Docket No. STN 50-605

January 26, 1990

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

Dear Mr. Marriott:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING THE GENERAL ELECTRIC COMPANY APPLICATION FOR CERTIFICATION OF THE ABWR DESIGN

In our review of your application for certification of your Advanced Boiling Water Reactor Design, we have identified a need for additional information. Our request for additional information, contained in the enclosure, addresses the areas of SRP Chapter 10 reviewed by the Plant Systems Branch. We request that you provide your responses to this request by February 28, 1990. If you have any concerns regarding this request please call me on (301) 492-1104.

Sincerely,

/s/
Dino C. Scaletti, Project Manager
Standardization and Life Extension
Project Directorate
Division of Reactor Projects - III, IV
V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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Enclosure

REQUEST FOR ADDITIONAL INFORMATION

430.59 (10.1) Provide information on the following figures and tables:

a. Figure 10.1-2, Heat Balance for Guaranteed Reactor Rating

b. Figure 10.1-3, Heat Balance for Valve-Wide-Open

c. Table 10.1-1, Summary of Important Design Features and Performance Characteristics of the Steam and Power Conversion System, with regard to:

— Condensate pumps: total head (ft) and motor hp.

— Low pressure heaters: Stage pressure (psia) and duty per shell (Btu/hr) for Heater Nos. 1, 2, 3, and 4.

— High pressure heaters: Stage pressure (psia) and duty per shell (Btu/hr) for Heater Nos. 5 and 6.

— Low pressure turbine exhaust pressure to condenser

430.60 (10.2) Specify the value for time "T" in Figure 10.2-2.

430.61 (10.2) Provide a description of the bulk hydrogen storage facility mentioned in Section 10.2.2.2.

430.62 (10.2) Provide a description of the speed control unit, the load control unit and the flow control unit of the electro-hydraulic control (EHC) system. Your description should include how they perform their intended functions. Clarify whether the EHC system will fully cut off steam at 103 percent of rated turbine speed.

430.63 (10.2) For the turbine overspeed protection system (described in Section 10.2.2.4), the SSAR referred to redundant electrical trip signals. Provide information on the power source associated with each of the trip circuits.

430.64 (10.2) As presented in Section 10.2.2.4 of the ABWR SSAR, the closing time of the extraction nonreturn valves is less than 0.2 seconds, while it is 2 seconds at current BWR plants. Provide additional information on the design of these valves that supports the difference between the above closing time values.

430.65 (10.2) Clarify whether at least one main steam stop valve, control valve, reheat stop valve and reheat intercept valve will be inspected at

approximately 3 1/3 years by dismantling them, and whether visual and surface examinations will be conducted for the valve seats, disks and stems (note that the above is an acceptance criterion for SRP Section 10.2).

430.66 (10.2) Identify preoperational and startup tests of the turbine generator in accordance with Regulatory Guide 1.68, "Initial Test Programs for Water Cooled Power Plants," as an interface requirement.

430.67 (10.3) As stated in Section 10.3.2.1, "the four main steam lines are connected to a header upstream of the turbine stop valves ...". However, according to Figure 10.3-2a, the main steam header is located downstream of the turbine stop valves. Identify whether the statement or figure is in error and revise the item in error so that the SSAR is consistent.

430.68 (10.3) Provide information on the leakage detection system for steam leakage from the MSSS in the event of a steam line break. Also provide information on the stated "safety feature designed into the MSSS" that will prevent radiation exposures in excess of the limits of 10 CFR Part 100 in the event of a break of a main steam line or any branch line (SSAR Section 10.3.3).

430.69 (10.3) For the following items identified in SSAR Figure 10.3-1:

a. Deaerating steam to condenser
b. Offgas system
c. Steam jet air ejectors
d. Turbine gland sealing system
e. Reheater
f. Main steam bypass

Provide the following information:

a. Maximum steam flow (lbs/hr)
b. Type of shut-off valve(s)
c. Size, quality, design code, closure time, actuation mechanism and associated motive power of the valve(s).

430.70 (10.3) Provide information on the following items:

(a) Analysis for steam hammer and relief valve discharge loads issues.
(b) Power source to the solenoid valves for the inboard and outboard main steam isolation valves.
(c) Location of seismic interface restraint (e.g., interface of which buildings?)
(d) Route which the main steam lines, including the branch lines, pass up to the turbine stop valves.

(e) Specific design features provided to protect safety-related portions of the main steam supply system, including the main steam isolation valves, against externally and internally generated missiles and adverse natural phenomena such as floods, hurricanes and tornadoes.

430.71 (10.4.1) Describe provisions for operation of the main condenser with leaking condenser tubes.

430.72 (10.4.1) Provide the permissible cooling water inleakage rate and the allowed time of operation with inleakage.

430.73 (10.4.1) Provide information on the following items:

(a) Provisions incorporated into the main condenser to preclude component or tube failure due to steam blowdown from the turbine bypass system.
(b) Worst possible flood level in the applicable buildings due to complete failure of main condenser and provisions for protecting safety-related equipment located in the buildings against such flooding (note that ABWR SSAR Section 3.4 does not discuss the turbine building).

430.74 (10.4.2) Discuss how the components of the main condenser evacuation system (MCES) conform to the guidelines of Regulatory Guide 1.26, 1.33 and 1.123 with respect to quality group classification and quality assurance programs.

430.75 (10.4.2) Provide the design pressure and normal operational absolute pressure for the MCES components that could contain potentially explosive gas mixtures.

430.76 (10.4.2) Identify the radiation monitoring provisions for the mechanical vacuum pump exhaust. Is the exhaust filtered by charcoal adsorber and HEPA filters prior to release?

430.77 (10.4.2) Identify the number, location and functions (i.e., recording and annunciating alarm) performed by the hydrogen analyzers. Clarify whether they can withstand a hydrogen detonation.

430.78 (10.4.2) Clarify whether the air ejectors are redundant in the sense that one of them is a standby.

430.79 (10.4.2) Identify the components and portions of the MCES that are designed to withstand a detonation in the system.

430.80 (10.4.3) Discuss how the design of the turbine gland sealing system (TGSS) conforms to the guidelines of Regulatory Guide 1.26 as it relates to the quality group classification for the system, and Regulatory Guide 1.33 and 1.123 as they relate to the quality assurance programs.

430.81 (10.4.3) Provide a description of the exhauster blower provided for the TGSS.

430.82 (10.4.3) ABWR SSAR Subsection 10.4.3.1.2 states that the TGSS exhausts the noncondensable gases to the turbine building equipment vent system; however, Subsection 10.4.3.3 states that the TGSS exhausts the noncondensable gases eventually to the main vent. Clarify how the TGSS exhausts are monitored. Also, clarify whether the main vent mentioned above is the plant vent referred to in SSAR Section 11.5.

430.83 (10.4.3) What is the source for the auxiliary steam? Justify why an advanced design will use essentially radioactivity free auxiliary steam (see SSAR Section 10.4.3.2.2) as a backup sealing source rather than as normal sealing source. Note that the use of a process steam supply for sealing purpose can result in significant operational radioactivity releases.

430.84 (10.4.4) For the turbine bypass system:

(a) Provide figures which delineate the system and its components.
(b) Clarify whether the system includes pressure-reducer assemblies for the bypass valves to reduce steam pressure prior to steam discharge into the condenser.

430.85 (10.4.5) For the circulating water system:

(a) Describe the function of the waterbox fill and drain subsystem mentioned in ABWR Subsection 10.4.5.2.1. Also, describe the "makeup water" shown in SSAR Figure 10.4-3.
(b) Provide the worst possible flood levels that can occur in the applicable plant buildings as a result of circulating water system failure and indicate how safety-related equipment located in the buildings is protected against such flooding.

430.86 How is the remote manual motor-operated shutoff valve (gate valve F 282 powered?

430.87 Describe the design features provided to protect the safety-related portion of the condensate and feedwater system from internally generated missiles.

430.88 Provide a summary of the analysis of a postulated high-energy pipe break for the feedwater piping in the steam tunnel including the design features provided (e.g., pipe whip restraints) for preventing adverse effects resulting from pipe whip, jet impingement and flooding.

430.89 Provide information on the analysis that shows that the entire feedwater system piping can accommodate water hammer events and the means to prevent water hammer loads due to hydraulic transients.

403.90 Provide detail information on the feedwater control valve and controller design, including the features that ensure the design will be stable and compatible with the system and imposed operating conditions.