discussion on Boral and Metamic.

Page 6.2-5, 2nd to last paragraph is modified to explicitly state the B10 areal density.

Page 6.3-1, last full paragraph modified to remove statement about Metamic.

Page 6.4-16 deleted subsections 6.4.12, 6.4.13 and 6.1.14.

Appendix 6.D was modified as a result of the elimination of subsection 6.4.13, to remove the MCNP sample input file of the MPC-68 with gap and width reductions in the poison plates. Since this was the only change proposed in Revision 13, deleting this input file results in this section reverting back to the latest SAR revision, which is Revision 10. This Section is no longer included in the LAR.

Page 6.1-2, paragraph on top of page was modified for discussion of undamaged fuel.

Page 6.1-3 1st line at top of page was added to clarify that only 75% credit is taken for Metamic in MPC-HB even though the material is qualified to the requirements for 90% credit.

Page 6.1-3 to the end added discussion for undamaged fuel assemblies.

Chapter 7

Changes per RAI 7-1 as follows:

Page 7.1-2 revised Step #2 of Section 7.1.3.1 to have the receipt inspection of the MPC and removal of road dirt/debris and any foreign material performed prior to the other activities described in this step.

Page 7.1-6 included language in Step #1 of Section 7.1.5 that states leak testing will be done if one or more overpack lid bolts, the drain port, or the vent port plug has been de-tensioned to be consistent with the conditions for which testing is required in Step #6 of Section 7.1.4.

Page 7.1-6 added the description that pocket trunnions, if present and not in use, are plugged in Section 7.1.5 Step #3.

Page 7.2-1 changed the ALARA note to discuss the HI-STAR 100 and not the HI-STAR 60.

Page 7.1-1 removed Section 7.1.1.2 from the SAR.

Chapter 8

Changes per RAI 8-1, 8-2 and 3-1 as follows:

Subsection 8.1.5.4 of the proposed SAR, Revision 13b, has been revised to include the shielding effectiveness tests described in subsection 8.1.5.2 of the currently approved SAR.

Subsection 8.2.4 was revised to contain Condition 6.(b)(6) of the current approved CoC for periodic verification of the neutron shield integrity.

Subsection 8.2.5 was revised to contain Condition 6(b)(8) of the current approved CoC for periodic thermal testing with slight modification of the language to be consistent with subsection 8.2.4.

Page 8.2-3 added the Shielding Effectiveness and Periodic Thermal tests to Table 8.2.1.

Page 8.3-1 editorial correction to Document Package # in Ref. 8.1.7 (DOC-5014-03).