February 7, 2006

MEMORANDUM TO: Daniel S. Collins, Acting Chief
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Girija S. Shukla, Project Manager /RA/
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MEETING HELD ON JANUARY 24, 2006, WITH BABCOCK & WILCOX OWNERS GROUP TO DISCUSS TOPICAL REPORT BAW-2461, "RISK-INFORMED JUSTIFICATION FOR CONTAINMENT ISOLATION VALVES ALLOWED OUTAGE TIME CHANGE" (TAC NO. MC5722)

On January 24, 2006, at the request of Babcock & Wilcox Owners Group (B&WOG), the Nuclear Regulatory Commission (NRC) staff met with representatives of B&WOG to discuss the NRC staff draft questions on the review of Topical Report BAW-2461, "Risk-Informed Justification for Containment Isolation Valves Allowed Outage Time Change."

The meeting began with discussions of the enclosed NRC staff draft questions, followed by the NRC staff's clarifications and B&WOG's proposed disposition of these questions. It is expected that the NRC staff will provide the final questions to B&WOG by February 15, 2006, and B&WOG will provide its response to the NRC by March 15, 2006. Based on this schedule, it is expected that the draft safety evaluation will be issued by June 30, 2006.

At the conclusion of the meeting, the NRC staff expressed its appreciation to the B&WOG representatives for the meeting. An attendance list is enclosed. No slides were used during the meeting.

Project No. 693

Enclosures: As stated

cc w/encls: See next page

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DATE	2/6/06	2/2/06	2/7/06

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MEETING ATTENDEES FOR

MEETING WITH BABCOCK & WILCOX OWNERS GROUP TO DISCUSS

TOPICAL REPORT BAW-2461, "RISK-INFORMED JUSTIFICATION FOR

CONTAINMENT ISOLATION VALVES ALLOWED OUTAGE TIME CHANGE"

JANUARY 24, 2006

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Bob Schomaker	
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DISTRIBUTION FOR SUMMARY OF CLOSED MEETING HELD ON JANUARY 24, 2006, WITH BABCOCK & WILCOX OWNERS GROUP TO DISCUSS TOPICAL REPORT BAW-2461

Date: February 7, 2006

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NRC Staff draft questions on Topical Report BAW-2461, "Risk-informed Justification for Containment Isolation Valves Allowed Outage Time Change."

1.0 Page 2-8. Section 2.2.2 Common Cause failure Determination. The topical report (TR) states that an action has been added to perform a common cause failure determination of the second redundant CIV, of a like pair, within the original four-hour AOT of the inoperable CIV. Is this action included in the technical specification markups? Describe the methods used in this determination.

2.0 Discuss the increase in CIV unavailability due to test or maintenance as a result of the AOT extension to 168 hours and confirm the impact on the average CDF/LERF remains acceptable and is consistent with the expected number of preventive and corrective maintenance evolutions to be performed.

3.0 Page 3-8. For the ICCDP and ICLERP calculations, provide the CDF and LERF impact definition - (baseline, zero maintenance model).

4.0 Page 3-12. The TR states that the acceptance criteria for ICCDP and ICLERP ensure that the overall risk impact of the proposed AOT will be small, even considering separate LCO entries for multiple penetrations. The TR states that the maintenance rule will be used to evaluate multiple simultaneous extended AOT CIV entries in separate penetrations. However, the topical report analysis is applicable to only a single CIV AOT entry at a time.

The topical report BAW-2461 implementation of RG 1.177 Tier 3 guidelines generally implies the assessment of risk with respect to CDF. However, the proposed CIV AOT impacts containment isolation and consequently LERF and CDF. Therefore, a licensee's CRMP, including those implemented under the maintenance rule of 10 CFR 50.65(a)(4), must be enhanced to include an LERF methodology/assessment and must be documented in a licensee's plant-specific submittal (see RG 1.174 Section 2.3.7.2 for key components of a CRMP)

The staff is concerned that configuration risk management as implemented under the maintenance rule is inadequate to evaluate the risk impact of CIVs in maintenance or repair such that the assumptions of BAW-2461 remain valid. The extension of the AOTs for CIVs generally does not have a significant impact on CDF but does impact LERF/ICLERP (containment isolation). The TS allows multiple condition entry for CIVs but the topical report analyses are based on a single PCIV AOT and therefore cumulative risk must also be evaluated for multiple PCIV LCOs. Plant Tier 3 programs that are based on the maintenance rule generally do not provide a quantitative or qualitative assessment of LERF. BAW-2461 provides limited guidance on performing a Tier 3 LERF analysis either for single or multiple CIV AOTs. The maintenance rule does not require a quantitative risk assessment and, usually, the Tier 3 assessment is done with only a level 1 CDF analysis. Since the extension of a CIV AOT mainly impacts LERF/ICLERP it is the staff's concern that the evaluation of CIVs in a Tier 3 configuration risk management program is limited in that the configuration risk assessment may be incomplete for CIVs in maintenance or repair (only a quantitative or qualitative CDF assessment with a limited qualitative LERF/ICLERP assessment is performed).

Provide an evaluation as to the applicability of topical report BAW-2461 to simultaneous multiple extended CIV AOTs in separate penetrations including the methodology to be used to evaluate LERF/ ICLERP such that the conclusions of the topical report continue to be met.

Background;

A Tier 3 program ensures that while a CIV is in an LCO condition, additional activities will not be performed that could further degrade the capability of the plant to respond to a condition the inoperable CIV or system was designed to mitigate, and as a result, increase plant risk beyond that assumed by the TR analysis. Tier 3 programs, as implemented by the maintenance rule of 10 CFR 50.65(a)(4) during CIV maintenance are to: (1) ensure that additional maintenance does not increase the likelihood of an initiating event intended to be mitigated by the out-of-service equipment, (2) evaluate the effects of additional equipment out-of-service during CIV maintenance activities that would adversely impact CIV AOT risk such as from redundant systems or components, and (3) evaluate the impact of maintenance on equipment or systems assumed to remain operable by the CIV AOT analysis.

NEI Guidance 93-01, Revision 3, Section 11.3.7.1 as endorsed by RG 1.182 states that qualitative methods are an acceptable approach for establishing risk management actions for (a)(4) assessments. Section 11.3.7.2 provides guidance on establishing action thresholds based in part on the EPRI PSA applications guide EPRI-TR-105396. NEI-93-01 guidance states that an acceptable alternative for (a)(4) implementation would include establishing ICDP and ILERP risk management action thresholds. NEI-93-01 also states that due to differences in plant type and design, there is acknowledged variability in baseline core damage frequency and large early release frequency. Further, there is variability in containment performance that may impact the relationship between baseline core damage frequency and baseline large early release frequency for a given plant or class of plants. Finally 93-01 states that therefore, the determination of the appropriate method or combination of methods as discussed above (as presented in 93-01), and the corresponding quantitative risk management action thresholds are plant unique activities.

5.0 Page 2-2, 3-12. The analysis by the B&WOG assumed that core damage events with open penetration flow paths to the environment are assumed to be candidates for a large early release. No credit is given in the analysis for line size, termination point or ventilation systems. However, the TR allows separate LCO entry that may increase the effective hole size. Additionally, the TR allows licensees to use plant specific PRAs to screen penetrations based on hole size and size threshold for ISLOCA. The TR allows individual licensee to categorize penetrations as small risk and allow the extended AOT depending on the plant specific PRA. The TR states that this approach would be further supported by a licensees configuration risk management program to monitor simultaneous CIV LCO entries.

Several studies including NUREG/CR-4330, “Review of Light Water Reactor Regulatory Requirements,” NUREG-1493, “Performance-Based Containment Leak-Test Program,” NUREG/CR-6418, “Risk Importance of Containment and Related ESF System Performance Requirements,” and NUREG-1765, “Basis Document for Large Early

Release Frequency (LERF) Significance Determination Process (SDP)," have been performed to determine the risk significance of various levels of containment leakage. Describe the methodology to be employed and the appropriate acceptance criteria individual licensees will use to perform this evaluation as part of the TR implementation.

6.0 Page 3-13. With penetrations with two like CIVs the analysis did not include common cause failure when one CIV is inoperable. The B&WOG analysis assumes that plant operators will verify within four hours (the original AOT) that the remaining CIV of the like pair has not been affected by the same failure mode. Is the current common cause evaluation also four hours in the TS ? Are the 4 hours accounted for in the extended AOT risk?

9.0 Page 3-16. Base CDF estimate is internal events only.

10.0 Page 3-17. Although the TR states that the failure rate for the most limiting valve type for each failure mode was selected, the TR also states that failure rates were determined for each valve type and failure mode by comparing the failure rates for the participating plants and using the median values. Why were median values selected for the bounding analysis?

11.0 Page 3-14. The failure rate for random pipe failure is 6.0E-10/ hour per penetration flow path. The TR assumes 100 pipe sections per flow path giving a value of 6.0E-8 or 5.24E-4/year. Provide a discussion on the basis for this number.

12.0 Page 3-18. Provide a basis for the common cause beta factor selected.

13.0 Page 3-29, first paragraph. The TR discusses the use of the proposed AOT in delaying the repair of an inoperable CIV. Is the assumption that an extended AOT cannot be used to delay repair for an inoperable CIV on an RCS flow path if the reason for the inoperability is a failure of the valves RCS pressure boundary intended to be a licensee commitment?

14.0 TR BAW-2461 does not discuss the uncertainty in the proposed CIV extended AOT risk results. As discussed in RG 1.174 and NUREG/CR-6141, "Handbook of Methods for Risk-Based Analyses of Technical Specifications," a licensee can perform sensitivity studies to provide additional insights into the uncertainties related to the proposed AOT extension and demonstrate compliance with the guidelines and evaluate uncertainties related to modeling and completeness issues. Provide this discussion for BAW-2461.

15.0 Specific penetrations are to be identified by the licensee that contain similar redundant CIV subject to common cause evaluation before entering an extended AOT. The BAW-2461 states that these penetrations/CIVs will be documented through administrative controls. Is this considered a Tier 2 evaluation and a licensee commitment?

16.0 The topical report does not indicate that the B&WOG is developing a TSTF for the topical report. What is the associated TSTF?

17.0 Page 3-30. States that ISLOCA risk is exacerbated when one CIV is inoperable. An example is given for a penetration flow path with two NC CIVs and low pressure piping downstream. If one CIV is inoperable the remaining CIV is insufficient to keep the risk

impact small during the proposed AOT extension unless de-energized. The topical states that this suggests against extending the AOT for any penetration flow paths that may have this configuration. It is stated that the extended AOT will not be used unless the valve position is verified closed considered a license condition by the TR? How will the valve position be confirmed (closed) and is this considered in the risk assessment?

18.0 Page 3-41. The topical report states that for situations where there are only two NC CIVs between the RCS and the low-pressure interfacing system it is necessary when implementing the proposed TS changes to identify where this is the case to ensure that the proposed AOT extension is not applied to those penetrations. However, the proposed resolution states that these configuration are acceptable if the remaining CIV is verified closed. Reconcile this apparent discrepancy.

19.0 Page 3-42. The topical report discusses Tier 2 and the identification of potentially risk significant configurations that could exist with additional equipment out of service besides inoperable CIVs. The discussion is mainly concerned with redundant CIVs in the affected penetration but does not discuss CIVs in penetrations associated with an ACLS . What Tier 2 restrictions, if any, have been identified for penetration flow paths that include an ACLS.

20.0 Page 3-42. The topical report also discusses the establishment of a CRMP as part of a Tier 3 evaluation. As part of the topical reports discussion on Tier 3 and a CRMP the topical report reference's three bulleted conditions as part of the CRMP as follows.

- No action or maintenance activity is performed that will remove equipment that is functionally redundant to the inoperable CIV, including the redundant CIV(s) on the same penetration and supports for the redundant CIV.

- No action or maintenance activity is performed that will significantly increase the likelihood of challenge of the CIVs. Challenges to the CIVs include DBAs that result in release of radioactive material within containment (LOCA, main steam line break, rod ejection accident). Also included is removing equipment from service that may cause a significant increase in the likelihood of core damage while in the proposed AOT, which may increase the risk of large early release via the inoperable CIV.

- No action or maintenance activity is performed that will remove equipment that supports success paths credited in the AOT risk evaluation. This includes the other series valves, if any, credited in the risk assessment for RCS penetrations that otherwise would be high risk for ISLOCA.

  Are these to be considered license commitments for licensee's incorporating the topical report?

22.0 Discuss the impact of external effects on the proposed extended CIV AOT.

23.0 Page 3-43. No action or maintenance activity is performed that will remove equipment that is functionally redundant to the inoperable CIV, including the redundant CIV(s) on the same penetration and *supports for* the redundant CIV. What does "supports for" relate to?

24. Assumption 3, Page 3-12 of the submittal. The topical report references that a utility may employ an alternative evaluation approach to that shown in BAW-2461 to screen a minimum penetration size based on large early release and therefore establish screening criteria to eliminate certain line sizes from a topical report analysis or CRMP consideration.

Please provide the following:

A. An assessment of the impact of a line size screening criteria similar to the containment penetration screening criteria used in a typical PRA (e.g., larger than the 1" and 2" diameter line size criteria typically used in the methodologies to identify penetrations whose failures could result in a large early release). This should include an estimate of the number and types of lines for the established line size range.

B. Provide the details of the calculations performed to determine the pipe size screening including containment type.

C. If a PRA-type screening criteria is not adopted, please provide the results of offsite consequence calculations demonstrating that early health effects would not occur given a severe accident with containment breach sizes equivalent to the screening criteria proposed by the alternate methodology.

25.0 Page 3-21, Last paragraph. Paragraph states that the probabilities are calculated for two different AOT assumptions, once for the proposed 168-hour AOT, and once for the 72-hour AOT associated with the ACLS technical specifications. What TS change is associated with the 72-hour AOT? Is the 72-hour AOT limiting for AOT associated with an ACLS system?

26.0 Page 3-19, 22. The TR analysis addresses only single line penetration flow paths. To address additional pathways (parallel valves) or multiple pathways the TR suggests using the most limiting penetration pathway or combining the multiple flow paths to show that the risk remains small. Are these configurations addressed in the TR FMEA and risk calculations shown in Table 3.3 or is it expected that licensee’s will address these configurations on a plant specific basis? Discuss the guidance for the treatment of these configurations.