June 21, 2004

MEMORANDUM TO: Robert A. Gramm, Section Chief Project Directorate IV Division of Licensing and Project Management

- FROM: Peter Habighorst, Acting Section Chief /**RA**/ Probabilistic Safety Assessment Branch Division of Systems Safety and Analysis
- SUBJECT: REQUEST FOR ADDITIONAL INFORMATION NEEDED TO COMPLETE THE TECHNICAL REVIEW OF TOPICAL REPORT BAW-2441 Rev.2, "RISK-INFORMED JUSTIFICATION FOR LCO END-STATE CHANGES" (BABCOCK AND WILCOX PLANTS; TAC # MC2615)

The Probabilistic Safety Assessment Branch (SPSB) completed its initial review of the risk assessment and related information submitted by the Babcock and Wilcox Owners Group in support of Initiative 1 of the Risk-Informed Technical Specification (RITS) effort. Initiative 1 of the RITS effort relates to end states for technical specification action requirements. Based on this initial review, SPSB has prepared requests for additional information (RAIs) which are attached to this memorandum.

This additional information is needed to finalize the risk-related review and prepare a safety evaluation report for the approval of the proposed generic changes to the Standard Technical Specifications (STS). If you have any questions regarding these RAIs, please contact Nick Saltos at 415-1072.

Attachment: As stated

cc: D. G. Holland Yi-Hsiung Hsii T. R. Tjader

CONTACT: Nick Saltos, NRR/DSSA/SPSB 415-1072.

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REQUEST FOR ADDITIONAL INFORMATION ON TOPICAL REPORT BAW-2441 Rev.2, "RISK-INFORMED JUSTIFICATION FOR LCO END-STATE CHANGES" (TAC # MC2615)

- 1. The submitted information does not provide sensitivity studies investigating the robustness of the results to uncertainties in data and modeling assumptions. Examples of potential uncertainties in data used during Modes 3, 4 and 5 are initiating event frequencies, recovery probabilities and common cause failure probabilities. This type of data are usually taken from the power operation risk models and adjusted to reflect the different shutdown conditions (e.g., loss of coolant accident (LOCA) frequencies are often assumed to be one or two orders of magnitude lower in Mode 4 than in Mode 1, due to the reduced reactor coolant system (RCS) pressure). Such adjustments may not always be conservative and at times may include significant uncertainties. An example of potential non-conservative modeling assumption during Mode 4 (while on steam generator cooling) is the modeling of reactor coolant pump (RCP) seal LOCAs. Please investigate the robustness of the quantitative risk assessment results and provide your findings, including supporting discussions, for the staff's review.
- 2. Please provide risk assessment results for each individual LCO and identify any potential high risk configurations which must be allowed only in conjunction with risk management actions based on approved implementation guidance. The quantitative risk assessment results, in terms of core damage frequency (CDF), are provided only as numerical averages of several limited conditions of operation (LCO). In addition, it is stated that the Mode 4 (on steam generator cooling) end state is associated with less risk than the Mode 4 (on shutdown cooling) and Mode 5 end states, for all the individual LCO conditions for which end state change is proposed. However, this information does not provide any insights about potential high risk configurations that may occur when additional equipment, beyond the one associated with the non-met LCO, is inoperable. Insights about potential high risk configurations are needed, according to applicable regulatory guidance, to identify risk management actions and ensure that the proposed changes will be safely implemented.
- 3. There are differences in the reactor coolant system (RCS) pressures allowed while the plant is in Mode 4 (on steam generator cooling). As a consequence, following a total loss of feedwater, there will be cases where a plant may need to enter shutdown cooling (SDC) from relatively high pressures. Please list the means (and required actions) the various B&W plants have to depressurize the RCS to SDC entry conditions and discuss how these means and actions were modeled in the risk assessments.
- 4. At Davis-Besse (DB) the decay heat removal suction is aligned to the RCS before shutdown cooling is initiated (due to low temperature overpressure protection (LTOP) considerations). Thus, the draining-related risk at DB is not only associated with Mode 4 (on steam generator cooling) operation but also appears to be higher than during transition to Mode 5 because of the longer time the plant stays at a higher pressure where a pressure spike or LTOP valve drift can cause an LTOP valve lift. Please discuss how this feature is modeled in the risk assessments supporting the proposed end state changes.
- 5. Please list the initiating event categories that were considered in the risk assessments for both the current and the proposed end states. Also, please provide the base case

(no LCO) dominant cutsets (e.g., top 100; less that 100 cutsets will be adequate if they are contributing to at least 90% of the end state's CDF) with a brief discussion.

6. The quantitative risk assessments do not include external events, such as seismic, internal fires and internal floods. This implies that it is assumed that the results and conclusions would not change had external event risks been considered. Please provide arguments to justify this assumption.