

March 22, 2006

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 13 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 attachment to this letter. This RAI concerns fuel design details to support NRC staff confirmatory calculations. This RAI was sent to you via electronic mail on March 8, 2006, and was discussed with your staff during a telecon on March 13, 2006. You agreed to respond to this RAI by March 24, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2875 or aec@nrc.gov, or Larry Rossbach at (301) 415-2863 or lwr@nrc.gov.

Sincerely,

/RA/

Amy Cabbage, Senior Project Manager
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-010

Attachment: As stated

cc w/ att: See next page

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ACCESSION NO. ML060790449

OFFICE	NRBA/PM	NRBA/BC
NAME	ACabbage	LDudes
DATE	03/21/2006	03/21/2006

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Distribution for DCD RAI Letter No. 13 dated March 22, 2006

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Draft Request for Additional Information (RAI)
ESBWR fuel design Information

RAI number	Reviewer	Summary	Full Text
4.2-1	Clifford P	Provide detailed information to support NRC confirmatory FRAPCON-3 benchmark cases	Provide information listed below. Include the nominal value and the range of expected values (e.g. manufacturing tolerance) for each parameter.

FRAPCON Input for GE14E Benchmark Cases

Rod Size

Outer Diameter	+/-	mm	
Inner Diameter	+/-	mm	
Pellet Diameter	+/-	mm	
Stack Length	+/-	mm	UO ₂
	+/-	mm	(U, Gd) O ₂
	+/-	mm	Part-Length Rod
Plenum Length	+/-	mm	UO ₂
	+/-	mm	(U, Gd) O ₂
	+/-	mm	Part-Length Rod

Spring Dimensions

spring outer diameter	in
spring wire diameter	in
number of spring turns	

Pellet Shape

Pellet Height	mm
Central Hole Radius	mm
Dish Radius	mm
Dish Depth	mm

Pellet Isotopics

Fuel U-235 Enrichment	% (Provide enrichment and cutback data)
UO ₂ or MOX?	
O/M ratio	
Gadolinia content	wt fraction (up to 8.0)
water in pellet	ppm
nitrogen in pellet	ppm
hydrogen in pellet	ppm

Pellet Fabrication

pellet density	%
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open porosity	%
pellet surface roughness	microns
expected density increase	g/cm ³
sintering temperature	°F

Cladding Fabrication

Cladding type	
Cladding cold work	[Recommend 0 for RXA and 0.5 for CWSR]
Cladding surface roughness	microns
basal pole alignment	
Hydrogen in cladding	ppm
zirc liner thickness	microns (Identify which design analyses credit liner properties)

Rod Fill Conditions

Fill gas pressure	bar
Fill Gas	

Reactor Conditions

Type of plant	BWR
rod pitch	mm
crud model	(provide crud deposition)
initial crud thickness	mils
	mils/hr
coolant pressure	MPa
coolant inlet temperature	°C
coolant mass flux	lb/hr-ft ²

Power History

<u>Time Step</u>	<u>Duration (days)</u>	<u>Power (KW/m)</u>
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(Provide thermal mechanical operating limit (TMOL) depletion, AOO case, etc....)
(Identify axial power distribution at each time step)

Axial Power Distribution

<u>Axial Position (mm)</u>	<u>Relative Power</u>
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(Provide BOC, MOC, EOC shapes)

Calculated Results

In addition to the Mechanical Overpower (MOP) and Thermal Overpower (TOP) values, please provide the calculated fuel temperatures, clad strains, void volumes, and rod internal pressures along with a brief description of the input parameters for each limiting case.

ESBWR

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

Dr. Jack W. Roe
Nuclear Energy Institute
1776 I Street, NW
Washington, DC 20006-3708

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

Ms. Sandra Sloan
Areva NP, 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
sandra.sloan@areva.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
george.stramback@gene.ge.com