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June 27, 1980

NOTE TO: S. S. Pawlicki, Chief
Materials Engineering Branch
Division of Engineering

FROM: R. M. Gamble, Section Leader
Component Integrity Section

SUBJECT: DIFFERING PROFESSIONAL OPINION - SEQUOYAH PRESSURIZER PIPE WELD

Based on my previous discussions with J. Halapatz, and NRR and IE staff over the last six months, I have some comments concerning the contents of the June 16, 1980 memorandum J. Halapatz to S. Pawlicki and the June 25, 1980 memorandum J. Halapatz to R. Gamble.

First, I believe that many of the individual technical points made by Mr. Halapatz are generally correct and have merit. Certainly, it is difficult to interpret radiographs to detect sensitization for the repair weld and additional radiographic examination might better characterize the degree of sensitization in this repair. Further, there is concern for material degradation and sensitization from excessive heating during repair welding, especially for austenitic stainless steels; better documentation and a more representative mock-up would have been helpful in evaluating the repair. Finally, NRC Pipe Crack Study Groups have evaluated similar concerns about IGSCC in austenitic stainless steel piping. In fact, the PWR Pipe Crack Study Group draft report recommends that a study be completed to define generic limits on the allowable extent of repair welding on pipe.

However, in my judgment, the extrapolation of these individual items to the conclusion or implication that this repair has significant potential for a line break is not accurate and neglects previous safety evaluations and a significant amount of service experience. First, some degree of sensitization probably exists in most welds in BWR and PWR stainless steel piping. While the documents to define the degree of sensitization for the repair weld may be less than desired, the metallographic work done by TVA and the IE evaluation indicate that the repair weld is no worse than the population of full penetration welds in LWRs. Second, the presence of sensitized material does not automatically produce cracking and to imply that the weld will be subject to cracking similar to that in BWRs ignores evidence provided by many years of PWR service experience. There have been over 100 cracking incidents in BWR primary systems and none in PWR pressurizer lines. Further, even if cracking occurs, operating experience indicates that IGSCC has been detected by either inspection or leak detection before excessive leakage results. Additionally, analyses by the last two NRC Pipe Crack Study Groups and various experimental data indicated that even very

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large through wall cracks in combination with faulted loading conditions are unlikely to result in large losses of coolant from stainless steel lines.

Since, I believe that the repair weld is representative of the population of pressurizer welds, I would not recommend further studies to define the degree of sensitization for the repair weld. Similarly, at this point, a third party inspection would not seem to provide significant added assurance of integrity because of the attention given to this weld by IE and because no cracks or other weld defects have been reported.

In summary, I believe Mr. Halapatz has raised valid points about the metallurgical and documentation aspects of this repair. However, his focus on the presence of sensitized material overlooks the safety issue. Successful service experience of sensitized welds that do not crack, analyses and experimental data that show the potential for significant coolant loss is unlikely in stainless steel lines having IGSCC, the small leakage rates associated with inservice IGSSC, and successful experience in detecting small leaks indicate that acceptable system safety margins will be maintained.



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cc: J. Halapatz
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