Enclosure: (1) NAVAL REACTORS RESPONSE TO NRC REQUESTS FOR ADDITIONAL INFORMATION
(2) SAFETY ANALYSIS REPORT FOR PACKAGING FOR THE TRANSPORT OF ASNPP SPARE MODULES IN THE MODEL 235R001 GROUP 11 NEW FUEL SHIPPING AND STORAGE CONTAINER - CHAPTER 1.0; PAGES 1.12-1.14
(3) A1G/A4W REACTOR CELL SHIPPING CONTAINER REQUEST FOR AEC CERTIFICATION (A1G 25-181 DATED APRIL 9, 1971), ENCLOSURES (1) AND (2)

Copy to (with enclosure (1) only):
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71-6386

Department of Energy
Washington, DC 20585

NR:RR:DTKawakami G#C09-01056
February 2, 2009

CONFIDENTIAL - Unclassified upon removal of enclosures (2) and (3)

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ADDITION OF S9G FUEL AS AUTHORIZED CONTENTS IN THE 235R001 CONTAINER; FORWARDING OF

The 235R001 new fuel shipping container is used to transfer new fuel cell assemblies to servicing facilities. In letter G#07-02462 dated December 18, 2007, Naval Reactors requested an amendment to Certificate of Compliance No. 6386 for the 235R001 package to authorize transport of S9G fuel and to modify the Criticality Safety Index for A1G fuel. In response to the request, the Nuclear Regulatory Commission (NRC) requested additional information in a letter dated November 20, 2008. Specifically, the NRC asked for clarification of the allowable stress/strain limits for normal conditions of transport and for references and supporting calculations demonstrating the lifting and tie-down standards for the package are satisfied.

This letter provides responses to the NRC request. If you have any questions, please call me at (202)781-6166.

BKMiles

B. K. Miles
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NMSS01

Enclosure (1)

NAVAL REACTORS RESPONSE TO NRC REQUESTS FOR ADDITIONAL INFORMATION

Enclosure (1) to
Ser 08G#C09-01056

Response to NRC Request for Additional Information
Model No. 235R001 Package
Docket No. 71-6386
Certificate of Compliance No 6386

The Nuclear Regulatory Commission, in responding to a Department of Energy request for amendment to Certificate of Compliance No. 6386, requested additional information necessary for the review of the DOE application. The requested information is documented below together with the Naval Reactors response.

SARP Chapter 2.0 - Structural Evaluation

NRC Comment 2-1: Clarify the allowable stress strain limits as described for Normal Conditions of Transport (NCOT).

In Section 2.1.2.1 of the application, "Allowable Stress/Strain Limits," the text states that for closed form calculations as well as finite element analysis (FEA), the primary membrane and primary membrane plus bending stress intensity and stresses calculated via FEA are limited to the yield stress of the material. However, Appendix 2.10.1, pp. 2.10.1.1, states, "This reaction load results in some localized yielding..." A range of plastic strains are then described. Given that the acceptance criteria only allow for elastic stresses, the staff is unclear as to why Appendix 2.10.1 deviates from and provides alternate acceptance criteria for Normal Conditions of Transport.

This information is needed to determine compliance with 10 CFR 71.71(c)(7).

Naval Reactors Response to Comment 2-1

Chapter 2.0, Section 2.1.2.1, first paragraph states; "Unless otherwise stated, the following acceptance criterion is used for all structural evaluations presented in this SARP."

The NCOT acceptance criteria listed after the first paragraph reflects acceptance criteria for NCOT analyses where the material's yield stress is not exceeded. In the single instance where the yield stress is exceeded, elastic-plastic analysis methods are applied to determine the extent of material

deformation and that the deformation is acceptable for NCOT. For the instance cited in Appendix 2.10.1, the detailed analysis for the NCOT 3 foot free drop is provided in Section 7.6 (pages 2.10.1.51 to 2.10.1.57). Figures 2.10.1-13 to 2.10.1-17 are strain plots illustrating the local areas of the fuel cell assembly above yield are small relative to the entire structure. Also, these areas are remote from any fuel bearing region. The basis for acceptance, given in this Appendix and Chapter 2.0, Section 2.6.8, is the deformation is local and in non fuel bearing areas, fuel cladding integrity is maintained, and the container remains intact.

The stress-strain curve for the cladding material is developed in SARP Appendix 2.10.3, Section 1.3 (i.e., see Table 2.10.3-5 true strain value for the ultimate true stress at 200°F) and is derived using a multi-linear stress-strain material model. This curve is used in the Appendix 2.10.1, as cited in Section 2.0, last paragraph (i.e., "There are no areas where the plastic strain exceeds the maximum allowable of 9.0%"), and Section 7.6, third paragraph (i.e., "There are no areas of the finite element mesh where plastic strain exceeds the maximum allowable of 9.0%"). Localized yielding occurs, but failure does not occur because the plastic strain does not exceed the true strain limit defined in Table 2.10.3-5.

NRC Comment 2-2: Provide relevant references which describe the lifting and tie-down devices used, as well as supporting calculations that demonstrate that the lifting and tie-down standards for the package are satisfied, or clarify why they are not subject to the requirements of 10 CFR 71.45.

The applicant points to external references for lifting and tie-down devices and systems, as well as an external reference which evaluates compliance. These [excerpted] references have not been provided.

This information is needed to determine compliance with 10 CFR 71.45.

Naval Reactors Response to Comment 2-2

The locations for the tie-downs are the same for all 235R001 containers. For compliance with 10CFR71.45, the S9G 235R001 SARP analysis references the ASNPP (Advanced Submarine Nuclear Propulsion Plant) Spare Modules in the 235R001 (Group 11) container SARP (i.e., S9G SARP, Chapter 2.0, Section 2.5). The ASNPP SARP, Sections 1.4.3 and 1.4.4 (Enclosure 2 of this letter), show compliance with lifting and tie-down standards by comparison of the ASNPP package weight (i.e., 9,912 pounds) with an A1G/A4W package weight of 11,870 pounds. The S9G 235R001 package weight (11,595 pounds) is also less than the A1G/A4W package weight used in the ASNPP SARP evaluation. Therefore, the ASNPP package lifting and tie-down evaluation is judged to be sufficient for showing the adequacy of the S9G 235R001 package in meeting 10CFR71.45 lifting and tie-down standards. Note that A1G/A4W and ASNPP SARP evaluations show compliance with the then current version of 10CFR71, Sections 71.31c and 71.31d for lifting and tie-down devices, respectively, and the original A1G SARP evaluation showed compliance with AEC Manual, Chapter 0529 (dated February 15, 1969), Sections II.A.3(a) through (d), and II.A.4 (a) through (c). The lifting and tie-down requirements contained in these earlier regulatory documents are consistent with current 10CFR71, Section 71.45 requirements referenced by the request for additional information. Also, the A1G shipment in the Model 235R001 container is currently certified. Compliance with current 10CFR71 lifting and tie-down requirements is documented in the A1G/A4W SARP (Enclosure 3 of this letter) and shows acceptable results for a maximum package weight of 12,421 pounds.

For clarifying the basis of the S9G SARP lifting and tie-down evaluation, the S9G SARP, Chapter 2.0, Reference 2.10.6 will be revised to a direct reference to the A1G/A4W SARP for the lifting and tie-down evaluation (i.e., without referencing the ASNPP SARP).