

May 9, 2002

John M. McKenzie  
Acting Director of Regulatory Affairs  
Naval Nuclear Propulsion Program  
Naval Sea Systems Command, Code 08 U  
1333 Isaac Hull Avenue, SE  
Washington Navy Yard, D.C. 20376

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

Dear Mr. McKenzie:

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 safety evaluation report (SER) documenting the results of the staff evaluation of the Addendum.

The scope of this 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 revisions to three items for acceptance are documented in a supplement to the Addendum, and transmitted in a letter from the NNPP to the NRC dated January 8, 2002. The NNPP further modified the second item for acceptance in a letter dated April 26, 2002. This letter also documents changes made by the NNPP in response to statements in the draft SER, Rev. 1 that was issued on March 8, 2002. The scope of the SER also considered the NNPP's December 1, 2000, responses to the NRC's May 9, 2000, request for additional information (RAI), the supplement to the Addendum identified above, and the information attached to the April 26, 2002 letter. The identified documents address most of the concerns identified in revisions 0 and 1 of the draft SER.

The SER documents the staff acceptance of the overall methodology except where identified as incomplete for the two open items and as clarified in the four acceptance conditions. The two open items identify technical areas where the methodology is incomplete. The acceptance conditions primarily clarify the information needed by the NRC or identify limitations for the methodology the NRC was asked to accept. An important part of the basis for the NRC acceptance of the methodology is the commitments made in features, events, and processes

(FEP) paper 11 of the supplement to the Addendum. In FEP paper 11, the NNPP agreed to provide the necessary data, analyses, and methods development needed to have a complete disposal criticality analysis methodology for naval spent nuclear fuel. The commitments allowed the NRC to minimize the number of open items and acceptance conditions in the SER. As more repository information becomes available, updating the commitments to capture resolved issues with repository performance and design would increase confidence in the application of the NNPP methodology.

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.

NNPP Item for Acceptance #	Description	NRC Open Items	NRC Acceptance Conditions
1	Criticality Limit Acceptance Criterion	0	0
2	Need for a Criticality Consequence Analysis (includes the evaluation of material performance)	0	2*
<b>1-2</b>	<b>General Items for Acceptance Subtotal</b>	<b>0</b>	<b>2*</b>
3	Identification of FEPs	0	0
4	Evaluation of FEPs	1	0
5	Inclusion or Exclusion of FEPs	0	1
4, and/or 5	Related to Multiple FEPs' Items for Acceptance	1	2*
<b>3-5</b>	<b>FEPs Items for Acceptance Subtotal</b>	<b>2</b>	<b>3*</b>
6	Depletion Modeling	0	0
7	Principal Isotope List	0	0
8	Biases and Uncertainties	0	0
9	Reactivity Codes and Cross Section Data	0	0
10	Trending Parameters	0	0
11	Benchmarks Used for Validation	0	0
<b>6-11</b>	<b>Neutronic Items for Acceptance Subtotal</b>	<b>0</b>	<b>0</b>
<b>1-11</b>	<b>Total Open Items and Acceptance Conditions</b>	<b>2</b>	<b>4**</b>

\* One acceptance condition for Item for Acceptance 2 also applies to Items for Acceptance 4 and 5.

\*\* Because of the common acceptance condition listed under the subtotals for Items for acceptance 1-2 and 3-5, there are only 4 total acceptance conditions.

As can be seen from the table, the NRC accepted items 1, 3, and 6-11 with no open items or acceptance conditions. Two acceptance conditions were identified for the second item for acceptance. These two acceptance conditions applied to the overall applicability of the methodology, including the need for a criticality consequence analysis. No acceptance conditions were identified for the NNPP methodology to determine the performance of naval fuel in the repository, the other part of item for acceptance two.

Two open items and three acceptance conditions were identified for the third through fifth items for acceptance that involve the identification, evaluation, and the inclusion or exclusion of FEPs that may increase the reactivity of naval fuel in the repository. One of the three acceptance conditions includes an acceptance condition identified for the second item for acceptance. The two open items deal with the methodology to determine the likelihood of criticality in the repository and the approach for evaluating igneous events. The acceptance conditions address the status of the FEPs approaches and conclusions. The FEPs approaches and conclusions were developed using preliminary information and were augmented with significant commitments to provide additional data, analyses, and methods development. The acceptance conditions account for the possibility that as new information is developed by the NNPP and the Office of Civilian Radioactive Waste Management (OCRWM), the approaches and conclusions may require modification.

No open items or acceptance conditions were identified for the sixth through eleventh items for acceptance that involve the neutronic modeling of naval fuel. This was done in part through identifying FEP paper 11 commitments that directly linked discussion in the SER. Acceptance of the NNPP neutronic methodology will be confirmed through the review of the core-specific analyses.

As agreed to by the NNPP at the April 22, 2002, meeting, the NNPP needs to provide a final FEP paper 11 that links the relevant commitments to discussions in the SER. This final FEP paper 11 will serve as a baseline for tracking the NNPP and OCRWM fulfillment of commitments associated with the NNPP Addendum to the Disposal Criticality Analysis Methodology Topical Report. As the SER contains classified information, interactions between the NNPP, the OCRWM, and the NRC involving the SER are not open to the public and the SER cannot be publicly released.

Sincerely,  
/RA/

Janet R. Schlueter, Chief  
High-Level Waste Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

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

cc: See attached distribution list, w/o enclosure

Letter to J.M. McKenzie from J.R. Schlueter dated: May 9, 2002

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Janet R. Schlueter, Chief  
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Enclosure: Draft Safety Evaluation Report for the Naval Nuclear Propulsion Program Addendum to the Disposal Criticality Analysis Methodology Topical Report, Rev. 1

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\*see previous concurrence

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