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UNIT NO 1

On July 20, 1982, the B&W Owners met with the Staff to culminate the continuing dialogue on the scope of the program for resolution of NUREG-0737, Item II.K.3.30, "Revised Small Break LOCA Methods to Show Compliance with 10CFR50, Appendix K." This letter formalizes the proposals made at that meeting.

We will resolve the two separate areas identified by the Staff in the April 16, 1982 meeting. The first, assurance of core cooling (10CFR50, Appendix K), is being evaluated under an ongoing SB LOCA Methods program approved by the Staff. The B&W Owners will continue to address the NUREG-0737, II.K.3.30 staff issues in the SB LOCA methods program as identified in Attachment #1. The B&W Owners Group has also prepared a number of reports as a result of the recent joint test evaluation with the Staff which are identified in Attachment #2.

The second area deals with the analytical basis for recovery of natural circulation, long-term cooling, and operator guidelines and training for these events. B&W Owners propose to benchmark our best estimate codes with Integral System Test (IST) data from the GERDA SB LOCA test facility. This facility was designed to provide better understanding of the longer term response of the B&W system. It will also provide data which will validate ATOG assumptions for these transient periods. The inclusion of GERDA and SRI-II test data should also alleviate the general uneasiness regarding the need for improved understanding of the B&W design which was expressed by the staff in our meetings. GERDA will provide test data for natural circulation, interruption of natural circulation, the transition to boiler-condenser mode of cooling and the long-term cooling of the system. This additional data should provide the Staff with sufficient confidence in the validity of B&W best estimate codes to accept the Owners' program as resolution of II.K.3.30.

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The B&W Owners are not willing to commit to an open ended test program, but do recognize that issues may be identified as data is developed which require further evaluation. We propose to evaluate any issues which arise and to take appropriate action for their resolution.

The following is more detail on the support for this position.

#### Background

Following the accident at TMI-2, the NRC required that further small break LOCA analyses be performed and that operator guidelines for managing small break loss of coolant transients be developed. The results of this work were documented by B&W in the May 7, 1979 "Blue Books". In their review documented in NUREG-0565, the NRC concluded that while there was not a safety concern, certain features on the B&W SB LOCA Evaluation Model required more extensive verification. In general, the recommendations were:

1. Additional code model predictions of Semiscale and LOFT experiments should be performed.
2. The SB LOCA methods should be revised to address their specific concerns. In addition, the licensees should verify the analysis models with appropriate integral system data.

These recommendations were implemented as requirements in NUREG-0737, Item II.K.3.30 and the following describes our actions toward resolution of this item.

#### Discussion

The B&W Owners have taken several actions in responding to these recommendations. In response to recommendation 1, computer code simulations of LOFT tests L3-1<sup>1</sup> and L3-6<sup>2</sup> and Semiscale test S-07-10D<sup>3</sup> were submitted. The B&W simulation results compared well with the test data and the simulations presented by other Vendors.

Since configurations tested in Semiscale and LOFT do not reflect all plant designs and arrangements, the acceptance by the Staff of benchmarks by other vendors would seem to be also applicable to B&W benchmarks of the same tests as adequate testing of computer codes used in SB LOCA calculations.

Prior to any action to respond to the SB LOCA issues in NUREG-0565, the B&W Owners Group met with the Staff on December 16, 1980 to obtain a better quantification of the Staff's issues relative to NUREG-0737, Item II.K.3.30. The Staff's issues were specified in the Staff minutes of that meeting.<sup>4</sup>

On May 12, 1981, the Owners Group again met with the Staff to present their program designed to address the issues of reference 4. The Staff concluded that eight of the nine issues would be resolved by the implementation of the program presented but that IST data would be required before II.K.3.30 could be signed off by the Staff. Attachment #1 details the response to each of the nine items in reference 4. During the main meeting the Staff raised a number of issues over and above those originally quantified as II.K.3.30 issues. Following this meeting and for several months thereafter, a continuing technical dialogue was held between the Owners and the Staff in an effort to obtain and understand a complete list of specific issues.

Finally, in a meeting on October 23, 1981 with B&W Utility Executives, the Staff identified the issues as uncertainties regarding hot leg "bubble dynamics" during the transition from natural circulation to the boiler-condenser mode.

From that meeting, the Staff agreed to participate in an in-depth review of the then current Babcock & Wilcox Small Break LOCA Methods Program, including the verification base. At the same time the Owners agreed to participate in a joint effort with the Staff to assure that current Small Break LOCA methods and Anticipated Transient Operating Guidelines (ATOG) programs are fully understood. The program was to include the following:

- Code parameters, models, assumptions, etc., which are important in controlling dynamics of interest will be identified and available experimental data substantiating their validity will be reviewed. This would be done using results of the improved evaluation model in order that the most accurate dynamic response characteristics are reviewed.
- Additional existing experimental data, from separate effects or integral tests, will be identified which address specific technical gaps, if any.
- Identify where and how additional experimental data may be obtained, if any is required.

The Owners Group Analysis Subcommittee set a meeting with the Staff for December 16 and 17 to implement this commitment. The Owners came to that meeting prepared to address "bubble dynamics" and the CRAFT code. The Staff expected to be presented with a test program and the meeting ended in an impasse. In a letter to the Staff on February 5, 1982, the Subcommittee again set a meeting to discuss:

- phenomena of bubble dynamics
- sensitivity of the system to decay heat, number of HPI pumps, phase slip, and interphase heat transfer
- discussion of benchmarks

August 12, 1982

On April 9, 1982, six reports were hand delivered to the Staff for review prior to the April 16 meeting with the Owners Group. Attachment #2 to this letter provides a brief description of these reports.

In the period between February and April, the Staff again expanded issues outside of II.K.3.30 (reference 5). Since the Owners were involved in an intensive effort to produce documents in response to the identified focused issue of "bubble dynamics", it was not possible to address the items in reference 5 specifically in the April 16 meeting. The presentations in the April 16 meeting were perceived by the Owners as being well received by the Staff and to date no negative comments have been received from the Staff on that meeting. We have since addressed these issues (Attachment #3).

At the conclusion of the April 16 meeting, the issues could clearly be separated into two parts. One part deals with the assurance of core cooling (10CFR50, Appendix K) and the other deals with the analytical basis for recovery of natural circulation, long-term cooling, and operator guidelines and training for these events. At this time the Owners began to develop the program described above for acquiring IST data to benchmark best estimate codes to be used in calculating operator oriented phenomena for ATOG.

#### Summary

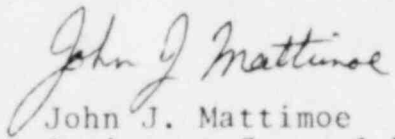
The B&W Utility Owners are continuing their work to address II.K.3.30 with the SB LOCA Methods Program described to the Staff and with the six reports described in Attachment #2. We further offer to benchmark best estimate codes with GERDA/SRI-II test data to provide better Staff understanding of the concerns in reference 5 which are outside of II.K.3.30. We believe that GERDA and SRI-II are technically acceptable test facilities to address the phenomenon associated with recovery from a small break and offer a unique way to benchmark several of these phenomenon as they interrelate - that is, GERDA is an integral system test focused on the longer term natural circulation phenomena of the B&W design. We provided the Staff with technical presentations on the design of GERDA at the Alliance Research Center on July 7 and followed with a tour of the facility.

The majority of Staff comments were favorable during and immediately following the presentation. However, a very negative comment was made by the Staff in the July 20 meeting with the Executives. We would be happy to address any technical questions the Staff or their consultants might have regarding GERDA, SRI-II and the test programs at each facility. We have, as an attachment to this letter, a description of the GERDA and SRI-II test programs.

August 12, 1982

We view our IST test program as the final element in addressing issues raised by the Staff during their review of the II.K.3.30 SB LOCA program and as a source of useful data to address other issues. These tests will be used as the bridge in the next logical step toward identifying any residual need for additional or modified test facilities. We therefore invite the Staff to consider our test program as the means to minimize limited owner and staff resources while enhancing the knowledge of the B&W system.

We intend to provide a follow-up letter within the next three weeks which will provide additional details and milestones which we intend to pursue.



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Attachments