GE Energy

James C. Kinsey
Project Manager, ESBWR Licensing

PO Box 780 M/C J-70
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 85 – Neutron Fluence Calculation– RAI Number 5.3-14**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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Reference:

1. MFN 07-054, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 85 Related to the ESBWR Design Certification Application*, January 19, 2007

Enclosures:

1. MFN 07-191– Response to Portion of NRC Request for Additional Information Letter No. 85 – Neutron Fluence Calculation – RAI Number 503-14

cc:	AE Cubbage	USNRC (with enclosures)
	GB Stramback	GE/San Jose (with enclosures)
	BE Brown	GE/Wilmington (with enclosures)
	eDRF	0064-1046

Enclosure 1

MFN 07-191

Response to Portion of NRC Request for Additional Information Letter No. 85 Related to ESBWR Design Certification Application

Neutron Fluence Calculations

RAI Number 5.3-14

NRC RAI 5.3-14:

Discrepancy of applied and approved methods.

DCD Tier 2, Revision 2, Section 4.1.4.5 states that the cross sections are prepared with I/E spectrum but do not include self-shielding factors. The methodology referenced in NEDC-32983P-A states in Section 2.1.6 that the cross section library is used in performing the resonance self shielding. Is the methodology not applied as described in the approved document and if so what is the basis?

GE Response:

The NRC approved GE fluence methodology referenced in NEDC-32983P-A was applied to the neutron fluence calculations for the ESBWR. DCD Subsection 4.1.4.5 will be revised in DCD Tier 2, Revision 4, as follows (changes in bold):

4.1.4.5 Neutron Fluence Calculations

Neutron vessel fluence calculations were carried out using a two-dimensional, discrete ordinates, Sn transport code with general anisotropic scattering.

This DORT code is the most widely used two-dimensional, discrete ordinates code that solves a wide variety of radiation transport problems. The program solves both fixed source and multiplication problems. Rectangular (X, Y), cylindrical (R, Z), or polar (R, θ) geometry is allowed with various boundary conditions. The fluence calculations incorporate, as an initial starting point, neutron fission distributions prepared from core physics data as a distributed source. Anisotropic scattering is considered for all regions. The cross sections are prepared with 1/E flux weighting using **polynomial** expansion matrices for anisotropic scattering. **Resonance self-shielding computation is included in the preparation of a working cross section library** (Section 12.3).

DCD Impact:

DCD Tier 2, Rev. 4 will reflect the changes delineated above in bold.