72-1015

NAC INTERNATIONAL

Atlanta Corporate Headquarters
655 Engineering Drive
Norcross, Georgia 30092
770-447-1144
Fax 770-447-1797
www.nacintl.com

September 26, 2000

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Attn: Document Control Desk

Subject: Comments on Preliminary Certificate of Compliance and Safety Evaluation Report for the NAC-UMS® Storage System Maine Yankee Amendment
Docket No. 72-1015 (TAC No. L22979)

References:
1. Submittal of NAC-UMS® Universal Storage System Safety Analysis Report, Revision 4, NAC International, August 2, 2000
2. Submittal of NAC-UMS® Universal Storage System Safety Analysis Report for Maine Yankee, Revision UMSS-00K, September 12, 2000
3. Preliminary Certificate of Compliance and Safety Evaluation Report for the NAC-UMS® Storage System Maine Yankee Amendment, U.S. NRC, September 21, 2000

As requested by the NRC in Reference 3, NAC International (NAC) herewith provides comments on the Preliminary Certificate of Compliance and Safety Evaluation Report for the NAC-UMS® Storage System Maine Yankee Amendment as Attachment 1.

If you have any comments or questions, please contact me or Jim Hobbs at (770) 447-1144.

Sincerely,

T. C. Thompson

Thomas C. Thompson
Director, Licensing
Engineering & Design Services

Attachments:
1. Comments on Preliminary CoC and SER
2. Technical Specification Changed Pages

cc:

M. Meisner	Maine Yankee
G. Zinke	Maine Yankee
P. Plante	Maine Yankee
E. Washer	SWEC

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ATTACHMENT 1

NAC COMMENTS ON THE PRELIMINARY CERTIFICATE OF COMPLIANCE AND SAFETY EVALUATION REPORT FOR THE NAC-UMS STORAGE CASK MAINE YANKEE AMENDMENT

DOCKET NO. 72-1015 (TAC NO. L22979)

NAC COMMENTS ON THE PRELIMINARY CERTIFICATE OF COMPLIANCE AND SAFETY EVALUATION REPORT FOR THE NAC-UMS STORAGE CASK MAINE YANKEE AMENDMENT, DOCKET NO. 72-1015 (TAC NO. L22979)

NAC requests that the following comments be considered for incorporation:

1. C of C, Page 1:

   - Block titled "Safety Analysis Report Title": add ", Revision 5" after "UMS Universal Storage System."

2. C of C, Page 2:

   - Second paragraph, next to last sentence reads: "The top of the VCC is closed by a shield plug, consisting of carbon steel plate (gamma shielding) and NS-4-FR (neutron shielding), and a carbon steel lid." NAC may use an alternative material for this application, depending on the commercial availability of the materials and equipment to prepare the neutron shielding.

     Therefore, NAC requests that the specific reference to NS-4-FR be deleted. Revise the sentence to read "The top of the VCC is closed by a shield plug, consisting of carbon steel plate (gamma shielding) and solid neutron shielding material, and a carbon steel lid."

3. TS, Page A1-5

   - Definition of FUEL DEBRIS: Add: "FUEL DEBRIS is stored in a MAINE YANKEE FUEL CAN." (Similar to the definition for CONSOLIDATED FUEL.)

4. TS, Page A1-6

   - Definition of MAINE YANKEE FUEL CAN: Add: "FUEL DEBRIS" after "DAMAGED FUEL". The definition should read: "A specially designed stainless steel screened can sized to hold INTACT FUEL, CONSOLIDATED FUEL, DAMAGED FUEL, or FUEL DEBRIS."

5. APPENDIX B, Page B2-4:

   - Item B 2.1.3, second paragraph, first sentence: The text reads, "...fuel assemblies with fuel rods that have been replaced by hollow Zircaloy rods." In the Maine Yankee inventory, hollow Zircaloy rods have only been used to replace burnable poison rods, not fuel rods.

     Change "fuel rods" to "burnable poison rods."

   - Item B 2.1.3, fifth paragraph, first sentence, first line: Add "assembly (CEA)" after "element", and in the second line, replace "control element" with "CEA."

6. APPENDIX B, Page B2-14:

   - Table B2-7, Item A.2: Change "Component" to "Element."

7. APPENDIX B, Page B2-15:

   - Table B2-7, Item 4. b), first sentence: Replace "or" with "and/or", and add "provided that the total number of fuel rods and burnable poison rods does not exceed 176" at the end of the sentence.

8. SER, Page 1, Summary:

   - Third paragraph, item (3): Add "no" before "known." The sentence should read "...or with <u>no</u> known or suspected fuel rod cladding defects greater than pinhole leaks or hairline cracks..."

9. SER, Page 2, Background Information:

   - Second paragraph, seventh sentence reads: "The top of the VCC is closed by a shield plug, consisting of carbon steel plate (gamma shielding) and NS-4-FR (neutron shielding), and a carbon steel lid." NAC may use an alternative material for this application, depending on the commercial availability of the materials and equipment to prepare the neutron shielding.

     Therefore, NAC requests that the specific reference to NS-4-FR be deleted. Revise the sentence to read "The top of the VCC is closed by a shield plug, consisting of carbon steel plate (gamma shielding) and solid neutron shielding material, and a carbon steel lid."

10. SER, Page 4:

- Section 1.2, item B.4.b), first sentence: Change "or" to "and/or", and add "provided that the total number of fuel rods and burnable poison rods does not exceed 176" at the end of the sentence.

11. SER, Page 9:

- Section 3.3, mid-paragraph: Revise the buckling capacity and DLF values to be consistent with the numbers in Section 11.2.15.1.5 of the SAR. The text with the revised numbers reads:

  "The SAR modeled the full length of the fuel rod to be laterally constrained at spacer grids, and uses the ANSYS code to obtain the buckling capacity of 39.0 g. By considering the 60-g design basis axial impact load as impulsive and short duration in nature, the SAR determined a DLF of 0.244 to result in an equivalent static load of 14.6 g (60 x 0.244 = 14.6 g). This load is smaller than the fuel rod buckling capacity of 39.0 g."

12. SER, Page 10:

- Section 3.5, second and third paragraphs: Change "damaged fuel can" to "Maine Yankee fuel can."

13. SER, Page 12:

- Section 4.1, items 4.1.2 and 4.1.4: As stated, it is not explicit that a control element assembly may be placed into an assembly with burnable poison rods replaced by hollow Zircaloy tubes. Maine Yankee intends to store control element assemblies in fuel assemblies with hollow Zircaloy tubes in order to optimize the loading plan.

  NAC requests that that the following sentence be added to 4.1.4: "This assembly configuration may also contain an inserted control element assembly."

14. SER, Page 15:

- Section 4.3, Item 4.1.7 states "Standard fuel with removed fuel rods (must be canned and located in the corner perimeter positions of the basket)." The fuel assemblies with fuel rods removed are not required to be canned, but are required to be loaded in corner positions of the basket.

  Delete "canned and". Revised sentence reads: "Standard fuel with removed fuel rods (must be located in the corner perimeter positions of the basket)."

15. SER, Page 18,

Section 5.0:

- First paragraph, second sentence: Change "OFA" to "Standard."
- First paragraph, fifth sentence: Change "licensee" to "applicant."

16. SER, Page 19:

- Section 5.0, First paragraph, third and fourth sentences: The two specified fuel assemblies containing stainless steel rods, R439 and R444, do not require placement on the periphery to satisfy the shielding evaluation. The requirement for peripheral loading is based on the high burnup of the assemblies.

  Replace the third and fourth sentences with: "Two of the assemblies evaluated, specifically R439 and R444, are high burnup assemblies and are thus required to be loaded only in the periphery of the TSC."

U.S. Nuclear Regulatory Commission
September 26, 2000

ATTACHMENT 2

TECHNICAL SPECIFICATION CHANGED PAGES

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HIGH BURNUP FUEL	A fuel assembly having a burnup between 45,000 and 50,000 MWD/MTU, which must be preferentially loaded in periphery positions of the basket. An intact HIGH BURNUP FUEL assembly in which no more than 1% of the fuel rods in the assembly have a peak cladding oxide thickness greater than 80 microns, and in which no more than 3% of the fuel rods in the assembly have a peak oxide layer thickness greater than 70 microns, as determined by measurement and statistical analysis, may be stored as INTACT FUEL. HIGH BURNUP FUEL assemblies not meeting the cladding oxide thickness criteria for INTACT FUEL or that have an oxide layer that has become detached or spalled from the cladding is stored as DAMAGED FUEL.
FUEL DEBRIS	An intact or a partial fuel rod or an individual intact or partial fuel pellet not contained in a fuel rod. Fuel debris is inserted into a 9 x 9 array of tubes in a lattice that has approximately the same dimensions as a standard fuel assembly. FUEL DEBRIS is stored in a MAINE YANKEE FUEL CAN.
CONSOLIDATED FUEL	A nonstandard fuel configuration in which the individual fuel rods from one or more fuel assemblies are placed in a single container or a lattice structure that is similar to a fuel assembly. CONSOLIDATED FUEL is stored in a MAINE YANKEE FUEL CAN.

(continued)

SITE SPECIFIC FUEL	Spent fuel configurations that are unique to a site or reactor due to the addition of other components or reconfiguration of the fuel assembly at the site. It includes fuel assemblies, which hold nonfuel-bearing components, such as control components or instrument and plug thimbles, or which are modified as required by expediency in reactor operations, research and development or testing. Modification may consist of individual fuel rod removal, fuel rod replacement of similar or dissimilar material or enrichment, the installation, removal or replacement of burnable poison rods, or containerizing damaged fuel. Site specific fuel includes irradiated fuel assemblies designed with variable enrichments and/or axial blankets, fuel that is consolidated and fuel that exceeds design basis fuel parameters.
MAINE YANKEE FUEL CAN	A specially designed stainless steel screened can sized to hold INTACT FUEL, CONSOLIDATED FUEL, DAMAGED FUEL or FUEL DEBRIS. The screens preclude the release of gross particulate from the can into the canister cavity. The MAINE YANKEE FUEL CAN may be loaded only in a Class 1 canister.

Table A3-1 [deleted]

B 2.1.3 Maine Yankee SITE SPECIFIC FUEL Preferential Loading

The estimated Maine Yankee SITE SPECIFIC FUEL inventory is shown in Table B2-6. As shown in this table, certain of the Maine Yankee fuel configurations must be preferentially loaded in specific basket fuel tube positions.

Corner positions are used for CONSOLIDATED FUEL, certain HIGH BURNUP FUEL and DAMAGED FUEL or FUEL DEBRIS loaded in a MAINE YANKEE FUEL CAN, for fuel assemblies with missing fuel rods or fuel assemblies with burnable poison rods that have been replaced by hollow Zircaloy rods. Designation for placement in corner positions results primarily from shielding or criticality evaluations of these fuel configurations. CONSOLIDATED FUEL is conservatively designated for a corner position, even though analysis shows that these lattices could be loaded in any basket position. Corner positions are positions 3, 6, 19, and 22 in Figure B2-1.

Preferential loading is also used for HIGH BURNUP fuel not loaded in the MAINE YANKEE FUEL CAN. This fuel is assigned to peripheral locations, positions 1, 2, 3, 6, 7, 12, 13, 18, 19, 22, 23, and 24 in Figure B2-1. The interior locations must be loaded with fuel that has lower burnup and/or longer cool times to maintain the design basis heat load and component temperature limits for the basket and canister, and the spent fuel short-term temperature limits, as described in Section B 2.1.2.

One of the three loading patterns (Standard, 1.05 kW (periphery), or 0.958 kW (periphery)) shown in Table B2-8 must be used to load each canister. Once selected, all of the spent fuel in that canister must be loaded in accordance with that pattern. Within a pattern, mixing of enrichment and cool time is allowed, but no mixing of loading patterns is permitted. For example, choosing a Perf (1.05) pattern restricts the interior fuel to the cool times shown in the Perf (1.05i) column, and the peripherial fuel to the cool times shown in the Perf (1.05p) column.

Fuel assemblies with a control element assembly (CEA) inserted will be loaded in a Class 2 canister and basket due to the increased length of the assembly with the CEA installed. However, these assemblies are not restricted as to loading position within the basket.

The Transportable Storage Canister loading procedures indicates that loading of a fuel configuration with removed fuel or poison rods, CONSOLIDATED FUEL, or a MAINE YANKEE FUEL CAN with HIGH BURNUP FUEL, DAMAGED FUEL or FUEL DEBRIS, or HIGH BURNUP FUEL, is administratively controlled in accordance with Section B 2.1.

B 2.2 [deleted]

Table B2-7 Maine Yankee Site Specific Fuel Limits

A. Allowable Contents
1. Combustion Engineering 14 x 14 PWR INTACT FUEL ASSEMBLIES meeting the specifications presented in Tables B2-1, B2-2 and B2-4.
2. PWR INTACT FUEL ASSEMBLIES may contain inserted Control Element Assemblies (CEA) or inserted In-Core Instrument (ICI) Thimbles.
3. PWR INTACT FUEL ASSEMBLIES with fuel rods replaced with stainless steel or Zircaloy rods or with Uranium oxide rods nominally enriched up to 1.95 wt %.
4. PWR INTACT FUEL ASSEMBLIES with fuel rods having variable enrichments with a maximum fuel rod enrichment up to 4.21 wt % ^{235}U and that also have a maximum planar average enrichment up to 3.99 wt % ^{235}U.
5. PWR INTACT FUEL ASSEMBLIES with annular axial end blankets. The axial end blanket enrichment may be up to 2.6 wt % ^{235}U.
6. PWR INTACT FUEL ASSEMBLIES with solid filler rods or burnable poison rods occupying up to 16 of 176 fuel rod positions.
7. PWR INTACT FUEL ASSEMBLIES with one or more grid spacers missing or damaged such that the unsupported length of the fuel rods does not exceed 60 inches. End fitting damage including damaged or missing hold-down springs is allowed, as long as the assembly can be handled safely by normal means.

B. Allowable Contents requiring preferential loading based on shielding, criticality or thermal constraints. The preferential loading requirement for these fuel configurations is described in Table B2-6.
1. PWR INTACT FUEL ASSEMBLIES with up to 176 fuel rods missing from the fuel assembly lattice.
2. PWR INTACT FUEL ASSEMBLIES with a burnup between 45,000 and 50,000 MWD/MTU.
3. PWR INTACT FUEL ASSEMBLIES with a burnable poison rod replaced by a hollow Zircaloy rod.

Table B2-7 Maine Yankee Site Specific Fuel Limits (continued)

4. FUEL enclosed in a MAINE YANKEE FUEL CAN. The allowable contents of the MAINE YANKEE FUEL CAN are:

   a) A PWR INTACT FUEL ASSEMBLY.
   b) PWR fuel assemblies with up to two INTACT and/or DAMAGED FUEL rods inserted in each fuel assembly guide tube or with up to two burnable poison rods inserted in each guide tube provided that the total number of fuel rods and burnable poison rods does not exceed 176. The rods inserted in the guide tubes can not be from a different fuel assembly. The maximum number of rods in the fuel assembly (fuel rods plus inserted rods, including burnable poison rods) is 176.
   c) A DAMAGED FUEL ASSEMBLY with up to 100% of the fuel rods classified as damaged and/or damaged or missing assembly hardware components.
   d) Individual INTACT or DAMAGED FUEL rods in a rod type structure, which may be a guide tube, to maintain configuration control.
   e) FUEL DEBRIS consisting of fuel rods with exposed fuel pellets or individual intact or partial fuel pellets not contained in fuel rods.
   f) CONSOLIDATED FUEL lattice structure with a 17 x 17 array formed by grids and top and bottom end fittings connected by four solid stainless steel rods. Maximum contents:
      - Up to 289 fuel rods
      - Lattice weight ≤ 2,100 pounds
   g) HIGH BURNUP FUEL (45,000 to 50,000 MWD/MTU)

C. The MAINE YANKEE FUEL CAN may be loaded only in a Class 1 CANISTER.

D. Unenriched fuel assemblies are not authorized for loading.

E. A canister preferentially loaded in accordance with Table B2-8 may only contain fuel assemblies selected from the same loading pattern.