May 11, 2001

Glen E. Mowbray
Director of Regulatory Affairs
Naval Nuclear Propulsion Program
Naval Sea Systems Command, Code 08 U
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

SUBJECT: DRAFT SAFETY EVALUATION REPORT FOR THE NAVAL NUCLEAR PROPULSION PROGRAM ADDENDUM TO THE DISPOSAL CRITICALITY ANALYSIS METHODOLOGY TOPICAL REPORT

Dear Mr. Mowbray:

By letter dated October 29, 1999, the Department of the Navy (DON) requested that the U.S. Nuclear Regulatory Commission (NRC) review the Naval Nuclear Propulsion Program (NNPP) Addendum to the Disposal Criticality Analysis Methodology Topical Report, Addendum to YMP/TR-004Q, Revision 0. The NRC staff has completed its review and has prepared the enclosed draft safety evaluation report (SER) documenting the results of the staff evaluation of the Addendum.

The scope of this draft SER is based on the eleven specific items for which the NNPP requested NRC acceptance. Subsequent meetings between the NRC, the NNPP, and the U.S. Department of Energy (DOE) resulted in revisions to three of the eleven items, which were documented in a letter from the NNPP to the NRC dated December 7, 1999. Further, the scope of the draft SER considered the NNPP's December 1, 2000, responses to the NRC's May 9, 2000, request for additional information.

The draft SER documents the results of the staff evaluation of the proposed methodology and its partial implementation, which is embodied in the eleven items for acceptance, in terms of Acceptance, Acceptance with Conditions, and Open Items. The staff accepted specific areas of the methodology and its partial implementation for which the staff agreed with the NNPP proposal and the NNPP provided an adequate basis for the staff to make a determination. The Acceptance Conditions are identified for those specific areas for which the staff finds the NNPP proposal acceptable but are subject to conditions such as resolution of closed pending agreements with DOE, clarification of commitments made by the NNPP, or the NNPP providing additional justification for calculations or assumptions in the Addendum. The Open Items are identified for those specific areas for which the staff does not agree with the NNPP proposal or where the NNPP did not provide an adequate basis for the staff to make a determination. A summary of the number of Open Items and Acceptance Conditions along with a brief description of each item for acceptance is provided in the table below.

The first item for acceptance involves the criticality limit acceptance criterion. NRC accepted this item for acceptance as the criticality limit acceptance criterion chosen by the NNPP has

been accepted in existing NRC guidance. The NRC has identified a total of 109 Open Items and 32 Acceptance Conditions for the remaining ten items for acceptance. NRC acceptance of these ten items for acceptance is dependent on NNPP addressing the Open Items and Acceptance Conditions.

NNPP Item for Acceptance #	Description	NRC Open Items	NRC Acceptance Conditions
1	Criticality Limit Acceptance Criterion	0	0
2	Methodology Acceptance Criterion (includes material related acceptance conditions)	0	12
1-2	**Acceptance Criterion Items for Acceptance Subtotal**	**0**	**12**
3	Identification of FEPs	2	0
4	Evaluation of FEPs	26	11
5	Inclusion or Exclusion of FEPs	4	2
3,4,and/or 5	Related to Multiple FEPs' Items for Acceptance	61	5
3-5	**FEPs Items for Acceptance Subtotal**	**93**	**18**
6	Depletion Modeling	4	1
7	Principal Isotope List	1	1
8	Biases and Uncertainties	3	0
9	Reactivity Codes and Cross Section Data	2	0
10	Trending Parameters	1	0
11	Benchmarks Used for Validation	5	0
6-11	**Neutronic Items for Acceptance Subtotal**	**16**	**2**
1-11	**Total Open Items and Acceptance Conditions**	**109**	**32**

The NRC identified twelve acceptance conditions for the second item for acceptance that involves the methodology acceptance criterion. Ten of these acceptance conditions involved the modeling of the degradation and mechanical disruption of naval fuel materials. These acceptance conditions are critical as the NNPP criticality methodology is dependent on NNPP demonstrating that naval fuel will experience negligible degradation and mechanical disruption for the regulatory period and the period of geological stability.

Ninety-three open items and eighteen acceptance conditions were identified for the third through fifth items for acceptance that involve the identification, evaluation, and the inclusion or exclusion of features events and processes (FEPs) that may increase the reactivity of naval fuel in the repository. The Addendum and thus the NRC evaluation do not always make a clear distinction among the three items for acceptance regarding supporting data and analyses. The

large number of open items and acceptance conditions is due partially to evaluating the three items for acceptance for each of the 34 FEPs and the fact that much of the methodology is dependent on preliminary or incomplete data.

Sixteen open items and two acceptance conditions were identified for the sixth through eleventh items for acceptance that involve the neutronic modeling of naval fuel. The open items deal mainly with demonstrating that the biases, developed using naval ship cores, bound the isotopic and burnup profile biases that can be ascertained from measurements included in the Data Book that was submitted to the NRC as part of the RAI.

In accordance with the topical report review plan, we will be scheduling a meeting to go over the draft SER. As the draft SER contains classified information, the meeting on the draft SER will not be open to the public and distribution of the draft SER will be limited to you and Dr. Brocoum at the Office of Civilian Radioactive Waste Management (OCRWM).

Sincerely,

/RA/

C. William Reamer, Chief
High-Level Waste and Performance
Assessment Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: Draft Safety Evaluation Report for the Naval Nuclear Propulsion Program
Addendum to the Disposal Criticality Analysis Methodology Topical Report

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S. Brocoum, OCRWM

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Letter to G. Mowbray from C.W. Reamer dated: May 11, 2001

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Assessment Branch
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S. Brocoum, OCRWM

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