

August 1, 2001

Mr. Andrew Drake, 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-15376, "RISK-INFORMED ASSESSMENT OF THE REACTOR TRIP SYSTEM (RTS) AND ENGINEERED SAFETY FEATURE ACTUATION SYSTEMS (ESFAS) SURVEILLANCE TEST INTERVALS AND REACTOR TRIP BREAKER TEST AND COMPLETION TIMES" (MUHP-3045) (TAC NO. MB0983)

Dear Mr. Drake:

By letter dated November 8, 2000, the Westinghouse Owners Group (WOG) submitted for staff review Topical Reports (TRs) WCAP-15376-P, Rev. 0 (Proprietary) and WCAP-15377-NP, Rev. 0 (Non-Proprietary), "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times." In a subsequent letter dated June 8, 2001, the WOG requested that the staff review, in conjunction with review of WCAP-15376, the technical specification and Bases changes justified by WCAP-15376, as reflected in Nuclear Energy Institute (NEI) Technical Specification Task Force Traveler TSTF-411, Rev. 0, "Surveillance Test Interval Extensions for Components of the Reactor Protection System" (MUHP-3046). The June 8 letter stated that the NEI report had been previously submitted for staff review via an NEI letter dated May 29, 2001.

On June 25, 2001, the WOG transmitted additional information requested by the NRC staff during a May 21, 2001, phone conversation between the staff and Westinghouse on the subject of WCAP-15376.

The staff has completed its preliminary review of WCAP-15376 and has identified a number of items for which additional information is needed to continue its review. Therefore, the staff is forwarding the enclosed request for additional information (RAI). A draft copy of the RAI was provided to you on July 6, 2001, and was discussed at a meeting between your representatives and the NRC staff on July 11, 2001. Clarifications obtained at the meeting obviated the need for some of the RAI items (those already adequately addressed in the TR), so they have been deleted. Others have been reworded to clarify them. The staff believes, based on the discussions at the meeting, that the revised RAI is clear and that the WOG understands what information is being sought.

Please provide the requested information by August 31, 2001, so that the staff's review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

Mr. Andrew Drake

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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 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) 415-1421.

Sincerely,

/RA/

Michael L. Scott, 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
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REQUEST FOR ADDITIONAL INFORMATION

WCAP-15376-P, "RISK-INFORMED ASSESSMENT OF THE RTS AND ESFAS SURVEILLANCE TEST INTERVALS AND REACTOR TRIP BREAKER TEST AND COMPLETION TIMES"

PROJECT NO. 694

1. The Westinghouse Owners Group (WOG) is requesting extension of completion time (CT) for reactor trip breakers (RTBs) from 1 hour to 24 hours. The WOG is also requesting extension of the bypass time for RTBs from 2 hours to 4 hours. Please address the following questions:
 - From an operational point of view, please explain how bypass time is related to the CT. Can a RTB be in an inoperable state and at the same time not be in a bypassed state? If so, for how long?
 - The fourth sentence in the third paragraph of Section 3 reads, "This can result in the shorter RTB CT and bypass time limiting logic cabinet activities if tested concurrently." What would be a representative alignment when a logic cabinet and a RTB are tested concurrently?
 - The same paragraph addresses the inconsistency in the current technical specification (TS) related to CT and bypass time of RTBs and logic cabinets. It appears that this inconsistency was introduced as the result of changes requested under WCAP-10271 and WCAP-14333. Please confirm this and confirm that all such inconsistencies will have been removed after the proposed TS changes go into effect.
2. Please explain why WCAP-15376 proposes deletion of note 2 under "required action" for Condition R of TS 3.3.1. Also, WCAP-14333 requested approval to insert an additional note to TS 3.3.1, Condition R. Specifically, the note read, "One RTB train may be bypassed for up to [4] hours for concurrent surveillance testing of the RTB and automatic trip logic, provided the other train is OPERABLE." This note has been approved by NRC. However, it is not reflected in WCAP-15376. Please explain why.
3. Clarifications are needed regarding the relationship between the proposed changes, the baselines against which the proposed changes are to be measured, and previous changes to the baselines. Please address the following:
 - Describe how cumulative risks have been defined, tracked, and documented. Reference Section 3.32 of Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." Are additional relaxations (surveillance test interval [STI] and allowed outage time [AOT]/CT) proposed for the reactor trip system and engineered safety feature actuation system (RTS/ESFAS) that

may increase risk cumulatively with the proposed relaxations (e.g., slave relays, sensors, response time testing)?

- Item 6 of WCAP-15376, Section 5.0 states: "The analysis results should be referenced back to the pre-TOP (TS Optimization Program) and TOP (WCAP-10271) AOT and STI conditions." The second paragraph of Section 8.3.1 defines the base case as the model developed for WCAP-14333. As stated in the first paragraph of Section 8.3.3 of WCAP-15376, the base case model chosen for comparative risk studies was not the original WCAP-14333 model but a variation of the WCAP-14333 model in which Westinghouse modeled the components in the logic cabinets at the card level instead of at the component level. Please clarify and justify the choice of the base model and comment on the appropriateness of the conclusions drawn from comparative risk studies in view of the use of a modified base case.
 - The cumulative core damage frequency (CDF) changes relative to two regimes are compared in Section 8.4.4. Is the comparison realistic in light of the fact the both the logic models and data have been changed since the approval of WCAP-10271?
 - The comparison provided in Table 8.33 does not match the information in the WCAP-14333 safety evaluation report (SER). Please explain the reason for this difference.
4. The AOT risk analysis for RTBs does not follow guidelines of NUREG/CR-6141 relative to common cause failure analysis. According to the guidelines, if the limiting condition for operation (LCO) is entered for corrective maintenance (CM), the redundant hardware should be assigned a β -factor, which is the conditional failure probability given one item has already failed. The AOT risk of CM, if provided, can provide the upper bound for the AOT risk associated with the LCO configuration. Please explain why the common cause failure analysis guidelines of NUREG/CR-6141 were not used for the AOT risk analysis for RTBs in WCAP-15376. Also, please describe what steps would be taken to provide assurance against common cause hardware failures.
5. Please clarify how and when operator actions are credited in the signal unavailability analyses. Some operator actions appear to be credited in the fault trees and others in the accident sequences. Please explain how assurance is provided that operator credit is not "double-counted" in the analysis. Also, please address the following:
- It appears that some of the human error probabilities (HEPs) provided in Table 8.28 of the analysis (WCAP-15376, page 8-52) do not correlate with the HEPs listed in Table 3.3.3.2 of the Vogtle probabilistic risk analysis (PRA). Please explain how the events OSI1, OSI2, OMG, and OCR of the Vogtle PRA model correspond to events listed in Table 8.28 of WCAP-15376.

- Please explain how the split fractions for top events engineered safety features (ESF) and reactor trip (RT) of the Vogtle PRA (Table 3.3.5-1, pages 3-141 and 3-153) are impacted as a result of the requested changes. In your response please correlate these split fractions to split fractions reported under the "base case" regime in Tables 8.9 through 8.13 of WCAP-15376.
6. Westinghouse developed failure probabilities for several components based on a WOG survey (Table 8.6). The failure probabilities were used in the analysis of the fault trees to determine the impact of the proposed changes. WCAP-15376 does not identify the observation period for the actual demand and failure data provided by the plants. Please provide the data observation periods.
 7. Please explain why conclusion 4 on page 8-28 does not hold for total signal unavailability (e.g., ESFAS system).
 8. Section 8.1.1 of WCAP-15376 identifies the representative reactor protection system (RPS) signals that are used for evaluation. Please provide additional explanation of the basis for selection of these representative signals and how assurance is provided that analysis of these signals bounds the risk posed by the proposed changes.
 9. The single AOT risk for the reactor trip breakers is reported in Section 8.4.3.2. Please provide the following additional information:
 - The percent contribution of anticipated transient without scram (ATWS) events to total CDF for Vogtle and other Westinghouse plants; and
 - Whether the AOT risk results credit AMSAC.
 10. Regarding Sections 8.4.3.3 and 8.4.3.4 and the discussion of large early release frequency (LERF) and incremental conditional large early release probability (ICLERP): please provide the quantitative metrics used for "early" and for "large" in the Vogtle LERF model. For example, are all "early" failures considered "large," or do you discriminate between large and small releases at some radiological release threshold? Is a "Level-3" PRA performed to determine the effect of evacuation on early fatalities? Please provide the contributors (accident sequences) that contribute to the Vogtle LERF. Is this basically the same set of contributors across all the relevant Westinghouse plants?
 11. Regarding Section 8.4.3.4 and the discussion of ICLERP, WCAP-15376 states: "Because the success of [sic] failure of the containment systems is independent of the reactor trip breakers, the LERF will increase only *in direct proportion* (emphasis added) to the increased frequency of core damage sequences involving reactor trip breaker failures." Is the document implying that if (for example) the core damage frequency increases by 10 percent, the LERF will always increase by the same amount, 10 percent (in consideration here of the reactor trip breaker failures)?

12. WCAP-15376 does not clearly indicate how the common cause failure (CCF) grouping is performed. Please define the CCF group for each signal type.
13. WCAP-15376 provides representative fault trees but does not provide basic event probabilities used in the fault trees. Please provide basic event probabilities used in the fault trees.
14. Pages B-3 and B-4 of WCAP-15376 are missing. (The corresponding pages in WCAP-15377 are present.) Please provide the missing pages.
15. Page B-10 of WCAP-15376 identifies a proposed insert 2 to TS 3.3.2, page 3.3-29, that reads, "(a) Reviewer's Note: The Frequency remains at 31 days on a STAGGERED TEST BASIS for plants with a Relay Protection System." However, Table 1.2 of WCAP-15376 indicates that the master relay STI for the relay protection systems is one month. Please explain the apparent inconsistency and address the impacts of inconsistencies or incorrect periodicities (if any) used in the topical report analyses on the validity of the results of the analyses.
16. The results of WCAP-15376 are for the most part based on plant operating data of existing components. With plant life extension and equipment modernization, how can assurance be provided that the results of WCAP-15376 will remain bounding with either component replacement or system retrofits (RPS replacements for example)? Will changes in system architecture/configuration or additional failure modes (software) be accommodated in the WCAP-15376 model?
17. Please describe how equipment performance will be monitored to provide feedback that equipment for which the proposed extended STIs and CTs would be implemented is performing per the assumptions of WCAP-15376?
18. Page 6-3 of WCAP-15376 states that the limiting safety system settings and response times are not impacted by the proposed changes. The channel operational test includes rack components (signal conditioning, bistables, etc.). There does not appear to be a provision in WCAP-15376 to review uncertainty assumptions for the included instrumentation to accommodate an extended surveillance interval. Additionally, how have time-related effects on these components (drift and aging) and the projection of these effects to an extended surveillance interval been addressed?