

PHILADELPHIA ELECTRIC COMPANY

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April 10, 1984

Docket No. 50-277
50-278

Dr. Thomas E. Murley, Administrator
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

SUBJECT: Supplement to Preliminary Report of the
Fracture Mechanics Analyses for Weld
Acceptability on the Weld Imperfections
Identified by Philadelphia Electric Company
in Licensee Event Report 2-83-24/1T

REFERENCE: Letter to Dr. T. E. Murley from
W. T. Ullrich dated March 30, 1984,
(Preliminary Report of the Fracture
Mechanics Analyses for Weld Acceptability)

Dear Dr. Murley:

This supplement to our above referenced letter of March 30, 1984, W. T. Ullrich (PECo) to Dr. T. E. Murley (NRC) provides the findings of densitometer readings performed to confirm the accuracy of the weld deficiency characteristics identified by a Philadelphia Electric Company NDE Level III. In addition, this supplement corrects an error contained in the attachment to the March 30, 1984, letter entitled, "Radiographic Indications and Fitness of Affected PBAPS Units 2 and 3 Systems for Continued Service (Preliminary Evaluation)."

As stated in our above referenced report of March 30, 1984, microdensitometer readings were performed February 14, 1984, utilizing a Perkin-Elmer microdensitometer. Unfortunately, it was determined following the readings that the Perkin-Elmer microdensitometer had not been recently calibrated. As a result, Philadelphia Electric Company re-performed the readings during the period of March 25, 1984, through April 2, 1984, with a Macbeth, Model Number TD-504, densitometer.

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These readings were performed on the radiographs of five welds that had previously been selected by PECO and the NRC (after NRC film review, per Inspection No. 50-277/84-05; 50-278/84-05, T. T. Martin, NRC, to S. L. Daltroff, PECO, dated February 17, 1984). The following is a summary of the radiographs which were examined:

<u>Weld No.</u>	<u>Material</u>	<u>System</u>
686-2-15A	6-inch Schedule 80 Pipe ASTM/A-312/ Type 316L Stainless Steel	Reactor Water Cleanup
389-2-1 389-2-11	12-inch Schedule 80 Pipe ASTM/A-316/ Type 304 Stainless Steel	Core Spray
655-2-12 655-2-39	6-inch Schedule 80 Pipe ASTM/A-106/ Grade B Carbon Steel	Scram Discharge Volume

The enclosed Attachment 1 to this submittal, "Table 1, Peach Bottom Atomic Station, Units 2 and 3, Weld Defect Depth Summary," lists the weld defect depths observed by the Philadelphia Electric Company NDE Level III, together with the calculated defect depths determined from readings taken with the Macbeth densitometer and the Perkin-Elmer microdensitometer. Also included within this table are the depths utilized by Stone and Webster Engineering Corporation in their preliminary fracture mechanics analyses. A review of this tabulation reveals that the defect characteristics observed by the Philadelphia Electric Company NDE Level III are conservative when compared with the Macbeth densitometer readings. Philadelphia Electric Company, based on these densitometer readings, has concluded that these findings validate the defect characteristics observed by the NDE Level III. In addition, as the preliminary fracture mechanics evaluation performed by Stone and Webster Engineering Corporation on the worst weld defects is based on the defect characteristics observed by the Philadelphia Electric Company NDE Level III, and as these weld defect characteristics have been confirmed to be conservative by densitometer readings on selected welds, Philadelphia Electric Company concludes that the decision to continue to operate Peach Bottom Atomic Power Station, as stated in our above referenced letter of March 30, 1984, is valid.

The enclosed Attachment 2 to this submittal is the amended page 3 to the report, "Radiographic Indications and Fitness of Affected PBAPS Units 2 and 3 Systems for Continued

Service (Preliminary Evaluation)." The location of the change is noted by the vertical bar in the margin of page 3, first paragraph of Section 3.2, Cyclic Crack Growth Analysis.

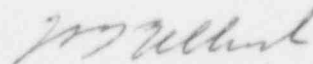
Due to an oversight, the depth of the indications was reported as "between 5 and 25 mils". This sentence should have stated, "The depth of the reported indications varied between 5 and 60 mils"..... because the depth of the indication on Weld No. 389-2-11, based on the Philadelphia Electric Company NDE Level III observation of radiographs of Weld No. 389-2-11 was 0.060 inches (60 mils).

The analysis performed and summarized in the Attachment to the March 30, 1984, letter (Dr. T. E. Murley, NRC, from W. T. Ullrich, PECO) is still considered valid by Philadelphia Electric Company because the analysis was performed assuming a crack depth of 1/16 inch (62.5 mils) and because the densitometer readings of the radiographs of Weld No. 389-2-11 demonstrate that the observed depth of the crack as reported by the NDE Level III for Weld 389-2-11 was conservative.

As we discussed in our above referenced March 30, 1984, letter, a final determination will be made by Philadelphia Electric Company upon receipt and review of the Stone and Webster Engineering Corporation final report on the fracture analyses for all twenty-three welds identified with weld imperfections.

Should you require additional information, please do not hesitate to contact us.

Very truly yours,



W. T. Ullrich
Superintendent
Nuclear Generation Division

Attachments

cc: A. R. Blough, Site Inspector
NRC Document Control Desk

TABLE 1
 PEACH BOTTOM ATOMIC POWER STATION
 UNITS 2 AND 3
 WELD DEFECT DEPTH SUMMARY

Weld No.	NDE Level III Observation	Macbeth Densitometer	Perkin-Elmer Microdensitometer	Preliminary Fracture Mechanics Analysis Depth
686-2-15A	0.050" Deep	0.0077" Deep	0.0076" Deep	0.125" Deep
389-2-1	0.025" Deep	0.027" Deep	0.038" Deep	0.0625" Deep
389-2-11	0.060" Deep	0.0157" Deep	0.039" Deep	0.0625" Deep
655-2-12	0.010" Deep 0.025" Deep	0.0146" Deep 0.0086" Deep	0.0072" Deep 0.0112" Deep	0.125" Deep 0.125" Deep
655-2-39	0.060" Deep	0.0104" Deep	0.0089" Deep	0.125" Deep

PHILADELPHIA ELECTRIC COMPANY
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

DOCKET NOS. 50-277 AND 50-278

EXCERPT FROM ATTACHMENT TO LETTER,
W. T. ULLRICH, PECO, TO DR. T. E. MURLEY, NRC
DATED MARCH 30, 1984

RADIOGRAPHIC INDICATIONS AND FITNESS OF AFFECTED
PBAPS UNITS 2 AND 3 SYSTEMS FOR CONTINUED SERVICE
(PRELIMINARY EVALUATION)

2.3 Acceptance Evaluation

The acceptance criterion of IWB-3612(a) of Ref. 1, i.e.,

$$K_I \leq K_{Ia} \sqrt{10}$$

was used as suggested in paragraph IWB-3620.

Here K_I is the maximum stress intensity factor and K_{Ia} is the crack arrest toughness given by Figure A4200-1 in Appendix A of Ref. 1.

Since the indications were reported in the weld metal, fracture toughness of the weld metal, SFA5.1 E7018, was used in the analysis.

The evaluation has determined that the above criterion is met even when the number of loading cycles is greater than 1000 (see Table 2).

3.0 CORE SPRAY (CS)

3.1 Stress Analysis

The Unit 2 CS contains five welds with eight indications. Four of these welds are at pipe/elbow girth butt welds and the fifth is girth butt weld adjacent to the RVP nozzle safe end (on the pipe side). The stresses for this latter weld are shown in Table 1. These stresses are determined based on Code permissible moments and in addition are determined from the loads taken from the PECO stress analysis.

The Unit 3 CS contains one weld with two indications. The weld is a pipe/elbow girth butt weld. The indications are such that for the purpose of this preliminary evaluation, the Unit 2 result suffices to cover Unit 3.

The CS system does not experience any operating transients (cyclic stress) due to CS operation. The CS system experiences RPV pressure cycling and free end expansion stresses caused by RPV expansion/contraction while the CS pipe remains essentially at ambient temperature.

3.2 Cyclic Crack Growth Analysis

The depth of the reported indications varied between 5 and 60 mils. An initial postulated crack depth of 1/16 in. was assumed in this analysis. The calculations were performed for stresses based on the stress analysis submitted by PECO and stresses based on the Code allowable values.

Crack growth rate data from Ref. 5 and high-temperature properties of 308 weld stainless steel are used in this analysis.