ATTACHMENT C

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNIT 3

DOCKET NO. 50-278

SAFETY EVALUATION FOR THE
OPERATION OF PEACH BOTTOM
ATOMIC POWER STATION UNIT 3

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Docket No. 50-278

SUBJECT: Safety Evaluation for the Operation of
Peach Bottom Atomic Power Station Unit 3

INTRODUCTION

Philadelphia Electric Company performed inspections of the Peach Bottom Unit 3 jet pump instrumentation penetrations in response to I.E. Information Notice 84-41 and NRC Generic Letter 84-11. As part of this program, ultrasonic examinations were performed on the five welds associated with each jet pump instrumentation penetration. Circumferential crack-like indications were found on weld No. 2 on each of the two jet pump instrumentation penetrations (see Figure No. 1). In addition to the crack-like indications, the "B" loop No. 2 weld also showed three pin-hole leaks.

Philadelphia Electric Company contracted General Electric Company to analyze these indications and to provide their recommendations. All circumferential indications would require a weld overlay in order to provide the structural reinforcement necessary for 18 months of full power operation. The weld overlays were designed and sized as full structural overlays; thus meeting the requirements of NRC Generic Letter 84-11, and providing all ASME Code safety margins.

Overlay weld procedures were prepared to perform these temporary repairs with the concurrence of the on-site representative of the Hartford Steam Boiler Inspection and Insurance Company. Both welds received the weld overlays as recommended by General Electric Company. These overlays were made to provide additional structural reinforcement and prevent potential leakage.

BACKGROUND

The "A" loop circumferential indication was in the 12 o'clock position on the safe-end side of the No. 2 weld. The "B" loop circumferential indication with three pin-hole leaks was in the 12 o'clock position on the reducer side of the No. 2 weld. The pipe material at both of these locations is 4" nominal, Schedule 80 TP-304 Stainless Steel. The minimal wall thickness of these welds is 0.337".

General Electric Company performed a fracture mechanics analysis on the crack indications identified in both welds. The analyses showed that these indications would not violate the code required safety factor of three for at least 9,000 hours of full power service. Although a through-wall leak was present on the "B" loop, the weld was still within the allowable requirements since the ASME Code safety factor of three can be maintained with a through-wall crack of over 40% of the circumference in length.

General Electric Company recommended applying a 0.125" thick by 1.5" long overlay on each weld to assure leak-free operation for a minimum of 18 months of full power operation.

EVALUATION

The ultrasonic exmaination techniques used in the detection of the crack-like indications has been demonstrated to be capable of finding IGSCC cracking at Battelle Columbus Laboratories and the EPRI NDT Center in Charlotte, North Carolina. The technicians participating in the examination have been certified as being able to detect service induced IGSCC by an actual demonstration using cracked specimens in accordance with NUREG IE Bulletin 83-02 and NRC Generic Letter 84-11.

The overlay design applied to these welds is conservative since it was designed to accommodate a hypothetical through-wall crack, 360 degrees in circumference. The overlay weld as applied is a full structural overlay and meets all the requirements of NRC Generic Letter 84-11.

The welding procedures and welders used to perform the weld overlays were qualified to procedures which meet the requirements of the ASME Code Section IX 1980 Edition including the Winter 1981 Addenda. The welding procedure required an adequate cooling water flow inside the pipe which produced desired compressive stresses on the inside diameter of the pipe similar to those

produced by IHSI. Crack propagation into the weld metal is not likely to occur by IGSCC since the high ferrite weld material is not susceptible to IGSCC. The fracture mechanics analysis was done in accordance with Section XI, Appendix X to the ASME Code.

CONCLUSION

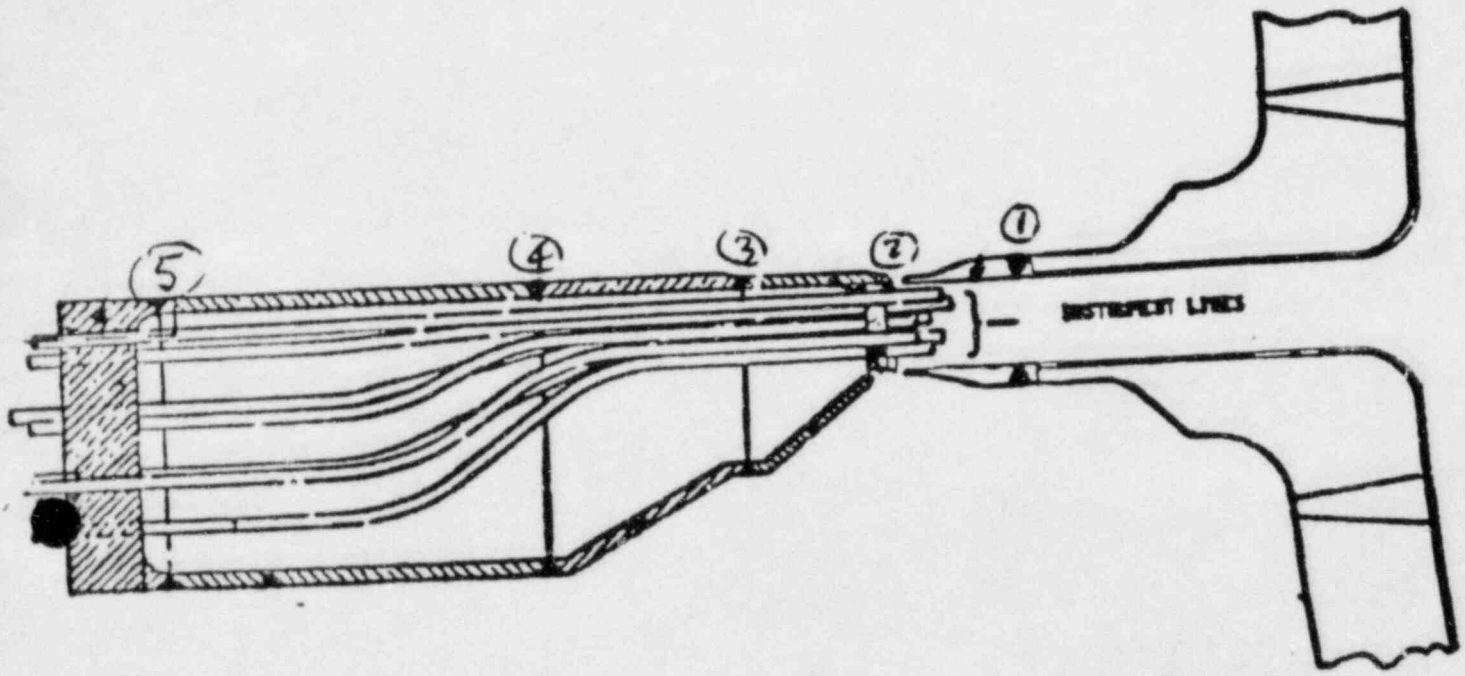
We have concluded, based on the considerations discussed above, that:

1. The Unit 3 ultrasonic examination was conducted by personnel trained in the detection of IGSCC cracking and certified by ultrasonic technique demonstration at Battelle Laboratories in Columbus, Ohio and at the EPRI NDT Center in Charlotte, North Carolina, in accordance with I.E. Bulletin 83-02 and NRC Generic Letter 84-11. The procedure and instrumentation used in this exmaination has been proven capable of detecting and characterizing intergranular stress corrosion cracking.

2. The Fracture Mechanics Analysis performed on the crack indications and the applied overlay temporary repairs possess an inherent safety factor of three and provide full structural margins in accordance with NRC Generic Letter 84-11.

3. The overwhelming laboratory and industry experience to date has shown that IGSCC will fail in a leak before break manner.

It can be concluded that Unit 3 of the Peach Bottom Atomic Power Station can operate at full-load power for at least 18 months with reasonable assurance that the health and safety of the public will not be endangered by oepration in the proposed manner.



JET PUMP INSTRUMENTATION

SEAL AND SAFE END

FIGURE 1