July 11, 2001

Mr. H. A. Sepp, Manager
Regulatory and Licensing Engineering
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR WESTINGHOUSE TOPICAL REPORT WCAP-12472-P-A, ADDENDUM 2, "BEACON CORE MONITORING AND OPERATION SUPPORT SYSTEM" (TAC NO. MB1711)

Dear Mr. Sepp:

By letter dated March 29, 2001, Westinghouse submitted Addendum Two to Topical Report WCAP-12472-P-A, "Beacon Core Monitoring and Operating Support System," for NRC review and approval. On June 25, 2001, Westinghouse and the NRC staff discussed the review of the topical report including additional information that the staff needed to complete its review. Enclosed is the request for additional information that the staff requires. If you have any questions on this matter, please contact me at 301-415-1313 or Michael Scott at 301-415-1421.

Sincerely,

/RA/

Steven D. Bloom, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 700

cc: Mr. Andrew Drake, Project Manager
Westinghouse Owners Group
Westinghouse Electric Corporation
Mail Stop ECE 5-16
P.O. Box 355
Pittsburgh, PA 15230-0355

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REQUEST FOR ADDITIONAL INFORMATION

WCAP-12472-P-A, ADDENDUM 2

"BEACON CORE MONITORING AND OPERATION SUPPORT SYSTEM"

PROJECT NO. 700

1. In response to the staff's request for additional information (RAI) for Addendum One review, Westinghouse stated that if the BEACON system were to be used at Babcock or Combustion Engineering plants, it will be necessary to include a BEACON operability specification in the Technical Requirement (TR) Manual associated with either the NUREG-1430 or NUREG-1432 format technical specifications. This TR specification would address the minimum number and distribution of plant sensor inputs required for BEACON to properly monitor the core power distribution. Please provide sample TR Manual information for your Addendum Two application.

2. As stated in Addendum Two to WCAP-12472, the Platinum detectors are sensitive to gamma flux and the Vanadium detectors are neutron sensitive. It also stated that the Platinum and Vanadium detectors can be mixed in the core with each other or with Rhodium incore detectors. Please explain how to predict the detector responses with different detector configurations at the plant.

3. Figure Four shows that the Platinum detectors are arranged with four detectors in a string. It is not clear from Figure Five how the Vanadium detectors are arranged.

4. Please explain why the surface spline fitting methodology does not require a minimum number of detectors in a detector string to obtain predicted power.

5. Table One listed three plants that had installed experimental self-powered detectors (SPDs). Plants A and B had Platinum detectors, while plant C had Vanadium detectors. The number of SPD maps analyzed at plants A and B are 15 and 14 respectively. The number of SPD maps analyzed at plant C is 230. Why does the Vanadium detectors take so many maps to be analyzed in comparison to so few for Platinum detectors? What is the meaning of the number listed in the last column of Table One, "Max BU GWD/MTU"?

6. What is the meaning of the number listed at the last column of Table Two, "Measurement Variability σ_m"? What is the bounding measurement variability used by the BEACON system?

7. What are the failure rates of the Platinum detectors and Vanadium detectors? Do you have sufficient data to support that these detectors can be considered as non-depleting detectors.

8. Reference Four, "The Advanced PHOENIX and POLCA Codes for Nuclear Design of Boiling Water Reactor" methodology was used to predict the Platinum reaction rate as a new feature added to BEACON. Please explain the applicability of this code for the pressurized water reactor application.

9. On page 5 of your submittal, Equation 3, how does the power distribution calculated by BEACON at the current core conditions differ from the measured power distribution?

10. On the same page as question nine, the last sentence of the fourth paragraph states that "no minimum No. of detectors in a detector string is required." How is the interpolation carried out if there are no detectors in a string (presumed to have failed)?

11. Will the different types of detectors have an impact on the BEACON interpolation scheme?

12. In the case of mixed cores, will the removal and installation of the same detectors from one type of fuel into a different type of fuel affect the detector response?

13. With the inclusion of three different types of detectors (and possibly more), what is the probability that the wrong detector string is loaded into BEACON? How can the staff be assured that this situation cannot occur, and what would be the consequences if it did?

14. Figures two and three provide some insight into the uncertainties associated with the Platinum and Vanadium detectors. However, no data was provided as to the uncertainties associated with the "combined uncertainties" associated with the case of having Rhodium, Vanadium, and Platinum detectors in the same core. Please provide statistics associated with different combined configurations. i.e., measurability uncertainty, standard deviations, etc.

15. On page 7 of 16 of your submittal, in the middle of paragraph 2, it is stated that "If the current rhodium detector assemblies are gradually replaced by the similarly configured platinum detector assemblies------." If the detector configuration is not the same, will the BEACON power distribution measurement uncertainty remain the same?