February 27, 1997

Mr. Ian C. Rickard, Director
Operations Licensing
ABB Combustion Engineering Nuclear Operations
Post Office Box 500
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING CENPD-289-P

Dear Mr. Rickard:

ABB Combustion Engineering (ABB-CE) letter LD-93-142, dated September 30, 1993, submitted CENPD-289-P, "Use of Inert Replacement Rods in ABB CENF Fuel Assemblies" for staff review. Enclosed is a request for additional information on the submittal. The request identifies items of concern which must be resolved for the staff to complete its review.

You requested that the submittal be exempt from mandatory public disclosure. While the staff has not completed its review of your request in accordance with the requirements of 10 CFR 2.790, your submittal is being withheld from public disclosure pending the staff's final determination.

If you have any questions regarding this matter, you can contact me at (301) 415-3139.

Sincerely,

Original Signed By:

Stewart L. Magruder, Project Manager
Generic Issues and Environmental
Projects Branch
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Enclosure: As stated

cc w/encl: See next page

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

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Final Questions on CENPD-289-P,
"Use of Inert Replacement Rods in ABB CENF Fuel Assemblies"

1. What is the maximum number of inert replacement rods, including burnable poison rods, that ABB CENF proposes to use in a fuel assembly? What is the maximum number of inert replacement rods adjacent to a subchannel? What is the maximum number of rods adjacent to a single guide tube and in a row on the assembly periphery? What is the maximum number of inert rods per reactor quadrant? What is the maximum number of inert replacement rods that can be placed in the reactor core? Please justify these numbers based on the applicability of the CHF correlation, DNBR, local power peaking, and assembly lift-off analysis.

2. There are no CHF data presented that demonstrate that the CE-1 CHF correlation is applicable when the inert replacement rods are outside of the Class "A" criteria. How does ABB CENF plan to ascertain the applicability of their thermal margin calculation methodology to reconstructed fuel assemblies that do not meet the Class "A" criteria? For example, what are the limitations of the CHF correlation in relation to cold wall effects and changes in power, enthalpy and flow distributions due to inert replacement rods that are outside of the Class "A" criteria based on CHF data or analyses? Also, what criteria will be used to determine applicability of the CE-1 correlation when replacement rods are outside of the Class "A" criteria?

   In addition, on p. 43 of the topical report, the claim is made that the error in the CE-1 CHF correlation, in which it overpredicts critical heat flux for the special CHF test bundle, counterbalances the effect on CHF of the increased power that would occur in the adjacent rods in an actual reconstituted fuel bundle. This raises the following question:

   > How can these two variables, which are due to different factors affecting the thermal behavior of the bundle and the correlation's performance, be assumed to be directly proportional to each other?

   No CHF tests have been performed with both inert rods and the additional radial peaking to demonstrate this direct proportionality for configuration outside of the Class "A" criteria. Of particular concern are those reconstituted assembly configurations outside of the Class "A" criteria with large power increases in the adjacent rods. Please address this question and concern for assembly configurations outside of the Class "A" criteria.

3. What explicit analyses will be performed for reconstituted fuel assembly configurations that do not meet Class "A" criteria? Please provide examples for configurations 8 and 9.

Enclosure

4. Because very little information is provided on the impact of the seismic/LOCA events, please provide the following information:

   a) Please discuss the impact of using the maximum number of inert rods on a reconstituted assembly and resulting rod forces due to seismic/LOCA events.

   b) Please compare assembly and rod forces from a reconstituted assembly to those from a normal assembly due to the changes in assembly stiffness, frequency, weights, and spacer grid strength and stiffness of the reconstituted assembly.

5. Please provide analyses that quantify the following two effects of the use of reconstituted assemblies on the peak cladding temperatures (PCTs) for small and large break LOCAs.

   a) The possible increase in PCT due to the placement of a reconstituted fuel assembly (with the maximum number of inert replacement rods and the maximum effect) next to the hot assembly for which PCT is calculated. These analyses should include changes in water density and cross flow due to the presence of the reconstituted fuel assembly.

   b) The increase in PCT due to an increase in the average linear heat generation rate of the remaining fuel rods in the core due to the presence of the maximum possible number of inert replacement rods in the reactor core.

ABB Combustion Engineering, Inc.

cc: Mr. Charles B. Brinkman, Director
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