June 22, 2006

Mr. David Hinds, Manager, ESBWR
General Electric Company
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 36 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. This RAI concerns the "Steam and Power Conversion System," Chapter 10, and "Radioactive Waste Management," Chapter 11, of Tier 2 of the ESBWR design control document. The RAI regarding Chapter 10, RAI 10.3-1 - 10.3-3, was sent to you via electronic mail on April 13, 2006. The RAIs were discussed with you during a telecon on May 30, 2006. The RAI regarding Chapter 10, RAI 10.3-4 - 10.3-9, was sent to you via electronic mail on April 14, 2006. The RAIs were discussed with you during a telecon on June 1, 2006. You agreed to respond to this RAI by July 7, 2006.

The RAI regarding Chapter 11 was sent to you via electronic mail on May 12, 2006. The RAIs were discussed with you during a telecon on June 1, 2006. You agreed to respond to this RAI by July 7, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-207 or lnq@nrc.gov, Amy Cubbage at (301) 415-42875 or aec@nrc.gov, Lawrence Rossbach at (301) 415-2863 or lwr@nrc.gov, or Martha Barillas at (301) 415-4115 or mcb@nrc.gov.

Sincerely,

/RA/

Lauren Quinones, Project Manager
ESBWR/ABWR Projects Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-0010

Enclosure: As stated

cc: See next page

If you have any questions or comments concerning this matter, you may contact me at (301) 415-207 or lnq@nrc.gov, Amy Cubbage at (301) 415-42875 or aec@nrc.gov, Lawrence Rossbach at (301) 415-2863 or lwr@nrc.gov, or Martha Barillas at (301) 415-4115 or mcb@nrc.gov.

Sincerely,

/RA/

Lauren Quinones, Project Manager
ESBWR/ABWR Projects Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-0010

Enclosure: As stated

cc: See next page

ACCESSION NO. ML061720089

OFFICE	NRBA/PM	NRBA/BC
NAME	LQuinones	ACubbage-G. Wunder for:
DATE	06/21/2006	06/22/2006

OFFICIAL RECORD COPY

Distribution for DCD RAI Letter No. 36 dated June 22, 2006

Hard Copy
PUBLIC
NESB R/F
ACubbage
LQuinones

E-Mail
JDanna
JHan
ACRS
OGC
ACubbage
LRossbach
LQuinones
MBarillas
JGaslevic
DHickman
JHernandez
RDavis
KGruss
SJones
JLee
MKotzalas

REQUESTS FOR ADDITIONAL INFORMATION (RAIs)
ESBWR DESIGN CONTROL DOCUMENT (DCD) CHAPTER 10

RAI Number	Reviewer	Question Summary	Full Text
10.3-1	Hernandez J	Address discrepancy with Criterion III.3.b regarding seismic design classification.	DCD Section 10.3.1 states that the main steam system (downstream of the seismic restraint) is analyzed, fabricated and examined to ASME Code Class 2 requirements, classified as Non-seismic, and subject to pertinent quality assurance requirements of Appendix B, 10 CFR 50. Main steam piping from the seismic interface restraint to the main stop valves and main turbine bypass valves (including the steam auxiliary valves) is analyzed to demonstrate structural integrity under safe shutdown earthquake (SSE) loading conditions. However, this is not consistent with the seismic design requirements of Standard Review Plan (SRP) 10.3, Criterion III.3.b, which require that the subject portions of the main steam supply system are designed to seismic Category I. Provide a justification for not meeting the guidelines of the SRP.
10.3-2	Hernandez J	Provide description of means and methods to detect and control leakage during a postulated steam line break.	SRP 10.3 Criterion III.5.c specifies that means such as temperature and/or pressure sensors be provided to detect leakage in the event of a steam line break. DCD Section 15.4.5 states that the plant is designed to immediately detect large steam line pipe breaks outside containment, initiate isolation of all main steam lines including the broken line and actuate the necessary protective failures. Provide a detailed description of the means and methods to detect and control leakage during such event as described in the SRP.

10.3-3	Hernandez J	Provide additional information to demonstrate that the MSIV alternative leakage pathway performs its intended function under all expected conditions.	Rev. 01 of the DCD Section 10.3.2.1 states that the allowable main steam isolation valve (MSIV) leakage is required to be less than or equal to the value used in Section 15.4 for Main Steam Line Break Outside Containment analysis. Section 15.4.4.5.2.3 describes the basis for relying on the main steam lines and drain line complex downstream of the reactor building as mitigative factors in the analysis of loss-of-coolant accident (LOCA) leakage. The DCD section states that the main steam lines and drain lines are required under normal conditions to function to loads at temperatures and pressure far exceeding the loads expected from a safe shutdown earthquake (SSE). (A) Demonstrate that the main steam piping, drain line, and bypass line in the turbine building are protected from the collapse of any non-seismic Category I structure in the event of a SSE. (B) Provide the safety margin for the main steam line and drain lines based on the difference between normal operating loads and those expected during a SSE. (C) Provide detailed drawings that show the MSIV alternate leakage path lines including the condenser, all applicable connections to the system their seismic classification.
10.3-4	Davis R	Provide material specifications for feedwater and main steam components outside of the RCPB.	Section 10.3.6 indicates that the steam and feedwater component materials that are within the reactor coolant pressure boundary (RCPB) are addressed in Section 5.2 but the material specifications and grades for the steam and feedwater system components that are outside of the RCPB are not listed in 10.3.6 nor 10.4.7. Please provide a complete list of all material specifications and grades that are used in the steam, feedwater and condensate systems by component types including weld filler metal. Specify the Code Class for all portions of both systems.

10.3-5	Davis R	Provide clarification of compliance with RG 1.71.	Subsection 10.3.6.2 indicates that Regulatory Guide (RG) 1.71 is applicable to all components but states that as an alternative method, positions documented in Reference 10.3-1 could be used. Regarding reference 10.3-1, identify what portions of the alternative do not meet the guidance of RG 1.71. Provide a basis for not following the guidance in RG 1.71. Please provide the answer in a global context as it applies to the entire ESBWR design.
10.3-6	Davis R	Provide the ESBWR design consideration of minimizing the effects of erosion/corrosion.	Describe the mitigation steps taken in the ESBWR design related to: 1) Utilization of erosion/corrosion resistant materials, 2) specification of an adequate corrosion allowance and 3) consideration on minimizing the effects of erosion/corrosion in the design of all ESBWR feedwater, steam and condensate system piping from effects such as fluid velocity, bend locations and flash points.
10.3-7	Davis R	Provide basis for exclusion of ASME Code Class 2 stamping.	10.3.1.1 indicates that ASME authorized nuclear inspector (ANI) and ASME Code stamping is not required. Provide a basis for the exclusion of ANI and Code stamping.
10.3-8	Davis R	Provide information on conformance to ANSI N45.2.1.	Does the licensee intend on following the guidance provided in American National Standards Institute (ANSI) N45.2.1 as referenced in RG 1.37. If not, provide a description of the alternative.
10.3-9	Davis R	Provide information related to augmented inspection program for feedwater and condensate.	Given the history of failure of components in systems such as feedwater and condensate, which can effect safety related equipment and threaten personnel safety, provide a description of augmented inspection programs for ALL condensate, feedwater and steam piping.

RAI Number	Reviewer	Question Summary	Full Text
11.1-1	Lee J	Address source term criteria in the DCD Tier 2, Section 11.1	Address, or identify the relevant DCD sections that do address, the following criteria, in DCD Tier 2, Section 11.1: A. The parameters used to calculate concentrations of radioactive materials in primary and secondary coolant are consistent with those given in NUREG-0016, “Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Boiling Water Reactors” (BWR-GALE code). B. All normal and potential sources of radioactive effluents delineated in Subsection I of standard review plan (SRP) Section 11.1 are considered. C. For each source of liquid and gaseous waste considered in Subsection I of SRP Section 11.1, the volumes and concentrations of radioactive material given for normal operation and anticipated operational occurrences (AOOs) are consistent with those given in NUREG-0016. D. Decontamination factors (DFs) for in-plant control measures used to reduce gaseous effluent releases to the environment, such as iodine removal systems and high-efficiency particulate air (HEPA) filters for building ventilation exhaust systems and containment internal cleanup systems, are consistent with those given in RG 1.140. The building mixing efficiency for containment internal cleanup is consistent with that in NUREG-0016. E. DFs for in-plant control measures used to reduce liquid effluent releases to the environment, such as filters, demineralizers, and evaporators, are consistent with those in NUREG-0016.

			F. Effluent concentration limits at the boundary of the unrestricted area do not exceed the values specified in Table 2 of Appendix B to 10 CFR Part 20. G. The source terms result in meeting the design objectives for doses in an unrestricted area, as set forth in Appendix I to 10 CFR Part 50. H. The applicant provides in the DCD the relevant information required by 10 CFR Part 50.34a. This technical information should include all the basic data listed in Appendix B to RG 1.112 needed to calculate the releases of radioactive material in liquid and gaseous effluents. The Gaseous and Liquid Effluent (GALE) computer code, along with the source term parameters given in NUREG-0016, is an acceptable method to perform this calculation. I. If the calculational technique or any source term parameter differs from that given in NUREG-0016, the applicant should describe these differences in detail, as well as the bases for the method and parameters used.
11.1-2	Lee J	Provide the realistic source term for fission, activation, and corrosion products in the reactor water and steam.	Provide the realistic source term for fission, activation, and corrosion products in the reactor water and steam used to demonstrate compliance with: A. 10 CFR Part 20, as it relates to limits on doses for persons in unrestricted areas; and B. 10 CFR Part 50, Appendix I, as it relates to the numerical guidelines for design objectives and limiting conditions for operation to meet the as low as reasonably achievable (ALARA) criterion given in Appendix I. The realistic source term is the expected average concentrations of the principal radionuclides in the primary reactor coolant and steam that may be anticipated over the life of a BWR.

11.1-3	Lee J	Provide all calculational parameters used to determine the realistic source term provided in RAI 11.1-2.	Provide all calculational parameters used to determine the realistic source term provided in RAI11.1-2 above.

cc:

Mr. David H. Hinds, Manager
ESBWR
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

Mr. George B. Stramback
Manager, Regulatory Services
GE Nuclear Energy
1989 Little Orchard Street, M/C 747
San Jose, CA 95125

Mr. David Lochbaum, Nuclear Safety Engineer
Union of Concerned Scientists
1707 H Street, NW., Suite 600
Washington, DC 20006-3919

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW, Suite 404
Washington, DC 20036

Mr. James Riccio
Greenpeace
702 H Street, Suite 300
Washington, DC 20001

Mr. Adrian Heymer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Paul Leventhal
Nuclear Control Institute
1000 Connecticut Avenue, NW
Suite 410
Washington, DC 20036

Mr. Ron Simard
6170 Masters Club Drive
Suwanne, GA 30024

Mr. Brendan Hoffman
Research Associate on Nuclear Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Ms. Patricia Campbell
Morgan, Lewis & Bockius, LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Mr. Glenn H. Archinoff
AECL Technologies
481 North Frederick Avenue
Suite 405
Gaithersburg, MD. 20877

Mr. Gary Wright, Director
Division of Nuclear Facility Safety
Illinois Emergency Management Agency
1035 Outer Park Drive
Springfield, IL 62704

Mr. Charles Brinkman
Westinghouse Electric Co.
Washington Operations
12300 Twinbrook Pkwy., Suite 330
Rockville, MD 20852

Mr. Ronald P. Vijuk
Manager of Passive Plant Engineering
AP1000 Project
Westinghouse Electric Company
P. O. Box 355
Pittsburgh, PA 15230-0355

Mr. Ed Wallace, General Manager
Projects
PBMR Pty LTD
PO Box 9396
Centurion 0046
Republic of South Africa

Mr. Russell Bell
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Jerald S. Holm
Framatome ANP, Inc.
3315 Old Forest Road
P.O. Box 10935
Lynchburg, VA 24506-0935

Ms. Kathryn Sutton, Esq.
Morgan, Lewis & Bockius, LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Mr. Robert E. Sweeney
IBEX ESI
4641 Montgomery Avenue
Suite 350
Bethesda, MD 20814

Mr. Eugene S. Grecheck
Vice President, Nuclear Support Services
Dominion Energy, Inc.
5000 Dominion Blvd.
Glen Allen, VA 23060

Mr. George A. Zinke
Manager, Project Management
Nuclear Business Development
Entergy Nuclear, M-ECH-683
1340 Echelon Parkway
Jackson, MS 39213

E-Mail:
tom.miller@hq.doe.gov or
tom.miller@ nuclear.energy.gov
mwetterhahn@winston.com
whorin@winston.com
gcesare@enercon.com
jerald.holm@framatome-anp.com
eddie.grant@exeloncorp.com
joseph_hegner@dom.com
steven.hucik@ge.com
david.hinds@ge.com
chris.maslak@ge.com
james1beard@ge.com
louis.quintana@gene.ge.com
wayne.massie@ge.com
kathy.sedney@ge.com
mgiles@entergy.com
george.stramback@gene.ge.com