PRELIMINARY SAFETY EVALUATION REPORT

Docket No. 72-1008
Model No. HI-STAR 100 Cask System
Certificate of Compliance No. 1008
Amendment No. 1

SUMMARY

This Safety Evaluation Report (SER) documents the review and evaluation of an amendment application for the HI-STAR 100 Cask System. The application was submitted by Holtec International (the applicant) on November 24, 1999, as supplemented. The application requests changes to Certificate of Compliance 1008 (the certificate), including its appendices, the design drawings, and Revision 10 of the Safety Analysis Report (SAR) for HI-STAR 100 Cask System (the cask).

The requested changes include:

(1) revisions to limits for existing fuel array/classes,
(2) addition of pressurized water reactor (PWR) Burnable Poison Rod Assemblies (BPRAs) and Thimble Plug Devices (TPDs),
(3) addition of two new fuel assembly array/classes,
(4) addition of a new damaged fuel container (DFC),
(5) addition of thoria rods in canisters,
(6) addition of antimony-beryllium neutron sources, and
(7) clarifications, editorial corrections, and other minor changes.

The application, as supplemented, included the necessary engineering analyses and proposed SAR page changes. The proposed SAR revisions would be incorporated into the Final Safety Analysis Report that must be submitted within 90 days after the amendment has been approved (in accordance with 10 CFR 72.248(a)(1)).

The U. S. Nuclear Regulatory Commission (NRC) staff has reviewed the application, as supplemented, including the engineering analyses, proposed SAR revisions, and other supporting documents submitted with the application. Based on the statements and representations in the application, as supplemented, the staff concludes that the HI-STAR 100 Cask System, as amended, meets the requirements of 10 CFR Part 72.

References

Holtec International application dated November 24, 1999.

Supplements dated February 4, 18 and 28, March 2, 16 and 31, and May 23, 2000.

1.0 GENERAL

The applicant proposed several minor changes to Chapter 1 of the SAR and corresponding changes to the certificate, as applicable. These changes are described in detail in the application, as supplemented, and include minor revisions to the design drawings, definitions, and the Holtite neutron shield specifications. The purpose of the changes are primarily to provide clarification, enhance consistency between the certificate and SAR, remove unnecessary information, and provide flexibility where appropriate.

The staff has reviewed these changes and finds them acceptable. These changes are consistent with or supported by the analyses that have been previously reviewed and approved by the staff. These changes have no adverse impact on the design and operation of the cask and will not affect the ability of the cask to meet the requirements of 10 CFR Part 72.

2.0 PRINCIPAL DESIGN CRITERIA

The applicant proposed several changes to Chapter 2 of the SAR and corresponding changes to the certificate, as applicable. These changes are described in detail in the application, as supplemented. The changes include minor SAR revisions to provide clarification, enhance consistency between the certificate and SAR, remove unnecessary information, and provide flexibility where appropriate. The staff has reviewed these changes and finds them acceptable. These changes are consistent with or supported by the analyses that have been previously reviewed and approved by the staff. These changes have no adverse impact on the design and operation of the cask and will not affect the ability of the cask to meet the requirements of 10 CFR Part 72.

Chapter 2 of the SAR was also revised to address the revisions to the limits for existing fuel array/classes and the addition of BPRAs, TPDs, the 8x8F and 15x15H fuel assembly array/classes, a new DFC, thoria rods in canisters, and antimony-beryllium neutron sources. These changes primarily affect shielding and criticality and are evaluated in Chapters 5 and 6 of this SER.

The NRC staff reviewed the proposed changes to Chapter 2 of the SAR and found that changes to the design criteria complied with 10 CFR Part 72 requirements and provided adequate assurance that the specified spent fuel can be stored safely.

3.0 STRUCTURAL EVALUATION

The applicant proposed several changes to Chapter 3 of the SAR to address (1) the revisions to the design drawings; (2) the revisions to the limits for existing fuel array/classes; (3) the addition of BPRAs, TPDs, the 8x8F and 15x15 H fuel assembly array/classes, a new DFC, thoria rods in canisters, and antimony-beryllium neutron sources; and (4) other clarification or editorial changes. The requested changes do not have an impact on the structural performance or integrity of the cask and its contents.

The drawings were revised mainly to eliminate inconsistencies, replace non-essential dimensions and tolerances, and remove ambiguities in the verbiage of the drawing notes. A variety of enhancements have also been incorporated into the revised drawings, including: (1) eliminating multi-purpose canister (MPC) basket shims to allow flexibility to the manufacturer; (2) adding options to change the sheathing weld length and pitch to the extent that waviness is minimized while the total amount of weld remains the same; (3) adding an optional weld detail for the overpack neutron shield enclosure panel to a radial channel weld (the reduction in the amount of weld material allows for a more efficient fabrication process, yet still meets all structural design requirements); and (4) reducing the closure ring welds to 1/8 inch and deleting the liquid penetrant test required for the root pass of the closure ring welds (the 1/8-inch welds will not have separate root and final passes; the final pass is appropriate in addition to the visual inspection). These enhancements do not affect the structural performance of the cask.

A new DFC, the Transnuclear Dresden Unit 1 (TN/D-1) DFC, and a Thoria Rod Canister with 18 thoria rods were added to the approved contents. The TN/D-1 DFC and Thoria Rod Canister were structurally evaluated and found to meet all required design requirements for storage in the HI-STAR 100 Cask System. The structural analysis is provided in Appendix 3.AI of the proposed SAR. Results of the analysis show all factors of safety to be greater than 1.0.

Two new fuel assembly array/classes (8x8F and 15x15H), BPRAs, TPDs, and antimony-beryllium sources were added to the list of contents. Also, changes were made to the parameter limits of some previously approved fuel assemblies, including increases to their initial uranium masses. These changes do not increase the weight of the contents or cask and, therefore, do not affect the existing structural evaluation.

The proposed changes to the certificate, drawings, and SAR have been reviewed and found acceptable. The changes will have no impact on the structural performance of the HI-STAR 100 Cask System under normal, off-normal, and accident conditions.

4.0 THERMAL EVALUATION

The applicant proposed several changes to Chapter 4 of the SAR to address (1) the revisions to limits for existing fuel array/classes; (2) the addition of BPRAs, TPDs, the 8x8F and 15x15H fuel assembly array/classes, a new DFC, thoria rods in canisters, and antimony-beryllium neutron sources; and (3) other clarification or editorial changes. These changes do not involve an increase to the decay heat load or a change to the heat transfer characteristics of the cask. The new contents and content limits are bounded by the thermal analysis for previously approved contents. Therefore, the staff finds the proposed changes acceptable.

5.0 SHIELDING EVALUATION

The following proposed changes were considered for their impact on the shielding evaluation:

(1) addition of the TN/D-1 DFC to the approved contents;

(2) addition of the Dresden Unit 1 Thoria Rod Canister, with up to 18 thoria rods, to the approved contents;

(3) addition of the Dresden Unit 1 assemblies with one antimony-beryllium neutron source to the approved contents;

(4) revision of the uranium masses for some fuel assemblies;

(5) revision of fuel assembly parameter limits for some fuel assemblies;

(6) addition of two new fuel assembly array/classes to the approved contents;

(7) addition of BPRAs and TPDs to the approved contents;

(8) revision of the SAR and drawings to specify nominal values for the Holtite B_4C content and Holtite specific gravity;

(9) changes to the material composition testing requirements of Holtite.

TN/D-1 Damaged Fuel Container

The HI-STAR 100 is currently approved to store damaged fuel or fuel debris when the fuel is contained in a Holtec DFC. The applicant requested the addition of the TN/D-1 DFC to the HI-STAR 100 approved contents. Figure 2.1.2 in the proposed SAR shows the dimensions of the TN/D-1 DFC. The source term for both containers will be the same since the allowed fuel types are identical.

For damaged fuel and fuel debris, the applicant assumed that the fuel collapsed to a height of 80 inches. This height was determined by using the inner dimensions of the Holtec DFC. The source per inch was then calculated. Since the inner diameter of the TN/D-1 DFC is smaller than the inner diameter of the Holtec DFC and the fuel is identical, the height of the collapsed fuel in a TN/D-1 DFC will be greater (i.e., for two cylinders with the same volume but different diameters, the cylinder with a smaller diameter will have a greater height). Therefore, the source per inch will be less in the TN/D-1 DFC and the shielding evaluation for the Holtec DFC bounds the TN/D-1 DFC.

Based on the review of the applicant's analysis, the staff agrees that the TN/D-1 DFC is bounded by the current analysis and further evaluation is not required.

Dresden Unit 1 Thoria Rod Canister

The applicant requested the addition of the Dresden Unit 1 Thoria Rod Canister to the HI-STAR 100 approved contents. The canister contains up to 18 thoria rods with a maximum burnup of 16,000 MWD/MTU and a minimum cooling time of 18 years. The applicant used SAS2H and ORIGEN-S to calculate the source terms. The thoria rod source terms, listed in proposed SAR tables 5.2.32 and 5.2.33, were bounded by the source terms for the design basis boiling water reactor (BWR) fuel in all neutron groups and in all gamma groups except in the 2.5-3.0 MeV group. To demonstrate that the gamma dose rate from the thoria rods was bounded by the design basis fuel, the gamma dose rate from a cask completely filled with the thoria rods was compared to the gamma dose rate of a cask filled with the design basis fuel. The cask with the design basis fuel had a higher gamma dose rate; thus, the Thoria Rod Canister is bounded by the shielding analysis for the design basis fuel.

The staff has reviewed the applicant's analysis and agrees that the Thoria Rod Canister is bounded by the current shielding analysis for the design basis fuel.

Antimony-Beryllium Source in Dresden Unit 1 Fuel Assemblies

The applicant requested the addition of Dresden Unit 1 fuel assemblies containing an antimony-beryllium source to the HI-STAR 100 approved contents. The Dresden Unit 1 fuel assembly was previously approved for storage in the HI-STAR 100 cask. The beryllium produces neutrons through gamma irradiation, with the antimony (Sb-124) used as the gamma source. Since all of the initial Sb-124 has decayed away, the only gamma source available is from decay gammas from the fuel assemblies and Sb-124 activation. The applicant used MCNP to calculate the additional gamma source term from the antimony-beryllium source. The applicant conservatively neglected the reduction of antimony and beryllium while these sources were in the core. The neutron source was then calculated. Table 5.4.15 of the proposed SAR compares the calculated neutron source for the Dresden Unit 1 fuel with and without antimony-beryllium sources to the design basis fuel. As shown in the table, the Dresden Unit 1 fuel with the antimony-beryllium neutron source is bounded by the design basis fuel. The applicant also considered the gamma source due to activation of the source's stainless steel cladding, which was shown to be bounded by the design basis fuel.

The staff reviewed the applicant's analysis and agrees that Dresden Unit 1 fuel assemblies containing an antimony-beryllium source is bounded by the current shielding analysis for the design basis fuel.

Revision of Uranium Masses

The applicant requested an increase in the maximum allowed uranium masses for some fuel assemblies. The applicant proposed to increase the masses up to the values used in the shielding analysis.

The staff agrees that the masses may be increased as requested, and further evaluation is not required since these values have already been analyzed.

Revision of Fuel Assembly Parameter Limits

The applicant requested minor changes to certain fuel assembly parameter limits such as cladding thickness and guide tube/water rod thickness. The source term is dependent upon the uranium mass. The allowable mass loadings for the specified burnup and cooling times are not being changed. Therefore, these changes do not affect the shielding analysis.

The staff agrees that the dimensional changes have a negligible impact on the shielding analysis and further evaluation is not required.

New Fuel Assembly Array Classes

The applicant requested that two new fuel assembly array/classes, the PWR 15x15H and the BWR 8x8F, be added to the HI-STAR 100 approved contents. These assemblies are very similar to currently approved fuel assemblies, and the uranium masses are bounded by the design basis fuel assemblies. The burnup and cooling times are also the same as previously analyzed; therefore, additional analysis is not necessary. These assemblies are bounded by the current shielding analysis for the design basis fuel assemblies.

The staff has reviewed the information presented in the application and agrees that these assembly array classes are bounded by the design basis fuel.

BPRAs and TPDs

The applicant requested revision of the approved contents to allow storage of PWR fuel assemblies with BPRAs and TPDs in the HI-STAR 100 cask. The only significant radiation source is from irradiation of the impurities in the stainless steel and Inconel in the BPRAs and TPDs, which creates Co-60. The applicant determined the bounding BPRA and TPD, described in proposed SAR Table 5.2.29, by analyzing different BPRAs and TPDs to determine which produced the highest source term and decay heat for a specific burnup and cooling time. The applicant used the SAS2H and ORIGEN-S modules of the SCALE code to calculate the radiation source term and decay heat load for the BPRAs and TPDs which is the same code used for the fuel source term calculations. The total curies of cobalt and the decay heat were then calculated as a function of burnup and cooling time. The BPRA and TPD limits for burnup and cooling time are given in Table 1.1-6 of Appendix B of the proposed certificate. The allowable BPRA and TPD decay heat load was subtracted from the assembly decay heat load to determine the assembly burnup and cooling times for fuel with TPDs or BPRAs. The decay heat load from the TPDs is negligible. To account for the heat load from the BPRAs, the fuel assembly burnup and cooling times, given in Appendix B Table 1.1-5 of the proposed certificate, were revised.

The applicant then calculated the dose rates for the HI-STAR 100 cask assuming all fuel assemblies contained either BPRAs or TPDs. The results are discussed in proposed SAR Section 5.4.6. The dose rates were bounded by the current dose rates at all locations except dose point number 6. The differences in dose rates here are negligible and would not affect the cask's ability to meet the requirements of 10 CFR 72.104 and 72.106.

The staff performed confirmatory calculations to determine the additional source term and activity from the BPRAs and TPDs. The cooling time and average burnups given in Appendix B Table 1.1-6 of the proposed certificate were used. The staff's results are in close agreement with the applicant's results. For the confirmatory analysis, the staff used the SAS2H and ORIGENS modules of the SCALE version 4.4 computer code and the accompanying 44-group cross-section library. These codes are standards in the industry for performing shielding analyses and are appropriate for this particular application and fuel system.

Holtite Specific Gravity and B_4C Content

The applicant proposed changes to the SAR and drawings to specify the Holtite specific gravity and B_4C content as nominal values instead of maximum and minimum values, respectively. The applicant requested these changes to allow flexibility during fabrication.

A slight increase in the specific gravity will not adversely affect the shielding capabilities of the cask. Instead, an increase in the specific gravity would increase the effectiveness of the shielding, thus reducing the surface dose rates.

The applicant performed a sensitivity study to demonstrate the effects of a slight decrease in the B_4C content. The applicant showed that a reduction from 1 weight percent to 0.75 weight percent in the Holtite will have a minor impact on the dose rates. For the most bounding case, the calculated dose rates increased by 3 percent.

The staff has reviewed the applicant's analysis and agrees that these changes have a negligible impact on the shielding analysis.

Holtite Composition Testing

The applicant requested a change in the composition testing frequency of the Holtite shielding material. The applicant requested the frequency be changed to every manufactured lot rather than every mixed batch.

The staff agrees that changing the testing frequency to each manufactured lot will provide an appropriate level of control given that the casks are manufactured and tested under a Part 72 Quality Assurance Program.

Shielding Evaluation Conclusion

Based on the review of the application, the staff concludes that the proposed changes will not affect the ability of the cask to meet the dose rate requirements of 10 CFR Part 72.

6.0 CRITICALITY EVALUATION

The following requested changes required an update of the criticality evaluation:

(1) inclusion of the TN/D-1 DFC already loaded with Dresden Unit 1 fuel assemblies into the MPC-68 and MPC-68F;

(2) inclusion of one Dresden Unit 1 Thoria Rod Canister loaded with 18 thoria pins into the MPC-68 and MPC-68F;

(3) inclusion of Dresden Unit 1 fuel assemblies containing one antimony-beryllium neutron source in the assembly lattice;

(4) revision of allowable U-235 enrichment in the mixed-oxide (MOX) rods of fuel assembly array/class 6x6B;

(5) increases in the maximum allowed design initial uranium masses for the following fuel assembly array/classes: 14x14A, 14x14B, 14x14C, 15x15A, 16x16A, 17x17A, 17x17B, 17x17C, 6x6A, 6x6B, 8x8E, 9x9A, 9x9B, 9x9D, 9x9E, 9x9F, 10x10A, 10x10B, and 10x10C;

(6) revisions to the fuel assembly parameter limits for the following fuel assembly array/classes: 14x14C, 6x6A, 6x6B, 7x7A, 7x7B, 8x8A, 8x8B, 8x8D, 9x9B, 9x9E, 9x9F, and 10x10C;

(7) addition of fuel assembly array/classes 15x15H and 8x8F.

The other requested changes do not affect the cask criticality evaluation.

The applicant's evaluation and the staff's confirmatory review of the requested changes are described below. The applicant provided supporting analyses similar to analyses previously reviewed by the staff for the HI-STAR 100 Cask System.

TN/D-1 Damaged Fuel Containers

The applicant requested that the TN/D-1 DFC be approved for storage in the HI-STAR MPC-68 and MPC-68F. A sketch of the TN/D-1 DFC is provided in Figure 2.1.2 in Chapter 2 of the proposed SAR. The model of the packaging is similar to the previous DFC models except that the TN/D-1 DFC is slightly smaller than the original Holtec DFC design. The applicant performed analyses showing that the TN/D-1 DFC may store the 6x6 and 7x7 fuel assemblies with various number of rods missing, a collapsed fuel assembly, and dispersed fuel powder. These are the same contents as the original Holtec DFC design. The results of the applicant's analyses are provided in Table 6.4.5 of the proposed SAR. The k_{eff} for the TN/D-1 DFC is bounded by the Holtec DFC design in all cases with one exception. The reactivity of the system is slightly increased for a collapsed fuel array.

The staff performed independent confirmatory analyses that discreetly modeled the TN/D-1 DFC. The staff compared the results of the TN/D-1 DFC and the Holtec DFC and found comparable values for k_{eff}.

Dresden Unit-1 Thoria Rods

The applicant requested approval to store one Thoria Rod Canister within the MPC-68 or MPC-68F canisters. A sketch of the Dresden Unit 1 Thoria Rod Canister is provided in Figure 2.1.2A in the proposed SAR. The thoria rod contents are described in Table 6.2.42 of the proposed SAR. The applicant modeled the Thoria Rod Canister explicitly and performed an analysis for a cask filled with 68 of these canisters. The applicant calculated a k_{eff} of 0.18. The applicant concluded that the MPC-68 or MPC-68F filled with fuel assemblies or DFCs would remain subcritical with the inclusion of a single Thoria Rod Canister.

The staff performed a confirmatory analysis that discreetly modeled the MPC-68 filled with 68 Thoria Rod Canisters. The staff's results were comparable to those of the applicant. In addition, the staff further analyzed an MPC-68 containing 67 bounding BWR fuel assemblies and one Thoria Rod Canister. The k_{eff} for this case was bounded by the MPC-68 containing 68 bounding BWR assemblies. Staff verified that all fuel assembly parameters important to criticality safety have been included in Appendix B to the proposed certificate.

Antimony-Beryllium Neutron Source in Dresden Unit 1 Fuel Assemblies

The applicant requested approval to store several Dresden Unit 1 fuel assemblies containing one antimony-beryllium neutron source in the assembly lattice. The antimony-beryllium source is located within the water rod of the assembly. The applicant stated that the presence of an antimony-beryllium neutron source will not affect the reactivity of the system except for the moderator it displaces.

Staff verified that the antimony-beryllium sources have been included in Appendix B to the proposed certificate. The staff has reviewed the applicant's justification and agrees that the presence of a single antimony-beryllium neutron source within a water rod will not increase the overall reactivity of the system.

Revision of Allowable U-235 Enrichment in MOX Rods

The applicant requested an increase from 0.612 to 0.635 in the permissible U-235 weight percent for the MOX rods of the 6x6B fuel assembly array/class. The analysis and model of the packaging are similar to those used previously by the applicant. The fuel assemblies were modeled explicitly. The applicant reported that increasing the permissible U-235 weight percent from 0.612 to 0.635 resulted in an increase in k_{eff} from 0.7611 to 0.7824.

The staff has performed a confirmatory analysis and agrees that the increase in the permissible U-235 weight percent increases the reactivity of the system by only a small amount. The overall k_{eff} of the system remains well below 0.95.

Increased Maximum Allowed Design Initial Uranium Masses

The applicant requested an increase in the maximum allowed design initial uranium masses for the following fuel array/classes: 14x14A, 14x14B, 14x14C, 15x15A, 16x16A, 17x17A, 17x17B, 17x17C, 6x6A, 6x6B, 6x6C, 8x8E, 9x9A, 9x9B, 9x9C, 9x9D, 9x9E, 9x9F, 10x10A, 10x10B and 10x10C. The applicant increased the design initial uranium masses for consistency between the certificate of compliance and the values used in the shielding analyses.

The fuel assembly dimensions important to criticality safety are included in Appendix B to the proposed certificate. The staff concludes that, given the bounding fuel assembly dimensions defined in the current and proposed certificate, increases to the initial uranium mass will not affect the overall reactivity of the system.

Revisions to Fuel Assembly Parameter Limits

The applicant requested a revision to the fuel assembly parameter limits for the following fuel assembly array/classes: 14x14C, 6x6A, 6x6B, 7x7A, 7x7B, 8x8A, 8x8B, 8x8D, 9x9B, 9x9E, 9x9F, and 10x10C. The revised fuel parameters are provided in proposed SAR Table 6.2.1 for BWR assemblies and proposed SAR Table 6.2.2 for PWR assemblies. The analysis and model of the packaging are similar to those used previously by the applicant. The changes to each assembly type were modeled explicitly. Revised results are documented in Chapter 6 of the proposed SAR. The applicant showed that these revised fuel assembly parameter limits do not change the bounding fuel assembly array/class for the BWR and PWR assemblies.

The staff reviewed the revised fuel specifications considered in the criticality analyses and performed independent confirmatory analyses using explicit models. The staff calculated k_{eff} values comparable to the applicant's results.

Addition of two new fuel assembly classes, 15x15H and 8x8F

The applicant requested the addition of two new fuel assemblies to the list of permissible contents in the HI-STAR 100 Cask System. Characteristics of the 8x8F and 15x15H assemblies are presented in proposed SAR Tables 6.2.1 and 6.2.2, respectively. The 8x8F array/class includes a cruciform shaped water rod that separates the 64 fuel pins into quadrants. The applicant modeled each of these fuel assemblies explicitly. For the 8x8F, water channels were appropriately included in the model. The applicant calculated k_{eff}s of 0.9153 for the 8x8F assembly and 0.9411 for the 15x15H.

Staff verified that all fuel assembly parameters important to criticality safety have been included in Appendix B to the proposed certificate. For its confirmatory analyses, the staff explicitly modeled the two fuel assemblies within the packaging. The staff calculated k_{eff} values comparable to the applicant's results.

Criticality Evaluation Summary

The applicant performed all criticality analyses using MCNP4a, a three-dimensional, continuous-energy, Monte Carlo N-Particle code. The MCNP4a calculations used the continuous-energy cross-section data distributed with the code. This cross-section data is based on ENDF/B-V cross-section library.

The staff agrees that the codes and cross-section sets used in the analysis are appropriate for this application and fuel system. The staff performed its independent criticality analyses using the CSAS/KENO-Va codes and the 44-group cross-section library in the SCALE 4.3 system.

Based on the applicant's criticality evaluation, as confirmed by the staff, the staff concludes that the changes to the cask and the contents of the HI-STAR 100 Cask System do not affect the ability of the cask to meet the criticality safety requirements of 10 CFR Part 72.

7.0 CONFINEMENT EVALUATION

The applicant proposed several changes to Chapter 7 of the SAR to address (1) the revisions to limits for existing fuel array/classes; (2) the addition of BPRAs, TPDs, the 8x8F and 15x15H fuel assembly array/classes, a new DFC, thoria rods in canisters, and antimony-beryllium neutron sources; and (3) other clarification or editorial changes. The requested changes do not involve an increase to the confinement source terms or a significant change to the design and operation of the confinement system. The new contents and content limits are bounded by the confinement analysis for previously approved contents. Therefore, the staff finds the proposed changes acceptable.

8.0 OPERATING PROCEDURES

The applicant proposed several editorial and clarification changes to Chapter 8 of the SAR. The requested changes do not result in a significant change to the operation of the cask. Therefore, the staff finds the proposed changes acceptable.

9.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

The applicant proposed several editorial and clarification changes to Chapter 9 of the SAR. The requested changes do not result in a significant change to the cask’s acceptance testing and maintenance program. Therefore, the staff finds the proposed changes acceptable.

10.0 RADIATION PROTECTION

The radiological impact of the proposed changes are discussed in Chapter 5 of this SER. The proposed changes do not impact the ability of the cask to meet the requirements of 10 CFR 72.104 and 72.106.

11.0 ACCIDENT ANALYSES

The applicant proposed several changes to Chapter 4 of the SAR to address (1) the revisions to limits for existing fuel array/classes; (2) the addition of BPRAs, TPDs, the 8x8F and 15x15H fuel assembly array/classes, a new DFC, thoria rods in canisters, and antimony-beryllium neutron sources; and (3) other clarification or editorial changes. The proposed changes do not have a significant effect on the performance of the cask under off-normal and accident condition. Therefore, the staff finds the proposed changes acceptable.

12.0 CONDITIONS FOR CASK USE - OPERATING CONTROLS AND LIMITS OR TECHNICAL SPECIFICATIONS

Tables 12-1 and 12-2 below list the proposed changes to the certificate. The staff has reviewed these changes and, as discussed in the preceding chapters of this SER, have found them acceptable.

Table 12-1

Proposed Changes to Certificate of Compliance 1008
Appendix A - Technical Specifications

Appendix A Section	Change Description
Throughout	Editorial changes and typographical corrections.
1.1	Revised definitions of damaged fuel assembly and damaged fuel container for clarification.
2.1.1	Replaced the MPC helium backfill density limit with a helium backfill pressure limit to simplify requirement.
	Revised the leak rate units in Table 2-1 from std cc/sec to atm-cc/sec for clarification.

Table 12-2

Changes to Certificate of Compliance 1008
Appendix B - Approved Contents and Design Features

Appendix B Section	Change Description
Throughout	Editorial changes and typographical corrections.
1.0	Revised definitions of damaged fuel assembly, damaged fuel container, and planar-average initial enrichment for clarification and consistency with Appendix A.
1.1	Revised Section 1.1.1 to permit storage of certain non-fuel hardware.
1.4	Revised Item 6 to clarify the requirements for cask storage pad.
1.5	Revised Section 1.5.2 to clarify surface emissivity requirement.
Table 1.1-1	Added limits for BPRAs and TPDs, array class 8x8F, and thoria rods.
Table 1.1-2	Revised certain fuel assembly parameters, added array/class 15x15H fuel assembly, and added clarifying notes.
Table 1.1-3	Revised certain fuel assembly parameters, added array/class 8x8F fuel assembly, and added clarifying notes.
Tables 1.1-4 and 1.1-5	Revised to clarify limits, reflect addition of BPRAs and TPDs, and permit linear interpolation between points.
Table 1.1-6	Added table specifying cooling and average burnup limits for non-fuel hardware.
Table 1.3-1	Added exception to ASME Code NB-5230 for the MPC lid-to-shell weld and added clarifying text.

In addition to the changes above, the staff revised the certificate to include a condition that requires users to prepare written acceptance tests and maintenance program consistent with the technical basis described in Chapter 9 of the SAR.

13.0 QUALITY ASSURANCE

The applicant proposed several minor changes to Chapter 13 of the SAR. The purpose of the changes are to provide clarification and correct typographical errors. The proposed changes make Chapter 13 of the SAR consistent with Chapter 13 of the SAR for Holtec's HI-STORM 100 Cask System, which the NRC has previously accepted. Therefore, the staff finds the proposed changes acceptable.

14.0 DECOMMISSIONING

The proposed changes do not have a significant impact on the decommissioning considerations for the cask.

CONCLUSION - EVALUATION FINDINGS

The staff has reviewed the HI-STAR 100 Cask System amendment application, as supplemented, including the engineering analyses, proposed SAR revisions, and other supporting documents submitted with the application. Based on the information provided in the application, as supplemented, the staff concludes that the HI-STAR 100 Cask System, as amended, meets the requirements of 10 CFR Part 72.

Issued with Certificate of Compliance No. 1008, Amendment No. 1,
on _______________, 2000.