UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 8, 2001

Mr. Thomas Thompson
Director, Licensing
Engineering and Design Services
NAC International
655 Engineering Drive
Norcross, GA 30092

SUBJECT: MODEL NO. NAC INTERNATIONAL STORAGE TRANSPORT CASK (NAC-STC) PACKAGE

Dear Mr. Thompson:

As requested by your application dated October 5, 2000, as supplemented, enclosed is Certificate of Compliance No. 9235, Revision No. 3, for the Model No. NAC-STC package. This certificate supersedes, in its entirety, Certificate of Compliance No. 9235, Revision No. 2, dated March 25, 1999. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The staff's Safety Evaluation Report is also enclosed.

The approval constitutes authority to use the package for shipment of radioactive material and for the package to be shipped in accordance with the provisions of 49 CFR 173.471.

If you have any questions regarding this certificate, please contact me or David Tiktinsky of my staff at (301) 415-8523.

Sincerely,

/RA/

E. William Brach, Director
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No.: 71-9235
TAC No. L23206

Enclosures:
1. Certificate of Compliance No. 9235, Rev. No. 3
2. Safety Evaluation Report

cc w/encl: R. Boyle, Department of Transportation
M. Wangler, Department of Energy

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(Original Signed by M. Wayne Hodges for:)

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NAME:	DTiktinsky		EZiegler		MDelligatti		WHodges		CMiller		EWBrach	
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SAFETY EVALUATION REPORT
Docket No. 71-9235
Model No. NAC-STC Package
Certificate of Compliance No. 9235
Revision No. 3

SUMMARY

By application dated October 5, 2000, as supplemented on June 7 and August 1, 2001, NAC International, requested an amendment to Certificate of Compliance No. 9235 for the Model No. NAC-STC Package. The applicant requested: a) the addition of an alternate fuel basket design with enlarged fuel tubes in the four corner locations of the canister basket; b) minor revisions to some of the engineering drawings; and c) changes to the references to the acceptance tests, maintenance and operating procedures. Based on the statements and representations in the application, the staff agrees that the changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Chapter 1 General Information

1.1 Drawings

NAC submitted revisions to some of the engineering drawings for the NAC-STC. The changes include the optional basket configuration with oversized fuel tubes in the four corner locations. Other changes include: a) minor variations in a few dimensions and tolerances to allow for proper fit-up during fabrication; b) revision of the epoxy enamel coating from the specific designation of Ameron PSX 738 engineered siloxane to the equivalent Ameron engineered siloxane or the Keeler and Long E-series epoxy enamel; and, c) addition and clarification of some weld symbols.

The staff agrees with the applicant's conclusion that the drawing changes do not impact the ability of the package to meet the requirements of 10 CFR Part 71.

Chapter 2.0 Structural Evaluation

The applicant added an option to allow an alternate fuel basket design with enlarged fuel tubes in the four corner locations of the canister basket to accommodate fuel assemblies with slight physical effects (e.g., twisted or bowed). The alternate basket is made by removing the boral sheet and stainless steel cover from each side of a standard fuel tube and expansion of the fuel tube and expansion of the fuel tube inside dimensions to fill the resulting extra space at the fuel cell location. The openings in the top and bottom weldments are also expanded appropriately to accommodate the expanded fuel tube dimensions. The effect of this change is minimal since no structural part of the basket is affected by the change.

Based on the review of the statements and representations in the application, the staff concludes that the structural design has been adequately described, and that the package meets the structural requirements of 10 CFR Part 71.

6.0 Criticality Evaluation

The criticality analysis of the NAC-STC has been revised to include an alternate fuel basket design with enlarged fuel tubes in the four corner locations of the basket to accommodate fuel assemblies with slight physical effects. The enlarged fuel tubes are made by removing the BORAL sheet and stainless steel cover from each side of a standard fuel tube and expanding the inside dimensions to fill the resulting space in the fuel tube opening. Using KENO V.a with the 27 group cross section library, as in the previous analysis, the applicant calculated k_{eff} for the STC canister with enlarged fuel tubes. The calculations used assumptions similar to those used in determining k_{eff} for the STC without enlarged fuel tubes.

The calculation model consisted of a fully flooded, two spacer-plate horizontal slice of the cask, containing 36 Yankee Class United Nuclear Type A fresh fuel assemblies. The horizontal slice consisted of a stainless steel spacer plate region, an aluminum heat transfer spacer plate region, and two water regions, stacked axially with the minimum distance between the plate regions. A periodic boundary was applied to the top and bottom of the model to make the cask infinite in length, and the four sides of the cuboid containing the cask slice were reflected to make an infinite array in the x-y plane. The most reactive mechanical configuration was previously determined to consist of the fuel tubes and assemblies moved toward the center of the basket, maximum fuel tube opening, minimum spacer disk opening, maximum spacer disk thickness, and closely packed spacer disk openings. The resulting maximum k_{eff} for the basket configuration with four enlarged fuel tubes was 0.9183, including bias and uncertainty, for the storage cask under hypothetical accident conditions. This is 0.0169 higher than the maximum k_{eff} for the previously approved basket configuration without enlarged fuel tubes.

The staff performed confirmatory calculations using assumptions similar to the applicant's. Using KENO V.a in the SCALE 4.4 CSAS25 sequence with the 44 group cross section library, the staff calculated a maximum k_{eff} of 0.9027 ± 0.0008 for the cask under hypothetical accident conditions. This value is in good agreement with the applicant's results before correcting for bias and uncertainty.

Based on the review of the statements and representations in the application, the staff concludes that the criticality design has been adequately described, and that the package meets the criticality requirements of 10 CFR Part 71.

Chapter 7.0 and 8.0 Operating Procedures, Acceptance Tests and Maintenance Program

As requested by the applicant, the Certificate of Compliance (CoC) has been revised to include references to Chapters 7 and 8 of the Safety Analysis Report. This change has been made to ensure that all required acceptance tests, operating procedures, and the maintenance program are incorporated into the CoC.

Based on the review of the statements and representations in the application, the staff concludes that the acceptance tests, operating procedures, and the maintenance program have been adequately described, and that the package meets the requirements of 10 CFR Part 71.

Conclusion

The Certificate of Compliance has been revised to: a) include the optional basket configuration; b) revise the engineering drawings; and c) incorporate references to Chapters 7 and 8 of the Safety Analysis Report (SAR). Additionally, item 6 in the CoC has been deleted because it is duplicative to the requirements in item 5.(b)(2) of the CoC. There are no impacts from these changes on any of the remaining sections of the SAR. The changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9235, Revision No. 3,
on August 8, 2001.