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 Cubbage, 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	ACubbage	LDudes
DATE	03/21/2006	03/21/2006

OFFICIAL RECORD COPY

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)
UO2 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	%

Attachment

open porosity	%
pellet surface roughness	microns
expected density increase	g/cm³
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-ft²

Power History

Time Step	Duration (days)	Power (KW/m)

(Provide thermal mechanical operating limit (TMOL) depletion, AOO case, etc....)
(Identify axial power distribution at each time step)

Axial Power Distribution

Axial Position (mm)	Relative Power

(Provide BOC, MOC, EOC shapes)

Calculated Results

In addition to the Mechanical Overpoer (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.

cc:

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