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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Section

Gentlemen:

We have reviewed the draft proposed Regulatory Guide "Task SC 705-4, Ultrasonic Testing of Reactor Vessel Welds During Inservice Examination" and offer the following comments for your consideration:

The Babcock & Wilcox Company performs reactor vessel inspection from the internal surfaces of PWR vessels. The comments that we have made are applicable to the immersion ultrasonic examination of these vessels. The proposed regulatory guide may mean that supplemental examinations will have to be performed which may require that ultrasonic contact techniques be used from the internal surface. This would require major modifications to hardware and software. Vendors or utilities using external surface examination equipment may not be able to perform any alternate coverage (tandem technique) because of the cladding interface.

We believe that this guide, if fully implemented, will have a major impact on the inspections being performed, as well as the equipment and manpower required. We request that NRC study the implications fully before implementing any additional regulations. We will cooperate in these studies and any feasibility work.

C. Regulatory Position

1.1 Screen Height Linearity: These measurements should be made only on the vessel calibration block which covers the greatest depth to be examined. This will require approximately 30 minutes of additional time per examination at about $150 for inspection personnel time and $10,500 worth of critical path time. If this is done for each vessel calibration block, the time will be increased 5 or 6 times that estimated above with the corresponding increase in proportional costs.

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1.2 This is now being done once per day. We see no additional costs.

1.3 Frequency - Amplitude Curve: It is not clear whether this requirement is for the search unit only or the search unit/instrument system. It is not clear whether this is to be done on the reactor vessel or in the laboratory. If the measurements are to be performed during the reactor vessel examination, they will cost approximately $7,000 for additional equipment to go into containment; 4 hours of inspection time at about $300/hour and plus 4 hours of critical path time which costs an average of $21,000 an hour.

The required measurements are not specified in sufficient detail to know what is required. Where the measurements are made in the circuit greatly influences the results obtained.

1.4 Pulse - Shape: Does the requirement mean that this is a photograph of the ultrasonic instrument screen set up for the thickness range to be examined or that a separate calibrated time base signal should be used? What is meant by unloaded pulse?

To do this before and after examinations would add approximately 30 minutes of time at $150 for inspection time and $10,500 for critical path time.

2.0 Calibration: The recalibration time per the 1974 Code thru Summer 1975 Addenda is at the start and finish of each examination, when changes in the system occur and at least every 4 hours during an examination. This has been performed by B&W and requires 15 minutes of each 4 hours of examination time required for calibration. This has always been performed on the basic calibration block for the specific examination using the B&W inspection system.

The same calibration block cannot always be used for successive outage examinations because of NRC required Code updates.

B&W has always sealed the reactor vessel calibration block holes by welding seal plates over or plugs in the holes and penetrant inspecting the welds. The blocks have been canned in stainless steel sheet to protect carbon steel surfaces.

3.0 Near-Surface Examination and Surface Resolution: The word estimated is very broad. Estimated to what and with what precision? If a measurement is wanted, how is it to be obtained?

For internal immersion examinations, these factors are less significant than with contact examination.

The cost of this cannot be determined without tying down how it is to be accomplished.

4.0 Profile: Does the guide mean beam spread? This should be done on the largest vessel calibration block only. It will take approximately 10 minutes per search unit to perform and needs to be done for 2 search units. If this has to be done for each calibration block, approximately 2 hours is involved for 6 calibration blocks. This will cost approximately $600 for inspection time and $42,000 for outage time. Since later requirements of the proposed regulatory guide specify measurements at 20% DAC, this requirement doubles the total cost to $85,200.

5.0 Scanning Weld - Metal Interface: Most reactor vessel welds are fabricated with very low angle weld preparations (approximately 7 degrees) to comply with the requirement for ± 15 degrees to the perpendicular, major redesigns of every reactor vessel inspection system used in the United States would have to be made. Since regulations are not available to specify a uniform application of criteria, the various firms would go helter-skelter applying this requirement. Some alternate techniques such as radiography are just not feasible.

This one item alone can have a very great impact on the cost of examination. We question whether these methods will provide the additional quality assurance sought, in the absence of experimental verification that significant defects are missed. We do not question that more indications will be found, but we do question that nothing has been conclusively shown that enhances the safe operation of the plant by finding these indications. Changes to present techniques will find more indications.

What value will be gained through this requirement and the significant changes it will mean?

6.0 Sizing:

6.1 Traveling Indications: To record indications down to 20% DAC level will mean as much as a ten times (10X) increase in the recording time necessary to document indications. The requirement to record only indications that travel at a distance greater than indications from the calibration holes (at 20% amplitude) might have the effect of missing significant sharp cracks which do not travel to the same degree. Why permit the subtraction of beam spread at 20% DAC and not at 50% DAC? No measurement is made or addressed at half maximum amplitude as permitted by the Code for certain indications.

6.2 Nontraveling Indications: Many nontraveling indications are identified as geometric or metallurgical and do not need to be recorded for each and every scan. To record every indication at scan intervals of 1/4-inch or less is extremely time consuming and expensive without any benefit. To record at 5 amplitude settings is extremely expensive.

7.0 Reporting of Results: Only part of what is required to be reported is currently included in B&W reports. It is estimated that about four (4) man-hours would be required to collect, organize, and cross-reference these additional documents in B&W prepared reports. The cost increase would be approximately $200.

There is an inherent risk for the owner and his agents in items 7b and 7c. Very clear guidelines must be established for when alternate NDE methods would be considered mandatory by the NRC. A delay in the commercial operation of a nuclear plant resulting from NRC refusal of acceptance for alternate methods already reviewed and approved by the owner and his agents must be avoided. Such delay would impose a penalty on the owner of $500,000 per day for lost operating revenue, plus additional costs for any required reexaminations. Nowhere in this proposed guide are these guidelines established.

Under 7b, the determination of volumes not examined because of shadowing by part geometry and inaccessibility to the transducer require considerable engineering evaluation of the as-built weld configurations prior to examination. These evaluations will have to be updated from additional data after the examinations have been performed. Such updating would include any deficiencies not anticipated during engineering evaluations and add the shadowing effects from laminar defects.

Although this would appear to be a one-time effect for each weld, future changes in the size and configuration of examination equipment to meet changing Code requirements could repeatedly cause partial reworking of these determinations. A reasonable estimate of the initial cost of such evaluations would be eight (8) man-hours, or $400, per weld. Updates might cost four (4) man-hours, or $200, per weld every forty months.

D. Implementation: The writers of this proposed guide have failed to estimate the potential total impact of the guide on the performance of the various inspections. To require implementation of this guide immediately does not take into consideration the engineering studies of the examination coverage that will have to take place for each reactor vessel, the design and manufacture of equipment (design to hardware typically 1 to 2 years) or the qualification and demonstration of the techniques developed. These times may typically consume 1-1/2 to 3 years. The guide is not just requiring additional examination documentation requirements, but a major redirection of effort. This effort is not well defined or justified by the guide.

For these reasons, we believe that the proposed implementation schedule is not realistic.

E. Draft Value/Impact Statement: The draft value/impact statement partially justifies the requirements because they will have less impact on NRC reviews. We submit that these requirements will result in the need for greater NRC involvement in reviewing requests for deviations and compliance with the guide. It will most certainly require more reviews of data generated since the number of indications will increase by a large factor.

At the present time, a limited number of inservice inspection tools are available to handle the estimated work load for reactor vessel inspections as required by the ASME Code. The implementation or even pending implementation of the guide will have the addition impact of causing utilities or inspection service organizations to delay the order of new equipment or modification of existing equipment until the exact requirements are known.

The proposed guide has the potential for doubling or tripling the number of required inspection devices with a corresponding increase in the need for skilled operating personnel. It will put a very large stress on a segment of industry that is already being strained to supply skilled personnel.

We submit that NRC has not considered the above items in their value/impact statement, of even their own needs in these areas.

The staff position is based part on various studies which have demonstrated a substantial error band in discontinuity sizing. To a large extent, these tests were conducted using manual examination techniques.

We would recommend a round-robin comparison of the current code acceptable and proposed regulatory position techniques using automated equipment to demonstrate the true value of the proposed techniques weighted against the true impact of the regulatory position proposed.

Very truly yours,

James H. Taylor
Manager, Licensing

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cc: R. B. Borsum (B&W)

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