

December 31, 2001

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: WESTINGHOUSE TOPICAL REPORT WCAP-15622, REV. 0, "RISK-INFORMED EVALUATION OF EXTENSIONS TO AC ELECTRICAL POWER SYSTEM COMPLETION TIMES" - REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MB2257)

Dear Mr. Bischoff:

By letter dated June 15, 2001, the Westinghouse Owners Group (WOG) submitted for staff review Topical Report WCAP-15622, Rev. 0, "Risk-Informed Evaluation of Extensions to AC Electrical Power System Completion Times." In a subsequent letter dated October 5, 2001, the WOG requested that the staff review, in conjunction with their review of WCAP-15622, NEI Technical Specification Task Force (TSTF) Traveler TSTF-417, Rev. 0, "AC Electric Power System Completion Times" (WCAP-15622).

The NRC staff has completed its preliminary review of WCAP-15622 and has identified a number of items for which additional information is needed to continue its review. On November 21, 2001, the NRC staff provided an informal set of the questions to the WOG via e-mail. The NRC staff is now forwarding the enclosed request for additional information (RAI). Please provide the requested information so that the review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

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. Please provide the requested information by April 17, 2002, as we had discussed and agreed upon so that the staff's review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

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:

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

G. Bischoff

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Drew Holland, Project Manager, Section 2
Project Directorate IV and Decommissioning
Division of Licensing Project Management
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Mr. H. A. Sepp, Manager
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REQUEST FOR ADDITIONAL INFORMATION

WCAP-15622, "RISK-INFORMED EVALUATION OF EXTENSIONS TO AC ELECTRICAL POWER SYSTEM COMPLETION TIMES"

1. A review of the proposed technical specifications (TSs) shows that condition A.3 and B.4 extend the discovery of failure to meet the limiting condition for operation (LCO) from 6 days to 10 days. The 10-day value is based on the proposed 7-day diesel generator (DG) completion time and a proposed 72-hour completion time for ACTION B.3. The NRC staff is concerned that the 10-day completion time for discovery of meeting the LCO has not been based on a risk perspective, but simply reflects an adaptation of the TS to the proposed 7-day DG completion time. The NRC staff notes a similar situation with the proposed 34-hour completion time for LCO 3.8.9. Required Action A.1, "Restore the AC electrical power distribution system(s) to OPERABLE status," Required Action B.1, "Restore AC vital bus subsystem(s) to OPERABLE status," and Required Action C.1, "Restore the DC electrical power distribution system(s) to OPERABLE status". The 34-hour completion time for discovery of not meeting the LCO has not been based on a risk perspective, but simply reflects an adaptation of the TS to the 8-hour AC power distribution system, plus the 24-hour AC vital buses, plus the 2-hour DC electrical power distribution subsystems being inoperable. Provide a discussion for the basis of the proposed 10-day and 34-hour completion times that does not rely solely on engineering judgement.
2. The NRC staff noted that WCAP-15622 review methodology does not include probabilistic risk assessment (PRA) quality criteria for the evaluation of AC electrical power source completion times. Discuss PRA quality measures, including peer reviews, and how WCAP-15622 addressed individual plant PRA quality for the proposed plants and PRA quality guidance for subsequent plant specific submittals, including those plants not included in WCAP-15622.
3. Section 8.2.3.5, "Shearon Harris Results Discussion," states that the station blackout (SBO) core damage frequency (CDF) contribution with a 72-hour completion time is $1.34\text{E-}05/\text{yr}$ and that the contribution with a 7-day completion time is $1.36\text{E-}06/\text{yr}$. The WCAP states that the increased value of $1.36\text{E-}06$ is due to additional activities expected to be performed while at power. Reconcile the values given for SBO in Section 8.2.3.5.
4. WCAP-15622 provides a discussion of the sensitivity of the reactor coolant pump (RCP) seal models based on the topical report (TR) results. The Brookhaven National Laboratory loss-of-coolant accident (LOCA) seal model was used with modifications (WOG model) to address the importance of the LOCA seal model on the CDF analysis. At present, the Rhodes LOCA seal model is the model approved by the staff. Under certain circumstances, the use of the Rhodes model may yield significant differences in the PRA results. Provide a discussion on the CDF contributions when using the Rhodes model (SBO) and the effect on the conclusions stated in WCAP-15622.
5. Information Notice 97-02, "Availability of Alternate AC Power Source Designed for Station Blackout Event," addressed potential unavailability of alternate AC power

sources and noted that the capability to start on demand depends on the unavailability of support systems that may require AC or DC power. Determine the applicability of Information Notice 97-02 to WCAP-15622 review methodology and implementation guidelines.

6. Provide the values for emergency diesel generator (EDG) reliability and unavailability used in the PRA calculations including SBO (include alternate AC source if applicable). Discuss these values in relationship to the maintenance rule implementation goals and comparison to actual EDG performance and SBO commitments. Discuss the incorporation into WCAP-15622 implementation guidelines.
7. For plants that take credit for an alternate AC source, provide a discussion on the vulnerability of the alternate AC source to external events (including weather-related events) that could disable the alternate AC power source, the emergency AC power source, or the normal offsite power sources. Include common cause failure mechanisms between the normal electrical distribution system and the alternate AC source. Discuss the impact of external events on the availability of alternate sources of AC power (SBO diesels for example) with respect to WCAP-15622 and the included implementation guidelines. Provide a discussion as to the assumptions (qualification) and risk impact of the alternate AC source.
8. The results for Delta CDF and incremental conditional core damage probability (ICCDP) shown in Table 8-1, Table 8-5 and Table 8-6 are not consistent with the Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and RG 1.174, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" guidance. Numerous results show what appears to be substantial differences from the guidelines. Discuss these differences and include any compensatory measures (or guidance) before and during diesel generator maintenance or AC bus restoration including 10 CFR 50.65 maintenance rule provisions or surveillances to be performed to ensure operability of systems associated with the remaining equipment (EDG, AC bus). Include how these measures will be documented. Discuss any suggested revisions to the requested LCOs that will bring impacts into alignment with RG1.174 and RG 1.177 guidelines or propose an alternate basis for acceptability.
9. RG 1.177 states that when multiple TS changes are being considered, the combined impact of the changes should be considered in addition to the individual impacts. Appendix C, Step 7, states that cumulative risk needs to be determined but the results are not discussed in WCAP-15622. Provide a discussion of the combined impact of the proposed changes with respect to WCAP-15622.
10. For alternate AC sources credited in the analysis, confirm that the credited AC source meets the criteria set forth for SBO performance in industry and staff guidance (RG 1.155 and NUMARC 8700).
11. The proposed completion times are requested in part to facilitate on-line maintenance or at-power preventive maintenance. Although the frequency and duration of the

completion time may be estimated with the resulting unavailability calculated, discuss the effects that additional testing at power might have on plant risk due to improper maintenance or additional testing required that would have previously been performed during shutdown and not directly related to the extended completion time itself. Studies have shown that restoration failures have the potential to initiate a second loss of power that is difficult to diagnose and recover when that restoration was not always performed in accordance with established procedures.

12. WCAP-15622 discusses the risk impact of moving diesel maintenance activities from shutdown to at-power operation. WCAP-15622 found that performing scheduled maintenance activities at power results in ICCDPs significantly smaller than for shutdown. The conclusions presented by WCAP-15622 were based on the analysis for one plant and were expected to be applicable for all plants that schedule EDG maintenance at the beginning of the outage. It is not clear that a neutral or net risk impact improvement will result from the proposed shift to on-line EDG maintenance. While a qualitative argument could be made with regard to performing maintenance on-line as opposed to shutdown, it is not clear that a quantitative argument applicable to all plants would be bounding. Previous studies (NUREG/CR-5994) have indicated that with respect to CDF, taking an EDG out-of-service for maintenance during the early stages of an outage is comparable to short interval maintenance performed during power operation. However, the likelihood of core damage can be reduced substantially by scheduling long duration maintenance during refueling when decay heat is low as opposed to power operation. The NRC staff also notes that the standard TSs do not differentiate when work may be performed (what plant state) and therefore any risk averted by performing maintenance during power operation is problematic. Provide a discussion as to the generic applicability of WCAP-15622 results including plants without low power shutdown risk models.
13. The TR does not discuss whether each EDG at a plant is equivalent from a risk perspective when taken out-of-service. Discuss any differences and the impact on the TR conclusions. Additionally, discuss whether combining plant reliability data that may obscure the performance of individual EDGs at multi-unit sites.
14. Will the proposed allowed outage times (AOTs) for EDGs/vital 120 VAC power remain consistent with the maintenance rule reliability goals or commitments for SBO?
15. Provide a discussion on the configuration risk management program implementation to avoid risk significant configurations during extended EDG and vital 120 VAC power maintenance, repair, or overhaul.
16. Large early release frequency (LERF) or incremental conditional large early release probability (ICLERP) is not presented in WCAP-15622. Please provide results and a discussion.
17. Discuss considerations to prohibit entry or termination of extended AOTs (maintenance) should external event conditions or warnings exist.
18. For EDG maintenance that is not performed every cycle (five year EDG overhaul), the

EDG overhaul completion time is averaged over a five year period. The TR states that actual (proposed) completion times (CTs), ICCDP and realistic CTs for CDF are used. Provide an evaluation of the risk impact for EDG overhauls on ICCDP/CDF using the actual CTs including the EDG five year maintenance.

19. Section 7.1 of WCAP-15622 states that the proposed completion times primarily affect the CDF and have only a secondary effect on containment integrity such that as the CDF increases, the LERF will increase by a similar amount. In other words, if the CDF increases by a set amount, the LERF will also increase by the same amount. Please explain.