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February 10, 1983

Mr. Darrell G. Eisenhut
Director of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Generic Letter No. 82-32
Potential Steam Generator Related Generic Requirements
Comments on SAI's Value Impact Analysis

Dear Mr. Eisenhut:

B&W would like to provide the following comments on the final draft of the Science Application Inc., (SAI) report on "Value-Impact Analysis of Recommendations Concerning Steam Generator Tube Degradations and Rupture Events" per your request of 12/13/82.

In general B&W supports the SAI report's conclusions that tube degradation and tube rupture are basically economic rather than safety concerns and that emphasis should be put on prevention rather than mitigation. B&W also agrees that the value of requirements 4 and 7 through 12 are low and should not be implemented.

Comments Regarding Certain Specific Conclusions in SAI Report

The B&W's position on requirements 1a, 3 and 5 can be briefly summarized as follows:

- Establishment and maintenance of proper secondary water chemistry is the most beneficial measure that can be taken to protect steam generator tube integrity.

- Development of more sensitive techniques and equipment are needed to improve early detection of problems. In addition, better training and more consistency in inspection analysis are needed. However, we believe the most effective driving force for such development is the industry striving to meet clearly defined inspection objectives rather than prescriptive description of equipment and techniques to be used.

- Scheduled interval visual, video and fibre optic loose parts inspections of the secondary side of steam generators along with properly quality assured inventory of parts entering and leaving the steam generators during inspection and repairs are effective preventive measures for protection against loose parts.

YG01

Additional General Comments

B&W supports the use of independent systematic evaluation of proposed new NRC regulations. However, the heavy emphasis in this study on the recirculating steam generator (RSG) design seems, in certain areas, to burden unfairly the B&W designed Once Through Steam Generators (OTSG). For example, 240 reactor years' operation out of a total of 353 (68%), and 95 events out of 122 (78%) are attributable to one vendor with the RSG design.

B&W is concerned that the subjective character of this study will be forgotten so that what originally were estimates, become facts during future decision making activities or merely with the passage of time. The SAI study uses estimated values and impacts based on a combination of historical facts, judgements and simplifying assumptions attributed to unexplained time constraints, to reach its conclusions. While the results of the study provide additional insights into the value of the recommendations, we believe the results are not sufficiently founded on facts so that they may be used as the sole or primary basis for acceptance or rejection.

A major concern B&W has with the SAI study is that it appears to recommend an increase in S.G. tube inspections for B&W plant owners as a result of proposed Requirement 2. In this instance, the study ignores the fact that B&W plant owners routinely perform 100% inspection of the open lane region in the upper part of the steam generators and it penalizes them because they frequently shut down and plug tubes well before technical specification limits are reached. This latter fact causes B&W plants to appear to have more pluggable indication events than other vendor's designs. Thus, B&W plant owners under proposed Requirement 2 for increased tube inspections, would be forced, because of the higher event count, more often to go to full 100% inspection of tubes in a steam generator than would the non-B&W designed plant owners that continue operation until technical specification limits are reached. The results of this method of counting events is illustrated in the table on page IV·2-4 of the SAI report where B&W plants show an increase of 36.7% in tube inspections compared to 16.7% for W and O for CE under proposed Requirement 2. This illustrates the onerous burden placed on B&W owners by this proposed requirement for safe and conservative performance and seems to provide little benefit at the cost of increased critical path outage time and man-rem exposure. It also gives no credit to the additional inspections done in the open lane region. It would seem more appropriate for these plants to use the category C-2 requirements for such a situation (without the complicated proposed analysis process for justifying this choice.)

In the 1/27/83 telephone conversation with the staff seeking clarification of areas of the report, it became evident that there is an extensive and complicated series of ancillary potential requirements, acceptance criteria and supporting analysis that are not clearly stated or sufficiently visible in the report. This is particularly true of the proposed method for justifying tube inspection frequency at the Category C-2 level rather than going to 100% tube inspections. We strongly urge that these requirement subsets be clearly defined and adequately described so that both industry and the staff can properly consider them when judging the effectiveness of the proposed new requirements.

B&W Owners have for the past six to seven years been using stabilization of plugged tubes, where certain criteria are met, to prevent a severed tube from damaging surrounding tubes or becoming a loose part. This has been directed in particular at tubes in high flow regions. We believe this practice is sound and contributes to maintaining a good tube integrity record. We understood from the 1/27/83 telecon with the staff that they believe this practice to be worthwhile and that the assessment in the report was looking only at the value of establishing this practice, on a stand alone basis, where it has not been done before. We find this logic somewhat unclear and urge that the report more thoroughly and clearly state what is and is not considered effective in this area.

Clarifications

The remainder of B&W's comments on this report are directed toward obtaining a clearer understanding of the information presented and seeking correction of apparent inconsistencies in the data presented.

Most of these concerns are directed toward the data presented in Table III·2-1 and comparison of that information with data shown in Tables III·2-3, 4 & 5 in the main body of the report and Tables A-3 and A-6 in Appendix A.

The first of these concerns is that Tables III·2-1 and A-3 show 21 leakage events for B&W while Table A-6 shows 26 (5 additional events in the 0.1 gpm category). In addition, if the reactor years shown in Table III·2-1 (38) are multiplied by the frequency of total events listed for B&W designed plants (0.684, Table III·2-5), the 26 event count is also obtained. Checking the SAI report source document, NUREG-0886, and B&W's in-house records, we find both our records and NUREG-0886 agree (see attached table) with the 21 event count if the "two leaker" event of 7/80 at ANO-1 and the "two leaker" event of 4/81 at DB-1 are taken each as single occurrences.

Other concerns with Table III·2-1 are in the definition of tube rupture and the skewed range of the third of the three leak rate categories shown in Table III·2-1. We believe these present an unclear and misleading picture of OTSG operating experience. All but one of the B&W designed plants have normal make-up pumps with 3 to 4 times the capacity of the "charging pumps" used by RSG vendor plants. The pump flow capacity used to define the tube rupture threshold in the SAI report appears to be the low flow positive displacement pump capacity used on non B&W plants. In our telecon clarification with the staff we understood that this definition was plant specific and therefore the difference in capacity was considered. This should be more clearly reported. Secondly the tube rupture definition should be more sharply defined. The present definition of tube rupture does not recognize the suddenness of the event. This leaves in doubt the status of a very small leak that propagates during normal shutdown. In the attached table there are two instances in B&W plants where very small leaks propagated during shutdown to large leak rates, albeit well below the tube rupture levels.

B&W is also concerned that the method of classifying leakage used in Table III·2-1 does not give an accurate description of OTSG tube integrity operating experience. It would appear that for the significant leak category, 0.30 gpm to tube rupture (TR), B&W has the worst frequency rate of the three PWR vendors. This is misleading.

Shown below is an alternate, more definitive summary of the B&W plant leak experiences.

Present Table III·2-1		Alternate Presentation	
<0.1 gpm	0	<1.0 gpm	13
>0.1 gpm<0.3 gpm	8	≥1.0 gpm <10 gpm	4
>0.3 gpm to TR	13	≥10 gpm <50 gpm	4*
TR	0	TR	0
	21	Total	21

*2 out of 4 propagated from .03 gpm and 1.7 gpm to 30-40 during shutdown

In addition, it would appear that the 13 events from the table were used to obtain the expected frequency of tube rupture for B&W plants reported under "other" in Table III·2-5. We suggest that the arrangement of Table III·2-1 should be changed along the above lines and the expected SGTR for B&W plants be recalculated.

Multiple Tube Rupture Considerations

An additional request in your letter was to provide our assessment of the probability and consequence of multiple tube ruptures.

B&W does not currently have underway any accident analysis for multiple tube ruptures. However, the following activities are underway to develop optimum guidelines for B&W designed units:

1. Preparing an event tree analysis to identify operator actions for multiple tube ruptures without equipment failures.

2. Performing qualitative evaluations to describe optimum operator actions during the following SGTR scenarios:

   - Small leaks in both steam generators

   - A double ended SGTR in one steam generator with a small leak in the other

   - A double ended SGTR in both steam generators

3. Updating Abnormal Transient Operating Guidelines (ATOG), as required, to aid the operator during multiple tube rupture events.

This work is still in progress but so far it has provided the following insights in connection with procedure preparation:

1. Guidelines must stress diagnosis of the primary to secondary leak to minimize event consequences.

2. Judgements regarding plant responses are more difficult (i.e., as compared to a single double ended SGTR or a SBLOCA) because little or no analytical studies of multiple SGTR events have been performed.

3. Due to the larger primary to secondary leakages possible with multiple SGTRs, the operator should monitor BWST levels more carefully since, unlike SBLOCA, the leakage is not readily retrievable for core cooling.

B&W is pleased to submit these comments on the study of proposed new regulations pertaining to steam generator tube integrity. We would like to continue to work closely with the Staff in an effort to reach a set of workable requirements. If you have any questions related to steam generator tube integrity, please call me on (804-385-2817).

Very truly yours,

J. H. Taylor
Manager, Licensing Services

JHT/fw
cc: Mr. R. B. Borsum
B&W Bethesda Office

attachment

SUMMARY OF TUBE LEAKS IN OPERATING OTSG'S - Through 10/31/81

UNIT	DATE	TUBE	LEAK RATE GPM	LOCATION ELEVATION	LOCATION REGION
Oconee 1-A	11/76	77-17	1.0	UTS	Lane
	2/81	78-2	0.25	15	Lane
Oconee 1-B	12/76	75-18	4.0	UTS	Lane
	1/77	75-12	12.0	UTS	Lane
	2/77	32-13	0.1	14	Periphery
	3/77	77-25	0.2	UTS	Lane
	5/77	77-15	16.0	UTS	Lane
	5/78	74-2	0.33	UTS	Lane
	7/79	73-130	0.48	14	Periphery
Oconee 2-B	12/76	77-23	2.5	UTS	Lane
	1/78	77-25	0.2	UTS	Lane
	9/81	77-2	30.0*	15	Lane
ANO 1-A	7/80	74-1	0.3	15	Lane
	7/80	140-68	(total both tubes)	15-UTS	Periphery
	9/80	74-2	0.3	UTS	Lane
Oconee 3-A	6/80	77-3	0.1	13	Lane
Oconee 3-B	7/76	77-11	1.0	15	Lane
	2/77	77-19	0.2	15	Lane
	6/77	78-1	0.2	15	Lane
	7/77	77-2	0.4	UTS	Lane
Davis Besse 1-A	4/81	47-1	0.5-0.6	15-UTS	Periphery
	4/81	48-1	(total both tubes)	15-UTS	Periphery
Rancho Seco B	5/81	77-17	30.-40**	15	Lane
Crystal River 3-A	None				

Notes

Total of 21 events of tube leakage

83.3% Lane Region

16.7% Periphery

*Initially 0.03 gpm, grew to rate shown during shutdown

**Initially 1.7 gpm, grew to rate shown during shutdown