PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-5001

SHIELDS L. DALTROFF
VICE PRESIDENT
ELECTRIC PRODUCTION

July 23, 1984

Docket No. 50-278

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

SUBJECT: Supplement to Repair to the Jet Pump Instrumentation Penetrations

REFERENCE: Letter to D. G. Eisenhut from S. L. Daltroff dated June 20, 1984 (Repair to the Jet Pump Instrumentation Penetrations)

Dear Mr. Eisenhut:

This supplement to our above referenced letter of June 20, 1984, S. L. Daltroff (PECo) to D. G. Eisenhut, provides additional information relative to the Peach Bottom Atomic Power Station Unit 3 Reactor Pressure Vessel Jet Pump Instrument Nozzle Seals N8-A and N8-B.

The analysis performed by our consultant, General Electric Company, in Attachment B of our above referenced letter concluded that the repairs to the nozzle justified continued operation for 18 months. However, it is presently our intention to operate in this configuration only until the next refueling outage for Peach Bottom Unit 3, which is scheduled for March 30, 1985, at which time the permanent resolution will have been determined.

Philadelphia Electric Company is reviewing the Peach Bottom Unit 3 recirculation and reactor coolant pressure boundary (RCPB) piping in accordance with I.E. Bulletin 83-02, Generic Letter 84-11, and the NRC order issued September 1, 1983. The Unit 3 reactor pressure vessel jet pump instrument nozzle seals will be included in this review and will also be included as part of a report to be submitted to the NRC presenting the plans for inspection and/or modification of the recirculation and RCPB piping systems 3 months prior to the upcoming Unit 3 refueling outage as required by the September 1 1983 order.

DWNGS TO
PM: G. GEARS

A001
1/1

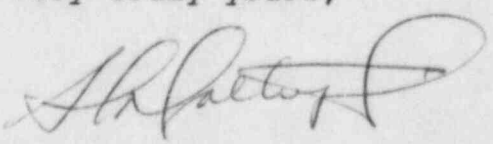
In accordance with our previously referenced letter of June 20, 1984, please find enclosed, as Attachment 1, a detailed sketch of the Reactor Pressure Vessel Jet Pump Instrument Nozzle Seals N8-A and N8-B configurations dated June 27, 1984 entitled, "Weld Overlay Design, Jet Pump Instrument Nozzle Safe End." Under separate cover, we will submit, as requested by the NRC staff at Bethesda, Maryland, during a June 18, 1984 meeting, a report addressing the instrument tube spacer plate effect on residual stresses following the weld overlay. This report will be dispatched the week of July 30, 1984 for delivery to your office by August 3, 1984.

As part of this letter, we wish to clarify the Safety Evaluation that was submitted as Attachment C to our June 20, 1984 letter.

The revisions to the Safety Evaluation are included as Attachment 2, "July 23, 1984 Revisions to Attachment C, Safety Evaluation for the Operation of Peach Bottom Atomic Power Station Unit 3", and are so indicated by a vertical bar in the margin of pages 1, 2 and 3.

Should you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,



Attachments

cc: Dr. T. E. Murley, Administrator
Mr. A. R. Blough, Site Inspector

ATTACHMENT 1

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNIT 3

DOCKET NO. 50-278

GE SKETCH 6/27/84

"WELD OVERLAY DESIGN, JET PUMP INSTRUMENT NOZZLE SAFE END"

DOCUMENT/ PAGE PULLED

ANO. 8407270028

NO. OF PAGES 1

REASON

☐ PAGE ILLEGIBLE
  ☐ HARD COPY FILED AT: PDR CF
  OTHER _____

☐ BETTER COPY REQUESTED ON __/__/__

☒ PAGE TOO LARGE TO FILM
  ☒ HARD COPY FILED AT: PDR (CF)
  OTHER _____

☐ FILMED ON APERTURE CARD NO 8407270028-01

ATTACHMENT 2

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNIT 3

DOCKET NO. 50-278

JULY 23, 1984 REVISIONS TO ATTACHMENT C
SAFETY EVALUATION FOR THE OPERATION OF
PEACH BOTTOM ATOMIC POWER STATION
UNIT 3

June 20, 1984
Revised: July 23, 1984

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

Attachment C
Docket No. 50-278
June 20, 1984
Revised: July 23, 1984

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, both liquid penetrant and 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.

Following completion of the weld overlays, both liquid penetrant and ultrasonic examinations were performed to verify their integrity.

Following this verification, a hydrostatic pressure test was performed in accordance with the requirements of ASME Section XI and our Peach Bottom Atomic Power Station In-Service Inspection Program.

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 of the eccentric reducer and the safe end at both locations are ASTM A182-F304 and ASTM A336-F8, respectively. Both components are 4" nominal, forged Schedule 80 TP-304 Stainless Steel. The minimal wall thickness of these piping components 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" wide full circumferential 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 the EPRI NDE Center in Charlotte, North Carolina. The technicians participating in the examination have been qualified 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:

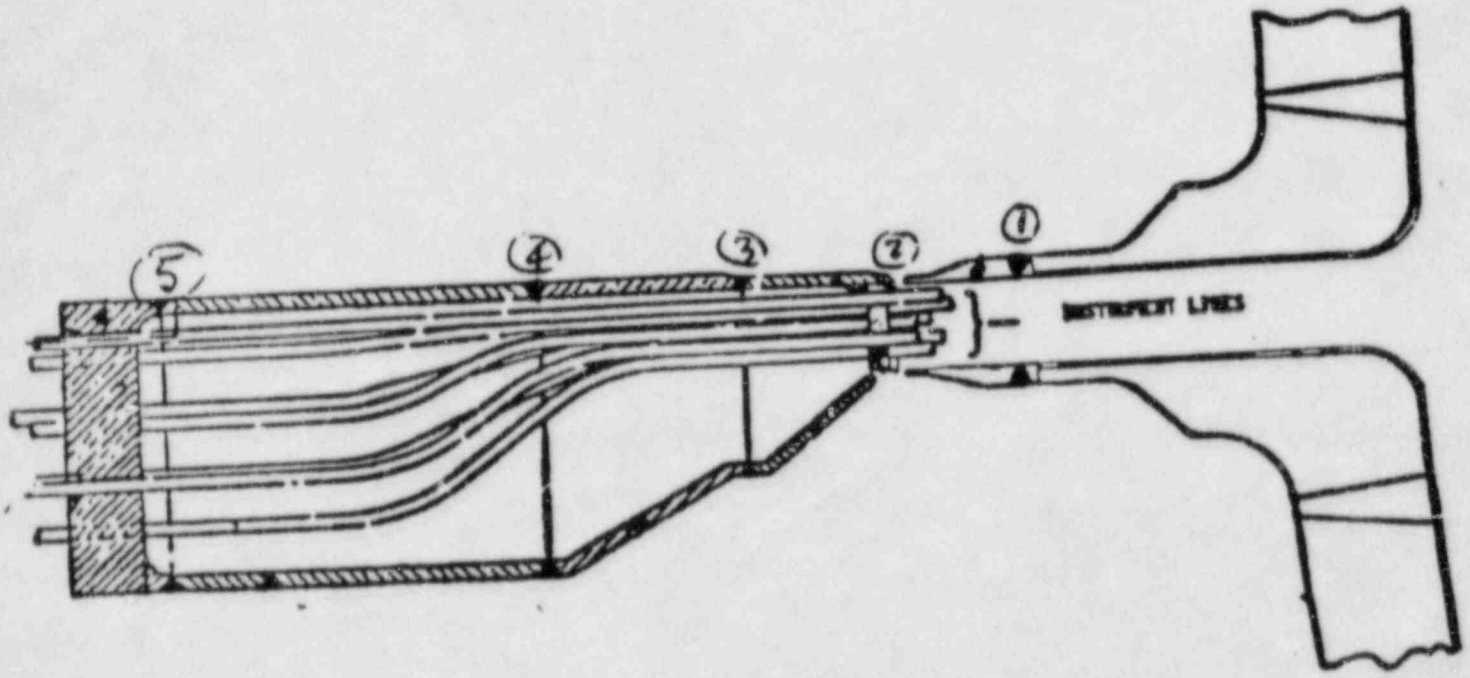
1. The Unit 3 ultrasonic examination was conducted by personnel trained in the detection of IGSCC cracking and qualified by ultrasonic technique demonstration at the EPRI NDE Center in Charlotte, North Carolina, in accordance with I.E. Bulletin 83-02 and NRC Generic Letter 84-11. The procedure and instrumentation 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 operation in the proposed manner.

Attachment C
Docket No. 50-278
June 20, 1984
Revised: July 23, 1984



JET PUMP INSTRUMENTATION

SEAL AND SAFE END

FIGURE 1