



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

April 8, 1994

Docket No. 52-004

Mr. Patrick W. Marriott, Manager
Advanced Plant Technologies
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 (Q252.1-Q252.11 AND Q281.1-
Q281.5)

The staff has determined that it needs additional information to support its review activities related to the SBWR design certification. Some additional information on materials application (Q252.1-Q252.11)* provided in Chapters 3, 4, 5, 6, 10, and 13 of the standard safety analysis report (SSAR) is needed. Information on chemical technology (Q281.1-Q281.5) as provided in SSAR Chapters 6, 9, and 10 of the SSAR is also needed. Please provide a written response to the enclosed questions within 90 days of the date of this letter.

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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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.

If you have any questions regarding this matter, please contact me at (301) 504-1178 or Mr. Son Ninh at (301) 504-1125.

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:
See next page

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***To be held for 30 days**

OFC	LA:PDST	PM:PDST	PM:PDST	SC:PDST
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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

Materials Application

- 252.1 Section 3.5.1.3, Turbine Missiles, of the SBWR standard safety analysis report (SSAR) should include a figure showing the ± 25 percent degree low-trajectory turbine missile ejection zone.
- 252.2 In SSAR Section 4.5.1, Control Rod System Structural Materials, the first sentence of Section 4.5.1.2, Austenitic Stainless Steel Components, states: "There is a special purpose process employed which requires 300 series stainless steel components to be subjected to temperatures in the sensitization range." Describe in the SSAR what this special process is, why it is employed, and whether it involves treatment of low carbon or regular unstabilized austenitic stainless steels.
- 252.3 In SSAR Section 4.5.2, Reactor Internal Materials, Section 4.5.2.1 indicates that the shroud support will be fabricated from ASME SB-166 or ASME SB-168 material. Is alloy type N06600 or N06690 to be used? Specify in the SSAR which alloy type will be used.
- 252.4 SSAR Section 4.5.2.1 states that core plate and sleeves may be fabricated from ASME SA-479, type 304 or 316 material; SA-213 type 316 material; or SA249 type 316 material. Provide an explanation of the use of regular unstabilized austenitic stainless steel instead of low carbon austenitic stainless steel for this application.
- 252.5 SSAR Section 5.2.3, Reactor Pressure Boundary Materials, Section 5.2.3.4.2, Control of Welding, should be expanded to include a commitment that production welds will be examined to verify that delta-ferrite levels are between 5 and 13 FN. Indicate whether magnetic measuring devices will be used to make those determinations.
- 252.6 SSAR Section 5.3.1, Reactor Vessel Materials, Section 5.3.1.5 states that separately produced test coupons may be used to test the reactor pressure vessel forgings toughness. With regard to this statement the following clarifications are needed:
- a. Explain why GE intends to use separately produced test coupons to test the reactor pressure vessel forgings.
 - b. Indicate whether there are written procedures describing how this activity is to be accomplished? If so, describe these procedures.
 - c. Explain how the quench cooling rates of the test forging are maintained and kept identical to the forging it is supposed to represent.

Enclosure

- 252.7 In SSAR Section 5.3.1.6.1, Compliance with Reactor Vessel Material Surveillance Program Requirements, the first sentence on page 5.3-7 states: "The capsule loading consists of 12 Charpy V specimens each base metal, weld metal, HAZ [heat-affected zone] material and three tensile specimens each from base metal and weld metal." This commitment does not meet the requirements of ASTM E-185, paragraph 6.2 which requires that tensile specimens be included from base metal, weld metal, and HAZ.
- 252.8 SSAR Section 5.3.1.6.1 states that specimens are manufactured from forgings actually used in the beltline region and weld typical of those in the beltline region. This paragraph should be expanded to explain that the term typical weld means the use of the same heat of wire and lot of flux and the same welding practice used for the actual production welds.
- 252.9 SSAR Section 5.3.2, Pressure/Temperature Limits, Section 5.3.2.1 includes a discussion related to the predicted shift of RT_{NDT} in upper-shelf energy. In order to complete review of this subject, the staff needs the following:
- Calculation for the predicted shift of RT_{NDT} for the reactor beltline forging and weld metal.
 - Information explaining how the fluence value of 1.41×10^{18} n/cm² and 6.2×10^{17} n/cm² was predicted.
 - Correction of the typographical errors concerning the fluence numbers reported on SSAR page 5.3-11. The values 1.41×10^{18} m/cm² and 6.2×10^{17} m/cm² should read 1.41×10^{18} n/cm² and 6.2×10^{17} n/cm², respectively.
- 252.10 In SSAR Section 6.1, Engineered Safety Feature Materials, the second sentence of Section 6.1.3, COL [combined operating license] License Information, states: "Evaluate the generation rate, as a function of time, of combustible gases that can be formed from these unqualified organic materials under DBA [design basis accident] conditions." This sentence should be modified to read: "Evaluate the generation rate, as a function of time, of combustible gases that can be formed from organic materials under DBA conditions" since all organic material must be evaluated under DBA conditions.
- 252.11 SSAR Section 10.3.6, Steam and Feedwater System Materials, should be revised to include a reference to Section 5.2.3.2.2 for discussion of potential deterioration of SBWR carbon steel piping from erosion/corrosion or alternatively, Section 10.3.6 should be expanded to explain what precautions GE will take to ensure that the effects of erosion/corrosion in the SBWR plant are minimized.

Chemical Technology

- 281.1 SSAR Section 6.1.1.2 should include a discussion concerning the compatibility of the sodium pentaborate liquid control solution (from the Standby Liquid Control System) with the selected system materials, or refer to the section of the SBWR where this discussion is provided.
- 281.2 SSAR Section 6.5.5, Pressure Suppression Pool As A Fission Product Cleanup System, should include a statement to confirm that there will be a program for preoperational and surveillance testing that will ensure a continued state of readiness for the suppression pool to remove fission products, and that bypass of the pool is unlikely to exceed the assumptions used in the dose assessment.
- 281.3 Describe how the SBWR Post-Accident Sampling System (PASS) requirements are different than those approved by the staff for the ABWR. [The requirements for PASS in boiling water reactors are specified in 10 CFR 50.34(f)(2)(viii) and Item II.B.3 of NUREG-0737 with the modifications approved by the Commission described in SECY-93-087 and the staff requirements memorandum of April 21, 1993. Any departures from meeting these requirements should be properly documented and appropriate justifications provided, allowing the staff to perform a detailed review.] In order to be consistent with the requirements of Section 9.3.2 of the Standard Review Plan (NUREG-0800), add the main condenser evacuation system offgas to the list of process sampling points. (Reference SSAR Section 9.3.2.)
- 281.4 SSAR Section 10.4.6, Condensate Purification System [CPS], Section 10.4.6.3, Evaluation, states that the CPS will comply with Regulatory Guide 1.56, "Maintenance of Water Purity in Boiling Water Reactors." This commitment is acceptable, however, GE should also commit to meet the guidelines stated in the Electric Power Research Institute's (EPRI's) report EPRI NP-4947-SR, "BWR Hydrogen Water Chemistry Guidelines: 1987 Revision, October 1988."
- 281.5 SSAR Section 10.4.6.3 states that gases from various collection points in the condensate purification system will be vented to the radwaste system for treatment and disposal. However, GE response (MFN No. 103-93, dated June 30, 1993) to RAI EMCB.9 states that there is no gaseous radwaste storage tank and, hence, no sampling is provided. The SSAR should explain how gases are handled and monitored before treatment and disposal.