July 2, 2003

Mr. Gordon Bischoff, Project Manager
Westinghouse Owners Group
Westinghouse Electric Company
Mail Stop ECE 5-16
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION – WCAP-15973-P, REVISION 00, "LOW ALLOY STEEL COMPONENT CORROSION ANALYSIS SUPPORTING ALLOY 600/690 NOZZLE REPAIR PROGRAM" (TAC NO. MB6805)

Dear Mr. Bischoff:

By letter dated November 11, 2002, the Westinghouse Owners Group submitted for staff review Topical Report WCAP-15973, "Low Alloy Steel Component Corrosion Analysis Supporting Alloy 600/690 Nozzle Repair Program." The staff has completed its preliminary review of WCAP-15973 and has identified a number of items for which additional information is needed to continue its review. The staff recently discussed this request for additional information (RAI) with Ken Vavrek of your staff, and it was agreed that a response would be provided within 15 days of receipt of this letter.

Pursuant to 10 CFR 2.790, we have determined that the enclosed RAI does not contain proprietary information. However, we will delay placing the RAI in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.790.

If you have any questions, please call me at (301) 415-1436.

Sincerely,

/RA/

Drew Holland, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 694

Enclosure: Request for Additional Information

cc w/encl: See next page

July 2, 2003

Mr. Gordon Bischoff, Project Manager
Westinghouse Owners Group
Westinghouse Electric Company
Mail Stop ECE 5-16
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION – WCAP-15973-P, REVISION 00, "LOW ALLOY STEEL COMPONENT CORROSION ANALYSIS SUPPORTING ALLOY 600/690 NOZZLE REPAIR PROGRAM" (TAC NO. MB6805)

Dear Mr. Bischoff:

By letter dated November 11, 2002, the Westinghouse Owners Group submitted for staff review Topical Report WCAP-15973, "Low Alloy Steel Component Corrosion Analysis Supporting Alloy 600/690 Nozzle Repair Program." The staff has completed its preliminary review of WCAP-15973 and has identified a number of items for which additional information is needed to continue its review. The staff recently discussed this request for additional information (RAI) with Ken Vavrek of your staff, and it was agreed that a response would be provided within 15 days of receipt of this letter.

Pursuant to 10 CFR 2.790, we have determined that the enclosed RAI does not contain proprietary information. However, we will delay placing the RAI in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.790.

If you have any questions, please call me at (301) 415-1436.

Sincerely,
/RA/
Drew Holland, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 694

Enclosure: Request for Additional Information

cc w/encl: See next page

DISTRIBUTION:
PUBLIC **(No DPC Folder for 10 working days)**
PDIV-2 Reading
RidsDlpmPdiv (HBerkow)
RidsNrrPMDHolland
RidsNrrLAEPeyton
RidsOgcMailCenter
RidsAcrsAcnwMailCenter
JHoncharik (NRR/DE/EMCB)
CSheng (NRR/DE/EMCB)
SCoffin (NRR/DE/EMCB)
TChan (NRR/DE/EMCB)

ADAMS Accession No.: ML031840676 NRR-106

OFFICE	PDIV-2P	PDIV-2/LA	PDIV-2/SC
NAME	DHolland	EPeyton	SDembek
DATE	7/2/03	7/2/03	7/2/03

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML031840676.wpd OFFICIAL RECORD COPY

REQUEST FOR ADDITIONAL INFORMATION

WCAP-15973-P, REVISION 00, "LOW ALLOY STEEL COMPONENT CORROSION ANALYSIS SUPPORTING SMALL-DIAMETER ALLOY 600/690 NOZZLE REPAIR/REPLACEMENT PROGRAMS"

WESTINGHOUSE OWNERS GROUP

PROJECT NO. 694

1. Section 2.6 of the topical report (TR) provides previous field experience of the half-nozzle repairs, including a pressurizer vapor space instrumentation nozzle repair performed in 1990 at Arkansas Nuclear One, Unit 1 (ANO-1). The repair was ultrasonic test (UT) inspected at the 1st and 2nd refueling outages and is currently UT inspected on an every-other-cycle basis. The repair is exposed to a high temperature steam environment which contains some boron, but not the same level as a pipe nozzle. This repair was approved provided that the licensee implements a monitoring program with a nondestructive examination technique demonstrated to be effective in evaluating base metal corrosion. A UT inspection method was developed and implemented. The monitoring plan was considered to be an essential part of the repair to provide assurance of continued safe operation, since laboratory data may not necessarily duplicate field conditions. Also, since there is limited experience with the behavior of the repair and different conditions such as potential extended outages or chemistry control fluctuations, periodic UT inspections performed every other outage of the repairs will provide the necessary data to understand the behavior of the repair and its continued safe operation. Why is a monitoring program not specified to evaluate repairs in nozzles with borated water that may be susceptible to primary water stress corrosion cracking? Please provide justification for omitting a volumetric monitoring program (such as UT inspection).

2. Sections 3.1 and 3.3 of the TR specify stress intensity factor ranges of KI(?KI) and crack growth (?a). These seem to be typographical errors. Please correct these errors.

3. Section 4.0 of CN-CI-02-71 (Summary of Fatigue Crack Growth Evaluation Associated with Small Diameter Nozzles in CEOG Plants) states that the elastic-plastic fracture mechanics (EPFM) evaluation is based on the Appendix K (ASME Section XI) approach. The Appendix K methodology is for the evaluation of flaws in reactor vessels when the vessel temperature is in the upper-shelf range. Justify the use of the Appendix K methodology in the current evaluation of crack stability for flaws originated from small diameter nozzle holes in pressurizers.

4. Section 6.1 of CN-CI-02-71 states that fatigue crack growth of the flaw is calculated over the remaining plant life and the final flaw size is used to confirm flaw stability at the end-of-plant life. However, plant life is not defined for these calculations. Please provide the length of time these calculations address. In addition, revise Tables 2-1, 2-3, and 2-5, by including in the tables the remaining plant life for each limiting plant selected for the fatigue crack growth calculation for the three locations. Further, report the RT_{NDT} values for the materials at the three locations being evaluated.

5. Section 6.2.2 of CN-CI-02-71 states that the specified design operating transients pertinent to this evaluation are similar for all plants. Confirm that the occurrences of transients specified in this section are for 40 years and the fatigue crack growth calculation was based on the portion of the occurrences corresponding to the remaining plant life for specific limiting plants.

6. Section 6.2.2.1 of CN-CI-02-71 discusses the establishment of the pressure curve based on "P_{SAT}+ 200°F." Please clarify how you shift the saturation curve.

7. Section 6.3.1 of CN-CI-02-71 indicates that both the hand calculations and ANSYS results for stresses are presented in Appendix B, Reference 7.1.18. Provide a discussion on these two sets of results as related to the validation of your ANSYS results.

8. Section 6.3.2 of CN-CI-02-71 states that the fracture mechanics evaluation used "the guidance outlined in ASME Code Section XI Appendix A for a double-sided crack that has propagated through the J-Weld..." Provide the figure number for the crack growth rate of Appendix A and the Edition of the ASME Code that you referenced.

9. Discuss the differences between the relative hole size and crack geometry of your issue and those of Raju-Newman's – address the need to use an additional margin to account for the concern for applying Raju-Newman's analytical results directly.

10. The last paragraph of Section 6.3.2 of CN-CI-02-71 indicates that thermal stresses are dominant in the pressurizer lower head due to its thick cladding. Was cladding with an appropriate thermal expansion coefficient modeled in your heat transfer analysis? Discuss the appropriateness of your heat transfer analysis.

11. Provide justification for using the J-material curve of NUREG/CR-5729 in your evaluation.

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