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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

Docket No. 50-387

MAY 0 8 1981

Pennsylvania Power and Light Company
ATTN: Mr. Norman W. Curtis
Vice President
Engineering and Construction - Nuclear
2 North Ninth Street
Allentown, Pennsylvania 18101

Gentlemen:

Your letter of January 8, 1981 concerning CRD housing to stub tube welds contained answers to questions and responses to requests contained in our letter of April 16, 1980 on this subject. It also included a report from your consultants describing PP&L's independent investigation to evaluate the adequacy of these welds. Based on our review of this submittal and our prior witnessing of the re-examination of selected welds, we have no further questions and consider this matter resolved.

As you know, the concern in this area was originally raised as the result of an allegation. The measures taken by this office to resolve this issue were accomplished through a series of letters, telephone calls and site visits/inspections. The enclosed "Summary of Actions Taken to Resolve Concerns About Adequacy of CRD Housing to Stub Tube Welds" was developed to summarize these efforts in one document.

Your cooperation with us is appreciated.

Sincerely,

Thomas T. Martin

Thomas T. Martin, Chief, Engineering
Inspection Branch, Division of
Engineering and Technical Inspection

Enclosure: As stated

cc w/encl:
A. R. Sabol, Manager, Nuclear Quality Assurance
W. E. Barberich, Licensing Engineer
H. W. Keiser, Superintendent of Plant

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SUMMARY OF ACTIONS TAKEN TO RESOLVE CONCERNS ABOUT ADEQUACY OF CRD HOUSING TO STUB TUBE WELDS

On January 31, 1980, the NRC Region I office received an allegation concerning "crack like" ultrasonic indications in the CRD housing to stub tube welds at Susquehanna, Unit 1.

The welds of concern are partial penetration, pressure boundary welds fabricated of inconel and stainless steel. The ASME Boiler and Pressure Vessel Code acceptance for this type of weld is predicated on surface examination using approved nondestructive examination methods. The alleged "crack like" indications were detected by an immersion ultrasonic longitudinal technique with a 0^{o} 2.25MHz transducer. The ultrasonic examination was intended as a supplementary examination to determine the amount of weld attachment and to assure that no axial leakage paths existed in the welds.

Based on examination and evaluation in accordance with General Electric Company (G.E.) procedure number 160A8515, Revision 0, the governing procedure for examination and evaluation of the welds, a G.E. Level III examiner accepted all the welds. This was not considered an ASME code acceptance examination. Code acceptance was based on the results of the liquid penetrant examination of the final weld surface.

During a subsequent routine inspection site visit the NRC obtained copies of selected ultrasonic examination data sheets and a copy of the aforementioned procedure. Liquid penetrant examination data were reviewed at the site.

Subsequent to NRC review of the above mentioned data, the alleger was contacted by telephone on March 17, 1980 to advise him of NRC follow-up on his allegation and to inquire about additional information if any was available. The alleger voiced his concern that the G.E. examiner failed to identify the cause of the indications found in the welds as well as concerns about the acceptability criteria as contained in the G.E. procedure.

The licensee was contacted by telephone on April 7, 1980 at which time the NRC understanding of the data was discussed and the licensee was made aware of the alleger's concerns. The telephone contact was followed by a letter dated April 16, 1980 which requested an engineering evaluation of the UT indications. As a result of these contacts, the licensee agreed to investigate the nature of the ultrasonic reflectors and to determine, if possible, their affect on weld quality.

Meetings on August 11, 1980 and on September 12, 1980, attended by NRC and licensee representatives, were held to discuss the status of the licensee's investigation and to advise the NRC of further actions planned by the licensee and licensee consultants, Dr. Warren F. Savage, Professor and Director of Welding Research, Materials Engineering Department, Rensselaer Polytechnic Institute, Troy, New York, and Mr. George Lockyer, Associate Professor of NDT Technology, Schenectady County Community College, Schenectady, New York, and certified NDT Level III, University of Lowell Research Foundation, Lowell, Massachusetts.

ENCLOSURE

The licensee's investigation included the following:

- Fabrication of a mockup weld using the same welding procedure used for the Unit 1 welds.

- Fabrication of a second mockup weld in which steps were taken to deliberately implant slag inclusions.

- In-process and final surface liquid penetrant examinations were performed with the same acceptance standards that applied to the Unit 1 welds.

- Ultrasonic examination and radiographic examination of the completed mockup welds.

- Sectioning of the welds to expose discontinuities and metallurgical evaluation of the polished and etched surfaces.

- Ultrasonic re-examination of Unit 1 welds as selected and witnessed by the NRC on October 28, 1980 (IE Report Number 387/80-28).

A final report of the investigation results and conclusions was submitted by Dr. Savage and Mr. Lockyer to the licensee by letter dated November 21, 1980. The licensee has provided the NRC with this report.

The authors of the report attribute the ultrasonic indications to the coarse grain dendritic structure of these welds. This conclusion is based on the metallurgical evaluation of sectioned mockup weld samples. This is evidenced by photographs of polished and etched samples taken from the mockup welds. This type structure is typical of inconel welds. NRC Region I staff has reviewed this report and agrees with the consultant's evaluation. Additionally, the ultrasonic re-examination of Unit 1 welds confirmed that the indications have no continuity, nor are they interconnected and are not typical of weld crack indications.

The licensee report addresses the NRC concerns and concludes that the CRD housing to stub tube welds will perform their intended function and are not cracked. This conclusion is supported by the metallurgical evidence provided in the report.

Based on the above, the NRC has no further questions concerning this item.