



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555 0001

March 1, 1994

Docket No. 52-004

Mr. Patrick W. Marriott, Manager  
Licensing & Consulting Services  
GE Nuclear Energy  
175 Curtner Avenue  
San Jose, California 95125

Dear Mr. Marriott:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING THE SIMPLIFIED  
BOILING WATER REACTOR (SBWR) DESIGN (Q950.35-Q950.43)

The staff has determined that it needs additional information to support its review activities related to the SBWR design certification. Some additional information on the SBWR plant, geysering tests, and the Dodewaard plant startup is needed (Q950.35-Q950.43)\* for our efforts to modify the RAMONA code for the staff's SBWR stability analysis and audit of GE's submittals. So that we may maintain progress on these efforts, we would appreciate a written response to the questions Q950.35-Q950.41 and Q950.43 by March 15, 1994. Please provide a written response to Q950.42 by September 30, 1994.

You have previously requested that portions of the information submitted in the August 1992, application for design certification of the SBWR plant, as supplemented in February 1993, be exempt from mandatory public disclosure. The staff has not completed its review of your request in accordance with the requirements of 10 CFR 2.790; therefore, that portion of the submitted information is being withheld from public disclosure pending the staff's final determination. The staff concludes that this RAI does not contain those portions of the information for which you are seeking exemption. However, the staff will withhold this letter from public disclosure for 30 calendar days from the date of this letter to allow GE the opportunity to verify the staff's conclusions. If, after that time, you do not request that all or portions of the information in the enclosure be withheld from public disclosure in accordance with 10 CFR 2.790, this letter will be placed in the NRC's Public Document Room.

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\*The numbers in parentheses designate the tracking numbers assigned to the questions.

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Mr. Patrick W. Marriott

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This RAI affects nine or fewer respondents, and therefore is not subject to review by the Office of Management and Budget under P.L. 96-511.

Please contact me at (301) 504-1178 or Mr. Frederick Hasselberg at (301) 504-1141 if you have any other questions regarding this matter.

Sincerely,

(Original signed by)

Melinda Malloy, Project Manager  
Standardization Project Directorate  
Associate Directorate for Advanced Reactors  
and License Renewal  
Office of Nuclear Reactor Regulation

Enclosure:  
RAI on the SBWR Design

cc w/enclosure:  
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Mr. Patrick W. Marriott  
GE Nuclear Energy

Docket No. 52-004

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REQUEST FOR ADDITIONAL INFORMATION (RAI) ON THE  
SIMPLIFIED BOILING WATER REACTOR (SBWR) DESIGN

RAMONA-4B Input Deck Preparation

- 950.35      What is the estimated heat loss from different sections of the reactor pressure vessel (RPV) surface to the surrounding atmosphere of the containment space? What is the expected air temperature at the vicinity of the RPV surface?
- 950.36      Provide geometrical and operational descriptions for the steam separators as follows:
- a.   Number of separators
  - b.   Surface area and height
  - c.   Total steel mass of components
- 950.37      Supplement the response to Q950.14 (transmitted in GE letter MFN No. 167-93 dated October 19, 1993) regarding the feedwater pump by providing the following information:
- a.   Steam line loss coefficients at line entrance, main steam isolation valve, and turbine stop valve
  - b.   Turbine valve closure rate
- 950.38      Supplement the response to Q950.13 (transmitted in GE letter MFN No. 167-93 dated October 19, 1993) regarding core flow-dependent loss coefficients by providing the exact locations and corresponding loss coefficients of the spacers in the rod bundles.
- 950.39      Provide the weight of the steam dryer assembly.
- 950.40      Supplement the response to Q950.14 (transmitted in GE letter MFN No. 167-93 dated October 19, 1993) regarding the feedwater pump by providing the following additional information:
- a.   Feedwater pump head
  - b.   Booster pump head
  - c.   Total liquid volume of the condenser
  - d.   Total volume of the condenser
  - e.   Rated feedwater pump speed
  - f.   Fraction of extraction steam to feedwater heaters

Enclosure

- g. Feedwater pump inertia
- h. Rated and maximum flow capacity of feedwater pump
- i. Total number of feedwater heaters
- j. Delay time for feedwater pump trip
- k. Delay time for feedwater heater failure

#### RAMONA-4B Assessment

- 950.41 To supplement the information provided in NEDO-32246, "Geysering Instability Study for the SBWR," transmitted by GE letter MFN No. 155-93 dated September 30, 1993, provide the following information for the geysering tests performed by the Tokyo Institute of Technology:
- a. Loop dimensions and loss coefficients
  - b. Test data in tabular form
  - c. Discussion of uncertainty in the data
  - d. TRACG manual describing the input deck construction and user guidance
  - e. TRACG input deck, including nodalization diagram and calculational sheets
- 950.42 To supplement the information provided in NEDO-32246, "Geysering Instability Study for the SBWR," transmitted by GE letter MFN No. 155-93 dated September 30, 1993, provide the following information for the Dodewaard plant startup:
- a. Plant dimensions and loss coefficients
  - b. Core kinetics parameters (cross sections and rod worths)
  - c. Initial conditions
  - d. Startup procedure
  - e. TRACG input deck, including nodalization diagram and calculational sheets
- 950.43 In order to generate a complete set of SBWR core cross sections and their associated void and moderator temperature feedback coefficients, the staff needs GE to supplement the responses to Q440.1-Q440.5 (transmitted in GE letter MFN No. 174-93 dated October 25, 1993) relating to neutronics data.

- a. For the void feedback, GE did not provide the perturbed cases at the history-dependent void fraction of 0.0 and 0.7 for all five fuel types. For the moderator temperature feedback, the perturbed cases were improperly generated (both the fuel and moderator temperatures were perturbed at the same time).

Run each of the following 10 cases as a function of exposure (0.0 to 55 GWD/T) for all five fuel types. (Cases 1-8 are for the void feedback as a function of void history. Cases 9 and 10 are for the moderator temperature feedback at an average instantaneous void of 40 percent and an average history-dependent void of 40 percent.)

Case	$\alpha_i/\alpha_h$	$T_f/T_{f,r}$ (° C)	$T_m/T_{m,r}$ (° C)	Control Rod
1	0.4/0.0	532/532	286/286	Out
2	0.4/0.0	532/532	286/286	In
3	0.7/0.0	532/532	286/286	Out
4	0.7/0.0	532/532	286/286	In
5	0.0/0.7	532/532	286/286	Out
6	0.0/0.7	532/532	286/286	In
7	0.4/0.7	532/532	286/286	Out
8	0.4/0.7	532/532	286/286	In
9	0.4/0.4	532/532	160/286	Out
10	0.4/0.4	532/532	160/286	In

$\alpha_i$  = instantaneous void fraction  
 $\alpha_h$  = history-dependent void fraction  
 $T_f$  = perturbed fuel temperature  
 $T_{f,r}$  = reference (rated) fuel temperature  
 $T_m$  = perturbed moderator temperature  
 $T_{m,r}$  = reference (rated) moderator temperature

- b. The reduced power cases at 0, 25, 50, and 75 percent of rated, needed for the evaluation of the coefficients for equilibrium xenon, appear to have been improperly generated as they all have identical cross sections. Regenerate the cross sections for the reduced power cases of 25 and 50 percent of rated power.