May 4, 2009

Mr. James A. Gresham, Manager
Regulatory Compliance and Plant Licensing
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION (RAI 6-33S1) RE: TOPICAL REPORT WCAP-16747-P "POLCA-T: SYSTEM ANALYSIS CODE WITH THREE-DIMENSIONAL CORE MODEL" (TAC NO. MD5258)

Dear Mr. Gresham:

By letter dated December 16, 2008 (Agencywide Documents Access and Management System Accession Nos. ML083660101 and ML083660102), Westinghouse Electric Company (Westinghouse) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report WCAP-16747-P. Upon review of the information provided, the NRC staff has determined that a request for additional information (RAI) is needed to complete the review. On March 6, 2009, Ms. Anne Leidich, Westinghouse Licensing Engineer, and I agreed that the NRC staff should receive your responses to the enclosed RAI questions by May 15, 2009. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-1970 or by electronic mail at George.Bacuta@nrc.gov.

Sincerely,

/RA/

George C. Bacuta, Project Manager
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 700

Enclosures:
1. RAI 6-33S1 questions (Non- Proprietary)
2. RAI 6-33S1 questions (Proprietary)

cc w/encl.-1 only: See next page

NOTICE: Enclosure 2 transmitted herewith contains proprietary information. When separated from Enclosure 2, this document is decontrolled.

May 4, 2009

Mr. James A. Gresham, Manager
Regulatory Compliance and Plant Licensing
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION (RAI 6-33S1) RE: TOPICAL REPORT WCAP-16747-P "POLCA-T: SYSTEM ANALYSIS CODE WITH THREE-DIMENSIONAL CORE MODEL" (TAC NO. MD5258)

Dear Mr. Gresham:

By letter dated December 16, 2008 (Agencywide Documents Access and Management System Accession Nos. ML083660101 and ML083660102), Westinghouse Electric Company (Westinghouse) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Topical Report WCAP-16747-P. Upon review of the information provided, the NRC staff has determined that a request for additional information (RAI) is needed to complete the review. On March 6, 2009, Ms. Anne Leidich, Westinghouse Licensing Engineer, and I agreed that the NRC staff should receive your responses to the enclosed RAI questions by May 15, 2009. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-1970 or by electronic mail at George.Bacuta@nrc.gov.

Sincerely,

/RA/

George C. Bacuta, Project Manager
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 700

Enclosures:
1. RAI 6-33S1 questions (Non-Proprietary)
2. RAI 6-33S1 questions (Proprietary)
cc w/encl 1 only: See next page
DISTRIBUTION:
See attached page

ADAMS Accession No: ML090790018 (Package); ML090580033 (Enclosure 1); ML090580044 (Enclosure 2)
NRR-106

OFFICE	PSPB/PM	PSPB/PM	PSPB/LA	SNPB/BC	PSPB/BC
NAME	GBacuta	HCruz	DBaxley (GKL For)	AMendiola	SRosenberg
DATE	03/20/09	04/27/09	05/3/09	05/4/09	05/4/09

OFFICIAL RECORD COPY

NOTICE: Enclosure 2 transmitted herewith contains proprietary information. When separated from Enclosure 2, this document is decontrolled.

Letter to James A. Gresham from Stacey L. Rosenberg dated May 4, 2009

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION (RAI 6-33S1) RE: TOPICAL REPORT WCAP-16747-P "POLCA-T: SYSTEM ANALYSIS CODE WITH THREE-DIMENSIONAL CORE MODEL"

DISTRIBUTION:
PUBLIC
PSPB Reading File
RidsNrrPMGBacuta
RidsNrrDpr
RidsNrrLADBaxley
RidsOgcMailCenter
RidsNrrDprPspb
RidsAcrsAcnwMailCenter
RidsNrrDss
RidsNrrDssSnpb

cc:

Mr. Gordon Bischoff, Manager
Owners Group Program Management Office
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355
gordon.c.bischoff@us.westinghouse.com

SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION (RAI 6-33S1)

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR TOPICAL REPORT (TR) WCAP-16747-P, "POLCA-T: SYSTEM ANALYSIS CODE

WITH THREE-DIMENSIONAL CORE MODEL" (TAC NO. MD5258)

WESTINGHOUSE ELECTRIC COMPANY (WESTINGHOUSE)

PROJECT NO. 700

RAI 6-33S1 [Supplement 1]

The U.S. Nuclear Regulatory Commission (NRC) staff requested the stability phenomena identification and ranking table (PIRT) to assist the NRC staff in reviewing the relevant capabilities of POLCA-T that are required to perform stability evaluations. The NRC staff requires additional information regarding the stability PIRT provided in response to RAI 6-33.

Part 1- Initial Condition Rankings

Under the subcategory of "Initial Conditions" the PIRT specifies the following phenomena as ranked low: **[** **]**. This appears to be inconsistent with the rank of **[** **]** under the subcategory of "Calculation of Fuel Rod Heat Transfer."

The NRC staff considers the **[** **]** as a highly important parameter in the stability evaluation because it affects the coupling between the neutronic power and the response of the fluid. The initial conditions specified for the **[** **]** appear to impact the fuel rod heat transfer characteristics. For instance, during irradiation as fission gas escapes the pellet the conductivity of the fill gas decreases, thus increasing the total fuel rod heat resistance. This effect, it would seem to the NRC staff, would be captured through initial conditions specifying the **[** **]**. For these phenomena provide a more detailed rationale for the low ranking.

If a ranking is "low" because the results are not sensitive to the analysis input conditions, please quantitatively justify the rationale.

Part 2 - Input Assumptions Affecting Heat Resistance

Based on the PIRT ranking the NRC staff is not certain if the aforementioned phenomena are treated in the Westinghouse standard production stability analysis methodology. Please refer to POLCA-T audit open item 8 (referenced in RAI 4-11) in terms of the oxide thickness. Please provide similar information for the fill gas parameters.

Part 3 - Regional Mode Oscillations and Bypass Boiling

The NRC staff notes the **[ ]** was a highly ranked PIRT for regional mode instability analyses. The NRC staff notes that if POLCA-T is run with a **[ ]** that POLCA-T **[ ]** the capability to model transient changes in **[ ]** during regional mode oscillations. Because the total reactor power and pressure drop remain constant during stable regional oscillations, treating the **[ ]** results in no net change in the **[ ]**. However, for regional oscillations the local heat deposited in the **[ ]**. In order to capture the effect of **[ ]** during regional mode oscillations the **[ ]** must be treated with **[ ]** (one on each side of the harmonic symmetry plane). Please clarify how this highly ranked phenomena is captured in the POLCA-T simulations.

The NRC staff understands that POLCA-T has the capability to model the **[ ]** as well as sub-dividing the **[ ]** into several isolated regions. This degree of modeling resolution is not likely to be necessary in all cases. Please provide a detailed description of the process by which the potentiality of **[ ]** is assessed. This process description should consider those reactor conditions typical of decay ratio analysis such as low flow points in the operating domain and conditions of natural circulation. Please also describe the process or methodology by which the **[ ]** several parallel channels. This description should address how hot channel peaking factors and the regional mode flux harmonic shape are used to determine where greater resolution is required for **[ ]**.